



ENVIRONMENT & ENERGY CONCLAVE

Organised by

The Environment Committee

BENGAL CHAMBER OF COMMERCE

Mine Water Treatment

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Importance of Water

Mr. Kofi Annan, ex-UN Secretary General said in March 2001

“Fierce competition for fresh water may well become a source of conflict and wars in the future.”

As per UN Statistics, globally

- >1 billion people lack access to safe drinking water
- 250 million illnesses in a year are result of contaminated water
- 2.2 to 5 million deaths in a year is due to absence of potable water
- 20% of irrigated lands are salt-ladden

Effluents Generated

Effluents generated at various stages of mining:

- Mine Effluent
- Work Shop effluent
- Washery effluent
- Domestic effluent
- Rain water run off.

Mine Water Treatment

Pollutants

- Mining operations do not involve any Chemical Reaction, except mineral beneficiation.
- Only suspended particles are present in effluent.

Treatment

- Treatment for removal of suspended coal / ore particles in mine water done by settlement & removal of sludge.
- Sedimentation tanks – design depends on particle size distribution in effluent.

Acid Mine Water Drainage

- Chemical reaction takes place changing iron from ferrous to ferric state and sulphur compounds to sulphuric acid.
- In some places small particles of iron (ferric hydroxide) forms a suspension, more commonly known as ochre. This has the appearance of reddish water.

Treatment of Acidic Effluent

Conventional neutralization

1. Pumped to a central location to be neutralized by alkaline chemicals.
2. Effluent passes through lime bed & gets neutralized.

Biological treatment of Acid Mine Drainage

- Series of shallow ponds lined with lime and planted with native Typha plants.
- Such Wetlands are passive systems requiring little / no continuing maintenance.

Reuse of Treated Mine Water

Present Practice

- Drinking Water Supply to the colony and utility buildings
- Used for agriculture
- Stored in mine voids for Ground Water Recharge
- Source of income for villagers by pisci-culture

Measures for Future :

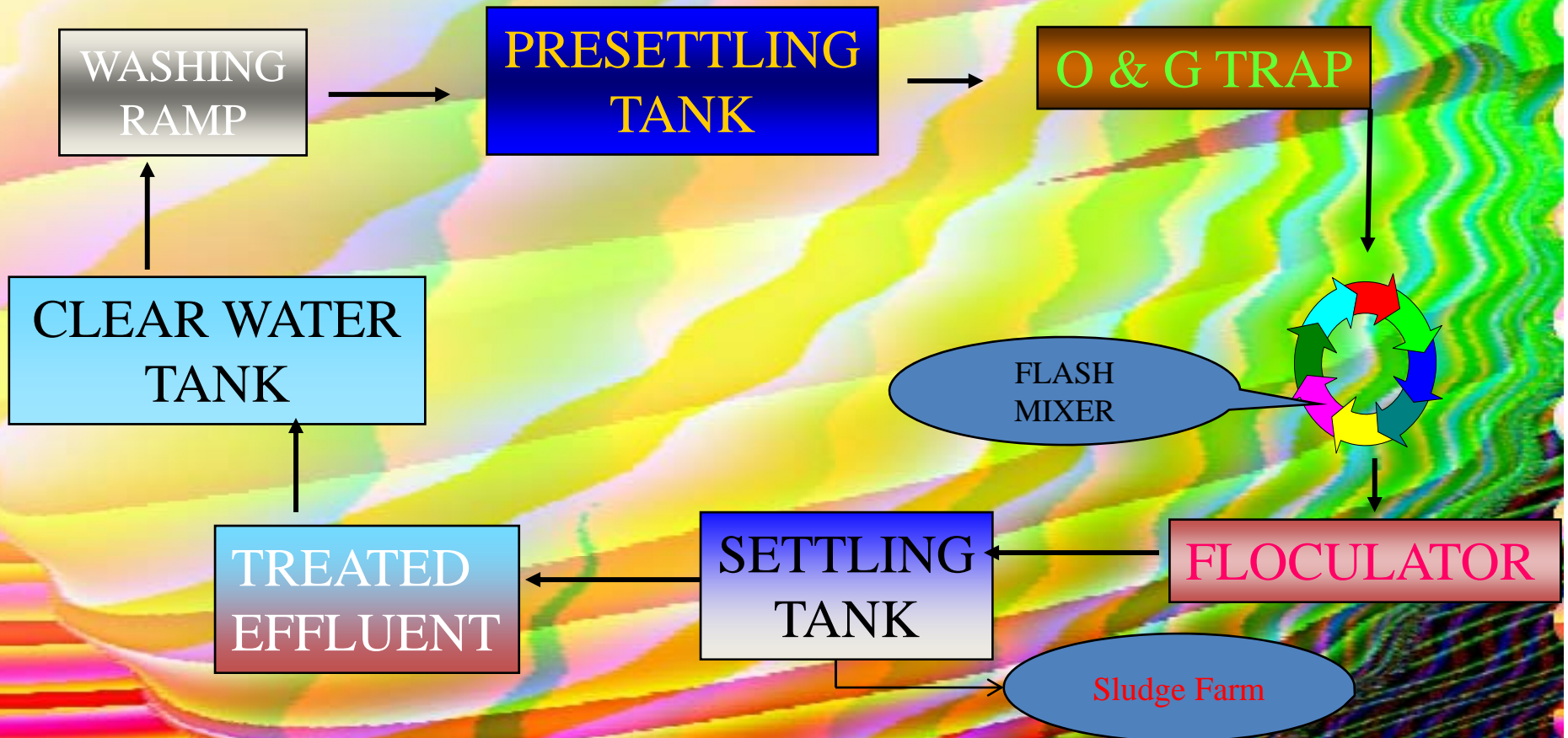
- Major water users may be identified along with quantum & quality & mine water treated accordingly.

Work Shop Effluent Treatment

- Results out of Presence of oil & grease from engines, washing & floor cleaning.
- Treatment Process consists of following units.
 1. Oil & grease trap
 2. Flash mixer
 3. Flocculator
 4. Settling tank
 5. Clear water tank
 6. Sludge removal mechanism
- Reuse : Treated water recycled to use for washing of vehicles & cleaning purpose.

TYPICAL WORK SHOP EFFLUENT TREATMENT PLANT

in Major OCPs



ZERO DISCHARGE CONCEPT

Effluent Treatment in Washeries

- No chemical process is involved.

Treatment

- Effluents passed through thickeners
- Sedimentation of suspended particles by gravitational settling

Reuse

Clear water is pumped back to main Washing Circuit - closed circuit design.

Domestic Effluents

- In large colonies (+ 1000 quarters), Sewerage Treatment Plants are constructed

- **Sewerage treatment plants**

- Extended Aerated Lagoon
- Activated Sludge method

Reuse :

- Treated water used for tree plantation/agriculture
- Sludge is used as manure.

Monitoring

- Laboratories are available in Treatment Plants to regulate & monitor regularly
- Effluent monitored on by external agency
- Water analysis as per ISI standards for drinking water is also done at regular intervals.

Water Conservation

CURRENT PRACTICE

- Reused as Drinking Water Supply to colony & utility buildings. Surplus supplied outside.
- Ground Water Recharge through storage in mining voids.

FUTURE PATH

- Major water users may be identified, quantum & quality identified, & mine water treated accordingly.
- Conceptual designs & capital and operating costs are to be developed for various effluent treatment.
- Existing and proposed water circuits may be studied thro dynamic models to predict circuit water quantities.
- Performance specifications are set for appropriate effluent treatment plants & various effluent treatment options are to be evaluated.

Issues of Concern to Coal Mining

1. High concentration of Thermal Power Plants, Steel Plants, Cement Plants, & ancillary industries located in and around mining areas leads to high pollution.
2. Coal mining operations do not involve any chemical processes.
3. Bulk of pollution caused by vehicular transport & other industries.
4. However, restrictions are imposed on mining – CEPI in recent times affected coal production in major upcoming coalfields.
5. Due to CEPI - new/expansion projects cannot be taken up in such areas affecting growth of coal production.

Suggestions

1. New Red Category industries may preferably located away the coalfields.
2. Source apportionment of the pollution from different sources should be carried out by Pollution Control Board.
3. Regional Impact Study should be conducted by Pollution Control Board.
4. To reduce pollution due to vehicle movement, thrust on building rail-infrastructure, conveyor & silo loading.
5. R&D should be encouraged for finding economical and viable solutions for Acid Mine Water Treatment.

CONCLUSION

- Results of efforts undertaken to restrict water pollution & conserve water in mining areas is not up to mark.
- Special attention needed to arrest pollution from run-off rain water from dumps & stocks.
- Stricter monitoring required by Environment Law enforcement authorities.
- Repeated campaigns needed to sensitize Mine Operators.
- Increase general awareness about water-pollution in local populace.

THANK YOU

