पावर फाइनेंस कॉर्पोरेशन लिमिटेड
POWER FINANCE CORPORATION LTD.
(भारत सरकार का उपक्रम) (A Govt. of India Undertaking)
(आई.एस.ओ. 9001:2015 प्रमाणित) (ISO 9001:2015 Certified)

No:02:10:IPDS:2017:SBD: 50750 Date: 1st Sept. 2017

To,
CMDs/MDs/Head of Utility

Sub: Regarding changes/clarifications issued in Standard Bidding Document including post award changes, if any under IPDS

Dear Madam/Sir,

This is to inform you that the Standard Bidding Document (SBD) is a common document to be used for DDUGJY and IPDS schemes and the same was circulated by REC to all the Utilities for use in DDUGJY/IPDS schemes. Further, a few changes/clarifications in technical specifications, condition of contract, drawings, price schedule etc. were conveyed to the States from time to time by REC as per Annexure-I (copies of amendments/clarifications also enclosed). These changes have been accepted by Committee headed by CEA on finalization of Standard Bidding Documents. However, States/Utilities, being tender inviting, awarding and execution authority, have to take decision on adopting such changes and its commercial aspects, if any, on the awarded works. The same has already been clarified by ED (DDUGJY) vide his letter dated 21.072017.

PFC vide letter dated 27.03.2017 has also issued an "Advisory on procurement of Distribution Transformer under IPDS" w.r.t. Energy Efficiency requirements and other compliances following various Standards/Govt. notifications and provisions in the Standard Bidding Document of IPDS to ensure quality procurement of transformers by Utilities.
It is once again clarified to all the Utilities that the changes/amendments/clarifications in Standard Bidding Documents issued by REC for DDUGJY as per Annexure-I are also applicable for IPDS works, as the common SBD has been prepared for use in both the schemes i.e. DDUGJY and IPDS works.

This is for your kind information and necessary action please.

Thanking You,

Yours faithfully,

A Saxena

(Avkash Saxena)
ED (IPDS)

Encd. Annexure-1 along with copies of amendments/clarifications issued by REC

पावर फाइनेंस कॉरपोरेशन लि.
ऊर्जानिधि, 1, बाराखंबा लेन,
कनॉट प्लेस, नई दिल्ली-110001
01 SEP 2017
डिस्पैच अनुभाग

Annexure-1: Amendment/ Clarification issued for Standard Bidding Document for DDUGJY/IPDS Scheme

S. No.	Clause No. in SBD for DDUGJY/IPDS	Subject	Date of issue of clarification by REC	Amendment/ Clarification
1	Volume-III (TS & Drawing)	Regarding Standard make of equipment in SBD	01.06.2016	Standard Bidding document are neutral on the name of any make and it is up to engineer-in charge of PIA to decide acceptable make of equipment including relays etc. based on Technical Specification, past performance, technical suitability and state practices of the equipment in the system.
2	Vol-I Section-IV_GCC	Clarification on statutory Tax variations on introduction of GST	30.06.2016	In the event of introduction of GST in the course of performance of contract, PIA shall examine its impact on the affected transactions under the contract in totality, for equitable adjustment in the contract price, if required.
3	Vol-I Section-V_SCC, Annexure-I	Inclusion of IDFC bank in list of eligible banks under SBD	30.06.2016	To include IDFC bank in the list of eligible scheduled commercial Private Indian banks for issuance of Bank Guarantee under SBD.
4	Volume-III (TS & Drawing)	Amendment in TS of 11 kV composite Insulator	27.07.2016	The minimum shed diameter for long rod insulator should be between 75-100mm instead of 100mm.
5	Volume-III (TS & Drawing)	Amendment in TS of piercing connector	05.08.2016	Removal of Electrical Ageing test from the acceptance tests for Insulation piercing Connector (IPC).
6	General	"Zero effect" Concept for enclosure of meter box & Distribution Box	11.08.2016	As per the plastic waste management (PMW) rules, 2016 issued by Central Pollution Control Board (CPCB), the most preferred option is minimization of use of SMC/FRP/ Polycarbonate polymer products & promoting use of alternate material, which could be easily recyclable/reusable/degradable. If States still opts to purchase SMC/FRP/ Polycarbonate plastic enclosures, then States shall ensure the collection of plastic waste generated and its final disposal after the end of its useful life, as per the plastic waste management (PMW) rules, 2016 (along with latest amendments).
7	Volume-III (TS & Drawing)	Methodology of loss capitalization in Technical Specification of DTR	29.09.2016	It would be practically not feasible to implement the loss capitalization methodology for tender evaluation in full turnkey projects, the methodology of total owning cost based on loss capitalization may not be insisted upon for full turnkey tenders. However, states opting to go for direct procurement of DTR may take care of this methodology based on their state practice.

S. No.	Clause No. in SBD for DDUGJY/IPDS	Subject	Date of issue of clarification by REC	Amendment/ Clarification
8	General	Public Procurement Policy for Micro & Small Enterprises	01.12.2016	States may review and comply to Public Procurement Policy order dated 23.03.2012 for Micro & Small Enterprises (MSEs) under DDUGJY scheme, as per the state public procurement policy and practice for MSEs.
9	Volume-III (TS & Drawing)	Regarding Standard make of equipment in SBD	24.03.2017	In continuation to clarification issued vide letter dated 01.06.2016, Standard Bidding documents are neutral on the name of any make and it is up to engineer-in charge of PIA to decide acceptable make of equipment including relays etc., based on TS, past performance, technical suitability and state practices of the equipment in the system etc.
10	Volume-I , Scope of Work , Volume-II, Section-III, Price Schedule & Volume-III (TS & Drawing)	Rating of Distribution Transformer in revised SBD for full turnkey contracts	30.03.2017	As per Technical Specification finalized by Committee-A, Standard rating of Distribution Transformers of Energy Efficiency level-2 & above as specified in IS 1180 (part-I):2014 only are to be procured under the schemes for all KVA ratings of Distribution Transformers. PFC vide letter dated 27.03.2017 has also issued an "Advisory on procurement of Distribution Transformer under IPDS" w.r.t. Energy Efficiency requirements and other compliances following various Standards/Govt. notifications and provisions in the Standard Bidding Document of IPDS to ensure quality procurement of transformers by Utilities.
11	Volume-III (Tender Drawing)	Clarification in Tender drawings provided in SBD	25.04.2017	All the drawings provided in SBD are indicative drawings for tender purpose. These drawings are to facilitate the bidders for quoting the tenders; however every manufacturer has to submit his or her own design / drawing conforming to Technical Specifications and are to be approved by Engineer-in-Charge.
12	Volume-III (TS & Drawing)	Regarding Technical Specification of LTDB in SBD	15.05.2017	The Technical Specification of LTDB (Low Tension Distribution Boxes) specifies metallic boxes using deep drawn methodology. In addition to this, "Low Tension Distribution Box (LTDB) can also be manufactured by sheet bending process for developing three side walls (from a single sheet) with top & bottom walls welded to the same and front door fabricated separately and hinged."

S. No.	Clause No. in SBD for DDUGJY/IPDS	Subject	Date of issue of clarification by REC	Amendment/ Clarification
13	Volume-III (TS & Drawing)	Regarding technical specification for CTs, PTs	21.07.2017	The clarifications/amended provision of a few clause are as below (13a to 13d)-
	TS Clause No	**Existing Technical Specification**		**Clarification/amended provision**
a)	TS for 11 & 33 KV outdoor type current Transformers, Clause No. 4.7. (1)	The primary terminal shall be of standard size of 30mm dia X 80 mm length of heavily tinned(min. thickness 15 micron) electrolytic copper of 99.9% conductivity.		Clause may be modified to: The primary terminal shall be of maximum size of 30mm dia X 80 mm length of heavily tinned (min. thickness 15 micron) electrolytic copper of 99.9% conductivity. Manufacturer shall design the diameter of primary terminal keeping current density 1.6 A per sq. mm for the given capacity of CT.
b)	TS for 11 & 33 KV outdoor type potential Transformers, Clause No. 7	The secondary terminals studs shall be provided with at least 3 nuts and two plain washers. These shall be made of brass duly nickel plated. The min. stud outer dia shall be 10 mm & length 15 mm.		Clause may be modified to : The secondary terminals studs shall be provided with at least 3 nuts and two plain washers. These shall be made of brass duly nickel plated. The min. stud outer dia shall be 6 mm & length 15 mm.
c)	TS for 11kV and 33kV metering units, Clause No.9	Brass rods 12mm dia for Primary and 6mm dia for secondary.		Keeping current density of 1.6 A per sq. mm size of rod may be designed by manufacturer for given CT / PT.
d)	TS for 11kV and 33kV Metering Units, Clause No 10.b	Tank including top cover shall be Hot Dip Galvanized.		Existing clause of TS will prevail. However state may decide to use Hot dip galvanized / Epoxy paint tank for CT/PT unit as per their prevailing state practices.
14	Volume-III (TS & Drawing)	Regarding technical specification for Power Transformers, DTRs, XLPE Power Cables, 11kV and 33 kV Isolators & AB Switches	25.08.2017	The clarifications/amended provision of a few clause are as below (14a to 14j)-
	Item in the TS	**Existing Technical Specification**		**Clarification/amended provision**
a)	TS for Power Transformers	<u>Maximum temperature rise over ambient temperature for oil/ winding above ambient temperature:</u> Permissible Temperature rise over ambient temperature shall be as per IS-2026 (point no.-25 page no.-6)		The maximum temperature rise over ambient temperature for oil/winding above ambient temperature shall be as per IS-2026(Part-2):2010. i.e. Maximum temperature rise over ambient temperature for top oil measured by thermometer should be 50 degree C. and for winding measured by resistance should be 55 degree C.
b)	-Do-	<u>Noise level measurement type test:</u>		No change

		Noise Level Measurement IEC 551 Table : 6 Transformer Type Tests ambient (clause no.-8.2.1 pgno-31)	
c)	TS for Distribution transformers	Vacuum type test on transformer tank: Transformer tank shall be subjected to specified vacuum. The tank designed for vacuum shall be tested at an internal pressure of 0.35 kg per sq. cm absolute (250 mm of Hg) for one hour. (clause no.-31.10-pgno-80)	"Vacuum Type Test on Transformer Tank" shall be carried out as per IS-1180 (Part-1): 2014 i.e. The transformer tank shall be subjected to air pressure 80 kPa for 30 minutes and vacuum of 250 mm of mercury for 30 minutes.
d)	TS for XLPE Power Cables	Bleeding blooming type test: Bleeding and blooming tests (for outer sheath) (clause no-6.0, pgno-367)	"Bleeding Blooming Test" is deleted for XLPE cables.
e)	-Do-	Drum length: All Power Cables shall be supplied in drum length of 1000 m. Each drum shall contain one continuous length of cable. Owner shall have the option of rejecting cable drums with shorter lengths. (clause no.-5.0 pgno-366)	Drum length for power cable shall be 200/300/500m as per requirement of utility/Discom.
f)	TS for Isolators & AB switches	Maximum temperature rise over ambient temperature: The maximum temperature attained by any part of the equipment when in service at site under continuous full load conditions and exposed to the direct rays of Sun shall not exceed 45 degree above ambient (clause no.-4- pgno-488)	Maximum permitted temperature rise over ambient temperature will be as per Table-4 of IS-9921 (Part-2).
g)	TS for 11 kV AB Switch	Number of Post Insulator per stack: The complete set of three phase AB Switches shall have stacks of post insulators. 11KV AB Switches : 3 No. 11KV Post Insulator per stack(clause no.- 3 pgno-487)	For 11kV AB switch, one (1) no. 11 kV post insulator per stack shall be permitted.
h)	TS for 33 kV AB Switch	Number of Post Insulator per stack: The complete set of three phase AB Switches shall have stacks of post insulators. 33KV AB Switches : 3 No. 33KV Post Insulator per stack (clause no.- 3 pgno-487)	For 33kV AB Switch, two (2) no. 22 kV post insulator or 3 No 11 KV post Insulators shall be permitted in each stack

i)	TS for 11 kV Isolator	Number of Post Insulator per stack: 11 KV isolators shall comprise of three numbers 11 KV insulators per stack and 9 such stack shall be supplied with each isolator. (clause no.- 9 pgno-484)	Post insulators for the 11kV isolators shall comprise of one (01) no. 11kV insulator per stack and nine (9) such stacks shall be supplied with each isolator.
j)	TS for 33 kV Isolator	Number of Post Insulator per stack: 33 KV isolators, two numbers 33 KV insulators per stack and 9 stacks shall be supplied with each isolator (clause no.- 9 pgno-484)	Post insulators for 33kV isolators shall comprise two (02) nos. of 22kV insulators or 3 No of 11 KV post insulators or One no 33kV post insulator per stack and nine (9) such stack shall be supplied with each isolator

xxxxxxxxxxxxxxxxxxxx

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CIN : L40101DL1969GOI005095 Website: www.recindia.nic.in

स्वच्छ भारत
एक कदम स्वच्छता की ओर

Ref: REC/DDUGJY/SBD/609

Date: 01.06.2016

To
All PIAs/DISCOMs/Power Deptt.

Sub: Regarding Standard Make of equipment in SBD under DDUGJY

Sir,

Reference has been received from M/s Ashida Electronics Pvt. Ltd. on notification of name of manufacturers of Relay and Fitments in Technical Specifications provided in Standard Bidding Documents for DDUGJY projects. In this matter, it is clarified that the Make of equipment mentioned in Standard Bidding Documents are indicative only to ascertain the quality of materials.

Standard Bidding Documents are neutral on the name of any make and it is upto Engineer-incharge of PIA (Project Implementing Agency) to decide the acceptable make of equipment including relays etc. based on given technical specifications, past performance, technical suitability and state practices of the equipment in the system.

This is for your kind information and necessary action please.

Thanking You,

Yours Sincerely,

G S Bhati
GM (DDUGJY/QA)

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Regd. Office: Core-4 SCOPE Complex, 7, Lodhi Road, New Delhi 110 003
Tel: 011-24369851 FAX: 011-24369850 , Email:- ddugjyquality@gmail.com
CIN: L40101DL1969GO1005095 Website: www.recindia.nic.in

No. REC /DDUGJY/SBD/16-17/686 Date: 30.06.2016

To,

All Project Implementing Agencies
RE-DDUGJY Projects

Subject: Clarifications on Statutory Tax Variations on introduction of GST.

Madam/Sir,

This has reference to WBSEDCL e-mail dated 21.06.2016 received from ED distribution seeking clarification on the query raised by M/s L&T ,regarding admissibility of statutory variation in Taxes in the event of introduction of proposed GST. As per SBD for Partial Turnkey Contracts, Clause 10.7of General Conditions of Contract (GCC) under heading Taxes & Duties is reproduced as hereunder:
"For the purpose of the Contract, it is agreed that the Contract Price specified in Article 2(Contract Price and Terms of Payment) of the Contract Agreement is based on the taxes, duties, levies and charges prevailing at the date seven (07) days prior to the last date of bid submission (hereinafter called "Tax" in this GCC Sub-clause 10.7). If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the performance of the Contract, which was or will be assessed on the Contractor in connection with performance of the Contract, an equitable adjustment of the Contract price shall be made to fully take into account any such change by addition to the Contract price or deduction therefrom, as the case may be, in accordance with GCC Clause 31 (Changes in Laws and Regulations) hereof. However, these adjustments would be restricted to direct transactions between the Employer and the Contractor for which the taxes and duties are reimbursable by the Employer as per the Contract. These adjustments shall not be applicable on procurement of raw materials, intermediary components etc by the Contractor and also not applicable on the bought out items dispatched directly from sub-vendor's works to site".

Moreover the clause 31, of GCC of SBD under heading changes in Laws and Regulations is stated as hereunder:

Contd..

If, after the date seven (07) days prior to the date of Bid Opening, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed in India (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the costs and expenses of the Contractor and/or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract. However, these adjustments would be restricted to direct transactions between the Employer and the Contractor and not on procurement of raw materials, intermediary components etc. by the Contractor for which the Employer shall be the sole judge. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with the Appendix-2 to the Contract Agreement.

In this connection, it is clarified that *"in the event of introduction of GST in the course of performance of contract, PIA shall examine its impact on the affected transactions under the contract in totality, for equitable adjustment in the contract price, if required. The contractor shall furnish the relevant details/documents for this purpose, as may be required by PIA".*

This is for kind information and necessary action please.

Thanking You,

Yours Sincerely,

30/06/16

(G S BHATI)
General Manager (DDUGJY)

Copy for kind information to:

1. All ZM /CPM, REC, ZO / PO

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CIN: L40101DL1969GO1005095 Website: www.recindia.nic.in

No. REC /DDUGJY/SBD/16-17/685 Date: 30.06.2016

To,
All CMDs/MDs
State Utilities /Discoms/Power Department

Subject: Inclusion of IDFC Bank in list of eligible banks under Standard Bidding Documents of DDUGJY.

Sir,

This has reference to the list of eligible Scheduled Commercial Private Indian Banks enlisted in Annexure-I to SCC (Vol-I, Section-V) of Standard Bidding Documents for partial turnkey for issuance of Bank Guarantees.

In this connection, it is to inform to all the PIAs to include IDFC bank in the list of eligible Scheduled Commercial Private Indian Banks for issuance of Bank Guarantee under Standard Bidding Documents for partial turnkey under DDUGJY scheme.

Thanking You,

Yours Sincerely,

30/6/16

(G S Bhati)
General Manager (DDUGJY)

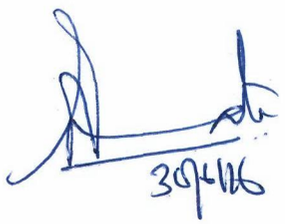
Enclosure:

Annexure-I: List of eligible Scheduled Commercial Private Indian Banks

Annexure-I

LIST OF ELIGIBLE SCHEDULED COMMERCIAL PRIVATE INDIAN BANKS

Sl. No.	Name of Banks
1	HDFC Bank Ltd.
2	Axis Bank Ltd.
3	Kotak Mahindra Bank Ltd.
4	Federal Bank Ltd.
5	Indusind Bank Ltd.
6	Development Credit Bank Ltd.
7	ING Vysya Bank Ltd.
8	Karnataka Bank Ltd.
9	Karur Vysya Bank Ltd.
10	Ratnakar Bank Ltd.
11	South Indian Bank Ltd.
12	Yes Bank Ltd.
13	ICICI Bank
14	**IDFC Bank**



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Tel: 011-24369851 FAX: 011-24369850 , Email:- ddugjyquality@gmail.com
CIN: L40101DL1969GO1005095 Website: www.recindia.nic.in

Ref. No. REC/DDUGJY/SBD/ 749. Dated: 27-07-2016

To
All Project Implementing Agencies
(DISCOMs/SEBs/CPSUs/Power Departments)
RE-DDUGJY Projects

Sub: Amendment in Technical Specification of 11 kV Composite Insulators -reg

Sir/Madam,

This has reference to the Standard Bidding Document Vol -III Section-I Technical Specification of 11 kV Composite Insulators to be used under DDUGJY scheme. The clause no. 5 of technical specification has been amended which is as here under:

Existing Provision in the Clause	Amended Clause
The minimum shed diameter for long rod insulator should be 100 mm	The minimum shed diameter for long rod insulator should be between 75-100 mm

This is for kind information please.

Yours sincerely,

27/07/16

(G S Bhati)
General Manager (DDUGJY)

Copy to:
ZM/CPM- Please circulate to PIAs in the states of your purview.

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Ref. No. REC/DDUGJY/SBD/770 Dated: 05-08-2016

To
All Project Implementing Agencies
(DISCOMs/SEBs/CPSUs/Power Departments)
RE-DDUGJY Projects

Sub: Amendment in Technical Specification of Piercing Connector -reg

Sir/Madam,

This has reference to the technical Specification of Piercing Connector to be used under RE-DDUGJY (erstwhile RGGVY) XII Plan & DDUGJY schemes. The clause no. 5.4.1 of technical specification which shall constitute Acceptance Tests for Insulation Piercing Connectors (IPC) has been amended which is as here under:

Existing Provision in the Clause	Amended Clause
• Visual • Dimensional (as per SCD and overall dimensions submitted with Tender Offer) • **Electrical Ageing Test** • Dielectric and Water Tightness Test. • Mechanical Tightening Test • Effect of Tightening on Main Core • Effect of Tightening on Branch Core	• Visual • Dimensional (as per SCD and overall dimensions submitted with Tender Offer) • Dielectric and Water Tightness Test. • Mechanical Tightening Test • Effect of Tightening on Main Core • Effect of Tightening on Branch Core

This is for kind information please.

Yours sincerely,

(G S Bhati)
Executive Director (DDUGJY)

Copy to:
1. ZM/CPM- Please circulate to PIAs in the states of your purview.

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CIN : L40101DL1969GOI005095 Website: www.recindia.nic.in

Ref. No. REC/DDUGJY/SBD/ 310 Date: 11-08-2016

To
All Project Implementing Agencies
(DISCOMs/CPSUs/Power Departments)

Sub: "Zero Effect" Concept for enclosures of Meter Box & Distribution Box under DDUGJY.

Ma'M/Sir,

This has reference to specifications of Meter Boxes and LT Distribution Boxes (LTDB) provided in Standard Bidding Documents of DDUGJY & IPDS, wherein metallic box is recommended. The Ministry of Environment & Forests (MOEF) & Climate Change and Central Pollution Control Board (CPCB) have notified New Plastic Waste Management Rules (PWM), 2016 and guidelines, as per the directions of the Hon'ble NGT. These guidelines are available on the website of MOEF and are also enclosed herewith. As per clause 5.2.1 of these guidelines, "***the most preferred option is minimization of use of SMC/FRP/Polycarbonate polymer products & promoting use of alternate material, which could be easily recyclable/reusable/degradable***".

As highlighted in Standard Bidding Documents, use of eco-friendly & Recyclable/Reusable/degradable metallic boxes is encouraged. However, if State DISCOMs/Power Departments still opt to purchase SMC/FRP/Polycarbonate plastic enclosures, then **States shall ensure the collection of such plastic waste generated and its final disposal after the end of its useful life, as per the Plastic Waste Management (PMW) Rules, 2016 (along with its latest amendments).**

This is for kind information please.

Yours sincerely,

11/8/16

(G S Bhati)
Executive Director (DDUGJY)

Encl:a/a
Copy for kind information to:

i. ED (PMG), REC
ii. ED (DDUGJY)-I/II
iii. All ZM/CPM, REC - To circulate to PIAs in the states under your jurisdiction.

Guidelines for Disposal of Thermoset Plastic Waste including Sheet moulding compound (SMC)/Fiber Reinforced Plastic (FRP)

CENTRAL POLLUTION CONTROL BOARD
(Ministry of Environment, Forest and Climate Change,
Government of India)
'Parivesh Bhawan' C.B.D.Cum-Office Complex,
East Arjun Nagar, Shahdara, Delhi-110032
(25th May, 2016)

CONTENTS

Background:

It is well known that plastic waste are non-biodegradable & remain on earth for several years. Further, some of the plastic waste like thermoset plastic waste can't be remoulded / recycled and may cause environmental issues. In view of non-recyclable nature of the thermoset plastic, the petitioner Sh. Money Goyal & Akash Seth filed a petition No OA 124/2014 in Hon'ble NGT in respect of non-recyclability of SMC/FRP enclosures being used by some Electricity Departments in Haryana, Punjab, UP etc. Hon'ble NGT while hearing the said matter on 27.01.2015 passed the following direction:-

> ***"The CPCB in consultation with the MoEF shall constitute such a Committee within a period of 2 weeks from the date of receipt of the copy of the order and thereafter, we request the Committee thus constituted to study the entire aspect and give its recommendations to the CPCB expeditiously in any event within 4 weeks."***

The copy of the Hon'ble NGTs Order is attached as **Annexure-I**. In compliance of the Order of the Hon'ble NGT, Central Pollution Control Board constituted a Committee comprising officials from MoEF & CC, BIS, CIPET, IIT Delhi and Associated Cement Company (ACC) for framing guidelines for the purpose of proper and appropriate disposal of SMC/FRP plastic waste.

2.0 Definition of Thermoset Polymer including SMC/FRP Plastic waste:

Thermoset plastic when cured by heat or other means, changes into a substantially infusible or insoluble product. The thermoset polymer is a kind of plastic, which due to its composite chemical structure can't be re-moulded / recycled. The thermoset plastic discarded after use are accumulated & landfilled. The SMC/FRP products are a kind of thermoset plastics commonly made from composites of glass fibers embedded in polyester resin, vinylester resin, epoxy resins etc.

2.1 Definition of Sheet Moulding Compound (SMC):-

Sheet moulding compound (SMC) or sheet moulding composite is a ready to mould glass-fiber reinforced polyester material primarily used in compression moulding. This is manufactured by dispersing long strands (usually >1") of chopped fiber (commonly glass fibers or carbon fibers on a bath of resin (commonly polyester resin, vinylester resin or epoxy resin). The longer fibers in SMC result in better strength properties than standard bulk moulding compound (BMC) products.

2.2 Definition of Fibre Reinforced Polymer (FRP):-

The FRP are both thermoset and thermoplastic, FRP products having thermoset base material are discussed here. FRP composite materials consist of two or more distinct physical phases, one of which, the fibrous, is dispersed in a continuous matrix phase. Composites offer the designer a combination of properties not available in traditional materials. It is possible to introduce the fibres in the polymer matrix at highly stressed regions in a certain position, direction and volume to obtain maximum efficiency from the reinforcement, and then, within the same member to reduce the reinforcement to a minimal amount at regions of low stress. Other advantages offered by the material are its

lightness, resistance to corrosion, resilience, translucency and greater efficiency in construction compared to the more conventional materials.

3.0 Chemical Structure & Properties of Thermosetting Polymers:

3.1. Epoxy resins

3.1.1 The terminology 'epoxy resin' is generally applicable to both prepolymers as well as to cured resins. The former contains reactive epoxy groups whereas the cured resin may or may not contain reactive epoxy groups. While the term can be justified in the former case, the cured resins are also called epoxy resins. Epoxy resins typically contain a three membered ring with -O- atom. Different terminologies are also used to specify the group such as epoxide, oxirane and ethoxyline group, $RCHOCH_2$. Commercial epoxy resins usually contain aliphatic, cycloaliphatic, or aromatic backbones. Epoxy resins are highly reactive presumably due to the strained three membered ring structures and react with many nucleophilic and electrophilic reagents. Therefore, a wide variety of organic compounds having active hydrogen atoms can be used as curatives. These include amines (both aliphatic/aromatic and primary/secondary), phenols, carboxylic acids, thiols, anhydrides etc. The general reaction of epoxy resin with these compounds are presented below;

3.1.2 Epoxy resins possess high resistance to chemicals and corrosion, besides having moderate toughness, flexibility and excellent mechanical and electrical behaviour. Epoxy resins are also used as outstanding adhesives for different substrates. Epoxies are used in tooling, for laminates in flooring and to a small extent in moulding powders and in road surfacing. Epoxy resins are used for encapsulation of miniature components, particularly in space crafts. Epoxy resin laminates are useful in aircraft industry, while Carbon fiber/epoxy resin composites are used for structural modification in aeroplanes and epoxy / aramid fibers find uses in the design of small boats.

3.2. Unsaturated polyester resins

3.2.1 Linear unsaturated polyesters, which are often, called prepolymers have varied industrial applications. Unsaturation is introduced into the resin molecule using an unsaturated dicarboxylic acid such as maleic acid. For example, polyester of the following type is generated by reaction between ethylene glycol and maleic acid**;**

3.2.1 Commercial unsaturated polyesters are based on phthalic acid, maleic acid, ethylene glycol, and butanediol. The crosslink density, which represents the average number of crosslinks between polyester chains and the average length of the crosslinks, determines the mechanical properties of the product. The crosslink density, in turn, depends on the relative amount of the unsaturated acids used to prepare the prepolymer. The average length of the crosslinks depends on the relative amounts of the prepolymer and monomer and on the copolymerization behaviour of the two double bonds. For example, fumarate-styrene system yields a harder and tougher material than fumaratemethyl methacrylate system. The unsaturated polyester- matrix is employed in fiber-reinforced plastics (FRP) structures. The resins are also useful for decorative coatings. The resin finds use in the manufacturing of large structures such as boats and car bodies since it is curable at room temperature. The powder form of the resin is used in solution or emulsion form as binders for glass-fiber performs and for the manufacture of pre-impregnated cloths.

3.3. Phenolic resins

3.3.1 Phenolic polymers are obtained by the polymerization of phenol with formaldehyde [1]. The polycondensation reaction can be accelerated either by acids or by bases. The reaction yields resole prepolymers (resole phenolics) which are mixtures of mononuclear methylolphenols and various dinuclear and polynuclear compounds. Other products include substitution at o- and p- positions and the type of bridge between the rings (methylene versus ether). The typical ratio of formaldehyde to phenol is 1.2:1. Substituted phenols such as cresols (o-, m-, and p-), p-butylphenol, resorcinol, and bisphenolA are used for specific applications. Other aldehydes such as acetaldehyde, glyoxal, 2-furaldehyde are also used. The composition and molecular weights of the resole depend on the ratio of monomers, pH, temperature and other reaction conditions. For crosslinking temperature as high as 180^{o}C is necessary. During the curing process, methylene and ether bridges are formed between benzene rings to yield a network structure. Phenolic mouldings are hard, insoluble and heat resistant materials, since they are highly cross linked and interlocked [2]. The type of resin and filler influence the chemical resistance of the cured material. Cresol and xylenol-based resins are inert towards NaOH attack, whereas simple phenol formaldehyde will be affected. Phenolic mouldings are resistant to acids except 50 % sulphuric acid, formic acid, and oxidizing acids, if the filler used is also resistant. The reins are stable up to 200^{o}C.

3.3.2 Phenol-formaldehyde mouldings are widely used for domestic plugs and switches. Used in electrical industry where high electrical insulation properties are not needed. It is used for making cases, knobs, handles and telephones. In automobile industry, the resins are used for making fuse-box covers, distributor heads, and in other applications where electrical insulation together with adequate heat resistance are needed. Heat resistant grade of the resins are used for saucepan handles, saucepan lid knobs, lamp housings, cooker handles, welding tongs, and electrical iron parts. Since the resin is hard and can be electroplated, it is used in the manufacture of 'golf ball' heads for typewriters etc. Bottle caps and closures are made from the resin in large quantities.

3.4. Urea-formaldehyde resin

3.4.1 It is an amino plastic, a term generally used to represent resinous polymers formed by the interaction of amines or amides with aldehydes. The cured products form cross linked insoluble and infusible thermoset. Compared to phenolic resins, the resins are cheaper, light in colour, and have better resistance to electrical tracking. However, it exhibits higher water absorption and poor heat resistance. The mono and dimethylol derivatives, formed during the reaction, further condense with urea to give the final resin structure.

3.4.2 There are many desirable properties for U-F moulding powders that enable to keep it in the highest application level. The wide range of colours is a reason for the widespread use of the material. U-F resins do not impart taste and odour to foodstuffs and beverages with which they come in contact. Another added advantage is their good electrical insulation properties with particularly good resistance to tracking. The resin can resist continuous heat upto a temperature of 70^{o}C. Some physical properties of urea-formaldehyde resins are presented in the **Table 1.**

3.4.3 The major application of urea-formaldehyde resin is in the field of electric and electronic applications. It's mainly used for making plugs, sockets and switches. In

addition, it is used for domestic applications such as pot and panhandles and table wares. In the sanitary sector, the resins are used as toilet seats and miscellaneous bathroom equipment. The wide colour range and freedom from taste and odour make the material a good choice for the manufacture of bottle caps and closures. However, nowadays, its consumption in this area has been reduced by the development of new thermoplastics. Buttons are made from U-F moulding powders due to its resistance to detergents and dry-cleaning solvents. Miscellaneous uses include meat trays, toys, knobs, lampshades etc. The bulk of U-F resins are used as adhesives for particleboard, plywood and furniture industries. Another application of the resin is in the manufacture of chipboard. U-F resins are also used to make foams. U-F foams are placed on airport runways to act as an arrester bed to stop aircraft that overshoot during emergency landings or abortive take-offs. Another large scale application of the resin lies in the manufacture of firelighters.

Table 1. Properties of urea-formaldehyde resins

Property	Units	α-cellulose filled	Wood flour filled	Plasticized	Translucent
Specific gravity	-	1.5-1.6	1.5-1.6	1.5-1.6	1.5-1.55
Tensile strength	10^3lbf/in	7.5-11.5	7-9.5	7-10	8-12
Impact strength	ft/bf	0.20-0.35	0.16-0.35	0.16-0.24	0.14-0.2
Cross-breaking strength	10^3lbf/in	11-17	11-16.5	13.5-15.5	13-17
Dielectric Strength	0.001 in	120-200	60-180	100-200	70-130
Volume resistivity	Ωm	10^{13}-10^{15}	10^{13}-10^{15}	10^{14}-10^{15}	-
Water absorption					
24h at 24°C	mg	50-130	40-170	50-90	50-100
30min at 100°C	mg	180-460	250-600	300-450	300-600

3.5. Melamine-formaldehyde resin

3.5.1 Melamine-Formaldehyde (MF) can also react to give methylol derivatives of melamine. The methylol derivative with excess melamine undergoes polycondensation to give linear polymer, which forms three-dimensional network structure with further quantities of melamine monomer. The M-F resins are characterized by superior properties.
3.5.2 The mineral-filled resins are having low water absorption. The melamine resin is

having better resistance to attack by aqueous solutions such as fruit juice and beverages. Good electrical properties are maintained at elevated temperatures. Better heat resistance and greater hardness are the added advantages. They have a wide colour range, besides track being and scratch resistance.

3.5.3 Mineral-filled melamine based compositions have superior electrical insulation and heat resistance to the cellulose-filled grades. The resins are used for the manufacture of decorative foils in compression moulding. The principal application of the resin is for the manufacture of tableware. A wide colour range distribution, surface hardness and stain resistance are the reasons. Cellulose-filled compositions are used at small levels for the manufacture of trays, clock cases and radio cabinets. The mineral-filled compounding are used in electrical applications and knobs and handles for kitchen utensils. M-F resins are widely employed for laminating applications owing to their high hardness, good scratch resistance, freedom from colour and heat resistance. They are also used as adhesives. Melamine-formaldehyde condensates are useful in textile industry. They are useful agents for permanent glazing, rot proofing, wool shrinkage control and, with phosphorus compounds, flame proofing. The resin can be used to prepare paper with enhanced wet-strength.

3.6. Polyimides

3.6.1 In Polyamides, the branched nature of the functional group facilitates the production of polymers. The backbone consists mainly of ring structures and hence high softening points. The polymers exhibit high thermal stability and are hence valuable for high temperature applications. Aromatic polyimides are formed by the polycondensation of dianhydrides with diamines. For example, polycondensation of pyromellitic anhydride with p,p′-diaminodiphenyl results in the synthesis of polyimides. The reaction is carried out in two steps. In the first step, the reaction is conducted with suitable solvents such as DMF at around 50^{o}C, where polymerization takes place with the formation of polyamic acid Thepolyamic acid is then casted as a film, by evaporating the solvent and baked at 300^{o}C in the atmosphere of nitrogen. Where polycondensation takes place to form the product. In the second step, the product is converted into the required shape. Polyimides, which can be either thermoplastic or thermoset, are widely used in aerospace applications.
3.6.2 Thermosetting polyimides provide easier processing and higher thermal resistance, while thermoplastic polyimides offer greater toughness. A comparison of the properties of epoxy and polyimide thermoset matrices is furnished in **Table 2.**

3.6.3 The polymer is having excellent resistance to oxidative degradation and is inactive towards most chemicals other than strong bases and high-energy radiations. The principal application of polyimides is as compressor seals in jet engines. It is used in data processing equipment such as pressure discs, sleeves, bearings, and as friction elements and as valve shafts in shut-off valves. Due to their heat resistance capacity and resistant to deformation, the polymers are used in soldering and welding equipment. However, the disadvantage of the polymer is that they may undergo hydrolysis and crack in water or steam at temperatures above 100^{o}C. For such purposes, polyetheretherketones (PEEK) are employed.

Table 2. Properties of Composite Matrices

Property	Epoxy	Polyimide
Modulus, GPa	2.8-4.2	3.2
Tensile Strength, MPa	55-130	56
Compressive strength, MPa	140	187
Density, g cm^{-3}	1.15-1.2	1.43
Thermal expansion coefficient, 10-6 ^{o}C	**45-65**	**50**

4.0 Sources/uses of SMC/FRP Plastic Waste;

The wide utilization of Thermoset Polymers including Sheet Moulding Compound (SMC)/Fibre Reinforced Plastics (FRP) is due to the combination of their mechanical and physical properties at the lowest system cost, without compromising on quality. Thermoset plastics are used in a broad range of applications, such as:

- **Automotive:** cars, trucks and other commercial and agricultural vehicles (body parts, structure and engine parts)
- **Mass transport:** trains, trams, light railways and monorail
- **Electrical & electronics:** housing, fuses, switchgear, etc.
- **Building & construction:** civil engineering and household fixtures
- **Domestic appliances:** coffee machines, toasters, irons etc.
- **Sanitary:** bathroom suites and hygienic surfaces.
- **Power utilities:** MCB boxes etc.

5.0 Management of Thermoset Polymer including SMC/FRP Waste

The use of polymer materials has simplified the modern life. At the same time, the extensive use of polymer materials in every walk of life have caused serious waste problems. The handling of increased amount of polymer waste has become a serious issue globally and is also a cause of depletion of petroleum resources which are an essential requirement of the mankind.

5.1 Collection, Segregation & Transportation

5.1.1 At present, no system exists with Municipal Bodies for collection, segregation & transportation of all kind of plastic waste including SMC/FRP/Polycarbonate plastic waste. However, as per Rule "6" of the Plastic Waste Management Rules, 2016:-

"1. Every local body shall be responsible for development and setting up of infrastructure for segregation, collection, storage, transportation, processing and disposal of the plastic waste either on its own or by engaging agencies or producers.

2. The local body shall be responsible for setting up, operationalisation and co-ordination of the waste management system and for performing the associated functions, namely:-

(a) Ensuring segregation, collection, storage, transportation, processing and disposal of plastic waste;
(b) ensuring that no damage is caused to the environment during this process;
(c) ensuring channelization of recyclable plastic waste fraction to recyclers;
(d) ensuring processing and disposal on non-recyclable fraction of plastic waste in accordance
with the guidelines issued by the Central Pollution Control Board;
(e) creating awareness among all stakeholders about their responsibilities;
(f) engaging civil societies or groups working with waste pickers; and
(g) ensuring that open burning of plastic waste does not take place.

3. The local body for setting up of system for plastic waste management shall seek assistance of producers and such system shall be set up within one year from the date of final publication of these rules in the Official Gazette of India.

4. The local body to frame bye-laws incorporating the provisions of these rules."

5.1.2 As per the Rule "9(1)" of the Plastic Waste Management Rules, 2016, The producers, within a period of six months from the date of publication of PWM Rules, 2016, shall work out modalities for waste collection system based on Extended Producers Responsibility and involving State Urban Development Departments, either individually or collectively, through their own distribution channel or through the local body concerned. In case of disposal of SMC/FRP waste etc. is carried out in cement kilns, the monitoring of air quality including dioxin/furan shall be the responsibility of producers to monitor the air quality on regular basis or as the case may be.

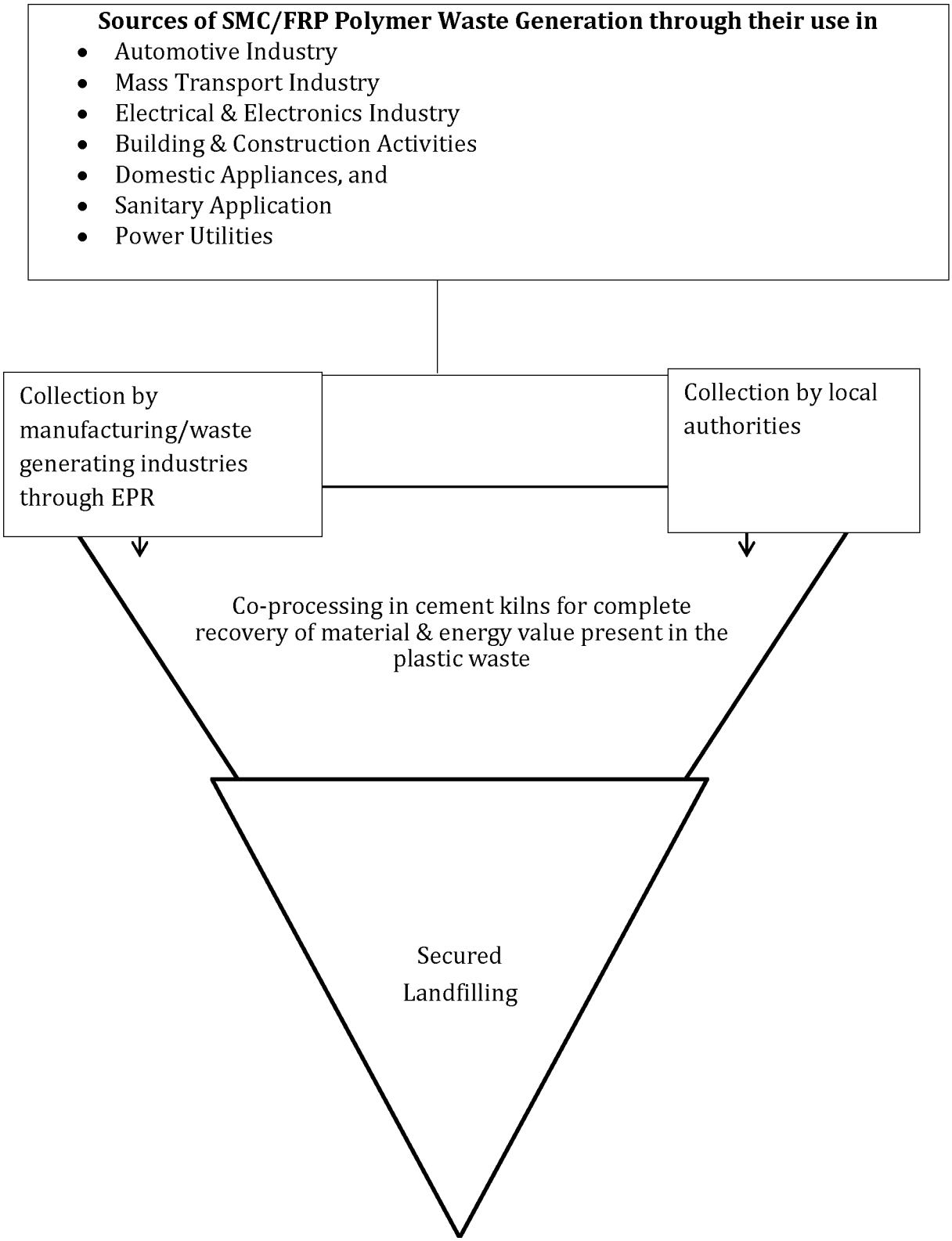
5.2 Management /Disposal Options:

The most deserved options are:

(i) Minimizing the waste generation
(ii) Co-processing in cement kilns
(iii) Disposal in secured landfills

Based on the various options practiced globally for disposal of plastic waste including SMC/FRP wastes and the waste management hierarchy, recommendation on collection & disposal of SMC/FRP wastes are illustrated in **Fig - 1:**

Figure – 1: Collection and Disposal of SMC/FRP Waste



5.2.1 Minimizing the waste generation

The most preferred option is minimization of use of SMC/FRP/Polycarbonate polymer products & promoting use of alternate material, which could be easily recyclable/reusable/degradable.

5.2.2 Co-processing of Thermosetting polymer waste in cement plants:-

Co-processing is a more environmentally friendly and sustainable method of waste disposal as compared to land filling and incineration because of reduced emissions and no residue after the treatment. Co-processing refers to the use of waste materials in industrial processes as alternative fuels or raw material (AFR) to recover energy and material from them. Due to the high temperature and long residence time in cement kiln, all types of wastes can be effectively disposed without any harmful emissions. As per the Basal Convention, variety of wastes including hazardous wastes, get disposed in an environmentally safe and sound manner through the technology of co-processing in cement kiln. Disposal of SMC / FRP wastes through co-processing is practiced in many countries as a regular method for their environmentally sound disposal. In India also, the capability of disposing FRP in an environmentally sound manner has been demonstrated through a co-processing trial carried out by ACC Limited in their Madukkarai Cement Works in Tamil Nadu. The results of this trial have demonstrated that there is no untoward impact of co-processing of FRP in the cement kiln on emissions or on the product quality. This trial was carried out at a Thermal Substitution Rate (TSR) of 0.924% which was reviewed by CPCB and permission to regularly co-process FRP waste in cement kiln at Madukkarai Cement Works granted.

5.2.2.1 Pre requisites for Co-processing of SMC/FRP polymer waste in cement plants:

Following should be considered as a prerequisite for permitting Co-processing of SMC/FRP wastes in cement plants.

a) The Producers of thermoset plastic, major user like industries, Electricity authority etc in consultation with local authority shall arrange to collect the SMC/FRP waste and handover to cement plants. They shall maintain a record of quantity generated and handed over to Cement plant.

b) The Cement plant shall maintain a record of quantity received and utilised by them.

c) The producers of SMC/FRP, major user like industries, Electricity authority etc shall assist the cement plants for establishment of required facilities for utilization of SMC/FRP like shredding, feeding system, safety measures as applicable for co-incineration, online emission monitoring for PM, SO_2 and NOx, and stack monitoring of heavy metals, dioxin and furans based on Extended Producers Responsibility.

5.2.3 Secured Landfill:

Secured landfill is another option that can be utilised for disposal of the thermoset waste. The experience has however demonstrated that the land utilised for the landfill purpose gets locked and the liability associated with this land, filled-up with materials

tends to continue forever, besides the land remains unusable. Most countries have stopped the practice of utilising landfill as the option for disposal of wastes. The cost of landfill expected to keep on increasing over the time due to increase in land and fuel coils. Further, availability of land is a major issue in the cities/towns, therefore, this method could be ranked as least preferred option. The producers of thermoset plastic -SMC/FRP boxes in collaboration with power utilities may also explore the possibility of establishing common secured landfills for disposal of thermoset waste including SMC/FRP etc.

6.0 Recommendations & Conclusion:

- The most preferred option is minimization of use of SMC/FRP/Polycarbonate polymer products & promoting use of alternate material, which could be easily recyclable / reusable / degradable
- The preferred option for disposal of thermoset plastic -SMC/FRP wastes is therefore co-processing in cement plants due to its high temperature (upto2000°C and long residence time). The producers of thermoset plastic, major user like industries, Electricity authority etc, in consultation with local authority, cement plants shall working out modalities for co-processing of such waste in cement kiln.
- The producers of SMC/FRP, major user like industries, Electricity authority etc shall assist the cement plants for establishment of required facilities for utilization of SMC/FRP like shredding, feeding system, safety measures as applicable for co-incineration, online emission monitoring for PM, SO_2 and NOx, and stack monitoring of heavy metals, dioxin and furans based on Extended Producers Responsibility.
- The State Pollution Control Board / Pollution Control Committee may consider stipulating suitable condition in consent order of the such Cement Plants on the co-processing of SMC/FRP/Polycarbonate polymer products.
- SPCB/PCC may consider incentives such as reduction of water cess / consent fee etc for such cement plants.

7.0 References

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Annexure – I

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 124/2014
And
M.A. No. 382/2014 & M.A. No. 64/2015

Money Goyal&Ors.V/s Ministry of Environment & Forests &Ors.

CORAM: HON'BLE JUSTICE DR. P. JYOTHIMANI, JUDICIAL MEMBER
HON'BLE MR. B.S. SAJWAN, EXPERT MEMBER
HON'BLE MR. RANJAN CHATTERJEE, EXPERT MEMBER

Present: Applicant / Appellant : Mr.HaminderSyal and Mr.Akash Seth, Advs.
Respondent No. 1 : Mr.VikasMalhotra, Adv.
Respondent No. 3 : Ms.ManishaAgrawalNarain, Adv. andMr. S.L. Gundli, Sr. Law Officer, CPCB
Respondent No. 4 : Mr.NitinKaushal and Mr. Rahul Meena, Advs.
Respondent Nos. 6to8 : Mr.Jayat K. Sud, SSC, PSPCL and Ms. Bonita Singh, Advs.
Respondent No. 9 : Mr.Tarunvir Singh Khehar and GurmeetKhehar, Advs.

	Date & Remarks	Order of the Tribunal
	Item No. 3 **January, 27 2015**	Respondent no. 3, CPCB has filed M.A. No.64/2015. The 3rd respondent has filed the above M.A seeking permission from this Tribunal to constitute an Expert group to frame guidelines on the subject matter involved.

		In the previous order of this Tribunal dated 12.12.2014 we have directed the CPCB as well as MoEF to jointly frame guidelines for the purpose of proper and appropriate disposal of SMC/FRP plastics and produce the same today. It is the case of the CPCB that since the Waste Management relating to plastic requires a thorough scientific study, the CPCB felt appropriate to constitute an expert group consisting of Members from CIPET, BIS, IIT-D and ICPE. It is their case that if such expert group studies the effects as well as the consequences of such a project it will be appropriate for the project to come in proper manner, for safe disposal of the non- recyclable and non- biodegradable plastic. The learned Counsel appearing for MoEF Mr.Malhotra, also submit that constitution of such Committee will be an appropriate step for better handling of the situation. Accordingly, taking note of the entire situation, we are of the view, that the request made on behalf of CPCB in the miscellaneous application has to be conceded. Accordingly, M.A. No. 64/2015 stand allowed and is accordingly disposed of. The CPCB in consultation with the MoEF shall constitute such a Committee within a period of 2 weeks from the date of receipt of the copy of the order and thereafter, we request the Committee thus constituted to study the entire aspect and give its recommendation to the CPCB expeditiously in any event within 4 weeks. In the meantime, the order passed in the last two paragraphs in the earlier order shall continue to be in operation. Stand over to 5th March, 2015. ……., JM (Dr. P. Jyothimani) ……., EM (B.S. Sajwan) ……., EM (RanjanChatterjee)

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Rural Electrification Corporation Limited
(भारत सरकार का उद्यम) / (A Government of India Enterprise)
Regd. Office: Core-4, SCOPE Complex, 7 Lodhi Road, New Delhi 110 003
Tel: +91-11-4102 0101 Fax: +91.11.2436 0644 E-mail: reccorp@recl.nic.in
CIN : L40101DL1969GOI005095 Website: www.recindia.nic.in

स्वच्छ भारत
एक कदम स्वच्छता की ओर

No. REC/DDUGJY/SBD/DTR-TS/ 969 Dated: 29.09.2016

To,

All PIAs /DISCOMs/Power Deptt.

Subject: Methodology of Loss Capitalisation in Technical Specification of Distribution Transformer under DDUGJY -reg.

Dear Ma'M / Sir,

Ministry of Power vide OM No 44/15/2015 dated 14.08.2015 had formed two committees viz. Committee 'A' & 'B' to facilitate and handhold states in mobilizing major materials with Standard Technical Specifications at competitive prices through a transparent bidding process under DDUGJY / IPDS Schemes. Committee A had identified the major high value items viz., Power Transformers, Distribution Transformers, Conductor, AB Cables & Energy Meter, finalized their Technical Specification and aggregated the quantity.

During the meeting held on June 29, 2016 under the Chairmanship of Hon'ble MoS (IC) for Power, Coal and New & Renewable Energy, it was decided that states are free to procure the materials on their own, if it is felt that their rates are lower than CPP rates. Accordingly, REC vide letter no. REC/DDUGJY/NIMM/745 dated 26.07.2016 (copy enclosed) allowed full turnkey mode of execution under DDUGJY and revised Standard Bidding Documents for full turnkey execution were circulated to all States vide REC letter No. REC/DDUGJY/SBD/239 on 22.08.2016.

The Technical Specification of Distribution Transformer, finalized by Committee 'A', mentioned the methodology for computing total owning cost based on loss capitalization. Since it would be practically not feasible to implement the Loss Capitalisation methodology for tender evaluation in full turnkey projects, the methodology of Total Owning Cost based on Loss Capitalisation may not be insisted upon for full turnkey tenders. However, States opting to go for direct procurement of Distribution Transformers may take care of this methodology based on their State practice.

This is for kind information and further needful action please.

Thanking You.

Yours Sincerely,

29/9/16

G S BHATI
Executive Director (DDUGJY-III)

Copy for kind information to:

1. The ZMs/CPMs, REC ZOs/POs – to circulate to all PIAs in the states of their jurisdiction

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CIN : L40101DL1969GOI005095 Website: www.recindia.nic.in

No. REC/DDUGJY/NIMM/ 745 Dated: 26/07/2016

To,
All CMDs/MDs/Chairman/Chief Engineer
DISCOMs/SEBs/Power Deptt.

Subject: Procurement of major high value equipments / items under Govt. of India's initiative to facilitate states in mobilization of quality equipment's/materials under DDUGJY/IPDS Schemes.

Dear Sir/Madam,

This is continuation to our letter no. REC/DDUGJY/NIMM/736 dated 21-07-2016 vide which outcome of central procurement under DDUGJY/IPDS was conveyed. In this regard, it is further clarified as under:

1. PIAs/Discoms /Power Department may go for full turnkey execution of the project as per approved Standard Bidding Document circulated earlier subject to condition that they will adhere to the technical specifications finalized by committee-A.
2. PIAs/Discoms/Power Department may procure the materials through their own purchase department and execute the works on partial turnkey subject to condition that they will adhere to the technical specifications finalized by committee-A.

   In both the above cases, PIAs/Discoms /Power Department shall adhere to strict testing and inspection to ensure control on the quality of the materials. They shall increase the sample size to ensure quality monitoring at the factories as well as to prevent slippages.

This is for kind information and further needful action please.

Yours faithfully

(Sunil Kumar)
Executive Director (DDUGJY)

Copy for kind information to:

1. ZMs/CPMs REC ZOs/POs –to circulate to all PIAs in the states of their purview.

RURAL ELECTRIFICATION CORPORATION LIMITED
(A Government of India Enterprise)
Regd Office: Core-4, SCOPE Complex, 7 Lodi Road New Delhi 110003
Tele. 24365161 Fax 24360644 Email reccorp@recl.nic.in Gram RECTRICWebsite www.recindia.com & www.recindia.nic.in

REC/DDUGJY/SBD/2016/ 1169 Date: 01.12.2016

To
All PIAs/DISCOMs/Power Deptts.

Sub: Public Procurement Policy for Micro & Small Enterprises under DDUGJY

Sir,

To encourage participation of Micro & Small Enterprises (MSEs), Gazette Notification on Public Procurement Policy was issues by Ministry of Micro, Small and Medium Enterprises dated 23.03.2012 (Copy Enclosed).

States may review and comply to above existing Public Procurement Policy order dated 23.03.2012 for MSEs under DDUGJY scheme, as per the State Public Procurement Policy and practice for MSEs.

This is for kind information and further needful action please.

Thanking You,

Yours Sincerely,

G S Bhati
ED (DDUGJY-III)

Copy to :

1) The Additional Industrial Advisor, Office of Development Commissioner, Ministry of Micro, Small & Medium Enterprises, Nirvan Bhawan, 7th Floor, Maulana Azad Road, New Delhi 110108, with regard to reference letter No. F. No. 4(1)/2015-MA dated 29.09.2016
2) The ZM/CPM, REC Project Office

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Tel: +91-11-4102 0101 Fax: +91.11.2436 0644 E-mail: reccorp@recl.nic.in
CIN : L40101DL1969GOI005095 Website: www.recindia.nic.in

Ref: REC/DDUGJY/SBD/643

Date: 24.03.2017

To
All PIAs/DISCOMs/Power Deptt.

Sub: Regarding Standard Make of equipment in SBD under DDUGJY

Sir,

This is in continuation to our letter no. REC/DDUGJY/SBD/609 dated 01.06.2016 regarding standard make of equipment in SBD under DDUGJY. It has been brought to our notice that some DISCOMs are raising concerns towards acceptance of others make of protection relays apart from ones mentioned in SBD, though a clarification has already been issued by REC vide letter dated 01.06.2016 that Make of equipment mentioned in Standard Bidding Documents are indicative only to ascertain the quality of materials.

It is once again reiterated that Standard Bidding Documents are neutral on the name of any make and it is upto Engineer-incharge of PIA (Project Implementing Agency) to decide on the makes of equipment including relays etc. based on given technical specifications, past performance, technical suitability and state practices of the equipment in the system etc.

This is for your kind information and necessary action please.

Thanking You,

Yours Sincerely,

24/03/17

G S Bhati
ED (DDUGJY/QA)

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स्वच्छ भारत
एक कदम स्वच्छता की ओर

Ref: REC/DDUGJY/SBD/609

Date: 01.06.2016

To
All PIAs/DISCOMs/Power Deptt.

Sub: Regarding Standard Make of equipment in SBD under DDUGJY

Sir,

Reference has been received from M/s Ashida Electronics Pvt. Ltd. on notification of name of manufacturers of Relay and Fitments in Technical Specifications provided in Standard Bidding Documents for DDUGJY projects. In this matter, it is clarified that the Make of equipment mentioned in Standard Bidding Documents are indicative only to ascertain the quality of materials.

Standard Bidding Documents are neutral on the name of any make and it is upto Engineer-incharge of PIA (Project Implementing Agency) to decide the acceptable make of equipment including relays etc. based on given technical specifications, past performance, technical suitability and state practices of the equipment in the system.

This is for your kind information and necessary action please.

Thanking You,

Yours Sincerely,

G S Bhati
GM (DDUGJY/QA)

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No. REC/DDUGJY/SBD/2017 / 677 Dated: 30.03.2017

To,

All Project Implementing Agencies
DISCOMs /Power Deptt./ SEBs/CPSUs

Subject: Rating of Distribution Transformers in Revised Standard Bidding Documents for full turnkey contracts under DDUGJY & IPDS schemes

Dear Ma'M / Sir,

This has reference to revised Standard Bidding Documents for full turnkey contracts under DDUGJY & IPDS circulated vide letter No. REC/DDUGJY/SBD/239 dated 22.08.2016. It has come to our notice that in Volume-II : Section-III, Price Schedules of Standard Bidding Documents, inadvertently 3 star is mentioned along with Distribution Transformers. It is to be clarified that as mentioned in Volume-I : Section-VII - Scope of works and Technical Specification finalised by Committee-A, Standard rating Distribution Transformers of **Energy Efficiency level-2 & above as specified in IS 1180 (Part-1):2014** only are to be procured under the schemes for all kVA ratings of distribution transformers.

Thanking You,

Yours Sincerely,

30/03/17

G S BHATI
Executive Director (DDUGJY)

Copy for kind information to:
1. All ZM/CPM - Please circulate to PIAs in the states under your purview

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REC/DDUGJY/2017-18/1010

Date: 25.04.2017

To
All Projects Implementing Agencies
(DISCOMs/SEBs/CPSUs/Power Departments)

Sub: Clarifications in Tender drawings provided in Standard Bidding Documents of DDUGJY.

Sir / Madam,

A representation has been received regarding tender drawings of AB Cable accessories provided in Standard Bidding Documents of DDUGJY Scheme. It is to clarify that as mentioned at S.No. 4, page no-2, of scope of works (Volume-I: Section-VII), all the drawings provided in volume-II of SBD are indicative drawings for tender purpose. These drawings are to facilitate the bidders for quoting the tenders however every manufacturer has to submit his or her own design / drawing conforming to Technical Specifications and are to be approved by Engineer-in-charge.

This is for your kind information and necessary action please.

Thanking You,

Yours Sincerely,

25/04/17.

G S BHATI
Executive Director (DDUGJY)

Copy to:
1. All ZM/CPM - Please circulate to PIAs in the states under your purview.
2. AGM (IT) – For uploading the letter on DDUGJY Web-portal.

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Regd. Office: Core-4 SCOPE Complex, 7, Lodhi Road, New Delhi 110 003
Tel: 011-24369851 FAX: 011-24369850 , Email:- ddugjyquality@gmail.com
CIN: L40101DL1969GO1005095 Website: www.recindia.nic.in

No. REC/DDUGJY/SBD/2017-18 / 1129 Dated: 15.05.2017

To,

All Project Implementing Agencies
DISCOMs /Power Deptt./ SEBs/CPSUs

Subject: Regarding Technical Specifications of LTDB in Standard Bidding Documents for DDUGJY

Ma'M / Sir,

This has reference to revised Standard Bidding Documents for full turnkey contracts under DDUGJY & IPDS circulated vide letter No. REC/DDUGJY/SBD/239 dated 22.08.2016. The Technical Specification of LTDB (Low Tension Distribution Boxes) specifies metallic boxes using deep drawn methodology. In addition to this," *Low Tension Distribution Box (LTDB) can also be manufactured by sheet bending process for developing three side walls (from a single sheet) with top & bottom walls welded to the same and front door fabricated separately and hinged*."

This is for kind information and further needful action please.

Thanking You,

Yours Sincerely,

G S BHATI
Executive Director (DDUGJY)

Copy for kind information to:
1. All ZM/CPM - Please circulate to PIAs in the states of your purview.

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REC/DDUGJY/SBD/2017/2148

Date: 21.07.2017

To,
All PIAs
(States Discoms/Power Departments)

Sub: Modification in technical specification for CTs, PTs under DDUGJY Scheme.

Sir / Madam,

A representation was received from MPPKVVCL seeking clarification in technical specification for CTs & PTs under DDUGJY scheme. In this connection, following modification has been made in the technical specification for CTs & PTs :

Sl No	TS Clause No	Existing Technical Specification	REC Comments / Clarification
1	TS for current Transformers Clause No. 4.7. (1)	The primary terminal shall be of standard size of 30mm dia X 80 mm length of heavily tinned(min. thickness 15 micron) electrolytic copper of 99.9% conductivity.	Clause may be modified to : The primary terminal shall be of **maximum** size of 30mm dia X 80 mm length of heavily tinned(min. thickness 15 micron) electrolytic copper of 99.9% conductivity. Manufacturer shall design the diameter of primary terminal keeping current density 1.6 A per sq. mm for the given capacity of CT.
2	TS for potential Transformers Clause No. 7	The secondary terminals studs shall be provided with at least 3 nuts and two plain washers. These shall be made of brass duly nickel plated. The min. stud outer dia shall be 10 mm & length 15 mm.	Clause may be modified to : The secondary terminals studs shall be provided with at least 3 nuts and two plain washers. These shall be made of brass duly nickel plated. The min. stud outer dia shall be **6 mm** & length 15 mm.
3	TS for metering units, Clause No.9	Brass rods 12mm dia for Primary and 6mm dia for secondary.	Keeping current density of 1.6 A per sq. mm size of rod may be designed by manufacturer for given CT / PT.

Sl No	TS Clause No	Existing Technical Specification	REC Comments / Clarification
4	TS for Metering Units, Clause No 10.b	Tank including top cover shall be Hot Dip Galvanized.	Existing clause of TS will prevail. However state may decide to use Hot dip galvanized / Epoxy paint tank for CT/PT unit as per their prevailing state practices.

This is for your kind information and necessary action please.

Thanking You,

Yours faithfully,

(A Veluchamy)
Addl. General Manager
DDUGJY-Q&FM

Copy for kind information to:

1. The Sr. CPM / CPM, REC Regional office, for kind information please.

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REC/DDUGJY/SBD/TS/2017-18/D.No.3091 Dated: 25.08.2017

The Chairman / Managing Director/ Chief Engineer
All Project Implementing Agencies (PIA)/DISCOM/
State Power Utilities/ Power Department

Sub: Clarification in Technical Specifications of various equipment included in the Standard Bidding Document (SBD) of DDUGJY/IPDS

Dear Sir/Madam,

Following clarification pertains to technical specification of DDUGJY scheme are hereby conveyed:

Sl. No.	Name of materials	Particulars	Provision in SBD	Amended Provision
1	Distribution Transformers	Vacuum type test on transformer tank	Transformer tank shall be subjected to specified vacuum. The tank designed for vacuum shall be tested at an internal pressure of 0.35 kg per sq. cm absolute (250 mm of Hg) for one hour. (clause no.-31.10- pgno-80)	"Vacuum Type Test on Transformer Tank" shall be carried out as per IS-1180 (Part-1): 2014 i.e. The transformer tank shall be subjected to air pressure 80 kPa for 30 minutes and vacuum of 250 mm of mercury for 30 minutes.
2	Power Transformers	Maximum temperature rise over ambient temperature for oil/ winding above ambient temperature	Permissible Temperature rise over ambient temperature shall be as per IS-2026 (point no.-25 page no.-6)	The maximum temperature rise over ambient temperature for oil/winding above ambient temperature shall be as per IS-2026(Part-2):2010. i.e. Maximum temperature rise over ambient temperature for top oil measured by thermometer should be 50 degree C. and for winding measured by resistance should be 55 degree C
3	XLPE Power Cables	Bleeding blooming type test	Bleeding and blooming tests (for outer sheath) (clause no-6.0, pgno-367)	"Bleeding Blooming Test" is deleted for XLPE cables.

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: Bangalore, Bhopal, Bhubaneswar, Chennai, Guwahati, Jaipur, Jammu, Patna, Ranchi, Shillong, Shimla, Thiruvananthapuram & Vadodara
: Dehradun, Raipur
Training Centre : Central Institute for Rural Electrification (CIRE), Hyderabad

Sl. No.	Name of materials	Particulars	Provision in SBD	Amended Provision
4	Isolators & AB switches	Maximum temperature rise over ambient temperature.	The maximum temperature attained by any part of the equipment when in service at site under continuous full load conditions and exposed to the direct rays of Sun shall not exceed 45 degree above ambient (clause no.-4- pgno-488)	Maximum permitted temperature rise over ambient temperature will be as per Table-4 of IS-9921 (Part-2).
5	Power Transformers	Noise level measuremen t type test	Noise Level Measurement IEC 551 Table : 6 Transformer Type Tests ambient (clause no.-8.2.1 pgno-31)	No change
6	XLPE Power Cable	Drum length	All Power Cables shall be supplied in drum length of 1000 m. Each drum shall contain one continuous length of cable. Owner shall have the option of rejecting cable drums with shorter lengths. (clause no.-5.0 pgno-366)	Drum length for power cable shall be 200/300/500m as per requirement of utility/Discom.
7	11 kV AB Switch	Number of Post Insulator per stack	The complete set of three phase AB Switches shall have stacks of post insulators. 11KV AB Switches : 3 No. 11KV Post Insulator per stack(clause no.- 3 pgno-487)	For 11kV AB switch, one (1) no. 11 kV post insulator per stack shall be permitted.
8	33 kV AB Switch	Number of Post Insulator per stack	The complete set of three phase AB Switches shall have stacks of post insulators. 33KV AB Switches : 3	For 33kV AB Switch, two (2) no. 22 kV post insulator or 3 No 11 KV post Insulators shall be permitted in each stack

Sl. No.	Name of materials	Particulars	Provision in SBD	Amended Provision
			No. 33KV Post Insulator per stack (clause no.- 3 pgno-487)	
9	11 kV Isolator	Number of Post Insulator per stack	11 KV isolators shall comprise of three numbers 11 KV insulators per stack and 9 such stack shall be supplied with each isolator. (clause no.- 9 pgno-484)	Post insulators for the 11kV isolators shall comprise of one (01) no. 11kV insulator per stack and nine (9) such stack shall be supplied with each isolator.
10	33 kV Isolator	Number of Post Insulator per stack	33 KV isolators, two numbers 33 KV insulators per stack and 9 stacks shall be supplied with each isolator(clause no.- 9 pgno-484)	Post insulators for 33kV isolators shall comprise two (02) nos. of 22kV insulators or 3 No of 11 KV post insulators or One no 33kV post insulator per stack and nine (9) such stack shall be supplied with each isolator

This is issued with the approval of the competent authority

Thank you

Yours faithfully,

(A. Veluchamy)
Addl. General Manager
(DDUGJY-QA&FM)

Copy for uploading in DDUGJY web portal

Utility & Address
Chairman & Managing Director AP Southern Power Dist. Co. Ltd. Srinivasa Kalyana Mandampam Backside, Tiruchanoor Road, Kesvayana Gunta, Thirupathi – 517 501
Chairman & Managing Direcor AP East Power Dist. Co. Ltd. P&T Colony, Near Gurudwara Junction, Seethammadhara Vishakapatnam – 530013
Chairman & Managing Director, Northern Power Dist.Co.of Telangana Ltd. House No. 2-5-31/2 Vidyut Bhawan, Nakkalgutta, Hanamkonda Warangal – 506 001
Chairman & Managing Director Southern Power Dist.Co. of Telangana Ltd. 6-1-50 Mint Compound, Hyderabad-500063.
Managing Director Assam Power Distribution Co. Ltd. Bijuli Bhawan IV Floor, Paltan Bazar Guwahati-781 001.
Managing Director, North Bihar Power Distribution Company Ltd . Vidyut Bhawan, Bailey Road Patna-800 021
Managing Director, South Bihar Power Distribution Company Ltd. Vidyut Bhawan, Bailey Road Patna-800 021

Managing Director Chhattisgarh State Power Distribution Co. Ltd. Danganiya ,P.O. Sunder Nagar, Raipur-492013
Managing Director Paschim Gujarat Vij Co. Ltd. Nana Mava Main Road, Laxminagar, Rajkot-360004.
Managing Director, Uttar Gujarat Vij Company Ltd. Visnagar Road, Mehsana-384001.(Gujarat)
Managing Director, Madhya Gujarat Vij Co. Ltd. Vidyut Bhawan, Race Course Road Vadodara – 390 007
Managing Director Dakshin Gujarat Vij Company Ltd. Nana Varachha Road, Near Gajjar Petrol Pump, Kapodara, Surat-395006.
Managing Director Dakshin Haryana Bijli Vitran Nigam Ltd. Vidyut Sadan, Vidyut Nagar Hissar-125 005
Chairman & Managing Director Uttar Haryana Bijli Vitran Nigam Ltd. C-16, Vidyut Sadan, Sec.-6 Panchkula – 134 109.
Managing Director Himachal Pradesh State Elecy Board Ltd., Vidyut Bhawan, Shimla-171004.

Commissioner/ Secretary (Power) Power Development Deptt. Government of J&K Civil Secretariat, Jammu-180001.
Managing Director Jharkhand Bijli Vitran Nigam Ltd., HEC Engineering Building, P.O. DHURWA, Ranchi Jharkhanad – 834 004.
Managing Director Bangalore Elecy. Supply Co. Ltd. Corporate Office, K.R. Circle Dr. Ambedkar Veedi Bangalore – 560 001.
Managing Director Mangalore Electricity Supply Corpn., Corporate Office, Paradigm Plaza, 5th floor, AB Shetty Circle, Mangalore-575 001
Managing Director Hubli Electricity Supply Co. Ltd. (HESCOM), Corporate Office, P.B. Road, Navnagar, Hubli, Hubli – 580 025.
Managing Director Gulbarga Electricity Supply Co. Ltd., Corporate Office, Main Road Gulbarga-585 102. (Karnataka)
Managing Director Chamudeshwari Electric Supply Corpn. Ltd. No. 927, LJ Avenue Commercial Complex New Kantharaja Road, Saraswanthipuram Mysore-570 009.

Chairman Kerala State Electricity Board Ltd., Vaidyuthi Bhavanam P.B. No. 5048 Pattom Thiruvananthapuram – 695 004
Deputy Chairman, Cochin Port Trust Willingdon Island Cochin-682009
Managing Director M.P. Purvi Kshetra Vidyut Vitran Co. Ltd., Shakti Bhawan, Vidyut Nagar, Jabalpur – 482 008.
Managing Director M.P. Paschim Kshetra Vitran Co. Ltd., Polo Grounds, Indore – 452 003.
Managing Director M.P. Madhya Kshetra Vidyut Vitran Co. Ltd., Bijli Nagar Colony, Govindpura, Bhopal – 462 023.
Chairman & Managing Director Maharashtra State Electricity Dist. Co. Ltd. 6th floor, Prakashgadh, Plot No. G9 Station Road, Bandra (E) Mumbai-400 051.
General Manager, Brihan Mumbai Electric Supply & Transport Undertaking [BEST] BEST Bhavan, BEST Marg, Colaba, Mumbai - 400 001
CMD Punjab State Power Corporation Limited PSEB Head Office, The Mall, Patiala-147001

Managing Director Jaipur Vidyut Vitran Nigam Ltd. Vidyut Bhawan, Janpath, Jyoti Nagar, Jyoti Marg, Jaipur - 302 005.
Managing Director, Jodhpur Vidyut Vitran Nigam Ltd., New Power House, Industrial Area Jodhpur – 342 003.
Managing Director Ajmer Vidyut Vitran Nigam Ltd. Vidyut Bhawan, Pancheel, Makarwali Road, Ajmer
PCE cum Secretary Energy & Power Department Govt. of Sikkim, Power Secretariat Building, Kazi Road Gangtok-737101.
Chairman & Managing Director Tamil Nadu Generation & Distribution Corporation (TANGEDCO) N.P.K.R.R, Maaligai 800 Electricity Avenue, Anna Salai, Chennai – 600 002.
Chairman cum Managing Director, Tripura State Elecy Corporation Ltd. Vidyut Bhawan, North Banamalipur, Agartala-799001. Tripura
Managing Director Paschimanchal Vidyut Vitran Nigam Ltd. Victoria Park Meerut – 250 001.
Managing Director Madhyanchal Vidyut Vitran Nigam Ltd. 4-A, Gokhle Marg, Lucknow – 226 001.
Managing Director Kanpur Electric Supply Co. (KESCO) 14/71, Civil Lines Kanpur

Managing Director Purvanchal Vidyut Vitran Nigam Ltd. Hydel Colony, Bhikhari Pur, Post DLW, Varanasi-221 004.
Managing Director Dakshinanchal Vidyut Vitran Nigam Ltd. 220 K.V. Vidyut Sub Station Mathura Agra By Pass Road, Sikandra, AGRA-282 007.
Managing Director Uttarakhand Power Corporation Nigam, Urja Bhawan, Kanwali Road, Dehradun- 248 001.
Chairman and Managing Director, West Bengal State Elecy Dstbn. Co. Ltd. Vidyut Bhavan 7th Floor, A-Block, Salt Lake City, Kolkata-700091.
Managing Director Durgapur Projects Ltd. Administrative Building Durgapur-713 201 District- Burdwan West Bengal
Commissioner & Secretary (Power) Power & Electricity Deptt. Govt. of Mizoram, New Secretariat, Aizwal, Mizoram-796001
Commissioner & Secretary (Power) Govt. of Arunachal Pradesh Jal Vidyut Bhawan, Dist. Papumpare Itanagar-7911111
Chairman and Managing Director Meghalaya Power Distribution Corporation Ltd. (MePDCL) Lum Jingshai, Short Round Road, Shillong – 793 001.

Executive Director (Tech), Manipur State Power Dist. Co. Ltd. 3rd Floor,New Directorate Building (Near Hotel Imphal), North AOC, Distt. Imphal-East, Manipur-795 001
Sh. K.D. Vizo Commissioner & Secretary (Power) Govt. of Nagaland, Deptt. of Power, Kohima-797 004.
Secretary (Power) Govt. of Goa, Secretariat, Porvorim, Goa-403 521.
Secretary (Power), Chief Secretariat, Govt. of Puducherry Goubert Avenue, Puducherry-605001
CMD, Odisha Power Transmission Power Corpn. Ltd. Janpath, Bhubaneshwar, Odisha-751001
Superintending Engineer Andaman & Nicobar Administration Offioe of the Superintending Engineer Electricity Department Port Blair — 744 101
Secretary (NDMC) New Delhi Municipal Council, Palika Kendra, Sansad Marg, New Delhi-110001