


# Pre-Treatment & Primary Sedimentation



The background is a solid blue color. Scattered across the background are several white, stylized snowflake graphics of varying sizes and orientations. Some are solid white, while others are faint outlines. The snowflakes are positioned in the top right, middle right, and bottom right areas of the slide.

**Wastewater Pretreatment** is the process of removing contaminants, or reclaiming valuable metals and chemicals, from industrial wastewater prior to discharge in order to meet regulatory requirements. Industrial Wastewater is spent water that has been used by manufacturers for any number of industrial purposes, such as for rinse water, cooling, heating, or washing.

# Pretreatment of Industrial Water:



Water is an essential component of many manufacturing and commercial processes. Much of the water used for these processes inevitably becomes tainted with a variety of contaminants, such as: metals, solvents, cleaners, chemicals and oils.



The Environmental Protection Agency (EPA) requires that spent industrial water conform with permitted limits prior to discharge. These contaminant limits are designed to prevent harm to publicly owned water treatment works, streams, rivers and lakes.



Community and municipal sewage plants (POTWs – publicly owned treatment works) are designed to effectively reduce contaminants from domestic sewage before discharge into streams and rivers.



Contaminants frequently resulting from manufacturing processes such as heavy metals, soaps or oils and grease may not be effectively reduced and may even cause problems with the sewage treatment process.



For these reasons, EPA compliance requires local POTWs to enforce pretreatment requirements where customer discharges exceed established limits. As the discharge limits imposed on POTWs become more stringent, the pretreatment requirements become proportionately tighter.





# EPA Compliance:



The consequences of not pretreating industrial water led the EPA to establish strict limits on the amount of contaminants that may remain in wastewater discharged into the environment.



It is imperative that businesses, plants and facilities have an effective wastewater pretreatment plan in place that meets the EPA contaminant standards for their industry. Failure to properly pretreat wastewater can result in undue stress on public water treatment facilities, contamination of drinking water sources, and lofty fines from the EPA.



Properly planned and monitored wastewater pretreatment is essential to ensuring EPA compliance, avoiding fines, and protecting waterways.



There are trained staff at many places around New Mexico that can work with you to develop a custom water treatment system that meets even the most stringent filtration requirements. You can always reach out to the NMED Surface Water Bureau for guidance on where to get help.



**SAFETY FIRST**

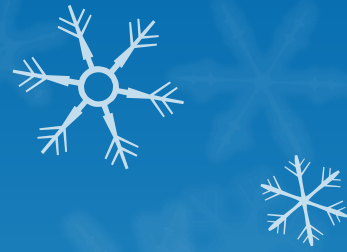


# There are many reasons to think about safety.

- Safety is everybody's job!
- Protecting the public is why we have our jobs.
- Being able to go home, alive and with no injuries, to your family, your pets and yes, even your Goldfish, is something that everyone should be able to do every day.

# Preliminary Treatment

The next step before Primary  
Sedimentation





# Screenings and Grit Removal



## Preliminary Treatment

- Need to remove any large debris, rags and such with a Bar Screen or grinded down so it can be removed in Primary Settling; this is a mechanical treatment.
- Need to remove inorganic solids (Grit)
- Grit removal can be done with a variety of systems. Can you name some?
- Do all systems need to have the flow slowed down?
- Mostly a physical treatment.

# Screenings

Do you know the difference  
between a Bar Rack and a  
Bar Screen?



# Preliminary Treatment

## Screening



Manual Bar Screens



Fine Screens



Mechanical  
Bar Screens









# What are some of the safety issues?

- Safety boots
- Gloves
- Hardhat if working with crane or if required
- Moving parts
- Raw Sewage
- Keep your mouth closed
- Wear safety glasses





# Grit Removal



# Kinds of Grit Removal

- Open Grit Channel
- Vortex Grit System
- Conex Grit System
- Aerated Grit System



# How do they work?

- What are the requirements for grit removal?
- For open grit channel what will the flow need to drop down to? This will be on your test!!!
- For an Aerated grit system, does the air reduce the density? Let's talk.
- There are other systems that do a much better job.

Grit systems that are of a Conical based system.



# Open Grit Channel







# Primary Sedimentation



Primary sedimentation is usually the second stage of the Wastewater Treatment (WWT) process. It occurs after the water passes through the Inlet Works/Screening process where all non-organic solids such as non-dissolved materials, wet-pipes and debris are removed from the water.





Once wastewater leaves the Inlet Works/Screening process, organic solids remain in it. The rate of wastewater flow is reduced dramatically before entry into the primary sedimentation tanks; this has two effects on the wastewater:



1. Fats, oil and greases (commonly known as FOG) float to the surface of the sedimentation tank are collected by a scraper bar which continuously rotates across the surface of the tank. The FOG is removed from the wastewater and disposed of or sent to a Anaerobic Digester.

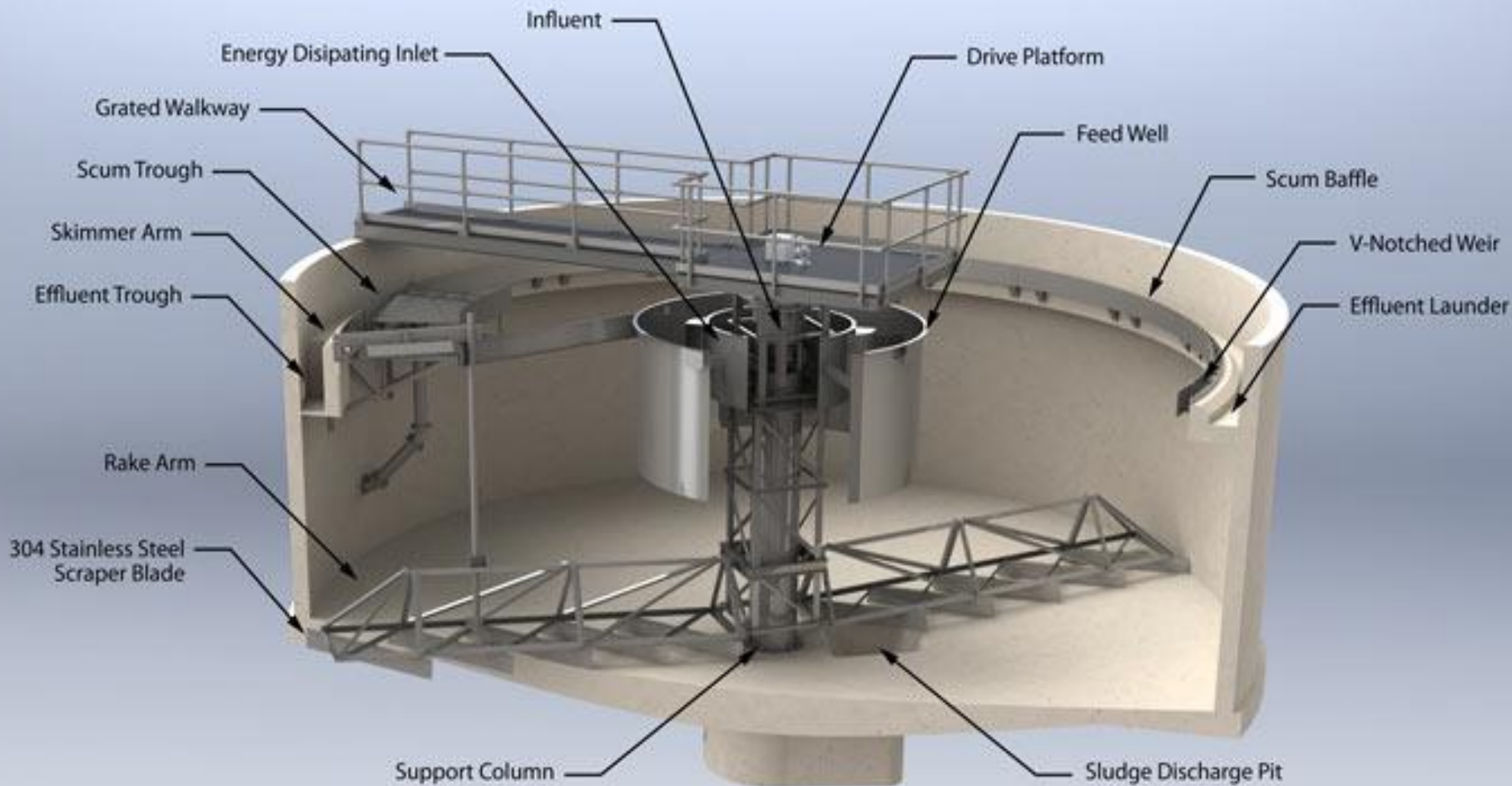


2. Organic solids are heavier than water, and due to the effects of gravity, fall to the bottom of the tank. Once they reach the bottom of the tank, the sediment (often referred to as sludge) is collected by a rake arm and moved to a nearby storage tank (similar process as point (1) above).



At this stage, the sediment is a concentrated mix of water solids with a high content of  $\text{HS}_2$ , methane and bacteria - this is where the sludge reprocessing process begins. The wastewater (now virtually solid free and considerably cleaner) enters the aeration stage of the process where small organic particles (too small to be affected by gravitation in the sediment tanks) and ammonia are removed.







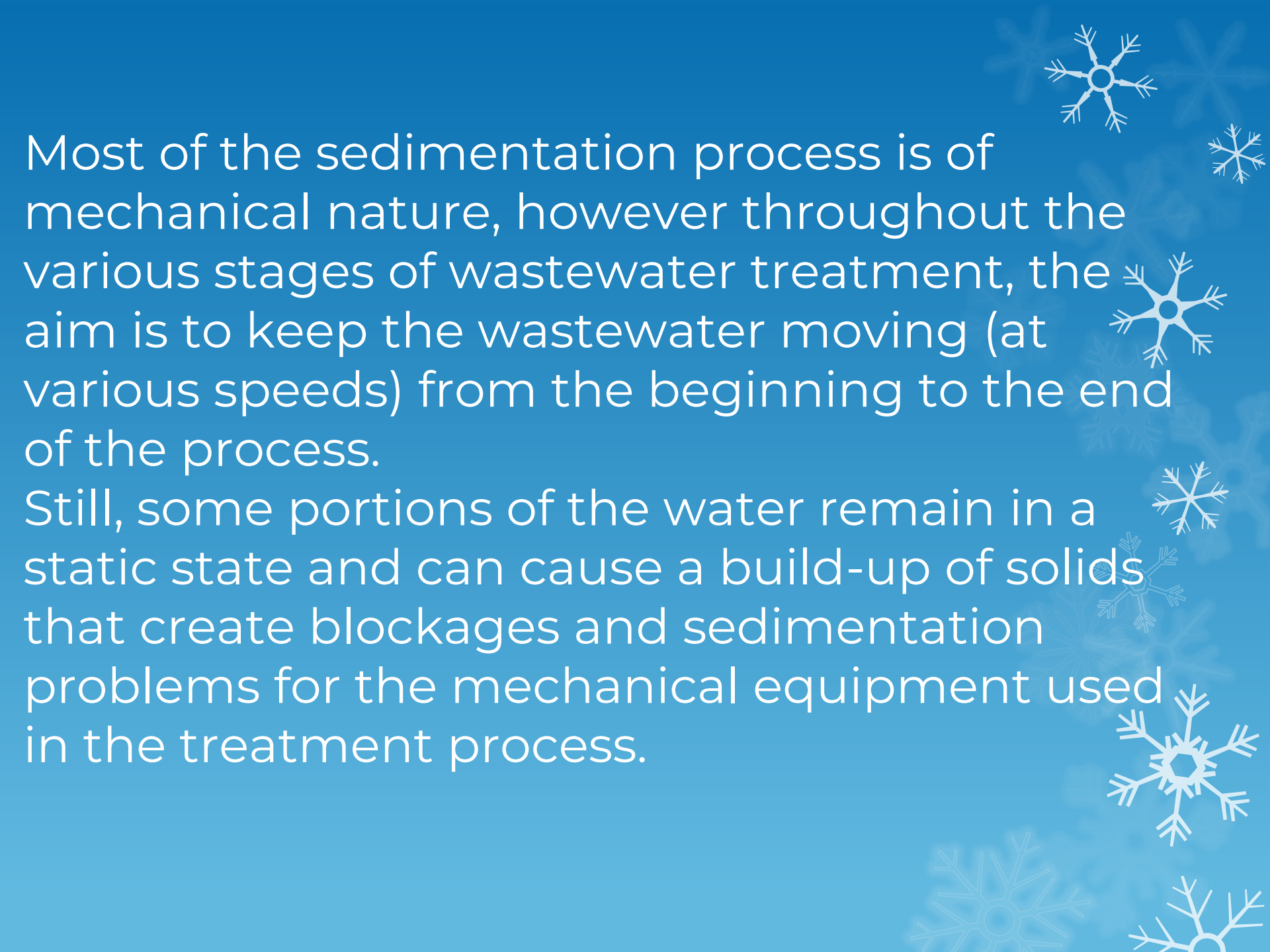










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Most of the sedimentation process is of mechanical nature, however throughout the various stages of wastewater treatment, the aim is to keep the wastewater moving (at various speeds) from the beginning to the end of the process.

Still, some portions of the water remain in a static state and can cause a build-up of solids that create blockages and sedimentation problems for the mechanical equipment used in the treatment process.

To alleviate this, small amounts of air are introduced into the process to move the water along with mechanical surfaces or submerged mixers. In some cases, chemical dosing is also used to help break down the sludge.



# What are the Benefits of Primary Sedimentation?



It is essential that the primary sedimentation process is maintained and operated to a high standard using reliable equipment. A poorly maintained primary sedimentation system can have a significant impact on the efficiency and life cycle of the treatment facility.



# Safety Issues

- What kind of safety issues can you think of?
- Handrails
- Protective covers
- PPE needed
- Sampling
- DOBs



# Thank you for your time.



- Good luck on your exams
- Go with your first answer unless you know that it should be changed
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