



DEVELOPMENT OF 50MW SOLAR
PHOTOVOLTAIC PLANT AT MANDSUAR (M.P)



TITLE OF THE DRAWING / DOCUMENT	FQP FOR POWER TRANSFORMER
BHEL DRG NO	4-38142-00414
NTPC DRG No	5714-004-P4-QVE-Q-152

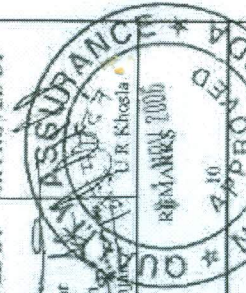
1	27.07.2016	FOR APPROVAL			KKP	<i>AK</i>	AN	<i>AK</i>
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PROJECT: DEVELOPMENT OF 50MW SOLAR PHOTOVOLTAIC PLANT AT MANDSUAR (M.P)								REV 1
							27.07.2016	Page 1 of 6

SYSTEM EQUIPMENT: TRANSFORMERS UPTO 100 MVA, 132 KV CLASS		STANDARD FIELD QUALITY PLAN					Q.P. No: 0000-999-QOE-J-001	REVIEWED BY	APPROVED BY
SUB-SYSTEM:		CONFORMANCE TO: NTPC SPECIFICATION.					REV No: 0	H. Shekhar	
DATE: 01.11.2006							DATE: 01.11.2006	S.D. Singh	
PAGE: 1 of 5							VALID UPTO: 31.10.2009	O.P. Niranjan	
S/N	ACTIVITY AND OPERATION	CLASS# OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		
1	2	4	5	6	7	8	9	D*	
1.00	MATERIAL RECEIPT AND STORAGE.								
1.01	Inspection of item on receipt at site	B	Visual	100%	Packing List	Packing List	Logbook		
1.02	Condition of packages	B	Visual	-do-	Packing List	Good Condition	-do-	Material Damage Report in case of damage.	
1.03	Check for short supply, if any	C	Verify	-do-	Packing list	No item short	-do-	Report to Manufacturing Unit for short supply.	
1.04	N2 pressure in transformer on receipt at site, if transformer is sent with N2 - N2 pressure gauge	B	Visual	At the time of receipt & every fortnight	Mfr's Erection & Maint. Manual	Positive pressure/ Mfr Manual	-do-	In case pressure is zero, inform manufacturer for further necessary action.	
1.05	Check oil level in the transformer, if transformer is sent with oil - Oil level gauge	B	Visual	At the time of receipt & every fortnight	-do-	Upto the mark	-do-	In case oil level is low & voiding is exposed, call manufacturer representative.	
1.06	Check reading of shock recorder on receipt at site - Impact Recorder	B	Visual	At the time of receipt	-do-	Mfr's Erection & Maint. Manual	-do-	In case data recorded is above normal, inform manufacturer for further necessary action.	
1.07	Safe unloading of material at site	C	Visual	Each Package		No damage		Material Damage Report in case of damage	
1.08	Check safe storage & position for bushings	C	Visual	During storage	Mfr's Erection & Maint. Manual	Mfr's Erection & Maint. Manual	-do-		
1.09	Check oil level in condenser bushings - Oil level	B	Visual	At the time of receipt & every fortnight	-do-	Upto the mark	-do-	Fill in case the same is low	
1.10	Check blanking of radiators (if sent separately)	B	Visual	100%		Intactness of blanking plates	-do-	In case of radiators blanks are missing, finishing of the same to be done & cover with new blanking plate.	
1.11	Ensure covered storage for identified items (fans, pumps, WTI, OT, breather, etc)	C	Visual	-do-	Mfr's Erection & Maint. Manual	No physical damage	-do-	Store Indoor	
1.12	Safe storage of other materials (oil, conservator, radiator, etc)	C	Visual	-do-	-do-	No physical damage	-do-	Store in outdoor covered with tarpulin.	

LEGEND: * RECORDS IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
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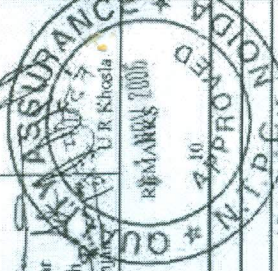
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Engg. Div./QA&I



KANTHI KIRAN P
 कति किरण पी
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 Manager / PE & SI

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1	3	4	F	6	7	8	9	D*	
1.00	MATERIAL RECEIPT AND STORAGE.								
1.01	Inspection of item on receipt at site	B	Visual	100%	Packing List	Packing List	Logbook		
1.02	Condition of packages	B	Visual	-do-	Packing List	Good Condition	-do-		Material Damage Report in case of damage
1.03	Check for short supply, if any	C	Verify	-do-	Packing list	No item short	-do-		Report to Manufacturing Unit for short supply.
1.04	N2 pressure in transformer on receipt at site, if transformer is sent with N2 - N2 pressure gauge	B	Visual	At the time of receipt & every fortnight	Mfr's Erection & Maint. Manual	Positive pressure/ Mfr Manual	-do-		In case pressure is zero, inform manufacturer for further necessary action.
1.05	Check oil level in the transformer, if transformer is sent with oil - Oil level gauge	B	Visual	At the time of receipt & every fortnight	-do-	Upto the mark	-do-		In case oil level is low & winding is exposed, call manufacturer representative.
1.06	Check reading of shock recorder on receipt at site - Impact Recorder	B	Visual	At the time of receipt	-do-	Mfr's Erection & Maint. Manual	-do-		In case data recorded is above normal, inform manufacturer for further necessary action.
1.07	Safe unloading of material at site	C	Visual	Each Package		No damage			Material Damage Report in case of damage
1.08	Check safe storage & position for bushings	C	Visual	During storage	Mfr's Erection & Maint. Manual	Mfr's Erection & Maint. Manual	-do-		
1.09	Check oil level in condenser bushings - Oil level	B	Visual	At the time of receipt & every fortnight	-do-	Upto the mark	-do-		Fill in case the same is low
1.10	Check blanking of radiators (if sent separately)	B	Visual	100%		Intactness of blanking plates	-do-		In case of radiators blanks are missing, finishing of the same to be done & cover with new blanking plate.
1.11	Ensure covered storage for identified items (fans, pumps, WTI, OTI, breather, etc)	C	Visual	-do-	Mfr's Erection & Maint. Manual	No physical damage	-do-		Store Indoor
1.12	Safe storage of other materials (oil, conservator, radiator, etc)	C	Visual	-do-	-do-	No physical damage	-do-		Store in outdoor covered with tarpulin.



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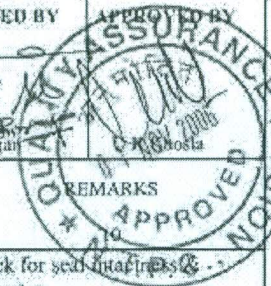
Realtime

कति किरण पी

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प्रबंधक / पी डी व एल डी

Material PE & SF

		SYSTEM EQUIPMENT: TRANSFORMERS UPTO 100 MVA, 132 KV CLASS	STANDARD FIELD QUALITY PLAN				QP No: 0000-999-QOE-T-001 REV No: 0 DATE: 01.11.2006 PAGE: 2 of 5 VALID UPTO: 31.10.2009	REVIEWED BY H Shekhar S D Singh O P Niranjan	APPROVED BY  APPROVED NOIDA
SUB-SYSTEM:		CONFORMANCE TO: NTPC SPECIFICATION				ACCEPTANCE NORMS	FORMAT OF RECORD	REMARKS	
Sl No	ACTIVITY AND OPERATION	CHARACTERISTICS	CLASS# OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	8	9	D*
1	2	3	4	5	6	7	8	9	D*
1.13		Ensure horizontal storage & protection of oil drums from water	C	Visual	At the time of receipt & monthly	-do-	No leakage	-do-	Check for seal integrity & tampering
1.14		Marshalling box to be stored vertically in their respective cases.	C	Visual	At the time of storage	-do-	No physical damage		In case supplied loose.
2.00 PRE-ERECTION									
2.01		Check availability of relevant drgs., T&P, protocols etc.	C	Verify	Once before erection	Mfr's Erection & Maint. Manual	Available as per list	Logbook	
2.02		Check availability of proper tools and tackles including jacking pad for carrying out erection	C	Visual	-do-	-do-	-do-		
2.03		Where rollers are applicable, check that rollers are greased properly before assembly of transformer	C	Visual	100%	-do-	Free movement of rollers		
2.04		Check for pipe cleaning before erection	B	Visual	100%	-do-	No dust / Moisture ingress	-do-	Oil flushing to be done, if required.
2.05		Check insulation resistance between core to earth -500 V meggar	B	Measure	Once before erection	-do-	IR>1 Mega Ohm		If core earthing is done outside the transformer tank.
2.06		Check general condition of core-coil assly. Including wedging of core through inspection covers	A	Visual	As Reqd.	-do-	No damage/distortion	-do-	Material Damage Report in case of damage / misalignment
2.07		Check oil parameters (as per specification) before & after filling in transformer.	B	Measure	As Reqd.	NTPC Specification	NTPC Specification	-do-	
2.08		Oil filling under vacuum (for N2 filled jobs)	B	Measure	As Reqd.	Mfr's Erection & Maint. Manual		-do-	
2.09		Oil filtration using filter machine	B	Testing	Before erection	NTPC Specification for oil parameters	NTPC Specification		Use new filters in filter machine and ensure M/c is moisture free.
2.10		Check IR value between core & earth after oil filling -500v meggar	B	Measure	-do-	-do-	IR>1 Mega Ohm	-do-	✓ If core earthing is done outside the transformer tank.

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 Engg. Div./QA&I

ACTIVITY AND OPERATION		SYSTEM EQUIPMENT:		STANDARD FIELD QUALITY PLAN					REVIEWED BY	APPROVED BY
Sl No		CHARACTERISTICS	CLASS# OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		
1	2	3	4	5	6	7	8	9	10	
2.11		Check all bushings are free from damage and oil level upto the mark - Oil level gauge	C	Visual	-do-	-do-	Upto the mark	-do-		
2.12		Check all condenser bushings for IR value & capacitance / tan delta test at 10 kV - (2.5 kV megger)	A	Measure	100%	-do-	IR > 5000 M ohms tan delta < 0.007	Logbook	✓	
2.13		Verify tan delta tap is set back to normal earthed position and record the same	A	Physical	100%	-do-		-do-		
2.14		Ensure new gaskets during final erection of turrets, bushings and piping	B	Physical	Once before erection	-do-				In case of condenser bushing
3.00	ERECTION									
3.01		Foundation readiness as per layout drawing	B	Measure	100%	Drawing	As per drawing	Log book		
3.02		Proper erection & alignment of all accessories	B	Visual	Each Unit	Mfr's Erection & Maint. Manual	As per drawing			
3.03		Operational checks on fans, oil pumps prior to installation	C	Testing	Each Unit	Mfr's Erection & Maint. Manual	To operate smoothly	Log book		
3.04		Manually operate OLTC / OCTC to raise & lower all taps, before electrical operation	C	Manual	-do-	-do-	To operate smoothly	-do-		
3.05		Direction of rotation of fans & pumps	C	Visual	-do-	-do-	Rotation as per mark	-do-		
3.06		Lubrication of fans & pumps	C	Visual	Each Unit	-do-	No abnormal noise	-do-		As applicable
3.07		Check tightness of core earthing after IR measurement between core to earth	A	Physical	-do-	-do-	No looseness	-do-		If core earthing is done outside the transformer tank.
3.08		Check earthing connections between transformer tank & cover, radiator bank, tank & OLTC head, main tank	B	Physical	-do-	-do-	To be tight	-do-		
3.09		Check continuity & IR value of internal wiring in marshalling box - 500 V megger	B	Test	-do-	-do-	IR > 1 Mega Ohm	-do-		
3.10		Furling of cables at both ends for identification	C	Visual	-do-	-do-	As per drg	-do-		
3.11		Ratio of CT (for WTT)	B	Visual	-do-	Test report	Test report	-do-		

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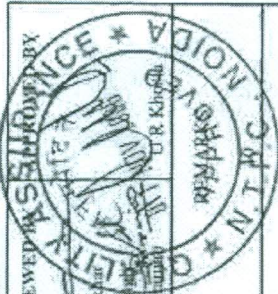
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Manager / PE & SD

वी.एच.ई.एल. डेवगान्धार RHEI HYD-32

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SUB-SYSTEM: CHARACTERISTICS		CLASS# OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	REVISED BY	
3.12	Oil filling under vacuum (for N2 filled jobs)	B	Measure	As Reqd.	Mfr's Erection & Maint. Manual		9	H. Shukla	
3.13	Proper cleaning of transformer after erection & oil filtration	C	Visual	-do-	Mfr's Erection & Maint. Manual	No sweating of oil	-do-	S. D. Singh	
3.14	Neutral grounding arrangement	B	Visual	100%	Drawing		-do-	O. P. Nigam	
3.15	Connection check for neutral formation & core, if applicable	B	Visual	100%	Mfr's Erection & Maint. Manual		-do-		
3.16	Insulation resistance measurement between following by 500V/1KV megger a) high voltage winding to earth b) low voltage winding to earth c) high voltage to low voltage windings	A	Test	100%	Mfr's Erection & Maint. Manual	Minimum IR value is (KV+1) M Ohms	Log book		
3.17	Polarity of CT's	B	Measure	100%	-do-		-do-		
3.18	Check readiness of alarm / trip of safety & protection equipment	C	Visual	-do-	-do-		-do-		
3.19	Check continuity between HV winding & neutral, while OLTC in operation	A	Visual	-do-	-do-	Continuity should not break, while OLTC in operation	-do-		
3.20	Check oil level in transformer - Oil level gauge	B	Visual	Each unit	-do-	Upto the mark	-do-	Fill processed oil in case oil is below the mark	
3.21	Test on oil samples taken from main tank top & bottom after 24 hours of oil settling for BDV, moisture content, etc.	A	Testing	Each Unit	Mfr's Erection & Maint. Manual / NTPC Specification	Mfr's Erection & Maint. Manual / NTPC Specification	-do-		
3.22	Oil leakage test at normal head plus 35 kN/sq m measured at the base of tank for 24 hrs - Pressure Gauge	B	Visual	Tank Assy.	-do-	No leakage	-do-	As per NTPC Specification	
3.23	Check bushing connections at line ends	B	Visual	Each Unit	-do-	-do-	-do-		
3.24	Check IR values between bushing terminal & flange of bushings-1/2.5 kV megger	B	Measure	Once	-do-	IR > (KV+1) M ohms	-do-		



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Engg. Div./QA&I
 KANTHI KIRAN P
 Manager / PE & SD



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132 KV CLASS

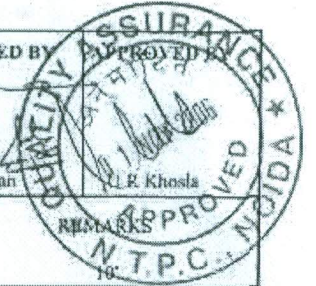
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STANDARD FIELD QUALITY PLAN

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REVIEWED BY: *[Signature]*
APPROVED BY: *[Signature]*
H Shekhar
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REMARKS



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1	2	3	4	5	6	7	8	9	D*
3.25		Functioning of oil pump from manual, local and remote controls.	B	Physical	100%	Schematic Drawing		-do-	
3.26		Sequential operation of cooling system on auto operation.	B	Physical	100%	Schematic Drawing		Log book	
3.27		Touch up painting to be carried out, wherever necessary.	C	Physical	Once before erection	-do-			
3.28		Check for tightness of joints and connections.	B	Physical	100%	Mfr's Erection & Maint. Manual	Mfr's Erection & Maint. Manual	-do-	
3.29		Check the readiness of fire alarm system and fire protection system.	B	Test	100%			-do-	
3.30		Record of OLTC - multimeter/stopwatch a) motor current b) operating time c) control voltage	B	Measure	100%	Mfr's Erection & Maint. Manual	Instruction Manual	-do-	
3.31		Check the completeness of erection.	A	Visual	100%	Mfr's Erection & Maint. Manual / Apprvd Drg	Mfr's Erection & Maint. Manual / Apprvd Drg	-do-	

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[Signature]
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