

INVENTORY No.		SIGN. & DATE		REF. DRG. No.		COMPUTER DRG. PATH NAME :		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company.			
A	B	C	D	E	F						
SH.-01	GROUNDING NOTES & DETAILS										
SH.-02	GROUNDING NOTES & DETAILS										
SH.-1	ANGULAR JOINT BETWEEN M.S. RODS										
SH.-2	ROD TO STRIP/RIGHT ANGLE BEND										
SH.-3	STRAIGHT LAP JOINT/RISER										
SH.-4	CROSS JOINT BETWEEN GS FLATS										
SH.-5	ANGULAR JOINT BETWEEN GS FLATS										
SH.-6	CABLE TRENCH/EQUIPMENT FOUNDATION PIT/ DRAIN CROSSING										
SH.-7	TYPICAL CROSS SECTION OF CABLE TRENCH										
SH.-8	RAIL GROUNDING										
SH.-9	DETAIL OF SUB / AUXILIARY GROUND MAT FOR ISOLATOR										
SH.-10	DETAIL OF PIPE GROUND ELECTRODE										
SH.-11	ROD ELECTRODE WITH TEST LINK FOR LM & TOWER WITH PEAK										
SH.-12	GROUNDING DETAIL OF 220/132KV CURRENT TRANSFORMER										
SH.-13	GROUNDING DETAIL OF 220/132KV WAVE TRAP										
SH.-14	GROUNDING DETAIL OF 220/132KV BUS POST INSULATOR										
SH.-15	GROUNDING DETAIL OF 132KV CIRCUIT BREAKER										
SH.-15A	GROUNDING DETAIL OF 220 CIRCUIT BREAKER										
SH.-16	GROUNDING DETAIL OF 220/132KV CAP. VOLTAGE TRANSFORMER										
SH.-17	GROUNDING DETAIL OF 216/120KV LIGHTNING ARRESTER										
SH.-18	GROUNDING DETAIL OF BAY MARSHALLING KIOSK/ CB OPERATING BOX MOUNTED ON GROUND										
SH.-19	GROUNDING DETAIL OF GATE										
SH.-20	NEUTRAL EARTHING OF SINGLE PHASE TRANSFORMERS										
SH.-21	GROUNDING DETAIL OF SHUNT REACTOR										
SH.-22	GROUNDING DETAIL OF ISOLATOR WITH ONE (1) EARTH SWITCH GROUNDING DETAIL OF ISOLATOR WITH TWO (2) EARTH SWITCH										
SH.-23	GROUNDING DETAIL OF ISOLATOR WITHOUT EARTH SWITCH										
SH.-24	GROUNDING DETAIL OF TOWER WITHOUT PEAK										
SH.-25	ARRANGEMENT FOR LIGHTNING PROTECTION BY SHIELD WIRE AND GROUNDING DETAILS FOR TOWER WITH PEAK										
SH.-26	GROUNDING DETAIL OF LT TRANSFORMER										
SH.-27	GROUNDING DETAIL FOR LIGHTNING MAST										

DRAWING No. TD-4-276-509-001

SHEET NO. 15, 15A, 20 & 21
 SHALL REPLACE CORRESPONDING
 SHEETS OF EARLIER
 REV 01 APPROVED IN
 CAT. ONE & ON 3/1/07.

CAT-ONE (SH 15, 15A, 20 & 21)

Approved/Released for Fabrication/
Construction.

Approved/Released for Fabrication/
Construction Subject to Incorporation
of Comments, Modification as Noted.
Revised Drawing Required.

To Be Resubmitted for Approval after
Incorporating the Comments.

For Information & Record.

Not approved.

Power Grid Corporation of India Ltd.
Eng. Deptt. (S&S Group), Gurgaon, Haryana

(Signature)
 CPE
 (Designation)
 1/5
 (Date)

COVER SHEET + 30 = 31 SHEETS

ADDITIONAL INFORMATION W.D.M.		C-12300-87104-3/104-1/1000 DATED 03.01.06.																					
STATUS OF DRAWING		NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PETROBRAS (NTP) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL																					
DISTRIBUTION OF PRINTS		<table border="1" style="width:100%; font-size: x-small;"> <tr> <th>NAME</th> <th>SEAL</th> <th>NAME</th> <th>SEAL</th> <th>DATE</th> </tr> <tr> <td>DRG</td> <td>KK</td> <td></td> <td></td> <td>12.07.06</td> </tr> <tr> <td>CHKD</td> <td>CPK</td> <td></td> <td></td> <td></td> </tr> <tr> <td>APPROV</td> <td>SKB</td> <td></td> <td></td> <td></td> </tr> </table>		NAME	SEAL	NAME	SEAL	DATE	DRG	KK			12.07.06	CHKD	CPK				APPROV	SKB			
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APPROV	SKB																						
<table border="1" style="width:100%; font-size: x-small;"> <tr> <th>REV.</th> <th>DATE</th> <th>ALTERED BY</th> <th>APPROVED BY</th> <th>REASON</th> </tr> <tr> <td>01</td> <td>27.10.06</td> <td></td> <td></td> <td></td> </tr> </table>		REV.	DATE	ALTERED BY	APPROVED BY	REASON	01	27.10.06				<table border="1" style="width:100%; font-size: x-small;"> <tr> <th>REV.</th> <th>DATE</th> <th>ALTERED BY</th> <th>APPROVED BY</th> <th>REASON</th> </tr> <tr> <td>01</td> <td>27.10.06</td> <td></td> <td></td> <td></td> </tr> </table>		REV.	DATE	ALTERED BY	APPROVED BY	REASON	01	27.10.06			
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01	27.10.06																						
REPT.		SCALE																					
CODE		CWD CODE																					
TITLE EQUIPMENT EARTHING DETAILS (SH 15, 15A, 20 & 21)		DRAWING NO. TD-4-276-509-001																					
SHEET No. -		NEXT SHEET -																					

INVENTORY No.		SIGN. & DATE		REF. DRG. No.		COMPUTER DRG. PATH NAME :		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.			
A		B		C		D		E		F	

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

DRAWING No. TB-4-278-809-061

ELEVATION

LEGEND :-

- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- 50 x 6 mm GS FLAT

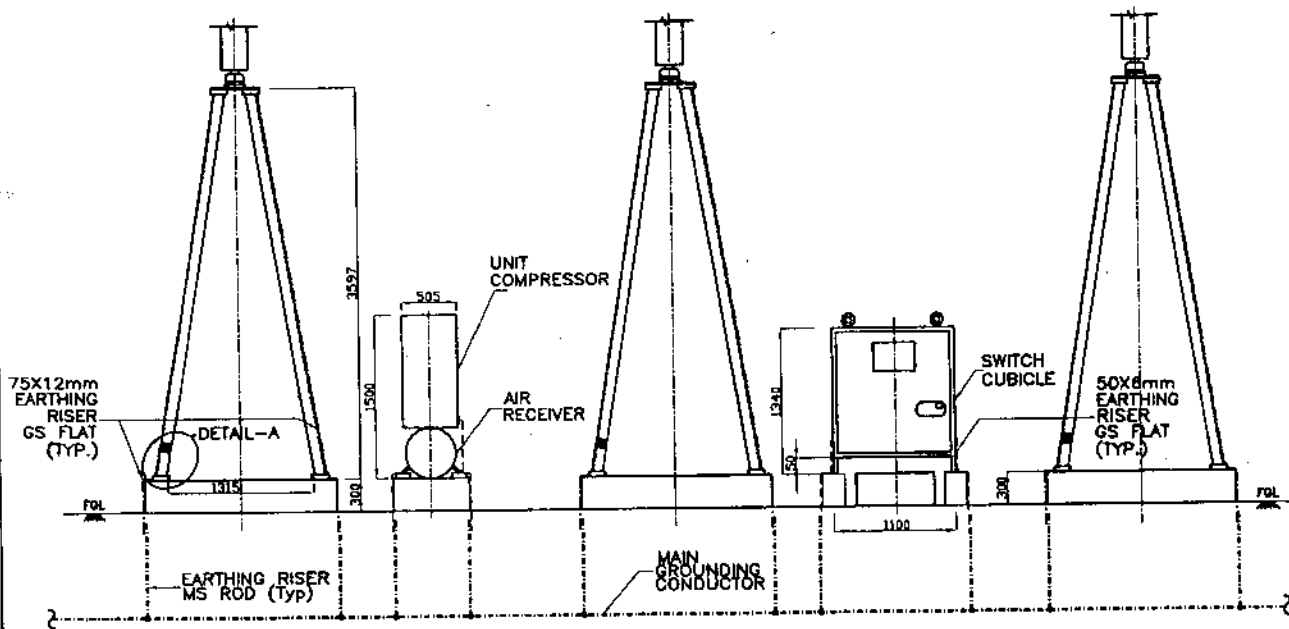
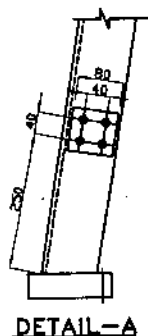
NOTES :-

1. No. OF RISERS FOR CIRCUIT BREAKER = 2 Nos. / PHASE.
2. No. OF RISERS FOR MACH. BOX = 2 Nos.
3. No. OF RISERS FOR OPERATING BOX = 2 Nos.
4. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

GROUNDING DETAIL OF 132KV CIRCUIT BREAKER

ADDITIONAL INFORMATION W.O.No.		DATE REC. 0-18308-08184-5/104-1/1090 DATED: 08.01.08.	
STATUS OF DRAWING		NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 500/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL	
DISTRIBUTION OF PRINTS		BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
REV. DATE 01 17.10.08	REV. DATE 02 17.10.08	REV. DATE 03 17.10.08	REV. DATE 04 17.10.08
APPROVED (Signature)		APPROVED (Signature)	
CHECKED (Signature)		CHECKED (Signature)	
DATE 17-10-08		DATE 17-10-08	
SCALE		SCALE	
DWD CODE		DWD CODE	
TITLE EQUIPMENT EARTHING DETAILS		DRAWING NO. TB-4-278-809-061	
SHEET No. 16		NEXT SHEET 16A	

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS



ELEVATION

LEGEND :-

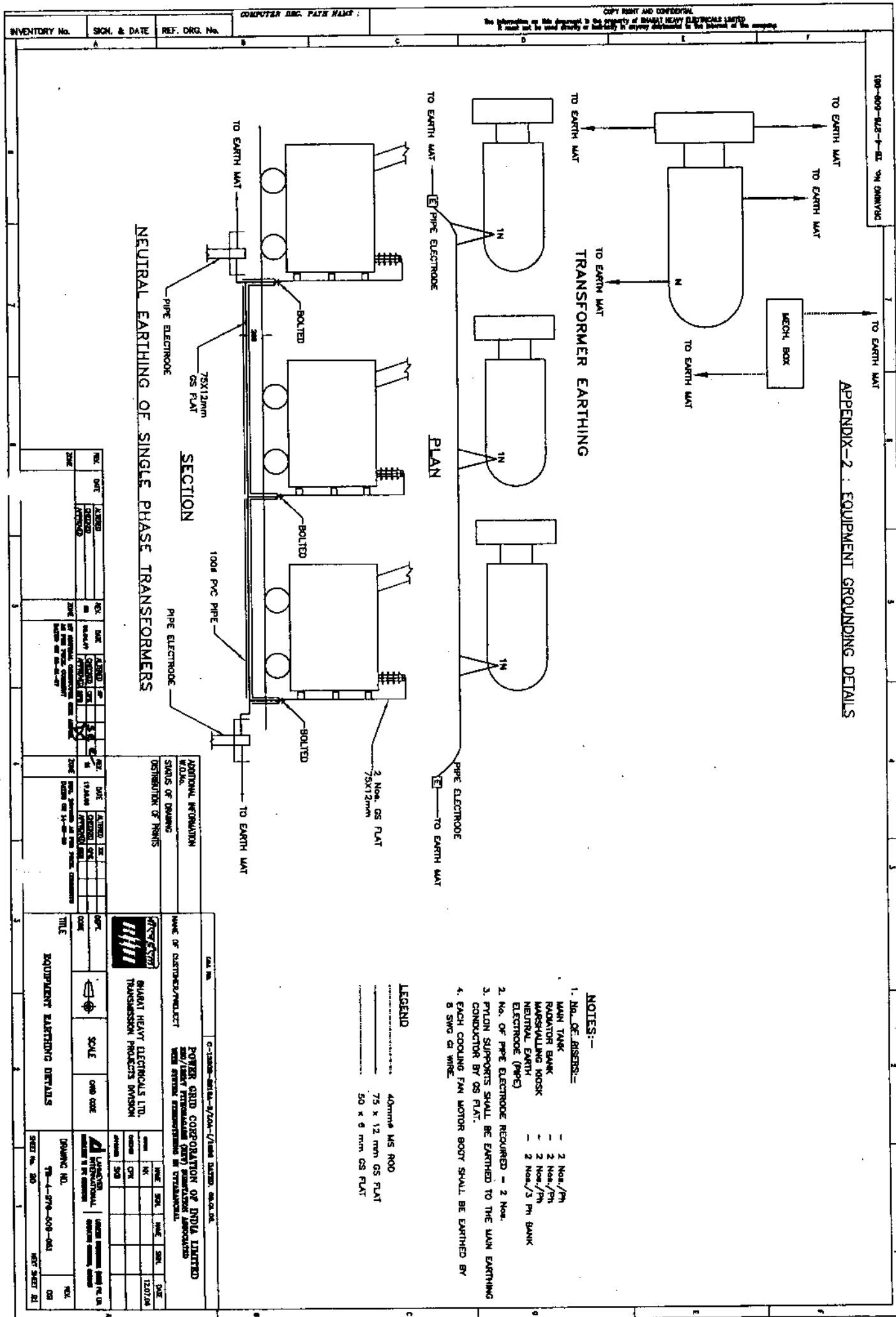
- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- 50 x 6 mm GS FLAT

NOTES :-

1. No. OF RISERS FOR CIRCUIT BREAKER = 2 Nos. EACH PHASE.
2. No. OF RISERS FOR SWITCH CUBICLE = 2 Nos.
3. No. OF RISERS FOR UNIT COMPRESSOR = 2 Nos.
4. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

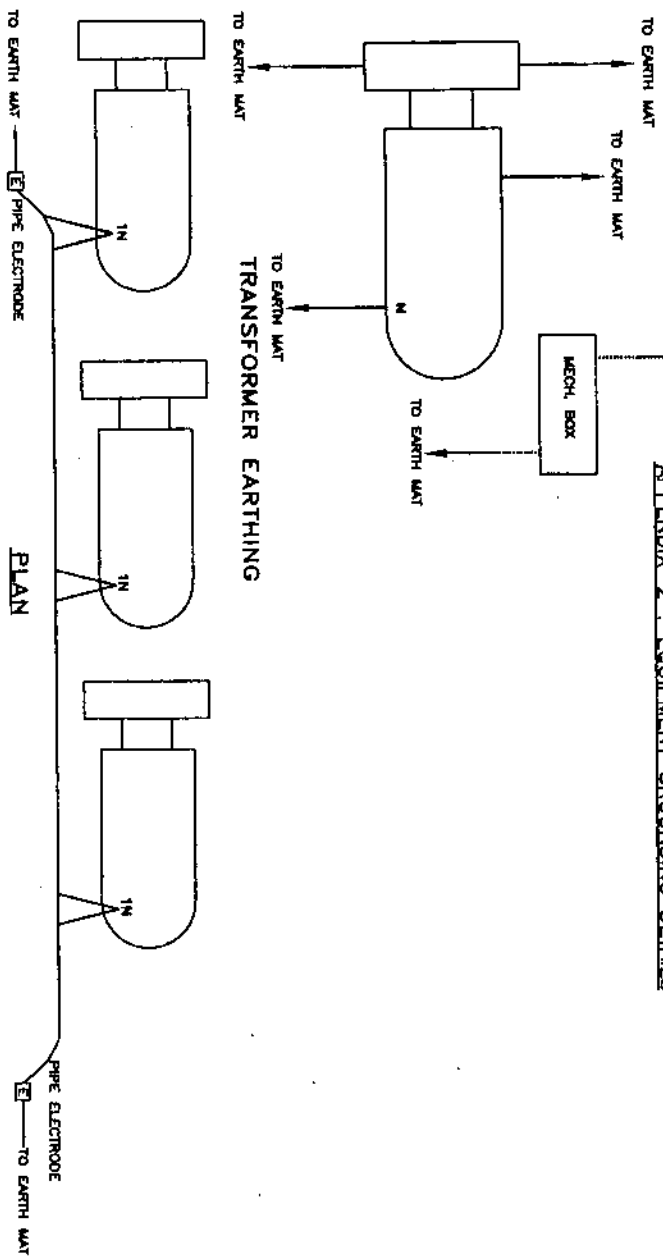
GROUNDING DETAIL OF 220kV CIRCUIT BREAKER

ADDITIONAL INFORMATION W.C.No.				DATE: 01.04.07			
STATUS OF DRAWING DISTRIBUTION OF PRINTS				NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/110KV PETERHARSH (HVS) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL			
DISTRIBUTION OF PRINTS				BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION			
REV.	DATE	APPROVED	REV.	DATE	APPROVED	REV.	DATE
TITLE EQUIPMENT EARTHING DETAILS				DRAWING NO. TS-4-876-509-061			
SCALE 1:1				SHEET NO. 18A			



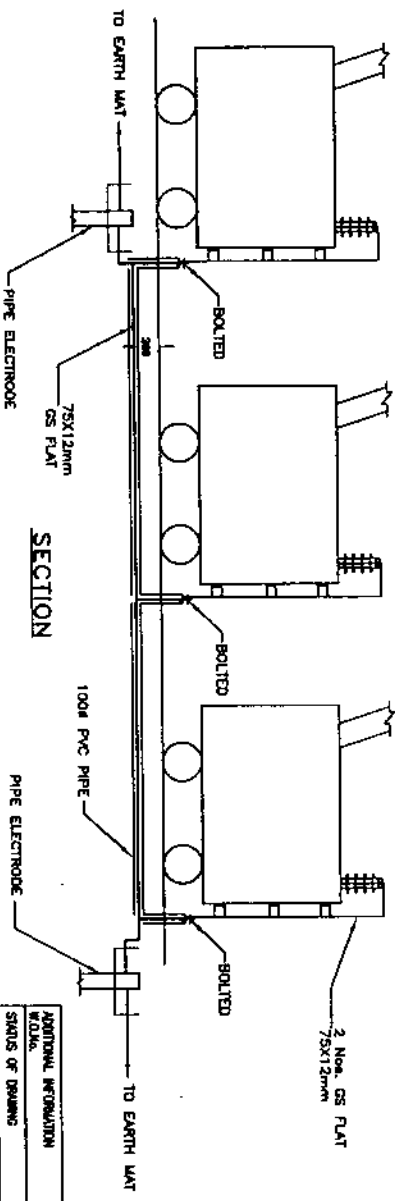
APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

TRANSFORMER EARTHING



PLAN

NEUTRAL EARTHING OF SINGLE PHASE TRANSFORMERS



SECTION

LEGEND

- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- 50 x 6 mm GS FLAT

NOTES:-


1. No. OF RISERS:-
MAIN TANK - 2 Nos./PH
RADIATOR BANK - 2 Nos./PH
MARSHALLING HOOK - 2 Nos./PH
NEUTRAL EARTH ELECTRODE (NPE) - 2 Nos./S PH BANK
2. No. OF PIPE ELECTRODE REQUIRED - 2 Nos.
3. PYLON SUPPORTS SHALL BE EARTHED TO THE MAIN EARTHING CONDUCTOR BY GS FLAT.
4. EACH COOLING FAN MOTOR BODY SHALL BE EARTHED BY 6 SWG GI WIRE.

PROJECT INFORMATION		DATE	
NAME OF CUSTOMER/PROJECT		DATE	
STATUS OF DRAWING		DATE	
DISTRIBUTION OF PRINTS		DATE	
ADDITIONAL INFORMATION		DATE	
W.D.M.		DATE	
NAME OF CUSTOMER/PROJECT		DATE	
POWER GRID CORPORATION OF INDIA LIMITED		DATE	
S&P/EST/TRANSMISSION (S&P) DIVISION		DATE	
TRANSMISSION PROJECTS DIVISION		DATE	
PROJECT NO.		DATE	
DRAWING NO.		DATE	
SHEET NO. 20		DATE	

INVENTORY No.	SN. & DATE	REF. DRG. No.	COMPUTER DRG. PATH NAME
SH.-01			GROUNDING NOTES & DETAILS
SH.-02			GROUNDING NOTES & DETAILS
SH.-01			ANGULAR JOINT BETWEEN M.S. RODS
SH.-02			ROD TO STRIP/RIGHT ANGLE BEND
SH.-03			STRAIGHT LAP JOINT/RISER
SH.-04			CROSS JOINT BETWEEN GS FLATS
SH.-05			ANGULAR JOINT BETWEEN GS FLATS
SH.-06			CABLE TRENCH/EQUIPMENT FOUNDATION PIT/ DRAIN CROSSING
SH.-07			TYPICAL CROSS SECTION OF CABLE TRENCH
SH.-08			RAIL GROUNDING
SH.-09			DETAIL OF SUB. / AUXILIARY GROUND MAT FOR ISOLATOR
SH.-10			DETAIL OF PIPE GROUND ELECTRODE
SH.-11			ROD ELECTRODE WITH TEST LINK FOR LM & TOWER WITH PEAK
SH.-12			GROUNDING DETAIL OF 220/132KV CURRENT TRANSFORMER
SH.-13			GROUNDING DETAIL OF 220/132KV WAVE TRAP
SH.-14			GROUNDING DETAIL OF 220/132KV BUS POST INSULATOR
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SH.-16			GROUNDING DETAIL OF 220/132KV CAP. VOLTAGE TRANSFORMER
SH.-17			GROUNDING DETAIL OF 216/120KV LIGHTNING ARRESTER
SH.-18			GROUNDING DETAIL OF BAY MARSHALLING KIOSK / CB OPERATING BOX MOUNTED ON GROUND
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SH.-26			GROUNDING DETAIL OF LT TRANSFORMER
SH.-27			GROUNDING DETAIL FOR LIGHTNING MAST

Earthing of 220/132KV
CBLs shall be revised
after approval of CB
drgs.

CAT-ONE A

 पावर ग्रिड (इंस्टॉलर) CDE (पदनाम) 31 (सि.क्र.)	वेधित/
	I. फेब्रिकेशन/निर्माण/हेतु अनुमोदित/जारी।
	II. फेब्रिकेशन/निर्माण/हेतु अनुमोदित/जारी। बशर्तें दी गई टिप्पणियों एवं आशोधनों को सम्मिलित किया जाए। कृपया आशोधित परामर्श अनुमोदनार्थ प्रस्तुत करें।
	III. टिप्पणियाँ सम्मिलित कर पुनः अनुमोदनार्थ प्रस्तुत करें।
	IV. सूचनाएं एवं रिकार्ड हेतु। V. अनुमोदित नहीं।
पावर ग्रिड कॉरपोरेशन ऑफ इंडिया आपसमंत्रिकी (उपकेन्द्र), गुरुगढ़, हरियाणा	

COVER SHEET + 29 = 30 SHEETS

ADDITIONAL INFORMATION W.O. No. STATUS OF DRAWING DISTRIBUTION OF PRINTS		NAME OF CUSTOMER/PROJECT BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION		C-13302-29/2A-3/LOA-1/1806 DATED 03.01.06 POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL	
REV.	DATE	ALTERED BY	NO.	DATE	REVISION
1	17.10.04	CHANDER	01	17.10.04	1
SHEETS NO. INVOICES AS PER POCL EXAMINATION DATED 14-06-06 18 GROUP SHEET NO. 2, 3, 4, 5, 9, 10, 16, 18, 17, 20 21, 22, 23, 25 & 27		SCALE CHAND CODE		DRAWING NO. TB-4-276-509-051	
SHEET NO. INVOICES AS PER POCL EXAMINATION DATED 14-06-06 18 GROUP SHEET NO. 2, 3, 4, 5, 9, 10, 16, 18, 17, 20 21, 22, 23, 25 & 27		TITLE EQUIPMENT EARTHING DETAILS		SHEET NO. 01	

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INVENTORY No.	SIGN & DATE	REF. DRG. No.	COMPUTER DRG. PATH NAME

GROUNDING NOTES

- 1.0 These grounding notes and details shall be read and constructed in conjunction with grounding layout drawings.
- 2.0 The grounding installation work shall conform to the requirements of the Indian electricity rules and code of practice for grounding (IS-3043) as ammended up to-date and IEEE-80.
- 3.0 The grounding system shall have an underground grounding grid. The main earth grid shall be buried in earth at a minimum depth of 600 mm below grade. A minimum earth in coverage of 300 mm shall be provided between the earth grid conductor and the bottom of trench/foundation/underground pipe while crossing.
- 4.0 The location of grounding grid and earth electrodes shown in the layout drawings are indicative and may be changed locally to suit the site conditions in consultation with engineer in charge.
- 5.0 An additional auxiliary grid of 1500mm x 1500mm comprising of closely spaced (300mm x 300mm) 40 dia conductors at a depth of 300 mm from finished grade level shall be provided below the operating handle of isolators and earth switches. This grid shall be connected to the main ground grid. The earth connection to operating handle shall be made of flexible connection. The main box of the isolator to be connected to this aux. grid.
- 6.0 The earth grid conductor below grade shall be of bare 40mm diameter mild steel rod. Buried earth electrode shall be 40 mm diameter and 3000 mm long mild steel rod driven into the ground and connected to the earth grid conductor.
- 7.0 Riser from the earth grid shall be 40mm diameter mild steel rod. Riser shall rise from the ground along the nearest equipment foundation / building column / wall to avoid any obstruction to movement of personnel. Risers from the earth grid to the equipment/structures shall be made by two short earthing leads (one direct and another through the support structure). Risers of one equipment shall be connected to different earthing rods in perpendicular axis.
- 8.0 All earth joints above/below grade shall be made by electric arc welding with electrode of low hydrogen content. Bending of the conductor where necessary shall be done by gas heating. The connection shall be treated with red lead and afterward coated with two coats of bitumen compound.
- 9.0 Resistance of the joints shall not be more than the resistance of the equivalent length of the conductor.
- 10.0 All above ground connections of equipments / devices & removable structures shall be bolted type. Equipment bolted connection after being tested, shall be painted with cold galvanising paint/compound.
- 11.0 The earth conductors at road crossing shall be laid at a depth of 1000mm (Minimum) below ground level.
- 12.0 Electrodes used for lightning protection shall not be connected to grounding conductors of any other system above ground.
- 13.0 Earth pits for electronic equipment grounding shall be distinct and not connected to any grounding conductors of any other system both above and under ground.
- 14.0 Grounding resistance of the grid shall be measured after connecting all the electrodes to the grid. The resistance between any point on the metallic earth grid and the general mass of earth shall not exceed 1.0 ohm
- 15.0 Ground conductor around the building shall be buried in earth at a minimum distance of 1500mm from the outer boundary of the building.
- 16.0 Down conductor of lightning mast and towers with peak shall be connected to rod electrode through test link. Earthing terminal of each lightning arrester and CVT shall also be connected to rod electrode. These rod electrodes in turn shall be connected to earth grid.
- 17.0 MS flat of size 50 x 6 mm shall run on top tier all along the cable trench and welded to each of the racks. MS flat shall be earthed at an interval of 30 m and also at both ends.
- 18.0 Earthing conductors embedded in the concrete floor of the building shall have approximately 50-mm concrete cover.
- 19.0 The connection between earthing pads/terminals and the earthing grid shall be made by short and direct earthing leads free from kinks and splices. All steel columns, metallic stairs, hand rails, fence, system neutrals etc. of the building housing electrical equipment shall be connected to the nearby earthing grid conductor by one earthing lead. Electrical continuity shall be ensured by bonding the different sections of hand rails and metallic stairs.
- 20.0 Electrical conduits, pipes and cable tray section shall be bonded and connected to earthing conductors at regular intervals. End and beginning points shall be connected to grounding system.
- 21.0 A separate earthing conductor shall be provided for earthing lighting fixtures, receptacles, switches, junctions boxes, lighting conduits, poles etc. This conductor shall be connected to the main ground grid.
- 22.0 Lighting poles, junction boxes on poles, floodlight supporting structures, pull boxes, push button switches, cable end boxes etc. shall be earthed by connecting to the earthing conductor running along the supply cable at two separate points. Whether specifically shown or not.
- 23.0 Metallic sheaths, screens and armour of all multicore cables shall be earthed at both equipment and switchboard ends. Sheath and armour of single core power cables shall be earthed at switchboard end only.

DRAWING No. TB-4-278-509-051

ADDITIONAL INFORMATION W.O. No. _____ STATUS OF DRAWING _____ DISTRIBUTION OF PRINTS _____		LOA No. _____ C-13302-S919A-3/LOA-1/1998 DATED: 03.01.00 POWER GRID CORPORATION OF INDIA LIMITED 250/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL NAME OF CUSTOMER/PROJECT _____ BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION DESIGNED BY: KKC CHECKED BY: CPE APPROVED BY: SPS DEPT. CODE _____ SCALE _____ CARD CODE _____ TITLE: GROUNDING NOTES & DETAILS DRAWING NO. TB-4-278-509-051 SHEET No. 01	
REV. DATE ALTERED 1. 12.07.05	REV. DATE ALTERED 1. 12.07.05	REV. DATE ALTERED 1. 12.07.05	REV. DATE ALTERED 1. 12.07.05

- 24.0 Two grounding leads shall be provided for transformer neutral. Each of the grounding leads shall be directly connected to pipe electrode treated earth pits, which in turn shall be connected to station grounding grid. Treated earth pits shall consist of 40 mm NB, 3000 mm long GI pipe ground electrode with disconnecting link facility for testing purposes.
- 25.0 Flexible earthing leads shall be provided for earthing the equipment on moving platforms.
- 26.0 Wherever GI strips are to be joined for connecting to risers or another earthing strip, both the strips shall be welded to a common plate of double the size of the GI strip. after welding, the welded portion should be treated with two coats of red oxide and afterwards coated with two layers of bitumen compound to prevent corrosion.
- 27.0 A 16 SWG G.I. wire shall run along the metallic conduit and shall be securely tied with the same.
- 28.0 Fence shall be earthed at every alternate post. Fence gate shall be separately earthed with flexible connection to permit movement.
- 29.0 For earth connections, the conductor sizes shall be as listed below-

Sl No.	Equipment	Galvanised mild steel flats
a)	Motors upto 5 kW, Miscellaneous devices etc.	: 8 S.W.G., G.I. wire
b)	Earthing leads for 400kV & 220kV equipment, columns and auxiliary structure.	: 75 X 12mm GS Flat
c)	Earthing of motor (5kW-30kW)	: 25 X 3mm GS Flat
d)	Junction boxes, Receptacles, Lighting fixtures	: 16 S.W.G., G.I. wire
e)	LT panels, C&R panels, outdoor MK'S, MOM boxes, junction boxes & lighting panels, transformer marshalling box etc.	: 50 X 6mm GS Flat

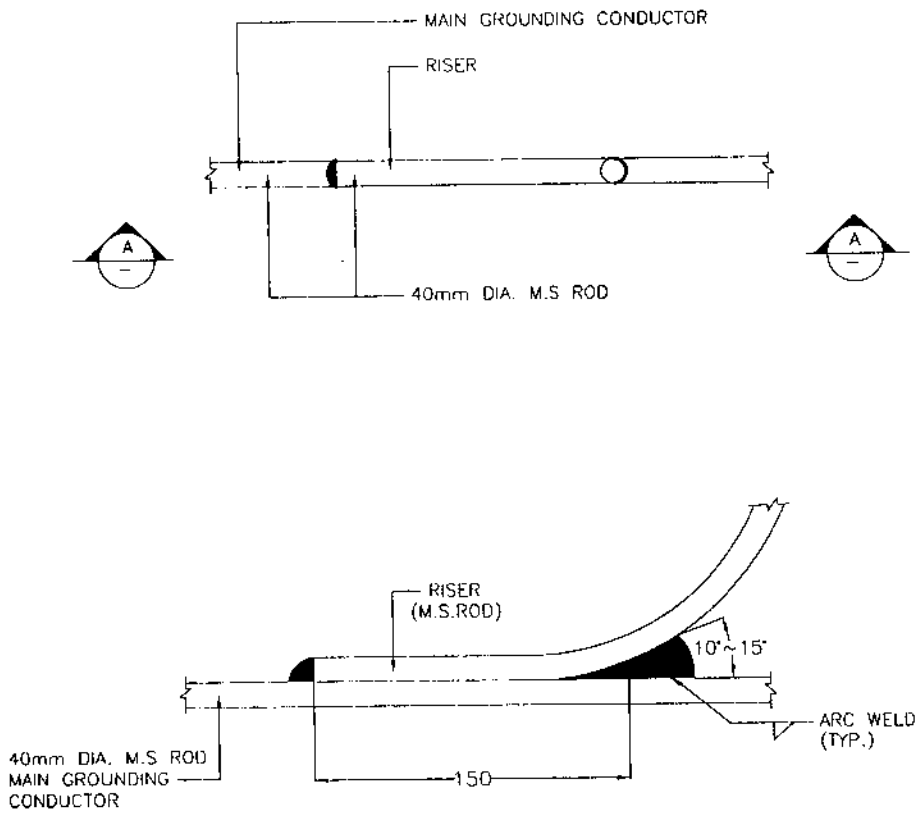
GROUNDING CONDUCTOR DETAILS :-

Sl. No.	DESCRIPTION	CONDUCTOR DETAILS
a)	MAIN GROUNDING CONDUCTOR	40mm ϕ MS ROD
b)	SUB / AUXILIARY GROUND MAT CONDUCTOR	40mm ϕ MS ROD
c)	GROUNDING RISERS ABOVE GROUND LEVEL	75 x 12 mm GS FLAT
d)	GROUNDING CONDUCTOR ALONG CABLE TRENCHES.	50 x 6 mm MS FLAT

LOA NO. C-13302-S010A-3/LOA-1/1898 DATED: 03.01.06.			POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED RTE SYSTEM STRENGTHENING IN UTTARANCHAL		
ADDITIONAL INFORMATION W.D. No. _____ STATUS OF DRAWING _____ DISTRIBUTION OF PRINTS _____			NAME OF CUSTOMER/PROJECT BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION		
REV.	DATE	ALTERED <small>CHECKED</small> <small>APPROVED</small>	REV.	DATE	ALTERED <small>CHECKED</small> <small>APPROVED</small>
ZONE			ZONE		
DPT. SCALE CARD CODE CODE _____			DRAWING NO. TB-4-276-509-051 SHEET No. 02 NEXT SHEET 03		
TITLE GROUNDING NOTES & DETAILS			LAYMAYER INTERNATIONAL ENGINEERING & DESIGN 10/10/05		

APPENDIX--1 : SYSTEM GROUNDING DETAILS

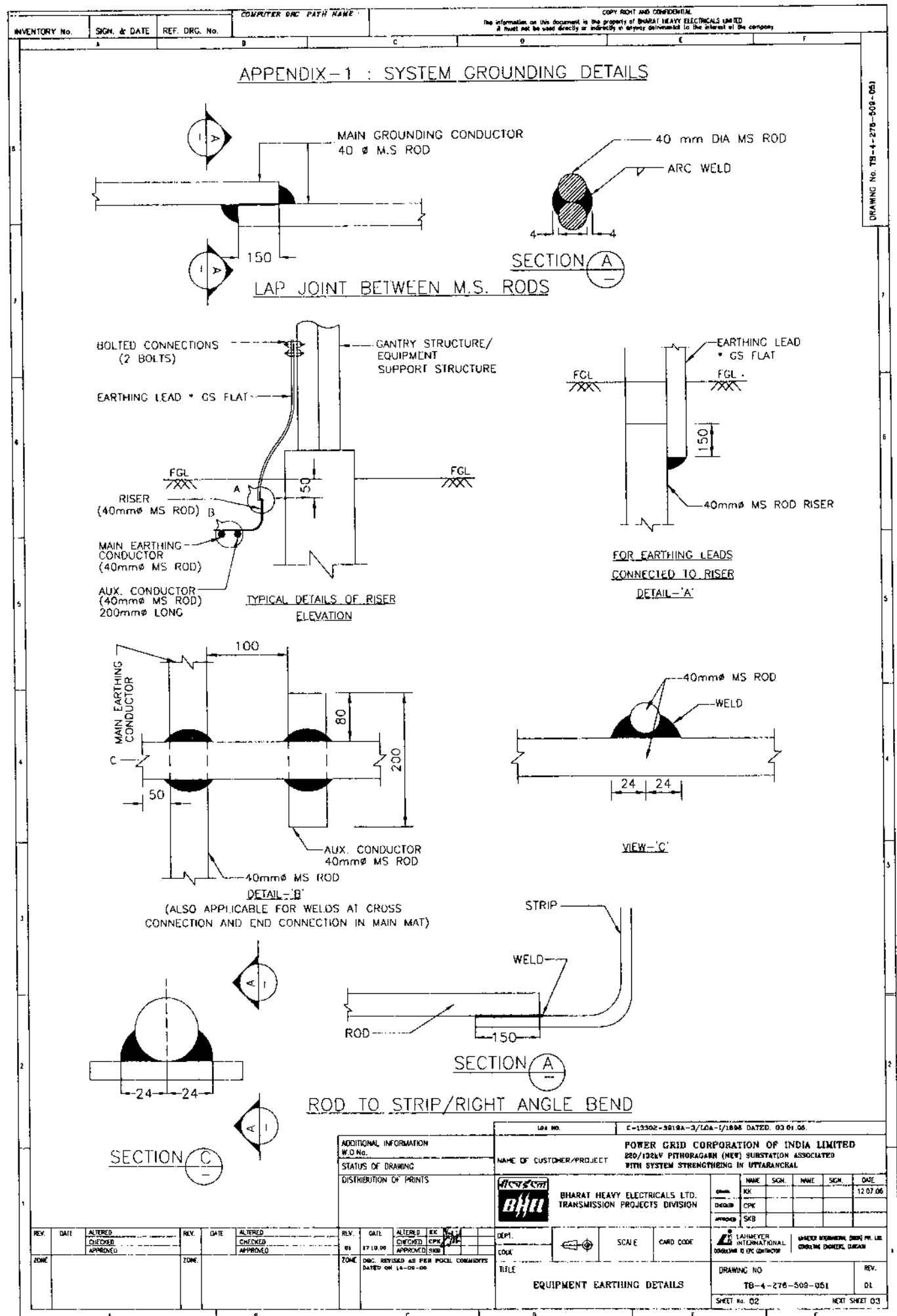
DRAWING No. TB-4-276-509-051



SECTION A

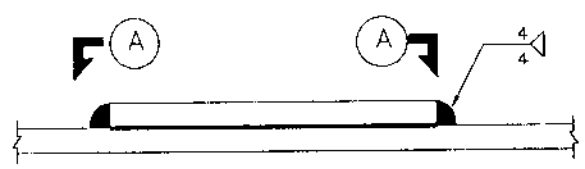
ANGULAR JOINT BETWEEN M.S. RODS

ADDITIONAL INFORMATION W.O. No. STATUS OF DRAWING DISTRIBUTION OF PRINTS			W.O. NO. C-13508-SR19A-3/LDA-1/1808 DATED: 03.01.08 NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL																															
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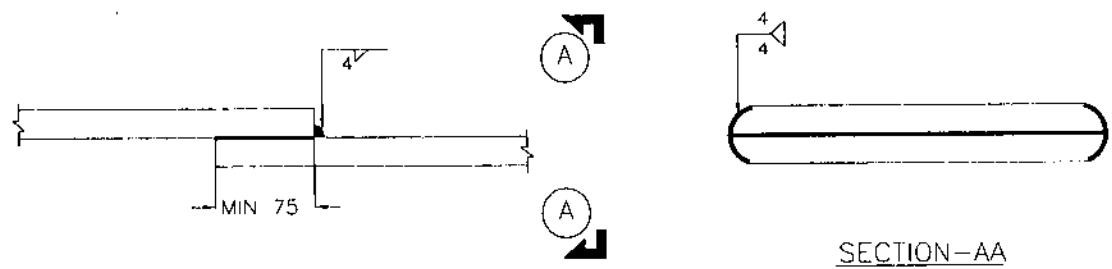
DRAWING No. TB-4-276-509-051

APPENDIX-1 : SYSTEM GROUNDING DETAILS



SECTION-AA

CROSS LAP JOINT
FOR EARTH STRIP

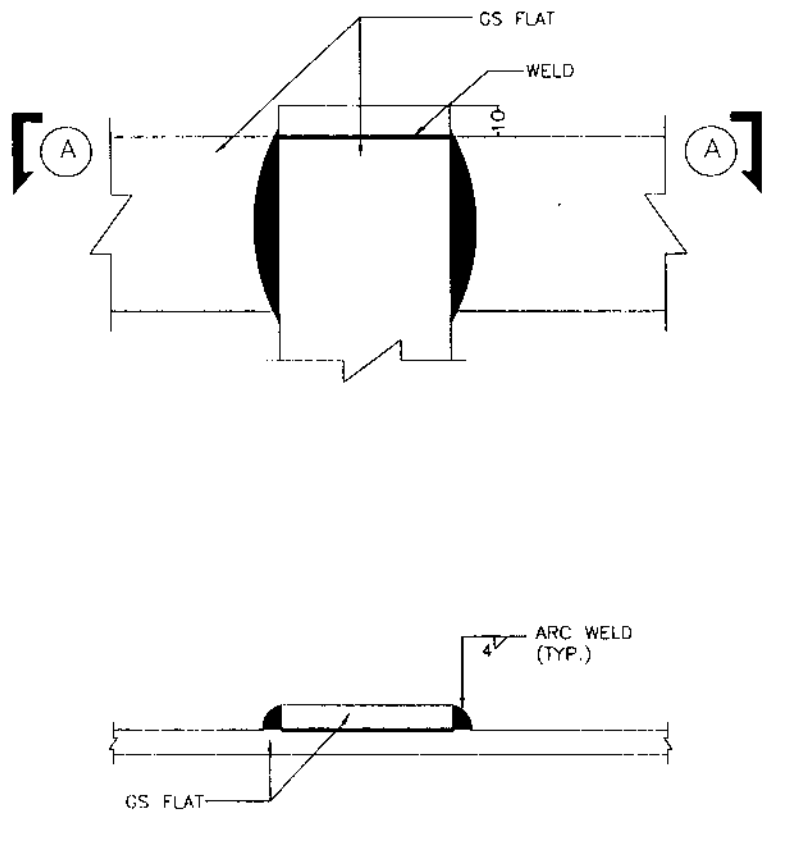


SECTION-AA

STRAIGHT LAP JOINT/RISER
FOR EARTH STRIP (75/12.50/6)

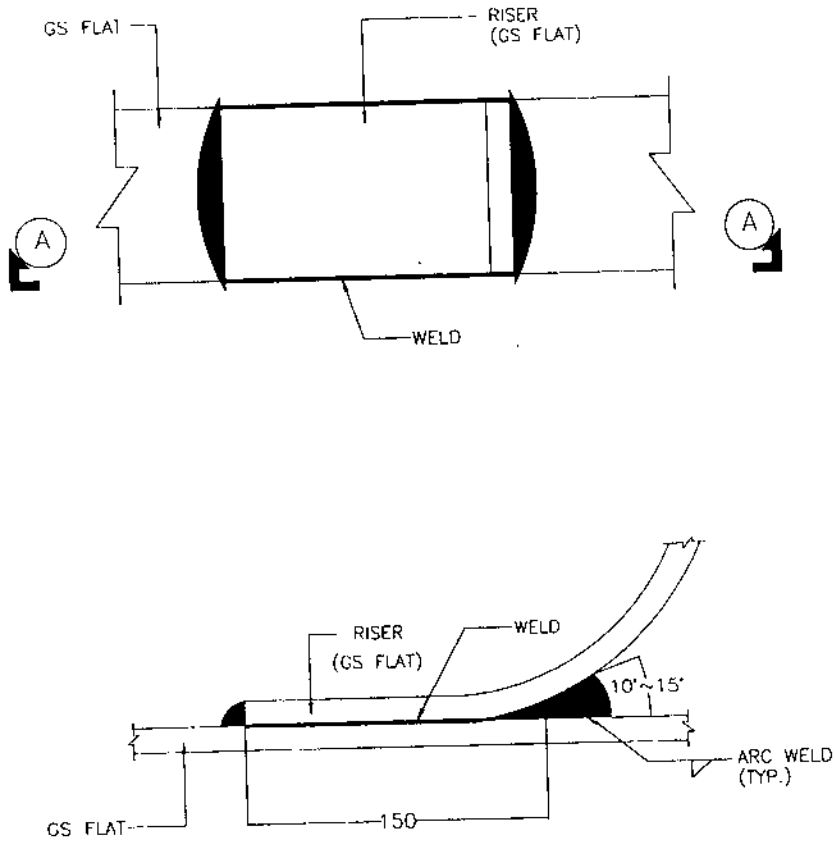
ADDITIONAL INFORMATION W.O.No. _____ STATUS OF DRAWING _____ DISTRIBUTION OF PRINTS _____				DRG. NO. C-13302-S0194-B/L0A-L/1009 DATED 03.01.08 NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL			
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DRG. REVISED AS PER POCL COMMENTS DATED ON 14-09-08				DEPT. _____ CODE _____ TITLE EQUIPMENT EARTHING DETAILS			
BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION				NAME SIGN NAME SIGN DATE ORDER CPK _____ 12.07.06 APPROVED SKS _____			
SCALE _____ CARD CODE _____				DRAWING NO. TB-4-276-509-051 SHEET NO. 03 NEXT SHEET 04			

DRAWING No. TB-4-276-509-051

INVENTORY No.		SIGN. & DATE		REF. DRG. No.		COMPUTER DRG. PATH NAME		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in anyway detrimental to the interest of the company.																																			
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DRAWING No. TB-4-276-500-051

APPENDIX-1 : SYSTEM GROUNDING DETAILS



SECTION-AA

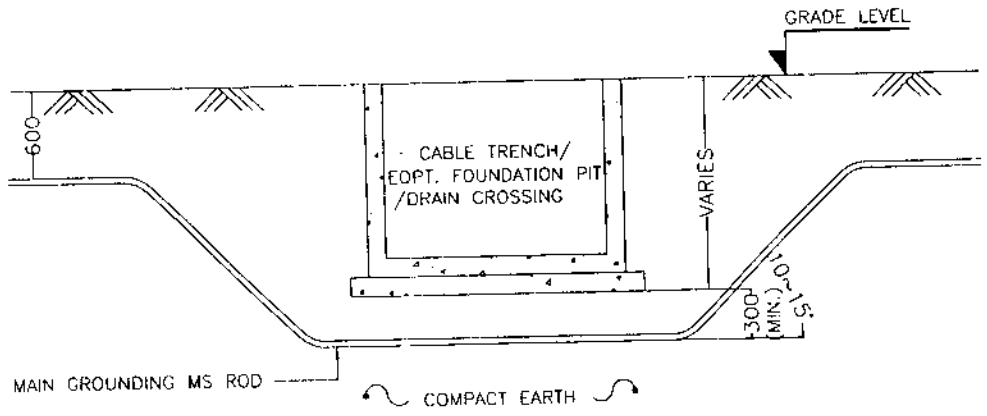
ANGULAR JOINT BETWEEN GS FLATS

DRAWING No. TB-4-276-509-051

ADDITIONAL INFORMATION N.O. No. STATUS OF DRAWING DISTRIBUTION OF PRINTS				LGD NO. C-13302-50124-3/LDA-1/1008 DATED: 03.01.06 POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL NAME OF CUSTOMER/PROJECT BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>NAME</th> <th>SIGN.</th> <th>NAME</th> <th>SIGN.</th> <th>DATE</th> </tr> <tr> <td>DRWN</td> <td>KR</td> <td></td> <td></td> <td>12.07.06</td> </tr> <tr> <td>CHECKED</td> <td>CPK</td> <td></td> <td></td> <td></td> </tr> <tr> <td>APPROVED</td> <td>SKB</td> <td></td> <td></td> <td></td> </tr> </table>		NAME	SIGN.	NAME	SIGN.	DATE	DRWN	KR			12.07.06	CHECKED	CPK				APPROVED	SKB											
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01	17.10.06																																				
ZONE BKG. REVERSED AS PER POCIL COMMENTS DATED 04-09-06				DRAWING NO. TB-4-276-509-051 SHEET No. 05 REV. 01 NEXT SHEET 06																																	

APPENDIX-1 : SYSTEM GROUNDING DETAILS

DRAWING No TB-4-276-509-051



CABLE TRENCH/EQUIPMENT FOUNDATION PIT/ DRAIN CROSSING

ADDITIONAL INFORMATION W.O. No.				LDA NO. C-13302 SBI/94-3/LDA-1/1898 DATED 03.01.06																							
STATUS OF DRAWING DISTRIBUTION OF PRINTS				NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL																							
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TITLE EQUIPMENT EARTHING DETAILS				DRAWING NO. TB-4-276-509-051		REV. 00																					
SHEET No 06				NEXT SHEET 07																							

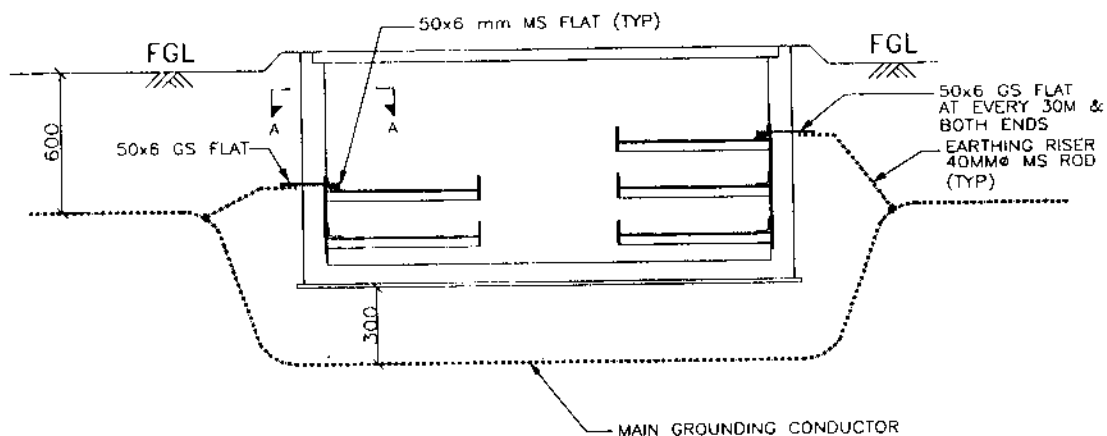
INVENTORY No.

SIGN. & DATE

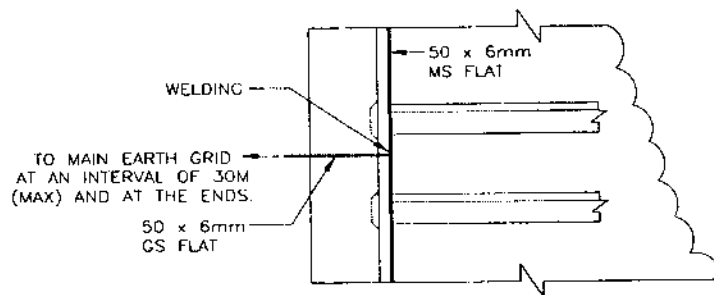
REF. DRG. No.

COMPUTER DRG. PATH NAME

APPENDIX-1 : SYSTEM GROUNDING DETAILS



TYPICAL CROSS SECTION OF CABLE TRENCH



SECTION A - A

NOTES :-

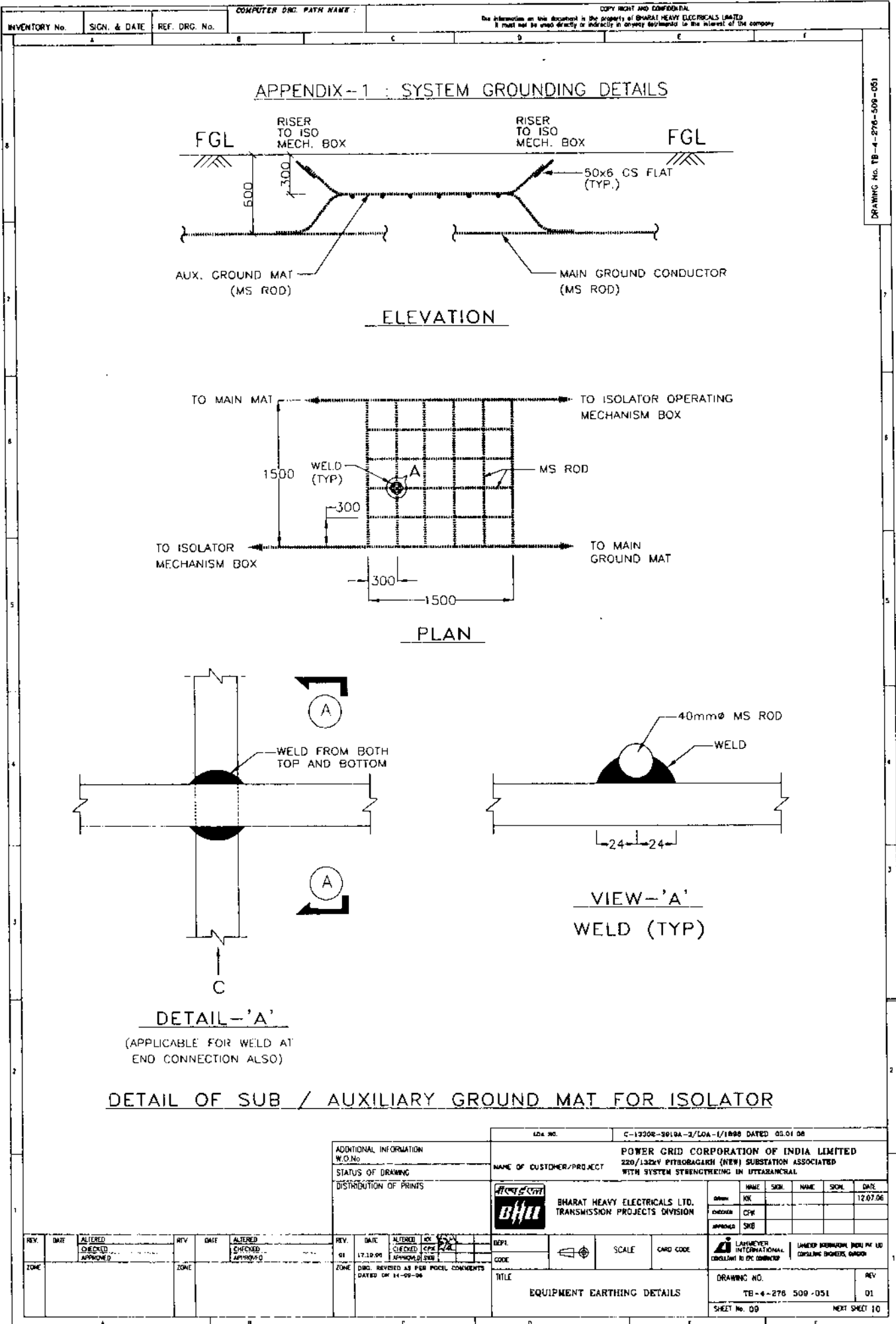
1. MS FLAT SHALL RUN ON TOP TIER ALL ALONG THE CABLE TRENCHES & WELDED TO EACH OF THE RACKS.
2. MS FLAT SHALL BE EARTHED AT 30M INTERVAL AND ALSO AT BOTH ENDS.

REV.		DATE	ALTERED	DATE	ALTERED	DATE	ALTERED	DATE	ALTERED
ZONE			CHECKED		CHECKED		CHECKED		CHECKED
			APPROVED		APPROVED		APPROVED		APPROVED

ADDITIONAL INFORMATION		C-13302-S919A-3/LOA-1/1698 DATED 03.01.06.	
P.O. No.		POWER GRID CORPORATION OF INDIA LIMITED	
STATUS OF DRAWING		220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL	
DISTRIBUTION OF PRINTS		NAME OF CUSTOMER/PROJECT	
		BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
		NAME SIGN. NAME SIGN. DATE	
		CHECKED: EPM 12.07.06	
		APPROVED: SKB	
		LAWMETER INTERNATIONAL CONSULTANT IN EPC CONTRACT	
		UNACKER INDIAN RAILWAY ENGINEERING GROUP	
		DEPT. CODE SCALE CARD CODE	
		TITLE	
		EQUIPMENT EARTHING DETAILS	
		DRAWING NO. TS-4-276-509-051	
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		SHEET No. 07 NEXT SHEET 08	

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<p style="text-align: right; margin-right: 50px;">RAIL</p> <p style="text-align: right; margin-right: 50px;">WELDED</p> <p style="text-align: right; margin-right: 50px;">75 X 12 GS FLAT</p> <p style="text-align: right; margin-right: 50px;">WELDED</p> <p style="text-align: right; margin-right: 50px;">75 X 12 GS FLAT</p> <p style="text-align: right; margin-right: 50px;">ARC. WELD</p> <p style="text-align: right; margin-right: 50px;">75 X 12 GS FLAT</p> <p style="text-align: right; margin-right: 50px;">TO MAIN EARTHING GRID AT AN INTERVAL OF 30m (MAX.) AND AT BOTH ENDS</p>																																																																																				
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DRAWING NO. TB-4-276-509-051



DRAWING No. TB-4-276-509-051

DRAWING No. TB-4-270-500-05!



ADDITIONAL INFORMATION W.O.No.		C-13302-S919A-3/LOA-1/1698 DATED. 03.01.06.																					
STATUS OF DRAWING		NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITMBAGRAH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL																					
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			SHEET No. 10 NEXT SHEET 11																				

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A		B		C		D		E	

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

ELEVATION

LEGEND

----- 40mm ϕ MS ROD

———— 75 x 12 mm GS FLAT

———— 50 x 6 mm GS FLAT

NOTES :-

1. No. OF RISERS FOR CURRENT TRANSFORMER = 2 Nos. / PHASE.
2. No. OF RISERS FOR JUNCTION BOX = 2 Nos.
3. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

GROUNDING DETAIL OF 220/132kv CURRENT TRANSFORMER

ADDITIONAL INFORMATION W.O.No. STATUS OF DRAWING DISTRIBUTION OF PRINTS		LOA NO.		C-13302-2010A-3/LOA-1/1888 DATED: 03.01.06.	
		NAME OF CUSTOMER/PROJECT		POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL	
REV. DATE ALTERED 1. 12.07.06		BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION		DRWN	NAME
				CHKD	CPK
REV. DATE ALTERED 2. 12.07.06		DEPT CODE		APPRVD	SKB
				SCALE CARD CODE	
REV. DATE ALTERED 3. 12.07.06		TITLE EQUIPMENT EARTHING DETAILS		DRAWING NO. TB-4-278-509-051	
				REV. 00	
ZONE		ZONE		SHEET No 12 NEXT SHEET 13	

INVENTORY No.		SIGN. & DATE		REF. DRG. No.		COMPUTER DRG. PATH NAME :		<small>COPY RIGHT AND CONFIDENTIAL</small> <small>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED</small> <small>It must not be used directly or indirectly in any way detrimental to the interest of the company.</small>	
A		B		C		D		E	

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

ELEVATION

LEGEND

----- 40mm ϕ MS ROD

———— 75 x 12 mm GS FLAT

NOTE :-

1. No. OF RISERS = 6 Nos. / WT

2. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

GROUNDING DETAIL OF 220/132kV WAVE TRAP

ADDITIONAL INFORMATION W.O No. _____ STATUS OF DRAWING _____ DISTRIBUTION OF PRINTS _____				LOA NO. C-13302-SB194-3/LOA-1/1995 DATED. 03.01.05		POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL					
				NAME OF CUSTOMER/PROJECT		<div style="display: flex; align-items: center;"> <div> BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION </div> </div>					
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
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DRAWING NO. TB-4-278-509-051 SHEET No. 13						REV. 00 NEXT SHEET 14					

INVENTORY No.		SIGN. & DATE		REF. DRC No.		COMPUTER DRC PATH NAME :		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in anyway detrimental to the interest of the company.			
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APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

LEGEND

----- 40mm ϕ MS ROD

———— 75 x 12 mm GS FLAT

NOTES :-

- No. OF RISERS = 2 Nos. / PHASE.
- CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL

GROUNDING DETAIL OF 220/132kv BUS POST INSULATOR

ADDITIONAL INFORMATION W.O. No.				LOA NO. C-13302-SB10A-3/LOA-1/1988 DATED 03.01.08			
STATUS OF DRAWING				NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/132kv PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL			
DISTRIBUTION OF PRINTS				<div style="display: flex; align-items: center;"> <div> BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION </div> </div>			
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TITLE				CARD CODE			
EQUIPMENT EARTHING DETAILS				DRAWING NO. TB-4-276-509-051			
SHEET No. 14				NEXT SHEET 15			

INVENTORY No.		SIGN. & DATE		REF. DRG. No.		COMPUTER DRG. PATH NAME		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company.			
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APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

ELEVATION

LEGEND :-

----- 40mm ϕ MS ROD

———— 75 x 12 mm GS FLAT

———— 50 x 6 mm GS FLAT

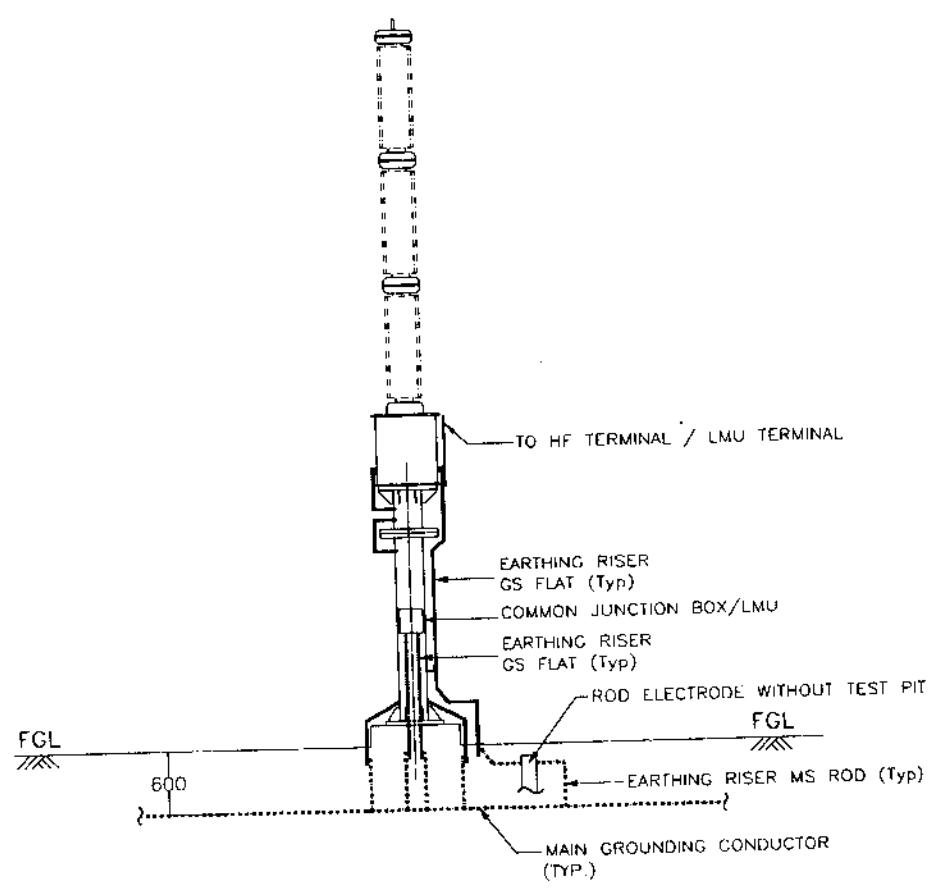
NOTES :-

- No. OF RISERS FOR CIRCUIT BREAKER = 2 Nos. / PHASE.
- No. OF RISERS FOR MACH. BOX = 2 Nos.
- CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

GROUNDING DETAIL OF 220/132kv CIRCUIT BREAKER

ADDITIONAL INFORMATION W.O.No. STATUS OF DRAWING DISTRIBUTION OF PRINTS				DDA NO. C-13302-S919A-3/LOA-U/1696 DATED. 03.01.06. POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL																											
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SHEET No. 15				NEXT SHEET 16				REV. 01																							

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS



ELEVATION

LEGEND

- 40mm ϕ MS ROD
- 75 x 12 mm GS FLAT
- 50 x 6 mm GS FLAT

NOTES :-

- No. OF RISERS FOR CVT = 3 Nos. (1 FOR ELECTRODE + 2 FOR STRUCT. / PHASE.
- No. OF RISERS FOR JUNCTION BOX = 2Nos.
- No. OF ROD ELECTRODE REQUIRED = 1 No. / PHASE.
- CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

GROUNDING DETAIL OF 220/132kV CAP. VOLTAGE TRANSFORMER

ADDITIONAL INFORMATION W.O.No. STATUS OF DRAWING DISTRIBUTION OF PRINTS			SAA NO. C-13302-59.0A-3/LQA-1/1806 DATED. 05.01.06. NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITBORAGH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL		
REV. DATE ALTERED 01 17.10.06 CHECKED 02 14.09.06 APPROVED			DEPT. CODE SCALE CARD CODE TITLE EQUIPMENT EARTHING DETAILS		
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REV. DATE ALTERED 01 17.10.06 CHECKED 02 14.09.06 APPROVED			LAMMEYER INTERNATIONAL CONSULTING TO EPC CONTRACTOR DRAWING NO. TB-4-276-509-051 SHEET No. 16 NEXT SHEET 17		

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DRAWING NO. TB-4-276-508-051				REV. 01				SHEET No. 17 NEXT SHEET 18																																																													

INVENTORY No.		SIGN. & DATE		REF. DRG. No.		COMPUTER DRG. PATH NAME :		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company			
A		B		C		D		E		F	

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

ELEVATION

LEGEND

----- 40mm ϕ MS ROD

———— 50 x 6 mm GS FLAT

NOTE :-

1. No. OF RISERS = 2 Nos.

GROUNDING DETAIL OF BAY MARSHALLING KIOSK/ CB OPERATING BOX MOUNTED ON GROUND

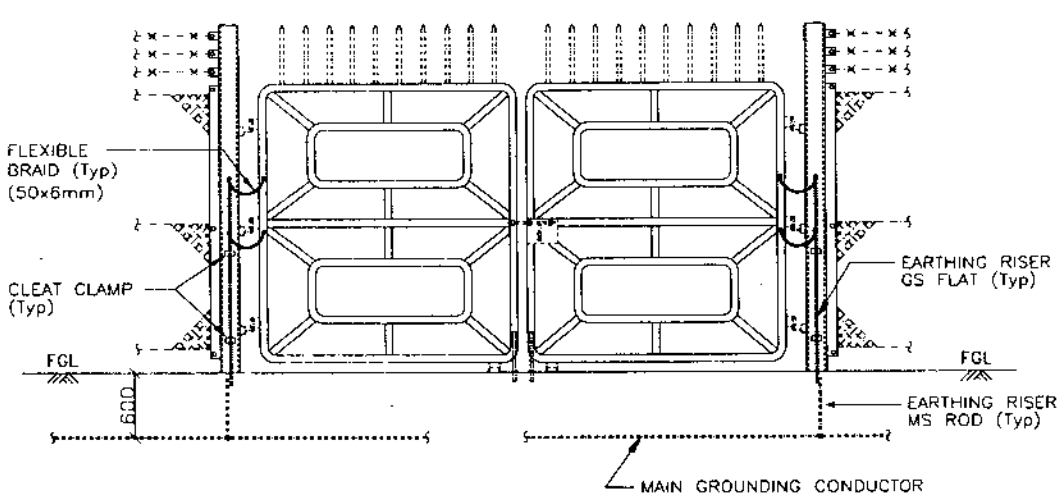
ADDITIONAL INFORMATION W.D. No. STATUS OF DRAWING DISTRIBUTION OF PRINTS		LODA NO. C-13302-S919A-3/LOA-1/1999 DATED: 03.01.06. POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL						
		NAME OF CUSTOMER/PROJECT <div style="display: flex; align-items: center;"> <div> BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION </div> </div>						
REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
ZONE		CHECKED APPROVED	ZONE		CHECKED APPROVED	ZONE		CHECKED APPROVED

DEPT.	CODE	SCALE	CARD CODE	LAHMEYER INTERNATIONAL <small>CONSULTANT IN EPC CONTRACTS</small>	NAME SIGN. NAME SIGN. DATE DRW. KK 12.07.06 CHECKED CPK APPROVED SKB
TITLE EQUIPMENT EARTHING DETAILS				DRAWING NO. TB-4-278-509-051	REV. 00
SHEET No. 1B				NEXT SHEET 19	

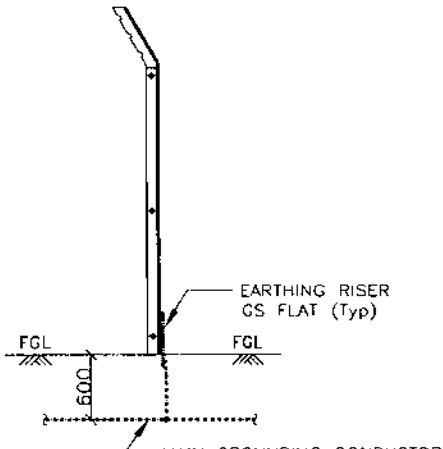
DRAWING No. TB-4-278-509-051

INVENTORY No.		SIGN. & DATE		REF. ORG. No.		COMPUTER DRG. PATH NAME		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company			
A		B		C		D		E		F	

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS



MAIN GATE



FENCE POST
(ALTERNATE FENCE POST)

LEGEND


----- 40mm ϕ MS ROD

———— 50 x 6 mm GS FLAT

NOTES :-

	FENCE POST	MAIN GATE
1. No. OF RISERS REQUIRED	1	2
2. No. OF FLEXIBLE BRAID	-	4
3. ALL GATES & EVERY ALTERNATE FENCE POST SHALL BE CONNECTED TO GROUNDING GRID.		

GROUNDING DETAIL OF GATE

ADDITIONAL INFORMATION W.O No STATUS OF DRAWING DISTRIBUTION OF PRINTS				L.O.A. NO. C-13302-SPIRA-3/LOA-1/1999 DATED 03.01.06. NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 226/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL																							
 BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION				<table border="1" style="width:100%; border-collapse: collapse; font-size: x-small;"> <tr> <td>NAME</td> <td>SIGN.</td> <td>NAME</td> <td>SIGN.</td> <td>DATE</td> </tr> <tr> <td>DESIGN</td> <td>SK</td> <td></td> <td></td> <td>12.07.06</td> </tr> <tr> <td>CHECKED</td> <td>CPK</td> <td></td> <td></td> <td></td> </tr> <tr> <td>APPROVED</td> <td>SKS</td> <td></td> <td></td> <td></td> </tr> </table>				NAME	SIGN.	NAME	SIGN.	DATE	DESIGN	SK			12.07.06	CHECKED	CPK				APPROVED	SKS			
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DEPT. CODE 				SCALE CARD CODE 																							
TITLE EQUIPMENT EARTHING DETAILS				DRAWING NO TB-4-276-509-051 SHEET No. 19 NEXT SHEET 20																							

DRAWING No. TB-4-276-509-051

INVENTORY No.	SIGN. & DATE	REF. DRC. No.	COMPUTER DRC. PATH NAME	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company	
A	B	C	D	E	F

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

LEGEND

----- 40mm MS ROD

———— 75 x 12 mm GS FLAT

NOTES :-

- No. OF RISERS FOR RADIATOR BANK = 2 Nos.
- No. OF RISERS FOR MARSHALLING BOX = 2 Nos
- No. OF RISERS FOR MAIN TANK = 2 Nos

GROUNDING DETAIL OF SHUNT REACTOR

ADDITIONAL INFORMATION W.O.No. STATUS OF DRAWING DISTRIBUTION OF PRINTS		LQA NO C-13302-S019A-3/LQA-1/1898 DATED: 03.01.06 NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 230/132kV PITHORAGARH (NEW) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL	
REV. DATE ALTERED BY 01 17.10.06 CHECKED CPM SKB DRC. REVIEWED AS PER POCL COMMENTS DATED ON 14-09-06		BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION	
REV. DATE ALTERED BY 01 17.10.06 CHECKED CPM SKB DRC. REVIEWED AS PER POCL COMMENTS DATED ON 14-09-06		DEPT. CODE SCALE CARD CODE LAHMEYER INTERNATIONAL CONSULTANT TO EPC CONTRACTOR UTTARANCHAL ENGINEERING DIVISION CHANDIGARH ENGINEERS, CHANDIGARH	
REV. DATE ALTERED BY 01 17.10.06 CHECKED CPM SKB DRC. REVIEWED AS PER POCL COMMENTS DATED ON 14-09-06		DRAWING NO. TB-4-276-509-051 SHEET No. 21	

DRAWING No. TB-4-276-509-051

INVENTORY No.		SIGN. & DATE		REF. DRC. No.		COMPUTER DRC. PATH NAME		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in anyway detrimental to the interest of the company.			
A		B		C		D		E		F	

EQUIPMENT GROUNDING DETAILS

DRAWING No. TB-4-278-509-051

NOTES :-

1. CLEAT CLAMP SHALL BE PROVIDED AT 1000mm INTERVAL.

LEGEND

	40mm ϕ MS ROD
	75 x 12 mm GS FLAT
	50 x 6 mm GS FLAT

1. NO. OF RISERS/ PH :-
ISOLATOR WITHOUT E/S : 4 Nos.

2. NO. OF RISERS EACH MACH. BOX : 2 Nos.

GROUNDING DETAIL OF ISOLATOR WITHOUT EARTH SWITCH

ADDITIONAL INFORMATION W.O.No.				LGA NO. C-12345-2018A-2/10A-2/1000 DATED: 05.01.00			
STATUS OF DRAWING DISTRIBUTION OF PRINTS				NAME OF CUSTOMER/PROJECT POWER GRID CORPORATION OF INDIA LIMITED 220/132KV HYDROELECTRIC (HEP) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL			
				BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION			
REV. DATE ALTERED CHECKED APPROVED		REV. DATE ALTERED CHECKED APPROVED		REV. DATE ALTERED CHECKED APPROVED		REV. DATE ALTERED CHECKED APPROVED	
ZONE		ZONE		ZONE		ZONE	
01 11.10.08		02 11.10.08		03 11.10.08		04 11.10.08	
BNC REVISED AS PER POCL COMMENTS DATED ON 14-08-08				DEPT. CODE			
TITLE EQUIPMENT EARTHING DETAILS				SCALE CARD CODE			
DRAWING NO. TB-4-278-509-051				REV. NO. 01			
SHEET No. 23				NEXT SHEET 24			

INVENTORY No.		SIGN. & DATE		REF. DRG. No.		COMPUTER DRG. PATH NAME		COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company.			
A		B		C		D		E		F	

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

ELEVATION

LEGEND

----- 40mm ϕ MS ROD

———— 75 x 12 mm GS FLAT

NOTES :-

1. No. OF RISERS = 2 Nos.

GROUNDING DETAIL OF TOWER WITHOUT PEAK

ADDITIONAL INFORMATION W.O.No. _____ STATUS OF DRAWING _____ DISTRIBUTION OF PRINTS _____						LGA NO. C-13302-S019A-3/LGA-1/1800 DATED: 03.01.06. POWER GRID CORPORATION OF INDIA LIMITED 220/132KV PITHORAGARH (NEN) SUBSTATION ASSOCIATED WITH SYSTEM STRENGTHENING IN UTTARANCHAL.																									
DEPT. _____ CODE _____ TITLE EQUIPMENT EARTHING DETAILS						BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>NAME</th> <th>SIGN.</th> <th>NAME</th> <th>SIGN.</th> <th>DATE</th> </tr> <tr> <td>CHK</td> <td></td> <td></td> <td></td> <td>12.07.06</td> </tr> <tr> <td>CHECKED</td> <td>CPK</td> <td></td> <td></td> <td></td> </tr> <tr> <td>APPROVED</td> <td>SAS</td> <td></td> <td></td> <td></td> </tr> </table>						NAME	SIGN.	NAME	SIGN.	DATE	CHK				12.07.06	CHECKED	CPK				APPROVED	SAS			
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A		B		C		D		E		F																					

APPENDIX-2 : EQUIPMENT GROUNDING DETAILS

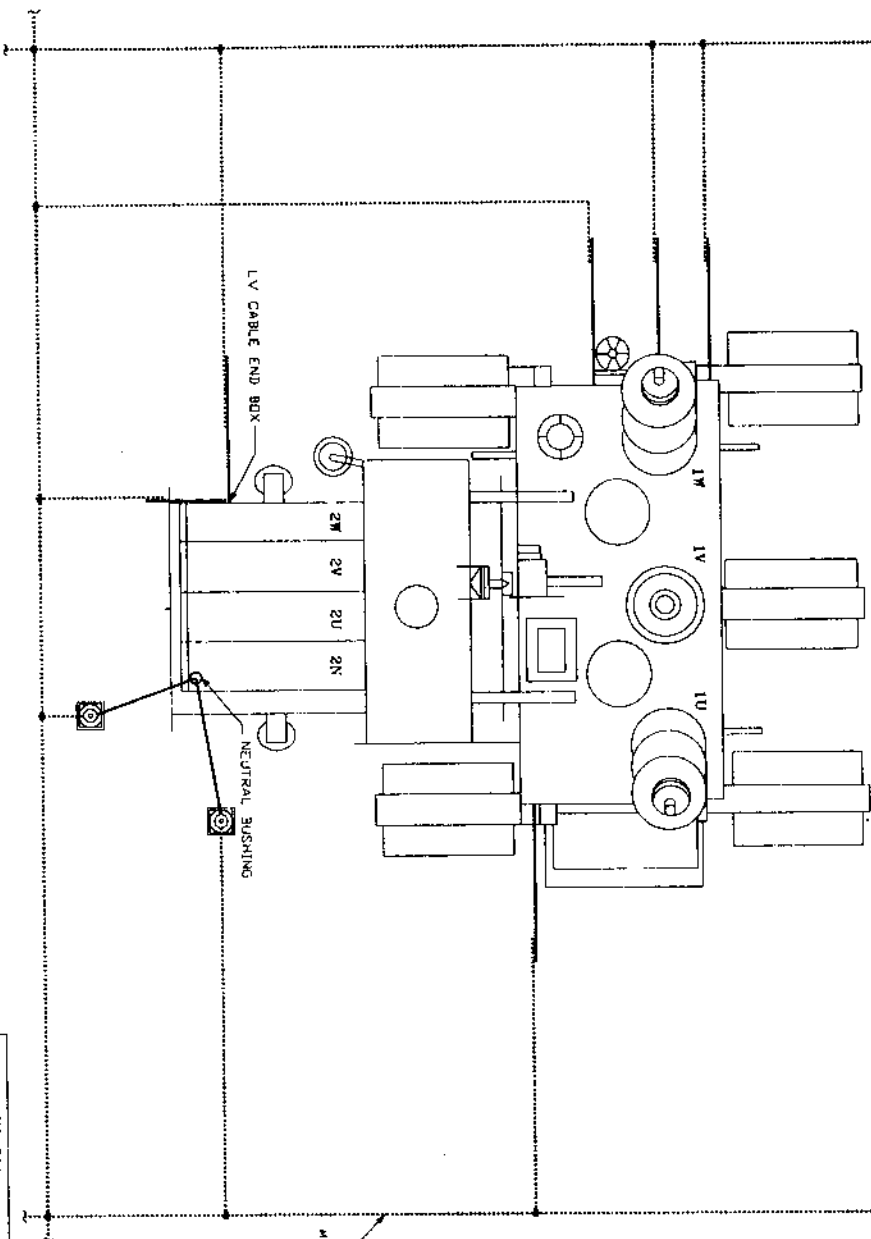
NOTES :-

1. NO. OF WIRES :-
 - 2 NOS. MAIN TANK
 - 2 NOS. MARSHALLING KIOSK
 - 2 NOS. LV CABLE END BOX
 - 2 NOS. NEUTRAL EARTH ELECTRODE
2. NO. OF PIPE ELECTRODE REQUIRED = 2 NOS.

LEGEND

- 40mm MS ROD
- 50 x 6 mm GS FLAT
- 75 x 12 mm GS FLAT

GROUNDING DETAIL OF LT TRANSFORMER



ADDITIONAL INFORMATION
W.O. NO.
STATUS OF DRAWING
DISTRIBUTION OF PRINTS



POWER GRID CORPORATION OF INDIA LIMITED
220/132KV PITHORAGARH (NEW) SUBSTATION ASSOCIATED
WITH SYSTEM STRENGTHENING IN UTTARANCHAL
TRANSMISSION PROJECTS DIVISION

4
LAKSHMI
INTERNATIONAL
DRAWING & REVISION
SHEET NO. 28

DATE
12/07/06

EQUIPMENT EARTHING DETAILS

DRAWING NO.
TB-4-276-609-031

REV.
00

SHEET No. 28

OF 27

REV.	DATE	BY	DATE	BY	DATE	BY
1	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06
2	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06

REV.	DATE	BY	DATE	BY	DATE	BY
1	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06
2	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06

REV.	DATE	BY	DATE	BY	DATE	BY
1	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06
2	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06

REV.	DATE	BY	DATE	BY	DATE	BY
1	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06
2	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06	12/07/06

