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smart ideas for wastewater & air treatment

NUCLEANTECH® H_3BO_3

CONCEPT

The objective of this product it to treat waste water produced in the regeneration of ion exchange resins in the treatment of primary circuit refrigerant of PWR reactors. The effluent from the regeneration of these resins contains all of the previously retained anions and cations, the majority of which are radioactive isotopes from the activation of atoms of irradiated structural materials by neutron flow (^{60}Co, ^{129}I, ^{131}I, ^{90}Sr, ^{55}Mn, ^{59}Fe, ^{137}Cs, ^{134}Cs, ^{51}Cr, etc.). This water can contain a significant amount of radioactive substances, so its decontamination must be carried out in an effective, controlled and safe manner. Furthermore, and also very importantly, this process also enables the recovery of the boron used in the reactor as a moderator of neutron flow, which is nuclear grade boron.

TECHNICAL CHARACTERISTICS

- Complete decontamination of the liquid effluent.
- Minimization of solid waste of low and intermediate level (LILW).
- Recover of nuclear grade boron from the primary refrigeration circuit.
- Exhaustive control of radiation throughout the entire process.
- Strict compliance with the strictest standards

PROCESS

The process is based on the separation and crystallization of boric acid solution in water from primary circuit refrigerant or sodium borate when it is neutralized with caustic soda. This effluent is concentrated using an evaporator & crystallizer obtaining dry crystals.

Furthermore, this process enables the recovery of the boric acid when possible.

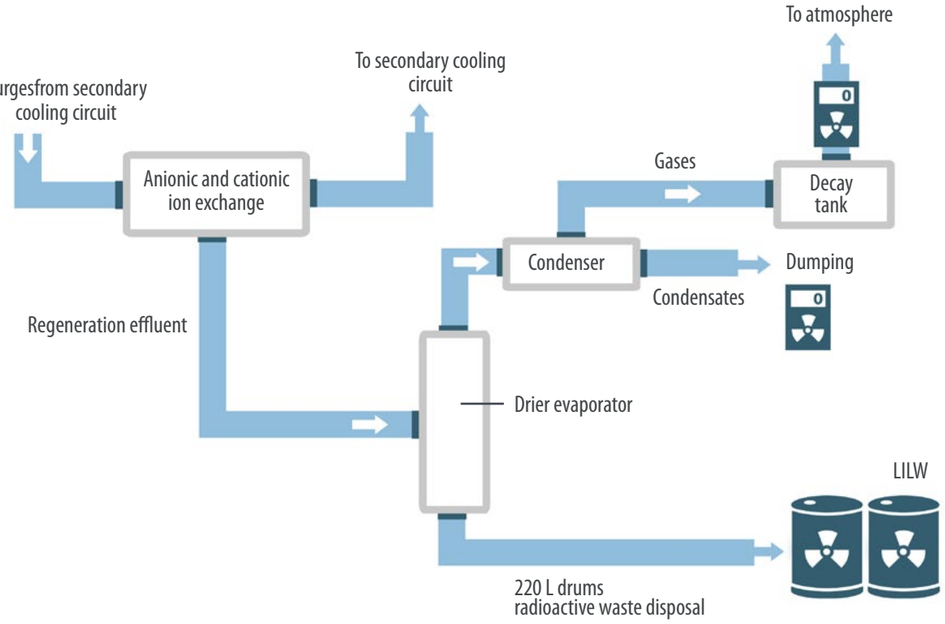
APPLICATIONS

The **NUCLEANTECH® H_3BO_3** process has been developed for the decontamination of effluent generated in the regeneration of ion exchange resins of the treatment of primary circuit refrigerant of PWR reactors. Furthermore, with small technical adaptation, the same process would be apt for the recovery of the boric acid present in the primary circuit refrigerant, obtaining nuclear grade boron.

ADVANTAGES

- Complete decontamination of the liquid effluent.
- Recovery of nuclear grade boron from the primary circuit.
- Minimization of solid waste of low and intermediate level (LILW).
- Significant reduction in financial operating costs.

PROCESS DIAGRAM



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