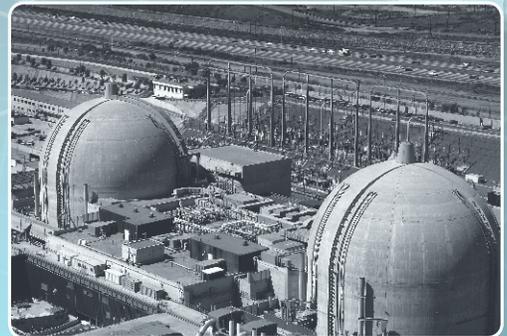




Pall Filtration  
Solutions for  
**Nuclear Plants**



**Pall offers filtration solutions that enable you to meet regulatory requirements and minimize radioactive exposure while reducing your total cost of ownership.**

State-of-the-art media design, application experience and unsurpassed removal efficiencies have made Pall the world standard in nuclear safety, control, radioactive waste treatment and fuel pool clean-up. Pall products shorten outages, increase operating efficiency and minimize exposure with the backing of expert customer support worldwide.

## Pressurized Water Reactor (PWR) Pressurized Heavy Water Reactor (PHWR)

### 1 Residual heat removal systems (RHR)

- ECCS - Emergency core cooling system
- ECCS\* - End shield cooling system
- Calandria Vault cooling system\*

Protect ion-exchange beds from fouling and abrasion, ensuring best on-stream life, protects mechanical seals and bearings from wear.

\*PHWR

### 2 Chemical Volume Control System (CVCS)

- Reactor coolant pump: Seal water injection & return filter

Filter protects mechanical seals & bearings from wear, prevent leaks of radioactive primary coolant water, extend pump maintenance interval.

- Letdown Demineralizer: Reactor Coolant Letdown Prefilter & Postfilter

Protect de-mineraliser beds from fouling and abrasion, ensuring best on-stream life, cost effective service, remove resin debris released from demineraliser beds, preventing release of material into volume control tank and reactor coolant system.

- Recycle Evaporator Filter/Recycle Evaporator Demineraliser Filter/Recycle Evaporator Concentrate Filter

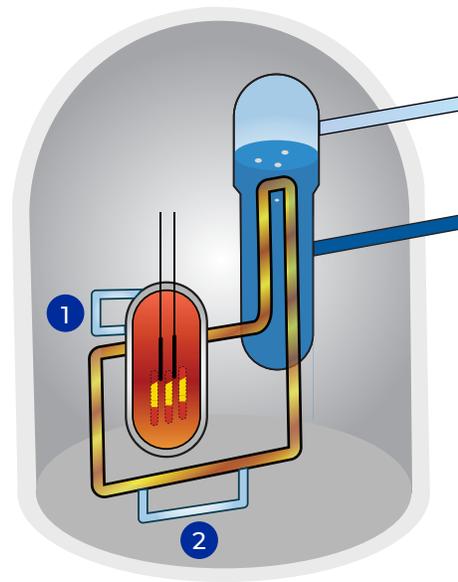
Protects evaporators from deposition which may reduce efficiency, removes debris from demineraliser, removes and precipitated solids & corrosion product.

- Chemical Addition Filter

Protects demineraliser and coolant loop.

- Concentrated Boric Acid Polishing Filter

Removes any resin debris from demineraliser.



## Boiling Water Reactor (BWR)

### 1 RHR - Residual heat removal systems

- ECCS - Emergency core cooling system

Protect ion exchange beds from fouling and abrasion, ensuring best on-stream life, protects mechanical seals & bearings from wear.

### 2 Reactor Coolant Pump & Chemical Addition

- Reactor coolant pump: Seal water injection & return filter

Filter protects mechanical seals & bearings from wear, prevent leaks of radioactive primary coolant water, extend pump maintenance interval.

- Letdown Demineralizer: Reactor Coolant Letdown Prefilter & Postfilter

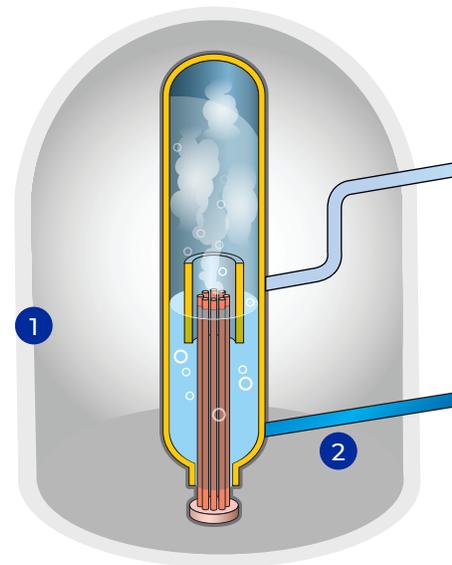
Protect de-mineraliser beds from fouling and abrasion, ensuring best on-stream life, cost effective service, remove resin debris released from demineraliser beds, preventing release of material into volume control tank and reactor coolant system.

- Chemical Addition Filter

Protects demineraliser and coolant loop.

- Concentrated Boric Acid Polishing Filter

Removes any resin debris from demineraliser.

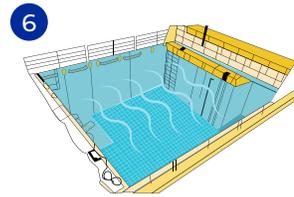


### 3 Turbine

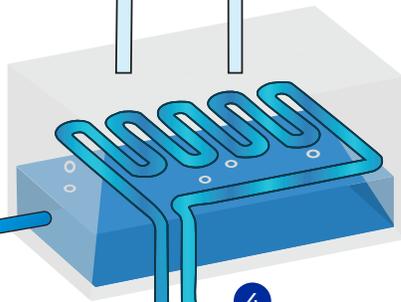
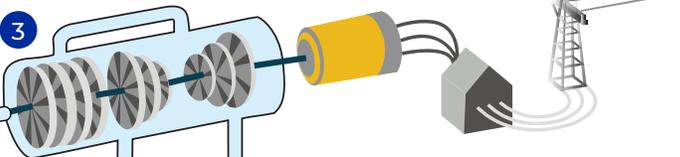
- **EHC fluid treatment**  
Ensure no fault operation of the speed control valve. Maintain integrity regardless of DP. Maintain low acid levels in the fluid to minimize corrosion. Ensure safety of plant personnel.
- **Hydrogen seal oil**  
Protect the seals from abrasive wear and prevent water ingress into the generator, maintain seal integrity, protect hydrogen purity, and minimize maintenance of the sealing system.
- **Turbine lube oil**  
Increase reliability of the turbine, extend fluid life, minimize electrostatic discharge (ESD) and remove varnish deposits. Lower maintenance and consumable cost.

### 6 Spent Fuel Pool

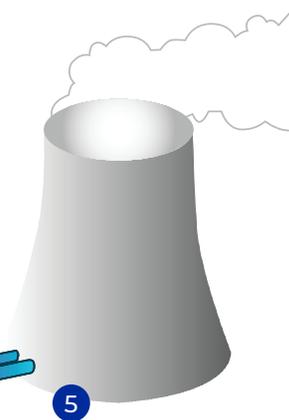
- Optimize the visual clarity of the fuel pool.
- Optimize the visual clarity of reactor cavity & fueling canal.



3



4



5

7



### 7 Radwaste

- Clarification of liquid radwaste having both high and low solids loading, meet regulatory requirements, minimize radioactive exposure, and reduce operational expenses.

8



### 4 Condensate

- **Condensate filtration system**  
Delivers excellent condensate filtration combined with absolute iron oxide removal. Captures suspended copper, silica and sulfate contaminants effectively.
- **Make-up water**  
Reduce chemical costs for precipitation, coagulation, and RO membrane regeneration, and lower water treatment costs.

### 5 Waste Water Plant

- Successfully removing the undesirable constituents such as solid particulate contaminants or hydrocarbon contaminants from waste streams is critical for conformance with stringent environmental regulations.

### 8 Diesel Generator

- Effectively remove dirt, water, and other particulate contaminants that cause erosive wear, thermal degradation, and reduced efficiencies of generators.

# Pall Solutions

**Primary Applications: Residual heat removal systems, CVCS, Spent Fuel, RadWaste**



## Ultipor® GF Fine Nuclear Filter

- Absolute rated at 99.98% efficiency, down to 0.05 micron<sup>1</sup>
- Finer media with enhanced Zeta potential improves removal of sub-micron dose contributors (including Cobalt 58, Cobalt 60, and iron oxides)
- High dirt-holding capacity
- High permeability, resulting in lower pressure drop

### Benefits

- Long service life, reduced maintenance costs, enhanced service life of reactor coolant pump seals

**Primary Applications: Condensate**



## Backwashable/Disposable Condensate Filters

Effectively remove corrosion products while preventing resin bleed-through.

**Pall Hydro-Guard backwashable filter elements** reduce particulate transport, protect steam generators and resin beds, and minimize worker exposure. They can be used with and/or without precoat.



## Pall Ultipleat High Flow Filters

High-efficiency condensate filtration systems, available down to 1.0 µm absolute. The large diameter design means that fewer filters are needed, and the small footprint lowers installation and filtration costs.

May also be used in Diesel Generator applications, to remove harmful particulate that if left unchecked, could lead to reduced reliability of critical equipment, unscheduled downtime and an increase in engine maintenance and repair costs.

**Primary Application: Turbine bearing lube, hydraulic controls**



## Athalon™ Hydraulic and Lube Oil Filters

- Laid-Over Pleat (LOP) design configuration that maximizes the available filter capacity to extend filter service life
- Resistant to high cyclic flow stress
- Beta<sub>x(c)</sub> ≥ 2000 efficiency performance rating (the highest in the industry today) for consistent fluid cleanliness throughout the full-service life of the filter
- Anti-static properties to prevent the detrimental effects of electrostatic discharge
- Quick, safe, and easy to maintain



## Oil Purifiers

Pall's oil purification solutions remove 100% of free water 80% of dissolved water, they also remove 100% of free and entrained gases and up to 80% of dissolved gases.



## Varnish\* removal systems

If varnish forms in turbine oils, the effects can be devastating to the operation and availability of the equipment Pall's varnish removal systems provides an efficient, easy and reliable method for removing varnish not only from the oil, but also from the wetted metal surfaces inside the machine.

\* Varnish is the thin, insoluble film deposit that forms on oil-wetted surfaces inside a turbine lube system, including bearings and servo valves.

# Experience Matters

For over 40 years power plants around the world have relied on Pall's advanced separation technologies to provide cleaner, safer, more reliable power to their customers. And as regulatory conditions tighten, Pall's experience plays an even greater role in meeting new environmental requirements. Don't take our

word for it. Just ask the thousands of nuclear plant personnel around the world why Pall is their supplier of choice for filtration and separation solutions in their plants. Let them tell you how our extended filter life and simple maintenance protocols save them time that can be spent on value-add process improvements.

## Pall Working to *Make Greener Cleaner*

### Safety, Quality & Environment

We enable our customers to succeed by delivering products and services that advance safety, improve quality, and directly enable people to live healthier, longer lives in a cleaner, better environment.

### Innovation

Product Development Engine that creates robust, differentiated, quality products that increase reliability, performance, and operational life, reduce maintenance costs and extend service intervals

### Proven Track Record

For over 75 years, Pall Corporation has been solving complex contamination problems for our customers around the world



### Local Technical & Service Support

Customer focused local technical, service & commercial support. Assisting customers with process integration by on site work, best practice training, process optimization.

### Global Player

Global provider of filtration and separation sciences enabling technology serving over 75 years with presence over 100+ countries.

**Contact Pall today and let us put our experience to work for you.**





**PALL CORPORATION**

**Corporate Headquarters**

Port Washington, NY, USA  
+1-800-717-7255 toll free (USA)  
+1-516-484-5400 phone

**European Headquarters**

Fribourg, Switzerland  
+41 (0)26 350 53 00 phone

**Asia-Pacific Headquarters**

Singapore  
+65 6389 6500 phone

Visit us on the Web at [www.pall.com](http://www.pall.com)

Contact us at [www.pall.com/contact](http://www.pall.com/contact)

Pall Corporation has offices and plants throughout the world. To locate the Pall office or distributor nearest you, visit [www.pall.com/contact](http://www.pall.com/contact).

The information provided in this literature was reviewed for accuracy at the time of publication. Product data may be subject to change without notice. For current information consult your local Pall distributor or contact Pall directly.

*IF APPLICABLE* Please contact Pall Corporation to verify that the product conforms to your national legislation and/or regional regulatory requirements for water and food contact use.

© Copyright 2023, Pall Corporation. Pall, , Athalon and Ultipor are trademarks of Pall Corporation.

® Indicates a trademark registered in the USA.

Document Number  
June 23