

सुनील कुमार
प्रधान कार्यकारी निदेशक मानक विद्युत

Sunil Kumar

Principal Executive Director Stds. Electrical



सत्यमेव जयते

भारत सरकार – रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन

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D.O.No.EL.8.5.10.1

Dt: 01.02.2021

प्रिय श्री मिश्रा,

Sub: PCDO for the month of January, 2021.

1.0 HIGHLIGHTS

One unit of End of Train Telemetry (EoTT) system of M/s Signotron was fitted on Loco No. 32812(WAG9) of ELS/BNDM of SER. Trial of EoTT system provided in Loco No. 32812 was conducted from 02.01.2021 to 11.01.2021 by a team of RDSO, SER& M/s Signotron in ROU-TATA section of SER. Display of BP pressure of LV, Odometer for fouling mark clearance, Emergency brake function, Train integrity function based on GPS, Broadcast of an emergency message, functionality of HVML (High Visibility Marker Light) & DTWL (Disable Train Warning Light) and radio communication between HoT (fitted on Locomotive) & EoT (fitted on Last Vehicle) are observed to have worked satisfactory.

2.0 RELIABILITY IMPROVEMENT

- 2.1 Based on the audit report of the assembly process of 3-phase TM 6FRA6068 at CLW conducted jointly by RDSO, M/s SKF, ELS/GMO, ELS/HWH & ELS/BJU, RDSO vide letter No.EL/2.2.13 dt. 01.01.2021 has sent observations to CLW for submitting action plan to resolve the issues raised during audit.
- 2.2 Joint investigation along with representative of CLW & RDSO held at ELS/LDH from 14.01.2021 to 16.01.2021 carried out on TM bearing seizure cases of 3-phase TM type 6FRA6068 and related issues were communicated to CLW vide letter No.EL/2.2.13 dated 22.01.2021 for rectification of the same.
- 2.3 M/s BHEL has been instructed to resolve reliability issues related with IGBT based propulsion equipments experienced in DLI division reported by Northern Railway vide this office letter No.EL/3.1.35/17 dated 29.01.2021.
- 2.4 M/s BTIPL has been instructed to resolve reliability issues related with IGBT based propulsion equipments experienced in DLI division reported by Northern Railway and Eastern Railway vide this office letter No.EL/3.1.35/17 dated 29.01.2021.

3.0 DEVELOPMENTAL ACTIVITIES

- 3.1 M/s PPS International vide their mail dt.19.01.2021 has submitted revised design document No.EOTT – Design Doc-001, Rev.0, Ver. 1.1 dated 02.01.2021. The document has been examined in reference with FRS No.RDSO/2019/EL/FRS/0025, Rev'0' dt. 25.06.2019 and comments have been communicated vide letter No.EL/4.2.15/EoTT/PPS dated 29.01.2021.

- 3.2 M/s Hind Rectifiers vide their letter No.HRL/PSP/EoTT/12121 dated 12.01.2021 has submitted technical proposal for EoTT system. The document has been examined in reference with FRS No.RDSO/2019/EL/FRS/0025, Rev'0' dt. 25.06.2019 and comments have been communicated vide letter No.EL/4.2.15/EoTT/HRL dated 29.01.2021.
- 3.3 OGA Drawings No.B-R658-89490, Rev-01 & B-R658-89435 Rev-01 & Routine Test Protocol Document ID MRB658/Routine Test Protocol Rev-00 for Regenerative Braking system of M/s Medha for WAG7 locomotives have been provisionally approved vide letter No.EL/3.2.19/RB/Medha dated 28.01.2021.
- 3.4 Deviations noticed regarding on line fresh vendor application for manufacturing & supply of EP assist brake system for 3-phase locomotive have been advised to M/s Knorr-Bremse vide letter No.EL/3.2.19/3-Phase/EP Assist/KBIL dtd. 08.01.2021.
- 3.5 After compliance of deficiencies, M/s Hind Rectifiers Ltd. resubmitted the design document for fresh vendor registration of Computer/microprocessor Controlled air Brake System. The same has been scrutinized and generally found in order. Firm has been advised to develop prototype unit, submit ITR, test protocol and offer prototype test vide letter No.EL/3.2.19/3-Phase/Hind dtd. 13.01.2021.
- 3.6 Current collection trials were done with modified design of pantographs offered by M/s Schunk under High Rise OHE as well as Conventional OHE of Delhi-Rewari/Rewari – Delhi section of Northern Railway from 9th to 10th Jan.'21. Firm pointed out improper OHE condition at certain locations that has resulted in sparking. In order to judge the performance in other sections having High Rise and Conventional OHE, the firm is advised to implement the design modifications referred by the firm in 5 locos each of ELS/GZB and ELS/BRC having both High Reach Pantograph and submit the modified design/drawing/BOM/QAP to RDSO at the earliest vide letter No.EL/2.2.1/High Reach dtd. 19.01.2021
- 3.7 Online application for fresh registration for manufacture and supply of High Reach Pantograph for Electric Locomotives submitted by M/s Sequoia Safety Products has been scrutinized by this office and minor deficiencies advised to firm vide letter No.EL/2.2.1/High Reach/Sequoia dtd. 22.01.2021.
- 3.8 Partial prototype testing of M/s JSTi make 2880 kVA transformer for 25 kV AC microprocessor controlled IGBT based Under-slung EMUs to be supplied by M/s Medha against ICF PO No.08/17/1119/1101/F dated 19.01.2018 has been witnessed at M/s JSTi works at Baddi from 19.01.2021 to 21.01.2021.
- 3.9 The clearance of design documents of M/s Advanced Rail Controls Pvt. Ltd.(ARCPL) make Brake Interface Unit of Distributed Power Wireless Control System to be fitted in tap changer based Electric locomotives having IRAB system has been accorded vide RDSO vide letter No.EL/3.1.3/DPWCS, dated 29.01.2021.
- 3.10 Comments on design document of LTCU for USMEMU to be supplied by M/s Medha have been communicated to PS&EMU Dte vide note No.EL/11.5.5/1/USMEMU/Medha dated 27.01.2021.
- 3.11 Meeting with M/s BHEL was held on 02.01.2021 for discussion on Design of Regenerative Braking feature in WAG-7 locomotive.

- 3.12 M/s Elixir Engineering, Bangalore has been registered in RDSO Vendor Directory as a developmental order.
- 3.13 Name of M/s Sujan Industries included in the list of vendors for developmental orders for spheriblocs for three phase locomotives with limited quantity of Initial supply. Internal Test Report submitted by M/s Sujan Industries, Mumbai has been scrutinized and firm has been advised to submit revised ITR vide letter No.EL/3.1.35/12(Sujan) dated 28.01.2021.
- 3.14 Successful Capacity/Capability assessment of M/s Alan Electronic Systems Pvt. Ltd., Thane has been done on 25.01.2021 and firms name included in the list of vendors for developmental orders for LED based twin beam head light with limited quantity of Initial supply. Same intimated to firm vide letter No.EL/6.11.1 (AESPL) dated 29.01.2021.
- 3.15 Virtual meeting with manufacturer of Bearings was held on 28.01.2021 for development of TBU 150 type of Axle Box Bearing used in WAP-5 locomotives as presently there is only one approved source for this item.
- 3.16 Online application ID No.1108 dated 19.09.2020 of M/s LVH Energy Pvt. Ltd., Bengaluru for fresh vendor registration for manufacturing and supply of LED based Head Light for an electric locomotive was scrutinized and some major deficiencies were not complied. This application has been closed and same has been communicated to firm vide this office letter No.EL/6.11.1 (LVH) dated 31.12.2020.
- 3.17 Prototype test of spheriblocs of M/s Awadh Rail Infra Ltd., Haridwar has been started from 11.01.2021 as per letter No.EL/3.1.35/12(SB) dated 08.01.2021
- 3.18 Online application ID No.1253 dated 10.12.2020 of M/s Signotron (India) Pvt. Ltd., Kolkata for fresh vendor registration for manufacturing and supply of LED Head Light for electric locomotives was scrutinized and accepted by competent authority for further processing with some minor deficiencies. The same has been communicated to firm vide this office letter No.EL/6.11.1 (Signotron) dated 12.01.2021.
- 3.19 Online application ID No.1233 dated 01.12.2020 of M/s Stellar Greentech Pvt. Ltd., Noida for fresh vendor registration for manufacturing and supply of LED Head Light for electric locomotives was scrutinized and major deficiencies were found. The same has been communicated to firm vide this office letter No.EL/6.11.1 (SGPL) dated 13.01.2021.
- 3.20 Online application ID No.1261 dated 11.12.2020 of M/s Nu-Cork Products Pvt. Ltd., Bhiwadi, Rajasthan for fresh vendor registration for manufacturing and supply of Elastic Ring for 3-phase Electric Locomotives was scrutinized and some major deficiencies were found. The same has been communicated to firm for further processing the application vide this office letter No.EL/3.1.35/12 (Nu-Cork) dated 21.01.2021.
- 3.21 Online application ID No.1039 dated 28.07.2020 of M/s Vajra Rubber Products Pvt. Ltd., Kerla for fresh vendor registration for manufacturing and supply of Spheriblocs for electric locomotives was scrutinized and accepted by competent authority for further processing.
- 3.22 Field trial clearance of M/s Prag Industries (India) Pvt. Ltd., Lucknow make Spheriblocs has been given vide letter No.EL/3.1.35/12(PRAG) dated 28.01.2021.

- 3.23 Design Documents of M/s BHEL, Bhopal for Traction Drive System of 25 KV AC Microprocessor controlled IGBT based three phase propulsion system and equipment of On Board EMU to RDSO Specification No.RDSO/PE/SPEC/EMU/ 0096-2008(Rev.4) of Dec 2009 along with ICF Annexure, ICF/EMU/0096-01(Rev. 03) have been scrutinized and comments have been sent to PS&EMU Directorate vide note No.EL/4.2.13 (EMU/BHEL) dated 19.01.2021.

4.0 SPECIFICATION/STR

- 4.1 Specification for single phase to three phase 2 x 130 KVA static converter (SIV) for conventional locomotives, RDSO/2018/EL/SPEC/0140 Rev.'1' has been revised on 21.01.2021.
- 4.2 STR No.RDSO/2007/EL/STR/0015, Rev.'1' for manufacture of air compressor for electric locomotive has been revised on 14.01.2021.
- 4.3 RDSO has issued the technical specification bearing No.RDSO/2021/EL/SPEC/0143, (Rev. '0') for Electric Hybrid (Electric + Battery) locomotives & copy of same has been uploaded on RDSO website vide letter No.EL/0.1.3/Driver, dated 20.01.2021.
- 4.4 RDSO has uploaded the final draft specification bearing No.ELRS/SPEC/ELC/0019 Rev.05 titled "specification for Thin walled flexible elastomeric cable with copper conductor for working voltage (i) upto 750V and (ii) above 750 V upto 1.8kV/3.0kV for Electric locomotives, AC DC EMU, BG AC EMU & EMEMU/Coaching stock" along with reasoned documents on RDSO website for suggestion/comments for 15 days from ZRs/PUs/Prospective vendors vide note No.EL/2.2.37 dated 07.01.2021 besides sending to ZRs/PUs/Prospective vendors through email.
- 4.5 RDSO has uploaded the final draft STR bearing No.RDSO/2017/EL/STR/0087 Rev.01 titled "STR for Thin walled flexible elastomeric cable with copper conductor for working voltage (i) upto 750V and (ii) above 750 V upto 1.8kV/3.0kV for Electric locomotives, AC DC EMU, BG AC EMU & EMEMU/Coaching stock" along with reasoned documents on RDSO website for suggestion/comments for 15 days from ZRs/PUs/Prospective vendors vide note No.EL/2.2.37 dated 07.01.2021 besides sending to ZRs/PUs/Prospective vendors through email.
- 4.6 RDSO has uploaded the final draft STR bearing No.RDSO/2007/EL/STR/0020 Rev.01 titled "STR for Thin walled flexible chemical cross linked elastomeric cable with copper conductor for working voltage (i) upto 750V and (ii) above 750 V upto 1.8kV/3.0kV for Electric locomotives, AC DC EMU, BG AC EMU & EMEMU/Coaching stock" along with reasoned documents on RDSO website for suggestion/comments for 15 days from ZRs/PUs/Prospective vendors vide note No.EL/2.2.37 dated 07.01.2021 besides sending to ZRs/PUs/Prospective vendors through email.
- 4.7 The Specification for Cable Transit System with EPDM rubber module used in electric locomotives/EMU/MEMU/Metro has been revised as Specification No.RDSO/2008/EL/SPEC/0067, Rev. '3' dated 29.01.2021.
- 4.8 The Schedule of Technical Requirements (STR) for manufacture & supply of Cable Transit System with EPDM rubber module for Electric locomotives/EMU/MEMU/Metro has been revised as STR No.RDSO/2014/EL/STR/0082, Rev. '1' dated 29.01.2021.

- 4.9 Final Draft for Revised Specification No.RDSO/2017/EL/SPEC/0134, Rev.2 for LED based Twin beam headlight used in Electric Locomotives and EMUs is uploaded to RDSO website for 15 days for comments/suggestions.

5.0 PROTOTYPE TESTING/QUALITY AUDIT

- 5.1 Prototype inspection of DE end TM bearing (NU2236) for traction motor type 6FRA 6068 manufactured indigenously by M/s SKF, Ahmedabad was carried out from 06.01.2021 to 08.01.2021 at their Works at Ahmedabad. Chemical composition test results of the bearing material from NABL accredited lab is awaited from M/s SKF.
- 5.2 Prototype testing of Traction Motor Type 6FRA6068 manufactured by M/s Siemens was carried out at the works of M/s Siemens/Nashik & Mumbai for 1 loco Set from 11.01.2021 to 23.01.2021 against Purchase Order No.061712711.18138981 dated 26/06/2018 of BLW jointly by RDSO & CLW.
- 5.3 Prototype testing of Traction Motor Type 1TB2626-OTB03 for WAG9HH 9K/WAP7HH manufactured by M/s Siemens was carried out at the works of M/s Siemens/Nashik & Mumbai for 1 loco Set from 11.01.2021 to 23.01.2021 against Purchase Order No.70/18/1145(GT) dated 04.12.2017 and Amendment No.1-70/18/1145(GT) dated 03.01.2018 & Modification advice no.70/18/1145(GT) dated 22.05.2018 jointly by RDSO & CLW.
- 5.4 Prototype testing for oil lubricated compressor model SDC1745 US of M/s Saber Dais has been carried out online/offline from 28.12.2020 to 22.01.2021. Test report are under scrutiny

6.0 OTHER ITEMS

- 6.1 In reference to Railway Board letter no.2020/E&R/7(14)/5 dated 20.10.2020,RDSO vide letter No.EL/3.2.182(ED-Lab) dated 06.01.2021 has submitted the desired information and has requested to sanction closure of work "Setting up a state of art Electrical Laboratory in RDSO".
- 6.2 Capability cum capacity assessment of M/s IC Electricals Company for fresh vendor registration reference ID:1124 dt.09.10.2020 for manufacturing and supply of Single phase to three phase 2 x 130 KVA Static Converter (SIV) for Conventional Locomotives was conducted on-line on 11.01.2021. Capability report has been prepared and submitted on 27.01.2021.
- 6.3 Revised design documents No.MAE675UM/Traction Motor/Design document Rev. 6 CD-2644 of traction motor for Under slung project of M/s Medha due to MEMU gross load has changed from 720 ton to 820 ton has been submitted by PS & EMU Directorate vide note No.EL/1.3.16.6/Under-Slung MEMU/Medha dated 08.12.2020. Further, 'Train Run Simulation' document No.MAE675UM/Traction Simulations/MD (CD-2505 Rev-09) and clarification due to change of weight of MEMU submitted by PS & EMU Directorate vide note No.EL/1.3.16.6/Under-Slung MEMU/Medha dated 22.01.2021 has been examined. Type Test & Special Test Protocol No.MTEPL/EMU/TM/TYPE TEST/001 Rev.05 & Routine Test Protocol No.MTEPL/NS/EMU/TM/RT/001 Rev.04 has been provisionally approved for prototype testing vide note No.EL/3.2.182/Under-Slung EMU/MEMU/Medha dated 28.01.2021
- 6.4 MP Dte. & PS & EMU Dte. have been requested vide Note No.EL/2.2.9/10, dated 19.01.2021 to peruse the specification (Part-I, Part-II & Part-III) for Energy cum speed


monitoring system and correct the relevant clause(s), especially the clauses in Red text of concerned specification as per requirement for incorporating the comments before uploading the initial draft on RDSO website.

- 6.5 RDSO official was deputed for conducting the NTPC exam conducted by RRB/Gorakhpur from 16.01.2021 to 22.01.2021 at Lucknow.
- 6.6 ECR has been advised the load charts etc. for utilization of WAP4 class of locomotive in freight operation vide RDSO letter No.EL/3.1.39/1, dated 01.01.2021.
- 6.7 Haulage charts of various class of electric freight locomotives required for operation of 25T axle load wagon beyond 45 kmph has been sent to Track Design Dte vide RDSO note No.EL/3.1.39/1, dated 05.01.2021.
- 6.8 MP Dte. has been advised regarding the TM current limit at 30t tractive effort per locomotive for WAG-5 class of electric locomotives vide note No.EL/3.1.28 dated 29.01.2021.
- 6.9 RDSO officials from Electrical along with Signal Dte visited Railway station, Charbagh, Lucknow on 11.01.2021 to identify the space in WAP5 locomotive for installation of On-board TCAS equipment(s).
- 6.10 RDSO vide letter No.EL/0.1.3/Driver dated 27.01.2021 has requested Railway Board to assign the responsibility for vendor development of Crew Voice & Video Recording System (CVVRS) to CLW instead of RDSO (Electrical Dte.).
- 6.11 In compliance to Railway Board letter No.97/Elect.(TRS)/113/113/4 dated 11.03.2020, RDSO in consultation with Zonal Railways has prepared an action plan to resolve the problem faced by Zonal Railways in procurement of spares of conventional locomotives and submitted to Railway Board vide letter No.EL/RB/Policy dated 25.01.2021 for issue of necessary directives.
- 6.12 Letter has been sent to SER & ECR for Rating Performance, Adhesion and Signal Interference trial of WAH-9HH locomotive vide this office letter No.3.1.35/4 (WAH9HH) dated 29.01.2021.

Encl: Annexure I ,II & III

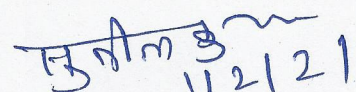
रहित,

Yours sincerely,


11/2/21
(Sunil Kumar)

Shri P.S. Mishra,
Member Traction & Rolling Stock,
Railway Board, Rail Bhavan,
New Delhi - 110 001

Copy for kind information to-
Additional Member (Traction), Railway Board, New Delhi.


11/2/21
(Sunil Kumar)

Pr.Exe.Dir.Stds. Electrical

Status of un-modified motor support in WAP7 & WAG9/9H three phase locomotives

Rly	Shed	TM location	WAP7	WAG9H	Total no. of bogies	Balance to be modified	PDC
CR	AQ	1,2	28	204	232	6	Feb' 21
		3	30	257	287	161	June'21
	KYN	3	0	29	58	23	June' 21
ECR	GMO	3	0	2	4	4	Feb'21
SCR	LGD	3	0	116	116	80	March 21
	KZJ	3/4	0	200	200	20	Feb'21
SECR	BIA	3/4	0	57	114	15	Feb'21

Note: Following sheds have already modified motor support in all locations of bogies.
HWH, WAT, LDH, CNB, BRC, ED, BNDM, SRC, ET, NKJ, RPM, TKD, BSL, GZB.

Status of modified/unmodified brake lever of WAG-9/9H locomotive as per MS 455 issued on Dec'16.

SN	Shed	No. of WAG-9/9H locos	Modified with TBU/PBU	Un-Modified with TBU/PBU	Converted to conventional rigging
1	BSL	30	13	0	17
2	AQ	161	92	60	9
3	KYN	29	8	15	6
4	GMO	239	03	162	74
5	WAT	185	22	108	55
6	LDH	129	22	0	107
7	CNB	95	12	0	83
8	LGD	130	28	50	52
9	KZJ	100	38	14	48
10	TATA	133	0	113	20
11	BIA	94	38	56	0
12	TKD	103	82	0	21
13	NKJ	08	03	01	04
14	BNDM	82	0	19	63
Total		1537	361	599	575

Position of Provision of 2 High Reach Pantograph in electric locomotives as on 31.01.2021

RLY	Shed	Cummulative position. How many locos with type of loco and its number provided with 2 HRPTs so far	Population of HRPTs
CR	AQ	28 WAG-9 32005, 31264, 32032,32052, 31114,31116, 32073, 31271, 31276, 31981, 31110, 32374, 31280, 31027, 31270, 31277, 31439, 31273, 31484, 31359, 31076,31464, 31224, 31278,31259, 31104,31111, 31115	58
CR	KYN	12 WAG9 (32194, 31575,32431, 31453, 31384, 32262,31387,32242, 31382, 31367, 31584, 31450)	25
CR	BSL	23 WAG9 (31560, 31406, 31738, 31642, 31403, 31516, 32401, 31402, 31404, 31405, 32432, 32273, 32429, 31645, 32274, 32377,32270, 41043, 32278, 31769, 32381, 32355, 41047)	46
NR	LDH	23 WAG9 (32142, 32387, 32455, 31665, 32166, 32286, 32315, 32263, 32246, 32317, 32436, 32454, 32585, 32283, 32252, 32397, 32584, 32261, 32680, 32186, 32383, 32193, 32313) 3 WAG-7 (24590, 24583, 24580)	50
NR	TKD/D	10 WAP1 (22024, 22028, 22029, 22036, 22039, 22040, 22049, 22050, 22056, 22076) 1 WAP4 (22345)	33
NR	GZB	22 WAP5 (30001, 30011, 30014, 30018, 30021, 30022, 30024, 30028, 30030, 30043,30098, 30100, 30132, 30133, 30135, 30146, 30149, 30163, 30164, 30165, 30187, 30188) 08 WAP7 (30600, 37324, 37236, 37336, 30747, 37054, 39006, 39097)	60
NR	KJGY	4 WAG-9 (32805, 32714, 32804, 32803)	8
NCR	JHS		21
NCR	CNB	25 WAG9 (32265, 32394, 32233, 32229, 32433, 32291. 32308, 32268, 32338, 32645,32266, 32346, 32244, 32446,32256,32309,32255, 32448, 32550,32287.)-Both side HRPTs Rev-2 (32549,32318,32307,32545,32398-PT2 HRPTs Rev-1)	50
ER	ASN	0	0
ER	HWH	0	0
ER	BWN	16 WAG9 (31619, 31416, 32515, 32563, 32516, 32560,31418,31409, 32557, 32451,34015, 34011,32450, 32562, 31551, 32449)	33

ECR	GMO	In 17 WAG9 Locomotive both side high reach Pantograph provided. (1. 32289, 2. 32339, 3. 32652, 4. 31853, 5. 31473, 6. 31859, 7. 31857, 8. 31509, 9. 31533, 10. 31488, 11. 31413, 12. 31834, 13. 31508 14. 31489, 15. 31546, 16.31532, 17. 31467)	35
ECR	MGS	3(WAG7-27038, 27032,27057)	6
ECR	BJU	5 WAG-9 (32334,32444, 32445,32457,32340)	10
ECOR	ANGL	0	2
ECOR	VSKP	9 WAG-9 (31625, 32607, 32810, 32809, 31623, 32693,32690, 31987,32682)	18
SCR	KZJ	23 WAG-9 (34001, 34002, 32542,32247, 32458, 32325, 32718, 32280, 32408, 32410,32649, 32389 GY,32279,32520,32461, 32282,32456, 32044 GY, 32695 32720,32322,32323) (32066 GY HRPTs Provided by ELS/LGD)	46
SCR	LGD	15 WAG9 (31143, 32367, 32480, 32418, 32413, 32481,32670,32363,32798,32512,32513,31618,31444,32928,41019)	33
SCR	BZA	04 WAG-7 (28249,28424,28464,28255(PT2))	7
SER	BKSC	3 WAG-9 - 32755, 32672,32521	12
SER	BNDM	4 WAG9-32655,32681,32653,32700	11
SER	SRC	0	2
SER	TATA	09 WAG9 (32324, 32647, 32582, 31432, 32576, 31716, 31899, 31425, 31603)	19
SER	ROU	03 WAG9 (32597,32281,32302)	29
SECR	BIA	10 WAG-9H (32688, 31844,31806,32679,32757,32807, 32807, 31886,)	32
SR	AJJ	0	0
SR	ED	6 WAG7(27460 , 27486 , 28027,27491 , 27271,)	12
SR	RPM	0	0
WCR	ET	3 WAG 9 (31943,32468,32070)	10
WCR	NKJ	1 nos WAG-9 (32290)	9
WCR	TKD	29 WAG9 (31170,31181,31183,31186,31196,31210,31297,31415,31471,31503 ,31607,31610,31614,31634,31807,32170,32251,32264,32294,32295 ,32303,32321,32331,32332,32335,32654,32656,32773,32775)	60
WR	BL	7 WAG-7(28727, , 28752, 24691,28726,24689,28640,28619)	73

WR	BRC	1 WAP-5 (30185) 29 WAP-7 (30470, 30473, 30474, 30480, 30526, 30527, 30531, 30569, 30574, 30585, 30598, 30634, 30637, 30719, 30759, 30761, 30767, 37111, 37126, 37128, 37163, 37164, 37175, 37302, 37303, 39018, 39027, 39065, 39103)	122
TOTAL	IR	WAG9=262 WAP7=37 WAP5= 23 WAG7=23 WAP4=1 WAP1=10	932