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Certified Company

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED

[Corporate Identity Number (CIN):L40109R]2000SGC016485]

Regd. Office: Vidyut Bhawan, Jyoti Nagar, Jaipur-302005.

OFFICE OF THE ADDL. CHIEF ENGINEER (COMMUNICATION)

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No. RVPN/ACE/COMM/Tech./F. /D. 118 Jaipur Dt:- 25-09-2024

ORDER

Sub: General guidelines for installation of PLCC and FOTE equipment on 765kV/400kV/220kV/132kV GSS of RVPN.

Presently analog communication system used over Power line namely power line carrier communication (PLCC) in RVPN on 765kV/400kV/220kV/132kV lines for carrier aided protection of transmission lines, real time data transmission of Grid substations to State Load Dispatch Centre (SLDC) Heerapura Jaipur and speech communication for exchanging grid operation related messages between Grid Sub Stations.

Due to the increasing numbers of sub-stations the present communication system is facing frequency congestion issue, analog systems are more prone to noise, the analog communication is now phasing out from the industry and is being replaced by Digital PLCC Communication system.

Also to implement smart grid applications more signals are required viz speech over IP, video surveillance, data acquisition and control commands over Ethernet, which requires large amount of bandwidth for transmission of signals. Hence optical fiber communication over OPGW and OFC underground cables are used in RVPN on various communication techniques viz SDH/PDH, MPLS -IP and MPLS -TP.

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Digitally signed by Ramawatar
Kanwadia
Designation : Additional Chief Engineer
Date: 2024.09.25 17:29:06 IST
Reason: Approved

Presently no standard practice has been adopted for intra-state transmission network (ISTS) for installation of Communication system over these lines in RVPN.

Looking to the above aspects & to upgrade the RVPN communication system with the latest technology available the communication system guideline of RVPN has been approved by Hon'ble MD RVPN Jaipur on E-file No RVPN/ACE/COMM/TECH/23-24/F.01-00045.

In view of above and as per direction of Director (Operation) RVPN, this order is being issued and shall be applicable to all the future departmental/turnkey/deposit works, including which are not started on the date of issue of this order (at the appropriate stage as applicable). The communication system at existing GSS/line will not be replaced with this order till their useful service life. However if required this order shall be implemented under augmentation of communication system.

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Kanwadia
Designation : Additional Chief Engineer
Date: 2024.09.25 17:29:06 IST
Reason: Approved

The detailed order for implementation of communication system guideline for upcoming 765/400/220/132kV GSS of RVPN, deposit work of Private Power Developers/CPPP/IPPP Consumers and 765/400/220 line section of ISTS network is as under:

A. Communication system guideline for upcoming 765/400/220/132kV GSS of RVPN.

1. 765/400kV GSS of RVPN.

Design Criterion	Present practice	Approved Communication System after issue of this order
Mode of Communication	PLCC & OPGW	PLCC & OPGW
PLCC Channels (Point to Point)	2 Channel for Carrier Protection 1 Channel for Speech 1 Channel for Data (IEC 101)	<ul style="list-style-type: none"> a. One 4kHz to 16kHz Channel Digital PLCC carrier terminal with Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications. b. One 4kHz to 16kHz Channel Digital PLCC carrier terminal without Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications.

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Fiber Optic Communication (Point to Point)	SDH (STM-1) & PDH (64kbps applications)	<ul style="list-style-type: none"> a. SDH of STM-4/16 capacity(mesh topology point to point with integrated PDH for 64kbps applications on all 400kV Circuits comprising services viz Carrier protection, Data IEC 101 & 104(Baud rate up to 38.4k), L2 LAN, Differential protection, VOIP phone and E&M facility for speech. b. 1G MPLS IP connectivity (ring topology) from 220/132kV Circuits comprising IEC 104 data transmission through DCU, VOIP phone, Video Camera and internet connectivity from associated 220/132kV Circuits
OPGW		OPGW to be laid on associated all 400kV /220kV/132kV Circuits
DC System	Dual Source of 48V 600AH Battery set, 48V 100A (N+1) SMPS Battery Charger & 50V DCDB with changeover facility	<ul style="list-style-type: none"> a. Dual Source of 48V 800AH Battery set and 48V 150A (N+1) SMPS Battery Charger& 50V DCDB with auto changeover facility b. It is proposed to install Battery set, Battery charger and DCDB in a kiosk which is equidistant from other kiosk and control room.

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2. 220kV GSS of RVPN.

Design Criterion	Present Practice	Approved Communication System after issue of this order
Mode of Communication	PLCC	PLCC and OPGW
PLCC Channels (Point to Point)	1 Analog Channel for Protection 1 Analog Channel for Speech 1 Analog Channel for Data (IEC 101)	One 4kHz to 16kHz Channel Digital PLCC carrier terminal with Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications.
Fiber Optic Communication	MPLS – IP connectivity through two directions of 132kV Lines	1G MPLS IP connectivity (ring topology) from at least two 132kV Circuits and one 220kV Circuit comprising IEC 104 data transmission, VOIP phone, Video Camera and internet connectivity from associated 220/132kV Circuits.
OPGW	Laid on at least two 132kV Circuits	OPGW to be laid on at least two 132kV Circuits and one 220kV Circuit
DC System	Dual Source of 48V 360AH Battery set, 48V 100A (N+1) SMPS Battery Charger & 50V DCDB	a. Dual Source of 48V 600AH Battery set and 48V 100A (N+1) SMPS Battery Charger & 50V DCDB with auto change over facility

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3. 132kV GSS of RVPN.

Design Criterion	Present Practice	Approved Communication System after issue of this order
Mode of Communication	PLCC	OPGW
PLCC Channels	One common channel for Speech and Data	No PLCC Communication required subject to availability of MPLS-IP connectivity at the time of commissioning of GSS If MPLS IP connectivity is not established till commissioning of GSS then PLCC system with One 4kHz to 16kHz Channel Digital PLCC carrier terminal without Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications will be used on phase to ground coupling mode
Fiber Optic Communication	MPLS – IP connectivity through two directions of 132kV Lines	1G MPLS IP connectivity from at least two 132kV Circuits comprising IEC 104 data transmission, VOIP phone, Video Camera and internet connectivity from associated 132kV Circuits.
OPGW	Connectivity through two directions of 132kV Lines	OPGW to be laid on at least two 132kV Circuits. Except for radial substations where only one connectivity shall exist.
DC System	Single Source of 48V 200AH Battery set, 48V 50A (N+1) SMPS Battery Charger	Dual source of 48V 200AH battery sets and 48V 50A (N+1) SMPS Battery Charger & 50V DCDB with auto change over facility

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B. Communication system guideline for 400/220/132 kV Private Power Developers/CPP/IPP Consumers.

1. 765/400kV GSS (Deposit works)

Design Criterion	Present Practice	Approved Communication System after issue of this order
Mode of Communication	PLCC & OPGW	PLCC & OPGW
PLCC Channels (Point to Point)	2 Channel for Carrier Protection 1 Channel for Speech 1 Channel for Data (IEC 101)	a. One 4kHz to 16kHz Channel Digital PLCC carrier terminal with Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications. b. One 4kHz to 16kHz Channel Digital PLCC carrier terminal without Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications.
Fiber Optic Communication (Point to Point)	SDH (STM-1) & PDH (64kbps applications)	SDH of STM-4/16 capacity(mesh topology point to point with integrated PDH for 64kbps applications on all 400kV Circuits comprising services viz Carrier protection, Data IEC 101 & 104(Baud rate up to 38.4k), L2 LAN, Differential protection, VOIP phone and E&M facility for speech.
OPGW		OPGW to be laid on connecting line to RVPN GSS

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2. 220kV GSS (Deposit works)

Design Criterion	Present Practice	Approved Communication System after issue of this order
Mode of Communication	PLCC	PLCC & OPGW
PLCC Channels (Point to Point)	1 Analog Channel for Protection 1 Analog Channel for Speech 1 Analog Channel for Data (IEC 101)	One 4kHz to 16kHz Channel Digital PLCC carrier terminal with Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications.
Fiber Optic Communication	Not Specified in present guideline.	SDH of STM-4/16 capacity(mesh topology point to point with integrated PDH for 64kbps applications on all 220kV Circuits comprising services viz Carrier protection, Data IEC 101 & 104(Baud rate up to 38.4k), L2 LAN, Differential protection, VOIP phone and E&M facility for speech.
OPGW	Not Specified in present guideline.	OPGW to be laid on connecting line to RVPN GSS

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3. 132kV GSS (Deposit works)

Design Criterion	Present Practice	Approved Communication System after issue of this order
Mode of Communication	PLCC	OPGW
PLCC Channels	One common channel for Speech and Data	No PLCC Communication required.
Fiber Optic Communication	Not Specified in present guideline.	SDH of STM-4/16 capacity(mesh topology point to point with integrated PDH for 64kbps applications on all 132kV Circuits comprising services viz Carrier protection, Data IEC 101 & 104(Baud rate up to 38.4k), L2 LAN, Differential protection, VOIP phone and E&M facility for speech.
OPGW	Not Specified in present guideline.	OPGW to be laid on connecting line to RVPN GSS

- In such cases where communication system is required to be established with the transmission system of RVPN at any voltage level with substation of other utility/ developer/ PPP/ RE/ Individual then following is to be considered:
 - a. The deposit work of communication system of any voltage level should be carried under **Supervision work as per relevant F&R of RVPN**. The developer should procure and commission communication system on approved specifications of RVPN.
 - b. The PLCC/ Fiber Optic Terminal Equipment and OPGW/ Fiber optic cable shall be considered as elements related to transmission line.
 - c. Wave Trap and CVT are to be considered as Substation elements (Bay Equipment).

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C. Communication system guideline for 765/400/220 line section of ISTS network:

- 1. If RVPN is constructing 765/400/220kV GSS with associated LILO of existing ISTS network lines from PGCIL GSS.**

Design Criterion	Present Practice	Approved Communication System after issue of this order
Mode of Communication	PLCC and OPGW	PLCC and OPGW
PLCC Channel (Point to Point)	2 Analog Channel for Carrier Protection 1 Channel for IEC 101 data 1 Channel for Speech Communication	<ol style="list-style-type: none"> a. One 4kHz to 16kHz Channel Digital PLCC carrier terminal with Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications. b. One 4kHz to 16kHz Channel Digital PLCC carrier terminal without Digital Protection Coupler (DTPC), IEC 101 & 104 Data and 4W E&M Speech applications.
Fiber Optic Communication	SDH (STM-1) & PDH (64kbps applications)	SDH of STM-4/16 capacity (mesh topology point to point with integrated PDH for 64kbps applications on all 132kV Circuits comprising services viz Carrier protection, Data IEC 101 & 104 (Baud rate up to 38.4k), L2 LAN, Differential protection, VOIP phone and E&M facility for speech.

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- **If PGCIL is constructing 765/400kV GSS with associated LILO of existing ISTS network lines involving RVPN GSS or new line section from existing RVPN GSS, then procurement of PLCC & FOTE equipment is on the part of PGCIL. No separate communication equipment to be procured by RVPN.**

**(Ramawatar Kanwadia)
Addl. Chief Engineer (Communication)
RVPN Jaipur**

Copy submitted/forwarded to the following for information and n.a

1. The Director (Operation/Technical/Finance), RVPN Jaipur
2. The Chief Controller of Accounts I/II, RVPN, Jaipur.
3. The Chief Engineer (PP&D), RVPN, Jaipur with request to issue directions to concern to incorporating approved guidelines in all DPR of future projects of RVPN.
4. The CE/ACE (T&C/NPPR/LD/Contract/Procurement/IT/MPT&S), RVPN, Jaipur/Ajmer/Jodhpur.
5. The Superintending Engineer (T&C/COMM/MPT&S/Proc.-(I/II)/Automation/Contract-(I/II)) RVPN _____.
6. The Superintending Engineer (MIS), RVPN Jaipur for arranging to upload on RVPN Portal.
7. The TA to Hon'ble MD, RVPN, Jaipur.
8. The Executive Engineer (COMM) RVPN _____.
9. Technical Section.

**Addl. Chief Engineer (Communication)
RVPN Jaipur**

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