

Management of waste water generated at railway stations, coaching depots, workshops and production units

Audit objective 3

Whether management of waste water generated through effluent/sewage treatment, water recycling and reduction in generation through automatic coach washing has been ensured.

Indian Railway has created vast infrastructure of stations, coaching depots, workshops, maintenance sheds and production units (PUs) for managing the volume of passenger and freight traffic. The activities related to operation of traffic at stations and maintenance of rolling stock not only requires extensive use of water, but also generates huge quantity of waste water.

For better management of fresh as well as waste water, Railways aims to follow the policy of 'Reduce', 'Reuse' and 'Recycle'. This aspect is prominently placed in the Indian railways Water Policy, 2017 that *inter alia* lays emphasis on judicious use of water as it is becoming a scarce commodity by each passing day.

For reduction in water usage, as also for managing the waste water, provision of Effluent/Sewage Treatments Plant (ETPs/STPs), Water Recycling Plants (WRPs) and Automatic Coach Washing Plants (ACWPs) is to be made by Railway Administration as per Water Policy, 2017. Central Pollution Control Board (CPCB) also directed (2 June 2020) that all the Zones should take steps to manage waste water as also to identify quality of sewage and non-sewage waste water separately and plan waste water recycling plants accordingly.

The efficacy and efficiency of the efforts made by IR for managing waste water at stations, coaching depots, workshops, maintenance sheds and production units were assessed and the deficiencies noticed are discussed in the succeeding paragraphs.

4.1 Provision/Planning, Commissioning and functioning of effluent/sewage treatment plants (ETPs/STPs)

As prescribed in Section 24 of the Water (Prevention and control of Pollution) Act, 1974, no person shall knowingly cause or permit flow of any poisonous, noxious or polluting matter into any stream, well, sewer and land without treating it. The activities in workshops, sheds and production units generate effluent such as waste oil, chemicals, sludge, waste grease etc.

As per the special condition attached to Consent for Operation (CFO) under the Water Act, provision of effluent treatment plants (ETPs) is necessary for treatment of effluents before discharging into sewer/waste bodies. Similarly, for treatment of effluents generated at railway stations and coaching depots, Railway Board, instructed⁵⁶ Zonal

⁵⁶ letter no. 99/LMB/9/25 dated 22-12-1999

Railways to formulate proposals, wherever considered economically desirable for setting up ETPs considering the economic, social and environment consideration. The National Green Tribunal (NGT), in its order dated 18 March 2015 asked railway authorities to ensure that effluents generated at stations and coaching depots/ yards does not get seeped into the ground water and such effluents should be channelized to ETPs/STPs located near all major stations. In compliance with these orders, Railway Board instructed⁵⁷ (30 April 2015) the Zonal Railways to prepare a time bound action plan for setting up ETPs/STPs near the major stations.

Audit examined the efficacy of steps taken for provision of ETP/STP at selected 102 major stations, 30 coaching depots and 101 workshop/shed/Production units and observed the following shortcomings: -

- i. ETP/STP though planned but were not commissioned in 40 workshops/sheds and 19 coaching depots.
- ii. ETPs/STPs commissioned on 87 stations were not functioning as of March 2020.

From the position given above, it can be inferred that statutory requirement of treatment of waste water before its discharge could not be effectively fulfilled as installation of the ETPs/STPs fell short of that planned and many of the installed ETPs/STPs remaining non-functional. Records made available did not indicate fund shortage preventing the installation of ETPs/STPs (part of environment related works). Para 4.5 has a mention of funds for environment related works remaining unutilised due to slow progress on such works. The environment concerns of contamination of ground water/water bodies as well as reduction in use of fresh water consequently remained unaddressed. However, it was observed that ETPs/STPs were provided in all Production Units test checked and the same were found in working condition.

4.2 Analysis of the effluents/sludge discharged from ETP/STPs provided at stations, coaching depots, workshops, sheds and production units

In compliance with the provisions of the Water Act, 1974, the effluent discharged from railway stations, coaching depots, workshops, sheds and production units were to be treated in ETPs/STPs before its discharge to municipal sewage lines or to low lying areas/land. As per the special conditions attached to consent for operation (CFO) under the Water Act, the effluent should conform to the prescribed standards; hence should be analysed before and after treatment in ETP/STP. The sludge from the ETP/STPs should be dried in sludge drying beds and testing of such dried sludge should be done to decide its disposal



ETP sludge lying undischarged at Loco & Carriage and Wagon Workshop- Dahod at Ratlam Division in WR

⁵⁷ letter No. 2015/Environ/01/03 dated 30.04.2015

method. Such analysis/testing is prescribed to address the environmental concerns related to handling/disposal of such effluents and sludge.

Examination of the efficacy of the process of handling/disposal of effluents/sludge in ETPs/STPs provided at railway stations, coaching depots, workshops, sheds and production units revealed the following:-

- i. Analysis of liquid waste discharge from such units was not done before treatment in 40 units.
- ii. Treated effluents from such ETP/STPs was not analysed in 14 units.
- iii. Adequate sludge drying beds were not available with the ETPs/STPs provided in the case of **12** units.
- iv. In **53** units, the sludge generated from ETP/STPs was not tested to find out its disposal method.

Thus, the sludge generated out of ETPs/STPs was disposed without mandatory testing as per the norms prescribed.

4.3 Provision of water recycling plants (WRPs)

Water recycling refers to reclaiming waste water from industrial, residential, municipal sources, by treating and purifying the waste water for reuse. Based on the extent of the treatment, the reclaimed water can be used for inferior services like coach washing, platform aprons cleaning, gardening, etc. Railway Board instructed⁵⁸ (July 2008 and August 2008) Zonal Railways to provide WRPs in such stations and sheds where water is scarce and the demand for water is heavy. Provision of WRPs at one A1 category station in each zone was emphasized⁵⁹ (March 2015) by Railway Board. Railway Board specifically stated (December 2015) that the provision of WRPs will be extended to all major stations.

Audit examined the status of the provision of WRPs in 102 selected major stations. Despite passage of more than 10 years since RB's instructions, provision of WRPs in the 86 major stations out of 102 test checked was not complete as of March, 2020. Thus, such an important aspect of minimising the usage of fresh water, thereby boosting the efforts for water conservation, did not get required attention of railway authorities.

Survey done by Quality Council of India (QCI) on the request of Ministry of Railways also revealed (2019) that out of 720 stations covered in their study, only *25 per cent* of the stations had the provision of water conservation measures and provision for water reclamation/waste water use was available on *nine per cent* of the stations covered in QCI's study. This is indicative of poor response on the aspect of water conservation despite instructions issued (2008) by Railway Board in this regard.

⁵⁸ Letter No. 2006/LMB/09/01 dated 19.07.2006 and 04.08.2008

⁵⁹ Letter No. 2015/LM (PA)/08/08WRP dated 04.03.2015

4.4 Provision of Automatic Coach Washing Plants (ACWP) at coaching depots and car sheds.

Automatic Coach Washing Plant (ACWP) is a multistage exterior cleaning system for coaches/trains using pressurized soap solutions and water jets with rotating nylon and cotton consignment brushes to clean complete exterior of the coaches in a rake while placed on the pit-line of the coaching depots. Use of ACWPs helps in minimization of fresh water consumption as well as effective management of waste water thereby resulting in conservation of water. Railway Board directed⁶⁰ (October 2017) Zonal Railways to provide ACWPs on priority basis at all major coaching depots and car sheds. The aspect of provision of ACWP was also emphasized upon in the Indian Railway Water Policy, 2017. Provision of 63 ACWPs was sanctioned between 2017-2020 in coaching depots/Car Sheds. However, progress of work was very slow as indicated below: -

- i. Work for providing ACWP was completed in nine cases only as of March 2020.
- ii. In 43 cases, work on providing ACWP did not commence at all.
- iii. In eight cases, the work is still in progress.
- iv. In three cases of WR, the records to confirm the progress of work were not available.

Thus, it is clear from the progress of the work that required effort lacked seriousness on such a priority work meant for conservation of water resources. The resultant benefits to minimize the fresh water consumption and recycling of waste water could not be achieved.

4.5 Progress of works related to management of waste sanctioned from the funds created for Environment Related Works (ERWs)

Keeping in view its commitment towards cleaner environment as also the need to comply with various statutory obligations towards mitigation of environmental impact, Railway Board, decided⁶¹ to include environment related works (ERW) as an integral part of Works Estimates for all Plan Heads excepts PH-17 (Computerization). Provision for ERWs was made as an itemized one or on lump sum basis (equal to one *per cent* of the cost of work). The works chargeable to EBR (IF) were to be excluded for the purpose of lump sum provisioning towards ERW. These identified works are to be coordinated/ managed by EnHM wing of the Zone/Division/PUs and such works should generally be completed within two years. Certain items related to waste management like provision of ETPs/STPs, WRPs, ACWPs, waste to compost, waste to energy plants *etc.* were included in the specified list of ERWs. As the progress on

⁶⁰ letter No. 2001/M1/141/1 Vol-I dated 20.04.2010 and 27.10.2017

⁶¹ letter No. 2016/EnHM/13/02 dated 13.05.2016

ERWs was slow on Zonal Railways, Railway Board instructed⁶² (March 2020) all Zonal Railways to make more serious efforts and ensure expeditious completion of works.

Review of position on utilisation of funds accumulated under ERW revealed that funds remained unutilised to the extent of 53 *per cent* during the period under review as indicated in Table 4.1.

Table 4.1 - Statement showing the funds accumulated under ERW remaining un-utilised

(₹ in crore)

Year	Funds accumulated for ERW during the year	Fund utilized during the year	Funds remaining un-utilized at the end of the year	Funds un-utilised (in per cent)
2015-16	0.48	0.00	0.48	100.00
2016-17	24.90	2.96	21.94	88.11
2017-18	83.74	30.21	53.53	63.92
2018-19	208.53	108.67	99.86	47.89
2019-20	285.17	137.86	147.31	51.66
Total	602.82	279.7	323.12	53.60

Funds created for environment related works remained un-utilised due to poor progress in completion of environment related works as indicated in Table 4.2 below:-

Table 4.2 - Progress of works under ERW Funds (Annexure 4.1)

Particulars	Works sanctioned (Numbers)	Location	Sanctioned cost (₹ in crore)	Works completed (Numbers) (March 2020)
Provision of ETP/STP	87	11 zones	83.17	26 (30 <i>per cent</i>)
Provision of WRP	54	13 zones	66.62	Nine (16 <i>per cent</i>)
Provision for Waste to Compost	93	14 zones	20.59	30 (32 <i>per cent</i>)
Waste to Energy Plant	5	04 zones	4.91	Two (40 <i>per cent</i>)

It is, thus clear that the very purpose of creating ERW fund for expeditious execution of environment related works was defeated due to lack of monitoring on the part of railway authorities. Consequently, the benefit envisaged from these environment-related works remained unachieved. This had adverse consequence on waste water management at these locations.

4.6 Conclusion

Railways use water at stations as also for units such as workshops, sheds etc. Provision of ETPs/STPs/WRPs/ACWPs was envisaged in pursuance to the water policy. NGT had also directed that effluents generated at stations/coaching depots/yards should be diverted to ETP/STPs and not allowed to seep in ground water.

⁶² letter No.2016/EnHM/13/02 dated 12.03.2020

Study in Audit revealed that ETPs/STPs were not commissioned as planned despite availability of funds for environment related works. Further, many of the ETPs/STPs commissioned were not operational. Shortcomings in process of handling and disposal of effluents and sludge were noticed in some of the ETPs/STPs. Water recycling plants were not found to have been installed defeating the objective of minimization of usage of fresh water. Progress on the installation of ACWPs at the coaching depots/car sheds was very slow. Resultantly, the objective to minimize water consumption remained unachieved.

Objective of creating ERW Fund, an initiative to commit to clean environment by way of providing ETPs/STPs/WRP, compost plant and solid waste management plant largely remained un-fulfilled as funds created remained unutilized due to slow/nil progress of environment related works.

Summary of Audit findings

- Statutory requirement of treatment of waste water before its discharge could not be effectively fulfilled due to ETP/STPs remaining non-functional besides, environment concerns of contamination of ground water/water bodies remaining unaddressed.
- Slow progress in providing water recycling plant and automatic coach washing plant adversely affected the aspect of better management of fresh as well as waste water as prominently placed in the Indian Railways Water Policy, 2017.

4.7 Recommendation

IR needs to develop a robust monitoring mechanism to oversee the expeditious completion of the works such as provision of water recycling plants, automatic coach washing plant meant for water conservation under Water Policy of IR.