



Environmental Monitoring Report

Project Number: 45224-003
July 2017
Part A: Main Report (Pages 1- 21) and Annexures

Period: October 2016 -March 2017

IND: Rajasthan Renewable Energy Transmission Investment Program - Tranche 1

Subprojects: 400 KV D/C Ramgarh – Akal Transmission Line (ICB-5)

Submitted by
Rajasthan Rajya Vidyut Prasaran Nigam Limited, Jaipur

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ICB 6 Environment Monitoring Report- 400 kV DC Bhadla to Jodhpur - 199.221 kms Oct- 2016 to March -2017.docx



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ICB -5 Environmental Monitoring Report

Environmental Safeguards Document

Environment Monitoring Report

400 KV D/C Ramgarh – Akal Transmission Line (ICB-5)

Project Number: 45224 (IND)

Period – October 2016 – March 2017.

Reporting – 1 April - 2017.

India: Rajasthan Renewable Energy Transmission Investment Program

Prepared for Rajasthan Rajya Vidyut Prasaran Nigam Limited (RRVPL), Government of Rajasthan.

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Environment Monitoring Report

Compliance Status & Monitoring Report of Environment Safeguards

Period:

Submitted by: Rajasthan RajyaVidyutPrasaran Nigam Limited, Rajasthan

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Abbreviations

AP's	Affected Persons
C/o	Construction of
Deptt.	Department
Distt.	District
FCA	Forest Conservation Act
GIS	Gas Insulated Switchgear
Gol	Govt of India
GRC	Grievance Redressal Committee
Ha.	Hectare (10,000 sq. m. land)
IE Rule	Indian Electricity Rule
MOEFCC	Ministry of Forest, Environment and Climate Change
MPAF	Main Project Affected Family

Project Information

A.1. General

I	Name of Project	Rajasthan Renewable Energy Transmission Investment Program
II	Loan Number	3052
II	Name of Monitoring/Reporting Agency and address	RRVPNL/VidutBhawan, Janpath , Jyoti Nagar Jaipur – 302005 Tata Projects Limited , Mithon Towers -1 , Prenderghast Road , Secunderabad - 500003
III	Monitoring Period (Season/month)	October -2016 to March -2017
IV	Report No.	4
V	Report for the period	October -2016 to March -2017
VI	Date of reporting	April -2017

A.2. Subproject details

	List of sub-projects	Name of the Project site
I	400 KV D/C Ramgarh to Akal Transmission Line. (ICB 5)	400kV D/C TWIN ACSR Moose Transmission Line from Ramgarh to Akal under specification No. RRVPN / ADB / Tranche 1/ICB-5 (Supply & Service contract) to TATA Projects Limited

A.3. Overall Project Progress, Agreed Milestones and Implementation Schedules

S No	Name of sub-project	Progress as on date of Report	Implementation Schedule
1	Survey	99.151 KM	100 % Completed
2	Foundation	278 Nos	FDN -100 % completed.
3	Erection	277 Nos	ERC - 99 % completed.
4	Stringing	98.52 KM	STRG -99 %Completed. (Balance work of Stringing - 0.631 KM Completed by July-17)

B.1: Compliance Status with National/State/Local Statutory Environmental Requirements and international standards

S No	Legal Requirements/Acts/Rules/Guidelines	Applicable Attributes	RRVPNL's Compliance Status
1	The Water (Prevention and Control of Pollution) Act, 1974 as amended;	Water Pollution	Preventive measures are being adopted to avoid such pollution. Testing has been conducted and testing report of same has been submitted in January '2017 (Report attached at Annexure- 4).
2	The Air (Prevention and Control of Pollution) Act, 1981	Air Pollution	Preventive measures are being adopted to avoid such pollution. Testing has been conducted and testing report of same has been submitted in January '2017 (Report attached at Annexure- 4).
3	The Environment (Protection) Act, 1986	Construction Practices	Testing has been conducted and testing report of same has been submitted in January '2017 (Report attached at Annexure- 4).
4	The Environment Impact Assessment Notification, 1994 as amended	EMP monitoring	Testing has been conducted and testing report of same has been submitted in January '2017
5	The Hazardous Wastes (Management and Handling) Rules, 1989 as amended	Transformer Oil	Not applicable
6	The Ozone Depleting Substances (Regulation and Control) Rules, 2000	Cleaning of electrical contacts using HFCs etc.	Not applicable
7	The Batteries (Management and Handling) Rules, 2001 as amended	Batteries	Not applicable
8	The Indian Forest Act, 1927 as amended	Reserve Forest areas, Right of way	Forest Land is not involved; we have avoided the forest area in complete Line. Line is more than 1.0 km's away from Forest Land.
9	The Wild Life (Protection) Act, 1972 as amended	Critical habitats	No Wild life is involved in Project. Line is more than 4-5 km's away from Forest Land.
10	The Biological Diversity Act, 2002	Wetland	No Wetland is involved.
11	The Forest (Conservation) Act, 1980 as amended	Construction work in forest areas	Forest Land is not involved; we have avoided the forest area in complete Line. Line is more than 1.0 km's away from Forest Land.
12	The National Environmental Policy, 2006 of GoI	Construction Practices	GOI norms for environmental management followed for all construction work.
13	Other State Level Acts	Compensation	Compensation as per RRVPNL and state Revenue department. Total Forty Eight farmers has affected till date and compensation paid according to state level act/

			Revenue Dept.
14	Other International levels conventions and treaties	Biodiversity, GHG emissions	Not being affected.

B.2: General Implementation Status

B.2.1. Forest Clearance.

SN o.	Measures/ stipulation	Compliance Status
I	Sub-Project #	
1	Right of Way/ land required	23 Mtr either side of the central line, corridor width 46 mtrs, as per approved RVPNL tower schedule.
2	Clearance from trees	26 Mtr either side of central line.
3	Forest area and Nos. of trees.	No Forest land is being involved. Three trees being affected during the Foundation work and compensation paid according to state level act/Revenue department. During the stringing work no trees shall be cut, only trimming of branches shall be done.
4	Damage to forest	No damage shall be done to forest area.
5	Wild life sanctuaries	No Wild life is involved in Project. Line is more than 4-5 Kms away from Forest Land.

B.2.2. Fulfillment of commitments made during Public Hearing/Consultation

S.No.	Query/Apprehension	Commitment	Compliance Statement
I	Sub-project #		
1	Compensation for crop	As per EPC contractor bid	All seasonal cultivated crops if damaged during the work shall be compensated as per the RVPN/State Revenue department. Total Forty Eight farmers has affected till date and compensation paid according to state level act/ Revenue Dept.
2	Compensation for land damages	As per EPC contractor bid	No land is damaged during the construction of line.
3	Compensation for pathways, channels for waterway.	Restoration after erection by EPC contractor	Till date no pathways, channels for waterways have been affected during the work. If affected, they shall be restored properly.
4	Nuisance due to dust, noise, vibrations, labor during construction	As per EMP implemented by EPC contractor	Preventive actions are being adopted to avoid such nuisance. No reported dust, noise, vibrations and labor problems currently.

B.2.3. ADB Stipulations/ safeguarding measures on Environment.

SNo.	Product Activity/Stage	Parameter to be monitored	Compliance Status
I	Sub-Project #		
	Construction		
1	Archeological site/ monument safety	Chance find	Not involved
2	Public places, schools, ponds, airport, railway etc.	Distance 500 m away	No school, ponds have been affected Railway Approval Received from Concern authority. Airport/ Aviation Proposal has been submitted concerned authority on dated 17-3-2016 same is under

SNo.	Product Activity/Stage	Parameter to be monitored	Compliance Status
			process of approval.
3	Safeguard against critically endangered Flora and fauna.	Avoid	Flora Fauna not involved in project
4	Rain and Flood prone area.	Avoid	Whole construction area of transmission line beyond the flood prone area
5	Environmental parameters for air, noise, land and water during project construction	Environmental Monitoring Plan	Testing has been conducted and testing report of same has been submitted in January '2017.

B.2.4 Record of complaints (regarding environment safeguard measures) and their resolution

Sr.No	Complainant Name and address	Date of receipt	Subject/Issue	Date of resolution	Remarks
I	Sub-Project #				
	No complaint has received till date regarding environment safeguard.				

B.2.5. Staffing, Institutional Arrangements and Grievance Redress

S.No.	Parameters	Commitment	Compliance Statement
1	Numbers of Staff deputed/employed for environment safeguards	One at -site	3 Nos
2	PMU established as per proposed institutional mechanism	Date	18-5-2015
3	GRC formation	Date	Project Engineer, safety head, Patwari and RVPNL JEN(July -2015)
4	Grievance Redress Mechanism followed	Proper record	Three tree cutting involved. Currently no environment related grievance received.

B.2.6. Other measures:

I	Sub-Project #
1	At Workplace like stores, we have provided Toilet facilities to our workmen.
2	Gas cylinders are being used to avoid the usage of wood for cooking.
3	Good quality water is being provided for drinking, cooking and bathing purpose.
4	Control of dust near habitats for top soil being stored near foundations using covering sheets

B2.8 Annexures

I	Sub-Project #
	Photographs of the following – Tower erection, Implementation of safety Net during tower erection, Reward for implementing best safety practice, color coding of T&P at store, Safety tool box meeting at site, placement of reflector on vehicle, safety practice during road crossing work.

B.3: Status of Implementation of Environment Management Plan (EMP) and Environment Monitoring Plan (EMoP)

B3.1. Environment Management Plan and Status on Implementation

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
Pre-construction								
Temporary use of land	Impact to the existing environment	Selection of lands adhering to local laws and regulations Construction facilities should be placed at least 500 m away from water bodies, natural flow paths, important ecological habitats and residential areas	water and air quality	Inventory activity of tree, crop and asset in the area that may be affected by project implementation such as excavation and material transportation was undertaken before construction activities. Compensation is implemented to damage crop.	278	Excess soil after foundation Kept on bund.	Need to maintain same practice up to completion of project.	RRVPNL
Substation location and design	Noise generation Exposure to noise, Nuisance to neighbouring properties Disturbance to the adjacent lands and the people due to cut and fill operations	Substation designed to ensure noise will not be a nuisance. Maintained adequate clearance, construction of retaining structures, minimise cut and fill operations adjoining to the dwellings	Expected noise emissions based on substation design, noise levels Setbacks to houses and other structures	Not Applicable				
Location of transmission towers and transmission line alignment and design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	Tower location and line alignment selection with respect to nearest dwellings	Tower Location on 26 Meter either side is away from House/dwelling area. Line is minimum 500 Mtr away from	199.151km	46 Mtr corridor from center of tower is maintained during survey work to avoid house & for 500 mtr for reserve.	Need to maintain up to completion of project.	RRVPNL

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
				such dwelling area.				
	Impact on water bodies / land/ residences	Consideration of site location to avoid water bodies or agricultural land as much as possible. Careful site selection to avoid existing settlements	Site location, line alignment selection (distance to dwelling, water and/or agricultural land)	All the water bodies/dwellings are more than 500 mtrs away from the Line	F-278 E – 277 Nos Str – 98.520KM	46 Mtr corridor from center of tower is maintained during survey work to avoid house & for 500 mtr for reserve	Need to maintain up to completion of project	RRV/PNL
Equipment specifications and design parameters	Release of chemicals and harmful gases in receptors (air, water, land)	PCBs free substation transformers or other project facilities or equipment.	Transformers and specifications and compliance with setback distances ("as-built" diagrams)		Not Applicable			
Encroachment into precious ecological areas	Loss of precious ecological values/ damage to precious species	Avoid encroachment by careful site and alignment selection and reconnaissance before final siting of activities. Minimise the RoW wherever possible	Floral and faunal habitats loss	Route has been selected in a manner to avoid such encroachments. No ecological areas are involved in TL		Entire line passing away from flora & forest area / NOC had taken before starting of project.	Non	RRV/PNL
Involuntary resettlement and acquisition	Loss of lands and structures	Compensation paid for temporary/ permanent loss of productive land	Public complaints		Compensation is implemented for the crop damaged. Compensation shall be paid for the cultivated crop damaged as measured jointly by RVPNL,	Land acquisition not required for work.	Crop compensation provide to affected person.	RRV/PNL

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
Encroachment into farmland	Loss of agricultural productivity	Use existing tower footings/towers wherever possible	Tower location and line alignment selection		Patwari and Tata project site incharge	F- 278 E- 277 Str – 98.520 Km	Non	RRVPNL
		Avoid siting new towers on farmland wherever possible	Design of Implementation of crop and tree compensation (based on affected area)	Avoided, though some are unavoidable		Discuss with owner	RVPNL to provide proper crop compensation	
		Farmers compensated for any permanent loss of productive land and trees that need to be trimmed or removed along RoW.	Statutory approvals for tree trimming /removal	During Foundation and erection work no trees are not involved.			Non	RRVPNL
Interference with drainage patterns/Irrigation channels	Temporary flooding hazards/loss of agricultural production	Appropriate sighting of towers to avoid channel interference Appropriate provision or excess soil dug up from the foundations/trenches	Site location and line alignment selection	All tower are spotted beyond the boundaries of water channel.		278	Non	RRVPNL
Explosions/Fire	Hazards to life	Design of substations to include modern fire control systems/firewalls. Provision of firefighting equipment to be located close to transformers, power generation equipment.	Substation design compliance with fire prevention and control codes	Not Applicable				
Construction								

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
Removal or disturbance to other public utilities	Public inconvenience	Advance notice to the public about the time and the duration of the utility disruption Use of well trained and experienced machinery operators to reduce accidental damage to the public utilities Restore the utilities immediately to overcome public inconvenience	Disruption to other commercial and public activities / Public complaints	Advance notice published into the local newspaper for electric utility shutdown.	F- 278 E-277 Str – 98.520Km	Nil	Advance notice published in daily newspaper.	RRVPNL

Acquisition of cultivable lands	Loss of agricultural productivity	Avoid farming season wherever possible for the project activities. Ensure existing irrigation facilities are maintained in working condition Protect /preserve topsoil and reinstate after construction completed Repair /reinstate damaged bunds etc. after construction completed	Land area of agriculture loss Usage of existing utilities Status of facilities (earthwork in m³) Implementation of crop compensation (amount paid,	We have avoided the work for the locations where there is farming season. Compensation provided to land owner against the crop damaged. Top soil is restored during the back filling work.	F – 278 Nos E – 277 Nos Str -98.520 Km	Non	Non	RRVPNL
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Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
Temporary outage of the electricity	Loss of power supply to the local community when distribution lines crossing the new transmission line are switched off	Compensation for temporary loss in agricultural production. Advance notice to the public about the time and the duration of the utility disruption Restore the utilities immediately to overcome public inconvenience	dates, etc.) Power disruption to houses and commercial premises of power disruption	Advance notice published into the local newspaper for electric utility shutdown.	E – 277 Advance notice published into newspapers.	Non	Non	RRVPNL
Equipment layout and installation	Noise and vibrations	Selection of construction techniques and machinery to minimise ground disturbance.	Construction techniques and machinery	Construction activity carried out during in day. Report are still awaited.	Foundation - 278 Erection – 277 Str -98.520 km	Non	Non	RRVPNL
	SF6 leakage during storage and erection of Switchgear	Record of all substation switchgear, storage cylinders located within secure casings	Switchgear casings and substation bounding	Not Applicable				
Substation construction	Loss of soil	Fill for the substation foundations obtained by creating or improving local drain system.	Borrow area sighting (area of site in m ² and estimated volume in m ³)	Not Applicable				
	Interference in drainage of rain and waste water at site	Removal of silt and trash choking the drainage of the substation land	Drains choked with rain/water due to silt and trash	Not Applicable				
	Water pollution	Construction activities involving significant ground disturbance (i.e. substation land forming) not undertaken during the monsoon	Water Quality (pH, BOD/COD, Suspended solids, other) during major earthworks	Not Applicable				

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
		season.						
Construction schedules	Noise nuisance to neighboring properties	Minimize construction activities undertaken during the night and local communities informed of the construction schedule.	Timing of construction (noise emissions, [dB(a)])	All Construction activity carried out during day time. (Report shall be submitted September -16 still awaited) We have avoided the work for the locations where there is farming season.	F – 278 Nos E -277 Nos Str – 98.520 Km	Non	Non	RRVPNL/TPL
Provision of facilities for construction workers	Nuisance to wildlife if the line construction crosses their migratory path	Restrict construction work during the known period of migration by any wildlife in the area	Timing of Construction	No wild life area involve through the TL	F -278 E - 277 Str -98.520 Km	Non	Non	RRVPNL/TPL
	Contamination of receptors (land, water, air)	Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.	Amenities for Workforce facilities	Covered and fence wall around the worker living area. Worker have sufficient waste water collection system and septic camp.				RRVPNL/TPL
Surplus earthwork/soil	Runoff to cause water pollution, solid waste disposal	Excess fill from tower foundation excavation to be reused on site or disposed of next to roads or around houses, in agreement with the local community or	Location and amount (m ³) of fill disposal Soil disposal locations and volume (m ³)	Excess soil is dumped on the bound of field and also dumped to path after discussing with the local persons as per requirement.	F – 278 E – 277 Str – 98.520km	Need to maintain same practice up to completion of project.	Non	RRVPNL/TPL

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
		landowners.						
Air Pollution	Loose dust might blow in the area causing dusty conditions	Damping of dust by sprinkling of water within the work area and stack the loose soil and contain it with covers if required.	Soil stacking locations, access roads, tower locations, substation site	Sprayed water to minimize dust releasing in case of windy and dry weather. Excavated earth is covered.	F -278 E – 277 Str – 98.520 km	Need to maintain same practice up to completion of project.	Non	RRVPNL/TPL
Wood/ vegetation harvesting, cut and fill operations	Loss of vegetation and deforestation	Construction workers prohibited from harvesting wood in the project area during their employment.	Illegal wood /vegetation harvesting (area in m ² , number of incidents reported)	LPG cylinder provided to Labor.	Always	Non	Non	RRVPNL/TPL
	Effect on fauna	Prevent work force from disturbing the flora, fauna including hunting of animal and fishing in water bodies. Proper awareness programme regarding conservation of flora, fauna including ground vegetation to all drivers, operators and other workers.	Habitat loss	Training program conducted to create awareness among the workers and staff to conserve the flora and fun. (Provide annexure if available).	F – 278 E – 277 Str – 98.520 km	Non	Non	RRVPNL/TPL
Site clearance	Vegetation	Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance.	Vegetation marking and clearance control (area in m ²)	Vegetation land not involve through the TL.	Always	Non	Non	RRVPNL/TPL
	Soil erosion and surface runoff	Construction near seasonal rivers, erosion and flood-prone areas (if any)	Soil erosion	No soil erosion involve during the construction activity of tower	Always	Non	Non	RRVPNL/TPL

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
		should be restricted to the dry season.		foundation.				
		Provision and maintenance of drains and retention ponds. Treat clearing and filling areas against flow acceleration and construction work should be carefully designed to minimise obstruction or destruction to natural drainage.						
Mechanised construction	Noise, vibration and operator safety, efficient operation	Construction equipment to be well maintained.	Construction equipment - estimated noise emissions and operating schedules	Construction equipment is regularly maintained. Pollution under control certificate available	Always	Work carried out with the standards norms.	Need to maintain same practice up to completion up to project.	RRV/PNL/TPL
	Noise, vibration, equipment wear and tear	Proper maintenance and turning off plant not in use.						
Construction of roads for accessibility	Increase in airborne dust particles	Existing roads and tracks used for construction and maintenance access to the site wherever possible.	Access roads, routes (length and width of access roads)	Existing road/path only used for the construction activity.	F – 278 E – 277 Str -98.520 km	Only existing path is used for construction activity	Need to maintain same practice up to completion up to project	RRV/PNL/TPL
	Increased land requirement for temporary accessibility	New access ways restricted to a single carriageway width within the Row.		Any new access path used is only one carriageway width for tractor, JCB machine and other machines.				
Transportation and storage of	Nuisance to the general public	Transport loading and unloading of	Water and Air Quality	Dropping material in the	Always	Non	Non	RRV/PNL/TPL

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
materials		construction materials should not cause nuisance to the people by way of noise, vibration and dust Avoid storage of construction materials beside the road, around water bodies, residential or public sensitive locations Construction materials should be stored in covered areas to ensure protection from dust, emissions and such materials should be bundled in environment friendly and nuisance free manner		road collected. Construction material stored at high level ground level at construction site. Construction waste removed from the construction site after work completion. Construction material – sand will be covered at top to avoid air pollution near houses, and stacked top soil to be also covered at top to avoid blowing during windy conditions				
Trimming/cutting of trees within RoW	Fire hazards Loss of vegetation and deforestation	Trees allowed growing up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations. Trees that can survive trimming to comply with statutory distance should be	Species-specific tree retention as approved by statutory authorities (average and maximum tree height at maturity, in metres) Disposal of cleared	The tree and bushes coming within the 26 Meter either side of central line has to be trimmed up height required for the clearance. No vegetation filed involved during the	Always	Compensation of same should be given in time.		RRVPNL/TPL

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
		lopped and not felled Felled trees and other cleared or pruned vegetation to be disposed of as authorised by the statutory bodies.	vegetation as approved by the statutory authorities (area cleared in m²)	construction activity.				
Health and safety ADD PPE	Injury and sickness of workers and members of the public	Contract provisions specifying minimum requirements for construction camps from water bodies, reserved areas etc. Contractor to prepare and implement a health and safety plan and provide workers with required personal protective equipment (PPE) at site. Contractor to arrange for health and safety awareness programmes	Contract clauses (number of incidents and total lost-work days caused by injuries and sickness)	Conducting training courses and meeting for the workers on safety and environmental hygienic Providing personal safety devices for workers safety boots, helmet ,gloves, mask and protective cloths	Always	All work is carrying out with PPE	Non	RRV/PNL/TPL
Nuisance to nearby properties	Losses to neighbouring land uses/ values	Contract clauses specifying careful construction practices. As much as possible existing access ways will be used. Productive land will be reinstated following completion of construction Compensation will	Contract clauses Design basis and layout Reinstatement of land status (area affected, m²) Implementation of Tree/Crop compensation (amount paid)	Excavated material is used for filling ground itself. Access roads always used for construction activity. Compensation paid against the crop damaged to farmers.	Completely	NA		RRV/PNL/TPL

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
		be paid for loss of production, if any.						
Operation and Maintenance Phase								
Electric shock	Death or injury to the workers and public	Security fences around substation Establishment of warning signs Careful design using appropriate technologies to minimise hazards	Proper maintenance of fences and sign boards Usage of appropriate technologies (lost work days due to illness and injuries)	Not Applicable				
Noise generation	Nuisance to the community around the site	Provision of noise barriers near substation sites	Noise level	Not Applicable				
Soil Erosion	Removal of top soil	Planting of buffer zone species suitable for arid climate.	Turbidity of water (Visual Inspection)	Not Applicable				
Maintenance of Transmission line	Exposure to electromagnetic interference	Transmission line design to comply with the limits of electromagnetic interference from overhead power lines	Required ground clearance (metres)	Not Applicable				
Substation maintenance	Exposure to electromagnetic interference	Substation design to comply with the limits of electromagnetic interference within floor area	Required vibrations level, instrumentation					
Oil spillage	Contamination of land/nearby water bodies	Substation transformers located within secure and impervious bundled areas with a storage capacity of at least 110% of the capacity of oil in transformers and associated	Substation bounding (“as-built” diagrams)	Not Applicable				

Project Activity	Potential Environmental Impact	Mitigation Action	Standards	Actions during reporting period (incl. corrective)	Cumulative Progress to date	Corrective Actions Required	Further Follow-up required	Institutional Responsibility
		reserve tanks.						
Operation of Switchgear	Leakage of SF6 gas	Record of all substation switchgear located within secure casings	Switchgear casings and Substation bounding		Not Applicable			

B.3.2 Environment Monitoring Plan and Status on Implementation

Environmental component	Project stage	Parameters to be monitored	Sampling Location	Monitoring Frequency	Regulatory Standards for parameter	Agency responsible for implementation	Agency responsible for supervision	Test Results	Observations/Comments	Actions for Compliance	Further follow-up required
1.Air Quality	A. Pre-construction stage (Baseline development)	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , SPM, CO (Visible dust)	Boundary of substation	One time	Spot check using field portable instruments National Air quality standards of CPCB [PM ₁₀ or PM _{2.5}]	RVPNL					
	B. Construction Stage	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , SPM, CO (Visible dust)	Boundary of substation	Every one month of construction period	Spot check using field portable instruments National Air quality standards of CPCB [PM ₁₀ or PM _{2.5}] Spot check using field portable instrument	TPL		RRVNL			Testing has been conducted and testing report of same has been submitted in January '2017, same is attached along with report.
	C. Operation Stage (Testing and Commissioning)	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , SPM, CO (Visible dust)	Boundary of substation	One time during commissioning	National Air quality standards of CPCB PM ₁₀ or PM _{2.5}	RVPNL					
2.Water Quality	A. Pre-construction stage (Baseline)	EC, TSS, DO,	Nearest well near substations	One time	National water quality	RVPNL					

	development)	BOD, PH Oil and grease, Pb,			standards of CPCB		
						TPL	Testing has been conducted and testing report of same has been submitted in January '2017, same is attached along with report.
	B. Construction Stage	EC, TSS, DO, BOD, PH Oil and grease, Pb,	Nearest well near substatio ns	One time during cable laying	National water quality standards of CPCB		
	C. Operation Stage	EC, TSS, DO, BOD, PH Oil and grease, Pb,	Nearest well near substatio ns	One time during commissioni ng	National water quality standards of CPCB	RVPNL	
3.Noise/ Vibration	A. Pre- construction stage (Baseline development)	Noise level [dB(A)]	Boundar y of substatio n	One time	CPCB standards for Noise and vibrations	RVPNL	
	B. Construction Stage	Noise level [dB(A)]	Boundar y of substatio n	Every one month of construction period	CPCB standards for Noise and vibrations	TPL	Testing has been conducted and testing report of same has been submitted in January '2017.

	C. Operation Stage	Noise level [dB(A)]	Boundary of substation	One time during commissioning	CPCB standards for Noise and vibrations	RVPNL	
4. Soil	A. Pre-construction stage (Baseline development)	Visible spills and/or soil staining, Oil & grease	1 location inside substation	One time	Hazardous Waste Management rules	RVPNL	
	B. Construction Stage	Visible spills and/or soil staining, Oil & grease	1 location inside substation	One time	Hazardous Waste Management rules	TPL	Testing has been conducted and testing report of same has been submitted in January '2017.
	C. Operation Stage	Visible spills and/or soil staining, Oil & grease	1 location inside substation	One time during commissioning	Hazardous Waste Management rules	RVPNL	
SF6	Operation Stage	Volumetric loss from GIS equipment	Substation equipment, circuit breakers	Online monitoring by data loggers	As per Approved Specifications of Equipment	Not Applicable	

Abbreviations:

SO₂- Sulphur Dioxide; NO₂- Nitrogen Dioxide; CO- Carbon Monoxide; EC – Electric Conductivity;
Pb – Lead; PM_{2.5}- Particulate Matter <2.5; PM₁₀- Particulate Matter <10; TSPM- Total suspended Particulate Matter;
EC - Electrical Conductivity; DO - Dissolved Oxygen; TSS - Total Suspended Solids;
SF₆ – Sulphur Hexafluoride gas
BOD - Biological Oxygen Demand; ORP – Oxidation Reduction Potential
NAAQS - National Ambient Air Quality Standards specified by CPCB, GoI;
NWQS - National Water Quality Standards specified by CPCB, GoI.

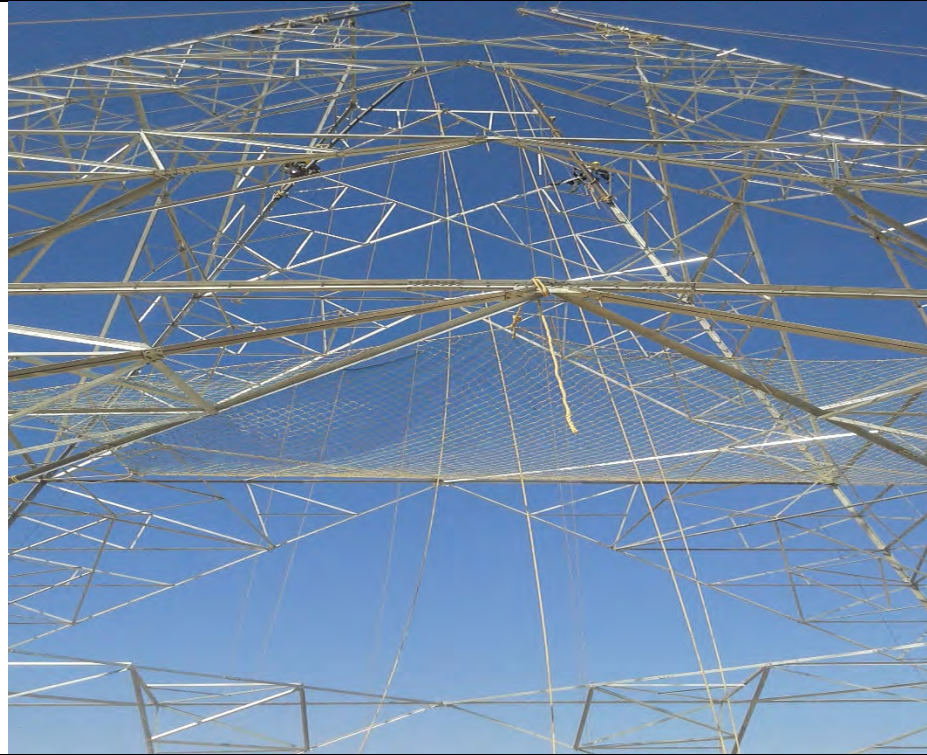
Annexure 1: Photographs regarding EMP issues



1.1 Safety Tool Box Meeting at site



1.2 Color coding of T&P



1.3 Implementation of Safety Net during Tower Erection work



1.4 Implementation of Fall Arrestor during Tower Erection Work



1.5 Use of Discharge Rod During Stringing Work



1.6 Placement of Reflector on store vehicle



1.7 Safety arrangement during Stringing work.



1.8 Safety Banner during Work.



1.9 Safety Belt Checking at store



1.10 Reflector placement on TSE Machine



1.11 Noise Sample collection at site



1.12 Air Sample RDS collection at Site





RAJASTHAN RAJYA VIDHYUT PRASARAN NIGAM LIMITED
Corporate Identity Number (CIN): U40109RJ2000SGC016485
Regd. Office: Vidyut Bhawan, Jyoti Nagar, Jaipur
O/o The Superintending Engineer (T&C) RVPN, JAISALMER
132 KV GSS PREMISES, JAISALMER Website: www.rvpn.co.in.
PH.NO.02992-250550; email-se.400jaisalmer@rvpn.co.in

No. RRVPNL/SE/T&C/Jaisalmer/Tech. /F. /D. 824 Dt. 7.2.2017

The Superintending Engineer (Contract-I)
100, Jaipur.

Project-Construction of 400 KV D/C twin ACSR Moose transmission line from
400 KV GSS Akal to 400 KV GSS Ramgarh (ICB-5) on turnkey basis

Subj: Submission of environment testing report of 400 KV D/C Ramgarh-Akal
transmission Line (ICB-5)

Ref: Letter no. 346 dated 7.2.2017 of the XEn (T&C) RVPNL, Jaisalmer

Kindly find attached herewith the environment testing report carried out in 400
KV (twin) Ramgarh-Akal transmission Line (ICB-5) through Vardan Enviro Lab and
approved by XEn (T&C) Jaisalmer, detail are as under-

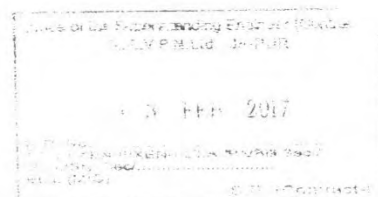
1. Ambient air quality monitoring- 11 Nos.
2. Ambient noise level monitoring- 11 Nos.
3. Soil- 4 nos.
4. Drinking water- 4 nos.

Submitted for further n/a please.

Encloses above.


Superintending Engineer
(T&C) RVPN Jaisalmer

Copy forwarded to the Executive Engineer (T&C) RVPNL, Jaisalmer. This is in
reference to your letter no. 346 dated 7.2.2017




Superintending Engineer
(T&C) RVPN Jaisalmer

Annexure – 2 (Reply of observation in January 2016 of ADB consultant Team during construction practice review).

Annexure 3

Baseline Test Reports (Tests done during IEE assessment in 2011-2012)

Location of Sampling Inside the Bhadla Solar Park (November 2011)

S. No	Component	No. of Sample	Report Reference No.	Sampling Location
1 and 2	Air Monitoring and Noise Monitoring	6	AN - 1	Near Munna Ram's tube well
			AN - 2	Near Sarpanch (Mathar Khan's House) Churon Ki Basti
			AN - 3	GSS Bhadla Substation land
			AN - 4	Near ArniyokiNadi
			AN - 5	Near PannukiNadi
			AN - 6	Near Mile stone of 0 km Bhadla Fanta on Nachna – Bhikampur road
3	Water Analysis	3	WS - 1	Munna Ram's tube well
			WS - 2	Govt. tube well Churon Ki Basti
			WS - 3	Water tank at Kamrudeen House in GamnokiBasti
4	Soil Analysis	3	SS - 1	GSS Bhadla Substation land
			SS - 2	Near ArniyokiNadi
			SS - 3	Near PannukiNadi

Location of Sampling along the associated Grid Substations (November 2011)

S. No	Component	No. of Sample	Report Reference No.	Sampling Location
1 and 2	for Air and Noise Monitoring	4 each	SS-1	GSS Sub Station Land, Khasara No. 8, Village: Bhadla, Post: Nuro Ki Burj, Tehsil: Phalodi, District Jodhpur
			SS - 2	400 KVA GSS Site, Village: Meyon Ki Dhani, Post: Ramgarh, Jaisalmer
			SS - 3	Near SE office 400 KVA (RRVPLN), Village: Akal, Post: Jodha, Jaisalmer
			SS - 4	GSS 400 kVA Site, Village: Kakani, Post and Tehsil: Luni, Jodhpur
3	Water Analysis	4	SS-1	Water sample collected from Bore well of Munna Ram Ji, Village: Bhadla (Khasra No.9), Post: Nuro Ki Burj, Tehsil: Phalodi, District Jodhpur
			SS - 2	Water sample collected from Govt. Bore well (Nearest Bore well GSS Ramgarh), Village and Post: Sonu, Tehsil: Ramgarh, District Jaisalmer
			SS - 3	Water sample collected from Govt. Bore well inside 400 KVA GSS (RRVPLN), Village: Akal, Post: Jodha, Jaisalmer
			SS - 4	Water sample collected from Open Well of Babu Singh Champavat, Village: Kakani, Post and Tehsil: Luni, Jodhpur
4	Soil Analysis	4	SS-1	Soil sample collected from the land of proposed GSS Sub Station, Khasara No. 8, Village: Bhadla, Post: Nuro Ki Burj, Tehsil: Phalodi, District Jodhpur
			SS - 2	Soil sample collected from the proposed Ramgarh GSS 400 KVA, Village and Post: Sonu, Tehsil: Ramgarh, District Jaisalmer
			SS - 3	Soil sample collected from the land of proposed GSS 400 KVA (RRVPLN), Village: Akal, Post: Jodha, Jaisalmer
			SS - 4	Soil sample collected from the land of Proposed GSS 400 KVA, Village: Kakani, Post and Tehsil: Luni, Jodhpur

Location of Sampling along the Tranche -1 transmission lines (December 2011 to January 2012)

S. No	Component	No. Of Sample	Sample No.	Sampling Location
1 and 2	for Air and Noise	17 each	Sample No. 1	Village: JajiwalGehlotan, Post: Jajiwal via Mandor, District Jodhpur
			Sample No. 2	Village and Post: Umed Nagar, Tehsil: Osiyan, District Jodhpur

	Monitoring		Sample No. 3	Near 44 No. Railway crossing, Bh kamkhor, Tehsil: Osiyan, District Jodhpur
			Sample No.4	Village: Amla (Near Kichan), Post and Tehsil: Phalodi, District Jodhpur
			Sample No.5	Village: Khirwa, Post: HidaGol, Tehsil: Phalodi, District Jodhpur)
			Sample No.6	Village: Kanasar, Post: Bap, Tehsil: Phalodi, District Jodhpur)
			Sample No. 7	(Village and Post: Askandra, Tehsil: Pokharan, District Jaisalmer)
			Sample No. 8	Village and Post: Tadana, Tehsil and District Jaisalmer)
			Sample No. 9	Village: Nirudeen Ki Dhani, District Jaisalmer)
			Sample No.10	Village: Nehdai, District Jaisalmer
			Sample No.11	Village: Tanusar, District Jaisalmer
			Sample No.12	Village: Joga, District Jaisalmer
			Sample No. 13	Village: Parewer, District Jaisalmer
			Sample No. 14	Village: Asda, District Jaisalmer
			Sample No. 15	Village: Hadda, District Jaisalmer
			Sample No.16	Hamira Rly Station, Village: Thaiyat, District Jaisalmer)
			Sample No.17	Village: BhaguKaGaon, District Jaisalmer
3	Water Analysis	7	Sample No. 1	Water sample collected from Pond, Village: JajiwaiGehlotan, Post: Jajiwai via Mandor, District Jodhpur
			Sample No. 2	Water sample collected from Bore well of Sukh Ram S/o ShriBhagirathRam, Village: Sirmandi, Post and Tehsil: Osiyan, District Jodhpur
			Sample No. 3	Water sample collected from Bore well of Manish S/o ShriPannaLaJi, Village: Amla, Post and Tehsil: Phalodi, District Jodhpur
			Sample No.4	Water sample collected from Govt. Bore well, Village and Post: Askandra, Tehsil: Pokharan, District Jaisalmer
			Sample No.5	Water sample collected from Water Tank of Babu Singh S/o ShriBaghSingh, Village: Tanusar, Jaisalmer
			Sample No.6	Water sample collected from Govt. Bore well, Village: Joshiyan (Hadda), Post: Kanod, Tehsil: and District: Jaisalmer
			Sample No.7	Water sample collected from Govt. Bore well, Village and Post: BhaguKaGaon, Tehsil and District: Jaisalmer
4	Soil Analysis	7	Sample No. 1	Soil sample collected from the Pond of Village: JajiwaiGehlotan, Post: Jajiwai via Mandor, District Jodhpur
			Sample No. 2	Soil sample collected from the land of Sukh Ram S/o ShriBhagirath Ram, Village: Sirmandi, Post and Tehsil: Osiyan, District Jodhpur
			Sample No. 3	Soil sample collected from the land of Manish S/o ShriPannaLaJi, Village: Amla, Post and Tehsil: Phalodi, District Jodhpur
			Sample No.4	Soil sample collected from the land of Padam Singh S/o ShriChandan Singh Ji, Village and Post: Askandra, Tehsil: Pokaran, District Jaisalmer
			Sample No.5	Soil sample collected from the land of Babu Singh S/o ShriBagh Singh, Village: Tanusar, Jaisalmer)
			Sample No.6	Soil sample collected from the land of BheraramJi S/o ShriManglaramJi Village: Hadda, Post: Kanod, Tehsil and District Jaisalmer
			Sample No.7	Soil sample collected from the land of Barkat Khan S/o ShriJalu Khan, Village and Post: BhaguKaGaon, Tehsil and District: Jaisalmer

A. AMBIENT AIR QUALITY MONITORING REPORT

i.Ambient Air Quality Monitoring Report for Solar Park at Bhadla (November 2011)

S. No	Site	Particulate Matter (PM 2.5)	Particulate Matter (PM 10)	Sulphur Dioxide (SO2)	Oxide Of Nitrogen (NOX)	Carbon Monoxide as (CO)
AN -1	Near House of Munna Ram Ji	26.5 µg / m ³	53.1 µg / m ³	6.2 µg / m ³	9.3 µg / m ³	573 µg / m ³
AN -2	Near House of Mathar Khan (Sarpanch), Chudon Ki Basti	31.4 µg / m ³	58.6 µg / m ³	6.3 µg / m ³	9.1 µg / m ³	458 µg / m ³

AN -3	GSS Sub Station Land	24.1 µg / m3	47.5 µg / m3	6.0 µg / m3	9.0 µg / m3	373 µg / m3
AN -4	Arniya Ki Nadi	29.4 µg / m3	56.8 µg / m3	6.3 µg / m3	9.2 µg / m3	458 µg / m3
AN -5	Panna Ki Nadi	25.3 µg / m3	50.8 µg / m3	6.0 µg / m3	9.0 µg / m3	458 µg / m3
AN -6	0 km Mile stone of Bhadla at Badhla Fanta	21.4 µg / m3	43.6 µg / m3	6.0 µg / m3	9.0 µg / m3	373 µg / m3
	Standard Value	60 µg / m3	100 µg / m3	80 µg / m3	80 µg / m3	2000 µg / m3
	Methods of Measurement	Gravimetric Method	Gravimetric Method	Improved West and Gaeke Method	Modified Jacob and Hochheiser Method	IS: 5182 – 1975 Part X

ii.Ambient Air Quality Monitoring Report for Grid Substations (November 2011)

Sample No	Site	Particulate Matter (PM 2.5)	Particulate Matter (PM 10)	Sulphur Dioxide (SO2)	Oxide of Nitrogen (NOX)	Carbon Monoxide as (CO)
SS - 1	GSS Sub Station Land, Khasara No. 8, Village: Bhadla, Post: Nuro Ki Burj, Tehsil: Phalodi, District Jodhpur	24.1 µg / m3	47.5 µg / m3	6.0 µg / m3	9.0 µg / m3	373 µg / m3
SS - 2	400 KVA GSS Site, Village: Meyon Ki Dhani, Post: Ramgarh, Jaisalmer	27.3 µg / m3	57.7 µg / m3	6.5 µg / m3	9.3 µg / m3	573 µg / m3
SS - 3	Near SE office 400 KVA (RRVPNL), Village: Akal, Post: Jodha, Jaisalmer	32.6 µg / m3	65.8 µg / m3	6.3 µg / m3	9.7 µg / m3	687 µg / m3
SS - 4	GSS 400 kVA Site, Village: Kakani, Post and Tehsil: Luni, Jodhpur	20.5 µg / m3	44.6 µg / m3	6.0 µg / m3	9.0 µg / m3	458 µg / m3
	Standard Value	60 µg / m3	100 µg / m3	80 µg / m3	80 µg / m3	2000 µg / m3
	Methods of Measurement	Gravimetric Method	Gravimetric Method	Improved West and Gaeke Method	Modified Jacob and Hochheiser Method	IS: 5182 – 1975 Part X

iii.Ambient Air Quality Monitoring Report along 3 nos. 440 KV Transmission Lines (December 2011 to January 2012)

Sam ple No	Site	Particulate Matter (PM 2.5)	Particulate Matter (PM 10)	Sulphur Dioxide (SO2)	Oxide of Nitrogen (NOX)	Carbon Monoxide as (CO)
1	Near NageshwarMahadev Temple, Village: JajiwalGehlotan, Post: JajiwalviaMandor, District Jodhpur	33.6 µg / m3	65.5 µg / m3	6.3 µg / m3	9.7 µg / m3	458 µg / m3
2	Near 33 KVA Sub Station, Village and Post: Umed Nagar, Tehsil: Osiyan, District Jodhpur	36.2 µg / m3	70.5 µg / m3	6.6 µg / m3	9.8 µg / m3	573 µg / m3
3	Near 44 No. Railway crossing, Bh kamkhor, Tehsil: Osiyan, District Jodhpur	39.5 µg / m3	62.3 µg / m3	6.8 µg / m3	10.1 µg / m3	687 µg / m3
4	Near house of Manish S/o ShriPannaLaJi, Village: Amla (Near Kichan), Post and Tehsil: Phalodi, District Jodhpur	24.1 µg / m3	52.3 µg / m3	6.2 µg / m3	9.5 µg / m3	458 µg / m3
5	Near NayaTalab, Village: Khirwa, Post: HidaGol, Tehsil: Phalodi, District Jodhpur	22.6 µg / m3	47.8 µg / m3	6.1 µg / m3	9.3 µg / m3	458 µg / m3
6	(Near house of Gopal S/o ShriPrem Pal Vishnoi, Village: Kanasar, Post: Bap,	30.5 µg / m3	62.3 µg / m3	6.3 µg / m3	9.8 µg / m3	573 µg / m3

Sam ple No	Site	Particulate Matter (PM 2.5)	Particulate Matter (PM 10)	Sulphur Dioxide (SO ₂)	Oxide of Nitrogen (NO _x)	Carbon Monoxide as (CO)
	Tehsil: Phalodi, District Jodhpur)					
7	Crossing point at Askandra – Nachna Road, Village and Post: Askandra, Tehsil: Pokharan, District Jaisalmer	41.5 µg / m ³	76.6 µg / m ³	7.6 µg / m ³	11.9 µg / m ³	687 µg / m ³
8	Near Stone Quarry, Nachna – Tadana Road, Village and Post: Tadana, Tehsil and District Jaisalmer)	24.0 µg / m ³	52.6 µg / m ³	6.7 µg / m ³	9.6 µg / m ³	458 µg / m ³
9	Near Nirudeen Ki Dhani, District Jaisalmer)	18.6 µg / m ³	41.4 µg / m ³	6.0 µg / m ³	9.0 µg / m ³	344 µg / m ³
10	Near PandiDungari, Village: Nehdai, District Jaisalmer	21.8 µg / m ³	49.4 µg / m ³	6.1 µg / m ³	9.3 µg / m ³	344 µg / m ³
11	Near house of Babu Singh S/o ShriBagh Singh, Village: Tanusar, District Jaisalmer	23.0 µg / m ³	52.4 µg / m ³	6.2 µg / m ³	9.6 µg / m ³	458 µg / m ³
12	Village: Joga, Post. Sauwa, Tehsil and District Jaisalmer	25.7 µg / m ³	59.8 µg / m ³	6.2 µg / m ³	9.5 µg / m ³	458 µg / m ³
13	Near Tulsiram Ki Dhani, Village: Parewer, Tehsil and District Jaisalmer)	28.0 µg / m ³	62.4 µg / m ³	6.5 µg / m ³	9.7 µg / m ³	573 µg / m ³
14	Near house of Fajal Khan S/o ShriViram Khan, Village: Asda, Post: Deva, Tehsil and District Jaisalmer	32.0 µg / m ³	62.5 µg / m ³	6.3 µg / m ³	9.8 µg / m ³	573 µg / m ³
15	Near Mile Stone KM. 3, Village: Hadda, Post: Kanod, Tehsil and District Jaisalmer	34.2 µg / m ³	71.7 µg / m ³	6.8 µg / m ³	10.9 µg / m ³	687 µg / m ³
16	Near Hamira Rly Station, Village: Thaiyat, District Jaisalmer	31.9 µg / m ³	67.1 µg / m ³	6.8 µg / m ³	9.7 µg / m ³	573 µg / m ³
17	Near house of Barkat Khan S/o ShriJalu Khan, Village and Post: BhaguKaGaon, Tehsil and District Jaisalmer	23.0 µg / m ³	56.2 µg / m ³	6.3 µg / m ³	9.5 µg / m ³	573 µg / m ³
	Standard Value	60 µg / m ³	100 µg / m ³	80 µg / m ³	80 µg / m ³	2000 µg / m ³
	Methods of Measurement	Gravimetric Method	Gravimetric Method	Improved West and Gaeke Method	Modified Jacob and Hochheiser Method	IS: 5182 – 1975 Part X

B. AMBIENT NOISE MONITORING REPORT

i.Ambient Noise Monitoring Report for Solar Park (November 2011)

S. No	Site	Ld (Day Equivalent)	Ln (Night Equivalent)	Ldn (Day-Night Equivalent)
AN -1	Near House of Munna Ram	47.15	41.57	49.16
AN –2	Near House of Mathar Khan (Sarpanch), Chudon Ki Basti	47.35	41.87	49.42
AN -3	GSS Sub Station Land	45.45	41.00	48.15
AN -4	Arniya Ki Nadi	47.53	41.71	49.40
AN -5	Panna Ki Nadi	47.47	40.77	48.87
AN -6	0 km Mile stone of Bhadla at Badhla Fanta	44.20	40.31	47.27

ii.Ambient Noise Monitoring Report for Grid Substations (November 2011)

Sample No	Site	Ld (Day Equivalent)	Ln (Night Equivalent)	Ldn (Day-Night Equivalent)
SS - 1	GSS Sub Station Land, Khasara No. 8, Village:	45.45	41.00	48.15

Sample No	Site	Ld (Day Equivalent)	Ln (Night Equivalent)	Ldn (Day-Night Equivalent)
	Bhadla, Post: Nuro Ki Burj, Tehsil: Phalodi, District Jodhpur			
SS - 2	400 KVA GSS Site, Village: Meyon Ki Dhani, Post: Ramgarh, Jaisalmer	48.58	41.94	50.01
SS - 3	Near SE office 400 KVA (RRVNL), Village: Akal, Post: Jodha, Jaisalmer	52.31	42.31	52.31
SS - 4	GSS 400 kVA Site, Village: Kakani, Post and Tehsil: Luni, Jodhpur	53.17	41.75	52.74

iii. Ambient Noise Monitoring Report for Along the 3 400 kV transmission lines (December 2011 to January 2012)

Sample No	Site	Ld (Day Equivalent)	Ln (Night Equivalent)	Ldn (Day-Night Equivalent)
1	Village: JajiwalGehlotan, Post: Jajiwal via Mandor, District Jodhpur	47.18	41.61	49.20
2	Village and Post: Umed Nagar, Tehsil: Osiyan, District Jodhpur	52.82	43.64	53.11
3	Near 44 No. Railway crossing, Bhikamkhor, Tehsil: Osiyan, District Jodhpur	49.73	41.23	50.29
4	Village: Amla (Near Kichan), Post and Tehsil: Phalodi, District Jodhpur	54.09	42.03	53.51
5	Village: Khirwa, Post: HidaGol, Tehsil: Phalodi, District Jodhpur)	51.05	41.88	51.34
6	Village: Kanasar, Post: Bap, Tehsil: Phalodi, District Jodhpur)	48.00	44.12	51.07
7	(Village and Post: Askandra, Tehsil: Pokharan, District Jaisalmer)	49.90	43.03	51.21
8	Village and Post: Tadana, Tehsil and District Jaisalmer)	52.64	42.43	52.57
9	Village: Nirudeen Ki Dhani, District Jaisalmer)	44.38	40.87	47.71
10	Village: Nehdai, District Jaisalmer	50.58	42.08	51.14
11	Village: Tanusar, District Jaisalmer	49.67	41.20	50.24
12	Village: Joga, District Jaisalmer	47.29	41.42	49.13
13	Village: Parewer, District Jaisalmer	49.94	41.74	50.62
14	Village: Asda, District Jaisalmer	47.82	41.59	49.47
15	Village: Hadda, District Jaisalmer	48.06	41.79	49.68
16	Hamira Rly Station, Village: Thaiyat, District Jaisalmer)	52.63	42.40	52.55
17	Village: BhaguKaGaon, District Jaisalmer	49.20	41.86	50.27

All results are in Decibel (dB) Unit

Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area/Zone	Limits in dB(A) Leq *	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.

2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
 3. Silence zone is defined as an area comprising not less than 100 metres around hospitals, educational institutions and courts. The silence zones are zones which are declared as such by the competent authority.
 4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.
- *dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.
A "decibel" is a unit in which noise is measured.
"A", in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.
Leq : It is an energy mean of the noise level, over a specified period.

Source: Ministry of Environment and Forests Notification, New Delhi, the 14 February, 2000 S.O. 123(E)

C. ANALYSIS REPORT OF SOIL

i. Analysis Report of Soil for Solar Park (November 2011)

Parameters (Unit)	Unit	SS -1: GSS Sub Station	SS -2 Near Arniya Ki Nadi	SS - 3: Near Pannu Ki Nadi
Color	Visual Comparison	Light Brown	Light Brown	Light Brown
pH (1:5)	-	7.87	7.86	7.56
Conductivity(1:5)	(μ S/cm)	141	132	291
Moisture	(%)	6.1	4.8	5.3
Chlorides as Cl	(%)	0.004	0.002	0.004
Sulphate as SO ₄	(%)	0.005	0.001	0.005
Total Carbonates	(%)	0.05	0.04	0.05
Total Soluble Solids	(%)	0.064	0.036	0.136
Total Organic Matter	(%)	0.13	0.04	0.11
Nitrogen as N	(%)	0.07	0.03	0.09
Phosphorus as P	(%)	< 0.0005	< 0.0005	< 0.0005
Potassium as K	(%)	0.012	0.013	0.025
Zinc	Mg / 100 Gm	BDL	BDL	BDL
Copper	Mg / 100 Gm	BDL	BDL	BDL
Chromium	Mg / 100 Gm	BDL	BDL	BDL
Cadmium	Mg / 100 Gm	BDL	BDL	BDL
Nickel	Mg / 100 Gm	BDL	BDL	BDL
Lead	Mg / 100 Gm	BDL	BDL	BDL

BDL * - Below Detectable Limit

ii. Analysis Report of Soil for Grid Substations (November 2011)

Parameters (Unit)	Unit	SS -1 Bhadla GSS	SS -2 Ramgarh GSS	SS -3 Akal GSS	SS 4 Jodhpur GSS at Kakani
Color	Visual Comparison	Light Brown	Light Brown	Light Brown	Light Brown
pH (1:5)	-	7.87	7.25	7.71	7.64
Conductivity(1:5)	(μ S/cm)	141	823	203	388
Moisture	(%)	6.1	6.5	7.2	6.8
Chlorides as Cl	(%)	0.004	0.037	0.005	0.01
Sulphate as SO ₄	(%)	0.005	0.016	0.002	0.003
Total Carbonates	(%)	0.05	0.04	0.05	0.02
Total Soluble Solids	(%)	0.064	0.33	0.072	0.122
Total Organic Matter	(%)	0.13	0.14	0.07	0.08
Nitrogen as N	(%)	0.07	0.09	0.04	0.04
Phosphorus as P	(%)	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Potassium as K	(%)	0.012	0.04	0.024	0.012

Zinc	Mg / 100 Gm	BDL	BDL	BDL	BDL
Copper	Mg / 100 Gm	BDL	BDL	BDL	BDL
Chromium	Mg / 100 Gm	BDL	BDL	BDL	BDL
Cadmium	Mg / 100 Gm	BDL	BDL	BDL	BDL
Nickel	Mg / 100 Gm	BDL	BDL	BDL	BDL
Lead	Mg / 100 Gm	BDL	BDL	BDL	BDL

BDL* - Below Detectable Limit

iii. Analysis Report of Soil along Transmission lines (December 2011 to January 2012)

Sample No		1	2	3	4	5	6	7
Parameters (Unit)	Unit	Results JajiwalGehl otan, Jodhpur	Village: Sirmandi, Jodhpur	Village: Amla, Jodhpur	Village Askandra, Jaisalmer	Village: Tanusar, Jaisalmer	Results Village: Hadda, Jaisalmer	Village: BhaguKaG aon, Jaisalmer
Color	Visual Comparison	Grey	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown	Light Brown
pH (1:5)	-	7.58	7.33	7.31	7.23	7.12	7.7	7.06
Conductivity(1:5)	(μ S/cm)	406	340	424	110	2520	146	1795
Moisture	(%)	2.64	2.06	2.49	0.06	1.98	0.30	0.34
Chlorides as Cl	(%)	0.007	0.016	.016	0.003	0.005	0.004	0.072
Sulphate as SO ₄	(%)	0.014	0.012	0.004	0.008	0.156	0.009	0.068
Total Carbonates	(%)	13.88	1.17	6.95	2.91	21.96	11.56	22.54
Total Soluble Solids	(%)	0.201	0.158	0.165	0.136	1.199	0.108	0.708
Total Organic Matter	(%)	0.187	0.037	0.091	0.026	0.029	0.034	0.004
Nitrogen as N	(%)	0.020	0.013	0.021	0.008	0.005	0.009	0.119
Phosphorus as P	(%)	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Potassium as K	(%)	0.007	0.003	0.004	0.002	0.015	0.003	0.007
Zinc	Mg / 100 Gm	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Copper	Mg / 100 Gm	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	Mg / 100 Gm	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Cadmium	Mg / 100 Gm	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nickel	Mg / 100 Gm	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Lead	Mg / 100 Gm	BDL	BDL	BDL	BDL	BDL	BDL	BDL

All results are on dry basis.

BDL - Below Detectable Limit

D. ANALYSIS OF WATER QUALITY

i. Analysis of Water Quality Within Solar Park (November 2011)

Water sample collected from Govt. Bore well, ChuronkiBasti

Parameter	Concentration	Standard Drinking water Specification as per IS –10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984

pH	7.97	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO ₃	588.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.06 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	443.86 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	2,674.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	136.00 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	60.76 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO ₄	137.03 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO ₃	8.54 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.31 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	372.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	19 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

Water sample collected from Cement Tank (Kharuddin S/o ShriKalu Khan, GamnokiBasti)

Parameter	Concentration	Standard Drinking water Specification as per IS –10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	7.81	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	552.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.08 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	851.74 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988

Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	2,652.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	118.40 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	62.72 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO ₄	147.94 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO ₃	8.94 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.21 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	292.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	12 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

ii. Analysis of Water Quality Along the Grid Substation Sites (November 2011)

Sample No : SS-1: Water sample collected from Bore well of Munna Ram Ji, Village: Bhadla (Khasra No.9), Post: Nuro Ki Burj, Tehsil: Phalodi, District Jodhpur (for GSS Bhadla)

Parameter	Concentration	Standard Drinking water Specification as per IS – 10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.1 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	7.40	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	548.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.10 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	775.76 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	2,532.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	110.40 Ma / L	75 Ma / L	200 Ma / L	IS: 3025 Part 40 - 1991

Magnesium as Mg	66.64 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO ₄	166.34 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO ₃	7.56 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.33 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	404.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	6 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

Sample No. SS – 2: Water sample collected from Govt. Bore well (Nearest Bore well GSS Ramgarh), Village and Post: Sonu, Tehsil: Ramgarh, District Jaisalmer

Parameter	Concentration	Standard Drinking water Specification as per IS – 10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.2 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	8.05	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	276.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.05 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	495.85 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	1,785.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	70.40 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	24.50 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO4	113.49 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO3	12.93 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988

Fluoride as F	1.47 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	268.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	7 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

Sample No. SS – 3: Water sample collected from Govt. Bore well inside 400 KVA GSS (RRVPNL), Village: Akal, Post: Jodha, District Jaisalmer

Parameter	Concentration	Standard Drinking water Specification as per IS – 10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.3 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	8.36	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	120.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.03 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	61.98 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	977.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	27.20 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	12.74 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO4	131.75 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO3	2.25 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	0.83 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C6H5OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	0.2 Mg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998

Cyanide as CN	0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	204.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	6 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

Sample No. SS – 4: Water sample collected from Open Well of Babu Singh Champavat Village: Kakani, Post and Tehsil: Luni, District Jodhpur

Parameter	Concentration	Standard Drinking water Specification as per IS – 10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.4 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	8.30	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	108.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.02 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	7.99 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	181.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	33.60 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	5.88 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO4	27.22 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO3	2.79 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	0.18 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C6H5OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991

Alkalinity	124.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	3 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

iii. Analysis Report of Water Along the 3 nos. 400 kV transmission lines (December 2011 to January 2012)

iv.

Sample No. 1 (Water sample collected from Pond, Village: JajiwalGehlotan, Post: Jajiwal via Mandor, District Jodhpur)

Parameter	Concentration	Standard Drinking water Specification as per IS –10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	2.3	5	10	IS: 3025 Part 10 - 1984
pH	7.75	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	100.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.02 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	57.98 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	580.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	30.40 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	5.88 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO4	33.30 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO3	8.12 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.00 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C6H5OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	192.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				

Coliform Organisms	80 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

CFU-Colony Forming Unit

Sample No. 2: (Water sample collected from Bore well of Sukh Ram S/o ShriBhagirath Ram, Village: Sirmandi, Post and Tehsil: Osiyan, District Jodhpur)

Parameter	Concentration	Standard Drinking water Specification as per IS –10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.5 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	7.88	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	588.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.08 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	591.82 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	3,619.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	113.60 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	74.48 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO4	185.06 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO3	16.82 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.50 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C6H5OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	260.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	16 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

CFU-Colony Forming Unit

Sample No. 3: (Water sample collected from Bore well of Manish S/o ShriPannaLaJi, Village: Amla, Post and Tehsil: Phalodi, District Jodhpur)

Parameter	Concentration	Standard Drinking water Specification as per IS –10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.6 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	7.13	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	300.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.04 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	127.96 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	1,245.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	73.60 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	28.42 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO4	77.41 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO3	19.66 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.16 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C6H5OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	352.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	18 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

CFU-Colony Forming Unit

Sample No.4: (Water sample collected from Govt. Bore well, Village and Post: Askandra, Tehsil: Pokharan, District Jaisalmer)

Parameter	Concentration	Standard Drinking water Specification as per IS –10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)

		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.7 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 - 1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	7.78	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO ₃	600.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.11 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	404.87 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	3,081.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	104.00 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	83.30 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO ₄	152.63 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO ₃	173.00 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.30 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	340.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	13 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

CFU-Colony Forming Unit

Sample No.5: (Water sample collected from Water Tank of Babu Singh S/o ShriBagh Singh, Village: Tanusar, District Jaisalmer)

Parameter	Concentration	Standard Drinking water Specification as per IS –10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.8 Essential Characteristics-Physical Parameter				

Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	7.39	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO ₃	344.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.04 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	33.98 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	748.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	97.60 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	24.50 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO ₄	49.97 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO ₃	13.95 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	0.55 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	240.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	23 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

CFU-Colony Forming Unit

Sample No.6 (Water sample collected from Govt, Bore well, Village: Joshiyan (Hadda), Post: Kanod, Tehsil: and District: Jaisalmer)

Parameter	Concentration	Standard Drinking water Specification as per IS – 10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	Permissible Limit in absence of alternate source	
1.1.1.1.9 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	7.71	6.5 – 8.5	-	IS: 3025 Part 11 - 1984

Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO ₃	396.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	0.09 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	427.87 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986
Desirable Characteristics-Chemical Parameters				
Dissolved Solids	3,161.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	84.80 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	45.08 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO ₄	173.52 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO ₃	0.74 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.72 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	452.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	10 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

CFU-Colony Forming Unit

Sample No.7: (Water sample collected from Govt. Bore well, Village and Post: BhaguKaGaon, Tehsil and District: Jaisalmer)

Parameter	Concentration	Standard Drinking water Specification as per IS – 10500:1991 as amendment up to 3 July 2010		Protocol (Test Method)
		Desirable Limit	1.1.1.1.10 Permissible Limit in absence of alternate source	
1.1.1.1.11 Essential Characteristics-Physical Parameter				
Color, Hazen Units	< 1	5	25	IS: 3025 Part 4 - 1983
Odour	Unobjectionable	Unobjectionable	-	IS: 3025 Part 5 - 1983
Taste	Agreeable	Agreeable	-	IS: 3025 Part 7,8 -1984
Turbidity, NTU	< 1	5	10	IS: 3025 Part 10 - 1984
pH	8.22	6.5 – 8.5	-	IS: 3025 Part 11 - 1984
Essential Characteristics-Chemical Parameters				
Total Hardness as CaCO3	120.00 Mg / L	300 Mg / L	600 Mg / L	IS: 3025 Part 21 - 1983
Iron as Fe	< 0.01 Mg / L	0.3 Mg / L	1.0 Mg / L	IS: 3025 Part 53 - 2003
Chloride as Cl	129.96 Mg / L	250 Mg / L	1000 Mg / L	IS: 3025 Part 32 - 1988
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	IS: 3025 Part 26 - 1986

Desirable Characteristics-Chemical Parameters				
Dissolved Solids	1,455.00 Mg / L	500 Mg / L	2000 Mg / L	IS: 3025 Part 16 - 1984
Calcium as Ca	24.00 Mg / L	75 Mg / L	200 Mg / L	IS: 3025 Part 40 - 1991
Magnesium as Mg	14.70 Mg / L	30 Mg / L	100 Mg / L	IS: 3025 Part 46 - 1994
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	IS: 3025 Part 42 - 1992
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	IS: 3025 Part 59 - 2006
Sulphate as SO ₄	121.67 Mg / L	200 Mg / L	400 Mg / L	IS: 3025 Part 24 - 1986
Nitrate as NO ₃	0.32 Mg / L	45 Mg / L	No relaxation	IS: 3025 Part 34 - 1988
Fluoride as F	1.86 Mg / L	1.0 Mg / L	1.5 Mg / L	IS: 3025 Part 60 - 2008
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	IS: 3025 Part 43 - 1991
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	IS: 3025 Part 48 - 1994
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 41 - 1992
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	IS: 3025 Part 56 - 2003
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 37 - 1998
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 27 - 1986
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 47 - 1994
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	IS: 3025 Part 49 - 1994
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	APHA 5540 C
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	IS: 3025 Part 52 - 2003
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	IS: 3025 Part 39 - 1991
Alkalinity	364.00 Mg / L	200 Mg / L	600 Mg / L	IS: 3025 Part 23 - 1986
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	IS: 3025 Part 55 - 2003
Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	IS: 3025 Part 57 - 2005
Bacteriological Characteristics				
Coliform Organisms	26 CFU	10 CFU	10 CFU	IS: 1622 - 1981
E. Coli	Absent	Absent	Absent	IS: 1622 - 1981

Significance of Water analysis

Parameter	Results	Desirable Limit	Permissible Limit in absence of alternate source	Instrument Detection Limit	Undesirable effect outside the Desirable Limit
Color, Hazen Units	< 1	5	25	1	Above 5 consumer acceptance decreases
Turbidity, NTU	< 1	5	10	1	Above 5 consumer acceptance decreases
Residual Free Chlorine	< 0.1 Mg / L	0.2 Mg / L	-	0.1 Mg / L	To be applicable when water is chlorinated
Copper as Cu	< 0.02 Mg / L	0.05 Mg / L	1.5 Mg / L	0.02 Mg / L	Encrustation in water supply structure and adverse effects on domestic use
Manganese as Mn	< 0.01 Mg / L	0.1 Mg / L	0.3 Mg / L	0.01 Mg / L	Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures
Phenolic Compounds as C ₆ H ₅ OH	< 0.001 Mg / L	0.001 Mg / L	0.002 Mg / L	0.001 Mg / L	Beyond this, it may cause objectionable taste and odour
Mercury as Hg	< 0.2 µg / L	0.001 Mg / L	No relaxation	0.2 µg / L	Beyond this, the water becomes toxic
Cadmium as Cd	< 0.005 Mg / L	0.01 Mg / L	No relaxation	0.005 Mg / L	Beyond this, the water becomes toxic
Selenium as Se	< 0.005 Mg / L	0.01 Mg / L	No relaxation	0.005 Mg / L	Beyond this, the water becomes toxic
Arsenic as As	< 0.005 Mg / L	0.05 Mg / L	No relaxation	0.005 Mg / L	Beyond this, the water becomes toxic
Cyanide as CN	< 0.02 Mg / L	0.05 Mg / L	No relaxation	0.02 Mg / L	Beyond this, the water becomes toxic
Lead as Pb	< 0.01 Mg / L	0.05 Mg / L	No relaxation	0.01 Mg / L	Beyond this, the water becomes toxic
Zinc as Zn	< 0.02 Mg / L	5 Mg / L	15 Mg / L	0.02 Mg / L	Beyond this limit it can cause astringent taste and an opalescence in water
Anionic Detergents as MBAS	< 0.1 Mg / L	0.2 Mg / L	1.0 Mg / L	0.1 Mg / L	Beyond this limit it can cause a light froth in water
Chromium as Cr+6	< 0.02 Mg / L	0.05 Mg / L	No relaxation	0.02 Mg / L	May be carcinogenic above this limit
Mineral Oil	< 0.01 Mg / L	0.01 Mg / L	0.03 Mg / L	0.01 Mg / L	Beyond this limit undesirable taste and odour after chlorination take place Toxic
Aluminum as Al	< 0.005 Mg / L	0.03 Mg / L	0.2 Mg / L	0.005 Mg / L	Beyond this limit taste becomes unpleasant Cumulative effect is reported to cause dementia

Boron as B	< 0.02 Mg / L	1 Mg / L	5 Mg / L	0.02 Mg / L	-
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Annexure 4



Vardan EnviroLab

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Laboratory: Samaspur, Opposite Amity School, Sector-51, Gurgaon (Hr)

Branch Off: J-3, Subhash Marg, C-Scheme, Jaipur (Rajasthan) Tel: 0141-4026275

(ISO 9001 | ISO 14001 | OHSAS 18001 | MoEF & CC Recognized | NABL Accredited | HSPCB & RSPCB Approved)

Test Certificate

Sample Number:	VEL/TPL-Ramgarh/A/01	Report No.:	VEL/A/1612/14007
Issued To:	M/s Tata Projects Limited	Format No.:	5.10 F-01
	Construction of 400 kV D/C Twin ACSR Moose	Party Reference No.:	NIL
	Ramgarh-Akal Transmission Line-RVPL Project	Reporting Date:	17/12/2016
	Jaisalmer (200134)		

Sample Description : Ambient Air Quality Monitoring

General Information:-

Client Representative	: Mr.Dharmendra
Sample collected by (Name & Designation)	: Mr.Tarun Singh
Type of Project	: Construction Project
Sampling Location	: Akal village near location no. AP-5
Latitude	: 26° 50' 0.2'' N
Longitude	: 071° 03' 50.6''E
Date of commencement of monitoring	: 11/12/2016
Date of end of monitoring	: 12/12/2016
Sampling Duration	: 24 Hrs
Instrument Used	: RDS & FPS
Instrument Calibration Status	: Calibrated
Meteorological condition including wind direction	: Clear Sky
Sampling & Analysis Protocol	: IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	34.67	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	67.89	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reffirmed-1998	10.78	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	6.98	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

Note:-On the Basis of Monitoring & analysis, the results found are well within Max Permissible limit

NOTE: a) The results listed refer only to the tested samples & applicable parameters
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Test Certificate

Sample Number:	VEL/TPL-Ramgarh/A/02	Report No.:	VEL/A/1612/14008
Issued To:	M/s Tata Projects Limited	Format No.:	5.10 F-01
	Construction of 400 kV D/C Twin ACSR Moose	Party Reference No.:	NIL
	Ramgarh-Akal Transmission Line-RVPNL Project	Reporting Date:	17/12/2016
	Jaisalmer (200134)		

Sample Description : Ambient Air Quality Monitoring

General Information:-

Client Representative	: Mr.Dharmendra
Sample collected by (Name & Designation)	: Mr.Tarun Singh
Type of Project	: Construction Project
Sampling Location	: Hamira Village near location no.AP-15
Latitude	: 27° 00' 36.1'' N
Longitude	: 077° 05' 52.8'' E
Date of commencement of monitoring	: 11/12/2016
Date of end of monitoring	: 12/12/2016
Sampling Duration	: 24 Hrs
Instrument Used	: RDS & FPS
Instrument Calibration Status	: Calibrated
Meteorological condition including wind direction	: Clear Sky
Sampling & Analysis Protocol	: IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	32.34	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	65.60	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reaffirmed-1998	10.98	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	7.87	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

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Test Certificate

Sample Number: VEL/TPL-Ramgarh/A/03
Issued To: M/s Tata Projects Limited
Construction of 400 kV D/C Twin ACSR Moose
Ramgarh-Akal Transmission Line-RVPL Project
Jaisalmer (200134)
Sample Description: Ambient Air Quality Monitoring

Report No.: VEL/A/1612/14009
Format No.: 5.10 F-01
Party Reference No.: NIL
Reporting Date: 17/12/2016

General Information:-

Client Representative : Mr.Dharmendra
Sample collected by (Name & Designation) : Mr.Tarun Singh
Type of Project : Construction Project
Sampling Location : Hadda near location No. AP-22
Latitude : 27° 04' 44.2'' N
Longitude : 071° 01' 47.6'' E
Date of commencement of monitoring : 11/12/2016
Date of end of monitoring : 12/12/2016
Sampling Duration : 24 Hrs
Instrument Used : RDS & FPS
Instrument Calibration Status : Calibrated
Meteorological condition including wind direction : Clear Sky
Sampling & Analysis Protocol : IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	35.56	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	72.60	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reaffirmed-1998	11.89	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	7.67	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

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Test Certificate

Sample Number:	VEL/TPL-Ramgarh/A/04	Report No.:	VEL/A/1612/14010
Issued To:	M/s Tata Projects Limited	Format No.:	5.10 F-01
	Construction of 400 kV D/C Twin ACSR Moose	Party Reference No.:	NIL
	Ramgarh-Akal Transmission Line-RVPL Project	Reporting Date:	17/12/2016
	Jaisalmer (200134)		

Sample Description : Ambient Air Quality Monitoring

General Information:-

Client Representative	: Mr.Dharmendra
Sample collected by (Name & Designation)	: Mr.Tarun Singh
Type of Project	: Construction Project
Sampling Location	: Asda near location no. 25/13
Latitude	: 27° 08' 51.1'' N
Longitude	: 070° 56' 11.5'' E
Date of commencement of monitoring	: 11/12/2016
Date of end of monitoring	: 12/12/2016
Sampling Duration	: 24 Hrs
Instrument Used	: RDS & FPS
Instrument Calibration Status	: Calibrated
Meteorological condition including wind direction	: Clear Sky
Sampling & Analysis Protocol	: IS-5182 & CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	32.20	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006 & CPCB Guidelines	65.78	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reaffirmed-1998	10.70	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	7.50	µg/m ³	80
5.	Carbon Monoxide (CO)	IS: 5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)] 16.11.2009

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Test Certificate

Sample Number: VEL/TPL-Ramgarh/A/05
Issued To: M/s Tata Projects Limited
Construction of 400 kV D/C Twin ACSR Moose
Ramgarh-Akal Transmission Line-RVPNL Project
Jaisalmer (200134)
Report No.: VEL/A/1612/14011
Format No.: 5.10 F-01
Party Reference No.: NIL
Reporting Date: 17/12/2016
Sample Description : Ambient Air Quality Monitoring

General Information:-

Client Representative : Mr.Dharmendra
Sample collected by (Name & Designation) : Mr.Tarun Singh
Type of Project : Construction Project
Sampling Location : Kandiyala Village near location no-26/4
Latitude : 27° 09' 58.5'' N
Longitude : 070° 54' 31.9'' E
Date of commencement of monitoring : 11/12/2016
Date of end of monitoring : 12/12/2016
Sampling Duration : 24 Hrs
Instrument Used : RDS & FPS
Instrument Calibration Status : Calibrated
Meteorological condition including wind direction : Clear Sky
Sampling & Analysis Protocol : IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	31.12	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	66.78	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reffirmed-1998	10.89	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	7.67	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

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Test Certificate

Sample Number: **VEL/TPL-Ramgarh/A/06** Report No.: **VEL/A/1612/14012**
Issued To: **M/s Tata Projects Limited** Format No.: **5.10 F-01**
Construction of 400 kV D/C Twin ACSR Moose Party Reference No.: **NIL**
Ramgarh-Akal Transmission Line-RVPL Project Reporting Date: **17/12/2016**
Jaisalmer (200134)

Sample Description : **Ambient Air Quality Monitoring**

General Information:-

Client Representative : Mr.Dharmendra
Sample collected by (Name & Designation) : Mr.Tarun Singh
Type of Project : Construction Project
Sampling Location : Gogadev Village near location no.27/1
Latitude : 27° 11' 41.4'' N
Longitude : 070° 53' 35.7'' E
Date of commencement of monitoring : 11/12/2016
Date of end of monitoring : 12/12/2016
Sampling Duration : 24Hrs
Instrument Used : RDS & FPS
Instrument Calibration Status : Calibrated
Meteorological condition including wind direction : Clear Sky
Sampling & Analysis Protocol : IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	30.54	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	65.62	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reaffirmed-1998	10.67	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	6.45	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

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Test Certificate

Sample Number: VEL/TPL-Ramgarh/A/07
Issued To: M/s Tata Projects Limited
Construction of 400 kV D/C Twin ACSR Moose
Ramgarh-Akal Transmission Line-RVPL Project
Jaisalmer (200134)
Report No.: VEL/A/1612/14013
Format No.: 5.10 F-01
Party Reference No.: NIL
Reporting Date: 17/12/2016

Sample Description : Ambient Air Quality Monitoring

General Information:-

Client Representative : Mr.Dharmendra
Sample collected by (Name & Designation) : Mr.Tarun Singh
Type of Project : Construction Project
Sampling Location : Moti Killo Ki Dhani near location no. 27/5
Latitude : 27° 12' 09.8'' N
Longitude : 070° 53' 19.9'' E
Date of commencement of monitoring : 11/12/2016
Date of end of monitoring : 12/12/2016
Sampling Duration : 24Hrs
Instrument Used : RDS & FPS
Instrument Calibration Status : Calibrated
Meteorological condition including wind direction : Clear Sky
Sampling & Analysis Protocol : IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	28.81	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	58.56	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reffirmed-1998	10.89	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	6.76	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

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Laboratory: Samaspur, Opposite Amity School, Sector-51, Gurgaon (Hr)

Branch Off: J-3, Subhash Marg, C-Scheme, Jaipur (Rajasthan) Tel: 0141-4026275

(ISO 9001 | ISO 14001 | OHSAS 18001 | MoEF & CC Recognized | NABL Accredited | HSPCB & RSPCB Approved)

Test Certificate

Sample Number: **VEL/TPL-Ramgarh/A/08** Report No.: **VEL/A/1612/14013**
Issued To: **M/s Tata Projects Limited** Format No.: **5.10 F-01**
Construction of 400 kV D/C Twin ACSR Moose Party Reference No.: **NIL**
Ramgarh-Akal Transmission Line-RVPL Project Reporting Date: **17/12/2016**
Jaisalmer (200134)

Sample Description : **Ambient Air Quality Monitoring**

General Information:-

Client Representative : Mr.Dharmendra
Sample collected by (Name & Designation) : Mr.Tarun Singh
Type of Project : Construction Project
Sampling Location : Khivasar near location no.- 31/3
Latitude : 27° 16' 40.2'' N
Longitude : 070° 50' 53.6'' E
Date of commencement of monitoring : 11/12/2016
Date of end of monitoring : 12/12/2016
Sampling Duration : 24Hrs
Instrument Used : RDS & FPS
Instrument Calibration Status : Calibrated
Meteorological condition including wind direction : Clear Sky
Sampling & Analysis Protocol : IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	30.12	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	66.23	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reffirmed-1998	11.67	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	7.07	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	0.56	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

Note:-On the Basis of Monitoring & analysis, the results found are well within Max Permissible limit

NOTE: a) The results listed refer only to the tested samples & applicable parameters
b) Total liabilities of our lab will be restricted to the invoice amount only
c) The sample will be destroyed after retention time unless otherwise specified
d) This report is not to be reproduced wholly or in part and cannot be used as evidence in the court of law





Vardan EnviroLab

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Laboratory: Samaspur, Opposite Amity School, Sector-51, Gurgaon (Hr)
Branch Off: J-3, Subhash Marg, C-Scheme, Jaipur (Rajasthan) Tel: 0141-4026275
(ISO 9001|ISO 14001|OHSAS 18001|MoEF & CC Recognized|NABL Accredited|HSPCB & RSPCB Approved)

Test Certificate

Sample Number: **VEL/TP-L-Ramgarh/A/09** Report No.: **VEL/A/1612/14015**
Issued To: **M/s Tata Projects Limited** Format No.: **5.10 F-01**
Construction of 400 kV D/C Twin ACSR Moose Party Reference No.: **NIL**
Ramgarh-Akal Transmission Line-RVPNL Project Reporting Date: **17/12/2016**
Jaisalmer (200134)

Sample Description : **Ambient Air Quality Monitoring**

General Information:-

Client Representative : Mr.Dharmendra
Sample collected by (Name & Designation) : Mr.Tarun Singh
Type of Project : Construction Project
Sampling Location : Parevar Village near location no.AP-42
Latitude : 27° 16' 40.2'' N
Longitude : 070° 50' 53.6'' E
Date of commencement of monitoring : 11/12/2016
Date of end of monitoring : 12/12/2016
Sampling Duration : 24Hrs
Instrument Used : RDS & FPS
Instrument Calibration Status : Calibrated
Meteorological condition including wind direction : Clear Sky
Sampling & Analysis Protocol : IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	29.12	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	64.13	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Refirmed-1998	10.78	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	6.56	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	0.54	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

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Branch Off: J-3, Subhash Marg, C-Scheme, Jaipur (Rajasthan) Tel: 0141-4026275

(ISO 9001|ISO 14001|OHSAS 18001|MoEF & CC Recognized|NABL Accredited|HSPCB & RSPCB Approved)

Test Certificate

Sample Number: VEL/TPL-Ramgarh/A/10
Issued To: M/s Tata Projects Limited
Construction of 400 kV D/C Twin ACSR Moose
Ramgarh-Akal Transmission Line-RVPL Project
Jaisalmer (200134)
Report No.: VEL/A/1612/14016
Format No.: 5.10 F-01
Party Reference No.: NIL
Reporting Date: 17/12/2016

Sample Description : Ambient Air Quality Monitoring

General Information:-

Client Representative : Mr.Dharmendra
Sample collected by (Name & Designation) : Mr.Tarun Singh
Type of Project : Construction Project
Sampling Location : Joga Village near location no.44/7
Latitude : 27° 21' 20.3'' N
Longitude : 070° 37' 42.7'' E
Date of commencement of monitoring : 11/12/2016
Date of end of monitoring : 12/12/2016
Sampling Duration : 24Hrs
Instrument Used : RDS & FPS
Instrument Calibration Status : Calibrated
Meteorological condition including wind direction : Clear Sky
Sampling & Analysis Protocol : IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	28.70	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	60.23	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reaffirmed-1998	10.20	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	7.03	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

Note:-On the Basis of Monitoring & analysis, the results found are well within Max Permissible limit

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Test Certificate

Sample Number: VEL/TPL-Ramgarh/A/11
Report No.: VEL/A/1612/14017
Issued To: M/s Tata Projects Limited
Format No.: 5.10 F-01
 Construction of 400 kV D/C Twin ACSR Moose
Party Reference No.: NIL
 Ramgarh-Akal Transmission Line-RVPNL Project
Reporting Date: 17/12/2016
 Jaisalmer (200134)

Sample Description : Ambient Air Quality Monitoring

General Information:-

Client Representative : Mr.Dharmendra
 Sample collected by (Name & Designation) : Mr.Tarun Singh
 Type of Project : Construction Project
 Sampling Location : Ramgarh near location no. Ap-46
 Latitude : 27° 20' 11.7' N
 Longitude : 070° 32' 45.8''E
 Date of commencement of monitoring : 11/12/2016
 Date of end of monitoring : 12/12/2016
 Sampling Duration : 24Hrs
 Instrument Used : RDS & FPS
 Instrument Calibration Status : Calibrated
 Meteorological condition including wind direction : Clear Sky
 Sampling & Analysis Protocol : IS-5182& CPCB Guidelines

TEST RESULTS

S. No.	Parameter	Protocol	Result	Unit	Limits Max.*
1.	Particulate Matter (PM _{2.5})	CPCB Guidelines (PM _{2.5} sampler-Gravimetric)	30.23	µg/m ³	60
2.	Particulate Matter (PM ₁₀)	IS: 5182 (P-23), 2006&CPCB Guidelines	60.50	µg/m ³	100
3.	Nitrogen Dioxide (NO ₂)	IS: 5182 (P-6), 1975 Reaffirmed-1998	10.10	µg/m ³	80
4.	Sulphur Dioxide (SO ₂)	IS: 5182 (P-2), 2001	6.35	µg/m ³	80
5.	Carbon Monoxide (CO)	IS:5182 (P-10), 1999	<0.50	mg/m ³	4

*NAAQS – National Ambient Air Quality Standards; Schedule-VII, [Rule 3 (3B)], [Part-II-sec.-3(i)]16.11.2009

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