Caustic Soda Manufacture.

- Brine saturation process.
- Purification process.
- Cell House-Electrolytic process.

By

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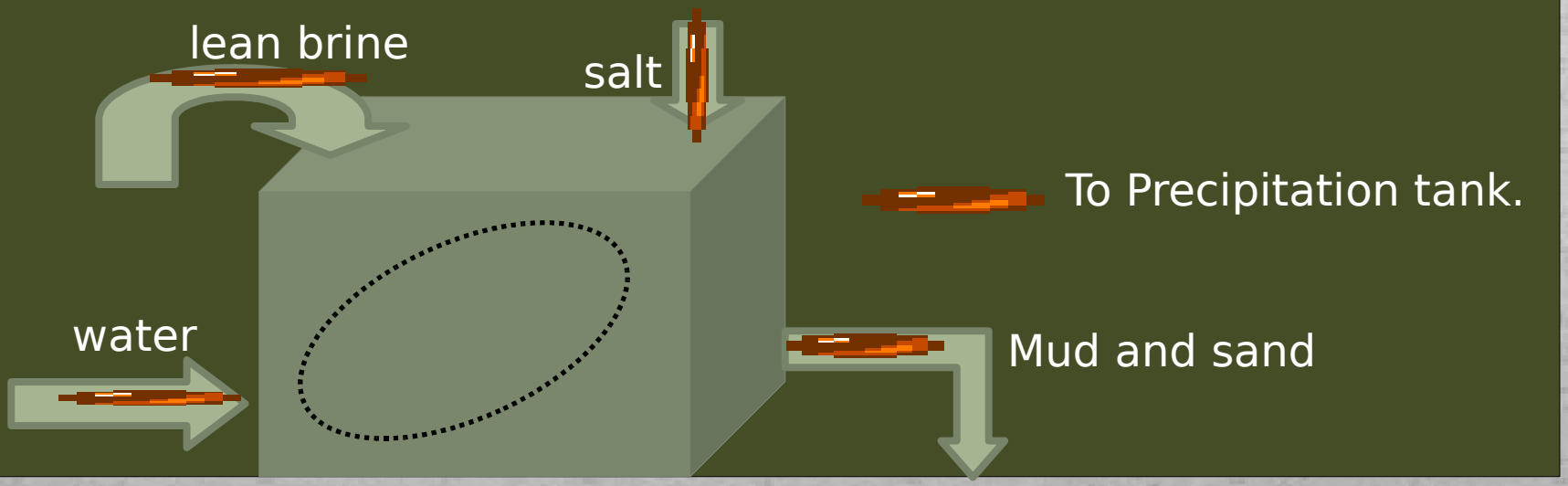
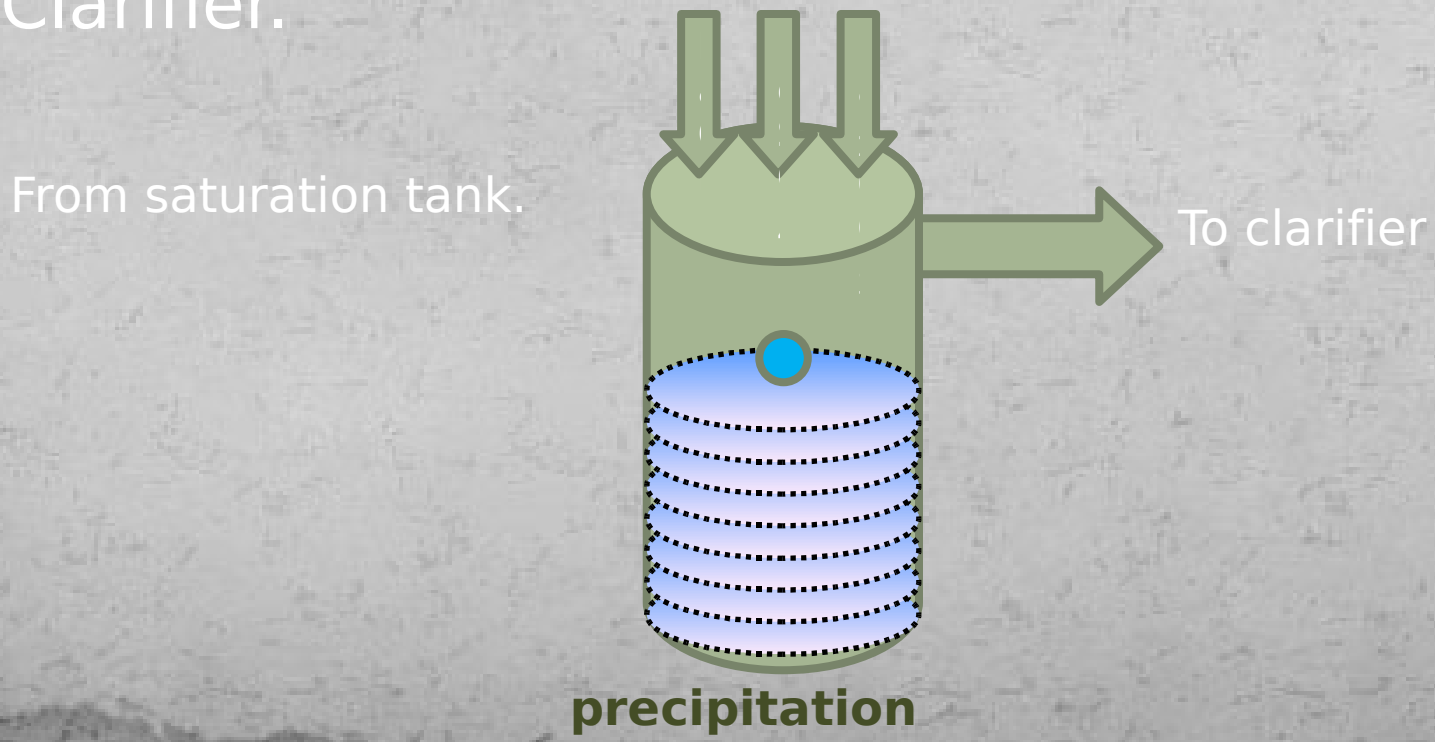
Brine Saturation

- Mixing of lean brine, water and untreated salt.

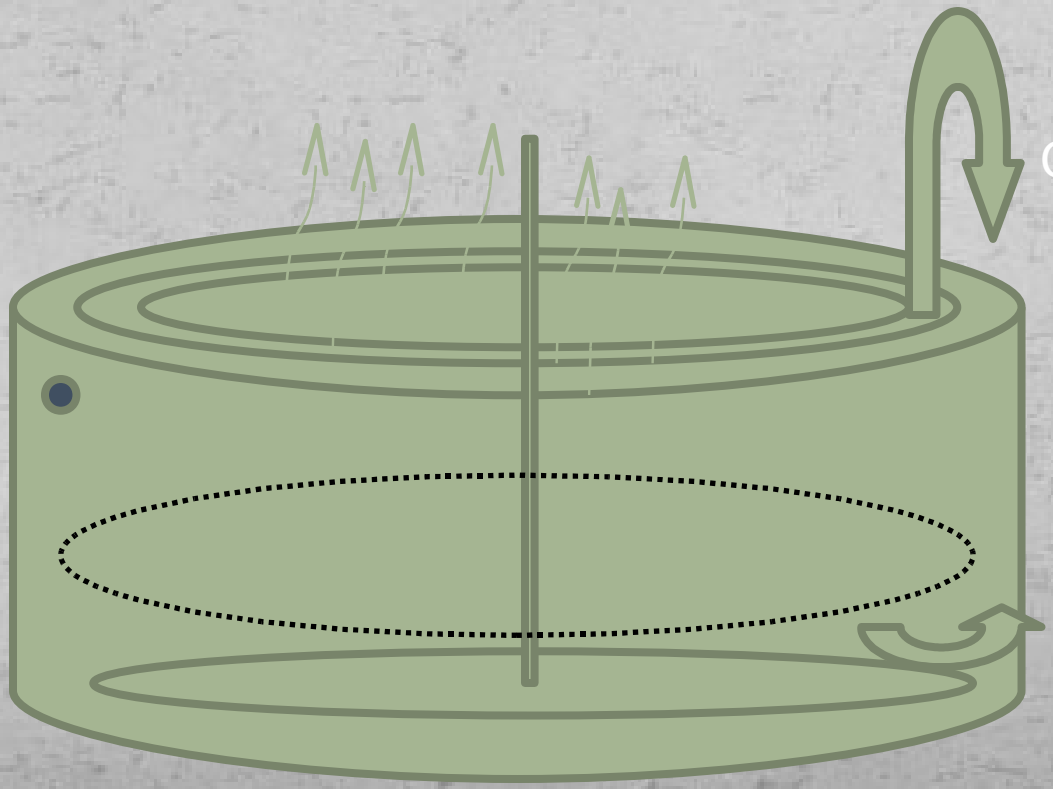
  The lean brine at 60 ˚C is sent to the saturation tank where, fresh salt is mixed along with water.



- Precipitation tank:
  Precipitation is done by adding 10% NaOH , 10% $MgSO_4$, 10% Ba_2CO_3 in the tank. Flocculant agents like magna floc are added to form flocwhich is removed. This is sent to the Clarifier.



- Clarifier : The brine is concentrated by using a centrifugal pump and the principle of sedimentation.

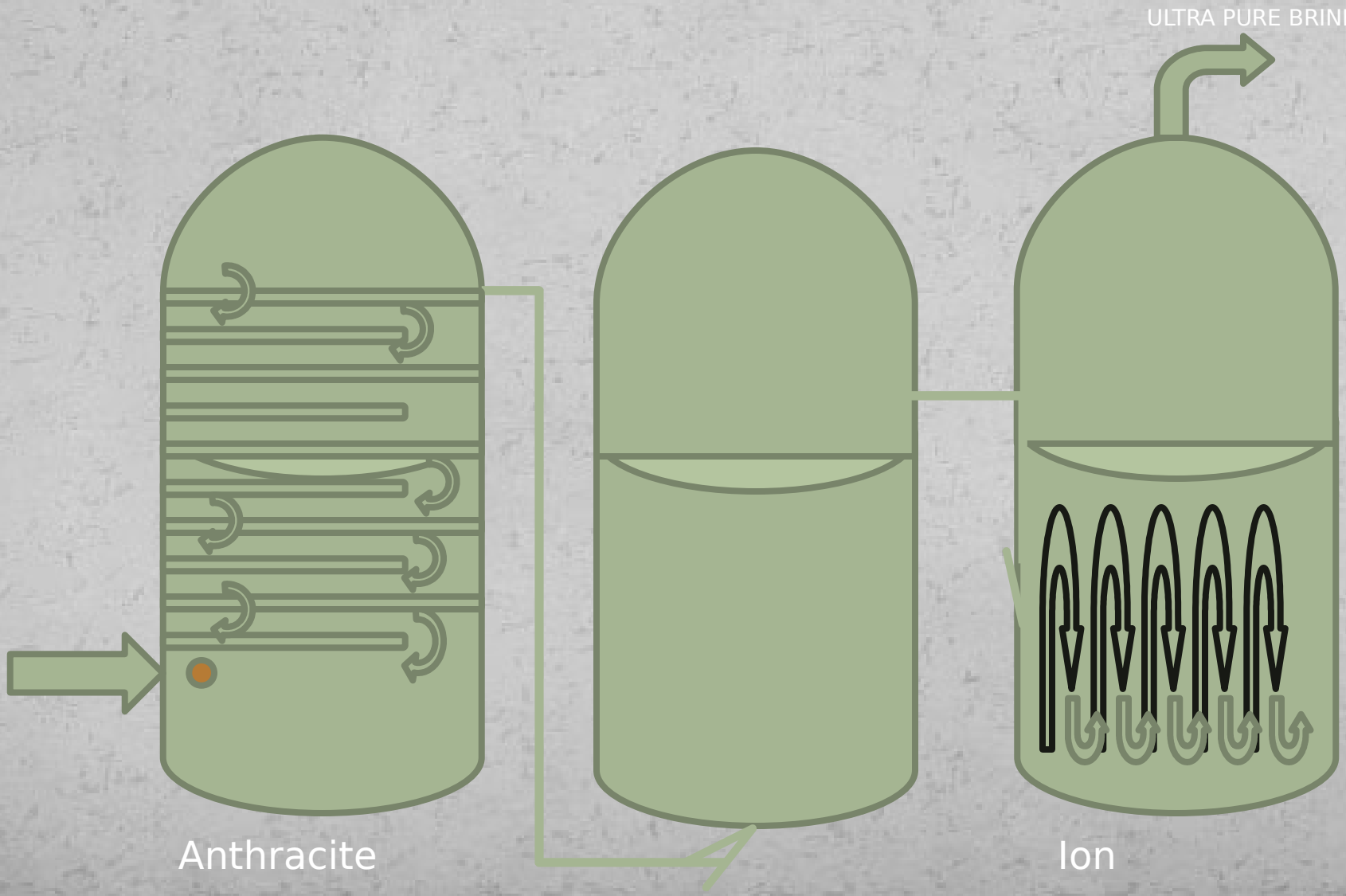


Clarifier

Purification

- Purification is done by anthracite and by ion-exchange method.
- Anthracite filters use porous anthracite coal arranged in beds. Cleaning is done by backflushing.
- Ion exchangers have α-cellulose tightly packed in tubular sieves. They absorb finner particles and produce ULTRA PURE BRINE(99.9%) which is sent to the cell house for electrolysis.

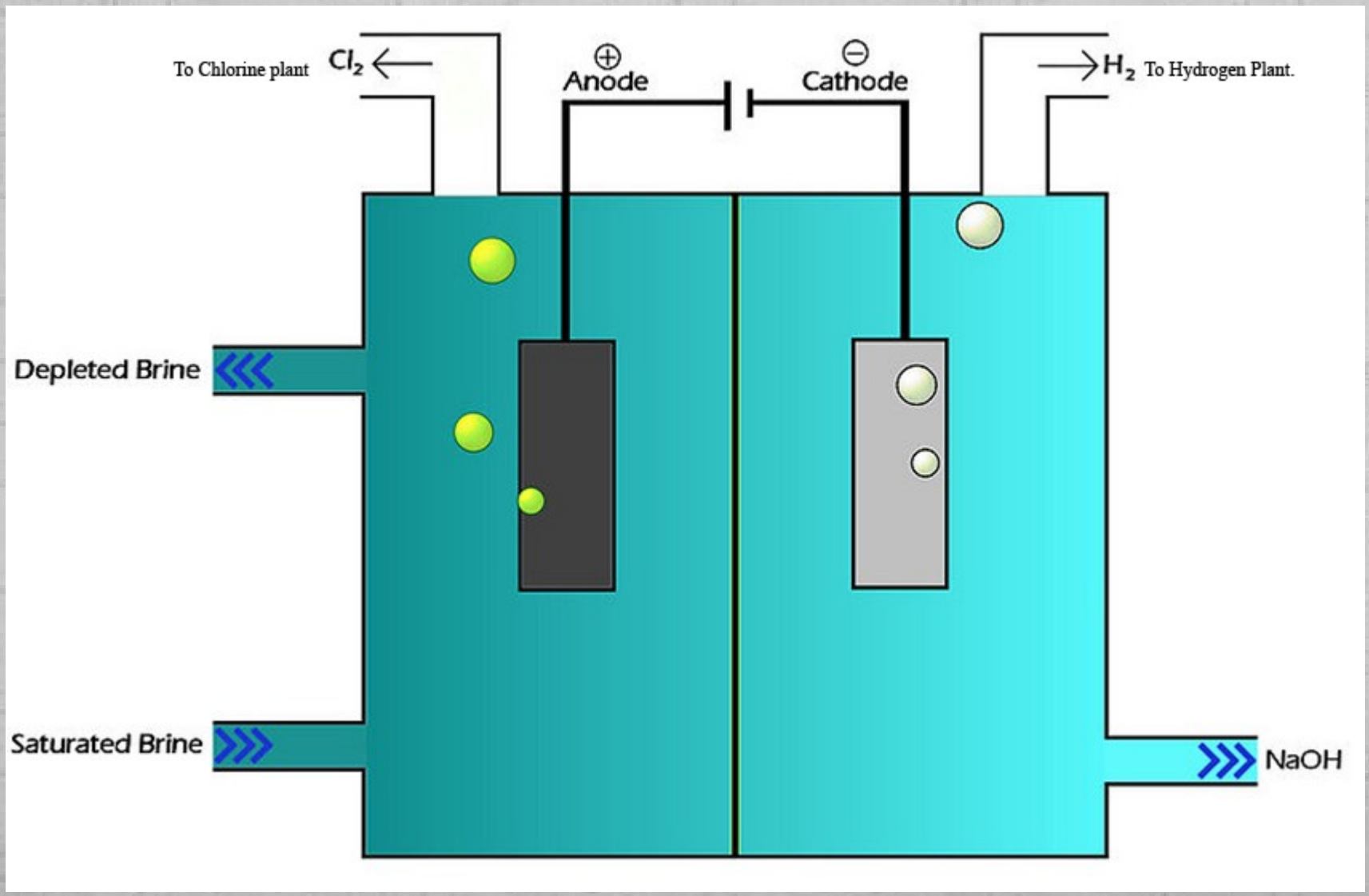
Purification Process



Electrolytic Process.

- Ultra pure brine is electrolysed.
- The lye produced is collected and sent to triple effect evaporator, for further concentration.
- The concentrated lye is filled in drums.
- To form flakes, the lye is sent to the furnace which is maintained at 450˚C by burning nitrates. The water is evaporated and then it is cut by rotating blades.

Electrolytic Cell Process



Uses of Caustic Soda

- Used as base in chemical industries, Labs for titraion purposes.
- High demand in soap manufacturing industries like Hindustan Lever ltd….
- Used in hair straightening process, performed by professionals.
- In paper industry, forms the main component of white liquor, bleaching agent of brown pulp, to maintain the pH > 10.5.
- And many more……..

Usage of the by products

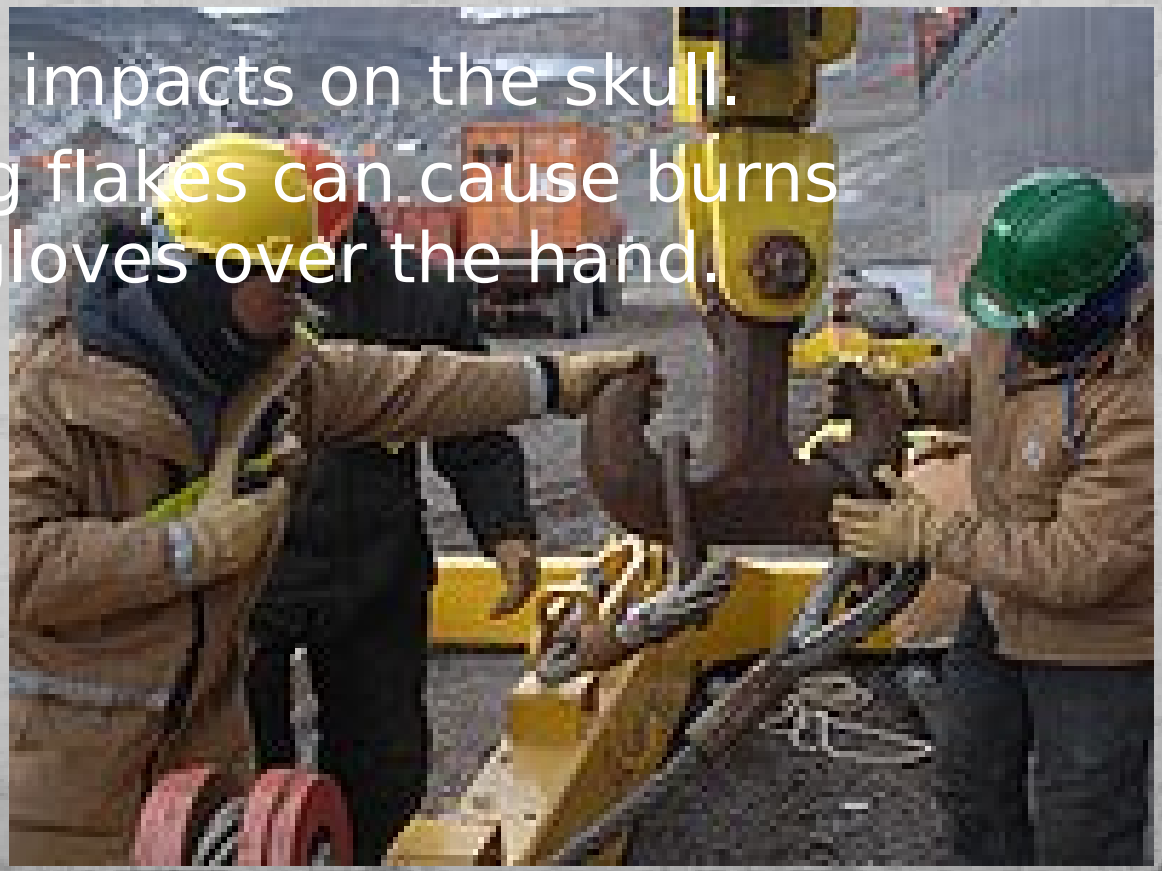
- The major product is Cautic soda or Lye.
- Lean brine is sent for recycle, after removing Cl_2.
- Hydrogen produced is completely burned with chlorine gas to produce HCl, used in industries.
- Chlorine is also separately filled in drums and sold.
- The sludge produced is dried, powdered and used as Nfhyk; powder.

Highlight of this plant

- The major raw material is only salt, directly produced from salt pans.(Very low cost)
- Major product is lye, the by-products like hydrogen and chlorine is used for HCl production and certain amount of Hydrogen is used for burning process instead of coal.(Energy utilization)
- The ultimate waste is only the sludge and the flue gases sent out after reused for heating purposes.
- The by-prods are of high commercial demand,

Safety and Hazards

- Eye glass: The reaction of lye and moisture is exothermic, and can cause blindness if comes in eye contact.
- Helmet: To avoid impacts on the skull.
- Gloves: Handling flakes can cause burns without rubber gloves over the hand.



Disadvantages

- The cost of each membrane used is in lakhs, so the total cost of membranes reaches crores.
- The maintanence of membrane is very important since any chlorine ion reaching the other electrode causes short circuit.
- Hence high initial and maintainance cost.
- Coastal area for easy availability of salt and water. And need for ports to transport, export through ships and tankers.
- Need for large area.

THE END

Thanks for your presence!