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 **Vindhyachal Super Thermal Power Station Stage-V (500 MW) for the period from 01.04.2024 to 31.03.2029**.

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Summary of Issues: Vindhyachal Super Thermal Power Station-V (1x 500 MW)

(In compliance with CERC notice dated 07.06.2024)

The major highlights of the Vindhyachal STPS-V (500 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, 2023 and Chapter-3, Regulation-9 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2024 for revision of tariff of Vindhyachal Super Thermal Power Station, Stage-V (500 MW) for the period from 01.04.2024 to 31.03.2029.

Vindhyachal STPS-V is located in Singrauli district in the Indian state of Madhya Pradesh and comprises of one unit of 500 MW having COD as on 30.10.2015. The power generated from VSTPS-V is being supplied to various Discoms as per MoP allocation and respective PPAs including Maharashtra State Electricity Distribution Co Ltd. (MSEDCL) , Gujarat Urja Vikas Nigam Ltd (GUVNL), Madhya Pradesh Power Management Company Ltd (MPPMCL), Chhattisgarh State Power Distribution Co. Ltd (CSPDCL), Electricity Deptt Goa, Dadra And Nagar Haveli and Daman and Diu Power Distribution Corporation Limited (DNHDDPDCL).

The tariff for Vindhyachal STPS-V for the period from 01.04.2019 to 31.3.2024 was determined by the Hon'ble Commission vide order dated 15.06.2023 in Petition No. 415/GT/2020. The capital cost allowed for tariff determination included the projected additional capital expenditure admitted by the Hon'ble Commission after prudence check. The petitioner 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.

The Petitioner in the instant petition has considered the opening capital cost for generating station as of 01.04.2024 by adjusting the admitted capital cost as on 31.03.2024, accounting for the difference between the admitted expenditure for the period 2019-24 and the actual expenditure as per true-up petition.

The projected additional Capital Expenditure generating station for the FY 2024-25, 2025-26, 2026-27, 2027-28 and 2028-29 are Rs 6.27 Cr, Rs 13.56 Cr, Rs 2.96 Cr, Rs 1.39 Cr and Rs 5.0 Cr respectively amounting to total of Rs 24.19 Crores during the 2024-29 period. It is humbly requested to approve the projected Additional Capital expenditure during the period of 2024-29.

The Hon'ble Commission is requested to allow the claims for water charges, security expenses, and ash transportation expenses for the instant station as estimated by the Petitioner in Form 3A of Appendix-I. These claims shall be subject to retrospective adjustment based on actual expenditures during the truing-up process.

Furthermore, the consumption of capital spares shall be claimed at the time of truing up based on the actual consumption of spares during the period 2024–29.

Further, in order to avoid interest liabilities for beneficiaries until the 2024-29 tariff order is finalized, the petitioner requests permission to recover ash transportation charges monthly, subject to true-up at the end of the 2024-29 period.

The petitioner seeks permission to approach the Commission to recover the impact of wage revisions effective from 1.1.2027, as allowed under Tariff Regulations 2024, during the tariff true-up based on actual payments made.

The petitioner requests the Commission's approval to recover the filing and publication fees directly from the beneficiaries, as permitted under Regulation 94(1) of the Tariff Regulations 2024.

VSTPS-V has FGD technology with Gas to Gas Heater, therefore additional APC of 1.2% has been claimed as per provisions of CERC Tariff Regulations 2024. Accordingly, the normative APC has been computed as 6.95%. Hon'ble Commission may please allow the same as per relevant provision of the Tariff Regulation 2024.

In the light of above submission and as per the Petition being filed by the Petitioner for revision of tariff of Vindhyachal Super Thermal Power Station, Stage-V (500 MW), The Hon'ble Commission may please approve revised tariff for the tariff period 2024-29 as per provision of Regulation 9(2) of Tariff Regulations 2024.

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 **Vindhyachal Super Thermal Power Station Stage-V (500 MW) for the period from 01.04.2024 to 31.03.2029**.
Petitioner:	:	NTPC Ltd. NTPC Bhawan Core-7, Scope Complex 7, Institutional Area, Lodhi Road New Delhi-110 003.
Respondents	**1.**	Madhya Pradesh Power Management Company Ltd.(MPPMCL) Shakti Bhawan, Vidyut Nagar, Jabalpur 482 008
	2.	Maharashtra State Electricity Distribution Co Ltd. (MSEDCL) Prakashgad, Bandra (East), Mumbai 400 051

3. Gujarat Urja Vikas Nigam Ltd.(GUVNL)
Vidyut Bhavan, Race Course
Vadodara – 390 007

4. Chhattisgarh State Power Distribution Co. Ltd (CSPDCL)
P.O. Sundar Nagar,
Danganiya, Raipur – 492013

5 Electricity Department
Government of Goa
Vidyut Bhawan, Panaji, Goa

6 Dadra And Nagar Haveli and Daman and Diu Power Distribution Corporation Limited (DNHDDPDCL);
1st & 2nd Floor, Vidyut Bhavan, Silvassa-396230, DNH, India

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. **Vindhyachal Super Thermal Power Station Stage-V (500 MW)** (hereinafter referred to as VSTPS-V is one such station located in the State of Madhya Pradesh. The power generated from VSTPS-V 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 VSTPS-V for the period from 01.04.2024 to 31.03.2029 as per the Tariff Regulations 2024.

6) The tariff of the VSTPS-V for the tariff period 1.4.2019 to 31.3.2024 was determined by the Hon'ble Commission vide its order dated 15.06.2023 in Petition No. 415/GT/2020 in accordance with the CERC (Terms & Conditions of Tariff) Regulations 2019. The petitioner vide affidavit dated 16.11.2024 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 15.06.2023 in Petition no 415/GT/2020 has allowed a capital cost of Rs 3089.64 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 aforesaid true-up petition as Rs.3104.38 Cr based on the actual expenditure after truing up exercise for the period 2019-24. Accordingly, the Petitioner has adjusted an amount of Rs 14.74 Cr from the admitted capital cost as on 31.03.2024 and accordingly the opening capital cost as on 01.04.2024 has been considered as Rs 3104.38 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 escalated @5% every January month year on year and same may be allowed in tariff based on the same 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 Thermal Power Plant
Type of cooling water system	Closed Circuit Cooling System
Consumption of Water	149 MCM
Rate of Water charges (Rs/cubic meter) for 2024-25	9.39
Total Water Charges for VSTPS all stages (4760 MW)	12581 lakh

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) It is submitted that the Petitioner has already paid the requisite filing fee vide Transaction Id 37c568eba62158b7b321 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 our communication dtd. 27.04.2024. For the subsequent years, it shall be paid as per the provisions of the CERC (Payment of Fees) Regulations, 2012 as amended. Further, the proof of payment of fees is being submitted in Form I specified under Regulation 12 of the Central Electricity Regulatory Commission (Payment of Fees) Regulations, 2012, as amended from time to time. Further Regulation 94 (1) of Tariff Regulations 2024 provides that the application fee and publication expenses may be allowed to be recovered directly from the beneficiaries at the discretion of the Hon'ble Commission. Accordingly, it is prayed that Hon'ble Commission may be pleased to allow recover filing fee and publication fee directly from the beneficiaries.

14) 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.

15) 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.

16) 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.

17) 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) 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.

19) 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.

20) 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.

21) 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 remains unaffected.

22) It is submitted that the Petitioner has uploaded the copy of the Petition at CERC site (Saudamini), the access of which is available to all the Respondents mentioned herein above and therefore the petition stands served to all the respondents. Further, the petitioner has also posted the Petition on the company website i.e. www.ntpc.co.in.

23) In accordance with the 'Conduct of Business Regulations 2023' of the Hon'ble Commission, the Petitioner shall, after filing the tariff petition, 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 alongwith the prayer for recovery of Publication Expenses 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 31.03.2024 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 VSTPS-V 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 the recovery of pay/wage revision as additional O&M over and above the normative O&M.

v) Pass any other order as it may deem fit in the circumstances mentioned above.

Petitioner

Noida
27.11.2024

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 Vindhyachal Super Thermal Power Station Stage-V (500 MW) for the period from 01.04.2024 to 31.03.2029.

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

Respondents:

Madhya Pradesh Power Management Company Limited,
Shakti Bhawan, Vidyut Nagar.
Jabalpur 482 008

and Others

AFFIDAVIT

I, Sameer Kumar Aggarwal, Son of Late Shri B K Aggarwal, aged about 51 years, working as Additional General Manager (Commercial) in the office of NTPC Limited, having its registered office at NTPC Bhawan, Scope Complex, Core-7, Lodhi Road, New Delhi-110003 do hereby solemnly affirm and state as follows:

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

समीर अग्रवाल/SAMEER AGGARWAL
अपर महाप्रबंधक (वाणिज्यिक)
Addl. General Manager (Commercial)
एन टी पी सी लिमिटेड/NTPC LIMITED
EOC, A-8A, Sector-24, Noida-201 301 (U.P.)

(19A)

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. 1 to 24 as mentioned in the Petition are true and correct based on the 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)

समीर अग्रवाल/SAMEER AGGARWAL
अपर महाप्रबंधक (वाणिज्यिक)
Addl. General Manager (Commercial)
एन टी पी सी लिमिटेड/NTPC LIMITED
EOC, A-8A, Sector-24, Noida-201 301 (U.P.)

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)

समीर अग्रवाल/SAMEER AGGARWAL
अपर महाप्रबंधक (वाणिज्यिक)
Addl. General Manager (Commercial)
एन टी पी सी लिमिटेड/NTPC LIMITED
EOC, A-8A, Sector-24, Noida-201 301 (U.P.)

NOTARY GOVT. OF INDIA

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

26 NOV 2024

(12B)

Appendix-I

TARIFF FILING FORMS (THERMAL)

FOR DETERMINATION OF TARIFF

FOR

Vindhyachal Super Thermal power Station Stage-V

(From 01.04.2024 to 31.03.2029)

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	NA
FORM-3	Normative parameters considered for tariff computations	✓
FORM-3A**	Statement showing O&M Expenses	✓
FORM-3B**	Statement of Special Allowance	NA
FORM- 4	Details of Foreign loans	NA
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	NA
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-12A**	Statement of Unrecovered Depreciation	NA
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 Seconday 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 2024-29

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	NA
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 Woks 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	✓

**** Additional Forms**

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

PART-I
FORM- 1

Summary of Tariff

	Name of the Petitioner:	**NTPC Limited**
	Name of the Generating Station:	**Vindhyachal Super Thermal power Station Stage-V**
	Place (Region/District/State):	**Western Region/Singraulli/ Madhya 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	16,483.25	16,551.39	16,604.21	16,648.22	16,659.82	6,987.76
1.2	Interest on Loan	Rs Lakh	7,562.09	6,489.41	5,459.96	4,160.21	2,815.23	1,831.33
1.3	Return on Equity	Rs Lakh	17,437.53	17,507.64	17,558.94	17,601.08	17,610.70	17,613.78
1.4	Interest on Working Capital	Rs Lakh	3,224.73	3,081.12	3,115.89	3,146.64	3,176.73	3,075.48
1.5	O&M Expenses	Rs Lakh	18,474.50	16096.72	17085.22	18079.46	19141.54	20261.75
	Total	Rs Lakh	**63182.10**	**59726.29**	**59824.22**	**59635.62**	**59404.03**	**49770.10**
2	Primary Fuel							
2.1	Landed Fuel Cost (coal/gas/RLNG/ liquid) as per FSA approved by beneficiaries	Rs/Ton		2275.27				
	(%) of Fuel Quantity	(%)		100.00				
2.2	Landed Fuel Cost (coal from Integrated mine) as per FSA, if any, approved by beneficiaries or as per allocation of coal quantity				NA			
	(%) of Fuel Quantity							
2.3	Landed Fuel Cost Imported Coal as per FSA approved by beneficiaries				NA			
	(%) of Fuel Quantity							
2.4	Landed Fuel Cost (coal/gas /RLNG/liquid) other than FSA	Rs/Ton			NA			
	(%) of Fuel Quantity	(%)						
2.5	Landed Fuel Cost Imported Coal other than FSA.				NA			
	(%) of Fuel Quantity							
3	Secondary Fuel							
3.1	Secondary fuel oil cost	Rs/Unit		53958.859				
	Energy Charge Rate ex-bus (Paise/kWh) 2A, 2B, 2C, 2D	Rs/Unit		1.546				

(Petitioner)

PART-I
FORM- 1(I)

Name of the Petitioner:	NTPC Limited
Name of the Generating Station:	Vindhyachal Super Thermal power Station Stage-V

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	3,10,438.26	3,11,065.37	3,12,421.74	3,12,717.90	3,12,857.24
2	Add: Addition during the year/period	627.11	1,356.37	296.16	139.34	-
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	3,11,065.37	3,12,421.74	3,12,717.90	3,12,857.24	3,12,857.24
7	**Average Capital Cost**	**3,10,751.82**	**3,11,743.56**	**3,12,569.82**	**3,12,787.57**	**3,12,857.24**

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	310438.26	310740.46	311668.46	311668.46	311668.46
2	Add: Addition during the year / period	302.20	928.00	0.00	0.00	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	310740.46	311668.46	311668.46	311668.46	311668.46
7	**Average Capital Cost**	**310589.36**	**311204.46**	**311668.46**	**311668.46**	**311668.46**

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	0.00	324.91	753.28	1049.44	1188.78
2	Add: Addition during the year / period	324.91	428.37	296.16	139.34	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	324.91	753.28	1049.44	1188.78	1188.78
7	**Average Capital Cost**	**162.45**	**539.09**	**901.36**	**1119.11**	**1188.78**

(Petitioner)

PART-I
FORM- 1(IIA)

Name of the Petitioner:	**NTPC Limited**
Name of the Generating Station:	**Vindhyachal Super Thermal power Station Stage-V**

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)	93,131.48	93,222.14	93,500.54	93,500.54	93500.53925
2	Less: Adjustment in Opening Equity					
3	Adjustment during the year	-	0.00	0.00	0.00	0.00
4	Net Opening Equity (Normal)	93,131.48	93,222.14	93,500.54	93,500.54	93,500.54
5	Add: Increase in equity due to addition during the year / period	90.66	278.40	0.00	0.00	0.00
6	Less: Decrease due to De-capitalisation during the year / period	0.00	0.00	0.00	0.00	0.00
7	Less: Decrease due to reversal during the year / period	0.00	0.00	0.00	0.00	0.00
8	Add: Increase due to discharges during the year / period	0.00	0.00	0.00	0.00	0.00
9	Net closing Equity (Normal)	93,222.14	93,500.54	93,500.54	93,500.54	93,500.54
10	Average Equity (Normal)	93,176.81	93,361.34	93,500.54	93,500.54	93,500.54
11	Rate of ROE (%)	18.782	18.782	18.782	18.782	18.782
12	Total ROE	**17,500.47**	**17,535.13**	**17,561.27**	**17,561.27**	**17,561.27**

(Petitioner)

PART-I

FORM- 1(IIB)

Name of the Petitioner:	**NTPC Limited**
Name of the Generating Station:	**Vindhyachal Super Thermal power Station Stage-V**

Statement showing Return on Equity linked to SBI MCLR + 350 basis points:

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 (beyond the original scope of work including additional capitalization due to Change in Law, Force Majeure)					
1	Gross Opening Equity (Normal)	0.00	97.47	225.98	314.83	356.63
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)	0.00	97.47	225.98	314.83	356.63
5	Add: Increase in equity due to addition during the year / period	97.47	128.51	88.85	41.80	0.00
6	Less: Decrease due to De-capitalisation during the year / period	0.00	0.00	0.00	0.00	0.00
7	Less: Decrease due to reversal during the year / period	0.00	0.00	0.00	0.00	0.00
8	Add: Increase due to discharges during the year / period	0.00	0.00	0.00	0.00	0.00
9	Net closing Equity (Normal)	97.47	225.98	314.83	356.63	356.63
10	Average Equity (Normal)	48.74	161.73	270.41	335.73	356.63
11	Rate of ROE-Pre Tax(%)	12.15	12.15	12.15	12.15	12.15
12	Rate of ROE-Post Tax (%)	14.723	14.723	14.723	14.723	14.723
13	Total ROE	**7.18**	**23.81**	**39.81**	**49.43**	**52.51**

(Petitioner)

PART-I
FORM-2

Plant Characteristics

Name of the Petitioner	**NTPC Ltd.**
Name of the Generating Station	**Vindhyachal STPS Stage-V**
Unit(s)/Block(s)/Parameters	Unit-1
Installed Capacity (MW)	500MW
Schedule COD as per Investment Approval	01.11.2015
Actual COD /Date of Taken Over (as applicable)	30.10.2015
Pit Head or Non Pit Head or Integrated Mine	Non Pit Head
Name of the Boiler Manufacture	BHEL
Name of Turbine Generator Manufacture	BHEL
Main Steams Pressure at Turbine inlet (kg/Cm^2) abs[1].	170
Main Steam Temperature at Turbine inlet (^oC) [1]	537
Reheat Steam Pressure at Turbine inlet ($kg/Cm^{2)}$ [1]	45
Reheat Steam Temperature at Turbine inlet (^oC) [1]	565
Main Steam flow at Turbine inlet under MCR condition (tons /hr)[2]	1471
Main Steam flow at Turbine inlet under VWO condition (tons /hr)[2]	1544
Unit Gross electrical output under MCR /Rated condition (MW)[2]	500
Unit Gross electrical output under VWO condition (MW)[2]	525
Guaranteed Design Gross Turbine Cycle Heat Rate (kCal/kWh)3	1932
Conditions on which design turbine cycle heat rate guaranteed	
% MCR	100%TMCR
% Makeup Water Consumption	0
Design Capacity of Make up Water System	85 m3 / hr
Design Capacity of Inlet Cooling System	Circulating water quantity 54300 m3/Hr.
Design Cooling Water Temperature (^0C)	33
Back Pressure	
Steam flow at super heater outlet under BMCR condition (tons/hr)	1590
Steam Pressure at super heater outlet under	
BMCR condition) **($kg/Cm^{2)}$**	178
Steam Temperature at super heater outlet under	
BMCR condition (^0C)	540
Steam Temperature at Reheater outlet at BMCR condition (^0C)	568
Design / Guaranteed Boiler Efficiency (%)[4]	84.47
Design Fuel with and without Blending of domestic/imported coal	Domestic Coal

PART-I
FORM-2

Plant Characteristics

Name of the Petitioner	**NTPC Ltd.**
Name of the Generating Station	**Vindhyachal STPS Stage-V**
Unit(s)/Block(s)/Parameters	Unit-1
Type of Cooling Tower	IDCT
Type of cooling system[5]	Recirculating Type CW System with Cooling
Type of Boiler Feed Pump[6]	2 TDBFP+2MDBFP
Fuel Details[7]	
-Primary Fuel	Coal
-Secondary Fuel	LDO (Startup/Low Load/Secondary Fuel)
-Alternate Fuels	-
Special Features/Site Specific Features[8]	**FGD with Gas to Gas Heater**
Special Technological Features[9]	
Environmental Regulation related features[10]	FGD & ESP
Any other special features	Station is having Tangential Fired Boilers.

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
9: Any Special Technological feature like Advanced class FA technology in Gas Turbines, etc.
10: Environmental Regulation related features like FGD, ESP etc.,

Petitioner

PART-I
FORM- 3

Normative parameters considered for tariff computations

Name of the Petitioner:	**NTPC Limited**
Name of the Generating Station:	**Vindhyachal Super Thermal power Station Stage-V**

(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 *	%	-	12.150	12.150	12.150	12.150	12.150
Effective Tax Rate	%	17.4720	17.4720	17.4720	17.4720	17.4720	17.4720
Target Availability	%	85.00	85.00	85.00	85.00	85.00	85.00
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
ß- Average Monthly Frequency Response Performance**	0-1	-	-	-		-	-
Auxiliary Energy Consumption#	%	7.55	6.95	6.95	6.95	6.95	6.95
Gross Station Heat Rate	kCal/kWh	2358.84	2347.61	2347.61	2347.61	2347.61	2347.61
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	4	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	1220000	1220000	1220000	1220000	1220000	1220000
SBI 1 Year MCLR plus 325 basis point	%	12.00	11.90	11.90	11.90	11.90	11.90
Blending ratio of domestic coal/imported coal	%	100	100	100	100	100	100
Norms for consumption of reagent							
Specific Limestone consumption for Wet Limestone FGD	g/kwh	16.2	16.2	16.2	16.2	16.2	16.2
Specific Limestone consumption for Lime Spray Dryer or Semi-dry FGD			NA	NA	NA	NA	NA
Specific consumption of sodium bicarbonate			NA	NA	NA	NA	NA
Specific Limestone consumption for CFBC based generating station			NA	NA	NA	NA	NA
Specific ammonia consumption of the SCR			NA	NA	NA	NA	NA
Transit and Handling Losses of coal or lignite, as applicable	%		0.8	0.8	0.8	0.8	0.8

*Rate of Return on Add - cap beyond the original scope of work including additional capitalization due to Change in Law, Force Majeure

**shall be provided at the time of truing up

The additional APC of 1.2 % claimed in respect of FGD technology with Gas to Gas Heater as per provision of CERC Tariff Regulation 2024

$ The Storage capacity indicated pertains to VSTPS Station(4760 MW)

Petitioner

Part-I
FORM-3A
ADDITIONAL FORM

Calculation of O&M Expenses

Name of the Company :	**NTPC Limited**
Name of the Power Station :	**Vindhyachal Super Thermal power Station Stage-V**

Amount in Rs. Lakhs

S.No.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
1	2	3	4	5	7	8
1	**O&M expenses under Reg.36(1)(l)**					
1a	Normative	13585.00	14300.00	15050.00	15840.00	16670.00
2	**O&M expenditure for FGD**	541.77	570.28	600.30	631.89	665.15
	Sale of Gypsum	-340.37	-340.37	-340.37	-340.37	-340.37
	Net O&M expenditure for FGD	201.40	229.91	259.93	291.52	324.78
3	**O&M expenses under Reg.36(1)(6)****					
3a	Water Charges	1332.02	1397.91	1467.69	1544.99	1617.47
3b	Security expenses	530.25	583.27	641.60	705.76	776.33
3c	Capital Spares	shall be provided at the time of truing up				
4	O&M expenses-Ash Transportation	448.06	574.12	660.24	759.28	873.17
	Total O&M Expenses	**16096.72**	**17085.22**	**18079.46**	**19141.54**	**20261.75**

** Actual figures shall be provided at the time of truing up

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 :	**Vindhyachal Super Thermal power Station Stage-V**

Last date of order of Commission for the project	**Date (DD-MM-YYYY)**	
Reference of petition no. in which the above order was passed	**Petition no.**	
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 (as on 31.03.2019)	**(Rs. in lakh)**	To be submitted at the time of truing up
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) as on 1.4.2014		
Gross Normative Debt		
Cumulative Repayment		
Net Normative Debt		
Normative Equity		
Cumulative Depreciation		
Freehold land		

(Petitioner)

PART 1
FORM- 5A

Abstract of Claimed Capital Cost for the existing Projects

Name of the Company :	**NTPC Limited**
Name of the Power Station :	**Vindhyachal Super Thermal power Station Stage-V**

Reference of Final True-up Tariff Petition	**Affidavit dated**	16.11.2024
Capital Cost	**Rs. Lakhs**	310438
Adjustment as per Para (7) of this petition		1474
Following details as considered by the Petitioner as on the last date of the period for which final true-up tariff is claimed:		
Capital cost as on 01.04.02024	**(Rs. in lakh)***	310438.26
Amount of un-discharged liabilities included in above (& forming part of admitted capital cost) as on 31.03.2024		
Amount of un-discharged liabilities corresponding to above admitted capital cost (but not forming part of admitted capital cost being allowed on cash basis)		
Gross Normative Debt		215954.58
Cumulative Repayment		110874.43
Net Normative Debt		105080.15
Normative Equity		93131.48
Cumulative Depreciation		110899.82
Freehold land		714.20

(Petitioner)

PART-I
FORM- 9A
Additional Form

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner	**NTPC Limited**
Name of the Generating Station	**Vindhyachal Super Thermal power Station Stage-V**
COD	**30-10-2015**
For Financial Year	**2024-29 (Summary)**

Amount in Rs Lakh

Sl. No.	Head of Work /Equipment	ACE Claimed (Actual / Projected)					Regulation under which claimed/Justification	Admitted Cost by the Commission, if any
		2024-25	2025-26	2026-27	2027-28	2028-29		
1	2	3	4	5.00	6.00	7.00	8	9
A.	**Works under Original scope, Change in Law etc. eligble for RoE at Normal Rate**							
1	Upgradation against Obsolescence of HMI of M/s BHEL with cyber security features in NTPC Vindhyachal Stage-5	63.2					As per Relevant Form- 9 of respective years	
2	Upgradation against Obsolescence of HMI of M/s Yokogawa DCS and Station LAN -NTPC VSTPS.	239	178				As per Relevant Form- 9 of respective years	
3	Upgradation of SCADA system with cyber security features in stage-V		200				As per Relevant Form- 9 of respective years	
4	Replacement of 220V DC main plant battery bank U#13		200				As per Relevant Form- 9 of respective years	
5	Replacement of UPS battery bank of Main plant, AHP, PT plant		250				As per Relevant Form- 9 of respective years	
6	Replacement of SG/TG/BOP/AHP 24V battery bank		100				As per Relevant Form- 9 of respective years	
	Total (A)	**302**	**928**	**0.00**	**0.00**	**0.00**		
B.	**Works beyond Original scope excluding add-cap due to Change in Law eligible for RoE at SBI MCLR + 350 basis points**							
7	Replacement of conventional chlorine system with Chlorine dioxide system for Stage-V	191	92				As per Relevant Form- 9 of respective years	
8	Gorbi Mines Ash Filling: Water Treatment Plant for mine overflow water	23	116	185.79	139.34		As per Relevant Form- 9 of respective years	
9	Bridge to Shahpur Ash Dyke	110	221	110.37			As per Relevant Form- 9 of respective years	
	Total (B)	**325**	**428**	**296.16**	**139.34**	**0.00**		
Total Add. Cap. Claimed (A+B)		**627**	**1356**	**296.16**	**139.34**	**0.00**		

(Petitioner)

PART-I
FORM- 9

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner	NTPC Limited
Name of the Generating Station	Vindhyachal Super Thermal power Station Stage-V
COD	30-10-2015
For Financial Year	2024-25

Amount in Rs Lakh

Sl. No.	Head of Work /Equipment	ACE Claimed (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 under Original scope, Change in Law etc. eligible for RoE at Normal Rate							
1	Upgradation against Obsolescence of HMI of M/s BHEL with cyber security features in NTPC Vindhyachal Stage-5	63.2	0	63.20		25(2)(c)	It is submitted that the HMI (Human-Machine Interface) application of DDCMIS of the instant Station was based on Windows XP/ Windows 7 operating system. Further, the DCS controller and the HMI system essentially has to be from the same manufacturer, as both the systems have to work in tandem to ensure stability and reliability of the operation, considering factors of safety (recommended by OEM). However, Microsoft Inc. declared obsolescence and End of Life (EOL) of Windows XP (EOL April 2014) and Windows 7 (EOL Jan 2020). Due to the same, it became imminent to replace HMI application since: i) No security updates are presently available from Microsoft, exposing the system vulnerable to cyber threat. ii) Compatible hardware to run obsolete Windows OS is not available. iii) The HMI application software version available for Win XP/Win 7 OS is not compatible with latest available Windows 10 Operating system. Obsolescence Certificate issued by OEM and documents related to End of Life (EOL) for Windows XP/7 declared by Microsoft Inc. are attached herewith at Annexure-A7. Also, CEA (Cyber Security in Power Sector) Guidelines, 2021 (attached herewith at Annexure-A4) provide for phasing out of legacy systems and ensuring security hardening with additional controls in consultation with the OEM. In view of the above, Hon'ble Commission may be pleased to allow the instant capitalization.	
2	Upgradation against Obsolescence of HMI of M/s Yokogawa DCS and Station LAN -NTPC VSTPS.	239	0	239.00		25(2)(c)	The HMI system previously deployed at Station relied on the Windows XP operating system. Since Microsoft no longer supports Windows XP, this created significant cyber security risks. To address these concerns and ensure continued functionality of the system, an upgradation was necessary. However, existing HMI software and hardware were not directly compatible with Windows 10. Therefore, the project scope encompassed a complete Replacement and Modernization (R&M) of the HMI system. Communication regarding non-support and non-availability from the HMI OEM, Yokogawa, regarding the incompatibility and obsolescence is attached as Annexure-A3. Also, CEA (Cyber Security in Power Sector) Guidelines, 2021 (attached herewith at Annexure-A4) provide for phasing out of legacy systems and ensuring security hardening with additional controls in consultation with the OEM. Hon'ble Commission had earlier allowed the upgradation of HMI on account of obsolescence in its various orders such as order dated 23.08.2022 in pet no. 257/GT/2020,order dtd 29.03.2022 in petition no. 442/GT/2020, order dtd 27.09.2022 in petition no. 396/GT/2020, order dtd 05.09.2023 in petition no. 432/GT/2020 etc. Therefore, for continued and efficient operation of the system, it is humbly requested that Hon'ble Commission may be pleased to allow the same on account of obsolescence of Technology	
	Total (A)	302	-	302.20	-			
B.	Works beyond Original scope excluding add-cap due to Change in Law eligible for RoE at SBI MCLR + 350 basis points							

PART-I
FORM- 9

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner	NTPC Limited
Name of the Generating Station	Vindhyachal Super Thermal power Station Stage-V
COD	30-10-2015
For Financial Year	2024-25

Amount in Rs Lakh

Sl. No.	Head of Work /Equipment	ACE Claimed (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
3	Replacement of conventional chlorine system with Chlorine dioxide system for Stage-V	191.31	0	191.31		26(1)(b) read with 26(1)(d) and 26(1)(i)	Chlorine gas is being dosed directly at various stages of water treatment to maintain water quality and to inhibit organic growth in the water retaining structures. Chlorine gas is very hazardous and may prove fatal in case of leakage, handling and storage of same involves risk to the life of public at large. Installation of ClO2 system by replacing chlorine gas injecting system is being undertaken at all NTPC stations to enhance safety of personnel engaged in power plant operation. Work taken-up in accordance to the various provisions and objectives of the 'National Disaster Management Guidelines – Chemical Disasters' which provides that industrial systems shall be continuously improved and upgraded for the prevention and management of chemical accidents. It is also pertinent that the action for installation of ClO2 system is also in compliance with the duties necessitated for an employer (NTPC) 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 28.09.2020 relevant extracts of which are reproduced below: '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 maintains, as far as is reasonably practicable, a working environment that is safe and without risk to the health of the employees' Some of the major benefits of installation of ClO2 system are as under (a) Avoid possible accidents due to leakage of chlorine while handling (b) Improves safety of personnel and plant & equipment (c) Increases the shelf life of water retaining structures/ equipment such as clarifiers, storage tanks, cooling towers, condenser tubes & piping etc thereby reduces the replacement cost. (d) Helps in complying with statutory direction of some states that have already made it mandatory. (e) Helps in running the station more efficiently. More details attached as Annexure-A1. In view of the above, it is humbly requested that Hon'ble Commission may be pleased to allow the same.	
4	Gorbi Mines Ash Filling: Water Treatment Plant for mine overflow water	23.22		23.22		26(1)(b)	As per the MOEF&CC Gazette Notification dtd 31.12.2021 (**attached as Annexure-A2**), every coal or lignite based thermal power plant shall be responsible to utilise 100 per cent utilisation of ash (fly ash, and bottom ash) generated by it in an eco-friendly manner, and various responsibilities were assigned to thermal power plants to dispose fly ash and bottom ash in which filling up of mine voids are also included. For the compliance of the notification, ash filling in the mines allocated to the Station (Gorbi Mine voids Pit-1 & Pit-2) in the designated quantities is required. Rail transportation, its facilities and unloading infrastrucure is required to be constructed for transport and filling of ash in the mine voids.Water treatment plant is required for the treatment of acid mine drainage existing in the mine voids that will overflow on ash filling to ensure ash utilisation in an eco-friendly manner as prescribed by the Notification. As per the office memorandum dtd 22.04.2021 issued by MOC, GOI, (attached as Annexure-A2A), the Gorbi mine of CIL was identified for fly ash filling. Clause 19 (3)(d) of Tariff Regulation 2024 also provides the capital expenditure on account of ash disposal and utilisation , including handling and transportation facilities. In view of the above, it is prayed before Hon'ble Commission to consider the same and allow the capital expenditure incurred towards ash utilization as mentioned.	
5	Bridge to Shahpur Ash Dyke	110.37		110.37		26(1)(b)	As per the MOEF&CC Gazette Notification dtd 31.12.2021 (attached as **Annexure-A2**), every coal or lignite based thermal power plant shall be responsible to utilise 100 per cent utilisation of ash (fly ash, bottom ash, legacy pond ash) generated by it in an eco-friendly manner. For the compliance of the notification, transportation of pond ash/ leagacy pond ash is required for 100% ash utilisation. Road Bridge to Shahpur Ash Dyke over SSTPS Canal & Surjia Nala is necessary for the required access of ash transportation vehicles. It is further submitted that condition of the bridge is getting deteriorated due to heavy ash vehicles movement, and bridge being the only way to nearby many villages, Collector vide letter dated 08.11.2024(attached as **Annexure-A3**) directed NTPC VSTPS to construct the bridge. Hon'ble Commission may please consider the above requirement and allow the expenditure projected against the work as mentioned.	
	Total (B)	324.90	-	324.90	-			
Total Add. Cap. Claimed (A+B)		627.10	-	627.10	-			

(Petitioner)

PART-I
FORM- 9

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner	NTPC Limited
Name of the Generating Station	Vindhyachal Super Thermal power Station Stage-V
COD	30-10-2015
For Financial Year	2025-26

Amount in Rs Lakh

Sl. No.	Head of Work /Equipment	ACE Claimed (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 under Original scope, Change in Law etc. eligble for RoE at Normal Rate							
1	Upgradation against Obsolescence of HMI of M/s Yokogawa DCS and Station LAN -NTPC VSTPS.	178	0	178.00		25(2)(c)	As per addcap justification provided in 2024-25.	
2	Replacement of 220V DC main plant battery bank U#13	200	0	200		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 (Ni-Cd) battery banks of different makes and ratings are provided at VSTPS and have been operational over a number of years. The ampere-hour capacity decreases with service life and rate of degradation depends on ambient and service temperature, maintenance practices etc.	
3	Replacement of UPS battery bank of Main plant, AHP, PT plant	250	0	250		25(2)(a)	The existing battery bank was installed during commissioning of the station i.e. before the station COD (30.10.2015). Batteries have operational life of approx. 10 years and thereafter, its performance decreases substantially and is not remained reliable. The Hon'ble Commission also observed that the battery life cycle is 10-12 years based on the technology being used and thereafter battery replacement is required after its operational life in its order dated 16.10.2023 in petition no. 218/GT/2019. It is also pertinent to mention that Hon'ble Commission has also indicated in its Tariff Regulation under Appendix-I, that the depreciation schedule of the batteries are 9.5%, thus signifying the life of batteries under 10 years. OEM communication in regard to the life of the battery system is attached herewth as **Annexure-A9**. Therefore, it is prayed before the Hon'ble Commission that the expenditure against the battery replacement may please be allowed under Regulation 25(2)(a).	
4	Replacement of SG/TG/BOP/AHP 24V battery bank	100	0	100		25(2)(a)		

5	SCADA upgradation of VSTPS-V with cyber security feature	200	0	200		25(2)(b) read with 25(2)(c)	Presently SAS of Stage-V Switchyard is based on Windows 7, which OEM has declared Obsolete operating system and has denied the services for revival in case of failure of SAS. OEM has stated the followings regarding the exising SAS : Presently Switchyard Automation is running on the obsolete Operating system i.e. Win-7 and the associated IGPC / Gateway Hardware that are also obsolete. Presently automation system is highly vulnerable due to following reasons: 1. There is no possibility to manage the system with the latest security patches, which are meant for the cyber vulnerabilities prevailing in the present environment. 2. If the PC crashes and if we have to re-install the OS, that will not be possible as Microsoft doesn't support older versions of Operating systems. 3. Any failure of the IGPC hardware can lead to the down time of the system, as the hardware components of the IGPC are obsolete and no support for old hardware is available. Looking at the present situation, system is vulnerable and is highly recommended to be upgraded to the latest version of hardware and OS with associated upgradation of the SAS and engineering software's compatible to Win-10 OS. The obsolescence declaration from OEM and the obsolescence letter from OES for the instant station are attached as **Annexure -A5, Annexure-A6, Annexure-A6A.**	
	Total (A)	928	0	928	0			
B.	**Works beyond Original scope exluding add-cap due to Change in Law eligble for RoE at SBI MCLR +**							
6	Replacement of conventional chlorine system with Chlorine dioxide system for Stage-V	91.51	0	91.51		26(1)(b) read with 26(1)d) and 26(1)(l)	As per addcap justification provided in 2024-25.	
7	Gorbi Mines Ash Filling: Water Treatment Plant for mine overflow water	116.12	0	116.12		26(1)(b)	As per addcap justification provided in 2024-25.	
8	Bridge to Shahpur Ash Dyke	220.75	0	220.75		26(1)(b)	As per addcap justification provided in 2024-25.	
	Total (B)	428.38	0	428.38	0			
Total Add. Cap. Claimed (A+B)		**1,356.38**	-	**1356.38**	-			

(Petitioner)

PART-I
FORM- 9

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner	**NTPC Limited**
Name of the Generating Station	**Vindhyachal Super Thermal power Station Stage-V**
COD	**30-10-2015**
For Financial Year	**2026-27**

Amount in Rs Lakh

Sl. No.	Head of Work /Equipment	ACE Claimed (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 under Original scope, Change in Law etc. eligble for RoE at Normal Rate**							
	Total (A)	-	-	-	-			
B.	**Works beyond Original scope exluding add-cap due to Change in Law eligble for RoE at SBI MCLR + 350 basis points**							
1	Gorbi Mines Ash Filling: Water Treatment Plant for mine overflow water	185.79	0.00	185.79		26(1)(b)	As per addcap justification provided in 2024-25.	
2	Bridge to Shahpur Ash Dyke	110.37	0.00	110.37		26(1)(b)	As per addcap justification provided in 2024-25.	
	Total (B)	**296.16**	-	**296.16**	-			
Total Add. Cap. Claimed (A+B)		**296.16**	-	**296.16**	-			

(Petitioner)

PART-I
FORM- 9

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner	**NTPC Limited**
Name of the Generating Station	**Vindhyachal Super Thermal power Station Stage-V**
COD	**30-10-2015**
For Financial Year	**2027-28**

Amount in Rs Lakh

Sl. No.	Head of Work /Equipment	ACE Claimed (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 under Original scope, Change in Law etc. eligble for RoE at Normal Rate**							
	Total (A)	-	-	-	-			
B.	**Works beyond Original scope exluding add-cap due to Change in Law eligble for RoE at SBI MCLR + 350 basis points**							
1	Gorbi Mines Ash Filling: Water Treatment Plant for mine overflow water	139.34	0.00	139.34		26(1)(b)	As per addcap justification provided in 2024-25.	
	Total (B)	**139.34**	-	**139.34**				
Total Add. Cap. Claimed (A+B)		**139.34**	-	**139.34**	-			

(Petitioner)

PART-I
FORM- 9

Year wise Statement of Additional Capitalisation after COD

Name of the Petitioner	**NTPC Limited**
Name of the Generating Station	**Vindhyachal Super Thermal power Station Stage-V**
COD	**30-10-2015**
For Financial Year	**2028-29**

Amount in Rs Lakh

Sl. No.	Head of Work /Equipment	ACE Claimed (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 under Original scope, Change in Law etc. eligble for RoE at Normal Rate**							
	Total (A)	-	-	-	-			
B.	**Works beyond Original scope exluding add-cap due to Change in Law eligble for RoE at SBI MCLR + 350 basis points**							
	Total (B)	-	-	-	-			
Total Add. Cap. Claimed (A+B)		-	-	-	-			

(Petitioner)

PART-I
FORM- 10

Name of the Petitioner	**NTPC Limited**
Name of the Generating Station	**Vindhyachal Super Thermal power Station Stage-V**
Date of Commercial Operation	**30-10-2015**

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										
Financing Details	**Add cap is proposed to be financed in Debt:Equity ratio of 70:30**									
Loan-1										
Loan-2										
Loan-3 and so on										
Total Loan2										
Equity Internal Resources										
Others (Pl. specify)										
Total										

Note:
1. Year 1 refers to Financial Year of COD and Year 2, Year 3 etc. are the subsequent financial years respectively.
2. Loan details for meeting the additional capitalisation requirement should be given as per FORM-7 or 8 whichever is relevant

(Petitioner)

PART-I
FORM- 12

Statement of Depreciation

Name of the Company :	NTPC Limited
Name of the Power Station :	Vindhyachal Super Thermal Power Station Stage-V

(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	3,08,506.55	3,10,438.26	3,11,065.37	3,12,421.74	3,12,717.90	3,12,857.24
2	Closing Capital Cost	3,10,438.26	3,11,065.37	3,12,421.74	3,12,717.90	3,12,857.24	3,12,857.24
3	Average Capital Cost	3,09,472.41	3,10,751.82	3,11,743.56	3,12,569.82	3,12,787.57	3,12,857.24
4	Average Cost of IT Equipments & Software	273.82	shall be provided at the time of truing up				
5	Freehold land	714.20	714.20	714.20	714.20	714.20	714.20
6	Rate of depreciation	5.33%	5.33%	5.33%	5.33%	5.33%	5.33%
7	Depreciable value	2,77,909.77	2,79,033.86	2,79,926.42	2,80,670.06	2,80,866.04	2,80,928.74
8	Balance useful life at the beginning of the period	17.50	16.50	15.50	14.50	13.50	12.50
9	Remaining depreciable value	1,67,009.79	1,51,915.68	1,36,256.85	1,20,396.28	1,03,944.03	87,346.91
10	Depreciation (for the period)	16,483.25	16,551.39	16,604.21	16,648.22	16,659.82	6,987.76
11	Cumulative depreciation at the end of the period	127383.2197	1,43,669.57	1,60,273.79	1,76,922.01	1,93,581.83	2,00,569.59
12	Less: Cumulative depreciation adjustment on account of de-capitalisation	265.04					
13	Net Cumulative depreciation at the end of the period after adjustments	1,27,118.18	1,43,669.57	1,60,273.79	1,76,922.01	1,93,581.83	2,00,569.59

(Petitioner)

Calculation of Interest on Actual Loans

FORM-13

Name of the Company: NTPC LTD.
Name of the Power Station: VSTPS V

(Amount in lacs)

Sl. no.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
	2					
4	Eurobond V					
	Gross loan - Opening	17585.54	17585.54	17585.54	17585.54	17585.54
	Cumulative repayments of Loans upto previous period	0.00	17585.54	17585.54	17585.54	17585.54
	Net loan - Opening	17585.54	0.00	0.00	0.00	0.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	17585.54	0.00	0.00	0.00	0.00
	Repayments of Loans during the period	17585.54	0.00	0.00	0.00	0.00
	Net loan - Closing	0.00	0.00	0.00	0.00	0.00
	Average Net Loan	8792.77	0.00	0.00	0.00	0.00
	Rate of Interest on Loan	4.6277%	4.6277%	4.6277%	4.6277%	4.6277%
	Interest on Loan Annualised	406.90	0.00	0.00	0.00	0.00
7	SBI VIII Total repayment from 31.01.2022 -9Y					
	Gross loan - Opening	18300.00	18300.00	18300.00	18300.00	18300.00
	Cumulative repayments of Loans upto previous period	6100.00	8133.33	10166.67	12200.00	14233.33
	Net loan - Opening	12200.00	10166.67	8133.33	6100.00	4066.67
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	12200.00	10166.67	8133.33	6100.00	4066.67
	Repayments of Loans during the period	2033.33	2033.33	2033.33	2033.33	2033.33
	Net loan - Closing	10166.67	8133.33	6100.00	4066.67	2033.33
	Average Net Loan	11183.33	9150.00	7116.67	5083.33	3050.00
	Rate of Interest on Loan	8.2000%	8.2000%	8.2000%	8.2000%	8.2000%
	Interest on Loan Annualised	917.03	750.30	583.57	416.83	250.10

Calculation of Interest on Actual Loans						FORM-13
Name of the Company		NTPC LTD.				
Name of the Power Station		VSTPS V				
						(Amount in lacs)
Sl. no.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
	2					
12	**Bonds- L 2A -repayment on 16.12.2028**					
	Gross loan - Opening	2642.29	2642.29	2642.29	2642.29	2642.29
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	0.00	0.00
	Net loan - Opening	2642.29	2642.29	2642.29	2642.29	2642.29
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	2642.29	2642.29	2642.29	2642.29	2642.29
	Repayments of Loans during the period	0.00	0.00	0.00	0.00	2642.29
	Net loan - Closing	2642.29	2642.29	2642.29	2642.29	0.00
	Average Net Loan	2642.29	2642.29	2642.29	2642.29	1321.14
	Rate of Interest on Loan	8.5100%	8.5100%	8.5100%	8.5100%	8.5100%
	Interest on Loan Annualised	224.86	224.86	224.86	224.86	112.43
13	**Bonds- L 3A -repayment on 16.12.2033**					
	Gross loan - Opening	3298.58	3298.58	3298.58	3298.58	3298.58
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	0.00	0.00
	Net loan - Opening	3298.58	3298.58	3298.58	3298.58	3298.58
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	3298.58	3298.58	3298.58	3298.58	3298.58
	Repayments of Loans during the period	0.00	0.00	0.00	0.00	0.00
	Net loan - Closing	3298.58	3298.58	3298.58	3298.58	3298.58
	Average Net Loan	3298.58	3298.58	3298.58	3298.58	3298.58
	Rate of Interest on Loan	8.6900%	8.6900%	8.6900%	8.6900%	8.6900%
	Interest on Loan Annualised	286.65	286.65	286.65	286.65	286.65

Calculation of Interest on Actual Loans						FORM-13
Name of the Company		NTPC LTD.				
Name of the Power Station		VSTPS V				
						(Amount in lacs)
Sl. no.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
	2					
15	**Bonds- L 2B-repayment on 16.12.2028**					
	Gross loan - Opening	966.15	966.15	966.15	966.15	966.15
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	0.00	0.00
	Net loan - Opening	966.15	966.15	966.15	966.15	966.15
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	966.15	966.15	966.15	966.15	966.15
	Repayments of Loans during the period	0.00	0.00	0.00	0.00	966.15
	Net loan - Closing	966.15	966.15	966.15	966.15	0.00
	Average Net Loan	966.15	966.15	966.15	966.15	483.08
	Rate of Interest on Loan	8.7600%	8.7600%	8.7600%	8.7600%	8.7600%
	Interest on Loan Annualised	84.63	84.63	84.63	84.63	42.32
16	**Bonds- L 3B- repayment on 16.12.2033**					
	Gross loan - Opening	4228.23	4228.23	4228.23	4228.23	4228.23
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	0.00	0.00
	Net loan - Opening	4228.23	4228.23	4228.23	4228.23	4228.23
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	4228.23	4228.23	4228.23	4228.23	4228.23
	Repayments of Loans during the period	0.00	0.00	0.00	0.00	0.00
	Net loan - Closing	4228.23	4228.23	4228.23	4228.23	4228.23
	Average Net Loan	4228.23	4228.23	4228.23	4228.23	4228.23
	Rate of Interest on Loan	8.9400%	8.9400%	8.9400%	8.9400%	8.9400%
	Interest on Loan Annualised	378.00	378.00	378.00	378.00	378.00
17	**Bond 54 Repayment on 25.03.2023**					
	Gross loan - Opening	33500.00	33500.00	33500.00	33500.00	33500.00
	Cumulative repayments of Loans upto previous period	20100.00	33500.00	33500.00	33500.00	33500.00
	Net loan - Opening	13400.00	0.00	0.00	0.00	0.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	13400.00	0.00	0.00	0.00	0.00
	Repayments of Loans during the period	13400.00	0.00	0.00	0.00	0.00
	Net loan - Closing	0.00	0.00	0.00	0.00	0.00
	Average Net Loan	6700.00	0.00	0.00	0.00	0.00
	Rate of Interest on Loan	8.5200%	8.5200%	8.5200%	8.5200%	8.5200%
	Interest on Loan Annualised	570.84	0.00	0.00	0.00	0.00
18	**Bond 57 Bullet Repayment on 15.12.2025**					
	Gross loan - Opening	2200.00	2200.00	2200.00	2200.00	2200.00
	Cumulative repayments of Loans upto previous period	0.00	2200.00	2200.00	2200.00	2200.00
	Net loan - Opening	2200.00	0.00	0.00	0.00	0.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	2200.00	0.00	0.00	0.00	0.00
	Repayments of Loans during the period	2200.00	0.00	0.00	0.00	0.00
	Net loan - Closing	0.00	0.00	0.00	0.00	0.00
	Average Net Loan	1100.00	0.00	0.00	0.00	0.00
	Rate of Interest on Loan	8.2200%	8.2200%	8.2200%	8.2200%	8.2200%
	Interest on Loan Annualised	90.42	0.00	0.00	0.00	0.00
20	**Bond 60 Bullet Repayment on 05.05.2026**					
	Gross loan - Opening	2600.00	2600.00	2600.00	2600.00	2600.00
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	2600.00	2600.00
	Net loan - Opening	2600.00	2600.00	2600.00	0.00	0.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	2600.00	2600.00	2600.00	0.00	0.00
	Repayments of Loans during the period	0.00	0.00	2600.00	0.00	0.00
	Net loan - Closing	2600.00	2600.00	0.00	0.00	0.00
	Average Net Loan	2600.00	2600.00	1300.00	0.00	0.00
	Rate of Interest on Loan	8.0800%	8.0800%	8.0800%	8.0800%	8.0800%
	Interest on Loan Annualised	210.08	210.08	105.04	0.00	0.00
21	**Bond 61 Repayment from 27.05.2021/26/31**					
	Gross loan - Opening	800.00	800.00	800.00	800.00	800.00
	Cumulative repayments of Loans upto previous period	266.67	266.67	266.67	533.33	533.33
	Net loan - Opening	533.33	533.33	533.33	266.67	266.67
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	533.33	533.33	533.33	266.67	266.67
	Repayments of Loans during the period	0.00	0.00	266.67	0.00	0.00
	Net loan - Closing	533.33	533.33	266.67	266.67	266.67
	Average Net Loan	533.33	533.33	400.00	266.67	266.67
	Rate of Interest on Loan	8.1300%	8.1300%	8.1300%	8.1300%	8.1300%
	Interest on Loan Annualised	43.36	43.36	32.52	21.68	21.68

Calculation of Interest on Actual Loans						FORM-13
Name of the Company		NTPC LTD.				
Name of the Power Station		VSTPS V				
						(Amount in lacs)
Sl. no.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
	2					
22	**Bond 62 bullet Repayment on 23.08.2026**					
	Gross loan - Opening	7500.00	7500.00	7500.00	7500.00	7500.00
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	7500.00	7500.00
	Net loan - Opening	7500.00	7500.00	7500.00	0.00	0.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	7500.00	7500.00	7500.00	0.00	0.00
	Repayments of Loans during the period	0.00	0.00	7500.00	0.00	0.00
	Net loan - Closing	7500.00	7500.00	0.00	0.00	0.00
	Average Net Loan	7500.00	7500.00	3750.00	0.00	0.00
	Rate of Interest on Loan	7.6100%	7.6100%	7.6100%	7.6100%	7.6100%
	Interest on Loan Annualised	570.75	570.75	285.38	0.00	0.00
23	**Bond 64 bullet Repayment on 07.11.2031**					
	Gross loan - Opening	700.00	700.00	700.00	700.00	700.00
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	0.00	0.00
	Net loan - Opening	700.00	700.00	700.00	700.00	700.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	700.00	700.00	700.00	700.00	700.00
	Repayments of Loans during the period	0.00	0.00	0.00	0.00	0.00
	Net loan - Closing	700.00	700.00	700.00	700.00	700.00
	Average Net Loan	700.00	700.00	700.00	700.00	700.00
	Rate of Interest on Loan	7.5200%	7.5200%	7.5200%	7.5200%	7.5200%
	Interest on Loan Annualised	52.64	52.64	52.64	52.64	52.64
24	**Bond 66 bullet Repayment on 14.12.2031**					
	Gross loan - Opening	3600.00	3600.00	3600.00	3600.00	3600.00
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	0.00	0.00
	Net loan - Opening	3600.00	3600.00	3600.00	3600.00	3600.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	3600.00	3600.00	3600.00	3600.00	3600.00
	Repayments of Loans during the period	0.00	0.00	0.00	0.00	0.00
	Net loan - Closing	3600.00	3600.00	3600.00	3600.00	3600.00
	Average Net Loan	3600.00	3600.00	3600.00	3600.00	3600.00
	Rate of Interest on Loan	7.4000%	7.4000%	7.4000%	7.4000%	7.4000%
	Interest on Loan Annualised	266.40	266.40	266.40	266.40	266.40
25	**Bond 67 bullet Repayment on 15.01.2025(ICICI VI Loan refinanced)**					
	Gross loan - Opening	5500.00	5500.00	5500.00	5500.00	5500.00
	Cumulative repayments of Loans upto previous period	0.00	0.00	0.00	0.00	0.00
	Net loan - Opening	5500.00	5500.00	5500.00	5500.00	5500.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	5500.00	5500.00	5500.00	5500.00	5500.00
	Repayments of Loans during the period	0.00	0.00	0.00	0.00	5500.00
	Net loan - Closing	5500.00	5500.00	5500.00	5500.00	0.00
	Average Net Loan	5500.00	5500.00	5500.00	5500.00	2750.00
	Rate of Interest on Loan	8.4200%	8.4200%	8.4200%	8.4200%	8.4200%
	Interest on Loan Annualised	463.10	463.10	463.10	463.10	231.55
26	**J&K Bank-IV Repayment from 31.03.2021**					
	Gross loan - Opening	2200.00	2200.00	2200.00	2200.00	2200.00
	Cumulative repayments of Loans upto previous period	733.33	1222.22	1466.67	1711.11	1955.55
	Net loan - Opening	1466.67	977.78	733.33	488.89	244.44
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	1466.67	977.78	733.33	488.89	244.44
	Repayments of Loans during the period	488.89	244.44	244.44	244.44	244.44
	Net loan - Closing	977.78	733.33	488.89	244.44	0.00
	Average Net Loan	1222.22	855.56	611.11	366.67	122.22
	Rate of Interest on Loan	7.9800%	7.9800%	7.9800%	7.9800%	7.9800%
	Interest on Loan Annualised	97.53	68.27	48.77	29.26	9.75

Calculation of Interest on Actual Loans						FORM-13
Name of the Company		NTPC LTD.				
Name of the Power Station		VSTPS V				
						(Amount in lacs)
Sl. no.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
	2					
28	Corporation Bank-IV D1- Repayment from 11.01.2023(ICICI V Loan refinanced)					
	Gross loan - Opening	10000.00	10000.00	10000.00	10000.00	10000.00
	Cumulative repayments of Loans upto previous period	2222.22	3333.33	4444.44	5555.56	6666.67
	Net loan - Opening	7777.78	6666.67	5555.56	4444.44	3333.33
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	7777.78	6666.67	5555.56	4444.44	3333.33
	Repayments of Loans during the period	1111.11	1111.11	1111.11	1111.11	1111.11
	Net loan - Closing	6666.67	5555.56	4444.44	3333.33	2222.22
	Average Net Loan	7222.22	6111.11	5000.00	3888.89	2777.78
	Rate of Interest on Loan	8.2333%	8.2333%	8.2333%	8.2333%	8.2333%
	Interest on Loan Annualised	594.63	503.15	411.67	320.19	228.70
29	Bank Of India-IV Repayment from 07.12.2024 (Refinancing of Bank of India II)					
	Gross loan - Opening	6000.00	6000.00	6000.00	6000.00	6000.00
	Cumulative repayments of Loans upto previous period	0.00	500.00	1000.00	1500.00	2000.00
	Net loan - Opening	6000.00	5500.00	5000.00	4500.00	4000.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	6000.00	5500.00	5000.00	4500.00	4000.00
	Repayments of Loans during the period	500.00	500.00	500.00	500.00	500.00
	Net loan - Closing	5500.00	5000.00	4500.00	4000.00	3500.00
	Average Net Loan	5750.00	5250.00	4750.00	4250.00	3750.00
	Rate of Interest on Loan	8.3500%	8.3500%	8.3500%	8.3500%	8.3500%
	Interest on Loan Annualised	480.13	438.38	396.63	354.88	313.13
30	HDFC Bank Ltd. IX D04 Repayment from 30.06.2024 (Refinancing of Syndicate Bank-III)					
	Gross loan - Opening	2500.00	2500.00	2500.00	2500.00	2500.00
	Cumulative repayments of Loans upto previous period	0.00	208.33	416.67	625.00	833.33
	Net loan - Opening	2500.00	2291.67	2083.33	1875.00	1666.67
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	2500.00	2291.67	2083.33	1875.00	1666.67
	Repayments of Loans during the period	208.33	208.33	208.33	208.33	208.33
	Net loan - Closing	2291.67	2083.33	1875.00	1666.67	1458.33
	Average Net Loan	2395.83	2187.50	1979.17	1770.83	1562.50
	Rate of Interest on Loan	8.4000%	8.4000%	8.4000%	8.4000%	8.4000%
	Interest on Loan Annualised	201.25	183.75	166.25	148.75	131.25
31	HDFC Bank Ltd. IX D04 Repayment from 30.06.2024 (Refinancing of Syndicate Bank-IV)					
	Gross loan - Opening	10000.00	10000.00	10000.00	10000.00	10000.00
	Cumulative repayments of Loans upto previous period	0.00	833.33	1666.67	2500.00	3333.33
	Net loan - Opening	10000.00	9166.67	8333.33	7500.00	6666.67
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	10000.00	9166.67	8333.33	7500.00	6666.67
	Repayments of Loans during the period	833.33	833.33	833.33	833.33	833.33
	Net loan - Closing	9166.67	8333.33	7500.00	6666.67	5833.33
	Average Net Loan	9583.33	8750.00	7916.67	7083.33	6250.00
	Rate of Interest on Loan	8.4000%	8.4000%	8.4000%	8.4000%	8.4000%
	Interest on Loan Annualised	805.00	735.00	665.00	595.00	525.00

Calculation of Interest on Actual Loans						FORM-13
Name of the Company		NTPC LTD.				
Name of the Power Station		VSTPS V				
						(Amount in lacs)
Sl. no.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
	2					
32	HDFC Bank Ltd. IX D04 Repayment from 30.06.2024 (Refinancing of Vijaya bank-V)					
	Gross loan - Opening	1428.57	1428.57	1428.57	1428.57	1428.57
	Cumulative repayments of Loans upto previous period	0.00	119.05	238.10	357.14	476.19
	Net loan - Opening	1428.57	1309.52	1190.48	1071.43	952.38
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	1428.57	1309.52	1190.48	1071.43	952.38
	Repayments of Loans during the period	119.05	119.05	119.05	119.05	119.05
	Net loan - Closing	1309.52	1190.48	1071.43	952.38	833.33
	Average Net Loan	1369.05	1250.00	1130.95	1011.90	892.86
	Rate of Interest on Loan	8.3750%	8.3750%	8.3750%	8.3750%	8.3750%
	Interest on Loan Annualised	114.66	104.69	94.72	84.75	74.78
33	HDFC Bank Ltd. IX D04 Repayment from 30.06.2024 (Refinancing of Vijaya bank-VI)					
	Gross loan - Opening	900.00	900.00	900.00	900.00	900.00
	Cumulative repayments of Loans upto previous period	0.00	75.00	150.00	225.00	300.00
	Net loan - Opening	900.00	825.00	750.00	675.00	600.00
	Increase/ Decrease due to FERV	0	0	0	0	0
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	900.00	825.00	750.00	675.00	600.00
	Repayments of Loans during the period	75.00	75.00	75.00	75.00	75.00
	Net loan - Closing	825.00	750.00	675.00	600.00	525.00
	Average Net Loan	862.50	787.50	712.50	637.50	562.50
	Rate of Interest on Loan	8.3750%	8.3750%	8.3750%	8.3750%	8.3750%
	Interest on Loan Annualised	72.23	65.95	59.67	53.39	47.11
	TOTAL LOAN					
	Gross loan - Opening	136449.36	136449.36	136449.36	136449.36	136449.36
	Cumulative repayments of Loans upto previous period	29422.22	67976.81	73101.41	88592.68	93717.28
	Net loan - Opening	107027.13	68472.55	63347.95	47856.68	42732.07
	Increase/ Decrease due to FERV	0.00	0.00	0.00	0.00	0.00
	Increase/ Decrease due to ACE/Drawl during the period	0.00	0.00	0.00	0.00	0.00
	Total	107027.13	68472.55	63347.95	47856.68	42732.07
	Repayments of Loans during the period	38554.58	5124.60	15491.27	5124.60	14233.04
	Net loan - Closing	68472.55	63347.95	47856.68	42732.07	28499.03
	Average Net Loan	87749.84	65910.25	55602.31	45294.38	35615.55
	Rate of Interest on Loan	7.8987%	8.2384%	8.2829%	8.3476%	8.3432%
	Interest on Loan Annualised	6931.10	5429.96	4605.48	3781.01	2971.49

Calculation of Interest on Actual Loans						FORM-13
Name of the Company		NTPC LTD.				
Name of the Power Station		VSTPS V				
						(Amount in lacs)
Sl. no.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
2						

Calculation of Interest on Actual Loans						FORM-13
Name of the Company		NTPC LTD.				
Name of the Power Station		VSTPS V				
						(Amount in lacs)
Sl. no.	Particulars	2024-25	2025-26	2026-27	2027-28	2028-29
2						

PART-I
FORM- 15

Details of Source wise Fuel for Computation of Energy Charges

Name of the Company :	NTPC Limited
Name of the Power Station :	Vindhyachal Super Thermal power Station Stage-V

S. No.	Month	Unit	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
			Domestic	Domestic	Domestic	Domestic	Domestic	Domestic	Domestic	Domestic	Domestic	Domestic	Domestic	Domestic
A)	OPENING QUANTITY													
1	Opening Quantity of Coal/Lignite	(MT)	1252489.57	1218367.65	1073022.64	1084415.14	1095471.73	1046910.24	986890.95	852368.33	772663.58	759794.635	810452.123	794857.518
2	Value of Stock	(Rs.)	2687353570	2537102541	2293270129	2451327496	2454943661	2411404098	2327936035	1953998115	1752025767.00	1721156981	1865191829	1833098769
B)	QUANTITY													
3	Quantity of Coal/Lignite supplied by Coal/Lignite Company for the particular month giving complete details of mode of transportation used for transportation along with quantity	(MT)	2063807.51	2015172.41	1808823	1764460.04	1866841.02	1773198.68	1792307.66	1939908.17	1969720.42	2030587.554	1655370.653	1689922.106
	By Rail	(MT)	381801.76	355847.82	287307.26	253421.52	294472.12	303095.78	300776.68	326850.19	311821.28	321481.78	303919.7	610442.31
	By MGR	(MT)	1682005.73	1659324.59	1551517.74	1510038.52	1572368.9	1470102.9	1492030.98	1613057.98	1657899.14	1709105.774	1351450.953	1079479.796
4	Adjustment (+/-) in quantity supplied made by Coal/Lignite Company	(MT)	0											
5	Coal supplied by Coal/Lignite Company (3+4)	(MT)	2063807.51	2015172.41	1808823	1764460.04	1866841.02	1773198.68	1792307.66	1939908.17	1969720.42	2030587.554	1655370.653	1689922.106
6	Normative Transit & Handling Losses (For coal/Lignite based Projects) specify the source	(MT)	6418.43	6165.43	5161.49	5043.45	5500.31	5364.97	5390.28	5840.92	5810.37	5990.07	5134.26	7042.50
7	Net coal / Lignite Supplied (5-6)	(MT)	2057389.08	2009006.98	1803663.51	1759416.59	1861340.71	1767833.71	1787417.38	1934067.25	1963910.05	2024597.49	1650236.40	1682879.61
C)	PRICE													
8	Amount charged by the Coal /Lignite Company	(Rs.)	4115936226	4054963834	3813454413	3813474989	4203586664	4088918822	3885188607	4226875289	4202838742	4516364242	3833704993	4080596072
9	Adjustment (+/-) in amount charged made by Coal/Lignite Company	(Rs.)	-57775635	131831721	209570618	0	0	0	0	0	0	0	0	0
10	Unloading, Handling and Sampling charges	(Rs.)	34591091	63782292	48618716	45782642	57880761	47366214	84738443	40532551	148582096	98213867.71	59361378.87	-73837151.3
	Unloading charges													
	Handling charges													
	Sampling charges													
11	Total amount Charged (8+9+10)	(Rs.)	4092751622	4250577847	4071643747	3859257631	4261467425	4136285036	3969927050	4267407840	4351420938	4611578110	3893066572	4006758921
D)	TRANSPORATION													
12	Transportation charges by rail/ship/road transport	(Rs.)												
	By Rail		89414135	84020171	60631634	58668185	68899052	71361740	70568670	76805031	73449462	75323707	71365588	137736388
	By Road													
	By Ship													
	By MGR													
13	Adjustment (+/-) in amount charged made by Railways/ Transport Company	(Rs.)												0
14	Demurrage Charges, if any	(Rs.)												55755
15	Cost of fuel in transporting coal through MGR system, if applicable	(Rs.)	22901799	25863591	24168272	18732870	25274371	20675880	21438885	20075210	22244546			143571236.69
16	Total Transportation Charges (12+13+14+15)	(Rs.)	112315934	109883762	84799906	77401055	94173423	92037620	92007555	96880241	95694008	75323707	71365588	162149269.7
17	Total amount Charged for coal/lignite supplied including Transportation (11+16)	(Rs.)	4205067556	4360461609	4156443653	3941678686	4355640848	4228322656	4061934605	4364287881	4447114846	4686901317	3964432160	4168908191
E)	TOTAL COST													
18	Landed cost of coal/ Lignite (2+17)/(1+7)	Rs./MT	2,082.38	2,137.21	2,242.06	2,240.99	2,303.35	2,358.91	2,292.43	2,267.52	2,265.29	2,301.42	2,369.10	2,442.55
19	Blending Ratio		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20	Weighted average cost of coal/ Lignite for preceding twelve months	Rs./MT												
F)	QUALITY													
21	GCV of Domestic Coal of the opening coal stock as per bill of Coal Company	(kCal/Kg)	4420	4427	4398	4400	4450	4493	4473	4539	4582	4478	4471	4466
22	GCV of Domestic Coal supplied as per bill of Coal Company	(kCal/Kg)	4431	4380	4416	4475	4519	4461	4576	4601	4437	4469	4464	4452
23	GCV of Imported Coal of the opening stock as per bill Coal Company	(kCal/Kg)												
24	GCV of Imported Coal supplied as per bill Coal Company	(kCal/Kg)												
25	Weighted average GCV of coal/ Lignite as Billed	(kCal/Kg)	4427	4398	4409	4450	4493	4473	4539	4582	4478	4471	4466	4456
26	GCV of Domestic Coal of the opening stock as received at Station	(kCal/Kg)	3839	3773	3797	3896	3978	3917	3917	3937	3909	3982	4015	4083
27	GCV of Domestic Coal supplied as received at Station	(kCal/Kg)	3733	3811	3955	4029	3881	3917	3946	3897	4010	4028	4117	3946
28	GCV of Imported Coal of opening stock as received at Station	(kCal/Kg)												
29	GCV of Imported Coal of opening stock as received at Station	(kCal/Kg)												
30	Weighted average GCV of coal/ Lignite as Received	(kCal/Kg)	3773	3797	3,896.00	3,978.00	3,917.00	3,917.00	3,937.00	3,909.00	3,982.00	4,015.00	4,083.00	3,990.00

weighted avg price of coal 2,275.27
weighted average GCV 3,932.83

(Petitioner)

PART-I
FORM- 15A

Details of Secondary Fuel for Computation of Energy Charges

Name of the Company : NTPC Limited
Name of the Power Station : Vindhyachal Super Thermal power Station Stage-V

Sl.No.	Month	Unit	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
			HFO	HFO	HFO	HFO	HFO	HFO	HFO	HFO	HFO	HFO	HFO	HFO
1	Opening quantity of oil	KL	3150.017	2942.017	2812.017	5525.857	4789.857	4547.857	4175.857	3294.857	3294.857	3001.857	2595.857	2292.857
2	Value of opening	Rs	171996831.45	160639642.49	153541399.39	297458290.64	257839226.64	244812303.72	224787447.00	177362996.75	177362996.75	161590730.57	139735645.01	123425076.23
3	Quantity of oil supplied by Oil Company*	KL												
4	Value of Oil *	(Rs)												
5	Adjustment (+/-) in quantity supplied made by Oil Company	KL												
6	Oil supplied by Oil Company	KL			2844.84									
7	Normative transit & Handling losses	KL												
8	Net Oil supplied (4-5)	KL			2844.84									
9	Amount charged by the Oil Company	(Rs)			150968654									
10	Adjustment (+ / -) in amount charged by Oil Company	(Rs)												
11	Total Amount charged (7+8)	(Rs)			150968654									
12	Transportation charges by Rail / Ship / Road Transport	(Rs)												
13	Adjustment (+/-) in amount charged by railways / transport company	(Rs)												
14	Demurrage charges, if any	(Rs)												
15	Cost of diesel in transporting Oil through MGR system, if applicable	(Rs)												
16	Total transportation charges (10+/- 11 - 12 + 13)	(Rs)												
17	Others- Entry Tax on oil	(Rs)												
18	Total amount charged for Oil supplied including transportation (14 + 15)	(Rs)			150968654									
19	Landed Cost of Oil	Rs/KL	54601.87	54601.87	53830.25	53830.25	53830.26	53830.26	53830.25	53830.26	53830.26	53830.26	53830.26	53830.25
21	Weighted average GCV of Oil	kCal/L	9770	9776	9770	9861	9874	9437	9379	9379	9789	9808	9843	9785
22	Weighted average rate of Secondary Fuel	Rs/KL	54601.87	54601.87	53830.25	53830.25	53830.26	53830.26	53830.25	53830.26	53830.26	53830.26	53830.26	53830.25

* Including opening stock

Weighted avg price of oil 53958.86
weighted avg GCV of oil 9705.92

PETITIONER

PART 1
FORM- L

Name of the Petitioner: NTPC Ltd
Name of the Generating Station: Vindhaychal STPS Stage-V(500 MW)

Statement of Capital cost
(To be given for relevant dates and year wise)

(Amount in Rs. Lakh)

S. No.	Particulars	As on 01.04.2024		
		Accrual Basis	Un-discharged Liabilities	Cash Basis
A	a) Opening Gross Block Amount as per books	326508.23	2684.72	323823.51
	b) Amount of IDC in A(a) above	19476.23	0.00	19476.23
	c) Amount of FC in A(a) above	0.00	0.00	0.00
	d) Amount of FERV in A(a) above	10046.53	0.00	10046.53
	e) Amount of Hedging Cost in A(a) above	0.00	0.00	0.00
	f) Amount of IEDC in A(a) above	0.00	0.00	0.00
B	a) Addition in Gross Block Amount during the period (Direct purchases)	To be provided at the time of truing-up		
	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 CWIP)			
	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)

PART 1
FORM- M

Name of the Petitioner: NTPC Ltd
Name of the Generating Station: Vindhaychal STPS Stage-V(500 MW)

Statement of Capital Woks in Progress

(To be given for relevant dates and year wise)

(Amount in Rs. Lakh)

S. No.	Particulars	01.04.2024		
		Accrual Basis	Un-discharged Liabilities	Cash Basis
A	a) Opening CWIP as per books	6675.08	1738.32	4936.76
	b) Amount of IDC in A(a) above	0.00		0.00
	c) Amount of FC in A(a) above	0.00		0.00
	d) Amount of FERV in A(a) above	0.00		0.00
	e) Amount of Hedging Cost in A(a) above	0.00		0.00
	f) Amount of IEDC in A(a) above	0.00		0.00
		To be provided at the time of truing-up		
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 FERV 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 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 CWIP 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 CWIP 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)

PART-I
FORM- N

Calculation of Interest on Normative Loan

Name of the Company :	**NTPC Limited**
Name of the Power Station :	**Vindhyachal Super Thermal power Station Stage-V**

(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	2,15,954.58	2,17,306.78	2,17,745.76	2,18,695.22	2,18,902.53	2,19,000.07
2	Cumulative repayment of Normative loan up to previous year	1,10,874.43	1,27,092.64	1,43,644.03	1,60,248.24	1,76,896.46	1,93,556.28
3	**Net Normative loan – Opening**	1,05,080.15	90,214.15	74,101.73	58,446.98	42,006.07	25,443.79
4	Add: Increase due to addition during the year / period	1352.20	438.97	949.46	207.31	97.54	-
5	Repayment adjustment on acount of decapitalization	265.04					
6	Less: Repayment of Loan	16,483.25	16,551.39	16,604.21	16,648.22	16,659.82	6,987.76
7	**Net Normative loan - Closing**	90,214.15	74,101.73	58,446.98	42,006.07	25,443.79	18,456.02
8	**Average Normative loan**	97,647.15	82,157.94	66,274.36	50,226.52	33,724.93	21,949.90
9	Weighted average rate of interest	7.7443	7.8987	8.2384	8.2829	8.3476	8.3432
10	**Interest on Loan**	**7562.09**	**6489.41**	**5459.96**	**4160.21**	**2815.23**	**1831.33**
11	Cumulative repayment of Normative loan at the end of the period	**1,27,357.68**	**1,43,644.03**	**1,60,248.24**	**1,76,896.46**	**1,93,556.28**	**2,00,544.05**

(Petitioner)

Computation of Energy Charges

Form-O(i)
ADDITIONAL FORM

Name of the Company : **NTPC LTD**
Name of the Power Station **VSTPS-V**

		2024-25	2025-26	2026-27	2027-28	2028-29
Installed Capacity		500	500	500	500	500
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	%	6.95	6.95	6.95	6.95	6.95
Heat Rate	Kcal/Kwh	2,347.61	2,347.61	2,347.61	2,347.61	2,347.61
Sp. Lime Stone Consumption	Kg/Kwh	0.0162	0.0162	0.0162	0.0162	0.0162
Computation of Variable Charges						
Variable Charge (Coal)	p/kwh	148.877	148.877	148.877	148.877	148.877
Variable Charge (Oil)	p/kwh	2.899	2.899	2.899	2.899	2.899
Variable Charge (Lime Stone)	p/kwh	2.803	2.803	2.803	2.803	2.803
Total	p/kwh	154.58	154.58	154.58	154.58	154.58

Computation of Fuel Expenses for Calculation of IWC:

ESO in a year	(MUs)	3464.25	3464.25	3464.25	3473.74	3464.25
ESO for 50 days	(MUs)	474.555	474.555	474.555	474.555	474.555
Cost of coal for 50 Days	(Rs. Lakh)	7065.03	7065.03	7065.03	7065.03	7065.03
Cost of oil for 2 months	(Rs. Lakh)	167.41	167.41	167.41	167.87	167.41
Cost of Lime Stone for 50 days	(Rs. Lakh)	133.02	133.02	133.02	133.02	133.02
Energy Expenses for 45 days	(Rs. Lakh)	6602.08	6602.08	6602.08	6602.08	6602.08

		2024-25	2025-26	2026-27	2027-28	2028-29
Wtd. Avg. Price of Coal	Rs./MT	2275.27	2275.27	2275.27	2275.27	2275.27
Wtd. Avg. GCV of Coal as received	kCal/Kg	3932.83	3932.83	3932.83	3932.83	3932.83
Wtd. Avg. GCV of Coal as received-85	kCal/Kg	3847.83	3847.83	3847.83	3847.83	3847.83
Wtd. Avg. Price of Secondary Fuel	Rs/KL	53958.86	53958.86	53958.86	53958.86	53958.86
Wtd. Avg. GCV of Secondary Fuel	kCal/L	9705.92	9705.92	9705.92	9705.92	9705.92
Wtd. Avg. Price of Lime Stone	Rs/MT	1610.00	1610.00	1610.00	1610.00	1610.00

Rate of Energy Charge from Sec. Fuel Oil/ Alternate Fuel	$(REC)_s = (Q_s)_p \times P_s$	p/kwh	2.70	2.70	2.70	2.70	2.70
Heat Contribution from SFO / Alternate Fuel	$(H_s) = (Qs)_p \times (GCV)_s$	kcal/kwh	4.85	4.85	4.85	4.85	4.85
Heat Contribution from coal	$= (Qs)_p \times (GCV)_s$ $(H_y) = GHR - H_s$	kcal/kwh	2,342.76	2,342.76	2,342.76	2,342.76	2,342.76
Specific Primary Fuel Consumption	$(Qp)_s = H_y / (GCV)_c$		0.609	0.609	0.609	0.609	0.609
Rate of Energy charge from Primary Fuel	$(REC)_c$	(p/kWh)	138.53	138.53	138.53	138.53	138.53
Rate of Energy Charge from lime stone		(p/kWh)	2.61	2.61	2.61	2.61	2.61
Rate of Energy charge ex-bus	$(REC) = ((REC)_s + (REC)LS / (1-(AUX))$	(p/kWh)	154.579	154.579	154.579	154.579	154.579

(Petitioner)

PART 1
FORM- O

Calculation of Interest on Working Capital

Name of the Company :	**NTPC Limited**
Name of the Power Station :	**Vindhyachal Super Thermal power Station Stage-V**

(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	7,335.49	7065.03	7065.03	7065.03	7065.03	7065.03
2	Cost of Main Secondary Fuel Oil	181.29	167.41	167.41	167.41	167.87	167.41
3	Cost of Lime stone	133.02	133.02	133.02	133.02	133.02	133.02
4	O & M Expenses	1,352.73	1341.39	1423.77	1506.62	1595.13	1688.48
5	Maintenance Spares	3,246.56	3219.34	3417.04	3615.89	3828.31	4052.35
6	Receivables	14,623.68	13965.59	13977.67	13954.41	13905.85	12738.12
7	Total Working Capital	26739.75	25891.78	26183.93	26442.38	26695.20	25844.40
8	Rate of Interest	12.0000	11.9000	11.9000	11.9000	11.9000	11.9000
9	**Interest on Working Capital**	**3208.77**	**3081.12**	**3115.89**	**3146.64**	**3176.73**	**3075.48**

Petitioner

PART 1
FORM-T

Summary of issue involved in the petition

Name of the Company :		NTPC Limited
Name of the Power Station :		Vindhyachal Super Thermal power Station Stage-V
1	Petitioner:	NTPC Limited
2	Subject	Approval of tariff of Vindhyachal STPS Stage-V (2X500 MW) for the period from 01.04.2024 to 31.03.2029
3	i)Approve tariff of VSTPS-V 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 based on auditor certificate, subject to true up. iv)Allow the recovery of pay/wage revision as additional O&M over and above the normative O&M. v)Pass any other order as it may deem fit in the circumstances mentioned above.	
4	Respondents SIX(6) no. respondents	
	Name of Respondents	
5	a.MSEDCL, Maharashtra b.GUVNL, Gujarat c.MPPMCL, Madhya Pradesh d. CSPDCL, Chhattisgarh e.Electricity Deptt, Goa f.DNHDDPDCL	

Project Scope	2024-25	2025-26	2026-27	2027-28	2028-29
Cost					
Commissioning					
Claim					
AFC (in Rs lakh)	59726.29	59824.22	59635.62	59404.03	49770.10
Capital cost (in Rs Lakh)	3,11,065.37	3,12,421.74	3,12,717.90	3,12,857.24	3,12,857.24
Initial spare	NA	NA	NA	NA	NA
NAPAF (Gen)	85%	85%	85%	85%	85%
Any Specific					

Petitioner

Justification for Additional Capitalization of "ClO2 System"

1. It is submitted that prior to installation of ClO2 System, Chlorine gas was 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 dozing system has been replaced by Chlorine Dioxide (**ClO2**) system, which is much safer and less hazardous than chlorine. In the ClO2 system, ClO2 is produced on site by use of commercial made HCI 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 underneath**). 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 thosuands 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 policy, it is submitted that the installation of ClO2 Plant is in accordance to various provisions of the said policy to ensure a safe workplace.

3. It is further submitted that installation of ClO2 system is 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

A copy of the said Code is **attached underneath.**

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-A, following major accidents due to leakage/explosion of

Chlorine gas in just a span of six years (from 2002 to 2006) have been documented:

i. 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 ClO2 Plant taken up by the Petitioner in place of earlier Chlorine dozing 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 (also **attached underneath)**.

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, 2019 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 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. In view of above submissions, it is submitted that the replacement of existing chlorine dosing system (which is highly hazardous) with ClO2 system (which is much safer), 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, 2019. Accordingly, Hon'ble Commission may be pleased to allow the additional capitalization of ClO2 Plant installation for the instant station under the said regulations and exercising the *Power to Relax* under the Regulation 76 of Tariff Regulations 2019.

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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रजिस्ट्री सं० डी० एल०—(एन)04/0007/2003—20 REGISTERED NO. DL—(N)04/0007/2003—20

भारत का राजपत्र
The Gazette of India

सी.जी.-डी.एल.-अ.-29092020-222112
CG-DL-E-29092020-222112

असाधारण
EXTRAORDINARY
भाग II — खण्ड 1
PART II — Section 1
प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं० 62] नई दिल्ली, मंगलवार, सितम्बर 29, 2020/ आश्विन 7, 1942 (शक)
No. 62] NEW DELHI, TUESDAY, SEPTEMBER 29, 2020/ASVINA 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

Short title, commencement and application.

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

(*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;

10 of 1949.

39 of 1989.

5 of 1970.

40 of 1980.

(*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,—

(*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

52 of 1961.

(*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 relatable 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 (*1*) of section 42;

(*zk*) "metro railway" means the metro railway as defined in sub-clause (*i*) of clause (*1*) of section 2 of the Metro Railways (Operation and Maintenance) Act, 2002; 60 of 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, hydraulicing, 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;

(*zs*) "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; 18 of 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;

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

(*zu*) "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;

(*zv*) "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;

(*zy*) "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.

(*zzb*) "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 (*l*) of the said section; 102 of 1956.

(*zzc*) "railway" means the railway as defined in clause (*31*) of section 2 of the Railways Act, 1989; 24 of 1989.

(*zzd*) "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;

(*zzl*) "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 likemedia 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

Registration of certain establishments.

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

(*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.

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

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.

(*2*) In the event of any contravention by any person whosoever 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.

Duties of architect, project engineer and designer.

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.

(*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 where 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.

Rights of employee.

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.

(*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.

Duty not to interfere with or misuse things.

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.

CHAPTER IV

OCCUPATIONAL SAFETY AND HEALTH

National Occupational Safety and Health Advisory Board.

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—

(*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.

Occupational safety and health standards.

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.

(*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.

18 of 2016.

Safety Committee and safety officers.

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.

(*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

Responsibility of employer for maintaining 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.

(*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

Welfare facilities in the establishment, etc.

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,—

(*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 creche 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

Daily and weekly working hours, leave, etc.

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

(*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.

Extra wages for overtime.

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:

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.

Night shifts.

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

(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.

Prohibition of overlapping shifts.

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.

(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.

Restriction on double employment in factory and mine.

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.

Notice of periods of work.

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.

(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 (*vi*) 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

Maintenance of registers, records and filing of 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,—

(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

Appointment of Inspector-cum-Facilitators.

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.

(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.

Powers of Inspector-cum-Facilitators.

35. (*1*) Subject to any rules made in this behalf, an Inspector-cum-Facilitator may—

(*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;

(*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:

14 of 1947.

(*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; 8 of 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.

(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.

Medical officer.

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:

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

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.

Adequate safety of employment of women in dangerous operation.

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.

CHAPTER XI

SPECIAL PROVISIONS FOR CONTRACT LABOUR AND INTER-STATE MIGRANT WORKER, ETC.

PART I

CONTRACT LABOUR

Applicability of this Part.

45. (*1*) This Part shall apply to—

(*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.

Procedure for issue or renewal of licence.

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.

(*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 section119 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.

No fees or commission or any cost to workers.

49. The contractor shall not charge directly or indirectly, in whole or in part, any fee or commission from the contract labour.

Information regarding work order to be given to the appropriate Government.

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.

(*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.

Revocation, suspension and amendment of licence.

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—

(*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-licenced 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.

Power to exempt in special cases.

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.

PART II

INTER-STATE MIGRANT WORKERS

Applicability of Part II.

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.

Facilities to inter-State migrant workers.

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—

(*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.

Journey allowance.

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.

Benefits of public distribution system, etc.

62. The appropriate Government shall make schemes to provide—

(*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;

(*ii*) wages and other benefits (including provident fund, if covered under the Employees' Provident Fund and Miscellaneous Provisions Act, 1952); 19 of 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:

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. 14 of 1947.

PART IV

MINES

Managers.

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:

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.

Code not to apply in certain cases.

68. (*1*) The provisions of this Code, except those contained in sections 35, 38, 40, 41 and 44, shall not apply to—

(*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.

Decision of question whether a mine is covered under this Code.

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.

PART V

BEEDI AND CIGAR WORKERS

Licence to industrial premises and person.

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.

(*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; 61 of 1986.

(*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

Prohibition of employment of certain persons in certain building or other construction work.

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.

PART VII

FACTORIES

Approval and licensing of factories.

79. (*1*) The appropriate Government may make rules in respect of factory or class or description of factories for—

(*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.

Liability of owner of premises in certain circumstances.

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.

Power to apply Code to certain premises.

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.

(*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.

Specific responsibility of the occupier in relation to hazardous processes.

85. Every occupier of a factory involving any hazardous process shall—

(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.

National Board to inquire into certain situations.

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.

(2) The recommendations of the National Board shall be advisory in the nature.

Emergency standards.

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.

(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

34 of 1948.

(*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.

Safety.

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.

(*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 clock 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.

Punishment for contravention of certain provisions.

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.

Punishment for falsification of records, etc.

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.

Penalty for omission to furnish plans, etc.

99. Any person who, without reasonable excuse the burden of proving which shall lies 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.

Punishment for disclosure of information.

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.

(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.

Offences by employees.

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.

(*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.

Prosecution of owner, agent or manager of mine.

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:

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.

Exemption of owner, agent or manager of mine or occupier of factory from liability in certain cases.

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—

(*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.

Power of officers of appropriate Government to impose penalty in certain cases.

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.

(*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.

Jurisdiction of court for entertaining proceedings, etc., for offence.

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.

Power of court to make orders.

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.

(*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.

Composition of certain offences.

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

2 of 1974.

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.

Onus as to age.

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.

(*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.

Onus of proving limits of what is practicable, etc.

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.

Common licence for contractor, factories and to industrial premises, 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.

(*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.

Jurisdiction of civil courts barred.

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.

Protection of action taken in good faith.

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.

(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.

Power to exempt in special cases.

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.

(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.

Power to exempt during public emergency.

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:

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 (*zb*) 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;

(*zzg*) 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;

(*zzq*) any other matter which is required to be, or may be, prescribed under this Code.

Power of Central Government to make rules.

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.

(*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;

(*zb*) 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.

Power of State Government to make rules.

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.

(*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 (*e*) 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;

(*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;

5 of 1908.

(*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;

4 of 1884.

(*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;

(*zza*) 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;

(*zzb*) 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;

(*zzc*) 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, retraceable 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.

(*4*) Without prejudice to the provisions of sub-section (*2*), provisions of section 6 of 10 of 1897. the General Clauses Act, 1897 shall apply to the repeal of such enactments.

THE FIRST SCHEDULE

[*See* section 2(*za*)]

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 produces (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, pallets 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 handing 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 handing coal of 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, retraceable 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(*l*)]

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. Beriyllium poisoning.

24. Carbon monoxide poisoning.

25. Coal miners' pneumoconiosis.

26. Phosgene poisoning.

27. Occupational cancer.

28. Isocyanates poisoning.

29. Toxic nephritis.

DR. G. NARAYANARAJU,
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UPLOADED BY THE MANAGER, GOVERNMENT OF INDIA PRESS, MINTO ROAD, NEW DELHI-110002
AND PUBLISHED BY THE CONTROLLER OF PUBLICATIONS, DELHI-110054.

MGIPMRND—875GI—29-09-2020.

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
National Disaster Management Authority
Government of India

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.

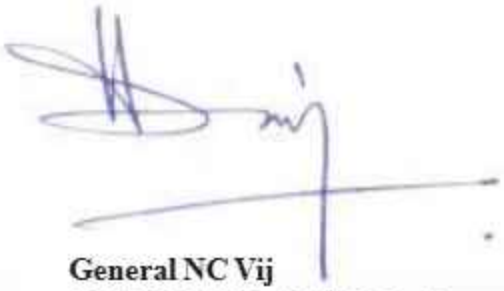
The work commenced with an Extended Group of approximately 60 experts, identifying 'the felt needs' and determining the critical objectives. A Core Group of 8 members, constituted out of this group, thereafter, prepared draft guidelines taking into account the operational, administrative, financial and 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

Contd.

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
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National Disaster Management Authority
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ACKNOWLEDGEMENTS

I am thankful to the Core Group Members for their untiring efforts in helping the NDMA in the formulation of the National Guidelines on Chemical Disaster Management. I would like to place on record the significant contribution made by the Ministry of Environment and Forests, New Delhi and National Safety Council, Mumbai for helping in designing the format of the document and providing lots of technical inputs from time-to-time. The Disaster Management Institute, Bhopal also deserves special recognition for providing inputs related to On-Site and Off-Site emergency plans.

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.

The efforts of Dr. Rakesh Kumar Sharma, Scientist 'F' and Additional Director, Defence Research Laboratory, Tezpur, Assam, and Dr. Raman Chawla, Senior Research Officer, NDMA, in providing knowledge-based technical inputs to the core group, are highly appreciated. Thanks are also due to Mr. Rubaab Sood and the secretarial staff of the NDMA including Mr. Deepak Sharma and Mr. D.K. Ray for their dedicated work during the convening of various workshops, meeting and preparation of the final document.

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 safely 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.

1 Introduction

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.

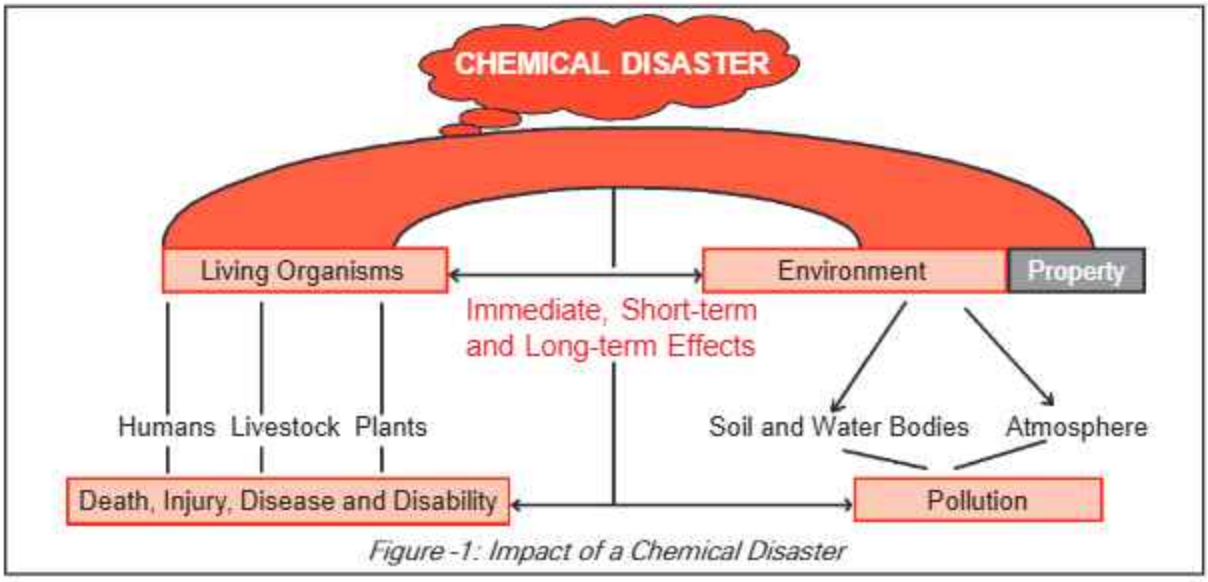

Figure -1: Impact of a Chemical Disaster

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.

2 Present Status and Context

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.

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 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.

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 & F, MoSRT & H, Ministry of Commerce and Industry (MoC & I), Department of Economic Affairs (DEA), Ministry of Finance (MoF), and others (Figure 2).

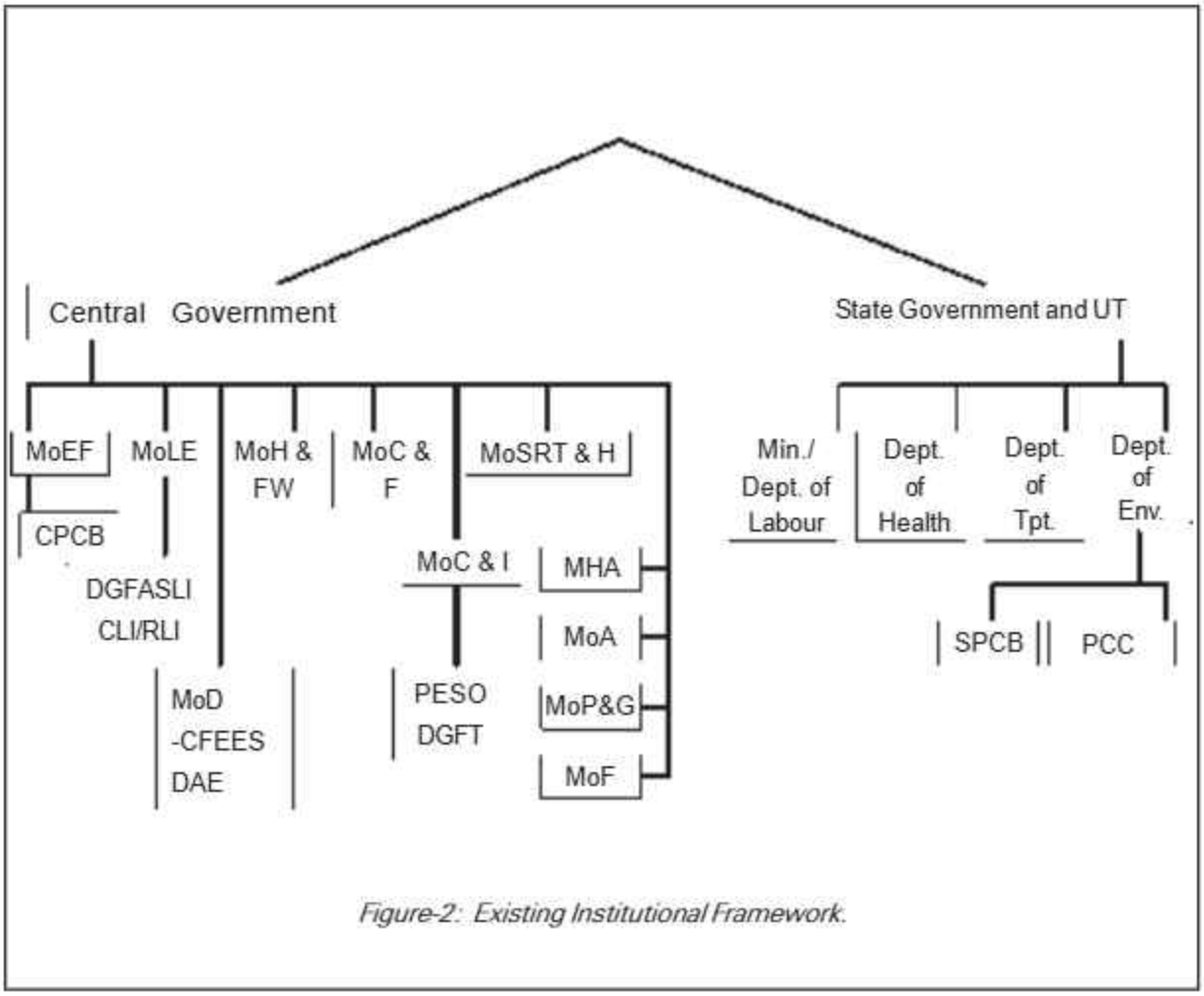

Figure-2: Existing Institutional Framework.

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 (Maharastra), 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), Maharastra (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 DDMAs.

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.

3 Salient Gaps

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 man power, 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 statues, 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 Manufactures' 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, upgradation 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 schedule[1] to the MSIHC rules, 1989, as amended till date and in the form of a guideline[2] 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 over-looked 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.

6 Guidelines for Transport Accidents

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 (TREMCARD) 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-op 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 Ghiselenghein (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 stake holders/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, SDMAs and DDMAs, 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/SDMAs 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 SDMAs need to designate officers in-charge of CDM safety matters. Recognising the enormity and criticality of CDM, the SDMAs 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 SDMAs 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 pro-active 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.

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.

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.

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.

Annexures

Annexure-A

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, Amla, 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.	Shyamlal 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., Sanathnagarn, 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/nll
22.	Kanoria Chemicals and Industries Ltd. Renukoot, Sonebhadra, 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 vaccum gas oil catches fire in air	2/nil/nil

Annexure-B

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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Contd

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).

Annexure –D

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.

Annexure –E

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.

Annexure-F

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.).

Contd

Contd

- 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.

Annexure-G

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.

Annexure-H

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.

Annexure-I

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.

Annexure-J

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

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Produced by: Magnum Books Pvt.Ltd, info@magnumbooks.org
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रजिस्ट्री सं. डी.एल.- 33004/99 REGD. No. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

सी.जी.-डी.एल.-अ.-01012022-232336
CG-DL-E-01012022-232336

असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 5075] नई दिल्ली, शुक्रवार, दिसम्बर 31, 2021/पौष 10, 1943
No. 5075] NEW DELHI, FRIDAY, DECEMBER 31, 2021/PAUSHA 10, 1943

पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय

अधिसूचना

नई दिल्ली, 31 दिसम्बर, 2021

का.आ. 5481(अ).—केन्द्रीय सरकार ने भारत सरकार के तत्कालीन पर्यावरण और वन मंत्रालय की अधिसूचना सं. का.आ. 763 (अ) तारीख 14 सितम्बर, 1999 द्वारा कोयला या लिग्नाइट आधारित ताप विद्युत संयंत्रों से तीन सौ किलोमीटर के विनिर्दिष्ट व्यास के भीतर ईंटों के विनिर्माण के लिए उपजाऊ मिट्टी के उत्खनन को प्रतिबंधित करने के लिए और भवन निर्माण सामग्री के विनिर्माण में और संनिर्माण क्रियाकलाप में फ्लाई-राख के उपयोग को बढ़ावा देने के लिए निदेश जारी किए हैं;

और, प्रदूषणकर्ता भुगतान सिद्धांत (पीपीपी) के आधार पर, ऐसा करके कोयला या लिग्नाइट आधारित ताप विद्युत संयंत्रों द्वारा फ्लाई-राख का 100 प्रतिशत उपयोग सुनिश्चित करते हुए और फ्लाई-राख प्रबंधन प्रणाली की संधारणीयता के लिए पूर्वोक्त अधिसूचना को और अधिक प्रभावकारी ढंग से कार्यान्वित करने हेतु, केंद्रीय सरकार ने मौजूदा अधिसूचना की समीक्षा की;

और प्रदूषणकर्ता भुगतान सिद्धांत के आधार पर पर्यावरणीय प्रतिकर निर्धारित किए जाने की आवश्यकता है;

और, विनिर्माण को बढ़ावा देकर तथा निर्माण कार्य के क्षेत्र में राख आधारित उत्पादों तथा भवन निर्माण सामग्रियों के प्रयोग को अनिवार्य करके उपजाऊ मिट्टी को संरक्षित करने की आवश्यकता है;

और, सड़क बनाने, सड़क एवं फ्लाई ओवर के रेलिंग बनाने, तटरेखा की सुरक्षा का उपाय करने, अनुमोदित परियोजनाओं के निचले क्षेत्रों को भरने, खनित स्थलों को फिर से भरने में मिट्टी की सामग्रियों से भरने के विकल्प के रूप में राख उपयोग को बढ़ावा देकर उपजाऊ मिट्टी और प्राकृतिक संसाधनों को संरक्षित करने की आवश्यकता है;

और, पर्यावरण को सुरक्षित करना तथा कोयला अथवा लिग्नाइट आधारित ताप विद्युत संयंत्रों से सृजित फ्लाई राख के निक्षेपण तथा निपटान की रोकथाम करना आवश्यक है;

और, उक्त अधिसूचना में जो 'राख' शब्द का प्रयोग किया गया है उसमें कोयला या लिग्नाइट आधारित ताप विद्युत संयंत्रों से सृजित फ्लाई-राख और बॉटम-राख दोनों शामिल हैं;

और, केंद्रीय सरकार प्रदूषणकर्ता भुगतान सिद्धांत के आधार पर, पर्यावरणीय प्रतिकर की प्रणाली सहित राख के उपयोग के लिए एक व्यापक ढांचा लाना चाहती है;

अत: पर्यावरण (संरक्षण) नियम, 1986 के नियम (5) के उप-नियम (3) के खंड (घ) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3 की उप-धारा (1) और उप-धारा (2) के खंड (v) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, भारत सरकार के पर्यावरण एवं वन मंत्रालय की अधिसूचना जो का.आ. 763 (अ) तारीख 14 सितम्बर, 1999 द्वारा भारत के राजपत्र, असाधारण भाग ।।, खंड 3, उप खंड (i) में प्रकाशित का अधिक्रमण करते हुए, कोयला या लिग्नाईट आधारित ताप विद्युत संयंत्रों द्वारा राख के उपयोग के संबंध में प्रारूप अधिसूचना जो सा.का.नि. 285 (अ) तारीख 22 अप्रैल, 2021 द्वारा भारत के राजपत्र, असाधारण, भाग-2, धारा 3, उप धारा (i) में प्रकाशित की गई थी जिसमें उन सभी व्यक्तियों से जिनका इससे प्रभावित होना सामान्य है उस तारीख से, जिसको उक्त प्रारूप उपबंधों की शासकीय राजपत्र में अंतर्विष्ट प्रतियां जनता को उपलब्ध करा दी गई थी, साठ दिनों के अवसान से पूर्व आक्षेप और सुझाव आमंत्रित किए गए थे।

और उक्त प्रारूप अधिसूचना के संबंध में उससे संभावित तौर पर प्रभावित होने वाले सभी व्यक्तियों से प्राप्त आक्षेपों और सुझावों पर केंद्रीय सरकार द्वारा सम्यक रूप से विचार कर लिया गया है;

अत: पर्यावरण (संरक्षण) नियम, 1986 के नियम (5) के उप-नियम (3) के खंड (घ) के साथ पठित पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 3 की उप-धारा (1) और उप-धारा (2) के खंड (v) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए और अधिसूचना का.आ. 763 (अ) तारीख 14 सितम्बर, 1999 का उन बातों के सिवाय अधिकांत करते हुए जिन्हें ऐसे अधिक्रमण से पूर्व किया गया है या करने का लोप किया गया है, केन्द्रीय सरकार कोयलों या लिग्नाईट आधारित ताप विद्युत संयंत्रों से राख के उपयोग के संबंध में निम्नलिखित अधिसूचना जारी करती है, जो इस अधिसूचना के प्रकाशन की तिथि से प्रवृत्त होगी, अर्थात्

क. फ्लाई-राख और बॉटम-राख का निपटान करने हेतु ताप विद्युत संयंत्रों (टीपीपी) के उत्तरदायित्व.-

(1) प्रत्येक कोयला या लिग्नाइट आधारित ताप विद्युत संयंत्र (जिनमें कैप्टिव और/या सह-उत्पादन केंद्र शामिल हैं या दोनों) की यह प्राथमिक जिम्मेदारी होगी कि वह अपने द्वारा सृजित राख (फ्लाई-राख और बॉटम-राख) का उप पैरा (2) में दिए गए पारि-अनुकूल तरीके से 100 प्रतिशत उपयोग सुनिश्चित करे;

(2) कोयला या लिग्नाइट आधारित ताप विद्युत संयंत्रों से सृजित राख का उपयोग केवल निम्नलिखित पारि-अनुकूल प्रयोजनों के लिए किया जाएगा, अर्थात्:-

(i) फ्लाई राख पर आधारित उत्पाद अर्थात्: ईट ब्लॉक टाइल, फाइबर सीमेंट शीट, पाइप, बोर्ड, पैनल का विनिर्माण;

(ii) सीमेंट विनिर्माण, रेडी-मिक्स कंक्रीट;

(iii) सड़क निर्माण और फ्लाई-ओवर के रेलिंग का निर्माण, राख और जिओ-पॉलीमर आधारित निर्माण सामग्री;

(iv) बांध का निर्माण;

(v) निचले क्षेत्र को भरना;

(vi) खनन कार्य से रिक्त हुए स्थान को भरना;

(vii) सिंटर्ड या शीत–बद्ध राख संचय का विनिर्माण;

(viii) मृदा परीक्षण के आधार पर नियंत्रित तरीके से कृषि;

(ix) तटीय जिलों में तटरेखा संरक्षण संरचनाओं का निर्माण;

(x) अन्य देशों को राख का निर्यात;

(xi) समय-समय पर यथाधिसूचित किसी अन्य पारि-अनुकूल प्रयोजन के लिए।

(3) अध्यक्ष, केंद्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) की अध्यक्षता में एक समिति गठित की जाएगी जिसमें पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय (एमओईएफसीसी), विद्युत मंत्रालय, खान मंत्रालय, कोयला मंत्रालय, सड़क परिवहन और राजमार्ग मंत्रालय, कृषि अनुसंधान एवं शिक्षा विभाग, सड़क कांग्रेस संस्थान तथा राष्ट्रीय सीमेंट एवं भवन सामग्री परिषद के प्रतिनिधियों को सदस्यों के रूप में शामिल किया जाएगा, जिसका प्रयोजन राख के उपयोग के पारि-अनुकूल तौर-तरीकों की जांच करना, उनकी समीक्षा एवं अनुशंसा करना तथा प्रौद्योगिकीय विकासों तथा पणधारी से प्राप्त अनुरोधों के आधार पर उप-पैरा (2) में यथोल्लिखित ऐसे तौर-तरीकों की सूची में समिति द्वारा सुझाए गए तौर-तरीकों को शामिल करना या किसी तौर-तरीके को सूची से हटाना या उसमें संशोधन करना है। जब भी इस प्रयोजन के लिए अपेक्षित हो, यह समिति राज्य प्रदूषण नियंत्रण बोर्ड या प्रदूषण नियंत्रण समिति, ताप विद्युत संयंत्र और खानों के प्रचालकों को आमंत्रित कर सकती है। इस समिति सिफारिश के आधार पर, पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय ऐसे पारि-अनुकूल प्रयोजन प्रकाशित करेगा।

(4) प्रत्येक कोयला या लिग्नाइट आधारित ताप विद्युत संयंत्र उस वर्ष के दौरान सृजित राख (फ्लाई-राख और बॉटम-राख) का 100 प्रतिशत उपयोग करने हेतु उत्तरदायी होगा; तथापि, किसी भी स्थिति में, किसी वर्ष में राख का उपयोग 80 प्रतिशत से नीचे नहीं होगा और साथ ही, उस ताप विद्युत संयंत्र को तीन वर्ष की अवधि में 100 प्रतिशत औसत राख के उपयोग का लक्ष्य प्राप्त करना होगा :

परंतु, यह और कि पहली बार के लिए लागू तीन वर्ष के चक्र को ऐसे ताप विद्युत संयंत्रों, जहां राख का उपयोग 60-80 प्रतिशत के बीच होता है, एक वर्ष के लिए और ऐसे संयंत्रों, जहां राख का उपयोग 60 प्रतिशत से कम है, दो वर्ष के लिए बढ़ाया जा सकता है, और राख के उपयोग की प्रतिशतता की गणना के प्रयोजन के लिए वर्ष 2021-2022 में उपयोग की प्रतिशत प्रमात्रा को नीचे दी गई तालिका के अनुसार ध्यान में रखा जाएगा:

तापीय विद्युत संयंत्रों के उपयोग की प्रतिशतता	100 प्रतिशत उपयोगिता प्राप्त करने के लिए प्रथम अनुपालन चक्र	100 प्रतिशत उपयोगिता प्राप्त करने के लिए द्वितीय अनुपालन चक्र
>80 प्रतिशत	3 वर्ष	3 वर्ष
60-80 प्रतिशत	4 वर्ष	3 वर्ष
<60 प्रतिशत	5 वर्ष	3 वर्ष

परन्तु, ताप विद्युत संयंत्रों के लिए 80 प्रतिशत न्यूनतम उपयोग प्रतिशतता, क्रमश: 60-80 प्रतिशत और <60 प्रतिशत की उपयोगिता की श्रेणी के तहत आने वाले ताप विद्युत संयंत्रों के लिए प्रथम अनुपालन चक्र के पहले वर्ष और पहले दो वर्षों पर लागू नहीं होगी।

परन्तु, अनुपालन चक्र के अंतिम वर्ष में सृजित 20 प्रतिशत राख को अगले चक्र में भी ले जाया जाएगा जिसका उपयोग उस अनुपालन चक्र के दौरान सृजित राख के साथ अगले तीन वर्षों में किया जाएगा।

(5) अप्रयुक्त संचित राख अर्थात् लीगेसी राख, जिसका इस अधिसूचना के प्रकाशन से पहले भंडारण किया गया है, को ताप विद्युत संयंत्र (टीपीपी) द्वारा इस रीति से क्रमिक रूप से उपयोग में लाया जाएगा, कि लीगेसी राख को इस अधिसूचना के प्रकाशन की तिथि से दस वर्षों के भीतर पूरी तरह उपयोग कर लिया जाएगा और यह उस विशिष्ट वर्ष के चालू संचालनों के माध्यम से राख उत्सर्जन के लिए निर्धारित उपयोग लक्ष्यों से अतिरिक्त होगा।

परन्तु, निम्नलिखित प्रतिशतताओं में यथा उल्लिखित लीगेसी राख की न्यूनतम मात्रा का उपयोग तात्स्थानी वर्ष के दौरान कर लिया जाएगा और लीगेसी राख की न्यूनतम मात्रा की ताप विद्युत संयंत्र की संस्थापित क्षमता के अनुसार वार्षिक राख उत्सर्जन के आधार पर की जानी है।

प्रकाशन की तिथि से वर्ष	पहला	दूसरा	तीसरा-दसवां
लीगेसी राख का उपयोग (वार्षिक राख की प्रतिशतता)	कम से कम 20 प्रनिशत	कम से कम 35 प्रतिशत	कम से कम 50 प्रतिशत

परन्तु, यह और कि लीगेसी राख का उपयोग वहां अपेक्षित नहीं है, जहां राख के तालाब या डाइक स्थिर हो गए हैं और हरित पट्टी के निर्माण या पौध रोपण से पुनरूद्धार किया गया है और संबंधित राज्य प्रदूषण नियंत्रण बोर्ड इस संबंध में प्रमाणित करेगा। किसी राख तालाब या डाइक के स्थिरीकरण और भूमि-उद्धार का कार्य, जिसमें केन्द्रीय प्रदूषण नियंत्रण बोर्ड या राज्य प्रदूषण नियंत्रण बोर्ड द्वारा प्रमाणन शामिल है, इस अधिसूचना के प्रकाशन की तारीख से एक वर्ष के भीतर किया जाएगा। अन्य सभी राख के कुंड या डाइक में शेष बचे राख का उपयोग ऊपर उल्लिखित समय-सीमाओं के अनुसार क्रमिक रूप से किया जाएगा।

टिप्पण: राख के उपयोग के लक्ष्यों को हासिल करने के लिए उप पैरा (4) और (5) के अधीन दायित्व 01 अप्रैल, 2022 की तारीख से लागू होंगे।

(6) किसी भी नए तापीय विद्युत संयंत्र (टीपीपी) में 0.1 हेक्टेयर प्रति मेगावाट (एमडब्ल्यू) क्षेत्रफल के साथ आपातकालीन या अस्थायी राख कुंड की अनुमति दी जा सकती है। राख के तालाब या डाइकों का तकनीकी विनिर्देश, केन्द्रीय विद्युत प्राधिकरण (सीईए) के परामर्श से केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा बनाए गए दिशानिर्देशों के अनुसार होगा और ये दिशानिर्देश राख के कुंड या डाइक के संबंध में इसकी सुरक्षा, पर्यावरणीय प्रदूषण, उपलब्ध प्रमात्रा, निपटान का तरीका, निपटान में जल की खपत या संरक्षण, राख जल पुनर्चक्रण और ग्रीन बेल्ट आदि के वार्षिक प्रमाणन के लिए कार्यविधि भी निर्धारित करेंगे और इस अधिसूचना के प्रकाशन की तारीख से तीन महीनों के भीतर प्रस्तुत किए जाएंगे।

(7) प्रत्येक कोयला या लिग्नाईट आधारित ताप विद्युत संयंत्र यह सुनिश्चित करेगा कि राख की लदाई, उतराई, ढुलाई, भंडारण और निपटान पर्यावरणीय दृष्टि से अनुकूल रीति से किया गया है और वायु और जल प्रदूषण की रोकथाम के लिए सभी ऐहितयात किए गए हैं और इस संबंध में स्थिति की सूचना इस अधिसूचना में संलग्न अनुबंध में संबंधित राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) को दी जाएगी।

(8) प्रत्येक कोयला या लिग्नाइट आधारित तापीय विद्युत संयंत्र, संस्थापित क्षमता पर आधारित राख के कम से कम 16 घंटों के भंडारण के लिए समर्पित शुष्क फ्लाई राख साइलोस प्रतिष्ठापित करेगा, जिनके पास पृथक पहुंच मार्ग होंगे, जिससे कि राख पहुंचाने के कार्य को सुगम बनाया जा सके। इसकी सूचना संबंधित राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) को उपाबंध में दी जाएगी और केन्द्रीय प्रदूषण नियंत्रण

बोर्ड (सीपीसीबी) या राज्य केन्द्रीय प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति द्वारा समय-समय पर निरीक्षण किया जाएगा।

(9) प्रत्येक कोयला या लिग्नाईट आधारित तापीय विद्युत संयंत्र (जिसके अंतर्गत कैप्टिव या सह उत्पादन केन्द्र भी है या दोनों), वास्तविक उपयोगकर्ता (उपयोगकर्ताओं) के हित के लिए केन्द्रीय प्रदूषण नियंत्रण बोर्ड के वेब पोर्टल या मोबाईल फोन एप्प का लिंक उपलब्ध कराकर ताप विद्युत संयंत्र के पास राख की उपलब्धता के वास्तविक आंकड़े प्रदान करेगा।

(10) राख के 100 प्रतिशत उपयोग का वैधानिक दायित्व, जहां भी लागू हो, विधि में बदलाव के रूप में माना जाएगा।

ख. राख के उपयोग के प्रयोजनार्थ, उत्तरवर्ती उप पैराग्राफ लागू होंगे .-

(1) ऐसे सभी अभिकरण (सरकारी, अर्द्धसरकारी और निजी), जो सड़क बिछाने, सड़क और फ्लाई ओवर के किनारों, तटीय जिलों में तटरेखा की सुरक्षा संरचनाओं और लिग्नाईट या कोयला आधारित ताप विद्युत संयंत्र से 300 किमी के भीतर बांधों जैसे निर्माण संबंधी कार्यकलापों में लगे हुए हैं, इन कार्यकलापों में अनिवार्य रूप से राख का उपयोग करेंगे :

परंतु इसको परियोजना स्थल पर निशुल्क पहुंचाया जाए और परिवहन लागत, ऐसे कोयला या लिग्नाईट आधारित ताप विद्युत संयंत्रों द्वारा वहन की जाए।

परंतु यह और कि ताप विद्युत संयंत्र पारस्परिक सहमत हुई शर्तों के अनुसार राख की लागत और परिवहन के लिए शुल्क ले सकता है उस मामले में जहां ताप विद्युत संयंत्र अन्य माध्यम से राख का निपटान करने में समर्थ है और ये अभिकरण इसके लिए प्रर्थाना कर सकते हैं और बिना लागत और बिना परिवहन शुल्क के राख उपलब्ध कराने के प्रावधान तभी लागू होंगे यदि उसके लिए ताप विद्युत संयंत्र उस निर्माण अभिकरण को नोटिस जारी करता है।

(2) उक्त कार्यकलापों में राख का उपयोग भारतीय मानक ब्यूरो, भारतीय रोड कांग्रेस, केन्द्रीय भवन अनुसंधान संस्थान, रूड़की, केन्द्रीय सड़क अनुसंधान संस्थान, दिल्ली, केन्द्रीय लोक निर्माण विभाग, राज्य लोक निर्माण विभागों और अन्य केन्द्रीय और राज्य सरकार के अभिकरणों द्वारा निर्धारित किए गए विनिर्देशों और दिशानिर्देशों के अनुसार किया जाएगा।

(3) तापीय विद्युत संयंत्र की 300 किलोमीटर की परिधि के भीतर अवस्थित सभी खानों के लिए विस्तारित उत्पादक उत्तरदायित्व (ईपीआर) के तहत खुली आवर्त खानों में राख का पृष्ठ भंडारण करना या अधिक भार के ढेरों के साथ राख का मिश्रण करना बाध्यकारी होगा। सभी खान के स्वामी या प्रचालक (चाहे सरकारी, सार्वजनिक और निजी क्षेत्र के हो) कोयला या लिग्नाईट आधारित तापीय विद्युत संयंत्रों से तीन सौ किलोमीटर (सड़क द्वारा) के भीतर, महानिदेशक, खान सुरक्षा (डीजीएमएस) के दिशानिर्देशों के अनुसार ओवर बर्डन के बाह्य निक्षेप खान की बैकफिलिंग अथवा स्टोविंग (प्रचालित या छोड़ी गई खानों, जैसा भी मामला हो) के लिए उपयोग की गई सामग्रियों के भार-दर-भार के आधार पर कम से कम 25 प्रतिशत राख को मिश्रित करने के लिए उपाय करेंगे :

परंतु ऐसे तापीय विद्युत केन्द्र नि:शुल्क राख प्रदान करके और परिवहन की लागत को वहन करके या पारस्परिक सहमत हुई शर्तों पर लिए गए निर्णय के अनुसार लागत या परिवहन व्यवस्था करके राख की अपेक्षित मात्रा की उपलब्धता को सुकर बनायेंगे और खानों के खाली स्थानों और ढेरो में अधिकभार के साथ राख को मिश्रित करना, सृजित अधिभार के लिए इस अधिसूचना के प्रकाशन की तिथि से लागू होगा और उक्त कार्यकलापों में राख का उपयोग, केंद्रीय प्रदूषण नियंत्रण बोर्ड, महानिदेशक खान सुरक्षा और भारतीय खदान ब्यूरो द्वारा निर्धारित दिशा-निर्देशों के अनुसार किया जाएगा।

स्पष्टीकरण .- इस उप-पैरा के प्रयोजन के लिए यह भी स्पष्ट किया जाता है कि लागत मुक्त राख और नि:शुल्क परिवहन के उपबंध केवल तभी लागू होंगे यदि ताप विद्युत संयंत्र इसके लिए खान मालिक को नोटिस देते हैं और अधिभार वाले ढेर के साथ मिश्रित करने और खान में खाली स्थान को भरने के लिए राख के 25 प्रतिशत हिस्से के उपयोग का अधिदेश तब तक लागू नहीं होगा जब तक कि ताप विद्युत संयंत्र द्वारा खान मालिक को नोटिस न दिया गया हो।

(5) (i) सभी खान मालिकों को खान में खाली स्थानों में राख को समायोजित करने के लिए खान बंद योजना (प्रगामी और अंतिम) तैयार करनी होगी और खान में खाली स्थान में राख के निपटान और अधिभार वाले ढेर के साथ राख को मिश्रित करने के लिए खान योजनाओं को संबंधित प्राधिकारी अनुमोदित करेगा। पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय द्वारा ताप विद्युत संयंत्रों और कोयला खदानों की पर्यावरणीय मंजूरी की अपेक्षा से छूट देने के साथ-साथ ऐसे निपटान के लिए अपनाए जाने वाले दिशानिर्देशों के संबंध में तारीख 28 अगस्त, 2019 को दिशानिर्देश जारी किए गए।

(ii) मंत्रालय, केन्द्रीय प्रदूषण नियंत्रण बोर्ड, महानिदेशक, खान सुरक्षा (डीजीएमएस) और भारतीय खान ब्यूरो (आईबीएम) के साथ परामर्श करके, खानों में खाली स्थानों में राख के निपटान करने तथा अधिभार वाले ढेरों में इसे मिश्रित करना सुगम बनाने के लिए समय-समय पर आगे भी दिशानिर्देश जारी कर सकता है और यह खान मालिकों की जिम्मेदारी होगी कि वे ऐसी खानों को अभिज्ञात करने की तिथि से एक वर्ष के भीतर विभिन्न विनियामक प्राधिकरणों द्वारा जारी की गई अनुमतियों में आवश्यक संशोधन या परिवर्तन प्राप्त करेंगे।

(6) (i) पर्यावरणीय प्रदूषण के संदर्भ में सुरक्षा, व्यवहार्यता (आर्थिक व्यवहार्यता नहीं) और पहलुओं की जांच सहित राख से खान में खाली स्थान को वापस भरने/अधिभार वाले ढेर के साथ राख को मिश्रित करने के लिए खानों की पहचान करने के लिए पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, विद्युत मंत्रालय, खान मंत्रालय, कोयला मंत्रालय, महानिदेशक खान सुरक्षा और भारतीय खान ब्यूरो से प्रतिनिधियों को शामिल करते हुए अध्यक्ष, केन्द्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) की अध्यक्षता में एक समिति का गठन किया जाएगा और यह समिति पणधारी मंत्रालयों या विभागों के लिए अभिज्ञात खानों (भूमिगत और खुली, दोनों) के संबंध में तैयार की गई तिमाही रिपोर्टों को अद्यतन करेगी और यह समिति, इस अधिसूचना के प्रकाशन के तुरंत पश्चात उपयुक्त खानों की पहचान करना आरंभ करेगी।

(ii) ताप विद्युत संयंत्र या खानें, उपरोक्त अनुसार अधिदेशित उपयोग लक्ष्यों को पूरा करने के लिए उपर्युक्त समिति द्वारा पहचान किए जाने तक राख के निपटान हेतु प्रतीक्षा नहीं करेंगी।

(7) राख से निचले क्षेत्र को भरने का कार्य, अनुमोदित परियोजनाओं के लिए राज्य प्रदूषण नियंत्रण बोर्ड की पूर्व अनुमति से और केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा निर्धारित दिशा-निर्देशों के अनुसार किया जाएगा और राज्य प्रदूषण नियंत्रण बोर्ड या प्रदूषण नियंत्रण समिति द्वारा अनुमोदित स्थलों, अवस्थान, क्षेत्र और अनुमत मात्रा को अपनी वेबसाइट पर प्रतिवर्ष प्रकाशित किया जाएगा।

(8) केन्द्रीय प्रदूषण नियंत्रण बोर्ड, संगत पणधारी के साथ मिलकर, राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) द्वारा अनुमति प्रदान करने के लिए समयबद्ध ऑनलाइन आवेदन प्रक्रिया प्रस्तुत करने के साथ-साथ इस अधिसूचना के अधीन परिकल्पित सभी प्रकार के कार्यकलापों के लिए एक वर्ष के भीतर दिशानिर्देश प्रस्तुत करेगा।

(9) कोयला या लिग्नाइट आधारित तापीय ऊर्जा संयंत्र से तीन सौ किलोमीटर के दायरे में स्थित सभी भवन निर्माण परियोजनाएं (केंद्रीय, राज्य और स्थानीय प्राधिकरणों सरकारी उपक्रमों, अन्य सरकारी अभिकरणों तथा सभी निजी अभिकरणों) राख की ईंटों, टाईल्स, धातुमल राख अथवा अन्य राख आधारित उत्पादों का उपयोग करेंगी बशर्ते कि वे वैकल्पिक उत्पादों की कीमत से अधिक कीमत पर उपलब्ध न हो।

(10) राख आधारित उत्पादों के विनिर्माण और ऐसे उत्पादों में राख के उपयोग में भारतीय मानक ब्यूरो, भारतीय सड़क कांग्रेस और केंद्रीय प्रदूषण नियंत्रण बोर्ड द्वारा निर्धारित विनिर्देशों और दिशानिर्देशों की अनुपालना होगी।

ग. गैर-अनुपालन के लिए पर्यावरणीय प्रतिकर .-

(1) तीन वर्ष के चक्र के प्रथम दो वर्षों में, यदि कोयला या लिग्नाइट आधारित तापीय ऊर्जा संयंत्र (कैप्टिव और/ या सह-उत्पादक स्टेशनों या दोनों सहित) ने कम-से-कम 80 प्रतिशत राख (फ्लाई-राख और बॉटम-राख) उपयोग नहीं की है तो ऐसे गैर-अनुपालन ताप विद्युत संयंत्रों पर प्रस्तुत की गई वार्षिक रिपोर्टों के आधार पर वित्तीय वर्ष के

अंत में अप्रयुक्त राख पर 1000 रुपए प्रति टन की दर से पर्यावरणीय प्रतिकर लगाया जाएगा और यदि यह तीन वर्ष के चक्र के तीसरे वर्ष में 100 प्रतिशत राख का उपयोग करने में असमर्थ रहता है, तो वह अप्रयुक्त मात्रा पर 1000 रुपए प्रति टन की दर से पर्यावरणीय प्रतिकर के भुगतान का पात्र होगा, जिस पर पहले पर्यावरणीय प्रतिकर नहीं लगायी गयी है।

परंतु पर्यावरणीय प्रतिकर को पैरा क के उप-पैरा (4) में उल्लिखित विभिन्न उपयोगी श्रेणियों के अनुसार प्रथम अनुपालन चक्र के अंतिम वर्ष के अंत में अनुमान लगाया जाएगा और अधिरोपित किया जाएगा।

(2) अधिकारियों द्वारा एकत्रित पर्यावरणीय प्रतिकर को केन्द्रीय प्रदूषण नियंत्रण बोर्ड के निर्दिष्ट खाते में जमा किया जाएगा।

(3) लैगेसी राख के मामले में, यदि कोयला या लिग्नाइट आधारित तापीय ऊर्जा संयंत्र (कैप्टिव या सह-उत्पादक स्टेशनों या दोनों सहित) ने स्थापित क्षमता पर आधारित उत्पन्न राख का कम-से-कम 20 प्रतिशत (प्रथम वर्ष के लिए), 35 प्रतिशत (द्वितीय वर्ष के लिए), 50 प्रतिशत (तीसरे से दसवें वर्ष तक) उपयोग के बराबर लक्ष्य प्राप्त नहीं किया है तो उस वित्तीय वर्ष के दौरान अप्रयुक्त लैगेसी राख पर 1000 रुपए प्रति टन की दर से पर्यावरणीय प्रतिकर लगाया जाएगा और यदि 10 वर्ष के अंत में लैगेसी राख का उपयोग नहीं किया जाता है तो 1000 रुपए प्रति टन की दर मे शेष अप्रयुक्त मात्रा पर पर्यावरणीय प्रतिकर लगाया जाएगा जिस पर पहले पर्यावरणीय प्रतिकर नहीं लगाया गया है।

(4) अधिकृत खरीददारों या उपभोक्ता अभिकरणों तक राख भेजने की जिम्मेदारी परिवाहकों या वाहन मालिक की जिम्मेदारी है और यदि इसका अनुपालन नहीं किया जाता है, तो अनधिकृत उपयोगकर्ताओं अथवा गैर-अधिकृत उपयोगर्ताओं को ऐसी मात्रा गलत तरीके से वितरित करने पर 1500 रूपए प्रति टन की दर से पर्यावरणीय प्रतिकर लगायी, इसके अतिरिक्त राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) द्वारा गैर अनुपालनकर्ता परिवाहकों पर अभियोजन लागू होगा।

(5) इस अधिसूचना के पैरा ख में विहित पर्यावरण अनुकूल तरीके में राख के उपयोग की जिम्मेदारी खरीददार या उपभोगकर्ता एजेंसियों की है और ऐसा नहीं करने पर केन्द्रीय प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) द्वारा 1500 रूपए प्रति टन की दर से पर्यावरणीय प्रतिकर लगाया जाएगा।

(6) यदि उपयोगकर्ता अधिकरण पैरा ख के अधीन निर्धारित सीमा तक अथवा पैरा घ के उप-पैरा (1) के अधीन, दिए गए नोटिस के माध्यम से सूचित की गई सीमा, इनमें से जो भी कम हो, तक राख का उपयोग नहीं करती है, वे अतिरिक्त राख की मात्रा का 1500 रूपए प्रति टन की दर से भुगतान करने के लिए उत्तरदायी होंगी।

परंतु भवन निर्माण के संबंध में पर्यावरणीय प्रतिकर निर्मित क्षेत्र के 75 रूपये प्रति वर्ग फीट की दर से वसूल किया जाएगा।

(7) (i) ताप विद्युत संयंत्रों अन्य बकायादारों से केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा लगायी गई का पर्यावरणीय प्रतिकर उपयोग अप्रयुक्त राख के सुरक्षित निपटान हेतु किया जाएगा और राख आधारित उत्पादों सहित राख के उपयोग के संबंध में और अधिक अनुसंधान करने के लिए भी निधि का उपयोग किया जा सकता है।

(ii) अप्रयुक्त मात्रा पर लगाए गए पर्यावरणीय प्रतिकर के पश्चात भी राख के उपयोग का उत्तरदायित्व ताप विद्युत संयंत्रों की होगी और यदि पश्चातवती चक्रों में पर्यावरणीय प्रतिकर लगाने के पश्चात ताप विद्युत संयंत्र, किसी विशेष चक्र की राख के उपयोग के लक्ष्य को प्राप्त करता है तो अगले चक्र के दौरान अप्रयुक्त मात्रा पर एकत्र की गई पर्यावरणीय प्रतिकर में 10 प्रतिशत कटौती के पश्चात उक्त रकम ताप विद्युत संयंत्र को वापस कर दी जाएगी और पश्चातवती चक्रों में राख के उपयोग के मामले में एकत्र की गई पर्यावरणीय प्रतिकर की 20 प्रतिशत, 30 प्रतिशत और उसी क्रम में कटौती की जानी है।

घ. राख या राख आधारित उत्पादों की आपूर्ति हेतु प्रक्रिया ._

(1) ताप विद्युत संयंत्रों के स्वामी अथवा राख की ईंटों या टाईल्स या धातुमल आधारित राख के विनिर्माता उन व्यक्तियों या अभिकरणों को लिखित सूचना देंगे जो बिक्री या परिवहन या दोनों के लिए प्रस्तुत राख या राख आधारित उत्पादों के उपयोग के लिए उत्तरदायी हैं।

(2) ऐसे व्यक्ति या उपयोगकर्ता अभिकरणों जिन्हें ताप विद्युत संयंत्रों के स्वामी द्वारा या राख की ईंटों या टाईल्स या धातुमल आधारित राख के उत्पादकों द्वारा सूचना दी गई है, यदि वे पहले ही राख या राख उत्पादों के उपयोग के प्रयोजन से अन्य अभिकरणों के साथ जुड़े हुए हैं, यदि वे किसी भी राख/राख उत्पादों का उपयोग नहीं कर सकते हैं अथवा कम मात्रा का उपयोग कर सकते हैं, तदनुसार ताप विद्युत संयंत्र को सूचित करेंगे।

ड. प्रवर्तन, निगरानी, लेखा परीक्षा और प्रतिवेदन करना

(1) केंद्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) और संबंधित राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी), उपबंधों के अनुपालना सुनिश्चित करने के लिए प्रवर्तन और निगरानी प्राधिकरण होंगे। सीपीसीबी या एसपीसीबी या पीसीसी निमाही आधार पर राख के उपयोग की निगरानी करेंगे और सीपीसीबी इस प्रयोजन के लिए अधिसूचना की प्रकाशन की तारीख से छः माह के भीतर एक पोर्टल विकसित करेगा। संबंधित जिला अधिकारी के पास इस अधिसूचना के उपबंधों को लागू करने और निगरानी करने के लिए समवर्ती अधिकारिता होगी।

(2) (i) ताप विद्युत संयंत्र, राख उत्सर्जन और उपयोग से संबंधित मासिक सूचना वेब पोर्टल पर अगले महीने की 5 तारीख तक अपलोड करेगा। कोयला या लिग्नाइट आधारित ताप ऊर्जा संयंत्रों द्वारा केंद्रीय प्रदूषण नियंत्रण बोर्ड, संबंधित राज्य प्रदूषण नियंत्रण बोर्ड या प्रदूषण नियंत्रण समिति (पीसीसी), केंद्रीय विद्युत प्राधिकरण (सीईए) और पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय के संबंधित एकीकृत क्षेत्रीय कार्यालयों को इस अधिसूचना के उपबंधों के अनुपालन संबंधी सूचना उपलब्ध कराते हुए वार्षिक कार्यान्वयन रिपोर्ट प्रत्येक वर्ष (1 अप्रैल से 31 मार्च तक की अवधि के लिए) अप्रैल माह के 30वें दिन तक प्रस्तुत की जाएगी। सीपीसीबी और सीईए द्वारा सभी ताप विद्युत संयंत्रों द्वारा प्रस्तुत वार्षिक रिपोर्टों का समेकन किया जाएगा और उसे पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय को 31 मई तक प्रस्तुत किया जाएगा।

(ii) सभी अन्य उपयोगकर्ता अधिकरण पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय या राज्य स्तरीय पर्यावरण प्रभाव आकलन प्राधिकरण (एसईआईएए) द्वारा जारी पर्यावरणीय मंजूरी (ईसी) अथवा राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) द्वारा जारी संचालन की सहमति (सीटीओ), जो भी लागू हो, की अनुपालना रिपोर्ट में इस अधिसूचना में आज्ञापकता के अनुसार राख के उपभोग या उपयोग या निस्तारण तथा राख आधारित उत्पादों के उपयोग संबंधी सूचना प्रस्तुत करेंगे। केन्द्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) या राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) अधिसूचना के उपबंधों के प्रभावी कार्यान्वयन की समीक्षा करने हेतु ताप विद्युत संयंत्रों के अतिरिक्त अन्य सभी अधिकरणों की राख उपयोग की वार्षिक रिपोर्ट प्रकाशित करेंगे।

(3) इस अधिसूचना के उपबंधों की निगरानी और कार्यान्वयन के प्रयोजन के लिए केन्द्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) की अध्यक्षता में एक समिति का गठन किया जाएगा जिसके सदस्य विद्युत मंत्रालय, कोयला मंत्रालय, खनन मंत्रालय, पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय, सड़क परिवहन और राजमार्ग मंत्रालय और भारी उद्यम विभाग से होने के साथ-साथ समिति के अध्यक्ष द्वारा नामित किए जाने वाले कोई संबंधित पणधारी होंगे। यह समिति संगत पणधारी को आमंत्रित कर सकती है। यह समिति इस अधिसूचना के उपबंधों के प्रभावी और दक्ष कार्यान्वयन के लिए सिफारिशें कर सकती है। यह समिति छः माह में कम से कम एक बार एक बैठक करेगी और वार्षिक कार्यान्वयन रिपोर्टों की समीक्षा करेगी और यह समिति, इस अधिसूचना द्वारा आजापक किए गए अनुसार छः महीनों में कम से कम एक बार संगत पणधारी (को) को आमंत्रित करके राख के उपयोग की निगरानी करने के लिए पणधारी से साथ परामर्शदात्री बैठकें आयोजित करेगी। यह समिति पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय (एमओईएफसीसी) को छः मासिक रिपोर्ट प्रस्तुत करेगी।

(4) ताप विद्युत संयंत्रों और राख के उपयोगकर्ताओं या राख आधारित उत्पादों के विनिर्माताओं के बीच के विवाद का समाधान करने के प्रयोजन से राज्य सरकारें या संघ राज्यक्षेत्र की सरकारें इस अधिसूचना के प्रकाशन की तारीख से तीन माह के भीतर राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) की अध्यक्षता में एक समिति का गठन करेगी जिसमें विद्युत विभाग के प्रतिनिधि और एक प्रतिनिधि उस विभाग का होगा, जो विवाद वाले संबंधित अभिकरण का कार्य देख रहे हैं।

(5) केन्द्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) द्वारा प्राधिकृत लेखा परीक्षकों द्वारा ताप विद्युत संयंत्रों और उपयोगकर्ता अभिकरणों द्वारा किए गए राख के निपटान की अनुपालन लेखा परीक्षा संचालित की जाएगी और लेखा परीक्षा की रिपोर्ट प्रत्येक वर्ष 30 नवम्बर तक केन्द्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) और संबंधित राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) को प्रस्तुत की जाएगी। केन्द्रीय प्रदूषण नियंत्रण बोर्ड (सीपीसीबी) और संबंधित राज्य प्रदूषण नियंत्रण बोर्ड (एसपीसीबी) या प्रदूषण नियंत्रण समिति (पीसीसी) लेखा परीक्षा की रिपोर्ट प्राप्त होने के पंद्रह दिनों के भीतर अनुपालन न करने वाले ताप विद्युत संयंत्रों के विरूद्ध कार्रवाई प्रारंभ करेगें।

[फा. सं. एचएसएम-9/1/2019-एचएसएम]

नरेश पाल गंगवार, संयुक्त सचिव

उपाबंध

31 मई तक अथवा उससे पहले प्रस्तुत की जाने वाली राख संबंधी उपबंधों की अनुपालन रिपोर्ट (01 अप्रैल से 31 मार्च की अवधि के लिए)।

क्र.सं.	ब्यौरा	
1.	विद्युत संयंत्र का नाम	
2.	कंपनी का नाम	
3.	जिला	
4.	राज्य	
5.	पत्राचार के लिए डाक का पता :	
6.	ई-मेल :	
7.	विद्युत संयंत्र की संस्थापित क्षमता (मेगा वॉट) :	
8.	संयंत्र लोड फैक्टर (पीएलएफ) :	
9.	उत्पादित यूनिटों की संख्या (एमडब्ल्यूएच) :	
10.	विद्युत संयंत्र के अंतर्गत कुल क्षेत्र (हेक्टेयर) (राख कुंडों के अधीन क्षेत्र सहित) :	
11.	रिपोर्टिंग की अवधि के दौरान कोयला खपत की मात्रा (प्रति वर्ष मीट्रिक टन) :	
12.	औसत राख सामग्री प्रतिशतता में (%) :	
13.	रिपोर्टिंग की अवधि के दौरान वर्तमान में उत्पादित राख की मात्रा (प्रति वर्ष मीट्रिक टन) : फ्लाई राख (प्रति वर्ष मीट्रिक टन) : बॉटम राख (प्रति वर्ष मीट्रिक टन) :	
14.	ड्राई फ्लाई राख भंडारण गड्ढा (गड्ढों) की क्षमता (मीट्रिक टन) :	
15.	**रिपोर्टिंग की अवधि के दौरान वर्तमान में उत्पादित राख के उपयोग का ब्यौरा:** (क) रिपोर्टिंग की अवधि के दौरान वर्तमान में उपयोग की गई राख की	

	कुल मात्रा (एमटीपीए) : (ख) उपयोग की गई फ्लाई राख की मात्रा (एमटीपीए) : i. फ्लाई-एश आधारित उत्पाद (ईट या ब्लॉक या टाइल्स या फाइबर सीमेंट शीट या पाइप या बोर्ड/पैनल) : ii. सीमेंट विनिर्माण : iii. रेडी मिक्स कंक्रीट : iv. राख और जीओ-पॉलिमर आधारित निर्माण सामग्री : v. सिंटर्ड या कोल्ड बॉन्डेड राख एग्रीगेट का निर्माण : vi. सड़कों, सड़क और फ्लाई ओवर के पुश्तों का निर्माण : vii. बांधों का निर्माण : viii. निम्न भू-क्षेत्र का भराव : ix. खनिज क्षेत्रों का भराव : x. अधिभार वाले डम्पों में उपयोग : xi. कृषि : xii. तटीय जिलों में तटरेखा सुरक्षा संरचनाओं का निर्माण : xiii. अन्य देशों को राख का निर्यात : xiv. अन्य (कृपया विनिर्दिष्ट करें) : (ग) उपयोग किए गए तल के राख की मात्रा (एमटीपीए) : i. फ्लाई-एश आधारित उत्पाद (ईट या ब्लॉक या टाइल्स या फाइबर सीमेंट शीट या पाइप या बोर्ड या पैनल) : ii. सीमेंट विनिर्माण : iii. रेडी मिक्स कंक्रीट : iv. राख और जीओ-पॉलिमर आधारित निर्माण सामग्री : v. सिंटर्ड या कोल्ड बॉन्डेड राख एग्रीगेट का निर्माण : vi. सड़कों, सड़क और फ्लाईओवर के पुश्तों का निर्माण : vii. बांधों का निर्माण : viii. निम्न भू-क्षेत्र का भराव : ix. खनिज क्षेत्रों का भराव : x. अधिभार वाले डम्पों में उपयोग : xi. कृषि : xii. तटीय जिलों में तटरेखा सुरक्षा संरचनाओं का निर्माण : xiii. अन्य देशों को राख का निर्यात : xiv. अन्य (कृपया विनिर्दिष्ट करें) : रिपोर्टिंग की अवधि के दौरान वर्तमान में अप्रयुक्त राख की कुल मात्रा (एमटीपीए :	
16.	रिपोर्टिंग की अवधि के दौरान वर्तमान में उत्पादित राख का प्रतिशतता उपयोग (%) :	
17.	**राख कुंडों में राख के निपटान का ब्यौरा** क) तारीख 31 मार्च तक (रिपोर्टिंग की अवधि को छोड़कर) राख कुण्ड (कुण्डों) में निपटान किए गए राख की कुल मात्रा (मीट्रिक टन):	

	ख) रिपोर्टिंग की अवधि के दौरान राख कुण्ड (कुण्डों) में निपटान किए गए राख की मात्रा (मीट्रिक टन): ग) रिपोर्टिंग की अवधि के दौरान राख कुण्डों में गारा निस्सरण हेतु खपत हुए जल की कुल मात्रा (मी^{3}): घ) राख कुण्डों की कुल संख्या: (i) सक्रिय: (ii) खाली किए गए (पुन: भरा जाना है) (iii) पुन: भरे गए: ड.) राख कुण्डों के अधीन कुल क्षेत्र (हेक्टेयर):	
18.	**अलग-अलग राख कुण्ड का ब्यौरा** *राख कुण्ड 1,2 आदि (यदि राख कुण्डों की संख्या एक से अधिक हो, तो कृपया निम्नलिखित ब्यौरा अलग से उपलब्ध कराएं)* क) स्थिति: निर्माणाधीन या सक्रिय या खाली किया गया या पुन: भरा गया ख) राख कुण्ड में राख का निपटान शुरू करने की तारीख/महीना/वर्ष या महीना/वर्ष): ग) राख कुण्ड की क्षमता पूर्ण किए जाने के पश्चात् उसमे राख निपटान रोकने की तारीख (तारीख/महीना/वर्ष या महीना/वर्ष): (सक्रिय राख कुण्डों के लिए लागू नहीं) ग) क्षेत्र (हेक्टेयर): घ) डाइक की ऊंचाई (मी.): घ) आयतन (मी^{3}): ड.) तारीख 31 मार्च तक निपटान किए गए राख की मात्रा (मीट्रिक टन): च) उपलब्ध आयतन का प्रतिशत (%) और आगे निपटान किए जा सकने वाले राख की मात्रा (मीट्रिक टन): छ) राख कुण्ड के भरे जाने की अनुमानित अवधि (वर्षों और महीनों की संख्या): ड.) निर्देशांक (अक्षांश और देशान्तर): (कृपया न्यूनतम 4 निर्देशांकों को विनिर्दिष्ट करें) ज) राख कुण्ड में की गई लाइनिंग का प्रकार: एचडीपीई लाइनिंग या एलडीपीई लाइनिंग या क्ले लाइनिंग या कोई लाइनिंग नहीं छ) निपटान की विधि: शुष्क निपटान या नम गारा (नम गारा के मामले में कृपया विनिर्दिष्ट करें कि क्या एचमीएसडी या एमसीएसडी या एलसीएसडी है) ज) राख का अनुपात: गारा मिश्रण में जल (1:____): झ) संस्थापित और कार्यशील राख जल पुनर्चक्रण प्रणाली (एडब्ल्यूआरएस): हां या नहीं ञ) जमीन के अंदर या जल निकाय में राख कुण्ड से निस्सरित अपशिष्ट जल की मात्रा (मी^{3}): ट) डाइक की स्थिरता का अध्ययन कराए जाने की पिछली तारीख और उस संगठन का नाम जिसने अध्ययन किया: ठ) लेखा-परीक्षा किए जाने की पिछली तारीख और उस संगठन का नाम जिसने लेखा-परीक्षा की:	
19.	उपयोग किए गए पुराने राख की मात्रा (एमटीपीए): i. फ्लाई-एश आधारित उत्पाद (ईट या ब्लॉक या टाइल्स या फाइबर	

	सीमेंट शीट या पाइप या बोर्ड या पैनल): ii. सीमेंट विनिर्माण: iii. रेडी मिक्स कंक्रीट: iv. राख और जीओ-पॉलिमर आधारित निर्माण सामग्री: v. सिंटर्ड या कोल्ड बॉन्डेड राख एग्रीगेट का निर्माण: vi. सड़कों, सड़क और फ्लाई ओवर के पुश्तों का निर्माण: vii. बांधों का निर्माण: viii. निम्न भू-क्षेत्र का भराव: ix. खनिज क्षेत्रों का भराव: x. अधिभार वाले डम्पों में उपयोग: xi. कृषि: xii. तटीय जिलों में तटरेखा सुरक्षा संरचनाओं का निर्माण: xiii. अन्य देशों को राख का निर्यात xiv. अन्य (कृपया विनिर्दिष्ट करें):	

20.	**सार :**			
	ब्यौरा	सृजित मात्रा (एमटीपी)	उपयोग की गई मात्रा (एमटीपी) और (%)	शेष मात्रा (एमटीपी)
	रिपोर्टिंग की अवधि के दौरान राख			
	पुरानी राख			
	कुल			

21.	कोई अन्य सूचना : वार्षिक अनुपालन रिपोर्ट, और विद्युत संयंत्रों और राख कुण्डों की शेष फाइलों की सॉफ्ट कॉपी ई-मेल:- moefcc-coalash@gov.in पर भेजी जाए।	
22.	प्राधिकृत हस्ताक्षरकर्ता के हस्ताक्षर	

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 31st December, 2021

S.O. 5481(E).—Whereas by notification of the Government of India in the erstwhile Ministry of Environment and Forests *vide* S.O.763 (E), dated the 14th September, 1999, as amended from time to time, the Central Government, issued directions for restricting the excavation of top soil for manufacturing of bricks and promoting the utilisation of fly ash in the manufacturing of building materials and in construction activity within a specified radius of three hundred kilometres from the coal or lignite based thermal power plants;

And whereas, to implement the aforesaid notification more effectively based on the polluter pays principle (PPP) thereby ensuring 100 per cent utilisation of fly ash by the coal or lignite based thermal power plants and for the sustainability of the fly ash management system, the Central Government reviewed the existing notification; and whereas environmental compensation needs to be introduced based on the polluter pays principle;

And whereas, there is a need to conserve top soil by promoting manufacture and mandating use of ash based products and building materials in the construction sector;

And whereas, there is a need to conserve top soil and natural resources by promoting utilisation of ash in road laying, road and flyover embankments, shoreline protection measures, low lying areas of approved projects, backfilling of mines, as an alternative for filling of earthen materials;

And whereas, it is necessary to protect the environment and prevent the dumping and disposal of fly ash discharged from coal or lignite based thermal power plants on land;

And whereas, in the said notification the phrase 'ash', has been used which includes both fly ash as well as bottom ash generated from the Coal or Lignite based thermal power plants;

And whereas, the Central Government intends to bring out a comprehensive framework for ash utilisation including system of environmental compensation based on polluter pays principle;

And whereas, a draft notification on ash utilisation by coal or lignite thermal power plants in supersession of the notification of the Government of India, Ministry of Environment and Forests published in the Gazette of India, Extra Ordinary part II, section 3, sub-section (i) *vide* S.O.763 (E), dated the 14th September, 1999, by notification in exercise of the powers conferred under sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with clause (d) of sub-rule (3) of rule (5) of the Environment (Protection) Rules, 1986, was published in the Gazette of India, Extraordinary, Part II, section 3, sub-section (i), *vide* G.S.R. 285(E), dated the 22nd April, 2021 inviting objections and suggestions from all persons likely to be affected thereby before the expiry of sixty days from the date on which copies of the Gazette containing the said draft provisions were made available to the public;

And, whereas all the objections and suggestions received from all persons likely to be affected thereby in respect of the said draft notification have been duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with clause (d) of sub-rule (3) of rule (5) of the Environment (Protection) Rules, 1986, and in supersession of the Notification S.O.763 (E), dated the 14th September, 1999 except as respect things done or omitted to be done before such supersession, the Central Government hereby issues the following notification on ash utilisation from coal or lignite thermal power plants which shall come into force on the date of the publication of this notification, namely:-

A. Responsibilities of thermal power plants to dispose fly ash and bottom ash.—

(1) Every coal or lignite based thermal power plant (including captive or co-generating stations or both) shall be primarily responsible to ensure 100 per cent utilisation of ash (fly ash, and bottom ash) generated by it in an eco-friendly manner as given in sub-paragraph (2);

(2) The ash generated from coal or lignite based thermal power plants shall be utilised only for the following eco-friendly purposes, namely:-

(i) Fly ash based products viz. bricks, blocks, tiles, fibre cement sheets, pipes, boards, panels;

(ii) Cement manufacturing, ready mix concrete;

(iii) Construction of road and fly over embankment, Ash and Geo-polymer based construction material;

(iv) Construction of dam;

(v) Filling up of low lying area;

(vi) Filling of mine voids;

(vii) Manufacturing of sintered or cold bonded ash aggregate;

(viii) Agriculture in a controlled manner based on soil testing;

(ix) Construction of shoreline protection structures in coastal districts;

(x) Export of ash to other countries;

(xi) Any other eco-friendly purpose as notified from time to time.

(3) A committee shall be constituted under the chairmanship of Chairman, Central Pollution Control Board (CPCB) and having representatives from Ministry of Environment, Forest and Climate Change (MoEFCC), Ministry of Power, Ministry of Mines, Ministry of Coal, Ministry of Road Transport and Highways, Department of Agricultural Research and Education, Institute of Road Congress, National Council for Cement and Building Materials, to examine and review and recommend the eco-friendly ways of utilisation of ash and make inclusion or exclusion or modification in the list of such ways as mentioned in Sub-paragraph (2) based on technological developments and requests received from stakeholders. The committee may invite State Pollution Control Board or Pollution Control Committee, operators of thermal power plants and mines, cement plants and other stakeholders as and when required for this purpose. Based on the recommendations of the Committee, Ministry of Environment, Forest and Climate Change (MoEFCC) may publish such eco-friendly purpose.

(4) Every coal or lignite based thermal power plant shall be responsible to utilise 100 per cent ash (fly ash and bottom ash) generated during that year, however, in no case shall utilisation fall below 80 per cent in any year, and the thermal power plant shall achieve average ash utilisation of 100 per cent in a three years cycle:

Provided that the three years cycle applicable for the first time is extendable by one year for the thermal power plants where ash utilisation is in the range of 60-80 per cent, and two years where ash utilisation is below 60 per cent and for the purpose of calculation of percentage of ash utilisation, the percentage quantity of utilisation in the year 2021- 2022 shall be taken into account as per the table below:

Utilisation percentages of thermal power plants	First compliance Cycle to meet 100 per cent utilisation	Second compliance cycle onwards, to meet 100 per cent utilisation
>80 per cent	3 years	3 years
60-80 per cent	4 years	3 years
<60 per cent	5 years	3 years

Provided further that the minimum utilisation percentage of 80 per cent shall not be applicable to the first year and first two years of the first compliance cycle for the thermal power plants under the utilisation category of 60-80 per cent and <60 per cent, respectively.

Provided also that 20per cent of ash generated in the final year of compliance cycle may be carried forward to the next cycle which shall be utilised in the next three years cycle along with the ash generated during that cycle.

(5) The unutilised accumulated ash i.e. legacy ash, which is stored before the publication of this notification, shall be utilised progressively by the thermal power plants in such a manner that the utilization of legacy ash shall be completed fully within ten years from the date of publication of this notification and this will be over and above the utilisation targets prescribed for ash generation through current operations of that particular year:

Provided that the minimum quantity of legacy ash in percentages as mentioned below shall be utilised during the corresponding year and the minimum quantity of legacy ash is to be calculated based on the annual ash generation as per installed capacity of thermal power plant.

Year from date of publication	1st	2nd	3rd -10th
Utilisation of legacy ash (in percentage of Annual ash)	At least 20 per cent	At least 35 per cent	At least 50 per cent

Provided further that the legacy ash utilisation shall not be required where ash pond or dyke has stabilised and the reclamation has taken place with greenbelt or plantation and the concerned State Pollution Control Board shall certify in this regard. Stabilisation and reclamation of an ash pond or dyke including certification by the Central Pollution Control Board (CPCB) or State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) shall be carried out within a year from the date of publication of this notification. The ash remaining in all other ash ponds or dykes shall be utilised in progressive manner as per the above mentioned timelines.

Note: The obligations under sub-paragraph (4) and (5) above for achieving the ash utilisation targets shall be applicable from 1st April, 2022.

(6) Any new as well as operational thermal power plant may be permitted an emergency or temporary ash pond with an area of 0.1 hectare per Mega Watt (MW). Technical specifications of ash ponds or dykes shall be as per the guidelines of Central Pollution Control Board (CPCB) made in consultation with Central Electricity Authority (CEA) and these guidelines shall also lay down a procedure for annual certification of the ash pond or dyke on its safety, environmental pollution, available volume, mode of disposal, water consumption or conservation in disposal, ash water recycling and greenbelt, etc., and shall be put in place within three months from the date of publication of this notification.

(7) Every coal or lignite based thermal power plant shall ensure that loading, unloading, transport, storage and disposal of ash is done in an environmentally sound manner and that all precautions to prevent air and water pollution are taken and status in this regard shall be reported to the concerned State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) in Annexure attached to this notification.

(8) Every coal or lignite based thermal power plant shall install dedicated silos for storage of dry fly ash silos for at least sixteen hours of ash based on installed capacity and it shall be reported upon to the concerned State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) in the Annexure and shall be inspected by Central Pollution Control Board (CPCB) or State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) from time to time.

(9) Every coal or lignite based thermal power plant (including captive or co-generating stations or both) shall provide real time data on daily basis of availability of ash with Thermal Power Plant (TPP), by providing link to Central Pollution Control Board's web portal or mobile phone App for the benefit of actual user(s).

(10) Statutory obligation of 100 per cent utilisation of ash shall be treated as a change in law, wherever applicable.

B. **For the purpose of utilisation of ash, the subsequent sub-paras shall apply**.—

(1) All agencies (Government, Semi-government and Private) engaged in construction activities such as road laying, road and flyover embankments, shoreline protection structures in coastal districts and dams within 300 kms from the lignite or coal based thermal power plants shall mandatorily utilise ash in these activities:

Provided that it is delivered at the project site free of cost and transportation cost is borne by such coal or lignite based thermal power plants.

Provided further that thermal power plant may charge for ash cost and transportation as per mutually agreed terms, in case thermal power plant is able to dispose the ash through other means and those agencies makes a request for it and the provisions of ash free of cost and free transportation shall be applicable, if thermal power plant serves a notice on the construction agency for the same.

(2) The utilisation of ash in the said activities shall be carried out in accordance with specifications and guidelines laid down by the Bureau of Indian Standards, Indian Road Congress, Central Building Research Institute, Roorkee, Central Road Research Institute, Delhi, Central Public Works Department, State Public Works Departments and other Central and State Government Agencies.

(3) It shall be obligatory on all mines located within 300 kilometres radius of thermal power plant, to undertake backfilling of ash in mine voids or mixing of ash with external Overburden dumps, under Extended Producer Responsibility (EPR). All mine owners or operators (Government, Public and Private Sector) within three hundred kilometres (by road) from coal or lignite based thermal power plants, shall undertake measures to mix at least 25 per cent of ash on weight to weight basis of the materials used for external dump of overburden, backfilling or stowing of mine (running or abandoned as the case may be) as per the guidelines of the Director General of Mines Safety (DGMS):

Provided that such thermal power stations shall facilitate the availability of required quantity of ash by delivering ash free of cost and bearing the cost of transportation or cost or transportation arrangement decided on mutually agreed terms and mixing of ash with overburden in mine voids and dumps shall be applicable for the overburden generated from the date of publication of this notification and the utilisation of ash in the said activities shall be carried out in accordance with guidelines laid down by the Central Pollution Control Board, Director General of Mines Safety and Indian Bureau of Mines.

Explanation.- For the purpose of this sub-paragraph, it is also clarified that the provisions of ash free of cost and free transportation shall be applicable, if thermal power plants serve a notice on the mine owner for the same and the mandate of using 25 per cent of ash for mixing with overburden dump and filling up of mine voids shall not be applicable unless a notice is served on the mine owner by thermal power plant.

(4) (i) All mine owners shall get mine closure plans (progressive and final) to accommodate ash in the mine voids and the concerned authority shall approve mine plans for disposal of ash in mine voids and mixing of ash with overburden dumps. The Ministry of Environment, Forest and Climate Change (MoEFCC) has issued guidelines on 28th August, 2019 regarding exemption of requirement of Environmental Clearance of thermal power plants and coal mines along with the guidelines to be followed for such disposal.

(ii) The Ministry in consultation with Central Pollution Control Board (CPCB), Director General of Mine Safety (DGMS) and Indian Bureau of Mines (IBM) may issue further guidelines time to time to facilitate ash disposal in mine voids and mixing with overburden dumps and it shall be the responsibility of mine owners to get the necessary amendments or modifications in the permissions issued by various regulatory authorities within one year from the date of identification of such mines.

(5) (i) There shall be a committee headed by Chairperson, Central Pollution Control Board (CPCB) with representatives from Ministry of Environment, Forest and Climate Change, Ministry of Power, Ministry of Mines, Ministry of Coal, Director General of Mine Safety and Indian Bureau of Mines for identification of mines for backfilling of mine voids with ash or mixing of ash with overburden dump including examination of safety, feasibility (not economic feasibility) and aspects of environmental contamination and the committee shall get updated quarterly reports prepared regarding identified mines (both underground and opencast) for the stakeholder Ministries or Departments and the committee shall start identifying the suitable mines immediately after the publication of this notification.

(ii) Thermal power plants or mines shall not wait for disposal of ash till the identification is done by the above mentioned committee, to meet the utilisation targets mandated as above.

(6) Filling of low lying areas with ash shall be carried out with prior permission of the State Pollution Control Board or Pollution Control Committee for approved projects, and in accordance with guidelines laid down by Central Pollution Control Board (CPCB) and the State Pollution Control Board or Pollution Control Committee (PCC) shall publish approved sites, location, area and permitted quantity annually on its website.

(7) Central Pollution Control Board after engaging relevant stakeholders, shall put in place the guidelines within one year for all types of activities envisaged under this notification including putting in place time bound online application process for the grant permission by State Pollution Control Boards (SPCBs) or Pollution Control Committees (PCCs).

(8) All building construction projects (Central, State and Local authorities, Govt. undertakings, other Govt. agencies and all private agencies) located within a radius of three hundred kilometres from a coal or lignite based thermal power plant shall use ash bricks, tiles, sintered ash aggregate or other ash based products, provided these are made available at prices not higher than the price of alternative products.

(9) Manufacturing of ash based products and use of ash in such products shall be in accordance with specifications and guidelines laid down by the Bureau of Indian Standards, Indian Road Congress, and Central Pollution Control Board.

C. Environmental compensation for non-compliance.—

(1) In the first two years of a three years cycle, if the coal or lignite based thermal power plant (including captive or co-generating stations or both) has not achieved at least 80 per cent ash (fly ash and bottom ash) utilisation, then such non-compliant thermal power plants shall be imposed with an environmental compensation of Rs. 1000 per ton on unutilised ash during the end of financial year based on the annual reports submitted and if it is unable to utilise 100 per cent of ash in the third year of the three years cycle, it shall be liable to pay an environmental compensation of Rs. 1000 per ton on the unutilised quantity on which environmental compensation has not been imposed earlier:

Provided that the environmental compensation shall be estimated and imposed at the end of last year of the first compliance cycle as per the various utilisation categories as mentioned in sub-paragraph (4) of Para A.

(2) Environmental compensation collected by the authorities shall be deposited in the designated account of Central Pollution Control Board.

(3) In case of legacy ash, if the coal or lignite based thermal power plant (including captive or co-generating stations or both) has not achieved utilisation equivalent to at least 20 per cent (for the first year), 35 per cent (for the second year), 50 per cent (for third to tenth year) of ash generated based on installed capacity, an environmental compensation of Rs. 1000 per ton of unutilised legacy ash during that financial year shall be imposed and if the utilization of legacy ash is not completed at the end of 10 years, an environmental compensation of Rs.1000 per ton shall be imposed on the remaining unutilised quantity which has not been imposed earlier.

(4) It shall be the responsibility of the transporters or vehicle owner to deliver ash to authorised purchaser or user agency and if it is not complied, then an environmental compensation of Rs. 1500 per ton on such quantity as mis-delivered to unauthorised users or non- delivered to authorised users will be imposed besides prosecution of such non-compliant transporters by State Pollution Control Board (SPCB) or Pollution Control Committee (PCC).

(5) It is the responsibility of the purchasers or user agencies to utilise ash in an eco-friendly manner as laid down at para B of this notification and if it is not complied, then an environmental compensation of Rs. 1500 or per ton shall be imposed by State Pollution Control Board (SPCB) or Pollution Control Committee (PCC).

(6) If the user agencies do not utilise ash to the extent obligated under para B or the extent to which they have been intimated through Notice(s) served under sub-paragraph (1) of para D, whichever is lower, they shall be liable to pay Rs. 1500 per ton of ash for the quantity they fall short off:

Provided that the environmental compensation on building constructions shall be levied at Rs.75/- per square feet of built up area of construction.

(7) (i) The environmental compensation collected by Central Pollution Control Board from the thermal power plants and other defaulters shall be used towards the safe disposal of the unutilised ash and the fund may also be utilised for advancing research on use of ash including ash based products.

(ii) The liability of ash utilisation shall be with thermal power plants even after imposition of environmental compensation on unutilised quantities and in case thermal power plant achieves the ash utilisation of any

particular cycle after imposition of environmental compensation in subsequent cycles, the said amount shall be returned to thermal power plant after deducting 10 per cent of the environmental compensation collected on the unutilised quantity during the next cycle and deduction of 20 per cent, 30 per cent, and so on, of the environmental compensation collected is to be made in case of utilisation of ash in subsequent cycles.

D. Procedure for supply of ash or ash based products.—

(1) The owner of thermal power plants or manufacturers of ash bricks or tiles or sintered ash aggregate shall serve written notice to persons or agencies who are liable to utilise ash or ash based products, offering for sale, or transport or both.

(2) Persons or user agencies who have been served notices by owner of thermal power plants or manufacturers of ash bricks or tiles or sintered ash aggregate, if they have already tied up with other agencies for the purpose of utilisation of ash or ash products, shall inform the thermal power plant accordingly, if they cannot use any ash or ash products or use reduced quantity.

E. Enforcement, Monitoring, Audit and Reporting.—

(1) The Central Pollution Control Board (CPCB) and the concerned State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) shall be the enforcing and monitoring authority for ensuring compliance of the provisions and shall monitor the utilisation of ash on quarterly basis. Central Pollution Control Board shall develop a portal for the purpose within six months of date of publication of the notification. The concerned District Magistrate shall have concurrent jurisdiction for enforcement and monitoring of the provisions of this notification.

(2) (i) Thermal power plants shall upload monthly information regarding ash generation and utilisation by 5th of the next month on the web portal. Annual implementation report (for the period 1st April to 31st March) providing information about the compliance of provisions in this notification shall be submitted by the 30th day of April, every year to the Central Pollution Control Board, concerned State Pollution Control Board or Pollution Control Committee (PCC), Central Electricity Authority (CEA), and concerned Integrated Regional Office of Ministry of Environment, Forest and Climate Change by the coal or lignite based thermal power plants. Central Pollution Control Board and Central Electricity Authority shall compile the annual reports submitted by all the thermal power plants and submit to Ministry of Environment, Forest and Climate Change by 31st May.

(ii) All other user agencies shall submit consumption or utilisation or disposal of ash and use of ash based products as mandated in this notification in the compliance report of Environmental Clearance (EC) issued by Ministry of Environment, Forest and Climate Change or State Level Environment Impact Assessment Authority (SEIAA) or Consent to Operate (CTO) issued by State Pollution Control Board (SPCB) or Pollution Control Committee (PCC), whichever is applicable. The Central Pollution Control Board (CPCB) or State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) shall publish annual report of ash utilisation of all other agencies except thermal power plants to review the effective implementation of the provisions of the notification.

(3) For the purpose of monitoring the implementation of the provisions of this notification, a committee shall be constituted under the Chairperson, Central Pollution Control Board (CPCB), with members from Ministry of Power, Ministry of Coal, Ministry of Mines, Ministry of Environment, Forest and Climate Change, Ministry Road Transportation and Highways, Department of Heavy Industry as well as any concerned stakeholder(s), to be nominated by the Chairman of the committee. The committee may make recommendations for effective and efficient implementation of the provisions of the notification. The committee shall meet at least once in six months and review annual implementation reports and the committee shall also hold stakeholder consultations for monitoring of ash utilisation as mandated by this notification by inviting relevant stakeholder(s) at least once in six months. The committee shall submit the six monthly report to Ministry of Environment, Forest and Climate Change (MoEFCC).

(4) For the purpose of resolving disputes between thermal power plants and users of ash or manufacturer of ash based products, the State Governments or Union territory administration constitute a Committee within three months from the date of publication of this notification under the Chairman, State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) with representatives from Department of Power, and one representative from the Department which deals with the subject of concerned agency with which dispute is made.

(5) The compliance audit for ash disposal by the thermal power plants and the user agency shall be conducted by auditors, authorised by Central Pollution Control Board (CPCB) and audit report shall be submitted to Central Pollution Control Board (CPCB) and concerned State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) by 30th November every year. Central Pollution Control Board (CPCB) and concerned State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) shall initiate action against non-compliant thermal power plants within fifteen days of receipt of audit report.

[F. No. HSM-9/1/2019-HSM]

NARESH PAL GANGWAR, Jt. Secy.

Annexure

Ash Compliance Report (for the period 1st April-31st March) to be submitted on or before 31st May.

Sl. No.	Details	
1.	Name of Power Plant	
2.	Name of the company	
3.	District	
4.	State	
5.	Postal address for communication:	
6.	E-mail:	
7.	Power Plant installed capacity (MW):	
8.	Plant Load Factor (PLF):	
9.	No. of units generated (MWh):	
10.	Total area under power plant (ha): (including area under ash ponds)	
11.	Quantity of coal consumption during reporting period (Metric Tons per Annum):	
12	Average ash content in percentage (per cent):	
13.	Quantity of current ash generation during reporting period (Metric Tons per Annum): Fly ash (Metric Tons per Annum): Bottom ash (Metric Tons per Annum):	
14.	Capacity of dry fly ash storage silo(s) (Metric Tons) :	
15	Details of utilisation of current ash generated during reporting period (a) Total quantity of current ash utilised (MTPA) during reporting period: (b) Quantity of fly ash utilised (MTPA): (i) Fly ash based products (bricks or blocks or tiles or fibre cement sheets or pipes or boards or panels) (ii) Cement manufacturing:	

	(iii) Ready mix concrete: (iv) Ash and Geo-polymer based construction material: (v) Manufacturing of sintered or cold bonded ash aggregate: (vi) Construction of roads, road and fly over embankment: (vii) Construction of dams: (viii) Filling up of low lying area: (ix) Filling of mine voids: (x) Use in overburden dumps: (xi) Agriculture: (xii) Construction of shoreline protection structures in coastal districts; (xiii) Export of ash to other countries: (xiv) Others (please specify): (c) Quantity of bottom ash utilised (MTPA): (i) Fly ash based products (bricks or blocks or tiles or fibre cement sheets or pipes or boards or panels): (ii) Cement manufacturing: (iii) Ready mix concrete: (iv) Ash and Geo-polymer based construction material: (v) Manufacturing of sintered or cold bonded ash aggregate: (vi) Construction of roads, road and flyover embankment: (vii) Construction of dams: (viii) Filling up of low lying area: (ix) Filling of mine voids: (x) Use in overburden dumps: (xi) Agriculture: (xii) Construction of shoreline protection structures in coastal districts: (xiii) Export of ash to other countries: (xiv) Others (please specify): Total quantity of current ash unutilised (MTPA) during reporting period:	
16.	Percentage utilisation of current ash generated during reporting period (per cent):	
17.	Details of disposal of ash in ash ponds (a) Total quantity of ash disposed in ash pond(s) (Metric Tons) as on 31st March (excluding reporting period): (b) Quantity of ash disposed in ash pond(s) during reporting period (Metric Tons): (c) Total quantity of water consumption for slurry discharge into ash ponds during reporting period (m^3): (d) Total number of ash ponds: (i) Active: (ii) Exhausted (yet to be reclaimed): (iii) Reclaimed: (e) total area under ash ponds (ha):	
18.	Individual ash pond details *Ash pond-1,2, etc (please provide below mentioned details separately, if number of ash ponds is more than one)* (a) Status: Under construction or Active or Exhausted or	

	Reclaimed (b) Date of start of ash disposal in ash pond (DD/MM/YYYY or MMYYYY): (c) Date of stoppage of ash disposal in ash pond after completing its capacity (DD/MM/YYYY or MM/YYYY): (Not applicable for active ash ponds) (c) area (hectares): (d) dyke height (m): (d) volume (m^3): (e) quantity of ash disposed as on 31st March (Metric Tons): (f) available volume in percentage (per cent) and quantity of ash can be further disposed (Metric Tons): (g) expected life of ash pond (number of years and months): (e) co-ordinates (Lat and Long): (please specify minimum 4 co-ordinates) (f) type of lining carried in ash pond: HDPE lining or LDPE lining or clay lining or No lining g) mode of disposal: Dry disposal or wet slurry (in case of wet slurry please specify whether HCSD or MCSD or LCSD) (h) Ratio of ash: water in slurry mix (1:___): (i) Ash water recycling system (AWRS) installed and functioning: Yes or No (j) Quantity of wastewater from ash pond discharged into land or water body (m3): (k) Last date when the dyke stability study was conducted and name of the organisation who conducted the study: (l) Last date when the audit was conducted and name of the organisation who conducted the audit:	
19.	Quantity of legacy ash utilised (MTPA): i. Fly ash based products (bricks or blocks or tiles or fibre cement sheets or pipes or boards or panels): ii. Cement manufacturing: iii. Ready mix concrete: iv. Ash and Geo-polymer based construction material: v. Manufacturing of sintered or cold bonded ash aggregate: vi. Construction of roads, road and flyover embankment: vii. Construction of dams: viii. Filling up of low lying area: ix. Filling of mine voids: x. Use in overburden dumps: xi. Agriculture: xii. Construction of shoreline protection structures in coastal districts; xiii. Export of ash to other countries: xiv. Others (please specify):	
20.	Summary:	

Details	Quantity generated (MTP)	Quantity utilised (MTP) and (per cent)	Balance quantity (MTP)

	Current ash during reporting period			
	Legacy ash			
	Total			
21.	Any other information: Soft copy of the annual compliance report, and shape files of power plant and ash ponds may be e-mailed to:- moefcc-coalash@gov.in			
22.	Signature of Authorised Signatory			

Uploaded by Dte. of Printing at Government of India Press, Ring Road, Mayapuri, New Delhi-110064
and Published by the Controller of Publications, Delhi-110054. ALOK KUMAR

Annexure-A2A

No.43012/13/2017-CPAM
Government of India
Ministry of Coal
******

Shastri Bhavan,New Delhi
Date : 22nd April, 2021

Office Memorandum

Subject:	List of UG mines and abandoned OC mines identified by CIL and SCCL for ash filling

The undersigned is directed to refer to the recommendations dated 01.03.2019 of Expert Committee constituted by NITI Aayog for best utilization of fly ash. One of the recommendations of the Expert Committee, pertaining to MoC was identification of mines for fly ash filling and periodic updation of the list by a Task Force constituted by Ministry of Power.

2. In compliance to Expert Committee recommendations and subsequent order dated 12.02.2020 of Hon'ble NGT, MoC vide its letter dated 08.04.2020 had communicated to MoEF&CC a list of mines (21 Nos.) identified by coal PSUs for fly ash/bottom ash filling.

3. Based on the inputs received from coal PSUs, the list of mines for fly ash/ bottom ash filling has now been updated. The revised list comprises of 22 mines of CIL (Annexure-I) and 10 mines of SCCL (Annexure-II).

Encl: As above

(Manish Uniyal)
Under Secretary to the Govt. of India

To,

1. Shri A N Singh
Addl. Director (S)/Scientist 'E', HSM Division
Ministry of Environment, Forest and Climate Change
Indira Paryavaran Bhawan, New Delhi

2. Shri RK Das
Under Secretary to the Govt. of India.
Ministry of Power, New Delhi
Tel: 23715507, Ext: 212

Annexure-I

List of CIL mines identified for fly/bottom ash filling as on 31.03.2021							
Sl.No	CIL Subsidiary	Admin. Areas	Name of Mine	OC/UG	Volume (Approx) (Lakh Cu.m)	Nearby TPP's	Remarks
	Ongoing mine for fly ash Dumping= 06 NOS						
1	MCL	Jaganath	South Balanda Q-II &III	OC	14.73	NTPC	MoU signed on 15.07.2004 and **14.57** lakh cu.m has been filled
2			Jaganath OC, Quarry IV	OC	17	Bhusan steel	Already filled with **0.558 lakh cu.m.** Filling stopped from Feb, 2016 as the permission for transportation of ash has not obtained by Bhusan Steel.
3			Jaganath OC, Quarry VI & VII	OC	6.43 & 3.96 =10.39	NTPC	MoU for ash filling was executed on 30.07.2020 and 0.462 lakh cum has been filled.
4			South Balanda Q-I	OC	0.883	NBVL	Already filled with **0.624 lakh cu.m**., Fly ash dumping is continuing.
5	SECL	Korba	Manikpur, western quarry	OC	210	NTPC & CSPGCL	1)MoU has been signed with NTPC for filling of fly ash 105 lakh cu.m As per agreement, 2.13 **lakh** cu.m fly ash has been filled 2)MoU has been signed with CSPGCL for 105 lakh cu.m and as per agreement **4.17 lakh cu.m** fly ash has been filled
6		Korba	Surakachhar 3&4 pit	UG	1.50 & 1.80	NTPC	MoU has been signed with NTPC on 13.10.16 for **1.50** lakh cu.m and filling has been completed. Fresh MoU with NTPC signed on 31.08.2019 for filling of **1.80** lakh cu.m. As on date **0.855 lakh cu.m** has been filled.
	MoU signed = 04 NOS						
7	BCCL	WIA	Murulidih (Cluster-XIII)	OC	1.5	CTPP	MoU between BCCL & DVC for Back filling Fly-Ash from Chandrapura Thermal Power plant has been signed on 14th September 2020. Safety Clearance from DGMS and Clearance from MoEFCC for dumping fly ash within 500 m range from Damodar river is yet to be obtained by DVC.
8	NCL	Block-B	Gorbi	OC	14	NTPC	MoU has been signed with NTPC on 03.01.2019. NTPC is in the process for obtaining statutory clearances.

Sl.No	CIL Subsidiary	Admin. Areas	Name of Mine	OC/UG	Volume (Approx) (Lakh Cu.m)	Nearby TPP's	Remarks
9	MCL	Jaganath	Jaganath OC, Quarry VIII	OC	17.8	NTPC	MoU for ash filling was executed on 18.09.2020.
10		Bhartpur	Bharatpur	OC	13.3	NALCO	Laying of pipeline by NALCO is under process for transportation of fly ash.
On process = 12 NOS							
11	WCL	Majri	Telwasa OC	OC	200	GMR power, Warora, SeiVardha Power, Warora	Abandoned Mine Plan (AMP) has been submitted to DGMS vide our letter no. WCL/ MA/ CTSA/ SAM/ 2020/280 and 277 dated 30.09.2020, field Inspection from DGMS officials awaited. A meeting with MAHAGENCO was held on 12.02.2021 at WCL HQ. In the meeting, the guidelines of CIL on Fly ash filling in mine void was explained in detail to MAHAGENCO. The safety and environmental issues in respect of operational mines was also informed.
12		Majri	Dhorwasa OC	OC	100		
13		Majri	NavinKunada OC	OC	250		Abandoned Mine Plan (AMP) has been submitted to DGMS vide our letter dated 30.09.2020, DGMS visited the site on 21.11.2020.
14	SECL	Bhatgaon	Dugga	OC	170	NTPC,Korba	Void is filled with water
15		Bishrampur	Bishrampur	OC	17	NTPC, Korba	Bishrampur Quarry-1, partially backfilled. Part has been planted and remaining part is filled with water.
16		JamunaKotma	Jamuna OC	OC	10	NTPC,	TPPs have submitted their applications. Allotment will be done with consent of state pollution control Board.
17		Sohagpur	ShardaOC (OPQR patch & Trench T-1 patch)	OC	10.0 & 30.0	TPPS	
18	ECL	Mugma	Pusai	OC	12	MPL,Maithon	ECL has approved dumping of Fly ash in Pusia OCP.
19		Kajora	Lachipur	OC	3	DSTPS (DVC)Durgapur	ECL has approved dumping of fly ash in Lachipur Colliery & voids in Nabakajora Colliery under Kajora Area .MoU is under process
20			NabaKajora	OC	3.8		
21	CCL	Kathara	Govindpur	UG	0.85	DVC/STPS	Bottom ash could be filled in the mine void for stowing.
22		NK	Dakra	OC	214.5	Patratu	It is a running mine and expected reserve may exhaust by 2023. Available for ash filling from 2023-24

Annexure-II

List of SCCL Mines identified for fly ash/Bottom ash filling as on 31.03.2021												
OC mines (1)												
Sl. No.	Comp.	Area	Name of Mine	OC	District	Area (Ha)	Volume (Lakh Cu.m)		Nearby TPP	Distance (Km)	Transport	Remarks
1	SCCL	RG-1	Medapalli OCP	OC	PeddapalliT elangana	258.31	2164.3		NTPC	5.00	Road	Mine to be closed in 2022-23
List of UG mines (9 Nos.) - suitable for Bottom ash filling												
Sl. No.	Comp.	Admin Area	Name of Mine	UG	District	Volume of ash (Cu.m/Annum)			Nearby TPPs	Distance from TPPs	Transport Infra	Remarks, if any
						Utilization Potential	Actual utilization (2019-20)	Balance Potential		Km (Approx)		
2	SCCL	RG-I	GDK-1 Inc.	UG	Peddapalli	220828	164079	56748	STPP, NTPC	10.41, 26.10	Road	Bottom ash and Processed OB (POB) are utilised for stowing
3	SCCL	RG-I	GDK-2 Inc.	UG	Peddapalli	283687	275582	8105	STPP, NTPC	21.34, 27.04	Road	
4	SCCL	RG-II	GDK-7Lep	UG	Peddapalli	219398	219398	0	STPP, NTPC	24.47,32.03	Road	-
5	SCCL	RG-II	Vakilpalli	UG	Peddapalli	18699	18699	0	STPP, NTPC	32.4, 39.0	Road	-
6	SCCL	SRP	RK-7 Inc.	UG	Mancherial	250948	86452	164496	STPP	13.05	Road	Bottom ash, Processed OB (POB) & Sand are utilised for stowing.
7	SCCL	SRP	SRP-3 & 3A Inc.	UG	Mancherial	218879	60520	158359	STPP	12.71	Road	
8	SCCL	SRP	IK-1A Inc.	UG	Mancherial	168467	81865	86602	STPP	15.89	Road	
9	SCCL	MM	Kasipet	UG	Mancherial	146102	94621	51541	STPP	40.62	Road	
10	SCCL	MM	RK 1A	UG	Mancherial	26240	15841	10399	STPP	25.70	Road	Bottom ash & sand are utilised for stowing.
	Total UG					1553308	1017058	536251				

To,
NTPC Limted Noida

TO WHOMSOEVER IT MAY CONCERN

Sub: Support for Installed System at Various Location at NTPC Plants

As per Lifecycle policy of Yokogawa, we have Two Phases in Lifecycle:

a) *Standard Sales Phase*
b) *Maintenance Phase*

The Hardware is supported for at least 10 Years in the maintenance phase

While in Standard Sales Phase the Hardware is supplied for all NEW Projects and / or expansion projects while in Maintenance phase initially it is provided for expansion projects and later only for maintenance purpose

The Hardware (CENTUM VP) Supplied at NTPC except controllers for Barh - Offsites is in Standard Sales Phase

Please note as WINDOWS 7 Support is not available from Microsoft, CENTUM VP Licensed Software version is also changed to be compatible to WINDOWS 10. The earlier version of CENTUM VP Software compatible to WINDOWS 7 is obsolete.

The Workstation, Server, network Switches compatible to WINDOWS 7 are also obsolete and are not available .

The Same will not be available for following Projects

1. *Kudgi STPP- 1 , 3x 800 MW*
2. *Lara STPP- 1 , 2x 800 MW*
3. *NTPC Barh STPP-I, 3 x 660 MW*
4. *BRBCL- 4 x 250 MW*
5. *NTPC Talcher, Kaniya- 2 x 500 MW*
6. *NTPC Vindyachal-V, 1 x 500 MW*

Further:

Suppor t Availability -for Windows 10 and Windows Server 2019 along with Control System:

Support for the Supplied control system will be available for next 10 years from year 2022 after Upgradation of HMI , when read in conjunction with following:

- *Windows 10 LTSC Version Support will be available till 2029 (as per Microsoft)*
- *Windows Server 2019 will be available till 2029 (as per Microsoft)*
- *In ONLY BARH SSTPP- offsites section the support for supplied controller will be available till 2025*

With the Operating System and CENTUM VP System Software Upgrade - application Software and the NEW CENTUM VP System Software will work seamlessly

We endeavor to provide unstinted Services and envisage to have continued relation with your esteemed organization

Thanking you and assuring you best of attention at all times Yours sincerely

For Yokogawa India Limited



Avnish Garg

AVP- System Sales

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
सूचना प्रौद्योगिकी एवं साइबर सुरक्षा प्रभाग
Information Technology & Cyber Security Division
****

विषय : CEA (Cyber Security in Power Sector) Guidelines, 2021.

CEA is mandated to prepare 'Guidelines on Cyber Security' in Power Sector under the provision of regulation (10) of the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019. Guidelines on Cyber Security in Power Sector incorporating the cardinal principles has been prepared by CEA. In compliance to the provision of the above regulation, **CEA (Cyber Security in Power Sector) Guidelines, 2021** are issued for compliance by all entities listed in the clause 2.3 (Applicability of the Guidelines) of the guidelines.

Encl: Guidelines on Cyber Security

07/10/21
(V.K Mishra)
Secretary CEA

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CEA (Cyber Security in Power Sector) Guidelines, 2021

1.0 Background

1.1 Cyber intrusion attempts and Cyber-attacks in any critical sector are carried out with a malicious intent. In Power Sector it's either to compromise the Power Supply System or to render the grid operation in-secure. Any such compromise, may result in mal-operations of equipments, equipment damages or even in a cascading grid brownout/blackout. The much hyped air gap myth between IT and OT Systems now stands shattered. The artificial air gap created by deploying firewalls between any IT and OT System can be jumped by any insider or an outsider through social engineering. Cyber-attacks are staged through tactics & techniques of Initial Access, Execution, Persistence, Privilege Escalation, Defence Evasion, Command and Control, Exfiltration. After gaining the entry inside the system through privilege escalation, the control of IT network and operations of OT systems can be taken over even remotely by any cyber adversary. The gain of sensitive operational data through such intrusions may help the Nation/State sponsored or non-sponsored adversaries and cyber attackers to design more sinister and advanced cyber-attacks.

1.2 Government of India has set up the Indian Computer Emergency Response Team (CERT-In) for Early Warning and Response to cyber security incidents and to have collaboration at National and International level for information sharing on mitigation of cyber threats. CERT-In regularly issues advisories on safeguarding computer systems and publishes Security Guidelines which are widely circulated for compliances. All Central Government Ministries/ Departments and State/Union Territory Governments have been advised to conduct cyber security audit of their entire Cyber Infrastructure including websites at regular interval through CERT-In empanelled Auditors so as to identify gaps and appropriate corrective actions to be taken in cyber security practices. CERT-In extends supports to enable Responsible Entity in conducting cyber security mock drills and in assessment of their preparation to withstand cyber-attacks. The Responsible Entity must submit Reports of Cyber Audit of cyber security controls, architecture, vulnerability management, network security and periodic cyber security drills to sectoral CERT as well as CERT-In. Team of experts shall review these reports and shortcomings if any in the compliances shall be flagged by them. CERT-In on regular basis also conducts workshops and training programs to enhance Cyber awareness of all Stakeholders.

1.3 Ministry of Power has created 6(six) sectoral CERTs namely Thermal, Hydro, Transmission, Grid Operation, RE and Distribution for ensuring cyber security in Indian Power Sector. Each Sectoral CERT has prepared their sub-sector specific model Cyber Crisis Management Plan(C-CMP) for countering cyber-attacks and cyber terrorism. Each Sectoral CERT has circulated their model C-CMPs for preparation and implementation of organization specific C-CMP by each of their Constituent Utility.

1.4 All Responsible Entities, Service Providers, Equipment Suppliers/Vendors and Consultants engaged in Power Sector are equally responsible for ensuring cyber security of the Indian Power Supply System. They are to act timely upon each threat intelligence,

Model CCMP → org^n specific CCMP
by
Sectoral CERTs

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advisories and other inputs received from authenticated sources, for continuous improvement in their cyber security posture.

1.5 In the current Indian scenario though many cyber security directives and guidelines exists, but none of them are power sector specific. Ministry of Power has directed CEA to prepare Regulation on Cyber Security in Power Sector. And as an interim measures CEA has been directed to issue Guideline on Cyber Security in Power Sector, under the provision of Regulation 10 on Cyber Security in the "Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019".

1.6 The Guidelines on Cyber Security, in the form of Articles written below, requires mandatory Compliance by all Responsible Entities. The Guidelines shall come into effect from the date of issue by Central Electricity Authority, New Delhi.

2.0 Hereby the Guidelines on Cyber Security are drawn in the form of Articles for compliance by the Requester as well as User under the following provision of Regulation 10 on Cyber Security, in the "Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019".

"The requester and the user shall comply with cyber security guidelines issued by the Central Government, from time to time, and the technical standards for communication system in Power Sector laid down by the Authority."

2.1 **Objective of issuing Guideline**:

a) Creating cyber security awareness
b) Creating a secure cyber ecosystem,
c) Creating a cyber-assurance framework,
d) Strengthening the regulatory framework,
e) Creating mechanisms for security threat early warning, vulnerability management and response to security threats,
f) Securing remote operations and services,
g) Protection and resilience of critical information infrastructure,
h) Reducing cyber supply chain risks,
i) Encouraging use of open standards,
j) Promotion of research and development in cyber security,
k) Human resource development in the domain of Cyber Security,
l) Developing effective public private partnerships,
m) Information sharing and cooperation
n) Operationalization of the National Cyber Security Policy

2.2 Within the text of these Articles, '**Responsible Entity**' shall mean all:

a) Transmission Utilities as well as Transmission Licensees,
b) Load despatch centres (State, Regional and National),
c) Generation utilities (Hydro, Thermal, Nuclear, RE),
d) Distribution Utilities
e) Generation Aggregators,
f) Trading Exchanges,
g) Regional Power Committees, and
h) Regulatory Commissions.

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2.3 **Applicability:** To RE, SI, OEM

All Responsible Entities as well as System Integrators, Equipment Manufacturers, Suppliers/Vendors, Service Providers, IT Hardware and Software OEMs engaged in the Indian Power Supply System.

2.4 **Scope:**

2.4.1 **Control Systems for System Operation and Operation Management.**

a) Grid Control and Management Systems,
b) Power Plant Control Systems,
c) Central Systems used to monitor and control of distributed generation and loads e.g. virtual power plants, storage management, central control rooms for hydroelectric plants, photovoltaic/wind power installations,
d) Systems for fault management and work force management,
e) Metering and measurement management systems,
f) Data archiving systems,
g) Parameterisation, configuration and programming systems,
h) Supporting systems required for operation of the above mentioned systems,

2.4.2 **Communication System.**

a) Routers switches and firewalls,
b) Communication technology-related network components,
c) Wireless digital systems.
d) Control Centre to Control Centre Communications for data exchange on ICCP. **(IEC 61850/60850-5/TASE.2/)**

2.4.3 **Secondary, Automation and Tele control technologies**

a) Control and Automation components,
b) Control and field devices,
c) Tele control devices,
d) Programmable logic controllers / Remote Terminal Units, including digital sensor and actuators elements,
e) Protection devices,
f) Safety components,
g) Digital measurement and metering installations,
h) Synchronisation devices,
i) Excitation Systems,

3.0 Definition of Terms:

1. **Access Management**: shall mean set of policies and procedures of the Responsible Entity for allowing Personnel, devices and IoT to securely perform a broad range of operational, maintenance, and asset management tasks either on site or remotely as laid down in Clause 5.2.5 of IS 16335.
2. **Accreditation:** shall mean the process of verifying that an organisation is capable of conducting the tests and assessments against a product/process that are required to be certified.

3. **Accreditation Body:** shall mean an organisation that has been accredited to verify the credentials and capabilities of the organisations that wish to become a certification body.
4. **Act:** shall mean the Information Technology Act, 2000 (21 of 2000)
5. **Asset**: shall mean anything that has value to the organization.
6. **Certification:** shall mean the process of verifying that a product has been manufactured in conformance with a set of predefined standards and/or regulations by an organisation, that is accredited to conduct the certification process
7. **Certification Body:** shall mean an organisation that has been accredited by an accreditation body to certify products / process against a certification scheme.
8. **Certification Scheme:** shall mean the processes, paperwork, tools, and documentation that define how a product or manufacturer is certified
9. **Chief Information Security Officer:** shall means the designated employee of Senior management level directly reporting to Managing Director/Chief Executive Officer/Secretary of the Responsible Entity, having knowledge of Information Security and related issues, responsible for cyber security efforts and initiatives including planning, developing, maintaining, reviewing and implementation of Information Security Policies
10. **Critical Assets:** shall mean the facilities, systems and equipment which, if destroyed, degraded or otherwise declared unavailable, would affect the reliability or operability of the Power Supply System.
11. **Critical System:** shall mean cyber assets essential to the reliable operation of critical asset. Critical System consists of those cyber assets that have at least one of the following characteristics:
    a) The cyber asset uses a routable protocol to communicate outside the electronic security perimeter.
    b) The cyber asset uses a routable protocol within a control centre.
    c) The cyber asset is dial-up accessible.
12. **Critical Information Infrastructure:** shall mean Critical Information Infrastructure as defined in explanation of sub-section (1) of Section 70 of the Act.
13. **Cyber Assets**: shall mean the programmable electronic devices, including the hardware, software and data in those devices that are connected over a network, such as LAN, WAN and HAN.
14. **Cyber Crisis Management Plan:** shall mean a framework for dealing with cyber related incidents for a coordinated, multi-disciplinary and broad-based approach for rapid identification, information exchange, swift response and remedial actions to mitigate and recover from malicious cyber related incidents impacting critical processes.
15. **Cyber Security Breach**: shall mean any cyber incident or cyber security violation that results in unauthorized or illegitimate access or use by a person as well as an entity, of data, applications, services, networks and/or devices through bypass of the underlying cyber security protocols, policies and mechanisms resulting in the compromise of the confidentiality, integrity or availability of data/information maintained in a computer resource or cyber asset.
16. **Cyber Security Incident:** shall mean any real or suspected adverse cyber security event that violates, explicitly or implicitly, cyber security policy of Responsible Entity resulting in unauthorized access, denial of service or disruption, unauthorized use of computer resource for processing or storage of information or changes to data or information

without authorization, leading to harm to the power grid or its critical sub-sectoral elements Generation, Transmission and Distribution.

17. **Cyber Security Policy:** shall mean documented set of business rules and processes for protecting information, computer resources, networks, devices, Industrial Control Systems and other OT resources.
18. **Electronic Security Perimeter:** shall mean the logical border surrounding a network to which the Cyber Systems of Power Supply System are connected using a routable protocol.
19. **Information Security Division:** shall mean a division accountable for cyber security and protection of the Critical System of the Responsible Entity.
20. **Protected System:** shall mean any computer, computer system or computer network of the Responsible Entity notified under section 70 of the Act, in the official gazette by appropriate Government.
21. **Security Architecture:** shall mean a framework and guidance to implement and operate a system using the appropriate security controls with the goal to maintain the system's quality attributes like confidentiality, integrity, availability, accountability and assurance.
22. **Vulnerability:** shall mean intrinsic properties of something resulting in susceptibility to a risk source that can lead to an event with a consequence
23. **Vulnerability Assessment:** shall mean a process of identifying and quantifying vulnerabilities

4.0 Standards

Reference	Description
ISO/IEC 15408	Common Criteria Certification Standard
ISO/IEC 17011	General requirements for accreditation bodies accrediting conformity assessment bodies
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories
ISO/IEC 21827	Systems Security Engineering - Capability Maturity Model (SSE-CMM)
ISO/IEC 24748-1	Systems and software engineering — Life cycle management — Part 1: Guidelines for life cycle management.
ISO 27001/2	Information Security Management
ISO/ IEC 27019	Information technology — Security techniques — Information Security controls for the energy utility industry
ISO/IEC 61508	Functional Safety of Electrical / Electronic / Programmable Electronic Safety-related Systems
IEC 61850	Communication networks and systems for power utility automation
IEC 62351	Standards for Securing Power System Communications
IEC 62443	Cyber Security for Industrial Control Systems
IS 16335	Power Control Systems – Security Requirements.

5.0 Abbreviations

Abbreviations		Description
a)	BES	Bulk Electric System

b)	CDAC	Centre for Development of Advanced Computing
c)	CEA	Central Electricity Authority
d)	CERC	Central Electricity Regulatory Commission
e)	CERT	Computer Emergency Response Team
f)	CERT-In	Indian Computer Emergency Response Team
g)	CII	Critical Information Infrastructure
h)	CISO	Chief Information Security Officer
i)	CSK	Cyber Swachhta Kendra
j)	COTS	Commercial off-the Shelf
k)	ESP	Electronic Security perimeter
l)	ICS	Industrial Control Systems
m)	ICT	Information and Communications Technology
n)	IEC	International Electro Technical Commission
o)	ISAC	Information Sharing and Analysis Centre
p)	ISD	Information Security Division
q)	ISO	International Organization for Standardization
r)	ISMS	Information Security Management System
s)	IT	Information Technology
t)	FAT	Factory Acceptance Test
u)	NABL	National Accreditation Board for Testing and Calibration Laboratories
v)	NCIIPC	National Critical Information Infrastructure Protection Centre
w)	NLDC	National Load Dispatch Centre
x)	NPTI	National Power Training Institute
y)	NSCS	National Security Council Secretariat
z)	OEM	Original Equipment Manufacturer
aa)	OT	Operational Technology
bb)	RLDC	Regional Load Dispatch Centres
cc)	SAT	Site Acceptance Test
dd)	SERC	State Electricity Regulatory Commission
ee)	SCADA	Supervisory Control and Data Acquisition Systems
ff)	SIEM	Security Information and Event Management
gg)	SLA	Service Level Agreement
hh)	SLDC	State Load Dispatch Centre
ii)	QCI	Quality Council of India

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Article 1. Cyber Security Policy.

a. **Cardinal Principles: The Responsible entity will strictly adhere to following cardinal principles while framing cyber security policy:**

i. There is hard isolation of their OT Systems from any internet facing IT system.
ii. May keep only one of their IT systems with internet facing at any of their site/location if required which is isolated from all OT zones and kept in a separate room under the security and control of CISO.
iii. Downloading/Uploading of any data/information from their internet facing IT system is done only through an identifiable whitelisted device followed by scanning of both for any vulnerability/malware as per the SOP laid down and for all such activities digital logs are maintained and retained under the custody of CISO for at least 6 months. The log shall be readily to carry out the forensic analysis if asked by investigation agency.
iv. List of whitelisted IP addresses for each firewall is maintained by CISO and each firewall is configured for allowing communication with the whitelisted IP addresses only.
v. Communication between OT equipment/systems is done through the secure channel preferably of POWERTEL through the fibre optic cable. Security configuration of the communication channel is also to be ensured.
vi. All ICT based equipment/system deployed in infrastructure/system mandatorily CII are sourced from the list of the "Trusted Sources" as and when drawn by MoP/CEA.

b. The Responsible Entity shall be ISO/IEC 27001 certified (including sector specific controls as per ISO/IEC 27019).
c. The Responsible Entity shall have a Cyber Security Policy drawn upon the guidelines issued by NCIIPC.
d. The Responsible Entity shall ensure annual review of their Cyber Security Policy by subject matter expert and changes shall be made therein only after obtaining the due approval from Board of Directors.
e. The process of Access Management for all Cyber Assets owned or under control of the Responsible Entity shall be detailed in the Cyber Security Policy.
f. The Cyber Security Policy shall leverage state-of-art cyber security technologies and relevant processes at multiple layers to mitigate the cyber security risks.
g. The Responsible Entity shall be solely responsible to get Cyber Security Policy implemented through its Information Security Division (ISD).
h. The CISO shall record the reason(s) for exemption required, if any, in case, unable to comply with any of the provision(s) of the Cyber Security Policy. Any exception shall be allowed only after an approval of provisions of compensatory control(s) to mitigate residual cyber security risks.

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i. The CISO shall record the exemptions sought in statement of applicability controls, while getting the ISO 27001 certified. All exemptions and its justification need to be in conformance with Cyber Security Policy of the Responsible Entity.
j. The Responsible Entity shall allocate sufficient Annual budget for enhancing cyber security posture, enhanced year over year.
k. The Responsible Entity shall work in collaboration with other Industry Stakeholders as well as Academia to promote R&D activity in the domain of cyber security.
l. The Responsible Entity shall ensure that cyber security issues are taken up as agenda items in their Board meetings once in every three months.

Article 2 Appointment of CISO.

a) The Responsible Entity shall mandatorily appoint a CISO and shall confirm to qualification, if any, **laid** by Quality Council of India (QCI). In absence, the work of CISO shall be looked upon by Alternate CISO. In case qualification for appointment of Alternate CISO has been relaxed for reasons recorded thereof, Alternate CISO has to mandatorily acquire the minimum required cyber security skill sets within six months from the date of his appointment.
b) The Responsible Entity shall regularly update details of CISO and Alternate CISO, with the Sectoral CERT, as well as on ISAC-Power Portal.
c) Roles and Responsibility of CISOs shall be as laid by CERT-In and ring-fenced to ensure cyber security of the Cyber Assets of the Responsible Entity.

Article 3: Identification of Critical Information Infrastructure (CII).

a) The Responsible Entity shall submit to NCIIPC through Sectoral CERT, details of Cyber Assets which uses a routable protocol to communicate outside the Electronic Security Perimeter drawn by the Responsible Entity or a routable protocol within a control centre and dial-up accessible Cyber Assets, within 30 days from the date of their commissioning in the System.
b) The Responsible Entity shall submit details of Critical Business Processes and underlying information infrastructure along with mapped impact and Risk Profile to NCIIPC and shall get their CIIs identified in consultation with NCIIPC. The process of the notification/declaration by Appropriate Government shall follow thereafter.
c) The Responsible Entity shall review their declared/notified CIIs at least once a year to examine changes if any in the functional dependencies, protocols and technologies or upon any change in security architecture. The Responsible Entity shall review their declared/notified CIIs once in every 6 months, in case if NCIIPC has directed them to constitute an Information Security Steering Committee.
d) The Responsible Entity shall ensure that all cyber assets of their identified/notified CIIs are recorded in the asset register and considered for risk assessment as well as for finalization of controls in statement of applicability.

Article 4. Electronic Security Perimeter

a) The Responsible Entity shall identify and document the Electronic Security Perimeter(s) and all Access Points to the perimeter(s).

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b) The Responsible Entity shall follow procedure of identifying "Electronic Security Perimeter" in case of distributed and/or hybrid information infrastructure, as per IEC 62443 / IS16335 (as amended from time to time).

c) The Responsible Entity shall ensure that every Critical System resides within an Electronic Security Perimeter.

1 Yr – OT
6 Mth – IT

d) The Responsible Entity shall perform a cyber-Vulnerability Assessment of each electronic Access Points to the Electronic Security Perimeter(s) at least once in every 6 (six) months and/or after any change in Security Architecture.

e) The Responsible Entity shall ensure that all critical, high and medium vulnerabilities identified as a result of cyber Vulnerability Assessment shall be closed and verified for the effective closure.

Article 5. Cyber Security Requirements

a) The Responsible Entity shall have an Information Security Division (ISD), headed by CISO.

b) The Responsible Entity shall ensure that the ISD must be functional on 24x7x365 basis and is manned by sufficient numbers of Engineers having valid certificate of successful completion of course on cyber security of Power Sector from the Training Institutes designated by CEA.

c) The Responsible Entity shall ensure that ISD

1) has on-boarded Cyber Swachhta Kendra(CSK) of CERT-In, if they have public IPs.
2) has timely acted upon the advisories, guidelines and directive of NCIIPC, CSK, CERT-In and Sectoral CERTs,
3) has deployed an Intrusion Detection System and Intrusion Prevention System capable of identifying behavioural anomaly in both IT as well as OT Systems.
4) shares reports on incident response and targeted malware samples with CERT-In,
5) updates the firmware/software with the digitally signed OEM validated patches only.
6) enables only those ports and services that are required for normal operations. In case of any emergency the procedure as laid in Access management be followed.
7) maintains firewall logs for the last 6 months duration. Firewall logs shall be analysed and all critical and high severity comments shall be addressed for effective closure.
8) retains document of FAT, SAT test results and report/ certificate of cyber tests carried out for compliance of Government Orders and Cyber Security Audit.*
9) maintains all cyber logs and cyber forensic records of any incident for at least** 90 days.

* FAT, SAT must include comprehensive cyber security tests of the component/equipment/system to be delivered/delivered at site.

** 90 days from date of the commissioning of the system/recovery from any incident, whichever is later.

d) The Responsible Entity shall routinely audit and test security properties of the Critical System and must act upon, in case if any new vulnerabilities is identified through testing or by the equipment manufacturer.

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e) The Responsible Entity shall design a secure architecture for control system appropriate for their process control environment*.

f) All State Load Dispatch Centres(SLDCs) shall comply with the directions issued by the National Load Dispatch Centre(NLDC) as well as Regional Load Dispatch Centres(RLDCs) U/s 29 (1) of the Electricity Act, 2003 to ensure stability and cyber security of grid operation and achieve efficiency in the grid operation. In case of any non-compliance, the Head of SLDC shall be responsible and shall be liable for Penalty as per the provision of CERC/SERC.

*There are so many different types of systems in existence and so many possible solutions, it is important that the selection process ensures that the level of protection is commensurate with the business risk and the Responsible Entity shall not rely on one single security measure for its defence. *(Reference IEC/TR62351-10* Edition1.0 2012-10 *Power systems management and associated information exchange –Data and communications security – Part 10: Security architecture guidelines).*

Article 6 Cyber Risk Assessment and Mitigation Plan

a) The Responsible Entity shall document in their Cyber Security Policy a Cyber Risk Assessment and Mitigation Plans drawn upon the best practises being followed in the Power Sector, and the same shall be approved by Board of Directors.

b) The Cyber Risk Assessment and Mitigation Plans shall clearly define the matrix for assessing the cyber risk of both IT and OT environment and risk acceptance criteria.

c) The Cyber Risk Assessment Plan shall be capable to demonstrate that repeated cyber security risk assessment delivers consistent, valid and comparable results.

d) The review of cyber risk assessment shall be carried out at least once in a Quarter. The actionable of risk treatment and mitigation shall be tracked in this review for their effectiveness.

e) The CISO shall be responsible for implementation and regular review, on the basis of internal and external feedbacks, of the Cyber Risk Assessment and Mitigation Plans.

Article 7 Phasing out of Legacy System

a) As the life cycle of the Power System Equipment/System is longer than that of IT Systems deployed therein, the Responsible Entity shall ensure that all IT technologies in the Power System Equipment/System should have the ability to be upgraded.

b) The Responsible Entity shall ensure that the Information Security Division shall draw the list of all communicable equipments/systems nearing end life or are left without support from OEM. Thereafter CISO shall identify equipment/systems to be phased out from the list drawn, firm up their replacement plan and put up the replacement plan for approval before the Board of Directors.

c) The CISO shall ensure that till equipments/systems nearing end life or left without support from OEM are not replaced, their cyber security is hardened and ensured through additional controls provisioned in consultation with the OEM or alternate Supplier(s)*.

*e.g. Use of CDAC developed AppSamvid and whitelisting of applications installed may be explored across all legacy systems.

d) The Responsible Entity shall document in their Cyber Security Policy a Standard Operating Procedure for safe and secure disposal of outlived or legacy devices.

Article 8. Cyber Security Training.

a) The Responsible Entity shall establish, document, implement, and maintain an annual cyber security training program for personnel having authorized cyber or authorized physical access (unescorted or escorted) to their Critical Systems.
b) The Responsible Entity shall review annually their cyber security training program and shall update it whenever necessary. Annual Review shall record evaluation of the effectiveness of the trainings held.
c) The Responsible Entity shall ensure that Cyber Security training program designed for their IT as well as OT O&M Personnel must include following topics and as per their functional requirements and security concerns additional topics shall be added:
   1) User authentication and authorization.
   2) Cyber Security and Protection mechanisms of IT/OT/ICS Systems.
   3) Introduction to various standards i.e. ISO/IEC:15408, ISO/IEC:24748-1, ISO: 27001, ISO: 27002, ISO 27019, IS 16335, IEC/ISO:62443.
   4) Training on implementation of ISO/IEC 27001 and awareness on IEC 62443.
   5) Vulnerability Assessment in the Critical System.
   6) Monitoring and preserving of electronic logs of access of Critical Assets.
   7) Detecting cyber-attacks on SCADA and ICS systems
   8) The handling of Critical System during cyber crisis.
   9) Action plans and procedures to recover or re-establish normal functioning of Critical Assets and access thereto following a Cyber Security Incident.
   10) Hands on SCADA operation at any of the Regional Load Dispatch Centre.
   11) Handling of risks involved in the procurement of COTS Products.

d) All Personnel engaged in O&M of IT & OT Systems shall mandatorily undergo courses on cyber security of Power Sector from any of the training institute designated by CEA, immediately within 90 days from the notification of CEA Guidelines on Cyber Security in Power Sector.
e) The Responsible Entity shall ensure that none of their newly hired or the current Personnel have access to the Critical System, prior to the satisfactory completion of cyber security training programme from the Training Institutes designated in India, except in specified circumstances such as cyber crisis or an emergency.
f) NPTI in consultation with CEA shall identify and design domain specific courses on Cyber Security for different target groups. The "Governing Board for PSO Training and Certification" shall approve the content, duration etc of these courses and shall review it Annually. NPTI shall conduct these courses at all of their branches on regular basis and shall maintain the list of the Participants successfully completing the course.

Article 9 Cyber Supply Chain Risk Management

a) The Responsible Entity shall ensure that, as and when Ministry of Power, Government of India notifies the Model Contractual Clauses on cyber security, these clauses are included in their every Bid invited for procurement of any ICT based components/equipments/System to be used for Power System.
b) The Responsible Entity shall ensure that all the Communicable Intelligent Equipments and the Service Level Agreements (SLAs) for their Critical Systems shall be sourced from the list of the "Trusted Sources" as and when drawn by MoP/CEA.

c) The Responsible Entity shall ensure that, in case, for the any Communicable Intelligent Devices, if no Trusted Source has been identified, then the successful bidder in compliance with the provisions made in MoP order dated 2.7.2020 and any other relevant MoP order has got the product cyber tested for any kind of embedded malware/Trojan/cyber threat and for adherence to Indian Standards at the designated lab.

d) The Responsible Entity shall ensure that the essential cyber security tests are carried out successfully during FAT, SAT as detailed in **Annexure A.** The equipment/System besides for functionality shall also be tested in the factory for vulnerabilities, design flaws, parts being counterfeit or tainted, so as to minimize problems during on-site-testing and installation. Cyber Security Conformance Testing are to be carried out in the designated Lab as listed in **Annexure-I of MoP Order No. 12/13/2020-T&R dt. 8th June, 2021(Order at Annexure-B).**

e) The Responsible Entity shall ensure that the Equipment/System supplied by the successful bidder shall accompany with a certificate[$, #] obtained by OEM from a certification body accredited to assess devices and process for conformances to IEC 62443-4 standards during design and manufacture. The Responsible Entity shall accept the certificate submitted along with the supplied Equipment/System only if it's in line with the Testing Protocol as notified by Ministry of Power, Government of India, from time to time.

f) The Responsible Entity in compliance to the requirement of Article 9(e) shall also accept, till the setting up of an adequate certification facility in the India, a digitally signed self-declaration of conformance to the IEC 62443-4 standards during design and manufacture of the equipment/system, if submitted by the OEM.

g) The Responsible Entity shall dispose all unserviceable or obsolete Communicable Intelligent Devices as per the procedure laid in their Cyber Risk Assessment and Mitigation Plans which shall be in line with the prevailing best practices.

$ The National & International certification may be specified in the tender for critical systems/sub-systems being procured by the Responsible Entity.

Certification Schemes:
Embedded Device Security Assurance Certification is for an individual product,
System Security Assurance Certification is for a set of products in a system (possibly from different vendors)
Security Development Lifecycle Assurance Certification is for the development processes that a manufacturer uses for developing products.

Article 10 Cyber Security Incident Report and Response Plan

a) The CISO of the Responsible Entity shall report in the formats prescribed by CERT-In, all Cyber Security Incidents, classified as reportable events.

b) Root cause analysis for all reportable events shall be carried out and corrective action taken, so as to ensure that any re-occurrence of such event can be managed with ease.

c) The Responsible Entity shall mandatorily define in their Cyber Security Policy, criteria(s) identified on the basis of impact analysis, for declaring the occurrence of

Cyber Security Incident(s) as a Cyber Crisis in the System owned or controlled by them.

d) The Responsible Entity shall mandatorily designate an Officer along with his/her standby by name and designation and empower them to declare an occurrence of the incident(s) as "Cyber Crisis". The contact details of these Officers shall be updated in the C-CMP within 15 days of changes if any due to transfer or superannuation etc.
e) The CISO shall ensure that during any Cyber Security Incident, ISD monitors and minutely records every details of cyber security events and incidents in both IT as well as the OT System owned or controlled by the Responsible Entity.
f) The CISO shall ensure that each cyber incident is handled strictly as per Cyber Security Incident Response Plan detailed in the latest C-CMP approved by the Board of Directors.
g) The Responsible Entity shall ensure that the efficacy of the Cyber Security Incident Response Plan is tested annually through mock drill(s) carried out, if feasible, as simulation exercise(s) or as table top exercise(s) with wider participation of their employees, in consultation with CERT-In and sectoral CERT. In case if any shortcoming is observed in the Cyber Security Incident Response Plan suitable changes shall be made in it.
h) The Responsible Entity shall ensure that the CISO compiles details of incident detection, incident handling, learnings from each incident and damage claims made if any and shall report to CERT-In as well as upload information on ISAC-Power Portal.

Article 11 Cyber Crisis Management Plan(C-CMP)

a) The Responsible Entity shall prepare a Cyber Crisis Management Plan and submit to their sectoral-CERT for review with intimation to Ministry of Power/CISO-MoP. Responsible Entity shall update their C-CMP on the basis of comments made by sectoral-CERT and then submit for vetting to CERT-In. The C-CMP shall be updated once again to include the observations made by CERT-In before seeking approval of Board of Directors for implementation of C-CMP.
b) The Responsible Entity shall ensure that the C-CMP is reviewed at least annually. The CISO shall ensure that all changes are made in C-CMP only with the due approval of Board of Directors and the changes made in C-CMP have been communicated through a verifiable means to all the concerned Personnel of the Responsible Entity.
c) The CISOs shall be the custodian of all the cyber security related documents including Cyber Crisis Management Plan, Risk Treatment Plan, Statement of Applicability of controls, and compliance to regulator's requirement.
d) The CISO shall be accountable for ensuring enforcement of C-CMP by Information Security Division of the Responsible Entity, during a cyber-crisis, as and when declared by the designated Officer. (refer Article 10(d))

Article 12: Sabotage Reporting%

a) The Responsible Entity shall incorporate procedure for identifying and reporting of sabotage in their Cyber Security Policy within 30 days from issue of the Guidelines, or grant of licence under the appropriate legal provisions to the Responsible Entity.
b) The CISO shall be held liable for non-reporting of identified sabotage(s) as per procedure laid for identifying and reporting of sabotage in the Cyber Security Policy of the Responsible Entity.

c) The CISO shall prepare a detailed report on disturbances or unusual occurrences, identified, suspected or determined to be caused by sabotage in the Critical System of the Responsible Entity, and shall submit the report to the Sectoral CERT as well as to CERT-In within 24 hours of its occurrence.

d) The CISO shall submit to NCIIPC within 24 hours of occurrence the report on every sabotage classified as cyber incidents(s) on "Protected System".

e) The CISO upon occurrence on every sabotage shall take custody of all log records as well as digital forensic records of affected Cyber Assets, Intrusion Detection System, Intrusion Protection System, SIEM and shall preserve them for at least 90 days and shall make them available as and when called upon for investigation by the concerned Agencies.

%Disturbances or unusual occurrences, suspected or determined to be caused by sabotage.
Sabotage e.g. can be a forced intrusion in un-manned/manned facility and taking control of operation of Critical System through a communicating device.

Article 13 Security and Testing of Cyber Assets

a) The Responsible Entity shall ensure security of all in-service phase as well as standby Cyber Assets through regular firmware/Software updates and patching, Vulnerability management, Penetration testing (of combined installations), securing configuration, supplementing security controls. CISO shall maintain details of update version of each firmware and software and their certification if received from OEMs.

b) The Responsible Entity shall carry out regularly Vulnerability Assessment of all Cyber Assets owned or under their control. If a Cyber Asset is found vulnerable to any exploits or upon any patch updates or major configuration changes, then further Penetration Testing may be carried out offline or in a suitably configured laboratory test-bed to determine other vulnerabilities that may have not been identified so far.

c) The Responsible Entity shall specify security requirement and evaluation criteria during each phase of their procurement Process.

d) The Responsible Entity shall ensure that all Cyber Assets being procured shall conform to the type tests as mentioned in the specification for type testing listed in the bid document. Type test reports of tests conducted in NABL accredited Labs or internationally accredited labs (with in last 5 years from the date of bid opening) shall be mandated to be submitted along with bid. In case, the submitted Type Test reports are not as per specification, the re-tests shall be conducted without any cost implication to the Responsible Entity.

e) The Responsible Entity shall ensure that all Communicable devices are tested for communication protocol as per the ISO/IEC/IS standards listed in **MoP Order No. 12/13/2020-T&R dated 8th June, 2021(Annexure-B).**

f) The Responsible Entity shall ensure that all Critical Systems designed with Open Source Software are adequately cyber secured.

g) The Responsible Entity as a best practise upon any incidence of Cyber Security Breach shall carry out cyber security tests at any lab designated for cyber testing by Ministry of Power. These tests shall be similar to Pre Commissioning Security Test and those essential for carrying out Post Incident Forensics Analysis.

Article 14 Cyber Security Audit

a) The Responsible Entity shall implement Information Security Management System (ISMS) covering all its Critical Systems.
b) The Responsible Entity shall through a CERT-In Empanelled Cyber Security OT Auditor shall get their IT as well as OT System audited at least once in every 6 (six) months and shall close all critical and high vulnerabilities within a period of one month and medium as well as low non-conformity before the next audit. Effective closure of all non-conformities shall be verified during the next audit.
c) The Cyber Security Audit shall be as per ISO/IEC 27001 along with sector specific standard ISO/IEC 27019, IS 16335 and other guidelines issued by appropriate Authority if any. These mentioned standards shall be current with all amendments if any and in case if any standard is superseded, the new standard shall be applicable. CISO shall ensure immediate closure of non-conformance, based on the criticality and by means all non-conformances are to be closed before the next audit.
d) The Responsible Entity shall ensure that CISO has all the required systems and documents in place, as mandated by NSCS for base line cyber security audit.

FAT & SAT

1. During FAT stage, the customer has to verify all types test reports / certificates including Communication protocol and security conformance tests of the devices offered for FAT.
2. FAT of SCADA involves testing as a whole system in the integrated scale down set up. For SCADA, Indian standard IS 15953: 2011 "SCADA System for Power System Applications" provides definition and guidelines for the specification, performance analysis and application of SCADA systems for use in electrical utilities (for transmission & Distribution) including guidance on Tests and inspections.
3. The SAT will be done at customer site as per the SAT document mutually agreed by buyer and supplier. For SAT also, guidance from IS 15953: 2011need to be applied.
4. IEC 61850-10-3 Communication Networks and Systems For Power Utility Automation-Functional testing of IEC 61850 systems (in draft stage - CDTR) covers testing of applications within substations covering

    a. A methodical approach to the verification and validation of a substation solution
    b. The use of IEC 61850 resources for testing in Edition 2.1
    c. Recommended testing practices for different use cases
    d. Definition of the process for testing of IEC 61850 based devices and systems using communications instead of hard wired system interfaces (ex. GOOSE and SV instead of hardwired interfaces)
    e. Use cases related to protection and control functions verification and testing.

    This standard may be used as a guidelines for FAT & SAT for Substation Automation System (SAS) based on IEC 61850.

Annexure - B

Annexure – 1

List of designated laboratories for cyber security conformance testing

Table -A. Field Equipment /Operational Technology (OT)

Sl. No.	Equipment	Communication Protocol Conformance Standards	Protocol Security Conformance Standards	Designated Laboratories
1	Remote Terminal Units (RTUs) & PLCs with IEC communications protocols	IEC 60870-5 -101 / IEC 60870-5 -104 (Test Details Annexure 2)	IEC 60870-5- 7 Security extension & IEC 62351 series (specifically IEC 62351-100 parts 1 & 3) (Test Details Annexure-2	Central Power Research Institute (CPRI), Prof Sir C V Raman Road, Sadashivanagar P O, Bengaluru – 560080, Karnataka
2	Intelligent Electronic Equipment / Numerical Protection Relays / Bay Control Units / Bay Protection Units, Gateways, Transformer Tap controller/ changer, etc. with IEC 61850 communication protocol	IEC 61850 – 5 to IEC 61850 – 10 (Test Details Annexure 2)		CPRI
3	Smart meters with IEC 62056 communication protocols	IEC 62056 series / DLMS & IS 15959 series and IS 16444 series (Test details Annexure 2)	IEC 62056 series / DLMS & IS 15959 series and IS 16444 series (Test Details Annexure 2)	1. CPRI 2. Electrical Research and Development Association (ERDA), ERDA Road, GIDC, Makarpura, Vadodara - 390 010 Gujarat 3. Yadav Measurements Pvt. Ltd. (YMPL) 373-375, RIICO Bhamashah Industrial Area Kaladwas 313003 Udaipur – Rajasthan

Information Technology (IT) Equipment (Main / Backup / Disaster recovery (DR) Control Centre / Substation control centre IT equipment)

All IT products procured /supplied shall have a valid Certificate of Common Criteria as per ISO/IEC 15408 issued by signatories of the Common Criteria Recognition Agreement (CCRA) (www.commoncriteriaportal.org).

Import/procurement/supplied from vendors sourcing from prior reference countries, the Certificate for Common Criteria shall be from Government Laboratories in India according to the IC3S scheme operated by Ministry of Electronics and Information Technology, which is a signatory to CCRA.

https://www.commoncriteria-india.gov.in/

Annexure - 2

Details of tests for various identified products

Remote Terminal Units (RTUs) (Sl. No. 1 of Table – A of Annexure – 1)

Test protocol:

Utilities / manufacturers will submit the sample along with all the required technical documentation for taking up testing to the designated laboratory.

Reference standards

1) IEC 60870-5-101 & IEC 60870-5-104 as applicable

2) IEC 60870-5-7 Telecontrol equipment and systems - Part 5-7: Transmission protocols - Security extensions to IEC 60870-5-101 and IEC 60870-5-104 protocols (applying IEC 62351)

3) IEC 62351-100-1 & IEC 62351-100-3 and other cross referenced standards.

Test cases

Extract from standard (IEC 62351-100-1)

The conformance test cases are divided into four clauses:

- Clause 5: Verification of configuration parameters. This clause contains the configuration parameters affecting the message contents and/or the protocol behaviour.
- Clause 6: Verification of communication. The goal of this clause is to verify that Device Under Test (DUT) is able to implement the security extension messages as described in IEC TS 60870-5-7.
- Clause 7: Verification of procedures. The goal of this clause is to verify that DUT is able to execute the security extension procedures as described in IEC TS 62351-5.
- Clause 8: Test result chart. This clause contains the results of the test cases listed in Clauses 6 and 7 for each supported value of the configuration parameters listed in Clause 5.

The test cases are organized in tables. They are numbered; their numbering syntax is: Subclause number (where the Table is located) + test case number.

In the column 'reference' each test case has a direct reference to IEC TS 62351-5 or IEC TS 60870-5-7 where the clause under test is defined.

Test cases are mandatory depending on the description in the column 'Required'. The following situations are possible:

M= Mandatory test case. The test is referencing a clause that is mandatory in IEC TS 62351-5 or IEC TS 60870-5-7.

Protocol Information Conformance Statement (PICS) x, x = Mandatory test case if the functionality is enabled in the PICS (by marking the applicable check box), with a reference to the section number of the PICS (x.x).

Conformance testing of security extension procedures

The security extension procedures can be summarized as follows:

- User management
- Update key maintenance
- Session key maintenance
- Challenge/Reply authentication
- Aggressive Mode authentication

Extract from standard (IEC 62351-100-3)

IEC 62351-3 defines the requirements related to the authentication/encryption protocol, procedures and methods to be implemented at TCP/IP (transport) level.

The conformance test cases are divided into three clauses:

- Clause 5: Verification of configuration parameters. This clause contains the parameters specified by the standards referencing IEC 62351-3 (see IEC 62351-3:2014/AMD1:2018, Clause 7) and affecting the protocol behaviour.
- Clause 6: Verification of IEC 62351-3 requirements. The goal of this clause is to verify that DUT is conformant to the requirements of the IEC 62351-3.
- Clause 7: Test result chart. This clause contains the results of the test cases listed in Clause 6 for each supported value of the configuration parameters listed in Clause 5.

The test cases are organized in tables. They are numbered, their numbering syntax is: Subclause number (where the table is located) + test case number.

In the column 'Reference' each test case has a direct reference to IEC 62351-3 where the clause under test is defined. PICS or Protocol Implementation eXtra Information for Testing (PIXIT) could be found in the "Reference" column for some test cases whenever the execution of the test case shall take into account specific parameter values declared in the PICS or PIXIT of the DUT.

Test cases are mandatory depending on the description in the column 'Required'. The following situations are possible:

M = Mandatory test case. The test is referencing to a clause that is mandatory in IEC 62351-3.

PICS

or

PIXIT = Mandatory test case if the functionality is enabled in the PICS or PIXIT by marking the applicable check box or declaring the applicable value.

Intelligent Electronic Devices (IEDs) (Sl. No. 2 of Table – A of Annexure – 1)

Utilities / manufacturers will submit the sample along with all the required technical documentation for taking up testing to the designated laboratory.

Reference standards

IEC 61850 series

Specifically IEC 61850-5, IEC 61850-6, IEC 61850-7, IEC 61850-8, IEC 61850-9 and IEC 61850-10

Test cases

Communication protocol conformance as per IEC 61850 -10. This part of standard defines methods and abstract test cases for conformance testing of client, server and sampled values devices used in power utility automation systems, the methods and abstract test cases for conformance testing of engineering tools used in power utility automation systems, and the metrics to be measured within devices according to the requirements defined in IEC 61850-5. Further this part of standard specifies standard techniques for testing of conformance of client, server and sampled value devices and engineering tools, as well as specific measurement techniques to be applied when declaring performance parameters. The use of these techniques will enhance the ability of the system integrator to integrate IEDs easily, operate IEDs correctly, and support the applications as intended.

Smart Meters (Sl. No. 3 of Table – A of Annexure – 1)

Utilities / manufacturers will submit the sample along with all the required technical documentation for taking up testing to the designated laboratory.

IEC 62056 series of standards (Electricity metering data exchange – The DLMS/COSEM suite) specifies details of communication protocol requirements, conformance testing and security requirements. The Part 5-3 (DLMS/COSEM application layer) specifies the DLMS/COSEM application layer in terms of structure, services and protocols for DLMS/COSEM clients and servers, and defines rules to specify the DLMS/COSEM communication profiles. It defines services for establishing and releasing application associations, and data communication services for accessing the methods and attributes of COSEM interface objects, defined in IEC 62056-6-2 using either logical name (LN) or short name (SN) referencing.

Clause 5 and sub clauses specifies security requirements. It cover security concepts, Identification and authentication, Cryptographic algorithms, Cryptographic keys – overview, Key used with symmetric key algorithms, Keys used with public key algorithms and Applying cryptographic protection.

Note: All above referred standards shall be latest with amendments if any at the time of submission of sample(s) for testing.

Annexure – 3

Testing Criteria

1) Supply from Trusted Sources

The sample size shall be as specified by CEA as per the approved criteria for Trusted Vendors

2) Supply from other than trusted vendors

The sample size shall be shall be 5% of the supply lot / ordered quantity (minimum one). The manufacturer shall submit request to the Nodal agency along with vendor's / manufacturer's certifications for supply chain management system practices and secure product development process implementations based on any one or more of standards ISO / IEC 27036, ISO / IEC 20243, IEC 62443 for verification.

After scrutiny of vendor's / manufacturer's certifications the supplier / utilities shall be asked to submit product to the designated laboratory for communication and cyber security conformance testing.

The supply lot shall stand rejected on failure to comply with the test requirements.

3) Supply from prior reference countries

The utility shall obtain prior permission from the Government of India for importing the product / system from prior reference countries.

The sample size shall be shall be 10 % of the supply lot / ordered quantity (minimum one). The manufacturer shall submit request to the Nodal agency along with vendor's / manufacturer's certifications for supply chain management system practices and secure product development process implementations based on any one or more of standards ISO / IEC 27036, ISO / IEC 20243, IEC 62443 for verification.

After scrutiny of vendor's / manufacturer's certifications the supplier / utilities shall be asked to submit product to the designated Government / Government controlled Autonomous laboratory for type tests (Annexure – 4) and communication & cyber security conformance testing.

The supply lot shall stand rejected on failure to comply with the test requirements.

Type Tests

Products imported from prior reference countries shall also undergo type testing as per following standards in addition to communication protocol and security conformance testing at the designated Government / Government controlled Autonomous laboratory:

Type test standards for RTUs

1. IEC 60870-1-2:1989 Telecontrol equipment and systems. Part 1: General considerations. Section Two: Guide for specifications.
2. IEC 60870-2-1:1995 Telecontrol equipment and systems - Part 2: Operating conditions - Section 1: Power supply and electromagnetic compatibility.
3. EC 60870-2-2:1996 Telecontrol equipment and systems - Part 2: Operating conditions -Section 2: Environmental conditions (climatic, mechanical and other non-electrical influences).
4. IEC 60870-3:1989 Telecontrol equipment and systems. Part 3: Interfaces (electrical characteristics)

Type test standard for IEDs / Numerical Protection Relays / Bay controls units

1. IEC 61850-3: 2013, Ed. 2 Communication networks and systems for power utility automation – Part 3: General requirements.

Type test standards for Smart meters

1. IS 16444: 2015 AC static direct connected watthour smart meter class 1 and 2 – Specification.
2. IS 16444 Part 2: 2017 AC static transformer operated watthour and var - Hour smart meters, class 0.2 S, 0.5 S and 1.0 S: Part 2 specification transformer operated smart meters.

Note:

1. All above referred standards shall be latest with amendments if any at the time of submission of sample(s) for testing.
2. Type tests generally covers functionality, environmental, mechanical, EMI/ EMC and electrical safety related tests.

Windows XP

Windows XP follows the Fixed Lifecycle Policy.

This applies to the following editions: Home, Professional, Professional for Embedded Systems, Professional x64, Starter

> ⓘ **Important**
>
> Support for this product has ended. See migration guidance below.

Support dates are shown in the Pacific Time Zone (PT) - Redmond, WA, USA.

Support Dates

Listing	Start Date	Mainstream End Date	Extended End Date
Windows XP	Dec 31, 2001	Apr 14, 2009	Apr 8, 2014

Releases

Version	Start Date	End Date
Service Pack 3	Apr 21, 2008	Apr 8, 2014
Service Pack 2	Sep 17, 2004	Jul 13, 2010
Service Pack 1a	Feb 3, 2003	Oct 10, 2006
Service Pack 1	Aug 30, 2002	Oct 10, 2006
Original Release	Dec 31, 2001	Aug 30, 2005

Links

- Migration guidance
- Service pack policy

> ⓘ **Note**
>
> The start date for Microsoft Windows XP Professional x64 Edition was April 24, 2005.

Editions

- Home
- Professional
- Professional for Embedded Systems
- Professional x64
- Starter

Microsoft support lifecycle > Search product lifecycle

Search product life cycle

Search by Product name

Windows 7

+ Add filter group

Search

Export

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Microsoft Windows Media Encoder 7.1	01/05/2001	31/03/2003	31/03/2004		
Microsoft Windows Media Encoder 7.1 for Windows 98 SE	01/05/2001	30/06/2002	30/06/2003		
Microsoft Windows Media Encoder 7.1 for Windows NT 4.0	01/05/2001	31/12/2003	31/12/2004		

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Microsoft Windows Media Encoder 7.1 on Windows 2000 Professional	01/05/2001	31/03/2003	31/03/2004		
Microsoft Windows Media Encoder 7.1 on Windows Millennium Edition	01/05/2001	31/12/2003	31/12/2004		
Microsoft Windows Media Format 7.1 SDK Windows 98 SE	01/05/2001	30/06/2002	30/06/2003		
Microsoft Windows Media Format Software Developers Kit 7.1 on Windows 2000 Professional	01/05/2001	31/03/2003	31/03/2004		
Microsoft Windows Media Format Software Developers Kit 7.1 on Windows Millennium Edition	01/05/2001	31/12/2003	31/12/2004		

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Microsoft Windows Media Player 7.1 for Pocket PC	01/05/2001	Not Applicable	Not Applicable		
SQL Server 2017 on Windows (all editions)	29/09/2017	11/10/2022	12/10/2027		Starting with SQL Serve Service Packs will be rel Server follows this servi
Windows 10 Mobile Enterprise, released in April 2017	25/04/2017	11/06/2019	Review Note		See the Device OS Lifec Windows as a Service (V regarding servicing requ other important informa
Windows 10 Mobile Enterprise, released in October 2017	17/10/2017	10/12/2019	Review Note		These dates also apply t IoT Mobile. See the Device OS Lifec Windows as a Service (V regarding servicing requ other important informa
Windows 10 Mobile, released in April 2017	25/04/2017	11/06/2019	Review Note		See the Device OS Lifec Windows as a Service (V regarding servicing requ other important informa
Windows 10 Mobile, released in October 2017	17/10/2017	10/12/2019	Review Note		See the Device OS Lifec Windows as a Service (V regarding servicing requ other important informa
Windows 10, version 1507 (Enterprise, Education, Pro, Home, IoT Enterprise)	29/07/2015	09/05/2017	Review Note		See the Windows Lifecy Windows as a Service (V regarding servicing requ other important informa Unless deferred, subseq 10 Semi-Annual Channe updates may be installe listed end of Mainstrear

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Windows 10, version 1607 (Enterprise, Education, IoT Enterprise)	02/08/2016	09/04/2019	Review Note		See the Windows Lifecy FAQ and Windows as a (WaaS) for details regar requirements and other information. Unless def subsequent Windows 1 Channel feature update installed prior to the list Mainstream Support da
Windows 10, version 1607 (Home, Pro, Pro Education, Pro for Workstations, IoT Core)	02/08/2016	10/04/2018	Review Note		See the Windows Lifecy FAQ and Windows as a (WaaS) for details regar requirements and other information. Unless def subsequent Windows 1 Channel feature update installed prior to the list Mainstream Support da
Windows 10, version 1703 (Enterprise, Education, IoT Enterprise)	11/04/2017	08/10/2019	Review Note		See the Windows Lifecy FAQ and Windows as a (WaaS) for details regar requirements and other information. Unless def subsequent Windows 1 Channel feature update installed prior to the list Mainstream Support da
Windows 10, version 1703 (Home, Pro, Pro Education, Pro for Workstations, IoT Core)	05/04/2017	09/10/2018	Review Note		See the Windows Lifecy FAQ and Windows as a (WaaS) for details regar requirements and other information. Unless def subsequent Windows 1 Channel feature update installed prior to the list Mainstream Support da

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Windows 10, version 1709 (Enterprise, Education, IoT Enterprise)	17/10/2017	13/10/2020	Review Note		Windows 10, version 17 Channel is governed by Lifecycle Policy. See the Lifecycle FAQ and Wind (WaaS) for details regar requirements and other information. Unless deferred, subseq 10 Semi-Annual Channe updates may be installe listed end of Mainstrear Note: This product's en been delayed from Apri October 13, 2020.
Windows 10, version 1709 (Home, Pro, Pro Education, Pro for Workstations, IoT Core)	17/10/2017	09/04/2019	Review Note		Windows 10, version 17 Channel is governed by Lifecycle Policy. See the Lifecycle FAQ and Wind (WaaS) for details regar requirements and other information. Unless def subsequent Windows 1 Channel feature update installed prior to the list Mainstream Support da
Windows 7 Enterprise	22/10/2009	Not Applicable	Not Applicable	09/04/2013	Migration guidance can Extended Security Upda for this product. See the Pack listing for end of s
Windows 7 Enterprise N	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can
Windows 7 Home Basic	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can
Windows 7 Home Premium	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Windows 7 Home Premium N	22/10/2009	13/01/2015	Not Applicable		
Windows 7 Professional	22/10/2009	Not Applicable	Not Applicable	09/04/2013	Migration guidance can Extended Security Upda for this product. See the Pack listing for end of s
Windows 7 Professional for Embedded Systems	22/10/2009	Not Applicable	Not Applicable	09/04/2013	Migration guidance can Extended Security Upda for this product. See the Pack listing for end of s
Windows 7 Professional N	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can
Windows 7 Service Pack 1	22/02/2011	13/01/2015	14/01/2020		Extended Security Upda available for Windows 7 Enterprise, and Professi Embedded Systems edi product, for up to an ad years past the end of su to learn more. Support after the next service pa the end of the product's lifecycle, whichever com more information, pleas pack policy here. Migrat can be found here.
Windows 7 Starter	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can
Windows 7 Starter N	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can
Windows 7 Ultimate	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Windows 7 Ultimate for Embedded Systems	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can
Windows 7 Ultimate N	22/10/2009	Not Applicable	Not Applicable	09/04/2013	See the latest Service Pa product for the end of s Migration guidance can
Windows Automated Installation Kit for Windows 7	22/10/2009	13/01/2015	Not Applicable		
Windows Embedded Compact 7	15/03/2011	12/04/2016	13/04/2021		Migration guidance can
Windows Embedded POSReady 7	10/09/2011	11/10/2016	12/10/2021		Migration guidance can Extended Security Upda for this product. See the Pack listing for end of su
Windows Embedded Standard 7	29/07/2010	Not Applicable	Not Applicable	09/04/2013	Migration guidance can Extended Security Upda for this product. See the Pack listing for end of su
Windows Embedded Standard 7 Service Pack 1	28/02/2011	13/10/2015	13/10/2020		Extended Security Upda available for Windows 7 Enterprise, and Professi Embedded Systems edit product, for up to an ad years past the end of su to learn more. Support after the next service pa the end of the product's lifecycle, whichever com more information, pleas pack policy here. Migrat can be found here.

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Windows Internet Explorer 7	18/10/2006	Review Note	Review Note		Beginning January 12, 2 most current version of available for a supporte system will receive tech and security updates. PI Internet Explorer Lifecyc a list of supported oper and browser combinatic Migration guidance can
Windows Media Player 7.0 on Windows Millennium	31/12/2000	Not Applicable	Not Applicable		
Windows Media Player 7.0.1 on Mac OS	24/07/2001	Review Note	Review Note		Visit http://support.microsof for details.
Windows Media Player 7.1 on Mac OS	08/01/2002	Review Note	Review Note		Visit http://support.microsof for details.
Windows Media Player 7.1 on Windows 2000 Professional	01/05/2001	Not Applicable	Not Applicable		
Windows Media Player 7.1 on Windows 98 SE	01/05/2001	Not Applicable	Not Applicable		

Products Released ↓	Life Cycle Start Date	Mainstream Support End Date	Extended Support End Date	Service Pack Support End Date	Notes
Windows Media Player 7.1 on Windows Millennium Edition	01/05/2001	Not Applicable	Not Applicable		
Windows Phone 7.8	09/02/2013	14/10/2014	Review Note		Microsoft will make upc for the Operating Syste phone, including securit period of 18 months aft start date. Distribution c may be controlled by th operator or the phone r from which you purchas Update availability will a country, region, and har capabilities.
Windows Server, version 1709 (Datacenter, Standard)	17/10/2017	09/04/2019	Review Note		Windows Server, versio Annual Channel is gove Modern Lifecycle Policy See the Windows Lifecy Windows Server Semi-A Overview for details reg requirements and other information.

Windows Server 2003

Windows Server 2003 follows the Fixed Lifecycle Policy.

This applies to the following editions: Datacenter (32-bit x86), Datacenter (x64), Datacenter for Itanium-Based Systems, Enterprise (32-Bit x86), Enterprise for Itanium-based Systems, Enterprise X64, Standard (32-bit x86), Web

Support dates are shown in the Pacific Time Zone (PT) - Redmond, WA, USA.

Support Dates

Listing	Start Date	Mainstream End Date	Extended End Date
Windows Server 2003	May 28, 2003	Jul 13, 2010	Jul 14, 2015

Releases

Version	Start Date	End Date
Service Pack 2	Mar 13, 2007	Jul 14, 2015
Service Pack 1	Mar 30, 2005	Apr 14, 2009
Original Release	May 28, 2003	Apr 10, 2007

Links

- Supported paths for upgrading from Windows Server 2003 to Windows Server 2008
- Service pack policy

- Prepare Windows Server 2003 machines for migration

> ⓘ Note
>
> Itanium-Based Systems have a start date of June 19, 2003.

Editions

- Datacenter (32-bit x86)
- Datacenter (x64)
- Datacenter for Itanium-Based Systems
- Enterprise (32-Bit x86)
- Enterprise for Itanium-based Systems
- Enterprise X64
- Standard (32-bit x86)
- Web

End of support for Windows Server 2008 and Windows Server 2008 R2

FAQ • 5 contributors

In this article

Summary
More information
Resources
Migration assistance with the Azure Migration and Modernization Center

This article provides some information about end of support for Windows Server 2008 and Windows Server 2008 R2.

Applies to: Windows Server 2012 R2
Original KB number: 4456235

Summary

Windows Server 2008 and Windows Server 2008 R2 are approaching the end of their support lifecycle. This means that as of the dates in the table below there will be no additional:

- Free security updates on-premises
- Non-security updates
- Free support options
- Online technical content update

Customers who use Windows Server 2008 or Windows Server 2008 R2 products and services should migrate to Microsoft Azure to take advantage of three additional years of **Critical** and **Important** security updates at no additional charge and modernize when ready. For environments other than Azure, we recommend customers upgrade to the latest version before the deadline. For customers who cannot meet the end-of-support

deadline may purchase Extended Security Updates to keep server workloads protected until they upgrade (some restrictions apply).

More information

The following Windows Server 2008 and 2008 R2 products are approaching End of Support:

Product	End of Extended Support
Windows Server 2008 Datacenter	1/14/2020
Windows Server 2008 Datacenter without Hyper-V	1/14/2020
Windows Server 2008 Enterprise	1/14/2020
Windows Server 2008 Enterprise without Hyper-V	1/14/2020
Windows Server 2008 for Itanium-Based Systems	1/14/2020
Windows Server 2008 Foundation	1/14/2020
Windows Server 2008 R2 Datacenter	1/14/2020
Windows Server 2008 R2 Enterprise	1/14/2020
Windows Server 2008 R2 for Itanium-Based Systems	1/14/2020
Windows Server 2008 R2 Standard	1/14/2020
Windows Server 2008 Standard	1/14/2020
Windows Server 2008 Standard without Hyper-V	1/14/2020

We recommend that you migrate to Azure or upgrade to the current product versions before the support end dates. This lets you take advantage of the latest product innovations and make sure you have uninterrupted support from Microsoft.

> ⓘ Note
>
> The following Server products are NOT eligible for Extended Security Updates.

Product	End of Extended Support
Microsoft Hyper-V Server 2008	1/14/2020
Microsoft Hyper-V Server 2008 R2	1/14/2020
Windows HPC Server 2008	4/14/2020
Windows HPC Server 2008 R2	4/14/2020
Windows HPC Server 2008 without Hyper-V	4/14/2020
Windows Server Update Services 3.0	7/14/2009
Windows Server Update Services 3.0 SP1	10/12/2010
Windows Server Update Services 3.0 SP2	1/14/2020
Windows Storage Server 2008 Basic	1/14/2020
Windows Storage Server 2008 Basic 32-bit	1/14/2020
Windows Storage Server 2008 Basic Embedded	1/14/2020
Windows Storage Server 2008 Basic Embedded 32-bit	1/14/2020
Windows Storage Server 2008 Enterprise	1/14/2020
Windows Storage Server 2008 Enterprise Embedded	1/14/2020
Windows Storage Server 2008 R2	1/14/2020
Windows Storage Server 2008 R2 Essentials	1/14/2020

Product	End of Extended Support
Windows Storage Server 2008 Standard	1/14/2020
Windows Storage Server 2008 Standard Embedded	1/14/2020
Windows Storage Server 2008 Workgroup	1/14/2020
Windows Storage Server 2008 Workgroup Embedded	1/14/2020

Resources

Windows Server 2008 and 2008 R2 EOS site
Windows Server 2008 and 2008 R2 EOS brochure
Windows Server 2008 and 2008 R2 documentation

Migration assistance with the Azure Migration and Modernization Center

The Azure Migration and Modernization Center has a full range of tools available to help you assess your current on-premises environment, migrate your workloads onto Azure, and optimize your Azure usage to best suit your needs. Microsoft also works with many Partners, who are available to help you at every step of the journey.

Recommended content

Windows Server 2012 - Microsoft Lifecycle
Windows Server 2012 follows the Fixed Lifecycle Policy.

Windows Server 2012 R2 - Microsoft Lifecycle
Windows Server 2012 R2 follows the Fixed Lifecycle Policy.

Windows Server 2016 - Microsoft Lifecycle

Windows Server 2016 follows the Fixed Lifecycle Policy.

Windows Server 2008 R2 - Microsoft Lifecycle

Windows Server 2008 R2 follows the Fixed Lifecycle Policy.

Windows Server 2019 - Microsoft Lifecycle

Windows Server 2019 follows the Fixed Lifecycle Policy.

Lifecycle dates extended for Windows Server 2012 - Microsoft Lifecycle

Announcing that lifecycle dates are extended for Windows Server 2012.

Windows Server 2022 - Microsoft Lifecycle

Windows Server 2022 follows the Fixed Lifecycle Policy.

Windows Server 2003 R2 - Microsoft Lifecycle

Windows Server 2003 R2 follows the Fixed Lifecycle Policy.

Show more ∨

ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
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Ref: GM-NTPC/404/CE-HMI-02 Dated 21/09/2022

Sub: Recommendation for HMI Upgrade

The Windows XP/ Windows 7 based workstation hardware and Microsoft Operating System available at sites (projects listed in annexure-1) is out of mainstream support from OEM and Microsoft respectively. Also the support for Symantec Antivirus version 10.0 has been withdrawn by the OEM and no more security updates / virus definitions are available for that version. Hence the HMIs-maxStations are prone to vulnerabilities which can tamper the operation of plant.

HMI Upgrade for the projects mentioned in Annexure-1 is proposed due to various obsolescence in the DCS components as detailed below.

DCS Component		Existing version / model / Specification	Obsolescence
Workstation / Engineering server / Historian server	Hardware	**Workstation:** Intel Core 2 Duo processor, 1GB RAM, 146 GB SAS disk, 10 Mbps Ethernet port. **Server:** Intel Xeon dual core processor, 2 GB RAM, 3x76GB HDD, 10 Mbps Ethernet port.	Lower Processor cores and speed, lower HDD capacity and RAM requirements incompatible for latest software requirements; Lower network bandwidth of 10Mbps restricting communication speed capability of latest DCS components and attributing to latency.
	Operating System	Windows 7 SP1 / Windows XP / Windows Server 2008 R2	Operating Systems were declared End of Support by the OEM-Microsoft as mentioned below: Windows XP - April' 2014 Windows 7 - Jan' 2020 Windows Server 2008 R2 - Jan' 2020
	maxDNA software	maxDNA 4.2.1 / 4.5 / 4.5.1 / 6.0.x	These versions are not compatible with latest Operating Systems; more improved version of maxDNA- release 7.x is available suiting the latest OS.
	Antivirus Software	Symantec 10.x / Symantec 11.x / Symantec 12.x	Declared obsolete by the OEM-Broadcom and no longer updates or virus definitions are available.

ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
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Network	Switch	10 Mbps backbone	Lower network bandwidth of 10Mbps restricting communication speed capability of latest DCS components.
	Network Hardening settings	No validated Network hardening settings	Not suitable for latest network requirements with hardening features.



Prakash D
AGM (CE-Engg-I)

Annexure-1 List of upgrade projects	
Sl No	Project Name
1	Barauni_Stage-2
2	Bongaigaon_Stage-1
3	Dadri-Thermal_Stage-1
4	Dadri-Thermal_Stage-2
5	Darlipalli_Stage-1
6	Farakka_Stage-2
7	Farakka_Stage-3
8	Gadarwara_Stage-1
9	KoldamHydro
10	Korba_Stage-1
11	Korba_Stage-3
12	Mauda_Stage-1
13	Mauda_Stage-2
14	NorthKaranpura_Stage-1
15	Rihand_Stage-2
16	Rihand_Stage-3
17	Simhadri_Stage-2
18	TANDA_Stage-1
19	TANDA_Stage-2
20	Unchahar_Stage-4
21	Vindhyachal_Stage-4
22	Vindhyachal_Stage-5
23	BRBCL Stage-I
24	Jhajjar Stage-I
25	KBUNL Stage-I
26	KBUNL Stage-II
27	NPGCL Stage-I
28	NSPCL Bhilai Stage-I
29	NTECL Stage-I

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TECHNICAL PROPOSAL

Technical proposal for Secured Migration of SAS at NTPC Vindhyachal Stage 4 & 5.

Submitted by: Nihit Agarwal
nihit.agarwal@siemens.com
Issue Date: 10 October 2021

Note:

Siemens Confidential

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Reference Documents

This proposal is in response to the RFQ received dated 10/10/2021 and following documents have been referred while drafting this offer:

Document No.	Revision	Date	Description
Email	0	10.10.2021	Secured Migration of SAS

Revision Log

Rev.	Date	Created By	Description

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   2.1 Architecture of Vindhyachal Stage - 4 & 5 5

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4. Detailed Bill of Material 7

5. Design basis 10

6. Scope of Work 13

7. Price Schedule 14

8. Terms and Conditions: 14

1. Site Summary

Presently Switchyard Automation is running on the obsolete Operating system i.e. Win-XP and the associated IGPC / Gateway Hardware that are also obsolete. Presently automation system is highly vulnerable due to following reasons:

1. There is no possibility to manage the system with the latest security patches, which are meant for the cyber vulnerabilities prevailing in the present environment.
2. If the PC crashes and if we have to re-install the OS, that will not be possible as Microsoft doesn't support older versions of Operating systems.
3. Any failure of the IGPC hardware can lead to the down time of the system, as the hardware components of the IGPC are obsolete and no support for old hardware is available.

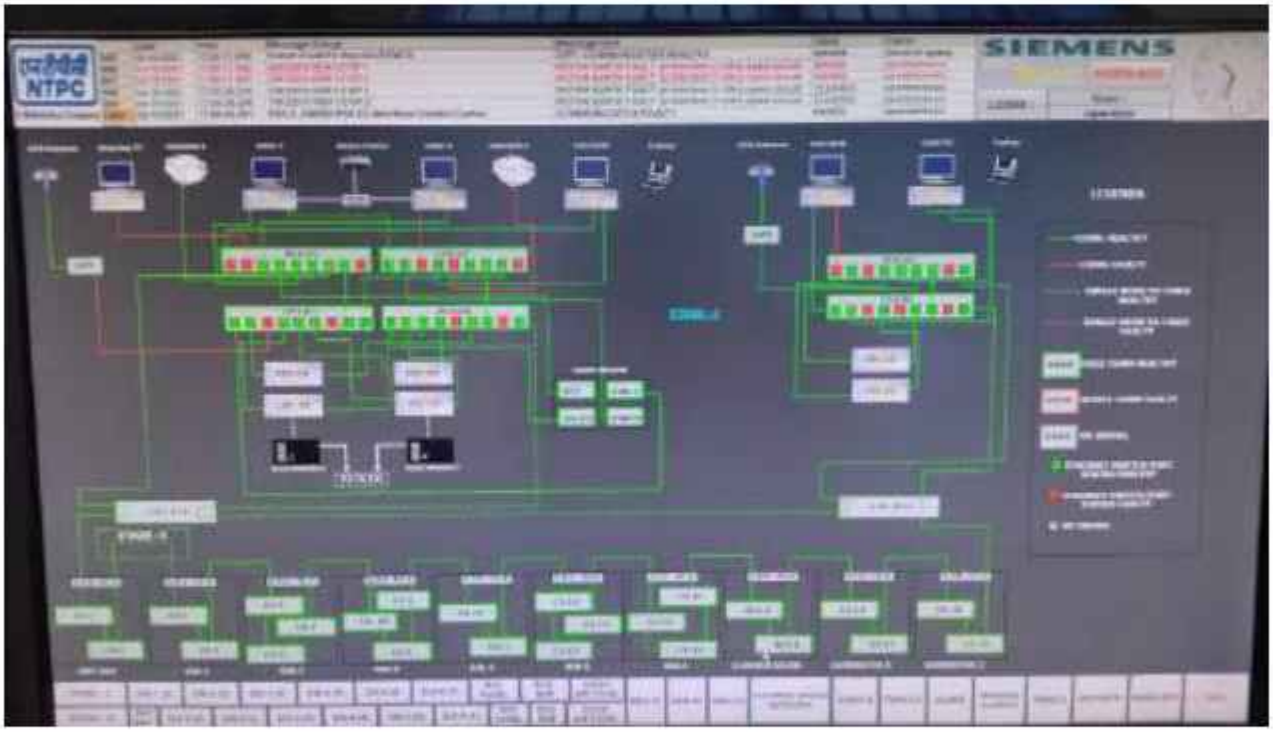
Looking at the present situation, system is vulnerable and is highly recommended to be upgraded to the latest version of hardware and OS with associated upgradation of the SAS and engineering software's compatible to Win-10 OS.

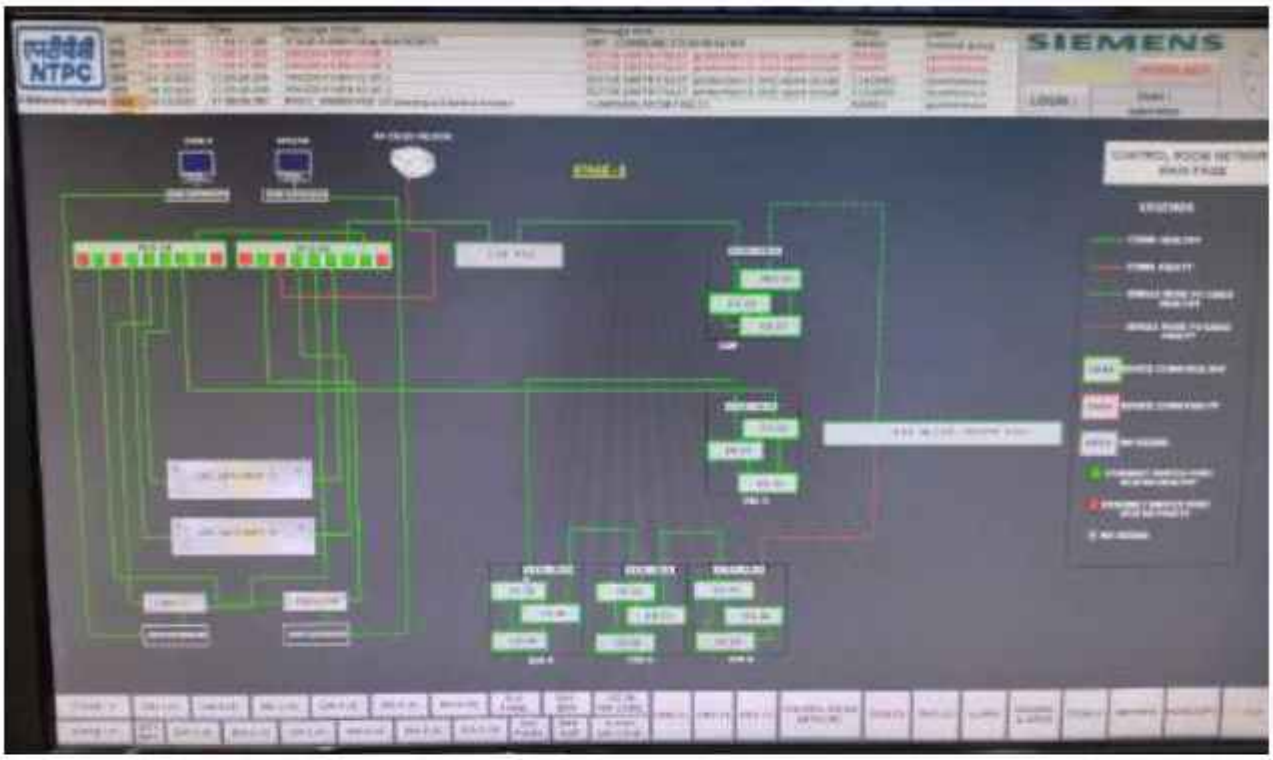
2. Proposal Architectures

Tender architecture is enclosed below for reference

2.1 Architecture of Vindhyachal Stage - 4 & 5

In this proposal, existing system will be upgraded with new HMIs & PAS based data concentrators, over Win-10 based OS and SCADA system will be upgraded with SICAM SCC with additional license to integrate field devices over IEC-61850 & Modbus. Substation data to load dispatch center / remote control center, will be via PAS based gateways. This product gives us flexibility to send data to remote locations over IEC-104 or IEC 101. Customer can choose during sales stage, which protocol they would prefer for control center communication. Also, to secure IEC-104 communication to remote control centers, its advised to route the data via Firewalls, which can be added on request. Secured IEC-104 communication can also be achieved via CP-8050. This solution can also be proposed on request.





In addition to this we will be upgrading EWS as well on Win-10. For successful migration of automation system, if any support required for siemens & 3rd party relays, same will be arranged by NTPC. IDMZ jump box PC will be additionally supplied with Win-2019 server to accommodate various external interactions not limited to patch management &, remote connect. This PC will be kept in a DMZ, so that sufficient security can be enabled to keep the perimeter of the ICS system secured from the external vulnerabilities. To enhance the cybersecurity of the system, this Jump box PC will be kept in a DMZ zone, and this DMZ zone will be prepared using Siemens Ruggedcom RX-1500 Firewall. RX-1500 will also be provided with enhanced intrusion detection system (IDS). IDS console software will be configured in Jump box PC, where all the intrusions will be identified. RX-1500 will also help in segmenting the network and enhance the overall network security. Post implementation of this system, overall ICS system at NTPC Vindhyachal Stage – 4&5 will have a better security posture and will be a step ahead in terms of security of the substation automation systems.

3. Requirement Summary

S.No.	BOM Typical Reference & Description	TOTAL QUANTITY
1	Supply for Secured Migration of SAS at Vindhyachal Stage – 4 & 5	1
2	Service for Secured Migration of SAS at Vindhyachal Stage – 4 & 5	1
3	Intrusion Detection System over RX-1500	1

4. Detailed Bill of Material

S.NO	DESCRIPTION	TYPE	MAKE	QTY
1	**Supply for Secured Migration of SAS at REL Raipur**			
	SICAM PAS / SCC / EWS / Gateways IGPC Chassis: 19" 4U Industrial Grade Rack mount Intel i7 Processor. 2 x 8GB DDR 4 Memory. 2 x 1TB SATA Hard Disk Drive with RAID-1 controller 1 x DVD-Combo. 4 x USB, 2 x Serial, 1 x VGA Port, 1 x HDMI. 4 x 10/100/1000 mbps LAN Ethernet 4 x RS 232 Serial interface. Audio output. 220VAC, 400-Watt Power Supply. Windows Enterprise 10 LTSB - 2016	SAS-IPC	ADVANTECH-TECHNICS	**14**
	Keyboard and Mouse- USB type	KM	Microsoft/Logitech/Dell/HP/All Reputed Make	**6**
	27" LED TFT Monitor.	Display	Reputed Make	**6**
	Trend Micro Office Scan Server Client.	Software	Reputed Make	**1**
	Microsoft Office 2019	Software	Microsoft	**1**

	SICAM PAS Configuration for EWS 6MD9000-2AA20-8AA0 License type – Soft License	Software	Siemens	**1**
	SICAM PAS Runtime for DC-1 & 2 6MD9000-2AA10-8AA0 License type – Soft License	Software	Siemens	**8**
	SICAM PAS additional licenses IEC 61850 Client 6MD9000-0CE00-8AA0 License type – Soft License	Software	Siemens	**2**
	SICAM PAS additional licenses OPC Client 6MD9000-0BA40-8AA0 License type – Soft License	Software	Siemens	**4**
	SICAM PAS additional licenses IEC-104 Slave 6MD9000-0CC04-8AA0 License type – Soft License	Software	Siemens	**2**
	SICAM PAS additional licenses IEC-101 Slave 6MD9000-0CC00-8AA0 License type – Soft License	Software	Siemens	**2**
	Incident Explorer for Valuation of Fault Records – Usage on SICAM PAS Full server in EWS 6MD5532-0AA10-3AA0 License type – Soft License	Software	Siemens	**1**
	SIMATIC WinCC RT&C V7.4 SP1 8192 Tags for HMI-2 6AV6381-2BS07-4AX0 License type – Soft License	Software	Siemens	**1**

	SIMATIC WinCC RT V7.4 SP1 8192 Tags for HMI-1, HMI-3 & HMI-4 6AV6381-2BH07-4AX0 License type – Soft License	Software	Siemens	**3**
	Functional Upgrade from SIMATIC WinCC to SICAM SCC – RT&C for HMI-2 6MD5510-0AP00-0BA0 License type – Soft License	Software	Siemens	**1**
	Functional Upgrade from SIMATIC WinCC to SICAM SCC – RT for HMI-1, HMI-3 & HMI-4 6MD5500-0AP00-0BA0 License type – Soft License	Software	Siemens	**3**
	WinCC Archive V7.4. 1500 Archive Tags 6AV6371-1DQ17-4AX0 License type – Soft License	Software	Siemens	**4**
	Topological Coloring for HMIs 6MD5500-0TP00-0AA0 License type – Soft License	Software	Siemens	**4**
2	**Service for Secured Migration of SAS at Vindhyachal Stage – 4 & 5**			
	Services for Secured Migration	Services	Siemens	**1 Lot**
3	**Intrusion Detection System over RX-1500**			
	IDMZ Jump Box IGPC for Cyber security Chassis: 19" 4U Industrial Grade Rack mount Intel i7 Processor 2 x 8GB DDR 4 Memory. 2 x 1TB SATA Hard Disk Drive with RAID-1 controller 1 x DVD-Combo. 4 x USB, 2 x Serial,	SAS-IPC	ADVANTECH-TECHNICS	**1**

	1 x VGA Port, 1 x HDMI. 4 x 10/100/1000 mbps LAN Ethernet 4 x RS 232 Serial interface. Audio output. 220VAC, 400-Watt Power Supply. Windows Server 2019			
	RX-1500 with IDS Sensor software in APE	Firewall	Siemens - Ruggedcom	**1**
	IDS Console Software for Jump box PC	Software	Nozomi	**1**

5. Design basis

S.No	SPECIFICATION CLAUSE	SPECIFICATION REQUIREMENT	COMMENTS	COMMENT TYPE
1	HMI /DC Upgrade	HMI /DC Upgrade	Existing HMIs / DCs will be upgraded with SICAM SCC and SICAM PAS respectively with latest Hardware IGPC and Softwares depending on the proposal acceptance. This upgrade will bring user friendly and secured HMI.	EXTERNAL COMMENT
2	Secured Communication	Secured Communication	Existing system is having an unsecured communication with SLDC over IEC-101, after secured migration, communication security will be enhanced. All connections to untrusted networks like SLDC, RSCC, etc over IEC-104 will be routed via an external Firewall in case of PAS and via internal firewall in case of CP-8050. With this only relevant data is communicated, and unwanted data traffic can be restricted. CP-8050 also supports VLAN functionality. External connections can also be configured via RX-1500 or RX-1400.	EXTERNAL COMMENT

3	Jump box PC with Remote Connect	Jump box PC with Remote Connect	Jump box PC will be kept in an IDMZ which will be utilized for remote connect, patch management or any other external interaction with external world. IDMZ is created using RX-1500 firewall that is proposed in this offer. This firewall will be capable of detecting intrusions. Remote connect facility if desired at site needs to be opted, same can be offered if desired using cRSP client.	EXTERNAL COMMENT
4	System Hardening	System Hardening	Post Secured Migration, system hardening will be carried out, where all unwanted ports will be disabled, and any default password will be de-activated.	EXTERNAL COMMENT
5	Supply of System & FAT	Supply of System & FAT	Since this is a migration activity, all items (Hardware & Software) will be procured by our factory. Timelines for the same will be communicated by PM of project after receipt of order. Only material verification can be done during FAT, rest of the activities will be done at site.	EXTERNAL COMMENT
6	License by OSD	License by OSD	All licenses will be ordered and supplied as OSD (Online Software Delivery) in form of soft licenses. All Automation licenses are perpetual and can be transferred to another hardware in case of failure of an existing hardware. At any instance, one license will be used to activate only one machine / Hardware.	EXTERNAL COMMENT
7	Protection Engineer	Protection Engineer	Any protection engineer required for Siemens or 3rd Party relays during SAS Migration shall be arranged by customer or shall be on chargeable basis as per manday rates.	EXTERNAL COMMENT
8	Failure of any	Failure of any	Any failure of equipment in the asset	EXTERNAL

	equipment	equipment	base is not included in this offer like, ethernet switch, GPS, relays or any such equipment. This offer includes equipment's and software's as per BOQ only. Any equipment beyond this will be charged at actuals.	COMMENT
9	Patch Management	Patch Management	Customer can subscribe to the newsletters for getting the latest information of the patches. Patch management as a service can be opted as part of AMC if desired. Patch management frequency to be decided by customer (Monthly, Quarterly, Half yearly or annually), also modality of implementation also to be finalized, i.e. remote patching or Physical patching. Details of patch management can be found in patch management catalogue.	EXTERNAL COMMENT
10	Protocol support for RTU	Protocol support for RTU	Following protocols are supported in CP-8050 RTU based gateway. IEC 61850 (Client and Server), IEC 104 (master and slave), Modbus (master and slave), DNP3 & IEC 101.	EXTERNAL COMMENT

6. Scope of Work

S. No.	Description	Siemens	Customer
1	Design inputs of primary equipment		√
2	Designing and engineering of SAS	√	
3	Approval of engineering documents & manufacturing clearance		√
4	Manufacturing of SAS as per approved documents	√	
5	Factory acceptance test for SAS – Material Verification	√	√
6	Dispatch instructions for FAT approved system		√
7	Dispatch of equipment from factory to site	√	
8	Unloading of panels and equipment at site		√
9	Communication link between substation and RCC		√
10	Supply of Furniture in the Control Room as per above BOM		√
11	All Auxiliary power supply equipment such as UPS, battery, battery charger, ACDB, DCDB etc.		√
12	Testing & Commissioning of SAS as mentioned in price basis	√	
13	Modification of software at RCC end		√

7. Price Schedule

SL NO.	DESCRIPTION	UNIT	QTY	UNIT PRICE (INR)	TOTAL PRICE (INR)
1	Supply for Secured Migration of SAS at Vindhyachal Stage – 4 & 5	Lot	1	14,319,298	14,319,298
2	Service for Secured Migration of SAS at Vindhyachal Stage – 4 & 5	Lot	1	2,136,207	2,136,207
3	Intrusion Detection System over RX-1500	Lot	1	7,327,586	7,327,586

8. Terms and Conditions:

1. Price quoted are ex-works; all applicable taxes extra at actual
2. Freight extra at actual
3. Offer Valid till 31st Dec'2021.
4. Price Valid till June'2022 for delivery of the system/services
5. Warranty: Standard 12 months from commissioning or 18 months from supply whichever is earlier
6. Schedule: Detailed schedule is shared via Project schedule excel file.
7. Refer Technical offer for scope of work & basis of offer consideration

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

PHONE : 080-26998281
MOBILE : 9845696568
E-MAIL : prakashdevadas@bhel.in

Ref: GM-NTPC/404/CE-HMI-02 Dated 21/09/2022

Sub: Recommendation for HMI Upgrade

The Windows XP/ Windows 7 based workstation hardware and Microsoft Operating System available at sites (projects listed in annexure-1) is out of mainstream support from OEM and Microsoft respectively. Also the support for Symantec Antivirus version 10.0 has been withdrawn by the OEM and no more security updates / virus definitions are available for that version. Hence the HMIs-maxStations are prone to vulnerabilities which can tamper the operation of plant.

HMI Upgrade for the projects mentioned in Annexure-1 is proposed due to various obsolescence in the DCS components as detailed below.

DCS Component		Existing version / model / Specification	Obsolescence
Workstation / Engineering server / Historian server	Hardware	**Workstation:** Intel Core 2 Duo processor, 1GB RAM, 146 GB SAS disk, 10 Mbps Ethernet port. **Server:** Intel Xeon dual core processor, 2 GB RAM, 3x76GB HDD, 10 Mbps Ethernet port.	Lower Processor cores and speed, lower HDD capacity and RAM requirements incompatible for latest software requirements; Lower network bandwidth of 10Mbps restricting communication speed capability of latest DCS components and attributing to latency.
	Operating System	Windows 7 SP1 / Windows XP / Windows Server 2008 R2	Operating Systems were declared End of Support by the OEM-Microsoft as mentioned below: Windows XP - April' 2014 Windows 7 - Jan' 2020 Windows Server 2008 R2 - Jan' 2020
	maxDNA software	maxDNA 4.2.1 / 4.5 / 4.5.1 / 6.0.x	These versions are not compatible with latest Operating Systems; more improved version of maxDNA- release 7.x is available suiting the latest OS.
	Antivirus Software	Symantec 10.x / Symantec 11.x / Symantec 12.x	Declared obsolete by the OEM-Broadcom and no longer updates or virus definitions are available.

ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
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PHONE : 080-26998281
MOBILE : 9845696568
E-MAIL : prakashdevadas@bhel.in

Network	Switch	10 Mbps backbone	Lower network bandwidth of 10Mbps restricting communication speed capability of latest DCS components.
	Network Hardening settings	No validated Network hardening settings	Not suitable for latest network requirements with hardening features.

Digitally signed by Prakash Devadas
DN: cn=Prakash Devadas, o=BHEL, ou=EDN, email=prakashdevadas@bhel.in, c=IN
Date: 2022.09.21 17:12:52 +05'30'

Prakash D
AGM (CE-Engg-I)

Annexure-1 List of upgrade projects	
Sl No	Project Name
1	Barauni_Stage-2
2	Bongaigaon_Stage-1
3	Dadri-Thermal_Stage-1
4	Dadri-Thermal_Stage-2
5	Darlipalli_Stage-1
6	Farakka_Stage-2
7	Farakka_Stage-3
8	Gadarwara_Stage-1
9	KoldamHydro
10	Korba_Stage-1
11	Korba_Stage-3
12	Mauda_Stage-1
13	Mauda_Stage-2
14	NorthKaranpura_Stage-1
15	Rihand_Stage-2
16	Rihand_Stage-3
17	Simhadri_Stage-2
18	TANDA_Stage-1
19	TANDA_Stage-2
20	Unchahar_Stage-4
21	Vindhyachal_Stage-4
22	Vindhyachal_Stage-5
23	BRBCL Stage-I
24	Jhajjar Stage-I
25	KBUNL Stage-I
26	KBUNL Stage-II
27	NPGCL Stage-I
28	NSPCL Bhilai Stage-I
29	NTECL Stage-I

NTPC Ltd

13TH May 2022

Engineering Office Sector 24 Noida

Uttar Pradesh.

Subject: End of life cycle of Existing Works Station with HMI, Network Switches at NTPC Three Sites

Dear Sir

We wish to inform that Microsoft XP based system are obsolete and not available. The hard wares used in control system like workstations/servers /switches are obsolete and not available in the market. As a result supplied Workstations /Servers with XP based operating system at NTPC Rihand, Mouda, Vindhyachal sites are obsolete . Application software runs on Windows XP are also obsolete. The currently installed workstations / servers needs to be upgraded with latest hardware and operating system, to meet the compatibility with latest our application softwares.

The existing network switches installed at NTPC sites have also entered end of life cycle phase. We propose NTPC to migrate end of life phase switches to latest X-Series network switches during upgradation of HMI.

We confirm that in case of placement of order by NTPC on M/s Schneider Electric, we shall continue to support NTPC in maintenance support and spare part for a period of 10 years from the date of delivery of material at site.

Yours Truly

For Schneider Electric Systems India Pvt Ltd

Kuldip Pahuja

DGM -Sales

Mobile 9810661828,

kuldip.pahuja@se.com

Schneider Electric Systems India Private Limited
2nd Floor, Venus Building, Plot No. 8A1/2B,
TTC Industrial Area, Opp. Digha Talav, Digha,
Thane Belapur Road, Navi Mumbai- 400708

Windows XP

Windows XP follows the Fixed Lifecycle Policy.

This applies to the following editions: Home, Professional, Professional for Embedded Systems, Professional x64, Starter

> **Important**
>
> Support for this product has ended. See migration guidance below.

Support dates are shown in the Pacific Time Zone (PT) - Redmond, WA, USA.

Support Dates

Expand table

Listing	Start Date	Mainstream End Date	Extended End Date
Windows XP	Dec 31, 2001	Apr 14, 2009	Apr 8, 2014

Releases

Expand table

Version	Start Date	End Date
Service Pack 3	Apr 21, 2008	Apr 8, 2014
Service Pack 2	Sep 17, 2004	Jul 13, 2010
Service Pack 1a	Feb 3, 2003	Oct 10, 2006
Service Pack 1	Aug 30, 2002	Oct 10, 2006

Version	Start Date	End Date
Original Release	Dec 31, 2001	Aug 30, 2005

Links

- Migration guidance
- Service pack policy

> **Note**
>
> The start date for Microsoft Windows XP Professional x64 Edition was April 24, 2005.

Editions

- Home
- Professional
- Professional for Embedded Systems
- Professional x64
- Starter

Windows 7

Windows 7 follows the Fixed Lifecycle Policy.

This applies to the following editions: Enterprise, Enterprise N, Home Basic, Home Premium, Home Premium N, Professional, Professional for Embedded Systems, Professional N, Starter, Starter N, Ultimate, Ultimate for Embedded Systems, Ultimate N

ⓘ Important

Support for this product has ended. See migration guidance below.

Support dates are shown in the Pacific Time Zone (PT) - Redmond, WA, USA.

Support Dates

Expand table

Listing	Start Date	Mainstream End Date	Extended End Date
Windows 7	Oct 22, 2009	Jan 13, 2015	Jan 14, 2020

Releases

Expand table

Version	Start Date	End Date
Extended Security Update Year 3*	Jan 12, 2022	Jan 10, 2023
Extended Security Update Year 2*	Jan 13, 2021	Jan 11, 2022
Extended Security Update Year 1*	Jan 15, 2020	Jan 12, 2021

Version	Start Date	End Date
Service Pack 1	Feb 22, 2011	Jan 14, 2020
Original Release	Oct 22, 2009	Apr 9, 2013

Tip

- Extended Security Updates (ESU) are available through specific volume licensing programs for Windows 7 Professional, Enterprise, and Professional for Embedded Systems editions of this product, for up to an additional three years past the end of support. Contact your Microsoft partner or account team to learn more.

Links

- Migration guidance
- Upgrading from Windows 7 to Windows 10
- Extended Security Update Program (ESU)
- Service pack policy

Note

Microsoft Edge version 109, releasing the week of January 12, will be the last browser version to support Windows 7 and Windows 8.1. Version 109 will be supported until version 110 is released in February 2023, at which time Windows 10 or later will be required to continue using a supported version of Microsoft Edge. Please go here to learn more.

Editions

- Enterprise
- Enterprise N
- Home Basic
- Home Premium
- Home Premium N
- Professional

- Professional for Embedded Systems
- Professional N
- Starter
- Starter N
- Ultimate
- Ultimate for Embedded Systems
- Ultimate N

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
सूचना प्रौद्योगिकी एवं साइबर सुरक्षा प्रभाग
Information Technology & Cyber Security Division
****

विषय : CEA (Cyber Security in Power Sector) Guidelines, 2021.

CEA is mandated to prepare 'Guidelines on Cyber Security' in Power Sector under the provision of regulation (10) of the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019. Guidelines on Cyber Security in Power Sector incorporating the cardinal principles has been prepared by CEA. In compliance to the provision of the above regulation, **CEA (Cyber Security in Power Sector) Guidelines, 2021** are issued for compliance by all entities listed in the clause 2.3 (Applicability of the Guidelines) of the guidelines.

Encl: Guidelines on Cyber Security

07/10/21
(V.K Mishra)
Secretary CEA

CEA (Cyber Security in Power Sector) Guidelines, 2021

1.0 Background

1.1 Cyber intrusion attempts and Cyber-attacks in any critical sector are carried out with a malicious intent. In Power Sector it's either to compromise the Power Supply System or to render the grid operation in-secure. Any such compromise, may result in mal-operations of equipments, equipment damages or even in a cascading grid brownout/blackout. The much hyped air gap myth between IT and OT Systems now stands shattered. The artificial air gap created by deploying firewalls between any IT and OT System can be jumped by any insider or an outsider through social engineering. Cyber-attacks are staged through tactics & techniques of Initial Access, Execution, Persistence, Privilege Escalation, Defence Evasion, Command and Control, Exfiltration. After gaining the entry inside the system through privilege escalation, the control of IT network and operations of OT systems can be taken over even remotely by any cyber adversary. The gain of sensitive operational data through such intrusions may help the Nation/State sponsored or non-sponsored adversaries and cyber attackers to design more sinister and advanced cyber-attacks.

1.2 Government of India has set up the Indian Computer Emergency Response Team (CERT-In) for Early Warning and Response to cyber security incidents and to have collaboration at National and International level for information sharing on mitigation of cyber threats. CERT-In regularly issues advisories on safeguarding computer systems and publishes Security Guidelines which are widely circulated for compliances. All Central Government Ministries/ Departments and State/Union Territory Governments have been advised to conduct cyber security audit of their entire Cyber Infrastructure including websites at regular interval through CERT-In empanelled Auditors so as to identify gaps and appropriate corrective actions to be taken in cyber security practices. CERT-In extends supports to enable Responsible Entity in conducting cyber security mock drills and in assessment of their preparation to withstand cyber-attacks. The Responsible Entity must submit Reports of Cyber Audit of cyber security controls, architecture, vulnerability management, network security and periodic cyber security drills to sectoral CERT as well as CERT-In. Team of experts shall review these reports and shortcomings if any in the compliances shall be flagged by them. CERT-In on regular basis also conducts workshops and training programs to enhance Cyber awareness of all Stakeholders.

1.3 Ministry of Power has created 6(six) sectoral CERTs namely Thermal, Hydro, Transmission, Grid Operation, RE and Distribution for ensuring cyber security in Indian Power Sector. Each Sectoral CERT has prepared their sub-sector specific model Cyber Crisis Management Plan(C-CMP) for countering cyber-attacks and cyber terrorism. Each Sectoral CERT has circulated their model C-CMPs for preparation and implementation of organization specific C-CMP by each of their Constituent Utility.

1.4 All Responsible Entities, Service Providers, Equipment Suppliers/Vendors and Consultants engaged in Power Sector are equally responsible for ensuring cyber security of the Indian Power Supply System. They are to act timely upon each threat intelligence,

advisories and other inputs received from authenticated sources, for continuous improvement in their cyber security posture.

1.5 In the current Indian scenario though many cyber security directives and guidelines exists, but none of them are power sector specific. Ministry of Power has directed CEA to prepare Regulation on Cyber Security in Power Sector. And as an interim measures CEA has been directed to issue Guideline on Cyber Security in Power Sector, under the provision of Regulation 10 on Cyber Security in the "Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019".

1.6 The Guidelines on Cyber Security, in the form of Articles written below, requires mandatory Compliance by all Responsible Entities. The Guidelines shall come into effect from the date of issue by Central Electricity Authority, New Delhi.

2.0 Hereby the Guidelines on Cyber Security are drawn in the form of Articles for compliance by the Requester as well as User under the following provision of Regulation 10 on Cyber Security, in the "Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019".

"The requester and the user shall comply with cyber security guidelines issued by the Central Government, from time to time, and the technical standards for communication system in Power Sector laid down by the Authority."

2.1 **Objective of issuing Guideline**:

a) Creating cyber security awareness
b) Creating a secure cyber ecosystem,
c) Creating a cyber-assurance framework,
d) Strengthening the regulatory framework,
e) Creating mechanisms for security threat early warning, vulnerability management and response to security threats,
f) Securing remote operations and services,
g) Protection and resilience of critical information infrastructure,
h) Reducing cyber supply chain risks,
i) Encouraging use of open standards,
j) Promotion of research and development in cyber security,
k) Human resource development in the domain of Cyber Security,
l) Developing effective public private partnerships,
m) Information sharing and cooperation
n) Operationalization of the National Cyber Security Policy

2.2 Within the text of these Articles, '**Responsible Entity**' shall mean all:

a) Transmission Utilities as well as Transmission Licensees,
b) Load despatch centres (State, Regional and National),
c) Generation utilities (Hydro, Thermal, Nuclear, RE),
d) Distribution Utilities
e) Generation Aggregators,
f) Trading Exchanges,
g) Regional Power Committees, and
h) Regulatory Commissions.

2.3 **Applicability:**

All Responsible Entities as well as System Integrators, Equipment Manufacturers, Suppliers/Vendors, Service Providers, IT Hardware and Software OEMs engaged in the Indian Power Supply System.

2.4 **Scope:**

2.4.1 **Control Systems for System Operation and Operation Management.**

a) Grid Control and Management Systems,
b) Power Plant Control Systems,
c) Central Systems used to monitor and control of distributed generation and loads e.g. virtual power plants, storage management, central control rooms for hydroelectric plants, photovoltaic/wind power installations,
d) Systems for fault management and work force management,
e) Metering and measurement management systems,
f) Data archiving systems,
g) Parameterisation, configuration and programming systems,
h) Supporting systems required for operation of the above mentioned systems,

2.4.2 **Communication System.**

a) Routers switches and firewalls,
b) Communication technology-related network components,
c) Wireless digital systems.
d) Control Centre to Control Centre Communications for data exchange on ICCP. **(IEC 61850/60850-5/TASE.2/)**

2.4.3 **Secondary, Automation and Tele control technologies**

a) Control and Automation components,
b) Control and field devices,
c) Tele control devices,
d) Programmable logic controllers / Remote Terminal Units, including digital sensor and actuators elements,
e) Protection devices,
f) Safety components,
g) Digital measurement and metering installations,
h) Synchronisation devices,
i) Excitation Systems,

3.0 Definition of Terms:

1. **Access Management**: shall mean set of policies and procedures of the Responsible Entity for allowing Personnel, devices and IoT to securely perform a broad range of operational, maintenance, and asset management tasks either on site or remotely as laid down in Clause 5.2.5 of IS 16335.
2. **Accreditation:** shall mean the process of verifying that an organisation is capable of conducting the tests and assessments against a product/process that are required to be certified.

3. **Accreditation Body:** shall mean an organisation that has been accredited to verify the credentials and capabilities of the organisations that wish to become a certification body.
4. **Act:** shall mean the Information Technology Act, 2000 (21 of 2000)
5. **Asset**: shall mean anything that has value to the organization.
6. **Certification:** shall mean the process of verifying that a product has been manufactured in conformance with a set of predefined standards and/or regulations by an organisation, that is accredited to conduct the certification process
7. **Certification Body:** shall mean an organisation that has been accredited by an accreditation body to certify products / process against a certification scheme.
8. **Certification Scheme:** shall mean the processes, paperwork, tools, and documentation that define how a product or manufacturer is certified
9. **Chief Information Security Officer:** shall means the designated employee of Senior management level directly reporting to Managing Director/Chief Executive Officer/Secretary of the Responsible Entity, having knowledge of Information Security and related issues, responsible for cyber security efforts and initiatives including planning, developing, maintaining, reviewing and implementation of Information Security Policies
10. **Critical Assets:** shall mean the facilities, systems and equipment which, if destroyed, degraded or otherwise declared unavailable, would affect the reliability or operability of the Power Supply System.
11. **Critical System:** shall mean cyber assets essential to the reliable operation of critical asset. Critical System consists of those cyber assets that have at least one of the following characteristics:
    a) The cyber asset uses a routable protocol to communicate outside the electronic security perimeter.
    b) The cyber asset uses a routable protocol within a control centre.
    c) The cyber asset is dial-up accessible.
12. **Critical Information Infrastructure***:* shall mean Critical Information Infrastructure as defined in explanation of sub-section (1) of Section 70 of the Act.
13. **Cyber Assets**: shall mean the programmable electronic devices, including the hardware, software and data in those devices that are connected over a network, such as LAN, WAN and HAN.
14. **Cyber Crisis Management Plan:** shall mean a framework for dealing with cyber related incidents for a coordinated, multi-disciplinary and broad-based approach for rapid identification, information exchange, swift response and remedial actions to mitigate and recover from malicious cyber related incidents impacting critical processes.
15. **Cyber Security Breach**: shall mean any cyber incident or cyber security violation that results in unauthorized or illegitimate access or use by a person as well as an entity, of data, applications, services, networks and/or devices through bypass of the underlying cyber security protocols, policies and mechanisms resulting in the compromise of the confidentiality, integrity or availability of data/information maintained in a computer resource or cyber asset.
16. **Cyber Security Incident:** shall mean any real or suspected adverse cyber security event that violates, explicitly or implicitly, cyber security policy of Responsible Entity resulting in unauthorized access, denial of service or disruption, unauthorized use of computer resource for processing or storage of information or changes to data or information

without authorization, leading to harm to the power grid or its critical sub-sectoral elements Generation, Transmission and Distribution.

17. **Cyber Security Policy:** shall mean documented set of business rules and processes for protecting information, computer resources, networks, devices, Industrial Control Systems and other OT resources.
18. **Electronic Security Perimeter:** shall mean the logical border surrounding a network to which the Cyber Systems of Power Supply System are connected using a routable protocol.
19. **Information Security Division:** shall mean a division accountable for cyber security and protection of the Critical System of the Responsible Entity.
20. **Protected System:** shall mean any computer, computer system or computer network of the Responsible Entity notified under section 70 of the Act, in the official gazette by appropriate Government.
21. **Security Architecture:** shall mean a framework and guidance to implement and operate a system using the appropriate security controls with the goal to maintain the system's quality attributes like confidentiality, integrity, availability, accountability and assurance.
22. **Vulnerability:** shall mean intrinsic properties of something resulting in susceptibility to a risk source that can lead to an event with a consequence
23. **Vulnerability Assessment:** shall mean a process of identifying and quantifying vulnerabilities

4.0 Standards

Reference	Description
ISO/IEC 15408	Common Criteria Certification Standard
ISO/IEC 17011	General requirements for accreditation bodies accrediting conformity assessment bodies
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories
ISO/IEC 21827	Systems Security Engineering - Capability Maturity Model (SSE-CMM)
ISO/IEC 24748-1	Systems and software engineering — Life cycle management — Part 1: Guidelines for life cycle management.
ISO 27001/2	Information Security Management
ISO/ IEC 27019	Information technology — Security techniques — Information Security controls for the energy utility industry
ISO/IEC 61508	Functional Safety of Electrical / Electronic / Programmable Electronic Safety-related Systems
IEC 61850	Communication networks and systems for power utility automation
IEC 62351	Standards for Securing Power System Communications
IEC 62443	Cyber Security for Industrial Control Systems
IS 16335	Power Control Systems – Security Requirements.

5.0 Abbreviations

Abbreviations		Description
a)	BES	Bulk Electric System

b)	CDAC	Centre for Development of Advanced Computing
c)	CEA	Central Electricity Authority
d)	CERC	Central Electricity Regulatory Commission
e)	CERT	Computer Emergency Response Team
f)	CERT-In	Indian Computer Emergency Response Team
g)	CII	Critical Information Infrastructure
h)	CISO	Chief Information Security Officer
i)	CSK	Cyber Swachhta Kendra
j)	COTS	Commercial off-the Shelf
k)	ESP	Electronic Security perimeter
l)	ICS	Industrial Control Systems
m)	ICT	Information and Communications Technology
n)	IEC	International Electro Technical Commission
o)	ISAC	Information Sharing and Analysis Centre
p)	ISD	Information Security Division
q)	ISO	International Organization for Standardization
r)	ISMS	Information Security Management System
s)	IT	Information Technology
t)	FAT	Factory Acceptance Test
u)	NABL	National Accreditation Board for Testing and Calibration Laboratories
v)	NCIIPC	National Critical Information Infrastructure Protection Centre
w)	NLDC	National Load Dispatch Centre
x)	NPTI	National Power Training Institute
y)	NSCS	National Security Council Secretariat
z)	OEM	Original Equipment Manufacturer
aa)	OT	Operational Technology
bb)	RLDC	Regional Load Dispatch Centres
cc)	SAT	Site Acceptance Test
dd)	SERC	State Electricity Regulatory Commission
ee)	SCADA	Supervisory Control and Data Acquisition Systems
ff)	SIEM	Security Information and Event Management
gg)	SLA	Service Level Agreement
hh)	SLDC	State Load Dispatch Centre
ii)	QCI	Quality Council of India

CEA (Cyber Security in Power Sector) Guidelines, 2021

Article 1. Cyber Security Policy.

a. Cardinal Principles: The Responsible entity will strictly adhere to following cardinal principles while framing cyber security policy:

i. There is hard isolation of their OT Systems from any internet facing IT system.
ii. May keep only one of their IT systems with internet facing at any of their site/location if required which is isolated from all OT zones and kept in a separate room under the security and control of CISO.
iii. Downloading/Uploading of any data/information from their internet facing IT system is done only through an identifiable whitelisted device followed by scanning of both for any vulnerability/malware as per the SOP laid down and for all such activities digital logs are maintained and retained under the custody of CISO for at least 6 months. The log shall be readily to carry out the forensic analysis if asked by investigation agency.
iv. List of whitelisted IP addresses for each firewall is maintained by CISO and each firewall is configured for allowing communication with the whitelisted IP addresses only.
v. Communication between OT equipment/systems is done through the secure channel preferably of POWERTEL through the fibre optic cable. Security configuration of the communication channel is also to be ensured.
vi. All ICT based equipment/system deployed in infrastructure/system mandatorily CII are sourced from the list of the "Trusted Sources" as and when drawn by MoP/CEA.

b. The Responsible Entity shall be ISO/IEC 27001 certified (including sector specific controls as per ISO/IEC 27019).
c. The Responsible Entity shall have a Cyber Security Policy drawn upon the guidelines issued by NCIIPC.
d. The Responsible Entity shall ensure annual review of their Cyber Security Policy by subject matter expert and changes shall be made therein only after obtaining the due approval from Board of Directors.
e. The process of Access Management for all Cyber Assets owned or under control of the Responsible Entity shall be detailed in the Cyber Security Policy.
f. The Cyber Security Policy shall leverage state-of-art cyber security technologies and relevant processes at multiple layers to mitigate the cyber security risks.
g. The Responsible Entity shall be solely responsible to get Cyber Security Policy implemented through its Information Security Division (ISD).
h. The CISO shall record the reason(s) for exemption required, if any, in case, unable to comply with any of the provision(s) of the Cyber Security Policy. Any exception shall be allowed only after an approval of provisions of compensatory control(s) to mitigate residual cyber security risks.

i. The CISO shall record the exemptions sought in statement of applicability controls, while getting the ISO 27001 certified. All exemptions and its justification need to be in conformance with Cyber Security Policy of the Responsible Entity.
j. The Responsible Entity shall allocate sufficient Annual budget for enhancing cyber security posture, enhanced year over year.
k. The Responsible Entity shall work in collaboration with other Industry Stakeholders as well as Academia to promote R&D activity in the domain of cyber security.
l. The Responsible Entity shall ensure that cyber security issues are taken up as agenda items in their Board meetings once in every three months.

Article 2 Appointment of CISO.

a) The Responsible Entity shall mandatorily appoint a CISO and shall confirm to qualification, if any, **laid** by Quality Council of India (QCI). In absence, the work of CISO shall be looked upon by Alternate CISO. In case qualification for appointment of Alternate CISO has been relaxed for reasons recorded thereof, Alternate CISO has to mandatorily acquire the minimum required cyber security skill sets within six months from the date of his appointment.
b) The Responsible Entity shall regularly update details of CISO and Alternate CISO, with the Sectoral CERT, as well as on ISAC-Power Portal.
c) Roles and Responsibility of CISOs shall be as laid by CERT-In and ring-fenced to ensure cyber security of the Cyber Assets of the Responsible Entity.

Article 3: Identification of Critical Information Infrastructure (CII).

a) The Responsible Entity shall submit to NCIIPC through Sectoral CERT, details of Cyber Assets which uses a routable protocol to communicate outside the Electronic Security Perimeter drawn by the Responsible Entity or a routable protocol within a control centre and dial-up accessible Cyber Assets, within 30 days from the date of their commissioning in the System.
b) The Responsible Entity shall submit details of Critical Business Processes and underlying information infrastructure along with mapped impact and Risk Profile to NCIIPC and shall get their CIIs identified in consultation with NCIIPC. The process of the notification/declaration by Appropriate Government shall follow thereafter.
c) The Responsible Entity shall review their declared/notified CIIs at least once a year to examine changes if any in the functional dependencies, protocols and technologies or upon any change in security architecture. The Responsible Entity shall review their declared/notified CIIs once in every 6 months, in case if NCIIPC has directed them to constitute an Information Security Steering Committee.
d) The Responsible Entity shall ensure that all cyber assets of their identified/notified CIIs are recorded in the asset register and considered for risk assessment as well as for finalization of controls in statement of applicability.

Article 4. Electronic Security Perimeter

a) The Responsible Entity shall identify and document the Electronic Security Perimeter(s) and all Access Points to the perimeter(s).

b) The Responsible Entity shall follow procedure of identifying "Electronic Security Perimeter" in case of distributed and/or hybrid information infrastructure, as per IEC 62443 / IS16335 (as amended from time to time).
c) The Responsible Entity shall ensure that every Critical System resides within an Electronic Security Perimeter.
d) The Responsible Entity shall perform a cyber-Vulnerability Assessment of each electronic Access Points to the Electronic Security Perimeter(s) at least once in every 6 (six) months and/or after any change in Security Architecture.
e) The Responsible Entity shall ensure that all critical, high and medium vulnerabilities identified as a result of cyber Vulnerability Assessment shall be closed and verified for the effective closure.

Article 5. Cyber Security Requirements

a) The Responsible Entity shall have an Information Security Division (ISD), headed by CISO.
b) The Responsible Entity shall ensure that the ISD must be functional on 24x7x365 basis and is manned by sufficient numbers of Engineers having valid certificate of successful completion of course on cyber security of Power Sector from the Training Institutes designated by CEA.
c) The Responsible Entity shall ensure that ISD
   1) has on-boarded Cyber Swachhta Kendra(CSK) of CERT-In, if they have public IPs.
   2) has timely acted upon the advisories, guidelines and directive of NCIIPC, CSK, CERT-In and Sectoral CERTs,
   3) has deployed an Intrusion Detection System and Intrusion Prevention System capable of identifying behavioural anomaly in both IT as well as OT Systems.
   4) shares reports on incident response and targeted malware samples with CERT-In,
   5) updates the firmware/software with the digitally signed OEM validated patches only.
   6) enables only those ports and services that are required for normal operations. In case of any emergency the procedure as laid in Access management be followed.
   7) maintains firewall logs for the last 6 months duration. Firewall logs shall be analysed and all critical and high severity comments shall be addressed for effective closure.
   8) retains document of FAT, SAT test results and report/ certificate of cyber tests carried out for compliance of Government Orders and Cyber Security Audit.*
   9) maintains all cyber logs and cyber forensic records of any incident for at least** 90 days.

      * FAT, SAT must include comprehensive cyber security tests of the component/equipment/system to be delivered/delivered at site.
      ** 90 days from date of the commissioning of the system/recovery from any incident, whichever is later.

d) The Responsible Entity shall routinely audit and test security properties of the Critical System and must act upon, in case if any new vulnerabilities is identified through testing or by the equipment manufacturer.

e) The Responsible Entity shall design a secure architecture for control system appropriate for their process control environment*.
f) All State Load Dispatch Centres(SLDCs) shall comply with the directions issued by the National Load Dispatch Centre(NLDC) as well as Regional Load Dispatch Centres(RLDCs) U/s 29 (1) of the Electricity Act, 2003 to ensure stability and cyber security of grid operation and achieve efficiency in the grid operation. In case of any non-compliance, the Head of SLDC shall be responsible and shall be liable for Penalty as per the provision of CERC/SERC.

*There are so many different types of systems in existence and so many possible solutions, it is important that the selection process ensures that the level of protection is commensurate with the business risk and the Responsible Entity shall not rely on one single security measure for its defence. *(Reference IEC/TR62351-10* Edition1.0 2012-10 *Power systems management and associated information exchange –Data and communications security – Part 10: Security architecture guidelines).*

Article 6 Cyber Risk Assessment and Mitigation Plan

a) The Responsible Entity shall document in their Cyber Security Policy a Cyber Risk Assessment and Mitigation Plans drawn upon the best practises being followed in the Power Sector, and the same shall be approved by Board of Directors.
b) The Cyber Risk Assessment and Mitigation Plans shall clearly define the matrix for assessing the cyber risk of both IT and OT environment and risk acceptance criteria.
c) The Cyber Risk Assessment Plan shall be capable to demonstrate that repeated cyber security risk assessment delivers consistent, valid and comparable results.
d) The review of cyber risk assessment shall be carried out at least once in a Quarter. The actionable of risk treatment and mitigation shall be tracked in this review for their effectiveness.
e) The CISO shall be responsible for implementation and regular review, on the basis of internal and external feedbacks, of the Cyber Risk Assessment and Mitigation Plans.

Article 7 Phasing out of Legacy System

a) As the life cycle of the Power System Equipment/System is longer than that of IT Systems deployed therein, the Responsible Entity shall ensure that all IT technologies in the Power System Equipment/System should have the ability to be upgraded.
b) The Responsible Entity shall ensure that the Information Security Division shall draw the list of all communicable equipments/systems nearing end life or are left without support from OEM. Thereafter CISO shall identify equipment/systems to be phased out from the list drawn, firm up their replacement plan and put up the replacement plan for approval before the Board of Directors.
c) The CISO shall ensure that till equipments/systems nearing end life or left without support from OEM are not replaced, their cyber security is hardened and ensured through additional controls provisioned in consultation with the OEM or alternate Supplier(s)*.
*e.g. Use of CDAC developed AppSamvid and whitelisting of applications installed may be explored across all legacy systems.
d) The Responsible Entity shall document in their Cyber Security Policy a Standard Operating Procedure for safe and secure disposal of outlived or legacy devices.

Article 8. Cyber Security Training.

a) The Responsible Entity shall establish, document, implement, and maintain an annual cyber security training program for personnel having authorized cyber or authorized physical access (unescorted or escorted) to their Critical Systems.
b) The Responsible Entity shall review annually their cyber security training program and shall update it whenever necessary. Annual Review shall record evaluation of the effectiveness of the trainings held.
c) The Responsible Entity shall ensure that Cyber Security training program designed for their IT as well as OT O&M Personnel must include following topics and as per their functional requirements and security concerns additional topics shall be added:
   1) User authentication and authorization.
   2) Cyber Security and Protection mechanisms of IT/OT/ICS Systems.
   3) Introduction to various standards i.e. ISO/IEC:15408, ISO/IEC:24748-1, ISO: 27001, ISO: 27002, ISO 27019, IS 16335, IEC/ISO:62443.
   4) Training on implementation of ISO/IEC 27001 and awareness on IEC 62443.
   5) Vulnerability Assessment in the Critical System.
   6) Monitoring and preserving of electronic logs of access of Critical Assets.
   7) Detecting cyber-attacks on SCADA and ICS systems
   8) The handling of Critical System during cyber crisis.
   9) Action plans and procedures to recover or re-establish normal functioning of Critical Assets and access thereto following a Cyber Security Incident.
   10) Hands on SCADA operation at any of the Regional Load Dispatch Centre.
   11) Handling of risks involved in the procurement of COTS Products.

d) All Personnel engaged in O&M of IT & OT Systems shall mandatorily undergo courses on cyber security of Power Sector from any of the training institute designated by CEA, immediately within 90 days from the notification of CEA Guidelines on Cyber Security in Power Sector.
e) The Responsible Entity shall ensure that none of their newly hired or the current Personnel have access to the Critical System, prior to the satisfactory completion of cyber security training programme from the Training Institutes designated in India, except in specified circumstances such as cyber crisis or an emergency.
f) NPTI in consultation with CEA shall identify and design domain specific courses on Cyber Security for different target groups. The "Governing Board for PSO Training and Certification" shall approve the content, duration etc of these courses and shall review it Annually. NPTI shall conduct these courses at all of their branches on regular basis and shall maintain the list of the Participants successfully completing the course.

Article 9 Cyber Supply Chain Risk Management

a) The Responsible Entity shall ensure that, as and when Ministry of Power, Government of India notifies the Model Contractual Clauses on cyber security, these clauses are included in their every Bid invited for procurement of any ICT based components/equipments/System to be used for Power System.
b) The Responsible Entity shall ensure that all the Communicable Intelligent Equipments and the Service Level Agreements (SLAs) for their Critical Systems shall be sourced from the list of the "Trusted Sources" as and when drawn by MoP/CEA.

c) The Responsible Entity shall ensure that, in case, for the any Communicable Intelligent Devices, if no Trusted Source has been identified, then the successful bidder in compliance with the provisions made in MoP order dated 2.7.2020 and any other relevant MoP order has got the product cyber tested for any kind of embedded malware/Trojan/cyber threat and for adherence to Indian Standards at the designated lab.

d) The Responsible Entity shall ensure that the essential cyber security tests are carried out successfully during FAT, SAT as detailed in **Annexure A.** The equipment/System besides for functionality shall also be tested in the factory for vulnerabilities, design flaws, parts being counterfeit or tainted, so as to minimize problems during on-site-testing and installation. Cyber Security Conformance Testing are to be carried out in the designated Lab as listed in **Annexure-I of MoP Order No. 12/13/2020-T&R dt. 8th June, 2021(Order at Annexure-B).**

e) The Responsible Entity shall ensure that the Equipment/System supplied by the successful bidder shall accompany with a certificate[$, #] obtained by OEM from a certification body accredited to assess devices and process for conformances to IEC 62443-4 standards during design and manufacture. The Responsible Entity shall accept the certificate submitted along with the supplied Equipment/System only if it's in line with the Testing Protocol as notified by Ministry of Power, Government of India, from time to time.

f) The Responsible Entity in compliance to the requirement of Article 9(e) shall also accept, till the setting up of an adequate certification facility in the India, a digitally signed self-declaration of conformance to the IEC 62443-4 standards during design and manufacture of the equipment/system, if submitted by the OEM.

g) The Responsible Entity shall dispose all unserviceable or obsolete Communicable Intelligent Devices as per the procedure laid in their Cyber Risk Assessment and Mitigation Plans which shall be in line with the prevailing best practices.

$ The National & International certification may be specified in the tender for critical systems/sub-systems being procured by the Responsible Entity.

Certification Schemes:
Embedded Device Security Assurance Certification is for an individual product,
System Security Assurance Certification is for a set of products in a system (possibly from different vendors)
Security Development Lifecycle Assurance Certification is for the development processes that a manufacturer uses for developing products.

Article 10 Cyber Security Incident Report and Response Plan

a) The CISO of the Responsible Entity shall report in the formats prescribed by CERT-In, all Cyber Security Incidents, classified as reportable events.

b) Root cause analysis for all reportable events shall be carried out and corrective action taken, so as to ensure that any re-occurrence of such event can be managed with ease.

c) The Responsible Entity shall mandatorily define in their Cyber Security Policy, criteria(s) identified on the basis of impact analysis, for declaring the occurrence of

Cyber Security Incident(s) as a Cyber Crisis in the System owned or controlled by them.

d) The Responsible Entity shall mandatorily designate an Officer along with his/her standby by name and designation and empower them to declare an occurrence of the incident(s) as "Cyber Crisis". The contact details of these Officers shall be updated in the C-CMP within 15 days of changes if any due to transfer or superannuation etc.
e) The CISO shall ensure that during any Cyber Security Incident, ISD monitors and minutely records every details of cyber security events and incidents in both IT as well as the OT System owned or controlled by the Responsible Entity.
f) The CISO shall ensure that each cyber incident is handled strictly as per Cyber Security Incident Response Plan detailed in the latest C-CMP approved by the Board of Directors.
g) The Responsible Entity shall ensure that the efficacy of the Cyber Security Incident Response Plan is tested annually through mock drill(s) carried out, if feasible, as simulation exercise(s) or as table top exercise(s) with wider participation of their employees, in consultation with CERT-In and sectoral CERT. In case if any shortcoming is observed in the Cyber Security Incident Response Plan suitable changes shall be made in it.
h) The Responsible Entity shall ensure that the CISO compiles details of incident detection, incident handling, learnings from each incident and damage claims made if any and shall report to CERT-In as well as upload information on ISAC-Power Portal.

Article 11 Cyber Crisis Management Plan(C-CMP)

a) The Responsible Entity shall prepare a Cyber Crisis Management Plan and submit to their sectoral-CERT for review with intimation to Ministry of Power/CISO-MoP. Responsible Entity shall update their C-CMP on the basis of comments made by sectoral-CERT and then submit for vetting to CERT-In. The C-CMP shall be updated once again to include the observations made by CERT-In before seeking approval of Board of Directors for implementation of C-CMP.
b) The Responsible Entity shall ensure that the C-CMP is reviewed at least annually. The CISO shall ensure that all changes are made in C-CMP only with the due approval of Board of Directors and the changes made in C-CMP have been communicated through a verifiable means to all the concerned Personnel of the Responsible Entity.
c) The CISOs shall be the custodian of all the cyber security related documents including Cyber Crisis Management Plan, Risk Treatment Plan, Statement of Applicability of controls, and compliance to regulator's requirement.
d) The CISO shall be accountable for ensuring enforcement of C-CMP by Information Security Division of the Responsible Entity, during a cyber-crisis, as and when declared by the designated Officer. (refer Article 10(d))

Article 12: Sabotage Reporting%

a) The Responsible Entity shall incorporate procedure for identifying and reporting of sabotage in their Cyber Security Policy within 30 days from issue of the Guidelines, or grant of licence under the appropriate legal provisions to the Responsible Entity.
b) The CISO shall be held liable for non-reporting of identified sabotage(s) as per procedure laid for identifying and reporting of sabotage in the Cyber Security Policy of the Responsible Entity.

c) The CISO shall prepare a detailed report on disturbances or unusual occurrences, identified, suspected or determined to be caused by sabotage in the Critical System of the Responsible Entity, and shall submit the report to the Sectoral CERT as well as to CERT-In within 24 hours of its occurrence.

d) The CISO shall submit to NCIIPC within 24 hours of occurrence the report on every sabotage classified as cyber incidents(s) on "Protected System".

e) The CISO upon occurrence on every sabotage shall take custody of all log records as well as digital forensic records of affected Cyber Assets, Intrusion Detection System, Intrusion Protection System, SIEM and shall preserve them for at least 90 days and shall make them available as and when called upon for investigation by the concerned Agencies.

%Disturbances or unusual occurrences, suspected or determined to be caused by sabotage.
Sabotage e.g. can be a forced intrusion in un-manned/manned facility and taking control of operation of Critical System through a communicating device.

Article 13 Security and Testing of Cyber Assets

a) The Responsible Entity shall ensure security of all in-service phase as well as standby Cyber Assets through regular firmware/Software updates and patching, Vulnerability management, Penetration testing (of combined installations), securing configuration, supplementing security controls. CISO shall maintain details of update version of each firmware and software and their certification if received from OEMs.

b) The Responsible Entity shall carry out regularly Vulnerability Assessment of all Cyber Assets owned or under their control. If a Cyber Asset is found vulnerable to any exploits or upon any patch updates or major configuration changes, then further Penetration Testing may be carried out offline or in a suitably configured laboratory test-bed to determine other vulnerabilities that may have not been identified so far.

c) The Responsible Entity shall specify security requirement and evaluation criteria during each phase of their procurement Process.

d) The Responsible Entity shall ensure that all Cyber Assets being procured shall conform to the type tests as mentioned in the specification for type testing listed in the bid document. Type test reports of tests conducted in NABL accredited Labs or internationally accredited labs (with in last 5 years from the date of bid opening) shall be mandated to be submitted along with bid. In case, the submitted Type Test reports are not as per specification, the re-tests shall be conducted without any cost implication to the Responsible Entity.

e) The Responsible Entity shall ensure that all Communicable devices are tested for communication protocol as per the ISO/IEC/IS standards listed in **MoP Order No. 12/13/2020-T&R dated 8th June, 2021(Annexure-B).**

f) The Responsible Entity shall ensure that all Critical Systems designed with Open Source Software are adequately cyber secured.

g) The Responsible Entity as a best practise upon any incidence of Cyber Security Breach shall carry out cyber security tests at any lab designated for cyber testing by Ministry of Power. These tests shall be similar to Pre Commissioning Security Test and those essential for carrying out Post Incident Forensics Analysis.

Article 14 Cyber Security Audit

a) The Responsible Entity shall implement Information Security Management System (ISMS) covering all its Critical Systems.
b) The Responsible Entity shall through a CERT-In Empanelled Cyber Security OT Auditor shall get their IT as well as OT System audited at least once in every 6 (six) months and shall close all critical and high vulnerabilities within a period of one month and medium as well as low non-conformity before the next audit. Effective closure of all non-conformities shall be verified during the next audit.
c) The Cyber Security Audit shall be as per ISO/IEC 27001 along with sector specific standard ISO/IEC 27019, IS 16335 and other guidelines issued by appropriate Authority if any. These mentioned standards shall be current with all amendments if any and in case if any standard is superseded, the new standard shall be applicable. CISO shall ensure immediate closure of non-conformance, based on the criticality and by means all non-conformances are to be closed before the next audit.
d) The Responsible Entity shall ensure that CISO has all the required systems and documents in place, as mandated by NSCS for base line cyber security audit.

FAT & SAT

1. During FAT stage, the customer has to verify all types test reports / certificates including Communication protocol and security conformance tests of the devices offered for FAT.
2. FAT of SCADA involves testing as a whole system in the integrated scale down set up. For SCADA, Indian standard IS 15953: 2011 "SCADA System for Power System Applications" provides definition and guidelines for the specification, performance analysis and application of SCADA systems for use in electrical utilities (for transmission & Distribution) including guidance on Tests and inspections.
3. The SAT will be done at customer site as per the SAT document mutually agreed by buyer and supplier. For SAT also, guidance from IS 15953: 2011need to be applied.
4. IEC 61850-10-3 Communication Networks and Systems For Power Utility Automation-Functional testing of IEC 61850 systems (in draft stage - CDTR) covers testing of applications within substations covering

    a. A methodical approach to the verification and validation of a substation solution
    b. The use of IEC 61850 resources for testing in Edition 2.1
    c. Recommended testing practices for different use cases
    d. Definition of the process for testing of IEC 61850 based devices and systems using communications instead of hard wired system interfaces (ex. GOOSE and SV instead of hardwired interfaces)
    e. Use cases related to protection and control functions verification and testing.

    This standard may be used as a guidelines for FAT & SAT for Substation Automation System (SAS) based on IEC 61850.

Annexure - B

Annexure – 1

List of designated laboratories for cyber security conformance testing

Table -A. Field Equipment /Operational Technology (OT)

Sl. No.	Equipment	Communication Protocol Conformance Standards	Protocol Security Conformance Standards	Designated Laboratories
1	Remote Terminal Units (RTUs) & PLCs with IEC communications protocols	IEC 60870-5 -101 / IEC 60870-5 -104 (Test Details Annexure 2)	IEC 60870-5- 7 Security extension & IEC 62351 series (specifically IEC 62351-100 parts 1 & 3) (Test Details Annexure-2	Central Power Research Institute (CPRI), Prof Sir C V Raman Road, Sadashivanagar P O, Bengaluru – 560080, Karnataka
2	Intelligent Electronic Equipment / Numerical Protection Relays / Bay Control Units / Bay Protection Units, Gateways, Transformer Tap controller/ changer, etc. with IEC 61850 communication protocol	IEC 61850 – 5 to IEC 61850 – 10 (Test Details Annexure 2)		CPRI
3	Smart meters with IEC 62056 communication protocols	IEC 62056 series / DLMS & IS 15959 series and IS 16444 series (Test details Annexure 2)	IEC 62056 series / DLMS & IS 15959 series and IS 16444 series (Test Details Annexure 2)	1. CPRI 2. Electrical Research and Development Association (ERDA), ERDA Road, GIDC, Makarpura, Vadodara - 390 010 Gujarat 3. Yadav Measurements Pvt. Ltd. (YMPL) 373-375, RIICO Bhamashah Industrial Area Kaladwas 313003 Udaipur – Rajasthan

Information Technology (IT) Equipment (Main / Backup / Disaster recovery (DR) Control Centre / Substation control centre IT equipment)

All IT products procured /supplied shall have a valid Certificate of Common Criteria as per ISO/IEC 15408 issued by signatories of the Common Criteria Recognition Agreement (CCRA) (www.commoncriteriaportal.org).

Import/procurement/supplied from vendors sourcing from prior reference countries, the Certificate for Common Criteria shall be from Government Laboratories in India according to the IC3S scheme operated by Ministry of Electronics and Information Technology, which is a signatory to CCRA.

https://www.commoncriteria-india.gov.in/

Annexure - 2

Details of tests for various identified products

Remote Terminal Units (RTUs) (Sl. No. 1 of Table – A of Annexure – 1)

Test protocol:

Utilities / manufacturers will submit the sample along with all the required technical documentation for taking up testing to the designated laboratory.

Reference standards

1) IEC 60870-5-101 & IEC 60870-5-104 as applicable

2) IEC 60870-5-7 Telecontrol equipment and systems - Part 5-7: Transmission protocols - Security extensions to IEC 60870-5-101 and IEC 60870-5-104 protocols (applying IEC 62351)

3) IEC 62351-100-1 & IEC 62351-100-3 and other cross referenced standards.

Test cases

Extract from standard (IEC 62351-100-1)

The conformance test cases are divided into four clauses:

- Clause 5: Verification of configuration parameters. This clause contains the configuration parameters affecting the message contents and/or the protocol behaviour.
- Clause 6: Verification of communication. The goal of this clause is to verify that Device Under Test (DUT) is able to implement the security extension messages as described in IEC TS 60870-5-7.
- Clause 7: Verification of procedures. The goal of this clause is to verify that DUT is able to execute the security extension procedures as described in IEC TS 62351-5.
- Clause 8: Test result chart. This clause contains the results of the test cases listed in Clauses 6 and 7 for each supported value of the configuration parameters listed in Clause 5.

The test cases are organized in tables. They are numbered; their numbering syntax is: Subclause number (where the Table is located) + test case number.

In the column 'reference' each test case has a direct reference to IEC TS 62351-5 or IEC TS 60870-5-7 where the clause under test is defined.

Test cases are mandatory depending on the description in the column 'Required'. The following situations are possible:

M= Mandatory test case. The test is referencing a clause that is mandatory in IEC TS 62351-5 or IEC TS 60870-5-7.

Protocol Information Conformance Statement (PICS) x, x = Mandatory test case if the functionality is enabled in the PICS (by marking the applicable check box), with a reference to the section number of the PICS (x.x).

Conformance testing of security extension procedures

The security extension procedures can be summarized as follows:

- User management
- Update key maintenance
- Session key maintenance
- Challenge/Reply authentication
- Aggressive Mode authentication

Extract from standard (IEC 62351-100-3)

IEC 62351-3 defines the requirements related to the authentication/encryption protocol, procedures and methods to be implemented at TCP/IP (transport) level.

The conformance test cases are divided into three clauses:

- Clause 5: Verification of configuration parameters. This clause contains the parameters specified by the standards referencing IEC 62351-3 (see IEC 62351-3:2014/AMD1:2018, Clause 7) and affecting the protocol behaviour.
- Clause 6: Verification of IEC 62351-3 requirements. The goal of this clause is to verify that DUT is conformant to the requirements of the IEC 62351-3.
- Clause 7: Test result chart. This clause contains the results of the test cases listed in Clause 6 for each supported value of the configuration parameters listed in Clause 5.

The test cases are organized in tables. They are numbered, their numbering syntax is: Subclause number (where the table is located) + test case number.

In the column 'Reference' each test case has a direct reference to IEC 62351-3 where the clause under test is defined. PICS or Protocol Implementation eXtra Information for Testing (PIXIT) could be found in the "Reference" column for some test cases whenever the execution of the test case shall take into account specific parameter values declared in the PICS or PIXIT of the DUT.

Test cases are mandatory depending on the description in the column 'Required'. The following situations are possible:

M = Mandatory test case. The test is referencing to a clause that is mandatory in IEC 62351-3.

PICS

or

PIXIT = Mandatory test case if the functionality is enabled in the PICS or PIXIT by marking the applicable check box or declaring the applicable value.

Intelligent Electronic Devices (IEDs) (Sl. No. 2 of Table – A of Annexure – 1)

Utilities / manufacturers will submit the sample along with all the required technical documentation for taking up testing to the designated laboratory.

Reference standards

IEC 61850 series

Specifically IEC 61850-5, IEC 61850-6, IEC 61850-7, IEC 61850-8, IEC 61850-9 and IEC 61850-10

Test cases

Communication protocol conformance as per IEC 61850 -10. This part of standard defines methods and abstract test cases for conformance testing of client, server and sampled values devices used in power utility automation systems, the methods and abstract test cases for conformance testing of engineering tools used in power utility automation systems, and the metrics to be measured within devices according to the requirements defined in IEC 61850-5. Further this part of standard specifies standard techniques for testing of conformance of client, server and sampled value devices and engineering tools, as well as specific measurement techniques to be applied when declaring performance parameters. The use of these techniques will enhance the ability of the system integrator to integrate IEDs easily, operate IEDs correctly, and support the applications as intended.

Smart Meters (Sl. No. 3 of Table – A of Annexure – 1)

Utilities / manufacturers will submit the sample along with all the required technical documentation for taking up testing to the designated laboratory.

IEC 62056 series of standards (Electricity metering data exchange – The DLMS/COSEM suite) specifies details of communication protocol requirements, conformance testing and security requirements. The Part 5-3 (DLMS/COSEM application layer) specifies the DLMS/COSEM application layer in terms of structure, services and protocols for DLMS/COSEM clients and servers, and defines rules to specify the DLMS/COSEM communication profiles. It defines services for establishing and releasing application associations, and data communication services for accessing the methods and attributes of COSEM interface objects, defined in IEC 62056-6-2 using either logical name (LN) or short name (SN) referencing.

Clause 5 and sub clauses specifies security requirements. It cover security concepts, Identification and authentication, Cryptographic algorithms, Cryptographic keys – overview, Key used with symmetric key algorithms, Keys used with public key algorithms and Applying cryptographic protection.

Note: All above referred standards shall be latest with amendments if any at the time of submission of sample(s) for testing.

Annexure – 3

Testing Criteria

1) Supply from Trusted Sources

The sample size shall be as specified by CEA as per the approved criteria for Trusted Vendors

2) Supply from other than trusted vendors

The sample size shall be shall be 5% of the supply lot / ordered quantity (minimum one). The manufacturer shall submit request to the Nodal agency along with vendor's / manufacturer's certifications for supply chain management system practices and secure product development process implementations based on any one or more of standards ISO / IEC 27036, ISO / IEC 20243, IEC 62443 for verification.

After scrutiny of vendor's / manufacturer's certifications the supplier / utilities shall be asked to submit product to the designated laboratory for communication and cyber security conformance testing.

The supply lot shall stand rejected on failure to comply with the test requirements.

3) Supply from prior reference countries

The utility shall obtain prior permission from the Government of India for importing the product / system from prior reference countries.

The sample size shall be shall be 10 % of the supply lot / ordered quantity (minimum one). The manufacturer shall submit request to the Nodal agency along with vendor's / manufacturer's certifications for supply chain management system practices and secure product development process implementations based on any one or more of standards ISO / IEC 27036, ISO / IEC 20243, IEC 62443 for verification.

After scrutiny of vendor's / manufacturer's certifications the supplier / utilities shall be asked to submit product to the designated Government / Government controlled Autonomous laboratory for type tests (Annexure – 4) and communication & cyber security conformance testing.

The supply lot shall stand rejected on failure to comply with the test requirements.

Type Tests

Products imported from prior reference countries shall also undergo type testing as per following standards in addition to communication protocol and security conformance testing at the designated Government / Government controlled Autonomous laboratory:

Type test standards for RTUs

1. IEC 60870-1-2:1989 Telecontrol equipment and systems. Part 1: General considerations. Section Two: Guide for specifications.
2. IEC 60870-2-1:1995 Telecontrol equipment and systems - Part 2: Operating conditions - Section 1: Power supply and electromagnetic compatibility.
3. EC 60870-2-2:1996 Telecontrol equipment and systems - Part 2: Operating conditions -Section 2: Environmental conditions (climatic, mechanical and other non-electrical influences).
4. IEC 60870-3:1989 Telecontrol equipment and systems. Part 3: Interfaces (electrical characteristics)

Type test standard for IEDs / Numerical Protection Relays / Bay controls units

1. IEC 61850-3: 2013, Ed. 2 Communication networks and systems for power utility automation – Part 3: General requirements.

Type test standards for Smart meters

1. IS 16444: 2015 AC static direct connected watthour smart meter class 1 and 2 – Specification.
2. IS 16444 Part 2: 2017 AC static transformer operated watthour and var - Hour smart meters, class 0.2 S, 0.5 S and 1.0 S: Part 2 specification transformer operated smart meters.

Note:

1. All above referred standards shall be latest with amendments if any at the time of submission of sample(s) for testing.
2. Type tests generally covers functionality, environmental, mechanical, EMI/ EMC and electrical safety related tests.

Annexure-A8

दूरभाष :
कार्यालय (07805) – 234541
निवास (07805) – 244110
email: dmsingrauli@mp.gov.in

कार्यालय कलेक्टर एवं जिला मजिस्ट्रेट, जिला सिंगरौली (म0प्र0)

कमांक 526 /सीएसटी/एफ.2/2024 सिंगरौली, दिनांक 08 नवम्बर 2024

प्रति,

कार्यकारी निदेशक
एन.टी.पी.सी. विन्ध्यनगर
जिला सिंगरौली (म0प्र0)

विषयः–शाहपुर डाइक क्षेत्र में एसएसटीपीएस डिस्चार्ज चैनल पर नए वैकल्पिक पुल का निर्माण कराने बावत ।

विभिन्न माध्यमों से यह ज्ञात हुआ है कि पुराने सेमरा बाबा पुल की स्थिति भारी भरकम राख वाहनों की आवाजाही से खराब हो रही है । इस संबंध में एसएसटीपीएस डिस्चार्ज चैनल पर नए पुल के निर्माण के संबंध में गांवों के विभिन्न हितधारकों की ओर से कई अनुरोध प्राप्त हुए हैं । इसके साथ ही वाहनों की बड़ी संख्या में आवाजाही के कारण आसपास रहने वाले लोगों के जीवन पर आसन्न खतरा हो सकता है ।

अतएव उपरोक्त कारणों को देखते हुए एसएसटीपीएस डिस्चार्ज चैनल पर नए वैकल्पिक पुल का निर्माण कराने का कष्ट करें ।

(चन्द्र शेखर शुक्ला)
कलेक्टर
जिला सिंगरौली

Annexure-A9

Outlook

Re: LIFE OF TUBULAR BATTERY

From Mankar, Mohan Pralhadrao <MohanPM@exide.co.in>
Date Thu 21/11/2024 15:19
To Abhishek Kumar <ABHISHEKKUMAR05@NTPC.CO.IN>
Cc Sandeep Kohli <SANDEEPKOHLI@NTPC.CO.IN>

You don't often get email from mohanpm@exide.co.in. Learn why this is important

Dear Sir,

Expected life of 2V Tubular SAN container battery 10 to 12 years in standby float application with recommended maintaince & operation practices.

Regards

Mohan Mankar
Territory Manager-P&P (Vidarbha&CG) II Institutional
Exide Industries Limited
Office No. 102, S.K.Tower,Nelson Square, Chhindwara Road, Nagpur - 440013.
Mobile : +91 9975766595 II Direct No.: Nagpur
Corporate Website : www.exideindustries.com

From: Abhishek Kumar <ABHISHEKKUMAR05@NTPC.CO.IN>
Sent: Wednesday, November 20, 2024 12:34 PM
To: Mankar, Mohan Pralhadrao <MohanPM@exide.co.in>
Cc: Sandeep Kohli <SANDEEPKOHLI@NTPC.CO.IN>
Subject: LIFE OF TUBULAR BATTERY

CAUTION (External Email): Do not click links or open attachments unless you recognize the Sender's Email id (do not go by the displayed name) and know the content is safe.

Dear Sir,
As discussed kindly provide us the details about life of Tubular battery used in power plant for 220V battery bank. It will be helpful if you provide the manual or document where life of battery is mentioned.
Please treat this message as most urgent and reply asap.
साढर,
अभिषेक कुमार
उप महा प्रबंधक
विद्युत अनुरक्षण
एनटीपीसी विंध्याचल
मो० -9431600306

Regards,
ABHISHEK KUMAR
DGM (EMD)
NTPC VSTPS
M-9431600306
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NTPC 50
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