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Pollution Control of River Jhelum by Proposal of Effluent Treatment Plant

Shabbir Ul Nabi Shah

M.Tech Scholar, Department of Civil Engineering, RIMT University, Mandi Gobindgarh, Punjab, India

Correspondence should be addressed to Shabbir Ul Nabi Shah; shabbirulnabishah@gmail.com

ABSTRACT- This research aim to analyze and control the sources and impact of pollution on the Jhelum River in India. The pollution of water bodies due to discharge of untreated or inadequately treated wastewater has become a major environmental concern worldwide. Effluent Treatment Plants (ETPs) are an effective tool for controlling water pollution and can significantly improve the water quality of rivers and other water bodies. This research aims to study the effectiveness of ETPs in controlling water pollution by analyzing the design, operation, and performance of ETPs in various industries and communities. The study involves a comprehensive review of literature on ETPs, including their design, operation, and performance. The study also involves a case study of the Jhelum river in India, which has been heavily polluted due to discharge of untreated wastewater from various sources. The case study analyzes the design and operation of the ETPs installed in the industries located in India which can be used in Kashmir region for controlling the pollution of Jhelum River and evaluates their effectiveness in controlling water pollution. The study finds that ETPs are an effective tool for controlling water pollution and can significantly improve the water quality of rivers and other water bodies. The study also finds that the design and operation of ETPs are critical factors that determine their effectiveness in controlling water pollution. The study ETP also highlights the importance of proper monitoring, maintenance, and operation of ETPs, as well as appropriate discharge standards and regulations to ensure that the effluent does not harm the river ecosystem or human health. Overall, this research provides a comprehensive analysis of the effectiveness of ETPs in controlling water pollution and highlights the importance of proper design, operation, and regulation of ETPs for effective pollution control. The findings of this study can help guide policymakers and industry leaders in developing and implementing effective pollution control strategies to improve water quality and protect the environment and public health.

KEYWORDS- ETP, Effluent Treatment Plant, River Jhelum, Kashmir

I. INTRODUCTION

Our survival on the planet is predicated upon three assets – water, air, and soil, nature's three precious objects to mankind. Water is the maximum critical factor as it forms the simple medium for the origin of life [1]. With booming business development and increasing human pastimes, a fantastic amount of wastewater containing eutrophic pollution and heavy metals was discharged into the water. The Jhelum River has exquisite cultural and historic significance, as it flows via the Kashmir Valley, which is taken into consideration as one of the maximum stunning regions in India. The Jhelum River is also an essential source of water for irrigation and energy generation. The river is the lifeline of the Kashmir Valley, offering water for agriculture and hydroelectricity technology further to supplying water, The Jhelum River is certainly a crucial river for tourism in India, especially inside the Kashmir Valley region. The river's splendor and serenity have attracted tourists from around the arena to visit the region and revel in the herbal landscapes and cultural history. here are some ways in which the Jhelum River is enormous for tourism:

Scenic Splendor: The Jhelum River flows via picturesque landscapes of the Kashmir Valley, providing breathtaking perspectives of snow-capped mountains, lush greenery, and lovely sunsets. The riverbanks are coated with beautiful Mughal gardens, historic landmarks, and traditional houseboats that offer a unique and tranquil enjoyment for travelers.

Journey Sports: The Jhelum River is a really perfect vacation spot for adventure sports fans, who can enjoy water sports activities like rafting, kayaking, and canoeing. The river's rapids offer exciting enjoyment for thrill-seekers, whilst the calm waters offer a nonviolent ride for the ones looking for a more cozy revel.

Furthermore, the river has played a vast function within the history of Kashmir, with numerous towns and cities, consisting of Srinagar, the summertime capital of Jammu and Kashmir country, situated on its banks. The river has been used for the transportation of products and those from ancient times, making it a critical mode of transport within the area. but, in current years, the river has confronted extreme pollutant troubles due to industrialization, agricultural runoff, and domestic sewage. The pollution has adversely affected the nice of water and has triggered harm to the aquatic lifestyles of the river. There have been efforts to control pollutants and repair the river's ecological balance, however, greater massive steps are needed to ensure the river's sustainability and long-term health. besides, anthropogenic sports consisting of open defecation inside the river mattress discharge of biomedical wastes, and

excretion of animals complement the quantity of pathogenic bacteria and protozoa inside the river. loss of lavatories and sanitation centers reasons open defecation within the agricultural and concrete tablet areas of India, which ends in the pollution of floor water [2]

In step with statistical records that more than 14,000 humans die every day, seven hundred million Indians have no access to proper toilets and one thousand Indian youngsters die of diarrhea each day [3]. India is the second biggest population after China which is expected to put extra strain on water assets due to the fact the sort of people increase. Water availability in India is strongly advocated with the aid of a huge style of climatic and geographical elements. The rivers in both developing and developed international locations within the international are polluted physically, chemically, and bacteriological, the review record concludes. In a survey, carried out in 1980, around 25 million human beings die every 12 months because of ailments triggered due to risky ingesting water and horrible sanitary conditions, the Sector Fitness Corporation (WHO) estimates[4].

II. CAUSE OF WATER POLLUTION

Pollutants of water are the consequences of various causes. There are three main sources of pollution water, Agriculture, and industry. Within the take, a look at place water pollutants triggered especially from home and agriculture in preference to the enterprise.

- High population density (consistent with the 2011 census the district has a populace density of 1334 inhabitants consistent with a rectangular kilometer)
- Pollutants of floor water via drilling sports
- Commercial waste dumped into water (commercial waste is extraordinarily harmful to both people and surroundings)
- Sewage leakages
- Flooding for the duration of the wet season which carries waste deposits into water (It manifests especially in river Ganga within the observed region)
- Heavy metal
- Toxic waste disposal at the river
- Soil digging inner river vicinity (that is the main point of the have a look at region for water pollutants)
- Eroded sediments
- Deforestation
- Littering
- Pesticides
- Herbicides and fertilizer
- Use of HYV seed
- Eutrophication (Eutrophication is an expanded degree of vitamins in water bodies. This outcome in the bloom of Algae in the Water. It additionally depletes the oxygen in water, which negatively impacts fish and other aquatic animal populations)
- Failing septic gadget
- Family chemical compounds (Dishwashing waste, laundry waste)
- Warmness (business areas hot water mixed into bloodless water and polluted

III. WATER QUALITY PARAMETERS

Based mostly on its supply, water may be divided into groundwater and floor water[5]. Both sorts of water can be uncovered to infection risks from agricultural, business, and domestic sports, which also can embody many types of pollutants inclusive of heavy metals, insecticides, fertilizers, unstable chemical substances, and oils [6]. Water can be labeled into 4 kinds—potable water, palatable water, infected (polluted) water, and infected water [7] [8].

IV. NECESSITY OF PROJECT

The pollution of water bodies due to the discharge of untreated or inadequately handled wastewater has turned out to be a first-rate environmental challenge worldwide. Effluent remedy plants (ETPs) are an effective device for controlling water pollution and can considerably enhance the water satisfaction of rivers and different water bodies. This research aims to take a look at the effectiveness of ETPs in controlling water pollutants by reading the layout, operation, and overall performance of ETPs in numerous industries and groups.

ETPs are a powerful tool for controlling water pollution and may substantially enhance the water pleasant of rivers and other water bodies. They take a look at additionally find that the design and operation of ETPs are essential factors that decide their effectiveness in controlling water pollution. The take a look at ETP additionally highlights the significance of proper monitoring, preservation, and operation of ETPs, in addition to suitable discharge standards and policies to ensure that the effluent does not harm the river atmosphere or human fitness.

usual, this research offers a complete evaluation of the effectiveness of ETPs in controlling water pollution and highlights the significance of the right design, operation, and regulation of ETPs for effective pollutant manipulation. The findings of this examination can help manual policymakers and industry leaders in growing and imposing effective pollutant manipulation techniques to improve water excellently and defend the surroundings and public health.

V. EFFLUENT TREATMENT PLANT

Effluent treatment plant (ETPs) are used to deal with wastewater generated by using commercial strategies before it's miles discharged into the surroundings. The dealt-with water can be reused for non-potable functions, including irrigation or business cooling, or released into floor water bodies.ETPs normally consist of three ranges: Primary treatment, secondary treatment, and tertiary treatment.

A. Primary Treatment

Includes the removal of huge stable debris and grit from the wastewater that is commonly done via a bodily technique, including screening or sedimentation. The wastewater is first passed via displays to dispose of massive particles, including plastic, timber, and rocks. The wastewater is then despatched to a sedimentation tank, wherein heavier debris settles to the bottom and is

removed as sludge. The sludge is generally despatched to a separate remedy facility for further processing.

B. Secondary Treatment

Includes the elimination of dissolved and suspended organic depend from the wastewater. that is typically executed via an organic method, such as activated sludge remedy or trickling filters. In activated sludge treatment, the wastewater is blended with microorganisms in aeration tanks. The bacteria consume the natural count number, changing it into carbon dioxide and water. The water is then separated from the microorganism and despatched to a clarifier, wherein the closing solids settle out and are removed as sludge. In trickling filters, the wastewater is sprayed onto a bed of rocks or different media, wherein bacteria consume the organic remember. The treated water is then amassed and despatched to a clarifier.

C. Tertiary Treatment

Tertiary treatment is the very last stage of remedy and includes the removal of any closing impurities from the wastewater. this is typically executed via a physical or chemical manner, inclusive of sand filtration, carbon adsorption, or disinfection. Sand filtration entails passing the handled water through a bed of sand, which gets rid of any closing suspended debris. Carbon adsorption involves passing the water through a mattress of activated carbon, which removes any final dissolved natural count. Disinfection involves the use of chemicals or UV mild to kill any final microorganisms or viruses in the water.

D. Sludge Treatment

Sludge produced for the duration of the treatment process is normally despatched to a separate treatment facility. Sludge treatment involves the elimination of any last impurities from the sludge earlier than it's miles disposed of or reused. that is typically finished through a physical or chemical technique, together with thickening, dewatering, digestion, or incineration. Thickening involves the elimination of water from the sludge to lessen its extent. Dewatering involves the elimination of extra water from the sludge to form a solid cake. Digestion entails the organic breakdown of organic rely in the sludge, which produces biogas that may be used as a fuel source. Incineration entails the burning of the sludge to supply power.

In summary, effluent treatment plants involve a series of physical, biological, and chemical processes to remove impurities from wastewater generated by industrial processes. The treated water can be reused for non-potable purposes or released into surface water bodies. Sludge produced during the treatment process is sent to a separate treatment facility for further processing. Sludge treatment involves the removal of impurities from the sludge before it is disposed of or reused.

VI. RESULTS AND DISCUSSION

The ETP manner is designed to treat commercial wastewater and do away with contaminants earlier than discharging it into the environment. here's a simplified outline of the standard ETP process:

A. Screening

On this stage, large particles and solids are removed from the wastewater to save the downstream equipment.

B. Primary Treatment

The wastewater is authorized to settle in a primary clarifier, in which heavier solids settle at the bottom and are removed as sludge.

C. Secondary Treatment

Organic strategies are used to similarly destroy down natural count number in the wastewater. this will encompass techniques like activated sludge, aerobic or anaerobic digestion.

D. Tertiary Treatment

Relying at the precise necessities, extra strategies like chemical remedy or filtration may be employed to similarly polish the effluent.

E. Disinfection

Effluent is disinfected to kill dangerous microorganisms, regularly using chlorine or UV treatment.

F. Effluent Discharge

After treatment, the clean water (effluent) may be competently discharged into the environment or reused for non-potable functions.

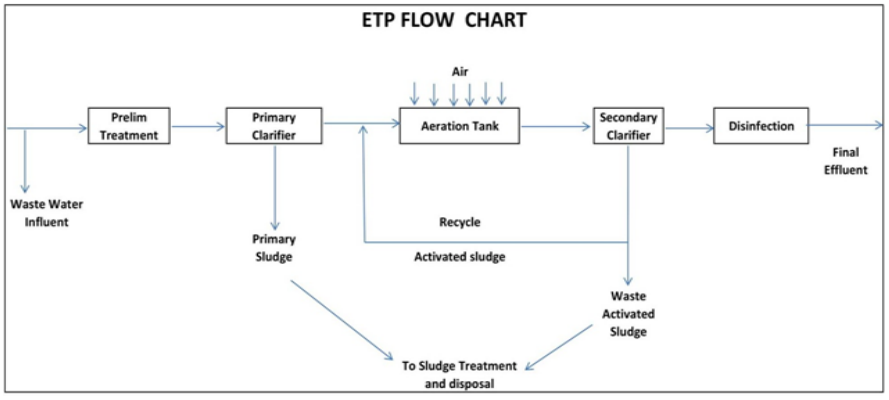

Figure 1: ETP Flow Plant

The content material of DO in recorded wastewater is located to be of low cost because of the presence of excessive natural depend as well as extra BOD and COD. This increase in BOD and COD values suggests a bad nature of discharge. High amounts of inorganic vitamins consisting of nitrogen and phosphorus were determined in contaminated water.

Table 1: Calculations For Dissolved Oxygen

S.no	Volume of Sample	Burette readings		Conc of water sample	Average Conc of water sample (V1)
		Initial	Final		
1	50 ml	0.0	1.0	1.0	0.93
2	50 ml	0.0	0.9	0.9	
3	50 ml	0.0	0.9	0.9	

Calculations:

N1V1=N2V2

N÷40×0.93=N2×50

N2=1÷40×0.93÷50×8

N2=0.025×0.0186×8

N2=0.0372×103=3.72ppm or 3.71mgl

DO=3.71 mgl or 3.72ppm

Where

N1=Normality of NA2SO3

N2= Dissolved oxygen content

V1= Conc of Sample

V2= Volume of sample

VII. CONCLUSION

Effluent treatment Plant are categorically used to treat the wastewater and reuse the particular water. This is an eco-friendly process as this process lessens the stipulation of fresh water while protecting the environment.Jhelum River is polluted mainly due to the discharge of untreated or partially treated sewage from adjoining areas. Wastewater with excessive BOD, Turbidity, and soluble solids. We propose to make this water more secure within the herbal environment or to use it for other purposes.The content material of DO in recorded wastewater is located to be of low cost because of the presence of excessive natural depend as well as extra BOD and COD. This increase in BOD and COD values suggests a bad nature of discharge. High amounts of inorganic vitamins consisting of nitrogen and phosphorus were determined in contaminated water. Wastewater has a pH range of 7.5-8.5.Knowing this practical trouble, beneath the coverage assertion for abatement of pollutants the government extends the scheme for selling blended centers for remedy of effluent for clusters of small-scale industrial gadgets and also to provide technical support to them. The concerted technique of common effluent treatment provisions has many blessings. Wastewater of individual industries often comprises a large concentration of pollutants; and reducing them by individual treatment up to the preferred awareness, will become techno-economically.Effluent treatment plants are vital for the proper management and treatment of industrial wastewater to protect by removing pollutants that the treated effluent is safe for discharge. Effluent treatment plants play a crucial role in maintaining the ecological balance of water bodies and safeguarding public health. Effluent treatment plants are subject to strict regulations and guidelines to ensure that the treated wastewater meets the required standards. These standards may vary depending on the type of industry and the specific pollutants present in the wastewater. The effluent is regularly monitored and tested to ensure compliance with these standards.ETP helps in treating and purifying industrial wastewater before it is discharged into the environment. This ensures that harmful pollutants and contaminants are removed, preventing them from polluting water bodies, soil, and air. It helps in maintaining the ecological balance and protecting the environment.

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