

Tritium Removal System

Richland, WA, USA



| The Background

The MDS® is a tritium management tool for processing large volumes of light water across a range of concentrations. This technology is based on the working principle of combined electrolysis catalytic exchange (CECE) and releases only clean oxygen and hydrogen with no liquid effluent. The technology builds on proven heavy water solutions, and although developed with a focus on light water, it can also be adapted for use in heavy water detritiation.

| Veolia's solution

As interest in tritium in nuclear fusion accelerates Veolia Nuclear Solutions presents our Modular Detritiation System (MDS).

What makes our MDS a game-changer?

- Efficient Decontamination: Safely processes tritium-contaminated effluents and water.
- Environmental Protection: Concentrates tritiated water with zero discharge into the environment.
- Versatile Recovery & Storage: Retains tritium on a solid support for recovery or storage.

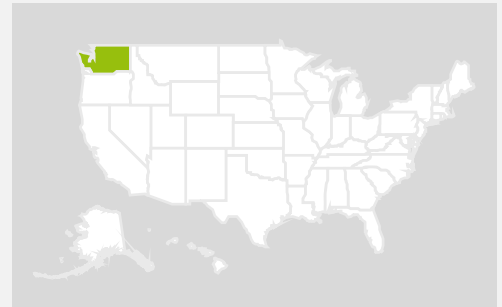
Powered by advanced CECE technology (catalytic exchange combined with electrolysis), the MDS delivers:

- Unmatched efficiency, thanks to our expertise in catalyst selection.
- Tailored, modular units for diverse project needs.
- A sustainable, adaptable solution for the future of energy.

Veolia's fully licensed and permitted tritium facility contains a unique operational prototype system utilised to perform experimental testing focused on supporting field deployments. The facility and system were fully constructed and commissioned in 5 months with the MDS® been in operation for over 1,000 hours in a 9 month period. The facility is available to support verification testing and scoping studies.

| Unique And Proven Technology

The MDS® is currently operational in Richland, Washington. The technology offers unparalleled flexibility and efficiency. Thanks to its modular design, the MDS® can handle a diverse array of concentrations and flow rates, making it adaptable to various scenarios and requirements.



Richland, WA, USA



Contract Facts:

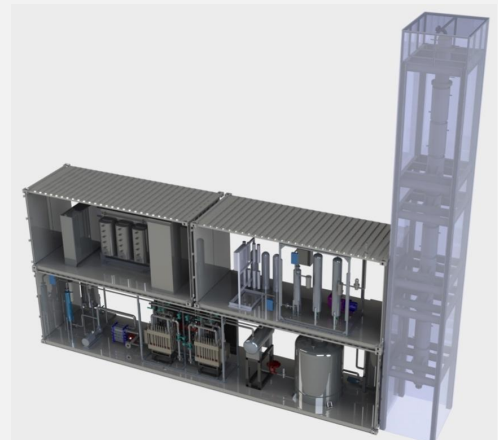
PROJECT: Modular Detritiation System (MDS®) for Light-Water Detritiation

DURATION: 2016 - Present

Electrical
power: Total
load – .6 MW

Hydrogen Flow:
100 Nm³/h

Processing Rate: 1.3 m³/d (14 g/h)



MDS® Model

| A Unique Decontamination Challenge

The decontamination of tritium (T) is particularly problematic: it is a special form of hydrogen that creates tritiated water (HTO vs. H₂O), which does not lend itself to removal by conventional technologies. This is because instead of the contaminant being carried along in water in suspended or dissolved form, the water molecule itself is modified. As a result, tritiated water is particularly difficult to treat and can spread easily if it escapes into the environment.

| How Does The MDS® Work?

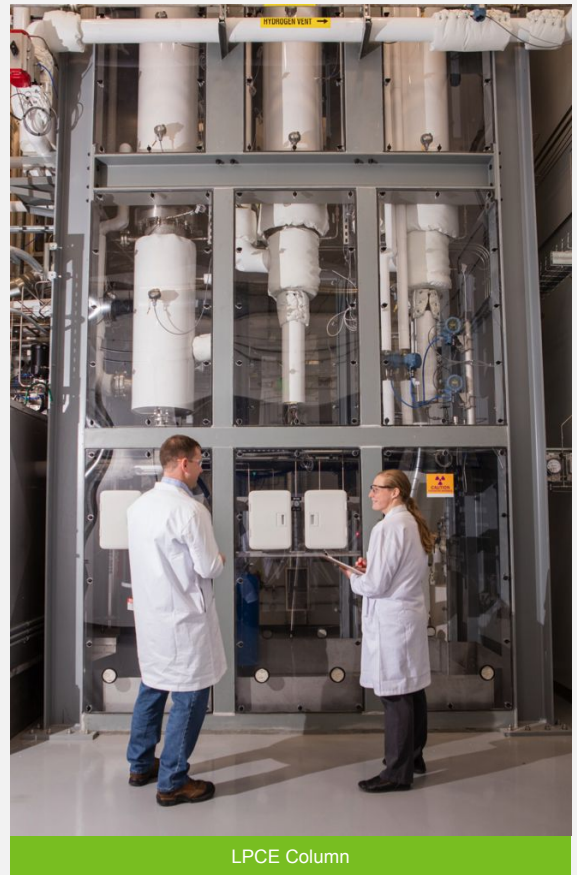
The MDS® concentrates tritiated water (HTO) and produces clean hydrogen (H₂) and clean oxygen (O₂) via the CECE process utilising modified commercially available components. Many detritiation solutions operate at low volume/ high concentration conditions. By adjusting certain physical and operational parameters, Veolia can modify the system's goals to also a successfully process high volume/low concentration water.

Proprietary column internal materials ensure a much greater amount of gas flows up the column as compared to liquid flowing down, which result in increased efficiency while ensuring the column releases clean hydrogen at the outlet. The clean oxygen and hydrogen produced can be released to the atmosphere, captured for future use, recycled, or recombined as a clean water source. Veolia's innovative MDS® technology can be tailored to meet a wide range of market needs and client requirements due to the versatility of the design.

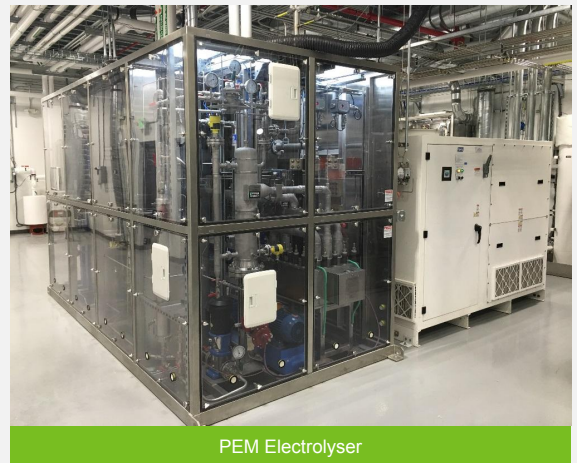
The solution allows Stakeholders' to dispose of large volumes of tritiated water in a socially and environmentally responsible manner via proven industry technologies (e.g., safely absorbed on a metal hydride).

| MDS® Module Benefits

- Factory quality – manufactured and tested off-site
- Commercial Electrolyzer
- Technology
 - SAFETY - Used in H₂ fueling stations downtown in major cities
 - MAINTENANCE - Designed for remote operation and minimal maintenance
- Indoors or outdoors location
- Contained in ventilated containers



LPCE Column



PEM Electrolyzer

