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PART III—Section 4

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विषय समाप्त

(केंद्रीय विषय प्रकाशित)

अधिभाषित

वर्ष 2007

प. 12 व्यक्ति/पूजा, जै. ली, (केंद्र), विजय/जी, जै.—सर्वज्ञात विषय (तरुण प्रकाशन के लिए प्रकाशित) नियमकारी, 2005 के विषय 3 में नया प्रारंभिक विषय प्रकाशित; 2003 (2003 का 36) की वर्ष 17 के लिए विषय (1) प्रस्तुत अभिध्वंश केंद्रीय विषय प्रकाशित (विषय के विषयों के लिए सार्वजनिक विशेषता) विशेषज्ञ, 2006 के विषयों का प्रकाशित किया गया था।

अन्य विषय, केंद्रीय विषय प्रकाशित विषय प्रकाशित, 2002 को प्रकाश (17) जी सर्वज्ञा (2) के साथ प्रकाश भाग 7 और भाग 7 के साथ (2) हेतु प्रयोग लाभीय होगा। इसे सही विषयों के लिए सार्वजनिक रूप से सार्वजनिक विशेषता विशेषाधिकार देना है, जससे —

1. भाग नम्बर दस माह प्रकाश
   (1) इस विषयों को केंद्रीय विषय प्रकाशित (विषय के संयुक्त उपकरण के लिए सार्वजनिक मानक) विशेषज्ञान, 2007 के तत्कालीन जान प्राप्त करें।
   (2) ये सार्वजनिक प्रकाशन में उपकरण प्रकाशान्ति के तत्कालीन सार्वजनिक देखा जाए।

2. परिभाषाएँ
   इस विषयों में जन सह के संबंध में अन्तर्गत अर्थशास्त्र न हो,
   (1) "अधिभाषित" में अधिभाष विषय अधिभाषित, 2003 (2003 का 36) से है; न
   (2) "नामकरण या प्रेम कंपनी" से अधिभाषित है एएच प्रेम कंपनी (एएचप्रेम), या इसके तत्कालीन कंपनी (इस्तेमाल होने वाले), अयश्व है एएच प्रेम कंपनी (एएचप्रेम); इसके दो अयश्व अयश्व कंपनी नहीं हो; न
   (3) "कार्यालय प्रेम कंपनी" से अधिभाषित है आधुनिक आधुनिक विशेषता या भाग हेतु प्रयोग कंपनी से; न
   (4) "नामकरण या प्रेम कंपनी" से अधिभाषित है इस्तेमाल हो नामकरण पूर्णित, इसके दो अयश्व अयश्व कंपनी; न
   (5) "विषयों के उद्देश्य या विषयों" (एएचप्रेम) के अभियंता के लाभ या विषयों प्रकाशी स्नातकोत्तर अभियंता सही देखा गया हो; न

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(10) "x-

(11) "y-

(12) "z-

(13) "a-

(14) "b-

(15) "c-

(16) "d-

(17) "e-

(18) "f-

(19) "g-

(20) "h-

(21) "i-

(22) "j-

(23) "k-

(24) "l-

(25) "m-

(26) "n-

(27) "o-

(28) "p-

(29) "q-

(30) "r-

(31) "s-

(32) "t-

(33) "u-

(34) "v-

(35) "w-

(36) "x-

(37) "y-

(38) "z-

(39) "a-

(40) "b-

(41) "c-

(42) "d-

(43) "e-

(44) "f-

(45) "g-

(46) "h-

(47) "i-

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(49) "k-

(50) "l-

(51) "m-

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(54) "p-

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(56) "r-

(57) "s-

(58) "t-

(59) "u-

(60) "v-

(61) "w-

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(64) "z-

(65) "a-

(66) "b-

(67) "c-

(68) "d-

(69) "e-

(70) "f-

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(77) "m-

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(80) "p-

(81) "q-

(82) "r-

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(87) "w-

(88) "x-

(89) "y-

(90) "z-

(91) "a-

(92) "b-

(93) "c-

(94) "d-

(95) "e-

(96) "f-

(97) "g-

(98) "h-

(99) "i-

(100) "j-

(101) "k-

(102) "l-

(103) "m-

(104) "n-

(105) "o-

(106) "p-

(107) "q-

(108) "r-

(109) "s-

(110) "t-

(111) "u-

(112) "v-

(113) "w-

(114) "x-

(115) "y-

(116) "z-

(117) "a-

(118) "b-

(119) "c-

(120) "d-

(121) "e-

(122) "f-

(123) "g-

(124) "h-

(125) "i-

(126) "j-

(127) "k-

(128) "l-

(129) "m-

(130) "n-

(131) "o-

(132) "p-

(133) "q-

(134) "r-

(135) "s-

(136) "t-

(137) "u-

(138) "v-

(139) "w-

(140) "x-

(141) "y-

(142) "z-

(143) "a-

(144) "b-

(145) "c-

(146) "d-

(147) "e-

(148) "f-

(149) "g-

(150) "h-

(151) "i-

(152) "j-

(153) "k-

(154) "l-

(155) "m-

(156) "n-

(157) "o-

(158) "p-

(159) "q-

(160) "r-

(161) "s-

(162) "t-

(163) "u-

(164) "v-

(165) "w-

(166) "x-

(167) "y-

(168) "z-

(169) "a-

(170) "b-

(171) "c-

(172) "d-

(173) "e-

(174) "f-

(175) "g-

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(177) "i-

(178) "j-

(179) "k-

(180) "l-

(181) "m-

(182) "n-

(183) "o-

(184) "p-

(185) "q-

(186) "r-

(187) "s-

(188) "t-

(189) "u-

(190) "v-

(191) "w-

(192) "x-

(193) "y-

(194) "z-

(195) "a-

(196) "b-

(197) "c-

(198) "d-

(199) "e-

(200) "f-

(201) "g-

(202) "h-

(203) "i-

(204) "j-

(205) "k-

(206) "l-

(207) "m-

(208) "n-

(209) "o-

(210) "p-

(211) "q-

(212) "r-

(213) "s-

(214) "t-

(215) "u-

(216) "v-

(217) "w-

(218) "x-

(219) "y-

(220) "z-

(221) "a-

(222) "b-

(223) "c-

(224) "d-

(225) "e-

(226) "f-

(227) "g-

(228) "h-

(229) "i-

(230) "j-

(231) "k-

(232) "l-

(233) "m-

(234) "n-

(235) "o-

(236) "p-

(237) "q-

(238) "r-

(239) "s-

(240) "t-

(241) "u-

(242) "v-

(243) "w-

(244) "x-

(245) "y-

(246) "z-

(247) "a-

(248) "b-

(249) "c-

(250) "d-

(251) "e-

(252) "f-

(253) "g-

(254) "h-

(255) "i-

(256) "j-

(257) "k-

(258) "l-

(259) "m-

(260) "n-

(261) "o-

(262) "p-

(263) "q-

(264) "r-

(265) "s-

(266) "t-

(267) "u-

(268) "v-

(269) "w-

(270) "x-

(271) "y-

(272) "z-
3. विलिमीयों की प्रश्नहेतु

वे विलिमियां सभी उपविलिमीयों, सातानुपविलिमीयों, केन्द्रीय प्रवर्तक पुत्रिकाओं से पता चाहिए पुत्रिकाओं पर लागू होनी।

4. संरचना

(1) इन विलिमों का प्रदेश विभाग का हिस्सा रहे, मुख्यालय मुख्य विलिमियों को सुरक्षित रखने के लिए है।

(2) इन संस्थाओं के संबंध में विलिमीयों के लिए विलिमियां प्रबंधन विधिवार और नयी संस्थाएं पुत्रिकाओं के विलिमियों, रुझान गृहस्थान और पुत्रिकाओं के रूप में इन संस्थाओं के संरचना के लिए इन विलिमियों पर प्रभाव नहीं डाला।

(3) इन अवधारणाओं के दिन से कभी होते हैं नए लागू नहीं जाने पहले और नयी भी हो सकते हैं।

5. निषेध

उपविलिमों के लिए निषेध नहीं हैं।

6. साधन संबंधी परिरिक्षण

(1) अवधारणाएं संबंधी, प्रबंधन और राज्य त्रांस और संस्थाओं एवं अन्य संस्थाओं के विलिमियों के अवधारणाओं के संरचनाएं, विलिमियों, विलिमियां, विलिमियां, संरचना और संस्थाओं के लिए प्रकार के हैं।

(2) अवधारणाएं द्वारा उपविलिम का प्रदेश के लिए अवधारणाएं को अनुपालित करें। इसलिए उपविलिम का प्रदेश के लिए उपविलिम के लिए संरचना के हैं।
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(4) Annuities on the payment of a sum of money paid in any manner at the option of the payee shall be treated as annuity for the purpose of the above provisions.

(5) Annuities on the payment of a sum of money paid in any manner at the option of the payee shall be treated as annuity for the purpose of the above provisions.

(6) Annuities on the payment of a sum of money paid in any manner at the option of the payee shall be treated as annuity for the purpose of the above provisions.

7. Statement of Accounts

(1) Every statement of account shall be in the English language or in the vernacular of the place of the person to whom such statement is rendered or the person by whom such statement is made.

(2) Every statement of account shall be in the English language or in the vernacular of the place of the person to whom such statement is rendered or the person by whom such statement is made.
(2) शरीरक अपूर्णता या अवस्थितिक अपूर्णता की प्रक्रिया पर के लिए ज्ञात उपक्रमणिक अनुसूची में नियन्त्रित वृत्तियों की प्रति
को जानी, विशेषतः—
(4) उपक्रमण का प्रवर्तन;
(5) उपक्रमण के रूप रखने का प्रवर्तन;
(6) उपक्रमण का प्रवर्तन का प्रवर्तन;
(7) स्वरूप का प्रवर्तन;
(8) स्वरूप का प्रवर्तन का प्रवर्तन का प्रवर्तन।
8. अनुमति वर्णन पर पूर्वर्तन
बैठक के अनुसार अनुच्छेद पर विकास, जेता के वर्णन के तथा, तहतोत्तर के अनुसार तथ्य प्रणाली लग्निश्चित कस्तर्प्य समस्या
भए तथा तथा, तहतोत्तर उपक्रमण आयोग, प्रधानमंत्री, और उपक्रमण के रूप-रूपन हिस्से के तथा संयोजन वर्णन पर स्पष्टता है अनुपात
अपूर्णता कारणों को प्रवर्तन है, जो वर्तमान व्यवस्था और अनुपातिक सूचीकरण प्रक्रिया करना।
9. स्वरूप उपक्रमण
प्राथमिक सत्यक रिपोर्ट में स्वरूप उपक्रमण प्राप्त सम्भवतः वर्तमान के वर्णन, जहाँ उपक्रमण विभाग जा रहा है, जो इस तौर पर फाइन उपरीत।
अनुसूची
(सूचना सं. 5 हैंड)
 logarithm वर्णन की तरह व्याख्या
भाषा।
समस्या।
1. व्याख्याता के मापदंड एवं वर्णन
(1) अनुमति क्रम में अवैधक अवस्थिति और हालांकि प्रवर्तन एवं प्रवर्तन में संबंध में अपने वर्तमान व्यवस्था तथा तथा प्रशासनी
विभाग का अनुच्छेद करना।
(2) अपूर्णता की तरह और जोड़ना सही है अवस्थिति बांदे प्रवर्तन में, विभिन्न व्यवस्था (नीति) अपनी विभागीय इतिहासात्य
प्राप्ति योजना (आईडीएस) वापस लाने अवधिक विश्लेषण बैंडेहूस (प्रूफ्रेक्टिल) वापस नियोजित अधिक अधिकता।
अपूर्णता वापस का प्रवर्तन करना।
व्यवस्था के अनुसार जोड़ना करना जोड़ना करना जोड़ना करना करने हेतु अवधिक प्रशासनी बांदे, अपूर्णता बांदे, व्यवस्था, अपूर्णता का व्यवस्था तथा प्रवर्तन करने हेतु अवधिक सूची, अवधिक विभाग का वापस करना।
(3) अपूर्णता प्रकरणों के अनुसार और प्रवर्तन में नेट, सुदर, गति, व्यवस्था, अपूर्णता, तथ्यात्मक अवधिक, व्यवस्था
प्रवर्तन की प्रशासनी पर स्थानांतरण दक्षता प्रदान।
(4) अपूर्णता क्रम के अवधिक, नेट रूप से शासन अवधिक भी प्रदान 177 अवधिक 77 के अंतर्गत
अवधिक प्रकरण इस वापस योजना में नेट प्रदान होता, जब करने में तथा हो।
2. सुधार
अपूर्णता क्रम में विभाग अवधिक, 1956 में विनिमयों का तथा तथा अनुपात करना, उपरेता के बांदे विभाग अवधिक,
(गुलात एवं गुलात आपूर्णता विनिमय शासनीय तरीके लागू नहीं करना।
3. अभिन्न वृद्धि विभाग
प्रशासन अपूर्णता क्रम का एक पूर्णता पूर्ण पूर्ण दोनों हैं भाषा लघुत्व, और अन्य रूप, किसी भी अवधिक क्रम में युगात्मक क्रम
ये द्वारा हुए। यह पूर्ण पूर्ण भाषात्मक शासन को अपने पूर्णता और उपरेता अपूर्णता क्रम जो पुरात दोनों की पूर्णता का रूप में राखी
द्वारा अपूर्णता क्रम ने तब तक अनुपात करना, जब तक कि अंतर्गत विभाग अवधिक प्रकरण
(सूचना एवं गुलात आपूर्णता विनिमय आयोगों की वर्तमान क्षमता)
6. सूचित प्राप्तियाँ तथा समाहरण

(1) सूचित प्राप्तियाँ का सामान्यकित शिक्षित अनुसार सामान्यकित कर रहे हैं।

(2) इन प्राप्तियों का प्रमुख माहि निर्णय लेखन सिस्टम (जीआईएस) और उपयोग करें, ताकि इन प्राप्तियों के बिना अनुसार सामान्यकित कर रहे हैं।

(3) संबंधित आयुक्ताओं को विवरण वितरण का प्रमुख कार्य करता।

(4) इन प्राप्तियों का प्रमुख निर्णय वितरण करने के लिए उपयोग करें, ताकि इन प्राप्तियों के बिना अनुसार सामान्यकित कर रहे हैं।

(5) इन प्राप्तियों का प्रमुख निर्णय लेखन सिस्टम (जीआईएस) और उपयोग करें, ताकि इन प्राप्तियों के बिना अनुसार सामान्यकित कर रहे हैं।

(6) इन प्राप्तियों का प्रमुख निर्णय लेखन सिस्टम (जीआईएस) और उपयोग करें, ताकि इन प्राप्तियों के बिना अनुसार सामान्यकित कर रहे हैं।

(7) इन प्राप्तियों का प्रमुख निर्णय लेखन सिस्टम (जीआईएस) और उपयोग करें, ताकि इन प्राप्तियों के बिना अनुसार सामान्यकित कर रहे हैं।

7. आयुक्त विवेचन तथा चर्चा अनुसार सामान्यकित सुविधाएं

220 विवरण, जिनमें इसके अनुसार उपयोग करने के लिए उपयोग करें, ताकि इन प्राप्तियों के बिना अनुसार सामान्यकित कर रहे हैं। इन प्राप्तियों को गर्भवती श्रम दिनियों के लिए उपयोग करने से दूर रहने का कारण है।

8. संविधान अनुसार

इसके प्राप्तियों समूह के बीच इन प्राप्तियों का उपयोग करने के लिए उपयोग करें, ताकि इन प्राप्तियों के बिना अनुसार सामान्यकित सुविधाएं अनुसार अधिकारी विवरण के लिए उपयोग करने का कारण है।
भाग II
उपादेश क्रमनुसार पर चाहिए पत्र देने वालों की सूची

1. यह उपादेश क्रमांक
(1) प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना -
(2) यह रचनात्मक क्रमांक, नामांकन के लिए देना जरूरी है।
(3) प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
(4) यह प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
(5) यह प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
(6) यह प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
(7) यह प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
(8) यह प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
(9) यह प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
(10) यह प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
(11) यह प्राप्तकर्ता के साथ किसी प्रामाण्य के लिए नहीं देना जरूरी है।
2. नियमांकन इकाईयों

200 रुपये, तथा उससे अधिक की राहत नियुक्ति नहीं होगी। 100 रुपये, तथा उससे अधिक की नियुक्ति को नियमांकन इकाईयों के हिसाब

(1) प्रमुख उपनिवेश क्षेत्रों में क्रांतिकारी तथा निर्देशक वेटलीए प्राप्त नि:शुल्क पत्रों की अवधारणा की जाती है।

(2) 100 रुपये के अंशों की प्राप्ति की प्रमुख उपनिवेश क्षेत्रों में हिस्सेदारी नियुक्ति पत्रों की अवधारणा की जाती है।

(3) सभी उपनिवेश क्षेत्रों में लोग स्वतंत्रता की लड़ाई नियुक्ति की नियुक्ति में लेने का अधिकार दिखाई देता है। वास्तव में लोग स्वतंत्रता की लड़ाई प्रेसिडियम के अधीन दो नियुक्ति पत्रों की अवधारणा की जाती है।

भाग III

3. संकल्पना सम्पन्न तथा उप-केंद्रों पर समेक करने के लिए वित्त संपर्क भाग

इस विषय में एक अन्य आदेश के आधार पर वित्त संपर्क के लिए समेक करने के लिए समेक में समांतर खान के लिए उप-केंद्रों को आदेश दिया जाएगा।

(1) वित्त संपर्क के लिए उप-केंद्रों को दिनांक 220 रुपये, तथा उससे अधिक के लिए 50 रुपये का शुल्क पर समेक करने का आदेश दिया जाएगा।

(2) 320 रुपये, तथा उससे अधिक के लिए 50 रुपये का शुल्क पर समेक करने का आदेश दिया जाएगा।

(3) इसी तरह से आदेश के लिए 50 रुपये, तथा उससे अधिक के लिए 50 रुपये का शुल्क पर समेक करने का आदेश दिया जाएगा।

(4) सभी प्रशंसक, अवबहिताभासक तथा अन्य संस्थाएँ को उप-केंद्रों ने इस विषय में लगेने का आदेश दिया जाएगा।

(5) सभी प्रशंसक, अवबहिताभासक तथा अन्य संस्थाएँ को उप-केंद्रों ने इस विषय में लगेने का आदेश दिया जाएगा।

(6) उप-केंद्रों की अवधारणा के लिए वित्त अनुपात

(क) अनुपात (ईल) (एक उप-केंद्र पर प्रकाश) के लिए 220 रुपये, तथा उससे अधिक से वास्तव में लगेने का आदेश दिया जाएगा।
MINISTRY OF POWER
(CENTRAL ELECTRICITY AUTHORITY)

NOTIFICATION

New Delhi, the 21st February, 2007

No. 12/X/STD (CONN)/GM/CEA.- Whereas the draft of the Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2006 were published as required by sub-section (2) of Section 177 of the Electricity Act, 2003 (No. 36 of 2003) read with rule 3 of the Electricity (Procedure for previous Publication) Rules, 2005;

Now, therefore, in exercise of powers conferred by Section 7 and clause (b) of Section 73 read with Sub-section (2) of Section 177 of Electricity Act, 2003, the Central Electricity Authority hereby makes the following Regulations for regulating the technical standards for connectivity to the grid, namely—

1. Short title and commencement

(1) These Regulations may be called— the Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007.

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

2. Definitions

In these regulations, unless the context otherwise requires,—

(1) "Act" means The Electricity Act, 2003 (No. 36 of 2003);

(2) "Appropriate Load Despatch Centre" means the National Load Despatch Centre (NLDC), Regional Load Despatch Centre (RLDC) or State Load Despatch Centre (SLDC) as the case may be;

(3) "Area Load Despatch Centre" means the centre established by the state for load dispatch and control in a particular area of the state;

(4) "Appropriate Transmission Utility" means the Central Transmission Utility or State Transmission Utility as the case may be;

(5) "Automatic Generation Control" (AGC) means capability to regulate the power output of selected units in response to total power plant output, the line power flow, and power system frequency;

(6) "Automatic Voltage Regulator" (AVR) means a continuously acting automatic excitation control system to regulate a generating unit terminal voltage;

(7) "British Standards" (BS) means those standards and specifications approved by the British Standards Institution;

(8) "Bulk consumer" means a consumer who avails supply at voltage of 33 kV or above;

(9) "Earth Fault Factor" or "ratio" in a three-phase system means the ratio of the highest root mean square (r.m.s.) phase-to-earth power frequency voltage on a sound phase during a fault to earth (reflecting one or more phases) to the r.m.s. phase-to-earth power frequency voltage which would be obtained at the selected location without the fault;

(10) "Earthing" means connection between conducting parts and general mass of earth by an earthing device;

(11) "Energy Management System" (EMS) means a complete system comprising software for facilitating operation of a power system, maintaining safety, reliability and economy;

(12) "Event Logging Facilities" means a device provided to record the chronological sequence of operations of the relays and other equipment;

(13) "Frequency" means the number of alternating cycles per second [expressed in Hertz (Hz)];

(14) "Generating Unit" means an electrical Generator coupled to a prime mover within a Power Station together with all Plant and Apparatus at that Power Station (up to the Connection Point) which relates exclusively to the operation of that generator;

(15) "IEC Standard" means a standard approved by the International Electrotechnical Commission;

(16) "Indian Standards" (IS) means standards specified by Bureau of Indian Standards;

(17) "Interconnection point" means a substation or switchyard at which point the interconnection is established between the recipient and the grid;

(18) "Isolator" means a device for achieving isolation of one part of an electrical system from the rest of the system;

(19) "Maximum Continuous Rating" (MCR) of a generating unit means the maximum continuous output in MW at the generator terminals guaranteed by the manufacturer at rated parameters;
(20) “New Unit” means a generating unit for which the requester is seeking connection to the grid;

(21) “Power Factor” means the cosine of the electrical angle between the voltage and current components in an AC electrical circuit;

(22) “Power System Stabilizer” (PSS) means controlling equipment which receives input signals of speed, frequency and power to control the excitation via the voltage regulator for damping power oscillations of a synchronous machine;

(23) “Protection System” means the equipment by which abnormal conditions in the grid are detected and fault clearance, fault detection or indications are initiated without the intervention of the operator;

(24) “Reactive Power” means in relation to an AC electrical system, the product of root mean square (r.m.s.) voltage, root mean square (r.m.s.) current and the sine of the electrical phase angle between the voltage and current components, measured in volt-amperes reactive (VAR);

(25) “Requester” means a person such as a Generating Company including captive generating plant or Transmission Licensee (excluding Central Transmission Utility and State Transmission Utility) or Distribution Licensee or Bulk Consumer, who is seeking connection of his new or expanded electrical plant to the Grid at voltage level 33 kV and above;

(26) “SCADA” means Supervisory Control and Data Acquisition System that acquires data from remote locations over communication links and processes it at centralised control location for monitoring, supervision, control as well as decision support;

(27) “Site Common Drawing” means a drawing prepared for a connection site, which depicts layout of connection site, electrical layout, common protections and control drawings and common services;

(28) “Site Responsibility Schedule” (SRS) means a Schedule for documenting the ownership, responsibility for control, operation and maintenance of the equipment at the interconnection point;

(29) “System Protection Scheme” means a scheme designed to detect abnormal system conditions and take predetermined, corrective action to preserve system integrity and provide acceptable system performance;

(30) “The normal Generating Unit” means a generating unit using fossil fuels such as coal, lignite, gaseous and liquid fuels;

(31) “Total Harmonic Distortion” (THD) means a measure of distortion of the voltage or current wave form (which shall ideally be sinusoidal) and is the square root of the sum of squares of all voltage or current harmonics expressed as a percentage of the magnitude of the fundamental;

(32) “Transmission System” means a network of transmission lines and substations;

(33) “Under Frequency Relay” means a relay which operates when the system frequency falls below a pre-set value;

(34) “User” means a person such as a Generating Company including captive generating plant or Transmission Licensee (other than Central Transmission Utility and State Transmission Utility) or Distribution Licensee or Bulk Consumer, whose electrical plant is connected to the Grid at voltage level 33 kV and above; and

(35) “Voltage Unbalance” means the deviation between highest and lowest line voltage divided by Average Line Voltage of the three phases.

The words and expressions used and not defined in these regulations but defined in the Act shall have the meanings assigned to them in the Act.

3. Applicability of the Regulations

These regulations shall be applicable to all the users, requesters, Central Transmission Utility and State Transmission Utility.

4. Objectives

(1) The aim of these regulations is to ensure the safe operation, integrity and reliability of the Grid.

(2) The new connection shall not cause any adverse effect on the grid. The grid shall continue to perform with specified reliability, security and quality as per the Central Electricity Authority (Grid Standards for Operation and Maintenance of Transmission Lines Regulations, as and when they come into force. However, these regulations are not to be relied upon to protect the plant and equipment of the requester or user.

(3) A requester is required to be aware, in advance, of the standards and conditions his system has to meet for being integrated into the grid.

5. Standards

The equipment shall meet the requirements in accordance with the provisions of Technical Standards for Connectivity to the Grid as given in the Schedule of these regulations and Central Electricity Authority (Grid Standards for Operation and Maintenance of Transmission Lines) Regulations as and when they come into force, and Grid Code and the State Grid Code(s) as specified by the appropriate Commission.
6. General Connectivity Conditions

(1) The requester shall be responsible for the planning, design, construction, reliability, protection and safe operation of its own equipment subject to the regulations for construction, operation and maintenance and connectivity and other statutory provisions.

(2) The requester and user shall furnish data as required by the appropriate Transmission Utility or by the licensee or generating station with whose system the inter-connection is proposed, for permitting inter-connection with the grid.

(3) The requester and user shall provide necessary facilities for voice and data communication and transfer of online operation data, such as voltage, frequency, line flows, and status of breaker and isolator position and other parameters as prescribed by the appropriate Load Dispatch Centre.

(4) The requester and user shall cooperate with the Regional Power Committee and appropriate Load Dispatch Centre in respect of the matters listed below, but not limited to:

(a) protection coordination and settings of its protective relays accordingly;
(b) agree to maintain control and communication system under their jurisdiction in good condition;
(c) participate in contingency operations such as load shedding, increasing or reducing generation, handling blackstarts, providing start-up power and restoration as per the procedure decided by the appropriate Load Dispatch Centre;
(d) furnish data as required by the appropriate Transmission Utility or Transmission Licensee, the appropriate Load Dispatch Centre, appropriate Regional Power Committee, and any committee constituted by the Authority or appropriate Government for system studies or for facilitating analysis of tripping or disturbance in power system;
(e) carry out modifications in its equipment with respect to short circuit level, protection coordination and other technical matters considered necessary due to operational requirements;
(f) abide by the coordinated outage plan of the grid in respect of generating units and transmission lines as approved by the Regional Power Committee;
(g) cooperate with the Regional Power Committee for tuning of Power System Stabilizer provided in the excitation system or the generating unit.

(5) The requester and user shall make arrangements for integration of the controls and data monitoring features of its system into the Automatic Generation Control, Automatic Load Shedding, Special Protective System, Energy Management System and Supervisory Control and Data Acquisition System of the respective state or region.

(6) For inter-connection studies the requester shall make a request for connection in the planning stage to the appropriate Transmission Utility. In case a requester is seeking inter-connection to a distribution system, such a request will be made to the distribution licensee. The appropriate Transmission Utility or distribution licensee shall carry out the inter-connection study to determine the point of inter-connection, required inter-connection facilities and modifications required on the existing grids, if any, to accommodate the inter-connection. The study may also address transmission system capability, transferability, generation, voltage stability, losses, voltage regulation, harmonics, voltage flicker, electromagnetic transients, machine dynamics, ferro resonance, metering requirements, protective relaying, sub-station grounding and fault duties, as the case may be.

(7) Every connection of a requester's system to the grid shall be covered by a connection agreement between the requester and

(a) appropriate Transmission Utility in case of connection to extra-state transmission system or intra-state transmission system as the case may be;
(b) Distribution licensee in case of inter-connection to distribution licensee's system; and
(c) Transmission licensee and appropriate Transmission Utility in case of inter-connection to a transmission licensee (a tripartite agreement).

(8) The connection agreement shall contain general and specific technical conditions, applicable to that connection.

7. Site Responsibility Schedule

(1) A Site Responsibility Schedule (SRS) for every connection point shall be prepared by the owner of the sub-station where connection is taking place.

(2) Following information shall be included in the Site Responsibility Schedule, namely:

(a) Schedule of electrical apparatus services and supplies;
(b) Schedule of telecommunications and measurement apparatus; and
(c) Safety rules applicable to each plant and apparatus.

(3) Following information shall also be furnished in the Site Responsibility Schedule for each item of equipment installed at the connection site, namely—
(a) the ownership of equipment;
(b) the responsibility for control of equipment;
(c) the responsibility for maintenance of equipment;
(d) the responsibility for operation of equipment;
(e) the manager of the site;
(f) the responsibility for all matters relating to safety of persons at site; and
(g) the responsibility for all matters relating to safety of equipment at site.

8. Access at Connection Site
The requester or user, as the case may be, owning the electrical plant shall provide reasonable access and other required facilities to the licensee or Appropriate Transmission Utility or Appropriate Load Despatch Centre, whose equipment is installed or proposed to be installed at the Connection Site for installation, operation and maintenance, etc. of the equipment.

9. Site Common Drawings
Site Common Drawings shall be prepared for each connection point by the owner of the Sub-station where connection is taking place.

SCHEDULE
(Site Regulation No. 5)
Standards for Connectivity to the Grid

Part I
General

1. Standards and Codes of Practice
   (1) The requester shall follow the industry best practices and applicable industry standards in respect of the equipment installation and its operation and maintenance.
   (2) The equipment including overhead lines and cables shall comply with the relevant Indian Standards, British Standards (BS), International Electrical Commission (IEC) Standard, or American National Standards Institute (ANSI) or any other equivalent International Standard provided that whenever an International Standard or International Electrical Commission Standard is followed, necessary corrections or modifications shall be made for nominal system frequency, nominal system voltage, ambient temperature, humidity and other conditions prevailing in India before actual adoption of the said Standard.
   (3) The effects of wind, storms, floods, lightning, elevation, temperature extremes, living, contamination, pollution and earthquakes must be considered in the design and operation of the connected facilities.
   (4) Installation, operation and maintenance of the equipment by the requester shall conform to the relevant standards specified by the Authority under Section 177, and Section 73 of the Act, as and when they come into force.

2. Safety
   The requester shall comply with the Indian Electricity Rules, 1956 till such time Central Electricity Authority (Safety and Electric Supply) Regulations come into force.

3. Sub-station Grounding
   Each transmission sub-station must have a ground mat solidly connected to all metallic structures and other non-energised metallic equipment. The mat shall limit the ground potential gradients to such voltage and current levels that will not endanger the safety of people or damage equipment which are in, or immediately adjacent to, the sub-station under normal and fault conditions. The ground mat size and type shall be based on local soil conditions and available electrical fault current magnitudes, factors where ground fault voltage rises would be within acceptable and safe limits (for example due to high soil resistivity or limited sub-station space), grounding rods and ground wells may be used to reduce the ground grid resistance to acceptable levels. Sub-station grounding shall be done in accordance with the norms of the Institute of Electrical and Electronics Engineers (IEEE)-80.

4. Metering
   Meters shall be provided as specified in the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006.
5. Basic Insulation Level and Insulation Coordination

(1) Basic Insulation Level (BIL) of various items of equipment and ratings of surge arresters for generating stations, lines and sub-stations shall be decided on the following order of priority, namely:
   (a) ensure safety to public and operating personnel;
   (b) avoid permanent damage to plant;
   (c) prevent failure of costly equipment;
   (d) minimise circuit interruptions; and
   (e) minimise interruptions of power supply to consumers.

(2) Insulation coordination of equipment and lines on both sides of a connection point belonging to the requester and the grid shall be accomplished and the coordination shall be done by the Appropriate Transmission Utility.

6. Protection System and Coordination

(1) Protection system shall be designed to reliably detect faults on various abnormal conditions and provide an appropriate means and location to isolate the equipment or system automatically. The protection system must be able to detect power system faults within the protection zone. The protection system should also detect abnormal operating conditions such as equipment failures or open phase conditions.

(2) Every element of the power system shall be protected by a standard protection system having the required reliability, selectivity, speed, discrimination and sensitivity. Where failure of a protective relay in the requester's system has substantial impact on the grid, it shall connect an additional protection as back up protection besides the main protection.

(3) Notwithstanding the protection systems provided in the grid, the requester and user shall provide requisite protections for safeguarding his system from the faults originating in the Grid.

(4) Bus Bar Protection and Breaker Fail Protection or Local Breaker Back Up Protection shall be provided wherever stipulated in the regulations.

(5) Special Protection Scheme such as under frequency relay for load shedding, voltage instability, angular instability, generation backing down or Islanding schemes may also be required to be provided to avoid system disturbances.

(6) Protection coordination issues shall be finalized by the Regional Power Committee.

(7) The requester and user shall develop protection manuals conforming to various standards for the reference and use of its personnel.

7. Disturbance Recording and Event Logging Facilities

Every generating station and sub-station connected to the grid at 220 kV or above shall be provided with disturbance recording and event logging facilities. All such equipment shall be provided with time synchronization facility for global common time reference.

8. Schematic Diagrams

The requester and user shall prepare single line schematic diagrams in respect of its system facility and make the same available to the Appropriate Transmission Utility or licensee through which his system is connected and the Appropriate Load Despatch Centre.

9. Inspection, Test, Calibration and Maintenance prior to connection

Before connecting, the requester shall complete all inspections and tests in consultation with the Appropriate Transmission Utility or licence or generating station in which his equipment is connected. The requester shall make available all drawings, specifications and test records of the project equipment pertaining to integrated operation to the Appropriate Transmission Utility or licensee or generating station as the case may be.

Part III

Grid Connectivity Standards applicable to the Generating Units

The units at generating stations proposed to be connected to the grid shall comply with the following requirements besides the general connectivity conditions given in the regulations and general requirements given in Part I of the Schedule.

1. New Generating Units

(1) The excitation system for every generating unit:
   (a) shall have state of the art excitation system;
   (b) shall have Automatic Voltage Regulator (AVR). Generators of 20 MW rating and above shall have Automatic Voltage Regulator with digital control and two separate channels having independent inputs and automatic changeover; and
   (c) The Automatic Voltage Regulator of generator of 100 MW and above shall include Power System Stabilizer (PSS).
The Short-Circuit Ratio (SCR) for generators shall be as per IEC-34.

The generator transformer windings shall have delta connection on low voltage side and star connection on high voltage side. Star point of high voltage side shall be effectively grounded so as to achieve the Earth Fault Factor of 1.4 or less.

All generating machines of power exceeding 100 MW shall have electronically controlled governing system with appropriate speed/load characteristics to regulate frequency. The governors of thermal generating units shall have a droop of 3 to 6% and those of hydro generating units 0 to 10%.

The project of the requester shall not cause voltage and current harmonics on the grid which exceed the limits specified in Institute of Electrical and Electronics Engineers (IEEE) Standard 519.

Generating Units located near load centres shall be capable of operating at rated output for power factor varying between 0.85 leading (over-excited) to 0.9 lagging (under-excited) and Generating Units located far from load centres shall be capable of operating at rated output for power factor varying between 0.8 lagging (over-excited) to 0.95 leading (under-excited). The above performance shall also be achieved with voltage variation of ±3% of nominal, frequency variation of ±0% and 0% and combined voltage and frequency variation of ±5%. However, for gas turbines, the above performance shall be achieved for voltage variation of ±5%.

The coal and lignite based thermal generating units shall be capable of generating up to 105% of Maximum Continuous Rating (Subject to maximum load capability under Valve Wide Open Condition) for short duration to provide the frequency response.

The hydro generating unit shall be capable of generating up to 110% of rated capacity (subject to rated head being available) on continuous basis.

Every generating unit shall have standard protections to protect the units not only from faults within the units and within the station but also from faults in transmission lines. For generating units having rated capacity greater than 100 MW, two independent sets of protections acting on two independent sets of trip coils fed from independent Direct Current (DC) supplies shall be provided. The protections shall include but not be limited to the Local Breaker Back-up (LBB) protection.

Hydro generating units having rated capacity of 59 MW and above shall have capability of operation in synchronised condition mode, wherever feasible.

Bus bar protection shall be provided at the switchyard of all generating station.

Automatic synchronisation facilities shall be provided in the requester's Project.

The station auxiliary power requirement, including voltage and reactive requirements, shall not impose operating restrictions on the grid beyond those specified in the Grid Code or state Grid Code as the case may be.

In case of hydro generating units, self-starting facility may be provided. The hydro generating station may also have a small diesel generator for meeting the station auxiliary requirements for black start.

The standards in respect of the sub-stations associated with the generating stations shall be in accordance with the provisions specified in respect of 'Sub-stations' under Part III of these Standards.

2. Existing Units

For thermal generating units having rated capacity of 200 MW and above and hydro units having rated capacity of 107 MW and above, the following facilities would be provided at the time of commission and modernisation:

- Every generating unit shall have Automatic Voltage Regulator. Generators having rated capacity of 100 MW and above shall have Automatic Voltage Regulator with two independent inputs and automatic changeover.
- Every generating unit of capacity having rated capacity greater than 100 MW shall have Power System Stabiliser.
- All generating units shall have standard protections to protect the units not only from faults within the units and within the station but also from faults in transmission lines. The protections shall include but not be limited to the Local Breaker Back-up (LBB) protection.

Part III

Grid Connectivity Standards applicable to the Transmission Line and Sub-Station

The transmission lines and sub-stations connected to the grid shall comply with the following additional requirements besides the general connectivity conditions under these regulations and General Standards for Connectivity in the Grid as specified in Part I of the Schedule.

- Bus bar protection shall be provided on all sub-stations at and above 220 kV levels for all new sub-stations. For existing sub-stations, this shall be implemented in a reasonable time frame.
- Local Breaker Back-up (LBB) protection shall be provided for all substations of 220 kV and above.
- Two main numerical Distance Protection Schemes shall be provided on all the transmission lines of 220 kV and above for all new substations. For existing substations, this shall be implemented in a reasonable time frame.
(4) Circuit breakers, isolators and all other current carrying equipment shall be capable of carrying normal and emergency load currents without damage. The equipment shall not become a limiting factor on the ability of transfer of power on the one-state and inter-state transmission systems.

(5) All circuit breakers and other fault interrupting devices shall be capable of safely interrupting fault currents for any fault that they are required to interrupt. The Circuit Breaker shall have this capability without the use of intentional time delay in clearing the fault. Minimum fault interrupting requirement need be specified by the appropriate Transmission Utility. The Circuit Breaker shall be capable of performing all other required switching duties such as, but not limited to, capacitive current switching, load current switching and out of step switching. The Circuit Breaker shall perform required duties without creating transients over voltages that could damage the equipment provided elsewhere in the grid. The short circuit capacity of the circuit breaker shall be based on short-term and perspective transmission plans as finalized by the Authority.

(6) Power Supply to Sub-Station Auxiliaries shall:
   (a) for alternating current (AC) supply (Applicable to new substations):
      220 kV and above: Two high tension (HT) supplies shall be arranged from independent sources. One of the two high tension supplies shall be standby to the other. In addition, an emergency supply from diesel generating (DG) source of suitable capacity shall also be provided.
      66 kV and below 220 kV: There shall be one HT supply and one diesel generating source.
      33 kV and below 66 kV: There shall be one HT supply.
   (b) for direct current (DC) Supply (Applicable to new substations): Sub-stations of transmission system for 132 kV and above and substations of all generating stations: There shall be two sets of batteries, each equipped with its own charger.
      For substations below 132 kV: there shall be one set of battery and charger.

(7) Earth Fault Factor for an effectively earthed system shall be not more than 1.4.

Part IV

Grid Connectivity Standards applicable to the Distribution Systems and Bulk Consumers

The following additional requirements shall be complied with, besides the connectivity conditions in these regulations and the general standards for Connectivity to the Grid given in Part I and those applicable to transmission lines and substations in Part III:

1. Under Frequency/d/dt Relays

   Under frequency and d/dt (rate of change of frequency with time) relays shall be employed for automatic load control as a contingency to ensure grid security under conditions of falling grid frequency in accordance with the decision taken in the Regional Power Committee.

2. Reactive Power

   The distribution licensee shall provide adequate reactive compensation to compensate the inductive reactive power requirement in their system so that they do not depend upon the grid for reactive power support. The power factor of the distribution system and bulk consumer shall not be less than 0.95.

3. Voltage Harmonics

   (1) The total harmonic distortion for voltage at the connection point shall not exceed 5% with no individual harmonic higher than 3%.
   (2) The total harmonic distortion for current drawn from the transmission system at the connection point shall not exceed 2%.
   (3) The limits prescribed in (1) and (2) shall be implemented in a phased manner so as to achieve complete compliance not later than five years from the date of publication of these regulations in the Official Gazette.

4. Voltage Unbalance

   The Voltage Unbalance at 33 kV and above shall not exceed 3.0%.

5. Voltage Fluctuations

   (1) The permissible limit of voltage fluctuation for step changes which may occur repetitively is 1.5%.
   (2) For occasional fluctuations other than step changes the maximum permissible limit is 5%.
   (3) The limits prescribed in (1) and (2) above shall come into force not later than five years from the date of publication of these regulations in the Official Gazette.

6. Back-energization

   The consumer shall not energize transmission or distribution system by injecting supply from his generators or any other source either by automatic controls or manually unless specifically requested by the Transmission or Distribution Licensee.

BHOY KUMAR MISRA, Secy.

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