

BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION

NEW DELHI

PETITION NO ____ of ____

IN THE MATTER OF: -

Petition Under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 2023 and Chapter-3, Regulation-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for approval of tariff of **Simhadri Super Thermal power Station Stage-I (1000 MW)** for the period **from 01.04.2024 to 31.03.2029.**

NTPC Limited

NTPC Bhawan, Core-7, Scope Complex
7, Institutional Area, Lodhi Road
New Delhi-110 003

..... Petitioner

Vs

APEPDCL (A.P. Eastern Power Distribution
Company Ltd.), Vishakapatnam (A.P)
And others

..... Respondent(s)

Place: Noida

Petitioner

BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

PETITION NO.....

IN THE MATTER OF : Petition Under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 2023 and Chapter-3, Regulation-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for approval of tariff of **Simhadri Super Thermal power Station Stage-I (1000 MW)** for the period **from 01.04.2024 to 31.03.2029.**

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Executive Summary of the Petition (Summary of Issues)

Simhadri Super Thermal Power Station-I (1x 500 MW)

(In compliance with CERC notice dated 07.06.2024)

The major highlights of the Simhadri STPS St-I (1000 MW) Tariff petition are as follows:-

The present petition is being filed under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999 & 2023 and Chapter-3, Regulation-13 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for revision of tariff of Simhadri Super Thermal Power Station, Stage-I (1000 MW) (hereinafter referred to as **Simhadri-I**) for the period from 01.04.2024 to 31.03.2029 based on actual expenditures as on 31.03.2024 and projections from 01.04.2024 to 31.03.2029.

Simhadri-I is located in the outskirts of Visakhapatnam city in the Indian state of Andhra Pradesh and comprises of two units of 500 MW each with their respective COD's as 01.09.2002 & 01.03.2003. The power generated from Simhadri-I is being supplied to discoms of Andhra Pradesh and Telangana as per MoP allocation and respective PPAs.

The trued up tariff of Simhadri-I for the tariff period 2019-24 after the truing up exercise based on actual expenditures as on 31.03.2024 is filed by petitioner through a separate petition which is yet to be decided by Hon'ble CERC.

Additional Capital Expenditure: The projected Additional Capital Expenditure for the FY 2019-20, 2020-21, 2021-22, 2022-23 and 2023-24 are Rs 81.61 cr, Rs 67.85 cr, Rs 201.3 cr, Rs 12.15 cr and Rs 1.25 cr respectively amounting to total of Rs 364.16 crores during the 2024-29 period. The same has been depicted year wise in Form 9A of the Appendix-I along with applicable regulations and justification for the claims. It is humbly requested to approve the projected Additional Capital expenditure during the period of 2024-29.

It is submitted that petitioner in its Tariff petition no 417/GT/2020 for the tariff period 2019-24 had projected the capitalisation of FRP-IDCT. The Hon'ble Commission vide its order dtd 30.05.2023 in petition no. 417/GT/2020 had **allowed the same as below:**

"FRP-IDCT (Fibre Reinforced Plastic based Induce Draft Cooling Tower)

32. We notice that due to deteriorating condition/health of the NDCTs, it has become unsafe for the maintenance personnel working at site. Keeping in view that the replacement of the asset/equipment is on account of early deterioration of asset, the additional capital expenditure as claimed by the Petitioner is allowed under Regulation 25(2)(a) in exercise of the power under Regulation 76 of 2019 Tariff Regulations.

...

However, the work of FRP-IDCT could not be capitalised during the control period 2019-24 and the same now is projected to be capitalised during 2024-29 period. Accordingly, the same is projected in the respective tariff forms in the current tariff period. Hon'ble Commission may be pleased to allow the same.

O&M Expenses: Hon'ble Commission may please allow the claims of water charges, security expenses, ash transportation charges and Additional O&M Expenses for Coastal based Coal Stations for the instant station as projected by the Petitioner in Form 3A of Appendix-I. Further capital spares consumption shall be claimed at the time of truing up.

- **Additional O&M Expenses for Coastal based Coal Stations:** It is submitted that the norms of O&M expenses have been fixed same for all river based and coastal based stations. However, Simhadri Station being a coastal power station, the impact of corrosion & erosion on the structures is on higher side compared to the river based power plants. Accordingly, for the plant to operate at desired levels these structures are to be maintained / painted regularly with anti-corrosive treatment and thus incurring an additional O&M Expenses.

Auxiliary Power Consumption (APC): The Simhadri-I has natural draft cooling tower, the normative APC as per Tariff Regulations, 2019 is 5.75%. It is submitted that Simhadri being coastal plants requires additional APC due to usage of sea water in condenser. Therefore, APC of the Simhadri Station is higher than the norms provided by the CERC Tariff Regulations, 2019. The following factors contribute to increase in APC for power plants using sea water over the river water-based power plants.

- a. SP. Gravity of Seawater: (around 2.5% higher than that of River water) – Requires more pumping power
- b. Cycles of Concentration (COC): 1.5 (instead of 3.0 for river water-based systems): Requires more blow down and more make up.

The system wise additional pumping power (with sea water) required for a 2X500MW Station at 85 % load in comparison to river water-based stations is tabulated below:

	System	Additional Power (MW)
1	Cooling Water System	1.055
2	ASH HANDLING SYSTEM	0.0319
3	Auxiliary Cooling Water System	0.0102
	TOTAL	1.0971
	IMPACT ON APC (%) at 85% LF	0.13

Therefore, in view of the details above, it is humbly prayed that an additional APC of 0.13% may be provided to Simhadri-I for using sea water under the Regulation 76 (Power to relax) & Regulation 77 (Power to remove difficulty) of the CERC Tariff Regulations, 2019.

BEFORE THE HON'BLE CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

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IN THE MATTER OF : Petition Under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 2023 and Chapter-3, Regulation-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for approval of tariff of **Simhadri Super Thermal power Station Stage-I (1000 MW)** for the period from **01.04.2024 to 31.03.2029.**

AND

IN THE MATTER OF

Petitioner: : NTPC Ltd.
NTPC Bhawan
Core-7, Scope Complex
7, Institutional Area, Lodhi Road
New Delhi-110 003.

Respondents

1. Chairman & Managing Director
APEPDCL (A.P. Eastern Power Distribution Company Ltd.)
P&T Colony, Seethammadhara,
Vishakapatnam-503013
2. Chairman & Managing Director
APSPDCL (A.P. Southern Power Distribution Company Ltd)
Beside Srinivassakalyana Mandapam,

Tiruchanur Road, Kesavayana Gunta,
Tirupati- 517501

3. Chairman & Managing Director
APCPDCL (A.P. Central Power Distribution Company
Ltd)
Corporate Office, Beside Govt. Polytechnic, ITI Road,
VIJAYAWADA, Andhra Pradesh
4. Chairman & Managing Director
TSSPDCL (Telangana State Southern Power
Distribution Company Ltd)
Mint Compound, Corporate Office
Hyderabad – 500 063
5. Chairman & Managing Director
TSNPDCL (Telangana Northern Power
Distribution Company Ltd)
H.No. 2-5-31/2, Vidyut Bhavan
Nakkalagutta, Hanamkonda
Warangal – 506 001

The Petitioner humbly states that:

1. The Petitioner herein NTPC Ltd. (hereinafter referred to as '**Petitioner**' or '**NTPC**'), is a company incorporated under provisions of the Company Act, 1956 and a Government Company as defined under Section 2(45) of the Companies Act, 2013. Further, NTPC is a 'Generating Company' as defined under Section 2(28) of the Electricity Act, 2003.
2. In terms of Section 79(1)(a) of Electricity Act, 2003, the Hon'ble Commission has been vested with the functions to regulate the tariff of NTPC, being a Generating Company owned and controlled by the Central Government. The regulation of the tariff of NTPC is as provided under Section 79(1)(a) read with Section 61, 62 and

64 of the Electricity Act, 2003 and the Regulations notified by the Hon'ble Commission in exercise of powers under Section 178 read with Section 61 of the Electricity Act, 2003.

3. The Petitioner is having power stations/ projects at different regions and places in the country. Simhadri Super Thermal Power Station Stage-I (1000 MW) (hereinafter referred to as **Simhadri-I**) is one such station located in the State of Andhra Pradesh. The power generated from Simhadri-I is being supplied to the respondents herein above.
4. The Hon'ble Commission has notified the Central Electricity Regulatory Commission (Terms & Conditions of Tariff) Regulations, 2024 (hereinafter 'Tariff Regulations 2024') which came into force from 01.04.2024, specifying the terms & conditions and methodology of tariff determination for the period 01.04.2024 to 31.03.2029.
5. Regulation 9(2) of Tariff Regulations 2024 provides as follows:
"(2) In case of an existing generating station or unit thereof, or transmission system or element thereof, the application shall be made by the generating company or the transmission licensee, as the case may be, by 30.11.2024 , based on admitted capital cost including additional capital expenditure already admitted and incurred up to 31.3.2024 (either based on actual or projected additional capital expenditure) and estimated additional capital expenditure for the respective years of the tariff period 2024-29 along with the true up petition for the period 2019-24 in accordance with the CERC (Terms and Conditions of Tariff) Regulations, 2019."
In terms of above, the Petitioner is filing the present petition for determination of tariff for Simhadri-I for the period from 01.04.2024 to 31.03.2029 as per the Tariff Regulations 2024.
6. The tariff of the Simhadri-I for the tariff period 1.4.2019 to 31.3.2024 was determined by the Hon'ble Commission vide its order dated 24.03.2023 in Petition No. 417/GT/2020 in accordance with the CERC (Terms & Conditions of Tariff) Regulations 2019. The petitioner vide affidavit dated 22.11.2024 had filed a

separate true up petition for the period 01.04.2019 to 31.03.2024 for revision of tariff in line with the applicable provisions of Tariff Regulations 2019.

7. It is submitted that Hon'ble Commission vide order dated 24.03.2023 in Petition No. 417/GT/2020 has allowed a capital cost of Rs 3641.29 Cr as on 31.03.2024 based on the admitted projected capital expenditure for the 2019-24 period. However, the actual closing capital cost as on 31.03.2024 has been worked out in the foresaid true-up petition as Rs. 3676.62 Cr based on the actual expenditure after truing up exercise for the period 2019-24. Accordingly, the opening capital cost as on 01.04.2024 has been considered as Rs 3676.62 Cr in the instant petition. The Hon'ble Commission may be pleased to accordingly adopt this adjustment in the admitted capital cost as on 31.3.2024 and determine the tariff in the present petition for the period 2024-29.
8. The capital cost claimed in the instant petition is based on the opening capital cost as on 01.04.2024 considered as above and projected estimated capital expenditures claimed for the period 2024-29 under Regulation 19 and Regulation 24, 25 and 26 of the Tariff Regulations, 2024.
9. The Petitioner further respectfully submits that as per Regulation 36(1)(6) of the Tariff Regulations 2024, the water charges, security expenses, ash transportation expenses and capital spares consumed for thermal generating stations are to be allowed separately. The details in respect of water charges such as type of cooling water system, water consumption, rate of water charges as applicable for 2023-24 have been furnished below. Water charges claimed is estimated basis for 2024-25 and is escalated @5% year on year and same may be allowed in tariff for the 2024-29. In accordance with provision of the Regulations, the petitioner shall be furnishing the details of actual for the relevant year at the time of truing up and the same shall be subject to retrospective adjustment.

Description	Remarks
Type of Plant	Coal based station

Type of cooling water system	NDCT / IDCT (as detailed in subsequent paras)
Consumption of Water	Sea Water: 80665539 KL (for 2023-24) Sweet Water: 10432361 KL (for 2023-24)
Rate of Water charges	Sea water: 0.05 Rs/KL (for 2023-24) Sweet Water: 20.18 Rs/KL (for 2023-24) Other charges to be paid as per water agreement
Total Water Charges	Yearly details as per Form-3A of Appendix-I

10. Similarly, the Petitioner is claiming the security & ash transportation expenses based on the estimated expenses for the period 2024-29, the same shall be subject to retrospective adjustment based on actuals at the time of truing up. In respect of capital spares consumption, it is submitted that the same shall be claimed at the time of true-up in terms of the proviso to the Regulation 36(1)(6) based on actual consumption of spares during the period 2024-29.
11. However, it is submitted that the expenditure towards the ash transportation charges is recurring in nature and the Petitioner has been incurring ash transportation expenditure in its stations in the current tariff period also. In case the same is permitted to be recovered after the issuance of the tariff order for the period 2024-29, there will be additional liability on the beneficiary on account of the interest payment for the period till the time the tariff petitions for the period 2024-29 is decided. To avoid the interest payment liability of the beneficiaries, it is prayed that the petitioner may be allowed to recover/ pass on the ash transportation charges on a monthly basis subject to true-up at the end of the 2024-29 period.
12. The petitioner humbly submits that petition no. 227/MP/2024 has been filed by the petitioner concerning Ash Transport Expenditure for its stations which is under active consideration of this Hon'ble Commission and the outcome of the said petition will be applicable to the instant petition also.

13. The present petition is filed on the basis of norms specified in the Tariff Regulations 2024. It is submitted that the petitioner is in the process of installing the Emission Control Systems (ECS) in compliance of the Revised Emission Standards as notified by MOEF vide notification dated 07.12.2015 as amended. The FGD of Unit-1 of Simhadri-I has already been declared commercial operation wef 16.09.2024 and the FGD of Unit-2 of Simhadri-I is anticipated to be commissioned on 01.12.2024. Completion of these schemes in compliance of revised emission norms will affect the Station APC, Heat Rate, O&M expenses etc. The APC of the station is considered including the impact of FGD. In addition, the availability of the unit/ station would be also affected due to shutdown of the units for installation of ECS. The petitioner would be filing the details of the same in terms of the Regulation 29 of Tariff Regulations 2024.
14. **Additional capitalisation of FRP IDCT:** It is submitted that Simhadri-I being a coastal project was designed to use sea water for cooling. The NDCT originally envisaged is under operation since 2002 in Simhadri-I. In view of corrosive nature of sea water and coastal atmosphere, to protect and enhance the life of NDCT structure, 2000-micron PU coating was provided on the concrete surface which was coming in direct contact of sea water. However, despite all the protective measures taken by Petitioner, spalling of concrete of shell structure was observed in NDCT. Due to deteriorating condition/health of the NDCTs, it was also very unsafe for the personnel working for the maintenance. To assess the condition further assessment study was awarded to Central Building Research Institute (CBRI), Roorkee in October 2010. CBRI carried out the study and submitted its report. In its report, CBRI recommended the following
- A) Short term measures:
Civil repair and rehabilitation of Cooling Towers including associated Structures like columns, beams, Staircase etc;
 - B) Long term measures:
Electrochemical techniques such as cathodic protection (CP) was recommended by CBRI as a long-term measure.
However, CBRI also mentioned its apprehension in the report about effectiveness, service life, high cost involved and availability of skilled manpower.

Based on CBRI recommendation and apprehensions of the cost effectiveness of corrective measures, and for sustainable and safe operation of Simhadri-I units, it was decided to install new IDCT (Fibre Reinforced Plastic based) in place of repairing NDCT. The IDCT has been awarded by Petitioner and it is expected that the same for one unit shall be capitalized and come in operation during 2026-27 and IDCT for second unit shall be under operation during 2027-28. the work of FRP-IDCTs for Units-I and II of the generating station, was awarded to M/s FANS, having its principal place of business at NA kvetnici 17, 14000 Prague-4.

15. In this regard it is submitted that petitioner in its Tariff petition no 417/GT/2020 had projected the capitalisation of FRP-IDCT during 2020-21 for one unit and during 2021-22 during 2022-23. The Hon'ble Commission vide its order dtd 30.05.2023 in petition no. 417/GT/2020 had **allowed the same as below:**

"FRP-IDCT (Fibre Reinforced Plastic based Induce Draft Cooling Tower)

....

32. We notice that due to deteriorating condition/health of the NDCTs, it has become unsafe for the maintenance personnel working at site. Keeping in view that the replacement of the asset/equipment is on account of early deterioration of asset, the additional capital expenditure as claimed by the Petitioner is allowed under Regulation 25(2)(a) in exercise of the power under Regulation 76 of 2019 Tariff Regulations.

..."

However, the work of FRP-IDCT could not be capitalised during the control period 2019-24 and the same now is projected to be capitalised during 2024-29 period. Accordingly, the same is projected in the respective tariff forms in Appendix-I of the petition. It is further submitted that the decapitalisation values against the decapitalised assets of NDCTs shall be provided at the time of truing up.

Since the replacement of NDCT with IDCT is due to Force Majeure Condition, it is prayed that additional capitalization on account of IDCT may be allowed by Hon'ble Commission.

16. Additional APC for Simhadri Station using Sea Water

- (i) It is submitted that Simhadri being coastal plants requires additional APC of around 0.13% due to usage of sea water in condenser. Due to usage of sea water, APC of the Simhadri Station is higher than the norms provided by the CERC Tariff Regulations 2024. The following factors contribute to increase in APC for power plants using sea water over the river water-based power plants.
- Specific Gravity of Seawater: (around 2.5% higher than that of River water)
– Requires more pumping power
 - Cycles of Concentration (COC): 1.5 (instead of 3.0 for river water-based systems): Requires more blow down and more make up
- (ii) The system wise additional pumping power (with sea water) required for a 2X500MW Station at 85 % load in comparison to river water-based stations is tabulated below:

S. No	System	Additional Power (MW)
1	Cooling Water System	1.055
2	ASH HANDLING SYSTEM	0.0319
3	Auxiliary Cooling Water System	0.0102
	TOTAL	1.0971
	IMPACT ON APC (%) at 85% PLF	0.13

- (iii) It can be seen from the above table that the impact of using Sea water on Aux power Consumption for 1000 MW Station (2 X 500 MW) comes to around 0.13% at 85% loading. This impact on part loads shall be much more than as calculated above. For which, adequate allowance to be provided in Tariff norms.
- (iv) Further, the recent changes in regime of operation of power sector are influencing the actual AEC/APC of the power station due to
- Partial loading and lowering of technical minimum load
 - SCED implementation.

Under the above regime of Operation, Schedule Generation (SG) is being revised around 150 times in a day for Simhadri Station. Almost for the 50% of time Station is running at Tech min loads (55% to 65%). To cope up with the above changes in grid operation, it becomes necessary to keep all 4 CW pumps in operation per stage and also keep one additional mill in spinning at loads less than 85% to meet the immediate revisions of SG. The approximate impact comes to 0.1% in AEC/APC.

- (v) The petitioner is furnishing the year wise actual details of the APC for the last control period (i.e 2019-24) as below:

	Actual APC (in %)	Normative APC as per Tariff Regulations 2019 (In %)	APC Under Recovery (In %)
2019-20	6.4	5.75	0.65
2020-21	6.4	5.75	1.12
2021-22	5.95	5.75	0.20
2022-23	5.84	5.75	0.09
2023-24	6.03	5.75	0.28

- (vi) It is clear from the table above that for the period 2019-24, the normative APC was not sufficient. Now the Tariff Regulations 2024 has set more stringent APC norms than the previous Tariff Regulations as below:

Normative APC as per Tariff Regulations 2019 with Natural Draft Cooling Tower for 500 MW units (In %)	Normative APC as per Tariff Regulations 2024 Natural Draft Cooling Tower for 500 MW units (In %)
5.75	5.25

Therefore, the relaxation in the APC as prayed is more necessary for meeting the actual requirement of auxiliaries.

- (vii) It is submitted that although the APC of the station is increased due to usage of sea water, however it is pertinent to mention that cost of sea water is very much less than the cost of river water (around 332 times in 2019-20 to 402 times in 2023-24). The benefit of lower water charges is directly passed on to beneficiaries of station.

- (viii) Hence, in view of the details above and data as in above table, it is humbly prayed that an additional APC of 0.13% may be provided to Simhadri-I for using sea water under the Regulation 102 (Power to Relax) & Regulation 103 (Power to Remove Difficulty) of the CERC Tariff Regulations, 2024.

17. Additional O&M Expenses for Coastal based Coal Stations

- (i) It is submitted that the norms of O&M expenses have been fixed same for all river based and coastal based stations. However, Simhadri Station being a coastal power station, the impact of corrosion & erosion on the structures is on higher side compared to the river based power plants. Accordingly, for the plant to operate at desired levels these structures are to be maintained / painted regularly with anti corrosive treatment.
- (ii) Hence, there is need for additional care to avoid corrosion. To combat the same, proper care is being taken by increased periodical maintenance of the structures. Accordingly, the additional work of pipes & PU Coating, Paints & Painting works, steel sections, PHA Plates (Titanium), NDCTs repair, Sea Water jetty repair work etc was executed in Simhadri Station. The executed works were solely towards the damage caused by the severe corrosion due to adverse climate conditions at coastal region. This is increasing the Repair & Maintenance cost of the Simhadri Station.
- (iii) The total additional O&M expense for the Simhadri Station (2000 MW) is Rs 4676 lakhs. After apportionment between Stage-I & Stage-II based on installed capacity, it amounts to Rs 2338 lakhs. In accordance with the provision of the Regulations, the petitioner shall furnish the details of actual for the relevant year at the time of truing up and the same shall be subject to retrospective adjustment.
- (iv) It is therefore submitted that additional O&M expenses of Rs 2338 lakhs each year for the period 2024-29 may be allowed over and above the normative O&M expenses for coastal stations such as Simhadri-I under Regulation-102 (Power to Relax) of Hon'ble Commission Tariff Regulations, 2024.

- 18.** It is submitted that in terms of Regulation 60 (5) of the Tariff Regulations 2024, the Petitioner is required to furnish details qua providing the details of Landed Price &

Gross Calorific Value ("GCV") of coal in Form 15. It is further submitted that the Petitioner in terms of Regulation 40 of the Tariff Regulations 2019 was required to furnish the details for Landed Price & GCV of coal also as per Form 15 of the Tariff Regulations, 2019.

18.1. However, in so far as the present Petition is concerned, the Petitioner has prepared & submitted the data of coal as per Form 15 of the Tariff Regulations, 2019. The same is because of the following reasons: -

- a. This Hon'ble Commission had notified the Tariff Regulations, 2019 on 07.03.2019 and the same was in effect till 31.03.2024.
- b. The Petitioner being a diligent utility has been seamlessly providing the said data of coal in terms of the prescribed format (i.e. Form 15 of Annexure-I (Part I)) of the Tariff Regulations, 2019 to this Hon'ble Commission for computation of Interest on Working Capital.
- c. Thereafter, this Hon'ble Commission on 15.03.2024 notified the Tariff Regulations, 2024, wherein the format of Form 15 was changed/ amended by this Hon'ble Commission and a new format was placed in the Tariff Regulations 2024 in the month of June'2024.
- d. By virtue of the said change, the Petitioner has been obligated to furnish the data of coal for its existing plants month wise for the preceding 12 months i.e. for FY 2023-24 for computation of Interest on Working Capital.

18.2. It is humbly submitted that by virtue of the Tariff Regulations, 2024, this Hon'ble Commission has added a new format/ revised the format of Form-15 which has not prescribed in the past Tariff Regulations i.e. of 2019. Hence, it is only now (in the Tariff Regulations 2024) that the Petitioner has been obligated to furnish the data of coal as per the new format of Form-15.

18.3. It is respectfully submitted that since the format for Form 15 has been changed in Tariff Regulations, 2024 and was notified in the month of June'2024, the Petitioner could not have been aware about the said changes earlier, hence the Petitioner did not maintain the data required in new format of Form 15 of Tariff Regulations, 2024.

18.4. Therefore, this Hon'ble Commission may kindly exempt the Petitioner from furnishing the data of coal in terms of new format of Form 15 of the Tariff

Regulations, 2024 & may be allowed to furnish the details of coal for FY 2023-24 in terms of the prescribed format of Form-15 of the Tariff Regulations, 2019.

18.5. In light of the above submissions, it may kindly be noted that no prejudice shall be caused to any party if the Petitioner is allowed for providing the details of Landed Price & GCV of coal to this Hon'ble Commission in terms of Form 15 of the Tariff Regulations, 2019 as the value of Landed Price & GCV of coal will remain unaffected.

19. The Petitioner humbly submits that the pay/wage revision for the employees of the Petitioner will be due wef 01.01.2027. Further, the wage/pay revision of CISF and Kendriya Vidyalaya employees will also be due for revision during the tariff period 2024-29. Regulation-36(1)(8) of CERC (Terms & Conditions of Tariff) Regulations-2024 provides as below:

"In the case of a generating company owned by the Central or State Government, the impact on account of implementation of wage or pay revision shall be allowed at the time of truing up of tariff."

In accordance with the above said regulation, the Petitioner shall approach the Hon'ble Commission for allowing the impact of Pay/wage revision of employees of the Petitioner i.e. NTPC Limited, CISF and Kendriya Vidyalaya (wherever applicable) as additional O&M at the time of truing-up of tariff for the control period 2024-29. Hon'ble Commission may be pleased to consider the impact of wage/pay revision as an additional impact on O&M and allow the same as additional O&M over and above the normative O&M.

20. It is submitted the Petitioner has served the copy of the Petition on to the Respondents mentioned herein above and has posted the Petition on the company website i.e. www.ntpc.co.in
21. The petitioner has accordingly calculated the tariff for 2024-29 period based on the above and the same is enclosed as **Appendix-I** to this petition.

22. In accordance with the 'Conduct of Business Regulations 2023' of the Hon'ble Commission, the Petitioner shall publish a notice about such filing in at least two daily leading digital newspapers one in English language and another in any of the Indian languages, having wide circulation in each of the States and Union Territories where the beneficiaries are situated, as per Form 14 appended to these regulations. Subsequently, the Petitioner shall submit the proof of publications as soft copies of the publications under an affidavit through the e-filing portal of the Hon'ble Commission within one week from the date of publication. Further, the Petitioner shall also submit the detail of expenses incurred for publication of the notice along with the prayer for recovery of Publication Expenses as per Regulation-94 of CERC Tariff Regulations 2024.
23. It is submitted that the Petitioner has already paid the requisite filing fee vide Transaction ID: 37c586eba62158b7b321 on 24.04.2024 for the year 2024-25 and the details of the same have been duly furnished to the Hon'ble Commission vide email dtd. 29.04.2024. For the subsequent years, it shall be paid as per the provisions of the CERC (Payment of Fees) Regulations, 2012 as amended. Hon'ble Commission may be pleased to take the above into consideration and allow the recovery of filing fee for the instant station as per Regulation-94 of CERC Tariff Regulations 2024.
24. It is submitted that the petitioner is filing this tariff petition subject to the outcome of its various appeals/ petitions pending before different courts. Besides, the petitions filed by NTPC for determination of capital base as on 31.3.2019 through true-up exercise are pending before the Hon'ble Commission and would take some time. The Petitioner, therefore, reserves its right to amend the tariff petition as per the outcome in such appeals/ petitions, if required.

Prayers

In the light of the above submissions, the Petitioner, therefore, prays that the Hon'ble Commission may be pleased to:

- i) Approve tariff of Simhadri-I for the tariff period 01.04.2024 to 31.03.2029.

- ii) Allow the recovery of filing fees as & when paid to the Hon'ble Commission and publication expenses from the beneficiaries.
- iii) Allow reimbursement of Ash Transportation Charges directly from the beneficiaries on monthly basis, subject to true up.
- iv) Allow reimbursement of additional O&M expenses for Coastal based Coal Stations
- v) Allow the relaxation in norms for Auxiliary Power Consumption.
- vi) Pass any other order as it may deem fit in the circumstances mentioned above.

Petitioner

Noida

BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION

NEW DELHI

PETITION NO.....

IN THE MATTER OF: -

Petition Under Section 62 and 79(1)(a) of the Electricity Act, 2003 read with Chapter-III of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 2023 and Chapter-3, Regulation-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for approval of tariff of **Simhadri Super Thermal power Station Stage-I (1000 MW)** for the period from 01.04.2024 to 31.03.2029

NTPC Ltd.

NTPC Bhawan, Core-7, Scope Complex

..... Petitioner

7, Institutional Area, Lodhi Road

New Delhi-110 003

Vs

Chairman & Managing Director

APEPDCL (A.P. Eastern Power Distribution

Company Ltd.)

.... Respondent (s)

P&T Colony, Vishakapatnam-503013

And Others

AFFIDAVIT



I, Umasankar Mohanty, son of Sh. B K Mohanty, aged about 58 years, Additional General Manager (Commercial), R/o D-109, Shaurya, NTPC Township, Sector-33, Noida (U.P) do hereby solemnly affirm and state as follows:

1. That the deponent is the Additional General Manager (Commercial) of the Petitioner NTPC Limited and is well conversant with the facts and the circumstances of the case and therefore competent to swear this affidavit.



2. That the accompanying Petition under Section 62 and 79 (1) (a) of the Electricity Act, 2003, has been filed by my authorized representative under my instruction and the contents of the same are true and correct to the best of my knowledge and belief.
3. That the contents of Para No..... to..... as mentioned in the Petition are true and correct based on my personal knowledge, belief and records maintained in the office.
4. That the annexures annexed to the Petition are correct and true copies of the respective originals.
5. That the Deponent has not filed any other Petition or Appeal before any other forum or court of law with respect to the subject matter of the dispute.


(DEPONENT)

उमशंकर मोहंती / Umashankar Mohanty
अपेक्षित सहायक प्रबंधक (व्यवसायिक)
Addl. General Manager (Commercial)
एनटीपीसी लिमिटेड / NTPC Limited


VERIFICATION

Verified at Noida on this 26th day of November 2024, that the contents of my above noted affidavit are true and correct to my knowledge and no part of it is false and nothing material has been concealed therefrom.


(DEPONENT)

उमशंकर मोहंती / Umashankar Mohanty
अपेक्षित सहायक प्रबंधक (व्यवसायिक)
Addl. General Manager (Commercial)
एनटीपीसी लिमिटेड / NTPC Limited



ATTESTED

YOGENDRA SINGH
NOTARY NOIDA
G B NAGAR (U.P.) INDIA

12 6 NOV 2024

TARIFF FILING FORMS (THERMAL)

FOR DETERMINATION OF TARIFF

FOR

Simhadri Super Thermal power Station Stage-I

(From 01.04.2024 to 31.03.2029)

PART-I

APPENDIX-I

Checklist of Main Tariff Forms and other information for tariff filing for Thermal Stations

Form No.	Title of Tariff Filing Forms (Thermal)	Tick
FORM- 1	Summary of Tariff	✓
FORM-1 (I)	Statement showing claimed capital cost	✓
FORM-1 (II)	Statement showing Return on Equity	✓
FORM-2	Plant Characteristics	✓
FORM-3	Normative parameters considered for tariff computations	✓
FORM-3A **	Statement showing O&M Expenses	✓
FORM-3B**	Statement of Special Allowance	✓
FORM- 4	Details of Foreign loans	✓
FORM- 4A	Details of Foreign Equity	NA
FORM-5	Abstract of Admitted Capital Cost for the existing Projects	✓
FORM-5A **	Abstract of Claimed Capital Cost for the existing Projects	✓
FORM- 6	Financial Package upto COD	NA
FORM- 7	Details of Project Specific Loans	✓
FORM- 8	Details of Allocation of corporate loans to various projects	✓
FORM-9A**	Summary of Statement of Additional Capitalisation claimed during the period	✓
FORM-9 ##	Statement of Additional Capitalisation after COD	✓
FORM- 10	Financing of Additional Capitalisation	✓
FORM- 11	Calculation of Depreciation on original project cost	NA
FORM- 12	Statement of Depreciation	✓
FORM- 13	Calculation of Weighted Average Rate of Interest on Actual Loans	✓
FORM- 14	Draw Down Schedule for Calculation of IDC & Financing Charges	NA
FORM- 15	Details of Fuel for Computation of Energy Charges	✓
FORM- 15A	Details of Secondary Fuel for Computation of Energy Charges	✓
FORM- 15B	Computation of Energy Charges	✓
FORM- 16	Details of Limestone for Computation of Energy Charge Rate	NA
FORM-17	Details of Capital Spares	***
FORM- 18	Non-Tariff Income	***
FORM-19	Details of Water Charges	***
FORM-20	Details of Statutory Charges	***

Provided yearwise for the period 2019-24

** Additional Forms

*** Shall be provided at the time of true up

PART-I

List of Supporting Forms / documents for tariff filing for Thermal Stations

Form No.	Title of Tariff Filing Forms (Thermal)	Tick
FORM-A	Abstract of Capital Cost Estimates	NA
FORM-B	Break-up of Capital Cost for Coal/Lignite based projects	NA
FORM-C	Break-up of Capital Cost for Gas/Liquid fuel based Projects	NA
FORM-D	Break-up of Construction/Supply/Service packages	NA
FORM-E	Details of variables, parameters, optional package etc. for New Project	NA
FORM-F	Details of cost over run	NA
FORM-G	Details of time over run	NA
FORM-H	Statement of Additional Capitalisation during end of the useful life	✓
FORM-I	Details of Assets De-capitalised during the period	***
FORM-J	Reconciliation of Capitalisation claimed vis-à-vis books of accounts	***
FORM-K	Statement showing details of items/assets/works claimed under Exclusions	***
FORM-L	Statement of Capital cost	✓
FORM-M	Statement of Capital Works in Progress	✓
FORM-N	Calculation of Interest on Normative Loan	✓
FORM-O	Calculation of Interest on Working Capital	✓
FORM-P	Incidental Expenditure up to SCOD and up to Actual COD	NA
FORM-Q	Expenditure under different packages up to SCOD and up to Actual COD	NA
FORM-R	Actual cash expenditure	NA
FORM-S	Statement of Liability flow	✓
FORM-T	Summary of issues involved in the petition	✓

*** Shall be provided at the time of true up

List of supporting documents for tariff filing for Thermal Stations		
S. No.	Information / Document	Tick
1	Certificate of incorporation, Certificate for Commencement of Business, Memorandum of Association, & Articles of Association (For New Station setup by a company making tariff application for the first time to CERC)	NA
2	A. Station wise and Corporate audited Balance Sheet and Profit & Loss Accounts with all the Schedules & annexures on COD of the Station for the new station & for the relevant years. B. Station wise and Corporate audited Balance Sheet and Profit & Loss Accounts with all the Schedules & annexures for the existing station for relevant years.	*
3	Copies of relevant loan Agreements	NA
4	Copies of the approval of Competent Authority for the Capital Cost and Financial package.	NA
5	Copies of the Equity participation agreements and necessary approval for the foreign equity.	NA
6	Copies of the BPSA/PPA with the beneficiaries, if any	NA
7	Detailed note giving reasons of cost and time over run, if applicable. List of supporting documents to be submitted: a. Detailed Project Report b. CPM Analysis c. PERT Chart and Bar Chart d. Justification for cost and time Overrun	NA
8	Generating Company shall submit copy of Cost Audit Report along with cost accounting records, cost details, statements, schedules etc. for the Generating Unit wise /stage wise/Station wise/ and subsequently consolidated at Company level as submitted to the Govt. of India for first two years i.e. 2019-20 and 2020-21 at the time of mid-term true-up in 2021-22 and for balance period of tariff period 2019-24 at the time of final true-up in 2024-25. In case of initial tariff filing the latest available Cost Audit Report should be furnished.	*
9	Any other relevant information. (Please specify)	
10	Reconciliation with Balance sheet of any actual additional capitalization and amongst stages of a generating station	*
11	BBMB is maintaining the records as per the relevant applicable Acts. Formats specified herein may not be suitable to the available information with BBMB. BBMB may modify the formats suitably as per available information to them for submission of required information for tariff purpose.	NA
*	Information shall be provided at the time of true up	
Note	1: Electronic copy of the petition (in words format) and detailed calculation as per these formats (in excel format) and any other information submitted has to be uploaded in the e-filing website and shall also be furnished in pen drive/flash drive.	

**PART-I
FORM- 1**

Summary of Tariff

Name of the Petitioner:

NTPC Limited

Name of the Generating Station:

Simhadri Super Thermal power Station Stage-I

Place (Region/District/State):

Southern Region/ Visakhapatnam/ Andhra Pradesh

Amount in Rs. Lakhs

S. No.	Particulars	Unit	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8	9
1.1	Depreciation	Rs Lakh	12,172.64	12,598.28	13,128.92	14,166.37	10,997.40	2,798.80
1.2	Interest on Loan	Rs Lakh	980.69	710.31	428.01	272.96	142.37	-
1.3	Return on Equity	Rs Lakh	20,678.60	20,935.23	21,343.98	22,083.56	22,671.49	22,703.52
1.4	Interest on Working Capital	Rs Lakh	11,813.07	11,553.62	11,612.68	11,690.30	11,741.52	11,721.18
1.5	O&M Expenses	Rs Lakh	43,815.33	40153.15	41156.46	42245.25	44181.52	46215.53
1.6	Special Allowance (If applicable)	Rs Lakh					3,583.33	10,750.00
	Total	Rs Lakh	89460.32	85950.60	87670.04	90458.43	93317.64	94189.02
2.1	Landed Fuel Cost (coal/gas/RLNG/ liquid)	Rs/Ton		3748				
	(%) of Fuel Quantity	(%)		100				
2.2	Landed Fuel Cost Imported Coal			NA				
	(%) of Fuel Quantity							
2.3	Landed Fuel Cost (coal/gas /RLNG/liquid) other than FSA	Rs/Ton		NA				
	(%) of Fuel Quantity	(%)						
2.4	Landed Fuel Cost Imported Coal other than FSA			NA				
	(%) of Fuel Quantity							
2.5	Secondary fuel oil cost	Rs/Unit	0.046	0.042	0.042	0.042	0.042	0.042
2.6	Energy Charge Rate ex-bus (Paise/kWh)	Rs/Unit	4.294	4.086	4.086	4.086	4.086	4.086

(Petitioner)

PART-I
FORM- 1(I)

Name of the Petitioner: NTPC Limited
Name of the Generating Station: Simhadri Super Thermal power Station Stage-I

Amount in Rs. Lakhs

Statement showing claimed capital cost – (A+B)

S. No.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7
1	Opening Capital Cost	3,67,662.44	3,75,823.44	3,82,608.44	4,02,738.44	4,03,953.44
2	Add: Addition during the year/period	8,161.00	6,785.00	20,130.00	1,215.00	125.00
3	Less: De-capitalisation during the year/period	-	-	-	-	-
4	Less: Reversal during the year / period	-	-	-	-	-
5	Add: Discharges during the year/ period	-	-	-	-	-
6	Closing Capital Cost	3,75,823.44	3,82,608.44	4,02,738.44	4,03,953.44	4,04,078.44
7	Average Capital Cost	3,71,742.94	3,79,215.94	3,92,673.44	4,03,345.94	4,04,015.94

Statement showing claimed capital cost eligible for RoE at normal rate (A)

S. No.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7
1	Opening Capital Cost	366932.05	374748.05	379853.05	398593.05	398993.05
2	Add: Addition during the year / period	7816.00	5105.00	18740.00	400.00	0.00
3	Less: De-capitalisation during the year / period	0.00	0.00	0.00	0.00	0.00
4	Less: Reversal during the year / period	0.00	0.00	0.00	0.00	0.00
5	Add: Discharges during the year / period	0.00	0.00	0.00	0.00	0.00
6	Closing Capital Cost	374748.05	379853.05	398593.05	398993.05	398993.05
7	Average Capital Cost	370840.05	377300.55	389223.05	398793.05	398993.05

**Statement showing claimed capital cost eligible for RoE
at one year MCLR + 350 bps subject to ceiling of 14.00% (B)**

S. No.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7
1	Opening Capital Cost	730.39	1075.39	2755.39	4145.39	4960.39
2	Add: Addition during the year / period	345.00	1680.00	1390.00	815.00	125.00
3	Less: De-capitalisation during the year / period	0.00	0.00	0.00	0.00	0.00
4	Less: Reversal during the year / period	0.00	0.00	0.00	0.00	0.00
5	Add: Discharges during the year / period	0.00	0.00	0.00	0.00	0.00
6	Closing Capital Cost	1075.39	2755.39	4145.39	4960.39	5085.39
7	Average Capital Cost	902.89	1915.39	3450.39	4552.89	5022.89

(Petitioner)

Name of the Petitioner: NTPC Limited
Name of the Generating Station: Simhadri Super Thermal power Station Stage-I
Statement showing Return on Equity at Normal Rate

Amount in Rs. Lakhs

S. No.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7
	Return on Equity					
1	Gross Opening Equity (Normal)	1,10,079.61	1,12,424.41	1,13,955.91	1,19,577.91	1,19,697.9078
2	Less: Adjustment in Opening Equity	-				
3	Adjustment during the year		0.00	0.00	0.00	0.00
4	Net Opening Equity (Normal)	1,10,079.61	1,12,424.41	1,13,955.91	1,19,577.91	1,19,697.91
5	Add: Increase in equity due to addition during the year / period	2344.80	1531.50	5622.00	120.00	0.00
7	Less: Decrease due to De-capitalisation during the year / period	0.00	0.00	0.00	0.00	0.00
8	Less: Decrease due to reversal during the year / period	0.00	0.00	0.00	0.00	0.00
9	Add: Increase due to discharges during the year / period	0.00	0.00	0.00	0.00	0.00
10	Net closing Equity (Normal)	1,12,424.41	1,13,955.91	1,19,577.91	1,19,697.91	1,19,697.91
11	Average Equity (Normal)	1,11,252.01	1,13,190.16	1,16,766.91	1,19,637.91	1,19,697.91
12	Rate of ROE (%)	18.782	18.782	18.782	18.782	18.782
13	Total ROE	20,895.35	21,259.38	21,931.16	22,470.39	22,481.66

(Petitioner)

PART-I
FORM- 1(IIB)

Name of the Petitioner:

NTPC Limited

Name of the Generating Station:

Simhadri Super Thermal power Station Stage-I

Statement showing Return on Equity linked to SBI MCLR

Amount in Rs. Lakhs

S. No.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7
1	Gross Opening Equity (Normal)	219.12	322.62	826.62	1243.62	1488.12
2	Less: Adjustment in Opening Equity	0.00	0.00	0.00	0.00	0.00
3	Adjustment during the year	0.00	0.00	0.00	0.00	0.00
4	Net Opening Equity (Normal)	219.12	322.62	826.62	1243.62	1488.12
5	Add: Increase in equity due to addition during the year / period	103.50	504.00	417.00	244.50	37.50
7	Less: Decrease due to De-capitalisation during the year / period	0.00	0.00	0.00	0.00	0.00
8	Less: Decrease due to reversal during the year / period	0.00	0.00	0.00	0.00	0.00
9	Add: Increase due to discharges during the year / period	0.00	0.00	0.00	0.00	0.00
10	Net closing Equity (Normal)	322.62	826.62	1243.62	1488.12	1525.62
11	Average Equity (Normal)	270.87	574.62	1035.12	1365.87	1506.87
12	Rate of ROE (%)	14.723	14.723	14.723	14.723	14.723
13	Total ROE	39.88	84.60	152.40	201.10	221.86

(Petitioner)

Plant Characteristics

Name of the Petitioner	NTPC Ltd	
Name of the Generating Station	Simhadri Super Thermal power Project, Stage-I	
Unit(s)/Block(s)/Parameters	Unit-I	Unit-II
Installed Capacity (MW)	500	500
Schedule COD as per Investment Approval	Oct'2002	July'2003
Actual COD /Date of Taken Over (as applicable)	01.09.2002	01.03.2003
Pit Head or Non Pit Head or Integrated Mine	Non pit Head	Non pit Head
Distance from Integrated mine (kms), if applicable		
Name of the Boiler Manufacture	BHEL	BHEL
Name of Turbine Generator Manufacture	BHEL	BHEL
Main Steams Pressure at Turbine inlet (kg/Cm2) abs1.	Not Applicable	
Main Steam Temperature at Turbine inlet (oC) 1		
Reheat Steam Pressure at Turbine inlet (kg/Cm2) 1		
Reheat Steam Temperature at Turbine inlet (oC)		
Main Steam flow at Turbine inlet under MCR condition (tons /hr)		
Main Steam flow at Turbine inlet under VVO condition (tons /hr)2		
Unit Gross electrical output under MCR /Rated condition (MW)2		
Unit Gross electrical output under VVO condition (MW)2		
Guaranteed Design Gross Turbine Cycle HeatRate (kCal/kWh)3		
Conditions on which design turbine cycle heat rate guaranteed		
% MCR		
% Makeup Water Consumption		
Design Capacity of Make up Water System (Cu.m/hr)		
Design Capacity of Inlet Cooling System (cu.m/hr)(cooling tower)		
Design Cooling Water Temperature (oC)		
Back Pressure		
Steam flow at super heater outlet under BMCR condition (tons/hr)		

Steam Pressure at super heater outlet under BMCR condition) (kg/Cm2)(abs)		
Steam Temperature at super heater outlet under BMCR condition (OC)		
Steam Temperature at Reheater outlet at BMCR condition (OC)		
Design / Guaranteed Boiler Efficiency (%)4		
Design Fuel with and without Blending of Domestic/Imported Coal TPH		
Type of Cooling Tower	NOCT/DCCT	
Type of cooling system 5	sea water cooled closed circuit cooling with make up	
Type of Boiler Feed Pump 6	2nos Steam Driven and 1no Motor driven in each unit	
Type of Coal Mill		
Fuel Details7		
-Primary Fuel	Coal	
-Secondary Fuel	LDO	
-Alternate Fuels		
Types of SOX control system	FGD	FGD
Types of NOX control system		
Details of SPM control system		
Special Features/Site Specific Features - 8	Vicinity to sea and sea water make up pump house on jetty at sea.	
Special Technological Features : 9	Sea water for Condenser cooling system	
Environmental Regulation related features : 10	ESP	
	FGD under Implementation	
Any other special features		
1: At Turbine MCR condition.		
2: with 0% (Nil) make up and design Cooling water temperature		
3: at TMCR output based on gross generation, 0% (Nil) makeup and design Cooling water temperature.		
4: With Performance coal based on Higher Heating Value (HHV) of fuel and at BMCR) out put		
5: Closed circuit cooling, once through cooling, sea cooling, natural draft cooling, induced draft cooling etc.		
6: Motor driven, Steam turbine driven etc.		
7: Coal or natural gas or Naptha or lignite etc.		
8: Any site specific feature such as Merry-Go-Round, Vicinity to sea, Intake /makeup water systems etc. scrubbers etc. Specify all such features		
9: Any Special Technological feature like Advanced class FA technology in Gas Turbines, etc.		
10: Environmental Regulation related features like FGD, ESP etc.,		

(Petitioner)

Normative parameters considered for tariff computations

Name of the Petitioner:

NTPC Limited

Name of the Generating Station:

Simhadri Super Thermal power Station Stage-I

(Year Ending March)

Particulars	Unit	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
Base Rate of Return on Equity \$\$	%	15.50	15.50	15.50	15.50	15.50	15.50
Base Rate of Return on Equity on Add. Capitalization** \$\$	%	-	14.723	14.723	14.723	14.723	14.723
Effective Tax Rate	%	17.4720	17.4720	17.4720	17.4720	17.4720	17.4720
Target Availability							
Peak Hours	%	85.00	85.00	85.00	85.00	85.00	85.00
Off-Peak Hours	%	85.00	85.00	85.00	85.00	85.00	85.00
5-Average Monthly Frequency Response Performance5	0-1						
Auxiliary Energy Consumption ***	%	5.88	5.250	5.250	5.250	5.250	5.250
Gross Station Heat Rate	kCal/kWh	2390.00	2375.00	2375.00	2375.00	2375.00	2375.00
Specific Fuel Oil Consumption	ml/kWh	0.50	0.50	0.50	0.50	0.50	0.50
Cost of Coal/Lignite for WC1	in Days	50	50	50	50	50	50
Cost of Main Secondary Fuel Oil for WC1	in Months	2	2	2	2	2	2
Fuel Cost for WC2	in Months						
Liquid Fuel Stock for WC2	in Months						
O&M Expenses	Rs lakh/MW	25.84	27.17	28.6	30.1	31.68	33.34
Maintenance Spares for WC	% of O&M	20.00	20.00	20.00	20.00	20.00	20.00
Receivables for WC	in Days	45	45	45	45	45	45
Storage capacity of Primary fuel *	MT	825000	825000	825000	825000	825000	825000
SBI 1 Year MCLR plus 350 basis point3	%	12.00	11.90	11.90	11.90	11.90	11.90
Blending ratio of domestic coal/imported coal							
Norms for consumption of reagent							
Specific Limestone consumption for Wet Limestone FGD							
Specific Limestone consumption for Lime Spray Dryer or Semi-dry FGD							
					NA		

Specific consumption of sodium bicarbonate							NA
Specific Limestone consumption for CFBC based generating station							NA
specific urea consumption of the SNCR							NA
Specific ammonia consumption of the SCR							NA
Transit and Handling Losses of coal or lignite, as applicable							
** Rate of Return on Add - cap linked with SBI MCLR							
\$\$ Additional RoE due to better ramp rate would be claimed at the time of true-up or as per guidelines to be issued							
* storage capacity of Simhadri Stage-I & II Combined							
*** APC has been considered as per details given in Petition							

Petitioner

Part-I
FORM-3A
ADDITIONAL FORM

Calculation of O&M Expenses

Name of the Company : NTPC Limited

Name of the Power Station : Simhadri Super Thermal power Station Stage-I

Amount in Rs. Lakhs

S.No	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7
1	O&M expenses under Reg. 36(1)(1)					
1a	Normative	27170.00	28600.00	30100.00	31680.00	33340.00
2	O&M expenses under Reg. 36(1)(6)					
2a	Water Charges ## **	1647.03	1728.28	1813.36	1903.04	1997.32
2b	Security expenses **	1861.13	1954.18	2051.89	2154.48	2262.21
2c	Capital Spares***					
3	O&M expenses-Ash Transportation**	6500	5750	5000	5000	5000
4	Additional O&M for Coastal Plant**	2975	3124	3280	3444	3616
	Total O&M Expenses	40153.15	41156.46	42245.25	44181.52	46215.53

** Subject to true up

*** Shall be provided at the trueing up

Notification/agreement of water charges attached

Petitioner

PART-I
FORM-3B
Additional Form

Computation of Special Allowance

Name of the Petitioner: NTPC Limited
Name of the Generating Station: Simhadri Super Thermal power Station Stage-I
Place (Region/District/State): Southern Region/ Visakhapatnam/ Andhra Pradesh

Rate of Special allowance @lakh/MW/year				10.75				
Unit	Capacity	Date of Unit COD	Year of completion of useful life of 25 yrs.	Special Allowance as per Regulation 16				
No.	(MW)			2024-25	2025-26	2026-27	2027-28	2028-29
#-1	500	1-Sep-02	2027-28	-	-	-	3128.07	5375.00
#-2	500	1-Mar-03	2027-28	-	-	-	455.26	5375.00
Year wise Total for the Station				-	-	-	3583.33	10750.00

Year wise for the Station			
Unit	Capacity	Date of Unit COD	Year of completion of useful life
No.	(MW)		
#-1	500	1-Sep-02	2027-28
#-2	500	1-Mar-03	2027-28

Petitioner

PART 1
FORM- 5

Abstract of Admitted Capital Cost for the existing Projects

Name of the Company : NTPC Limited

Name of the Power Station : Simhadri Super Thermal power Station Stage-I

Last date of order of Commission for the project	Date (DD-MM-YYYY)	27-06-2016
Reference of petition no. in which the above order was passed	Petition no.	270/GT/2014
Following details (whether admitted and /or considered) as on the last date of the period for which tariff is approved, in the above order by the Commission:		
Capital cost	(Rs. in lakh)	367596.58
Amount of un-discharged liabilities included in above (& forming part of admitted capital cost)		
Amount of un-discharged liabilities corresponding to above admitted capital cost (but not forming part of admitted capital cost being allowed on cash basis)		5642.06
Gross Normative Debt		257317.606
Cumulative Repayment		180219.55
Net Normative Debt		77098.056
Normative Equity		110278.974
Cumulative Depreciation		223225.33
Freehold land		7675.47

(Petitioner)

Year wise Statement of Additional Capitalization after COD

Name of the Petitioner:
Name of the Generating Station:
COD:
Per Financial Year:

NTPC Limited
Simhadri Super Thermal power Station Stage-I
01-03-2003
2024-25 (Summary)

Sl. No.	Head of Work / Equipment	ACE Claimed (Actual / Projected)					Regulations under which claimed	Justification	Amount in Ru Lakh Admitted Cost by the Commission, if any
		2024-25	2025-26	2026-27	2027-28	2028-29			
1	2	3	4	5	6	7		8	9
A. Works eligible for Reg. at Normal Rate									
1	Replacement of Steam and Water Analysis System (SWAS)	300					25 (2)(c)	Please refer respective year Form B	
2	Fire Detection and Protection System (FDPS) replacement in Admin building	100					25 (2)(c)		
3	Electrolyser		250		300		25(2)(a)		
4	Battery bank Replacement		155	130			25(2)(a)		
5	Upgradation of end winding vibration systems of generator		300	500			25(2)(c) & 26(1)(d)		
6	LT switchgear	200	400	400			25(2)(c)		
7	Conversion to energy chain system in SR and paddle feeder systems			1000			25 (2)(c)		
8	DCS upgradation	7000	3000				25(2)(c)		
9	Fire system upgradation	210					25(2)(c) & 26(1)(d)		
10	Conversion of >100kw motor modules in CHP MCCs with vacuum contactor modules				100		25(2)(c) & 26(1)(d)		
11	IDCT Package for Simhadri STPP, Stage-I (2*500MW)			16050			25(2)(a) & 25(2)(b) read with 102		
Total (A)		7,816	5,130	16,740	400	-			
B. Works eligible for RoE linked to SBI NCLR									
12	CCTV Camera for coverage of Switch gear room	120					25 (1) (d)	Please refer respective year Form B	
13	Generator auxiliary	75					26(1)(d), 26(1)(e) & 26(1)(f)		
14	Electrochlorination & ClO2 System	150	750	850			26(1)(b) & 26(1)(d) & 26(1)(g)		
15	RTV Coating of 400KV Insulators		150				26(1)(b) & 26(1)(d) & 26(1)(j)		
16	HT Switchgear		700	700	700	60	26 (1) (d), 26(1)(f) & 25(2)(c)		
17	2000 KVA (1600/1000 KVA) Transformer and auxiliaries		80	40	116	75	26 (1) (i) & 26(1)(f)		
Total (B)		345	1680	1350	816	135			
Total Add. Cap. Claimed (A+B)		8,161.00	6,810.00	18,090.00	1,216.00	135.00			

(Petitioner)

Year wise Statement of Additional Capitalization after CCG

Name of the Petitioner: NTPC Limited
 Name of the Generating Station: Simhadri Super Thermal power Station Stage-I
 COD: 01-09-2003
 For Financial Year: 2024-25

Sl. No.	Head of Work/Equipment	Amount in Rs Lakhs				Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
		Actual basis as per G&AP	Un-discharged liability included in col. 3	Cash basis	IDC included in col. 3			
1	2	3	4	5= (3+4)	6	7	8	9
A. Works eligible for RoE at Normal Rate:								
1	Replacement of Steam and Water Analysis System (SWAS)	300.00	-	300.00		25 (2)(c)	Steam and Water Analysis System (SWAS) is used for continuous monitoring and control of water and steam purity in the power plant cycle. The parameters include pH, conductivity, silica, sodium, dissolved oxygen, phosphate, chlorides etc. Based on the SWAS data, Chemical dosing is done in steam/water to maintain parameters within acceptable limit. Existing analysers have become obsolete and not supported for spares or service by OEM. The communication of obsolescence from Tech D-HR (OEM) is enclosed as Annexure-I.	
2	Fire Detection and Protection System (FDPS) replacement in Admin building	100.00	-	100.00		26 (2)(c)	This Fire Detection and Protection System is one of the most important safety measure that can help to protect assets and minimize the impact of a fire in a power plant. The simplex 4100U fire alarm system in admin building has become inoperational & inoperable. During site visit by Service engineer and Project manager, it is informed that existing obsolete Simplex 4100 U system is very outdated version and has become obsolete. Further, it was recommended to be replaced by Simplex 4100 ES. The communication from OEM/supplier is enclosed as Annexure-II.	
3	LT switchgear	200.00	-	200.00		25(2)(c)	Obsolescence of Technology. In Stage-I of Simhadri, LT switchgears were supplied by M/s C&S and are open door operation module type and the MCC, Breakers are 25 years old technology and obsolete, no support from OEM. The same needs replacement with closed operation modules with MCCBs and new version to improve safety and reliability.	
4	DCS upgradation	7,000.00	-	7,000.00		25(2)(c)	The existing DCS of Simhadri Stage-I is ABB Procontrol P13 system supplied by BHEL. This system was commissioned in the year 2000 and 2001 for Unit-1&2 (SG, TG, 4/6 BOP area). Spares and service for ABB Procontrol P13 not available from OEM/CS, which is affecting reliability of the equipment and Units. Letter dated 17.04.2019 from BHEL EDN on non-availability of spares for procontrol P13/42 DCS is attached as Annexure-III. The aforesaid items are C&I items and with time there has been fast technological upgradation in this field. Hence the Digital Control System is the automated intelligence of any thermal power generating station. In the absence of support from OEM and obsolescence of technology, systems were vulnerable to faults and operating with these obsolete items was a threat to man and machine, therefore these works are also required for safe operation of Plant and machines. The existing systems were highly unreliable and failure prone due to aging and obsolescence. The above upgradation has helped in better connectivity with other systems, better monitoring of plant, enhanced reliability and availability and helping in reliable and safe operation of Units.	

Name of the Petitioner
Name of the Generating Station
COD
For Financial Year

NTPC Limited
Simhadri Super Thermal power Station Stage-I
01-03-2013
2024-25

5	Fire system upgradation	218.00	-	218.00	25(2)(c) & 25(1)(d)	<p>Fire Detection System for Stage-I of Simhadri units have been provided with M/s Autrofire make, BS-100 system. This system is utilized for detection of fire at various important areas like UCR, SWGR, CHP, Cable Galleries, ESP, etc. Fire detection system is very critical for detection of fire in case of any fire accident and availability of this system is also very critical for ensuring the safety of equipment from fire accidents. Fire Alarm Panels are located at UCR#1&2, BWYD, CHP Control Room to operate automatic spray system & parallelly audio visual alarms are generated at UCR, BWYD, CHP Control room & CIBF Control room for further course of action from CIBF & NTPC representatives.</p> <p>The spare parts of BS-100 products, such as smoke and heat detectors, manual call points and interface units, are not available with us. OEM (Autrofire Fire and Security AS) has declared that spare parts and the entire range of BS-100 products, such as smoke and heat detectors, manual call points and interface units, are discontinued. The OEM/OES has suggested for upgradation of the fire detection system with a latest technological system. The upgradation also helps in better safety of the equipment & the manpower. The reliability and availability of the complete system will be improved. Discontinuation declaration of OEM is attached as Annexure-IV.</p>	
Total (A)		7,816.00	-	7,816.00	-		
B. Works eligible for RoE linked to SBI MCLR							
6	CCTV Camera for coverage of Switch gear room	120.00	-	120.00	26 (1) (d)	<p>It is submitted that the remote visual monitoring of unmanned locations like Switchgear room area, etc is not continuously possible. Further, timely detection of fire, cable burning, theft of locally mounted instruments, valves, telephones, etc is very much essential for safety as well as security of material. Movement of unauthorized personnel or fire caused by smoldering coal or spilled-out oil, burning of cables due to short circuit, etc can be monitored and timely action can be taken by covering these areas through CCTV system.</p> <p>Further, during site inspection of Simhadri by Dr. K. Jayaram, IPS, IG/SS Chennai and Shri Anand Mahan, IPS, IG/SS Hqs Chennai on 13.08.2016 and 07.11.2017 respectively, it was directed to install various measures including CCTV Cameras to keep a check on the movements as well as handling/storing over. Letters of CIBF dtd 12.10.2017 and 16.10.2018 are enclosed as Annexure-V.</p> <p>As the current capitalization corresponds to the activity on account of need for higher security and safety of the unit and as directed by competent authority, the Hon'ble Commission may be pleased to allow the capitalization of the same under Regulation 26(1)(d).</p>	
7	Generator auxiliary	73.00	-	73.00	26(1)(d), 26(1)(c) & 26(1)(f)	<p>Generators are provided with Hydrogen Gas (H2) system for Rotor and Stator cooling. The heat gained from Generator by H2 gas is cooled by 4 Nos of H2 coolers through which H2 gas is circulated in a closed loop. The availability of H2 coolers is very important for reliable and safe running of Generators.</p> <p>Simhadri Station of NTPC is located at sea coast and the equipments are continuously exposed to saline weather conditions which results in excessive corrosion & erosion of the equipment. Coolers are developing faults while in service due to saline weather conditions making the system highly unreliable and failure prone. The petitioner is having no other option but to mitigate the force majeure condition arisen due to uncontrollable weather conditions. Thus the work of Generator's auxiliary is for enhancing reliability and availability and helping in reliable and safe operation of Units.</p>	
8	Electrochlorination & ClO2 System	150.00	-	150.00	26(1)(b) & 26(1)(d) & 26(1)(c)	Kindly refer Attached Annexure-VI for detailed justification.	
Total (B)		343.00	-	343.00	-		
Total Add. Cap. Claimed (A+B)		8,159.00	-	8,159.00	-		

(Petitioner)

Year wise Statement of Additional Capitalization after CCR

Name of the Petitioner: NTPC Limited
 Name of the Generating Station: Simhadri Super Thermal power Station Stage-I
 CCR: 01-03-2023
 For Financial Year: 2023-24

Sl. No.	Head of Work / Equipment	ACE Claimed / Actual / Provided				Regulations under which provided	Justification	Amount in Rs Lakh
		Actual basis as per IGAAP	Undisbursed Liability included in ccr	Cash basis	ACC included in ccr			
1	2	3	4	5= (3+4)	6	7	8	9
A. Works eligible for RoI at Normal Rate								
1	Electrolyser	200	-	200	25(2)(a)		Simhadri power plant is using Sea Water for Condenser Cooling and air evacuation. Sea water is taken from Bay of Bengal. Electrolyser is installed at Sea Water Pump House for Hypochlorite Dosing in sea water in order to control marine organisms and algae. It requires 20 night continuous dosing. As per OEM, the guaranteed life of the equipment is 5 years. Therefore, after completion of useful life, the same needs replacement to maintain the parameters. In Simhadri Stage-I, the Electrolyser-1 is installed for more than 5 years and needs immediate replacement and Electrolyser-1 installed in 2021 and needs to replace by 2027. The equipment data sheet mentioning life of the equipment as 5 years is attached as Annexure-VII.	
2	Battery bank Replacement	100	-	100	25(2)(a)		The D.C power supply is of vital importance for the safety and security of a power station. Lead acid and Nickel Cadmium (NiCd) battery banks of different makes and ratings are provided at power stations and have been operational over a number of year. The life of these batteries is maximum 10 years or a capacity specific (capacity less than 80% for lead acid battery or less than 85% for nickel cadmium battery) after which all such batteries need to be replaced. The battery bank at the station is more than 10 years old and therefore needs replacement. In Southern Region Protection Coordination Sub-committee Meetings, Healthiness of Batteries are regularly monitored. Minutes of CEA SRPC 117th Meeting No SRPC/SE/PC/CRSS/117/PCSC/0024/1661-95 dt 10.04.2024 is enclosed for reference (Clause No. 5.3) as Annexure-VIII.	
3	Upgradation of end winding vibration systems of generator	300	-	300	25(2)(a) & 26(1)(ii)		Obsolescence of Technology: Generator rotor end winding vibration measuring sensors (accelerometers) are installed to monitor healthiness of rotor winding and support system integrity. This is very important on-line generator health monitoring system which was installed in all large modern turbo-generators. BHEL 500 MW generators which are supplied in between year 2002 to 2013, are fitted with piezoelectric type accelerometers having metallic body. BHEL generators supplied from year 2014 onwards are fitted with Fibre Optic accelerometers having insulated body and without any metal parts. The piezoelectric type accelerometers are obsolete now and are technologically inferior to the recently available Fibre Optic accelerometers. Safety & Security of equipment & manpower (working): Simulations/ inadequacies of piezoelectric type accelerometers are observed with respect to its mounting location, mounting arrangement, insulation quality and sensor cable voltage withstand level which can lead to flash over inside generator. The short of such flash over with much severe intensity inside in-service generators may take place if the sensor leads (used for securing sensors on conductor insulation level) is breached during generator earth fault at any location of generator terminal/PT/DGVT LV side/UT HV side (similar incident has already occurred in one of the station of NTPC). The detailed analysis of the same is done by NTPC along with BHEL. It was concluded that a long term solution to avoid such occurrence is to go for installation of Fibre Optic Accelerometer sensors and accelerated monitoring system to replace existing system with Photo-electric Accelerometer. The MoM of the meeting between NTPC and BHEL, dt 31.08.2023 suggesting an above is attached as Annexure-IX.	
4	LT system upgrade	800	-	800	25(1)(i) & 26(1)(ii)		Same as 2021-22	
5	DCS upgradation	3,600	-	3,600	25(1)(i) & 26(1)(ii)		Same as 2021-22	
	Total (A)	5,100	-	5,100	-			

Year wise Statement of Additional Capitalization after CDD

Name of the Petitioner: NTPC Limited
 Name of the Generating Station: Simhadri Super Thermal power Station Stage-I
 CDD: 01-03-2003
 For Financial Year: 2025-26

Sl. No.	Head of Work/Equipment	ACE Claimed (Actual/Proposed)				Regulation under which claimed	Justification	Amount in Rs Lakh	Admitted Cost by the Commission (P 4%)
		Actual base as per IGMP	Undisbursed Liability included in col. 3	Cash base	IOC included in col. 5				
1	2	3	4	5	6	7	8	9	10
B. Works eligible for RoI limited to 38% WGLR									
6	RTV Coating of 400KV Insulators	150	-	150		26(1)(i) 26(1)(d) & 26(1)(ii)	A Special Meeting was held on 4th May, 2016 at SRPC Benchariat, Bengaluru to deliberate on the issues factors that led to recent disturbances in Gajuwaka-Simhadri-Kalsakra corridor which resulted in tripping of various 400 KV interconnected lines, and finally culminated in Grid Disturbances at Gajuwaka SS (PGCIL-SRTS(I)), Vazag SS (APTRANSCO), and Kalsakra SS (APTRANSCO) during 24-26 April, 2016. It was noted in the meeting that Simhadri being in the coastal region regular clearing of the insulators mounted within the substation is not so effective. The damming/damaging effects of saline & pollutant medium would start to fault the insulators in a couple of weeks. As such, the need for protecting all insulators mounted within the substation by suitable coatings such as RTV Silicone high voltage insulator coating was deliberated. It is recommended in the meeting that NTPC-Simhadri provide suitable High Voltage Silicone coatings for all Bus-connected insulators at their respective 400 KV & 330 KV substations/switchyards. Minutes of the SRPC special meeting held 09.05.2016 is attached as Annexure-3. Simhadri Station Black-out happened on 03.05.2022 due to transmission system outage. The Record Notes of POSOCO on Grid Disturbance for the Month of May 2022 attached (SI No. 3/021) attached as Annexure-XI. Thus the force majeure condition of weather has constrained petitioner for RTV Coating of 400 KV insulator which is required for safety & security and efficient operation of unit.		
7	HT Switchgear	700	-	700		26(1)(d), 26(1)(i) & 26(1)(ii)	In the earlier BHEL supplied HT panels, the breaker featured conventional open-door operation with a cam-type racking system. In this setup, the breaker handle needed to be racked in and out from the test to service position and vice versa after opening the breaker cabinet door. This poses a safety threat for the operator. However, the latest HT breakers panels supplied by BHEL in new projects of NTPC closed door operation design has been introduced which significantly enhances operator safety. In the new design, the racking-in and racking-out operations of the breaker can be performed with the door closed. Considering above, NTPC has planned to execute retrofit project on 01 nos of HT panels at Simhadri station. The work is being done to remove obsolescence due to technological advancement and for the safety of equipment and personnel. The Hon'ble Commission may be pleased to allow the same under Regulation 26 (1)(d) read with 26(1)(i) and Regulation 26(2)(c).		
8	2000 KVA/1600/1000 KVA Transformer and auxiliary	80	-	80		26(1)(ii) & 26(1)(i)	For efficient operation of Generating Station, Environment of Simhadri plant is saline and corrosive. Stage-1 transformers are approx 20 years old and due to aging and environmental effect having heavy oil leakage and breakdowns. There leakages are beyond repair. For safety, reliability and environmental effect these transformers needs replacement.		
9	Electrodeposition & CL02 System	750	-	750		26(1)(b), 26(1)(d) & 26(1)(i)	Some vs 2024-25		
Total (B)		1,680	-	1,680					
Total Add. Cap. Claimed (A+B)		8,785	-	8,785	-				

(Petitioner)

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner: NTPC Limited
 Name of the Generating Station: Simhadri Super Thermal power Station Stage-I
 COD: 01-03-2003
 For Financial Year: 2026-27

Amount in Rs Lakh

Sl. No.	Head of Work /Equipment	ACE Claimed (Actual / Projected)				Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis as per IGAAP	Un-discharged Liability included in col. 3	Cash basis	IDC included in col. 3			
1	2	3	4	5= (3+4)	6	7	8	9
A. Works eligible for RoE at Normal Rate								
1	Battery bank Replacement	130.00	-	130.00		25 (2)(c)	Same as 2025-26	
2	Upgradation of end winding vibration systems of generator	500.00	-	500.00		25 (2)(c)	Same as 2025-26	
3	LT switchgear	460.00	-	460.00		25 (2)(c)	Same as 2025-26	
4	Conversion to energy chain system in Stacker Reclaimer and Paddle feeder systems.	1,000.00	-	1,000.00		25 (2)(c)	Obsolescence & technology change. For moving equipments like Stacker reclaimers and paddle feeders, energy chain system is required in order to avoid over-tension and slackness of cables that pass through a pendulum. With energy chain system, CCRD motors and CRD drums could be avoided thus saving energy and control cable damage/opening could be avoided. Obsolescence Certificate from Siemens (RC-IN DI CS SD SR PR1-HYD) dtd 20.06.2021 enclosed as Annexure-XII.	
5	IDCT Package for Simhadri STPP, Stage-I (2*500MW)	16,650.00	-	16,650.00		25(2)(a) & 25(2)(b) read with 102	May kindly refer para-14 and 15 of petition.	
Total (A)		18,740.00	-	18,740.00	-			
B. Works eligible for RoE linked to SBI MCLR								
7	HT Switchgear	700.00	-	700.00		26 (1) (d)	Same as 2025-26	
8	2000 KVA /1600/1000 KVA Transformer and auxiliaries	40.00	-	40.00		26 (1) (i) & 26(1)(c)	Same as 2025-26	
9	Electrochlorination & CLO2 System	650.00	-	650.00		26 (1) (b), 26(1)(e) & 26(1)(j)	Same as 2024-25	
Total (B)		1,390.00	-	1,390.00	-			
Total Add. Cap. Claimed (A+B)		20,130.00	-	20,130.00	-			

(Petitioner)

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner: NTPC Limited
 Name of the Generating Station: Simhadri Super Thermal power Station Stage-I
 COD: 01-03-2003
 For Financial Year: 2027-28

Amount in Rs Lakh

Sl. No.	Head of Work/Equipment	ACE Claimed (Actual / Projected)		Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis as per GAAP	Un-discharged Liability included in	Cash basis IDC included in col. 3		
1	2	3	4	5= (3+4)	6	7
A. Works eligible for RoE at Normal Rate						
1	Electrolyser	300.00	-	300.00	25(2)(a)	Same as 2025-26
2	Conversion of >100kV motor modules in CHP MCCs with vacuum contactor modules	100.00	-	100.00	25(2)(c) & 26(1)(d)	Breakers (vacuum contactors or ACB) in the place of contactor modules for LT switchgear feeders (especially motors) of rating 100KV/ is proposed to be done to enhance safety and reliability of the system. The existing LT switchgears in CHP are 13 to 23 years old in which the power contactors and other control gear used are becoming obsolete due to technological advancement. Hence for large LT motors, conversion into breakers is done.
Total (A)		400.00	-	400.00	-	
B. Works eligible for RoE linked to SBI MCLR						
2	HT Switchgear	700.00	-	700.00	26 (1) (d), 26(1)(i) & 25(2)(c)	Same as 2025-26
3	2000 KVA /1600/1000 KVA Transformer and auxiliaries	115.00	-	115.00	26 (1) (i) & 26(1)(c)	Same as 2025-26
Total (B)		815.00	-	815.00		
Total Add. Cap. Claimed (A+B)		1,215.00	-	1,215.00		

(Petitioner)

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner			NTPC Limited					
Name of the Generating Station			Simhadri Super Thermal power Station Stage-I					
COD			01-03-2003					
For Financial Year			2028-29					
Sl. No.	Head of Work /Equipment	Accrual basis as per IGAAP	ACE Claimed (Actual / Projected)			Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
			Un-discharged Liability included in col. 3	Cash basis	IDC included in col. 3			
1	2	3	4	5= (3+4)	6	7	8	9
A. Works eligible for RoE at Normal Rate								
	Total (A)	-	-	-	-			
B. Works eligible for RoE linked to SBI MCLR								
1	HT Switchgear	50.00	-	50.00		26 (1) (d)	Same as 2025-26	
2	2000 KVA /1600/1000 KVA Transformer and auxiliaries	75.00	-	75.00		26 (1) (i) & 26(1)(c)	Same as 2025-26	
	Total (B)	125.00	-	125.00	-			
Total Add. Cap. Claimed (A+B)								
		125.00	-	125.00	-			

(Petitioner)

PART-I
FORM- 10

Name of the Petitioner					NTPC Limited																
Name of the Generating Station					Simhadri Super Thermal power Station Stage-I																
Date of Commercial Operation					01-03-2003																
					Amount in Rs Lakh																
Financial Year (Starting from COD)1	Actual					Admitted															
	2024-25	2025-26	2026-27	2027-28	2028-29	2024-25	2025-26	2026-27	2027-28	2028-29											
1		3	4	5	6	7	8	9	10	11											
Amount capitalised in Work/ Equipment																					
<table border="1"> <tr> <td>Financing Details</td> <td rowspan="10"> <p>Add cap is proposed to be finance in Debt:Equity ratio of 70:30</p> </td> </tr> <tr> <td>Loan-1</td> </tr> <tr> <td>Loan-2</td> </tr> <tr> <td>Loan-3 and so on</td> </tr> <tr> <td>Total Loan2</td> </tr> <tr> <td>Equity</td> </tr> <tr> <td>Internal Resources</td> </tr> <tr> <td>Others (Pl. specify)</td> </tr> <tr> <td></td> </tr> <tr> <td>Total</td> </tr> </table>											Financing Details	<p>Add cap is proposed to be finance in Debt:Equity ratio of 70:30</p>	Loan-1	Loan-2	Loan-3 and so on	Total Loan2	Equity	Internal Resources	Others (Pl. specify)		Total
Financing Details	<p>Add cap is proposed to be finance in Debt:Equity ratio of 70:30</p>																				
Loan-1																					
Loan-2																					
Loan-3 and so on																					
Total Loan2																					
Equity																					
Internal Resources																					
Others (Pl. specify)																					
Total																					

(Petitioner)

Statement of Depreciation

Name of the Company :

NTPC Limited

Name of the Power Station :

Simhadri Super Thermal power Station Stage-I

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
1	Opening Capital Cost	367453.31	3,67,662.44	3,67,662.44	3,67,662.44	3,67,662.44	3,67,662.44
2	Closing Capital Cost	367662.44	3,67,662.44	3,67,662.44	3,67,662.44	3,67,662.44	3,67,662.44
3	Average Capital Cost	367557.88	3,67,662.44	3,67,662.44	3,67,662.44	3,67,662.44	3,67,662.44
1a	Cost of IT Equipments & Software included in (1) above	1,204.58	1,521.35	1,521.35	1,521.35	1,521.35	1,521.35
2a	Cost of IT Equipments & Software included in (2) above	1,521.35	1,521.35	1,521.35	1,521.35	1,521.35	1,521.35
3a	Average Cost of IT Equipments & Software	1,382.97	1,521.35	1,521.35	1,521.35	1,521.35	1,521.35
4	Freehold land	7,803.42	7,803.42	7,803.42	7,803.42	7,803.42	7,803.42
5	Rate of depreciation						
6	Depreciable value	3,23,915.31	3,24,025.25	3,24,025.25	3,24,025.25	3,24,025.25	3,24,025.25
7	Balance useful life at the beginning of the period	4.67	3.67	2.67	1.67	1.00	1.00
8	Remaining depreciable value	56,810.84	45,250.09	32,920.37	20,590.85	8,260.93	-
9	Depreciation (for the period)	12,172.64	12,329.72	12,329.72	12,329.72	8,260.93	-
10	Depreciation (annualised)	12,172.64	12,329.72	12,329.72	12,329.72	8,260.93	-
11	Cumulative depreciation at the end of the period		2,91,104.88	3,03,434.60	3,15,764.32	3,24,025.25	3,24,025.25
12	Less: Cumulative depreciation adjustment on account of undischarged liabilities deducted as on 01.04.2009	0.00	-	-	-	-	-
13	Add: Cumulative depreciation adjustment on account of liability Discharge	0.00	-	-	-	-	-
14	Less: Cumulative depreciation adjustment on account of de-capitalisation	481.85	-	-	-	-	-
15	Net Cumulative depreciation at the end of the period after adjustments	2,76,776.16	2,91,104.88	3,03,434.60	3,15,764.32	3,24,025.25	3,24,025.25

Statement of Depreciation (New Assets)

Name of the Company :

NTPC Limited

Name of the Power Station :

Sinbadri Super Thermal power Station Stage-I

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
1	Opening Capital Cost	-	-	9,161.00	14,946.00	35,076.00	36,291.00
2	Closing Capital Cost	8,161.00	14,946.00	35,076.00	36,291.00	36,416.00	36,416.00
3	Average Capital Cost	4,080.50	11,553.50	25,011.00	35,683.50	36,353.50	36,353.50
1a	Cost of IT Equipments & Software included in (1) above	-	-	-	-	-	-
2a	Cost of IT Equipments & Software included in (2) above	-	-	-	-	-	-
3a	Average Cost of IT Equipments & Software	-	-	-	-	-	-
4	Freehold land	-	-	-	-	-	-
5	Rate of depreciation	-	-	-	-	-	-
6	Depreciable value	3,672.45	10,398.16	22,509.90	32,115.15	32,718.15	32,718.15
7	Balance useful life at the beginning of the period	13.67	12.67	11.67	10.67	9.67	9.67
8	Remaining depreciable value	3,672.45	10,129.59	21,442.14	29,210.74	27,077.27	27,077.27
9	Depreciation (for the period)	268.56	799.20	1,836.65	2,736.47	2,798.80	2,798.80
10	Depreciation (annualised)	268.56	799.20	1,836.65	2,736.47	2,798.80	2,798.80
11	Cumulative depreciation at the end of the period	268.56	1,067.76	2,904.41	5,640.88	8,439.68	8,439.68
12	Less: Cumulative depreciation adjustment on account of un-discharged liabilities deducted as on 01.04.2009	-	-	-	-	-	-
13	Add: Cumulative depreciation adjustment on account of liability Discharge	-	-	-	-	-	-
14	Less: Cumulative depreciation adjustment on account of de-capitalisation	-	-	-	-	-	-
15	Net Cumulative depreciation at the end of the period after adjustments	268.56	1,067.76	2,904.41	5,640.88	8,439.68	8,439.68

Petitioner

Company		NTPC Limited		
Name of the generating Station		Simhadri Super Thermal Power-STAGE 01		
Month		April-2023		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A)	OPENING QUANTITY			
1	Opening Stock of coal	MT	190314.93	111286.37
2	Value of Stock	Rs.	1005090039.61	1398355310.75
B)	QUANTITY			
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	620189.65	93301.80
3.01	- Qty Received (Pit Head)	MT	0.00	93301.80
3.02	- Qty Received (Non Pit Head)	MT	620189.65	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	1869.42-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	618320.23	93301.80
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	4961.52	186.60
6.01	- Normative Loss (Pit Head)	MT	0.00	186.60
6.02	- Normative Loss (Non Pit Head)	MT	4961.52	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	613358.71	93115.20
C)	PRICE			
8	Amount charged by the Coal / Lignite Company	Rs.	1913966366.12	1177411324.94
9	Adjustment (+ / -) in amount charged by coal / Lignite Company	Rs.	4515870.22-	0.00
10	Handling, Sampling and such other Similar charges	Rs.	54995269.78	0.00
11	Total Amount charged (8 +9+10)	Rs.	1964445765.68	1177411324.94
D)	TRANSPORTATION			
12	Transportation charges by Rail / Ship / Road Transport	Rs.	853604485.22	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	756652.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	853047833.22	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	2817493598.90	1177411324.94
E)	TOTAL COST			
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	4756.39	12601.50
19	Blending Ratio (Domestic/Imported)	%	87.06	12.94
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	5771.63	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	5771.63	5771.63
F)	QUALITY			
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	3819	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	3957	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	4980
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	4981
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	4061	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	4061	4061
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	2852	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	2984	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	4980
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	4981
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3217	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3217	3217

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		May-2023		
SL	Particulars	Unit	COAL - DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	157365.64	108145.57
2	Value of Stock	Rs.	748492023.01	1362796555.43
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	661016.23	80037.68
3.01	- Qty Received (Pit Head)	MT	0.00	80037.68
3.02	- Qty Received (Non Pit Head)	MT	661016.23	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	2442.93-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	658573.30	80037.68
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	5288.13	160.08
6.01	- Normative Loss (Pit Head)	MT	0.00	160.08
6.02	- Normative Loss (Non Pit Head)	MT	5288.13	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	653285.17	79877.60
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	2138095330.64	1024522469.36
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	5898721.28-	0.00
10	Handling, Sampling and such other Similar charges	Rs.	924526.41	0.00
11	Total Amount charged (8 +9+10)	Rs.	2133121135.77	1024522469.36
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	956609069.61	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	0.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	956609069.61	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	3089730205.38	1024522469.36
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	4734.74	12696.94
19	Blending Ratio (Domestic/Imported)	%	86.95	13.05
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	5773.78	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	5773.78	5773.78
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	3924	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	4049	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	4981
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	4955
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	4148	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	4148	4148
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	2955	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3004	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	4981
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	4955
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3252	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3252	3252

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		June-2023		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	360130.81	118700.17
2	Value of Stock	Rs.	1705126262.55	1507129053.17
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	565643.98	103045.40
3.01	- Qty Received (Pit Head)	MT	0.00	103045.40
3.02	- Qty Received (Non Pit Head)	MT	565643.98	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	343.96-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	565300.02	103045.40
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	4525.15	206.09
6.01	- Normative Loss (Pit Head)	MT	0.00	206.09
6.02	- Normative Loss (Non Pit Head)	MT	4525.15	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	560774.87	102839.31
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	2300898763.85	1328768449.53
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	865666.42-	0.00
10	Handling, Sampling and such other Similar charges	Rs.	48655200.97	0.00
11	Total Amount charged (8 +9+10)	Rs.	234688298.40	1328768449.53
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	733394553.17	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	1710436.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	731684117.17	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	3060372415.57	1328768449.53
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	5196.51	12800.87
19	Blending Ratio (Domestic/Imported)	%	84.19	15.81
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	6398.39	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	6398.39	6398.39
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	4025	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	4177	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	4970
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	5056
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	4259	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	4259	4259
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	2995	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3158	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	4970
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	5056
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3398	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3398	3398

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		July-2023		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	357402.68	114134.48
2	Value of Stock	Rs.	1857248013.08	1359275908.55
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	466909.13	0.00
3.01	- Qty Received (Pit Head)	MT	0.00	0.00
3.02	- Qty Received (Non Pit Head)	MT	466909.13	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	0.00	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	466909.13	0.00
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	3735.27	0.00
6.01	- Normative Loss (Pit Head)	MT	0.00	0.00
6.02	- Normative Loss (Non Pit Head)	MT	3735.27	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	463173.86	0.00
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	1754140825.39	0.00
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	0.00	0.00
10	Handling, Sampling and such other Similar charges	Rs.	4174041.24	0.00
11	Total Amount charged (8 +9+10)	Rs.	1758314866.63	0.00
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	631326818.00	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	197956.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 + 14 + 15)	Rs.	631128862.00	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	2389443728.63	0.00
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	5175.25	11909.42
19	Blending Ratio (Domestic/Imported)	%	86.88	13.12
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	6058.94	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	6058.94	6058.94
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	4118	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	4112	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	5010
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	0
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	4232	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	4232	4232
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3095	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3146	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	5010
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	0
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3371	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3371	3371

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		August-2023		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	339514.54	41271.48
2	Value of Stock	Rs.	1757073701.96	491519535.73
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	631934.84	0.00
3.01	- Qty Received (Pit Head)	MT	0.00	0.00
3.02	- Qty Received (Non Pit Head)	MT	631934.84	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	2692.19-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	629042.65	0.00
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	5055.48	0.00
6.01	- Normative Loss (Pit Head)	MT	0.00	0.00
6.02	- Normative Loss (Non Pit Head)	MT	5055.48	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	623987.17	0.00
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	1777043325.84	0.00
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	7242172.00-	0.00
10	Handling, Sampling and such other Similar charges	Rs.	22054672.36	0.00
11	Total Amount charged (8 +9+10)	Rs.	1791855826.20	0.00
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	858436367.00	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	632708.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	857803659.00	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	2649859485.20	0.00
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	4573.66	11909.42
19	Blending Ratio (Domestic/Imported)	%	93.54	6.46
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	5047.55	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	5047.55	5047.55
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	4114	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	3721	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	5010
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	0
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	3934	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	3934	3934
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3124	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3282	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	5010
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	0
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3342	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3342	3342

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		September-2023		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	259315.71	0.00
2	Value of Stock	Rs.	1186023029.66	0.00
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	609075.93	12783.30
3.01	- Qty Received (Pit Head)	MT	0.00	12783.30
3.02	- Qty Received (Non Pit Head)	MT	609075.93	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	1328.86-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	607747.07	12783.30
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	4872.61	25.57
6.01	- Normative Loss (Pit Head)	MT	0.00	25.57
6.02	- Normative Loss (Non Pit Head)	MT	4872.61	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	602874.46	12757.73
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	1244067667.63	124687088.00
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	0.00	0.00
10	Handling, Sampling and such other Similar charges	Rs.	95501010.22	1730987.14-
11	Total Amount charged (8 +9+10)	Rs.	1339568677.85	123156100.86
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	940085556.00	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	893118.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	939192436.00	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	2278761115.85	123156100.86
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	4018.58	9653.45
19	Blending Ratio (Domestic/Imported)	%	98.56	1.44
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	4099.53	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	4099.53	4099.53
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	3860	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	3808	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	5010
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	5258
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	3706	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	3706	3706
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3226	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3091	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	5010
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	5258
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3162	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3162	3162

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		October-2023		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	38124.17	838.73
2	Value of Stock	Rs.	153034531.30	8096666.07
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	762305.61	73089.15
3.01	- Qty Received (Pit Head)	MT	0.00	73089.15
3.02	- Qty Received (Non Pit Head)	MT	762305.61	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	319.13-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	761986.48	73089.15
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	6098.45	146.18
6.01	- Normative Loss (Pit Head)	MT	0.00	146.18
6.02	- Normative Loss (Non Pit Head)	MT	6098.45	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	755888.03	72942.97
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	1439158778.73	727484146.92
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	0.00	0.00
10	Handling, Sampling and such other Similar charges	Rs.	13550811.66	0.00
11	Total Amount charged (8 +9+10)	Rs.	1452707890.39	727484146.92
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	1150901599.81	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	603751.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 + 14 + 15)	Rs.	1150297848.81	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	2603005439.20	727484146.92
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	3471.03	9969.69
19	Blending Ratio (Domestic/Imported)	%	92.37	7.63
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	3966.80	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	3966.80	3966.80
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	3684	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	3684	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	5258
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	4995
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	3784	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	3784	3784
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3132	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3196	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	5258
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	4995
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3331	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3331	3331

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		November-2023		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	10263.21	3534.81
2	Value of Stock	Rs.	35623679.03	35240926.28
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	767656.87	54604.40
3.01	- Qty Received (Pit Head)	MT	0.00	54604.40
3.02	- Qty Received (Non Pit Head)	MT	767656.87	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	1779.47-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	765877.40	54604.40
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	6141.26	109.21
6.01	- Normative Loss (Pit Head)	MT	0.00	109.21
6.02	- Normative Loss (Non Pit Head)	MT	6141.26	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	759736.14	54495.19
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	1674600822.42	577242441.98
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	0.00	0.00
10	Handling, Sampling and such other Similar charges	Rs.	11405628.31	11616393.44-
11	Total Amount charged (8 +9+10)	Rs.	1686008450.73	565626048.54
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	1143470570.19	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	328691.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	1143141879.19	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	2829148329.92	565626048.54
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	3720.49	10354.42
19	Blending Ratio (Domestic/Imported)	%	93.00	7.00
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	4185.09	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	4185.09	4185.09
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	3684	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	3782	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	4996
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	5067
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	3870	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	3870	3870
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3193	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3105	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	4996
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	5067
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3243	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3243	3243

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		December-2023		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A)	OPENING QUANTITY			
1	Opening Stock of coal	MT	46991.35	143.00
2	Value of Stock	Rs.	174830857.64	1480664.28
B)	QUANTITY			
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	687501.06	96476.40
3.01	- Qty Received (Pit Head)	MT	0.00	96476.40
3.02	- Qty Received (Non Pit Head)	MT	687501.06	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	533.92-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	686967.14	96476.40
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	5500.01	192.95
6.01	- Normative Loss (Pit Head)	MT	0.00	192.95
6.02	- Normative Loss (Non Pit Head)	MT	5500.01	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	681467.13	96283.45
C)	PRICE			
8	Amount charged by the Coal / Lignite Company	Rs.	1964697113.09	960289177.98
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	0.00	0.00
10	Handling, Sampling and such other Similar charges	Rs.	112347566.37	0.00
11	Total Amount charged (8 +9+10)	Rs.	2077044681.46	960289177.98
D)	TRANSPORTATION			
12	Transportation charges by Rail / Ship / Road Transport	Rs.	938051755.00	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	364754.00-	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	938436509.00	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	3015481190.46	960289177.98
E)	TOTAL COST			
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	4379.54	9974.13
19	Blending Ratio (Domestic/Imported)	%	87.75	12.25
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	5064.99	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	5064.99	5064.99
F)	QUALITY			
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	3781	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	3654	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	5063
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	5002
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	3826	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	3826	3826
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3106	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3035	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	5063
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	5002
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3280	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3280	3280

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		January-2024		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	179861.48	19117.03
2	Value of Stock	Rs.	787710091.32	190675736.70
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	734040.00	119432.39
3.01	- Qty Received (Pit Head)	MT	0.00	119432.39
3.02	- Qty Received (Non Pit Head)	MT	734040.00	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	0.00	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	734040.00	119432.39
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	5872.32	238.87
6.01	- Normative Loss (Pit Head)	MT	0.00	238.87
6.02	- Normative Loss (Non Pit Head)	MT	5872.32	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	728167.68	119193.52
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	2095061571.84	1277587772.78
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	0.00	0.00
10	Handling, Sampling and such other Similar charges	Rs.	61497684.34	0.00
11	Total Amount charged (8 +9+10)	Rs.	2156559256.18	1277587772.78
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	1130309039.66	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	279222.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	1130029817.66	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	3286589073.84	1277587772.78
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	4486.97	10615.70
19	Blending Ratio (Domestic/Imported)	%	89.44	10.56
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	5134.08	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	5134.08	5134.08
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	3662	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	4050	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	5002
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	5048
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	4086	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	4086	4086
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3040	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3195	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	5002
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	5048
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3363	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3363	3363

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		February-2024		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A)	OPENING QUANTITY			
1	Opening Stock of coal	MT	136464.16	47058.56
2	Value of Stock	Rs.	612310157.11	499559561.83
B)	QUANTITY			
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	764059.48	178819.00
3.01	- Qty Received (Pit Head)	MT	0.00	178819.00
3.02	- Qty Received (Non Pit Head)	MT	764059.48	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	0.00	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	764059.48	178819.00
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	6112.48	357.64
6.01	- Normative Loss (Pit Head)	MT	0.00	357.64
6.02	- Normative Loss (Non Pit Head)	MT	6112.48	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	757947.00	178461.36
C)	PRICE			
8	Amount charged by the Coal / Lignite Company	Rs.	2620242260.79	1966344341.47
9	Adjustment (+/-) in amount charged by coal / Lignite Company	Rs.	0.00	0.00
10	Handling, Sampling and such other Similar charges	Rs.	16091723.36	25541808.00
11	Total Amount charged (8 +9+10)	Rs.	2636333984.15	1940802533.47
D)	TRANSPORTATION			
12	Transportation charges by Rail / Ship / Road Transport	Rs.	1181306360.34	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	1036106.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	1180270254.34	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	3816804238.49	1940802533.47
E)	TOTAL COST			
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	4951.77	10821.05
19	Blending Ratio (Domestic/Imported)	%	87.34	12.66
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	5694.54	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	5694.54	5694.54
F)	QUALITY			
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	3973	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	4610	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	5042
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	5025
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	4578	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	4578	4578
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3164	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3386	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	5042
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	5025
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3564	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3564	3564

Company		NTPC Limited		
Name of the generating Station		Sinhadri Super Thermal Power-STAGE 01		
Month		March-2024		
SL	Particulars	Unit	COAL- DOMESTIC	COAL - IMPORTED
A) OPENING QUANTITY				
1	Opening Stock of coal	MT	252849.17	133004.92
2	Value of Stock	Rs.	1252049497.11	1439252747.07
B) QUANTITY				
3	Quantity of Coal /Lignite supplied by Coal / Lignite Company	MT	792108.83	105985.29
3.01	- Qty Received (Pit Head)	MT	0.00	105985.29
3.02	- Qty Received (Non Pit Head)	MT	792108.83	0.00
4	Adjustment (+/-) in quantity supplied made by Coal / Lignite Company	MT	1102.94-	0.00
5	Coal supplied by Coal/Lignite Company (3+4)	MT	791005.89	105985.29
6	Normative transit & Handling losses (for Coal /Lignite based projects)	MT	6328.05	211.93
6.01	- Normative Loss (Pit Head)	MT	0.00	211.93
6.02	- Normative Loss (Non Pit Head)	MT	6328.05	0.00
7	Net Coal / Lignite supplied (5 - 6)	MT	784677.84	105753.36
C) PRICE				
8	Amount charged by the Coal / Lignite Company	Rs.	3128193739.08	1133125756.45
9	Adjustment (+ / -) in amount charged by coal / Lignite Company	Rs.	2776854.36-	0.00
10	Handling, Sampling and such other Similar charges	Rs.	112175801.37	0.00
11	Total Amount charged (8 +9+10)	Rs.	3237596686.09	1133125756.45
D) TRANSPORTATION				
12	Transportation charges by Rail / Ship / Road Transport	Rs.	1086593913.00	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs.	0.00	0.00
14	Demurrage charges, if any	Rs.	1540897.00	0.00
15	Cost of diesel in transporting Coal through MGR system, if applicable	Rs.	0.00	0.00
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs.	1088052916.00	0.00
17	Total amount charged for Coal / Lignite supplied including transportation (11 + 16)	Rs.	4322649602.09	1133125756.45
E) TOTAL COST				
18	Landed Cost of Coal/Lignite (2+17) / (1+7)	Rs./MT	5373.06	10773.99
19	Blending Ratio (Domestic/Imported)	%	86.26	13.74
20	Weighted average cost of Coal /Lignite (Including biomass)	Rs./MT	6115.05	
20.10	Weighted average cost of Coal /Lignite (Excluding biomass)	Rs./MT	6115.05	6115.05
F) QUALITY				
21	GCV of Domestic coal of the opening coal stock as per bill of coal company	kCal/Kg	4513	0
22	GCV of Domestic coal supplied as per bill of coal company	kCal/Kg	4624	0
23	GCV of Imported coal of the opening coal stock as per bill of coal company	kCal/Kg	0	5028
24	GCV of Imported coal supplied as per bill of coal company	kCal/Kg	0	4980
25	Weighted average GCV of Coal /Lignite as billed (Including biomass)	kCal/Kg	4653	
25.10	Weighted average GCV of Coal /Lignite as billed (Excluding biomass)	kCal/Kg	4653	4653
26	GCV of Domestic coal of the Opening stock as received at station	kCal/Kg	3362	0
27	GCV of Domestic coal/biomass supplied as received at station	kCal/Kg	3482	0
28	GCV of Imported coal of the Opening stock as received at station	kCal/Kg	0	5028
29	GCV of Imported coal supplied as received at station	kCal/Kg	0	4980
30	Weighted average GCV of coal/ Lignite as Received (Including biomass)	kCal/Kg	3664	
30.10	Weighted average GCV of coal/ Lignite as Received (Excluding biomass)	kCal/Kg	3664	3664

Weighted Average Price of Coal Rs./MT 5275.86

Weighted Average GCV of Coal kCal/Kg 3348.92

DETAILS OF SOURCE WISE FUEL FOR COMPUTATION OF ENERGY CHARGES			PART 1 FORM-15	
NAME OF THE PETITIONER			NTPC Limited	
NAME OF THE GENERATING STATION			Simhadri Super Thermal Power Station	
			Stage-I	
S NO.	MONTH	Unit	For the Month of	
			Apr-23	
			HFO	LDO
A)	OPENING QUANTITY			
1	OPENING QUANTITY OF OIL	(KL)	0.00	1372.76
2	VALUE OF STOCK		0	115660798
B)	QUANTITY			
3	QUANTITY OF OIL SUPPLIED BY OIL/LIGNIE COMPANY	(KL)	0.00	608.96
4	ADJUSTMENT (+/-) IN QUANTITY SUPPLIED MADE BY OIL COMPANY	(KL)		
5	OIL SUPPLIED BY OIL COMPANY(3+4)	(KL)	0.00	608.96
6	NORMATIVE TRANSIT & HANDLING LOSSES (FOR OIL BASED PROJECTS)	(KL)		
7	NET OIL SUPPLIED (5-6)	(KL)	0.00	608.96
C)	PRICE			
8	AMOUNT CHARGED BY OIL COMPANY	(Rs.)	0	46926815
9	ADJUSTMENT(+/-) IN AMOUNT CHARGED BY OIL COMPANY	(Rs.)		
10	HANDLING, SAMPLING AND SUCH OTHER SIMILAR CHARGES			
11	TOTAL AMOUNT CHARGED (8+9+10)	(Rs.)	0	46926815
D)	TRANSPORTATION			
12	TRANSPORTATION CHARGES BY RAIL/ROAD/SHIP TRANSPORT	(Rs.)	0	0
	BY RAIL			
	BY ROAD		0	0
	BY SHIP			
13	ADJUSTMENT(+/-) IN AMOUNT CHARGED MADE BY	(Rs.)		
14	DEMURRAGE CHARGES, IF ANY	(Rs.)		
15	COST OF DIESEL IN TRANSPORTING OIL THROUGH MGR SYSTEM, IF APPLICABLE	(Rs.)		
16	TOTAL TRANSPORTATION CHARGES(12+13+14+15)	(Rs.)	0	0
17	TOTAL AMOUNT CHARGED FOR OIL SUPPLIED INCLUDING TRANSPORTATION (11+16)	(Rs.)	0	46926815
E)	TOTAL COST			
18	LANDED COST OF OIL(2+17)/(1+7)	Rs./KL	0	82044
19	BLENDING RATIO(IMPORTED)		0.00	1.00
20	WEIGHTED AVERAGE COST OF OIL	Rs./KL	82043.85	
F)	QUALITY			
21	GCV OF OIL OF THE OPENING STOCK AS PER BILL OF OIL COMPANY	(KCAL/L)		
22	GCV OF OIL SUPPLIED AS PER BILL OF OIL COMPANY	(KCAL/L)		
23	GCV OF OIL OF THE OPENING STOCK AS PER BILL OF OIL COMPANY	(KCAL/L)		
24	GCV OF OIL SUPPLIED AS PER BILL OF OIL COMPANY	(KCAL/L)		
25	WEIGHTED AVERAGE GCV OF OIL AS BILLED	(KCAL/L)		
26	GCV OF OIL OF THE OPENING STOCK AS RECEIVED AT STATION	(KCAL/L)		
27	GCV OF OIL SUPPLIED AS RECEIVED AT STATION	(KCAL/L)		9236
28	GCV OF OIL OF OPENING STOCK AS RECEIVED AT STATION	(KCAL/L)		
29	GCV OF OIL SUPPLIED AS RECEIVED AT STATION	(KCAL/L)		
30	WEIGHTED AVERAGE GCV OF OIL AS RECEIVED	(KCAL/L)	9236	

DETAILS OF SOURCE WISE FUEL FOR COMPUTATION OF ENERGY CHARGES				PART 1
				FORM-15
NAME OF THE PETITIONER			NTPC Limited	
NAME OF THE GENERATING STATION			Simhadri Super Thermal Power Station	
				Stage-I
S NO.	MONTH	Unit	For the Month of	
			May-23	
			HFO	LDO
A)	OPENING QUANTITY			
1	OPENING QUANTITY OF OIL	(KL)	0.00	1830.24
2	VALUE OF STOCK		0	150159939
B)	QUANTITY			
3	QUANTITY OF OIL SUPPLIED BY OIL/LIGNIE COMPANY	(KL)	0.00	1122.96
4	ADJUSTMENT (+/-) IN QUANTITY SUPPLIED MADE BY OIL COMPANY	(KL)		
5	OIL SUPPLIED BY OIL COMPANY(3+4)	(KL)	0.00	1122.96
6	NORMATIVE TRANSIT & HANDLING LOSSES (FOR OIL BASED PROJECTS)	(KL)		
7	NET OIL SUPPLIED (5-6)	(KL)	0.00	1,122.96
C)	PRICE			
8	AMOUNT CHARGED BY OIL COMPANY	(Rs.)	0	78836703
9	ADJUSTMENT(+/-) IN AMOUNT CHARGED BY OIL COMPANY	(Rs.)		
10	HANDLING, SAMPLING AND SUCH OTHER SIMILAR CHARGES			
11	TOTAL AMOUNT CHARGED (8+9+10)	(Rs.)	0	78836703
D)	TRANSPORTAION			
12	TRANSPORTATION CHARGES BY RAIL/ROAD/SHIP TRANSPORT	(Rs.)	0	0
	BY RAIL			
	BY ROAD		0	0
	BY SHIP			
13	ADJUSTMENT(+/-) IN AMOUNT CHARGED MADE BY	(Rs.)		
14	DEMURRAGE CHARGES, IF ANY	(Rs.)		
15	COST OF DIESEL IN TRANSPOTING OIL THROUGH MGR SYSTEM, IF APPLICABLE	(Rs.)		
16	TOTAL TRANSPORTATION CHARGES(12+13+14+15)	(Rs.)	0	0
17	TOTAL AMOUNT CHARGED FOR OIL SUPPLIED INCLUDING TRANSPORTATION (11+16)	(Rs.)	0	78836703
E)	TOTAL COST			
18	LANDED COST OF OIL(2+17)/(1+7)	Rs./KL	0	77542
19	BLENDED RATIO(IMPORTED)		0.00	
20	WEIGHTED AVERAGE COST OF OIL	Rs./KL	77541.87	
F)	QUALITY			
21	GCV OF OIL OF THE OPENING STOCK AS PER BILL OF OIL COMPANY	(KCAL/L)		
22	GCV OF OIL SUPPLIED AS PER BILL OF OIL COMPANY	(KCAL/L)		
23	GCV OF OIL OF THE OPENING STOCK AS PER BILL OF OIL COMPANY	(KCAL/L)		
24	GCV OF OIL SUPPLIED AS PER BILL OF OIL COMPANY	(KCAL/L)		
25	WEIGHTED AVERAGE GCV OF OIL AS BILLED	(KCAL/L)		
26	GCV OF OIL OF THE OPENING STOCK AS RECEIVED AT STATION	(KCAL/L)		
27	GCV OF OIL SUPPLIED AS RECEIVED AT STATION	(KCAL/L)		9266
28	GCV OF OIL OF OPENING STOCK AS RECEIVED AT STATION	(KCAL/L)		
29	GCV OF OIL SUPPLIED AS RECEIVED AT STATION	(KCAL/L)		
30	WEIGHTED AVERAGE GCV OF OIL AS RECEIVED	(KCAL/L)	9266	

Details of Sourcewise fuel for computation of Energy Charges			FORM -15
Company			
Name of the generating Station			SIMHADRI STAGE I
Month			June-2023
SL	Particulars	Unit	LDO
A) OPENING QUANTITY			
1	Opening Stock of Oil	KL	1,828.19
2	Value of Stock	Rs	14,17,60,955.90
B) QUANTITY			
3	Quantity of LDO/HFO supplied by Oil Company	KL	268.00
4	Adjustment (+/-) in quantity supplied made by Oil Company	KL	0.00
5	LDO/HFO supplied by Oil Company (3+4)	KL	268.00
6	Normative transit & Handling losses	KL	NA
7	Net Oil supplied (5 - 6)	KL	268.00
C) PRICE			
8	Amount charged by the Oil Company	Rs	1,87,15,079.00
9	Adjustment (+ / -) in amount charged by Oil Company	Rs	0.00
10	Handling, Sampling and such other Similar charges	Rs	0.00
11	Total Amount charged (8 +9+10)	Rs	1,87,15,079.00
D) TRANSPORTATION			
12	Transportation charges by Rail / Ship / Road Transport		
	By Rail	Rs	0.00
	By Road	Rs	0.00
	By Ship	Rs	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs	0.00
14	Demurrage charges, if any	Rs	0.00
15	Cost of diesel in transporting LDO/HFO through MGR system, if applicable	Rs	0
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs	0.00
17	Total amount charged for Oil supplied including transportation (11 + 16)	Rs	1,87,15,079.00
E) TOTAL COST			
18	Landed Cost of Oil (HFO/LDO) (2+17) / (1+7)	Rs/KL	76,556.20
19	Blending Ratio		NA
20	Weighted average cost of Oil		76,556.20
F) QUALITY			
21	GCV of Oil of the opening stock as per bill of Oil company	(Kcal/Ltr)	NA
22	GCV of oil supplied as per bill of oil company	(Kcal/Ltr)	NA
23	GCV of Imported coal of the opening coal stock as per bill of coal company	(Kcal/Ltr)	
24	GCV of Imported coal supplied as per bill of coal company	(Kcal/Ltr)	
25	Weighted average GCV of Oil as billed	(Kcal/Ltr)	NA
26	GCV of Oil of the Opening stock as received at station	(Kcal/Ltr)	
27	GCV of Oil supplied (HFO/LDO)	(Kcal/Ltr)	
28	GCV of Imported coal of the Opening stock as received at station	(Kcal/Ltr)	
29	GCV of Imported coal supplied as received at station	(Kcal/Ltr)	
30	Weighted average GCV of Oil (HFO/LDO)	(Kcal/Ltr)	9220

Details of Sourcewise fuel for computation of Energy Charges			FORM -15
Company			
Name of the generating Station			SIMHADRI STAGE I
Month			July-2023
SL	Particulars	Unit	LDO
A)	OPENING QUANTITY		
1	Opening Stock of Oil	KL	1,790.07
2	Value of Stock	Rs	13,70,40,650.92
B)	QUANTITY		
3	Quantity of LDO/HFO supplied by Oil Company	KL	0.00
4	Adjustment (+/-) in quantity supplied made by Oil Company	KL	0.00
5	LDO/HFO supplied by Oil Company (3+4)	KL	0.00
6	Normative transit & Handling losses	KL	NA
7	Net Oil supplied (5 - 6)	KL	0.00
C)	PRICE		
8	Amount charged by the Oil Company	Rs	0.00
9	Adjustment (+ / -) in amount charged by Oil Company	Rs	0.00
10	Handling, Sampling and such other Similar charges	Rs	0.00
11	Total Amount charged (8 +9+10)	Rs	0.00
D)	TRANSPORTATION	Rs	
12	Transportation charges by Rail / Ship / Road Transport		
	By Rail	Rs	0.00
	By Road	Rs	0.00
	By Ship	Rs	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs	0.00
14	Demurrage charges, if any	Rs	0.00
15	Cost of diesel in transporting LDO/HFO through MGR system, if applicable	Rs	0
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs	0.00
17	Total amount charged for Oil supplied including transportation (11 + 16)	Rs	0.00
E)	TOTAL COST		
18	Landed Cost of Oil (HFO/LDO) (2+17) / (1+7)	Rs/KL	76,556.20
19	Blending Ratio		NA
20	Weighted average cost of Oil		76,556.20
F)	QUALITY		
21	GCV of Oil of the opening stock as per bill of Oil company	(Kcal/Ltr)	NA
22	GCV of oil supplied as per bill of oil company	(Kcal/Ltr)	NA
23	GCV of Imported coal of the opening coal stock as per bill of coal company	(Kcal/Ltr)	
24	GCV of Imported coal supplied as per bill of coal company	(Kcal/Ltr)	
25	Weighted average GCV of Oil as billed	(Kcal/Ltr)	NA
26	GCV of Oil of the Opening stock as received at station	(Kcal/Ltr)	
27	GCV of Oil supplied (HFO/LDO)	(Kcal/Ltr)	
28	GCV of Imported coal of the Opening stock as received at station	(Kcal/Ltr)	
29	GCV of Imported coal supplied as received at station	(Kcal/Ltr)	
30	Weighted average GCV of Oil (HFO/LDO)	(Kcal/Ltr)	9224

Details of Sourcewise fuel for computation of Energy Charges			FORM -15
Company			
Name of the generating Station			SIMHADRI STAGE I
Month			August-2023
SL	Particulars	Unit	LDO
A)	OPENING QUANTITY		
1	Opening Stock of Oil	KL	1,758.93
2	Value of Stock	Rs	13,46,56,997.08
B)	QUANTITY		
3	Quantity of LDO/HFO supplied by Oil Company	KL	417.00
4	Adjustment (+/-) in quantity supplied made by Oil Company	KL	0.00
5	LDO/HFO supplied by Oil Company (3+4)	KL	417.00
6	Normative transit & Handling losses	KL	NA
7	Net Oil supplied (5 - 6)	KL	417.00
C)	PRICE		
8	Amount charged by the Oil Company	Rs	3,49,92,463.40
9	Adjustment (+ / -) in amount charged by Oil Company	Rs	0.00
10	Handling, Sampling and such other Similar charges	Rs	0.00
11	Total Amount charged (8 +9+10)	Rs	3,49,92,463.40
D)	TRANSPORTATION	Rs	
12	Transportation charges by Rail / Ship / Road Transport		
	By Rail	Rs	0.00
	By Road	Rs	0.00
	By Ship	Rs	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs	0.00
14	Demurrage charges, if any	Rs	0.00
15	Cost of diesel in transporting LDO/HFO through MGR system, if applicable	Rs	0
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs	0.00
17	Total amount charged for Oil supplied including transportation (11 + 16)	Rs	3,49,92,463.40
E)	TOTAL COST		
18	Landed Cost of Oil (HFO/LDO) (2+17) / (1+7)	Rs/KL	77,966.41
19	Blending Ratio		NA
20	Weighted average cost of Oil		77,966.41
F)	QUALITY		
21	GCV of Oil of the opening stock as per bill of Oil company	(Kcal/Ltr)	NA
22	GCV of oil supplied as per bill of oil company	(Kcal/Ltr)	NA
23	GCV of Imported coal of the opening coal stock as per bill of coal company	(Kcal/Ltr)	
24	GCV of Imported coal supplied as per bill of coal company	(Kcal/Ltr)	
25	Weighted average GCV of Oil as billed	(Kcal/Ltr)	NA
26	GCV of Oil of the Opening stock as received at station	(Kcal/Ltr)	
27	GCV of Oil supplied (HFO/LDO)	(Kcal/Ltr)	
28	GCV of Imported coal of the Opening stock as received at station	(Kcal/Ltr)	
29	GCV of Imported coal supplied as received at station	(Kcal/Ltr)	
30	Weighted average GCV of Oil (HFO/LDO)	(Kcal/Ltr)	9204

Details of Sourcewise fuel for computation of Energy Charges			FORM -15
Company			
Name of the generating Station			SIMHADRI STAGE I
Month			September- 2023
SL	Particulars	Unit	LDO
A)	OPENING QUANTITY		
1	Opening Stock of Oil	KL	1,630.144
2	Value of Stock	Rs	12,70,96,482.93
B)	QUANTITY		
3	Quantity of LDO/HFO supplied by Oil Company	KL	0.00
4	Adjustment (+/-) in quantity supplied made by Oil Company	KL	0.00
5	LDO/HFO supplied by Oil Company (3+4)	KL	0.00
6	Normative transit & Handling losses	KL	NA
7	Net Oil supplied (5 - 6)	KL	0.00
C)	PRICE		
8	Amount charged by the Oil Company	Rs	0.00
9	Adjustment (+ / -) in amount charged by Oil Company	Rs	0.00
10	Handling, Sampling and such other Similar charges	Rs	0.00
11	Total Amount charged (8 +9+10)	Rs	0.00
D)	TRANSPORTATION	Rs	
12	Transportation charges by Rail / Ship / Road Transport		
	By Rail	Rs	0.00
	By Road	Rs	0.00
	By Ship	Rs	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs	0.00
14	Demurrage charges, if any	Rs	0.00
15	Cost of diesel in transporting LDO/HFO through MGR system, if applicable	Rs	0
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs	0.00
17	Total amount charged for Oil supplied including transportation (11 + 16)	Rs	0.00
E)	TOTAL COST		
18	Landed Cost of Oil (HFO/LDO) (2+17) / (1+7)	Rs/KL	77,966.41
19	Blending Ratio		NA
20	Weighted average cost of Oil		77,966.41
F)	QUALITY		
21	GCV of Oil of the opening stock as per bill of Oil company	(Kcal/Ltr)	NA
22	GCV of oil supplied as per bill of oil company	(Kcal/Ltr)	NA
23	GCV of Imported coal of the opening coal stock as per bill of coal company	(Kcal/Ltr)	
24	GCV of Imported coal supplied as per bill of coal company	(Kcal/Ltr)	
25	Weighted average GCV of Oil as billed	(Kcal/Ltr)	NA
26	GCV of Oil of the Opening stock as received at station	(Kcal/Ltr)	
27	GCV of Oil supplied (HFO/LDO)	(Kcal/Ltr)	
28	GCV of Imported coal of the Opening stock as received at station	(Kcal/Ltr)	
29	GCV of Imported coal supplied as received at station	(Kcal/Ltr)	
30	Weighted average GCV of Oil (HFO/LDO)	(Kcal/Ltr)	9201

Details of Sourcewise fuel for computation of Energy Charges			FORM -15
Company			
Name of the generating Station			SIMHADRI STAGE I
Month			October- 2023
SL	Particulars	Unit	LDO
A)	OPENING QUANTITY		
1	Opening Stock of Oil	KL	1,476.829
2	Value of Stock	Rs	11,51,43,062.08
B)	QUANTITY		
3	Quantity of LDO/HFO supplied by Oil Company	KL	763.00
4	Adjustment (+/-) in quantity supplied made by Oil Company	KL	0.00
5	LDO/HFO supplied by Oil Company (3+4)	KL	763.00
6	Normative transit & Handling losses	KL	NA
7	Net Oil supplied (5 - 6)	KL	763.00
C)	PRICE		
8	Amount charged by the Oil Company	Rs	7,02,26,520.00
9	Adjustment (+ / -) in amount charged by Oil Company	Rs	0.00
10	Handling, Sampling and such other Similar charges	Rs	0.00
11	Total Amount charged (8 +9+10)	Rs	7,02,26,520.00
D)	TRANSPORTATION	Rs	
12	Transportation charges by Rail / Ship / Road Transport		
	By Rail	Rs	0.00
	By Road	Rs	0.00
	By Ship	Rs	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs	0.00
14	Demurrage charges, if any	Rs	0.00
15	Cost of diesel in transporting LDO/HFO through MGR system, if applicable	Rs	0
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs	0.00
17	Total amount charged for Oil supplied including transportation (11 + 16)	Rs	7,02,26,520.00
E)	TOTAL COST		
18	Landed Cost of Oil (HFO/LDO) (2+17) / (1+7)	Rs/KL	82,760.60
19	Blending Ratio		NA
20	Weighted average cost of Oil		82,760.60
F)	QUALITY		
21	GCV of Oil of the opening stock as per bill of Oil company	(Kcal/Ltr)	NA
22	GCV of oil supplied as per bill of oil company	(Kcal/Ltr)	NA
23	GCV of Imported coal of the opening coal stock as per bill of coal company	(Kcal/Ltr)	
24	GCV of Imported coal supplied as per bill of coal company	(Kcal/Ltr)	
25	Weighted average GCV of Oil as billed	(Kcal/Ltr)	NA
26	GCV of Oil of the Opening stock as received at station	(Kcal/Ltr)	
27	GCV of Oil supplied (HFO/LDO)	(Kcal/Ltr)	
28	GCV of Imported coal of the Opening stock as received at station	(Kcal/Ltr)	
29	GCV of Imported coal supplied as received at station	(Kcal/Ltr)	
30	Weighted average GCV of Oil (HFO/LDO)	(Kcal/Ltr)	9193

	Details of Sourcewise fuel for computation of Energy Charges		FORM -15A
	Company		
	Name of the generating Station		SIMHADRI STAGE I
	Month		November- 2023
SL	Particulars	Unit	LDO
A)	OPENING QUANTITY		
1	Opening Stock of Oil	KL	1,882.636
2	Value of Stock	Rs	15,58,08,076.65
B)	QUANTITY		
3	Quantity of LDO/HFO supplied by Oil Company	KL	0.00
4	Adjustment (+/-) in quantity supplied made by Oil Company	KL	0.00
5	LDO/HFO supplied by Oil Company (3+4)	KL	0.00
6	Normative transit & Handling losses	KL	NA
7	Net Oil supplied (5 - 6)	KL	0.00
C)	PRICE		
8	Amount charged by the Oil Company	Rs	0.00
9	Adjustment (+ / -) in amount charged by Oil Company	Rs	0.00
10	Handling, Sampling and such other Similar charges	Rs	0.00
11	Total Amount charged (8 +9+10)	Rs	0.00
D)	TRANSPORTATION	Rs	
12	Transportation charges by Rail / Ship / Road Transport		
	By Rail	Rs	0.00
	By Road	Rs	0.00
	By Ship	Rs	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs	0.00
14	Demurrage charges, if any	Rs	0.00
15	Cost of diesel in transporting LDO/HFO through MGR system, if applicable	Rs	0
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs	0.00
17	Total amount charged for Oil supplied including transportation (11 + 16)	Rs	0.00
E)	TOTAL COST		
18	Landed Cost of Oil (HFO/LDO) (2+17) / (1+7)	Rs/KL	82,760.60
19	Blending Ratio		NA
20	Weighted average cost of Oil		82,760.60
F)	QUALITY		
21	GCV of Oil of the opening stock as per bill of Oil company	(Kcal/Ltr)	NA
22	GCV of oil supplied as per bill of oil company	(Kcal/Ltr)	NA
23	GCV of Imported coal of the opening coal stock as per bill of coal company	(Kcal/Ltr)	
24	GCV of Imported coal supplied as per bill of coal company	(Kcal/Ltr)	
25	Weighted average GCV of Oil as billed	(Kcal/Ltr)	NA
26	GCV of Oil of the Opening stock as received at station	(Kcal/Ltr)	
27	GCV of Oil supplied (HFO/LDO)	(Kcal/Ltr)	
28	GCV of Imported coal of the Opening stock as received at station	(Kcal/Ltr)	
30	Weighted average GCV of Oil (HFO/LDO)	(Kcal/Ltr)	9197

	Details of Sourcewise fuel for computation of Energy Charges		FORM -15A
	Company		
	Name of the generating Station		SIMHADRI STAGE I
	Month		December- 2023
SL	Particulars	Unit	LDO
A)	OPENING QUANTITY		
1	Opening Stock of Oil	KL	1,816.042
2	Value of Stock	Rs	15,02,88,786.57
B)	QUANTITY		
3	Quantity of LDO/HFO supplied by Oil Company	KL	317.00
4	Adjustment (+/-) in quantity supplied made by Oil Company	KL	0.00
5	LDO/HFO supplied by Oil Company (3+4)	KL	317.00
6	Normative transit & Handling losses	KL	NA
7	Net Oil supplied (5 - 6)	KL	317.00
C)	PRICE		
8	Amount charged by the Oil Company	Rs	2,42,91,456.40
9	Adjustment (+ / -) in amount charged by Oil Company	Rs	0.00
10	Handling, Sampling and such other Similar charges	Rs	0.00
11	Total Amount charged (8 +9+10)	Rs	2,42,91,456.40
D)	TRANSPORTATION	Rs	
12	Transportation charges by Rail / Ship / Road Transport		
	By Rail	Rs	0.00
	By Road	Rs	0.00
	By Ship	Rs	0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs	0.00
14	Demurrage charges, if any	Rs	0.00
15	Cost of diesel in transporting LDO/HFO through MGR system, if applicable	Rs	0
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs	0.00
17	Total amount charged for Oil supplied including transportation (11 + 16)	Rs	2,42,91,456.40
E)	TOTAL COST		
18	Landed Cost of Oil (HFO/LDO) (2+17) / (1+7)	Rs/KL	81,850.35
19	Blending Ratio		NA
20	Weighted average cost of Oil		81,850.35
F)	QUALITY		
21	GCV of Oil of the opening stock as per bill of Oil company	(Kcal/Ltr)	NA
22	GCV of oil supplied as per bill of oil company	(Kcal/Ltr)	NA
23	GCV of Imported coal of the opening coal stock as per bill of coal company	(Kcal/Ltr)	
24	GCV of Imported coal supplied as per bill of coal company	(Kcal/Ltr)	
25	Weighted average GCV of Oil as billed	(Kcal/Ltr)	NA
26	GCV of Oil of the Opening stock as received at station	(Kcal/Ltr)	
27	GCV of Oil supplied (HFO/LDO)	(Kcal/Ltr)	
28	GCV of Imported coal of the Opening stock as received at station	(Kcal/Ltr)	
30	Weighted average GCV of Oil (HFO/LDO)	(Kcal/Ltr)	9091

Details of Sourcewise fuel for computation of Energy Charges		FORM -15A
Company		
Name of the generating Station		SIMHADRI STAGE I
Month		January- 2024
SL	Particulars	Unit LDO
A)	OPENING QUANTITY	
1	Opening Stock of Oil	KL 1,817.451
2	Value of Stock	Rs 14,87,59,007.87
B)	QUANTITY	
3	Quantity of LDO/HFO supplied by Oil Company	KL 916.98
4	Adjustment (+/-) in quantity supplied made by Oil Company	KL 0.00
5	LDO/HFO supplied by Oil Company (3+4)	KL 916.98
6	Normative transit & Handling losses	KL NA
7	Net Oil supplied (5 - 6)	KL 916.98
C)	PRICE	
8	Amount charged by the Oil Company	Rs 7,00,93,857.52
9	Adjustment (+ / -) in amount charged by Oil Company	Rs 0.00
10	Handling, Sampling and such other Similar charges	Rs 0.00
11	Total Amount charged (8 +9+10)	Rs 7,00,93,857.52
D)	TRANSPORTATION	
12	Transportation charges by Rail / Ship / Road Transport	
	By Rail	Rs 0.00
	By Road	Rs 0.00
	By Ship	Rs 0.00
13	Adjustment (+/-) in amount charged by railways / transport company	Rs 0.00
14	Demurrage charges, if any	Rs 0.00
15	Cost of diesel in transporting LDO/HFO through MGR system, if applicable	Rs 0
16	Total transportation charges (12+/- 13 - 14 + 15)	Rs 0.00
17	Total amount charged for Oil-supplied including transportation (11 + 16)	Rs 7,00,93,857.52
E)	TOTAL COST	
18	Landed Cost of Oil (HFO/LDO) (2+17) / (1+7)	Rs/KL 80,035.92
19	Blending Ratio	NA
20	Weighted average cost of Oil	80,035.92
F)	QUALITY	
21	GCV of Oil of the opening stock as per bill of Oil company	(Kcal/Ltr) NA
22	GCV of oil supplied as per bill of oil company	(Kcal/Ltr) NA
23	GCV of Imported coal of the opening coal stock as per bill of coal company	(Kcal/Ltr)
24	GCV of Imported coal supplied as per bill of coal company	(Kcal/Ltr)
25	Weighted average GCV of Oil as billed	(Kcal/Ltr) NA
26	GCV of Oil of the Opening stock as received at station	(Kcal/Ltr)
27	GCV of Oil supplied (HFO/LDO)	(Kcal/Ltr)
28	GCV of Imported coal of the Opening stock as received at station	(Kcal/Ltr)
30	Weighted average GCV of Oil (HFO/LDO)	(Kcal/Ltr) 9144

Details of Sourcewise fuel for computation of Energy Charges

Company Name of the generating Station Month		NTPC Limited Simhadri Super Thermal Power(STAGE 01) Feb-24			
SL	Particulars	Unit	LDO	HFO	HSD
A)	OPENING QUANTITY				
1	Opening Stock Of Oil	KL	1739.699	0.000	0.000
2	Value Of Stock	Rs.	139238413.00	0.00	0.00
B)	QUANTITY				
3	Quantity Of Oil Supplied By Oil Company	KL	0.000	0.000	0.000
4	Adjustment (+/-) In Quantity Supplied Made By Oil Company	KL	0.000	0.000	0.000
5	Oil Supplied By Oil Company (3+4)	KL	0.000	0.000	0.000
6	Normative Transp. & Handling Losses	KL	0.000	0.000	0.000
7	Net Oil Supplied (5 - 6)	KL	0.000	0.000	0.000
C)	PRICE				
8	Amount Charged By The Oil Company	Rs.	0.00	0.00	0.00
9	Adjustment (+/-) In Amount Charged By Oil Company	Rs.	0.00	0.00	0.00
10	Handling, Sampling And Such Other Similar Charges	Rs.	0.00	0.00	0.00
11	Total Amount Charged (8 +9+10)	Rs.	0.00	0.00	0.00
D)	TRANSPORTATION				
12	Transportation Charges By Rail / Ship / Road Transport	Rs.	0.00	0.00	0.00
13	Adjustment (+/-) In Amount Charged By Railways/Transport	Rs.	0.00	0.00	0.00
14	Demurrage Charges, If Any	Rs.	0.00	0.00	0.00
15	Cost Of Diesel In Transporting Coal Through MGR System	Rs.	0.00	0.00	0.00
16	Total Transportation Charges (12+/- 13 - 14 + 15)	Rs.	0.00	0.00	0.00
17	Total Amount Charged For Oil Supplied Incl Transportation (11+16)	Rs.	0.00	0.00	0.00
E)	TOTAL COST				
18	Landed Cost Of Oil (LDG/HFO) (2+17) / (1+7)	Rs.	80035.92	0.00	0.00
19	Blending Ratio		1.000	0.000	0.000
20	Weighted Average Cost Of Oil	Rs.	80035.92		
F)	QUALITY				
21	GCV Of Oil Of The Opening Stock As Per Bill Of Oil Company	Kcal/Ltr	0	0	0
22	GCV Of Oil Supplied As Per Bill Of Oil Company	Kcal/Ltr	0	0	0
23	GCV Of Imported Oil Of The Op Stock As Per Bill Of Oil Company	Kcal/Ltr	0	0	0
24	GCV Of Imported Oil Supplied As Per Bill Of Oil Company	Kcal/Ltr	0	0	0
25	Weighted Average GCV Of Oil As Billed	Kcal/Ltr	0	0	0
26	GCV Of Oil Of The Opening Stock As Received At Station	Kcal/Ltr	0	0	0
27	GCV Of Oil Supplied	Kcal/Ltr	9183	0	0
28	GCV Of Imported Oil Of The Opening Stock As Received At Station	Kcal/Ltr	0	0	0
29	GCV Of Imported Oil Supplied As Received At Station	Kcal/Ltr	0	0	0
30	Weighted Average GCV Of Oil	Kcal/Ltr	9183		

Details of Sourcewise fuel for computation of Energy Charges

Company Name of the generating Station Month		NTPC Limited Simhadri Super Thermal Power(STAGE 01) Mar-24			
SL	Particulars	Unit	LDO	HFO	HSD
A)	OPENING QUANTITY				
1	Opening Stock Of Oil	KL	1645.782	0.000	0.000
2	Value Of Stock	Rs.	131721679.00	0.00	0.00
B)	QUANTITY				
3	Quantity Of Oil Supplied By Oil Company	KL	45.000	0.000	0.000
4	Adjustment (+/-) In Quantity Supplied Made By Oil Company	KL	0.000	0.000	0.000
5	Oil Supplied By Oil Company (3+4)	KL	45.000	0.000	0.000
6	Normative Transit & Handling Losses	KL	0.000	0.000	0.000
7	Net Oil Supplied (5 - 6)	KL	45.000	0.000	0.000
C)	PRICE				
8	Amount Charged By The Oil Company	Rs.	3503007.00	0.00	0.00
9	Adjustment (+/-) In Amount Charged By Oil Company	Rs.	0.00	0.00	0.00
10	Handling, Sampling And Such Other Similar Charges	Rs.	0.00	0.00	0.00
11	Total Amount Charged (8 +9+10)	Rs.	3503007.00	0.00	0.00
D)	TRANSPORTATION				
12	Transportation Charges By Rail / Ship / Road Transport	Rs.	0.00	0.00	0.00
13	Adjustment (+/-) In Amount Charged By Railways/Transport	Rs.	0.00	0.00	0.00
14	Demurrage Charges, If Any	Rs.	0.00	0.00	0.00
15	Cost Of Diesel In Transporting Oil Through MGR System	Rs.	0.00	0.00	0.00
16	Total Transportation Charges (12+/- 13 - 14 + 15)	Rs.	0.00	0.00	0.00
17	Total Amount Charged For Oil Supplied Incl Transportation (11+16)	Rs.	3503007.00	0.00	0.00
E)	TOTAL COST				
18	Landed Cost Of Oil (LDO/HFO) (2+17) / (1+7)	Rs.	79977.60	0.00	0.00
19	Blending Ratio		1.000	0.000	0.000
20	Weighted Average Cost Of Oil	Rs.	79977.60		
F)	QUALITY				
21	GCV Of Oil Of The Opening Stock As Per Bill Of Oil Company	Kcal/Ltr	0	0	0
22	GCV Of Oil Supplied As Per Bill Of Oil Company	Kcal/Ltr	0	0	0
23	GCV Of Imported Oil Of The Op Stock, As Per Bill Of Oil Company	Kcal/Ltr	0	0	0
24	GCV Of Imported Oil Supplied As Per Bill Of Oil Company	Kcal/Ltr	0	0	0
25	Weighted Average GCV Of Oil As Billed	Kcal/Ltr	0	0	0
26	GCV Of Oil Of The Opening Stock As Received At Station	Kcal/Ltr	0	0	0
27	GCV Of Oil Supplied	Kcal/Ltr	9157	0	0
28	GCV Of Imported Oil Of The Opening Stock As Received At Station	Kcal/Ltr	0	0	0
29	GCV Of Imported Oil Supplied As Received At Station	Kcal/Ltr	0	0	0
30	Weighted Average GCV Of Oil	Kcal/Ltr	9157		

Weighted Average Rate of OIL	Rs / KL	79,670.99
Weighted Average GCV of OIL	Kcal/Ltr	9,193.00

Details of Water Charges

Name of the Petitioner: NTPC Limited
Name of the Generating Station: Simhadri STPS SI-I (2x500 MW)

S. No.	Details of Water charges (excluding water cess)	Quantity allocated	Actual water consumption			Normative consumption at 100% PLF	Rate specified (as per govt. notification or agreement)	Spillage of water (in percentage)	Amount Claimed
	Name of source and quantity	Amount	Unit....	Plant	Other than plant	Total	Unit....		
1	Sweet water is being supplied from Yeleru reservoir through canal by gravity flow or through pumping.	Details shall be provided at the time of truing up							
2									
3									
4									
5	Sea water is taken from sea								
6									

Note:

1) Sweet water is being supplied from Yeleru reservoir through canal by gravity flow. Due deficit rainfall in Yeleru reservoir catchment area, level was below gravity level flow. Pumping power charges were paid additional to normal water charges. Way leave Charges: payable as per notification of Energy, Infrastructure & Investment (PORTS-II) Department, Govt of Andhra Pradesh
2) Notification of water charges rate are Attached at Annexure-XIII

(Petitioner)

PART 1
FORM- 20

Name of the Petitioner		<u>Details of Statutory Charges</u>	
Name of the Generating		NTPC Limited	
		Simhadri STPS St-I (2x500 MW)	
Particulars	Unit Rate	No of Units	Amount Claimed
Electricity Duty	Shall be provided at the time of truing up, if any		
Water Cess			
....			

(Petitioner)

Statement of Additional Capitalisation during five year before the end of useful life of the Project

Name of the Company : NTPC Limited
Name of the Power Station : Simhadri Super Thermal power Station Stage-I
COD 01-03-2003

(Amount in Rs. Lakh)

S. No	Year	Work / Equipment added during last five years of useful life of each Unit/Station	ACE Claimed (Actual / Projected)				Regulation s under which claimed	Justification	Impact on life extension
			Accrual basis	Un-discharged Liability included in col. 4	Cash basis	IDC included in col. 4			
1	2	3	4	5	(6 = 4 - 5)	7	8	9	10
1		Replacement of Steam and Water Analysis System (SWAS)	300.00	0	300.00				-
2		Fire Detection and Protection System (FDPS) replacement in Admin building	100	-	100				-
3		LT switchgear	200	-	200				-
4	2024-25	DCS upgradation	7,000	-	7,000			Please refer form 9 for the year 2024-25	-
5		Fire system upgradation	216	-	216				-
6		CCTV Cameras for coverage of Switch gear room	120	-	120				-
7		Generator auxiliaries	75	-	75				-
8		Electrochlorination & CLO2 System	150	-	150				-
9		Electrolyser	250	-	250				-
10		Battery bank Replacement	155	-	155			Please refer form 9 for the year 2025-26	-
11		Upgradation of end winding vibration systems of generator	300	-	300				-
12		LT switchgear	800	-	800				-
13	2025-26	DCS upgradation	3,600	-	3,600				-
14		Electrochlorination & CLO2 System	750	-	750				-
15		RTV Coating of 400KV insulators	150	-	150				-
16		HT Switchgear	700	-	700				-
17		2000 KVA /1600/1000 KVA Transformer and auxiliaries	80	-	80				-

18	Battery bank Replacement	130	-	130		-
19	Upgradation of end winding vibration systems of generator	500	-	500		-
20	LT switchgear	460	-	460		-
21	Conversion to energy chain system in SR and paddle feeder systems.	1,000	-	1,000		-
22	Electrochlorination & CLO2 System	650	-	650		-
23	HT Switchgear	700	-	700		-
24	2000 KVA /1600/1000 KVA Transformer and auxiliaries	40	-	40		-
25	IDCT Package for Simhadri STPP, Stage	16,650	-	16,650		-

Please refer form 9 for the year 2026-27

(Petitioner)

Name of the Petitioner
Name of the Generating StationNTPC Ltd
Simhadri Super Thermal power Station Stage-I**Statement of Capital cost**
(To be given for relevant dates and year-wise)

S. No.	Particulars	As on 31.03.2024		
		Accrual Basis	Un-discharged Liabilities	Cash Basis
A	a) Opening Gross Block Amount as per books	43,59,95,26,663	19,20,38,856	43,40,74,87,757
	b) Amount of IDC in A(a) above	-	-	-
	c) Amount of FC in A(a) above	-	-	-
	d) Amount of FERV in A(a) above	2,53,20,06,077	-	2,53,20,06,077
	e) Amount of Hedging Cost in A(a) above	-1,93,02,169	-	-1,93,02,169
	f) Amount of IEDC in A(a) above	-	-	-
B	a) Addition in Gross Block Amount during the period (Direct purchases)	-	-	-
	b) Amount of IDC in B(a) above	-	-	-
	c) Amount of FC in B(a) above	-	-	-
	d) Amount of FERV in B(a) above	-	-	-
	e) Amount of Hedging Cost in B(a) above	-	-	-
	f) Amount of IEDC in B(a) above	-	-	-
C	a) Addition in Gross Block Amount during the period (Transferred from CWP)	-	-	-
	b) Amount of IDC in C(a) above	-	-	-
	c) Amount of FC in C(a) above	-	-	-
	d) Amount of FERV in C(a) above	-	-	-
	e) Amount of Hedging Cost in C(a) above	-	-	-
	f) Amount of IEDC in C(a) above	-	-	-
D	a) Deletion in Gross Block Amount during the period	-	-	-
	b) Amount of IDC in D(a) above	-	-	-
	c) Amount of FC in D(a) above	-	-	-
	d) Amount of FERV in D(a) above	-	-	-
	e) Amount of Hedging Cost in D(a) above	-	-	-
	f) Amount of IEDC in D(a) above	-	-	-
E	a) Closing Gross Block Amount as per books	-	-	-
	b) Amount of IDC in E(a) above	-	-	-
	c) Amount of FC in E(a) above	-	-	-
	d) Amount of FERV in E(a) above	-	-	-
	e) Amount of Hedging Cost in E(a) above	-	-	-
	f) Amount of IEDC in E(a) above	-	-	-

(Petitioner)

Name of the Petitioner
Name of the Generating Station

NTPC Ltd
Simhadri Super Thermal power Station Stage-I
Statement of Capital Works in Progress

(Amount in Rs. Lakh)

S. No.	Particulars	As on 31.03.24		
		Accrual Basis	Un-discharged Liabilities	Cash Basis
A	a) Opening CWIP as per books	6,89,57,00,634.53	1,00,64,60,509.86	5,88,92,50,114.67
	b) Amount of IDC in A(a) above	60,59,02,385.87		60,59,02,385.87
	c) Amount of FC in A(a) above	-		-
	d) Amount of FERRV in A(a) above	-		-
	e) Amount of Hedging Cost in A(a) above	-		-
	f) Amount of IEDC in A(a) above	6,06,95,477.27		6,06,95,477.27
B	a) Addition in CWIP during the period			
	b) Amount of IDC in B(a) above			
	c) Amount of FC in B(a) above			
	d) Amount of FERRV in B(a) above			
	e) Amount of Hedging Cost in B(a) above			
	f) Amount of IEDC in B(a) above			
C	a) Transferred to Gross Block Amount during the period			
	b) Amount of IDC in C(a) above			
	c) Amount of FC in C(a) above			
	d) Amount of FERRV in C(a) above			
	e) Amount of Hedging Cost in C(a) above			
	f) Amount of IEDC in C(a) above			
D	a) Deletion in CWIP during the period			
	b) Amount of IDC in D(a) above			
	c) Amount of FC in D(a) above			
	d) Amount of FERRV in D(a) above			
	e) Amount of Hedging Cost in D(a) above			
	f) Amount of IEDC in D(a) above			
E	a) Closing CWIP as per books			
	b) Amount of IDC in E(a) above			
	c) Amount of FC in E(a) above			
	d) Amount of FERRV in E(a) above			
	e) Amount of Hedging Cost in E(a) above			
	f) Amount of IEDC in E(a) above			

(Petitioner)

PART-I
FORM- N

Calculation of Interest on Normative Loan

Name of the Company :
Name of the Power Station :

NTPC Limited
Sinhadri Super Thermal power Station Stage-I

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
1	Gross Normative loan – Opening	2,57,217.33	2,57,363.71	2,63,076.41	2,67,825.91	2,81,916.91	2,82,767.41
2	Cumulative repayment of Normative loan up to previous year	2,23,554.58	2,35,280.01	2,47,878.29	2,61,007.22	2,75,173.58	2,82,767.41
3	Net Normative loan – Opening	33,662.74	22,083.70	15,198.12	6,818.70	6,743.33	-
4	Add: Increase due to addition during the year / period	550.47	5,712.70	4,749.50	14,091.00	850.50	87.50
5	Less: Decrease due to de-capitalisation during the year / period	-442.20	0.00	0.00	0.00	0.00	0.00
6	Less: Decrease due to reversal during the year / period						
7	Add: Increase due to discharges during the year / period	38.11	0.00	0.00	0.00	0.00	0.00
8	Net addition in loan during the period (4+5+6+7)	146.39	5712.70	4749.50	14091.00	850.50	87.50
9	Less: Repayment of Loan	12172.64	12,598.28	13,128.92	14,166.37	7,593.83	87.50
10	Repayment adjustment on account of de capitalisation	442.20					
11	Repayment adjustment on account of discharges/reversals corresponding to un discharged liabilities deducted as on 1.4.2009	-					
12	Net Normative loan - Closing	22,078.69	15,198.12	6,818.70	6,743.33	-	-
13	Average Normative loan	27,870.72	18,640.91	11,008.41	6,781.01	3,371.86	-
14	Weighted average rate of interest	3.5187	3.8105	3.8880	4.0253	4.2225	4.5342
15	Interest on Loan	980.69	710.31	428.01	272.96	142.37	0.00

(Petitioner)

Calculation of Interest on Working Capital

Name of the Company :

NTPC Limited

Name of the Power Station :

Simhadri Super Thermal power Station Stage-I

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	6	7	8
1	Cost of Coal/Lignite	40,608.33	39082.02	39082.02	39082.02	39082.02	39082.02
2	Cost of Main Secondary Fuel Oil	600.96	494.36	494.36	494.36	495.71	494.36
3	Fuel Cost						
4	Liquid Fuel Stock						
5	O & M Expenses	2,954.25	3346.10	3429.70	3520.44	3681.79	3851.29
6	Maintenance Spares	7,090.21	8030.63	8231.29	8449.05	8836.30	9243.11
7	Receivables	46,954.81	46136.16	46348.14	46691.92	46572.41	45826.51
8	Total Working Capital	98208.46	97089.26	97565.52	98237.78	98668.24	98497.29
9	Rate of Interest	12.0000	11.9000	11.9000	11.9000	11.9000	11.9000
10	Interest on Working Capital	11785.02	11553.62	11612.68	11690.30	11741.52	11721.18

Petitioner

Computation of Energy Charges

Form-Oil
ADDITIONAL FORM

Name of the Company	NTPC Limited
Name of the Power Station	Simhadri Super Thermal power Station Stage-I

Computation of Energy Charges			2024-25	2025-26	2026-27	2027-28	2028-29
No of Days in the year	Days		365	365	365	366	365
Sp. Oil consumption	ml/kwh		0.5	0.5	0.5	0.5	0.5
Auxiliary consumption	%		5.25	5.25	5.25	5.25	5.25
Heat Rate	Kcal/Kwh		2,375.00	2,375.00	2,375.00	2,375.00	2375
Computation of Variable Charges							
Variable Charge (Coal)	p/kwh		404.387	404.387	404.387	404.387	404.387
Variable Charge (Oil)	p/kwh		4.204	4.204	4.204	4.204	4.204
Total	p/kwh		408.592	408.592	408.592	408.592	408.592
Price of fuel from Form-15/15A							
Coal Cost	(Rs./MT)		5275.86	5275.86	5275.86	5275.86	5275.86
Oil Cost	(Rs./KL)		79670.99	79670.99	79670.99	79670.99	79670.99
Computation of Fuel Expenses for Calculation of IWC:							
ESO in a year	(MUs)		7055.09	7055.09	7055.09	7074.41	7055.085
ESO for 50 days	(MUs)		966.450	966.450	966.45	966.45	966.450
Cost of coal for 50 Days	(Rs. Lakh)		39082.02	39082.02	39082.02	39082.02	39082.02
Cost of oil for 2 months	(Rs. Lakh)		494.36	494.36	494.36	495.71	494.36
Energy Expenses for 45 days	(Rs. Lakh)		35539.51	35539.51	35539.51	35539.51	35539.51
Rate of Energy charge ex-bus (p/kWh)							
1 Rate of Energy Charge from Sec. Fuel Oil/ Alternate Fuel (p/kwh) REC _o	$= (Q_o) \times P_o$	3.984					
2 Heat Contribution from SFO / Alternate Fuel (H _o)	$= (Q_o) \times (GCV)_o$	4.597					
3 Heat Contribution from coal (H _c)	$= GHR \times H_c$	2370.40					
4 Specific Primary Fuel Consumption (Qp _o)	$= H_o / (GCV)_o$	0.726					
5 Rate of Energy charge from Primary Fuel (p/kwh) REC _c		383.157					
6 Rate of Energy charge ex-bus (p/kWh)	$= [(REC)_o + (REC)_c] / (1 - ALD)$	408.592 for 2023-24					
Coal							
Wtd. Avg. Price of Coal					Rs./MT	5275.86	
Wtd. Avg. GCV of Coal as received					kCal/Kg	3348.92	
Wtd. Avg. GCV of Coal as received after adjustment of 85 kcal/kg						3263.92	
Sec. Oil							
Wtd. Avg. Price of Secondary Fuel					Rs./KL	79670.99	
Wtd. Avg. GCV of Secondary Fuel					kCal/L	9193.00	

PETITIONER

Summary of issue involved in the petition

Name of the Company :		NTPC Limited				
Name of the Power Station :		Simhadri Super Thermal power Station Stage-I				
1	Petitioner:	NTPC Limited				
2	Subject	Petition Under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-V of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999 and Chapter-3, Regulation-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 for approval of tariff of Simhadri Super Thermal Power Station Stage-I (1000 MW) for the period from 01.04.2024 to 31.03.2029				
3	Prayer:	i) Approve tariff of Simhadri-I for the tariff period 01.04.2024 to 31.03.2029. ii) Allow the recovery of filing fees as & when paid to the Hon'ble Commission and publication expenses from the beneficiaries. iii) Allow reimbursement of Ash Transportation Charges directly from the beneficiaries on monthly basis, subject to true up. iv) Allow reimbursement of additional O&M expenses for Coastal based Coal Stations. v) Allow the relaxation in norms for Auxiliary Power Consumption. vi) Pass any other order as it may deem fit in the circumstances mentioned above.				
4	Respondents:					
	Name of Respondents					
	a.	APEPDCL (A.P. Eastern Power Distribution Company Ltd.)				
	b.	APSPDCL (A.P. Southern Power Distribution Company Ltd)				
	c.	APCPDCL (A.P. Central Power Distribution Company Ltd)				
	d.	TSSPDCL (Telangana State Southern Power Distribution Company Ltd)				
	e.	TSNPDCL (Telangana State Northern Power Distribution Company Ltd)				
5	Project Scope	Simhadri Super Thermal power Station Stage-I (2 x500 MW)				
	Cost					
	Commissioning					
	Claim					
	AFC	85950.60	87670.04	90458.43	93317.64	94189.02
	Capital cost	3,71,742.94	3,79,215.94	3,92,673.44	4,03,345.94	4,04,015.94
	Initial spare	-				
	NAPAF (Gon)	85%				
	Any Specific					

Fw: Repair of Hach make analyzers

JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>

Thu 6/13/2024 2:15 PM

To: V Senthilkumar <VSENTHILKUMAR@NTPC.CO.IN>

Dear sir

The SWAS analysers are obsolete and need to be upgraded

The requirement of SMART positioners may be shifted to St 2 from St 1

Regards

From: Sholapur, Siddaram S <ssholapu@hach.com>**Sent:** Sunday, September 11, 2022 3:50 PM**To:** JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>**Cc:** AJEET KUMAR RAUSHAN <AKRAUSHAN@NTPC.CO.IN>; T.R. Rajagopalan <TRRAJAGOPAL@NTPC.CO.IN>**Subject:** RE: Repair of Hach make analyzers**CAUTION:** This Email has been sent from outside the Organization. Unless you trust the sender, Don't click links or open attachments as it may be a Phishing email, which can steal your Information and compromise your Computer.

Dear Madam,

Please note that the your Polymetron make Silica & Sodium analysers got obsolete for more than 8 to 10 years before, now we don't have spare parts to support for these analysers.

SILICA ANALYZER	SILKOSTAT 8891	POLYMETRON	OBSOLUTE - No spares available
SODIUM ANALYZER	MONEC 8941 ISE	POLYMETRON	OBSOLUTE - No spares available

Whereas your Silica analyzer series 5000 also got obsolete, but still spares supply from Hach company is available, we can support for the same and provide our services to you.

SILICA ANALYZER	SERIES 5000	HACH	OBSOLUTE -- But still spares are available for service support from Hach company
-----------------	-------------	------	---

As per our Spares offer for your Silica analyzer Series 5000 attached and based on our visit to your site in the Month of Feb 2022, we recommend you to procure Max possible spares parts, for this analyser to avoid any breakdown and malfunction of this analyzer. **Also we have NTPC Rate Contract for this Analyzer Series 5000 model, which is attached FYR.**

Also we have AMC service contract from Hach company, wherein you can enter into our Service contract for any service support for Hach analyzers.

Please let us know to send our AMC offer

Best Regards,

Siddaram S.S.
7676302345

From: JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>
Sent: 10 September 2022 10:47
To: Sholapur, Siddaram S <ssholapu@hach.com>
Cc: AJEET KUMAR RAUSHAN <AKRAUSHAN@NTPC.CO.IN>; T.R. Rajagopalan <TRRAJAGOPAL@NTPC.CO.IN>
Subject: Repair of Hach make analyzers

This Message Is From an External Sender

This message came from outside your organization. Use caution when opening.

Dear Mr Siddaram

We have 3 nos of analyzers which need repair . Details as below -

SILICA ANALYZER	SERIES 5000	HACH
SILICA ANALYZER	SILKOSTAT 8891	POLYMETRON
SODIUM ANALYZER	MONEC 8941 ISE	POLYMETRON

PI arrange to inspect and give a budgetary

quote for the same .

Regards
Jayamol Rachel V
AGM(C&I)
9440918557

From: JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>
Sent: 08 August 2022 09:53
To: RAJESH MANDAVI <RAJESHMANDAVI@NTPC.CO.IN>
Subject: Fw: Request for site visit for Hach make analyzers

From: Sholapur, Siddaram S <ssholapu@hach.com>
Sent: 06 August 2022 20:08
To: JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>
Subject: RE: Request for site visit for Hach make analyzers

<p>CAUTION: This Email has been sent from outside the Organization. Unless you trust the sender, Don't click links or open attachments as it may be a Phishing email, which can steal your information and compromise your Computer.</p>

Dear Madam,

Please let us know the status of our spares offer for your Silica analyser series 5000 model attached.

Thanks & Regards,

Siddaram S.S. | Deputy Manager – Key Accounts Service – South & MP Region.

Mobile: +91-7676302345

HACH DHR India Pvt. Ltd.

31/2, Addakamaranahalli, Makali Post , Village Dasanapura Hobli,

Bangalore – 562123

www.hachco.in | Email: ssholapu@hach.com



Be confident in your water analysis. Be right with expert answers, outstanding support, and reliable, easy-to-use solutions from Hach.

Confidential - Company Proprietary

Confidential - Company Proprietary

From: Sholapur, Siddaram S

Sent: 01 March 2022 23:41

To: jayamolrv@ntpc.co.in

Cc: Jain, Sanket <sanket.jain@hach.com>; Bhosale, Mahesh <mahesh.bhosale@hach.com>

Subject: RE: Request for site visit for Hach make analyzers

Dear Madam,

We thank you very much for your kind courtesy extended during our recent visit to your site, further to our checking of your analysers; please find attached our offer for Spares for your Silica analysers Series 5000 from Hach company. Kindly go through our offer & please let us know from your side.

Also very soon we will depute our service engineer visit to your site for checking the Faulty Sc200 controllers display and rectify the same. Also please share the Invoice copy pertaining to these analysers, which will help us to initiate the FOC process.

Thanks & Regards,

Siddaram S.S. | Deputy Manager – Key Accounts Service – South & MP Region.

Mobile: +91-7676302345

HACH DHR India Pvt. Ltd.

31/2, Addakamaranahalli, Makali Post , Village Dasanapura Hobli,

Bangalore – 562123

www.hachco.in | Email: ssholapu@hach.com

Fw: Reg: Your visit to Site for assistance of Simplex Fire Alarm Panel at NTPC Ltd, Simhadri.

JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>

Thu 6/13/2024 10:41 AM

To: V Senthilkumar <VSENTHILKUMAR@NTPC.CO.IN>

Cc: RAJESH MANDAVI <RAJESHMANDAVI@NTPC.CO.IN>

Regarding Admin1 Fire system upgradation - Simplex make, M/s Johnson Controls has made an assessment but budgetary offer is pending . Model 4100 U is to be upgraded to 4100 ES

Regards

From: Ummidi Bodakonda <ummidi.bodakonda@jci.com>

Sent: Thursday, June 15, 2023 3:09 PM

To: RAJESH MANDAVI <RAJESHMANDAVI@NTPC.CO.IN>

Cc: Girish Babu Ramakrishna <girishbabu.ramakrishna@jci.com>; Sunitha James <sunitha.james@jci.com>; Pathan Roshan Ahamed Khan <pathan.roshan.ahamedkhan@jci.com>; Shankar Rao Panuganti <Shankar.Rao.Panuganti@jci.com>; lakshmi Narasimha Rao Nujiveti <narasimha.l.rao@jci.com>; JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>; T.R. Rajagopalan <TRRAJAGOPAL@NTPC.CO.IN>; G H Rao <GHNRAO@NTPC.CO.IN>

Subject: RE: Reg: Your visit to Site for assistance of Simplex Fire Alarm Panel at NTPC Ltd, Simhadri.

Some people who received this message don't often get email from ummidi.bodakonda@jci.com. [Learn why this is important](#)

CAUTION: This Email has been sent from outside the Organization. Unless you trust the sender, Don't click links or open attachments as it may be a Phishing email, which can steal your Information and compromise your Computer.

Dear Sir,

As per My team Discussed with you, we have visited the site and find below observations for this project.

Site Details : NTPC Simhadri, Vizag, Consultant: NTPC.	Survey Done By 1. Mr. Ummidi Bodakonda-Service engineer 2. Mr. N. L. Narasimha Rao-Project engineer
Date: 15-06-2023	Time: 3:00 AM to 5:30 PM
Contact Person at Site: 1. Mr. Rajesh	Scope Checking of Existing Fire alarm Panel Status

Ops Observation:

- It is 4 loops Simplex 4100U fire alarm system
- It is showing 307 No's of troubles in FAS system
- It is showing 5 No's of Fire alarm in FAS system
- All hooter are Offline
- Graphics system is not working(CPU is faulty)
- Programming errors in Panel
- **Required field side inspection of all Detectors, Cables healthiness, and Panel Healthiness (manpower required 1 Eng. & 2 Technicians for 6 days)**

Recommendation:

- Unhealthy cable Needs to be replace
- Non-working detectors Needs to be Change
- New Devices to be Procure If material is not available at site
- Total Graphics system Needs to be Replace
- Simplex 4100U fire alarm system is very outdated version, so we must recommended to replace the Updated 4100 ES panel Instead of 4100 U.

Regards

Konda

9059898535.

From: Pathan Roshan Ahamed Khan <pathan.roshan.ahamedkhan@jci.com>

Sent: Monday, June 12, 2023 10:59 AM

To: Shankar Rao Panuganti <Shankar.Rao.Panuganti@jci.com>; Ummidi Bodakonda <ummidi.bodakonda@jci.com>

Cc: Girish Babu Ramakrishna <girishbabu.ramakrishna@jci.com>; Sunitha James <sunitha.james@jci.com>

Subject: FW: Reg: Your visit to Site for assistance of Simplex Fire Alarm Panel at NTPC Ltd, Simhadri.

Dear Konda,

Please find the below mail, and plan for site visit.

[@Shankar Rao Panuganti](#)- Please share site visit charges if applicable.

Regards

Pathan Roshan Ahamed Khan

Mobile: 7207070690



From: Asique Rahaman <asique.rahaman@jci.com>

Sent: Monday, June 12, 2023 10:37 AM

To: Pathan Roshan Ahamed Khan <pathan.roshan.ahamedkhan@jci.com>; Ummidi Bodakonda <ummidi.bodakonda@jci.com>

Cc: JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>; T.R. Rajagopalan <TRRAJAGOPAL@NTPC.CO.IN>; G H Rao <GHNRAO@NTPC.CO.IN>; RAJESH MANDAVI <RAJESHMANDAVI@NTPC.CO.IN>

Subject: RE: Reg: Your visit to Site for assistance of Simplex Fire Alarm Panel at NTPC Ltd, Simhadri.

Hi Roshan Sir,

As discussed, please assign our engineer for site visit.

Thanks & Regards,

Asique Rahaman

Mobile: 8961331721

Service Engineer



From: RAJESH MANDAVI <RAJESHMANDAVI@NTPC.CO.IN>

Sent: 12 June 2023 10:31

To: Asique Rahaman <asique.rahaman@jci.com>

Cc: JAYAMOL RACHEL V <JAYAMOLRV@NTPC.CO.IN>; T.R. Rajagopalan <TRRAJAGOPAL@NTPC.CO.IN>; G H Rao <GHNRAO@NTPC.CO.IN>

Subject: Reg: Your visit to Site for assistance of Simplex Fire Alarm Panel at NTPC Ltd, Simhadri.

Dear Sir,

As discussed telephonically with Mr.Kartik & you , a short visit is requested for the problems we are facing at NTPC Ltd Simhadri.(4X500MW), Visakhapatnam. It is located at approx 36 Km from Vizag Rly station & approx 29 km from airport via Gajuwaka.

Fire alarm panel details as under:

Make: Simplex Fire systems

Model: 4100U

Your quick response will be highly apprrtiated.

सादर,

Regards,



राजेश मंडावी,

वरिष्ठ प्रबंधक- नियंत्रण एवं उपकरण,

एनटीपीसी-सिम्हाद्री,विशाखापट्टनम-531020

मोबाइल: 9425222133

Rajesh Mandavi,

Senior Manager-C&I,

NTPC-Simhadri,Vishakhapatnam-531020

Mobile: 9425222133



ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Bharat Heavy Electricals Limited

(A Government of India Undertaking)

ELECTRONICS DIVISION

P.B.No 2606, Mysore Road, Bangalore - 560 026

Annexure-III

Phone : +91-80-26989240
Fax : +91-80-26989222
: +91-80-26989217
E-mail: saravanang@bhel.in
Mobile : +91-9900541230

Ref: CE/803/SM&RM/NTPC/VSTPPP/GS

Date: 17.04.2019

To: Shri. NEERAJ AGARWAL
Addl. General Manager (C&I Mtc.),
NTPC Vindhyachal,
Distt. - Singrauli (M.P.)
Mobile : 09479501212, 07440222477
E-Mail : neerajagrawal@ntpc.co.in

Dear Sir,

Sub: Support for Procontrol P13/42 based system supplied by BHEL
Ref : Your email dated 05.04.2019 to BHEL on the subject.

With reference to your enquiry on the support from BHEL for Procontrol P13/42 based control modules, please find our reply as below.

Earlier, BHEL has supplied control systems based on Procontrol P13/42 technology. Since year 2002, BHEL has migrated to 'maxDNA' and 'valmetDNA' based DCS systems which are state-of-the-art technology.

As regards support to Procontrol P13/42 system, BHEL still extends services for repair of cards. However, it has been very difficult to extend support for supply of new spares and we have stopped giving new DCS offers/solutions based on Procontrol technology.

BHEL-EDN offers solutions for 'Complete DCS upgradation/replacement and support for implementing the controls at site in a short duration during the planned shutdown for Overhauling.

Please contact for more information.

Thanking you,

Yours faithfully,

Saravanan

(G.Saravanan)

AGM / R&M and Spares Mgmt.

Regd. Office : BHEL House, Siri Fort, NEW DELHI - 110049
Website : www.bhel.co.in



Preannouncement

Cut-off date BS-100: spare parts and the entire product range

After 15 years of solid service, the BS-100 Fire Alarm System was discontinued from Autronica's product portfolio January 1, 2006 with an official announcement in Sales Bulletin 01-2005 a year before this cut-off date, and in Sales Bulletin 41-2005.

In this preannouncement we would like to inform you that Autronica Fire and Security's intention is to continue to provide spare parts for BS-100 systems until the final cut-off date, 31 December 2015. However, it is important to be aware of the fact that due to non-availability of components (components manufactured by third parties) some field devices can no longer be manufactured.

Please note that after 31 December 2015, BS-100 spare parts and the entire range of BS-100 products, such as smoke and heat detectors, manual call points and interface units, will be discontinued.

The interactive fire detection systems AutoSafe and Autoprime are the successors to the BS-100 system. In this respect, Autronica manufactures interface units to maintain backwards compatibility. The product portfolio for our current system, AutoSafe, includes interface units for BS-100 detection loops. Furthermore, the Base Adapter BWB-110 allows simple retrofit of BS-100 detection loops to easily accommodate the new series of interactive detectors common for both of the new generation fire detection systems.

Please contact your Autronica representative if you have any questions regarding retrofit solutions, or email a request to info@autronicafire.no.

Product Marketing Department
Autronica Fire and Security AS
N-7483 Trondheim, Norway
Phone: +47-73 58 25 00
Fax: +47-73 58 25 01

For further information on our systems and products, please visit our web site www.autronicafire.com

उप कमाण्डेंट का कार्यालय
केन्द्रीय औद्योगिक सुरक्षा बल
(गृह मन्त्रालय)

Annexure-V

एसटीपीपी/एसटीपीसी सिम्हाद्री
जिला : विशाखपटनम (आओप्रो)
दिनांक 12.10.2017

सं ई-42099/एसटीपीपी(एस)/ Mgt Corres /PA/2017/ 3253

To

The AGM(HR),
NTPC Simhadri

**Subject : Rectification of security observations noticed by IG/SS HQr. Chennai
during formal inspection of the unit on 10 & 11.04.2013 and 13.06.2016:
Reg.**

Kindly refer to this office letter No. (228) dated 20.02.2016, even No. (481) dated 04.04.2016, No. (1633) dated 12.05.2016, letter No. (2065) dated 20/21.06.2016, letter dated 03.08.2016, letter No. (377) dated 07.02.2017, letter dated 09.03.2017, No. (1213) dated 10.04.2017, No. (1585) dated 08.03.2017, No. (1819) dated 13.06.2017, No. (2218) dated 10.07.2017, No. (243) dated 28.07.2017 and letter of even No. (2882) dated 11.09.2017 on the subject cited above.

02. The security observations raised by Dr. K. Jayanth Murali, IPS, IG/SS HQrs. Chennai and Shri Anand Mohan, IPS, IG/SS HQrs Chennai during formal inspection of the unit on 10 & 11.04.2013 and 13.06.2016 respectively are still pending as mentioned below :-

Observation raised by Dr. K. Jayanth Murali, IPS, IG/SS HQrs. Chennai during formal inspection of the Unit on 10 & 11.04.2013

01 The Morchas available inside the main gate are not proper from security point of view. It should be relocated either on the top or in front of the main gate. The morcha should be made grenade-resistant.

Observation raised by Shri Anand Mohan, IPS, IG/SS HQrs. Chennai during formal inspection of the Unit on 13.06.2016

01 Repairing/replacement of unserviceable security gadgets like Boom Barrier, X-BIS, Night vision devise and HHMDs.

02 Installation of integrated security system for access control and surveillance.

03 Providing of CCTV cameras at all the important places and sensitive installation after conducting proper survey for this.

04 Integrated access control system should be introduced at the gates.

03. It is further intimated that a lot of correspondences have been made for rectification of the observation mentioned above raised by the IG/SS during inspection of the Unit but in spite of elapsing of a considerable period, there is no tangible progress on these points and the same are pending for quite a long time.

04. Hence, It is requested to kindly look into the matter on priority basis and do the needful action for early rectification of these essential security observations raised by the IG/SS HQrs. Chennai during the formal inspection of the unit on 10 & 11.04.2013 and 13.06.2016 please as it will largely help the Unit for strengthening of the plant security.

05. An early action to this effect is solicited please.

Copy to :-

Coy. Commander, Security &-
I/C CIW, CISF Unit STPP (S)

You are directed to liaise with the management for early rectification of the observation raised by the IG/SS HQr. Chennai and report compliance.

उप कमाण्डेंट का कार्यालय
केन्द्रीय औद्योगिक सुरक्षा बल
(गृह मन्त्रालय)

एसटीपीपी/एनटीपीसी सिम्हाद्री
जिला : विशाखपटनम (आओप्रो)
दिनांक 15.10.2018

सं ई-42099/एसटीपीपी(एस)/ Mgt Corres /PA/2018 /4051

To

The AGM(HR),
NTPC Simhadri

Subject : Rectification of security observations raised by IG/SS HQrs. Chennai during formal inspection/visit of the unit : Reg.

Please refer to the earlier correspondences made by this office on the subject cited above.

02. The security observations raised by Dr. K. Jayanth Murali, IPS, IG/SS HQrs. Chennai and Shri Anand Mohan, IPS, IG/SS HQrs Chennai during formal inspection/visit of the unit on 13.06.2016 and 07.11.2017 respectively are still pending for rectification as per the details mentioned below :-

Observation raised by Shri Anand Mohan, IPS, IG/SS HQrs. Chennai during formal inspection of the Unit on 13.06.2016

- (i) Repairing/replacement of unserviceable security gadgets like Boom Barrier, X-BIS, Night vision devise and HHMDs.
- (ii) Procurement of Night Vision devices

Observation raised by Shri Anand Mohan, IPS, IG/SS HQrs. Chennai during formal visit of the Unit on 07.11.2017

- (i) The only X-BIS Machine kept at the Control Room is not working.
- (ii) Night vision devices are required for Ash dyke area patrolling and Sea water Pump House duty post for effective surveillance over the area.
- (iii) CCTV should be installed in the Kote to keep a check on the movements as well as handing/taking over of arms.

03. It is further submitted that frequent correspondences have been made with your good office for rectification of the observations mentioned above raised by the IG/SS during inspection/visit of the Unit but in spite of elapsing of a considerable period, there is no tangible progress on these points have been observed by the higher formation and the same are pending for quite a long time.

04. Hence, it is requested to kindly look into the matter on priority basis and do the needful action for early rectification of these essential security observations raised by the IG/SS HQrs. Chennai during the formal inspection of the unit on 13.06.2016 & 07.11.2017 please.

05. An early action to this effect is solicited please.

(धनंजय कुमार)
उप कमाण्डेंट

केओसुब इकाई एसटीपीपी सिम्हाद्री

Copy to :-

Asstt. Commandant/SW - You are directed to liaise with the management for & I/C CIW, CISF Unit STPP (S) early rectification of the observation raised by the IG/SS HQr Chennai and report compliance.

Justification for Electro-chlorination & Chlorine Dioxide (ClO₂) system

1. At present Chlorine gas is being dozed directly at various stages of water treatment to maintain water quality and to inhibit organic growth in the water retaining structures/ equipment such as clarifiers, storage tanks, cooling towers, condenser tubes, piping etc. Chlorine dosing is done from chlorine stored in cylinders/ tonners. Chlorine gas is very hazardous and may prove fatal in case of leakage/ explosion and therefore, handling and storage of same involves risk to the life of public at large. Hence, in the interest of public safety, the chlorine dosing system is now being replaced by Electro-chlorination & Chlorine Dioxide (ClO₂) system, which is much safer and less hazardous than chlorine. In the ClO₂ system, ClO₂ shall be produced on site by use of commercial made HCl and sodium chlorite. As ClO₂ is generated at site, it avoids handling and storage risk.
2. It is submitted that Ministry of Labour and Employment, GOI, released the "National Policy on Safety, Health and Environment at Workplace" in Feb 2009 (attached herewith at **Annexure-VI-A**). The relevant clauses of the policy pertinent to the case of the Petitioner requiring installation of ClO₂ to meet the policy provisions are as follows:

Clause 1.3

".....Government is committed to regulate all economic activities for management of safety and health risks at workplaces and to provide measures so as to ensure safe and healthy working conditions for every working man and woman in the nation. Government recognizes that safety and health of workers has a positive impact on productivity and economic and social development. Prevention is an integral part of economic activities."

Clause 1.8:

" The increasing use of chemicals, exposure to physical, chemical and biological agents with hazard potential unknown to people; the indiscriminate use of agro-chemicals including pesticides, agricultural machineries and equipment; industries with major accident risks; effects of computer controlled technologies and alarming influence of stress at work in many modern jobs pose serious safety, health and environmental risks."

Clause 1.9:

"The fundamental purpose of this National Policy on Safety, Health and Environment at workplace, is not only to eliminate the incidence of work related injuries, diseases, fatalities, disaster and loss of national assets and ensuring achievement of a high level of occupational safety, health and environment performance through proactive approaches but also to enhance the well-being of the employee and society, at large. The necessary changes in this area will be based on a co-ordinated national effort focused on clear national goals and objectives."

The Objectives of the policy are as stated below:

"3.1 The policy seeks to bring the national objectives into focus as a step towards improvement in safety, health and environment at workplace. The objectives are to achieve:-

a) Continuous reduction in the incidence of work related injuries, fatalities, diseases, disasters and loss of national assets....."

Further, the Clause 5.3 of the code concludes that:

"5.3 The National Policy and programme envisages total commitment and demonstration by all concerned stake holders such as Government and social partners. Our goals and objectives will be that through dedicated and concerted efforts consistent with the requirements of safety, health and environment at work place and thereby improving the quality of work and working life."

It is submitted that for NTPC, a Maharatna Company and India's largest power generator operating Power Stations across the country with thousands of workmen engaged round the clock, it is a constant endeavour to improve the safety practices and mitigate the hazards in line with the statutory provisions on safety, health and environment at workplace. As evident from the above quoted clauses of the said National policy, it is submitted that the installation of Electro-chlorination & Chlorine Dioxide (ClO₂) system is in accordance to various provisions of the said policy to ensure a safe workplace.

3. It is further submitted that the "Draft Safety, Health and Working Conditions Code 2018" was put up by the Ministry of Labour and Employment in March 2018 inviting comments/suggestions of various stakeholders, wherein responsibilities of various faculties of industries/factories was mentioned including the employer. NTPC, as a responsible employer, took cognizance of the hazardous nature of chlorine gas dosing and decided to replace the earlier chlorine dosing system by a much safer Electro-chlorination & Chlorine Dioxide (ClO₂) system in the instant station. This is also in line with the duties necessitated for an employer under the clause 6(1)(a) and 6(1)(d) of "The Occupational Safety, Health and Working Conditions Code, 2020" notified by Ministry of Law & Justice, GoI vide Gazette Notification dated 29th September 2020. as below"

Quote

".....DUTIES OF EMPLOYER AND EMPLOYEES, ETC.

6. (1) Every employer shall:

a) ensure that workplace is free from hazards which cause or are likely to cause injury or occupational disease to the employees;

....

(d) provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of the employees;"

Unquote

The Draft code as well as the notified code are attached herewith at **Annexure-VI-B**.

4. It is submitted that chlorine gas is very hazardous as mentioned above. In India, chlorine is deemed to be an explosive, when contained in any metal container in a compressed or liquefied state, within the meaning of the Indian Explosives Act, 1884. The leakage or failure in handling of this chlorine gas may result into major accident which may involves loss of property and human life. The National Disaster Management Authority (NDMA), Govt. of India, had released "National Disaster Management Guidelines: Chemical Disasters" in April 2007. In the said guidelines at **Annexure-VI-C**, following major accidents due to leakage/explosion of Chlorine gas in just a span of six years (from 2002 to 2006) have been documented:
- On Sep 5, 2002, Chlorine gas explosion occurred in GACL, Vadodara, Gujarat in which 4 deaths as well as 20 injuries were reported.

- ii. On Dec 20, 2002, Chlorine gas got released in IPCL, Gandhar, Gujarat in which as much as 18 workers were reported to be injured and also 300 villagers in nearby villages were adversely affected.
- iii. On Oct 13, 2003, liquid Chlorine gas was released in Orient Paper Mill, Madhya Pradesh in which 88 injuries were reported.
- iv. On Jul 18, 2004, Chlorine leak happened in Chemplast, Tamil Nadu in which 27 injuries were reported.
- v. On Mar 29, 2006, due to the release of Chlorine in Kanoria Chemicals and Industries Ltd, UP, 6 people lost their lives and 23 persons were reported to be injured.

The above clearly illustrates that even the slightest inadvertent error on part of either human or machinery may result in a huge loss to persons or property or both.

Further, Chapter 5 (Guidelines for Industrial (Chemical) Installations and Storages) of the said guidelines by NDMA provides that industrial systems shall be continuously re-engineered (improved and upgraded)/ strengthened for the prevention and management of chemical accidents. The relevant extract from the said guideline is as below:

"5.1 Industrial (Chemical) Installations: A prime area of concern is the strengthening of the industrial systems for the prevention and management of chemical accidents. Such provisions shall be established to continuously reengineer (improve and upgrade) the system. As a part of government policy, it is envisaged that the present regulatory inspection and monitoring framework will evolve measures to encourage self-regulation, public consultation and PPP. These activities would develop credibility at all levels."

Further, clause 5.1.1 of the said guideline provides various engineering methods to control hazards as quoted below:

"Engineering methods to control hazards include:

i) Change of processes: to shift to less hazardous processes.

....."

In view of above, it is submitted that the installation of Electro-chlorination & Chlorine Dioxide (ClO₂) system taken up by the Petitioner in place of earlier Chlorine dosing system is a *Change of process* taken up for prevention and management of chemical accidents in accordance to the various provisions and objectives of the "National Disaster Management Guidelines – Chemical Disasters" released by the NDMA, GOI in April 2007 (Annexure-VI-C).

5. It is submitted that Chlorine gas is heavier than air and therefore sticks close to the ground and spread horizontally to the ground, thereby it may affect persons in vicinity for a longer duration. Exposure to low levels of chlorine can result in nose, throat, and eye irritation whereas at higher levels, breathing chlorine gas may result in changes in breathing rate, coughing, and damage to the lungs, toxic pneumonitis and/or acute pulmonary edema which can cause permanent damage to affected persons and also deaths.

Specifically, in Power Plants, any such incident may be more severe because of nature of the plant. It will not only affect numerous workers/staff of the Plant but also nearby communities. Also, the various equipment in the Power Plant need continuous monitoring and in absence of any such monitoring in case of a chemical accident, there will be possibility of serious damage to equipment also which itself is a very high hazard.

6. It is submitted that Tariff Regulations, 2024 under clause 26(1)(d) provides for admittance of Add-Cap works for Security & Safety of Power Stations. It is humbly submitted that Safety is inclusive of safety of the people working within the plant and neighbouring communities. As a responsible corporate entity, safety of workmen and employees is of paramount importance for NTPC. Also, it is the responsibility of NTPC to ensure that neighbouring communities are safe and not affected adversely due to Plant operations.
7. It is further submitted that the Hon'ble Commission vide Order dated 08.01.2022 in Petition No 408/GT/2022 has allowed expenditure for safety provisions for workmen/Plant as Add Cap under provisions of Tariff Regulations 2014/ Tariff Regulations 2019 for Change in Law or compliance or any existing law/ need for higher security and safety of the Plant. The relevant extracts of the said Order are quoted below:

"...67...Keeping in view that the expenditure incurred was in compliance with the IS:3034 standard (which deals with "Fire Stations in Industrial Buildings") and as the same is required for the safety and security of the plant, the additional capital expenditure incurred is allowed under Regulation 14(3)(ii) of the 2014 Tariff Regulations...." ...

"..232. The Petitioner has claimed projected additional capitalization of Rs.350.00 lakh in 2020-21 towards 'Economiser platform for both boilers' under Regulation 26(1)(d) of the 2019 Tariff Regulations and has submitted as under:

"During annual outage most of the maintenance works are undertaken in the economizer and LTSH region due to maximum erosion of coils. Due to space and design constraints through inspection, lifting of multiple coils and carrying out repair activity becomes difficult. Moreover, due to multiple activities being carried out simultaneously, it becomes unsafe for the workers and employees. In view of above constraint and safety of the workmen, it is proposed to fabricate permanent structure to create additional space for the coil removal, inspection, immediate repair and replacement of coil in the boiler. Additional space shall enhance safety to the workplace and thereby avoiding any unwanted eventuality. In addition, it will reduce downtime for peak, off-peak availability. This expenditure is admissible in terms of Regulations 26(1)(d) of the 2019 Tariff Regulations and the cost of the work for Rs.350 lakh is proposed to be incurred in 2020-21 and the Commission may kindly approve the same."

233. The Petitioner has not established through documentary evidence that the additional capital expenditure is required to be incurred based on the advice or direction of any Indian Government Instrumentality or statutory authorities. However, considering the fact that the asset is required for the safe operation of the plant, we allow the projected additional capital expenditure claimed. The Petitioner is directed to furnish, at the time of truing up of tariff, the relevant advice or direction of any Indian Government Instrumentality or statutory authority to substantiate the said claim."

8. Further it is submitted that Hon'ble CERC vide order dtd 19.05.2024 in one of the station of petitioner has allowed the similar work under Regulation 26(1)(d) [i.e need for higher security and safety of the plant] of Tariff Regulations, 2019 as below:

"25. Keeping in view the public interest and the safety & security of the plant and its employees, we allow the additional capital expenditure claim for Rs.500.00 lakh in 2019-20 for the replacement of the chlorine dosing system with the ClO2 system under Regulation 26(1)(d) of the 2019 Tariff Regulations. Since the said expenditure is beyond the original scope of work, the Petitioner is directed to furnish the total capitalized expenditure as well as the decapitalized amount pertaining to the chlorine dosing system that was already existing at the time of truing-up of tariff"

From the above, it is evident that the Electro-chlorination & Chlorine Dioxide (ClO2) system (which is much safer) is very much essential for the safety of safety & security of the plant and its employees.

9. Further Regulation 26(1)(i) of Tariff Regulations, 2024 provides for Any additional capital expenditure which has become necessary for efficient operation of generating station. The present work of Electro-chlorination & Chlorine Dioxide (ClO2) is very much necessary for the safe & reliable operation of unit, therefore qualifies under Regulation 26(1)(i) of Tariff Regulations, 2024.
10. In view of above submissions, it is submitted that the replacement of existing chlorine dosing system (which is highly hazardous) with Electro-chlorination & Chlorine Dioxide (ClO2) system (which is much safer), being taken up by the Petitioner to comply with the safety provisions and guidelines mandated by the "The Occupational Safety, Health and Working Conditions Code, 2020" notified by Ministry of Law & Justice, GoI and the "National Disaster Management Guidelines – Chemical Disasters" released by the NDMA, GoI, comes under the ambit of clause 26(1)(b) as well as 26(1)(d) of the Tariff Regulations, 2024. Accordingly, Hon'ble Commission may be pleased to allow the Petitioner's claim of Electro-chlorination & Chlorine Dioxide (ClO2) system on projection basis for the instant station under the said regulations of Tariff Regulations 2024.

Government of India
Ministry of Labour and Employment

**NATIONAL POLICY ON SAFETY, HEALTH AND ENVIRONMENT AT WORK
PLACE**

1. PREAMBLE

- 1.1 The Constitution of India provide detailed provisions for the rights of the citizens and also lays down the Directive Principles of State Policy which set an aim to which the activities of the state are to be guided.
- 1.2 These Directive Principles provide
- (a) for securing the health and strength of employees, men and women;
 - b) that the tender age of children are not abused;
 - c) that citizens are not forced by economic necessity to enter avocations unsuited to their age or strength;
 - d) just and humane conditions of work and maternity relief are provided; and
 - e) that the Government shall take steps, by suitable legislation or in any other way, to secure the participation of employee in the management of undertakings, establishments or other organisations engaged in any industry.
- 1.3 On the basis of these Directive Principles as well as international instruments, Government is committed to regulate all economic activities for management of safety and health risks at workplaces and to provide measures so as to ensure safe and healthy working conditions for every working man and woman in the nation. Government recognizes that safety and health of workers has a positive impact on productivity and economic and social development. Prevention is an integral part of economic activities

as high safety and health standard at work is as important as good business performance for new as well as existing industries.

- 1.4 The formulation of policy, priorities and strategies in occupational safety, health and environment at work places, is undertaken by national authorities in consultation with social partners for fulfilling such objectives. A critical role is played by the Government and the social partners, professional safety and health organizations in ensuring prevention and in also providing treatment, support and rehabilitation services.
- 1.5 Government of India firmly believes that without safe, clean environment as well as healthy working conditions, social justice and economic growth cannot be achieved and that safe and healthy working environment is recognized as a fundamental human right. Education, training, consultation and exchange of information and good practices are essential for prevention and promotion of such measures.
- 1.6 The changing job patterns and working relationships, the rise in self employment, greater sub-contracting, outsourcing of work, homework and the increasing number of employees working away from their establishment, pose problems to management of occupational safety and health risks at workplaces. New safety hazards and health risks will be appearing along with the transfer and adoption of new technologies. In addition, many of the well known conventional hazards will continue to be present at the workplace till the risks arising from exposure to these hazards are brought under adequate control. While advancements in technology have minimized or eliminated some hazards at workplace, new risks can emerge in their place which needs to be addressed.
- 1.7 Particular attention needs to be paid to the hazardous operations and of employees in risk prone conditions such as migrant employees and various vulnerable groups of employees arising out of greater mobility in the

workforce with more people working for a number of employers, either consecutively or simultaneously.

- 1.8 The increasing use of chemicals, exposure to physical, chemical and biological agents with hazard potential unknown to people; the indiscriminate use of agro-chemicals including pesticides, agricultural machineries and equipment; industries with major accident risks; effects of computer controlled technologies and alarming influence of stress at work in many modern jobs pose serious safety, health and environmental risks.
- 1.9 The fundamental purpose of this National Policy on Safety, Health and Environment at workplace, is not only to eliminate the incidence of work related injuries, diseases, fatalities, disaster and loss of national assets and ensuring achievement of a high level of occupational safety, health and environment performance through proactive approaches but also to enhance the well-being of the employee and society, at large. The necessary changes in this area will be based on a co-ordinated national effort focused on clear national goals and objectives.
- 1.10 Every Ministry or Department may work out their detailed policy relevant to their working environment as per the guidelines on the National Policy.

2. GOALS:

The Government firmly believes that building and maintaining national preventive safety and health culture is the need of the hour. With a view to develop such a culture and to improve the safety, health and environment at work place, it is essential to meet the following requirements:-

- 2.1 providing a statutory framework on Occupational Safety and Health in respect of all sectors of industrial activities including the construction sector, designing suitable control systems of compliance, enforcement and incentives for better compliance.
- 2.2 providing administrative and technical support services.

- 2.3. providing a system of incentives to employers and employees to achieve higher health and safety standards .
- 2.4 providing for a system of non-financial incentives for improvement in safety and health.
- 2.5. establishing and developing the research and development capability in emerging areas of risk and providing for effective control measures.
- 2.6. Focusing on prevention strategies and monitoring performance through improved data collection system on work related injuries and diseases.
- 2.7 Developing and providing required technical manpower and knowledge in the areas of safety, health and environment at workplaces in different sectors.
- 2.8 Promoting inclusion of safety, health and environment, improvement at workplaces as an important component in other relevant national policy documents.
- 2.9 Including safety and occupational health as an integral part of every operation.

3. OBJECTIVES:

3.1 The policy seeks to bring the national objectives into focus as a step towards improvement in safety, health and environment at workplace. The objectives are to achieve:-

- a) Continuous reduction in the incidence of work related injuries, fatalities, diseases, disasters and loss of national assets.
- b) Improved coverage of work related injuries, fatalities and diseases and provide for a more comprehensive data base for facilitating better performance and monitoring.
- c) Continuous enhancement of community awareness regarding safety, health and environment at workplace related areas.
- d) Continually increasing community expectation of workplace health and safety standards.

- e) Improving safety, health and environment at workplace by creation of “green jobs” contributing to sustainable enterprise development.

4. ACTION PROGRAMME

For the purpose of achieving the goals and objectives mentioned in paragraphs 2 and 3 above, the following action programme is drawn up and where necessary time bound action programme would be initiated, namely:-

4.1. Enforcement

- 4.1.1 by providing an effective enforcement machinery as well as suitable provisions for compensation and rehabilitation of affected persons;
- 4.1.2 by effectively enforcing all applicable laws and regulations concerning safety, health and environment at workplaces in all economic activities through an adequate and effective labour inspection system;
- 4.1.3 By establishing suitable schemes for subsidy and provision of loans to enable effective implementation of the policy;
- 4.1.4 by ensuring that employers, employees and others have separate but complementary responsibilities and rights with respect to achieving safe and healthy working conditions;
- 4.1.5 by amending expeditiously existing laws relating to safety, health and environment and bring them in line with the relevant international instruments;
- 4.1.6 by monitoring the adoption of national standards through regulatory authorities;
- 4.1.7 by facilitating the sharing of best practices and experiences between national and international regulatory authorities;
- 4.1.8 by developing new and innovative enforcement methods including financial incentives that encourage and ensure improved workplace performance;
- 4.1.9 by making an enabling legislation on Safety, Health and Environment at Workplaces;

4.1.10 by setting up safety and health committees wherever deemed appropriate;

4.2 National Standards

4.2.1 by developing appropriate standards, codes of practices and manuals on safety, health and environment for uniformity at the national level in all economic activities consistent with international standards and implementation by the stake holders in true spirit;

4.2.2 by ensuring stakeholders awareness of and accessibility to applicable policy, documents, codes, regulations and standards;

4.3 Compliance

4.3.1 by encouraging the appropriate Government to assume the fullest responsibility for the administration and enforcement of occupational safety, health and environment at workplace, provide assistance in identifying their needs and responsibilities in the area of safety, health and environment at workplace, to develop plans and programmes in accordance with the provisions of the applicable Acts and to conduct experimental and demonstration projects in connection therewith;

4.3.2 by calling upon the co-operation of social partners in the supervision of application of legislations and regulations relating to safety, health and environment at work place;

4.3.3 by continuous improvement of Occupational Safety and Health by systems approach to the management of Occupational Safety and Health including developing guidance on Occupational Safety and Health management systems, strengthening voluntary actions, including mechanisms for self-regulatory concept and establishing auditing mechanisms which can test and authenticate occupational safety and health management systems;

- 4.3.4 by providing specific measures to prevent catastrophes, and to co-ordinate and specify the actions to be taken at different levels, particularly in the industrial zones with high potential risks;
- 4.3.5 by recognising the best safety and health practices and providing facilitation for their adoption.
- 4.3.6 by providing adequate penal provisions as deterrent for violation of laws for the time being in force;
- 4.3.7 by encouraging all concerned to adopt and commit to “Responsible Care” and / or “Corporate Social Responsibility” to improve safety, health and environment at workplace performance;
- 4.3.8 by ensuring a suitable accreditation machinery to recognise institutions, professionals and services relating to safety, health and environment at workplace for uniformity and greater coverage as also authenticating safe management system;
- 4.3.9 by encouraging employers to ensure occupational safety and health management systems, establish them in efficient manner to improve workplace safety and health;
- 4.3.10 by specifically focusing on such occupational diseases like pneumoconiosis and silicosis; developing a framework for its prevention and control as well as develop technical standards and guidelines for the same;
- 4.3.11 by promoting safe and clean technology and progressively replacing materials hazardous to human health and environment;

4.4 Awareness

- 4.4.1 by increasing awareness on safety, health and environment at workplace through appropriate means;
- 4.4.2 by providing forums for consultations with employers’ representatives, employees representatives and community on matters of national concern

- relating to safety, health and environment at work place with the overall objective of creating awareness and enhancing national productivity;
- 4.4.3 by encouraging joint labour-management efforts to preserve, protect and promote national assets and to eliminate injuries and diseases arising out of employment;
 - 4.4.4 by raising community awareness through structured, audience specific approach;
 - 4.4.5 by continuously evaluating the impact of such awareness and information initiatives;
 - 4.4.6 by maximizing gains from the substantial investment in awareness campaigns by sharing experience and learning;
 - 4.4.7 by suitably incorporating teaching inputs on safety, health and environment at work place in schools, technical, medical, professional and vocational courses and distance education programme;
 - 4.4.8 by securing good liaison arrangements with the International organisations;
 - 4.4.9 by providing medical criteria wherever necessary which will assure insofar as practicable that no employee will suffer diminished health, functional capacity, or life expectancy as a result of his work place activities and that in the event of such occupational diseases having been contracted, is suitably compensated;
 - 4.4.10 by providing practical guidance and encouraging employers and employees in their efforts to reduce the incidence of occupational safety and health risks at their places of employment and to impress upon employers and employees to institute new programmes and to improve existing programmes for providing safe and healthful working conditions, requiring employers to ensure that workers and their representatives are consulted, trained, informed and involved in all measures related to their safety and health at work;

4.5 Research and Development

- 4.5.1 by providing for research in the field of safety, health and environment at workplace, including the social and psychological factors involved, and by developing innovative methods, techniques including computer aided Risk Assessment Tools, and approaches for dealing with safety, health and environment at workplace problems which will help in establishing standards;
- 4.5.2 by exploring ways to discover latent diseases, establishing causal connections between diseases and work environmental conditions, updating list of occupational diseases and conducting other research relating to safety, health and environmental problems at workplace;
- 4.5.3 by establishing research priorities as per national requirements; exploring partnerships and improving communications with various national and international research bodies;
- 4.5.4 by ensuring a coordinated research approach and an optimal allocation of resources in Occupational Safety and Health sector for such purposes;

4.6 Occupational safety and health skills development

- 4.6.1 by building upon advances already made through employer and employee initiative for providing safe and healthy working conditions;
- 4.6.2 by providing for training programmes to increase the number and competence of personnel engaged in the field of occupational safety, health and environment at workplace;
- 4.6.3 by providing information and advice, in an appropriate manner, to employers and employees organisations, with a view to eliminating hazards or reducing them as far as practicable;.
- 4.6.4 by establishing occupational health services aimed at protection and promotion of health of employee and improvement of working conditions and by providing employee access to these services in different sectors of economic activities;

4.6.5 by integrating health and safety into vocational, professional and labour related training programmes as also management training including small business practices;

4.6.6 by adopting Occupational Safety and Health training curricula in workplace and industry programmes;

4.7 Data collection

4.7.1 by compiling statistics relating to safety, health and environment at work places, prioritising key issues for action, conducting national studies or surveys or projects through governmental and non-governmental organisations;

4.7.2 by reinforcing and sharing of information and data on national occupational safety, health and environment at work place information amongst different stake holders through a national network system on Occupational Safety and Health;

4.7.3 by extending data coverage relevant to work-related injury and disease, including measures of exposure, and occupational groups that are currently excluded, such as self-employed people;

4.7.4 by extending data systems to allow timely reporting and provision of information;

4.7.5 by developing the means for improved access to information;

4.8 Review

4.8.1 An initial review and analysis shall be carried out to ascertain the current status of safety, health and environment at workplace and building a national Occupational Safety and Health profile.

4.8.2 National Policy and the action programme shall be reviewed at least once in five years or earlier if felt necessary to assess relevance of the national goals and objectives.

5. Conclusion

- 5.1 There is a need to develop close involvement of social partners to meet the challenges ahead in the assessment and control of workplace risks by mobilising local resources and extending protection to such working population and vulnerable groups where social protection is not adequate.
- 5.2 Government stands committed to review the National Policy on Safety, Health and Environment at Workplace and legislations through tripartite consultation, improve enforcement, compilation and analysis of statistics; develop special programmes for hazardous operations and other focus sectors, set up training mechanisms, create nation-wide awareness, arrange for the mobilisation of available resources and expertise.
- 5.3 The National Policy and programme envisages total commitment and demonstration by all concerned stake holders such as Government and social partners. Our goals and objectives will be that through dedicated and concerted efforts consistent with the requirements of safety, health and environment at work place and thereby improving the quality of work and working life.

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Relevant Extract

Annexure-VI-B

F. No. Z-13025/12/2015-LRC
Government of India
Ministry of Labour and Employment

Shram Shakti Bhawan, New Delhi
Dated: 23rd March, 2018

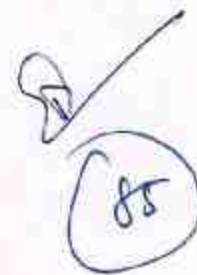
OFFICE MEMORANDUM

Sub:- The draft Labour Code on Occupational Safety, Health and
Working Conditions, 2018. - inviting
comments/suggestions/inputs Reg.

The undersigned is directed to say that the Ministry of Labour & Employment has been taking steps for simplification, amalgamation and rationalization of Central Labour Laws which is also in tandem with recommendations of 2nd National Commission on Labour. The various existing Acts are being proposed to be subsumed in four major Labour Codes viz., Code on Wages, Code on Industrial Relations, Code of Social Security and Code on Occupational Safety, Health and Working Conditions.

2. Now, the Ministry has prepared a preliminary draft on Code on Occupational Safety, Health and Working Conditions, 2018, by amalgamating 13 labour laws relating to safety and health standards, health and working conditions, welfare provisions for the employees and leave and hours of work. The following Acts have been merged.

- i. The Factories Act, 1948 (Act no. 63 of 1948)
- ii. The Mines Act, 1952 (Act no. 35 of 1952)
- iii. The Dock Workers (Safety, Health and Welfare) Act, 1986 (Act no. 54 of 1986)
- iv. The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (Act No. 27 of 1996)
- v. The Plantations Labour Act, 1951 (Act No. 69 of 1951)
- vi. The Contract Labour (Regulation and Abolition) Act, 1970
- vii. The Inter-State Migrant workmen (Regulation of Employment and Conditions of Service) Act, 1979

A handwritten signature and the initials 'JS' inside a circle.

- viii. The Working Journalist and other News Paper Employees (Conditions of Service and Misc. Provision) Act, 1955
- ix. The Working Journalist (Fixation of rates of wages) Act, 1958
- x. The Motor Transport Workers Act, 1961
- xi. Sales Promotion Employees (Condition of Service) Act, 1976
- xii. The Beedi and Cigar Workers (Conditions of Employment) Act, 1966
- xiii. The Cine Workers and Cinema Theatre Workers Act, 1981

3. Your specific inputs/suggestions are requested on the various aspects of the code including threshold/applicability, the registration/ licensing and processes there of, National/State Occupational Safety & Health Boards, the broad aspects on working and health conditions, safety standards, welfare measures, enforcement mechanism, penalties, rule making powers of the Central and State Governments and the various items incorporated in the three schedules.

4. The preliminary draft is enclosed for inviting comments/suggestions of the various stakeholders including general public. It is requested that the comments/suggestions may be sent to this Ministry by 22.04.2018 on the address, i.e. Under Secretary (LRC), Ministry of Labour & Employment, Room No. 17A, Shram Shakti Bhawan, Rafi Marg, New Delhi – 110 001 or through email: jk.singh68@nic.in. The suggestions/comments should be in the following format:

Format			
Section/Sub-section/Clause/Proviso of the code	Issue/problem identified in the relevant clause	Proposed change/correction that is suggested	Reason for the proposed change

Anita Tripathi
(Anita Tripathi)
22/3/18

Deputy Secretary to the Government of India
Ph: 23711354

Encl: 65 pages of the Code

To

All stakeholders.

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भारत का राजपत्र The Gazette of India

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CG-DL-E-29092020-222112

असाधारण

EXTRAORDINARY

भाग II — खण्ड 1

PART II — Section 1

प्राधिकार से प्रकाशित

PUBLISHED BY AUTHORITY

सं. 62] नई दिल्ली, मंगलवार, सितम्बर 29, 2020/आश्विन 7, 1942 (शक)
No. 62] NEW DELHI, TUESDAY, SEPTEMBER 29, 2020/ASHVINA 7, 1942 (SAKA)

इस भाग में भिन्न पृष्ठ संख्या दी जाती है जिससे कि यह अलग संकलन के रूप में रखा जा सके।
Separate paging is given to this Part in order that it may be filed as a separate compilation.

MINISTRY OF LAW AND JUSTICE

(Legislative Department)

New Delhi, the 29th September, 2020/Asvina 7, 1942 (Saka)

The following Act of Parliament received the assent of the President on the 28th September, 2020 and is hereby published for general information:—

THE OCCUPATIONAL SAFETY, HEALTH AND WORKING CONDITIONS CODE, 2020

No. 37 OF 2020

[28th September, 2020.]

An Act to consolidate and amend the laws regulating the occupational safety, health and working conditions of the persons employed in an establishment and for matters connected therewith or incidental thereto.

BE it enacted by Parliament in the Seventy-first Year of the Republic of India as follows:—

CHAPTER I

PRELIMINARY

1. (1) This Act may be called the Occupational Safety, Health and Working Conditions Code, 2020.

Short title,
commencement
and
application.

(2) It shall come into force on such date as the Central Government may, by notification appoint; and different dates may be appointed for different provisions of this Code and any reference in any such provision to the commencement of this Code shall be construed as a reference to the coming into force of that provision.

(3) It shall not apply to the offices of the Central Government, offices of the State Government and any ship of war of any nationality:

Provided that the Code shall apply in case of contract labour employed through contractor in the offices of the Central Government or in the offices of the State Government, where, the Central Government or, as the case may be, the State Government is the principal employer.

Definitions:

2. (1) In this Code, unless the context otherwise requires,—

(a) "adolescent" shall have the same meaning as assigned to it in clause (i) of section 2 of the Child and Adolescent Labour (Prohibition and Regulation) Act, 1986; 61 of 1986

(b) "adult" means a person who has completed his eighteenth year of age;

(c) "agent" when used in relation to a mine, means every person, whether appointed as such or not, who, acting or purporting to act on behalf of the owner, takes part in the management, control, supervision or direction of such mine or of any part thereof;

(d) "appropriate Government" means—

(i) in relation to, establishments [other than those specified in sub-clause (ii)] carried on by or under the authority of the Central Government or concerning any such controlled industry as may be specified in this behalf by the Central Government or the establishment of railways including metro railways, mines, oil field, major ports, air transport service or telecommunication service, banking company or any insurance company (by whatever name called) established by a Central Act or a corporation or other authority established by a Central Act or a Central public sector undertaking or subsidiary companies set up by the Central public sector undertakings or autonomous bodies owned or controlled by the Central Government, including establishment of contractors for the purposes of such establishment, corporation or other authority, Central public sector undertakings, subsidiary companies or autonomous bodies, as the case may be, the Central Government;

Provided that in the case of Central Public Sector Undertakings the appropriate Government shall continue to be the Central Government even if the holding of the Central Government reduces to less than fifty per cent. equity of the Central Government in that Public Sector Undertakings after the commencement of this Code; and

(ii) in relation to a factory, motor transport undertaking, plantation, newspaper establishment and establishment relating to beedi and cigar including the establishments not specified in clause (i), the concerned State Government where it is situated.

Explanation.—For the removal of doubts it is hereby clarified that State Government shall be the appropriate Government in respect of occupational safety, health and working conditions in a factory situated in that State;

(e) "audio-visual production" means audio-visual produced wholly or partly in India and includes—

(i) animation, cartoon depiction, audio-visual advertisement;

(ii) digital production or any of the activities in respect of making thereof; and

(iii) features films, non-feature films, television, web-based serials, talk shows, reality shows and sport shows;

(f) "audio-visual worker" means a person, who is employed, directly or through any contractor, in or in connection with the audio-visual production to work as an

artist including actor, musician, singer, anchor, news reader, dancer, dubbing artist or stunt person or to do any work, skilled, unskilled, manual, supervisory, technical, artistic or otherwise, and his remuneration with respect to such employment in or in connection with the production of audio-visual does not exceed, where remuneration is by way of monthly wages or where such remuneration is by way of lump sum, in each case, such amount as may be notified by the Central Government;

(g) "banking company" means a banking company as defined in clause (c) of section 5 of the Banking Regulation Act, 1949 and includes the Export-Import Bank of India, the Industrial Reconstruction Bank of India, the Small Industries Development Bank of India established under section 3 of the Small Industries Development Bank of India Act, 1989, the Reserve Bank of India, the State Bank of India, a corresponding new bank constituted under section 3 of the Banking Companies (Acquisition and Transfer of Undertakings) Act, 1970, a corresponding new bank constituted under section 3 of the Banking Companies (Acquisition and Transfer of Undertakings) Act, 1980;

(h) "building or other construction work" means the construction, alteration, repairs, maintenance or demolition in relation to buildings, streets, roads, railways, tramways, airfields, irrigation, drainage, embankment and navigation works, flood control works (including storm water drainage works), generation, transmission and distribution of power, water works (including channels for distribution of water), oil and gas installations, electric lines, internet towers, wireless, radio, television, telephone, telegraph and overseas communications, dams, canals, reservoirs, watercourses, tunnels, bridges, viaducts, aqua-ducts, pipelines, towers, cooling towers, transmission towers and such other work as may be specified in this behalf by the Central Government, by notification, but does not include building or other construction work which is related to any factory or mine and the building or other construction work where such work is for own residential purposes of an individual or group of individuals for their own residence and the total cost of such work does not exceed rupees fifty lakhs or such higher amount and employing more than such number of workers as may be notified by the appropriate Government;

(i) "building worker" means a person who is employed to do any highly skilled, skilled, semi-skilled or unskilled, manual, technical or clerical work for hire or reward, whether the terms of such employment are express or implied, in connection with any building or other construction work, but does not include any such person who is employed mainly in a managerial or supervisory or administrative capacity;

(j) "cargo" includes anything carried or to be carried in a ship or other vessel, or vehicle;

(k) "Chief Inspector-cum-Facilitator" means a Chief Inspector-cum-Facilitator appointed under sub-section (5) of section 34;

(l) "competent person", means a person or an institution recognised as such by the Chief Inspector-cum-Facilitator for the purposes of carrying out tests, examinations and inspections required to be done in an establishment having regard to—

(i) the qualifications and experience of the person and facilities available at his disposal; or

(ii) the qualifications and experience of the persons employed in such institution and facilities available therein;

Provided that in case of mines the competent person includes such other person who is authorised by the manager referred to in section 67 to supervise or perform any work, or to supervise the operation of machinery, plant or equipment and is responsible for such duties assigned to him and also includes a shot firer or blaster;

(m) "contract labour" means a worker who shall be deemed to be employed in or in connection with the work of an establishment when he is hired in or in connection with such work by or through a contractor, with or without the knowledge of the principal employer and includes inter-State migrant worker but does not include a worker (other than part time employee) who is regularly employed by the contractor for any activity of his establishment and his employment is governed by mutually accepted standards of the conditions of employment (including engagement on permanent basis), and gets periodical increment in the pay, social security coverage and other welfare benefits in accordance with the law for the time being in force in such employment;

(n) "contractor", in relation to an establishment, means a person, who—

(i) undertakes to produce a given result for the establishment, other than a mere supply of goods or articles of manufacture to such establishment, through contract labour; or

(ii) supplies contract labour for any work of the establishment as mere human resource,

and includes a sub-contractor;

(o) "controlled industry" means any industry the control of which by the Central Government has been declared under any Central Act in the public interest;

(p) "core activity of an establishment" means any activity for which the establishment is set up and includes any activity which is essential or necessary to such activity:

Provided that the following shall not be considered as essential or necessary activity, if the establishment is not set up for such activity, namely:—

(i) sanitation works, including sweeping, cleaning, dusting and collection and disposal of all kinds of waste;

(ii) watch and ward services including security services;

(iii) canteen and catering services;

(iv) loading and unloading operations;

(v) running of hospitals, educational and training Institutions, guest houses, clubs and the like where they are in the nature of support services of an establishment;

(vi) courier services which are in nature of support services of an establishment;

(vii) civil and other constructional works, including maintenance;

(viii) gardening and maintenance of lawns and other like activities;

(ix) housekeeping and laundry services, and other like activities, where these are in nature of support services of an establishment;

(x) transport services including, ambulance services;

(xi) any activity of intermittent nature even if that constitutes a core activity of an establishment;

(q) "day" means a period of twenty-four hours beginning at mid-night;

(r) "District Magistrate", in relation to any mine, means the District Magistrate or the Deputy Commissioner, as the case may be, who is vested with the executive powers of maintaining law and order in the revenue district in which the mine is situated:

Provided that in case of a mine, which is situated partly in one district and partly in another, the District Magistrate for the purpose shall be the District Magistrate authorised in this behalf by the Central Government;

(s) "dock work" means any work in or within the vicinity of any port in connection with, or required for, or incidental to, the loading, unloading, movement or storage of cargoes into or from ship or other vessel, port, dock, storage place or landing place, and includes—

(i) work in connection with the preparation of ships or other vessels for receipt or discharge of cargoes or leaving port;

(ii) all repairing and maintenance processes connected with any hold, tank structure or lifting machinery or any other storage area on board the ship or in the docks; and

(iii) chipping, painting or cleaning of any hold, tank, structure or lifting machinery or any other storage area on board the ship or in the docks;

(t) "employee" means.—

52 of 1961.

(i) in respect of an establishment, a person (other than an apprentice engaged under the Apprentices Act, 1961) employed on wages by an establishment to do any skilled, semi-skilled, unskilled, manual, operational, supervisory, managerial, administrative, technical, clerical or any other work, whether the terms of employment be express or implied; and

(ii) a person declared to be an employee by the appropriate Government, but does not include any member of the Armed Forces of the Union;

Provided that notwithstanding anything contained in this clause, in case of a mine a person is said to be "employed" in a mine who works as the manager or who works under appointment by the owner, agent or manager of the mine or with the knowledge of the manager, whether for wages or not—

(a) in any mining operation (including the concomitant operations of handling and transport of minerals up to the point of dispatch and of gathering sand and transport thereof to the mine);

(b) in operations or services relating to the development of the mine including construction of plant therein but excluding construction of buildings, roads, wells and any building work not directly connected with any existing or future mining operations;

(c) in operating, servicing, maintaining or repairing any part of any machinery used in or about the mine;

(d) in operations, within the premises of the mine, of loading for dispatch of minerals;

(e) in any office of mine;

(f) in any welfare, health, sanitary or conservancy services required to be provided under this Code relating to mine, or watch and ward, within the premises of the mine excluding residential area; or

(g) in any kind of work, whatsoever, which is preparatory or incidental to, or connected with, mining operations;

(u) "employer" means a person who employs, whether directly or through any person, or on his behalf, or on behalf of any person, one or more employees in his establishment and where the establishment is carried on by any Department of the Central Government or the State Government, the authority specified, by the head of

such Department, in this behalf or where no authority, is so specified, the head of the Department and in relation to an establishment carried on by a local authority, the Chief Executive of that authority, and includes,—

(i) in relation to an establishment which is a factory, the occupier of the factory;

(ii) in relation to mine, the owner of the mine, agent or manager referred to in section 67;

(iii) in relation to any other establishment, the person who, or the authority which has ultimate control over the affairs of the establishment and where said affairs are entrusted to a manager or managing director, such manager or managing director;

(iv) contractor; and

(v) legal representative of a deceased employer;

(v) "establishment" means—

(i) a place where any industry, trade, business, manufacturing or occupation is carried on in which ten or more workers are employed; or

(ii) motor transport undertaking, newspaper establishment, audio-video production, building and other construction work or plantation, in which ten or more workers are employed; or

(iii) factory, for the purpose of Chapter II, in which ten or more workers are employed, notwithstanding the threshold of workers provided in clause (w); or

(iv) a mine or port or vicinity of port where dock work is carried out;

Provided that in sub-clauses (i) and (ii), the threshold of worker specified therein shall not be applicable in case of such establishment or class of establishments, in which such hazardous or life threatening activity is being carried on, as may be notified by the Central Government:

Provided further that notwithstanding any threshold provided in the definition of factory in clause (w), for the purposes of Chapter II, the establishment specified in sub-clause (i) or sub-clause (ii) or sub-clause (iii) shall be deemed to be the establishment within the meaning of this clause though the number of employees employed are ten or more;

(w) "factory" means any premises including the precincts thereof—

(i) whereon twenty or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on with the aid of power, or is ordinarily so carried on; or

(ii) whereon forty or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on without the aid of power, or is ordinarily so carried on,

but does not include a mobile unit belonging to the armed forces of the Union, railways running shed or a hotel, restaurant or eating place;

Provided that where under any law for the time being in force in a State immediately before the commencement of this Code, the number of workers specified is more or less than the number specified in clause (i) or clause (ii), then, the number specified under the law of the State shall prevail in that State till it is amended by the competent Legislature.

Explanation I.—For computing the number of workers for the purposes of this clause all the workers (in different groups and relays) in a day shall be taken into account.

Explanation II.—For the purposes of this clause, the mere fact that an Electronic Data Processing Unit or a Computer Unit is installed in any premises or part thereof, shall not be construed as factory if no manufacturing process is being carried on in such premises or part thereof:

(x) "family", when used in relation to a worker, means—

(i) spouse;

(ii) children including adopted children of the worker who are dependent upon him and have not completed the age of eighteen years; and

(iii) parents, grand-parents, widowed daughter and widowed sister dependent upon such worker.

Explanation.—For the purposes of this clause, such dependents shall not be included who are, for the time being, getting such income from such sources, as may be prescribed by the appropriate Government;

(y) "godown" means any warehouse or other place, by whatever name called, used for the storage of any article or substance required for any manufacturing process which means any process for, or incidental to, making, finishing or packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal as finished products;

(z) "hazardous" means involving danger or potential danger;

(za) "hazardous process" means any process or activity in relation to an industry or plantation specified in the First Schedule where, unless special care is taken, raw materials used therein or the intermediate or finished products, bye-products, hazardous substances, wastes or effluents thereof or spraying of any pesticides, insecticides or chemicals used therein, as the case may be, would—

(i) cause material impairment to the health of the persons engaged in or connected therewith, or

(ii) result in the pollution of the general environment;

(zb) "hazardous substance" means any substance or such quantity of the substance as may be prescribed by the appropriate Government or preparation of which by reason of its chemical or physio-chemical properties or handling is liable to cause physical or health hazards to human being or may cause harm to other living creatures, plants, micro-organisms, property or the environment;

(zc) "industrial premises" means any place or premises (not being a private dwelling house), including the precincts thereof, in which or in any part of which any industry, trade, business, occupation or manufacturing is being ordinarily carried on with or without the aid of power and includes a godown attached thereto;

(zd) "industry" means any systematic activity carried on by co-operation between an employer and worker (whether such worker is employed by such employer directly or by or through any agency, including a contractor) for the production, supply or distribution of goods or services with a view to satisfy human wants or wishes (not being wants or wishes which are merely spiritual or religious in nature), whether or not,—

(i) any capital has been invested for the purpose of carrying on such activity; or

(ii) such activity is carried on with a motive to make any gain or profit, but does not include—

(a) institutions owned or managed by organisations wholly or substantially engaged in any charitable, social or philanthropic services; or

(b) any activity of the appropriate Government relating to the sovereign functions of the appropriate Government including all the activities carried on by the Departments of the Central Government dealing with defence research, atomic energy and space; or

(c) any domestic service; or

(d) any other activity as may be notified by the Central Government;

(ze) "Inspector-cum-Facilitator" means an Inspector-cum-Facilitator appointed under sub-section (1) of section 34;

(zf) "inter-State migrant worker" means a person who is employed in an establishment and who—

(i) has been recruited directly by the employer or indirectly through contractor in one State for employment in such establishment situated in another State; or

(ii) has come on his own from one State and obtained employment in an establishment of another State (hereinafter called destination State) or has subsequently changed the establishment within the destination State,

under an agreement or other arrangement for such employment and draws wages not exceeding the amount of rupees eighteen thousand per month or such higher amount as may be notified by the Central Government from time to time;

(zg) "machinery" means any article or combination of articles assembled, arranged or connected and which is used or intended to be used for converting any form of energy to perform work, or which is used or intended to be used, whether incidental thereto or not, for developing, receiving, storing, containing, confining, transforming, transmitting, transferring or controlling any form of energy;

(zh) "major port" means a major port as defined in clause (8) of section 3 of the Indian Ports Act, 1908;

15 of 1908

(zi) "manufacturing process" means any process for—

(i) making, altering, repairing, ornamenting, finishing, packing, oiling, washing, cleaning, breaking up, demolishing, or otherwise treating or adapting any article or substance with a view to its use, sale, transport, delivery or disposal; or

(ii) pumping oil, water, sewage or any other substance; or

(iii) generating, transforming or transmitting power; or

(iv) composing, printing, printing by letter press, lithography, offset, photogravure screen printing, three Dimensional or four Dimensional printing, prototyping, flexography or other types of printing process or book binding; or

(v) constructing, reconstructing, repairing, refitting, finishing or breaking up ships or vessels; or

(vi) preserving or storing any article in cold storage; or

(vii) such other processes as the Central Government may notify;

(zf) "medical officer" means the medical officer appointed under sub-section (f) of section 42;

60 of 2002.

(zk) "metro railway" means the metro railway as defined in sub-clause (f) of clause (f) of section 2 of the Metro Railways (Operation and Maintenance) Act, 2002;

(zl) "mine" means any excavation where any operation for the purpose of searching for or obtaining minerals has been or is being carried on and includes—

(i) all borings, bore holes, oil wells and accessory crude conditioning plants, including the pipe conveying mineral oil within the oilfields;

(ii) all shafts, in or adjacent to and belonging to a mine, whether in the course of being sunk or not;

(iii) all levels and inclined planes in the course of being driven;

(iv) all open cast workings;

(v) all conveyors or aerial ropeways provided for bringing into or removal from a mine of minerals or other articles or for the removal of refuse therefrom;

(vi) all adits, levels, planes, machinery, works, railways, tramways and sidings in or adjacent to and belonging to a mine;

(vii) all protective works being carried out in or adjacent to a mine;

(viii) all workshops and stores situated within the precincts of a mine and under the same management and used primarily for the purposes connected with that mine or a number of mines under the same management;

(ix) all power stations, transformer sub-stations, converter stations, rectifier stations and accumulator storage stations for supplying electricity solely or mainly for the purpose of working the mine or a number of mines under the same management;

(x) any premises for the time being used for depositing sand or other material for use in a mine or for depositing refuse from a mine or in which any operations in connection with such sand refuse or other material is being carried on, being premises exclusively occupied by the owner of the mine;

(xi) any premises in or adjacent to and belonging to a mine on which any process ancillary to the getting, dressing or preparation for sale of minerals or coke is being carried on;

(xii) a mine owned by the Government;

(zm) "minerals" means all substances which can be obtained from the earth by mining, digging, drilling, dredging, hydraulic mining, quarrying or by any other operation and includes mineral oils (such as natural gas and petroleum);

(zn) "motor transport undertaking" means a motor transport undertaking employing motor transport worker and engaged in carrying passengers or goods or both by road for hire or reward, and includes a private carrier;

(zo) "motor transport worker" means a person who is employed in a motor transport undertaking directly or through an agency, whether for wages or not, to work in a professional capacity on a transport vehicle or to attend the duties in connection with the arrival, departure, loading or unloading of such transport vehicle and includes a driver, conductor, cleaner, station staff, line checking staff, booking clerk, cash clerk, depot clerk, time-keeper, watchman or attendant, but does not include any such person—

(i) who is employed in a factory;

(ii) to whom the provisions of any other law for the time being in force regulating the conditions of service of persons employed in shops or commercial establishments apply;

(zp) "newspaper" means any printed periodical work containing public news or comments on public news and includes such other class of printed periodical work as may, from time to time, be notified in this behalf by the Central Government;

(zq) "newspaper establishment" means an establishment under the control of any person or body of persons, whether incorporated or not, for the production or publication of one or more newspapers or for conducting any news agency or syndicate and includes following newspaper establishments which shall be deemed to be one establishment, namely:—

(i) two or more newspaper establishments under common control;

(ii) two or more newspaper establishments owned by an individual and his or her spouse unless it is shown that such spouse is a sole proprietor or partner or a shareholder of a corporate body on the basis of his or her own individual funds;

(iii) two or more newspaper establishments publishing newspapers bearing the same or similar title and in the same language in any place in India or bearing the same or similar title but in different languages in the same State or Union territory.

Explanation 1.—For the purposes of sub-clause (i) two or more establishments shall be deemed to be under common control where—

(a) (i) the newspaper establishments are owned by a common individual or individuals;

(ii) the newspaper establishments are owned by firms, if such firms have a substantial number of common partners;

(iii) the newspaper establishments are owned by bodies corporate, if one body corporate is a subsidiary of the other body corporate, or both are subsidiaries of a common holding company or a substantial number of their equity shares are owned by the same person or group of persons, whether incorporated or not;

(iv) one establishment is owned by a body corporate and the other is owned by a firm, if a substantial number of partners of the firm together hold a substantial number of equity shares of the body corporate;

(v) one is owned by a body corporate and the other is owned by a firm having bodies corporate as its partners if a substantial number of equity shares of such bodies corporate are owned, directly or indirectly, by the same person or group of persons, whether incorporated or not, or

(b) there is functional integrality between concerned newspaper establishments.

Explanation 2.—For the purposes of this clause,—

(i) different departments, branches and centres of newspaper establishments shall be treated as parts thereof;

(ii) a printing press shall be deemed to be a newspaper establishment if the principal business thereof is to print newspaper;

(zr) "notification" means a notification published in the Gazette of India or the Official Gazette of a State, as the case may be, and the expression "notify" with its grammatical variations and cognate expressions shall be construed accordingly;

(za) "occupier" of a factory means the person who has ultimate control over the affairs of the factory:

Provided that—

(i) in the case of a firm or other association of individuals, any one of the individual partners or members thereof;

(ii) in the case of a company, any one of the directors, except any independent director within the meaning of sub-section (6) of section 149 of the Companies Act, 2013;

(iii) in the case of a factory owned or controlled by the Central Government or any State Government, or any local authority, the person or persons appointed to manage the affairs of the factory by the Central Government, the State Government or the local authority or such other authority as may be prescribed by the Central Government,

shall be deemed to be the occupier:

Provided further that in the case of a ship which is being repaired, or on which maintenance work is being carried out, in a dry dock which is available for hire, the owner of the dock shall be deemed to be the occupier for all purposes except the matters as may be prescribed by the Central Government which are directly related to the condition of ship for which the owner of ship shall be deemed to be the occupier;

(zi) "office of the mine" means an office at the surface of the mine concerned;

(zii) "open cast working" means a quarry, that is to say, an excavation where any operation for the purpose of searching for or obtaining minerals has been or is being carried on, not being a shaft or an excavation which extends below superjacent ground;

(ziv) "ordinarily employed" with reference to any establishment or part thereof, means the average number of persons employed per day in the establishment or part thereof during the preceding calendar year obtained by dividing the number of man days worked by the number of working days excluding rest days and other non-working days;

(zw) "owner", in relation to a mine, means any person who is the immediate proprietor or lessee or occupier of the mine or of any part thereof and in case of a mine the business whereof is being carried on by a liquidator or receiver, such liquidator or receiver; but does not include a person who merely receives a royalty, rent or fine from the mine, or is merely the proprietor of the mine, subject to any lease grant or licence for the working thereof, or is merely the owner of the soil and not interested in the minerals of the mine: but any contractor or sub-lessee for the working of a mine or any part thereof shall be subject to this Code in like manner as if he were an owner but not so as to exempt the former from any liability;

(zx) "plantation" means—

(a) any land used or intended to be used for—

(i) growing tea, coffee, rubber, cinchona or cardamom which admeasures five hectares or more;

(ii) growing any other plant, which admeasures five hectares or more and in which persons are employed or were employed on any day of the preceding twelve months, if, after obtaining the approval of the Central Government, the State Government, by notification, so directs.

Explanation.—Where any piece of land used for growing any plant referred to in this sub-clause admeasures less than five hectares and is

contiguous to any other piece of land not being so used, but capable of being so used, and both such pieces of land are under the management of the same employer, then, for the purposes of this sub-clause, the former piece of land shall be deemed to be a plantation, if the total area of both such pieces of land admeasures five hectares or more; and

(b) any land which the State Government may, by notification, declare and which is used or intended to be used for growing any plant referred to in sub-clause (a), notwithstanding that it admeasures less than five hectares;

Provided that no such declaration shall be made in respect of such land which admeasures less than five hectares immediately before the commencement of this Code; and

(c) offices, hospitals, dispensaries, schools and any other premises used for any purpose connected with any plantation within the meaning of sub-clause (a) and sub-clause (b); but does not include factory on the premises;

(zv) "prescribed" means prescribed by rules made by the appropriate Government under this Code;

(zz) "principal employer", where the contract labour is employed or engaged, means—

(i) in relation to any office or Department of the Government or a local authority, the head of that office or Department or such other officer as the Government or the local authority, may specify in this behalf;

(ii) in a factory, the owner or occupier of the factory and where a person has been named as the manager of the factory, the person so named;

(iii) in a mine, the owner or agent of the mine;

(iv) in relation to any other establishment, any person responsible for the supervision and control of the establishment;

(zza) "producer", in relation to audio-visual production, means the company, firm or other person by whom the arrangements necessary for producing such audio-visual (including the raising of finances and engaging audio-visual workers for producing audio-visual) are undertaken.

Explanation.—For the purposes of this clause, the expressions "company" and "firm" have the same meaning as respectively assigned to them in the Companies Act, 2013 and the Indian Partnership Act, 1932;

18 of 2013.
9 of 1932.

(zxb) "qualified medical practitioner" means a medical practitioner who possesses any recognised medical qualification as defined in clause (i) of section 2 of the Indian Medical Council Act, 1956 and who is enrolled on a Indian Medical Register as defined in clause (e) and on a State Medical Register as defined in clause (f) of the said section;

102 of 1956.

(zxc) "railway" means the railway as defined in clause (31) of section 2 of the Railways Act, 1989;

24 of 1989.

(zxd) "relay" means a set of two or more persons carrying out the same kind of work during different periods of the day and each such period is called a "shift";

(zze) "sales promotion employees" means any person by whatever name called employed or engaged in any establishment for hire or reward to do any work relating to promotion of sales or business, or both, but does not include any such person who,—

(i) being employed or engaged in a supervisory capacity, draws wages exceeding eighteen thousand rupees per mensem or an amount as may be notified by the Central Government from time to time; or

(ii) is employed or engaged mainly in a managerial or administrative capacity.

(zzf) "Schedule" means the Schedule appended to this Code;

(zzg) "serious bodily injury" means any injury which involves, or in all probability will involve, the permanent loss of any part or section of a body or the use of any part or section of a body, or the permanent loss of or injury to the sight or hearing or any permanent physical incapacity or the fracture of any bone or one or more joints or bones of any phalanges of hand or foot;

(zzh) "standards", "regulations", "rules", "bye-laws" and "orders" respectively means standards, regulations, rules, bye-laws and orders made or declared, as the case may be, under this Code;

(zzi) "telecommunication service" means the telecommunication service as defined in clause (k) of sub-section (1) of section 2 of the Telecom Regulatory Authority of India Act, 1997;

24 of 1997

(zzj) "wages" means all remuneration whether by way of salaries, allowances or otherwise, expressed in terms of money or capable of being so expressed which would, if the terms of employment, express or implied, were fulfilled, be payable to a person employed in respect of his employment or of work done in such employment, and includes,—

(i) basic pay;

(ii) dearness allowance; and

(iii) retaining allowance, if any,

but does not include—

(a) any bonus payable under any law for the time being in force, which does not form part of the remuneration payable under the terms of employment;

(b) the value of any house-accommodation, or of the supply of light, water, medical attendance or other amenity or of any service excluded from the computation of wages by a general or special order of the appropriate Government;

(c) any contribution paid by the employer to any pension or provident fund, and the interest which may have accrued thereon;

(d) any conveyance allowance or the value of any travelling concession;

(e) any sum paid to the employed person to defray special expenses entailed on him by the nature of his employment;

(f) house rent allowance;

(g) remuneration payable under any award or settlement between the parties or order of a court or Tribunal;

(h) any overtime allowance;

(i) any commission payable to the employee;

(j) any gratuity payable on the termination of employment;

(k) any retrenchment compensation or other retirement benefit payable to the employee or any *ex gratia* payment made to him on the termination of employment;

Provided that, for calculating the wages under this clause, if payments made by the employer to the employee under sub-clauses (a) to (i) exceeds

one-half, or such other per cent. as may be notified by the Central Government, of the all remuneration calculated under this clause, the amount which exceeds such one-half, or the per cent. so notified, shall be deemed as remuneration and shall be accordingly added in wages under this clause:

Provided further that for the purpose of equal wages to all genders and for the purpose of payment of wages, the emoluments specified in sub-clauses (d), (f), (g) and (h) shall be taken for computation of wages.

Explanation.—Where an employee is given in lieu of the whole or part of the wages payable to him, any remuneration in kind by his employer, the value of such remuneration in kind which does not exceed fifteen per cent. of the total wages payable to him, shall be deemed to form part of the wages of such employee;

(zzk) "week" means a period of seven days beginning at midnight on Saturday night or such other night as may be approved in writing for a particular area by the Chief Inspector-cum-Facilitator;

(zzi) "worker" means any person employed in any establishment to do any manual, unskilled, skilled, technical, operational, clerical or supervisory work for hire or reward, whether the terms of employment be express or implied, and includes working journalists and sales promotion employees, but does not include any such person—

(i) who is subject to the Air Force Act, 1950, or the Army Act, 1950, or the Navy Act, 1957; or

45 of 1950.

46 of 1950

62 of 1957.

(ii) who is employed in the police service or as an officer or other employee of a prison; or

(iii) who is employed mainly in a managerial or administrative capacity; or

(iv) who is employed in a supervisory capacity drawing wage exceeding eighteen thousand rupees per month or an amount as may be notified by the Central Government from time to time;

(zzm) "Working Journalist" means a person whose principal avocation is that of a journalist and who is employed as such, either whole-time or part-time, in, or in relation to, one or more newspaper establishment, or other establishment relating to any electronic media or digital media such as newspaper or radio or other like media and includes an editor, a leader-writer, news editor, sub-editor, feature-writer, copy-tester, reporter, correspondent, cartoonist, news-photographer and proof-reader, but does not include any such person who is employed mainly in a managerial, supervisory or administrative capacity:

(2) For the purposes of this Code, a person working or employed in or in connection with mine is said to be working or employed—

(a) "below ground" if he is working or employed—

(i) in a shaft which has been or is in the course being sunk; or

(ii) in any excavation which extends below superjacent ground; and

(b) "above ground" if he is working in an opencast working or in any other manner not specified in clause (a).

CHAPTER II

REGISTRATION

3. (1) Every employer of any establishment,—

Registration
of certain
establishments

(a) which comes into existence after the commencement of this Code; and

(b) to which this Code shall apply.

shall, within sixty days from the date of such applicability of this Code, make an application electronically to the registering officer appointed by the appropriate Government (hereinafter referred to as the registering officer) for the registration of such establishment:

Provided that the registering officer may entertain any such application for registration after the expiry of such period on payment of such late fees as may be prescribed by the appropriate Government.

(2) Every application under sub-section (1) shall be submitted to the registering officer in such manner, in such form, containing such particulars including the information relating to the employment of inter-State migrant workers and shall be accompanied by such fees as may be prescribed by the appropriate Government.

(3) After the receipt of an application under sub-section (1), the registering officer shall register the establishment and issue a certificate of registration electronically to the employer thereof in such form and within such time and subject to such conditions as may be prescribed by the Central Government:

Provided that if the registering officer fails to register an establishment under the application so made or to entertain the application within the prescribed period, then, such establishment shall be deemed to have been registered under this Code immediately on the expiration of such period and the electronic certificate of registration shall be auto generated and the responsibility of such failure shall be on the registering officer.

(4) Any change in the ownership or management or in any particulars referred to in sub-section (2) which occurs after the registration of an establishment under this Code, shall be intimated by the employer electronically to the registering officer within thirty days of such change in such form as may be prescribed by the Central Government and thereafter the registering officer shall make amendment in the certificate of registration electronically in such manner as may be prescribed by the Central Government.

(5) The employer of an establishment shall, within thirty days of the closing of the establishment—

(a) inform the closing of such establishment; and

(b) certify payment of all dues to the workers employed in such establishment, to the registering officer in such manner as may be prescribed by the Central Government and the registering officer shall, on receiving such information and certificate remove such establishment from the register of establishments maintained by him and cancel the registration certificate of the establishment within sixty days from the receipt of such information;

Provided that if the registering officer fails to cancel the registration certification of the establishment under this sub-section within such sixty days, then, the registration certificate of such establishment shall be deemed to have been cancelled under this Code immediately on the expiration of such period of sixty days and the cancellation of registration certificate shall be auto generated and the responsibility of such failure shall be on the registering officer.

(6) If an employer of an establishment—

(a) has obtained the registration of his establishment by misrepresentation or suppression of any material fact, or

(b) has obtained the registration of his establishment so fraudulently or otherwise that the registration has become useless or ineffective to run the establishment,

then, in case of clause (a) such misrepresentation or suppression of any material fact shall be deemed to be the contravention of the provisions of this Code for prosecution of the employer under section 94 without affecting the registration and running of the establishment and in case of clause (b) the registering officer may, after giving an opportunity to the employer of the establishment to be heard, revoke the registration by an order and such process for revocation shall be completed by the registering officer within sixty days from coming into his notice the facts specified in clause (b).

(7) No employer of an establishment who—

(a) has not registered the establishment under this section; or

(b) has not preferred appeal under section 4 against the cancellation of the registration certificate of the establishment under sub-section (5) or revocation of the registration of the establishment under sub-section (6) or the appeal so preferred has been dismissed,

shall employ any employee in the establishment.

(8) Notwithstanding anything contained in this Code, where any establishment, to which this Code applies, has already been registered under any—

(a) Central Labour law; or

(b) any other law which may be notified by the Central Government and which applies to the establishment which is in existence at the time of the commencement of this Code,

shall be deemed to have been registered under the provisions of this Code, subject to the condition that the registration holder provides the details of registration to the concerned registering officer within such time and in such form as may be prescribed.

Appeal.

4. (1) Any person aggrieved by an order made under section 3 may, within thirty days from the date on which the order is communicated to him, prefer an appeal to an appellate officer who shall be a person notified in this behalf by the appropriate Government:

Provided that the appellate officer may entertain the appeal after the expiry of the said period of thirty days, if he is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

(2) On receipt of an appeal under sub-section (1), the appellate officer shall, after giving the appellant an opportunity of being heard, dispose of the appeal within a period of thirty days from the date of receipt of such appeal.

Notice by employer of commencement and cessation of operation.

5. (1) No employer of an establishment being factory or mine or relating to contract labour or building or other construction work shall use such establishment to commence the operation of any industry, trade, business, manufacturing or occupation thereon without sending notice of such purpose in such form and manner and to such authority and within such time as may be prescribed and shall also intimate the cessation thereof to the said authority in such manner as may be prescribed by the appropriate Government.

(2) The notice or intimation under sub-section (1) shall be given electronically.

CHAPTER III

DUTIES OF EMPLOYER AND EMPLOYEES, ETC.

Duties of employer.

6. (1) Every employer shall,—

(a) ensure that workplace is free from hazards which cause or are likely to cause injury or occupational disease to the employees;

(b) comply with the occupational safety and health standards declared under section 18 or the rules, regulations, bye-laws or orders made under this Code;

(c) provide such annual health examination or test free of costs to such employees of such age or such class of employees of establishments or such class of establishments, as may be prescribed by the appropriate Government;

(d) provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of the employees;

(e) ensure the disposal of hazardous and toxic waste including disposal of e-waste;

(f) issue a letter of appointment to every employee on his appointment in the establishment, with such information and in such form as may be prescribed by the appropriate Government and where an employee has not been issued such appointment letter on or before the commencement of this Code, he shall, within three months of such commencement, be issued such appointment letter;

(g) ensure that no charge is levied on any employee, in respect of anything done or provided for maintenance of safety and health at workplace including conduct of medical examination and investigation for the purpose of detecting occupational diseases;

(h) relating to factory, mine, dock work, building or other construction work or plantation, ensure and be responsible for the safety and health of employees, workers and other persons who are on the work premises of the employer, with or without his knowledge, as the case may be.

(2) Without prejudice to the generality of the provisions of sub-section (1), the duties of an employer shall particularly in respect of factory, mines, dock, building or other construction work or plantation include—

(a) the provision and maintenance of plant and systems of work in the workplace that are safe and without risk to health;

(b) the arrangements in the workplace for ensuring safety and absence of risk to health in connection with the use, handling, storage and transport of articles and substances;

(c) the provision of such information, instruction, training and supervision as are necessary to ensure the health and safety of all employees at work;

(d) the maintenance of all places of work in the workplace in a condition that is safe and without risk to health and the provision and maintenance of such means of access to, and egress from, such places as are safe and without such risk;

(e) the provision, maintenance or monitoring of such working environment in the workplace for the employees that is safe, without risk to health as regards facilities and arrangements for their welfare at work.

7. (1) The owner and agent of every mine shall jointly and severally be responsible for making financial and other provisions and for taking such other steps as may be necessary for compliance with the provisions of this Code and the rules, regulations, bye-laws and orders made thereunder, relating to mine.

Duties and responsibilities of owner, agent and manager in relation to mine.

(2) In the event of any contravention by any person whatsoever of any of the provisions of this Code or of the rules, regulations, bye-laws or orders made thereunder, relating to mine, except those which specifically require any person to do any act or thing or prohibit any person from doing an act or thing, besides the person who contravenes, then, each of the following persons shall also be deemed to be guilty of such contravention unless he

proves that he had used due diligence to secure compliance with the provisions and had taken reasonable means to prevent such contravention, namely:—

- (a) the official or officials appointed to perform duties of supervision in respect of the provisions contravened;
- (b) the manager of the mine;
- (c) the owner and agent of the mine;
- (d) the person appointed, if any, to carry out the responsibility under section 24.

(3) It shall not be a defence in any proceedings brought against the owner or agent of a mine under this section that the manager and other officials have been appointed in accordance with the provisions of this Code or that a person to carry the responsibility under section 24 has been appointed.

Duties of
designers,
manufacturers,
importers or
suppliers

8. (1) Every person who designs, manufactures, imports or supplies any article for use in any establishment shall—

(a) ensure so far as is reasonably practicable, that the article is so designed and constructed in the establishment as to be safe and without risk to the health of the workers when properly used;

(b) carry out or arrange for the carrying out of such tests and examination in the establishment as may be considered necessary for the effective implementation of the provisions of clause (a);

(c) take steps as may be necessary to ensure that adequate information will be available—

(i) in connection with the use of the article in any establishment;

(ii) about the use for which such article is designed and tested; and

(iii) about any conditions necessary to ensure that the article, when put to such use, shall be safe, and without risk to the health of the workers:

Provided that where an article is designed or manufactured outside India, then it shall be obligatory on the part of the importer to see—

(A) that the article conforms to the same standards of such article manufactured in India; or

(B) if the standards adopted in the country outside India for the manufacture of such article is above the standards adopted in India, that the article conforms to such standards in such country;

(C) if there is no standard of such article in India, then, the article conforms to the standard adopted in the country from where it is imported at its national level.

(2) The designer, manufacturer, importer or supplier shall also comply with such duties as the Central Government may, in consultation with the National Occupational Safety and Health Advisory Board referred to in sub-section (1) of section 16, by regulations specify.

(3) Every person, who undertakes to design or manufacture any article and substance for use in any factory, may carry out or arrange for the carrying out of necessary research with a view to the discovery and, so far as is reasonably practicable, the elimination or minimisation of any risks to the health or safety of the workers to which the design or manufacture of article and substance may give rise to such risk.

(4) Nothing contained in sub-sections (1) and (2) shall be construed to require a person to repeat the testing, examination or research which has been carried out otherwise than by him or at his instance in so far as it is reasonable for him to rely on the results thereof for the purposes of the said sub-sections.

(5) Any duty imposed on any person by sub-sections (1) and (2) shall extend only to things done in the course of business carried on by him and to matters within his control.

(6) Every person,—

(a) who erects or installs any article for use in a factory, shall ensure, so far as practicable, that such article so erected or installed does not make it unsafe or a risk to health when that article is used by the persons in such factory;

(b) who manufactures, imports or supplies any substance for use in any factory shall—

(i) ensure, so far as practicable, that such substance when used in the factory does not make it unsafe or a risk to health of persons working in such factory;

(ii) carry out or arrange for carrying out of such tests and examination in relation to such substance as may be necessary;

(iii) take such steps as are necessary to secure that the information about the results of tests carried out in connection with the use of the substance as referred to in sub-clause (ii) is available in a factory along with conditions necessary to ensure its safe use and no risks to health;

(c) who undertakes the manufacture of any substance for use in any factory shall carry out or arrange for carrying out of any necessary research with a view to discover and, so far as practicable, to ensure the elimination or minimisation of any risks to health or safety to which the substance may give rise out of such manufacture or research:

(7) For the purposes of this section, an article and substance is not to be regarded as properly used, if they are used without regard to any information or advice relating to their use which has been made available by the person who has designed, manufactured, imported or supplied the article and substance.

Explanation.—For the purpose of this section—

(a) "article" shall include plant and machinery;

(b) "substance" means any natural or artificial substance whether in a solid or liquid form or in the form of a gas or vapour; and

(c) "substance for use in any factory" means such substance, whether or not intended for use by persons working in a factory.

9. (1) It shall be the duty of the architect, project engineer or designer responsible for any building or other construction work or the design of any project or part thereof relating to such building or other construction work to ensure that, at the planning stage, due consideration is given to the safety and health aspects of the building workers and employees who are employed in the erection, operation and execution of such projects and structures as the case may be.

Duties of
architect,
project
engineer and
designer

(2) Adequate care shall be taken by the architect, project engineer and other professionals involved in the project referred to in sub-section (1), not to include anything in the design which would involve the use of dangerous structures or other processes or materials, hazardous to health or safety of building workers and employees during the course of erection, operation and execution as the case may be.

(3) It shall also be the duty of the professionals, involved in designing the buildings structures or other construction projects, to take into account the safety aspects associated with the maintenance and upkeep of the structures and buildings whose maintenance and upkeep may involve such hazards as may be notified by the appropriate Government.

Notice of
certain
accident

10. (1) Where at any place in an establishment, an accident occurs which causes death, or which causes any bodily injury by reason of which the person injured is prevented from working for a period of forty-eight hours or more immediately following the accident or which is of such nature as may be prescribed by the appropriate Government, then,—

(a) employer or owner or agent or manager referred to in section 67 of such establishment if it is mine; or

(b) employer or manager in relation to such establishment if it is factory or relates to dock work; or

(c) the employer of a plantation or an establishment relating to building or other construction or any other establishment,

shall send notice thereof to such authorities, in such manner and within such time, as may be prescribed by the appropriate Government.

(2) Where a notice given under sub-section (1) relates to an accident causing death in a plantation or an establishment relating to building or other construction work or any other establishment, the authority to whom the notice is sent shall make an inquiry into the occurrence within two months of the receipt of the notice or if there is no such authority, the Chief Inspector-cum-Facilitator shall cause the Inspector-cum-Facilitator to make an inquiry within the said period.

Notice of
certain
dangerous
occurrences

11. Where in an establishment there is any dangerous occurrence of such nature, (whether causing any bodily injury or disability, or not) the employer shall send notice thereof to such authorities, and in such form and within such time, as may be prescribed by the appropriate Government.

Notice of
certain
diseases

12. (1) Where any worker in an establishment contracts any disease specified in the Third Schedule, the employer of the establishment shall send notice thereof to such authorities, and in such form and within such time, as may be prescribed by the appropriate Government.

(2) If any qualified medical practitioner attends on a person, who is or has been employed in an establishment, and who is, or is believed by the qualified medical practitioner, to be suffering from any disease specified in the Third Schedule, the medical practitioner shall without delay send a report in writing to the office of the Chief Inspector-cum-Facilitator in such form and manner and within such time as may be prescribed by the appropriate Government.

(3) If any qualified medical practitioner fails to comply with the provisions of sub-section (2), he shall be punishable with penalty which may extend to ten thousand rupees.

Duties of
employee

13. Every employee at workplace shall,—

(a) take reasonable care for the health and safety of himself and of other persons who may be affected by his acts or omissions at the workplace;

(b) comply with the safety and health requirements specified in the standards;

(c) co-operate with the employer in meeting the statutory obligations of the employer under this Code;

(d) if any situation which is unsafe or unhealthy comes to his attention, as soon as practicable, report such situation to his employer or to the health and safety representative and in case of mine, agent or manager referred to in section 67, safety officers or an official for his workplace or section thereof, as the case may be, who

shall report it to the employer in the manner as may be prescribed by the appropriate Government;

(e) not wilfully interfere with or misuse or neglect any appliance, convenience or other thing provided at workplace for the purpose of securing the health, safety and welfare of workers;

(f) not do, wilfully and without reasonable cause, anything, likely to endanger himself or others; and

(g) perform such other duties as may be prescribed by the appropriate Government.

14. (1) Every employee in an establishment shall have the right to obtain from the employer information relating to employee's health and safety at work and represent to the employer directly or through a member of the Safety Committee as constituted under section 22, if constituted by the employer for such purpose, regarding inadequate provision for protection of his safety or health in connection with the work activity in the workplace, and if not satisfied, to the Inspector-cum-Facilitator.

Rights of employee

(2) Where the employee referred to in sub-section (1) in any workplace has reasonable apprehension that there is a likelihood of imminent serious personal injury or death or imminent danger to health, he may bring the same to the notice of his employer directly or through a member of the Safety Committee referred to in sub-section (1) and simultaneously bring the same to the notice of the Inspector-cum-Facilitator.

(3) The employer or any employee referred to in sub-section (1) shall take immediate remedial action if he is satisfied about the existence of such imminent danger and send a report forthwith of the action taken to the Inspector-cum-Facilitator in such manner as may be prescribed by the appropriate Government.

(4) If the employer referred to in sub-section (3) is not satisfied about the existence of any imminent danger as apprehended by his employees, he shall, nevertheless, refer the matter forthwith to the Inspector-cum-Facilitator whose decision on the question of the existence of such imminent danger shall be final.

15. No person shall intentionally or recklessly interfere with, damage or misuse anything which is provided in the interest of health, safety or welfare under this Code.

Duty not to interfere with or misuse things

CHAPTER IV

OCCUPATIONAL SAFETY AND HEALTH

16. (1) The Central Government shall, by notification, constitute the National Occupational Safety and Health Advisory Board (hereinafter in this Code referred to as the National Board) to discharge the functions conferred on it by or under this Code and to advise the Central Government on the matters relating to—

National Occupational Safety and Health Advisory Board

(a) standards, rules and regulations to be declared or framed under this Code;

(b) implementation of the provisions of this Code and the standards, rules and regulations relating thereto;

(c) the issues of policy and programme relating to occupational safety and health referred to it, from time to time, by the Central Government; and

(d) any other matter in respect of this Code referred to it, from time to time, by the Central Government.

(2) The National Board shall consist of—

(a) Secretary, Ministry of Labour and Employment—Chairperson *ex officio*;

(b) Director General, Factory Advice Service and Labour Institutes, Mumbai—Member *ex officio*;

(c) Director General, Mines Safety, Dhanbad—Member *ex officio*;

(d) Chief Controller of Explosives, Nagpur—Member *ex officio*;

(e) Chairman, Central Pollution Control Board, New Delhi—Member *ex officio*;

(f) Chief Labour Commissioner (Central), New Delhi—Member *ex officio*;

(g) Principal Secretaries dealing with labour matters of four States (by rotation as the Central Government may deem fit)—Member *ex officio*;

(h) Director General, Employee's State Insurance Corporation, New Delhi—Member *ex officio*;

(i) Director General, Health Services, New Delhi—Member *ex officio*;

(j) five representatives of employers—Member *ex officio*;

(k) five representatives of employees—Member *ex-officio*;

(l) a representative of professional body associated with the matter for which standards, rules, policies being framed—Member;

(m) five eminent persons connected with the field of Occupational Safety and Health, or representatives from reputed research institutions or similar other discipline—Member;

(n) special invitees from the State Government or the Government of Union territory for seeking inputs in specific matters or industry or sector which is predominant in that State or Union territory—Member;

(o) Joint Secretary, Ministry of Labour and Employment—Member Secretary *ex officio*.

(3) The terms of office of the Members referred to in clauses (g), (j), (k), (l) and (m) of sub-section (2) shall be of three years and the procedure for their nomination, and discharge of their functions shall be such as may be prescribed by the Central Government.

(4) The Central Government may, in consultation with the National Board, determine the number, nature and categories of other officers and employees required to assist the National Board in the efficient discharge of its functions and terms and conditions of service of such officers and employees of the National Board shall be such as may be prescribed by the Central Government.

(5) The Central Government may constitute as many technical committees or advisory committees consisting of such number of members having such qualifications as may be prescribed by the Central Government, to assist the National Board in discharge of its function specified in sub-section (1).

(6) The National Board shall consult the State Governments whose Principal Secretaries are the Members of the National Board as required under clause (g) of sub-section (2) of section 16 and in case of specific issues relating to plantation, factories and like other issues, the State Government concerned may be invited by the National Board as special invitee for obtaining their inputs on such issues.

State
Occupational
Safety and
Health
Advisory
Board

17. (1) The State Government shall constitute a Board to be called the State Occupational Safety and Health Advisory Board (hereinafter referred to as "State Advisory Board") to advise the State Government on such matters arising out of the administration of this Code as may be referred to it by the State Government.

(2) The constitution, procedure and other matters relating to State Advisory Board shall be such as may be prescribed by the State Government.

(3) The State Government may constitute as many technical committees or advisory committees of the State Advisory Board including site appraisal committees, consisting of such number of members and having such qualifications as may be prescribed, to assist the State Government or State Advisory Board in discharge of their functions relating to the area falling within their respective jurisdictions.

18. (1) The Central Government shall declare, by notification, standards on occupational safety and health for workplaces relating to factory, mine, dock work, *beedi* and cigar, building and other construction work and other establishments.

Occupational
safety and
health
standards

(2) In particular and without prejudice to the generality of the power to declare standards to be followed under sub-section (1), such standards shall relate to—

(a) physical, chemical, biological and any other hazards to be dealt with for the working life of employee to ensure to the extent feasible on the basis of the best available evidence or functional capacity, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to such hazards;

(b) the norms—

(i) appraising the hazards to employees and users to whom such hazards are exposed;

(ii) relating to relevant symptoms and appropriate energy treatment and proper conditions and precautions of safe use or exposure;

(iii) for monitoring and measuring exposure of employees to hazards;

(iv) for medical examination and other tests which shall be made available, by the employer or at his cost, to the employees exposed to hazards; and

(v) for hazard evaluation procedures like safety audit, hazard and operability study, fault free analysis, event free analysis and such other requirements;

(c) medical examination including criteria for detection and reporting of occupational diseases to be extended to the employees even after he ceases to be in employment, if he is suffering from an occupational disease which arises out of or in the course of employment;

(d) such aspects of occupational safety and health relating to workplaces which the Central Government considers necessary on the report of the authority designated by such Government for such purpose;

(e) such safety and health measures as may be required having regard to the specific conditions prevailing at the workplaces relating to mine, factory, building and other construction work, *beedi* and cigar, dock work or any other establishments notified; and

(f) matters specified in the Second Schedule to this Code.

(3) Notwithstanding anything contained in section 131, the Central Government may, on the basis of the recommendation of the National Board and after notifying its intention so to do for not less than forty-five days, by notification, amend the Second Schedule.

(4) The State Government may, with the prior approval of the Central Government, by notification amend the standards made under sub-section (1) and sub-section (2) for the establishment for which it is the appropriate Government situated in the State.

Research
related
activities.

19. It shall be the duty of such institutions in the field of occupational safety and health as the Central or State Government may notify to conduct research, experiments and demonstrations relating to occupational safety and health and thereafter submit their recommendations to the Central Government or the State Government, as the case may be:

Provided that the State Government shall consult National Board before notifying conduct of research, experiments and demonstration relating to occupational safety and health.

Safety and
occupational
health surveys

20. (1) At any time during the normal working hours of an establishment or at any other time as he may deem necessary,—

(a) the Chief Inspector-cum-Facilitator in the case of factory or mine; or

(b) the Director General of Factory Advice Service and Labour Institute in the case of factory; or

(c) the Director General of Mines Safety in the case of mine; or

(d) the Director General of Health Services in the case of factory or mine; or

(e) such other officer as may be authorised by the appropriate Government in the case of any other establishment or class of establishments,

after giving notice in writing to the employer, conduct survey of the factory or mine or such other establishment or class of establishments and such employer shall afford all facilities for such survey, including facilities for the examination and testing of plant and machinery and collection of samples and other data relevant to the survey.

Explanation.—For the purposes of this sub-section, the expression "employer" includes manager for the factory or in the case of any other establishment or class of establishments such person who is for the time being responsible for the safety and the occupational health of such other establishment or class of establishments, as the case may be.

(2) For the purpose of facilitating surveys under sub-section (1) every worker shall, if so required by the person conducting the survey, present himself to undergo such medical examination as may be considered necessary by such person and furnish all information in his possession which is relevant to the survey.

(3) Any time spent by a worker for undergoing medical examination or furnishing information under sub-section (2) shall, for the purpose of calculating wages and extra wages for overtime work, be deemed to be working hour for him.

Explanation.—For the purposes of this section, the report submitted to the appropriate Government by the person conducting the survey under sub-section (1) shall be deemed to be a report submitted by an Inspector-cum-Facilitator under this Code.

Collection of
statistics and
portal for
inter-State
migrant
workers.

21. (1) For the purposes of this Code, the Central Government and the State Government shall collect, compile and analyse occupational safety and health statistics in such form and manner as may be prescribed.

(2) The Central Government and the State Governments shall maintain the database or record, for inter-State migrant workers, electronically or otherwise in such portal and in such form and manner as may be prescribed by the Central Government:

Provided that an inter-State migrant worker may register himself as an inter-State migrant worker on such portal on the basis of self-declaration and Aadhaar.

Provided further that the workers who have migrated from one State to any other State and are self-employed in that other State may also register themselves on that portal.

Explanation.—For the purposes of this sub-section, the expression "Aadhaar" shall have the same meaning as assigned to it in clause (a) of section 2 of the Aadhaar (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act, 2016.

22. (1) The appropriate Government may, by general or special order, require any establishment or class of establishments to constitute in the prescribed manner a Safety Committee consisting of representatives of employers and workers engaged in such establishment in such manner that the number of representatives of workers on the Committee shall not be less than the number of representatives of the employer and the representatives of the workers shall be chosen in such manner and for such purpose as may be prescribed by the appropriate Government.

Safety
Committee
and safety
officers.

(2) In every establishment which is a—

- (a) factory wherein five hundred workers or more; or
- (b) factory carrying on hazardous process wherein two hundred fifty workers or more; or
- (c) building or other construction work wherein two hundred fifty workers or more; or
- (d) mine wherein one hundred workers or more, are ordinarily employed,

the employer shall also appoint such number of safety officers, who shall possess such qualifications and perform such duties, as may be prescribed by appropriate Government.

CHAPTER V

HEALTH, SAFETY AND WORKING CONDITIONS

23. (1) The employer shall be responsible to maintain in his establishment such health, safety and working conditions for the employees as may be prescribed by the Central Government.

Responsibility
of employer
for
maintaining
health, safety
and working
conditions.

(2) Without prejudice to the generality of the power conferred under sub-section (1), the Central Government may prescribe for providing all or any of the following matters in the establishment or class of establishments, namely:—

- (i) cleanliness and hygiene;
- (ii) ventilation, temperature and humidity;
- (iii) environment free from dust, noxious gas, fumes and other impurities;
- (iv) adequate standard of humidification, artificially increasing the humidity of the air, ventilation and cooling of the air in work rooms;
- (v) potable drinking water;
- (vi) adequate standards to prevent overcrowding and to provide sufficient space to employees or other persons, as the case may be, employed therein;
- (vii) adequate lighting;
- (viii) sufficient arrangement for latrine and urinal accommodation to male, female and transgender employee separately and maintaining hygiene therein;
- (ix) effective arrangements for treatment of wastes and effluents; and
- (x) any other arrangement which the Central Government considers appropriate.

CHAPTER VI

WELFARE PROVISIONS

24. (1) The employer shall be responsible to provide and maintain in his establishment such welfare facilities for the employees as may be prescribed by the Central Government, including,—

Welfare
facilities in
the
establishment,
etc.

(i) adequate and suitable facilities for washing to male and female employees separately;

(ii) bathing places and locker rooms for male, female and transgender employees separately;

(iii) place of keeping clothing not worn during working hours and for the drying of wet clothing;

(iv) sitting arrangements for all employees obliged to work in a standing position;

(v) facilities of canteen in an establishment for employees thereof, wherein one hundred or more workers including contract labourers are ordinarily employed;

(vi) in case of mines, medical examination of the employees employed or to be employed in the mines, before their employment and at specific intervals;

(vii) adequate first-aid boxes or cupboards with contents readily accessible during all working hours; and

(viii) any other welfare measures which the Central Government considers, under the set of circumstances, as required for decent standard of life of the employees.

(2) Without prejudice to the generality of the powers referred to under sub-section (1), the Central Government may also prescribe for the following matters, namely:—

(i) ambulance room in every factory, mine, building or other construction work wherein more than five hundred workers are ordinarily employed;

(ii) medical facilities at the operating centres and halting stations, uniforms, raincoats and other like amenities for protection from rain or cold for motor transport workers;

(iii) adequate, suitable and separate shelters or rest-rooms for male, female and transgender employees and lunch-room in every factory and mine wherein more than fifty workers are ordinarily employed and in motor transport undertaking wherein employee is required to halt at night;

(iv) the appointment of welfare officer in every factory, mine or plantation wherein two hundred and fifty or more workers are ordinarily employed and the qualification, conditions of service and duties of such welfare officer;

(v) for providing by the employer temporary living accommodation, free of charges and within the work site or as near to it as may be possible, to all building workers employed by him and for causing removal or demolition of such temporary living accommodation and for returning by the employer the possession of any land obtained by him for such purpose from Municipal Board or any other local authority;

(vi) for payment by the principal employer the expenses incurred on providing the accommodation to the contractor, where the building or other construction work is done through the contractor;

(vii) any other matter which may be prescribed.

(3) The Central Government may make rules to provide for the facility of crèche having suitable room or rooms for the use of children under the age of six years of the employees at suitable location and distance either separately or along with common facilities in establishments wherein more than fifty workers are ordinarily employed:

Provided that an establishment can avail common crèche facility of the Central Government, State Government, municipality or private entity or provided by non-Governmental organisation or by any other organisation or group of establishments may pool their resources for setting up of common crèche in the manner as they may agree for such purpose.

CHAPTER VII

HOURS OF WORK AND ANNUAL LEAVE WITH WAGES

25. (1) No worker shall be required or allowed to work, in any establishment or class of establishment for more than—

Daily and weekly working hours, leave, etc.

(a) eight hours in a day; and

(b) the period of work in each day under clause (a) shall be so fixed, as not to exceed such hours, with such intervals and spread overs, as may be notified by the appropriate Government:

Provided that subject to clause (a) in the case of mines,—

(i) the persons employed below ground in a mine shall not be allowed to work for more than such hours as may be notified by the Central Government in any day;

(ii) no work shall be carried on below ground in any mine except by a system of shifts so arranged that the period of work for each shift is not spread over more than the daily maximum hours as notified under clause (i);

(iii) no person employed in a mine shall be allowed to be present in any part of a mine below ground except during the periods of work shown in respect of him in the register maintained under clause (a) of section 33:

Provided further that subject to clause (a) that the hours of work in case of motor transport worker shall include—

(i) the time spent in work done during the running time of the transport vehicle;

(ii) the time spent in subsidiary work; and

(iii) period of mere attendance at terminals of less than fifteen minutes.

Explanation.—For the purposes of this sub-section—

(a) "running time" in relation to a working day means the time from the moment a transport vehicle starts functioning at the beginning of the working day until the moment when the transport vehicle ceases to function at the end of the working day, excluding any time during which the running of the transport vehicle is interrupted for a period exceeding such duration as may be prescribed by the Central Government during which period the persons who drive, or perform any other work in connection with the transport vehicle are free to dispose of their time as they please or are engaged in subsidiary work;

(b) "subsidiary work" means the work in connection with a transport vehicle, its passengers or its load which is done outside the running time of the transport vehicle, including in particular—

(i) the work in connection with accounts, paying of cash, signing of registers, handover of service sheets, the checking of tickets and other similar work;

(ii) taking over and garaging of the transport vehicles;

(iii) travelling from the place where a person signs on to the place where he takes over the transport vehicle and from the place where he leaves the transport vehicle to the place where he signs off;

(iv) work in connection with the upkeep and repair of the transport vehicle; and

(v) the loading and unloading of the transport vehicle;

(c) "period of mere attendance" means the period during which a person remains at his post solely in order to reply to possible calls or to resume action at the time fixed in the duty schedule.

(2) Notwithstanding anything contained in sub-section (1), the hours of work for working journalist shall, subject to a maximum of one hundred and forty-four hours of work during any period of four consecutive weeks and a period of not less than twenty-four consecutive hours of rest during any period of seven consecutive days, be such as may be prescribed by the Central Government.

(3) Notwithstanding anything contained in sub-sections (1) and (2), a sales promotion employee or the working journalist,—

(i) in addition to such holidays, casual leave or other kinds of leave as may be prescribed by the Central Government, shall be granted, if requested for—

(a) earned leave on full wages for not less than one-eleventh of the period spent on duty;

(b) leave on medical certificate on one-half of the wages for not less than one-eighteenth of the period of service;

(ii) may accumulate earned leave up to such maximum limit as may be prescribed by the Central Government;

(iii) shall be entitled for the limit up to which the earned leave may be either encashed or availed of at a time by him and the reasons for which such limit may be exceeded shall be such as may be prescribed by the Central Government;

(iv) shall,—

(a) when he voluntarily relinquishes his post or retires from service; or

(b) when his services are terminated for any reason whatsoever (not being termination as punishment),

be entitled to cash compensation, subject to such conditions and restrictions as may be prescribed by the Central Government (including conditions by way of specifying the maximum period for which such cash compensation shall be payable), in respect of the earned leave earned by him and not availed of;

(v) who dies while in service, his heirs shall be entitled to cash compensation for the earned leave earned by him and not availed of his heirs shall be paid the cash compensation in respect of any period of earned leave for which he or his heirs, is or are entitled to cash compensation under clause (iv) or clause (v), which shall be an amount equal to the wages due to him for such period.

(4) Notwithstanding anything contained in this section, the working hours of an adolescent worker shall be regulated in accordance with the provisions of the Child and Adolescent Labour (Prohibition and Regulation) Act, 1986.

61 of 1986

Weekly and
compensatory
holidays

26. (1) No worker shall be allowed to work in an establishment for more than six days in any one week:

Provided that in any motor transport undertaking, an employer may, in order to prevent any dislocation of a motor transport service, require a worker to work on any day of weekly holiday which is not a holiday so arranged that the worker does not work for more than ten days consecutively without a holiday for a whole day intervening.

(2) The appropriate Government may, by notification, exempt such workers as it thinks fit from the provisions of sub-section (1), subject to such conditions as may be prescribed.

(3) Where, as a result of the passing of an order or the making of a rule under the provisions of this Code exempting an establishment or the workers therein from the provisions of sub-section (1), a worker is deprived of any of the weekly holidays, the worker shall be allowed, within the month in which the holidays were due or within the two months immediately following that month, compensatory holidays of equal number to the holidays, so deprived.

27. There shall be paid wages at the rate of twice the rate of wages in respect of overtime work, where a worker works in an establishment or class of establishment for more than such hours of work in any day or in any week as may be prescribed by the appropriate Government and the period of overtime work shall be calculated on a daily basis or weekly basis, whichever is more favourable to such worker:

Extra wages
for overtime.

Provided that a worker shall be required to work overtime by the employer subject to the consent of such worker for such work:

Provided further that the appropriate Government may prescribe the total number of hours of overtime.

28. Where a worker in an establishment works on a shift which extends beyond midnight,—

Night shifts.

(a) for the purposes of section 26, a weekly holiday for a whole day shall mean in his case a period of twenty-four consecutive hours beginning when his shift ends;

(b) the following day for him shall be deemed to be the period of twenty-four hours beginning when such shift ends, and the hours he has worked after midnight shall be counted in the previous day.

29. (1) The work shall not be carried on in any establishment by means of a system of shifts so arranged that more than one relay of workers is engaged in work of the same kind at the same time.

Prohibition of
overlapping
shifts.

(2) The appropriate Government or subject to the approval of the appropriate Government, the Chief Inspector-cum-Facilitator, may, by written order and for the reasons specified therein, exempt on such conditions as may be deemed expedient, any establishment or class of establishments or any department or section of an establishment or any category or description of workers therein from the provisions of sub-section (1):

Provided that the provisions of this sub-section shall not apply to mines.

30. No worker shall be required or allowed to work in a mine or factory if he has already been working in any other such similar establishment within the preceding twelve hours, save in such circumstances as may be prescribed by the appropriate Government.

Restriction on
double
employment
in factory and
mine.

31. (1) There shall be displayed and correctly maintained in every establishment a notice of periods of work, showing clearly for every day the periods during which workers may be required to work in accordance with the provisions of this Code.

Notice of
periods of
work.

(2) The form of notice required by sub-section (1), the manner of display of such notice and the manner in which such notice shall be sent to the Inspector-cum-Facilitator shall be such as may be prescribed by the appropriate Government.

(3) Any proposed change in the system of work in any establishment which will necessitate a change in the notice referred to in sub-section (1) shall be intimated to the Inspector-cum-Facilitator before the change is made, and except with the previous sanction of the Inspector-cum-Facilitator, no such change shall be made until one week has elapsed since that last change.

Annual leave
with wages,
etc.

32. (1) Every worker employed in an establishment shall be entitled for leave in a calendar year with wages subject to the following conditions, namely:—

(i) that he has worked one hundred and eighty days or more in such calendar year;

(ii) that he shall be entitled for one-day leave for every twenty days of his work, in the case of adolescent worker for fifteen days of his work, and in case of worker employed below ground mine, at the rate of one day for every fifteen days of his work, in such calendar year;

(iii) any period of layoff, maternity leave or annual leave availed by such worker in such calendar year shall be counted for calculating the period of one hundred and eighty days or more under clause (i), but he shall not earn leave for the period so counted;

(iv) any holidays falling between the leave availed by such worker (in a calendar year or prefixed or suffixed holiday) shall be excluded from the period of leave so availed;

(v) in case of such worker whose service commences otherwise than on the first day of January shall be entitled to leave with wages at the rate specified in clause (ii), if he has worked for one-fourth of the total number of days in the remainder of the calendar year;

(vi) in case such worker is discharged or dismissed from service or quits employment or is superannuated or dies while in service, during the course of the calendar year, such worker or his heir or nominee, shall be entitled to wages in lieu of the quantum of leave to which such worker was entitled immediately before his discharge, dismissal, quitting of employment, superannuation or death, calculated as specified in preceding clauses, even if such worker has not worked for the required period under this sub-section making such worker eligible to avail such leave, and such payment shall be made—

(a) where such worker is discharged or dismissed or quits employment before the expiry of the second working day from the date of such discharge, dismissal or quitting; and

(b) where such worker is superannuated or dies while in service, before the expiry of two months from the date of such superannuation or death;

(vii) if such worker does not in any one calendar year take the whole of the leave allowed to him under this sub-section and the rules made thereunder, then, any leave not taken by him shall be added to the leave to be allowed to him in the succeeding calendar year so that—

(a) the total number of days of leave that may be carried forward to a succeeding year shall not exceed thirty days; and

(b) such worker, who has applied for leave with wages but has not been given such leave in accordance with this sub-section and the rules made thereunder shall be entitled to carry forward the leave refused without any limit;

(viii) without prejudice to clause (v) such worker shall be entitled on his demand for encashment of leave at the end of calendar year;

(ix) such worker shall be entitled, where his total number of leave exceeds thirty days under sub-clause (a) of clause (vii), to encash such exceeded leave.

(2) The appropriate Government may, by notification, extend the provisions of sub-section (1) to any other establishment except railway establishment.

(3) The provisions of sub-section (1) shall not operate to the prejudice of any right to which a person employed in a mine may be entitled under any other law or under the terms of any award, agreement or contract of service:

Provided that if such award, agreement or contract of service, provides for longer annual leave with wages than that provided in sub-section (1), the quantum of leave, which the person employed shall be entitled to, shall be in accordance with such award, agreement or contract of service but leave shall be regulated in accordance with the provisions of sub-section (1) with respect of matters not provided for in such award, agreement or contract of service:

Provided further that where the Central Government is satisfied that the leave rules applicable to persons employed in any mine provide benefits which in its opinion are not less favourable than those provided for in sub-section (1) it may, by order in writing and subject to such conditions as may be specified therein exempt the mine from all or any of the provisions of sub-section (1).

CHAPTER VIII

MAINTENANCE OF REGISTERS, RECORDS AND RETURNS

33. An employer of an establishment shall—

(a) maintain register in prescribed form, electronically or otherwise, containing such particulars of workers as may be prescribed by the appropriate Government including—

Maintenance of registers, records and filing of returns.

(i) work performed by them;

(ii) number of hours of work constituting normal working hours in a day;

(iii) day of rest allowed in every period of seven days;

(iv) wage paid and receipts given therefor;

(v) leave, leave wages, overtime work, attendance and dangerous occurrences; and

(vi) employment of adolescent;

(b) display notices at the work place of the workers in such manner and form as may be prescribed by the appropriate Government;

(c) issue wage slips to the workers, in electronic forms or otherwise; and

(d) file such return electronically or otherwise to the Inspector-cum-Facilitator in such manner and during such periods as may be prescribed by the appropriate Government.

CHAPTER IX

INSPECTOR-CUM-FACILITATORS AND OTHER AUTHORITY

34. (1) The appropriate Government may, by notification, appoint Inspector-cum-Facilitators for the purposes of this Code who shall exercise the powers conferred on them under this Code throughout their respective jurisdiction specified in the notification.

Appointment of Inspector-cum-Facilitators.

(2) The Inspector-cum-Facilitators appointed under sub-section (1) shall, apart from other duties to be discharged by them under this Code, conduct such inspections as specified in sub-section (3).

(3) The appropriate Government may—

(i) for the purposes of inspection referred to in sub-section (2), by notification, lay down an inspection scheme which may provide for the generation of web-based

inspection and calling of information under this Code, electronically and such scheme shall, *inter alia*, have provisions to cater to special circumstances for assigning inspection and calling for information from establishment or any other person besides web-based inspections: and

(ii) without prejudice to the provisions of sub-section (2), by notification, under the scheme, provide for the randomised selection of establishment and the Inspector-cum-Facilitator for inspection.

(4) Without prejudice to the powers of the appropriate Government under this section, the inspection scheme referred to in sub-section (3) may be designed taking into account, *inter alia*, the following factors, namely:—

(a) assignment of unique number, to each establishment (which will be same as the registration number allotted to the establishment registered under section 3), unique number to each Inspector-cum-Facilitator and to each inspection in such manner as may be notified by the appropriate Government;

(b) timely uploading of inspection reports in such manner and subject to such conditions as may be notified in the scheme;

(c) provisions for special inspections based on such parameters as may be notified by the appropriate Government; and

(d) the characteristics of employment, the nature of work, and characteristics of the workplaces based on such parameters as may be notified by the appropriate Government.

(5) The appropriate Government may, by notification, appoint any person or persons possessing the prescribed qualifications and experience to be Chief Inspector-cum-Facilitator for the purposes of such establishments or class of establishments and for such local limits of jurisdiction as may be specified in the notification:

Provided that a Chief Inspector-cum-Facilitator may be appointed for the purposes of a State or more than one States or for the purposes of the whole of the Country.

(6) The appropriate Government may, by notification, appoint for the purposes of establishments as may be notified by that Government, as many Additional Chief Inspector-cum-Facilitators, Joint Chief Inspector-cum-Facilitators and Deputy Chief Inspector-cum-Facilitators or any other officer of any designation as it thinks appropriate, to exercise such powers of the Chief Inspector-cum-Facilitator within his jurisdiction, as may be specified in the notification.

(7) Every Additional Chief Inspector-cum-Facilitator, Joint Chief Inspector-cum-Facilitator, Deputy Chief Inspector-cum-Facilitator and every other officer appointed under sub-section (6) shall, in addition to the powers of a Chief Inspector-cum-Facilitator specified in the notification by which the officer is appointed, exercise the powers of an Inspector-cum-Facilitator within such local limits as may be specified in the notification.

(8) No person shall be appointed under this section or having been so appointed, shall continue to hold office, who is, or who becomes, directly or indirectly interested in a workplace or work activity or in any process or business carried on in any workplace or in any plant or machinery connected therewith.

(9) The appropriate Government may also, by notification, appoint such public officers as it thinks fit to be Inspector-cum-Facilitators in addition to existing Inspector-cum-Facilitator for exercising the powers and discharging the duties of Inspector-cum-Facilitator for all or any of the purposes of this Code within such local limits as may be specified in such notification.

(10) Without prejudice to the other functions of the Inspector-cum-Facilitator under this Code, an Inspector-cum-Facilitator may in respect of any establishment or class of establishments in local area or areas of his jurisdiction where the Chief Inspector-cum-Facilitator with the approval of the appropriate Government and subject to such restrictions or conditions as he may think fit to impose, by order in writing authorise the Inspector-cum-Facilitator to exercise such of the powers of the Chief Inspector-cum-Facilitator as may be specified in such order;

Provided that the Chief Inspector-cum-Facilitator, with the approval of the appropriate Government, may by order in writing, prohibit the exercise, by any Inspector-cum-Facilitator or any class of Inspector-cum-Facilitators specified in such order, of any such power by such Inspector-cum-Facilitator or class of Inspector-cum-Facilitators.

(11) Every Chief Inspector-cum-Facilitator, Additional Chief Inspector-cum-Facilitator, Joint Chief Inspector-cum-Facilitator, Deputy Chief Inspector-cum-Facilitator, Inspector-cum-Facilitator and every other officer appointed under this section shall be deemed to be a public servant within the meaning of section 21 of the Indian Penal Code, and shall be officially subordinate to such authority as the appropriate Government may specify in this behalf.

45 of 1860.

35. (1) Subject to any rules made in this behalf, an Inspector-cum-Facilitator may—

Powers of
Inspector-
cum-
Facilitators

(i) enter, with such assistance of persons, being persons in the service of the Government, or any local or other public authority, or with an expert, as he thinks fit, any place which is used, or which he has reason to believe, is used as a work place;

(ii) inspect and examine the establishment, any premises, plant, machinery, article, or any other relevant material;

(iii) inquire into any accident or dangerous occurrence, whether resulting in bodily injury, disability or death or not and take on the spot or otherwise statement of any person which he may consider necessary for such inquiry;

(iv) subject to any rules made by the State Government in this behalf, within his jurisdiction, examine the crops grown in any plantation or any worker employed therein or require the production of any register or other document maintained in pursuance of this Code, and take on the spot or otherwise statement of any person which he may consider necessary for carrying out the purposes of this Code relating to plantation;

(v) supply information and sensitise the employers and workers regarding the provisions of this Code and compliance thereof;

(vi) require the production of any register or any other document relating to the workplace or work activity;

(vii) search or seize, or take copies of, any register, record or other document or any portion thereof, as he may consider necessary in respect of any offence under this Code, which he has reason to believe, has been committed;

(viii) direct the concerned occupier or employer that any premises or any part thereof, or anything lying therein, shall be left undisturbed (whether generally or in particular respects) for so long as is necessary for the purpose of any inspection or inquiry;

(ix) take measurements, photographs and videographs and make such recordings as he considers necessary for the purpose of any examination or inquiry;

(x) take samples of any articles or substances found in any establishment or premises into which he has power to enter and of the air of the atmosphere in or in the vicinity of any such establishment or premises in such manner as may be prescribed by the appropriate Government;

(xi) in case of any article or substance found in any establishment or premises, being an article or substance which appears to him as having caused or is likely to cause danger to the health and safety of the employees, direct it to be dismantled or subject it to any process or test (but not so as to damage or destroy it unless the same is, in the circumstances necessary, for carrying out the purposes of any provision of this Code) and take possession of any such article or substance or a part thereof, and detain it for so long as is necessary for such examination;

(xii) issue show cause notice relating to safety, health and welfare provisions arising under this Code, rules, regulations and bye-laws made thereunder;

(xiii) prosecute, conduct or defend before any court any complaint or other proceeding arising under this Code, the rules and regulations made thereunder; and

(xiv) exercise such other powers and perform such other duties as may be prescribed by the appropriate Government.

(2) Any person required to produce any document or to give any information required by an Inspector-cum-Facilitator under sub-section (1) shall be deemed to be legally bound to do so within the meaning of section 175 and section 176 of the Indian Penal Code.

45 of 1860.

(3) The provisions of the Code of Criminal Procedure, 1973, shall, so far as may be, apply to such search or seizure under sub-section (1) as they apply to any search or seizure made under the authority of a warrant issued under section 94 of the said Code.

2 of 1974.

Powers and
duties of
District
Magistrate.

36. The District Magistrate shall, within the local limits of his jurisdiction, exercise such powers and duties of the Inspector-cum-Facilitator in respect of mines as may be prescribed by the Central Government.

Third party
audit and
certification.

37. (1) The appropriate Government may, by notification, formulate a scheme to empanel experts possessing such qualifications and experience as may be prescribed for the purpose of such start-up establishments or class of establishments, as may be specified in the notification.

(2) The experts empanelled under sub-section (1), shall,—

(a) be assigned the third party audit and certification in a randomised manner, by the appropriate Government through a web-based scheme;

(b) carry out the audit and certification in the manner and for the purpose specified in the scheme referred to in sub-section (1);

(c) perform such duties as may be specified in such scheme and submit his report to the concerned employer and to the Inspector-cum-Facilitator.

Special powers
of Inspector-
cum-
Facilitator in
respect of
factory,
mines, dock
work and
building or
other
construction
work.

38. (1) Without prejudice to the other powers of an Inspector-cum-Facilitator in this Code, an Inspector-cum-Facilitator,—

(A) shall have the following special powers in respect of a factory, namely:—

(a) where it appears to the Inspector-cum-Facilitator that conditions in a factory or part thereof are such that they may cause serious hazard or imminent danger by way of injury or death to the persons employed therein or to the general public in the vicinity, he may, by order in writing to the occupier of the factory, state the particulars in respect of which he considers the factory or part thereof to be the cause of such serious hazard or imminent danger and prohibit such occupier from employing any person in the factory or any part thereof other than the minimum number of persons necessary to attend to the minimum tasks till the hazard or danger is removed;

(b) any order issued by the Inspector-cum-Facilitator under sub-clause (a) shall have effect for a period of three days until extended by the Chief Inspector-cum-Facilitator by a subsequent order;

14 of 1947.

(c) any person aggrieved by an order of the Inspector-cum-Facilitator under sub-clause (a), and the Chief Inspector-cum-Facilitator under sub-clause (b), shall have the right to appeal to the High Court;

(d) any person whose employment has been affected by an order issued under sub-clause (a), shall, without prejudice to the rights of the parties under the Industrial Disputes Act, 1947, be entitled to wages and other benefits and it shall be the duty of the occupier to provide alternative employment to him wherever possible in such manner as may be prescribed by the appropriate Government;

(B) shall have the following special powers in respect of mines, namely:—

(a) if, in respect of any matter for which no express provision is made by or under this Code, it appears to the Chief Inspector-cum-Facilitator or an Inspector-cum-Facilitator that any mine or part thereof or any matter, thing or practice in or connected with the mine, or with the control, supervision, management or direction thereof, is dangerous to human life or safety or is defective so as to threaten or tend to cause the bodily injury of any person, he may give notice in writing thereof to the employer of the mine stating therein the particulars in respect of which he considers the mine or part thereof or the matter, thing or practice to be dangerous or defective and require the same to be remedied within such time and in such manner as he may specify in the notice;

(b) where the employer of a mine fails to comply with the terms of a notice given under sub-clause (a) within the period specified therein, the Chief Inspector-cum-Facilitator or the Inspector-cum-Facilitator may, by order in writing, prohibit the employment in or about the mine or any part thereof of any person whose employment is not in his opinion reasonably necessary for securing compliance with the terms of the notice;

(c) without prejudice to the provisions contained in sub-clause (a), the Chief Inspector-cum-Facilitator or the Inspector-cum-Facilitator may, by order in writing addressed to the employer of a mine, prohibit the extraction or reduction of pillars or blocks of minerals in the mine or part thereof, if, in his opinion, such operation is likely to cause the crushing of pillars or blocks of minerals or the premature collapse of any part of the workings or otherwise endanger the mine or the life or safety of persons employed therein or if, in his opinion, adequate provision against the outbreak of fire or flooding has not been made by providing for the sealing off and isolation of the part of the mine in which such operation is contemplated and for restricting the area that might be affected by fire or flooding;

(d) if the Chief Inspector-cum-Facilitator or an Inspector-cum-Facilitator authorised, by general or special order in writing by the Chief Inspector-cum-Facilitator, is of opinion that there is urgent and immediate danger to the life or safety of any person employed in any mine or part thereof, he may, by order in writing containing a statement of the grounds of his opinion, prohibit until he is satisfied that the danger is removed, the employment in or about the mine or any part thereof of any person whose employment is not in his opinion reasonably necessary for the purpose of removing the danger;

(e) every person whose employment is prohibited under sub-clause (b) or sub-clause (d) shall be entitled to payment of full wages for the period for which he would have been, but for the prohibition, in employment and the employer shall be liable for payment of such full wages of that person;

Provided that the employer may instead of paying such full wages provide such person with an alternative employment at the same wages which such person was receiving in the employment which was prohibited:

(f) where a notice has been given under sub-clause (a) or an order is made under sub-clause (b) or sub-clause (c) or sub-clause (d) by an Inspector-cum-Facilitator, the employer of the mine may, within ten days after the receipt of the notice or order, as the case may be, appeal against the same to the Chief Inspector-cum-Facilitator who may confirm, modify or cancel the notice or order;

(g) the Chief Inspector-cum-Facilitator or the Inspector-cum-Facilitator sending a notice under sub-clause (a) or making an order under sub-clause (b) or sub-clause (c) or sub-clause (d) and the Chief Inspector-cum-Facilitator making an order (other than an order of cancellation in appeal) under sub-clause (f) shall forthwith report the same to the Central Government;

(h) if the employer of the mine objects to a notice sent under sub-clause (a) by the Chief Inspector-cum-Facilitator or the Inspector-cum-Facilitator or to an order made by the Chief Inspector-cum-Facilitator or the Inspector-cum-Facilitator under sub-clause (b) or sub-clause (c) or sub-clause (d) or sub-clause (f), as the case may be, he may, within twenty days after the receipt of the notice containing the requisition or of the order or after the date of the decision on appeal, as the case may be, send his objection in writing stating the grounds thereof to the Central Government which shall, ordinarily within a period of one month from the date of receipt of the objection, decide the matter;

(i) every notice under sub-clause (a), or order under sub-clause (b) or sub-clause (c) or sub-clause (d) or sub-clause (f), to which objection is made under sub-clause (h), shall be complied with, pending the objection with the concerned Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator of the mine, for the decision of the Central Government;

Provided that the Central Government may, on the application of the employer, suspend the operation of a notice under sub-clause (a), pending its decision on the objection;

(j) nothing in this section shall affect the powers of a magistrate under section 144 of the Code of Criminal Procedure, 1973;

2 of 1974

(k) where in respect of any matter relating to safety of mine for which express provision is made by or under this Code, the employer of a mine fails to comply with such provisions, the Chief Inspector-cum-Facilitator may give notice in writing requiring the same to be complied with within such time as he may specify in the notice or within such extended period of time as he may, from time to time, specify thereafter;

(l) where the employer fails to comply with the terms of a notice given under sub-clause (k) within the period specified in such notice or within the extended period of time specified under that sub-clause, the Chief Inspector-cum-Facilitator may, by order in writing, prohibit the employment, in or about the mine or any part thereof, of any person whose employment is not, in his opinion, reasonably necessary for securing compliance with the terms of the notice;

(m) every person whose employment is prohibited under sub-clause (l), shall be entitled to payment of full wages for the period for which he would have been, but for the prohibition, in employment, and the owner, agent or manager referred to in section 67 shall be liable for payment of such full wages of that person;

Provided that the employer may, instead of paying such full wages, provide such person with an alternative employment at the same wages which such person was receiving in the employment which was prohibited under sub-clause (l);

(n) the provisions of sub-clauses (g), (h) and (i) shall apply in relation to a notice issued under sub-clause (k) or an order made under sub-clause (l) as they apply in relation to a notice or an order under sub-clause (b);

(o) the Chief Inspector-cum-Facilitator may, for reasons to be recorded in writing, reverse or modify any order passed by him under this Code or under any regulation, rule or bye-law made thereunder in relation to mine;

(p) no order prejudicial to the owner, agent or manager of a mine shall be made under this section unless such owner, agent or manager has been given a reasonable opportunity of making representation;

(q) the Central Government may reverse or modify any order passed by Chief Inspector-cum-Facilitator under this Code or under any regulation, rule or bye-laws thereunder in relation to mine;

(C) shall have the following special powers in respect of dock work namely:—

(a) if it appears to an Inspector-cum-Facilitator that any place where any dock work is being carried on is in such a condition that it is dangerous to life, safety or health, of workers employed in dock work, he may, in writing, serve on the employer, an order prohibiting any dock work, in such place, until measures have been taken to remove the cause of the danger to his satisfaction;

(b) an Inspector-cum-Facilitator after serving an order under clause (a) shall endorse a copy thereof to the Chief Inspector-cum-Facilitator who may modify or cancel the order without waiting for an appeal;

(c) any person aggrieved by an order under clause (a) or clause (b) may, within fifteen days from the date on which the order is communicated to him, prefer an appeal to the Chief Inspector-cum-Facilitator or where such order is by the Chief Inspector-cum-Facilitator, to the Central Government and the Chief Inspector-cum-Facilitator or the Central Government shall, after giving the appellant an opportunity of being heard, dispose of the appeal within sixty days:

Provided that the Chief Inspector-cum-Facilitator or the Central Government may entertain the appeal after the expiry of the said period of fifteen days, if he or it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time;

Provided further that an order under clause (a) or an order modified under clause (b) shall be complied with, pending the decision of the Chief Inspector-cum-Facilitator or the Central Government.

(2) Without prejudice to the other powers of an Inspector-cum-Facilitator elsewhere in this Code,—

(a) if it appears to the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator that any site or place at which any building or other construction work is being carried on, is in such condition that it is dangerous to life, safety or health of building workers or the general public, he may, in writing serve, on the employer of building workers working at such site or place or on the employer of the establishment in which such site or place is situated or on the person in charge of such site or place, an order prohibiting any building or other construction work at such site or place until measures have been taken to remove the cause of the danger to his satisfaction;

(b) an Inspector-cum-Facilitator serving an order under clause (a) shall endorse a copy of the order to the Chief Inspector-cum-Facilitator;

(c) such prohibition order made by the Inspector-cum-Facilitator shall be complied with by the employer forthwith.

(3) Any person aggrieved by an order under clause (a) of sub-section (2), may, within fifteen days from the date on which the order is communicated to him, prefer an appeal to the Chief Inspector-cum-Facilitator or where such order is by the Chief Inspector-cum-Facilitator, to the appropriate Government and the Chief Inspector-cum-Facilitator or the appropriate Government, as the case may be, shall, after giving the appellant an opportunity of being heard, dispose of the appeal within sixty days:

Provided that the Chief Inspector-cum-Facilitator or the appropriate Government may, entertain the appeal after the expiry of the said period of fifteen days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time:

Provided further that the order under clause (a) of sub-section (2), shall be complied with, subject to the decision of the Chief Inspector-cum-Facilitator or the appropriate Government as the case may be.

Secrecy of
information
by Chief
Inspector-
cum-
Facilitator or
Inspector-
cum-
Facilitator,
etc.

39. (1) All copies of, and extracts from, registers or other records pertaining to any establishment and all other information relating to any manufacturing or commercial business or any working process acquired by the Chief Inspector-cum-Facilitator or an Inspector-cum-Facilitator or by any one assisting him, in the course of the inspection or survey of any establishment under this Code or acquired by any officer authorised under section 20 in the exercise of his duties thereunder, shall be regarded as confidential and shall not, while in service or after leaving the service, be disclosed to any person or authority unless the Chief Inspector-cum-Facilitator or the Inspector-cum-Facilitator considers disclosure necessary to ensure the health, safety or welfare of any person employed in establishment.

(2) Nothing in sub-section (1) shall apply to the disclosure of any such information to—

- (a) any court;
- (b) any Committee or Board constituted under this Code;
- (c) an official superior or the employer of the establishment concerned;
- (d) a Commissioner for employees' compensation appointed under the Employees' Compensation Act, 1923;
- (e) the Controller, Indian Bureau of Mines; and
- (f) any such officer, authority or authorised person as may be specified in this behalf by the appropriate Government.

8 of 1923.

(3) Notwithstanding anything contained in the Right to Information Act, 2005, no Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator shall disclose the source of any complaint, made to him regarding the contravention of the provisions of this Code without the consent of the complainant and shall also not while making an inspection under this Code in pursuance of such complaint, disclose to the employer concerned or any of his representative that the inspection is being made in pursuance of such complaint.

22 of 2005.

Facilities to
be afforded to
Inspector-
cum-
Facilitator

40. Every employer of an establishment shall afford the Chief Inspector-cum-Facilitator and every Inspector-cum-Facilitator having jurisdiction or every person authorised by the Chief Inspector-cum-Facilitator all reasonable facilities for making any entry, inspection, survey, measurement, examination or inquiry under this Code.

Powers of
special officer
to enter,
measure, etc.,
in relation to
mine.

41. Any person in the service of the Government duly authorised in this behalf by a special order in writing of the Chief Inspector-cum-Facilitator or of an Inspector-cum-Facilitator may, for the purpose of surveying, leveling or measuring any mine or any output therefrom, after giving not less than three days' notice to the manager of such mine, enter the mine and may survey, level or measure the mine or any part thereof or any output therefrom at any time by day or night:

Provided that, where in the opinion of the Chief Inspector-cum-Facilitator or of an

Inspector-cum-Facilitator an emergency exists, he may, by order in writing, authorise any such person to enter the mine for any of the aforesaid purposes without giving any such notice.

42. (1) The appropriate Government may appoint medical practitioners having prescribed qualification to be medical officers for the purposes of this Code in relation to factory, mines, plantation, motor transport undertakings and in any other establishment as may be prescribed: Medical officer.

Provided that the medical officers so appointed shall before entering into their office shall disclose to the appropriate Government their interest in the concerned establishment.

(2) The medical officer shall perform the following duties, namely:—

(a) the examination and certification of workers in a mine or factory or in such other establishment engaged in such dangerous occupations or processes as may be prescribed;

(b) the exercise of such medical supervision for any factory, mines, plantation, motor transport undertaking and for such other establishment as may be prescribed by the appropriate Government where cases of illness have occurred which it is reasonable to believe are due to the nature of any process carried on or other conditions of work prevailing in such establishments;

(c) the examination and certification of adolescent for the purpose of ascertaining his fitness for employment in factory, plantation, motor transport undertakings and in any other establishment as may be prescribed by the appropriate Government in any work which is likely to cause injury to their health.

CHAPTER X

SPECIAL PROVISION RELATING TO EMPLOYMENT OF WOMEN

43. Women shall be entitled to be employed in all establishments for all types of work under this Code and they may also be employed, with their consent before 6 a.m. and beyond 7 p.m. subject to such conditions relating to safety, holidays and working hours or any other condition to be observed by the employer as may be prescribed by the appropriate Government. Employment of women.

44. Where the appropriate Government considers that the employment of women is dangerous for their health and safety, in an establishment or class of establishments or in any particular hazardous or dangerous processes in such establishment or class of establishments, due to the operation carried out therein, such Government may in the prescribed manner, require the employer to provide adequate safeguards prior to the employment of women for such operation. Adequate safety of employment of women in dangerous operation.

CHAPTER XI

SPECIAL PROVISIONS FOR CONTRACT LABOUR AND INTER-STATE MIGRANT WORKER, ETC.

PART I

CONTRACT LABOUR

45. (1) This Part shall apply to—

Applicability of this Part.

(i) every establishment in which fifty or more contract labour are employed or were employed on any day of the preceding twelve months through contract;

(ii) every manpower supply contractor who has employed, on any day of the preceding twelve months, fifty or more contract labour.

(2) This Part shall not apply to the establishment in which work only of an intermittent or casual nature is performed:

Provided that if a question arises as to whether work performed in an establishment is of an intermittent or casual nature, the appropriate Government shall decide that question after consultation with the National Board or a State Advisory Board and its decision thereon shall be final.

Explanation.—For the purpose of this sub-section, work performed in an establishment shall not be deemed to be of an intermittent nature—

(i) if it was performed for more than one hundred and twenty days in the preceding twelve months; or

(ii) if it is of seasonal character and is performed for more than sixty days in a year.

Appointment
of designated
authority.

46. The appropriate Government may, by an order, appoint such persons, being Gazetted officers of the Government, as it thinks fit to be designated as authority under sub-section (1) of section 119 and specify the limits of their jurisdiction and vest with such powers and duties including dealing with issuance and revocation of licences electronically as may be specified therein.

Licensing of
contractors.

47. (1) No contractor to whom this Part applies shall—

(a) supply or engage contract labour in any establishment; or

(b) undertake or execute the work through contract labour,

except under and in accordance with a licence issued to him by the authority referred to in sub-section (1) of section 119 in accordance with the provisions of that section after satisfying that the contractor fulfills such requisite qualifications or criteria as may be prescribed by the Central Government and such licence shall, in addition to the requisite particulars and conditions specified in sub-section (3), specify the number of such contract labour who can be supplied or engaged and the amount of security to be deposited by the contractor.

(2) Where the contractor does not fulfil the requisite qualifications or criteria referred to in sub-section (1), the authority referred to in sub-section (1) of section 119 may issue him a "work specific licence" electronically renewable within such period as may be prescribed by the Central Government to supply or engage the contract labour, or execute the work through contract labour, only for the concerned work order as may be specified in such licence and subject to such conditions as may be specified in such licence.

(3) Subject to the provisions of this Part,—

(a) a licence under sub-section (1) may contain such conditions including, in particular, conditions as to hours of work, fixation of wages and other essential amenities in respect of contract labour as may be prescribed by the appropriate Government;

(b) the licence referred to in sub-section (1) or sub-section (2), shall be obtained from, if for such establishment the appropriate Government is—

(i) the Central Government, the authority referred to in sub-section (1) of section 119 designated by that Government; and

(ii) the State Government, the authority referred to in sub-section (1) of section 119 designated by that Government;

Provided that where the contractor is desirous of obtaining licence for supplying or engaging contract labour or undertaking or executing the contract works under sub-section (1) or sub-section (2) in more than one States or for the whole of India, then, he

may obtain the licence from the authority referred to in sub-section (1) of section 119 designated by the Central Government for such purpose and the provisions of that section shall apply:

Provided further that before issuing such licence the authority referred to in the first proviso shall consult the concerned State or States authorities designated under sub-section (1) of section 119, electronically before issuing licence for the establishments for which the appropriate Government is the State Government.

48. (1) Subject to the provisions of section 119, every application for issuing a licence under section 119 for the purposes of sub-section (1) or sub-section (2) of section 47 shall be made electronically in such form and manner and shall contain such particulars regarding the number of contract labour, nature of work for which contract labour is to be employed and such other particulars including the information relating to the employment of inter-State migrant workers as may be prescribed by the appropriate Government.

Procedure for
issue or
renewal of
licence.

(2) Subject to the provisions of section 119, the authority referred to in sub-section (1) thereof shall follow such procedure as may be prescribed by the appropriate Government.

(3) Subject to the provisions of section 119, the licence issued for the purposes of sub-section (1) of section 47 shall be valid for a period of five years in respect of the number of contract labour specified therein and in case the contractor wants to increase the number of the contract labour, he shall apply in the prescribed manner for the amendment to the licence for such purpose to the authority referred to in sub-section (1) of section 119 and if the licence is so amended, the number of contract labour shall be increased to such extent by depositing such security deposit as specified in the amended licence for the balance period.

(4) Subject to the provisions of section 119, the licence issued for the purposes of sub-section (1) of section 47 shall contain responsibility of the contractor as may be prescribed by the appropriate Government.

49. The contractor shall not charge directly or indirectly, in whole or in part, any fee or commission from the contract labour.

No fees or
commission or
any cost to
workers.

50. (1) When a contractor receives work order from an establishment either to supply contract labour in the establishment or to execute the contract through contract labour in the establishment he shall, within such time and in such manner as may be prescribed, intimate to the authority referred to in section 119.

Information
regarding work
order to be
given to the
appropriate
Government.

(2) Where the contractor fails to give intimation under sub-section (1), the designated authority may, after giving the holder of the licence an opportunity of showing cause, suspend or cancel the licence in such manner as may be prescribed by the appropriate Government.

51. (1) If the authority referred to in sub-section (1) of section 119 is satisfied, either on a reference made to him in this behalf or otherwise, that—

Revocation,
suspension
and
amendment
of licence.

(a) a licence granted for the purposes of this Part has been obtained by misrepresentation or suppression of any material fact, or

(b) the holder of a licence has, failed to comply with the conditions subject to which the licence has been granted or has contravened any of the provisions of this Part or the rules made thereunder, then,

without prejudice to any other penalty to which the contractor may be liable under this Code, the authority referred to in sub-section (1) of section 119 may, after giving the contractor an opportunity of showing cause, revoke or suspend the licence in accordance with the procedure as may be prescribed by the Central Government.

(2) Subject to any rules that may be made in this behalf, the authority referred to in sub-section (1) of section 119 may amend a licence granted for the purposes of this Part.

Appeal.

52. (1) Any person aggrieved by an order made under section 47, section 48 or section 51 may, within thirty days from the date on which the order is communicated to him, prefer an appeal to an appellate authority prescribed by the appropriate Government under sub-section (6) of section 119:

Provided that the appellate authority may entertain the appeal after the expiry of the said period of thirty days, if he is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

(2) On receipt of an appeal under sub-section (1), the appellate authority shall, after giving the appellant an opportunity of being heard, dispose of the appeal within thirty days from the date on which the appeal is preferred.

Liability of principal employer for welfare facilities.

53. Welfare facilities specified under section 23 and section 24 shall be provided by the principal employer of the establishment to the contract labour who are employed in such establishment.

Effect of employing contract labour from a non-licensed contractor.

54. Where any principal employer of an establishment is employing contract labour through a contractor who is required to obtain a licence under this Part, but he has not obtained such licence, then, such employment shall be deemed to be in contravention of the provision of this Code.

Responsibility for payment of wages.

55. (1) A contractor shall be responsible for payment of wages to each contract labour employed by him and such wages shall be paid before the expiry of such period as may be prescribed by the appropriate Government.

(2) Every contractor shall, make the disbursement of wages referred to in sub-section (1) through bank transfer or electronic mode and inform the principal employer electronically the amount so paid by such mode:

Provided that where it is not practicable to disburse payment in the mode specified in this section, then, the payment shall be made in such manner as may be prescribed by the appropriate Government.

(3) In case the contractor fails to make payment of wages referred to in sub-section (1) within the prescribed period or makes short payment, then, the principal employer shall be liable to make payment of the wages in full or the unpaid balance due, as the case may be, to the concerned contract labour employed by the contractor and recover the amount so paid from the contractor either by deduction from any amount payable to the contractor under any contract or as a debt payable by the contractor.

(4) The appropriate Government, in the event the contractor does not pay the wages to the contract labour employed by him, shall pass the orders of making payment of such wages from the amount deposited by such contractor as security deposit under the licence issued by the licensing officer to the contractor, in such manner as may be prescribed by such Government.

Experience certificate.

56. Every concerned contractor shall issue, on demand, experience certificate, in such form as may be prescribed by the appropriate Government, to the contract labour giving details of the work performed by such contract labour.

Prohibition of employment of contract labour.

57. (1) Notwithstanding anything contained in this Part, employment of contract labour in core activities of any establishment is prohibited:

Provided that the principal employer may engage contract labour through a contractor to any core activity, if—

(a) the normal functioning of the establishment is such that the activity is ordinarily done through contractor; or

(b) the activities are such that they do not require full time workers for the major portion of the working hours in a day or for longer periods, as the case may be;

(c) any sudden increase of volume of work in the core activity which needs to be accomplished in a specified time.

(2) (a) The appropriate Government may, by notification, appoint a designated authority to advise that Government on the question whether any activity of an establishment is a core activity or otherwise;

(b) if a question arises as to whether any activity of an establishment is a core activity or otherwise, the aggrieved party may make an application in such form and manner as may be prescribed, to the appropriate Government for decision;

(c) the appropriate Government may refer any such question *suo motu* or refer the application to the designated authority, which on the basis of relevant material in its possession, or after making such an enquiry as it deems fit, shall report to the appropriate Government, within such period and thereafter the appropriate Government shall decide the question within such period as may be prescribed.

58. The appropriate Government may, in the case of an emergency, direct, by notification, that subject to such conditions and restrictions, if any, and for such period, as may be specified in the notification, all or any of the provisions of this Code or the rules made thereunder shall not apply to any establishment or class of establishments or any class of contractors.

Power to exempt in special cases.

PART II

INTER-STATE MIGRANT WORKERS

59. This Part shall apply to every establishment in which ten or more inter-State migrant workers are employed or were employed on any day of the preceding twelve months.

Applicability of Part II.

60. It shall be the duty of every contractor or the employer, of an establishment employing inter-State migrant workers in connection with the work of that establishment—

Facilities to inter-State migrant workers.

(i) to ensure suitable conditions of work to such worker having regard to the fact that he is required to work in a State different from his own State;

(ii) in case of fatal accident or serious bodily injury to any such worker, to report to the specified authorities of both the States and also the next of kin of the worker;

(iii) to extend all benefits to such worker which are available to a worker of that establishment including benefits under the Employees' State Insurance Act, 1948 or the Employees' Provident Funds and Miscellaneous Provisions Act, 1952 or any other law for the time being in force and the facility of medical check-up as available to a worker under clause (c) of sub-section (1) of section 6.

34 of 1948.
19 of 1952.

61. The employer shall pay, to every inter-State migrant worker employed in his establishment, in a year a lump sum amount of fare for to and fro journey to his native place from the place of his employment, in the manner taking into account the minimum service for entitlement, periodicity and class of travel and such other matters as may be prescribed by the appropriate Government.

Journey allowance.

62. The appropriate Government shall make schemes to provide—

Benefits of public distribution system, etc.

(a) option to an inter-State migrant worker for availing benefits of public distribution system either in his native State or the destination State where he is employed; and

(b) for portability of the benefits of the inter-State migrant worker working for building or other construction work out of the building and other construction cess fund in the destination State where such inter-State migrant worker is employed.

Toll free
helpline.

63. The appropriate Government may provide facility of toll free helpline to the inter-State migrant workers in such manner as may be prescribed by that Government.

Study of
inter-State
migrant
workers

64. The appropriate Government may provide for study of inter-State migrant workers in such manner as may be prescribed by that Government.

Past liabilities

65. No suit or other proceeding shall lie in any court or before any authority for the recovery of debt or any part thereof relating to an inter-State migrant worker after the completion of his employment where it remains unsettled obligation to the contractor or the principal employer and such debt or part thereof shall, on the completion of the period of employment of such worker, be deemed to have been extinguished.

PART III

AUDIO-VISUAL WORKERS

Prohibition of
employment
of audio-visual
worker
without
agreement

66. (1) No person shall be employed as an audio-visual worker in or in connection with production of any audio-visual programme unless,—

(a) an agreement in writing is entered into—

(i) with such person by the producer of such audio-visual programme; or

(ii) with such person by the producer of such audio-visual programme with the contractor, where such person is employed through such contractor; or

(iii) with such person by the contractor or other person through whom such person is employed; and

(b) such agreement is registered with the competent authority, to be notified by the appropriate Government, by the producer of such audio-visual programme.

(2) Every agreement, referred to in sub-section (1) shall,—

(a) be in the prescribed form;

(b) specify the name and such other particulars as may be prescribed by the appropriate Government with respect to, such person to be employed under the agreement as audio-visual worker;

(c) include, where such audio-visual worker is employed through a contractor, a specific condition to the effect that in the event of the contractor failing to discharge his obligations under the agreement to the audio-visual worker with respect to payment of wages or any other matter, the producer of the audio-visual programme shall also be liable to discharge such obligations and shall be entitled to be reimbursed with respect thereto by the contractor.

(3) A copy of the agreement referred to in sub-section (1) with respect to the employment of the audio-visual worker shall, if such audio-visual worker is covered under the provision of an enactment for the time being in force for providing the benefit of provident fund to him, also be forwarded by the producer of the audio-visual programme to such authority as may be prescribed by the appropriate Government.

(4) Notwithstanding anything contained in Chapters V, VI and VII, the agreement referred to in sub-section (1) shall include,—

(i) nature of assignment;

19 of 1952.

(ii) wages and other benefits (including provident fund, if covered under the Employees' Provident Fund and Miscellaneous Provisions Act, 1952);

(iii) health and working conditions;

(iv) safety;

(v) hours of work;

(vi) welfare facilities; and

(vii) dispute resolution process or mechanism, the constitution and other details of which shall be prescribed by the appropriate Government:

14 of 1947.

Provided that in case of failure of the resolution of the dispute in such dispute resolution process or mechanism, either party in the dispute may invoke the jurisdiction of the Industrial Tribunal established by the appropriate Government under section 7A of the Industrial Disputes Act, 1947 and for such purpose such dispute shall be deemed to be industrial dispute within the meaning of that Act and it shall be the responsibility of the producer of the audio-visual programme to provide the facilities specified in the agreement to the audio-visual worker and the payment of wages shall be through electronic mode.

PART IV

MINES

67. (1) Save as may be otherwise prescribed, every mine shall be under a sole manager who shall have such qualifications as may be prescribed by the Central Government and the owner or agent of every mine shall appoint a person having such qualifications to be the manager: Managers.

Provided that the owner or agent may appoint himself as manager if he possesses the prescribed qualifications.

(2) Subject to any instructions given to him by or on behalf of the owner or agent of the mine, the manager shall be responsible for the overall management, control, supervision and direction of the mine and all such instructions when given by the owner or agent shall be confirmed in writing forthwith.

(3) Except in case of an emergency, the owner or agent of a mine or anyone on his behalf shall not give, otherwise than through the manager, instructions affecting the fulfilment of his statutory duties, to a person, employed in a mine, who is responsible to the manager.

68. (1) The provisions of this Code, except those contained in sections 35, 38, 40, 41 and 44, shall not apply to— Code not to apply in certain cases.

(a) any mine or part thereof in which excavation is being made for prospecting purposes only and not for the purpose of obtaining minerals for use or sale subject to such conditions relating to number of employees, depth of excavation and other matters as may be prescribed by the Central Government;

(b) any mine engaged in the extraction of kankar, murrum, laterite, boulder, gravel, shingle, ordinary sand (excluding mouldings and glass sand and other mineral sands), ordinary clay (excluding kaolin, china clay, white clay or fire clay), building stone, slate, road metal, earth, fullers earth (marl, chalk) and lime stone subject to such conditions relating to workings, open cast workings and explosives as may be prescribed by the Central Government.

(2) Notwithstanding anything contained in sub-section (1), the Central Government may declare that the provisions of this Code shall apply to such mine or part thereof as may be prescribed by the Central Government.

(3) Without prejudice to the provisions contained in sub-section (2), if at any time any of the conditions specified in clause (a) or clause (b) of sub-section (1) is not fulfilled in relation to any mine referred to in that sub-section, the provisions of this Code not set out in sub-section (1), shall become immediately applicable, and it shall be the duty of the employer of the mine to inform about such non-fulfilment to such authority in such manner and within such time as may be prescribed by the Central Government.

Exemption from provision regarding employment.

69. (1) In case of an emergency involving serious risk to the safety of the mine or of persons employed therein, or in case of an accident, whether actual or apprehended, or in case of any act of God or in case of any urgent work to be done to machinery, plant or equipment of the mine as a result of breakdown of such machinery plant or equipment, the manager may, subject to the provision of clause (B) of sub-section (1) of section 38 and in accordance with the provisions of section 25 relating to exemption from hours of work above ground, hours of work below ground and notification regarding hours of work and weekly day of rest relating to mines under section 26, permit persons to be employed in contravention of sections 25 and 30 and sub-section (1) of section 31 on such work as may be necessary to protect the safety of the mine or of the persons employed therein:

Provided that in case of any urgent work to be done to machinery, plant or equipment under this section, the manager may take the action permitted by this section, although the production of mineral would thereby be incidentally affected, but any action so taken shall not exceed the limits necessary for the purpose of avoiding serious interference with the ordinary working of the mine.

(2) Every case in which action has been taken by the manager under sub-section (1), shall be recorded together with the circumstances relating thereto and a report thereof shall also be made to the Chief Inspector-cum-Facilitator or the Inspector-cum-Facilitator.

Employment of persons below eighteen years of age.

70. (1) No person below eighteen years of age shall be allowed to work in any mine or part thereof.

(2) Notwithstanding anything contained in sub-section (1), apprentices and other trainees, not below sixteen years of age, may be allowed to work, under proper supervision, in a mine or part thereof by the manager as referred to in section 67:

Provided that in the case of trainees, other than apprentices, prior approval of the Chief Inspector-cum-Facilitator or an Inspector-cum-Facilitator shall be obtained before they are allowed to work.

(3) The Central Government may prescribe the provisions for medical examination of apprentice, other trainee and employee in the mine to ensure their fitness to work and to prevent the persons below sixteen years of age to work as apprentice or trainee and those who are not adults to work as such employee.

Explanation.—In this section, "apprentice" means an apprentice as defined in clause (a) of section 2 of the Apprentices Act, 1961.

52 of 1961.

Exemption to certain persons.

71. The Central Government may make rules to provide for exemption to certain persons or category of persons employed in mines from the provisions of sub-section (1) of section 25, sub-section (1) of section 26, section 30 and sub-section (1) of section 31.

Establishment, maintenance of rescue services and vocational training.

72. The Central Government may prescribe vocational training and rescue and recovery services for persons employed in a mine.

73. If any question arises as to whether any excavation or working or premises in or adjacent to and belonging to a mine, on which any process ancillary to the getting, dressing or preparation for sale of minerals or of coke is being carried on in a mine within the meaning of this Code, the Central Government may decide the question, and a certificate signed by a Secretary to the Government of India in the Ministry of Labour and Employment shall be conclusive proof thereof.

Decision of question whether a mine is covered under this Code.

PART V

BEEDI AND CIGAR WORKERS

74. (1) Save as otherwise provided in this Part, no employer shall use or allow to use any place or premises as an industrial premises unless he holds a valid licence issued under section 119 for the purposes of this Part and no such premises shall be used except in accordance with the terms and conditions of such licence.

Licence to industrial premises and person.

(2) Subject to the provisions of section 119, any person who intends to use or allows to use any place or premises specified in sub-section (1) shall make an application to the authority referred to in sub-section (1) of section 119, in such form and on payment of such fees as may be prescribed by the State Government, for a licence to use, or allow to use, such premises as an industrial premises.

(3) Subject to the provisions of section 119, the application shall specify the maximum number of employees proposed to be employed at any time of the day in the place or premises and shall be accompanied by a plan of the place or premises prepared in such manner as may be prescribed by the State Government.

(4) Subject to the provisions of section 119, the authority referred to in sub-section (1) thereof shall, in deciding whether to grant or refuse to grant a licence, have regard to the following matters, namely:—

(a) the suitability of the place or premises which is proposed to be used for the manufacture of beedi or cigar or both;

(b) previous experience of the applicant or he has employed experienced person or has entered into agreement with the experienced person for employment for the period of licence;

(c) the financial resources of the applicant including his financial capacity to meet the demands arising out of the provisions of the laws for the time being in force relating to welfare of labour;

(d) whether the application is made *bona fide* on behalf of the applicant himself or in *benami* of any other person;

(e) welfare of the labour in the locality, the interest of the public generally and such other matters as may be prescribed by the State Government.

(5) Subject to the provisions of section 119, a licence granted under the said section for the purposes of this section shall be valid for five years and may be renewed thereafter.

(6) Subject to the provisions of section 119, an application for the renewal of a licence for the purposes of this Part shall be made at least thirty days before the expiry of the period thereof, on payment of such fees as may be prescribed by the State Government, and where such an application has been made, the licence shall be deemed to continue, notwithstanding the expiry of the period thereof, until the renewal of the licence, or, as the case may be, the rejection of the application for the renewal thereof.

Provided that the authority referred to in sub-section (1) of section 119 shall not grant or renew a licence unless it is satisfied that the provisions of this Part and the rules made thereunder have been complied with:

Provided further that the authority referred to in sub-section (1) of section 119 shall renew or refuse to renew the licence within such period as may be prescribed by the State Government and in deciding whether to renew a licence or to refuse a renewal thereof shall have regard to the matters specified in sub-section (4).

(7) Subject to the provisions of section 119, the authority referred to in sub-section (1) thereof may, after giving the holder of a licence an opportunity of being heard, cancel or suspend any licence granted or renewed under section 119 for the purposes of this Part, if it appears to it that such licence has been obtained by misrepresentation or fraud or that the licence has contravened or failed to comply with any of the provisions of this Part or the rules made thereunder or any of the terms or conditions of the licence.

(8) The State Government may issue in writing to an authority referred to in sub-section (1) of section 119 such directions of a general character as that Government may consider necessary in respect of any matter relating to the grant or renewal of licence under section 119 relating to this section.

(9) Subject to section 119 and the foregoing provisions of this section, the authority referred to in sub-section (1) of section 119 may grant or renew licence relating to this Part on such terms and conditions as it may determine and where such authority refuses to grant or renew any licence, it shall do so by an order communicated to the applicant, giving the reasons in writing for such refusal.

Appeals.

75. Any person aggrieved by the decision of the authority referred to in sub-section (1) of section 119 refusing to grant or renew a licence, or cancelling or suspending a licence, relating to this Part may, within such time and on payment of such fees as may be prescribed, appeal to the appellate authority referred to in sub-section (6) of section 119, and such authority may by order confirm, modify or reverse any order refusing to grant or renew a licence, or cancelling or suspending a licence, relating to this Part.

Permission to work by employees outside industrial premises.

76. (1) The State Government may permit the wetting or cutting of beedi or tobacco leaves by employees outside the industrial premises on an application made to it by the employer on behalf of such employees, subject to such conditions as may be prescribed.

(2) The employer shall maintain the record of the work permitted under sub-section (1), to be carried on outside the industrial premises, in such form as may be prescribed.

(3) Save as otherwise provided in this section, no employer shall require or allow any manufacturing process connected with the making of beedi or cigar or both to be carried on outside the industrial premises:

Provided that nothing in this sub-section shall apply to any worker who is given raw material by an employer or a contractor to make beedi or cigar or both at home.

Part not to apply to self-employed persons in private dwelling houses

77. Nothing contained in this Part shall apply to the owner or occupier of a private dwelling house, not being an employee of an employer to whom this Part applies, who carries on any manufacturing process in such private dwelling house with the assistance of the members of his family living with him in such dwelling house and dependent on him.

Explanation.—For the purposes of this section,—

(i) "family" does not include child, as defined in the Child and Adolescent (Prohibition and Regulation) Act, 1986, for this section;

(ii) "private dwelling house" means a house in which persons engaged in the manufacture of beedi or cigar or both reside.

PART VI

BUILDING OR OTHER CONSTRUCTION WORKERS

78. No person, about whom the employer knows or has reasons to believe that he is a deaf or he has a defective vision or he has a tendency to giddiness, shall be required or allowed to work in any such operation of building or other construction work which is likely to involve a risk of any accident either to the building worker himself or to any other person.

Prohibition of employment of certain persons in certain building or other construction work.

PART VII

FACORIES

79. (1) The appropriate Government may make rules in respect of factory or class or description of factories for—

Approval and licensing of factories.

(a) the submission of plans including specifications, nature and certification thereof;

(b) the previous permission for the site on which the factory is to be situated and for the construction or extension thereof; and

(c) subject to the provision of sub-section 119, licensing and renewal thereof including fees to be payable for such, licensing and renewal, if required, as the case may be.

(2) If on an application for permission referred to in clause (b) of sub-section (1) accompanied by the plans and specifications required by the rules made under clause (a) of that sub-section, sent to the State Government or Chief Inspector-cum-Facilitator in the electronic mode, no order is communicated to the applicant within such period not exceeding thirty days, the permission applied for in the said application shall be deemed to have been granted.

(3) Where a State Government or a Chief Inspector-cum-Facilitator refuses to grant permission to the site, construction or extension of a factory and licensing of a factory, the applicant may within thirty days of the date of such refusal appeal to the Central Government if the decision appealed from was of the State Government and to the State Government in any other case.

Explanation.—A factory shall not be deemed to be extended within the meaning of this section by reason only of the replacement of any plant or machinery or within such limits as may be prescribed, of the addition of any plant or machinery if such replacement or addition does not reduce the minimum clear space required for safe working around the plant or machinery or adversely affect the environmental conditions from the evolution or emission of steam, heat or dust or fumes injurious to health.

80. Where any premises or separate buildings are leased to different occupiers for use as separate factories, the owner of the premises and occupiers of the factories utilising such common facilities which include safety and fire prevention and protection, access, hygiene, occupational health, ventilation, temperature, emergency preparedness and response, canteens, shelter, rest rooms and crèches shall jointly and severally be responsible for provision and maintenance of such common facilities and services as may be prescribed by the appropriate Government.

Liability of owner of premises in certain circumstances.

81. (1) The appropriate Government may, by notification, declare that all or any of the provisions of this Part shall apply to any place wherein a manufacturing process is carried on with or without the aid of power or is ordinarily carried on irrespective of the number of workers working in the factory.

Power to apply Code to certain premises.

(2) After a place is so declared, it shall be deemed to be a factory for the purposes of this Code, and the owner shall be deemed to be the occupier, and any person working therein, a worker.

Explanation.—For the purposes of this section, "owner" shall include a lessee or mortgagee with possession of the premises.

Dangerous
operations.

82. The appropriate Government may by rules make the provisions relating to any factory or class or description of factories in which manufacturing process or operation is carried on which exposes any of the persons employed in it to a serious risk of bodily injury, poisoning or disease, for—

(a) specifying the manufacturing process or operation and declaring it to be dangerous;

(b) prohibiting or restricting the employment of pregnant women in the manufacturing process or operation;

(c) the periodical medical examination before, or at any time during the employment to ascertain the fitness of a worker or employee for such employment on the cost of the occupier; and

(d) welfare amenities, sanitary facilities, protective equipment and clothing, and any other requirement necessary for dangerous operations.

Constitution
of site
appraisal
committee.

83. (1) The appropriate Government may, constitute one or more site appraisal committees consisting of a chairman and other members, for such purpose as may be prescribed including to consider and to give recommendations on an application for grant of permission for the initial location of a factory involving a hazardous process or for the expansion of such factory.

(2) The site appraisal committee referred to in sub-section (1) shall make its recommendation within a period of thirty days of the receipt of the application for any of the purpose referred to in the said sub-section in such form, as may be prescribed.

Compulsory
disclosure of
information
by occupier.

84. (1) The occupier of every factory involving a hazardous process shall disclose in the manner prescribed by the State Government all information regarding dangers, including health hazards and the measures to overcome such hazards arising from the exposure to or handling of the materials or substances in the manufacture, transportation, storage and other processes, to the workers employed in the factory, the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator, the local authority within whose jurisdiction the factory is situate and the general public in the vicinity.

(2) The occupier shall, at the time of registering the factory involving a hazardous process, lay down a detailed policy with respect to the health and safety of the workers employed therein and intimate such policy to the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator and the local authority and, thereafter, at such intervals as may be prescribed by the State Government, inform the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator and the local authority of any change made in the said policy.

(3) The information furnished under sub-section (1) shall include accurate information as to the quantity, specifications and other characteristics of wastes and the manner of their disposal.

(4) Every occupier shall, with the approval of the Chief Inspector-cum-Facilitator, draw up an on-site emergency plan and detailed disaster control measures for his factory and make known to the workers employed therein and to the general public living in the vicinity of the factory the safety measures required to be taken in the event of an accident taking place.

(5) Every occupier of a factory shall, if such factory proposes to engage in a hazardous process at any time after the commencement of this Code, within a period of thirty days before the commencement of such process, inform the Chief Inspector-cum-Facilitator about the nature and details of the process in such form and in such manner as may be prescribed by the State Government.

(6) Where any occupier of a factory contravenes the provisions of sub-section (5), the licence issued under section 79 to such factory shall, notwithstanding any penalty to which the occupier of factory shall be subjected to under the provisions of this Code, be liable for cancellation.

(7) The occupier of a factory involving a hazardous process shall, with the previous approval of the Chief Inspector-cum-Facilitator, lay down measures for the handling, usage, transportation and storage of hazardous substances inside the factory premises and the disposal of such substances outside the factory premises and publicise them in the manner prescribed by the State Government among the workers and the general public living in the vicinity.

85. Every occupier of a factory involving any hazardous process shall—

Specific responsibility of the occupier in relation to hazardous processes.

(a) maintain accurate and up-to-date health records or, as the case may be, medical records, of the workers in the factory who are exposed to any chemical, toxic or any other harmful substances which are manufactured, stored, handled or transported and such records shall be accessible to the workers subject to such conditions as may be prescribed by the State Government;

(b) appoint persons who possess prescribed qualifications and experience in handling hazardous substances and are competent to supervise such handling within the factory and to provide at the working place all the necessary facilities for protecting the workers in the manner prescribed by the State Government:

Provided that where any question arises as to the qualifications and experience of a person so appointed, the decision of the Chief Inspector-cum-Facilitator shall be final;

(c) provide for medical examination of every worker—

(i) before such worker is assigned to a job involving the handling of, or working with, a hazardous substance; and

(ii) while continuing in such job, and after he has ceased to work in such job, at intervals not exceeding twelve months, in such manner as may be prescribed by the State Government.

86. (1) The Central Government may, in the event of the occurrence of an extraordinary situation involving a factory engaged in a hazardous process, direct the National Board to inquire into the standards of health and safety observed in the factory with a view to finding out the causes of any failure or neglect in the adoption of any measures or standards prescribed by the State Government for the health and safety of the workers employed in the factory or the general public affected, or likely to be affected due to such failure or neglect and for the prevention of recurrence of such extraordinary situations in future in such factory or elsewhere.

National Board to inquire into certain situations.

(2) The recommendations of the National Board shall be advisory in the nature.

87. (1) Where the Central Government is satisfied that no standards of safety have been prescribed in respect of a hazardous process or class of hazardous processes, or where the standards so prescribed are inadequate, it may direct the Directorate General Occupational Safety and Health formerly known as the Directorate General of Factory Advice Service and Labour Institutes or any Institution authorised in matters relating to standards of safety in hazardous processes, to lay down emergency standards for enforcement of suitable standards in respect of such hazardous processes.

Emergency standards.

(2) The emergency standards laid down under sub-section (1) shall, until they are incorporated in the rules made under this Code, be enforceable and have the same effect as if they had been incorporated in the rules made under this Code.

Permissible limits of exposure of chemicals and toxic substances.

88. The maximum permissible limits of exposure of chemical and toxic substances in manufacturing process in any factory shall be of the value as may be prescribed by the State Government.

Right of workers to warn about imminent danger

89. (1) Where the workers employed in any factory engaged in a hazardous process have reasonable apprehension that there is a likelihood of imminent danger to their lives or health due to any accident, they may, bring the same to the notice of the occupier, agent, manager or any other person who is in-charge of the factory or the process concerned directly or through their representatives in the Safety Committee and simultaneously bring the same to the notice of the Inspector-cum-Facilitator.

(2) It shall be the duty of such occupier, agent, manager or the person in-charge of the factory or process to take immediate remedial action if he is satisfied about the existence of such imminent danger and send a report forthwith of the action taken to the Inspector-cum-Facilitator.

(3) If the occupier, agent, manager or the person in-charge referred to in sub-section (2) is not satisfied about the existence of any imminent danger as apprehended by the workers, he shall, nevertheless, refer the matter forthwith to the Inspector-cum-Facilitator whose decision on the question of the existence of such imminent danger shall be final.

Appeal against the order of Inspector-cum-Facilitator in case of factory.

90. The appropriate Government may prescribe provisions providing the manner in which and the appropriate authority to whom the manager or occupier of the factory may make appeal against the order of the Inspector-cum-Facilitator and the procedure for disposing of such appeals.

Power to make rules to exempt.

91. (1) The appropriate Government may make rules,—

(a) specifying the persons who hold positions of supervision or management or are employed in a confidential position in a factory or empowering the Chief Inspector-cum-Facilitator to declare any person, other than a person so specified, as a person holding position of supervision or management or employed in a confidential position in a factory if, in the opinion of the Chief Inspector-cum-Facilitator, such person holds such position or is so employed, and the provisions of this Code, shall not apply to any person so defined or declared;

(b) in respect of any worker or class of workers in any establishment or class of establishment, for providing the exemption, extent of exemption and conditions subject to which such exemption may be given.

(2) The appropriate Government or the Chief Inspector-cum-Facilitator may, by order in writing, exempt subject to such conditions as it may deem expedient, any or all of the adult workers in any establishment or class of establishments.

PART VIII

PLANTATION

Facilities for workers in plantation.

92. (1) Without prejudice to the generality of sections 23 and 24, the State Government may prescribe requiring every employer to make provisions in his plantation for—

(a) necessary housing accommodation including drinking water, kitchen and toilet to every worker employed in the plantation (including his family);

(b) crèches facilities where in the plantation fifty or more workers (including workers employed by any contractor) are employed or were employed on any day of the preceding twelve months:

Provided that,—

(i) an establishment may avail common crèche facility of the Central Government, State Government, municipality or private entity or provided by non-Governmental organisation or by any other organisation; or

(ii) a group of establishments may agree to pool their resources for setting up of common crèche;

(c) educational facilities for the children of the workers employed in the plantation where the children between the ages of six to twelve of the workers exceed twenty-five in number;

(d) health facilities to every worker employed in the plantation (including his family) or provide coverage under the Employees State Insurance Act, 1948; and

(e) recreational facilities for the workers employed in the plantation.

(2) An employer of a plantation shall be responsible to provide and maintain welfare facilities for which the workers in the plantation are entitled under this Code either from his own resources or through the schemes of the Central Government or State Government, Municipality or Panchayat for the locality in which the plantation is situated.

Explanation.—For the purposes of this sub-section—

(i) the expression "Municipality" has the same meaning as assigned to it in clause (e) of article 243 of the Constitution; and

(ii) the expression "Panchayat" has the same meaning as assigned to it in clause (d) of article 243 of the Constitution.

93. (1) In every plantation, arrangement shall be made by the employer to provide for the safety of a worker in connection with the use, handling, storage and transport of insecticides, pesticides and chemicals and toxic substances. Safety.

(2) The State Government may prescribe for special safeguards for employment of women or adolescents in using or handling hazardous chemicals.

(3) The employer of a plantation shall appoint persons possessing the prescribed qualifications to supervise the use, handling, storage and transportation of insecticides, chemicals and toxic substances in his plantation.

(4) Every employer of a plantation shall ensure that every worker in plantation employed for handling, mixing, blending and applying insecticides, chemicals and toxic substances, is trained about the hazards involved in different operations in which he is engaged, the various safety measures and safe work practices to be adopted in emergencies arising from spillage of such insecticides, chemicals and toxic substances and such other matters as may be prescribed by the State Government.

(5) Every worker in a plantation who is exposed to insecticides, pesticides, chemicals and toxic substances shall be medically examined periodically, in such manner as may be prescribed by the State Government.

(6) Every employer of a plantation shall maintain health record of every worker in plantation who is exposed to insecticides, pesticides, chemicals and toxic substances which are used, handled, stored or transported in a plantation, and every such worker shall have access to such record.

(7) Every employer of a plantation shall provide—

(a) washing, bathing and cloak room facilities; and

(b) protective clothing and equipment,

to every worker engaged in the handling insecticides, pesticides, chemicals and toxic substances in such manner as may be prescribed by the State Government.

(8) Every employer of a plantation shall display in the plantation, a list of permissible concentrations of insecticides, pesticides, chemicals and toxic substances in the breathing zone of the workers engaged in the handling and application of insecticides, pesticides, chemicals and toxic substances in the plantation.

(9) Every employer of a plantation shall exhibit such precautionary notices in the plantation as may be prescribed by the State Government indicating the hazards of insecticides, pesticides, chemicals and toxic substances.

CHAPTER XII

OFFENCES AND PENALTIES

General
penalty for
offences.

94. Save as otherwise expressly provided in this Code, if in, or in respect of, any establishment, there is any contravention of the provisions of this Code or regulations or rules, or bye-laws or any of standards, made thereunder or of any order in writing given under this Code or such regulations or rules or bye-laws or standards, the employer or the principal employer of the establishment, as the case may be, shall be liable to penalty which shall not be less than two lakhs rupees but which may extend up to three lakh rupees, and if the contravention is continued after the conviction, then, with further penalty which may extend to two thousand rupees for each day till such contravention continues.

Punishment
for causing
obstruction to
Chief
Inspector-
cum-
Facilitator or
Inspector-cum-
Facilitator,
etc.

95. (1) Whoever wilfully—

(i) prevents or causes obstruction to a Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator or an officer of the appropriate Government or a person authorised to discharge any duty or to exercise any powers under this Code or the rules or the regulations or the bye-laws made thereunder, from discharging such duty or exercising such power; or

(ii) refuses entry to the Chief Inspector-cum-Facilitator or the Inspector-cum-Facilitator or person or public authority referred to in clause (i) of sub-section (1) of section 35 or expert referred to in section 37, to any place where such Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator or such person or authority or expert is entitled to enter; or

(iii) fails or refuses to produce any document which he is required to produce; or

(iv) fails to comply with any requisition or order issued to him.

under this Code or the rules, regulations or bye-laws made thereunder he shall be punishable with imprisonment for a term which may extend to three months, or with fine which may extend to one lakh rupees, or with both.

(2) Where any person convicted of an offence punishable under sub-section (1) is again convicted of an offence under the same provision, then, he shall be punishable with imprisonment for a term which may extend to six months, or with fine which shall not be less than one lakh rupees but which may extend to two lakh rupees, or with both.

Penalty for
non-
maintenance
of register,
records and
non-filing of
returns, etc.

96. (1) Any person, who is required under this Code or the rules or regulations or bye-laws or order made thereunder, to—

(i) maintain any register or other document or to file returns, omits or fails to maintain such register or document or to file such returns: or

(ii) produce any register or plan or record or report or any other document, omits or fails to produce such register or plan or record or report or such other document,

he shall be liable to penalty which shall not be less than fifty thousand rupees but which may extend to one lakh rupees.

(2) Where any person convicted of an offence punishable under sub-section (1) is again convicted of an offence under the same provision, then, he shall be liable to penalty which shall not be less than fifty thousand rupees but which may extend to two lakh rupees.

97. (1) Any person, who, save as permitted by or under this Code, contravenes, any—

(i) provision of this Code or of any rule, regulation or bye-laws; or

(ii) order made under this Code prohibiting, restricting or regulating the employment of workers including women, audio-visual worker and contract labour and employee below eighteen years of age in case of mines.

he shall be liable to penalty which shall not be less than fifty thousand rupees but which may extend to one lakh rupees.

(2) Where any person convicted of an offence punishable under sub-section (1) is again convicted of an offence under the same provision, then, he shall be punishable with imprisonment for a term which may extend to three months, or with fine which may extend to two lakh rupees, or with both.

98. (1) Whoever—

(a) produces false records or counterfeits or knowingly makes or produces or uses a false statement, declaration or evidence regarding any document in connection with compliance of any of the provisions of this Code or any rules, regulations or bye-laws or any order made thereunder; or

(b) falsifies any plan or section, the maintenance of which is required by or under this Code or produces before any authority such plan or section, knowing the same to be false; or

(c) makes, gives or delivers knowingly a false plan, section, return, notice, record or report containing a statement, entry or detail,

he shall be punishable with imprisonment for a term which may extend to three months, or with fine which may extend to one lakh rupees, or with both.

(2) Where any person convicted of an offence punishable under sub-section (1) is again convicted of an offence under the same provision, then, he shall be punishable with imprisonment for a term which may extend to six months, or with fine which shall not be less than one lakh rupees but which may extend to two lakh rupees, or with both.

99. Any person who, without reasonable excuse the burden of proving which shall lie upon him, omits to make or furnish in the prescribed form or manner or at, or within, the prescribed time any plan, section, return, notice, register, record or report required by or under any provision of this Code to be made or furnished, he shall be liable to penalty which shall not be less than one lakh rupees but which may extend to two lakh rupees.

100. (1) Whoever being the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator or any other person referred to in section 39 or section 121 discloses, contrary to the provisions of that section, any such information as is referred to in that section without the consent of the appropriate Government, he shall be punishable with imprisonment for a term which may extend to three months, or with fine which may extend to one lakh rupees, or with both.

Punishment
for
contravention
of certain
provisions.

Punishment
for
falsification of
records, etc.

Penalty for
omission to
furnish plans,
etc.

Punishment
for disclosure
of
information.

(2) No court shall proceed with the trial of any offence under this section except with the previous sanction of the appropriate Government.

Punishment
for wrongfully
disclosing
results of
analysis

101. Whoever, except in so far as it may be necessary for the purposes of a prosecution for any offence punishable under this Code, publishes or discloses to any person the results of an analysis, of a sample of substance used or intended to be used in any process under this Code, shall be punishable with imprisonment for a term, which may extend to six months, or with fine, which may extend to fifty thousand rupees, or with both.

Punishment
for
contravention
of provisions
of duties
relating to
hazardous
processes.

102. (1) Whoever fails to comply with or contravenes any of his duties specified under—

(i) clauses (a) to (h) of sub-section (1) or sub-section (2) of section 6 or clause (d) of section 13 in so far as such duty relates to hazardous processes; or

(ii) section 80,

shall, in respect of such failure or contravention, be punishable with an imprisonment for a term which may extend to two years and with fine which may extend to five lakh rupees, and in case the failure or contravention continues, with additional fine which may extend to twenty-five thousand rupees for every day during which such failure or contravention continues, after the conviction for the first such failure or contravention.

(2) If the failure or contravention referred to in sub-section (1) continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to three years or with a fine of twenty lakh rupees, or with both.

Punishment
for
contravention
of provisions
of duties
relating to
safety
provisions
resulting in an
accident.

103. (1) If a person fails to comply with or contravenes any duties under this Code or the regulations, rules, bye-laws or orders made thereunder and such non-compliance or contravention has resulted in an accident or dangerous occurrences causing—

(a) death, he shall be punishable with imprisonment for a term which may extend to two years, or with a fine which shall not be less than five lakh rupees, or with both; or

(b) serious bodily injury to any person within the establishment, he shall be punishable with imprisonment for a term which may extend to one year, or with a fine which shall not be less than two lakh rupees but not exceeding four lakh rupees, or with both;

Provided that while imposing the fine under this section, the court may direct that a portion of the fine, which shall not be less than fifty per cent. thereof, shall be given as compensation to the victim or to the legal heirs of the victim, in the case of his death.

(2) Where a person having been convicted under sub-section (1) is again convicted thereunder, shall be punishable with double the punishment provided under that sub-section for first conviction.

Special
provision for
contravention
of order under
section 38.

104. Whoever continues to work in contravention of any general or special order issued under the provisions of section 38, shall be punishable with imprisonment for a term which may extend to two years and shall also be liable to fine which may extend to five lakh rupees:

Provided that the court shall not impose a fine under this section which shall be less than two lakh rupees without recording in the judgment the reasons for imposing such fine.

Failure to
appoint
manager in
mine.

105. Whoever in compliance of the provisions of section 67, fails to appoint a manager shall be punishable with imprisonment for a term which may extend to three months, or with fine which may extend to one lakh rupees, or with both.

106. (1) Subject to the provisions of section 13, except clause (d) thereof, if any employee employed in a workplace contravenes any provision of this Code or any rules or orders made thereunder, imposing any duty or liability on employee, he shall be punishable with penalty which may extend to ten thousand rupees.

Offences by employees.

(2) Where an employee is convicted of an offence punishable under sub-section (1), the employer of the establishment shall not be deemed to be guilty of an offence in respect of that contravention, unless it is proved that he failed to take all reasonable measures for its prevention.

107. No prosecution shall be instituted against any owner, agent or manager of a mine for any offence under this Code except at the instance of the Chief Inspector-cum-Facilitator or of the District Magistrate or of Inspector-cum-Facilitator authorised in this behalf by general or special order in writing by the Chief Inspector-cum-Facilitator:

Prosecution of owner, agent or manager of mine.

Provided that the Chief Inspector-cum-Facilitator or the District Magistrate or the Inspector-cum-Facilitator as so authorised shall before instituting such prosecution satisfy himself that the owner, agent or manager of a mine had failed to exercise due diligence to prevent the commission of such offence.

Provided further that in respect of an offence committed in the course of the technical direction and management of a mine, the District Magistrate shall not institute any prosecution against an owner, agent or manager of a mine without the previous approval of the Chief Inspector-cum-Facilitator.

108. Where the owner, agent or manager of the mine or employer or occupier of the factory is charged with an offence punishable under this Code he shall be entitled, upon complaint duly made by him and on giving to the prosecutor not less than three clear days' notice in writing of his intention so to do, to have any other person whom he charges as the actual offender brought before the Court at the time appointed for hearing the charge; and if, after the commission of the offence has been proved, the owner, agent or manager of the mine or occupier or manager of the factory, as the case may be, proves to the satisfaction of the Court—

Exemption of owner, agent or manager of mine or occupier of factory from liability in certain cases.

(a) that he has exercised due diligence to enforce the execution of this Code, or

(b) that the said other person committed the offence in question without his knowledge, consent or connivance;

that other person shall be convicted of the offence and shall be liable to the like punishment as if he was the owner, agent or manager of the mine or occupier or manager of the factory, as the case may be, and the owner, agent or manager of a mine or the occupier or the manager of the factory shall be, discharged from any liability under this Code in respect of such offence:

Provided that in seeking to prove as aforesaid the owner, agent or manager of a mine or the occupier or manager of the factory, as the case may be, may be examined on oath, and his evidence and that of any witness whom he calls in his support, shall be subject to cross-examination on behalf of the person he charges as the actual offender and by the prosecutor:

Provided further that, if the person charged as the actual offender by the owner, agent or manager of the mine or occupier or manager of the factory, as the case may be, cannot be brought before the court at the time appointed for hearing the charge, the court shall adjourn the hearing from time to time for a period not exceeding three months and if by the end of the said period the person charged as the actual offender cannot still be brought before the court, the court shall proceed to hear the charge against the owner, agent or manager of the mine or occupier or manager of the factory, as the case may be, and shall, if the offence be proved, convict him.

Offences by
companies,
etc.

109. (1) Where an offence under this Code has been committed by a company, every person who, at the time the offence was committed, was in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render any such person liable to any punishment, if he proves that the offence was committed without his knowledge or that he had exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1) where any offence under this Code has been committed by a company and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of any director, manager, company secretary or other officer of the company, such director, manager, company secretary or other officer shall be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Explanation.—For the purposes of this section,—

(a) "company" means any body corporate and includes a firm or other association of individuals; and

(b) "director" means,—

(i) in relation to a firm a partner thereof; or

(ii) the owner of a mine being a firm or other association of individuals or a company; or

(iii) in case of association of individuals other than specified in sub-clause (ii), any of its members.

Limitation of
prosecution
and
cognizance of
offences

110. (1) Notwithstanding anything contained in this Chapter, the Inspector-cum-Facilitator shall, not initiate prosecution proceeding against an employer for any offence under this Chapter, give an opportunity to comply with relevant provisions of this Act within a period of thirty days from the date of notice giving opportunity, and, if the employer complies with such provisions within such period, then, no such proceeding shall be initiated against such employer:

Provided that no such opportunity shall be accorded to an employer in case of an accident and if the violation of the same nature of the provisions under this Code is repeated within a period of three years from the date on which such first violation was committed and in such case the prosecution shall be initiated in accordance with provisions of sub-section (2).

(2) No court shall take cognizance of any offence punishable under this Code, unless a complaint in respect thereof is made within six months of the date on which the alleged commission of the offence came to the knowledge of the Inspector-cum-Facilitator and a complaint is filed in that regard by him.

(3) No court inferior to that of a Metropolitan Magistrate or a Judicial Magistrate of the First Class shall try any offence punishable under this Code.

Explanation.—For the purposes of this section,—

(a) in the case of a continuing offence, the period of limitation shall be computed with reference to every point of time during which the offence continues;

(b) where for the performance of any act, time is granted or extended on an application made by the employer of an establishment, the period of limitation shall be computed from the date on which the time so granted or extended expired.

111. (1) Notwithstanding anything contained in section 110, for the purpose of imposing penalty under sub-section (3) of section 12 or sections 94, 96, 97, 99, 106 and sub-section (3) of section 114, the appropriate Government may appoint any officer not below the rank of Under Secretary to the Government of India or an officer of equivalent rank in the State Government, as the case may be, for holding enquiry in such manner, as may be prescribed by the Central Government.

Power of officers of appropriate Government to impose penalty in certain cases.

(2) While holding the enquiry, the officer referred to in sub-section (1) shall have the power to summon and enforce attendance of any person acquainted with the facts and circumstances of the case to give evidence or to produce any document, which in the opinion of such officer, may be useful for or relevant to the subject-matter of the enquiry and if, on such enquiry, he is satisfied that the person has committed any offence under the provisions referred to in sub-section (1), he may impose such penalty as he thinks fit in accordance with the provisions of that sub-section.

(3) Any person aggrieved by an order made by the officer under sub-section (2) may prefer an appeal, in such form and manner and accompanied by such fee as may be prescribed, to the appellate authority to be appointed by the appropriate Government from amongst officers not below the rank of Deputy Secretary to the Government of India or an officer of equivalent rank in the State Government, as the case may be, within sixty days from the date on which the copy of the order made by the officer referred in sub-section (1) is received by the aggrieved person.

(4) The appellate authority may, after giving the parties to the appeal an opportunity of being heard, pass such order as he thinks fit, confirming, modifying or setting aside the order appealed against, within a period of sixty days from the date of receipt of appeal.

(5) Where a person fails to pay the penalty so imposed within a period of ninety days from the date of receipt of the copy of the order, he shall be punishable with fine which shall not be less than twenty-five thousand rupees but which may extend up to two lakh rupees.

(6) The amount of penalty imposed and received under this section shall be credited to the fund established under sub-section (1) of section 115.

112. For the purposes of conferring jurisdiction on any court in relation to an offence under this Code or the rules, regulation or bye-laws made thereunder in connection with an establishment, the place where the establishment is for the time being situated, shall be deemed to be the place where such offence has been committed.

Jurisdiction of court for entertaining proceedings, etc., for offence.

113. (1) Where the employer of a mine or a factory or a dock is convicted of an offence punishable under this Code, the court may, in addition to awarding him any punishment, by order in writing, require him within the period specified in the order (which may be extended by the court from time to time on application made in this behalf) to take such measures as may be specified in the order for remedying the matters in respect of which the offence was committed.

Power of court to make orders.

(2) Where an order is made under sub-section (1), the employer of the mine or the factory shall not be liable under this Code in respect of the continuance of the offence during the period or extended period, if any, but if on the expiry of such period or extended period the order of the court has not been fully complied with, employer shall be deemed to have committed a further offence and shall be punishable with imprisonment for a term which may extend to six months, or with fine which may extend to one hundred rupees for every day after such expiry on which the order has not been complied with, or with both.

114. (1) Notwithstanding anything contained in the Code of Criminal Procedure, 1973, any penalty under sub-section (3) of section 12 or section 94 or section 96 or sub-section (1) of section 97 or section 99 or section 106 or sub-section (3) or any offence

Composition of certain offences.

under sub-section (2) of section 97 or sub-section (1) of section 100 or section 101 or clause (b) of sub-section (1) of section 103 or section 105 or sub-section (2) of section 113 may either before or after the holding the enquiry or, as the case may be, of institution of prosecution may be compounded by such officer of the appropriate Government as may be notified by that Government in the manner as may be prescribed by it—

(a) in a case of penalty for a sum of fifty per cent. of the maximum penalty provided for such penalty; and

(b) in a case of offence for a sum of seventy-five per cent. of the maximum fine provided for such offence.

(2) Where a penalty or an offence has been compounded under sub-section (1), the person liable for penalty or the offender, as the case may be, shall be discharged of the penalty or offence and there shall be no further proceedings against him in respect of such penalty or offence.

(3) Any person who fails to comply with an order made by the officer referred to in sub-section (1), shall be liable to pay a penalty equivalent to twenty per cent. of the maximum penalty or fine provided for the penalty or the offence, as the case may be, in addition to the penalty or fine.

(4) The amount of composition received under sub-section (1) shall be credited to the fund established under sub-section (1) of section 115 for the unorganised workers.

(5) Nothing contained in sub-section (1) shall apply to a penalty or an offence committed by a person for a second or subsequent time within a period of three years from the date of penalty or offence, as the case may be,—

(a) which was earlier compounded; or

(b) for which such person was earlier convicted.

CHAPTER XIII

SOCIAL SECURITY FUND

Social security fund.

115. (1) There shall be established by the appropriate Government a social security fund for the welfare of the unorganised workers to which there shall be credited the amount received from composition of the offence as specified in sub-section (4) of section 114 and the amount of the penalty as specified in sub-section (6) of section 111.

(2) The fund may also be funded by such other sources as may be prescribed by the appropriate Government.

(3) The fund shall be administered and expended for welfare of the unorganised workers in such manner as may be prescribed by the appropriate Government including the transfer of the amount in the fund to any fund established under any other law for the time being in force for the welfare of the unorganised workers.

Explanation.—For the purpose of this section the expression "unorganised worker" shall have the same meaning as is assigned to it under clause (m) of section 2 of the Unorganised Workers Social Security Act, 2008.

33 of 2008

CHAPTER XIV

MISCELLANEOUS

Delegation of powers.

116. The Central Government may, by notification, direct that any power exercisable by it under this Code or rules made thereunder shall, in relation to such matters and subject to such conditions, if any, as may be specified in the notification, be exercisable also by the State Government or by such officer or authority subordinate to the State Government as may be specified in the said notification.

117. (1) When any offence is committed under this Code involving an issue of a certain age of a person and such person is in the opinion of the court *prima facie* under such age, the burden shall be on the accused to prove that such person is not under such age. Onus as to age.

(2) The medical authority prescribed by the Central Government shall, while examining a worker for issuing the certificate of age for the purposes of this Code, take into account the Aadhaar card of the worker, and in the absence thereof, the date of birth certificate from school or the matriculation or equivalent certificate from the concerned examination Board of the worker, if available, and in the absence thereof, the birth certificate of the worker given by a corporation or a municipal authority or a Panchayat, and only in the absence of any of the methods specified in this sub-section, the age shall be determined by such medical authority through an ossification test or any other latest medical age determination test.

118. In any proceeding for an offence for the contravention of any provision of this Code or regulations or bye-laws or rules made thereunder consisting of a failure to comply with a duty or requirement to do something, it shall be for the person who is alleged to have failed to comply with such duty or requirement, to prove that it was not reasonably practicable or all practicable measures were taken to satisfy the duty or requirement. Onus of proving limits of what is practicable, etc.

119. (1) Notwithstanding anything contained in this Code, any person desirous of obtaining common licence in respect of a factory, industrial premises for *beedi* and cigar work and for engaging contract workers or any combination thereof or single licence for any one of them under this Code shall make an application electronically or otherwise to such authority as may be designated, by notification, by the appropriate Government. Common licence for contractor, factories and to industrial premises, etc.

(2) The application under sub-section (1),—

(a) shall be in such form and filed in such manner and accompanied by such fee and contain such information as may be prescribed by the appropriate Government;

(b) shall, in so far as it relates to the licence for engaging contract labours, contain the number of inter-State migrant workers employed.

(3) On receipt of an application under sub-section (1), the authority referred to in that sub-section shall take such actions in such manner and make such inquiry as may be prescribed by the appropriate Government.

(4) Where the authority referred to in sub-section (1) is satisfied that the common licence may be issued in respect of a factory, industrial premises for *beedi* and cigar work and for engaging contract workers or any combination thereof or single licence for any one of them under this Code, such authority shall issue a licence electronically within forty-five days of the receipt of application failing which the licence shall be deemed to be issued and shall be auto generated and the responsibility of such failure shall be on such authority:

Provided that where the licence is deemed to be issued, no further inquiry shall be made:

Provided further that the form of licence shall, as far as practicable, be similar throughout India:

Provided also that where such authority rejects the application he shall assign the reason for such rejection.

(5) Notwithstanding anything contained in this Code, any licence in respect of a factory, industrial premises for *beedi* and cigar work and for engaging contract labour has been obtained under any Central labour law before the commencement of this Code, in respect of any establishment shall be deemed to have been obtained under the provisions of this Code and shall be valid for the period for which it was issued and shall have to be obtained afresh after its expiration.

(6) Any person aggrieved by an order passed under this section by the authority referred to in sub-section (1) may file, within thirty days from the date of the order, an appeal in such form, accompanied with such fee to such appellate authority as may be prescribed by the appropriate Government and the appeal shall be disposed of electronically within thirty days of the filing of the appeal.

Effect of law
and
agreements
inconsistent
with Code.

120. (1) The provisions of this Code shall have effect notwithstanding anything inconsistent therewith contained in any other law for the time being in force or in the terms of any award, agreement or contract of service whether made before or after the commencement of this Code:

Provided that where under any such award, agreement, contract of service or otherwise an employee is entitled to benefits in respect of any matters which are more favourable to him than those to which he will be entitled to under this Code, the employee shall continue to get the former notwithstanding that he receives benefits in respect of other matters under this Code.

(2) Nothing contained in this Code shall be construed as precluding any employee from entering into an agreement with an employer for granting him rights or privileges in respect of any matter which are more favourable to him than those to which he would be entitled under this Code.

Power of
appropriate
Government
to direct
inquiry in
certain cases.

121. (1) The appropriate Government may, in the event of the occurrence of an accident in an establishment which has caused or had the potentiality to cause serious danger to employees and other persons within, and in the vicinity of the workplace or whether immediate or delayed, or any occupational disease as specified in the Third Schedule, which has been or is suspected to have been contracted, in epidemic proportions, appoint one or more persons possessing legal or special knowledge to act as assessors or competent persons in such inquiry in order to inquire into the causes of the accident and disease, fix responsibilities and suggest a plan of action for the future to prevent such accidents or diseases and submit the report to the appropriate Government.

(2) The appropriate Government may direct a Chief Inspector-cum-Facilitator or any other officer under the control of the Government concerned or appoint a committee to undertake a survey in such manner as may be prescribed by the appropriate Government on the situation relating to safety or health at work at any workplace or class of workplaces or into the effect of work activity on the health of the employees and other persons within and in the vicinity of the workplace.

(3) The officer directed or committee appointed, under sub-section (1) or sub-section (2), to hold an inquiry, shall have the powers of a civil court under the Code of Civil Procedure, 1908, for the purposes of enforcing the attendance of witnesses and compelling the production of documents and material objects, and may also so far as may be necessary for the purposes of the inquiry, exercise such powers of an Inspector-cum-Facilitator under this Code as may be necessary.

5 of 1908.

(4) The Central Government may make rules for regulating the procedure of inquiry and survey and other related matters under this section.

Publication of
reports.

122. The appropriate Government may, if it thinks fit, cause to be published any report submitted to it by the National Board or State Advisory Board or any extracts from any report submitted to it under this Code.

Powers of
Central
Government
to give
directions.

123. The Central Government may give directions to a State Government for the implementation of the provisions of this Code.

General
restriction on
disclosure of
information.

124. (1) No person shall in respect of the establishment, disclose any information relating to any manufacturing or commercial business or any working process which may come to his knowledge in the course of his official duties.

(2) Nothing in sub-section (1) shall apply to any disclosure of information made with the previous consent in writing of the owner of the business or process or for the purposes of any legal proceeding (including adjudication or arbitration), pursuant to any of the relevant statutory provisions or of any criminal proceeding under this Code which may be taken, whether pursuant to any of the relevant statutory provisions or otherwise, or for the purposes of any report of any such proceedings.

125. No civil court shall have jurisdiction in respect of any matter to which any provision of this Code applies and no injunction shall be granted by any civil court in respect of anything which is done or intended to be done by or under this Code.

Jurisdiction of civil courts barred

126. (1) No suit, prosecution or other legal proceeding shall lie against any person for anything which is in good faith done or intended to be done in pursuance of this Code or any rule or regulation or bye-laws or order made thereunder.

Protection of action taken in good faith.

(2) No prosecution or other legal proceeding shall lie against the Government, any Board or committees constituted under this Code or any member of such Board or any officer or employee of the Government or the Board or any other person authorised by the Government or any Board or committee, for any damage caused or likely to be caused by anything which is in good faith done or intended to be done in pursuance of this Code or any rule or regulation or bye-laws or order made or issued thereunder.

127. (1) The appropriate Government may, by notification and subject to such conditions and restrictions, if any, and for such period or periods as may be specified in the notification, direct that all or any of the provisions of this Code or the rules or the regulations made thereunder shall not apply to or in relation to any establishment or class of establishments.

Power to exempt in special cases.

(2) Without prejudice to the generality of sub-section (1), where the State Government is satisfied in the public interest that it is necessary to create more economic activities and employment opportunities, it may, by notification, exempt, subject to such conditions as it may think fit, any new factory or class or description of new factories from all or any of the provisions of this Code for such period from the date on which such commercial production starts, as may be specified in the notification:

63 of 1948.

Provided that any notification issued by a State Government under the Factories Act, 1948 for the time being in force in the State prior to the commencement of this Code to achieve the same purpose as is specified in this sub-section, shall remain in force after such commencement for its remaining period as if the provisions of this Code, to the extent they defeat any purpose to be achieved by such notification issued by the State Government, were not in force.

Explanation.—For the purpose of this sub-section, the expression "new factory or class or description of new factories" means such factory or class or description of factories which are established and whose commercial production start within such period as may be specified in the notification.

128. In case of a public emergency or disaster or pandemic in whole of India or part thereof, the appropriate Government may, by notification, exempt any workplace or work activity or class thereof from all or any of the provisions of this Code for such period and subject to such conditions as it may think fit:

Power to exempt during public emergency.

Provided that no such notification shall be made for a period exceeding one year at a time.

Explanation.—For the purposes of this section "public emergency" means a grave emergency whereby the security of India or any part of the territory thereof is threatened, whether by war or external aggression or internal disturbance.

Power to
exempt public
institution.

129. The appropriate Government may exempt, subject to such conditions as it may consider necessary, any workshop or workplace where a manufacturing process is carried on and which is attached to a public institution maintained for the purposes of education, training, research or information, from all or any of the provisions of this Code:

Provided that no such exemption shall be granted from the provisions relating to hours of work and holidays unless the persons having the control of the institution submit, for the approval of the appropriate Government, a scheme of the regulation of the hours of employment, intervals for meals, and holidays of the persons employed in or attending the institution or who are inmates for the institution, and the appropriate Government is satisfied that the provisions of the scheme are not less favourable than the corresponding provisions of this Code.

Persons
required to
give notice,
etc., legally
bound to do
so.

130. Every person required to give any notice or to furnish any information to any authority in relation to the provisions of this Code shall be legally bound to do so within the meaning of section 176 of the Indian Penal Code.

45 of 1860.

Power of
Central
Government
to amend
Schedule

131. The Central Government may, by notification, amend any Schedule by way of addition, alteration or omission therein and on any such notification being issued, the Schedule shall be deemed to be amended accordingly.

Power to
remove
difficulties

132. (1) If any difficulty arises in giving effect to the provisions of this Code, the Central Government may, by order published in the Official Gazette, make such provisions not inconsistent with the provisions of this Code, as appears to it to be necessary or expedient for removing the difficulty:

Provided that no such order shall be made after the expiry of two years from the date on which this Code comes into force.

(2) Every order made under this section shall, as soon as may be after it is made, be laid before each House of Parliament.

Power of
appropriate
Government
to make rules

133. (1) The appropriate Government may, subject to the condition of previous publication and by notification, make rules for carrying out the purposes of this Code.

(2) In particular and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:—

(a) income from the sources under *Explanation* to clause (x) of sub-section (1) of section 2;

(b) substance or quantity of substance under clause (zh) of sub-section (1) of section 2;

(c) the late fee under the proviso to sub-section (1) of section 3;

(d) the manner of submitting application under sub-section (2) of section 3 and the form of such application and the particulars to be contained therein and the fees to be accompanied therewith;

(e) the form and manner of sending the notice and the authority to whom the notice shall be sent and the manner of intimating the authority under sub-section (1) of section 5;

(f) annual health examination or test free of costs, age of employees or class of employees or establishment or class of establishments under clause (c) of sub-section (1) of section 6;

(g) the information to be included in the letter of appointment and the form of such letter under clause (f) of sub-section (1) of section 6;

(h) the nature of bodily injury and the manner of notice and the time within which the notice shall be sent and the authority to which notice shall be sent under sub-section (1) of section 10;

(i) nature of dangerous occurrence and the form of notice, the time within which and the authority to which notice shall be sent under section 11;

(j) the form of notice related to certain diseases and the time within which the notice shall be sent and the authority to which the notice shall be sent under sub-section (1) of section 12;

(k) the form and manner of the report and the time within which such report shall be sent to the office of the Chief Inspector-cum-Facilitator under sub-section (2) of section 12;

(l) manner of making report by employee under clause (d) and other duties of employees under clause (g) of section 13;

(m) manner of sending report of action taken under sub-section (3) of section 14;

(n) the manner of constituting a safety committee and the manner and the purpose for choosing the representative of the workers in the Safety Committee under sub-section (1) of section 22;

(o) the qualifications, duties and number of safety officers under sub-section (2) of section 22;

(p) conditions for exemption of workers from weekly and compensatory holidays under sub-section (2) of section 26;

(q) the total number of overtime under second proviso to section 27;

(r) circumstances for exemption from restriction on double employment in factory and mine under section 30;

(s) the form of notice and manner of display of such notice and the manner in which such notice shall be sent to the Inspector-cum-Facilitator under sub-section (2) of section 31;

(t) the form of register and particulars of workers under clause (a) of section 33;

(u) the manner and form of displaying notices under clause (b) of section 33;

(v) return, manner of filing the return and periods of filing return to the Inspector-cum-Facilitator under clause (d) of section 33;

(w) the qualification and experience of Chief Inspector-cum-Facilitator under sub-section (5) of section 34;

(x) the manner of taking samples of any article or substance found in any premises and air of atmosphere under clause (x) of sub-section (1) of section 35;

(y) the other powers and duties under clause (xiv) of sub-section (1) of section 35;

(z) the specialised qualification and experience, duties and responsibilities of experts to be empanelled under section 37;

(za) the manner of providing alternative employment under sub-clause (d) of clause (A) of sub-section (1) of section 38;

(zb) the qualification for the appointment of medical practitioner and other establishment under sub-section (1) of section 42;

(zc) other establishment engaged in the dangerous occupation or processes under clause (a) of sub-section (2) of section 42;

(zd) medical supervision and other establishment under clause (b) of sub-section (2) of section 42;

(ze) other establishment under clause (c) of sub-section (2) of section 42;

(zf) conditions relating to safety, holidays and working hours or any other condition to be observed by the employer under section 43;

(zg) the manner of requiring the employer to provide the adequate safeguards under section 44;

(zh) conditions including, in particular, conditions as to hours of work, fixation of wages and other essential amenities in respect of contract labour under clause (a) of sub-section (3) of section 47;

(zi) the form and manner of application and the particulars which such application shall contain regarding the number of contract labour, nature of work for which contract labour is to be employed and other particulars including the information relating to the employment of inter-State migrant workers under sub-section (1) of section 48;

(zj) the procedure under sub-section (2) of section 48;

(zk) manner of applying for the renewal of licence and the manner of renewal of licence under sub-section (3) of section 48;

(zl) responsibility of the contractor under sub-section (4) of section 48;

(zm) the manner of intimation of work order and time-limit for such intimation under sub-section (1) of section 50;

(zn) the manner of suspending or cancelling the licence under sub-section (2) of section 50;

(zo) the period before which the wages shall be paid under sub-section (1) of section 55;

(zp) the mode of payment of wages under proviso to sub-section (2) of section 55;

(zq) the manner of payment of wages from security deposit under sub-section (4) of section 55;

(zr) the form of issuing experience certificate under section 56;

(zs) the form and manner of making application under clause (b) of sub-section (2) of section 57;

(zt) period of making report and the period of deciding the question under clause (c) of sub-section (2) of section 57;

(zu) minimum service for entitlement, class of travel and other matters under section 61;

(zv) manner of providing facility of toll free helpline under section 63;

(zw) manner of providing for study on inter-State migrant workers under section 64;

(zx) authority to whom a copy of the agreement shall be forwarded by the producer under sub-section (3) of section 66;

(zy) details under clause (vii) of sub-section (4) of section 66;

(zz) rules in respect of factory or class or description of factories under sub-section (1) of section 79;

(zza) mode of submission of application under sub-section (2) of section 79;

(zzb) common facilities and services for joint liability of owner of premises and occupiers of the factories under section 80;

(zzc) rules under section 82;

(zzd) purposes under sub-section (1) of section 83;

(zze) form of application under sub-section (2) of section 83;

(zzf) the appellate authority for appeal against the order of Inspector-cum-Facilitator of factory and the manner of appeal under section 90;

(zgg) rules under section 91;

(zzh) manner of holding enquiry under sub-section (1) of section 111;

(zzi) form and manner of preferring appeal and the fee to accompany such appeal under sub-section (3) of section 111;

(zzj) manner of compounding under sub-section (1) of section 114;

(zzk) other sources of fund under sub-section (2) of section 115;

(zzl) the manner of administering and expending the Fund under sub-section (3) of section 115;

(zzm) the form of application, manner of filing the application and the fee to be accompanied therewith including the information relating to the employment of Inter-State migrant workers under sub-section (2) of section 119;

(zzn) actions, manner of taking actions and inquiry under sub-section (3) of section 119;

(zzo) the form of appeal, the fee to be accompanied therewith and the appellate authority under sub-section (6) of section 119;

(zzp) the manner of survey under sub-section (2) of section 121;

(zqq) any other matter which is required to be, or may be, prescribed under this Code.

134. (1) The Central Government may, subject to the condition of previous publication and by notification, make rules for carrying out the purposes of this Code.

Power of
Central
Government
to make rules.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:—

(a) the other authority under sub-clause (iii) of clause (zs) of sub-section (1) of section 2;

(b) the matters which are directly related to the condition of ship under the proviso to sub-clause (iii) of clause (zs) of sub-section (1) of section 2;

(c) other period under clause (a) of sub-section (1) of section 3;

(d) the form of certificate of registration, the time within which and the conditions subject to which such certificate shall be issued under sub-section (3) of section 3;

(e) the form of intimation by the employer electronically and the manner of amendment in the certificate electronically under sub-section (4) of section 3;

(f) the manner of informing closing of establishment and certifying payment to the registering officer under sub-section (5) of section 3;

(g) procedure for nomination and discharge of functions of Members of National Board under sub-section (3) of section 16;

(h) the terms and conditions of service of officers and employees of the National Board under sub-section (4) of section 16;

(i) the number of members of technical committees or advisory committees and their qualifications under sub-section (5) of section 16;

(j) the form and manner of collecting, compiling and analyzing occupational safety and health statistics under sub-section (1) of section 21;

(k) the form and manner of maintaining database electronically or otherwise and the documents to be produced under sub-section (2) of section 21;

(l) health and working conditions under sub-section (1) of section 23;

(m) regarding matters specified in sub-section (2) of section 23;

(n) welfare facilities for the employees under sub-section (1) of section 24;

(o) regarding matters specified in sub-section (2) of section 24;

(p) facility of crèche under sub-section (3) of section 24;

(q) definition of "running time" in relation to a working day under clause (a) of the *Explanation* to sub-section (1) of section 25;

(r) the hours of work for working journalist under sub-section (2) of section 25;

(s) other kinds of leave under clause (i) of sub-section (3) of section 25;

(t) the maximum period of accumulating leave under clause (ii) of sub-section (3) of section 25;

(u) the limit up to which the earned leave may be availed of at a time and the reasons for which such leave may be exceeding under clause (iii) of sub-section (3) of section 25;

(v) conditions and restrictions for entitlement of cash compensation under clause (iv) of sub-section (3) of section 25;

(w) powers and duties of District Magistrate under section 36;

(x) requisite qualifications or criteria under sub-section (1) of section 47;

(y) period of renewal of licence under sub-section (2) of section 47;

(z) procedure under clause (b) of sub-section (1) of section 51;

(za) form of agreement under clause (a), and the name and other particulars under clause (b) of sub-section (2) of section 66;

(zh) the matter which may be saved and the qualifications of sole manager under sub-section (1) of section 67;

(zc) the conditions relating to number of employees, depth of excavation and other matters under clause (a) of sub-section (1) of section 68;

(zd) conditions relating to workings, opencast workings and explosives under clause (b) of sub-section (1) of section 68;

(ze) to declare the mines and part thereof for the purpose of applicability of the provisions of this Code under sub-section (2) of section 68;

(zf) the authority, the manner of informing such authority and the time limit for making such information under sub-section (3) of section 68;

(zg) to provide for medical examination of apprentice, other trainee or employee under sub-section (3) of section 70;

(zh) to exempt certain persons or category of persons holding positions of supervision or management and the persons employed in mine and the persons employed therein under section 71;

(zi) to provide for vocational training and rescue and recovery services to the persons employed in a mine under section 72;

(zj) medical authority under sub-section (2) of section 117;

(zk) rules under sub-section (4) of section 121;

(zl) the language of the bye-laws under sub-section (7) of section 139;

(zm) any other matter which is required to be, or may be prescribed.

135. (1) The State Government may, subject to the condition of previous publication and by notification, make rules for the carrying out the provisions of this Code.

Power of State Government to make rules.

(2) In particular and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:—

(a) the constitution, procedure and other matters relating to State Advisory Board under sub-section (2) of section 17;

(b) the number of members and their qualifications under sub-section (3) of section 17;

(c) the form of application and the payment of fees under sub-section (2) of section 74;

(d) the manner of preparing the plan of the place or premises under sub-section (3) of section 74;

(e) other matters under clause (a) of sub-section (4) of section 74;

(f) fees under sub-section (6) of section 74;

(g) period under the second proviso to sub-section (6) of section 74;

(h) the time of filing appeal and fees under section 75;

(i) the form of application by the employee and conditions under sub-section (1) of section 76;

(j) form of maintaining the record of the work under sub-section (2) of section 76;

(k) the manner of disclosing information by occupier of a factory under sub-section (1) of section 84;

(l) the interval of informing Chief Inspector-cum-Facilitator and the local authority about the policy with respect to the health and safety of the workers under sub-section (2) of section 84;

(m) the form and manner of informing Chief Inspector-cum-Facilitator under sub-section (5) of section 84;

(n) the manner of publicising among the workers and the general public living in the vicinity of the factory the measures and disposal laid down under sub-section (7) of section 84;

(o) the conditions for accessibility to the record by the workers under clause (a) of section 85;

(p) the qualification and experience of persons handling hazardous substance and manner of providing necessary facilities for protecting the workers under clause (b) of section 85;

(q) the manner of providing for medical examination of a worker under sub-clause (ii) of clause (c) of section 85;

(r) the measures or standards under sub-section (1) of section 86;

(s) the value of the maximum permissible limit of exposure of chemical and toxic substances in manufacturing process in any factory under section 88;

(t) requiring every employer to make in his plantation provisions in respect of as specified in clauses (a) to (d) of sub-section (1) of section 92;

(u) for prohibiting or restricting employment of women or adolescents under sub-section (2) of section 93;

(v) qualifications under sub-section (3) of section 93;

(w) other matters under sub-section (4) of section 93;

(x) manner of periodical medical examination of worker under sub-section (5) of section 93;

(y) the manner of providing facilities, clothing and equipment under sub-section (7) of section 93;

(z) precautionary notices under sub-section (9) of section 93;

(za) any other matter which is required to be, or may be, prescribed.

(3) The Central Government may, by notification and in consultation with the State Government, make rules for the purposes of bringing uniformity, throughout the country, in occupational safety, health or such other matters as it considers necessary in respect of factories.

Power of
Central
Government
to make
regulations in
relation to
mines and
dock work.

136. The Central Government may, by notification, make regulations consistent with this Code for all or any of the following purposes, namely:—

(a) for specifying the qualifications required for appointment as Inspector-cum-Facilitator;

(b) for specifying and regulating the duties and powers of the Chief Inspector-cum-Facilitator and of Inspector-cum-Facilitators in regard to the inspection of mines under this Code;

(c) for specifying the duties of owners, agents and managers of mines and of persons acting under them, and for specifying the qualifications (including age) of agents and managers of mines and of persons acting under them;

(d) for requiring facilities to be provided for enabling managers of mines and other persons acting under them to efficiently discharge their duties;

(e) for regulating the manner of ascertaining, by examination or otherwise, the qualifications of managers of mines and persons acting under them, and the granting and renewal of certificates of competency;

(f) for fixing the fees, if any, to be paid in respect of such examinations and of the grant and renewal of such certificates;

(g) for determining the circumstances in which and the conditions subject to which it shall be lawful for more mines than one to be under a single manager, or for any mines to be under a manager not having the specified qualifications;

- 5 of 1908. (h) for providing for inquiries to be made under this Code, including any inquiry relating to misconduct or incompetence on the part of any person holding a certificate under this Code and for the suspension or cancellation of any such certificate and for providing, wherever necessary, that the person appointed to hold an inquiry shall have all the powers of a civil court under the Code of Civil Procedure, 1908, for the purpose of enforcing the attendance of witnesses and compelling the production of documents and material objects;
- 4 of 1884. (i) for regulating, subject to the provisions of the Indian Explosives Act, 1884, and of any rules made thereunder, the storage, conveyance and use of explosives;
- (j) for prohibiting, restricting or regulating the employment of women in mines or in any class of mines or on particular kinds of labour which are attended by danger to the life, safety or health of such persons and for limiting the weight of any single load that may be carried by any such person;
- (k) for providing for the safety of the persons employed in a mine, their means of entrance there into and exit therefrom, the number of shafts or outlets to be furnished, and the fencing of shafts, pits, outlets, pathways and subsidences;
- (l) for prohibiting the employment in a mine either as manager or in any other specified capacity of any person except persons paid by the owner of the mine and directly answerable to the owner or manager of the mine;
- (m) for providing for the safety of the roads and working places in mines, including the siting, maintenance and extraction or reduction of pillars or blocks of minerals and the maintenance of sufficient barriers between mine and mine;
- (n) for the inspection of workings and sealed off fire- areas in a mine, and for the restriction of workings in the vicinity of the sea or any lake or river or any other body of surface water, whether natural or artificial, or of any public road or building, and for requiring due precaution to be taken against the irruption or inrush of water or other liquid matter into, outbreak of fire in or premature collapse of, any workings;
- (o) for providing for the ventilation of mines and the action to be taken in respect of dust, fire, and inflammable and noxious gases, including precautions against spontaneous combustion, underground fire and coal dust;
- 36 of 2003. (p) for regulating, subject to the provisions of the Electricity Act, 2003, and of any rules made thereunder, the generation, storage, transformation, transmission and use of electricity in mines and for providing for the care and the regulation of the use of all electrical apparatus and electrical cables in mines and of all other machinery and plant therein;
- (q) "for regulating the use of machinery in mines, for providing for the safety of persons employed on or near such machinery and on haulage roads and for restricting the use of certain classes of locomotives underground;
- (r) for providing for proper lighting of mines and regulating the use of safety lamps therein and for the search of persons entering a mine in which safety lamps are in use;
- (s) for providing against explosions or ignitions of inflammable gas or dust or irruptions of or accumulations of water in mines and against danger arising therefrom and for prohibiting, restricting or regulating the extraction of minerals in circumstances likely to result in the premature collapse of workings or to result in or to aggravate the collapse of workings or irruptions of water or ignitions in mines;
- (t) for specifying type of accidents for the purposes of notice under section 10 and for specifying the notices of accidents and dangerous occurrences, and the notices, reports and returns of mineral output, persons employed and other matters

provided for by regulations, to be furnished by owners, agents and managers of mines, and for specifying the forms of such notices, returns and reports, the persons and authorities to whom they are to be furnished, the particulars to be contained in them, and the time within which they are to be submitted;

(u) for requiring owners, agents and managers of mines to have fixed boundaries for the mines, for specifying the plans and sections and field notes connected therewith to be kept by them and the manner and places in which such plans, sections and field notes are to be kept for purposes of record and for the submission of copies thereof to the Chief Inspector-cum-Facilitator, and for requiring the making of fresh surveys and plans by them, and in the event of non-compliance, for having the survey made and plans prepared through any other agency and for the recovery of expenses thereof in the same manner as an arrear of land revenue;

(v) for regulating the procedure on the occurrence of accidents or accidental explosions or ignitions in or about, mines; for dealing effectively with the situation;

(w) for specifying the form of, and the particulars to be contained in, the notice to be given by the owner, agent or manager of a mine under section 5;

(x) for specifying the notice to be given by the owner, agent or manager of a mine before mining operations are commenced at or extended to any point within forty-five meters of any railway subject to the provisions of the Indian Railways Act, 1989 or of any public roads or other works as the case may be, which are maintained by the Government or any local authority; 24 of 1989

(y) for the protection from injury, in respect of any mine when the workings are discontinued, of property vested in the Government or any local authority or railway company as defined in the Indian Railways Act, 1989; 24 of 1989

(z) for requiring protective works to be constructed by the owner, agent or manager of a mine before the mine is closed, and in the event of non-compliance, for getting such works executed by any other agency and for recovering the expenses thereof from such owner in the same manner as an arrear of land revenue;

(za) for requiring the fencing of any mine or part of a mine or any quarry, incline, shaft, pit or outlet, whether the same is being worked or not, or any dangerous or prohibited area, subsidence, haulage, tramline or pathway, where such fencing is necessary for the protection of the public;

(zb) for specifying the number of officials to be appointed;

(zc) for specifying the qualifications of the officials to be appointed;

(zd) for specifying the qualifications and experience of the agents;

(ze) for specifying the period during which the agent shall be resident in India;

(zf) for specifying duties and responsibilities of suppliers, designers, importer and contractors for safety in mines;

(zg) for requiring the owners, agents and managers of mines to formulate, maintain and enforce safety management plan in their mines;

(zh) for requiring the managers of mines to formulate and implement codes of practice or standard operating procedure in respect of any machinery or operation used in the mines;

(zi) for providing for the safety in opencast mines and associated operations and machineries used therein;

(zj) for regulating the extraction of methane from working or abandoned coal mines or from virgin coal seam;

(zk) for specifying the forms of returns which shall be filed by the establishments or the class of establishments under this Code;

(zl) for the general requirement relating to the construction, equipping and maintenance for the safety of working places on shore, ship, dock, structure and other places at which any dock work is carried on;

(zm) for the safety of any regular approaches over a dock, wharf, quay or other places which dock workers have to use for going for work and for fencing of such places and projects;

(zn) for the efficient lighting of all areas of dock, ship, any other vessel, dock structure or working places where any dock work is carried on and of all approaches to such places to which dock workers are required to go in the course of their employment;

(zo) providing and maintaining adequate ventilation and suitable temperature in every building or an enclosure on ship where dock workers are employed;

(zp) providing for the fire and explosion prevention and protection;

(zq) providing for safe means of access to ships, holds, stagings, equipment, lifting appliances and other working places;

(zr) providing for the safety of workers engaged in the opening and closing of hatches, protection of ways and other openings in the docks which may be dangerous to them;

(zs) providing for the safety of workers on docks from the risk of falling overboard being struck by cargo during loading or unloading operations;

(zt) providing for the construction, maintenance and use of lifting and other cargo handling appliances and services, such as, pallets containing or supporting loads and provision of safety appliances on them, if necessary;

(zu) providing for the safety of workers employed in freight container terminals or other terminals for handling unitised cargo;

(zv) providing for the fencing of machinery, live electrical conductors, steam pipes and hazardous openings;

(zw) providing for the construction, maintenance and use of staging;

(zx) providing for the rigging and use of ship's derricks;

(zy) providing for the testing, examination, inspection and certification as appropriate of loose gears including chains and ropes and of slings and other lifting devices used in the dock work;

(zz) providing for the precautions to be taken to facilitate escape of workers when employed in a hold, bin, hopper or the like or between decks of a hold while handling coal or other bulk cargo;

(z za) providing for the measures to be taken in order to prevent dangerous methods of working in the stacking, unstacking, stowing and unstowing of cargo or handling in connection therewith;

(z zh) providing for the handling of dangerous substances and working in dangerous or harmful environments and the precautions to be taken in connection with such handling;

(z zc) providing for the work in connection with cleaning, chipping, painting, operations and precautions to be taken in connection with such work;

(zzd) providing for the employment of persons for handling cargo, handling appliances, power operated hatch covers or other power operated ship's equipment, such as, door in the hull of a ship, ramp, retractable car deck or similar equipment or to give signals to the drivers of such machinery;

(zze) providing for the transport of dock workers;

(zzf) providing for the precautions to be taken to protect dock workers against harmful effects of excessive noise, vibrations and air pollution at the workplace;

(zzg) providing for protective equipment or protective clothing;

(zzh) providing for the sanitary, washing and welfare facilities;

(zzi) providing for—

(i) the medical supervision;

(ii) the ambulance rooms, first aid and rescue facilities and arrangements for the removal of dock workers to the nearest place of treatment;

(iii) the safety and health organisation; and

(iv) the training of dock workers and for the obligations and rights of the dock workers for their safety and health at the workplace;

(zzj) providing for the investigation of occupational accidents, dangerous occurrences and diseases, specifying such diseases and the forms of notices, the persons and authorities to whom, they are to be furnished, the particulars to be contained in them and the time within which they are to be submitted;

(zzk) providing for the submission of statement of accidents, man-days lost, volume of cargo handled and particulars of dock workers; and

(zzl) any other matter which is required to be or may be specified by regulation.

Prior
publication of
rules, etc.

137. The power to make rules, regulations, and bye-laws under this Code shall be subject to the condition of the previous publication of the same being made, in the following manner, namely:—

(a) the date to be specified after a draft of rule, regulation, and bye-laws proposed to be made will be taken under consideration, shall not be less than forty-five days from the date on which the draft of the proposed rule, regulation and bye-laws is published for general information;

(b) rule, regulation and bye-laws shall be published in the Official Gazette and on such publication, shall have effect as if enacted in this Code.

Power to
make
regulation
without
previous
publication.

138. Notwithstanding anything contained in section 137, regulations under section 136 may be made without previous publication and without reference to the National Occupational Safety Health Advisory Board constituted under sub-section (1) of section 16, if the Central Government is satisfied that for the prevention of apprehended danger or the speedy remedy of conditions likely to cause danger and to avoid delay it is necessary to dispense with from such publication and reference.

Bye-laws

139. (1) The employer of a mine may, and shall, if called upon to do so by the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator, frame and submit to the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator a draft of such bye-laws, not being inconsistent with this Code or any rules or regulations or standards for the time being in force, governing the use of any particular machinery, or the adoption of a particular method of working in the mine, as the employer may deem necessary to prevent accidents and provide for the safety, convenience and discipline of the persons employed in the mine.

(2) If any such employer—

(a) fails to submit within two months a draft of bye-laws after being called upon to do so by the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator; or

(b) submits a draft of bye-laws which is not in the opinion of the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator sufficient, the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator may—

(i) propose a draft of such bye-laws as appear to him to be sufficient; or

(ii) propose such amendments in any draft submitted to him by the employer as will, in his opinion, render it sufficient, and shall send such draft bye-laws or draft amendments to the employer for consideration.

(3) If within a period of two months from the date on which any draft bye-laws or draft amendments are sent by the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator to the employer under the provisions of sub-section (2), the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator and the employer are unable to agree as to the terms of the bye-laws to be made under sub-section (1), the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator shall refer the draft bye-laws for settlement to the technical committee constituted under sub-section (5) of section 16 in respect of mines.

(4) When such draft bye-laws have been agreed to by the employer and the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator, or, when they are unable to agree, have been settled by the technical Committee constituted under sub-section (5) of section 16 in respect of mines, a copy of the draft bye-laws shall be sent by the Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator to the Central Government for approval:

Provided that the Central Government may make such modification of the draft bye-laws as it thinks fit:

Provided further that before the Central Government approves the draft bye-laws, whether with or without modifications, there shall be published, in such manner as the Central Government may think best adapted for informing the persons affected, a notice of the proposal to make the bye-laws and of the place where copies of the draft bye-laws may be obtained, and of the time (which shall not be less than thirty days) within which any objections with reference to the draft bye-laws, made by or on behalf of persons affected should be sent to the Central Government.

(5) Every objection under second proviso to sub-section (4) shall be in writing and shall state—

(i) the specific grounds of objections, and

(ii) the omissions, additions or modifications asked for.

(6) The Central Government shall consider any objection made within the required time by or on behalf of persons appearing to it to be affected, and may approve the bye-laws either in the form in which they were published or after making such amendments thereto as it thinks fit.

(7) The employer shall cause a copy of the bye-laws, in English and in such other language or languages as may be prescribed by the Central Government, to be pasted up in some conspicuous place at or near the mine, where the bye-laws may be conveniently read or seen by the persons employed; and, as and when the same become defaced, obliterated or destroyed, shall cause them to be pasted again.

(8) The Central Government may, by order in writing rescind, in whole or in part, any bye-law so made, and thereupon such bye-law shall cease to have effect accordingly.

Powers to
regulate
general safety
and health.

140. Notwithstanding any law for the time being in force, the Central Government may make rules to regulate general safety and health of the persons residing in whole or part of India, in the event of declaration of an epidemic, pandemic or disaster, for such period as may be notified by the Central Government.

Laying of
regulations,
rules, bye-
laws, etc.,
before
Parliament.

141. Every rule, regulation, standard and bye-laws notified or made by the Central Government under this Code shall be laid, as soon as may be after it is notified or made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised in one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule, regulation, standard or bye-law or both Houses agree that the rule, regulation, standard or bye-law should not be made, the rule, regulation, standard or bye-law shall thereafter have effect only in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule, regulation, standard or bye-law, as the case may be.

Laying of
rules made by
State
Government.

142. Every rule made by the State Government under this Code shall be laid, as soon as may be, after it is made, before the State Legislature.

Repeal and
Savings.

143. (1) The following enactments shall stand repealed on and from the dates the notification referred to in sub-section (2) of section 1 is issued, namely:—

(a) The Factories Act, 1948;	63 of 1948
(b) The Plantations Labour Act, 1951;	69 of 1951
(c) The Mines Act, 1952;	35 of 1952
(d) The Working Journalists and other Newspaper Employees (Conditions of Service) and Miscellaneous Provisions Act, 1955;	45 of 1955
(e) The Working Journalists (Fixation of Rates of Wages) Act, 1958;	29 of 1958
(f) The Motor Transport Workers Act, 1961;	27 of 1961
(g) The Beedi and Cigar Workers (Conditions of Employment) Act, 1966;	32 of 1966
(h) The Contract Labour (Regulation and Abolition) Act, 1970;	37 of 1970
(i) The Sales Promotion Employees (Conditions of Service) Act, 1976;	11 of 1976
(j) The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979;	30 of 1979
(k) The Cine-Workers and Cinema Theatre Workers (Regulation of Employment) Act, 1981;	50 of 1981
(l) The Dock Workers (Safety, Health and Welfare) Act, 1986;	54 of 1986
(m) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.	27 of 1996

(2) Every Chief Inspector, Additional Chief Inspector, Joint Chief Inspector, Deputy Chief Inspector, Inspector and every other officer appointed for the purposes under any of the provisions of the enactments repealed by this Code, shall be deemed to have been appointed under this Code for such purposes under this Code.

(3) Notwithstanding repeal under sub-section (1), anything done or any action taken under the enactments so repealed (including any rule, regulation, bye-laws, notification, nomination, appointment, order or direction made thereunder) shall be deemed to have been done or taken under the corresponding provisions of this Code and shall remain in force to the extent they are not contrary to the provisions of this Code till they are repealed by the Central Government.

10. of 1897. (4) Without prejudice to the provisions of sub-section (2), provisions of section 6 of the General Clauses Act, 1897 shall apply to the repeal of such enactments.

THE FIRST SCHEDULE

[See section 2(a)]

List of Industries involving hazardous processes:

1. Ferrous Metallurgical Industries

- Integrated Iron and Steel
- Ferro-alloys
- Special Steels.

2. Non-ferrous metallurgical Industries

— Primary Metallurgical Industries, namely, zinc, lead, copper, manganese and aluminium.

3. Foundries (ferrous and non-ferrous)

— Castings and forgings including cleaning or smoothening/roughening by sand and shot blasting.

4. Coal (including coke) industries

- Coal, Lignite, Coke and like other substances
- Fuel Gases (including Coal Gas, Producer Gas, Water Gas).

5. Power Generating Industries.

6. Pulp and paper (including paper products) industries.

7. Fertiliser Industries

- Nitrogenous
- Phosphatic
- Mixed.

8. Cement Industries

— Portland Cement (including slag cement, puzzolona cement and their products).

9. Petroleum Industries

- Oil Refining
- Lubricating Oils and Greases.

10. Petro-chemical Industries.

11. Drugs and Pharmaceutical Industries

— Narcotics, Drugs and Pharmaceuticals.

12. Fermentation Industries (Distilleries and Breweries).

13. Rubber (Synthetic) Industries.

14. Paints and Pigment Industries.

15. Leather Tanning Industries.

16. Electro-plating Industries.

17. Chemical Industries.

(a) Coke Oven by-products and Coaltar Distillation products:

(b) Industrial Gases (nitrogen, oxygen, acetylene, argon, carbon dioxide, hydrogen, sulphur dioxide, nitrous oxide, halogenated hydrocarbon, ozone, or any like gases);

(c) Industrial Carbon;

(d) Alkalies and Acids;

(e) Chromates and dichromates;

(f) Lead and its compounds;

(g) Electrochemicals (metallic sodium, potassium and magnesium, chlorates, perchlorates and peroxides);

(h) Electrothermal products (artificial abrasive, calcium carbide);

(i) Nitrogenous compounds (cyanides, cyanamides and other nitrogenous compounds);

(j) Phosphorous and its compounds;

(k) Halogens and Halogenated compounds (Chlorine, Fluorine, Bromine and Iodine);

(l) Explosives (including industrial explosives and detonators and fuses).

18. Insecticides, Fungicides, Herbicides and other Pesticides Industries.

19. Synthetic Resin and plastics.

20. Man made Fibre (Cellulosic and non-cellulosic) industry.

21. Manufacture and repair of electrical accumulators.

22. Glass and Ceramics.

23. Grinding or glazing of metals.

24. Manufacture, handling and processing of asbestos and its products.

25. Extraction of oils and fats from vegetable and animal sources.

26. Manufacture, handling and use of benzene and substances containing benzene.

27. Manufacturing processes and operations involving carbon disulphide.

28. Dyes and Dyestuff including their intermediates.

29. Highly flammable liquids and gases.

30. Printing and dyeing on fabrics in textiles and plywood and laminate manufacturing process.

31. Process involving usage of radium or Radioactive Substances.

32. Stone Crushing industry.

33. Extraction of Oil and Raw material from the scrap tyres.

34. Cigarette manufacturing industry.

35. Ship breaking industry.

36. Hazardous waste and e-waste processing plants.

37. Semiconductor manufacturing industry.

38. Styrene manufacturing, handling and processing industry.

39. Nano-particles utilising industry.

40. Manufacturing, processing, preparation and utilisation of Mercury or Compounds of Mercury, Lead Tetra-ethyl, Manganese, Arsenic, Chrome, Aliphatic series, Beryllium, Phosgene and Isocyanates.

THE SECOND SCHEDULE

[See section 18(2)(f)]

List of matters:

- (1) fencing of machinery;
- (2) work on or near machinery in motion;
- (3) employment of adolescents on dangerous machines;
- (4) striking gear and devices for cutting off power;
- (5) self acting machines;
- (6) casing of new machinery;
- (7) prohibition of employment of women, children and adolescent near cotton openers;
- (8) hoists and lifts;
- (9) lifting machines, chains, ropes and lifting tackles;
- (10) revolving machinery;
- (11) pressure plant;
- (12) floors, stairs and means of access;
- (13) pits, sumps, openings in floors and other similar indentation of area;
- (14) safety officers;
- (15) protection of eyes;
- (16) precautions against dangerous fumes, gases, etc.;
- (17) precautions regarding the use of portable electric light;
- (18) explosive or inflammable dust, gas, and other like dusts or gases;
- (19) safety committee;
- (20) power to require specifications of defective parts or tests of stability;
- (21) safety of buildings and machinery;
- (22) maintenance of buildings;
- (23) prohibition in certain cases of danger;
- (24) notice in respect of accidents;
- (25) court of inquiry in case of accidents;
- (26) safety management in plantation;
- (27) the general requirement relating to the construction, equipments and maintenance for the safety of working places on shore, ship, dock, structure and other places at which any dock work is carried on;
- (28) the safety of any regular approaches over a dock, wharf, quay or other places which dock worker have to use for going for work and for fencing of such places and projects;
- (29) the efficient lighting of all areas of dock, ship, any other vessel, dock structure or working places where any dock work is carried on and of all approaches to such places to which dock workers are required to go in the course of their employment;

(30) adequate ventilation and suitable temperature in every building or an enclosure on ship where dock workers are employed;

(31) the fire and explosion preventions and protection;

(32) safe means of access to ships, holds, stagings, equipment, appliances and other working places;

(33) the construction, maintenance and use of lifting and other cargo handling appliances and services, such as, pellets containing or supporting loads and provision of safety appliances on them, if necessary;

(34) the safety of workers employed in freight container terminals of other terminals for handling unitized cargo;

(35) the fencing of machinery, live electrical conductors, steam pipes and hazardous openings;

(36) the construction, maintenance and use of staging;

(37) the rigging and use of ship's derricks;

(38) the testing, examination, inspection and certification as appropriate of loose gears including chains and ropes and of slings and other lifting devices used in the dock work;

(39) the precautions to be taken to facilitate escape of workers when employed in a hold, bin, hopper or the like or between decks of a hold while handling coal or other bulk cargo;

(40) the measures to be taken in order to prevent dangerous methods of working in the stacking, unstacking, stowing and unstowing of cargo or handling in connection therewith;

(41) the handling of dangerous substances and working, in dangerous or harmful environments and the precautions to be taken in connection with such handling;

(42) the work in connection with cleaning, chipping, painting, operations and precautions to be taken in connection with such work;

(43) the employment of persons for handling cargo, handling appliances, power operated batch covers or other power operated ship's equipment such as, door in the hull of a ship, ramp, retractable car deck or similar equipment or to give signals to the drivers of such machinery;

(44) the transport of dock workers;

(45) the precautions to be taken to protect dock workers against harmful effects of excessive noise, vibration and air pollution at the work place;

(46) protective equipment and protective clothing;

(47) the sanitary, washing and welfare facilities;

(48) the medical supervision;

(49) the ambulance rooms, first aid and rescue facilities and arrangements for the removal of dock workers to the nearest place of treatment;

(50) the investigation of occupational accidents, dangerous occurrences and diseases, specifying such diseases and the forms of notices, the persons and authorities to whom, they are to be furnished, the particulars to be contained in them and the time within which they are to be submitted;

(51) the submission of statement of accidents, man-days lost, volume of cargo handled and particulars of dock workers.

(52) the safe means of access to, and the safety of, any working place, including the provision of suitable and sufficient scaffolding at various stages when work cannot be safely done from the ground or from any part of a building or from a ladder or such other means of support;

(53) the precautions to be taken in connection with the demolition of the whole or any substantial part of a building or other structure under the supervision of a competent person for the avoidance of danger from collapse of any building or other structure while removing any part of the framed building or other structure by shoring or otherwise;

(54) the handling or use of explosive under the control of competent persons so that there is no exposure to the risk of injury from explosion or from flying material;

(55) the erection, installation, use and maintenance of transporting equipment, such as locomotives, trucks, wagons and other vehicles and trailers and appointment of competent persons to drive or operate such equipment;

(56) the erection, installation, use and maintenance of hoists, lifting appliances and lifting gear including periodical testing and examination and heat treatment where necessary, precautions to be taken while raising or lowering loads, restrictions on carriage of persons and appointment of competent persons on hoists or other lifting appliances;

(57) the adequate and suitable lighting of every workplace and approach thereto, of every place where raising or lowering operations with the use of hoists, lifting appliances or lifting gears are in progress and of all openings dangerous to building workers employed;

(58) the precautions to be taken to prevent inhalation of dust, fumes, gases or vapours during any grinding, cleaning, spraying or manipulation of any material and steps to be taken to secure and maintain adequate ventilation of every working place or confined space;

(59) the measures to be taken during stacking or unstacking, stowing or unstowing of materials or goods or handling in connection therewith;

(60) the safeguarding of machinery including the fencing of every fly-wheel and every moving part of prime mover and every part of transmission or other machinery, unless it is in such a position or of such construction as to be safe to every worker working only of the operations and as if it were securely fenced;

(61) the safe handling and use of plant, including tools and equipment operated by compressed air;

(62) the precaution to be taken in case of fire;

(63) the limits of weight to be lifted or moved by workers;

(64) the safe transport of workers to or from any workplace by water and provision of means for rescue from drowning;

(65) the steps to be taken to prevent danger to workers from live electric wires or apparatus including electrical machinery and tools and from overhead wires;

(66) the keeping of safety nets, safety sheets and safety belts where the special nature or the circumstances of work render them necessary for the safety of the workers;

(67) the standards to be complied with regard to scaffolding, ladders and stairs, lifting appliances, ropes, chains and accessories, earth moving equipment and floating operational equipments;

(68) the precautions to be taken with regard to pile driving, concrete work, work with hot asphalt, tar or other similar things, insulation work, demolition operations, excavation, underground construction and handling materials;

(69) the safety policy, that is to say, a policy relating to steps to be taken to ensure the safety and health of the building workers, the administrative arrangements therefore and the

matters connected therewith, to be framed by the employers and contractors for tile operations to be carried on in a building or other construction work;

(70) emergency standards for enforcement of suitable standards in respect of hazardous processes in a factory;

(71) the maximum permissible threshold limits of exposure of chemical and toxic substances in manufacturing processes (whether hazardous or otherwise) in any factory;

(72) lightning; and

(73) any other matter which the Central Government considers under the circumstance for better working condition for safety at the workplace.

THE THIRD SCHEDULE

[See section 12(1)]

List of Notifiable Diseases:

1. Lead poisoning, including poisoning by any preparation or compound of lead or their sequelae.
2. Lead-tetra-ethyle poisoning.
3. Phosphorus poisoning or its sequelae.
4. Mercury poisoning or its sequelae.
5. Manganese poisoning or its sequelae.
6. Arsenic poisoning or its sequelae.
7. Poisoning by nitrous fumes.
8. Carbon bisulphide poisoning.
9. Benzene poisoning, including poisoning by any of its homologues, their nitro or amido derivatives or its sequelae.
10. Chrome ulceration or its sequelae.
11. Anthrax.
12. Silicosis.
13. Poisoning by halogens or halogen derivatives of the hydrocarbons of the aliphatic series.
14. Pathological manifestations due to—
 - (a) radium or other radio-active substances;
 - (b) X-rays.
15. Primary epitheliomatous cancer of the skin.
16. Toxic anaemia.
17. Toxic jaundice due to poisonous substances.
18. Oil acne or dermatitis due to mineral oils and compounds containing mineral oil base.
19. Byssionosis.
20. Asbestosis.
21. Occupational or contact dermatitis caused by direct contact with chemicals and paints. These are of two types, that is, primary irritants and allergic sensitizers.
22. Noise induced hearing loss (exposure to high noise levels).
23. Beryllium poisoning.
24. Carbon monoxide poisoning.

25. Coal miners' pneumoconiosis.
 26. Phosgene poisoning.
 27. Occupational cancer.
 28. Isocyanates poisoning.
 29. Toxic nephritis.
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DR. G. NARAYANARAJU,
Secretary to the Govt. of India.



NATIONAL DISASTER MANAGEMENT GUIDELINES

CHEMICAL DISASTERS



April 2007



NATIONAL DISASTER MANAGEMENT AUTHORITY
GOVERNMENT OF INDIA

National Disaster Management Guidelines

Chemical Disasters (Industrial)

National Disaster Management Guidelines

Chemical Disasters (Industrial)



National Disaster Management Authority
Government of India

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Vice Chairman
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FOREWORD

Preparation of guidelines for various types of disasters forms an important part of the mandate of the National Disaster Management Authority (NDMA). Chemical Disaster (Industrial) is one such high priority subject, as it can be a highly traumatic event. At times, it can result in irreparable damage to the environment; both biotic and abiotic, and also cause fatality to a large number of population. Consequently, the work on preparation of comprehensive guidelines on Chemical disasters was undertaken on priority over a year back.

Formulation of these guidelines has involved active participation and contributions of 275 experts, including stakeholders like representatives of central ministries and departments, regulatory agencies, research and development organisations, professionals from scientific and technical institutes/academies like the National Safety Council and various DM institutes and apex industrial associations/consortia of the corporate sector. Help and advice of the officials at the functional level were also taken to incorporate practical aspects of the functioning.

The work commenced with an Extended Group of approximately 60 experts, identifying 'the felt needs' and determining the critical objectives. A Core Group of 8 members, constituted out of this group, thereafter, prepared draft guidelines taking into account the operational, administrative, financial and legal aspects. These draft papers were reviewed extensively, a number of times by the Extended Group, and then finalized in a national workshop held at the Disaster Management Institute, Bhopal.

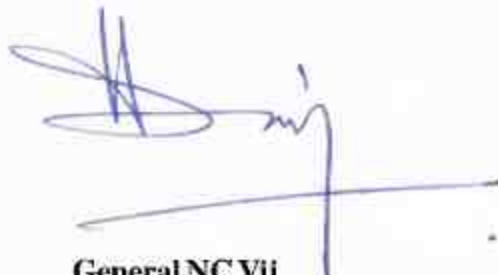
The underlying philosophy of these guidelines is to build on existing structures and mechanisms. The 'National Disaster Management Guidelines—Chemical Disasters' document calls for a proactive, participatory, well-structured, fail-safe, multi-disciplinary and multi-sectoral approach involving all stakeholder groups, aimed at refining and strengthening the national mechanisms in this field, from stages of planning to field operations. These guidelines contain all the details that are required by the planners and implementers and will help in the preparation of plans by the central ministries/departments and the states.

I take this opportunity to express my deep appreciation of the commitment of various stakeholder groups who extended their willing support and cooperation to our efforts. I am grateful to the members of the Core Group, who put in endless hours of work. I also wish to convey my gratitude to the members of the NDMA, Extended Group, and other experts whose contributions have resulted into the preparation

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of these guidelines. I would also like to commend the significant contributions made by the Ministry of Environment and Forests, the National Safety Council, Mumbai and the Disaster Management Institute, Bhopal in preparation of these guidelines. And finally, I am pleased to place on record my sincere appreciation for Lt Gen (Dr.) J.R. Bhardwaj, PVSM, AVSM, VSM, PHS (Retd), Member, NDMA, who guided and coordinated the entire exercise.

New Delhi
30 April 2007



General NC Vij
PVSM, UYSM, AVSM (Retd)



Member
National Disaster Management Authority
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I would also like to express my sincere thanks to the representatives of the other central ministries and departments concerned, regulatory agencies, R&D organisations, professionals from scientific and technical institutes/academics, technocrats from leading national institutions and apex industrial associations/consortiums of the corporate sectors for the valuable inputs that helped us in improving the content and presentation of the document.

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Finally, I would like to express my gratitude to General N.C. Vij, PVSM, UYSM, AVSM (Retd), Vice Chairman, NDMA and all Members of the NDMA for their constructive criticism and suggestions that guided us in formulating these guidelines.

New Delhi
30 April 2007

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Abbreviations

ADPC	Asian Disaster Preparedness Centre
AERB	Atomic Energy Regulatory Board
AMAI	Alkali Manufacturers Association of India
APELL	Awareness and Preparedness for Emergencies at Local Level
ASME	American Society of Mechanical Engineers
ASSOCHAM	Associated Chambers of Commerce and Industry
BIS	Bureau of Indian Standards
BLEVE	Boiling Liquid Expanding Vapour Explosion
CA (EPPR) Rules	Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996
CAS	Crisis Alert System
CCG	Central Crisis Group
CCR	Central Control Room
CDM	Chemical Disaster Management
CETP	Common Effluent Treatment Plant
CFEES	Centre for Fire, Explosive and Environment Safety
CIF	Chief Inspector of Factories
CII	Confederation of Indian Industry
CIR	Community Information Representative
CLI	Central Labour Institute
CMVR	Central Motor Vehicles Rules
CPAP	Continuous Positive Air Pressure
CPCB	Central Pollution Control Board
CRR	Community Response Representative
CSIR	Council of Scientific and Industrial Research
DAE	Department of Atomic Energy
DCG	District Crisis Group
DCR	District Control Room
DCS	Distributed Control System
DDMA	District Disaster Management Authority
DDMAP	District Disaster Management Action Plans
DEA	Department of Economic Affairs
DGFASLI	Directorate General Factory Advice Service and Labour Institutes
DGFT	Director General Foreign Trade
DISH	Directorate of Industrial Safety and Health
DM	Disaster Management
DMI	Disaster Management Institute
DMIS	Disaster Management Information System
DMP	Disaster Management Plan
DRDO	Defence Research and Development Organisation

DRM	Disaster Risk Management
DTIE	Division of Technology, Industry & Economics
EIA	Environment Impact Assessment
EIP	Emergency Information Panel
EMP	Emergency Management Plan
ENVIS	Environmental Information Systems
EOC	Emergency Operations Centre
ERC	Emergency Response Centre
ERF	Environment Relief Fund
ERRIS	Environment Risk Reporting and Information Systems
ESIC	Employee State Insurance Corporation
FE	Functional Exercise
FICCI	Federation of Indian Chambers of Commerce and Industry
FSD	Full-Scale Drill
GIDC	Gujarat Industrial Development Corporation
GIS	Geographic Information System
GPS	Global Positioning System
HAZAN	Hazard Analysis
HAZCHEM	Hazardous Chemical
HAZMAT	Hazardous Material
HAZOP	Hazard and Operability Study
HPC	High Powered Committee
HPCL	Hindustan Petroleum Corporation Ltd
HSE	Health, Safety and Environment
IATA	International Air Transport Association
ICA	Indian Chemical Association
ICAO	International Civil Aviation Organization
ICC	Indian Chamber of Commerce
ICMA	Indian Chemical Manufacturers' Association (now called Indian Chemical Council)
ICMR	Indian Council of Medical Research
ICSC	International Chemical Safety Cards
IDLH	Immediately Dangerous to Life and Health
IDRN	India Disaster Resource Network
IICT	Indian Institute of Chemical Technology
IIM	Indian Institute of Management
IIT	Indian Institute of Technology
ILO	International Labour Organization
IMO	International Maritime Organization
IPCL	Indian Petrochemicals Corporation Limited
IPCS	International Programme on Chemical Safety
IRPTC	International Register for Potentially Toxic Chemicals
IS	Indian Standards
ISDR	International Strategy for Disaster Reduction
ITRC	Industrial Toxicology Research Centre

LAMP	Local Accident Mitigation and Prevention
LCG	Local Crisis Group
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MAH Unit	Major Accident Hazard Unit
MAHC	Major Accident Hazard Control
MAHCAD	Major Accident Hazard Control Advisory Division
MARG	Mutual Aid Response Group
MARPOL	Maritime Pollution
MFR	Medical First Responders
MHA	Ministry of Home Affairs
MIS	Management Information System
MoA	Ministry of Agriculture
MoC & F	Ministry of Chemicals and Fertilizers
MoC & I	Ministry of Commerce and Industry
MoD	Ministry of Defence
MoEF	Ministry of Environment & Forests
MoF	Ministry of Finance
MoH & FW	Ministry of Health and Family Welfare
MoHI & PE	Ministry of Heavy Industries and Public Enterprises
MoLE	Ministry of Labour and Employment
MoP & NG	Ministry of Petroleum and Natural Gas
MoSRT & H	Ministry of Shipping, Road Transport and Highways
MSDS	Material Safety Data Sheet
MSIHC Rules	The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
NAC	National APELL Centre
NCDC	National Civil Defence College
NCL	National Chemical Laboratory
NCT	National Capital Territory
NDMA	National Disaster Management Authority
NDRF	National Disaster Response Force
NEC	National Executive Committee
NEERI	National Environmental Engineering Research Institute
NFSC	National Fire Service College
NGOs	Non-Governmental Organizations
NHAI	National Highway Authority of India
NICNET	National Informatics Centre Network
NIDM	National Institute of Disaster Management
NIOH	National Institute of Occupational Health
NOCs	No Objection Certificates
NSC	National Safety Council
OISD	Oil Industry Safety Directorate
PCC	Pollution Control Committee
PESO	Petroleum and Explosives Safety Organisation

PM	Preventive Maintenance
PMS	Pipeline Management System
PPE	Personal Protective Equipment
PPP	Public Private Partnership
PVOs	Private Voluntary Organisations
PWD	Public Works Department
QCI	Quality Council of India
QRMT	Quick Reaction Medical Team
QRT	Quick Reaction Team
QSP	Quick Start Programme
RC	Responsible Care
R&D	Research and Development
RLI	Regional Labour Institute
RTO	Regional Transport Officer
SAICM	Strategic Approach to International Chemical Management
SCG	State Crisis Group
SDMA	State Disaster Management Authority
SDRF	State Disaster Response Force
SEC	State Executive Committee
SMEs	Small and Medium Enterprises
SOLAS	Safety of Life at Sea
SOPs	Standing Operating Procedures
SPCB	State Pollution Control Board
STEL	Short Term Exposure Limit
TOR	Terms of Reference
TQ	Threshold Quantity
TREMCARD	Transport Emergency Card
TTE	Table Top Exercise
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
USAID	United States Agency for International Development
UTs	Union Territories
WAD	Waste Air Destruction
WEC	World Environment Centre
WHO	World Health Organization

Executive Summary

Background

The growth of chemical industries has led to an increase in the risk of occurrence of incidents associated with hazardous chemicals (HAZCHEM). A chemical industry that incorporates the best principles of safety, can largely prevent such incidents. Common causes for chemical accidents are deficiencies in safety management systems and human errors, or they may occur as a consequence of natural calamities or sabotage activities. Chemical accidents result in fire, explosion and/or toxic release. The nature of chemical agents and their concentration during exposure ultimately decides the toxicity and damaging effects on living organisms in the form of symptoms and signs like irreversible pain, suffering, and death. Meteorological conditions such as wind speed, wind direction, height of inversion layer, stability class, etc., also play an important role by affecting the dispersion pattern of toxic gas clouds. The Bhopal Gas tragedy of 1984—the worst chemical disaster in history, where over 2000 people died due to the accidental release of the toxic gas Methyl Isocyanate, is still fresh in our memories. Such accidents are significant in terms of injuries, pain, suffering, loss of lives, damage to property and environment. A small accident occurring at the local level may be a prior warning signal for an impending disaster. Chemical disasters, though low in frequency, have the potential to cause significant immediate or long-term damage.

A critical analysis of the lessons learnt from major chemical accidents exhibited various deficiencies. Laxity towards safety measures, non-conformation to techno-legal regimes and a low

level of public consultation are a few such shortcomings. The scenario called for concerted and sustained efforts for effective risk reduction strategies and capacity development under a national authority to decrease the occurrence of such incidents and lessen their impact. Although tremendous efforts have been made to minimise such accidents and to improve emergency preparedness at all levels, substantial efforts are still required to predict the occurrence of disasters, assess the damage potential, issue warnings, and to take other precautionary measures to mitigate their effects. Another pressing need is to properly assess the potential of chemical emergencies and develop tools for emergency planning and response to minimise the damage in case of any eventuality.

Risks Posed by HAZCHEM

Increased industrial activities and the risks associated with HAZCHEM and enhanced vulnerability lead to industrial and chemical accidents. Chemical accidents may originate in the manufacturing or formulation facility, or during the process operations at any stage of the product cycle, material handling, transportation and storage of HAZCHEM. Vulnerability is sometimes compounded due to the location of Major Accident Hazard (MAH) industries closer to densely populated areas. Chemical and industrial accidents generally occur due to technical failures that can be anticipated. The risk associated with them can thus be predicted and reduced effectively by identification of risk areas, risk assessment and designing pre-operative measures. The occurrence of chemical accidents and probability thereof, manifesting in a disaster, remain a cause of concern.

The Genesis of National Disaster Management Guidelines—Chemical Disasters

There has been a paradigm shift in the government's focus from its rescue, relief, and restoration-centric approach to a planning, prevention/mitigation and preparedness approach. It has been realised that effective Chemical Disaster Management (CDM) is possible by the adoption of preventive and mitigation strategies as most chemical disasters are preventable in comparison to natural disasters that are difficult to predict and prevent.

With this renewed emphasis, the National Disaster Management Authority (NDMA) took up the task of strengthening CDM in recognition of the gravity of the risk posed by HAZCHEM. The main stakeholders in the management of chemical disasters are Ministry of Environment and Forests (MoEF; the nodal ministry); Ministry of Home Affairs (MHA); Ministry of Health and Family Welfare (MoH & FW); Ministry of Labour and Employment (MoLE); Ministry of Agriculture (MoA); Ministry of Shipping, Road Transport and Highways (MoSRT & H); Ministry of Defence (MoD); Ministry of Chemicals and Fertilizers (MoC & F); Ministry of Petroleum and Natural Gas (MoP & NG); Department of Atomic Energy (DAE); state governments and Union Territories (UTs) and the chemical industries. As a first step, a meeting of the stakeholders including representatives of Research and Development (R&D) organisations, professionals from scientific and technical institutes, academics, technocrats from leading national institutions and apex industrial associations/consortiums of corporate sectors was convened on 17 February 2006, with a view to pool the knowledge in this multidisciplinary field. A core group of experts was constituted from amongst these participants. Several meetings of the core group were subsequently held and a draft document was evolved for bridging the gaps that

were identified. These deliberations acknowledged several initiatives taken up by the government and other stakeholders. The draft document was reviewed by a group of experts on 18 May 2006, for evolving a consensus among various stakeholders including the nodal ministry. Detailed inputs from MAH units and regulators were obtained during a meeting held during 7–8 September 2006, at Bhopal. The recommendations and action points that emerged out of these deliberations have resulted in the development of the National Guidelines for the Management of Chemical Disasters (hereinafter referred to as the Guidelines).

Structure of Guidelines

The present work is an important step in the direction of the development of plans for the management of chemical disasters. The Guidelines have been prepared to provide directions to ministries, departments and state authorities for the preparation of their detailed Disaster Management (DM) plans. These Guidelines call for a proactive, participatory, well-structured, fail-safe, multi-disciplinary and multi-sectoral approach at various levels.

The Guidelines consist of seven chapters; the details of which are as follows:

Chapter 1 provides an introductory brief of risks, vulnerabilities and consequences of chemical accidents; provides an account of causal factors of chemical disasters so as to restrict and contain them; and enlists major chemical accidents—their initiators, and impact on human lives and the environment. The aims and objectives of the Guidelines focus on all aspects of the DM cycle to assist the ministries and departments of the Government of India, state governments and other agencies to prepare DM plans.

Chapter 2 reviews the existing regulatory framework and practises. It furnishes an overview of the institutional framework with details of the monitoring mechanisms and compliance by central and state governments. It also provides an overview of the functioning of research institutes, autonomous bodies, professional institutes, Non-Governmental Organizations (NGOs) and MAH units, their compliance to statutory safeguards, and the efforts of the MoEF in setting up crisis management groups in industrial areas to ensure chemical safety. Various initiatives highlighting substantial work done in the area of emergency response and management systems in installations, storages and transport sectors are also illustrated. A bird's eye view of international best practises and developments within India is also given.

Chapter 3 gives an overview of the salient gaps identified in various aspects of the management of chemical accidents, transport accidents and medical emergencies.

The management of chemical disasters will aim at prevention and mitigation with the introduction of safer process technologies, improved performance of safety devices and reduction of human error. Immediate effects of a disaster can be mitigated through installing engineering systems like scrubbers, flares and venting systems. The various work areas and activities that can be undertaken within the framework of the Guidelines are described in chapters 4 to 6.

Chapter 4 includes comprehensive guidelines for a regulatory framework, code of practises, procedures and standards, testing and information, technical and technological information, preparedness including education, training, creation of appropriate infrastructure, capacity development, awareness generation, institutional framework, networking and communication, R&D, and response, relief and rehabilitation for CDM. The roles and responsibilities of various stakeholders at centre,

state and district levels are also described. The salient highlights include:

- Strengthening of the present regulatory framework to meet the defined national policies and aspirations; augmentation of technical support functions.
- A supportive and technology neutral regulation framework.
- Legislation on land-use policy (buffer zone around chemical industry).
- Standardisation of national codes and practises.
- Emphasis on regular safety audit, identification and selection of professional organisations and their accreditation.
- Commissioning and decommissioning of chemical industries.
- Preparation of On-Site and Off-Site Plans.
- Regular testing of emergency plans.
- Need of medical first responders and medical inventory to deal with specialised chemical accidents at the installation site.
- Crisis management plans of hospitals to manage the victims of chemical emergencies.
- Concept of mobile hospital and mobile teams.
- Issues related to public health response, medical rehabilitation and harmful effects on the environment.
- Post-disaster documentation and analysis.

Chapter 5 comprises comprehensive guidelines for installations and storages (including isolated storages of HAZCHEM) that contain good engineering practises for safety, accident reporting, investigation and analysis checklists and safety promotional activities as important tools for effective CDM.

Chapter 6 deals with guidelines related to chemical accidents during transportation of HAZCHEM. The areas covered include:

- Preparation of a highway DM plan.
- Modification of rules pertaining to transport emergencies.
- Specific roles and responsibilities of MAH units, transporters, drivers, authorities and aspects related to emergency communication systems and training of various stakeholders.
- The need for the development of an efficient pipeline management system.

Chapter 7 sets out the approach to implementation of the Guidelines and also highlights the key points for ensuring the implementation of the plans prepared by the central ministries, departments and states. The strategy to be adopted for the important activities to be included in the Action Plan are given below:

- Putting in place a national mechanism for covering all major disasters and reporting mechanisms at the district level.
- Dovetailing regulations governing HAZCHEM safety with the Disaster Management Act, 2005 (DM Act, 2005).
- Establishing a risk management framework criterion for chemical assessment.
- Strengthening of the institutional framework for CDM and its integration with the activities of the NDMA, State Disaster Management Authorities (SDMAs), District Disaster Management Authorities (DDMAs) and other stakeholders.
- Renewed focus on model safety codes/standards for prevention of accidents at industry level by matching processes and technologies for safety installations

comparable with the best available in the world.

- Identifying infrastructure needs for preparing mitigation plans.
- Implementing a financial strategy for the allocation of funds for different national and state/district level mitigation projects.
- Establishing an efficient information network for dissemination of alerts, warning and response messages.
- Identifying/recognising training institutions.
- Strengthening the National Disaster Response Force (NDRF), fire services, medical first responders and other emergency responders.
- Revamping of home guards and civil defence for CDM.
- Developing a national medical emergency plan binding all government, private and public hospitals with unified, well-established triage and other emergency procedures.
- Developing highway DM plans for all the identified stretches, nodal points, and Standard Operating Procedures (SOPs) integrated in the driver's kit.
- Establishing a register of relevant national and international institutes and information exchange programmes.
- Establishing post-disaster documentation procedures, epidemiological surveys and minimum criteria for relief and rehabilitation.
- Sensitising the community on chemical disasters.
- Sensitising all stakeholders, especially the management of MAH units for a more proactive role in prevention of chemical

accidents by instituting regular internal audits of plant safety measures, actuation of On-Site emergency plans and establishment of mutual aid arrangements.

The MoEF, as the nodal ministry, will prepare a detailed Action Plan in accordance with these Guidelines with specific tasks, activities, targets and timeframes that will also form a part of the national DM plan.

In view of the expected time lapse between the formulation and approval of the DM plan, an interim arrangement has also been suggested, highlighting the following features:

- Baseline information on hazard identification and risk assessment in chemical installations and pipelines.
- Incorporation of Geographic Information System (GIS) technology.
- Identification and incorporation of legislative and institutional framework for disaster preparedness with specific and measurable indicators.

- Risk mapping.
- Development and improvement of relevant databases including isolated storages and warehouses.
- Preparation of a National Response Plan.
- Pooling of resources available on transport routes of chemicals.
- Crisis Alert System (CAS) and continued training programmes.

The activities mentioned above will be initiated with immediate effect and will be further intensified in due course of time. An institutional framework for the management of chemical disasters will be set up at the national level, which will integrate and strengthen the existing institutional mechanisms on CDM. For efficient and coordinated management, the state governments will issue guidelines for the preparation of district and local level plans in accordance with these Guidelines. The objective is to evolve an attainable and practical approach for the management of chemical disasters in India with the participation of all stakeholders including local communities for On-Site and Off-Site emergencies.

Handling large quantities of HAZCHEM in installations, isolated storages, and during transportation, poses the grave risk of a sudden release of copious quantities of toxicants in the environment. There are about 1666 MAH units in India, handling a large number of chemicals as raw materials, in processes, products, and wastes, with flammable, explosive, corrosive, toxic and noxious properties. Any accident involving these may have an adverse impact on both the community and the environment.

Large quantities of chemicals are also stored/processed in industries that are located in densely populated areas. Inappropriate and haphazard construction and the lack of awareness and preparedness on the part of the community further enhance their vulnerability. The potential of heavy losses and adverse consequences on the environment due to a chemical accident calls for further improvement of safety measures in all processes/procedures and the adoption of appropriate methods for handling HAZCHEMs.

The Bhopal Gas Disaster in December 1984 brought into sharp focus the unprecedented potential of HAZCHEM like Methyl Isocyanate in terms of loss of life, health, injury and the long-term effects on the population and environment. It created compelling evidence to approach DM and chemical safety holistically. The era of restructuring with the induction of new HAZCHEM control systems and procedures all over the world in the wake of the Bhopal disaster also resulted in the strengthening of institutional mechanisms at local,

district, state and central levels for the management of chemical disasters in India. The consolidation of these institutional mechanisms and the mobilisation of corporate support for the preparation and implementation of emergency plans is an integral part of these Guidelines.

1.1 Sources of Chemical Disasters

Chemical accidents may originate in:

- i) Manufacturing and formulation installations including during commissioning and process operations; maintenance and disposal.
- ii) Material handling and storage in manufacturing facilities, and isolated storages; warehouses and godowns including tank farms in ports and docks and fuel depots.
- iii) Transportation (road, rail, air, water, and pipelines).

1.2 Causative Factors Leading to Chemical Disasters

Chemical disasters, in general, may result from:

- i) Fire.
- ii) Explosion.
- iii) Toxic release.
- iv) Poisoning.
- v) Combinations of the above.

Chemical disasters may occur due to process deviations concerning the chemistry of the process, pressure, temperature and other identified parameters with regard to the state of the substance i.e., solid, liquid or gas, proximity to other toxic substances and the probability of a runaway reaction due to the incidental mixing of two or more HAZCHEMs with dissimilar properties. In addition, it may be due to hardware failure, resulting in large-scale spills of toxic substances (in any form) due to loss of containment, or an explosion. Further, Boiling Liquid Expanding Vapour Explosion (BLEVE) may occur due to sparks, shocks or frictional forces on the chemicals during transportation.

The effects can be further compounded by the micro-meteorology of the area, wind speed and direction, rate of precipitation, toxicity/quantity of chemical released, population in the reach of release, probability of formation of lethal mixtures (fuel-air or other mixtures) and other industrial activities being performed in closer vicinity.

It is very important to understand that the state of the chemical substance (solid, liquid or gas) contributes substantially to the gravity of the accident and affects control measures. Chemicals in solid form may have devastating effects if their properties are suddenly changed (e.g., sublimation) due to pressure and temperature conditions to which they are accidentally exposed. If solids continue to remain in solid form, the damage will be negligible.

Any human/mechanical failure may cause large-scale spills of liquids or of compressed gases like chlorine or Liquid Petroleum Gas (LPG) which can cause BLEVE and can directly affect human lives and the environment. The release of compressed gases give rise to thermal and cryogenic stresses, which may also impact the surrounding structure or building, compounding the damage.

1.3 Initiators of Chemical Accidents

A number of factors including human errors could spark off chemical accidents with the potential to become chemical disasters. These are:

1.3.1 Process and Safety System Failures:

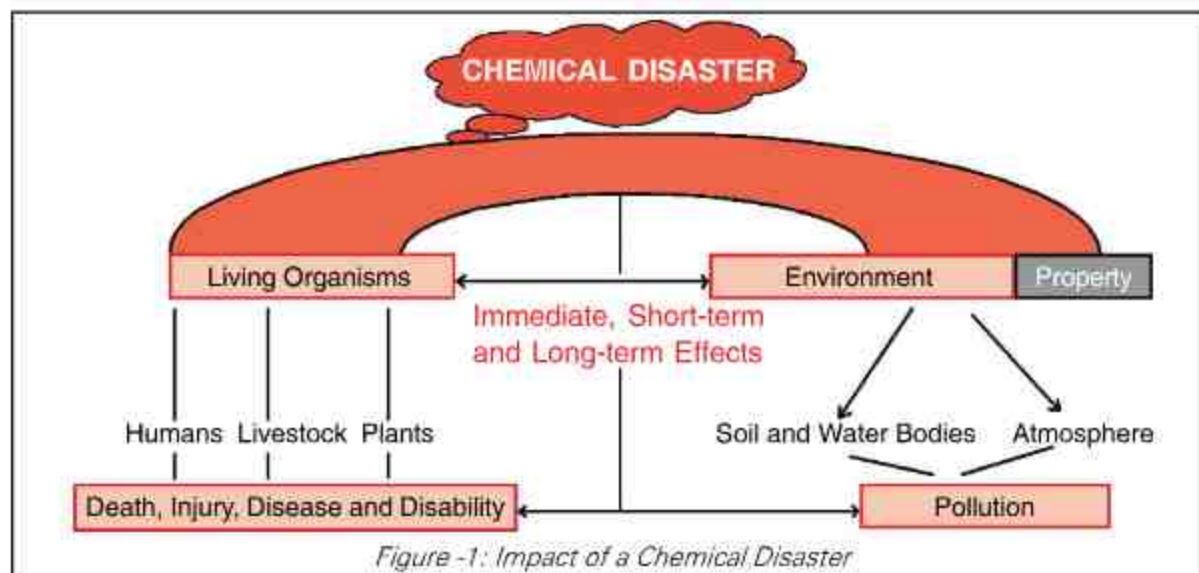
- i) **Technical errors:** design defects, fatigue, metal failure, corrosion etc.
- ii) **Human errors:** neglecting safety instructions, deviating from specified procedures etc.
- iii) **Lack of information:** absence of emergency warning procedures; non-disclosure of line of treatment etc.
- iv) **Organisational errors:** poor emergency planning and coordination, poor communication with public, non-compliance with mock drills/exercises etc., which are required for ensuring a state of quick response and preparedness.

1.3.2 Natural Calamities:

The Indian subcontinent is highly prone to natural disasters, which can also trigger chemical disasters. Damage to phosphoric acid sludge containment during the Orissa super cyclone in 1999 and the release of acrylonitrile at Kandla Port, during an earthquake in 2001, are some of the recent examples.

1.3.3 Terrorist Attacks/Sabotage:

Vulnerability to chemical disasters is further compounded by likely terrorist and warfare activities, which include sabotage and attack on HAZCHEM installations and transportation vehicles. This can occur at sources listed in para 1.1, anywhere, and at any time. Guidelines for the management of chemical warfare agents and chemical weapons of mass destruction will be issued separately.



1.4 Impact of Chemical Disasters

In addition to loss of life, the major consequences of chemical disasters include impact on livestock, flora/fauna, the environment (air, soil, water) and losses to industry as shown in Figure 1.

Chemical accidents may be categorised as a major accident or a disaster depending upon the number of casualties, injuries, damage to the property or environment. A major accident is defined in the Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989, issued under the Environment (Protection) Act, 1986, whereas 'disaster' is defined in the DM Act, 2005.

1.5 Major Chemical Accidents in India

Following the Bhopal Gas Disaster in 1984, major incidences of chemical disasters in India include a fire in an oil well in Andhra Pradesh (2003); a vapour cloud explosion in the Hindustan Petroleum Corporation Limited Refinery (HPCL), Vishakhapatnam (1997); and an explosion in the Indian Petrochemicals Corporation Limited (IPCL) Gas Cracker Complex, Nagothane, Maharashtra

(1990). Over 20 major chemical accidents have been reported in MAH units during 2002–06. Details of these accidents that involved chemicals like chlorine, ammonia, LPG and other HAZCHEMs are indicated in Annexure A.

1.6 Aims and Objectives of the Guidelines

The NDMA is mandated to issue guidelines to ministries/departments and states for preparing DM Plans for holistic and coordinated management of disasters. The Guidelines are intended to focus on all aspects of the DM cycle including prevention, mitigation, preparedness, relief, rehabilitation and recovery.

These Guidelines shall form the basis for the ministries and departments concerned, at the centre and state levels to evolve programmes and measures in their DM Plans. The approach followed shall emphasise chemical safety and risk reduction measures including technical and non-technical preparedness measures, be environment and technology friendly, sensitive to the special requirements of the vulnerable groups and communities, and address all stakeholders involved in the CDM. This is to be achieved through strict conformity with existing and new policies.

India is amongst the very few countries, which have enshrined the right to live in a clean and wholesome environment as a fundamental right. The Factories Act was enacted in 1948, for ensuring safety, health and welfare at the workplace. Recognising the need to mainstream environmental concerns in all developmental activities, a separate ministry—the MoEF—was created in 1980, and was declared as the nodal ministry for the management of chemical (industrial) disasters. CDM received greater emphasis the world over only after the Bhopal disaster in 1984.

activities as hazardous processes and introduced special provisions for hazardous process industries in its newly added Chapter IV A. Preparation of emergency plans, framing safety policies, constitution of safety committees to ensure workers' participation in safety and health management, notification of permissible exposure limits for harmful chemicals, and establishment of occupational health centres etc., were introduced by these amendments. The working details arising out of these amendments were issued to various state governments as model rules.

2.1 Regulatory Framework and Codes of Practises

The regulatory framework on chemical safety can be traced to the Factories Act, 1948 and chemical class-specific regulations like the Explosives Act, 1884; the Insecticide Act, 1968; and The Petroleum Act, 1934. Later, an umbrella Act, the Environment (Protection) Act, 1986, was enacted, which also deals with chemical management and safety. A number of regulations covering safety in transportation, insurance, liability and compensations were enacted thereafter. The Government of India has further reinforced the legal framework on chemical safety and management of chemical accidents by enacting new rules and by way of amendments to them (Annexure B).

The MoLE and its technical organ—the Directorate General Factory Advice Service and Labour Institutes (DGFASLI), amended the Factories Act, 1948, in 1987, notifying 29 types of industrial

A number of chemical specific codes of practises published by the Bureau of Indian Standards (BIS), the Oil Industry Safety Directorate (OISD) and guidelines brought out for chemical accident management by the MoEF are listed in Annexure C.

2.2 Institutional Framework and Compliance

2.2.1 Institutional Framework

The regulations referred to in para 2.1 above provide for institutional framework for enforcement and monitoring of chemical safety and emergency management. It involves various central/state ministries/departments viz. MHA, MoEF, MoLE, MoA, MoP & NG, MoC & E, MoSRT & H, Ministry of Commerce and Industry (MoC & I), Department of Economic Affairs (DEA), Ministry of Finance (MoF), and others (Figure 2).

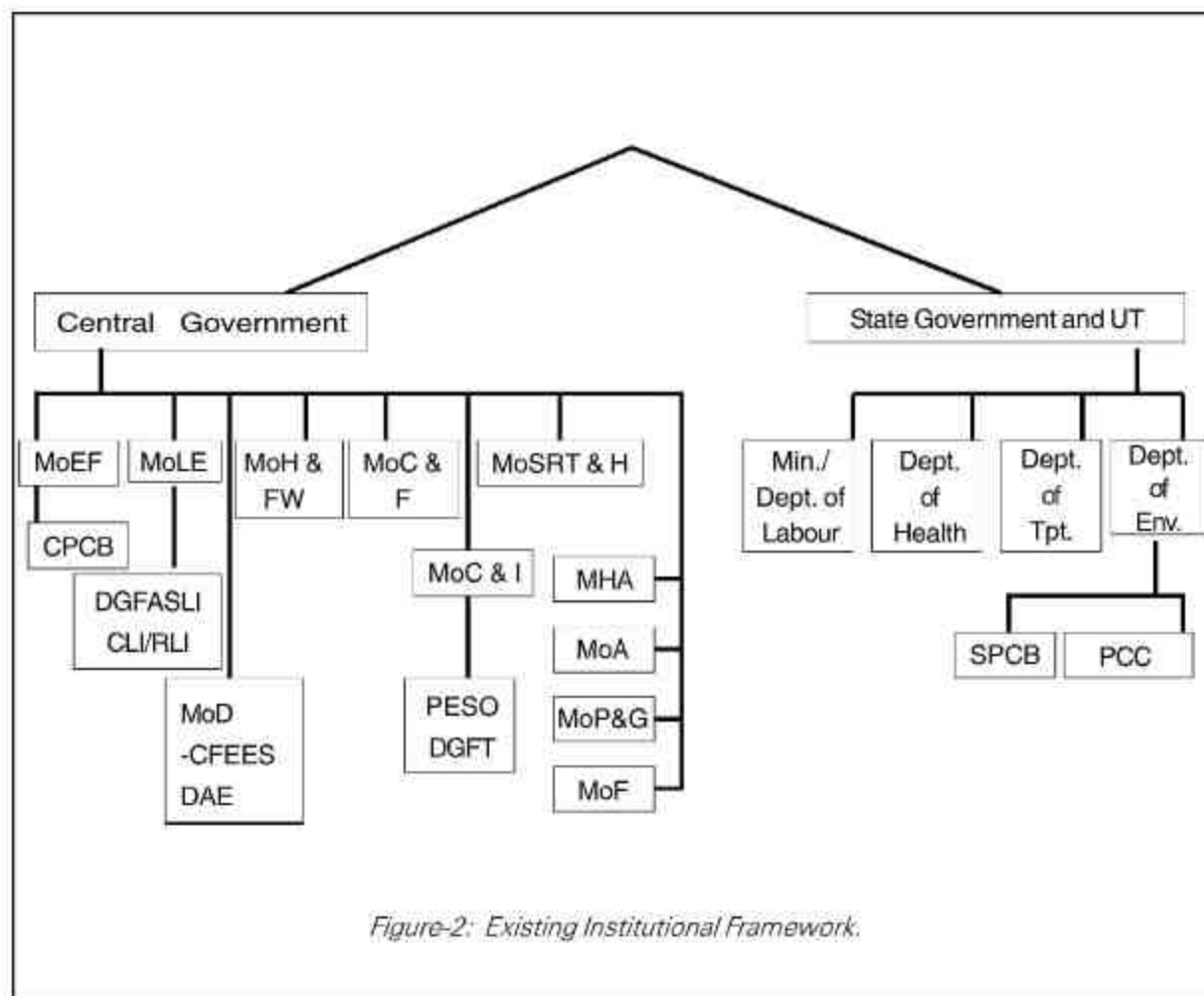


Figure-2: Existing Institutional Framework.

The MoLE, MoEF and MoSRT & H are responsible for enacting regulations. The MoLE through its state entities; the Inspectorate of Factories/Directorate of Industrial Safety and Health (DISH); the Central Pollution Control Board (CPCB) and the MoEF with its state entities, State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) of UTs monitors compliance of the various regulations. The MoLE is assisted in this regard by the DGFASLI and central/regional labour institutes. The MoSRT & H through the Department of Road, Transport and Highways is to ensure the development and maintenance of national highways.

On the other hand, the state governments through their respective state transport departments, transport commissioners/regional transport officers and Public Works Department (PWD) are responsible for the management of the roads and highways in the states.

With respect to petroleum products and explosives, the MoC & F through Department of Chemicals and Petrochemicals and Department of Fertilizers, MoP & NG, and Ministry of Heavy Industries and Public Enterprises (MoHI & PE) through the Petroleum and Explosives Safety Organization (PESO) monitor compliance of the regulations.

The MoH & FW through various hospitals responds to medical emergencies during chemical accidents. For prompt and effective medical response with requisite capacity building in emergency medical services, institutional linkages and statutory backups need to be urgently formalised.

Organisations/agencies like the DAE and Centre for Fire, Explosive and Environment Safety (CFEES) are responsible for preparing Off-Site emergency plans in the DAE and MoD respectively. The CFEES is an authority under the MSIHC Rules for enforcement of directions and procedures in respect of laboratories, industrial establishments and isolated storages dealing with HAZCHEMs in the MoD. Similarly, the DAE is responsible for nuclear installations.

Research institutes like the Indian Institute of Chemical Technology (IICT), Hyderabad; Industrial Toxicology Research Centre (ITRC), Lucknow; National Environmental Engineering Research Institute (NEERI), Nagpur; National Chemical Laboratory (NCL), Pune and National Institute of Occupational Health (NIOH), Ahmedabad, are working in the field of occupational hazard, safety and in aspects related to CDM. Defence Research Development Organisation (DRDO) is working on the field detection kits, personal protection equipment and measures for prophylaxis and therapy.

Limited facilities for the collection of environmental toxicants, released during a chemical disaster also exist in the Council of Scientific and Industrial Research (CSIR), the DRDO, and Indian Council of Medical Research (ICMR) laboratories, as well as in the CPCB, SPCBs, PCC, PESO and recognised laboratories in the private sector.

Autonomous bodies, professional institutes, Private Voluntary Organizations (PVOs) and NGOs play an important role in training and community

awareness and also can contribute significantly in response, rehabilitation and reconstruction efforts.

2.2.2 Compliance

Of the 602 districts in India, 263 districts have MAH units. Of them, 170 have clusters of more than five MAH units (hazardous/industrial pockets). As on date there are 1666 MAH units in India. In addition to these, there are a large number of storages of hazardous substances; big warehouses including local factories/storage sites, some of them presently existing in residential areas. On-Site emergency plans are in place for 1628 units. Off-Site emergency plans for 166 districts have been prepared. Twenty-six of them are based on hazard analysis studies undertaken at the initiative of the MoEF. Presently, a mock drill of the On-Site plan by occupiers of MAH units every six months is a statutory requirement. However, only a few mock drills of prepared Off-Site plans have been conducted.

The MoEF has set up a Central Crisis Group (CCG) and a coordination committee at the national level. Further, out of the 28 states and seven UTs, 20 states and three UTs have set up State Crisis Groups (SCG). Nineteen states with districts having MAH units, have set up District Crisis Groups (DCGs), while 17 of the states have also set up Local Crisis Groups (LCGs). Depending on the gravity of an accident, appropriate crisis groups at local, district, state and central levels are activated.

The MoEF has set up a Crisis Control Room (CCR) as part of the CAS, for the rapid exchange of information and for coordination of activities during an emergency. The MoEF is preparing a web-based accident information system for use of all stakeholders concerned, which will have better monitoring and management of chemical disasters. A 'red book' containing duties to be performed by authorities and agencies during an emergency is published periodically and circulated. It contains

names, addresses and telephone numbers of key functionaries of state governments, chief inspectorate of factories, SPCBs, PCC, experts/institutions, etc.

A brochure entitled, 'DOs and DON'Ts during a Chemical Accident', to educate and enable the community for self protection has been published. Industries have also undertaken awareness programmes for communities residing in the vicinity of industrial units.

2.3 Other Technical Activities/Initiatives

2.3.1 Initiatives in Installations

A) Major Accident Hazard Control System:

In addition to the efforts to strengthen the legal framework by amending the Factories Act, the MoLE through the DGFASLI and state factory inspectorates implemented a project called 'Establishment and Initial Operations of Major Accident Hazard Control System in India'. During the project period, the MAH units were identified and infrastructural facilities were augmented in the Chief Inspectorate of Factories (CIFs), Central Labour Institute (CLI), Mumbai, labour institutes of various states, and Regional Labour Institutes (RLIs), Kanpur, Kolkata and Chennai. Under the Major Accident Control System it is mentioned that the Major Accident Hazard Control Advisory Divisions (MAHCAD) of these institutes provide consultancy services to industries, conduct training programmes and workshops, training the officials of CIFs of various states and conduct joint safety inspections of MAH units with them to enhance safety levels of various installations.

B) Hazard Analysis Studies of Industrial Pockets

A sub-scheme entitled, 'Industrial Pocket-wise Hazard Analysis' has been in operation at the MoEF

since the Eighth Five Year Plan. Hazard analysis studies for identifying the accident potential of industrial areas/pockets, their possible consequence and prevention strategies including rapid safety audit of MAH units have been initiated for 107 districts covering 900 MAH units. Out of these, studies of 85 districts have been completed.

C) GIS-based Emergency Management System

A pilot study entitled, 'GIS based Emergency Planning and Response System for Chemical Accidents in MAH Installations in Major Industrial Clusters' in four identified industrial states namely—Gujarat, Maharashtra, Tamil Nadu and Andhra Pradesh has been completed. The system would help existing response agencies in planning for and responding to major chemical emergencies to contain damage to a minimum. Training programmes involving members of crisis groups have been conducted. This project has been extended to the National Capital Territory (NCT) of Delhi, Rajasthan, Uttar Pradesh, Haryana, Karnataka, Kerala, West Bengal, Assam, Madhya Pradesh and Punjab.

D) Environment Risk Reporting and Information Systems (ERRIS)

Another unique initiative is the ERRIS prepared by the Indian Chamber of Commerce (ICC), Kolkata for the chemical units in Haldia and Durgapur in West Bengal. The industry risk management system, ERRIS, was developed under a project funded by the European Union with the technical collaboration of The Netherlands and Italy.

E) Emergency Response Centres (ERCs) and Poison Control Centres

Five ERCs have been established in Manali (Tamil Nadu), Bhopal (Madhya Pradesh), Mahad (Maharashtra), Vishakhapatnam (Andhra Pradesh)

and Hyderabad (Andhra Pradesh), which serve as a link between the DCG and the industry during an emergency. ERCs deal with chemical emergencies in a given area and disseminate technical information relating to the chemicals involved. Presently, the ERCs do not cater to emergencies arising during the transportation of HAZCHEMs.

The first National Poison Information Centre was set up in the Department of Pharmacology in 1995, at the All India Institute of Medical Sciences, New Delhi. The main objectives of Poison Control Centres include toxico-surveillance (active survey of the prevailing and potential toxicity risks) and environmental health monitoring. It aims to help detect heavy metal contamination, occupational exposure, food, water, air, and soil contamination.

F) Capacity Development

Financial assistance has been provided for capacity development to the National Fire Service College (NFSC), Nagpur; National Civil Defence College (NCDC), Nagpur; offices of the CIFs/DISH of states including Maharashtra, Tamil Nadu, Andhra Pradesh, Gujarat, Rajasthan and NCT Delhi.

Some other national and regional institutions (viz. National Safety Council [NSC], Disaster Management Institute [DMI]) have also been working in the areas of accident prevention, emergency preparedness and hazardous risk management. The Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI) and the ICC are other notable leading umbrella networks of organisations of business and industry working in these fields.

G) Control Room Concept

The following five Control Rooms have been set up at the initiative of the industries in the state of Gujarat:

- i) Emergency Control Room in Vadodara (registered as a Central Control Room).
- ii) Atul Emergency Control Centre in Atul Ltd., Valsad.
- iii) Vapi Emergency Control Centre in Vapi Industrial Association, Vapi.
- iv) Disaster Prevention and Management Centre, in the Gujarat Industrial Development Corporation (GIDC) fire station, Ankleshwar.
- v) Disaster Management Centre, Bharuch in the IPCL Guest House, Dahej Off-Site Emergency Control Room.

H) National Networking of Emergency Operation Centres (EOCs)

The national network of EOCs with links to state EOCs and other state secretariats and the district EOCs at the district collectorate form the main emergency communication network in the country for DM. The National Informatics Centre Network (NICNET) and the Police Network (POLNET) are other important satellite-based networks for emergency communications.

I) Responsible Care (RC)

The concept of RC is a global voluntary initiative of the chemical industry, covering all activities including research, process and product development, manufacturing and sales. It aims at an ethical and behavioral change, going away from a regulatory driven approach to a proactive approach.

RC is now licensed by 52 national industry associations worldwide. The Indian Chemical Manufacturers' Association (ICMA) now called Indian Chemical Council launched the RC initiative in 1992 and at present, 92 chemical industries have become signatories to the RC initiative in India.

J) Mutual Aid Response Group (MARG)

MARG, a voluntary initiative on developing 'mutual aid arrangement' for effective emergency response on a voluntary basis among neighbouring units in an industrial pocket, has emerged during the last decade. This initiative of the association of industries in an industrial pocket, is a forum to mutually help each other by sharing resources to tackle emergencies.

It has been successful in Maharashtra, where 15 MARGs are presently working. This industry initiative is promoted by the DISH, which is the regulatory agency in Maharashtra under the Factories Act. It is also found that some industrial units have entered into formal mutual aid agreements. There is a need for the expansion of MARG initiatives in other states.

2.3.2 Initiatives in Storages

A) Inventory of Isolated Storages

An inventory of 'Isolated Storages' with chemicals and their quantities in the country was undertaken. The study identified 347 isolated storages, of which the maximum were in the states of Gujarat (41), Uttar Pradesh (38), Tamil Nadu (32), Andhra Pradesh (31), Karnataka (25), West Bengal (24), Maharashtra (23), Orissa (22), Rajasthan (22), Madhya Pradesh and Punjab (17), and Delhi (14).

2.3.3 Initiatives in the Road Transport Sectors

A) Vulnerability and Risk Assessment of Transportation of HAZCHEM

Risk assessment and vulnerability studies have been completed in 16 stretches of national highways in four states with a high density of hazardous material transportation. Based on the identified risks, mitigation measures including preparation of DM Plans are carried out.

B) Hazardous Material (HAZMAT) Emergency Response Van

The NSC identified and analysed the successful experience of developing and operating HAZMAT Emergency Response Vans by leading MAH units in the Patalganga-Rasayani Industrial Area, Dist. Raigad, in Maharashtra, and published a case study on it. The approach for responding to road transport emergencies represented by this case study is considered practical and cost effective in the Indian situation and needs to be replicated at the national level.

2.4 Parallel International Efforts

2.4.1 International Labour Organization (ILO)

The ILO convention No. C 174, adopted on 22 June 1993, dealing with the prevention of major industrial accidents involving hazardous substances and the limitation of the consequences of such accidents, is directly relevant for CDM in India.

2.4.2 Awareness and Preparedness for Emergencies at the Local Level (APELL) Project

APELL is a tool developed by the United Nations Environment Programme, Division of Technology, Industry and Economics office (UNEP DTIE) in 1988 to minimise the occurrence of harmful effects of technological accidents and emergencies.

The five-year (1992-97) APELL Project was implemented in India by the NSC in selected six high-risk areas in different regions across India.

The APELL project was timely and eminently suited to address the issues identified under the Major Accident Hazard Control (MAHC) project as the groundwork carried out provided a foundation for building the structure of community awareness and emergency preparedness. A systematic

methodology for testing emergency plans was also developed.

The outputs achieved include:

- i) Coordinating groups like the APELL setup in all the six high-risk industrial areas.
- ii) Positive experience in community involvement.
- iii) A systematic methodology developed for testing emergency plans (importance of holding table-top exercise prior to the field drills was particularly realised).
- iv) Strengthened technical capabilities at the national and local levels.
- v) Further issues identified.

Above all, the APELL approach was institutionalised through the notification of the Chemical Accidents (Emergency Planning, Preparedness and Response) (CA[EPPR]) Rules.

2.4.3 United Nations (UN) International Strategy for Disaster Reduction (ISDR)

The UN ISDR effort is promoting chemical disaster risk reduction by educating and involving the community and civil authorities.

2.5 Recent Major International Developments

2.5.1 The UNEP Trans-APELL Programme

The UNEP APELL Programme is being strengthened as a key vehicle for UNEP work, at the local level in preventing and preparing for natural and other disasters, such as industrial disasters.

The Trans-APELL Pilot Project (started in June 2000) is designed to channelise the proven APELL

approach to dangerous goods transport emergency planning in a local community by using the *Trans-APELL Handbook* published by UNEP in 2000. Following the Trans-APELL Workshop organised by the NSC with the participation from all the stakeholders, two initiatives have been undertaken on a pilot basis:

- i) To include the HAZMAT Response Training Module in the Curriculum of the Traffic Police Apex Institute and train their trainers.
- ii) To conduct awareness programmes for communities living near identified accident prone spots along a major highway. The statutory obligations resting on the road transport operators and the improvement measures taken on the ground for achieving compliance have made the situation particularly favourable to initiate this programme.

To promote the APELL process further, the UNEP is revising, adapting and elaborating new tools and methods to repackage it as a multi-hazard programme for disaster reduction that enables local communities to identify, assess, prevent and prepare for the impact of any type of disaster. A decision to this effect was taken in the UNEP General Council meeting held recently in February 2006 at Dubai.

2.5.2 Strategic Approach to International Chemicals Management (SAICM)

In February 2006, over 190 countries including India acceded to the SAICM—a voluntary agreement to ensure the safe use of chemicals by 2020. India has decided to contribute to the newly created Quick Start Programme (QSP) trust fund. This initiative of UNEP consists of an overarching policy strategy and a global plan of action. There are 192 activities that have been identified for a global plan of action.

2.6 Recent National Developments

2.6.1 Enactment of The DM Act, 2005

In view of the extensive loss of life and damage to property due to natural calamities and the devastating potential of man-made disasters, the union government decided to institutionalise DM, based upon prevention, an enhanced level of preparedness, prompt and effective response and capacity-building aspects.

The DM Act, 2005 provides for the requisite institutional mechanism for drawing up and monitoring the implementation of the DM Plans ensuring measures by various wings of government for prevention and mitigation effects of disasters and for undertaking a holistic coordinated and prompt response to any disaster situation. The Act seeks to institutionalise the mechanisms at the national, state and district levels to plan, prepare and ensure a swift response to both natural calamities and man-made disasters/accidents.

The Act, inter alia mandates:

- i) The formation of a national apex body, the NDMA, with the Prime Minister of India as the ex-officio chairperson.
- ii) The state governments to establish SDMAs, and also create DDMA.

2.6.2 Powers and Functions of the NDMA

The NDMA constituted under Section 3 of the DM Act, 2005, has the responsibility of laying down the policies, plans and guidelines for effective DM. As mandated, the NDMA may:

- i) lay down policies on disaster management;
- ii) approve the National Plan;
- iii) approve plans prepared by the ministries or departments of the Government of India in accordance with the National Plan;

- iv) lay down guidelines to be followed by the State Authorities in drawing up the State Plan;
- v) lay down guidelines to be followed by the different ministries or departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects;
- vi) coordinate the enforcement and implementation of the policy and plan for DM;
- vii) recommend provision of funds for the purpose of mitigation;
- viii) provide such support to other countries affected by major disasters as may be determined by the Central Government;
- ix) take such other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disaster as it may consider necessary;
- x) lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management (NIDM).

The NDMA will be assisted by its executive committee, the National Executive Committee (NEC). The NEC is responsible for implementing the policies and plans of the NDMA. The NEC shall act as the coordinating and monitoring body for DM for the implementation of the National Plan. The NDMA is, inter alia, responsible for coordinating and ensuring the implementation of the government's policies and plans for disaster reduction/mitigation and ensuring adequate preparedness at all levels; coordinating response to a disaster when it strikes and post-disaster relief, rehabilitation and reconstruction.

The NDMA shall maintain, build and strengthen the existing machinery, structure and mechanism. The nodal ministry will continue to be responsible for CDM, and based on the Guidelines issued by the NDMA, will prepare the detailed Action Plan for CDM. Similarly, all central ministries/departments and state governments and UTs shall prepare comprehensive DM Plans that will address all phases of the DM cycle in a coordinated manner as specified in these guidelines. The plans will finally be approved by the NDMA and respective SDMAs as specified in Section 23, sub-section 3 of the DM Act, 2005 respectively. The NDMA will coordinate and ensure their implementation with the help of all agencies concerned.

2.7 Genesis of National Disaster Management Guidelines—Chemical Disasters

As per the DM Act, 2005, the NDMA is required to prepare national Guidelines, based on which the nodal ministry will prepare a detailed Action Plan in consultation with states and other stakeholders for the better and effective management of chemical disasters.

A meeting on CDM was convened by the NDMA on 17 February 2006 with various ministries of the Government of India (MoEF; MoLE; MoSRT & H;

MHA), regulatory agencies (DGFASLI), NSC, R&D institutes (Bhabha Atomic Research Centre, Defence Research and Development Organisation (DRDO), Indian Institute of Chemical Technology, Industrial Toxicology Research Centre, National Institute of Occupational Health, NEERI, All India Institute of Medical Sciences, professional institutions (NIDM, Delhi and DMI, Bhopal), apex industrial associations (CII, FICCI) and the DM Authority of the Delhi Government, along with a large number of professionals and experts from the field of CDM.

During the workshop, the present status of CDM in India was discussed and salient gaps were identified. The workshop also identified priority areas for prevention, mitigation and preparedness of chemical disasters and provided an outline of comprehensive guidelines to assist in the preparation of plans by ministry/states. It was decided to articulate the CDM guidelines through a document called the National Disaster Management Guidelines—Chemical Disasters. A core group of experts was constituted to assist the NDMA in preparing these Guidelines.

Several meetings of the core group were held to review the draft versions of the document in consultations with ministries concerned, regulatory bodies and industries to evolve a consensus on the various issues of the Guidelines.

Chemical accidents pose special challenges in their management. The present status for CDM is contained in various chemical-specific and general regulations. A number of programmes and activities on preparedness, mitigation and response are underway at national, state, district and local levels. Chemical industries have also set up risk reduction measures and initiated resource sharing and other coordinated efforts. R&D activities and standards setting in CDM are also being pursued in various institutions/organisations, as already described in Chapter 2.

While considerable progress has been made in the last two decades in the development and implementation of regulations and programmes for the management of chemical disasters, critical gaps still exist in certain areas. Gaps identified in regulations, programmes, projects, activities and initiatives have been presented in detail in this chapter. The prevention, preparedness, response, rescue and rehabilitation aspects of hazards in industrial installations and the storages of chemicals have been taken into account while identifying the gaps in this area.

3.1 Management of Chemical Accidents

3.1.1. Regulations

The effectiveness of the present regulations can be gauged from fairly successful operational records/performance of industries. However, the following are the specific gaps identified in the regulations:

- i) Based on the Factories Act, 1948 (amended in 1987), the states have notified

their own Factories Rules, which need to be dovetailed with the subjects of accident prevention, preparedness and mitigation.

- ii) Absence of national regulations on occupational safety and health and medical emergency management.
- iii) Harmonisation of classification and definitions in existing regulations including petroleum and petroleum products.
- iv) Absence of regulations on storage and transportation of cryogenics.
- v) Lack of legislation on risk assessment requirements and classification, labeling and packaging for industrial chemicals.
- vi) Need to identify technical competent authorities and standardisation of reporting mechanisms for the status of implementation of various chemical disaster-related activities.
- vii) Non-availability of statutes for grant of compensation to chemical accident victims.
- viii) Harmonisation and incorporation of international laws in chemical management.

3.1.2 Codes of Practises, Procedures and Standards

A number of codes of practises, procedures and standards governing safety in the handling of chemicals are available. However, these are not exhaustive, do not cover all HAZCHEM and processes and are also not prescribed by the statutes.

The specific gaps in these Codes of Practises, Procedures and Standards are as follows:

- i) Lack of national-level risk assessment criteria and acceptable risks for chemical plants viz., failure rate and probability of accidents, etc.
- ii) Procedure for conduct of safety audit and safety report preparation.

3.1.3 Statutory Inspection, Safety Audit and Testing of Emergency Plans

A) Inspection System in Factory Inspectorates

There are a large number of industrial units that require inspection and the manpower to do so is limited. Inspection formats and guidelines on follow-up action also require updating. Currently, the departmental inspection manual does not adequately address process safety requirements and leaves much to individual discretion resulting in compromising on safety.

B) Safety Audit

A safety audit is a tool for identifying and rectifying gaps in institutional safety management systems and is currently mandated to be carried out every two years by law. This requirement is often unmet. Problems arise due to inspection by two or more different departments for the same location, for example, the Controller of Explosives, Director of Factories, Pollution Control Board and Fire Service Department. The requirement of a single inspection system has not been established.

C) Commissioning and Decommissioning Plans

There is currently no system in place to report accidents that occur during commissioning and de-

commissioning of plants. It is observed that a number of accidents take place during these processes.

D) On-Site Emergency Plan

The testing of On-Site emergency plans every six months is a statutory requirement. A large number of units conduct mock drills shop-floor wise or cover only a few components, while the requirement is for the installation as a whole.

E) Off-Site Emergency Plans

- i) A yearly mock drill of district Off-Site emergency plans is essential and mandated. Very few full-scale drills of district Off-Site emergency plans are being conducted in the country, and even those are not conducted as per the norms.
- ii) Preparation of SOPs for rescue teams and other QRTs regarding the wearing of full protective gear before entering the hazardous zone and cordoning off the disaster site are required.

F) Medical Emergency Plans

District Off-Site emergency plan should include a separate section on management of medical emergencies, which should also be tested yearly during mock drills.

3.1.4 Technical and Technological Information

A) Information on Chemicals

The disclosure of information via Material Safety Data Sheets (MSDS) by occupiers to workers on chemical hazards is a statutory requirement. The information in MSDS is generally complex and exhaustive, therefore, supervisory staff and workers find it difficult to comprehend the information available in them.

B) Technical Information

- i) Hazard and risk assessment information to first responders, harmonised risk assessment and management principles and case studies of accidents/major accidents/disasters in MAH units are not available.
- ii) Case studies of major accidents including emergency response experience and yearly statistics of major chemical accidents are not compiled and published at the national level.
- iii) There is lack of clear accessible information on potential chemical hazards and their management for ready use by local authorities. In addition, the officers responsible for issuing No Objection Certificates (NOCs) for establishing a storage facility often lack sufficient scientific knowledge and need to undergo appropriate training.

C) Technology

Some MAH units handling HAZCHEMs are not based on best available technologies. Many of the small and medium units continue to use obsolete and unsafe technologies.

3.2 Preparedness

3.2.1 Education, Training and Capacity Development

A) Education

DM has been introduced as a subject at the school level for classes VIII, IX and X by the Ministry of Human Resource Development. Different modules on DM are required to be developed and placed appropriately at different levels in the education system at the national and state levels. In addition, there is a need to include disaster-related technical education for professionals and medical officers in

their respective institutions. Besides chemical sciences and technologies, the basic knowledge of toxicology needs to be imparted at all levels.

B) Training of Emergency Services and District Authorities

- i) The existing training institutes in India require up-gradation and strengthening besides adequate funds to be provided by the centre and state governments. Dedicated institutes for training on CDM have not been identified/established. Institutes for imparting training to first responders, authorities and others involved in emergency planning, preparedness and response need to be identified/established.
- ii) Specific training modules need to be prepared for CDM with specialised packages for different stakeholders in a time-bound manner. These modules are required to be tested and implemented at different levels of CDM.
- iii) The paramedical staff lack knowledge on DM and need to be trained with appropriate knowledge of effects of chemicals and clinical modalities for management of their toxicities.
- iv) Self-inspection by the industries and corporate responsibility for safety are not practised; these measures need to be established through the training of trainers.

C) Capacity Development

Capacity in terms of adequate skilled manpower, material logistics and infrastructural facilities are grossly inadequate at various levels required in the management of chemical disasters.

- i) Infrastructural
 - a. Adequate infrastructural facilities in installations, monitoring institutions and authorities concerned and their requirements need to be addressed.

- b. There is a need to assess individually and collectively the augmentation of infrastructure and financial resources required in institutions associated with CDM.
- c. Based on the concentration of MAH units, the requirement and location of ERCs and poison centres need to be identified.
- d. The integration of infrastructural facilities with those of existing institutions after providing the necessary resources/expertise for process hazards and chemical disasters is required.

ii) Skilled Manpower

- a. Capacity in terms of skilled and trained manpower is required to be built up at the identified institutes/research departments/training centres.
- b. Functional integration of various aspects of disasters in the curriculum, and linkage of this knowledge in the initial recruitment and further promotions of the employees.
- c. The role of NGOs and the community is required to be defined. Resident Welfare Associations and NGOs needs to be integrated with this training network so as to develop a group of volunteers.
- d. Sensitisation of functionaries at all levels about the need, measures for quick assessment and action to be taken during chemical disasters.

iii) Material Logistics

- a. The adoption of suitable technologies for CDM need an established mechanism to test, verify and check

the technology in a rapid and time-bound manner. Once approved, the same is to be adopted at the grass-root level.

- b. Inventory of Personal Protective Equipment (PPE), chemical emergency management kits, relief and response material like ambulances, evacuation vans, fire-fighting equipment including HAZMAT vehicles and other safety-related items need to be identified, tested and established.

3.2.2 Awareness Generation

- i) The public at large is the most important stakeholder in DM. The creation of public awareness by MAH installations and the district administration/DDMA and local authorities regarding possible accidents is a statutory requirement. Even though community awareness is a priority area, it has not been adequately addressed.
- ii) Public awareness about HAZCHEM, their effects, dos and don'ts during an accident and remedial measures, is grossly inadequate.
- iii) Proper guidelines and a code of ethics and conduct is not available for the print and electronic media for handling sensitive issues arising out of chemical disasters. This is necessary for a disciplined, structured and panic-free approach in order to communicate any disastrous event and its immediate consequences to the public.
- iv) In awareness generation, NGOs can play an effective role. There is an urgent need for identifying NGOs with experience to successfully help in handling chemical emergencies and strengthening their capacities and capabilities to support effective response during an emergency.

3.2.3 Institutions, Networking and Communication

Institutional framework for providing technical support services at various levels is a key requirement for sustaining proper development and implementation of an effective DM system. These have not been fully identified.

A) Institutions

- i) National-level institutions and other academic institutions such as the Indian Institutes of Technology (IITs); the OISD; Atomic Energy Regulation Board (AERB); IICT; ITRC; NIOH; CLI; CLRI; NEERI; NFSC; NCDC; NSC; DMI; NIDM; Indian Chemical Association (ICA); and other professional bodies; industrial and corporate institutions/associations need to be further involved in CDM. The present status and strengths of these institutes need to be assessed and if required, to be strengthened to include disaster-related activities in their training and knowledge development thereof.
- ii) Fire services, which are traditionally the first responders, as an institution lacks modern equipment and advance training for strategic response.
- iii) Revamping of the Civil Defence and Home Guards is essential for these institutions to play an effective role in DM.

B) Networking and Communication

Effective communication and networking between various stakeholders is currently inadequate at all levels for a successfully orchestrated response to chemical disasters.

- i) Human and functional networking is needed at the following levels for

coordinated planning, preparedness and response. The communication network shall include:

- a. Control rooms at all levels (district, state and centre).
- b. Industries (with district/state authorities, and state/national institutions).
- c. Emergency functional units identified in On-Site and Off-Site plans and other responders including designated authorities.
- d. Institutes/analytical laboratories/ research departments identified by the nodal ministry; other associated ministries (in the concerned subjects) and the NDMA at the national level along with the others that will be identified by the states need to have an effective communication network to quickly assess toxicants/chemotoxins at the incident site and for continuing effective R&D programmes.
- e. Road transport and other modes of transportation need to have an established dedicated communication system with all stakeholders and a mechanism (including GIS) for continuous monitoring of the transport vehicle carrying HAZCHEM all along its route.
- f. It is required to make available the exhaustive list of HAZCHEMs, their side-effects and related dos and don'ts on the internet.

ii) Coordination between different stakeholders:

- a. An effective network based on the roles of different stakeholders in a pre-rehearsed manner is required. The roles and responsibilities of different stakeholders including the first responders as identified in the various

plans need to be further adequately defined and available as ready department-specific guides for better coordination during chemical disasters.

- b. Voluntary initiatives of industrial clusters for effective networking and mutual help viz. MARG, need to be encouraged at the national level. District administration/DDMAs, state authorities/SDMAs, response agencies and the other enforcement agencies need to network with such voluntary initiatives.

3.2.4 Medical Preparedness and Response

Effective medical preparedness and response for a chemical emergency is a priority area. There is a need to address medical preparedness comprehensively at all levels with specific stress on chemical disaster-related aspects.

The salient gaps identified are:

- i) Medical preparedness is the weakest link in the emergency response system and at hospitals.
- ii) It is essential to develop mechanisms for creating awareness, making available trained medical first responders, decontamination facilities, risk and resource inventory, trauma care, plans for evacuation, mechanisms to maintain uniform casualty profiles, proper chemical casualty treatment kits, mobile teams/hospitals, hospital DM Plans and preparing and responding to public health and environmental effects.
- iii) Non-availability of specific antidotes for chemicals.
- iv) Inadequacy of infrastructure for trained medical and paramedical staff.
- v) The SOPs for emergency medical response at incident site are not laid down. There is an absence of a separate medical

emergency plan in the district Off-Site plan. There is also a lack of documentation of uniform SOPs to be followed during chemical emergencies.

- vi) Gross inadequacies in terms of trained manpower and capacity in poison information centres and regional laboratories that are close to disaster-prone areas with detection facilities for HAZCHEM.
- vii) Absence of mechanism for medical surveillance.
- viii) There are inadequate studies on long-term effects of HAZCHEM and their medical management.
- ix) Mechanisms for medical rehabilitation need addressal.

3.3 R&D

Following are some of the areas where R&D activities are required to be initiated, intensified and pursued:

- i) Customisation and validation of software for risk assessment and consequence modeling under Indian conditions.
- ii) Critical analysis of available technology for acquisition.
- iii) Development of need-based technologies for detection, protection (including PPE), monitoring of common toxicants and their effective management.
- iv) Development of safer and cost effective alternatives and adoption of safer, affordable and sustainable technologies and processes.
- v) Epidemiological studies on high volume HAZCHEMs handled by industry.
- vi) To develop and introduce new biomarkers and indicators for chemical toxicants.
- vii) Collaborate, update and adopt developing new approaches to detect, evaluate and decontaminate chemical toxicants.

3.4 Response, Relief and Rehabilitation

- i) SOPs for all the response functions to be performed by all the functionaries of CDM according to the gravity of the chemical accident need to be developed and integrated into the existing structure and function of crisis management at all levels.
- ii) Detailed minimum standards for food, water, shelter, sanitation do not exist at present. There is also the absence of SOPs for providing evacuation, shelter, food, water and relief.
- iii) Immediate relief under the Public Liability Insurance Act, 1991 needs to be revisited.
- iv) During rehabilitation, there is a need to comprehensively address all the requirements of victims including medical care for long-term effects of HAZCHEM.

3.5 Management of Transport Accidents

The major gaps include:

- i) Air, maritime and rail transportation of HAZCHEM needs up-gradation in terms of loading, unloading, containerisation; their contingency plans also need to be revisited and revised to tackle any unexpected chemical emergency.
- ii) Specific roles and responsibilities of consignor, consignee, transporters, drivers and authority are required to be addressed.
- iii) Transport routes for HAZCHEM from the storage site to the delivery point with SOPs to be followed for transportation are essential to be defined. The safe stoppage points with the safe parking areas and an appropriate time of transportation need to be indicated in the route plans.

- iv) The system of communication and training of persons involved in HAZCHEM transportation are grossly inadequate.
- v) Highways are prone to numerous chemical emergencies due to bulk transportation of HAZCHEM but still no appropriate highway DM Plan exists. It needs to be comprehensively addressed.
- vi) It is essential to address the modification/ harmonisation of legislations to reduce the probability of occurrence of chemical transport emergencies.
- vii) The available study material on the specific highways stretches with heavy traffic density of HAZCHEM carriers needs to be replicated on other national/state highways.
- viii) A national and state-wise directory of chemical/technical experts needs to be compiled and published for ready reference of traffic police and other service providers.
- ix) Emergency response guidance for first responders and highway DM Plans are not available.
- x) Fire services lack required technological sophistication and number of HAZMAT vehicles for quick emergency response.
- xi) Transporters of chemicals including drivers lack the requisite training to discharge their roles satisfactorily during a HAZCHEM incident.
- xii) Traffic police lack requisite training, basic knowledge of relevant statutes, use of support tools such as TREMCARD, and their role in emergency response.
- xiii) In line with the existing system of fire brigade and police, a network of communication and a four-digit number-based connectivity is essential for ambulance services and hospitals for quick medical response on highways.

- xiv) Standardisation in design of vehicles and handling capacity needs to be addressed. Stress on R&D activities to address the designing of trucks and other vehicles carrying hazardous substances from the safety point-of-view is required.
- xv) Recording and monitoring facilities of transport vehicles carrying HAZCHEMs on the identified routes need to be provided.
- xvi) A statutory authority for inspecting the facilities on these vehicles and their monitoring and reporting mechanism is required.
- xvii) In case of disasters, post-disaster cleanup needs to be dealt with.
- xviii) Periodical training at regular intervals for drivers and attendants needs to be made mandatory. The syllabus for basic training and refresher courses needs to be designed and updated regularly.
- xix) Rules pertaining to the issues of safety of import and export of chemicals needs to be updated according to changing global scenarios.

3.6 Implementation of Existing Regulations and Procedures

Any plan, policy, regulation or guidelines is only as good as its implementation. Lack of compliance and weak enforcement including coordination of CDM has been identified as follows:

3.6.1 Lack of Emphasis on CDM Functions at Various Levels

In order for DM to be effective, focused attention at various levels, namely, designated focal points in the nodal ministries viz. MoEF and MoLE at the central and state levels and designation of an emergency coordinator at the district level are essential. The lack of assigned responsibility,

systems for update and clarity in functions currently plague the system.

3.6.2 Deficiencies in On-Site and Off-Site Emergency Plans

The Off-Site plan of a district/pocket is based on the On-Site emergency plans of MAH units in the industrial pocket. The following are some critical deficiencies observed in the On-Site emergency plans:

- i) Lack of standardisation of risk assessment methodology.
- ii) Non-use of standard terminology.
- iii) Non-uniformity in the structure of the plan.
- iv) Lack of separate documentation of the Off-Site consequences of an On-Site emergency.
- v) Currently On/Off-Site emergency plans are prepared based on the maximum loss scenario. Limits for maximum credible and probabilistic loss scenario have not been evolved at the national level.
- vi) Lack of graded response plans.
- vii) Lack of medical response plans.

Keeping in view the responsibilities entrusted to the factory inspectorate with respect to chemical industries and management of chemical accidents, and the reliance of the district collector on the factory inspectorate during emergencies, proper infrastructure facilities at the inspectorate are inadequate. The enforcement of the CA(EPPR) Rules is not uniform among different states. The following are the inadequacies in the present system:

- a. Non-availability of appointed dedicated staff in the control room.
- b. Regular checking of the procedures and systems detailed in the red book.
- c. Establishment of information networking with states and districts.

- d. Database availability in the control room and updating.
- e. The infrastructure facilities and management structure for the control room/ CAS.
- f. A system for flow of information in the nodal ministry and from the accident site in the states has not been detailed and documented.

3.7 Liability and Compensation

Mechanisms to deal with social and economic impact of chemicals on human health, society and the environment, including liability, compensation and redress need to be streamlined and strengthened.

3.8 Finance

Planning for adequate financing for disaster prevention, preparedness and management at the states and national levels have not been addressed. The ministries need to regularly earmark funds for activities to strengthen CDM. These issues are required to be addressed on a priority basis so that long-term planning for allotment of necessary finances is in place and the flow of funds is organised.

3.9 Role of Civil Society and the Private Sector

There is a need to promote the role of all sectors of civil society and private sector in the implementation of the Guidelines and DM Plan.

4

Guidelines for Chemical Disaster Management

Guidelines for CDM have been prepared based on the salient gaps identified and worldwide established best practises and techno-managerial advancements in the field. It is expected that these shall re-engineer the existing processes, systems, regulatory framework, institutional and infrastructural network and the related areas and achieve harmonisation of efforts to prevent and manage chemical disasters effectively at national, state and district levels.

The Guidelines have been prepared and arranged in detail in this chapter taking into account the approach of prevention, preparedness and mitigation along with response, rehabilitation and reconstruction.

Guidelines specific for industrial installations and chemical storages, state and district-level functions, preparation of On-Site and Off-Site emergency plans, and management of transport accidents involving HAZCHEM have been dealt with separately.

The Guidelines will be periodically reviewed and updated by the NDMA and if necessary, additional guidelines will be issued.

4.1 Management of Chemical Disasters

Guidelines for CDM are indicative in nature with necessary essential information to help in preparing detailed plans. The guidelines would help to formulate the DM Plan based on the constructive

model of Public Private Partnership (PPP) with the governmental agencies so that all the identified stakeholders continue to contribute proactively and effectively in their respective areas for the successful management of chemical disasters in India.

4.1.1 Regulatory Framework

Guidelines to strengthen the present regulatory framework on CDM are required to meet the current national policies and aspirations. These will promote self-regulation and public consultation. The Guidelines will have statutory effect through the DM Act, 2005 and will be binding on the persons concerned with CDM. Under this regulatory framework, technical support functions are required to be augmented so that in-depth information on technology, processes and material safety specifications in line with international standards are provided. Implementation would help in avoiding serious and costly environment problems due to ignorance about the risks associated with chemicals.

Regulation shall be supportive and technology neutral instead of prescriptive. The regulatory framework shall provide for the publication of detailed guidelines and institutional mechanisms for better compliance. Transparency in regulations is critical to implementation and therefore, shall be promoted as is done under various ISO accreditations. This would provide a very important tool and pathway to industries in covering gaps in a time-bound programmes depending upon available technologies and resources.

The Guidelines on the regulatory framework therefore, include the following specific recommendations:

- i) National regulation on occupational safety and health shall be prepared.
- ii) National regulation on the subject of accident prevention, preparedness and mitigation need to be dovetailed and harmonised with the legislations including the DM Act, 2005.
- iii) National regulation on medical emergency management shall be formulated and dovetailed with the existing regulation at central and state levels. Separate guidelines on medical preparedness and mass casualties management are being drafted by the NDMA.
- iv) Classification and definitions in existing regulations (including the Petroleum Act and Petroleum Rules) and others like the Indian Electricity Act, and Boilers Act, shall be harmonised with the DM Act, 2005.
- v) Regulations on the storage and transportation of cryogenics shall be notified as stresses developed on leakage due to super cooling of the environment in and around storage areas of compressed hazardous gases is a very critical factor in maintaining stability of the entire structural system. Thus, this aspect is required to be fully elaborated and included in the regulatory framework so that damage due to cryogenic stresses can be prevented.
- vi) Pipelines carry huge quantities of HAZCHEM both in liquid and gaseous form within and outside the manufacturing/storage facilities. The regulatory framework has to thus, adequately address safety measures for pipelines and area en-route. The regulations shall also address issues arising out of the emergencies occurring due to gas line/petroleum line failure in the neighbouring industry.
- vii) Legislation on 'Risk Assessment Requirements', 'Classification', 'Labeling', and 'Packaging' for Industrial Chemicals shall be prepared.
- viii) Factory inspectorates shall be empowered commensurate with their responsibilities. Authorities under Rule 19 of the MSIHC Rules further empower them to issue improvement notices. It is necessary to empower them to take legal actions for non-compliance of MSIHC Rules except for defence and nuclear installations, which are taken care by CFEES and DAE respectively.
- ix) Statutes for grant of compensation to chemical accident victims shall be revisited.
- x) A scheme for giving good performance awards to industries for achieving exemplary safety standards and statutory compliance shall be developed and implemented.
- xi) The International Register for Potentially Toxic Chemicals (IRPTC) was established in 1976 at Geneva by the UNEP to help, assess and control the proliferation of chemical hazards. Over a period, it was felt that the volume of information to be processed, organised and disseminated on chemicals was large. A National Register on potentially toxic chemicals, manufactured/used in India will be maintained using the institutional framework.
- xii) Most PPE is imported and expensive. These include life-saving devices, heavy equipment for salvage and extrication, chemical suits, fire entry suits, etc. Cost-cutting measures like reducing/waiving of import levies for these items need to be encouraged. It is also necessary to develop new indigenous industrial establishments to develop PPE. Gas masks and other PPE developed by the DRDO shall be adopted

- by industrial units and response forces, wherever applicable.
- xiii) The changes and modifications in the regulatory framework shall also be based on common elements and principles derived from regional and global instruments and drawing upon experience already gained through their preparation and implementation. Special efforts shall be made regarding the exchange of information on banned/severely restricted chemicals in international trade for the protection of human health and the environment at a global level.
 - xiv) The regulatory framework shall provide for instituting broader and more frequent information exchange on other systems, involving consultation with other countries to gain experience on alternative procedures.
 - xv) Governance is an important issue that needs to be addressed through a multi-sector and multi-stakeholder approach in pursuing the safe handling of chemicals and management of disasters. There is, therefore, a need to recognise and address:
 - a. Participation of stakeholders in all aspects of decision making related to the mitigation, relief and rehabilitation of victims of chemical disasters.
 - b. The gaps, overlaps and duplication in chemicals management activities and DM and the need for enhanced coherence, consistency and cooperation to ensure efficient and effective use of available resources at the district, state and national levels.
 - c. The mechanisms to deal with the social and economic impact of chemicals on human health, society and the environment, including liability, compensation and redress shall be streamlined and strengthened.
 - xvi) The legal provisions shall be enacted in the regulatory framework to give priority to emergency medical care over the forensic issues required to be handled by the police.
 - xvii) A land-use policy shall be prepared and strictly implemented. A legislation on the buffer zone (or to be referred as 'no man's' zone) will be introduced so that residential/slum colonies are not established in proximity to industries. The already settled residential colonies need to be relocated.
 - xviii) Proper and safe disposal of hazardous waste shall be ensured as per existing regulations.
 - xix) The rules pertaining to the issues of safety of import and export of chemicals will be reviewed and updated in accordance with changing global standards.
 - xx) The provision of establishing check-posts for checking the fitness of carriers/vehicles carrying HAZCHEM shall be established.
 - xxi) Units holding quantities marginally lower than those specified for MAH units including Small and Medium Entrepreneurs (SMEs) will also be documented. At present, such units are not considered as MAH units. All other regulatory and safety mechanisms shall be made applicable to medium and small-size industries that deal with HAZCHEM. As per existing regulations, the Off-Site and On-Site plans stress upon MAH units only. Emergency plans shall also be developed by SMEs and practised as a part of the overall DM plan of the district.
 - xxii) Provisions to be made to penalise the defaulter units after inspection by an expert technical committee for the relevant subject.

4.1.2 Codes of Practises, Procedures and Standards

Procedures for the conduct of safety audits need to be strengthened. Standardised national criteria

for risk assessment/management of installations are not currently available. In their absence, a standard method is not available to study and monitor the consequences and draw conclusions. Mechanisms shall be developed on risk assessment/management prescribing a standard criteria and methodology. Such mechanisms will be updated regularly.

In addition:

- i) There is a need to develop scientific understanding of the functions and behaviour of HAZCHEM, which is central to achieving risk reduction.
- ii) Risk reduction measures, derived by scientific methods and consideration of social and economic factors, are needed to reduce or eliminate the harmful effects of chemicals and the consequences of a chemical disaster.
- iii) Novel methodologies for identifying hazards in an installation, contemplating consequences of catastrophic failures and identifying the vulnerable population are required to be adopted and updated regularly.
- iv) Adherence to risk reduction measures and improving the existing ones are essential to prevent the adverse effects of chemicals on the health of people and environment.
- v) The pace of development of safer alternatives and adoption of safer, affordable and sustainable technologies and processes shall be accelerated.

4.1.3 Statutory Inspection, Safety Auditing and Testing of Emergency Plans

A) Inspection System by Regulatory Bodies

A proforma shall be developed to standardise the inspection procedures and reporting mechanism by each state factory inspectorate. Some of the issues to be addressed in developing the proforma include:

- i) It shall be developed in consultation with technical and scientific experts in the relevant subject area.
- ii) A department manual shall be prepared by the factory inspectorate for each type of hazardous unit to be inspected.
- iii) It shall cover all the important parameters for each activity carried out in a particular type of unit.

B) Safety Plan for Commissioning and Decommissioning

A hazardous unit shall be obliged to submit its commissioning and de-commissioning plans to the factory inspectorate.

C) Safety Auditing

Presently, conducting risk assessment, preparing safety reports and annual safety auditing by an independent expert is a statutory requirement under the MSIHC Rules, 1989. To ensure proper quality in these areas, it is necessary to develop and put in place a certification/approval system for the experts who carry out these activities and for the institutes who will provide training to such experts for obtaining certification. Such a system can be developed by the MoLE, MoEF and the Quality Council of India (QCI) in consultation with technical institutes.

There is some inconsistency between the MSIHC Rules and the State Factories Rules in respect of the above activities regarding periodicity of audits and approval of auditors. A uniform system is required to be developed throughout the country.

D) Regular Testing of Emergency Plans

- i) SOPs will be laid down at the district level for designing mock drills. Regular mock drills of both On-Site plans by the industrial installations and Off-Site plans by the

district administration/DDMA shall be conducted. There will be some award schemes for achievers as motivation to ensure compliance of safety provisions for all stakeholders.

- ii) Standardised protocol will be developed as a part of the National Plan for use at the national level for emergency plans; these must always remain fully tested and able to deliver.
- iii) Effectiveness and prompt functioning of the main stakeholders in the Off-Site emergency plans is the key to panic-free management of accidents. Establishing response time for initiating full-scale action by the identified responders to ensure effective management.

4.1.4 Technical and Technological Information

A) MSDS shall be made available for all chemicals irrespective of the quantity held including for those chemicals which arise as by-products.

- i) An authentic but simplified version of information on HAZCHEM through MSDS is needed for ready use on the shop floors, both by the supervisory staff and workers.
- ii) The MSDS will be displayed in multiple languages i.e., English, Hindi and the regional language and/or the vernacular language and shall be prominently displayed at strategic places like shift office, notice boards, security gates and also on the tankers.
- iii) Dos and don'ts and periodic training capsule of MSDS on relevant chemicals will be given to all stakeholders including the local police and municipal fire brigades and industry.

B) Use of International Chemicals Safety Cards (ICSCs) developed under the IPCS, a joint activity of the World Health Organization (WHO), ILO and UNEP, shall be promoted at the national level.

C) Realistic documented versions of major accidents/disasters which have taken place in India (including emergency response experience and yearly statistics of major chemical accidents) shall be compiled at the national level by the nodal ministry and published so that persons/organisations concerned are able to draw lessons from these tragic experiences.

D) District administration/DDMA will also evolve a mechanism for third-party evaluation of CDM plans for future learning.

E) MAH units handling HAZCHEM shall be encouraged to use best available and safe technologies.

4.2. Preparedness

Preparedness refers to the activities necessary to build and sustain performance across all of the other domains required for effective DM. These include a range of time-sensitive tasks that need to be undertaken involving efforts at all levels of government and within the private sector. One of its major component is medical preparedness.

The guidelines for medical preparedness and response will serve as broad principles for preparing hospital DM Plans and emergency medical response plans so that effects of HAZCHEMs can be minimised in terms of morbidity and mortality in the event of mass causality due to chemical disasters. The MoH & FW will ensure the incorporation of all these chemical-specific guidelines for medical management in the 'all hazard' medical management plan. The industry will ensure the establishment of medical setup requisites for the management of an On-Site

chemical emergency. All stakeholders of CDM will ensure that these plans are included as part of the main DM Plans at the level of central, state and district authorities and industrial installations. The quality of preparedness will be assured through proper training and mock drills. The major areas of preparedness are given below.

4.2.1 Education and Training

A) Education on CDM is necessary for all the stakeholders. Disaster-related topics shall be included in the syllabi of professional colleges at appropriate levels.

- i) Regular educational programmes in the form of symposia, exhibitions and demonstrations shall be encouraged.
- ii) Educational programmes shall be conducted in various languages according to geographical locations. Disaster-related manuals and pamphlets will be published in the vernacular so that they can easily be understood by less-educated people.
- iii) Electronic media will be used to impart educational knowledge to the community at large.
- iv) Disaster-related education material will be available for all stakeholders at various levels.

B) In the long term, DM education could be concurrently added in the curriculum of all students starting at the secondary education level. Some advanced content could be part of the curriculum of professionals and administrators who have critical roles to play in On-Site and Off-Site emergencies. The minimum criteria of educational qualification of unskilled worker in MAH units shall be upgraded to the senior secondary education level. The State Factory Inspectorate will have requisite technical knowledge to adequately address all the issues pertaining to CDM in industrial audits and minimum standards shall be laid down.

C) Training plays an important role in proper implementation of various disaster-related activities. SOPs will be laid down for first responders who form a very important component of DM, both at Off-Site and On-Site locations. Training will also be imparted to other stakeholders from industries, regulatory bodies, district/state authorities. The training programmes will be conducted at national, state and district levels by specific government and non-government institutes including the NIDM, and other academic institutes. Technical training plays an important role in understanding the probable root causes that can lead to a chemical disaster at installation sites.

Specific guidelines on training are as under:

- i) Specialised training will be conducted for all connected personnel in the industry, fire brigade, police, medical institutions, transporters and community leaders for active role-playing during emergencies and for the general public towards the maintenance of calm and poise during a chemical disaster.
- ii) Retraining programmes shall be conducted for all stakeholders at regular intervals.
- iii) There is a need to strengthen the existing training institutions and set up additional training institutes in fire, risk assessment, certification, safety audit and emergency planning etc.
- iv) Orientation course on the effects of industrial chemicals for medical management will be carried out for rural hospitals and primary health centres.
- v) Periodical mock-exercises for On-Site and Off-Site emergencies as part of the training schedules for both industries and district authorities will be conducted at regular intervals. Mock drills shall be conducted regularly in accordance with the MSIHC Rules/CA(EPPR) Rules for checking the

response time. Mock exercise/drills will also be conducted for small and medium industries at periodic intervals.

- vi) It is necessary to have technically trained professionals in the state/district administration with reasonably long tenures of service to maintain continuity and those who are replaced will be trained.
- vii) All the workers employed in an industry will have a sufficient induction period for training prior to the actual job.
- viii) Tools/techniques will be devised for measuring the competence of trained personnel.

4.2.2 Creation of Appropriate Infrastructure

Creation of proper infrastructure both in On-Site and Off-Site plans will serve as a strong back-up for the management of chemical disasters.

The infrastructural facilities will stress on the following areas:

A) Identification, budgeting and time-bound provision of infrastructural facilities in installations individually or collectively for achieving good engineering practises, backup facilities, monitoring and recording facilities and facilities for On-Site management of emergencies. These include:

- i) Centralised control system with monitors installed on the periphery of installations, or cluster of installations.
- ii) Public address system.
- iii) Setting up of anemometers with continuous recording system and back-up installations of wind sox at vulnerable locations.
- iv) Fire Tenders.
- v) Provision of adequate quantity of foam and any other suppressant for control of vaporisation of spill or leak of compressed gas.

- vi) Ensure availability of a sufficient quantity of fire extinguishers at various locations.
- vii) Availability of well-equipped emergency medical rooms with requisite number of ambulance van(s) sufficient to shift On-Site casualties. The ambulance(s) shall be parked at an identified area preferably at perpendicular locations for continuity of emergency operations in case of toxic release.
- viii) Emergency crew availability round the clock.
- ix) Adequate PPEs.
- x) Hotline telephone connection with nearby emergency services.
- xi) Mutual-aid service in clusters.
- xii) Alternative power back-up. Any other installation (chemical) specific facility.
- xiii) New industries shall be established in such a manner that clustering of similar chemical-based units are evolved together in the same geographical area.
- xiv) In specialised industries (MAH units) like ordnance factories, bomb disposal squads shall be available in the unit and a 'no fly zone' will be declared for such industry.

B) Preparation and inclusion of a 'Resources Directory' with complete details (source, availability, person/officers to be contacted, phone numbers, addresses etc.) is to be made available.

C) In the context of small-scale industries and other industrial clusters being promoted by the government, it is suggested that resources pertaining to DM be provided in proportion to the risks being assessed.

D) Mobilisation of resources from other districts/states during emergencies needs to be built within On-Site and Off-Site plans.

E) Identification of infrastructural facilities for Off-Site responders for efficient management of industrial (chemical) disasters and transport emergencies is an evolutionary process in line with the economic and industrial growth of the country. The major guidelines for Off-Site infrastructure include:

- i) Trained manpower, sufficient inventory of equipment (including PPE) and an effective communication system available with the police, fire, medical and other responders. Sufficient stock of antidotes and availability of beds in earmarked primary/secondary health centres/hospitals. Training of additional paramedics and ensuring their availability for emergencies.
- ii) A well-laid road network around installations and minimum congestion.
- iii) Minimising population sprawl around the industrial clusters.
- iv) Efficient and leak/spill proof rail carriages/wagons/sheds.
- v) Facilities of good broadcasting, law and order control, evacuation transport, rescue and relief facilities, emergency shelters and assembly points to be identified/built up at district level in a time-bound manner.
- vi) Development of medical capabilities for handling focused industrial toxic release.
- vii) For road transport, identification and training of community leaders en route highways for further community training.
- viii) Setting up of communication, and first-aid points en route highways and other roads commonly used for transport of HAZCHEMs.
- ix) Augmenting of point-to-point ambulance services on highways.

4.2.3 Capacity Development

Capacity development requires the all round development of human resources and infrastructure for establishment of a well-focused and functional organisation and the creation of a supportive socio-political environment. Proper attention is to be paid in development of infrastructural facilities in terms of trained manpower, mobility, connectivity, knowledge enhancement, and scientific up-gradation for all stakeholders concerned with the management of chemical disasters. Capacity development is an important component of preparedness for the management of chemical disasters.

Special emphasis will be given to capacity development in the following areas:

- i) Empowerment of DM authorities at state, district and local levels, with special reference to CDM.
- ii) The regulatory agencies shall also develop their infrastructural facilities and technical expertise beside capacity building in pre-, during and post-disaster monitoring and analysis.
- iii) Supported regulatory framework for gradual transition to self-regulation and public consultation.
- iv) ERCs shall be updated to define basic minimum standards, and their number shall be commensurate with the vulnerable population in focus. Establishment of ERCs in highly industrialised areas/pockets shall be made mandatory under the CA (EPPR) Rules, 1996. The responsibility to establish and run the ERC shall lie with industry/industry association. ERCs shall be integrated with medical, fire, civil defence, poison and other chemical detection laboratories, NDRF, SDRFs, police, traffic

- police and other emergency responders and subsequently, the newly evolved integrated system shall be adapted into the district DM Plans. ERCs will also cater to transport emergencies involving HAZCHEM.
- v) First responders shall be clear regarding their roles and preparedness for emergencies and must be suitably empowered.
 - vi) Specialised chemical facilities for the collection, identification, detection of HAZCHEMs need to be established close to chemical disaster-prone areas. Efforts shall also be made to develop their full capabilities.
 - vii) Dedicated/specialised transportation for different emergency services.
 - viii) Capacity building for medical preparedness is very crucial for the management of chemical disasters and, therefore, requires the commitment and full involvement of the present medical fraternity and available facilities. There is a need for substantially augmenting these resources to take care of mass casualties at various degrees of severity. Requirements include:
 - a. A fully equipped ambulance van for the transfer of casualties is the primary requirement.
 - b. Emergency mobile vans at all vulnerable locations.
 - c. Specialised hospitals, poison and trauma centres all around the country.
 - ix) Availability of adequate technically trained manpower in industries.
 - x) Latest safety hardware, software and instrumentation.
 - xi) Emergency equipment required to deal with disasters will be procured on a shared basis in a notified industrial area.
 - xii) The CCR concept shall be promoted up to the district level and a wide-area network-based communication up to the central level will be established. The availability of trained manpower at such control units ensures effective handling during/following a disaster. Concepts like MARG and RC will be promoted at different levels to develop them as important aspects of the existing system.
 - xiii) Effective and simplified communication networks as a dedicated fail-safe communication system to the important stakeholders in the On-Site as well as Off-Site emergency plans shall be established.
 - xiv) Information databases and their public access and response system.
 - xv) The pilot study GIS-based emergency planning and response system for chemical accidents in MAH installations in major industrial clusters shall be developed into a national-level programme. The initiative needs to ensure the participation of all stakeholders starting from town planners, district authorities, institutes involved in DM planning to the corporate sector and national agencies involved in digital mapping etc.
 - xvi) The civil defence and home guards can be effectively utilised in chemical emergency management after some basic training. Their skill, functions and temperament are attuned for effective use in emergencies. An exercise in revamping the structure, functions and practises of home guards and civil defence, and redefining their roles in DM shall be carried out.

- xvii) Procedures and actions for response agencies especially fire service, police, home guards, medicos, paramedics and community leaders needs to be updated.
- xviii) The number and capabilities of poison centres shall be augmented. To start with, at least one centre each will be planned for each state. Ultimately, every district of the country will have at least one such poison centre.
- xix) Expert institutional framework to deal with specific chemicals at every stage.
- xx) Adequate training to trainers at industry, factory inspectorate, responders, district authorities and community levels.
- xxi) Identification of professional bodies and employment of professionals and technocrats for critical safety evaluation of chemicals.
- xxii) Specific research institutes working in the field of chemical sciences, CDM, toxicology, and related biological fields shall be identified and updated to perform research on newly introduced chemicals to produce viable MSDS (if not existing), ways of protection, antidotes against different chemical derivatives of the original compound, case studies at installation levels, development of skilled manpower that understands differences at the micro-research level that will be eventually used to develop a safety system. Dedicated R&D centres and other institutions will work within such an integrated system.

4.2.4 Awareness Generation

A well-informed community is an asset both for industry and local authorities. Rapport with the community creates tremendous goodwill for industry. Effective two-way communication contributes to proper understanding and prevents the probable conversion of a small incident into a potential disastrous event. A strategy for

community awareness on HAZMAT is given in Annexure D.

Key suggestions include:

- i) Select target groups with the help of district administration/DDMA and community leaders.
- ii) Critical management teams at various levels responsible for community awareness need to be created.
- iii) Mechanisms for surveillance, thereby identification of targeted community and mutual help groups/associations needs to be established.
- iv) A standardised strategy needs to be adopted for identification of vulnerable locations, development of specific hazard information, warning mechanisms, simple basic advice sheets, family DM Plans, information and actions as a concerted response using all modes of media and promotional events.
- v) The concept of 'Emergency Action Advice' shall be adapted into a standard format using graphs and pictures so that the illiterate population also understand the response portion of the DM Plans.
- vi) Communication channels for community participation shall be established.
- vii) Community awareness programmes shall be based on the best practises that have been successful in the recent past.
- viii) The information provided will be simple, correct and need-based. The information to be passed on to the community should be properly perused and vetted by local district management establishments and a community representative shall be appointed by the crisis group/district administration/DDMA.
- ix) Community awareness shall be regularly conducted by local organisations.

- x) Ensure participation of designated Community Information Representative (CIR) by industry and DDMA in the generation of community awareness.
- xi) Ensure periodical training of community educators.
- xii) Create facilities of appropriate slogan display boards and audio-visual shows for sensitisation.
- xiii) Local welfare associations and panchayati raj institutions will be included in the emergency preparedness programme.
- xiv) Use of visual and print media for enhancing awareness among people regarding chemical disasters will be encouraged.
- xv) Public awareness about HAZCHEM, their effects, dos and don'ts during an accident and remedial measures will form a part of community awareness.
- xvi) The community will be educated on the urgency of action and immediate relief for clean water, food, hygiene, sanitation and shelter and the laid-down minimum standards.
- xvii) All community awareness programmes will be conducted in coordination and partnership of authorities of district administration and industry.

4.2.5 Institutional Framework

An institutional framework for providing technical support services at various levels is a key requirement for sustaining proper development and implementation of the DM system. Industries shall extend help in training and building capabilities of responding agencies, and during an emergency shall provide their expertise, trained personnel and equipment.

- i) It is necessary to identify and prepare a comprehensive list of national-level

institutions to provide necessary technical inputs to different stakeholders:

- a. Identification/establishment of institutions for the development of technology, processes, practises, procedures and other measures for improvisation in chemical safety.
 - b. Needs of these institutions shall be assessed and necessary resources including international technical inputs will be provided to them.
 - c. The states shall also ensure that the designated institutions in their states shall have sufficient resources to assume responsibility and continuation of work on chemical safety.
 - d. States may designate some institutions as competent authorities for different purposes such as for information exchange, or for some specific industrial chemicals with underlying purpose of improving their safety in manufacture, storage, transportation and import.
- ii) A register of designated national and international institutions will be maintained and updated by the nodal ministry.
 - iii) These institutions shall be assigned:
 - a. To develop training modules (package of training courses) for trainers of different target groups that would be emulated by other identified institutions in the country for developing capabilities at different levels.
 - b. To develop an information exchange system.
 - c. To work on novel technologies and initiatives especially on the preparation of safety data for chemicals.
 - d. To focus on specific chemicals imported in the country for the purpose

- of research and analysis in the quantities likely to affect human health and environment.
- e. The post-disaster documentation by the identified bodies shall be done at national/state/district levels.
 - f. Comprehensive epidemiological study/cohort studies on the effects of chemical disasters on the environment and public health will be carried out by these identified institutes in the disaster-prone areas so that baseline data is available for the development of preventive and mitigation measures.
- iv) Indian industry associations and federations namely, CII, Associated Chambers of Commerce and Industry (ASSOCHAM), FICCI, ICC, Alkali Manufacturers' Association of India (AMAI), etc., shall volunteer for R&D work and also for further transcending information to industries in augmenting safety measures.
 - v) The enforcement agencies shall be updated with the latest information technology. The software required for risk assessment/consequence modeling shall be available to the nodal ministry/CCG, state authority/SDMA and district administration/DDMA. Necessary training based upon latest scenarios need to be properly evolved and imparted to the respective officials.
 - vi) Liaison and rapport with International Institutions like the United Nations Development Programme (UNDP), UNEP and WHO need to be established to keep abreast with their R&D activities on risk reduction in the chemical industry and to study the adaptation of some of the studies in the Indian context.
 - vii) A large number of institutes shall be encouraged to increase the number of seats for grants of diploma in industrial safety. A

network of designated national institutions shall be created for transparent and vetted conclusions. This would bring about uniformity and quality in the training system for the regulatory agencies, industry, consulting organisations and professionals, etc.

4.2.6 Networking and Information

An information and networking system will be developed as part of DM Plan at district, state and national levels, which will be regularly updated and manned round-the-clock. A framework sufficiently robust, yet flexible, shall be evolved to provide necessary information availability for all stakeholders.

- i) The information networking system with the states and the districts needs to be established on a priority basis. All the departments concerned will have a control room as a part of the networking system.
- ii) At the national level, India Disaster Resource Network (IDRN) is already functioning as a nationwide electronic inventory of essential and specialist resources including both specialist equipment and specialist manpower resources for disaster response. The IDRN shall be updated regularly in integration with the control room in the Hazardous Chemical Management Division at the MoEF. This will include a list of equipment and resources categorised by type and by the functions it performs. Contact addresses and telephone numbers of the controlling officers-in-charge of the said resources will also be included and updated. Except for some critical data, the rest will be available for public access.
- iii) An exclusive CDM website needs to be developed and maintained by the nodal ministry, states and districts that will

contain comprehensive databases on HAZCHEM used nationally and internationally. Data shall also be available on important subjects like regulations, side-effects of HAZCHEM and their antidotes. The website shall also be accessible to the industry and public at large.

- iv) Hazard analysis in industrial pockets is already operational, on-going and supported so that it can be completed in a time-bound manner. The existing data and new data that emerges will be used in drafting the new and updated district DM plans.
- v) MARG at the industry level will also be part of the networking system with industries and state/district authorities.
- vi) Print and electronic media require awareness and education for information transfer to the community. SOPs and a code of ethics for print and electronic media is necessary for a disciplined, structured and panic-free approach for quick communication to the community of any disastrous event and its immediate consequences. The media shall play a supportive role especially for:
 - a. Mobilisation of resources.
 - b. Dissemination of useful information that can help the community in managing the effects of disasters.
 - c. It can provide information about relief and rehabilitation measures, medical support sites and other functions so that the sufferings are minimised and people receive latest information about their relatives and friends amongst the disaster victims. The entire exercise shall be done without encroachment on the independent functioning of the press and media but for curbing rumours and provocative statements.

- vii) There is a need to develop a regular programme or a dedicated emergency channel for the quick flow of information to the community.

4.2.7 Medical Preparedness

Medical preparedness will include the recognition of the impact of chemical disasters, and shall focus on injuries, illness and public health problems including psychosocial trauma that results in their wake. It shall address integration of medicine and public health with On-Site and Off-Site emergency plans, and crisis management at the hospital. Medical preparedness shall also address the necessity of planning and practise, exercises involving local, district, state, central government and voluntary agencies. It must include problem solving, based on the past experience of disasters. Employee State Insurance Corporation (ESIC) hospitals will also play an important role in the medical management of chemical disasters. Medical preparedness shall address the following facets:

A) Creating Awareness

All medical and paramedical staff shall be made aware about the type of illness, injuries, burns and other health problems caused by various toxicants and their preventive prophylactic and therapeutic measures. Awareness programmes will also be conducted for the employees of the industry and community in the vicinity of the chemical industrial installations and storage.

B) Creation of Trained Specialised Medical First Responders (MFRs)

Adequate medical and paramedical staff shall be trained in first aid and resuscitation measures as an essential component of On-Site and Off-Site emergency plans and for transportation emergencies. Specialised MFRs of the NDRF and

the SDRFs shall be trained and kept ready to supplement paramedical teams of the district administration/DDMA and other authorities responsible for the medical management of casualties. All members of the medical and paramedical staff team will carry out regular mock exercises based on the specific SOPs prepared for chemical casualty management.

C) Creation of Decontamination Facilities

Decontamination facilities need to be created in the On-Site and Off-Site emergency plan of MAH units. A mobile decontamination facility including a personnel decontamination vehicle and site decontamination vehicle also needs to be created so that it can be readily available to move to the site of incident.

D) Uniform Casualty Profile and Classification of Casualties

Medical officers will design a prototype of casualty profiles and their antidotes, based on the type of toxicants. A uniform profile will also be made for secondary injuries so that the treatment can largely be standardised.

E) Risk Inventory and Resources Inventory

A list of all the toxicants and their hazardous effects on the health and environment must be prepared at all levels for medical management plans both in On-Site and Off-Site plans. Inventory of antidotes, other prophylactic/therapeutic measures and medical equipment shall also be prepared and stocked at the hospitals. Data on chemicals being used and their antidotes shall be made available to the patient evacuation authority and also in the hospitals which are required to treat the victims. All the identified hospitals would have adequate stock of PPE including respirators.

F) Plans for Evacuation

A patient evacuation plan with a flow chart must be made, keeping the meteorological conditions in view. The plan will be further strengthened by creating an adequate number of ambulances/specialised ambulances fitted with resuscitation equipment to maintain vital parameters during evacuation. Resources for special ambulance helicopters, ambulance trains, etc., will be strengthened at all levels and a proper resource inventory will be prepared for the purpose. The ambulance shall have SOPs for treatment procedures and a list of specific antidotes. Acute health risks must be defined and known to paramedical staff, who are accompanying the patients in the ambulance. Vital parameters (like pulse, blood pressure and respiration) and intravenous drips of disaster victims shall be monitored and maintained during their transfer to hospital. It is essential to emphasise that medical persons at the site shall be used for their expertise, and activities like search and rescue, fire and chemical fighting shall be done by civil defence, fire services, police, NDRF, SDRFs and other stakeholders.

G) Proper Chemical Casualty Treatment Kits

A kit containing antidotes to various toxicants and resuscitation drugs need to be prepared. Gudel airways are one of the essential components of the kit. The concept of a mobile lab is required to be introduced in the long run so that the type of toxicants and their by-products can be identified at the site itself. Knowledge of the exact nature of the chemical will facilitate proper antidote administration and effective treatment for early recovery.

H) Crisis Management Plan at the Hospitals

A crisis management plan will be prepared by all earmarked hospitals. The responsibility for preparation and implementation of the plan lies solely with the medical superintendent of the

hospital. Establishing decontamination facilities, training medical personnel, creating awareness of toxicants and their antidotes and collection of biological samples like blood, urine (to be frozen) shall form part of the crisis management plan. A decontamination room is to be established in the hospital. All chemical casualties have to be taken first to a decontamination room. Stocking and turnover of antidotes needs to be maintained. A specialised laboratory for chemical analysis is to be established at the state level. A contingency plan is to be made ready for bed expansion. Wards must have bio-waste disposal facilities also. All earmarked hospitals would have a hospital disaster plan specifying the roles and responsibilities identified for managing chemical disasters. This shall include identification of a hospital incident command system, the command nucleus, the quick response teams, etc. The contact details of the members of the command nucleus and quick response teams, shall be available with the medical superintendent and district administration/DDMA.

A group of specialists like neurologists, hematologists, gastroenterologists, chest physicians, ophthalmologists, reconstructive surgeons and dermatologists must be fully trained to handle immediate and long-term effects of chemical disasters. Paramedical teams must also be trained to provide nursing care to chemical casualties. A sufficient quantity of medical stores i.e., antidotes, antibiotics, other drugs and life-support system/equipment must be available at the hospitals. The availability of oxygen, continuous positive air pressure (CPAP), ventilators, dialysis facilities, blood and IV fluid for transfusion must be stocked. Hospital staff shall also be trained for the accurate accounting of morbidity and mortality data. The medical superintendent must be able to forecast the enhanced numbers of doctors and paramedical staff required at the time of a disaster. The state will identify at least two hospitals which would be strengthened to cater to chemical disasters. These facilities would be extended over a period to all districts, the districts with clusters

of MAH units shall be given priority. The identified hospitals will have detection, protection and decontamination equipment, and indoor beds to treat at least 50 victims including 10 critical beds in intensive care units exclusively maintained for such a purpose, strictly following proper isolation/air barrier protocols.

The identified hospitals will develop proper facilities for disaster victim identification and management of dead bodies.

I) Mobile Hospital/Medical Team

The mobile hospital/medical team shall be trained in the health-care delivery system of the district administration/DDMA to manage patients with minor injuries at the incident site and will evacuate only those patients requiring hospitalisation. This will not only provide prompt medical care but will also relieve the pressure from the hospital. The capacity of a mobile hospital depends on the magnitude of the disaster and population to be treated.

J) Preparedness for Public Health and Environmental Effect Response

- i) Preparation of a toxicology database with information on specific chemicals.
- ii) Availability of information on diagnostic facilities, general and specialised treatment facilities, specialised sources of expertise.
- iii) Information on specific antidotes and other medication and where they are stockpiled must be made available.
- iv) The public health response team consists of a physician, toxicologist, environmental specialists, public information experts, community and medical representatives.
- v) Awareness about safe water, standards of proper hygiene and sanitation, availability of food and nutrition.
- vi) Poison control centre shall be strengthened.

4.3 R&D

R&D is mandatory to revisit, revise and update information at regular intervals, to capture the knowledge at national and international levels, and provide it to the different stakeholders involved in CDM. This is also applicable to:

- updating of equipment
- industrial technologies
- need-based equipment
- knowledge about newly emerging toxicants and their clinical management.

Continuous R&D activities in the area of CDM system are needed. This can be achieved through participation in national and international conferences, consultation with technical and professional bodies and making arrangements to impart this knowledge to different stakeholders.

In view of the above, the nodal ministry will ensure the R&D activities to be incorporated at all levels by establishment of research activity cells i.e., national/state/district levels including industry and other stakeholders identified in Off-Site and On-Site DM Plans. These activities shall include:

- i) Consultation with advisors, consultants, and young researchers/trainees/research fellows for keeping a track of national and international developments.
- ii) Appropriate feasibility and regular studies to capture the knowledge base and advise the authority.
- iii) Critical analysis of technology initiatives and development of need-based technologies for detection, protection (including for improving PPE so as to make it suitable for Indian tropical conditions), monitoring of common toxicants and their effective management shall be given top priority.
- iv) These knowledge workers shall be encouraged to interact with other subject

experts by participating in national/international workshops, meetings and symposia and training courses so as to apprise them of the latest happenings.

- v) Good laboratory practises shall be established.
- vi) Special need-based courses could also be drawn up with the help of professional bodies and advance teaching/training institutes in India and abroad.
- vii) The pace of scientific research in the areas of technological information, results of hazard and risk assessments, socio-economic methodologies and the tools to develop and apply science-based standards, harmonised risk assessment and management principles needs to be accelerated for improving chemical safety management systems. The approach may provide for more efficient use, substitution by less hazardous chemicals, in a time-bound programme.
- viii) The R&D approach, in-house at industrial level and through sponsored work at the institutional level requires to be augmented with designated R&D institutions functioning independently to generate and provide material safety data which has withstood scrutiny. The financing of such institutions shall be partly allocated by central and state government funds through environmental levies, viz., cess, environmental funds, consent and testing fees etc., and partly by industries.
- ix) IITs, Indian Institutes of Management (IIMs) and other engineering and management colleges/institutions which are actively taking up industrial projects will be encouraged to open up separate facilities for R&D on safety aspects of chemicals/processes.
- x) Pilot projects can be undertaken for newly emerging toxicants (produced

directly or as by-products) and to test the new technologies developed in India or abroad.

- xi) Customise and validate computer software by professional organisations.
- xii) Develop safer and cost effective alternative technologies for operations.
- xiii) Research activities could also be extended to the field of nanotechnology-based biosensors and development of newer biomarkers for detection of exposures (metals, pesticides, other chemicals and conjugates), effect (alteration in enzyme activity, molecules, receptors) and susceptibility (levels of enzymes involved in metabolism of chemicals, receptors and other chemicals).

4.4 Response, Relief and Rehabilitation

Disasters of major dimensions require prompt and effective response mechanisms and dedicated operations of long durations for relief and rehabilitation. A coordination between national, state, district bodies, institutions and industries to develop an integrated teamwork is a key component of relief and rehabilitation measures. Rehabilitation will be comprehensive and will take into account all the measures that will lead to normalcy in relation to financial, education, shelter, social and health aspects. All the states/districts shall address adequately the standards of relief and rehabilitation and the funding strategy for continued development and implementation of mitigation practises at the local level. It is essential to have a unified relief policy for all DM Plans (natural or man-made) at national, state and district levels that is updated from time to time.

4.4.1 Important Elements of Response

Efficient and quick response to disasters depends upon the state of preparedness of all the

stakeholders of On-Site and Off-Site emergency plans. The response activities shall be a multi-hazard concept so as to minimise the impact of the disaster in terms of life, environment and property. In the case of CDM, it becomes specific in some areas.

- i) It is essential to classify the disaster on the basis of magnitude of probable severity and level of control required, i.e., Level 0, Level 1, Level 2, Level 3:
 - a. **Level 0:** No disaster situation. This is the level at which surveillance, preparedness and mitigation activities must be carried out.
 - b. **Level 1:** A district level disaster, within the capabilities of the district administration to deal with.
 - c. **Level 2:** A state level disaster, within the capabilities of the state government to deal with.
 - d. **Level 3:** A National level disaster, requiring major direct intervention of the Central Government.
- ii) The response plans shall be based upon the level of disaster and SOPs shall be available with all emergency support functions in accordance with the level of disaster and shall be clearly mentioned in the district DM Plan.
- iii) In addition, it is recommended to define the alert, local area emergency, general emergency and the indicators for notification of any event that is unusual. A well-established signal/warning system along with the declaration of emergency and the emergency activation pathway to be adopted according to the level shall be in place to develop the preventive strategies at the installation site, Off-Site areas and transport emergencies etc. The alerts and indicators should be integrated into the response plans at different levels.

- iv) The community acts as a first responder in all hazards but in the case of CDM, the community must be made aware that the issue of specialised self-protection is required to be addressed. Thus, community-level awareness and training programmes can save a number of lives in real-time scenarios.
- v) Quick mobilisation and reaction of first responders for search and rescue, medical emergency response, fire and other activities are the major components that shall be worked out at a micro level in the risk zones of industries.
- vi) An incident command and technical coordination system for specific disastrous situations shall be identified, made available, tested and incorporated in the district DM Plan.
- vii) Emergency response activities, incident reporting protocol, incident verification and assessment, indicators about declaration of emergency, role of emergency support functions, systems that give an indication about the end of an emergency, general guidance procedures, functions to be performed by different emergency control rooms, communication by identified experts and action by authorities in accordance with the level of alert etc., will also be clearly mentioned in the DM Plans.
- viii) Communication back-ups shall always be available with different stakeholders including an alternate wireless-based communication system and satellite system.
- ix) The various response agencies including fire, police, NDRF, medical authority and other stakeholders shall have their laid down detailed response procedures on their role and responsibilities, infrastructure, manpower, prevailing practises and other related logistics. They shall have their emergency management plans integrated in the district/local emergency plan in advance.
- x) The district authority will ensure the availability of relief material (including medical relief), rescue and search, medical teams and integrated approach with the prompt response of various responders and other services. The inventory of all emergency logistics shall be made available on the web by using the IDRN database.
- xi) Specific SOPs will be prepared for safe translocation of population if the intensity of the disaster needs complete evacuation. While preparing SOPs, care shall be exercised to maintain a balance between the probability of occurrence of panic and promptness in response.
- xii) The civic responsibilities including identification of victims, safe disposal of dead bodies, preventing the spread of contamination and post-disaster psychosocial care shall also be dovetailed into the practise of various responders.
- xiii) The response plan will also include security and safety provisions. Development of infrastructure including EOCs, control rooms and other networks and training of specialised responders, equipping them with latest state-of-art equipment and rehearsing their activities via mock exercises/drills are the key issues for preparedness for an effective and prompt response.
- xiv) Establishing the minimum time taken for corrective action by physical presence and operation of designated mobile hardware, equipment and manpower of trained industrial personnel and other first responders.

- xv) Response time is different for different industries depending upon many factors including lethality of chemicals and micro-meteorology of the region. However, an attempt shall be made to bring down the response time to a practical minimum duration. One such tool is mock drills and development of a healthy competitive pro-active approach for safety among industries.
- xvi) Testing of response plans by mock drills on the basis of a pre-calculated response time in the DM Plan, the response procedures of authorities/team members will be checked by conducting regular On-Site and Off-Site emergency drills.
- xvii) The role of press and electronic media shall be integrated in a disciplined manner so as to help in developing an effective alert system, evacuation plan, public guidance and dissemination of disaster-related screened information to avoid unnecessary panic.

4.4.2 Emergency Medical Response

Emergency medical response plans will be incorporated in all On-Site and Off-Site plans for prompt medical care. Adequate infrastructure for trained medical and paramedical staff along with SOPs for chemical emergencies shall be ensured. Existing poison control centres, poison information centre, Environmental Information System (ENVIS) centres and ERCs shall be adequately available in close proximity to the disaster-prone area and obligatory capacities should be built.

A) Emergency Medical Response including, Rescue, Relief and Remedial Measures

In case of chemical disasters, the crisis management at hospital shall be immediately activated by triggering inbuilt mechanisms for prompt emergency medical response. The steps

taken in the first few minutes will determine the effectiveness of disaster mitigation. Quick Reaction Medical Teams (QRMTs) with PPE will reach the accident site immediately along with resuscitation, protection, detection and decontamination equipment and materials. Resuscitation, triage and evacuation work must be done as per SOPs. In hospitals the disaster victims shall be decontaminated and kept in a clean special ward. Initially, based on early symptoms, the type of chemical is assumed, symptomatic treatment initiated and an antidote administered. Blood is then analysed to find out the exact chemical agents and further course of treatment is decided. All supportive treatment must be given in the hospital immediately. The hospital casualty room should be well-equipped with resuscitation equipment like oxygen cylinders, suction apparatus, airways, laryngoscopes, ventilators, pulse oxymeters, defibrillators, life saving drugs, antidotes, auto injectors and dressing material.

B) Post-disaster Public Health Response

This is one of the prime responsibilities of the medical authorities. They must ensure availability of safe water supply and clean food along with maintenance of hygiene and sanitation by proper bio-waste disposal. Water testing and food inspection must also be carried out before consumption.

C) Post-disaster Documentation and Research

These documents will be prepared by a medical administrator. During response in hospitals an information centre will provide information to the public, to relatives of victims, and media. This will include warning guidelines, dos and don'ts, and the status of patients in the hospital. Dissemination of information to electronic and print media will also be carried out by the medical teams. Documentation, lessons learnt, follow up and research programmes should be used as feedback for future improvement. A research analysis is

required to find out the success and failure of the DM Plan. A pilot study is to be carried out to understand the causes of failure that need to be addressed in future plans.

D) Medical Response to Long-term Effects

The knowledge creation of long-term effects on the exposed population will help in the management and prevention of disease. In the post-disaster scenario some of the casualties will develop sequels due to chemical injuries. These cases may need regular follow-up, medical care, reconstructive surgery and rehabilitation. Close monitoring is required to identify and treat long term health effects like blindness, interstitial lung fibrosis, genetic disorders and neurological deficiencies etc.

4.4.3 Relief and Rehabilitation

- i) Immediate provision of relief to affected people in cash and kind for the loss of life and property, shall be done in a sensitive manner to assuage the feelings of sufferers.
- ii) Establishment of properly documented procedures for economic, social and medical rehabilitation.
- iii) Judicious use of allotted finance for achieving optimal social and economic rehabilitation.
- iv) Rehabilitation at alternative locations is necessary for temporary/semi-permanent dwellings.
- v) Reconstruction and restoration of infrastructure shall be achieved at the earliest. The restoration of normalcy and day-to-day functioning is an important factor for consideration. Infrastructure for the long-term follow-up of surviving victims is an essential measure. The strategies will be adopted keeping the same in mind.
- vi) Under the Public Liability Insurance Act, 1991, MAH installations are required to take

third-party insurance policies for providing relief to accident victims due to a chemical accident On-Site. The Act also provides for an Environment Relief Fund (ERF) to accident victims and enables payment of relief over and above the insured amount. The MAH units pay an amount equal to the premium to the ERF. The implementation of the Act needs to be strengthened. Statutory provisions shall be strictly implemented. Further, the insurance sector will be encouraged in strengthening the transport emergency management effort by providing statistical information and financial support. For vehicles carrying HAZCHEMs, special insurance provisions for driver, attendant and vehicle will also be evolved.

- vii) The district administration/DDMA will also evolve an appropriate mechanism to provide compensation to non-governmental people including the community, if they are injured during any humanitarian activity.
- viii) Medical Rehabilitation.

The psychological impact of a chemical disaster manifested as psychosocial trauma including psychological reactions, post-traumatic stress disorder and other psychological ailments in displaced disaster victims, needs to be addressed. Counseling by psychologists and psychiatrists for those suffering from mental trauma is an essential element of medical rehabilitation.

The relief and rehabilitation measures will be prompt and best achieved by the collective and constructive action of all stakeholders.

4.5 Guidelines for CDM at State and District Levels

Disaster events are normally faced by districts and if the level of accident is high, then states and

the centre have to step in to mitigate the disaster. At the state level, the preparedness measures shall be adopted and implemented in a similar fashion to that at the centre. State DM abilities shall be self-contained as far as possible, to tackle chemical disasters in an effective manner. The Guidelines issued by the NDMA in terms of function, finance and various activities will be integrated into the state DM Plans. It is necessary on the part of the state to safeguard the community in all aspects and by all means from any unexpected emergency.

Broad guidelines for state functioning include:

A) Preparation of State DM Plans

- i) The plans will be prepared in accordance with Section 23 of the DM Act, 2005.
- ii) The risk reduction framework shall be prepared on the basis of dynamic quantitative risk assessment of multi-hazard components of disasters using different methodologies.
- iii) The State Plan shall indicate the measures and corresponding funding strategy for all the components of the DM cycle.
- iv) Chemical risk-based micro zonation of states will prioritise the areas for capacity development during each phase.
- v) The State Plan is based upon the all-hazard approach and its superimposition, with a development strategy to be adopted for the future.
- vi) The definite pre-, during- and post-disaster plans shall be prepared and integrated on the basis of probabilistic simulation models of chemical disasters.
- vii) The State Plans will identify the roles and responsibilities of each stakeholder involved in different disasters and the experts/resources available in the same or neighbouring states. Schedule 5 of the

MSIHC Rules, 1989 (amended in 2000) specifies the roles of authorities and emergency services. Annexure E illustrates the important roles and responsibilities of a few stakeholders in CDM.

- viii) The State Plan shall give specifications about the large scale procurement of various DM equipment like HAZMAT vans.
- ix) The State Plan shall be practical in approach, community-centric and regularly updated to fill the critical gaps.

B) The state shall ensure that strict regulations will be in place and shall be implemented in an effective manner such that a balance between industrial growth and protection of community and environment from the short and long-term consequences of this expansion can be met.

- i) Industries select various sites for putting up their operations after critical evaluation of a number of parameters like proximity to natural resources (raw material, mineable ores, agriculture produce, bio-mass, etc.), power and water availability, assimilative capacity of the environment and infrastructure development, besides the proximity to large markets for finished goods. Chemical industries have to conform to a number of fresh guidelines for establishing their units at a particular location, including carrying out comprehensive environment and risk impact assessment studies for safeguarding the population in the vicinity during normal operations, or in the case of accidental toxic release. Industries also prepare Emergency Management Plans (EMPs) and Disaster Management Plans (DMPs) for continuously improving the operation with regard to environmental and safety criteria. States will ensure all these criteria have been met prior to establishment of a new industry.

- ii) A state must also ensure that once the industry has been allocated a site, population clusters will not occur in close proximity to these industries.
- iii) The states need to develop a strategy based on PPP for the development of buffer zones all around the industry in an effective manner and establish Off-Site responding agencies at an appropriate distance from the new installations.
- iv) The state has to direct the district administration to monitor the safety provisions including the emergency medical response components at the new installations and also support the district financially to develop Off-Site safeguards.
- v) It would be ideal to relocate the existing industries especially the MAH units away from proximate inhabitants though it may not be feasible in all cases. The alternative is to relocate the population settlements and if this is also not possible, the safety-related provisions to improve environmental and safety systems will be developed to minimise the impact of the industrial operations on the external population.

C) States need to spell out the specific areas of concern on safety measures within the industry and thereby formulate stricter DM Plans. Some of these guidelines at state and district levels include:

- i) Process safety code of management practises based on principles of safety in design according to sound engineering practises; built, operated and maintained properly and periodically reviewed for conformity.
- ii) Process safety, an interdisciplinary effort has four elements: management leadership, technology, facilities and personnel (including community). The practises include process safety from the

design stage through operation, maintenance and training. Safe On-Site storage of chemicals is an essential element of process safety which also provides for transparency in documentation and installations and recognises communities interests for their participation.

- iii) Management leadership is provided through policy, participation, communication and resource commitments in achieving continuous improvement of safety performance. Audits for compliance, measurement of performance, implementation of corrective actions; investigation, reporting and follow up of each incident are important elements.
- iv) Similarly technology, facilities and personnel provide for periodic safety reviews, complete documentation, up-gradation and identification of knowledge and skills of plant personnel necessary to perform each job.
- v) States have also to formulate guidelines on transportation, storages and in all other identified areas under the national guidelines for instituting self-regulation models in industries with the help of knowledgeable and experienced personnel available with the regulatory bodies and the expert institutions. Monitoring at the state level for On-Site and Off-Site safety provisions would continue to be looked after by designated regulatory agencies through their technical personnel with the help of a well-prepared check list/audit format. Review of progress of implementation of the guidelines at all stakeholders' level shall continue along with continuous technical and strategic discussions, and exchange of information.
- vi) States shall strengthen ERCs at state, district and local levels as well as crisis

groups for effective functioning by providing full-time technical personnel, software and hardware for 24-hour monitoring and providing assistance during On-Site and Off-Site emergencies in a more focused and planned way. All these groups will have MSDS on all HAZCHEMs (both in soft and hard copies) listed in the MSIHC Rules. Investment in manpower, equipment and other facilities for the crisis groups, important responders to the emergencies and the community (for temporary and permanent relief, rescue and rehabilitation) shall be made through a well-planned time-bound programme, so that after the final implementation no gaps exist. The role played by the state authority/SDMA and district administration/DDMA shall be well understood and communicated to all concerned in the industry, ERCs, crisis groups and state, district and local authorities for their maximum contribution and coordination.

The success of the guidelines and DM Plans for prevention and management of chemical disasters depends on constructive action taken at local and district levels in activities including planning, budgeting, training, institutional support, infrastructural development, management of emergencies, relief, rescue and rehabilitation, jointly by industries, district authorities and the community as a whole.

The state will allocate the funds judiciously based upon a mission-mode approach to achieve the targets in a time-bound manner in different phases of development. The micro functioning of the state plans can be inferred as the district DM Plans. It shall specify all the recommendations indicated in the state system in an implementation pattern. DDMA has been empowered by the DM

Act, 2005 and also given the responsibility to prepare themselves to respond to any disaster.

4.6 Preparation of On-Site and Off-Site Emergency Plans

Essential elements of the framework of the On-Site emergency plan shall be kept in mind while designing the DM Plan. The pre-defined framework would be useful for a medium to large-scale industry. The framework may be modified depending upon whether it is a small-scale unit or mega-scale complex. A summary of a few suggested elements of an On-Site Emergency plan is given in Annexure F. Every On-Site emergency plan will have a section for use in preparation of Off-Site emergency plans (Annexure G).

The district emergency authorities have a statutory responsibility for the preparation of the district Off-Site emergency plan based on inputs from the On-Site emergency plans of the industries in the district/industrial pockets. The district collector is required to prepare and update the Off-Site emergency plans for the industrial pockets. However, in practise they are not made by involving all the stakeholders including the community. A process of discussion with all stakeholders represented on these bodies, for consensus to develop an appropriate Off-Site plan for proper execution during an emergency is essential.

The Off-Site plans are made with varying contents and structure although some guidance is available from the contents provided as a schedule¹ to the MSIHC rules, 1989, as amended till date and in the form of a guideline² that has been prepared under the CA(EPPR) Rules, 1996. The plan exists mostly on paper, to satisfy the legal requirements. There is no standard format available at the national level for the structure of the Off-Site emergency plans. Medical emergency plans as an integral part of the

¹ Schedule 12 to The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 amended till date.

² A guide to the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 and On-site and Off-site Emergency Plan, WHO, 2001.

Off-Site emergency plan have not been addressed in either of the rules mentioned above. The following approach needs to be kept in mind while standardising the Off-Site plans:

- i) Standard structure of the Off-Site emergency plans shall be developed at the national level by referring to the above stated Rules.
- ii) The aspect of the medical emergency plan being an integral part of the Off-Site plan, shall be addressed appropriately. The nodal ministry (MoEF) with the help of the Health Ministry shall strengthen the infrastructure facilities and improve the response time to best achieved standards.
- iii) The plan is needed to be practical, based upon management of the scene and shall encompass issues of hot, warm and cold zones.
- iv) The plan shall specifically spell out the basis of scenarios and there will be no confusion in deciding maximum credible loss scenarios or worst case scenarios. Risks shall be dovetailed with the risk scenarios of the district Off-Site plans so that the plan has practical implications.
- v) There shall be a specific provision to specify the criteria of safe zone/buffer zone/ Land-use pattern around the industry. Preferably, the buffer zone shall be maintained by the hazardous industry itself and these points will be considered as an interface between the Off-Site and On-Site plans.
- vi) Certain industries located at the boundary/ overlapping boundary are generally overlooked due to overlying responsibility. Thus, clear-cut responsibility shall be assigned to the district administration for such units.
- vii) The preparation of these Off-Site plans will have a time-bound schedule and time will be given to a district to prepare them depending upon the number of industrial clusters, vulnerability and population size involved.

An Off-Site emergency plan consists of the following broad elements:

- Identification of hazards and hazard analysis.
- Concept of operations.
- Proper and detailed hazard analysis is the starting point for an Off-Site emergency plan. Off-Site emergency plans are based upon the On-Site emergency plan of the MAH unit. A summary of the results of hazard analysis of the scenarios having Off-Site consequences along with templates shall be included in the plan.
- Emergency response procedures including procedures for quick response to medical emergencies, transport to assembly points/shelters, evacuation, temporary/final rehabilitation and relief, both physical and medical.
- Training.
- Infrastructure and resources.
- Details regarding the following shall form a part of the document:
 - a. Site-specific data such as geographical features, meteorological data.
 - b. Demographic data.
 - c. Description of MAH installations, likely accident scenarios and other relevant information.
 - d. Summary results of release consequence calculations along with the use of templates.
 - e. Important telephone numbers.
 - f. Resource directories.

All the emergency plans (On-Site, Off-Site and medical emergency plans) shall be perfectly dovetailed so that the critical response time under each plan immediately complement each other, helping in minimising impact and suffering in case

of Off-Site emergencies. The following guidelines are suggested to improve the implementation of emergency plans:

1. The existing LCGs/DCGs will be empowered by providing a separate budget allocation, manpower, infrastructure, communication equipment and other resources. When new industries are approved, the state must upgrade the DM Plan to be commensurate with the additional risk and requirement.
2. Database availability and updating in the control room is to be improved.
3. The infrastructure facilities and management structure for the control room/CAS will be strengthened.
4. A system for flow of information in the nodal ministry and from the accident site in the states shall be detailed and documented.
5. Every Off-Site plan shall also lay down provisions for the management of waste generated due to disasters related to transport accidents and industrial events. It is necessary to dovetail the associated risks and evolved mechanisms to handle such hazardous wastes.
6. Mock drills shall be conducted regularly for evaluation of all the above aspects. The responsibility to conduct mock drills shall be fixed on the chief coordinator of the district administration/DDMA.
7. In Off-Site emergency plans covering the coastal authorities, the port authorities will also be an effective member of the team.
8. There should always be an alternative nodal officer for emergency support function units in the Off-Site plan. In addition, a ready reckoner of each department's role in brief will help the concerned staff in better understanding of their role.

5 Guidelines for Industrial (Chemical) Installations and Storages

5.1 Industrial (Chemical) Installations

A prime area of concern is the strengthening of the industrial systems for the prevention and management of chemical accidents. Such provisions shall be established to continuously re-engineer (improve and upgrade) the system. As a part of government policy, it is envisaged that the present regulatory inspection and monitoring framework will evolve measures to encourage self-regulation, public consultation and PPP. These activities would develop credibility at all levels.

The important guidelines are listed below:

5.1.1 Good Engineering for Safety

This is applicable for the prevention and minimisation of all disasters—both man-made and natural. In the context of industrial disasters, good engineering is the first step in achieving safety. The setting up of new industries by an occupier shall be done in consultation with the state inspectorate, considering all parameters including geographical, seismological, demographic and environmental factors. The process engineering and control including detailed evaluation at the design stage are essential inputs for safety.

Engineering methods to control hazards include:

- i) Change of processes: to shift to less hazardous processes.
- ii) Change of material: to shift to less hazardous material.
- iii) Change of equipment: to replace machinery before the expiry of residual life.

- iv) Detailed engineering of each equipment under requirement, capacity, specifications and regular maintenance of history sheets for fault analysis.
- v) Regular testing of critical equipment/storage vessels through non-destructive testing (radiography, thickness survey, hydraulic testing etc.).
- vi) Isolation and enclosures: Storages will be isolated and enclosed to minimise the impact of weather conditions (heat radiation, thermal and cryogenic stresses) and will be directly connected to containment including Waste Air Destruction (WAD) systems.
- vii) Hazard and Operability Study (HAZOP) and Hazard Analysis (HAZAN) studies for early identification of hazards; regular structural audit.
- viii) Management Information System (MIS) is a significant area for monitoring at the management level. It is divided into three categories:
 - a. Checking normal day-to-day operations; compliance of statutory requirements; monitoring reports; and reporting of exceptions to the top management.
 - b. This deals with emergency control systems (chemicals and fire contingency plans), training and retraining of employees, transporters, drivers and cleaners, stockists, distributors, retailers, community

- leaders, consumers, first responders—the police, fire services, home guards, civil defence, NDRF, SDRF and medics/paramedics. This also covers HAZOP/HAZAN studies, regular appraisal and updating.
- c. Provision, maintenance and regular upgrading of safety including PPE; maintenance of daily check charts of PPE, work permit system (including stoppage, start-up chemical manufacturing/storage equipment hardware).

5.1.2 Accident Reporting, Investigation and Analysis

- i) The basic concept is the 'Principles of Examination'. The examination will aim at identification of operational difficulties, fault in design, and inspection procedures after an accident.
- ii) There is a need to synthesise a prediction model that can spot problems/difficulties prospectively as well as retrospectively.
- iii) To identify principal causes of accidents or near misses.
- iv) To identify deficiencies in the process/operation/hardware/instrumentation.
- v) To find out and critically evaluate unsafe practises requiring correction.
- vi) To find out and finalise needs for engineering revision.

5.1.3 Safety Promotional Activities

Accident prevention needs proactive and reactive participation of all activities like:

- i) Installation of sensors and monitors, their regular maintenance and calibration at the plant perimeter to trigger alarms to the plant personnel as well as public.

- ii) Safety competitions, exhibitions, film/video shows, seminars, debates.
- iii) Celebration of Safety Day/Week.
- iv) Safety hoardings at strategic points.
- v) Frequent visit to other model industries.
- vi) Institution of chemical safety award system.

5.1.4 Other Areas of Attention

Efficacy of safety systems shall be checked daily and listed with special emphasis on the following:

- i. Provisions of two-to-three tier safety.
- ii. Early-warning system.
- iii. Two-to-three tier power back-up system for safety of equipment/provision.
- iv. Start-up and shutdown procedures.
- v. Daily exceptional reporting for top management based on status of full preparedness/compliance according to latest internal safety audit; internal audit highlights; high accident potential jobs, actions or conditions to be dealt on priority basis. The audit shall indicate shortfalls according to accident potential.
- vi. Best maintenance and preventive maintenance practises.
 - a. Regular improvisation of safety systems based on global success stories.
 - b. Toxicology (complete MSDS as ready reckoner for warnings/instructions).
 - c. Mock drills of warning alarm systems.
 - d. Instrumentation.
 - e. Written down preventive maintenance and breakdown maintenance practises and check listing of each on a daily basis.

- f. Regular (daily basis) trials of stand by systems.
- g. Key points to be kept in mind while setting SOPs for safety include:
 1. Use of danger and information tags.
 2. No substitutions of tags from one another.
 3. Information or instruction tag shall be used to convey special instructions for the equipment.
 4. The instruction tag shall not be used where a danger tag is required to identify a particular equipment as that equipment, if operated can cause an accident.
 5. The operator/shift officer shall assume responsibility for the use and removal of danger tags.
 6. Locking out of chemical plant equipment.
 7. Colour codes will be devised for locking.
 8. All locks will be placed on a breaker with a process until work is completed.
 9. The principle of isolation of equipment under maintenance repair without exception.

Based upon the actual inventory of HAZCHEM, adequacy of the preparedness and response is required to be established in the plant. It is essential to develop the DM capabilities both within the plant perimeter and in the vicinity on the basis of the dynamic quantitative risk assessment analysis. Meteorological data like wind direction shall be either obtained from concerned functionaries, or generated in-house for the proper management of chemical emergencies.

The best engineering practises practised the world over like those followed by the American Society of Mechanical Engineering (ASME) and others shall be modified and adapted in the Indian context under the authority of the BIS. Some of the major features of chemical safety procedures practised are shown in Annexure H for ready reference.

5.2 Storages

The storages of HAZMAT in an installation, or isolated storages are major sources of chemical disasters. The existing legal regulatory requirement provided through The Petroleum Act, 1934 and The Explosives Act, 1884, the Static and Mobile Pressure Vessels (Unfired) Rules 1981, the Gas Cylinder Rules, 2004, the MSIHC Rules, 1989, and the Factories Act, 1948, and various rules framed by the states give comprehensive guidelines to all installations and storages for the purpose of maintenance and operation of storage, tank farms and vessels. However, there are some glaring gaps with regard to safety, containment and neutralisation of toxic spill and release at the installation and storage site. Necessary provisions need to be enacted for fail-safe safety measures.

Important guidelines for installations and isolated storages are:

- i) Factories/Storages having Off-Site consequences need to be treated at par with MAH factories in view of the probability of occurrence of accident due to the risks associated with bulk storage of HAZMAT.
- ii) Standards in respect of design and construction with provisions for maintenance shall be laid down. The design shall be so formulated such that there would not be any effect of micrometeorological factors like temperature, pressure, humidity, air flow and protection from static charges.

- iii) The storages of large inventories of HAZMAT should go with corresponding safety, containment measures, good engineering and environmental practises. Better safety and containment measures for safety release installations should be used, like valves, rupture discs and monitors etc., to protect the storages.
- iv) At the installation level, storages require a risk assessment strategy addressing all the risk areas including the following components:
 - a. Safety and security provisions.
 - b. Pipelines transferring the HAZMAT to other plants/locations, or outside the premises.
 - c. Instrumentation especially—Distributed Control Systems (DCSs).
- v) Comprehensive guidelines are available for safe storages, testing and monitoring of storage vessels and areas, and for checking the residual life of vessels, pipelines and other equipment used in storage of HAZCHEMs. In addition, a testing system, its frequency and a certification system also exist. However, there is an urgent need of critical evaluation and review pertaining to the following areas:
 - a. Defining and ensuring the limits of quantity of HAZMAT as per the capacity of storage facility.
 - b. Simultaneous storage of non-compatible hazardous and toxic material.
 - c. Restriction of keeping storage vessels open to the sky due to the impact of weather conditions on the content of storage vessels.
- d. The concept of residual life with regard to depletion of various tolerances etc., needs to be re-evaluated from time-to-time, as many other factors and stresses responsible for the breakdown of vessels appear with ageing.
- e. Proper and adequate provisions of safety to cater to thermal and cryogenic stresses will be taken care of during the designing mode.
- f. A full-scale containment and neutralisation system shall be established for HAZCHEM that are not manufactured but stored in bulk quantities for in-house use. Such HAZCHEM include liquids like ammonia in ice manufacturing, LPG, furnace oils, compressed gas including chlorine in the pulp and paper industry, oxygen in Common Effluent Treatment Plants (CETPs), hydrogen in vegetable oil manufacturing and other inflammable fuels used in industries.
- g. Special provisions including the usage of lightning arrestors for gases (such as hydrogen that can make an explosive mixture with air, running the possible risk of exploding) as lightning acts as a catalyst for such a reaction.
- h. Ensure availability of a stand-by power supply system which shall operate in the case of failure/disruption of the main power supply and simultaneously requiring containment/neutralisation of stored liquid/gaseous chemicals to a designated place.

HAZCHEMs are transported across international borders. Hence, there is a need to comprehensively address the safe transportation of hazardous substances whether they are transported via air, ship, railways, roads or pipelines etc.

Petroleum products are transported via water, land and using various vessels like tankers, cylinders and others, making it a vulnerable area covered under The Petroleum Rules, 2002. The salient features of the Rules in the safety context are illustrated in Annexure I.

The Guidelines for transport accidents will address issues pertaining to bulk transportation of chemicals both by road, rail or marine means and safe transportation of petroleum products including combustible gases through pipelines. Comprehensive rules and guidelines under various acts provide for safe transportation of HAZCHEMs or dangerous goods. Transportation on land under the Petroleum Rules has laid down safety requirements for tank vehicle, tank capacity, engines, electrical installations etc., and has also highlighted restriction on loading/unloading of tank vehicles. Transportation on land is also covered under Explosives and Gas Cylinder Rules and under the Static and Mobile Pressure Vessels (Unfired) Rules. Self-certification for pressure vessels shall also be strengthened.

The coverage under the Motor Vehicles Rules and under the MSIHC Rules is also quite comprehensive. However, the issue also relates to state governments. Regulations for the transport of dangerous goods have received a lot of attention

from the UN, which has framed rules for such movement (given in Annexure J). The UN has also circulated an Orange Book for classification, packaging, marketing, labeling and documentation for transport of dangerous goods which are universally adopted. These can be visited to adopt relevant acceptable practises in the proposed DM Plans.

6.1 Air Transportation

Air transport of dangerous goods is required to conform to the International Air Transport Association (IATA) Dangerous Goods Regulations which govern the packaging and labeling of HAZCHEM.

A set of technical instructions for the safe transport of dangerous goods by air was also issued by International Civil Aviation Organization (ICAO) in 1982–83.

6.2 Maritime Transportation

Maritime transportation of dangerous goods follow The Merchant Shipping (Carriage of Cargo) Rules, 1995, under The Merchant Shipping Act, 1958, and the conventions of the International Maritime Organization (IMO); Maritime Pollution (MARPOL) Conference; and Safety Of Life At Sea (SOLAS) Convention. There is also a UN committee of experts, which is part of the international efforts to standardise handling and carriage of dangerous goods.

Accidents for marine transportation mostly take place while handling packages of dangerous goods which are a potential hazard within ports. Major incidents involved highly inflammable gases/liquids, or highly toxic substances which pose serious threats to public safety, damage to property and port operations. External assistance is needed for tackling these emergencies. In the port area, a major dangerous goods incident is initiated by:

- i) Dropping/toppling during loading/discharging/stacking operations.
- ii) Collisions during transportation.
- iii) Being hit by other vehicles during storage.
- iv) Prolonged undetected leakage.

Containerisation and rules governing thereof are very important for the maritime transportation of dangerous goods. Economic benefits of containerisation include reduction in port time, reduction in inland transportation (cost and risks), less transit time and consequently less inventory costs. An International organisation has provided the definition of containers and type of containers under which tanks are also defined for bulk liquid and compressed gases transport (Annexure J). The use of freight containers also substantially reduces the hazards of dangerous goods. However, the parties exposed to the inherent risks of loaded containers are the intermediary agencies and their personnel like road vehicle drivers and helpers, rail workers, dock and terminal workers, ships and board crew, and other handlers like packers.

6.3 Rail Transportation

Railways have their own safety manual for the transportation of hazardous goods containing the necessary information as well as resource contacts en route, such as the Red Tariff No. 20 prepared by the Indian Railways Conference Associations. The same needs to be strengthened keeping all requirements for management of transport

accidents in view. There will be increased awareness of railway personnel dealing with transportation of HAZCHEMs. Rail transport of dangerous goods, specially petroleum products, also follow the international code of labeling in transportation. However, toxic and hazardous gases/liquid are not generally permitted in bulk quantities in transportation as practised in developed countries.

Rail safety in general and related to the transportation of petroleum products requires to be addressed in a more transparent manner so as to match the level of mechanisation, on-line transmission of information and instructions, en route safety provisions for fire and explosion control and medical services, as well as for creation of trained skilled manpower to work in tackling emergencies with minimum loss and casualties. It is essential to prepare a complete response plan in coordination with the nodal ministry for simulated chemical disaster(s) based upon the risk assessment of the routes and connected resource availability, specifying the incident command system and SOPs for various identified stakeholders. The various modes of relief and rehabilitation of the victims shall also be integrated into such plans. It is also required to mark the railway routes loaded with HAZCHEM and a mechanism will be built by the railways so that the control rooms of the district continuously receive information about the HAZCHEM, time of stay or transition and related readiness at the district level.

6.4 Road Transportation

Road transport carries the bulk of dangerous goods in India while sea transport handles the import and export of dangerous goods. Presently, road transportation of dangerous goods is a very weak area under prevention and management of chemical disasters and, therefore, needs to be adequately addressed by the MoSRT & H, with the

help of the MoEF in fine-tuning the present legislative framework by introducing fresh rules, guidelines and facilities for the prevention and management of transportation emergencies through a focused approach of all the responders including the community, in the proximity of highways.

For safer transportation of dangerous goods, the guidelines are as follows:

6.4.1 Recommendations for MAH Units

MAH units are not only the recipients but also the consignors of HAZCHEM. It is in their business interest that the goods dispatched, reach the destination safely, in time and without any problem en route. Their role is by far the most important in terms of improving the status of implementing various legal requirements. Keeping this in mind, the following are the major recommendations for the MAH units (consignors) of HAZCHEM.

- i) Check driver's license for its validity, provide a certificate to the effect that he has successfully undergone the requisite training for transportation of hazardous goods and endorse his license, authorising him to drive vehicles carrying HAZCHEM.
- ii) Check documents and inspect vehicles with check lists.
- iii) Implement vehicle entry, loading/unloading check list.
- iv) Check compatibility with material last transported with the one intended to be loaded.
- v) Place appropriate fire extinguishers.
- vi) Provide separate earthing to tank and hoses.
- vii) Provide stop blocks to prevent rolling of vehicles. Loading/unloading operation to be carried out under supervision.
- viii) Make the driver read the Transport Emergency Card (TREM CARD) while the loading/unloading operation is carried out.

- ix) Seal and lock valves after loading. The Emergency Information Panel (EIP) should be checked and if found inappropriate, new panels should be pasted on all three places. Appropriate class labels should be pasted.
- x) Communicate the route and scheduled halts to driver and transporter.
- xi) Implement a computerised system for records. Although it may not be possible for all the units to implement such computerised systems, alert security staff and proper maintenance of records can easily achieve the objective. Train security staff in checking the documents and vehicles.
- xii) Selection of transporters should be on the basis of their credibility rather than solely on quotes.

6.4.2 Recommendations for Transporters

- i) Need to take a proactive role in keeping their vehicles fit, providing necessary fire extinguishers, PPE, antidotes, emergency kits, spark arrester and training to drivers for safe transportation of hazardous goods.
- ii) Careful driver selection.
- iii) Vehicle maintenance, display of appropriate EIP and class label, proper painting.
- iv) For transport of dangerous goods, the endeavour should be to find dedicated transport tanker vehicles or at least for dedicated use of specific material only. Interchangeability at times may cause mishaps/accidents.
- v) HAZCHEM should also be lettered in the vernacular for better understanding by the public at large.
- vi) Ensure availability of all relevant documents and inform the driver of the chemical being

transported, associated hazards and safety precautions to be taken during the journey.

- vii) Provide route map to the driver (finalised in consultation with the consignor) and a timetable for each trip.
- viii) Loading and unloading of dangerous goods is a specialist activity and should be handled by competent persons identified by transporters and their accountability should be defined in this regard.

6.4.3 Recommendations for Drivers

Trained and experienced personnel of MAH units are not normally available at accident site en route to transport. The response of driver, cleaner, public and response teams are therefore, of very high significance. Drivers on the other hand, are the weakest link in the entire process of HAZCHEM transportation due to the lack of proper training, low level of education, lack of awareness of the applicable legal requirements and a host of other factors such as rash driving, drinking habits, tendency for pilferage to make a quick buck, etc. All the efforts of consignors, transporters and authorities are diluted if the driver does not have safe driving habits, parks the vehicle incorrectly and/or leaves his vehicle unattended. The rules applicable to drivers for improving the level of safety in HAZCHEM transportation as per Central Motor Vehicle Rules (CMVR) are fairly comprehensive and proper enforcement can definitely bring about the desired change.

- i) Driver training and involvement in mock drills are necessary and must be initiated on a priority basis.
- ii) The driver should be trained to maintain a record of inspection round the clock at least every two hours, to check the pressure, temperature of the product to see that no leaks are developed and to check the temperature of hubs and tyres or to spot any other abnormality in the vehicle.

- iii) The drivers and cleaners should necessarily maintain and use PPEs to meet specific requirements during chemical spills/accidents.
- iv) Driver training efforts must be updated, specifically for non-petroleum tankers, where training is lacking.
- v) Though it is mandatory to keep fire extinguisher(s) and a first-aid box in the driver's cabin, sufficient attention is not given in training the driver in their use. Even the selection of the correct fire extinguisher for different types of fires is unknown to the driver. The fire extinguishers should be related to the HAZCHEM being transported, which makes dedicated use of the vehicle important.

6.4.4 Recommendations for Authorities

The primary concern regarding non-compliance by the consignors, transporters and drivers is the lack of enforcement of the applicable legal requirements and also lack of awareness amongst the stakeholder.

The MoSRT & H have introduced ambulances en route on some of the major highways to operate point-to-point transfer of casualties for first-aid and treatment. This facility requires further strengthening and extension on all the highways across the country under a time-bound programme with a maximum target of seven years. The implementation of the Rules 131–133 of CMVR, 1989, providing details of responsibility of consignors, transporters and drivers of the goods carriage transporting HAZCHEM shall be strengthened. Further, the states can also put additional restrictions in the permit condition while granting permits to the transporters.

- i) Training:
 - a. Comprehensive training of inspection staff issuing fitness certificates

- regarding design codes, their requirement for the inherent safety of the container and the vehicle, etc.
- b. Traffic policeman should be more stringent for HAZCHEM transporting tankers and must see to it that these tankers do not violate any rules. Moreover, a traffic policeman should not allow these tankers in crowded places/routes, for any reason whatsoever. Traffic policeman could be allowed to penalise the driver in case of illegibility of the emergency information panel and also if the class label is missing from the front and rear of the vehicle.
 - c. Comprehensive training of the traffic inspectors regarding the applicable legal requirements.
 - d. Training of inspectors regarding HAZCHEM as per the CMVR so as to make them understand the consequences of non-compliance.
 - e. Elaborate training programmes for community leaders, panchayats, NGOs and other identified prominent persons in the areas is necessary after a directory of information (containing the names, addresses, telephone numbers, etc.) is prepared. A small booklet in the vernacular on dos and don'ts for the local public should be brought out and circulated.
- ii) Narrow roads increase the traffic density, the travel time and also the accident potential. Infrastructure in terms of proper roads and lights in population pockets needs to be provided for safe HAZCHEM transportation.
 - iii) The highway patrol should ensure the smooth flow of traffic on the highways and highway rescue squads need to be set up at critical locations for rendering prompt response during accidents.
- iv) Police awareness about the provisions under the CMVR requires a major initiative, as it is poor. Police academies could be used for the purpose and special drives aimed at police forces should be made.
 - v) The regulatory authorities, mainly the police, are not adequately aware of the CMVR HAZCHEM provisions and are therefore not able to enforce the rules sufficiently. This is necessary and must be accomplished on a mass basis.
 - vi) Communication System: the HAZCHEM transported from a source unit to the ultimate destination will have a dedicated consignment tracking system within and also be linked to fire, police and emergency control rooms including medical services. The mechanism will be worked out with the due diligence of all stakeholders and in consultation with all authorities concerned.
 - vii) Global Positioning System (GPS) type communication and information management systems for HAZCHEM fleet tracking, monitoring and accident management has already started in the country by large corporate houses such as Reliance, mainly in Gujarat and Maharashtra. The drive must be widened to cover all HAZCHEM stretches and to transporters who should be explained the benefit of such systems. Such a system should be strengthened and the information instantly available and the facility should be spread over for transfer of information at a number of locations in CCRs.
 - viii) The Regional Transport Officer (RTO) should carry out the proper verification and examination of the tankers/trucks before issuing a new license/permits or the

- renewal of older ones. After the issue of the permit/license it is also important to check/stop tankers during transit and verify that all requirements are being met.
- ix) The condition of the transport vehicle should be very sound with regard to tyres, brakes, steering system, lighting, indicator system, and especially a leak-proof fuel and fail-safe wiring circuit to avoid explosion risks. Procedures for examination of vehicles carrying HAZCHEM should be strengthened.
 - x) Traders and small transporters are not able to match the performance of MAH units and large transporters in terms of safety. Special drives aimed at them in particular must be made at the national level.
 - xi) The resources for combating emergencies on the route are higher than average—their upkeep is also encouraging as is the level of enthusiasm. The efforts need to be sustained through various drives and imaginative ideas.
 - xii) A drive to encourage transporters to install tachographs must be started so that errant drivers can be identified—standardisation is important for acceptance and this must be done. Transporters must be made to understand the benefits. Having a clause in the CMVR that is blatantly violated is not encouraging. This may be taken up also during renewal of permits.
 - xiii) Comprehensive guidelines under different regulations on 'Training the people who matter'; 'Grounding vehicles during loading and unloading'; and on 'Product specific precautions' exist. These should be regularly updated, more widely circulated and mandated under the DM plan.
 - xiv) The transportation of chemicals should not be allowed on highways which are not well laid out or are damaged.
 - xv) Strict rules on compliance for tanker vehicles (overfilling and underfilling) should be enforced.
 - xvi) The tanker vehicles carrying chemicals that are affected on exposure to sun/heat leading to over-pressure/leakage should be identified and transported in heat insulated tanker vehicles.
 - xvii) A network of medical response centres/hospitals, ambulance services for first medical response on highways should be established and publicised so that the people are aware of such arrangements. A single telephone service (a 4-digit telephone number) in line with the existing 3-digit system for the fire brigade and police should be established for use at the national level. On the highways, the name and telephone number of emergency services like police, fire brigade and ambulance should be prominently displayed at regular distances.

6.4.5 Highway DMP

As transportation accidents can occur away from the city limits, or from the MAH units where response facilities are available, the results of consequence analysis clearly indicate the need for preparation of highway DM plans.

In addition to the normal Off-Site plan, the following elements should also be addressed:

- i) Special precautionary measures should be laid down for the transportation of dangerous goods involving highly flammable material. Accidents resulting from flammable goods encompass large areas in the proximity and also result in BLEVE where the vapour explosion can have cascading effects on other passing vehicles.

- ii) During the transport of hazardous goods, there are certain dos and don'ts on mixing. An indicative list of don'ts include: corrosive liquids with flammables, charged storage batteries with Class A explosives, detonating primers with explosives, poison label material with food stuff etc.
 - iii) For prevention and better relief in transportation accidents, the establishment of command posts, dedicated lines of communication, reassessing the situation continually and modifying responses accordingly are essential activities, which should be mentioned clearly in the highway DM plan.
 - iv) In view of the issue of illiteracy of drivers, it is recommended to develop MSDS graphically/pictorially.
 - v) Preparation and circulation of emergency response guides for each cluster of chemical plants and MAH units should be done for the public and all the responders and role players in case of Off-Site accidents during the transportation of dangerous goods. Such a booklet containing information on the classification of HAZCHEM, UN numbers, CAS numbers, important telephone numbers, potential hazards, and emergency response for each type of accident case like for explosion etc., would be of immediate assistance in combating transport emergencies.
 - vi) Instituting regular safety inspections and the number of inspections that should be mandatory.
 - vii) A highway DM plan should also contain the precautions and actions to be taken by the first responders reaching the incident site.
 - viii) The role of different emergency function units should also be clearly mentioned and should be updated regularly after mock drills, if required.
 - ix) The levels of transport disasters will also be categorised in the same way i.e., Level 0 to Level 3 mentioned in chapter 5.
 - x) The potential environmental emergency that may occur during a transport emergency should also be taken into account and the role of the Pollution Control Board will be important in such cases and must be clearly mentioned.
 - xi) Complete mop-up operations after a spill or a chemical accident shall be ensured.
 - xii) The highway DM plan shall include a dedicated communication network to integrate the highways all across the nation. To achieve this goal, the initiatives taken up by the Department of Road, Transport and Highways i.e., telephone no. 1073 already reserved for this purpose; provision of cranes for road clearance and ambulances at 50 km stretches, will be implemented. For its proper implementation, states shall ensure the development of a CCR, station ambulances on roads in connection with the nearest trauma care centre and dovetail with the DM plan of national highways.
 - xiii) The National Highway Authority has a provision to provide one ambulance for each completed stretch of 50 km of national highways and such provisions will be implemented in a time-bound manner. Health being the state subject, state governments shall ensure provision of immediate medical care to the disaster victims.
- The highway DM plans for a particular stretch should be categorically defined in the actions/response protocols in accordance to the various identified focal points where population is in the nearby vicinity. Response books with specific fire-

related precautionary measures with reference to the type of HAZCHEMs being transported should be available with the driver and in police/fire control rooms in the stretch under reference.

6.4.6 Avoidable HAZCHEM Traffic

It was noticed during a survey that some of the MAH units prefer to procure certain chemicals (sulphuric acid in particular) from neighbouring states. It is recommended that a detailed study should be undertaken where such unnecessary movement of HAZCHEM is taking place to estimate the incremental hazard potential. Further, if possible, the tax structure also needs to be reviewed, to prevent such cross boundary movement of HAZCHEM.

6.4.7 Training Police Personnel

District authorities, especially police personnel, need to be trained for hazardous goods transportation. Police academies in the various states may be suitably directed to bring about training in the field of hazardous goods transportation to various police personnel.

6.4.8 HAZMAT Vans

In addition to the availability of an ambulance and crane at the toll booths on the highway (by the National Highway Authority of India), procurement of HAZMAT vans may also be considered. These vans will not only be useful in prompt handling of chemical transport emergencies but will also be useful in case of industrial accidents.

6.4.9 List of Technical Experts

District-wise lists of technical experts need to be prepared and distributed to all the MAH units, transporters, police and fire stations which can be used to obtain technical guidance during an accident involving hazardous goods carriers.

6.4.10 Emergency Response Guidebook

The *Emergency Response Guidebook*, published jointly by the transport departments of the USA, Canada and Mexico, is a very useful document providing clear and concise information on the HAZCHEM management of a transport emergency involving HAZCHEM. It is a searchable database of all major HAZCHEMs. It is suggested that a copy should be provided to all technical experts, fire stations, major hospitals and police stations along the highway stretches for prompt and correct response.

6.4.11 Modification/Harmonisation of Rules

- i) Responsibility for Loading Leaky/Defective Tankers : Clarity is required on the issue of responsibilities associated with respect to loading of cargo into defective/non conforming vehicles at the consignor end (presently, the Central Motor Vehicles Rules, 1989 are not clear on this issue).
- ii) Fire Extinguishers and PPEs : It may be noted that Rule 41 of the Static and Mobile Pressure Vessel (Unfired) Rules, 1981, Rule 72 of the Petroleum Rules, 2002 and Rule 86 of the Explosives Rules, 1983, specify that two fire extinguishers need to be carried in the vehicle, of which one should be accessible from outside the cab. However, Rule 129(1)(iv) of the CMV Rules, 1989 does not specify the type or numbers of fire extinguishers to be carried on the vehicle. Specifications of the fire extinguishers and PPE need to be brought out in the rules. The rules need to be harmonised for better implementation.
- iii) Driver's Educational Qualifications: Rule 9 of the CMV Rules, 1989, addresses the educational qualification aspects of the drivers of hazardous goods carriers. Present criteria stipulates only reading and

writing skills, with knowledge of the English language. However as per a survey, less than 5 per cent of the drivers interviewed possess such knowledge skills. The implementation of a draft notified by the Department of Road, Transport and Highways vide GSR No. 583 (E) dated 21 September 2006, specifying the minimum educational qualification for the drivers i.e., Class VIII pass to be eligible for hazardous goods transport for better implementation of the rules, shall therefore be implemented in a time-bound manner.

- iv) Harmonisation of the List of HAZCHEMs: the MSIHC Rules, 1989, (amended in 1994 and 2000) lists 684 HAZCHEM in addition to qualifying criteria for toxic and flammable substances, whereas the CMV Rules, 1989, lists around 300 HAZCHEM. This disparity needs to be eliminated for better clarity and implementation of rules.
- v) Accident Database : Accident reporting requirements are defined under various rules, however, no comprehensive database is available for accidents involving HAZCHEM transportation. Results obtained from the analysis of historical data is very useful in planning, policy and implementation aspects. It is recommended to harmonise the relevant rules governing HAZCHEM transportation, appointing a single agency/authority for collection of accident information, database generation and clear-cut reporting requirements.
- vi) Community Awareness about Facilities on Highways
 - a. Sensitising the public and community by dissemination of proper information to the community at large by the district administration through press and electronic media about facilities for

handling highway transport emergencies involving HAZCHEM.

- b. At selected locations based on proximity to the population on highways, display boards in the interior areas besides the highways should be installed with dos and don'ts in case of transport accidents involving HAZCHEM.
- vii) Identify and Develop Local Community Leaders for an effective emergency response. Community leaders to accept the responsibility as trainers to train the public and should play a special role in building support and enthusiasm for awareness programmes.
- viii) Parking Lots of overnight parking of HAZCHEM vehicles should be away from inhabitation.
- ix) Trauma/Poison Centres should be spread out uniformly in India so that they are easily accessible during the transportation of casualties to prevent the loss of lives.
- x) Round-the-clock emergency crews/ professional technical teams provided with MAH and cluster of MAH should have an extended coverage of 200 km to reach transport accident spots for help. The arrangement would not be limited to dangerous goods transported by an installation only.
- xi) For urgent and immediate relief to victims in transportation accidents, all states should have dedicated helicopter services for medical relief and transfer of casualties to bigger hospitals. The crew should be fully conversant/trained on MSDS including antidotes and first-aid operations for relief operations.
- xii) As dangerous goods regulations are not as complicated as perceived, guidelines on simple common sense precautions by

involvement of all concerned with dangerous goods would lead to safety for all.

6.5 Transportation by Pipelines

Pipelines are assuming importance as a means of transport of hazardous substances. Crude oil, its derivatives and natural gas are among the main substances transported by pipelines. The advantages of pipeline transport are that they can move large volumes of substances quickly, over long distances at relatively low cost, high reliability and have few transport-associated environmental impact (i.e., exhaust, noise or congestion). However, like fixed installations handling hazardous substances, they also pose a threat to human health and safety and to the soil, water and environment.

The effects of accidents involving pipelines are often very serious, as felt in the Komi (Russian Federation) oil leakage in 1994 and the Ghiselenghien (Belgium) gas explosion in 2004. External interference, corrosion and poor maintenance are among the most common causes of pipeline accidents. The guidelines, therefore, comprise:

- i) Creation and maintaining an administrative framework to facilitate the development of a safe and environmentally sound transportation infrastructure, including pipelines for hazardous substances.
- ii) The pipeline operator has the primary responsibility for the safety of the systems and for taking measures to prevent accidents and to limit their consequences for human health and the environment.
- iii) Pipelines for the transport of hazardous substances will be designed and operated so as to prevent any uncontrolled release into the environment.
- iv) Risk assessment methods should be used in evaluating pipeline integrity and impact on human health and the environment.
- v) Land-use planning considerations will be taken into account both in the routing of new pipelines (e.g., to limit proximity to populated areas and water catchment areas to the extent possible), and in decisions concerning proposals for new developments/building in the vicinity of existing pipelines.
- vi) Pipeline operators and the authorities responsible for pipelines shall review and, if necessary, develop and implement systems to reduce third-party interference, which is a cause of accidents, including their effects.
- vii) National legislation shall be clear, enforceable and consistent to facilitate safe transport and international cooperation.
- viii) Competent authorities should ensure that pipeline operators:
 - a. Draw up emergency plans.
 - b. Provide the authorities designated for that purpose with the necessary information to enable them to draw up Off-Site emergency plans.
 - c. Emergency plans shall be coordinated between pipeline operators and competent authorities, as well as with fire brigades and other disaster control units.
- ix) Pipelines shall be designed, constructed and operated in accordance with recognised national and international codes, standards and guidelines.
- x) Consideration will be given to the impact on the safety of a pipeline such as design and stress factors, quality of material, wall thickness, depth of burial, external impact protection, markings, route selection and monitoring.
- xi) The safety of the pipelines shall be demonstrated through a suitable risk

assessment procedure including the worst case scenario and including breakdowns and external additional loads.

- xii) The pipeline operator shall draw up a Pipeline Management System (PMS) to ensure that it is properly implemented. The PMS shall be designed to guarantee a high level of protection of human health and the environment. The following issues shall be addressed by the safety management system.
 - a. The pipeline will be inspected and maintained regularly. Only reliable trained staff or qualified contractors may carry out maintenance work on a

pipeline. A certified expert should inspect the pipeline at regular intervals as far as required by the notification/permit. These inspections are to cover in particular the proper condition of the pipeline and the functioning of the equipment ensuring pipeline safety.

- b. Organisation ability, roles and responsibilities, identification and evaluation of hazards, operational control, management of change, planning for emergencies, monitoring performance, audit and review shall be duly addressed in the PMS.

7

Approach to Implementation of the Guidelines

The National Guidelines have been formulated as a part of an integrated national all-hazard approach for the management of disasters. The prime aim is to ensure that the occurrence of chemical accidents and risks posed to human health, life and the environment are reduced/minimised. The chemical emergency management approach aims to institutionalise the implementation of initiatives and activities covering all components of the DM cycle including prevention, mitigation, preparedness, relief, rehabilitation and recovery etc., with a view to develop a national community that is informed, resilient and prepared to face chemical emergencies, if any, with minimal loss of life and property. Therefore, it shall be the endeavour of the central and state governments and local authorities to ensure its implementation.

While the primary responsibility of initial accident response shall remain at the local level; the state, centre and the private sector shall reinforce the system. For an efficient and coordinated management of chemical disasters, evolving a single National Plan, identification of the various stakeholders/agencies who are actively involved along with their responsibilities, institutionalisation of the programmes and activities at the ministerial/department levels, increased inter-ministerial and inter-agencies communications and networking, rationalisation and augmentation of the existing regulatory framework and infrastructure, are considered vital for ensuring a seamless and harmonious functioning by all stakeholders. The preparation and planning for the response to a chemical emergency is to be structured into a coherent and interlocking system. In order to

optimise the use of resources and the response effectiveness, response plan will be highly coordinated and consolidated responsibilities will be assigned jointly with the participation of all the concerned stakeholders. Implementation of the Guidelines shall begin with formulation of a DM plan and an enabling phase to build necessary capacity, taking into consideration the existing elements such as legislation, emergency plans, stakeholder initiatives, gaps, priorities, needs and circumstances. To start with, the existing disaster management plans at various levels shall be further revamped/strengthened to address the chemical hazards.

The nodal ministry will evolve programmes and activities in the detailed Action Plan for the holistic and coordinated management of chemical disasters. To sustain an integrated approach to CDM, the central government needs to establish arrangements for implementing the National Plan on an inter-ministerial or inter-institutional basis so that all ministries concerned and stakeholders interests are represented and all relevant substantive areas are addressed (see Annexure K).

The agenda of these Guidelines shall also be implemented by the governments of the various states and UTs. The experience gained in the initial phase of the implementation is of immense value, to be utilised not only to make mid-term corrections but also to make long-term policy and guidelines after comprehensive review of the effectiveness of DM plans undertaken in the short term. All states and UTs shall develop their DM plans through an extensive consultative approach covering all

stakeholders and in consultation with their district-level plans. Three sets of agencies viz. the NDMA, SDMA and DDMA, shall forge a mutually reciprocal relationship for the effective implementation of the national Guidelines in a focused way. The relationship between the NDMA and state authority/SDMA need to be interactive and complimentary.

The guideline document provides for strengthening the chemical safety in the country on a sustainable basis. These guidelines have set modest goals and objectives to be achieved by mobilising all stakeholders through an inclusive and participative approach. Appropriate allocation of financial and other resources including dedicated manpower and targeted capacity building would be the key to the success of the implementation of the guidelines. Periodic training, tabletop exercises, simulations, mock drills, etc., would further enhance and ensure their effective implementation.

7.1 Implementation of Guidelines

7.1.1 Preparation of the Action Plan

Implementation of the guidelines at the national level could begin with the preparation of an Action Plan, that shall promote coherence among chemicals management mechanisms and strengthen chemicals management capacities at various levels.

The National Plan needs to include:

- i) Measures to be taken for prevention of chemical disasters (leading to zero tolerance), or mitigation of their effects (leading to avoidable morbidity and mortality).
- ii) Measures to be taken for the integration of mitigation procedures in the development plans.

- iii) Measures to be taken for preparedness and capacity building to respond to any threatening chemical disaster situations or disasters.
- iv) Roles and responsibilities of different ministries or departments of the Government of India, nodal ministry, industry, community and NGOs in respect of measures specified in clauses (a), (b) and (c) above.

The plan shall spell out detailed work areas, activities and agencies responsible, and indicate targets and time-frames. The plan prepared shall also specify indicators of progress to enable their monitoring and review. The plan would be sent to the NDMA through the NEC for approval.

The ministries/agencies concerned, in turn, shall:

- a. issue guidance on implementation of the plans to all stakeholders;
- b. obtain periodic reports from the stakeholders on the progress of implementation of the DM Plans;
- c. evaluate the progress of implementation of the plans against the time-frames and take corrective action, wherever needed;
- d. disseminate the status of progress and issue further guidance on implementation of the plans to stakeholders; and
- e. report the progress of implementation of the National Plan to the nodal ministry.

The MoEF shall keep the NEC apprised of the progress on a regular basis. Similarly, SECs/ departments shall develop state-level DM plans and dovetail these with the national DM plan and keep the state authority/SDMA informed. The state departments/authorities concerned will implement and review the execution of the DM plans at the district and local levels along the above lines.

7.1.2 Implementation and Coordination at the National Level

Planning, executing, monitoring and evaluating are four facets of the comprehensive implementation of the Guidelines. It is envisaged that the NDMA will work with the core group in identifying appropriate agencies, institutions and specialists with expertise in relevant fields and involve them in various activities to help implement the CDM plans as per the spirit of the national Guidelines. Separate stakeholder group of individuals or agencies is required to undertake each of the above four sets of activities. Some individuals may be common to the first three groups. However, the fourth stakeholders group involved in evaluating the outcome of the planning, executing and monitoring needs to consist of specialists who are not directly involved in any of first three groups; this will help in getting an objective feedback on the effectiveness of activities based upon the Guidelines. The professionals, particularly scientists, chemists, chemical engineers, pharmacologists and toxicologists etc., are therefore, to be closely involved in the disaster risk management initiatives at all levels and for all tasks relevant to their expertise. The availability of professional expertise is a crucial factor for the dissemination, monitoring and successful and sustainable implementation of the CDM plan. Professional expertise is required to be built up at all levels and for all tasks. The CDM framework also imposes additional responsibility on professionals to improve their skills and expertise corresponding to the best practises world over for a safer chemical industry, to contribute to capacity building and to cooperate with and form partnerships with other stakeholders. Synergy among their activities can be achieved by developing detailed documents on how to implement each of the activities envisaged in the guidelines. This consultative approach of developing detailed guidelines for plan implementation helps in two ways, namely (a) it increases the ownership of stakeholders in the solution process; and (b) it brings clarity to the governments on their roles and

responsibilities. Procedures need to be developed to elaborate the monitoring mechanisms to be employed for undertaking transparent, objective and independent review of activities outlined in these Guidelines. In particular, implementing these activities can be smooth and successful if a single-window system is adopted for conduct and documentation of each of the above four phases, i.e., having one person accountable for each of the above four phases of activities outlined in the guidelines in each of the stakeholder ministries, departments, state governments, agencies and organisations.

7.1.3 Institutional Mechanisms and Coordination at State and District Levels

The DM Act, 2005 envisages the constitution of SDMAs at the state level. The SCG constituted as required under the CA(EPPR) Rules, 1996 notified under the Environment (Protection) Act, 1986, shall act as the advisory committee/subcommittee of the SDMA in the field of CDM.

Similarly, the DCGs and the LCGs shall function as the advisory committee/subcommittee of the district administration/DDMAs and local authorities respectively for the management of chemical disasters. The measures indicated at the national level may be adopted to ensure effective implementation by regular monitoring at the state level by the authorities concerned. The state shall also allocate and provide the necessary finances for efficient implementation of the plans. Similarly, district and local level plans shall be developed and need to follow a professional approach. Since most activities under these guidelines are community centric, requiring the association of professional experts for planning, implementation and monitoring, the SDMAs shall formulate suitable mechanisms for their active involvement with the various stakeholders. These activities are to be taken up in a project mode with a specifically earmarked budget (both plan and non-plan) for each activity. The approach followed shall emphasise chemical

safety and risk reduction measures including technical and non-technical preparedness measures, be environment and technology friendly, sensitive to the special requirements of the vulnerable groups and communities, and address all stakeholders involved in CDM. This is to be achieved through strict compliance with existing and new policies. Further, the SDMA's need to designate officers in-charge of CDM safety matters. Recognising the enormity and criticality of CDM, the SDMA's are required to preferably identify and enlist officers with sole charge of matters related to chemical disaster risk management as a first step towards ensuring effective implementation of the CDM guidelines. It is essential that officers handling risk management aspects in the SDMA's need to have a reasonable term of office which is required in getting the best out of their experience and do justice to the office and responsibilities they are holding.

7.1.4 District Level to Community Level Preparedness Plan and Appropriate Linkages with State Support Systems

In the preparedness plan and state thereof, a number of weaknesses have been identified with regard to awareness generation, response time and other timely actions for evacuation and medical assistance. This constitutes significant portion of the Off-Site emergency plans and it has been found to be a weak link in emergency management which is required to be addressed in detail. The central and state governments need to evolve mechanisms through mock drills, awareness programmes, training programmes etc., with a view to sensitise and prepare officers concerned for initiating prompt and effective response.

7.2 Financial Resources for Implementation

Chemical disasters in the past have revealed that expenditure on relief, rescue and rehabilitation far exceeds the expenditure on prevention and

management. This should therefore, be the underlying principle for allocation of adequate funds at industry and government level for prevention, mitigation and preparedness rather than concentrating on their management at the time of a disaster. The basic principle of return on investment may not be applicable in the immediate context but the long-term impact would be highly beneficial. Thus, financial strategies will be worked out such that necessary finances are in place and flow of funds is organised on a priority basis by the identification of necessary functions, both in the phases of preparedness and response, relief and rehabilitation respectively.

Central ministries and departments and the state governments will mainstream DM efforts in their development plans. In the annual plans, specific allocations will be made for carrying out disaster preparedness efforts as well as disaster mitigation measures.

Each chemical industry will arrange sufficient funds for the purpose of prevention, mitigation and preparedness measures. Wherever necessary and feasible, the central ministries and departments and urban local bodies in the states may initiate discussions with the corporate sector undertakings to support the retrofitting measures of vulnerable storage sites and chemical industry buildings as a part of PPP and corporate social responsibility efforts.

After a chemical disaster, central and state governments provide funds for immediate relief and rehabilitation. These funds address the immediate needs of the victims. This process does not adequately cover the requirements for reconstruction of damaged structures, especially those privately owned. Expenditure incurred by the Government of India in the provision of funds for relief, rehabilitation and reconstruction is increasing manifold due to the rapidly increasing risk profile of the country and the emergence of new toxicants. In most countries, risk transfer through insurance has been adopted

as a step towards providing adequate compensation. Such a mechanism reduces the financial burden of the governments. Risk transfer mechanisms have been found to be fairly successful. The insurance sector will be encouraged to promote such mechanisms in the future.

The MoEF will develop a national strategy for risk transfer, using the experiences of micro-level initiatives in some states and global best practises and will also facilitate the development and design of appropriate risk-avoidance, risk-sharing and risk-transfer mechanisms in consultation with financial institutions, insurance companies and reinsurance agencies. The MoEF and other ministries will project their financial provisions in their annual budget for new mitigation projects requisite for risk management practises.

The MoEF will ensure that newly established industries will be made to comply with earthquake-resistant design and construction practises, adequate preparedness within the plant perimeter and adoption of best engineering practises as a preventive measure. The approval and disbursement of funds from banks and other financial institutions to industrial units will also be linked to the compliance with these norms by industrial units. The nodal ministry will coordinate with the central ministries/departments concerned and state governments compliance to this aspect by financial institutions. It will also coordinate, with the relevant bodies, the development of suitable techno-financial measures to improve the safety aspects of the industrial units.

7.3 Implementation Model

The phasing of the implementation model will include the short term covering 0–2 years; the medium term covering 2–5 years; and the long term covering 5–8 years. The Action Plan shall indicate detailed work areas and activities/targets with suggested time-frames, suitable indicators of

progress along with authorities/actors for the implementation of guidelines including monitoring mechanisms.

A) Some of the important issues for the formulation of the CDM Action Plan are as follows:

- i) Putting in place a national mechanism covering all major disasters and reporting mechanisms at the district level.
- ii) Dovetailing regulations governing HAZCHEM safety with the DM Act, 2005.
- iii) Establishing of a national risk management framework criterion for chemical assessment.
- iv) Strengthening of institutional framework for CDM and its integration with the activities of the NDMA, state authority/SDMA, district administration/DDMA and other stakeholders.
- v) Renewed focus on model safety codes/standards for prevention of accidents at industry level by matching processes, technologies for safety installations compared with the best in the world.
- vi) Identifying infrastructure needs for formulating the mitigation plans.
- vii) Implementing a financial strategy for allocation of funds for different national and state/district-level mitigation projects.
- viii) Establishing an information networking system with appropriate linkages with state transport departments, state police departments and other emergency services. The states will ensure proper education and training of the personnel using information networking system.
- ix) Identification/recognition of training institutions.
- x) Strengthening of NDRF, fire services, MFRs, paramedics and other emergency responders.

- xi) Revamping of home guards and civil defence for CDM.
- xii) Develop a national medical emergency plan binding all government, private and public hospitals under an enactment with unified, well-established triage and other emergency procedures.
- xiii) Develop highway DM plans for all the identified stretches, nodal points, and micro SOPs integrated in the driver's kit.
- xiv) Establish a register of relevant national and international institutes and information exchange programme.
- xv) Establish post-disaster documentation procedures, epidemiological surveys and minimum criteria for relief and rehabilitation.
- xvi) Sensitise the community regarding common chemical risks, and their expected cooperation and role during emergencies.
- xvii) Sensitise corporate houses for more proactive roles in the prevention of chemical accidents by instituting regular internal audits of plant safety measures, actuation of On-Site emergency plans and institutionalisation of mutual aid arrangements.
- ii) Risk analysis and assessment of pipelines to identify areas that are likely to be affected and have high exposure of natural hazards.
- iii) Incorporation of GIS technology which allows to collect, display, manage and analyse large volumes of specially referenced and associated data for emergency planning, preparedness and response.
- iv) Identify and incorporate legislative and institutional framework for preparedness with specific and measurable indicators.
- v) Analyse, summarise and disseminate past statistical information on disaster occurrence, impact and losses.
- vi) Develop, update and disseminate risk maps and related information to decision makers in an appropriate format.
- vii) Support the development and improvement of relevant data bases.
- viii) Research, analyse and report on long-term changes and emerging issues that might increase vulnerabilities and risks or the capacity of authorities and people to respond to disasters.
- ix) Prepare a national response plan indicating authorities and responsibilities with a view to enhance the ability of the country to prepare for and manage chemical disasters.

B) Stop-gap arrangement till formulation and approval of Action Plan: The following recommendations can be taken up as a stop-gap measure for immediate action pending formulation of the Action Plan by the nodal ministry and other stakeholders followed by its approval by the NDMA through the NEC:

- i) Preparation of a report to establish a summary baseline of information on hazard identification and risk assessment in chemical installations.
- x) The transport routes of HAZCHEM, the likely emergencies and resources available at defined locations are to be immediately documented.
- xi) CAS should be augmented (including the infrastructure facilities).
- xii) Isolated storages and warehouses in the country to be identified and documented.
- xiii) Continuation of CDM training and workshops.

Some Major Chemical Accidents in India (2002–06)

S. No.	Name of Unit	Date of Accident	Source	Death/Injury/Missing; Losses
1.	GACL, Vadodara, Gujarat	05.09.2002	Chlorine gas —explosion	4/20/nil
2.	IPCL, Gandhar, Gujarat	20.12.2002	Chlorine gas —release	Nil/18 workers & 300 villagers in Jageshwar affected/nil
3.	IOC Refineries, Digboi, Assam	07.03.2003	Fire in motor spirit tank	Nil; Product loss Rs11.55crore
4.	Ranbaxy Laboratories Ltd., Mohali, Punjab	11.06.2003	Toluene	2/19/nil
5.	BPCL Bottling Plant, Dhar, Madhya Pradesh	05.10.2003	LPG leak from tank lorry	Nil
6.	Orient Paper Mills, Amia, Shahdol, Madhya Pradesh	13.10.2003	Liquid chlorine	Nil/88/nil; 5 m pipe affected
7.	IDL Gulf Oil, Kukkatpally, Hyderabad, Andhra Pradesh	25.11.2003	Explosion	8/5/1
8.	Anil Enterprises, Zakhira, Rohtak, Haryana	28.04.2004	Fire in LPG fired oven	6/2/nil
9.	HIL Udyogmandal, Kerala	06.07.2004	Toluene fire	Nil
10.	Shyam Lal Industries, GIDC, Vatva, Ahmedabad, Gujarat	12.04.2004	Benzene fire	Nil
11.	Chemical Factory, Dombivilli, Maharashtra	31.05.2004	Hexane release —fire	1/8/Nil
12.	Chemplast, Mettur, Tamil Nadu	18.07.2004	Chlorine leak	Nil/27/nil

13.	Gujarat Refinery, Vadodara, Gujarat	29.10.2004	Explosion in slurry settler	2/13/nil
14.	Ranbaxy Laboratories Ltd., Mohali, Punjab	30.10.2004	Fire in dryer room	1/2/nil
15.	Matrix Laboratory Ltd. Unit 1, Kazipally, Medak District, Andhra Pradesh	05.03.2005	Sodium hydride	8/nil/nil
16.	Gujarat Refinery, Gujarat	15.06.2005	Fire	Nil
17.	Coromondal Fertilizer Ltd., Ennore, Tamil Nadu	22.07.2005	Ammonia	Nil/5/nil
18.	Gulf Oil Corporation Ltd., Sanathnagar, Hyderabad, Andhra Pradesh	04.10.2005	Explosion/fire	2/2/nil
19.	Orchid Chemicals and Pharmaceuticals Ltd., Alathur, Kancheepuram District, Tamil Nadu	03.11.2005	Explosion with fire	2/4/nil
20.	Aurobindo Pharma Ltd., Unit-V, IDA Pashamylaram Medak Dist., Andhra Pradesh	28.11.2005	Explosion while drying cloxaciline sodium	1/4/nil
21.	Indian Oil Corporation Ltd., Mathura Refinery, Mathura, Uttar Pradesh	29.12.2005	Fire	1/nil/nil
22.	Kanoria Chemicals and Industries Ltd. Renukoot, Sonabhadra, Uttar Pradesh	29.03.2006	Chlorine release	6/23/nil
23.	Anjana Explosives Ltd., Peddakaparthi Nalgonda District, Andhra Pradesh	18.07.2006	Spillage of hazchem	5/nil/nil
24.	Ravi Organics Ltd., Muzzaffarnagar, Uttar Pradesh	19.09.2006	Gas release	1/nil/nil
25.	Reliance Industries Refinery, Jamnagar, Gujarat	25.10.2006	Leaked hot vacuum gas oil catches fire in air	2/nil/nil

List of Relevant Statutes on Management of Hazardous Substances

- The Environment (Protection) Act, 1986 (amended 1991) and following Rules thereunder:
 - The Environment (Protection) Rules, 1986 (amended 2004).
 - The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (amended, 1994 and 2000).
 - The Hazardous Wastes (Management and Handling) Rules, 1989 (amended 2000 and 2003).
 - The Environment Impact Assessment Notification, 2006.
 - The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996.
 - Bio-medical Wastes (Management and Handling) Rules, 1989.
- The Factories Act, 1948 (amended 1987).
 - State Factory Rules.
- The Inflammable Substances Act, 1952.
- The Motor Vehicles Act, 1988 (amended 2001).
 - The Central Motor Vehicles Rules, 1989 (amended 2005).
- The Public Liability Insurance Act, 1991 (amended 1992).
 - The Public Liability Insurance Rules, 1991 (amended 1993).
- The Petroleum Act, 1934.
 - The Petroleum Rules, 2002.
- The Insecticide Act, 1968 (amended 2000).
 - The Insecticide Rules, 1971 (amended 1999).
- The National Environment Tribunal Act, 1995.
- The Explosives Act, 1884 (amended till 1983).
 - The Gas Cylinder Rules, 2004.
 - The Static and Mobile Pressure Vessels (Unfired) Rules, 1981 (amended 2002).
 - The Explosives Rules, 1983 (amended 2002).

Annexure-C

List of Selected BIS Standards on HAZCHEM

Standard	Title
IS 646: 1986	Liquid Chlorine, Technical (Second Revision).
IS 662: 1980	Anhydrous Ammonia (First Revision).
IS 1446: 2002	Classification of Dangerous Goods (Second Revision).
IS 4155: 1966	Glossary of Terms Relating to Chemical and Radiation Hazards and Hazchem.
IS 4209: 1987	Code of Safety in Chemical Laboratories (First Revision).
IS 4263: 1967	Code of Safety for Chlorine.
IS 4262: 2002	Sulphuric Acid—Code of Safety (First Revision).
IS 4544: 2000	Ammonia—Code of Safety (First Revision).
IS 4607: 1968	Code of Safety for Hazchem.
IS 4644: 1968	Code of Safety for Benzene, Toluene and Xylene.
IS 5184: 1969	Code of Safety for Hydrofluoric Acid.
IS 5513: 1984	Ethylene Oxide.
IS 5571: 1979	Guide for Selection of Electrical Equipment for Hazardous Areas.
IS 5572: 1994	Classification of Hazardous Areas (Other than Mines having Flammable Gases, Vapours for Electrical Installation).
IS 5685: 1970	Code of Safety for Carbon Disulphide.
IS 5931: 1970	Code of Safety for Handling Cryogenic Liquids (First Revision).
IS 6044 (Part I): 1971	COP for LPG Cylinder Installations.
IS 6044 (Part II): 2001	COP for LPG Storage Installations.
IS 6156: 1971	Code of Safety for Chlorosulphonic Acid.
IS 6164: 1971	Code of Safety for Hydrochloric Acid.
IS 6269: 1971	Code of Safety for Ethylene Oxide.
IS 6270: 1971	Code of Safety for Phenol.
IS 6818: 1973	Code of Safety for Phosphoric Acid.
IS 6819: 1973	Code of Safety for Calcium Carbide.
IS 6953: 1973	Code of Safety for Bromine.
IS 6954: 1973	Code of Safety for Caustic Potash.
IS 7415: 1974	Code of Safety for Aniline.
IS 7444: 1974	Code of Safety for Methanol.
IS 7445: 1974	Code of Safety for Acetone.
IS 8185: 1976	Code of Safety for Phosgene.
IS 8388: 1977	Code of Safety for Nitrobenzene.
IS 9277: 1979	Code of Safety for Monochlorobenzene.
IS 9279: 1979	Code of Safety for Aluminum Phosphide.

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IS 9786: 1981	Code of Safety for Vinyl Chloride Monomer (VCM).
IS 10553: 1983 (P-I, II, IV)	COP Chlorine Cylinders and Drums.
IS 10553: 1987 (Part V)	COP Chlorine Cylinders and Drums.
IS 10870: 1984	Code of Safety for Hexane.
IS 11141: 1984	Code of Safety for Acrylonitrile.
IS 13910: 1993	Code of Safety for Sulphur Dioxide.
IS 14165: 1995	Handling of Carcinogenic Substances—Code of Safety.
IS 14200: 1994	Code of Safety for Hydrogen Peroxide.
IS 14518: 1998	Acetaldehyde—Code of Safety.
IS 14572: 1998	Chloroform—Code of Safety.
IS 14631: 1999	Styrene—Code of Safety.
IS 14814: 2000	Acetylene—Code of Safety.
IS 14983: 2002	Phosphorus (White or Yellow)—Code of Safety.
IS 14984: 2001	1,3-Butadiene—Code of Safety.
IS 14985: 2001	Methyl Acrylate and Ethyl Acrylate—Code of Safety.
IS 15200: 2002	Hydrogen Sulphide—Code of Safety.
IS 15201: 2002	Hydrogen—Code of Safety.
IS 6044 (Part I): 1971	Code of Practice for Liquefied Petroleum Gas Cylinder Installations.
IS 6044 (Part II): 1972	Code of Practice for Liquefied Petroleum Gas Storage Installations.
- BIS Standard 'Code of Practice on Occupational Safety & Health Audit' (IS-14489:1998).	
- BIS Standard 'Occupational Safety and Health Management Systems' (IS-18001:2000).	
- BIS Standard 'Hazard Identification and Risk Analysis—Code of Practice' (IS: 15656.2006).	

OISD

Standard\Std-112.doc	Safe Handling of Air Hydrocarbon Mixtures and Pyrophoric Substances Rev. 1.
Standard\Std-113.doc	Classification of Area for Electrical Installation at Hydrocarbon and Handling Facilities.
Standard\GDN-115.doc	Guidelines on Fire Fighting, Equipment and Appliances in Petroleum Industry.
Standard\Std-116.doc	Fire Protection Facilities for Petroleum Refineries and Oil/Gas Processing Plants.
Standard\Std-117.doc	Fire Protection Facilities for Petroleum Depots and Terminals (Amended Edition).
Standard\Std-129.doc	Inspection of Storage Tanks Rev. I.
Standard\Std-138.doc	Inspection of Cross Country Pipelines—Onshore.
Standard\Std-142.doc	Inspection of Fire Fighting Equipments and Systems.

Standard\Std-144.doc	Liquefied Petroleum Gas (LPG) Bottling Plant Operations Rev. I. Vol - I Design Philosophies. Vol - II Operating Practices. Vol - III Inspection and Maintenance Practices. Vol-IV Safety and Fire Protection.
Standard\Std-150.doc	Design and Safety Requirements For Liquefied Petroleum Gas Mounded Storage Facility.
Standard\Std-157.doc	Recommended Practice for Transportation of Bulk Petroleum Products.
Standard\Std-158.doc	Recommended Practices on Storage and Handling of Bulk Liquefied Petroleum Gas.
Standard\Std-159.doc	LPG Tank Trucks—Requirements of Safety on Design/Fabrication and Fittings.
Standard\Std-160.doc	Protection to Fittings Mounted on Existing LPG Tank Trucks.
Standard\Std-163.doc	Process Control Room Safety.
Standard\Std-168.doc	Emergency Preparedness Plan for Marketing Locations of Oil Industry.
Standard\Std-180.doc	Lightning Protection.
Standard\Std-194.doc	Standard For the Storage and Handling of Liquefied Natural Gas (LNG).

MoEF Guidelines

1. A Manual on Emergency Preparedness for Chemical Hazards, 1992.
2. A Guide to Safe Road Transport of Hazchem, 1995.
3. A Guide to the MSIHC Rules, 1992, Second Edition, 2000.
4. A Guide to CA(EPPR) Rules and On-Site and Off-Site Emergency Plan, 2001.
5. Guidelines for Transportation of Hazardous Wastes issued by CPCB, 2004.

Other Organisations

1. Chlorine Safety Pays—An Overview of Hazardous and Safe Practices (World Environment Centre, 1988).
2. Code of Practice for Liquid Ammonia Storage Vessels (Fertilizer Association of India).
3. Guidelines for Safe Warehousing of Substances with Hazardous Characteristics (Indian Chemical Manufacturers Association, 1987).
4. Major Hazard Control, A Practical Manual (ILO, 1988).
5. Storage Tanks for Refrigerated Liquefied Gases with an Outer Concrete Container (Committee for Cryogenic Storage in Concrete Tanks, Netherlands, 1985).

Strategy for Community Awareness on Hazardous Materials

Key Importance of Proper Community Awareness

- Due to the statutory provisions, the industry is obliged to provide appropriate information to the community living in the vicinity of a hazardous plant/installation.
- It is important to realise that a well-informed community is an asset to both the industry and local authorities as it would offer willing cooperation not only during an emergency but also in other development programmes.
- Communication with the public is a joint responsibility of government, industry and the community. Rapport between them creates tremendous goodwill for industry.
- Communication channels need to be a two-way initiative. Further, members of the community should participate in the development and implementation of such communication programmes.

Suggested Strategy

To be effective, community awareness activities should be undertaken as per the strategy developed after due deliberations among the stakeholders in the LCG. The essential features of such a strategy are:

- **Credibility**—It is absolutely necessary to ensure that the information provided to the community and the activities undertaken for its propagation are absolutely credible. Since the LCGs represent all the stakeholders and community awareness is one of their functions, the information and activities should be approved by the LCG and released/undertaken on its behalf.
- **Need-based**—The information provided should be need-based relating to HAZCHEM handled and the type of accidents/emergencies encountered in the industrial area to which the community belongs. Too much detail should be avoided.
- **Regularity**
 - An on-off approach must be avoided
 - A regular system should be in place so that the community can seek information on its own as and when required. Further, a visible difference can only be ensured if awareness/education activities are undertaken regularly.
- **Community Information Representative (CIR)**
A suitable nodal person may be designated by the LCG to function as a CIR and made known in the industrial area. Such a person could be from a reputed NGO represented on the LCG. The CIR should use the facilities (lecture hall, audio visual aids, etc.) already available in the industrial area.

- **Effective Communication**

The information released should be simple, supported by pictorial representations as far as possible and issued in the local languages, Hindi and English. Further, for effective communication, it is not enough to issue only written information through leaflets. It should be supplemented by regular awareness sessions (about 2 hours duration). The use of video along with the lecture would contribute to the proper understanding of CDM. A required number of community educators can be trained in making the communication effort more effective. Besides general information, specific information on chemicals used in the industrial area should be given to individuals who ask for such information.

- **Target Groups**

These should be carefully selected by discussion in the LCGs. Opinion makers who interact with the community and are respected by it, such as college/school teachers, students, office bearers of Mahila Mandals and residential cooperative societies, hospital representatives, etc., can play an important role in developing community awareness and should be selected. The number of people to be exposed to such training and awareness programmes should be estimated carefully.

- **Supplementary Activities**

To supplement the above activities, community awareness information could be displayed in places frequently visited by the public, such as the municipal ward office, rationing office, hospitals/dispensaries, school/colleges, bus stops, railway stations, etc. Various other innovative/creative means such as shopping bags, inserts in the telephone directory etc., as decided by the LCG could also be used effectively. Community festivals could also be used.

Important Roles and Responsibilities of Various Stakeholders

The important roles of different stakeholders related to CDM shall be spelled out more clearly to further increase their effectiveness:

- a) **The chemical industry** should fulfil its total obligations as described earlier. Complete coordination should be ensured between the industry and district authority. The chemical industry shall also specifically address the following:
 - i) Selection of safe technology by industry shall be the prerogative of the industry based on their need, size and availability of inputs as an important preventive measure for CDM.
 - ii) On-Site emergency plan and periodic mock drills.
 - iii) Supporting district authorities in mitigation, rescue and rehabilitation, with resources identified and agreed with the authorities in advance. Such areas shall be included in Off-Site plans.
- b) **The district authority** is responsible for the Off-Site emergency plan and it shall be equipped with up-to-date MAH units, website, control room etc., with provisions for monitoring the level of preparedness at all times. Regular meetings of various stakeholders of CDM will be conducted by district administration/DDMA to review the preparedness for CDM.
- c) **The police** will be an important component of all disaster management plans as they will be associated with investigation of accidents/disasters. Police take overall charge of the Off-Site situation until the arrival of the district collector or its representative at the scene.
 - i) Special training should be imparted to the police personnel for the investigation of a transport emergency involving HAZCHEM. The police personnel should use the information available with the driver of the HAZMAT vehicle involved in the incident/accident for handling the emergency.
 - ii) Any disciplinary action, if warranted, against the driver or cleaner should not get precedence over the investigative procedure.
- d) **The fire services** are one of the first responders and shall be adequately trained and equipped to handle chemical emergencies. The fire services need to be updated in terms of equipment and trained manpower. Necessary regulations will also have to be evolved to empower them to handle chemical emergencies. The general perception of their functioning is that they are involved in fire fighting only. At times they have inhibitions to handle chemical emergencies. The fire services shall be strengthened to handle not only emergencies arising out of fire but also those arising out of HAZCHEMs. Fire services are to acquire a thorough knowledge of likely hazards at the incident site and the emergency control measures required to contain it. The infrastructure and capacity building of the NFSC and the fire brigades shall be augmented on a priority basis. A national-level programme shall be introduced to strengthen and train the entire fire-service sector, along with its capacity building.
- e) In a chemical emergency, the **revenue department** shall coordinate with other agencies for evacuation, establishment of shelters and provision of food, etc.

- f) When required for evacuation purposes in a chemical emergency, the **department of transport** should make transport promptly available.
- g) The role of **civil society and private sector** in the Off-Site plan shall be defined.
- h) **The health department** needs to assure that all victims get immediate medical attention on the site as well as at the hospitals/health-care facility where they are shifted. In addition, the department needs to network all the health-care facilities available in the vicinity for effective management and also take effective measures to prevent the occurrence of any epidemic.
- i) **Pollution control boards** need to ascertain the developing severity of the emergency in accordance with responsive measures by constant monitoring of the environment. If and when an area is fit for entry will depend upon the results of the monitoring. A decontamination operation would be required to be carried out with the help of other agencies and industries.
- j) **The NDRF and SDRF** are the specialised forces to manage these disasters in a longer run according to the severity and nature of the disaster. Their specialised training is an effective measure that needs to be built up and maintained with time for achieving a higher standard of preparedness. They need to coordinate with other local agencies such as the Central Industrial Security Force that may be responsible for security at the industrial site.

Suggested Elements of an On-Site Emergency Plan

- **Plant Emergency Organisation**
 - Designated person in charge/alternates.
 - Functions of each key individual and group.
 - Telephone numbers (office and home) for key people/alternates.
- **Plant Risk Evaluation/Information on Preliminary Hazard Analysis**
 - Quantity of HAZMATs.
 - Location of HAZMATs.
 - Properties of each (MSDS sheets).
 - Location of isolation valves.
 - Special fire-fighting procedures (if any).
 - Special handling requirements.
 - Type of accidents.
 - System elements or events that can lead to a MAH.
 - Safety relevant components.
- **Details about the site**
 - Location of dangerous substances.
 - Seat of key personnel.
 - Emergency control room.
- **Description of HAZCHEM at the plant site**
 - Chemicals (quantities and toxicological data).
 - Transformation if any, which could occur.
 - Purity of HAZCHEM.
- **Likely dangers to the plant**
- **Enumerate effects of**
 - Stress and strain caused during normal operation.
 - Fire and explosion inside the plant and effect if any, of fire and explosion outside.
- **Details regarding**
 - Warning alarm and safety and security.
 - Alarm and hazard control plans in line with disaster control planning, ensuring the necessary technical and organisational precautions.

- Reliable measuring instruments, control units and servicing of such equipment.
 - Precautions in designing of the foundation and load bearing parts of the building.
 - Continuous surveillance of operations.
 - Maintenance and repair work according to the generally recognised rules of good engineering practises.
 - Details of communication facilities available during emergency and those required for an Off-Site emergency.
 - Details of fire fighting and other facilities available and those required for an Off-Site emergency.
 - Details of first aid and hospital services available and its adequacy.
- **External organisation if involved in assisting during an On-Site emergency**
 - Type of accidents.
 - Responsibility assigned.
- **Area Risk Evaluation**
 - Properties of HAZMAT at nearby plants.
 - Population clusters nearby.
 - Contacts (names, telephone numbers) at other sites.
 - Established procedures for notification of chemical release at other sites in area.
- **Notification Procedures and Communication Systems**
 - Alarm systems.
 - Communication equipment (radios, hot lines, etc.) plant management, local officials and response agencies, neighbouring industries, nearby residents.
 - Names and telephone numbers (with alternates) list.
 - Designated person for media contacts.
 - Procedure for notifying families of injured employees.
 - Central reporting office.
- **Emergency Equipment and Facilities**
 - Fire-fighting equipment.
 - Emergency medical supplies.
 - Toxic gas detectors (where needed).
 - Wind direction/speed indicators.
 - Self-contained breathing apparatus.
 - Protective clothing.
 - Other On-Site equipment to be specified according to local conditions.
 - Containment capabilities.
- **Training and Drills**
 - Knowledge of chemicals (properties, toxicity, etc.).

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- Procedures for reporting emergencies.
 - Knowledge of alarm systems.
 - Location of fire-fighting equipment.
 - Use of fire-fighting equipment.
 - Use of protective equipment (respirators, breathing air, clothing, etc.).
 - Decontamination procedures for protective clothing and equipment.
 - Evacuation procedures.
 - Frequent, documented simulated emergencies.
- **Regular Tests of Emergency Organisation/Procedures**
 - Simulated emergencies.
 - Documented, frequent alarm system.
 - Frequent tests of fire-fighting equipment.
 - Evacuation practise.
 - On-going emergency preparedness committee.
- **Plan Updates**
 - Annual or more frequent if needed.
 - Reflect results of drills and tests.
- **Emergency Response Procedures**
 - Communications.
 - Evacuation or safe haven.
 - Medical (include handling of multiple injuries).
 - Special procedures for toxic gas releases (chlorine, etc.).
 - Hurricane procedures (coastal area only).
 - Utility failure procedures.
 - Individual unit emergency procedures.
 - Bomb threat procedures.
- **Detailed Operating Manuals (for each process unit and utility system)**
 - Start-up/shutdown emergency procedures.
 - Analysis of potential incidents.
 - Emergency response and action to be taken for each incident.
- **Established Emergency Response Durations**
 - Sounding of alert level III (for Off-Site emergency).
 - Communication to control room—wind speed and direction and for recorded message transmission to nearby community through public address system.

- Actuation of stand-by systems.
- Hotline/communication to first responders—the police and fire brigade.
- Mobilisation of internal resources.
 - Affected plant/system stoppage.
 - Replacement of operation staff with other plant/unit personnel.
 - Fire tender/ambulance.
 - Employees and visitors shifting to assembly points.
 - Energising fire hydrant/foam or other specified protection system.
 - Isolating the leaky area.
 - Emergency crew repairing/isolating leakages.
- **Procedure for Returning to Normal Operations**
 - Interface and lines of communications with Off-Site officials.

All clear siren or in case of aggravation of emergency—initiation of full scale Off-Site measures including broadcast, evacuation, diversion of all types of traffic etc. and full scale operation of medical emergency system.

Information for use in the Off-site Emergency Plan

This is a section in the On-Site emergency plan for use in the Off-Site emergency plan.

- Summary of risk analysis, vulnerability zone for those scenarios which can escalate into off-site emergencies.
- List of resources required to handle the off-site emergencies foreseen in the On-Site plan, their assessment of the adequacy and prompt full scale availability (establishment of response time), route/alternate route clearance, diversion/stoppage of traffic on mobilisation routes.
- If own resources (such as equipment, trained man-power, medical help etc.) are not adequate to meet such off-site emergencies, to clarify the arrangement (formal or informal) made to obtain the additional resources (e.g., mutual aid or arrangement with the public response agencies) mentioning the salient terms of such arrangements.

Organisations involved (including key personnel) and responsibilities and liaison arrangements between them.

- Information about the site including likely locations of dangerous substances, personnel and emergency control rooms.
- Technical information such as chemical and physical characteristics and dangers of the substances and plant.
- Identify the facilities and transport routes.
- Contact for further advice e.g., meteorological information, transport, temporary food and accommodation, first aid and hospital services, water and agricultural authorities.
- Communication links including telephones, radios and standby methods.
- Special equipment including fire-fighting materials, damage control and repair items.
- Details of emergency response procedures.
- Notify the public.
- Evacuation arrangements.
- Arrangements for dealing with the press and other media interests.
- Longer term clean up.
- What resources can be spared by the industrial unit for use in the Off-Site emergency arising out of On-Site emergencies of other units and what is the arrangement for releasing such resources?
- How has the community awareness programme been planned? How has the community been identified (from which zone/part or full vulnerability zone based on well established wind-roses)? Have the key opinion makers who can play an active role been identified? (Give list along with their contact details). Has the selection of the community or that of key persons in the community been done in consultation with the district authority, etc.?

- Has insurance under the Public Liability Insurance Act been obtained? Give summary.
- Designate a contact person who would be authorised to coordinate for the Off-Site plan and his contact details.

Technical team (chemical-wise) in case of an Off-Site emergency that has taken place due to escalation of an On-Site incident, contact details of its members.

Major Chemical Installations: Chemical Safety Procedures

- Accident/incident reporting system.
- Audit: external/internal.
- Confined space entry.
- Contractor safety/training.
- Loss prevention from hazards:
 - Building and structure design.
 - Capital project review during design and construction phases.
 - Combustible dusts.
 - Electrical.
 - Emergency planning.
 - Documentation for safe practises, equipment and piping.
 - Fire protection system.
 - Fire-fighting capability.
 - Regular inspection/testing of equipment.
 - Protective measures for flammable liquids and gases.
 - Flexible joints in hazardous services.
 - Minimisation of fragile devices in hazardous services.
 - Instrumentation to monitor and control critical parameters.
 - Leak and spill control/containment.
 - Means for egress of occupants.
 - Pressure vessel design, installation, inspection, documentation to prevent damage/rupture to equipment or other hazardous operations.
 - Process computer and data handling protection.
 - Process safety comprising:
 - Risk assessment to evaluate hazard potential, both qualitative and quantitative.
 - Procedures to evaluate impact upon safety and loss prevention.
 - Reactive chemicals review process.

- Reactive hazards for existing/new processes and whenever key personnel/processes changed.
- Storage facilities for toxic, flammable, combustible or corrosive material equipped with appropriate protective features as located to minimise exposure to other operations.
- Interlocking.
- Jobs and process operating procedures.
- Line and equipment operating rules and guidelines.
- Block-out and red-tag procedures.
- Testing of emergency.
- Emergency alarms and protective devices.
- Security:
 - Access control for authorisation, identification and control of all people and vehicles accessing installation facilities.
 - Control of data and process control computers.
 - Data information and transmission system.
 - Location emergency control (designated person responsible for overall security and planning).
 - Programming and vision to control emergencies.
 - Material control.
 - Social unrest procedures and tests.

Some Specific Safety Provisions for the Safe Transportation of Petroleum Products

Petroleum products are the major bulk HAZCHEM material transported by various means of transportation. The products mainly include gasoline (petrol), diesel, compressed gases and others. The Petroleum Rules, 2002, covers a majority of the safety aspects related to its handling, transportation, etc.

A) The following recommendations are in accordance with the above Rules specifically for liquid products:

- a) No leaky tank or container shall be used for transportation of HAZCHEM.
- b) Filled barrels and drums should be loaded with their bung upwards.
- c) No ship, vessel and vehicle shall carry petroleum if passengers or any combustible cargo is present on board.
- d) Smoking, matchsticks, lighters or other fire inducing appliances should be strictly prohibited during loading/unloading and while transportation.
- e) Loading/unloading of petroleum after sunset shall be prohibited unless adequate lighting and fire-fighting facilities with trained personnel are kept in place.
- f) Petroleum in bulk shall be necessarily carried in a ship or other vessel which is licensed for the stated purpose and stored in the standardised mandated manner approved by the licensing authority in water transportation.
 - i) It should not be transported in a barge or flat-bottomed boat unless it is self propelled or is in tow of, or attended by a steamer or tug and carries fire extinguishers. After complete discharge of petroleum from the vessel, its holds, tanks and bilges shall be rendered free from inflammable vapour.
 - ii) Gas Free Certificates for dock entry, man entry and hot work by the appointed officers are obligatory.
 - iii) Petroleum in bulk is to be loaded/unloaded into or from any ship only at locations notified/ permitted by the central government in case of import.
 - iv) Handling facilities in all cases shall be approved by the chief controller after evaluating the various safety reports.
 - v) The use of naked lights, fire or smoking on board a vessel is prohibited.
 - vi) Fire-extinguishing appliances should always be kept ready.
- g) Transportation of petroleum by land requires strict provisions for safety of the tank vehicle. The tank vehicle shall be built, tested and maintained as per the third schedule of The Petroleum Rules, 2002. The tanker shall be fabricated and mounted on the chassis by an approved manufacturer conforming to the approved fabrication/mounting drawings. The schedule also gives details about correct structural relationship between various components of the tank vehicle.

- h) Pipelines are one of the major modes of transportation for petroleum products. The design and route of pipelines shall be approved before laying them. Pipelines shall be constructed of suitable steel and designed as per the recognised code. Pipelines are to be patrolled effectively by the company owning it and they should have efficient communication facilities.

B) Compressed gases are highly inflammable and also prone to accidents while transportation. They are transported mainly by cylinders and tankers:

- a) Filled cylinders should not be transported by a bicycle/two-wheeled mechanically propelled vehicle; no portion of the cylinder should project from the vehicle and there should be no other flammable or corrosive articles in it. These cylinders need to be prevented from falling, rough handling, excessive shocks or local stresses.
- b) No lifting magnet shall be used in loading or unloading of filled cylinders.
- c) No person shall transport any leaky cylinder. In case of a leak during transport the same shall be removed to an isolated open place away from any source of ignition.
- d) Cylinders containing flammable gases should not be transported along with cylinders containing other type of compressed gas.
- e) Toxic or corrosive gas cylinders shall not be transported along with food-stuffs.
- f) Each LPG tanker should be provided with an emergency kit for handling leakage of gas in transit.
- g) Cryogenic pressure vessels intended for storage or transportation of cryogenic liquids are also covered and the provisions for safety during fabrication, installation and transportation should be strictly implemented.

UN Recommendations on the Transport of Dangerous Goods

RULES FOR MOVEMENT			
AIR	SHIP	ROAD*	RAIL
International Civil Aviation Organization (ICAO), Montreal www.icao.int	International Maritime Organization (IMO), London www.imo.org	United Nations Economic Commission for Europe (UNECE), Geneva www.unece.org	Office for International Rail Transport (OCTI), Berne www.otif.org
Technical Instructions for the Safe Transport of Dangerous Goods by Air (T1)	International Maritime Dangerous Goods Code (IMDG)	European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)	Regulations concerning the International Carriage of Dangerous Goods by Rail (RID)

Annexure-K

Important Websites

Ministry/ Institute/ Agency	Website
Council of Scientific and Industrial Research	http://www.csir.res.in/
Defence Research Development Organisation	http://www.drdo.org/
Department of Atomic Energy	http://www.dae.gov.in/
Department of Economic Affairs	http://finmin.nic.in/the_ministry/dept_eco_affairs/
Department of Road Transport and Highways	http://morth.nic.in/
Directorate General Factory Advice Service and Labour Institutes	www.dgfasli.nic.in
Disaster Management Institute, Bhopal	www.dmibpl.org
Indian Institute of Chemical Technology	www.iictindia.org
Indian Institute of Management, Ahmedabad	http://www.iimahd.ernet.in/
Indian Institute of Technology, Delhi	http://www.iitd.ac.in/
Industrial Toxicology Research Centre, Lucknow	www.itrcindia.org
Ministry of Agriculture	http://agricoop.nic.in/
Ministry of Chemicals and Fertilizers	http://chemicals.nic.in/
Ministry of Commerce and Industry	http://commerce.nic.in/
Ministry of Defence	http://mod.nic.in/
Ministry of Environment and Forests	www.envfor.nic.in
Ministry of Finance	http://finmin.nic.in/
Ministry of Health and Family Welfare	http://mohfw.nic.in/
Ministry of Home Affairs	http://mha.nic.in/
Ministry of Labour and Employment	http://labour.nic.in/
Ministry of Petroleum and Natural Gas	http://petroleum.nic.in/
National Chemical Laboratory, Pune	www.ncl.res.in/
National Civil Defence College	http://ncdcnagpur.nic.in
National Disaster Management Authority	www.ndma.gov.in
National Environmental Engineering Research Institute, Nagpur	http://neeri.res.in/
National Institute of Occupational Health, Ahmedabad	www.nioh.org
National Safety Council, Mumbai	www.nsc.org.in
UNEP/DTIE	www.uneptie.org
United Nations Development Program	www.undp.org.in
World Environment Centre	http://www.wec.org

Core Group for Chemical Disaster Management

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2	Dr Rakesh Kumar Sharma	Additional Director, DRL, Tezpur	Member & Coordinator
3	Mr K C Gupta	DG, NSC, Mumbai	Member
4	Dr Indrani Chandrashekharan	Director, HSMD, MoEF, New Delhi	Member
5	Dr K P Mishra	Ex-Head, RB&HSD, BARC, Mumbai	Member
6	Maj Gen J K Bansal, VSM	Head, NBC Mitigation, DRDE, Gwalior	Member
7	Mr Surendra Kumar	Consultant, FICCI, New Delhi	Member
8	Dr Rakesh Dubey	Director, DMI, Bhopal	Member

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Equipment Data Sheet

ELECTROCATALYTIC**ELECTROLYSERS**

1	GENERAL				chg
2	Flowrate of water to be treated	TBA	m3/h		
3	No of electrolyzers	1	unit	of 100%	
4	Model Number	3 MK III	24		
5	Layout	In Series			
6	Chlorine Production per Electrolyser	24.0	Kg/h		
7	Total Chlorine Production	24	Kg/h		
8	Seawater flow per electrolyser	16.5	m3/h		
9	Total seawater flow rate	16.5	m3/h		
10	Produced Hypochlorite Concentration	1455	mg/l		
11	DC Operating Current	1100	ADC		
12	DC Operating Voltage	162	VDC		
13					
14	OPERATING CONDITIONS				
15	Controlled Operating Pressure	6.4	Barg		
16	Equipment Design Pressure	10	Barg		
17	Seawater Inlet Operating Temp	23~32	Deg C		
18	Design Temperature (Mechanical)	45	Deg C		
19	Equipment Design Temperature	45	Deg C		
20	Chlorine Content (Design)	>18	g/l		
21					
22	CONSTRUCTION				
23	Design	Safe (indoor)			
24	Type of Cells	CTE, MK III			
25	Enclosure Protection	IP 20			
26					
27	MATERIALS				
28	Anode - base	Titanium to ASTM 337 and 338 Gr 2			
29	- coating	MMO			
30	Cathode - base	Titanium to ASTM 337 and 338 Gr 2			
31	- coating	None			
32	Piping	PVC sch 80			
33	Seals	Viton			
34					
35	Enclosure/Frame	FRP			
36					
37	ANODE LIFE				
38	Expected	7 years			
39	Guaranteed	5 years			
40					
41	INSPECTION				
42	Hydrotest	12	Barg (1.5 x PSV Set Pressure)		
43					

INITIAL ISSUE	Ek			18-May-15	0
DESCRIPTION	BY	CHK	APP	DATE	REV

ELECTROLYSERS Doc No : 9.2

भारतसरकार केंद्रीय विद्युत प्राधिकरण दक्षिण क्षेत्रीय विद्युत समिति 29, रेस कोर्स क्रॉस रोड बेंगलुरु-560 009	 सत्यमेव जयते	Government of India Central Electricity Authority Southern Regional Power Committee 29, Race Course Cross Road Bengaluru - 560 009
Web site: www.srpc.kar.nic.in	Email: seprotnsrpc-ka@nic.in	Phone: 080-22287205
सं/No. SRPC/SE(P,C & SS)/117PCSC/2024/	1651-85	दिनांक /Date 19 th April 2024

सेवा में / To

संलग्न सूचीके अनुसार

As per attached List

विषय: संरक्षण समन्वय उपसमितिकी 117 वी बैठक की की कार्यवृत्त के संबंध में।

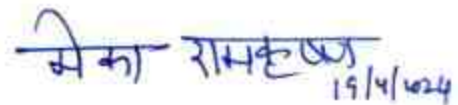
Subject: Minutes of the 117th Meeting of Protection Co-ordination Sub-Committee of SRPC held on 05.04.2024-reg.

महोदय/महोदया/ Sir/ Madam,

दिनांक 05.04.2024 को एन टी पी सी सिंहदरी एस टी पी एस में हुई दक्षिण क्षेत्रीय विद्युत समिति की संरक्षण समन्वय उपसमितिकी 117 वी बैठक की कार्यवृत्त दक्षिण क्षेत्रीय विद्युत समिति के वेबसाइट (www.srpc.kar.nic.in) में उपलब्ध है।

The Minutes of the 117th Meeting of Protection Co-ordination Sub-Committee of SRPC held on 05th April 2024 at NTPC Simhadri STPS, Visakhapatnam is available on the SRPC website (www.srpc.kar.nic.in).

भवदीय/Yours faithfully,


19/4/24

(मेका रामकृष्ण/MEKA RAMAKRISHNA)

अधीक्षक अभियंता(पी,सी & एसएस) / Superintending Engineer(P,C &SS)

प्रेषितिसूची/ Mailing List (Protection Coordination Sub-Committee)

1. मुख्यअभियंता (एचपीसीवजलपयोजना) एपीजेनको, 4 वी मंजिल,गुणदल,विजयवाडाआंप्र 520004/ Chief Engineer (Generation), APGENCO, 4th Floor, Vidyut Soudha, Eluru Road, Gunadala, Vijayawada, AP – 520 004
2. मुख्यअभियंता (परियोजना), एपीजेनको, 4वीमंजिल,गुणदल,विजयवाडाआंप्र 520004/Chief Engineer (Projects), APGENCO, 4th Floor, Vidyut Soudha, Eluru Road, Gunadala, Vijayawada, AP – 520 004
3. मुख्यअभियंता(आईपीसीविद्युतप्रणाली),एपीट्रान्स्को,3रीमंजिल,गुणदल,विजयवाडाआंप्र 520004/ Chief Engineer (IPC & Power Systems), APTRANSCO, 3rd Floor, Vidyut Soudha, Eluru Road, Gunadala, Vijayawada, AP – 520 004

- vi. SRLDC emphasized to carry out the studies before implementation of SPS.
- vii. KPTCL informed that the Shimoga SPS will trigger when Talaguppa ICT gets overloaded. KPTCL was requested to furnish all the SPS in Karnataka control area before OCC forum and get it approved.
- viii. SE (P,C&SS), SRPC expressed concern that relay settings i.r.o new elements and network reconfigurations are being proposed by KPTCL for approval within short notice. Protection Settings Sub Group (PSSG) has been reviewing/analysing the proposed settings and requires sufficient time to analyse the same. He requested the entities that the proposed protection settings details for all 400kV & above and inter-state lines need to be furnished two months in advance as per SR Protection Protocol for review and approval of PSSG.
- ix. TANTRANSCO requested to modify the width of the Compliance Status in P-REC in PMS website. SRPC replied that in order to fit the whole columns in the page, PRDC had provided the scroll bar to Compliance Status column. However, the same would be taken up with M/s PRDC. SE (P,C&SS), SRPC suggested to have a search option using Meeting Index number. Same would also be taken up with M/s PRDC.
- x. All the entities are requested to implement the pending PCSC recommendations (P-Rec) at the earliest. All entities are also requested to update their compliance/status of implementation & action plan/timelines for implementation of the P-Rec recommendations through "P-Rec module" in PMS.

Recommendation:

- ✚ *All the entities to implement the pending PCSC Recommendation at the earliest and furnish the compliance/status of implementation & action plan/timelines for implementation of the P-Rec recommendations through "P-Rec module" in PMS.*

5.3 Certificate for Healthiness of Batteries

- a) As per the MoP direction, given in pursuant to recommendations of the Enquiry Committee (NEW grid disturbance on 30th & 31st July, 2012), *the monthly certificate for healthiness of batteries, installed at 220 KV and above voltage level Substations (for power supply to Relays, RTUs and PLCC equipment) are required to be obtained by RPCs, from their respective Constituents and furnish the same to CEA/ MoP.*
- b) With reference to above, the Constituents have been requested to submit the

certificate on healthiness of batteries on monthly basis (i.e. status for a month shall be sent by the 7th day of the following month) to SRPC Secretariat.

Deliberation:

The Certificate of Healthiness of Batteries has been received from all the entities for the month of **February 2024**.

Recommendation:

- ✚ ***All the entities to furnish the certificate on healthiness of batteries to SRPC Secretariat consistently on monthly basis, by first week of the succeeding month.***

6. Islanding Schemes (IS) of Southern Region

6.1 Furnishing of Monthly Certificate on Healthiness of Islanding Schemes by Generators/ Transmission Utilities / SLDCs/ DISCOMS

- a) All Constituents as listed below were requested to submit certificate on Healthiness of Islanding Schemes on monthly basis –by the first week of every month (i.e. status for a month shall be sent before the 3rd day of the succeeding month) to SRPC as per the formats, circulated vide SRPC letter dated 09th August, 2021:

Islanding Scheme	Constituents
Hyderabad (Ramagundam) IS	TSTRANSCO, SLDC-TSTRANSCO, TSGENCO, PGCIL (SR-I), NTPC-Ramagundam
Chennai IS	TANTRANSCO, SLDC-TANTRANSCO, PGCIL (SR-II)
Neyveli IS	TANTRANSCO, SLDC-TANTRANSCO, PGCIL (SR-II), PED, NLCIL, NNPTPS, KSEBL
Kudankulam IS	TANTRANSCO, SLDC-TANTRANSCO, PGCIL (SR-II), KSEBL
Visakhapatnam (Simhadri) IS	APTRANSCO, SLDC-APTRANSCO, APGENCO, PGCIL (SR-I), NTPC-Simhadri
Bengaluru IS	KPCL, KPTCL, PGCIL (SR-I), PGCIL (SR-II), UPCL, NTPC-Kudgi, NTPC- Talcher, PGCIL Talcher HVDC, NPCIL-Kaiga.
Vijayawada IS	APTRANSCO, SLDC-APTRANSCO, APGENCO, PGCIL (SR-I)

- b) The Certificates of Healthiness of Islanding Schemes for the month of **February 2024** have been received from all utilities.
- c) As decided in 112th Meeting of PCSC held on 06th November 2023, All Utilities concerned are requested to furnish the certificate in the prescribed format regularly (before 7th day of every month) for onward reporting to CEA/MoP.

**MINUTES OF MEETING BETWEEN NTPC AND BHEL REGARDING TG END-WINDING
VIBRATION MONITORING SYSTEM (EWMVS) ON 31.08.2022**

BHEL Haridwar

Mr. Rajesh Ranjan, AGM-ISE, CPL & GRI
 Mr. R.C. Sharma, AGM-EME
 Mr. Anirudh Tijare, AGM-ISE, CPL & GRI
 Mr. Rajnish Gupta, AGM-CIE
 Mr. A.K. Goyal, SDGM-EME
 Mr. Satish Kumar, SDGM-CIE
 Mr. Ajay Kumar Gupta, DGM-EME
 Mr. R.S. Dewangan, Sr. Mgr-EME
 Mr. Minkosh Kumar, Sr. Mgr-ISE
 Mr. Avinash Kumar Akela, Dy. Mgr-GRI

NTPC

Mr. B.K. Singh, Ex ED-NTPC
 Mr. Debabrata Nanda, DGM-NTPC/CC-OS
 Mr. Sumit Bag, Sr. Mgr, NTPC Vindhyachal

NTPC informed the incident of Ramagundam-7, regarding the flashover in the junction box having termination of end winding vibration monitoring cable, during the checking of the interturn protection before synchronisation, in current overhaul in Aug-2022. On investigation, the braiding used for holding the sensor on the bar ends was also found charred. In view of the boxed up condition of the generator, it was decided to remove the charred braiding along with the sensors & to isolate the signal cable from rest of the sensors and go ahead for synchronisation, without End Winding Vibration Monitoring System (EWMVS).

In reference to above, BHEL informed that the charring of the braiding might have occurred due to flashover between bar head and the metallic sensor/signal cable through the braiding. The piezoelectric EWW monitoring system consists of Piezo-electric Accelerometers which are essentially of metallic structure. To make it suitable for the normal operating voltage levels inside the machine, the piezo-electric accelerometers are mounted only on neutral/near neutral locations which have very low voltage. The creepage path for voltage is further increased by introducing sensor mounting on special type of base plate.

Such types of Piezo-electric Accelerometer based End Winding Vibration Measurement System have been running on many power plants across the country satisfactorily in general. However, the system does have certain limitations like:

- No high voltage associated testing during overhauling is possible with the EWMVS probes connected.
- Though the accelerometers are mounted on neutral/near neutral locations which have very low voltage, but during ground fault conditions it may experience higher voltages, which may damage the monitoring system.




Page 1 of 2

As such, it has been decided to use state-of-art Fibre-Optic-Accelerometer (FOA) based end-winding vibration monitoring systems which is now almost universally being used by all major OEMs including Siemens. FOA based system has no metallic parts inside the generator, thus it can be mounted on any location of the stator overhang windings. BHEL has started offering the FOA based EWVMS for new projects, based on project requirements, including NTPC generators like 500MW Vindhyachal stage-V and Unchahar stage-IV. Further, it is confirmed that the FOA based system can also be implemented in the old sets as retrofit solution.

In view of the above, the short term and long term recommendations are as follows:

Short term recommendations:

- To remove the existing piezo-electric system during overhauling and to operate the machine without any measurement of end winding vibrations.

Long term recommendations:

- To go for implementation of installation of FOA based EWVM System for old sets to replace existing system with Piezo-electric Accelerometer.

(BHEL)

Mangin
01/09/2022

R Sharma
1.9.22

Goyal
01/09/22
(A.K. Goyal)

(NTPC)

B.K. Singh
(B.K. SINGH)
D Nanda
01/9/2022
(D NANDA)

भारत सरकार केंद्रीय विद्युत प्राधिकरण दक्षिण क्षेत्रीय विद्युत समिति 29 रेस कोर्स क्रॉस रोड बैंगलुरु-560009 ISO:9001:2008	 सत्यमेव जयते	Government of India Central Electricity Authority Southern Regional Power Committee No 29, Race Course Cross Road BENGALURU- 560 009 ISO:9001:2008
Email: unssrpc@yahoo.com	Phone : 080-22282516	FAX : 080-22259343, 22352616
सं./No: SRPC/SE-III/SPM/2016/	2870-76	दिनांक / Date: 09.05.2016

To

1. General Manager (O&M), SRTS-I, PGCIL, Secunderabad
2. General Manager (OS), NTPC SRHQ, Secunderabad
3. General Manager (O&M), Simhadri Super Thermal Power Project, NTPC Simhadri, Visakhapatnam -531020 (Fax:08924-243092)
4. Chief Engineer (Power System), APTRANSCO, Hyderabad
5. Chief General Manager (Operations), APEPDCL, Visakhapatnam
6. Sh. P. Arun Kumar, GM, Hinduja NPCL, Palavalasa Village, T. Devada Post, Steel Plant, Pedagantyada Mandal, Visakhapatnam - 530031

Sub: Minutes of the Special Meeting on issues relating to recent Grid Disturbances in Gajuwaka-Simhadri-Kalpaka corridor - reg.

Ref: SRPC letter no: SRPC/SE-III/SPM/2016/2581-86 dated 26.04.2016

Sir/ Madam,

With reference to the letter cited above, a special meeting was held on 04.05.2016 at SRPC Secretariat, Bengaluru to deliberate on the issues/ factors that led to recent Grid Disturbances that occurred in Gajuwaka – Simhadri – Kalpaka corridor during the period 24-26 April, 2016. The minutes of the meeting including the remedial actions taken/ proposed along with certain general recommendations to avert such disturbances in future are enclosed for kind reference and further necessary action.

The action/steps taken by PGCIL (SRTS-I), NTPC, APTRANSCO, APEPDCL & HNPCL in implementing the above proposed remedial actions/ recommendations may please be reported to SRPC Secretariat (Email: srpc.protection@gmail.com) latest by **23.05.2016**.

Encl: as above

Yours faithfully,



(S. R. BHAT)

Member Secretary

Copy to: Executive Director, SRLDC, POSOCO, Bengaluru

SOUTHERN REGIONAL POWER COMMITTEE BENGALURU

Minutes of the Special Meeting on issues relating to recent Grid Disturbances in Gajuwaka – Simhadri - Kalpaka corridor

A Special Meeting was held on 4th May, 2016 at SRPC Secretariat, Bengaluru to deliberate on the issues/ factors that led to recent disturbances in Gajuwaka – Simhadri - Kalpaka corridor which resulted in trippings of various 400 kV interconnected lines, and finally culminated in Grid Disturbances at Gajuwaka SS (PGCIL-SRTS1), Vizag SS (APTRANSCO), and Kalpaka SS (APTRANSCO) during 24-26 April, 2016. The list of participants is enclosed at **Annexure - I**.

Superintending Engineer (Operations), SRPC welcomed the Members & Participants to the meeting, and informed that the present meeting had been convened to deliberate on all operational & protection issues that led to above disturbances, and to finalize on suitable measures needed to be undertaken to prevent recurrence of such incidents.

Setting the tone for the meeting, he stated that as *Insulators' Tracking* appears to be the basic cause behind adverted disturbances, the need for preventive maintenance measures to ensure healthiness of power system equipment and transmission lines all times could not be more emphasized. He brought to members' attention that in compliance of Hon'ble CERC Order dated 20.02.2014 in respect of Petition No. 146/MP/2013 with IA 36/2013, Patrolling Protocol/ Guidelines (**Annexure - II**) for Over Head Transmission Lines had been formulated by SRPC Secretariat in due consultation with all stake holders and the same had been communicated to Hon'ble CERC and all Transmission Utilities (Central/State) vide SRPC letter dated 21.05.2014 with a request to strictly follow the guidelines.

He requested members to help chalk out actionable measures to tackle the core issues that rattled North Coastal Andhra Pradesh during 24-26 April, 2016 in the ensuing discussions.

A. Operational Issues relating to recent Disturbances in Gajuwaka – Simhadri - Kalpaka corridor

A.1 Line patrolling protocol & maintenance procedures

SE (Operations), SRPC mentioned that the line trippings on account of insulator failures in saline & pollution-prone areas had been on the rise, and brought to members' attention the specific cases of NTECL, Vallur and NTPL, Tuticorin that had experienced such trippings in April, 2014 and March, 2016 respectively. The transmission & generation entities involved were able to bring down trippings rate by undertaking hot-line washing of insulators, putting concerted efforts in keeping the switchyards healthy, and even going for complete replacement of insulators with CLR polymer type for lines up to 70 km, etc. In this regard, the applicable patrolling protocol and maintenance procedures for the Gajuwaka – Simhadri – Kalpaka - HNPCL corridor which falls in the most vulnerable terrain (coastal & pollution & generating) category were briefed, and requested all involved entities to strictly adhere to them. He also reminded members that as per the Guidelines, each transmission utility would furnish (i) the Annual Schedule of Patrolling to SRPC/SRLDC along with Annual Outage data by October each year, and (ii) Compliance report of the patrolling/

maintenance carried out during previous month with respect to schedule to SRLDC/ SRPC in the OCC Meeting. (SRPC letter dated 05.05.2016 addressed subsequently to all SR-Constituents in this regard is enclosed at **Annexure - III** for kind reference).

Further Regulation 25 of CEA Grid Standards stipulates:

'25. Use of diagnostic techniques for condition monitoring of equipment.-

The diagnostic methods of maintenance shall be preferred over traditional time based maintenance. For purpose of this regulation, devices or methods specified in the Schedule shall be used.

SCHEDULE

(See regulation 25)

The Devices and Methods for Condition Based Monitoring of Equipment

(1) Hot line puncture detection of insulators

(3) Pollution measurement of the equipment

(6) Tan δ and capacitance measurement'

As such, it is recommended to PGCIL, NTPC, APTRANSCO, HNPCL that maintenance activities stipulated as per CEA Grid Standards and IEGC Regulations need be ensured. Condition Based Monitoring of Equipment also needs to be strengthened.

A.2 Insulator Replacement Works

It was noted that the performance of Composite insulators such as SCR / CLR polymer type of insulators in inclimate terrain & weather conditions had been quite superior compared to the conventional porcelain insulators, as could be seen from the reduced rate of trippings in NTECL, Vallur area, which was also corroborated by PGCIL (SRTS-I) and APTRANSCO representatives from their experience.

Then the issue as to how much stretch of the transmission line was to be covered from the loci of substation/ switchyard for insulators replacement had been discussed. APTRANSCO, in this regard, stated that replacement of insulators was a continuous process, and whey they last did it on transmission lines from Kalpaka in 2013, they had covered full stretch of 400 kV Simhadri lines, and restricted to 10-km stretch of 400 kV Khammam & Vemagiri lines as the effect of saline & other polluting mediums including that contributed by fly-ash beyond the stated distance would be negligible. In 220 kV transmission lines adjoining Simhadri TPP area, this had been done for 5-km stretch of transmission lines.

PGCIL (SRTS-I) informed that they had completely changed the insulators in the Vallur & Tuticorin areas and the replacement was going on in a phased manner keeping in view the terrain/ importance of the lines. In the instant case of 400 kV Gajuwaka SS, PGCIL informed that they had commenced replacing insulators (with CLR polymer type) from 22 April, 2016. By 04.05.2016, they had already replaced 296 nos. of insulators, and covered full-stretch of 400 kV Gajuwaka – Simhadri (Stage-II) D/C lines & 30-km stretch of 400 kV Gajuwaka – Vijayawada line. PGCIL (SRTS-I) also informed that insulator replacement for 30-km stretch

of 400 kV Gajuwaka – Jeypore lines was under progress and was expected to be completed in a couple of weeks, after which 400 kV Simhadri-II – Vemagiri lines would be taken up for insulator replacement for a stretch of 30-km.

The issue was further discussed, and considering the general topology of transmission lines laid/ running in the coastal areas, it was decided that insulator replacement works should cover at least 30-km stretch transmission lines starting from substation/ generating station in coastal areas. ***APTRANSCO is recommended to take steps to replace all old porcelain type of insulators with SCR/CLR Polymer or any other suitable composite insulators for at least 30 km stretch of transmission lines on all their 400 kV & 220 kV transmission lines in the Gajuwaka – Kalpaka – Simhadri corridor.***

A.3 Hot-line/ Cold-line washing of Insulators & attending to hot-spots

NTPC representative informed that since Gajuwaka – Simhadri – Kalpaka corridor is in coastal area, it is generally observed that the humidity levels in air reach their peak during summer, as such it is necessary to undertake cleaning of insulators before the onset of summer, i.e., during February. Similarly, as the corridor is in highly pollution-prone zone, the dirt & other pollutants exhibit their inclination to come down as smog during winter; as such it is also necessary to undertake insulator cleaning works before the onset of winter, i.e., during November.

Echoing the above view, representatives of PGCIL (SRTS-I) and APTRANSCO informed that such procedure is already in place in their organizations and the hot-line/ cold-line washing of insulators is being carried out twice in a year. Further, depending on the criticality of the sector/section, they even resort to cleaning of insulators more frequently. In this regard, SE (Operations) informed that as per the SRPC issued Transmission Line Patrolling Protocol/ Guidelines, in Coastal and Heavy –to-medium polluted areas the line maintenance activities including hot-line/ cold-line washing of insulators are to be carried out at least once in every four months, and NTPC, PGCIL (SRTS-I), APTRANSCO and HNPCL were suggested to strictly adhere to these guidelines.

As regards hot-spots, the Regulation 26 of CEA Grid Standards was referred which stipulates that:

‘26. Thermo – vision scanning- The Thermo-vision scanning for hot spots on all overhead lines and sub-station equipment at voltage level of 220 kV and above shall be carried out at least once a year and necessary remedial measures shall be taken where hot spots are detected.’

It was noted that thermo-vision scanning cameras were being used by PGCIL (SRTS-I) and APTRANSCO to identify & attend to the hot-spots on their transmission lines & substation equipment, and the frequency of carrying out such exercise was mainly governed by the criticality of the lines & stations involved. In this regard, SE (Operations), SRPC emphasized on the need to cover all 400 kV & 220 kV lines and substations to attend to hot-spots in time, and requested PGCIL (SRTS-I) and APTRANSCO to liberally undertake such exercise in line with CEA grid standards. ***APTRANSCO, PGCIL, NTPC & HNPCL are recommended to adhere to Regulation 26 of CEA Grid Standards.***

In this regard, it was noted that Vizag division of APTRANSCO is having only one thermo-vision scanning camera, and seems to be under-equipped to deal with hot-spots on transmission lines given the sheer size & significance of the area. ***It is therefore recommended that APTRANSCO management take steps to provide one more thermo-vision camera to Vizag division for use exclusively on 400 kV & 220 & 132 kV transmission lines emanating from Kalpaka, Gajuwaka, VSS, Pendurti and other adjoining substations of APTRANSCO.***

Similarly, APTRANSCO is also requested to apprise Vizag Steel Plant Management of the maintenance measures needed to keep 220 kV VSP substation in healthy condition, and suggest suitable measures for the condition monitoring of various substation equipment.

Since the quality of power that end-consumers get invariably depends on the healthiness of distribution network, the role of distribution companies in ensuring the healthiness of distribution network was also discussed. Based on the discussions, ***it is recommended that APEPDCL shall take steps to ensure their 66kV transmission lines are maintained properly by regularly undertaking line patrolling, tree-cutting, hot-line/ cold-line washing of insulators, etc. Further, all old porcelain insulators on their 66 kV network shall be got replaced with SCR insulators/ Polymer insulators/ or any other suitable Composite insulators.***

A.4 Insulator Coatings

It was noted that the *tracking* phenomenon encountered during the referred period had been severe across the insulators mounted within the substation itself, and resulted in station outages by causing bus-faults. It was also noted that regular cleaning of the insulators mounted within the substation located in most vulnerable zones such as coastal & highly polluted areas may not be quite effective, for the damning/ damaging effects of saline & pollutant mediums would return to haunt the insulators in a couple of weeks. As such, the need for protecting all insulators mounted within the substation by suitable coatings such as RTV Silicone high voltage insulator coating was discussed. The efficacy/ beneficial effects of such coatings which APTRANSCO and PGCIL had undertaken in some of the bays in their 400/ 220 kV Kalpaka SS in AP and 400/ 220 kV Bachchao SS in Kutch region of Gujarat respectively were noted. However, as such coatings are generally quite expensive, as a first step ***it is recommended that PGCIL (SRTS-I), APTRANSCO, HNPCL, and NTPC-Simhadri provide suitable High Voltage Silicone coatings for all Bus-connected Insulators at their respective 400 kV & 220 kV substations/ switchyards. A call on the decision to cover all insulators in substation/ switchyards could be taken later by their respective managements.***

A.5 Reducing emissions during commissioning tests of new generating units

It was noted that as the Electrostatic precipitator is not generally put into service during oil firing, the emissions that result from it would have high content of pollutants/particulate matter/oil, and could lead to fire/ tracking on insulators. This could be controlled to some extent by proper tuning and adjustment of various boiler-firing parameters. It was noted that prior to the unravelling of *Insulator Tracking* phenomenon in April, 2016, HNPCL had undertaken some tests involving oil firing of the boilers. Though, HNPCL representative

informed that all necessary precautions had been taken, the possibility on the contributory role played by the emissions from various tests undertaken during commissioning of second unit of HNPCL could not be ruled out. ***It is therefore recommended to HNPCL to tune boilers properly before undertaking any commissioning/ start-up related tests, and suggested that NTPC's help may be taken in this regard.***

A.6 Ensuring supply reliability to Railway Traction network of North Coastal Andhra Pradesh

It was noted that supply to railway traction network of North Coastal Andhra Pradesh got affected during the disturbances in the Gajuwaka – Kalpaka – Simhadri corridor during 24-26 April, 2016. The supply to railway traction comes from 220 kV Vizag Switching Station (VSS) of APTRANSCO through the feeding points of 220 kV Pendurti and 220 kV Parawada substations. During the period under reference, it was noticed that some of the feeders emanating from 220 kV VSS station got over-loaded for more than 10 minutes; this resulted in falling down of conductors (due to broken clamps/ joints) which in turn caused station outage by creating bus faults. The fact that those conductors were allowed to be under sustained over-loading conditions without resorting to local/ domestic load-shedding at such a critical substation as VSS calls for reviewing/ prioritizing loads connected to VSS. Moreover, as restoration of traction loads in one occasion took more than 40 minutes also calls for reviewing their existing supply points so that outage time of railway traction loads is reduced to the minimum. In this regard, ***APTRANSCO is recommended to take steps to (i) enhance supply reliability to Railway Traction network of North Coastal Andhra Pradesh, and (i) ensure that traction loads are affected as a last resort, and furnish a status/ action taken report in this regard to SRPC & SRLDC.***

B. Protection Issues relating to recent Disturbances in Gajuwaka – Simhadri – Kalpaka corridor

B.1 Single Line Diagram (SLD): The general SLD interconnecting 400/220 kV Gajuwaka SS, 220 kV VSS, 400 kV NTPC-Simhadri STPP, 400 kV Hinduja TPS, and 400/220 kV Kalpaka SS, and specific SLD of Gajuwaka (HVDC & HVAC) SS are given at **Annexure – IV**.

B.2 Details of Trippings on 22.04.2016

Sequence of Events:

Sl. No.	Time (hh:mm)	Transmission Element	Details of Trippings
1	18:16	400 kV JEYPORE - GAZUWAKA 1	Line tripped due to DT receipt from Jeypore end. LBB operation was also observed subsequently due to wide spread insulator tracking.
2	18:16	400 kV JEYPORE - GAZUWAKA 2	Line tripped on over voltage conditions. LBB operation was also observed

			subsequently due to wide spread insulator tracking.
3	18:16	HVDC GAJUWAKA POLE 1	Pole-1 got blocked on loss of all filters of East side.
4	18:16	HVDC GAJUWAKA POLE 2	Pole-2 got blocked on loss of East side Voltage from Pole-1 East bus
5	➤ 400kV Jeypore-Gazuwaka line-1 was taken back into service at 20:04 hrs, and ➤ Gazuwaka HVDC Poles- 1 & 2 were de-blocked at 20:20 hrs & 20:41 hrs respectively.		
6	20:44	HVDC GAJUWAKA POLE 1	Pole-1 tripped due to LBB operation of 01 no. of South Side In-Service Filter, viz., CV/C36 which tripped on "IDMT EIF protection".
7	21:01	HVDC GAJUWAKA POLE 2	Pole-2 tripped on loss of East Side Voltage from HVDC Pole-1 due to tripping of East Bus-1 Extension on "Differential Current Phase L1 trip".
8	➤ Pole-1 could be restored only on 23.04.2016 at 14:19 hrs ➤ 400kV Jeypore-Gazuwaka line-2 could be restored only on 23.04.2016 at 16:56 hrs. ➤ Pole-2 could be restored only on 25.04.2016 at 19:12 hrs		

These trippings led to 650 MW reduction in transfer capability on the East to South Interregional corridor. Block-1 was restored at 1419 hours on 23rd April 2016 but there was a power order restriction of 300 MW.

Analysis: The tripping analysis of the above events is given at **Annexure – V**.

B.3 Details of Trippings on 24.04.2016

Sequence of Events:

Sl.No.	Time (hh:mm)	Details of Tripping	
1	02:44	Busbar protection (BBP) operation of 400 kV South Bus-2 at Gajuwaka SS. It was informed that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and which led to BBP operation HVAC South Bus -2.	
2	03:23	400kV Kalpaka – Gajuwaka – 1	Line tripped on R-E fault due to A/R operation, but successfully auto-reclosed from Kalapaka end.
3	03:26	Bus-Bar Protection operation of 400 kV Bus-1 at Kalpaka SS acted due to insulator tracking; this resulted in tripping of the following elements:	

		➤ 400kV Simhadri-3, Vemagiri-2, HNPCL -2, 400/220 kV ICT-1, 400 kV B/C-1, 400 kV B/S -1.	
4	03:36	400kV Gajuwaka - Jeypore - 2	Tripped on operation of O/V stage - 1 at Gajuwaka
5	03:36	Gajuwaka HVDC Pole-1	Blocked due to loss of south side filter. Filters tripped on inter-zone protection
6	03:44	<p>Bus-Bar Protection operation of 400 kV South Bus-1 at Gajuwaka SS; this resulted in tripping of the following elements:</p> <p>➤ 315 MVA, 400/220 kV ICT-1, 315 MVA, 400/220 kV ICT-2, and 400 kV Gajuwaka - Vijayawada line.</p> <ul style="list-style-type: none"> This resulted in Grid Disturbance at 400 kV Gajuwaka SS of PGCIL (SRTS-1) It was informed that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and which led to BBP operation HVAC South Bus -1. As a result of BBP of South Bus-2 at 02:44 hrs and South Bus-1 at 03:44 hrs, even though their respective Main-CB's got opened, 400kV Gajuwaka - Simhadri - 1 and 400kV Gajuwaka - Kalpaka - 2 lines remained in service through Tie-CB. Due to above trippings of ICTs at 400kV Gajuwaka SS, the 400kV, 315MVA ICT-2 & ICT-3 and connected 220kV feeders got over loaded at Kalapaka SS. 	
7	03:55	220 kV Kalpaka - VSS line-2	Tripped due to distance protection (DPR) operation
8	03:56	220 kV Kalpaka - Brandix lines-1&2	Hand tripped at Kalpaka end as per SLDC instructions to decrease the load on ICTS
9	03:57	220kV Kalapaka-VSS-1 tripped at Kalpaka end on distance protection (Gantry to terminal tower (Loc-1) B-ph conductor snapped and CVT porcelain portion uprooted at Kalapaka SS).	
10	03:57	<p>Busbar protection for 220kV Bus-2 operated at Kalpaka SS.</p> <p>It was informed that the 220kV Kalpaka - Dairyfarm line-2 Bus 2 to CB connected pipe got cut at breaker side and earthed at Bus 2 side, thus creating bus fault and tripped all Bus-2 connected feeders.</p>	
11	03:58	<p>220kV Kalpaka-Dairyfarm-1 tripped at both ends on distance protection (Y-ph Jumper cone melted and got cut at location no.20).</p> <p>With this, all the supply feeders on the 220 kV Bus-1 at Kalpaka SS effectively went out of service, due to which outage of 220 kV Kalpaka SS (Grid Disturbance) took place.</p>	
12	04:05	400 kV Kalpaka - Gajuwaka -1	Tripped on distance protection
13	04:17	400kV Gajuwaka - Simhadri-1 & 400kV Gajuwaka - Kalpaka - 2	Tie CB at Gajuwaka tripped
14	04:25	220kV Kalapaka-VSS-1	Hand tripped

15	04:47	400kV Jeypore – Gajuwaka - 1	Tripped on DT receipt at Gajuwaka end
16	05:02	<p>Bus bar protection of 220 kV Bus-1 got operated at VSS due to the Flash over of the bus coupler Y-ph Pilot insulators in Jack Bus connected to 220kV Bus-I, and gave the trip signal to the Bus-1 connected feeders and ICT's.</p> <ul style="list-style-type: none"> <i>Around this time, as no supply feeders were present on Bus-2 (due to their having got tripped prior to this event on various reasons, it resulted in outage (Grid Disturbance) of 220 kV Vizag Switching Station (VSS) of APTRANSCO.</i> <i>A detailed report on the factors that led to GD at this station along with remedial measures taken is given at Annexure – VI</i> 	

- There was a load loss of the order of 1000 MW in Southern region due to these trippings. Railway traction load was also affected at Gajuwaka and Kalpakka. These trippings led to 650 MW reduction in East to South transfer capability. Further, Simhadri generation had to be backed down by 500-600 MW to avoid a cascade tripping in Southern Region side.

Analysis: The tripping analysis of the above events is given at **Annexure – V**.

B.4 Details of Trippings on 25.04.2016

Sequence of Events:

Sl. No.	Time (hh:mm)	Transmission Element	Details of Trippings
1	02:13	400 kV KALPAKKA - GAZUWAKA 1	Tripped on TEED 1&2 protection at GWK end; tripped on R-E fault due to A/R operation, and successfully reclosed. But was hand-tripped at 02:44 hrs from Kalpaka as per instructions of SLDC, AP.
2	03:14	HVDC POLE-1 AT GAJUWAKA SS	Pole -1 blocked due to South filter inter zone protection operation
3	03:28	400 kV SOUTH BUS-2	South Bus-2 tripped on operation of Busbar protection
4	03:35	<p>Busbar protection operation of 400 kV South Bus-1; this resulted in the tripping of following elements at Gajuwaka SS:</p> <ul style="list-style-type: none"> ➤ 400/220 kV ICT-2, 400/220 kV ICT-1, and 400 kV GAJUWAKA - VIJAYAWADA LINE- 1 As HVDC Pole-2 has been under shutdown since April 22, 2016, Pole-1 and South Bus-1 went out prior to this event, BBP operation of 400 kV South Bus-1 led to outage (Grid Disturbance) of 400 kV Gajuwaka SS. As a result of BBP operation of 400 kV South Bus-2 at 03:28 hrs and 400 kV South Bus-1 at 03:35 hrs, even though their respective Main-CB's got 	

		opened, 400kV Gajuwaka – Simhadri – 1 and 400kV Gajuwaka – Kalpaka – 2 lines remained in service through Tie-CB.	
5	03:45	400 kV GAJUWAKA - KALPAKA - 2	Tripped at Gajuwaka end due to operation of TEED protection.
6	03:45	400 kV GAJUWAKA – SIMHADRI -1	Tripped at Gajuwaka end on opening of Tie-CB due to operation of TEED protection
7	03:45	400 kV SIMHADRI - KALPAKA -4	Tripped at both ends (OVR, Stage-1 operation at STPP; DT receipt at Kalpaka)
8	03:45	400 kV SIMHADRI - KALPAKA -3	Tripped at both ends (OVR, Stage-1 operation at STPP; DT receipt at Kalpaka)
9	03:45	400 kV SIMHADRI - KALPAKA -1	Tripped on DEFR protection in M-2 at Kalapaka end
10	03:56	400 kV JEYPORE - GAZUWAKA 2	Hand-tripped from Jeypore end subsequent to tripping of both the 400 kV buses at Gajuwaka SS
11	03:56	400 kV JEYPORE - GAZUWAKA 1	Hand-tripped from Jeypore end subsequent to tripping of both the 400 kV buses at Gajuwaka SS
12	05:24	At 220 kV Vizag Switching Station, Busbar protection of 220 kV Bus-1 got operated due to the Flash over of the bus coupler B-ph Pilot insulators in Jack Bus connected to 220kV Bus-I, and tripped all Bus-1 connected feeders and ICT's	
13	19:29	HVDC GAJUWAKA POLE 2	Tripped on South Bus Differential Protection

- These trippings led to load loss of approx 250 MW. Further, generation backing down of 650 MW was carried out at Simhadri Generating Station to control loadings of remaining lines.

Analysis: The tripping analysis of the above events is given at **Annexure – V**.

B.5 Details of Trippings on 26.04.2016

Sequence of Events:

Sl. No.	Time (hh:mm)	Transmission Element	Details of Trippings
1	04:00	400kV GAJUWAKA - VIJAYAWADA	Tripped on distance protection operation.
2	04:00	400 kV GAJUWAKA - SIMHADRI -2	Line tripped on B-N fault Dist-0.42KM FC 13.32KA
3	04:57	Busbar protection of 400 kV South Bus – 1 operated, and resulted in tripping of the following elements: ➤ 400/220 kV ICT-2, 400/220 kV ICT-1, and 400 kV GAJUWAKA - SIMHADRI -1	

		<ul style="list-style-type: none"> • The above incident also led to blocking of HVDC Pole-1 • As Pole-2 has been under shutdown since 19:29 hrs, 25.04.2016, this event ultimately resulted Grid Disturbance (GD) at 400 kV Gajuwaka SS of PGCIL (SRTS-1)
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Analysis: The tripping analysis of the above events is given at **Annexure – V**.

B.6 Recommendations

- (i) **Provision of Line differential Protection on all 400 kV transmission lines interconnecting Gajuwaka SS (PGCIL-SRTS1), Simhadri STPP (NTPC), Kalpaka SS (APTRANSCO), and Hinduja TPS (HNPCIL):**

It is noted that all these stations are connected with OPGW/ fibre optic cables. Considering the criticality and vulnerability of the corridor (this corridor, which is located in coastal & highly pollution prone area, is being used to (i) import power to the extent of 1000 MW from the eastern region, and to evacuate power from Simhadri and Hinduja power plants), and the very short lengths of the inter-connecting transmission lines, Unit-protection such as line differential protection is generally preferable to conventional distance protection in those lines to avoid associated over-reach problems. ***It is therefore recommended that PGCIL (SRTS-I), APTRANSCO, NTPC, and Hinduja take steps to provide line (current) differential protection as outlined below on all 400 kV transmission lines inter-connecting Gajuwaka SS, Kalpaka SS, Simhadri STPP, and Hinduja TPS.***

“Line differential protection is to be provided as both Main-I & Main-II protection with distance protection as backup (built-in feature of Main relay or standalone relay). The Zone-1 of such back-up distance protection would be normally in disabled condition, and would get automatically activated/ enabled in the event of communication link failure (i.e., when line differential protection goes off) to offer primary protection. The Zone-2 & Zone-3 & Zone-4 (reverse) of the back-up distance protection will always be kept enabled to offer back-up protection.”

- (ii) **Protection Settings:**

When enquired about the incorrect relay settings found during the protection audit of Gajuwaka SS of PGCIL for the Kalpaka bound lines, APTRANSCO informed that even though the relays in Gajuwaka SS of PGCIL for Kalpaka lines belonged to them, maintenance of the same lies with PGCIL (SRTS-I). As such, they had communicated the revised set points to PGCIL (SRTS-I) for implementation, and it needed to be confirmed whether the revised setting had been implemented or not. PGCIL (SRTS-I), in this regard, confirmed that the relays were being maintained by them and settings communicated by APTRANSCO had been implemented. *It is suggested that protection settings at Gajuwaka, Kalpakka, Simhadri & HNPCIL shall be got checked jointly/ in coordination by the respective entities, and ensure that they are kept properly.*

(iii) Ensuring healthiness of PLCC & Carrier-aided communication

In certain tripping events discussed under B.3, B.4 and B.5, it is observed that PLCC communication is unhealthy/ taking place in erroneous manner intermittently on the 400 kV transmission lines interconnecting 400 kV Gajuwaka SS of PGCIL (SRTS-I) with Simhadri (NTPC) STPP and Kalpaka SS of APTRANSCO. To deal with these cases of PLCC mal-operation, the following shall be carried out by PGCIL (SRTS-I) in coordination with NTPC-Simhadri and APTRANSCO:

- Healthiness of PLCC system components (hardware and software) at both ends shall be checked and faulty components shall be repaired/ replaced.
- End-to-end communication for DT/ permissive & other signals may be ensured by testing at both the ends.

(iv) Provision of GPS/ Time synchronization facility in all 220 kV & above substations/ generation switchyards in Gajuwaka – Simhadri – Kalpaka corridor

The importance of GPS or time synchronization facility in the substation/ switchyard cannot be over-emphasized considering the role it plays in harmonising the station-specific events with the pan-Indian power network, and the accountability & discipline it brings in the way the power system network is operated at sub-station level. Further this is also one of the recommendations given by the Enquiry Committee constituted by Min. of Power that took stock of the factors that led to grid disturbances in North India on 30-31 July, 2012. In this connection, it is noted that Gajuwaka SS of PGCIL, Hinduja TPS of HNPCL, and Simhadri STPP of NTPC already have this facility. APTRANSCO informed that provision for the same had been included in the DPR of the APTRANSCO substations identified for R&M works. In this regard, it is pointed out as provision of GPS does not present a problem either from cost point of view or time needed for implementation point of view, ***it is recommended that APTRANSCO shall provide GPS/ time synchronization facility in all their 220 kV & above substations in Gajuwaka – Simhadri – Kalpaka corridor at the earliest.***

(v) Furnishing of tripping details in compliance of Regulation 5.2 (r) of IEGC

Members' attention has been brought to their obligation of fulfilling requirements under Regulation 5.2 (r) of IEGC, as per which all Users, Utilities, STU/ SLDC, and CTU are required to furnish for analysis purpose the relevant information relating to tripping events in their system along with Disturbance Recorder (DR) and Event Logger (EL) to SRLDC/ SRPC within 24-hrs of occurrence of the same. Though this issue was regularly brought to Constituents' attention vide various SRLDC & SRPC (fort-nightly) letters, still data w.r.t. all events was either not being furnished or being made available with unacceptable delay of few weeks. In the instant case, it was noted with concern that PGCIL (SRTS-I), in gross violation of the above the quoted IEGC regulation, had not furnished any of the tripping files (FIR/DR/EL/TR) for the events on 22.04.2016, 24.04.2016, 25.04.2016 and 26.04.2016 till the meeting day – 04.05.2016.

It is therefore recommended to PGCIL (SRTS-I), APTRANSCO, NTPC, HNPCL to upload various tripping files (FIR/ DR/ EL/ TR), whenever any tripping involving their station

takes place, in SRLDC's web-portal within 24-hrs of the occurrence of the tripping event in compliance of Regulation 5.2 (r) of IEGC.

Further, all Constituents are requested to strictly follow the file naming nomenclature given by SRPC vide their letter no: SRPC/ SE-III/ PCSC-45/ 4609 – 649 dated 26.06.2015 (Annexure – VII) for naming various tripping files, as it facilitates in doing systematic tripping analysis. As illustrated therein, the format to be followed for the user entered part-name is given below:

Transmission Element	File name to be given by the user
Transmission line	SSN_DSN_line#_FT
Inter-connecting Transformer	SSN_ICT#_FT
Generating Transformer	SSN_GT#_FT
Generating Unit	SSN_Unit#_FT

Where, SSN = Source Station Name/ From end Station Name/ Sending end Station Name

DSN = Destination Station Name/ To end Station Name/ Receiving end Station Name

FT = File Type (FIR/ DR/ EL/ TR)

C. Specific Remedial measures taken by PGCIL (SRTS-I) at their Gajuwaka (HVDC & HVAC) SS subsequent to 24-26 April, 2016 Grid Disturbances
















- Immediately mobilised 300 Nos. man-power along with 02 Nos. Hot-line washing machines at Vizag substation for cleaning of insulators.
- Cold line washing of entire HVAC, HVDC Pole-1 & 2 including Filter Banks has been carried out.
- In Substation, Strung Bus Porcelain insulators are being replaced with CLR Polymer insulators.
- 296 Nos. Strings already replaced since 25.04.2016 in substation and work is under progress.
- RTV Silicon High Voltage Insulation Coating on BPI insulator stacks and Isolator support structures connected to 400kV Bus is under progress.
- In 400kV Simhadri – Gajuwaka – 1 & 2 Lines, all the porcelain insulators were replaced with CLR Polymer insulators.
- In 400kV Vijayawada – Gajuwaka S/C line, transmission lines porcelain insulators up to 30 km radius has been replaced with CLR Polymer insulators.
- In 400kV Jeypore – Gajuwaka – 1 & 2, it was proposed to replace porcelain insulators with CLR Polymer insulators up to 30 km radius. The work is under progress.
- In 400kV Simhadri – Vemagiri – 1 & 2, it was proposed to replace porcelain insulators with CLR Polymer insulators up to 30 km radius.

**Special Meeting on issues relating to recent Grid Disturbances at Gajuwaka- Simhadri-
Kalpakka corridor**

SRPC, Bangalore

04-05-2016

LIST OF PARTICIPANTS

S.NO.	NAME IN CAPITAL LETTERS	DESIGNATION	ORGANISATION	SIGNATURE	E-Mail ID(Please write legibly to communicate in future)	Phone No.(LL& Mob./PL write Land Line no also)
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Annexure-I

TRANSMISSION LINE PATROLLING PROTOCOL/GUIDELINES FOR SOUTHERN REGION

1. Background

Hon'ble Commission in its Order on Petition No. 146/MP/2013 with I.A. 36/2013 dated 20.02.2014 had pointed out there were instances of Grid disturbance due to non-clearance of bushing/jungle clearance or non-trimming of tree branches within the RoW to transmission lines periodically. A typical case of such instance happened on 13.06.2013 was also mentioned. On this instance Commission also pointed out that it was evident that there was no periodic patrolling of lines by the transmission utility in certain portions that lead to unwarranted tripping of critical transmission elements. It was also emphasized that in all control area of SR Regional entities, lack of proper patrolling and jungle clearance with respect to transmission lines was one of the frequently reported instances which are affecting the security, economy and efficiency of the entire power system in Southern Region and needs to be addressed quickly. In this regard Commission directed RPCs to formulate Patrolling Protocol/Guidelines of Over head Transmission Lines /Guidelines which shall take into account the terrain, forest cover and reach in that area and ensure regular monitoring as per requirement in that area to ensure efficient operation.

2. Introduction

Regular and Periodic maintenance of transmission system is of utmost importance for its uninterrupted operation. All the Power Utilities have their own set procedure. State- of- the- Art Operation and Maintenance Practices that includes state of art condition monitoring techniques, Live Line monitoring and maintenance, Disaster Management System etc. need to be initiated.

Trees and power lines are not a good mix. One tree limb may cause a "blackout" that cut power to million people in the country. Patrolling and tree trimming/removal or jungle clearance shall always be part of maintenance of

Transmission Licensee to eliminate potential hazards. The patrols, which could be done by helicopter or "foot" patrols, will include trimming and removal of trees within the power line right-of-way. This effort will ensure a reliable electric system while protecting the public safety for customers throughout the Region. By maintaining an appropriate clearance in the power line right-of-way, we can reduce tree-related power outages. Trees and limbs falling on power lines cause power outages and disruptions of electric system. Trees too close to power lines can provide a path for electricity to reach the ground, which can result in property damage or serious injury to anyone touching the tree. Therefore in order to avoid any unforeseen, it is necessary to have transmission line patrolling protocol/guidelines which shall also take into account the terrain, forest cover and reach in that area and ensure regular monitoring as per requirement in that area to ensure efficient operation.

Proper maintenance of transmission lines help to reduce scheduled outages and increase the stability and reliability of power system. Systematic and regular maintenance works is a pre-requisite for a healthy power system.

3. Patrolling Guidelines to be followed

A detailed schedule of patrolling is to be chalked out for each line by various levels (From Work man to Executive). The person carrying out patrolling has to check various items as per the standard check list and indicate the same in the format. These checks, the next level person verifies, when he goes for patrolling.

3.1 Categorization:

Transmission lines shall be patrolled at periodicity depending upon the terrain and different patrolling schedules shall be implemented by the transmission licensees for normal sections, vulnerable sections/terrains and most vulnerable sections/terrain.

Most Vulnerable Section/Terrain:

Transmission lines

- i. passing through coastal, forest, high/fast tree growth areas
- ii. passing through areas prone to flux/soil erosion/hilly tracts/ level crossings
- iii. passing through areas change of river course/ critical due to flood/ critical land sliding
- iv. Very heavy polluted areas

Vulnerable Section/Terrain:

Transmission lines

- i. emanating from generating stations
- ii. of 765 kV, 400 kV and 220/230 kV(Critical lines)
- iii. of Multiple circuit lines
- iv. prone to theft
- v. Heavy/medium polluted areas

Normal Sections:

Transmission line sections not prone to frequent defects and not covered under above vulnerable and most vulnerable sections.

Each transmission utility would categorize each of the line with the above criteria and furnish the details to SRPC/SRLDC. Some lines could be categorized under different category however location details, Ckm under different category would be furnished. New elements details would be furnished as and when they are commissioned.

3.2 Frequency of Patrolling

SL. No.	Section/Terrain	Frequency and By		
		Quarterly by Junior	Six monthly by Senior	Yearly by Executive
1	Normal			

Transmission Line Patrolling Protocol / Guidelines for SR-SRPC

		Staff	Engineer	
2	Vulnerable	Bi-Monthly(Once in two months) by Junior Staff	Once in four months by Senior Engineer	Half yearly by Executive
3	Most Vulnerable	Monthly by Junior Staff	Quarterly by Senior Engineer	Half yearly by Executive

- 3.2.1 The patrolling schedules for ground inspection of live lines and tower top inspection of de-energized lines shall be separately issued by the licensees. Patrolling and condition monitoring of the lines shall be done both by inspection from ground using visual and thermal instruments as well as tower top inspections.
- 3.2.2 Tower top patrolling shall be done for the transmission lines categorized under Most Vulnerable Section/Terrain under live condition or during shut down.
- 3.2.3 The important lines shall be inspected by senior engineers after patrolling by junior staff and maintenance works such as tree cutting and replacement of damaged insulators shall be carried out immediately after patrolling, wherever required.
- 3.2.4 Patrolling would be ensured up to switch yard of generating stations/switch yards of other transmission utilities wherever applicable. Necessary cooperation would be ensured by respective utilities.

3.3 Patrolling Check list

Patrolling check list would cover at least the following points. However, the transmission utility would add additional check points as per requirement.

A. Clearance of Trees, Shrubs etc:

- Check adequacy of clearance of trees, shrubs, bushes, etc., from line conductor
- Cut all trees, bushes, shrubs which infringe on clearance
- Check grass growth on boundary wall of farms, which can grow to a height to infringe clearance

B. Towers:

- Check the back filling/soil removal of foundation of Tower.
- Check the concrete of chimney for cracks.
- For tower location, provided with revetment ensure that retaining wall is neither broken nor in danger of falling.
- Check earthing of tower.
- Check all tower members are intact, in place and not damaged.
- Check galvanizing / painting of tower members are in proper condition.
- Check there is no corrosion of any part of tower/ hardware.
- Check anti climbing devices and barbed wiring are fixed and are in place.
- Check the number plate, danger board, phase plate and circuit plate.
- Clear all bird nests on tower / cross arms.

C. Insulator and Hardware:

- Check flash over / chipped insulators.
- Test insulators by Hot line method once in a year for healthiness of insulators.
- Replace failed insulators.
- Check arcing horns for loose connections.
- Check vibration dampers.
- Check jumpers connections by thermo vision camera by hot line staff.
- Check armour rods of suspension clamps.
- Check jumper connections at tension point, suspension clamps.

- Check earth bond provided on suspension and tension hardware of earth wire.

D. Conductor and Earth Wire

- Check for visible damages like cut strands, deposits, burn marks.
- Check midspan joint of conductor / ground wire damage of conductor and ground wire strands.

3.4 Patrolling reporting/ record

Each transmission utility would furnish the annual schedule of patrolling to SRPC/SRLDC along with annual outage data by October each year. Compliance report of the patrolling/maintenance carried out during previous month with respect to schedule would be furnished to SRPC/SRLDC in the OCC meeting.

4. Maintenance

4.1 Each line would be maintained as per the following schedule.

Area	Frequency
Forest/ High growth/Very heavy polluted	Once every four (4) months. It would be ensured in the months of May/June before monsoon
Heavy / Medium polluted	Once in every four (4) months. It would be ensured in month of November just before winter
Coastal	Once in every four (4) months. It would be ensured in month of February just before summer
Light polluted	Once in six months. It would be ensured in month of November just before winter
Lines emanating from Generating Stations	Once in six months
Balance(not covered above)	Once in a year

- 4.2** Maintenance and cleaning of various equipment fittings, accessories, primary instruments and sensors shall be carried out when they are de-energized during the shut-down of main equipment so as to minimize shutdown time.
- 4.3** Where defects are observed through condition monitoring or during patrolling and inspection, the maintenance work/attending works on various items of equipment may be advanced depending on the condition of the equipment.
- 4.4** Pruning of tree branches and clearing of vegetation within the Right of Way and up to 10m away from Right of Way and sectioning of vegetation around the tower footing shall be carried out frequently in a continuous manner.
- 4.5** The maintenance responsibility would be clearly spelt out for the lines terminating at switch yards of generating stations/other transmission utilities. Maintenance would be ensured as per the above schedule.

4.6 Maintenance records:

The records of all maintenance carried out for each transmission line shall be kept in the table formats in electronic form and hard copy and the next due date for maintenance of each item of work shall be clearly marked in such tables and formats.

4.7 Duration of Outages:

All the planned maintenance would be completed within 8 hours in day. All the transmission utilities would arrange for additional man power to meet the requirement. Only in extreme contingency planned maintenance would be permitted for two days or more after the approval from the OCC forum.

4.8 Maintenance of Tools and Equipment

The maintenance staff shall be made aware of the list of tools, devices and equipment for various maintenance and rectification works on transmission lines, and the tools shall be made readily available and certified for usage.

4.9 Inventory control and spare part management.-

The required spare parts shall be kept in stock, to ensure speedy the maintenance of the equipment. Computerized materials management system shall be developed by the Entities to optimize inventory.

- 4.10** Identified defects during patrolling would be closed by maintenance as per the line schedule / requirement and it would be recorded. During next visit by senior staff/executive, he would ensure all patrolling points have been cleared.

5. Maintenance/Patrolling Audit

- a) An internal committee may be established by the Entities to verify whether actual maintenance/patrolling works are carried out for the over head transmission line in compliance of the RPC Guidelines and procedures/policy of the transmission company.
- b) The observations of the Committee shall be put up to the management of the Entity for perusal and taking corrective action, if any.

6. Disaster management.

- a) The maintenance staff shall be trained in disaster management and a detailed procedure for the same shall be developed by the Entity and displayed prominently.
- b) This detailed procedure shall be reviewed periodically and also based on mock exercises carried out by the Entity.
- c) The maintenance staff shall be trained in emergency restoration procedures for managing major failures and breakdowns.
- d) The equipment including vehicles, diesel generating sets and firefighting equipment and Emergency Restoration System for transmission lines shall be kept available at sub-station or at appropriate location for disaster management.

7. Failure analysis

- a) All failures of equipment and tower collapse shall be analyzed by the Entity to avoid recurrence and a copy of the report shall be submitted to the Regional Power Committee (RPC) and Central Electricity Authority (CEA).
- b) CEA may appoint a group of experts for investigation and analysis and the representatives of manufacturers may be invited to participate in such analysis.
- c) All relevant data which may help the group of experts in analyzing the failures shall be furnished by the respective Entities.
- d) The recommendations of the group of experts shall be submitted to the CEA and the recommendations accepted by the CEA shall be implemented and circulated to all within the organization and to other concerned organizations to prevent recurrence of similar failures.

8. Training.

- a) Every person involved in operation and maintenance of transmission lines shall be trained at the induction level and at least once in a year.
- b) The maintenance personnel of every entity shall be trained in preventive and breakdown maintenance of various equipment and the personnel shall be trained in various detailed maintenance procedures.

फैक्स/स्पीड पोस्ट / FAX/SPEEDPOST

भारत सरकार केंद्रीय विद्युत प्राधिकरण दक्षिण क्षेत्रीय विद्युत समिति बेंगलूरु - 560 009				Government of India Central Electricity Authority Southern Regional Power Committee Bengaluru - 560 009	
Web site: www.srpc.kar.nic.in		Email: msrpc-kar@nic.in		Ph: 080-22287205 Fax: 080-22259343	
सं/No. SRPC/SE-II/2016/		दिनांक / Date		05.05.2016	

As per the list enclosed

Sub: Patrolling / Maintenance of critical lines and substations

As you are aware in recent times, insulator tracking has been observed in the Transmission lines and Substations located in the coastal and polluted areas. Gaziwaka, Tuticorin and Vallur areas have been severely affected in recent past. Many outages have been observed in lines passing through forest areas. This has serious ramification on grid security and has led to grid incidents / disturbances and affected the generation also. In compliance of Hon'ble CERC directions in petition No.146/MP/2013 with I.A.36/2013 (Order dt.20.2.2014) SRPC Secretariat had formulated the Patrolling Guidelines for overhead Transmission lines which is available at SRPC website (<http://www.srpc.kar.nic.in/website/2014/operation/patrolling.pdf>).

It is pertinent that the Patrolling and Maintenance needs to be carried out for the critical lines as per the Patrolling Guidelines. It is also imperative that the switchyards of the generators located in coastal areas need to be maintained stringently.

In this context, Transmission Lines and Substations in the most vulnerable terrain, coastal and polluted areas have been categorized for monitoring to ensure that Patrolling and Maintenance is being carried out as per the Patrolling guidelines (List at Annexure-I). The format for furnishing the details of schedule / Patrolling and Maintenance carried out of the critical Transmission lines and Substations is given at Annexure-II (soft copy in excel format is available in SRPC website). It is requested to furnish the necessary details in the specified format by 18.5.2016 positively.

All the concerned entities are requested to take necessary steps to ensure that Patrolling and Maintenance is carried out as per the Patrolling Guidelines and the matter may be considered as critical.

धन्यवाद / Thanking you,

भवदीय / Yours faithfully



(असित सिंह / Asit Singh)

अधीक्षक अभियंता / Superintending Engineer

Copy to:

ED, SRLDC, Bengaluru

Mailing list:

1. GM, SR-I, PGCIL, Secunderabad
2. GM, SR-II, PGCIL, Bengaluru
3. Chief Engineer (Grid Operation), APTRANSCO, Hyderabad
4. Chief Engineer (Elec), Load Despatch Centre, KPTCL, Bengaluru
5. CE(System Operation), KSEBL, Kalamaserry
6. Chief Engineer (Operation), TANTRANSCO, Chennai
7. CGM, Simhadri STPS, NTPC, Simhadri
8. GM, NTECL, Vallur
9. General Manager, TPS-II, Neyveli
10. OS, KKNPP, Kudankulam
11. GM, NTPL, Tuticorin
12. Chief Manager-Electrical, SEL, Nellore
13. Lead Engineer-Electrical, MEPL, Nellore
14. AGM, TPCIL, Nellore
15. AGM-Electrical, IL & FS, Nagipatnam
16. Advisor-Electrical, Coastal Energen, Tuticorin
17. AGM, SFMBCORP, Nellore
18. GM, HNPCL, Vizag
19. M/s. Raichur Sholapur Transmission Company Private Limited, Mumbai

Annexure-I

List of Transmission lines in most vulnerable section/terrain (Coastal areas, Forest areas, Highly polluted areas, Critical etc)**PGCIL:**

1. 765 kV Raichur- Sholapur S/C (PGCIL)
2. 765 kV Raichur- Kurnool S/C lines -2 Nos
3. 765 kV Kurnool-Tiruvalam D/C
4. 500 kV HVDC Talcher- Kolar D/C
5. 400 kV Jeypore-Gajuwaka D/C
6. 400 kV Ramagundam-Chandrapur D/C
7. 400 kV Gajuwaka-Simhadri Stg-II D/C
8. 400 kV Simhadri St-II – Vernagiri D/C
9. 400 kV Gajuwaka-Nunna S/C
10. 400 kV Nunna (Vijayawada)- Nellore D/C (2 D/C)
11. 400 kV Nellore- Nellore PS D/C
12. 400 kV Nellore- Tiruvalam D/C
13. 400 kV Gooty-Nelamangala S/C
14. 400 kV Gooty-Somanahally S/C
15. 400 kV Nelamangala-Bidadli D/C
16. 400 kV Kaiga-Guttur D/C
17. 400 kV Kaiga-Narendra D/C
18. 400 kV Hosur-Salem S/C (2 Nos)
19. 400 kV Kolar-Hosur D/C
20. 400kV Kolar-Hoody DC line
21. 400 kV Kolar- Sriperambadur S/C
22. 400 kV Chittor-Sriperambadur S/C
23. 400 kV Nellore- Sriperambadur D/C
24. 400 kV Udumalpet-Palakkad D/C
25. 400 kV NTPL- Tuticorin PS
26. 400 kV NTPL- CEPL
27. 400 kV CEPL- Tuticorin PS
28. 400 kV TPCIL-Nellore PS D/C
29. 400 kV Sembcorp- Nellore PS D/C
30. 400 kV Vallur- Almathy D/C
31. 400kV Vallur-Kalvendapattu DC line
32. 400kV Neyveli TS2-Nagapatnam line
33. 400kV NLCIExp-Nagapatnam line

RSTCL:

34. 765 kV Raichur- Sholapur (RSTCL)

APTRANSCO:

35. 400 kV Kalpakka-Simhadri Stg-I D/C (2 Nos)
36. 400 kV Kalpaka-Vernagiri D/C

- 37. 400 kV Gajuwaka- Kalpakka D/C
- 38. 400 kV Krishnapatnam-Manubolu D/C
- 39. 400kV Krishnapatnam-Chittoor D/C
- 40. 400kV HNPCL-Kalpaka DC line

KPTCL

- 41. 400 kV Kaiga-Guttur D/C
- 42. 400 kV Guttur-JSWEL S/C
- 43. 400 kV Guttur- Hiriyur D/C
- 44. 400 kV Hiriyur-Nelamangala
- 45. 400 kV BTPS- JSWEL S/C
- 46. 400 kV RTPS- BTPS S/C
- 47. 220 kV Nagjheri-Kodasalli D/C
- 48. 220 kV Nagjheri- Ambewadi D/C
- 49. 220 kV Nagjheri- Hubli D/C
- 50. 220 kV Nagjheri- Bidnal D/C
- 51. 400 kV UPCL-Hassan D/C
- 52. 220 kV Kadakola-Kaniyampet S/C

KSEBL:

- 53. 220 kV Kadakola-Kaniyampet S/C
- 54. 220 kV Idukki-Udumalpet S/C

TANTRANSCO:

- 55. 220 kV Idukki-Udumalpet S/C
- 56. 400 kV Vallur- NCTPS D/C

CEPL:

- 57. 400 kV CEPL – ILO point of NTPL-Tuticorin PS

MEPL/SEL:

- 58. 400 kV MEPL- SEL
- 59. 400 kV MEPL- Nellore
- 60. 400 kV SFL- Nellore

ILFS:

- 61. 400kVNagapatnam ILFS DC line

List of critical Substations in Coastal/Polluted Corridor:***PGCIL:***

1. 765/400kV Raichūr SS
2. 400kV Gajuwaka SS
3. 400kV Nellore(Manubolu) SS &
4. 765/400kV Nellore PS
5. 400kV Nagapattanam SS
6. Tuticorin PS

APTRANSCO:

7. 400kV Kalpakka SS/220 kV Switching station
8. 400kV Nellore SS
9. 400kV Krishnapatnam (SDSPP)

TANTRANSCO:

10. 400kV North Chennai TPS
11. 400kV Alamathy SS

Generating Stations:

12. NTPC --Simhadri SS
13. HNPCL (Hinduja)
14. TPCIL
15. MEPL
16. SEL
17. NTPL
18. NTECL
19. CEPL
20. ILFS
21. KKNPP

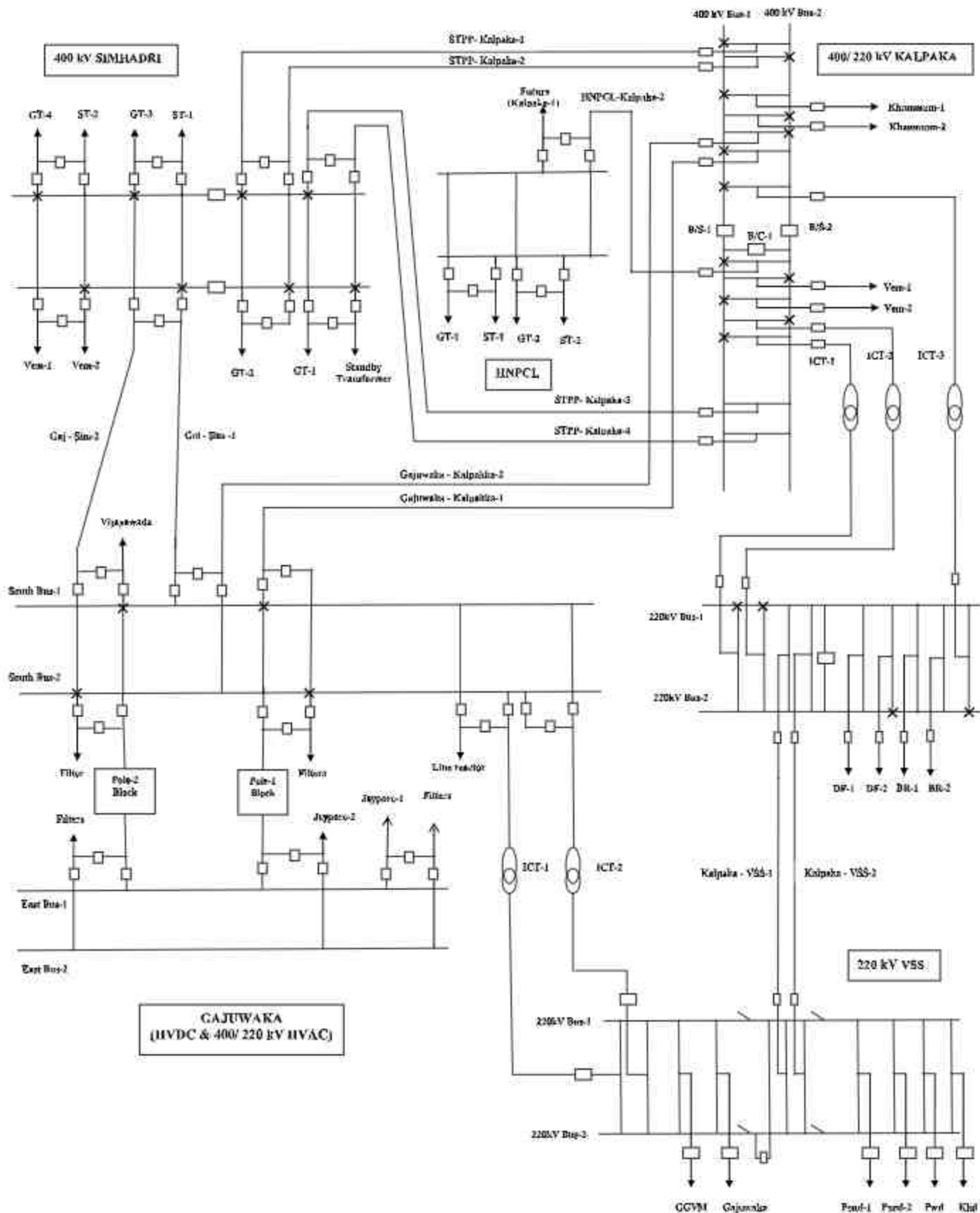
Patrolling/Maintenance schedule/carried out of transmission lines in Most Vulnerable sections/terrains

Name of the line:		Voltage level:											
Patrolling	Carried out/Scheduled	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
	Scheduled												
Junior Staff	Carried out												
	Scheduled												
Senior Engineer	Carried out												
	Scheduled												
Executive	Carried out												
	Scheduled												
Maintenance	Carried out												
	Scheduled												

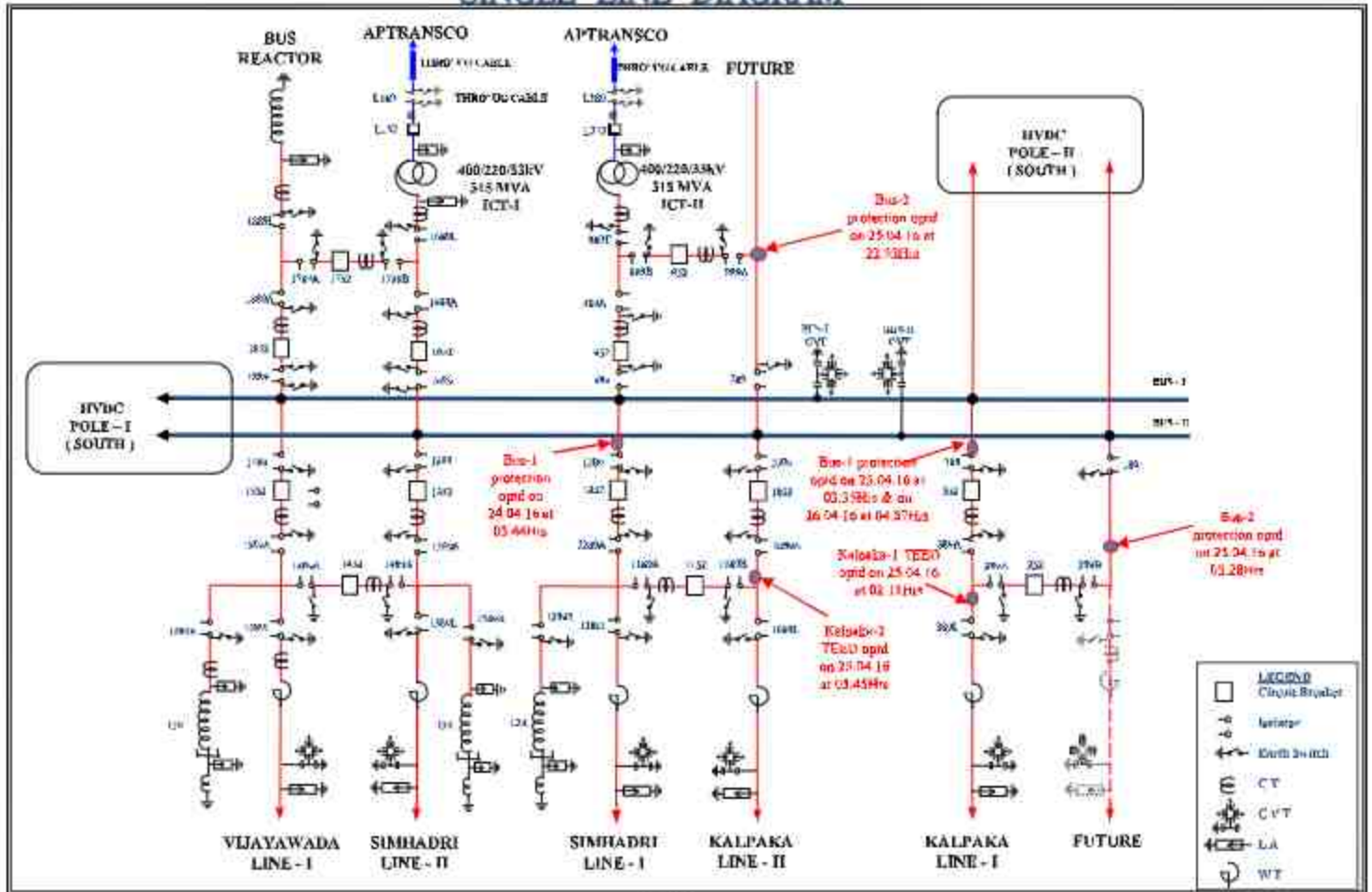
Maintenance schedule/carried out of Substations in Most Vulnerable sections/terrains

Name of the Substation:		Voltage level:											
Patrolling	Carried out/Scheduled	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17
	Scheduled												
Maintenance	Carried out												
	Scheduled												

**Single Line Diagram showing interconnections among 400/220 kV Gajuwaka SS,
220 kV VSS, 400 kV NTPC-Simhadri STPP, 400 kV Hinduja TPS**



POWER GRID CORPORATION OF INDIA LIMITED
VISAKHAPATNAM STATION (HVAC)
SINGLE LINE DIAGRAM







Analysis of the Grid Occurrences

B.2 Trippings on 22.04.2016

Sl. No.	Transmission Element	Date & Time	Reason	Category
1	400 kV JEYPORE - GAZUWAKA 1	22-04-2016 at 18:16 hrs	Line tripped due to DT receipt from Jeypore end. LBB operation was also observed subsequently due to wide spread insulator tracking.	GI-2
<u>Gajuwaka (PGCIL-SR-1) end:</u> <ul style="list-style-type: none"> As per DR/TR, the line tripped at 18:16:40.894 hrs (as per EL, this event occurred at 18:16:41.890 hrs) due to DT receipt from Jeypore end. But due to tracking in insulators, current flow was observed in all the three poles, due to which LBB operation took place at 18:16:41.150 hrs. In TR, it was mentioned that from 18:04 hrs onwards, severe voltage fluctuations from 280 kV to 440 kV on East Bus were observed. It was also stated that tripping of some of the 400 kV lines in the eastern region could have caused voltage fluctuations. 				
2	400 kV JEYPORE - GAZUWAKA 2	22-04-2016 at 18:16 hrs	Line tripped on over voltage conditions. LBB operation was also observed subsequently due to wide spread insulator tracking.	GI-2
<u>Gajuwaka (PGCIL-SR-1) end:</u> <ul style="list-style-type: none"> As per DR, the line tripped in 3-ph at 18:16:41.470 hrs apparently due to Over Voltage conditions. But due to tracking in insulators, current flow was observed in all the three poles, due to which LBB operation took place at 18:16:41.680 hrs (as per EL, LBB operation event occurred at 18:16:42.450 hrs). It was stated in TR that BFR operation was due to pollution around Vizag Substation mixed with saline pollutants causing visible/audible tracking in the insulators and thereby causing insulation breakdown and external conduction. 				
3	HVDC GAJUWAKA POLE 1	22-04-2016 at 18:16 hrs	Pole-1 got blocked on loss of all filters of East side.	
<u>Gajuwaka (PGCIL-SR-1) end:</u> <ul style="list-style-type: none"> As per TR, from 18:04 hrs onwards, severe Voltage Fluctuations on East Bus were observed from 280kV to 440kV. Voltage fluctuations along with Voltage Imbalance caused tripping of all East Side filters of Pole-1 on System conditions, there by Blocking the Pole-1 due to loss of all filters of East Side. In the DR & EL furnished, the relevant events showing Pole-1 block on loss of all filters of East side were not found. 				
4	HVDC GAJUWAKA POLE 2	22-04-2016 at 18:16 hrs	Pole-2 got blocked on loss of East side Voltage from Pole-1 East bus	
<u>Gajuwaka (PGCIL-SR-1) end:</u> <ul style="list-style-type: none"> As per TR, from 18:04 hrs onwards, severe Voltage Fluctuations on East Bus were observed from 280kV to 440kV. However, Pole-2 Blocked due to loss of East Side Voltage from Pole-1 East Bus. In the DR & EL furnished, the relevant events showing Pole-2 block on loss of East side Voltage from Pole-1 East bus were not found. 				
5	HVDC GAJUWAKA POLE 1	22-04-2016 at 20:44 hrs	Pole-1 tripped due to LBB operation of 01 no. of South Side In-Service Filter, viz., CWC36 which tripped on "IDMT E/F protection".	
<u>Gajuwaka (PGCIL-SR-1) end:</u> <ul style="list-style-type: none"> As per TR, POLE-1 was Blocked due to operation of BFR of 01 no. of South Side In-Service Filter, i.e., CWC36 which tripped on "IDMT E/F protection". Later, it was investigated that the very severe Corona discharge being observed in the switchyard equipments in the form of tracking caused flashovers and subsequent operation of E/F protection of respective elements. 				

<ul style="list-style-type: none"> Filter Breaker BFR protection was due to external conduction across the Grading capacitor thereby tripping the Main and Tie Breaker of Filter Bus and Blocking the Pole-1. Similar type of tracking was also observed inside the filter banks and resulted in tripping of Filter on "IDMT EIF protection" 				
6	HVDC GAJUWAKA POLE 2	22-04-2016 at 21:01 hrs	Pole-2 tripped on loss of East Side Voltage from HVDC Pole-I due to tripping of East Bus-1 Extension on "Differential Current Phase L1 trip".	
<u>Gajuwaka (PGCIL-SR-1) end:</u> <ul style="list-style-type: none"> As per TR, Pole-2 got blocked at on loss of East Side Voltage from HVDC Pole-I due to tripping of East Bus-1 Extension on "Differential Current Phase L1 trip". 				

B.3 Trippings on 24.04.2016

Sl. No.	Transmission Element	Date & Time	Reason	Category
1	400 kV KALPAKKA - GAZUWAKA line-1	24-04-2016 at 03:23 hrs	Line tripped on R-E fault due to A/R (Z1) operation, and successfully auto-reclosed from Kalpaka end.	GI-2
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, the line tripped at 3:23 hrs on R-E fault due to A/R (Z1) operation, and successfully auto-reclosed after 1sec. DR/EL/TR not furnished. <u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> FIR/DR/EL/TR not furnished. 				
2	400/220kV KALPAKKA ICT-1	24-04-2016 at 03:26 hrs	ICT-1 tripped due to BBP operation of 400 kV Bus-1 at Kalpaka SS.	GI-2
<ul style="list-style-type: none"> As per FIR, ICT-1 tripped due to BBP operation of 400 kV Bus-1 caused by insulator tracking. DR/EL/TR not furnished. 				
3	400 kV KALPAKKA - SIMHADRI LINE-3	24-04-2016 at 03:26 hrs	Line tripped at 03:26 hrs due to BBP operation of 400 kV Bus-1 at Kalpaka SS.	GI-2
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR/DR, the line tripped at 03:26:23.554 hrs due to BBP operation of 400 kV Bus-1 caused by insulator tracking. EL/TR not furnished. <u>Simhadri (NTPC) end:</u> <ul style="list-style-type: none"> As per FIR/DR/EL/TR, the line tripped at 3:26:01:376 hrs due to DT receipt from Kalpaka end. It was stated in DR that line voltage dipped from 400 kV by 52 kV during the incident. 				
4	400 kV KALPAKKA - VEMAGIRI LINE-2	24-04-2016 at 03:26 hrs	Line tripped at 03:26 hrs due to BBP operation of 400 kV Bus-1 at Kalpaka SS.	GI-2
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR/DR, the line tripped at 03:27:50.414 hrs due to BBP operation of 400kV Bus-1 caused by insulator tracking. EL/TR not furnished. <u>Vemagiri (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR/DR/EL, the line tripped at 3:25:22.339 hrs due to DT receipt from Kalpaka end. 				
5	400 kV KALPAKKA-HNPCL LINE-2	24-04-2016 at 03:26 hrs	Line tripped at 03:26 hrs due to BBP operation of 400 kV Bus-1 at Kalpaka SS.	GI-2
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, the line tripped at 03:25 hrs due to BBP operation of 400 kV Bus-1 caused by insulator tracking. DR/EL/TR not furnished. 				

HNPCL end: <ul style="list-style-type: none"> As per FIR/DR, the line tripped at 04:26:07.210 hrs due to DT receipt from Kalpaka end. EL not furnished. It was suspected that tracking of Insulators in 400 kV switchyard of Kalapaka had caused tripping of lines and severe voltage dips on the lines. Remedial action: <ul style="list-style-type: none"> It was also informed that at HNPCL, hot-line washing of all the switchyard insulators had been carried out in March (i.e., before onset of Summer season) to avoid tracking of insulators subsequently. 				
6	400KV JEYPORE-GAZUWAKA LINE-2	24-04-2016 at 03:36 hrs	The line tripped at 03:36 hrs due to operation of OVR, Stage-I protection at Gajuwaka end.	GI-2
Gajuwaka (PGCIL-SR1) end: <ul style="list-style-type: none"> As per DR/EL/TR, the line tripped at 03:36:59.220 hrs due to operation of OVR, Stage-I protection. 				
7	HVDC GAJUWAKA POLE 1	24-04-2016 at 03:36 hrs	POLE- I was blocked due to operation of South Filter Inter Zone Protection.	
Gajuwaka (PGCIL-SR1) end: <ul style="list-style-type: none"> As per DR/EL/TR, POLE- I was blocked due to operation of South Filter Inter Zone Protection. It was stated in TR that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and subsequent operation of South Filter Bus Inter Zone protection in the switchyard. Pole-I was deblocked on 24.04.2016 at 17:08 hrs vide SRLDC Code-64 1, ERLDC Code-75 8, and NLDC code-783. 				
8	Outage of 400 kV Gajuwaka SS	24-04-2016 at 03:44 hrs	400 kV South Bus-2 was already under shut down due to BBP operation at 02:44 hrs. With the BBP operation of 400 kV South Bus-1 at 03:44 hrs, the 400 kV Gajuwaka SS went under complete outage	GD-1
Gajuwaka (PGCIL-SR1) end: <ul style="list-style-type: none"> 400 kV South Bus-2 was already under shut down due to BBP operation at 02:44 hrs. With the BBP operation of 400 kV South Bus-1 at 03:44 hrs, the 400 kV Gajuwaka SS went under complete outage It was informed that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and which led to BBP operation HVAC South Bus -1. 				
9	400/220 kV ICT-2 at Gajuwaka SS	24-04-2016 at 03:44 hrs	ICT-2 tripped at 03:44 hrs due to BBP operation of 400 kV South Bus-1.	GI-2
Gajuwaka (PGCIL-SR1) end: <ul style="list-style-type: none"> As per DR/ EL/TR, ICT-2 tripped at 03:44:05.433 hrs due to BBP operation of 400 kV South Bus-1. It was informed that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and which led to BBP operation HVAC South Bus -1. 				
10	400/220 kV ICT-1 at Gajuwaka SS	24-04-2016 at 03:44 hrs	ICT-1 tripped at 03:44 hrs due to BBP operation of 400 kV South Bus-1.	GI-2
Gajuwaka (PGCIL-SR1) end: <ul style="list-style-type: none"> As per EL/TR, ICT-1 got disconnected at 03:44:05.433 hrs due to BBP operation of 400 kV South Bus-1. It was informed that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and which led to BBP operation HVAC South Bus -1. 				
11	400 kV GAZUWAKA-VIJAYAWADA - 1	24-04-2016 at	Line tripped at 03:44 hrs due to BBP	GI-2

		03:44 hrs	operation of 400 kV South Bus-1.	
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per DR/TR, From DR, the line tripped at 03:44:05.433 hrs due to BBP operation of 400 kV South Bus-1. It was informed that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and which led to BBP operation HVAC South Bus -1. 				
<u>Vijayawada (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> FIR/TR not furnished. In DR/EL furnished, Main-1 protection & DT receipt were observed at 03:44:17.374 hrs, and the line seemed to have got opened in 3-ph. Again after, 1 sec, DT receipt was observed. 				
12	400/220 kV ICT-3 at KALPAKA	24-04-2016 at 03:57 hrs	ICT-3 tripped due to BBP operation of 220 kV Bus-2	GI-2
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, ICT-3 tripped at 03:57 hrs due to BBP operation of 220 kV Bus-II. DR/EL/TR not furnished. It was informed that the 220kV Kalpaka – Dairyfarm line-2 Bus 2 to CB connected pipe got cut at breaker side and ear to Bus 2 side, thus creating bus fault and tripped all Bus-2 connected feeders. 				
12	Outage of 220 kV Kalpaka Substation	24-04-2016 at 03:58 hrs	220 kV Busbar protection of 220 kV Bus-2 got operated at 03:57 hrs and gave the trip signal to the Bus-2 connected feeders and ICT's. Then 220kV Kalpaka-Dairyfarm-1 tripped at 03:58 hrs at both ends on distance protection. With this, all the supply feeders on the 220 kV Bus-1 at Kalpaka SS effectively went out of service, and resulted in outage of 220 kV Kalpaka SS.	GD-1
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> DR/EL/TR not furnished. As per FIR, BBP of 220 kV Bus-2 got operated at 03:57 hrs and gave the trip signal to the Bus-2 connected feeders and ICT's. It was informed that the 220kV Kalpaka – Dairyfarm line-2 Bus 2 to CB connected pipe got cut at breaker side and earthed at Bus 2 side, thus creating bus fault and tripped all Bus-2 connected feeders. It was further informed that 220kV Kalpaka-Dairyfarm-1 tripped at both ends on distance protection as the Y-ph Jumper cone melted and got cut at location no.20. With this, all the supply feeders on the 220 kV Bus-1 at Kalpaka SS also effectively went out of service, and resulted in outage (Grid Disturbance) of 220 kV Kalpaka SS. 				
14	400kV Gazuwaka-Kalpakka -2	24-04-2016 at 04:17 hrs		GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> FIR/TR not furnished. From DR/EL, it was observed that the Main-CB was already in OPEN condition, and Tie-CB opened (in-3ph) at 04:17:22.343 hrs due to Main-1 protection operation & Main-2 B/U protection operation. What is the exact cause? 				
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, the line was kept holding from Kalpaka end. 				
15	400kV Gazuwaka-Simhadiri line-1	24-04-2016 at 04:17 hrs		GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> FIR/DR/EL/TR not furnished. 				
<u>Simhadri (NTPC) end:</u> <ul style="list-style-type: none"> As per FIR/DR/EL/TR, the line tripped at 04.17.22.152 hrs on Y-E fault due to A/R operation, and auto-reclosed successfully after 1 sec. However, in DR, as the time scale was restricted to 600 msec, successful A/R operation 				

could not be established from it.				
16	400/220 kV ICT-2 AT KALPAKA	24-04-2016 at 04:23 hrs	ICT-2 tripped at 04:23 hrs due to HV (400 kV) side O/C & E/F protection	GI-2
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, ICT-2 tripped at 04:23 hrs due to HV (400 kV) side O/C & E/F protection. DR/EL/TR not furnished. 				
17	400kV JEYPORE-GAZUWAKA-1	24-04-2016 at 04:47 hrs	Line tripped due to DT receipt from Jeypore end	GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per DR/EL/TR, the line tripped at 04:47:48.853 hrs due to DT receipt from Jeypore end. 				
18	Outage of 220 kV Vizag Switching Station (VSS)	24-04-2016 at 05:02 hrs	Bus bar protection of 220 kV Bus-1 got operated at VSS, and gave the trip signal to the Bus-1 connected feeders and ICT's.	GD-1
<u>VSS (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, BBP of 220 kV Bus-1 got operated at 05:05 hrs and gave the trip signal to the Bus-1 connected feeders and ICT's. From DR/EL, BBP of 220 kV Bus-1 occurred at 04:42:39.484 hrs. It was informed that due to the Flash over of the bus coupler Y-ph Pilot Insulators in Jack Bus connected to 220kV Bus-1, Bus bar protection of 220 kV Bus-1 got operated at VSS. Around this time, as no supply feeders were present on Bus-2 (due to their having got tripped prior to this event on various reasons, it resulted in outage (Grid Disturbance) of 220 kV Vizag Switching Station (VSS). A detailed report on the factors that led to GD at this station along with remedial measures taken is given at Annexure – VI. 				

B.4 Trippings on 25.04.2016

Sl. No.	Transmission Element	Date & Time	Reason	Category
1	400 kV KALPAKA - GAZUWAKA 1	25-04-2016 at 02:13 hrs	Tripped on TEED 1&2 protection at GWK end; tripped on R-E fault due to A/R operation, and successfully reclosed. But was hand-tripped at 02:44 hrs from Kalpaka as per instructions of SLDC, AP.	GI-2
<u>Kalpaka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, the line tripped at 02:13 hrs on R-E fault due to A/R (Z1) operation, and successfully auto-reclosed after 1 sec. It was stated that the feeder was hand-tripped at 02:44 hrs per the instructions of SLDC. DR/EL/TR not furnished. 				
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per DR/EL/TR, the line tripped at 02:15:01.114 hrs due to operation of TEED-1 & 2 protection. It was stated in TR that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers, which might have caused TEED protection operation. 				
2	HVDC GAJUWAKA POLE 1	25-04-2016 at 03:14 hrs	Pole -1 blocked due to South filter inter - zone protection operation	
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per DR/EL/TR, POLE-1 was blocked at 03:14:26.277 hrs due to operation of South Filter Inter Zone Protection. It was stated in TR that due to dense fog in and around Vizag Substation mixed with saline pollutants caused 				

visible/audible tracking in the insulators and thereby resulted in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and subsequent operation of South Filter Bus Inter-Zone protection in the switchyard.				
3	Outage of 400 kV GAJUWAKA SS	25-04-2016 at 03:35 hrs	This resulted from Busbar protection operation of 400 kV South Bus-1, as HVDC Pole-2, and 400 kV South-Bus-1 went out prior to this event.	GD-1
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> This resulted from Busbar protection operation of 400 kV South Bus-1, as HVDC Pole-2, and 400 kV South-Bus-1 went out prior to this event. It was informed that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers and which led to BBP operation 400 kV South Bus -1. 				
4	400/220 kV ICT-2 at GAJUWAKA	25-04-2016 at 03:35 hrs	Tripped due to BBP operation of 400 kV South Bus-1	GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per DR/EL/TR, ICT-2 tripped at 03:35:06.673 hrs due to BBP operation of 400 kV South Bus-1. 				
5	400/220 kV ICT-1 at GAJUWAKA	25-04-2016 at 03:35 hrs	Tripped due to loss of connectivity with any of the South Buses	GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per DR/EL/TR, ICT-1 tripped at 03:35:06.673 hrs on loss of connectivity with any of the South Buses. 				
6	400 kV GAJUWAKA – VIJAYAWADA -1	25-04-2016 at 03:35 hrs	Tripped due to BBP operation of 400 kV South Bus-1	GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per DR/EL/TR, ICT-2 tripped at 03:35:06.673 hrs due to BBP operation of 400 kV South Bus-1. 				
<u>Vijayawada (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> FIR/DR/EL/TR not furnished. 				
7	400 kV GAJUWAKA – KALPAKKA - 2	25-04-2016 at 03:45 hrs	Tripped at Gajuwaka end due to operation of TEED protection.	GI-2
<u>Kalpakka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, the line tripped at 03:45 hrs on R-E fault due to DPR, Z2 operation. DR/EL/TR not furnished. 				
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per EL/TR, line tripped at 03:35:30.940 hrs due to operation of TEED Protection-1. DR not furnished. From the Zone-2 tripping of the line from Kalpaka end, it appears that Carrier-aided communication did not take place or unhealthy on this line. 				
8	400 kV GAJUWAKA – SIMHADRI -1	25-04-2016 at 03:45 hrs	Tripped at Gajuwaka end on opening of Tie-CB due to operation of TEED protection	GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> As per DR/EL/TR, the line tripped at 03:35:30.977 hrs on opening of Tie-CB due to operation of TEED protection for 400 kV Gajuwaka – Kalpaka line-2. 				
<u>Simhadri (NTPC) end:</u> <ul style="list-style-type: none"> As per FIR/DR/EL/TR, the line was kept holding from Simhadri end. From DR, B-E fault seemed to have taken place at 03:45:31.096 hrs and tripped from Gajuwaka end; however, as no carrier was received, the line was kept holding from Simhadri end. (At Simhadri end, due to the fault on the line, Zone-2 & Zone-3 timers picked up, but each got reset within 50 msec time-span. 				

9	400 kV SIMHADRI - KALPAKKA -4	25-04-2016 at 03:45 hrs	Tripped at both ends (OVR, Stage-1 operation at STPP; DT receipt at Kalpaka)	GI-2
<u>Simhadri (NTPC) end:</u> <ul style="list-style-type: none"> As per FIR/DR/EL/TR, the line tripped at 03:45:31.231 hrs due to OVR, Stage-II operation. <u>Kalpikka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR/DR, the line tripped at 03:45:54:240 hrs due to DT receipt from Simhadri end. EL/TR not furnished. 				
10	400 kV SIMHADRI - KALPAKKA -3	25-04-2016 at 03:45 hrs	Tripped at both ends (OVR, Stage-1 operation at STPP; DT receipt at Kalpaka)	GI-2
<u>Simhadri (NTPC) end:</u> <ul style="list-style-type: none"> As per FIR/DR/EL/TR, the line tripped at 03:45:31.225 hrs due to OVR, Stage-II operation. <u>Kalpikka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, the line tripped at 03:45:54.240 hrs due to DT receipt from Simhadri end. EL/TR not furnished. 				
11	400 kV SIMHADRI - KALPAKKA -1	25-04-2016 at 03:45 hrs	Tripped on DEFR protection in M-2 at Kalpaka end	GI-2
<u>Kalpikka (APTRANSCO) end:</u> <ul style="list-style-type: none"> As per FIR, the line tripped at 03:48:26.330 hrs on RYB-E fault due to operation of DEF protection. EL/TR not furnished. <u>Simhadri (NTPC) end:</u> <ul style="list-style-type: none"> As per FIR/DR/EL/TR, the line was kept holding from Simhadri end. It was seen that DR was triggered at 03:45:31.095 hrs by OVR, Stage-I (110%). After 179 msec, ZONE-3 Timer picked up and got RESET within 186 msec. Later after about 400 msec, PSB operated and got RESET within 550 msec. No Carrier and DT were received. From the non-receipt of DT at Simhadri end in spite of DEFR operation at Kalpaka indicates that PLCC communication needs to be checked for this line. 				
12	400 kV GAJUWAKA - JEYPORE -1	25-04-2016 at 03:56 hrs	Hand-tripped from Jeypore end subsequent to tripping of both the 400 kV buses at Gajuwaka SS	GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> FIR/DR/EL/TR not furnished. 				
13	400 kV GAJUWAKA - JEYPORE -1	25-04-2016 at 03:56 hrs	Hand-tripped from Jeypore end subsequent to tripping of both the 400 kV buses at Gajuwaka SS	GI-2
<u>Gajuwaka (PGCIL-SR1) end:</u> <ul style="list-style-type: none"> FIR/DR/EL/TR not furnished. 				
14	220 kV BUS-1 OUTAGE AT VIZAG SWITCHING STATION (VSS)	25-04-2016 at 05:24 hrs	Busbar protection of 220 kV Bus-1 got operated, and tripped all the Bus-1 connected feeders and ICT's.	
<ul style="list-style-type: none"> As per FIR, BBP of 220 kV Bus-1 got operated at 05:24 hrs and gave the trip signal to the Bus-1 connected feeders and ICT's. As per DR/EL, BBP of 220 kV Bus-1 got operated at 05:03:32.480 hrs, and gave the trip signal to the Bus-1 connected feeders and ICT's. It was informed that Busbar protection of 220 kV Bus-1 got operated due to the Flash over of the bus coupler B-ph Pilot insulators in Jack Bus connected to 220kV Bus-1. Time-synchronization of various VSS connected relays with GPS needs to be ensured. 				

15	HVDC GAJUWAKA POLE 2	25-04-2016 at 19:29 hrs	Tripped on South Bus Differential Protection	
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Gajuwaka (PGCIL-SR1) end:

- As per DR/EL/TR, Pole got blocked due to South Bus differential protection operation at 19:29:57.347 hrs.

B.5 Trippings on 26.04.2016

Sl. No.	Transmission Element	Date & Time	Cause	Category
1	400 kV GAJUWAKA-VIJAYAWADA LINE	26-04-2016 at 04:00 hrs	Tripped on distance protection operation	GI-2

Gajuwaka (PGCIL-SR1) end:

- As per DR/TR, the line tripped at 04:00:35 hrs on Y-E & B-E faults due to DPR operation.
- In EL, the relevant events were not shown.**

Vijayawada (PGCIL-SR1) end:

- FIR/DR/EL/TR not furnished.**

2	400 kV GAJUWAKA - SIMHADRI -2	26-04-2016 at 04:00 hrs	Tripped on B-E fault due to distance protection operation	GI-2
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Gajuwaka (PGCIL-SR1) end:

- As per DR/TR, the line tripped at 04:00:35 hrs on B-E fault due to DPR, Z1 operation
- In EL, the relevant events were not shown.**

Simhadri (NTPC) end:

- As per FIR/DR/EL/TR, the line tripped at 04:00:36.166 hrs on B-E fault due to DPR, Z2 operation.
- It was stated/seen that no Carrier/DT had been received from Gajuwaka end during the incident.
- From above, it is seen that PLCC communication on this line needs to be checked for healthiness.**

3	400/220 kV ICT-2 at GAJUWAKA	26-04-2016 at 04:57 hrs	Tripped due to BBP operation of 400 kV South Bus-1	GI-2
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Gajuwaka (PGCIL-SR1) end:

- As per DR/EL/TR, ICT-2 tripped at 04:57:23.367 hrs due to BBP operation of 400 kV South Bus-1

4	400/220 kV ICT-1 at GAJUWAKA	26-04-2016 at 04:57 hrs	Tripped on loss of connectivity due to BBP operation of 400 kV South Bus-1	
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Gajuwaka (PGCIL-SR1) end:

- As per DR/EL/TR, ICT-1 tripped at 04:57:23.405 hrs on loss of connectivity due to BBP operation of 400 kV South Bus-1.

5	400 kV GAJUWAKA - SIMHADRI -1	26-04-2016 at 04:57 hrs	Tripped due to BBP operation of 400 kV South Bus-1.	GI-2
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Gajuwaka (PGCIL-SR1) end:

- As per DR/EL/TR, ICT-1 tripped at 04:57:23.307 hrs due to BBP operation of 400 kV South Bus-1.

Simhadri (NTPC) end:

- As per FIR/DR/EL/TR, the line tripped at 04:57:23.491 hrs due to DT receipt from Gajuwaka end.
- The receipt of DT by Simhadri end due to BBP operation at Gajuwaka end was not in order; whether this happened because of OVR conditions at Gajuwaka was not clear.**
- To ensure that PLCC communication is healthy, end-to-end testing may be carried out.**

6	HVDC GAJUWAKA POLE 1	26-04-2016 at 04:57 hrs	Blocked due to non-availability of South Buses due to tripping of both 400 kV South Buses - 1&2 on BBP operation	
Gajuwaka (PGCIL-SR1) end:				
<ul style="list-style-type: none"> As per EL/TR, HVDC Pole-1 got blocked at 04:57:25.507 hrs due to non-availability of South Buses due to tripping of both 400 kV South Buses - 1&2 on BBP operation. 				
7	OUTAGE OF 400 kV GAJUWAKA SS	26-04-2016 at 04:00 hrs	HVDC Pole-2 has been under shutdown since 22 April, 2016. Now with the BBP operation of 400 kV South Bus-1 at 04:57 hrs, Pole-1 also got blocked due to non-availability of South- Buses. This resulted in outage of 400 kV Gajuwaka SS.	GD-1
Gajuwaka (PGCIL-SR1) end:				
<ul style="list-style-type: none"> HVDC Pole-2 has been under shutdown since 22 April, 2016. Now with the BBP operation of 400 kV South Bus-1 at 04:57 hrs, Pole-1 also got blocked due to non-availability of South- Buses. This resulted in outage of 400 kV Gajuwaka SS. It was informed that due to dense fog in and around Vizag Substation mixed with saline pollutants caused visible/audible tracking in the insulators and thereby resulting in breakdown of insulators. Very severe Corona discharge was also observed in the switchyard equipments in the form of tracking causing flashovers, and suspected to have caused BBP operation of 400 kV South Bus-1. 				

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED

From
The Chief Engineer/
IPC & Power Systems,
APTRANSCO,
Vidyut Soudha, Hyderabad.

To
The Member Secretary,
SRPC,
29, Race Course Road
Bangalore-560009.

Lr.No.CPS/SP/121 /SRPC-FIR/Vol.1 /D.No: 205/16 , Dt: 09.05.2016

Sir,

Sub: System Protection – Detailed tripping report on the grid disturbance occurred at 220kV VSS on 24.04.2016 at 05:05 hrs - Regarding.

Ref: SRPC, Mail Dt: 04-05-2016

>>*<<

Vide reference cited above, SRPC has requested the detailed tripping report on the outage of 220kV VSS on 24.04.2016 at 05:05hrs.

In this regard, the following detailed tripping report and sequence of events that led to the outage of the 220kV VSS on 24.04.2016 at 05:05 Hrs has been furnished:

Tripping incident: 220kV Bus-I Bus bar protection operated and feeder connected to Bus-I and Bus coupler got tripped at 220kV VSS on 24.04.2016 at 05:05 hrs.

Status of elements (Feeders and ICT's) Prior to the incident:

- a). 220kV VSP-I, Kakinada, Gajuwaka and Pendurthy -II were connected to 220kV Bus-I.
- b). 220kV VSP-II, Parawada, Gangavaram and Pendurthy -I were connected to 220kV Bus-II.
- c). 220kV Supply to VSS was fed from Pendurthy and Parawada.
- d). 220kV VSS – Kalapaka -I&II, 400/220kV ICT's -I&II were in open condition.

Tripping Analysis:

- a). At 05:05 hrs, due to the Flash over of the bus coupler Y-ph Pilot insulators in Jack Bus connected to 220kV Bus-I, Bus bar protection got operated and all the feeders connected to Bus-I and bus coupler breaker got tripped and isolated the fault.

- b). Subsequently at 05:05 hrs Units-3&4 got tripped at Upper Sileru on loss of excitation thus causing no feeding to Pendurthy. The alternate supply available to Pendurthy from Kalpaka via Dairy Farm could not be extended as 220kV Kalpaka-Dairy Farm-1 &2 feeders were in open condition. Since the parawada feeder also got tripped on Zone-2 protection at VSS end, the incoming supply failed to the 220kV VSS.

Remedial action: The Bus coupler Y-ph pilot insulators in Jack Bus connected to 220kV Bus-I were replaced on 27.04.2016. And also to avoid tracking, all the Bus insulators in 200kV Bus-I&II were cleaned at 200kV VSS.

Sd/-
CHIEF ENGINEER/
IPC & POWER SYSTEMS

<p>भारत सरकार केंद्रीय विद्युत प्राधिकरण दक्षिण क्षेत्रीय विद्युत समिति 29 रेस कोर्स क्रॉस रोड बैंगलूर-560009 ISO:9001:2008</p>		<p>Government of India Central Electricity Authority Southern Regional Power Committee No 29, Race Course Cross Road BANGALORE- 560 009 ISO:9001:2008</p>
Email: mssrpc@yahoo.com	Phone : 080-22261656	FAX : 080-22259343, 22352616
सं/No. SRPC/SE-III/PCSC-45/2015/4609-649		दिनांक / Date: 26.06.2015

To

1. Chief Engineer (HPC & Hydel Projects), APGENCO, Hyderabad
2. Chief Engineer (Generation I), APGENCO, Hyderabad
3. Chief Engineer (Power System), APTRANSCO, Hyderabad.
4. Chief Engineer (Generation), TSGENCO, Hyderabad
5. Chief Engineer (Projects), TSGENCO, Hyderabad
6. Chief Engineer (Power System), TSTRANSCO, Hyderabad
7. Chief Engineer (Ele. Designs), KPCL, Bangalore
8. Chief Engineer (RT), KPTCL, Bangalore
9. Chief Engineer, SLDC, KPTCL, Bangalore
10. Chief Engineer (NCTPS-II), TANGEDCO, Chennai
11. Chief Engineer (Protection & Communication), TANTRANSCO, Chennai
12. Chief Engineer (Transmission) System Operation, IIMT Colony, KSEB, Kalamassery-683503
13. Chief Engineer (Transmission), NPCIL, Mumbai.
14. Additional Director (Projects), PCKL, Bangalore-9
15. General Manager (OS), NTPC SRHQ, Secunderabad
16. Superintending Engineer (EL), KPCL, Bangalore
17. Superintending Engineer (EL), KPTCL, O/o Chief Engineer (RT), KPTCL, Bangalore
18. AGM (O&M), SR-I, PGCIL, Secunderabad
19. AGM (O&M), SR-II, PGCIL, Bangalore
20. Shri P.P.Gestine, AGM (EM), NTECL, Chennai-103.
21. N.Sabapathi, DGM (E), TPS-I Expn. NLC, Neyveli-607807
22. Station Director, KGS 3&4, Kaiga, Karnataka
23. Maintenance Superintendent, KGS 1&2, Kaiga, Karnataka.
24. Maintenance Superintendent, MAPS, Kalpakkam
25. Maintenance Superintendent, KKNP, Thirunelveli Dist, TN-627106
26. EE (P&MD), O/o CE (G), Moolamattom, KSEB, Idukki (dist) - 685589
27. EE/ Div EHV, Electricity Department, Puducherry
28. Shri Satish Jindal, CEO, M/s JSW Energy Ltd, New Delhi-110066
29. Shri Veeresh Devaramani, DGM, M/s JSW Energy Ltd, Toranagallu, Bellary-583275
30. Shri R.V.Bhat, Vice President (Operations), UPCL, Bangalore
31. Shri Shrikant A. Vaidya, GM (C&I & Elec), UPCL, Bangalore
32. Shri Pankaj Vaidhya, AGM, GMR Energy Trading Ltd, Bangalore-25
33. CEO, NTPL, Harbour Estate, Thoothkudi - 628 004
34. CEO, SEL, Hyderabad
35. CEO, MEPL, Hyderabad
36. Sr. GM (Electrical), TPCIL, Hyderabad
37. Shri Venkata Ravi Ram, Plant In-Charge, GVK Gautami Power Limited, IDA Peddapuram, PO Box No.7, Samal kot 533440, E.G. Dist., AP
38. Asst. Vice president, GVK Industries Limited, Jegurupadu, Kadiyam Mandalam, Near Rajahmundry, E.G. Dist., AP
39. G.M. (O & M), m7th Floor, Corporate Tower, Ambience Mall, NH-8, Gurgaon - 122 001, Haryana

Sub: Nomenclature for naming various files in Web based Tripping Monitoring System of SRLDC Portal - reg.

Sir,

You are aware that while uploading various files, viz., FIR, DR, EL, TR, in SRLDC portal corresponding to a tripping event, the from_end_user (Sender) and to_end_user (Receiver) will also have to name the files appropriately. To this given name by the user (Sender/ Receiver), the system software prefixes an ID unique to the tripping event & type of file being uploaded (viz., FIR/ DR/ EL/ TR) by the user, and saves the file in the system database with this new name.

So, the name of every file uploaded in the SRLDC portal consists of two parts – (i) *system generated part-name* comprising Unique ID & File type, and (ii) *user entered part-name*. While the system generated part-name is as per well-defined format, the nomenclature followed by the users for giving the user entered part-name is observed to be not always uniform. This issue of non-uniformity in naming files and the unnecessary confusion that it creates in analyzing esp. grid occurrence involving multiple trippings was discussed in the 45th meeting of Protection Coordination Sub-Committee (PCSC-45) of SRPC held on 26.06.2015, wherein it was decided to follow a uniform nomenclature for naming the *user entered part-name* as explained below:

Every file name consists of two parts:

- (i) System part-name: This, which consists of an unique ID (UID) and file type, is taken care of by the software. Based on the type of file being uploaded, this could be one of the following:

UID_SENDFIR-, UID_SENDDR-, UID_SENDEL-, UID_SENDR-,
UID_RENDFIR-, UID_RENDDR-, UID_RENDEL-, UID_RENDR-

- (ii) User entered part-name: This is proposed to be entered by the user (Sender/ Receiver) as per the format given below:

Transmission Lines	SSN_DSN_LINE#
Inter-connecting Transformers	SSN ICT#
Generating Transformers	SSN GT#

Here, SSN = Source Station Name/ From end Station Name/ Sending end Station Name

DSN = Destination Station Name/ To end Station Name/ Receiving end Station Name

The above nomenclature is illustrated in the following examples:

Example-1: Chittoor – Tiruvalam 400 kV D/C line-1

For this line, Source Station Name (SSN) = Chittoor

Destination Station Name (DSN) = Tiruvalam

So Chittoor-end user should enter file name as 'Chittoor_Tiruvalam_line1'

Tiruvalam-end user should enter file name as 'Tiruvalam_Chittoor_line1'

So that complete file names for FIR, DR, EL, TR uploaded at Chittoor get stored in the system database as 10909_SENDFIR-Chittoor_Tiruvalam_line1, 10909_SENDDR-Chittoor_Tiruvalam_line1, 10909_SENDEL-Chittoor_Tiruvalam_line1, 10909_SENDR-Chittoor_Tiruvalam_line1. For the Tiruvalam end, they get stored as 10909_RENDFIR-Tiruvalam_Chittoor_line1, 10909_RENDDR-Tiruvalam_Chittoor_line1, 10909_RENDEL-Tiruvalam_Chittoor_line1, 10909_RENDR-Tiruvalam_Chittoor_line1. Here '10909' is the Unique ID generated by the system software for this tripping event.

It may be noted that users don't have to enter file type (FIR/DR/EL/TR) as part of file name as the software will take care of it depending on the location of the file [under FIR (S)/ DR (S)/ EL (S)/ TR (S)/ FIR (R)/ DR (R)/ EL (R), TR (R)] being uploaded.

Example-2: ICT-1 at 400/ 220 kV Guttur Substation

For this, file name to be entered by the user is 'Guttur_ICT1'

Example-3: GT-1 at NLC TPS -II (NLC-II)

For this, file name to be entered by the user is 'NLC-II_GT1'

It is requested to kindly intimate the above file naming nomenclature to all the concerned and ensure that it is followed at all stations in your control area so that tripping analysis can be done systematically.

Yours faithfully,



(A. Balan)

Superintending Engineer (P)

Copy to:

1. Chief Engineer (GM Division), CEA, New Delhi.
2. Executive Director, POSOCO, SRLDC, Bangalore

M/s NTPC Ltd
Simhadri, Visakhapatnam
Andhrapradesh- 531020

Kind Attn: Mr. M. Nageswara Rao
Mob: 8331016103
E-mail: makalanageswar@ntpc.co.in

Name : Mohan Kumar.P
Department : RC-IN DI CS SD SR PR1-HYD
Telephone : +91-40-3092 2511
Fax : +91-40-2324 3145
Mobile : +91 9848917531
Email : mohankumar.p@siemens.com
Date : 20.06.2021

Sub: Announcement of product phase-out of the SIMOVERT MASTERDRIVES family MASTERDRIVES devices / cabinets / options / spare parts with short MLFB: 6SE70....., 6SE71....., 6SY7....., 6SX7....

Dear Sir,

Due to its superior functionality, comprehensive performance range and flexibility, MASTERDRIVES has been for many years a very successful drive system for single motor and multi-motor applications performed on production machines, in general machine building and all industry sectors.

We would like to inform you that SIEMENS announced product phase-out of Master Drives effective from Oct. 1, 2010, followed by a 10-year phase-out period. **Product discontinuation is scheduled for Oct. 1, 2020.** After this date the product will be completely discontinued. Repair option, Spares are purely depending on the availability of stock at our repair center and logistic centers.



We strongly recommended you to convert existing master drives installbase in Stacker Reclaimers with our **Sinamics Series G120 Drives** which is a proven solution from SIEMENS.

Do revert for any clarifications on the same.

For SIEMENS Ltd

P
Mohankumar
Mohankumar.P
Sr. Manager- Customer Services
SIEMENS LTD
HYDERABAD

Digitally signed by P.Mohankumar
DN: cn=P.Mohankumar,
o=SIEMENS,
email=mohankumar.p@siemens.com
Date: 2021.06.20 23:22:23 +05'30'

ANNEX - XI



ఆంధ్ర ప్రదేశ్ ఆంధ్ర ప్రదేశ్ ANDHRA PRADESH

S.No. 1472 Date 24-10-2017

RS. 100/-

Sold To: Anup Katan maiti do (do) Susanta kumar maiti,

For whom: Gur Deepanjalnagar, VSP.

P. V. Varalakshmi
BV 429646
POLAVARAPU VARALAKSHMI
Licenced Stamp Vendor
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D.No. 2-56, Chinnapurupalli (West)
Parawada M, Visakhapatnam Dist.
553090

SUPPLEMENTARY AGREEMENT TO BULK WATER SUPPLY AGREEMENT

This Supplementary Agreement to Bulk Water Supply Agreement dated 27th September 2006 (BWVA) is made at Visakhapatnam on 06th May 2018

BETWEEN

THE GOVERNOR OF THE STATE OF ANDHRA PRADESH for and on behalf of the Government of the State of Andhra Pradesh, Hyderabad, India (hereinafter called the "GoAP" which expression shall, unless the context otherwise requires, include its permitted successors and assigns) acting through the Vice Chairman and Managing Director of APIIC vide GO MS No. 55, dated June 18, 2004 issued by Irrigation and Command Area Development Department of the GoAP.

AND

VISAKHAPATNAM INDUSTRIAL WATER SUPPLY COMPANY LIMITED, a Company incorporated under The Companies Act, 1956, having its Registered Office at c/o Greater Visakhapatnam Municipal Corporation, Room No.204, Tenneti Bhawanam, Asselmetta JN, Visakhapatnam 530002 (hereinafter called the "Operator", which expression shall include its permitted successors and assigns).

AND

NTPC LIMITED, a Company incorporated under The Companies Act, 1956, having its Registered Office at Con-7, Scope Complex, Lodi Road, New Delhi (hereinafter called the "User", which expression shall include its permitted successors and assigns).



Page 1

1.0 BACKGROUND

WHEREAS

- (i) In order to augment water supply to other consumers including NTPC in and around Visakhapatnam the GoAP has decided to implement the Visakhapatnam Industrial Water Supply (the Project) under Build Own Operate and Transfer (BOOT) scheme by GoAP entering in to a Concession Agreement dated March 12, 2004 with the Operator.
- (ii) The GoAP which has been supplying water through VIWSCO to NTPC will continue to supply water for the established 4 x 500 MW (2000 MW) units of NTPC Simhadri.
- (iii) The GOAP, Operator and User entered into the Bulk Water Supply Agreement dated 27th September 2006 to record the terms and conditions upon which Bulk Water will be supplied to User by the Operator.
- (iv) The rates for water supply and debt service restructuring for payment of the outstanding loan amount and Funded Interest amount, inter alia, had been discussed and mutually agreed by and between all the concerned participants viz., RINL, GVMC, NTPC, APIIC & VIWSCO in the meeting held on 19.11.2012 vide Minutes of the Meeting (MoM) of the even date.
- (v) The Government of Andhra Pradesh in the Irrigation and CAD Department, pursuant to the applicable provisions of the Concession Agreement between the GoAP and VIWSCO and taking into consideration the MoM of 19-11-2012, enhanced and fixed special rate for water supply to RINL, NTPC and GVMC by VIWSCO and accorded approval to the terms and conditions of the debt service restructuring as mutually agreed and advised entering in to supplementary agreements to give due effect and for implementation of the rate for water supply and debt service restructuring vide its G.O. MS No.24 dated 25.02.2015 by Irrigation and CAD Department, Government of Andhra Pradesh.

NOW This Supplementary Agreement to BWSA witnesses as follows:

MODIFICATION OF RELEVANT PROVISIONS OF BWSA

The parties to this agreement hereby agree to modify the said Bulk Water Supply Agreement for the purpose of giving effect and to implement the decisions vide above cited Minutes of Meeting dated 19-11-2012 and G.O. Ms.No.24. dated 25.02.2015 by substituting and/or modifying the relevant paragraphs of the BWSA as below:

5.0 CONVEYANCE AND CHARGES

5.1 Conveyance and Payment for Raw Water

- (A) Upon the terms and subject to the conditions this Agreement and during the term hereof, the Operator undertakes to Deliver the quantity of Raw Water at the Delivery Point as per Contract Volume and at the Charges in accordance with

Handwritten initials



Handwritten signature

Page 2

Appendix 2 and Appendix 1 respectively, during the Supply Period and the User undertakes to take and pay for the quantity of Raw Water as per Contract Volume in the Supply Period, as agreed to by the User in writing before commencement of the Supply Period as per the terms and conditions mentioned below:

- (a) The User will pay for contract volume at Special Charges of Rs. 11.80 (Rupees eleven and eighty paise only) per Kiloliter from 01.04.2012. The Special Charges shall be escalated in accordance with the provisions given in Appendix 1 of this Agreement.
- (b) In case, if any additional Raw Water is required by the User beyond 32 MLD and up to 48 MLD then the User will indicate the Triennial Demand in writing to the Operator at least one month before the Water Drawl Committee meeting. The Operator Deliver such additional Raw Water up to 48 MLD at Special Charges in accordance with Appendix 1 of this Agreement. The revised requirement so indicated will be considered as the Contract Volume.
- (D) The Special Charges, subject to maximum of Rs. 23.36 (Rupees twenty three and Paise thirty six only) per Kiloliter or Charges fixed by Charge Review Committee, whichever is lower, shall be applicable to the Contract Volume and up to 48 MLD. Beyond 48 MLD the charges shall be as fixed by the Charge Review Committee.
- (E) (ii) The monthly billing shall be as per the actual water quantity Delivered.
(iii) The monthly billing shall be as per the actual water quantity Delivered
(iv) The monthly billing shall be as per the actual water quantity Delivered
(v) In the month following the final month of the Supply Period the take or pay for Contract Volume for shall not be applied.
- (G) If during any Supply Period the total Volume of Raw Water taken by the User falls short of the obligations described in Appendix - 2 then the User shall pay as per actuals .

16. GENERAL

16.5 Notices

The Address of the Operators is changed as below:

For the Operator:

Chairman & Managing Director,
Visakhapatnam Industrial Water Supply Company Limited
C/o Greater Visakhapatnam Municipal Corporation
Room No. 204, Tenneti Bhavanam, Asseelmetta Jn.
VISAKHAPATNAM. Phone No. +91 0891-



Amruteshwar Mahto

OTHER TERMS & CONDITIONS OF AGREEMENT

The recitals and other paragraphs of the Bulk Water Supply Agreement with the respective side headings are applicable except to the extent and as modified by this supplementary agreement and are not inconsistent with the modifications.

1. Appendix 1 to BWSA dated 27-9-2006 is applicable subject to modifications in the form of substitution of paras 1, 2 and 3 with the following as paras A, B and C respectively:

A) "The User shall pay to the Operator the Special Charges of Rs. 11.80 (Rupees Eleven and Paise Eighty only) per kilolitre of Raw Water Delivered at the Delivery Point from the Effective date i.e. from 01.04.2012 till 31-3-2013.

B) The special Charges of Rs. 11.80 (Rupees Eleven and Paise Eighty only) per kiloliter shall continue till 31-3-2013. Thereafter the special charge as on 31st March of every Financial Year shall be escalated by 5% (five percent) annually as special charge for next financial year up to a maximum of Rs. 23.36 (Rupees Twenty Three and Paise Thirty Six only) per kiloliter.

The yearly escalated annual charges applicable are as under:

Year	13-14	14-15	15-16	16-17	17-18	18-19	19-20
Special charges (₹)	12.39	13.01	13.66	14.34	15.06	15.81	16.60

Year	20-21	21-22	22-23	23-24	24-25	25-26	26-27
Special charges (₹)	17.43	18.31	19.22	20.18	21.19	22.25	23.36

C) Such Special Charges, subject to a maximum of Rs. 23.36 (Rupees twenty three and paise thirty six only) per kiloliter or Charges fixed by Charge Review Committee, whichever is lower, shall be applicable to the Contract Volume and up to 48 MLD. Beyond 48 MLD, the Charges shall be as fixed by the Charge Review Committee."

Other contents of Appendix 1 remain unchanged

2. Appendix 2 to BWSA dated 27-9-2006 is applicable subject to modifications in the form of substitution of para 1 with the following para:

The Operator undertakes to supply and the User undertakes to accept a take and pay quantity of Raw Water at the charges in accordance with Appendix 1 to this Agreement before commencement of each Supply Period. The Contract Volume for the Supply period commencing from 1-4-2013 shall be 26 MLD and up to 32 MLD. For the additional raw water requirement above 32 MLD and up to 48 MLD the user shall intimate the operator in advance. Such additional quantity



Ampratan Maiti
23/11/2012

HMO

shall form part of contract volume from the supply period onwards. MLD denotes Million Liters per Day.

Other contents of Appendix 2 remain unchanged.

3. Appendix 4 to BWSA dated 27-9-2006 is applicable subject to modifications in the form of substitution of clause 1 with the following paras:

Extreme hydrological condition shall mean hydrological condition in Yeleru Reservoir due to severe prolonged shortage of inflows from the catchment area by which reservoir water level falls below the minimum level at which water can be discharged by gravity to the YLBC Canal.

Procedure: In the unlikely event of the occurrence of hydrological conditions so severe that, despite the correct application by the GoAP the water availability throughout a Lean Period, the water availability in the YLBC canal deteriorate such that the reservoir water level approaches or falls below the minimum level at which water can be discharged by gravity through the head works into the YLBC, the Operator and the GoAP shall discuss possible exceptional mitigation measures which could be undertaken. These measures could include the granting of permission by the GoAP for the Operator to abstract water from the reservoir by pumping into the YLBC. The GoAP would be obliged to grant any such permission solely on a best effort basis, where such a course of action would be commensurate with responsible management of the Yeleru Reservoir water resources and having considered the other release requirements within the allocation of the GoAP. In the event that the GoAP grants the Operator permission, under whatever conditions the GoAP considers it necessary to impose, to abstract Raw Water from the reservoir by pumping, the Operator shall make all necessary arrangements for pumping including the provision of a retention structure within the reservoir, if required by the GoAP, and the removal of all obstructions to or works which may influence normal gravity operation of the head works once the need for pumped abstraction is past. In such case, the operator shall be entitled to all additional capital and operational costs which may be associated with such pumping and shall be charged among all users of dead storage pumping water in proportion to their drawl of dead storage pumping water.

Other contents of Appendix 4 remain unchanged

4. Appendix 3 and 5 are applicable except to the extent and as stands modified by this supplementary agreement and are not inconsistent with the modifications.
5. This Agreement constitutes as supplementary agreement to Bulk Water Supply Agreement (BWSA) entered into between GoAP, Operator and User and forms part of the said BWSA.
6. This agreement shall remain in force and effect from 01.04.2012 till the validity of the said BWSA with enhanced period if any in the supplementary agreement. However, the payments / adjustments for the year 2012-13 shall be based on actual drawal quantity of water.

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In witness whereof, the Parties through their authorized representatives have executed these presents and to a duplicate hereof on the day and month and year first mentioned above.

FOR AND ON BEHALF OF THE NTPC

FOR AND ON BEHALF OF VIWSCO

Anupam Malik
Authorized Signatory



[Signature]
Authorized Signatory

Contact Address:
NTPC Limited
NTPC - Simhadri
Parawada Mandal
Visakhapatnam - 531 020

Telephone : +91 (8924) - 243436
Fax No. +91 (8924) - 243581

Contact Address:
Visakhapatnam Industrial Water Supply
Company Limited
C/o. Greater Visakhapatnam
Municipal Corporation, Room No. 204,
Tenneti Bhavan, Aseelmetta Jn.
VISAKHAPATNAM - 530002
Telephone : +91(891)-2746301 (Extn.132)

In presence of:

1. Y.M. Murthy
HOD (GEN) Simhadri SPS
NTPC, VIZAG
2. *[Signature]*
K. Suresh Babu
DGM (BEHC)
NTPC Simhadri

In presence of:

1. *[Signature]*
G. VYSKURTHY
Director, VIWSCO
2. *[Signature]*
C. Suman
SFO
VIWSCO, VIZAG

FOR AND ON BEHALF OF GoAP

[Signature]
Authorized Signatory

Andhra Pradesh Industrial Infrastructure Corporation Limited
5-9-58/B, 6th Floor, Parisrama Bhavanam, Fateh Maidan Road
Basheerbagh, Hyderabad - 500 004

In presence of:

1. *[Signature]* (V. Nagaswara Rao)
Zonal Manager, APIC
2. *[Signature]* (C. YATHIRAJU)

ZONAL MANAGER
APIC Limited
Visakhapatnam-07

ZONAL MANAGER
APIC LIMITED
SPECIAL PROJECTS ZONE
ONE STOP SERVICE CENTRE
APSEZ ATCHUTAPURAM
VISAKHAPATNAM-531 011



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GOVERNMENT OF ANDHRA PRADESH
INFRASTRUCTURE & INVESTMENT (Ports-I) DEPARTMENT

Memo No. 732-A/Ports.I (1)/2009-1, dated 13-8-2009

Sub: Ports Department – Permission for drawl of Sea Water for Power Projects / Industries – Certain Guidelines – Issued.

The attention of the Director of Ports, Kaklnada is invited to the subject matter and is informed that Government have framed the following guidelines for according permission for drawl and use of Sea Water for the purposes of Power Projects and other Industries:

- 1) Initially only in-principle approval / permission shall be granted;
- 2) Before recommending to Government for such permission, the Director of Ports shall
 - a) confirm that the firm has obtained No Objection Certificate from the appropriate Local Authority / State Govt Authority for setting up of such Power Plant / Industry, etc.
 - b) verify all necessary documents along with the DPR which the Firm has submitted to relevant Agencies / Ministries of Government of India / GoAP.
 - c) depute suitable officer to the site and obtain a report to the effect that the activity of drawl and use of Sea water shall not interfere / hinder the present / future port / Jetty development / operation activities

Based on the above details, Director of Ports shall make his recommendations to the Government of Andhra Pradesh. Government while granting such approval shall impose following conditions:-

- 1) that the Company shall pay an amount of Rs.0.05 paise per cum to the Director of Ports as charges and obtain statutory clearance such as environmental clearance etc, from the concerned departments for drawing the Sea water and pumping the same after use into Sea. The revision of charges, if any takes place at the instance of GoI / GoAP, shall be applicable.
- 2) The firm will give an undertaking that the activity of drawl and use of Sea water by the firm shall not hinder the present / future developmental / operational activities of the nearby Port / Jetty and in such event the firm agrees for withdrawal of permission at no costs to the Government.
- 3) that after using the Sea water, the same shall be treated / diluted to meet CPCB norms and other statutory environment norms before discharging to the Sea;

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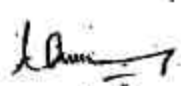
- 4) that necessary water measuring devices shall be fixed by the Consumer;
- 5) that the scheme of drawing of water from the Intake point shall be got approved by the Director of Ports, prior to execution;
- 6) within 15 days after obtaining necessary permission for establishment of the Power Project / Industry, the Firm shall furnish a Bank Guarantee equivalent for 1 year water drawl from Sea and a DD for the same amount in advance towards water charges for one year and after completion of the first year, every year the DD in advance has to be submitted at the rate prevailing that time. In case of failure on the part of the Firm, the BG shall be encashed.
- 7) that in the event of misrepresentation of fact or the Firm not observing any of the statutory / regulatory provisions of Govt / State Government, the Government reserves the right to cancel such permission.

The Director of Ports, Kakinada is, therefore, requested to keep the above guidelines in view while submit his report / recommendation to Government for recording permission for drawl of Sea water for the use in the Power Plant / Industry etc.

MANMOHAN SINGH
SECRETARY TO GOVERNMENT

To
The Director of Ports,
AP, Kakinada.

// forwarded by order //


ASST. SECRETARY TO GOVERNMENT (PORTS)

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Form-I

Particulars	
1. Name of the Petitioner/Applicant	NTPC Limited
2. Address of the Petitioner/Applicant	SCOPE Complex, Core -7, Institutional Area, Lodhi Road, New Delhi – 110 003
3. Subject Matter	Payment of Annual Tariff Filing fees for NTPC Stations for FY 2024-25 as per CERC (Payment of Fees) (Third Amendment) Regulations, 2022
4. Petition No., if any	As per Enclosed Sheet (Annexure A)
5. Details of generation assets a) Generating station/units b) Capacity in MW c) Date of commercial operation d) Period for which fee paid e) Amount of fee paid f) Surcharge, if any	As per Enclosed Sheet (Annexure A)
6. Details of transmission assets a) Transmission line and sub- stations b) Date of commercial operation c) Period for which fee paid d) Amount of fee paid e) Surcharge, if any	N.A.
7. Fee paid for Adoption of tariff for a) Generation asset b) Transmission asset	N.A.
8. Application fee for licence a) Trading licence b) Transmission licence c) Period for which paid d) Amount of fee paid	N.A.
9. Fees paid for Miscellaneous Application	N.A.
10. Fees paid for Interlocutory Application	N.A.

11. Fee paid for Regulatory Compliance petition	N.A.
12. Fee paid for Review Application	N.A.
13. License fee for inter-State Trading a) Category b) Period c) Amount of fee paid d) Surcharge, if any	N.A.
14. License fee for inter-State Transmission a) Expected/Actual transmission charge b) Period c) Amount of fee calculated as a percentage of transmission charge. d) Surcharge, if any	N.A.
15. Annual Registration Charge for Power Exchange a) Period b) Amount of turnover c) Fee paid d) Surcharge, if any	N.A.
16. Details of fee remitted a) Transaction id/ Reference No./ Payment id b) Date of remittance c) Amount remitted	37c568eba62158b7b321 24.04.2024 Rs. 256553700.00/-
Note: While Sl. Nos. 1 to 3 and 16 are compulsory, the rest may be filled up as applicable	
Signature of the authorized signatory with date	


 Dt. 27.04.2024
 HARSIT SHARMA
 Sr. Manager (Commercial)
 NTPC Limited
 Sector-24, NOIDA-201301 (U.P.)

CERC Filing Fees For FY 2024-25 For NTPC Stations

Annexure - I

S.No	Region	Station Name	Capacity as on 01.04.2024 (in MW)	Filling fees for 2024-25 (in Rs.) Rounded off to nearest hundred as per CERC Regulation
1	NR	Feroze Gandhi Unchahar Thermal Power Station-I	420	18,48,000
2	NR	Feroze Gandhi Unchahar Thermal Power Station-II	420	18,48,000
3	NR	Feroze Gandhi Unchahar Thermal Power Station-III	210	9,24,000
4	NR	Feroze Gandhi Unchahar Thermal Power Station-IV	500	22,00,000
5	NR	National capital Power Project Dadri Stage-I	840	36,96,000
6	NR	National capital Power Project Dadri Stage-II	980	43,12,000
7	NR	Tanda Thermal Power Station	440	19,36,000
8	NR	Tanda Super Thermal Power Station Stage-II	1320	58,08,000
9	NR	Singrauli Super thermal Power Station	2000	88,00,000
10	NR	Rihand Super Thermal Power Station-I	1000	44,00,000
11	NR	Rihand Super Thermal Power Station-II	1000	44,00,000
12	NR	Rihand Super Thermal Power Station-III	1000	44,00,000
13	NR	Dadri Gas Power Station	829.78	36,51,000
14	NR	Anta Gas Power Station	419.33	18,45,100
15	NR	Auraiya Gas Power Station	663.36	29,18,800
16	NR	Faridabad Gas Power Station	431.586	18,99,000
17	ER	Farakka Super Thermal Power Station, Stage-I&II	1600	70,40,000
18	ER	Farakka Super Thermal Power Station, Stage-III	500	22,00,000
19	ER	Kahalgaoon Super Thermal Power Station Stage-I	840	36,96,000
20	ER	Kahalgaoon Super Thermal Power Station Stage-II	1500	66,00,000
21	ER	Bongaigaon TPS	750	33,00,000
22	ER	Barh Super Thermal Power Station-I	1320	58,08,000
23	ER	Barh Super Thermal Power Station-II	1320	58,08,000
24	ER	Barauni TPS Stage-II	500	22,00,000
25	ER	Talcher Super Thermal Power Station Stage-I	1000	44,00,000
26	ER	Darlipalli Super Thermal Power Station-I	1600	70,40,000
27	ER	North Karanpura Super Thermal Power Station	1320	58,08,000
28	ER	Nabinagar Super Thermal Power Station	1980	87,12,000
29	ER	Muzaffarpur Thermal Power Station Stage-II	390	17,16,000
30	WR	Korba Super Thermal Power Station, Stage-I&II	2100	92,40,000
31	WR	Korba Super Thermal Power Station, Stage-III	500	22,00,000
32	WR	Jhanor Gandhar Gas Power Project	657.39	28,92,500
33	WR	Kawas Gas Power Project	656.2	28,87,300
34	WR	Sipat Super Thermal Power Project Stage-I	1980	87,12,000

CERC Filing Fees For FY 2024-25 For NTPC Stations

Annexure -

S.No	Region	Station Name	Capacity as on 01.04.2024 (in MW)	Filing fees for 2024-25 (in Rs.) Rounded off nearest hundred as per CERC Regulation
35	WR	Sipat Super Thermal Power Project Stage-II	1000	44,00,000
36	WR	Vindhyachal Super Thermal Power Station-I	1260	55,44,000
37	WR	Vindhyachal Super Thermal Power Station-II	1000	44,00,000
38	WR	Vindhyanchal Super Thermal Power Station-III	1000	44,00,000
39	WR	Vindhyanchal Super Thermal Power Station-IV	1000	44,00,000
40	WR	Vindhyanchal Super Thermal Power Station-V	500	22,00,000
41	WR	Mouda Super Thermal Power Station I	1000	44,00,000
42	WR	Mouda Super Thermal Power Station II	1320	58,08,000
43	WR	Solapur Super Thermal Power Station	1320	58,08,000
44	WR	Gadarwara Super Thermal Power Station	1600	70,40,000
45	WR	Lara Super Thermal Power Station	1600	70,40,000
46	WR	Khargone Super Thermal Power Project	1320	58,08,000
47	SR	Talcher Super Thermal Power Station Stage-II	2000	88,00,000
48	SR	Ramagundam STPS Stage-I&II	2100	92,40,000
49	SR	Ramagundam STPS Stage- III	500	22,00,000
50	SR	Simadhri Thermal Power Station, Stage-I	1000	44,00,000
51	SR	Simadhri Thermal Power Station Stage-II	1000	44,00,000
52	SR	Kudgi Super Thermal Power station	2400	1,05,60,000
53	SR	Telangana Super Thermal Power Station	1600	70,40,000
54	HYDRO	Koldam Hydro	800	35,20,000
		TOTAL	58307.646	25,65,53,700

AS Pandey
 आनंद सागर पाण्डेय/ANAND SAGAR PANDEY
 महाप्रबंधक (वाणिज्यिक)
 General Manager (Commercial)
 एन टी पी सी लिमिटेड/NTPC LIMITED

H. Sharma
 13/04/2024
 हर्षित शर्मा / HARSHIT SHARMA
 वरिष्ठ प्रबंधक (वाणिज्यिक)
 Sr. Manager (Commercial)
 एन टी पी सी लिमिटेड / NTPC Limited
 1st Floor, Sector-24, Noida-201301 (U.P.)

Fee Acknowledgement

Counterfoil (Office Copy)

Transaction Id.: 37c568eba62158b7b321

Payment 19716455492

Gateway ID:

Status: success

Received From : NTPC Limited

The Sum of Rs. : 256553700

Fee Type: Annual Fees for Determination of
Tariff Generating Station(GT)

Dated : Apr 24, 2024, 2:56 PM

Fee Mode: NB

Fee Period: 2024-25

**Petitioner/ Organisation
Name:** NTPC Limited