

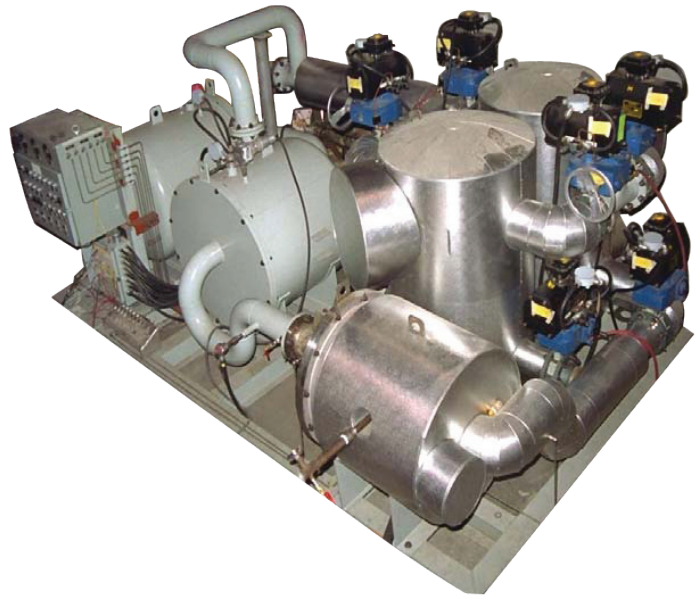
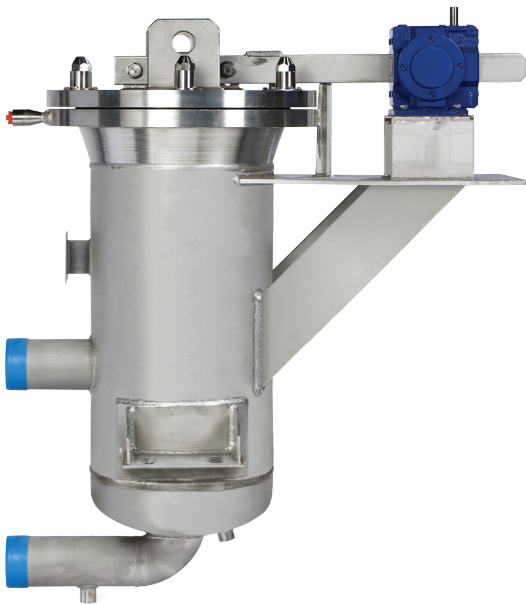


CCI Thermal
Technologies INC.
Heating and Filtration Solutions

Nuclear Filtration & Systems



3L Filters™
Engineered Filtration Systems



3L Filters™

Engineered Filtration Systems

3L Filters™ has exceeded the most demanding nuclear filtration requirements for over 40 years. We design and manufacture products for nuclear applications in PWR, BWR and PHWR nuclear reactors. A broad range of standard and custom products includes cartridge filters, strainers, demineralizers, recombiners, separators, pressure vessels and engineered systems.

Our nuclear quality program complies with:

- ASME NQA-1
- 10 CFR 50 Appendix B
- ANSI N45.2
- 10 CFR Part 21
- CSA N285.0



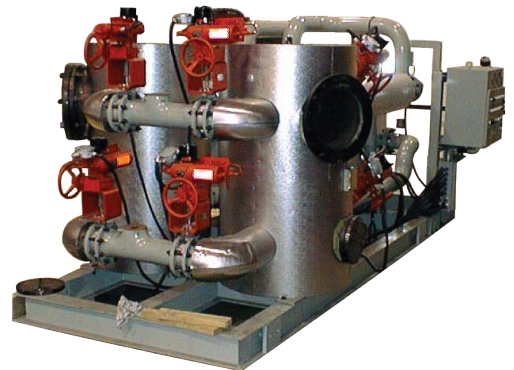
All nuclear design and manufacturing are done at our 100,000 square foot facility in Oakville, Ontario, Canada.

Engineering Capabilities

















- Mechanical and electrical design
- Pressure vessel design
- FEA analysis, including stress seismic and thermal analysis
- Design registration
- Safe or hazardous area equipment selection
- Application expertise
- Control and instrumentation system design
- PLC programming and testing
- Heating, filtration and pressure vessel technology selection
- Project engineering management

Manufacturing Capabilities

- Fabrication in carbon steel, stainless steel, aluminum or specialty/exotic materials
- GMAW, SMAW, SAW and GTAW welding methods
- Experienced qualified welders
- Large library of approved welding procedures
- In-house machining, blasting and painting
- 25 ton lift capacity
- Design and manufacture skids and packages
- In-house pressure testing
- Third-party NDE testing



Certifications

Certificate No.	Agency	Applicable Symbol or Standard	Description/Product Class
N-3578			Construction of Class 1, 2 & 3 vessels; Class 1, 2 & 3 Piping Systems; and Class 1, 2 & 3 Shop Assembly.
N-3579			Class 1, 2 & 3 Fabrication Without Design Responsibility and Class 1, 2 & 3 Fabrication With Design Responsibility for Appurtenances and as a Material Organization Supplying Ferrous & Nonferrous Material.
QA 181		CSA N285.0	Construction of Class 1, 2, 3 & 4 Vessels; Class 1, 2 & 3 Pumps, Vessels, Line Valves and Piping Systems; Class 2 & 3 Storage Tanks; Class 1, 2 & 3 Shop Assembly; as a Material Organization Supplying Ferrous and Nonferrous Material.
QA 03538		CSA N285.0	Fabrication of Class 1, 2, 3 & 4 Welded and Non-Welded Category A, B, E & H Type Fittings in Accordance with CSA Standard N285.0, General Requirements for Pressure Retaining Systems and Components in CANDU Nuclear Power Plants.
HAF604	China Nuclear Safety Bureau		Certification for Export of Nuclear Safety Related Equipment for Civil Use In China.
6N/EO1/2-2009			Technical Capability to Design, Manufacture, Test and Guarantee the Nuclear Class and Non-Nuclear Class (Class 6) Filtration Components and Pressure Vessels for Romania.
27,443			Manufacture of Pressure Vessels.
38,138			Manufacture of Miniature Pressure Vessels.
Stamps H, S, U & M	National Board		Manufacture of Boilers, Pressure Vessels or Other Pressure Retaining Items to ASME Code – H, S, U and UM Stamps.
R-7613	National Board		Metallic Repairs and/or Alterations.
QA 02216		ASME Sec. VIII Div.1 CSA B51	Manufacture of Pressure Vessels to ASME Boiler and Pressure Vessel Code, Section VIII Division 1; and CSA Standard B51 Boiler Pressure Vessel and Pressure Piping Code.
QA 03573		CSA B51 ASME B31.1	Fabrication and Assembly of Power Piping, Including Fabrication, Assembly and Erection of Power Piping at Field Sites in Accordance with CSA Standard B51, Boiler, Pressure Vessel and Pressure Piping Code and ASME B31.1 Power Piping.
QA 03574		CSA B51 ASME B31.3	Fabrication and Assembly of Process Piping, Including Fabrication, Assembly and Erection of Process Piping at Field Sites in Accordance with CSA Standard B51, Boiler, Pressure Vessel and Pressure Piping Code and ASME B31.3 Process Piping.
TS2200550-2013	SELO		Manufacture of Pressure Vessels A2 and Boiler (B) Electrical for China.

3L Filters™ Nuclear Products

1 Filters (Page 8 - 14)

Filters are used to remove fine suspended particles from fluid streams. CCI Thermal Technologies Inc. supplies liquid filters for nuclear plant applications such as: reactor coolant, coolant water make-up, condensate treatment, steam generator blow down, spent fuel pool water clean-up, radwaste clean-up, laundry rinse clean-up, pump seal injection and filters for control rod drive mechanisms and other applications. Filters in radioactive environments are designed for remote operation. Covers are equipped with gear box operators. CCI Thermal uses captive bolts that remain on the cover and do not fall when the cover is removed. The cover seal gasket is incorporated into the filter cartridge or filter basket, eliminating the need for a separate cover gasket. Filters from CCI Thermal are designed with advanced filter media that provide optimum filtration efficiency, dirt holding capacity and pressure drop. Filters are qualified for radioactive environments and are available with micron ratings from as low as 0.1 micron up to 100 micron.

2 Filter Cartridges and Filter Baskets (Page 14)

CCI Thermal nuclear filters incorporate high efficiency cartridges which provide optimum dirt holding capacity and low pressure drop. Filtering media is carefully selected to suit the specific nuclear application. A filter vessel may contain a single cartridge or a filter basket incorporating multiple cartridges. Cartridges and baskets have extraction couplings allowing remote handling using special tools. Cartridges are designed for either incineration or crushing to reduce disposal volume.

3 Strainers (Page 15)

Strainers are used to remove coarse suspended particles from fluid systems. CCI Thermal supplies strainers for capturing resin fines from deep bed ion exchange columns, up-stream strainers to protect pumps and other hydraulic rotating machinery and strainers for miscellaneous applications. The broad product line includes: cast Y strainers, fabricated Tee strainers, in-line strainers, blow down strainers and duplex strainers. Strainer baskets are manufactured using either perforated stainless sheets or, for finer straining, wire mesh sandwiched between perforated sheets for strength. Baskets are designed for high rupture pressure.

4 Emergency Core Cooling Strainers (Page 16)

Emergency Core Cooling (ECC) strainers provide protection for the reactor emergency core coolant pump and containment spray system pump under LOCA conditions. ECC strainers are used to capture the large amount of pipe insulation and other debris that is dislodged in the event of LOCA. They are designed to guarantee low head loss in order for the pump to continue operation. ECC strainers are customized for installation in an existing plant with minimal changes to plant infrastructure. CCI Thermal ECC strainers are tested per GSI-191 guidelines.

5 Ion Exchange Columns (Page 16)

Ion exchange columns are used to remove dissolved radionuclides from boiler condensate water, reactor coolant water and fuel pool water. They use cation, anion or mixed bed resins. The resin exchanges undesirable ions present in water with harmless ions. CCI Thermal ion exchange columns use a built-in flow distributor for maximizing bed efficiency and have built-in resin retention screens.

6 Filter Demineralizers (Page 16)

Filter demineralizers are used to remove dissolved radionuclides from condensate water, reactor coolant water and fuel pool water. Filter demineralizers are an alternative to deep bed ion exchange columns in applications where the dissolved ion concentration is low. A filter demineralizer is a filter equipped with special septa over which a specially-formulated powdered resin is pre-coated. As the contaminated water flows through the precoat, both the ion exchange and filtration processes occur in one step.

7 Hydrogen Recombiners (Page 17)

Hydrogen is released into the nuclear plant containment area under LOCA conditions. In the longer term under normal operation, radiolysis and corrosion can also increase hydrogen levels to the extent that a potentially explosive mixture of hydrogen and air could be present. To mitigate hydrogen concentration, passive catalytic recombiners are installed in the containment. Recombiners use a catalyst made of porous material treated with metals such as platinum and palladium. The catalyst provides sites where hydrogen and oxygen atoms from air come into close vicinity and chemically react to form water, thus reducing hydrogen concentration.

8 Restriction Orifices and Flow Elements (Page 17)

There are many uses for restriction orifices in nuclear plants. Their main purpose is to reduce downstream pressure. Depending upon the degree of pressure reduction, single-stage or multi-stage orifices are used. Flow elements are used for precise measurement of flow. CCI Thermal supplies precision machined restriction orifices and flow elements that provide 1% accuracy. These units are manufactured from corrosion and abrasion-resistant material to maintain accuracy for the life of the plant.

9 Separators (Page 17)

Process waste water gets contaminated with leakage of lubrication oil or coolants used in machinery. Oils must be removed prior to discharging the spent water into the sewer system. CCI Thermal oil water separators use mechanical impingement and coalescing media to strip the oil from water. These systems can also be supplied with acid/ base metered injection to neutralize the pH of the water.

10 Fuel Gas Conditioning Systems (Page 17)

Fuel gas conditioning skids are used upstream of natural gas turbines which are used in auxiliary or emergency power generation units. Fuel gas conditioning skids remove contaminants and water moisture from the natural gas and provide appropriate heating to inhibit formation of hydrates that severely affect turbine performance.

11 Radioactive Material Transportation Package (Page 18)

CCI Thermal supplies packages for the transportation of radioactive material. The annulus between the concentric cylinders is filled with foam that provides protection to the inner cylinder in case of sever impacts.

12 Vapor Recovery Dryers (Page 18)


Vapor recovery dryers are designed to remove moisture from air in the reactor building. In a CANDU reactor, they remove heavy water. Moist air is passed through a tower containing moisture-absorbing desiccant. Dry air is exhausted into the building. The desiccant is regenerated using hot, dry air. Both single and dual tower dryers are available.

13 Engineered Module Systems (Page 19)

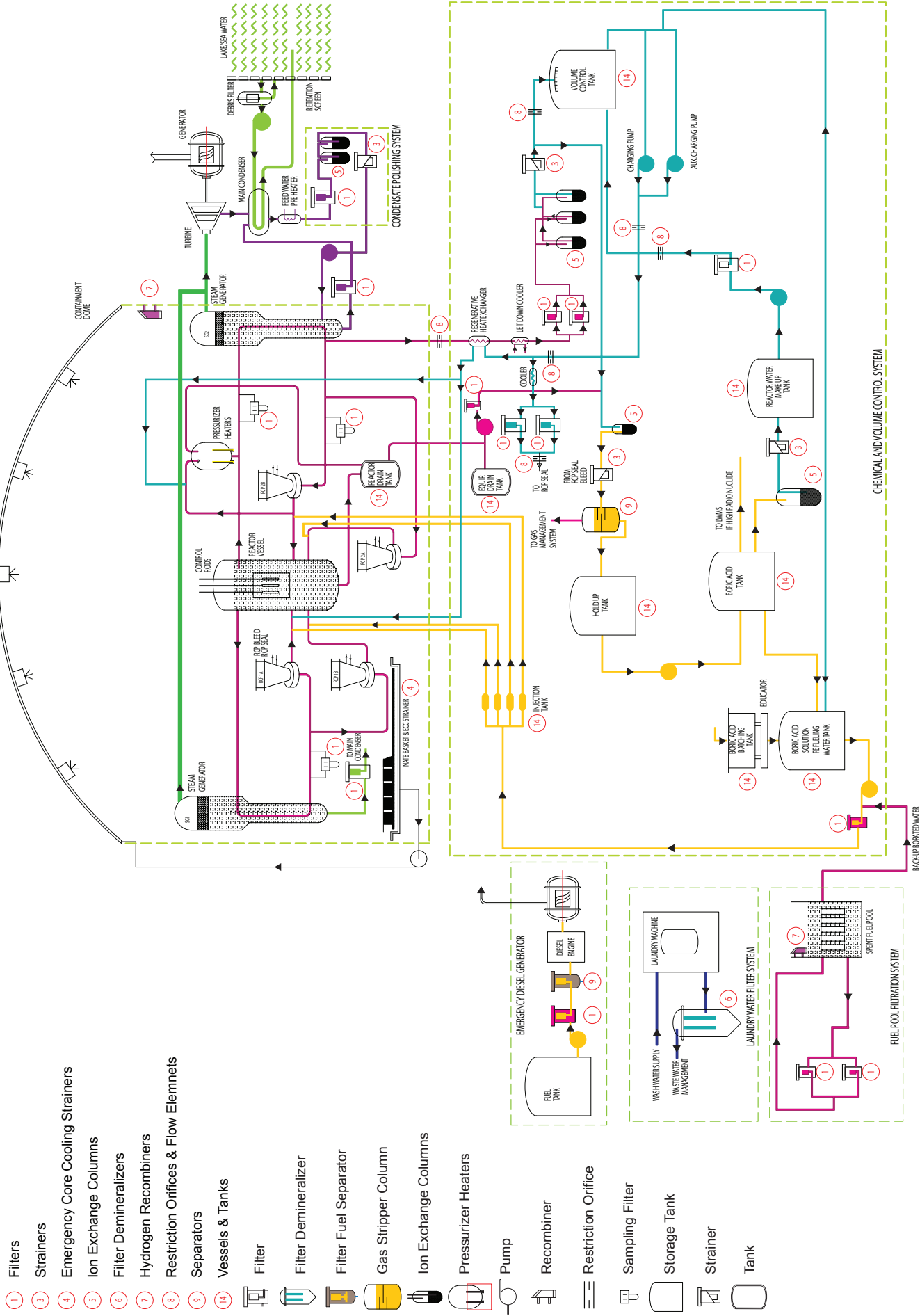
CCI Thermal Technologies Inc. designs, manufactures and tests custom engineered module systems. These systems typically consist of process equipment supplied by CCI Thermal or other vendors. Module systems are supplied complete with all interconnecting piping, instrumentation and controls. Modules are fully tested and seismically-qualified where required. These systems are supplied as turnkey systems, ready for site installation and operation.

14 Pressure Vessels and Tanks (Page 19)

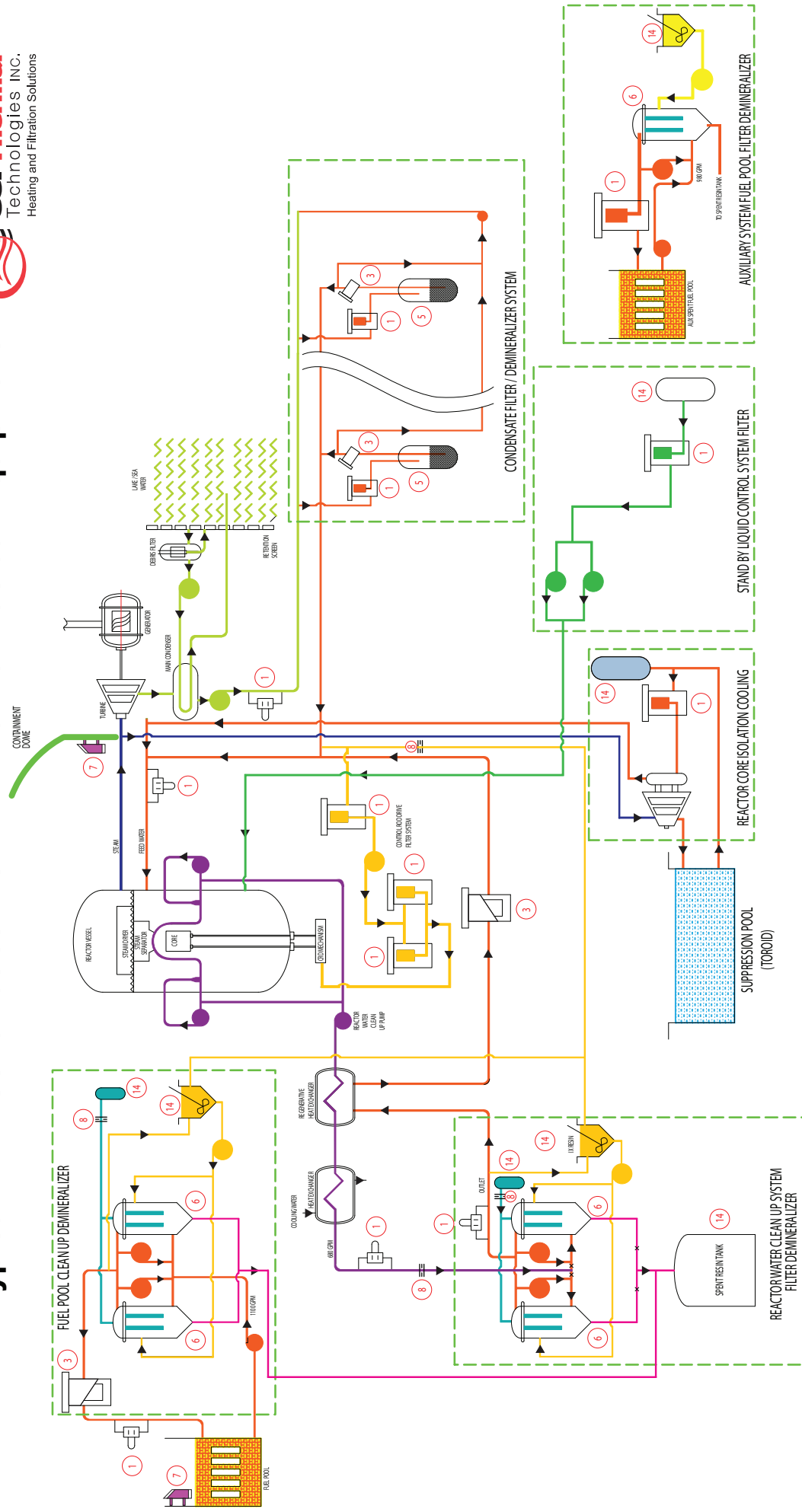
CCI Thermal Technologies Inc. designs and manufactures pressure vessel and tanks for process systems and liquid storage. These can be supplied in carbon steel, stainless steel and other alloys. Tanks and pressure vessel are designed to ASME pressure vessel code and seismically analyzed as per plant specific requirements. These units can be supplied in various sizes, pressure and temperature conditions.

		①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭
Features	Benefits	Filters	Filter Cartridges and Baskets	Strainers	ECC Strainers	Ion Exchange Columns	Filter Demineralizers	Recombiners	Restriction Orifices & Flow Elements	Separators	Fuel Gas Conditioning Systems	Radioactive Material Trnsnp. Packages	Vapor Recovery Dryers	Engineered Module Systems	Pressure Vessels & Pressure
Design Codes ASME, RCCM	Meets appropriate Jurisdictional requirement	•		•	•	•	•	•	•	•	•		•	•	•
ASME Stamps N, NPT, U, UM	Produced under rigorous quality control	•		•	•	•	•	•	•	•	•		•	•	
Seismically evaluated and qualified	Structural or operational integrity during and after earthquake	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Carbon steel and austenitic alloys consuction	Cost benefit and extended design life	•		•	•	•	•	•	•	•	•	•	•	•	
Abrasion resistant material	Maintain accuracy over life of equipment								•						•
Designed and manufactured in one location	Better control of quality and on time delivery	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Remote access to vessel cover and media	Quick maintenance and reduced radiation exposure	•	•												•
Maintenance free operation	No exposure for operating personnel			•			•	•							•
Flexibility of media selection	Same equipment can be used for different operating parameters	•	•	•		•									
Optimized design and standardization	Quick availability, competitive cost, can be used in many applications													•	•
Disposable vessels available	Use in high radiation areas	•	•	•											•
Automated operation	Minimum supervision									•	•		•	•	

Typical PWR Schematics with CCI Thermal Nuclear Equipment

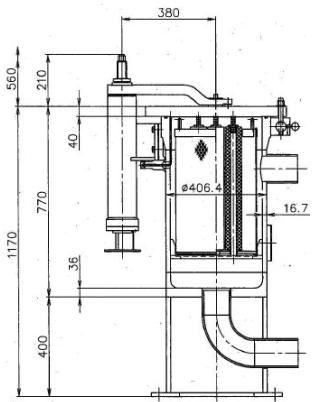
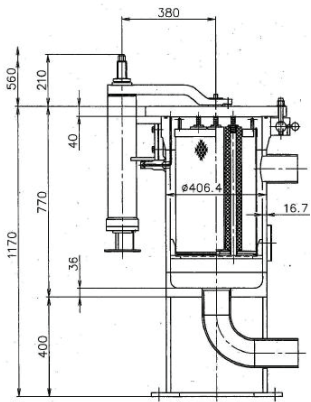


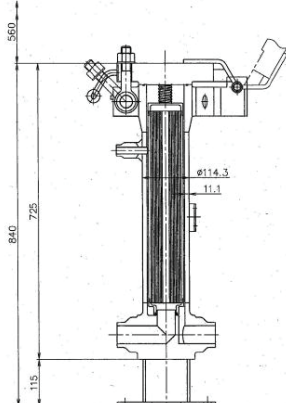
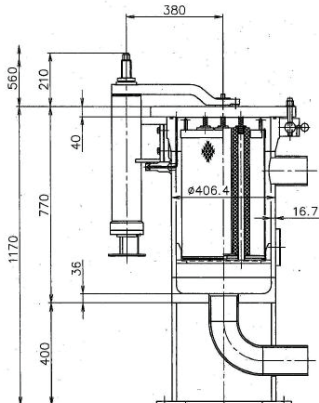
Typical BWR Schematics with CCI Thermal Nuclear Equipment



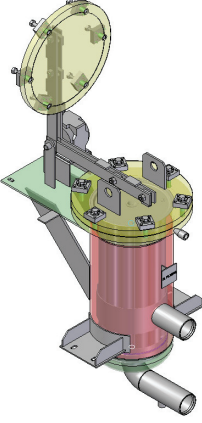
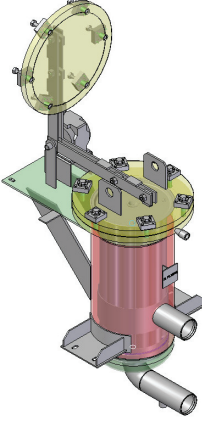
- | | | | | |
|------------------------------------|--|-------------------------|------------------------|-------------------|
| ① Filters | ⑦ Hydrogen Recombiners | ● Air Tank | 🔦 Ion Exchange Columns | 🔧 Sampling Filter |
| ③ Strainers | ⑧ Restriction Orifices & Flow Elements | 🔧 Boron Tank | 🔧 Mixing Tank | 🔧 Storage Tank |
| ④ Emergency Core Cooling Strainers | ⑨ Separators | 🔧 Condensate Surge Tank | 🔧 Pump | 🔧 Strainer |
| ⑤ Ion Exchange Columns | ⑭ Tanks & Pressure Vessels | 🔧 Filter | 🔧 Recombiner | 🔧 Tank |
| ⑥ Filter Demineralizers | | 🔧 Filter Demineralizer | ≡ Restriction Orifice | 🔧 Y Strainer |

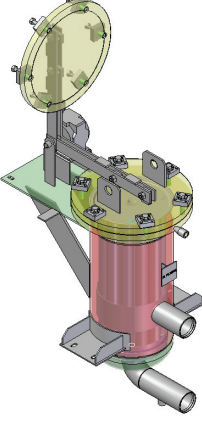
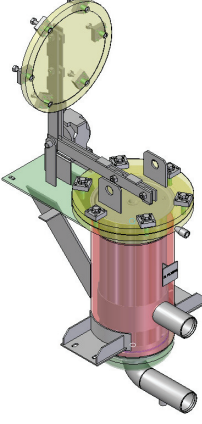
① Filters

Reactor Coolant Filter US - APWR		Mixed Bed Demineralizer Inlet Filter US - APWR	
			
Service	Water	Service	Water
Micron Rating	25 μ	Micron Rating	0.8 μ
Code Class	4	Code Class	4
Design Pressure	300 psig	Design Pressure	300 psig
Design Temperature	200°F	Design Temperature	150°F
Design Flow	180 USGPM	Design Flow	180 USGPM
Vessel Size	16 inches	Vessel Size	16 inches

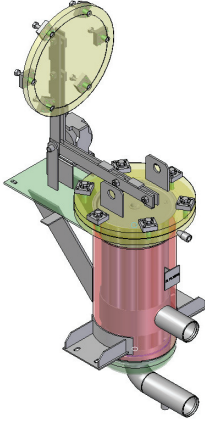
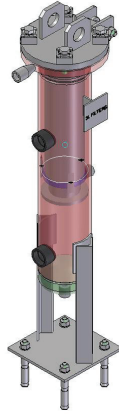
Seal Water Injection Filter US - APWR		Boric Acid Filter US - APWR	
			
Service	Pump Seal Water	Service	Borated Water
Micron Rating	5 μ	Micron Rating	25 μ
Code Class	4	Code Class	4
Design Pressure	3185 psig	Design Pressure	200 psig
Design Temperature	200°F	Design Temperature	200°F
Design Flow	37 USGPM	Design Flow	130 USGPM
Vessel Size	6 inches	Vessel Size	16 inches

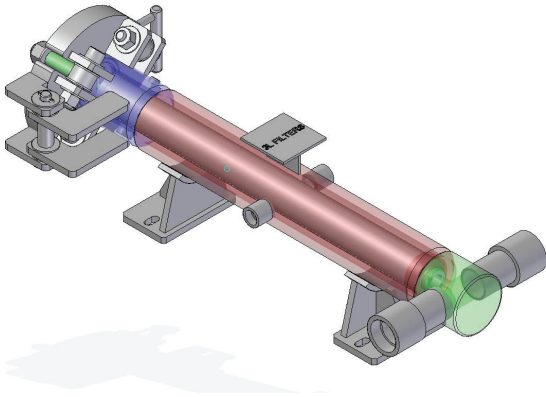
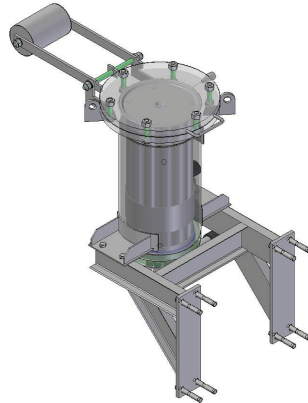
① Filters (Continued)

Steam Generator Blow Down Filter CPR1000		Spent Fuel Pit Water Filter CPR1000	
			
Service	Water	Service	Borated Water
Micron Rating	5 μ	Micron Rating	5 μ
Code Class	VIII	Code Class	CL-3
Design Pressure	232 psig	Design Pressure	131 psig
Design Temperature	176°F	Design Temperature	176°F
Design Flow	308 USGPM	Design Flow	286 USGPM
Vessel Size	16 inches	Vessel Size	16 inches

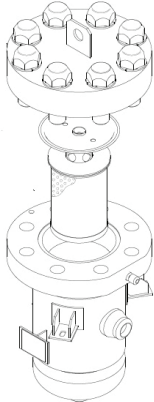
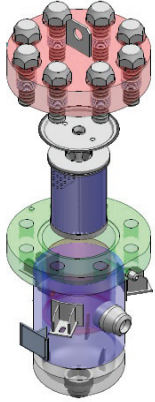
Reactor Cavity Filter CPR1000		Decontamination Filter CPR1000	
			
Service	Water	Service	Borated Water
Micron Rating	5 μ	Micron Rating	25 μ
Code Class	VIII	Code Class	CL-3
Design Pressure	116 psig	Design Pressure	230 psig
Design Temperature	176°F	Design Temperature	140°F
Design Flow	220 GPM	Design Flow	120 USGPM
Vessel Size	16 inches	Vessel Size	12 inches

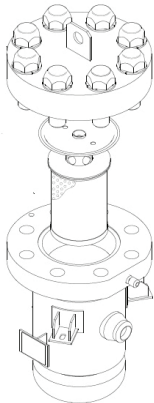
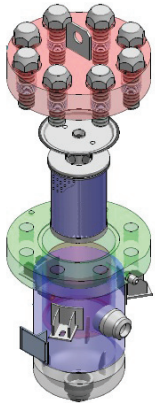
① Filters (Continued)

Resin Retention Filter CPR1000		Spent Fuel Pit Skimmer Filter CPR1000	
			
Service	Water	Service	Borated Water
Micron Rating	25 μ	Micron Rating	5 μ
Code Class	CL-3	Code Class	VIII
Design Pressure	230 psig	Design Pressure	102 psig
Design Temperature	140°F	Design Temperature	176°F
Design Flow	120 GPM	Design Flow	31 USGPM
Vessel Size	8 inches	Vessel Size	6 inches

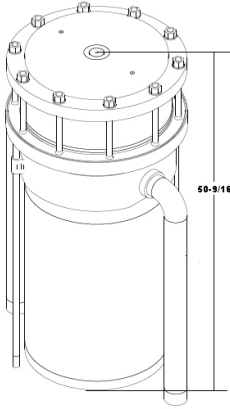
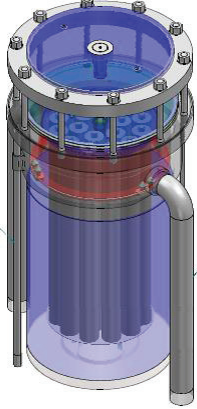
Seal Water Injection Filter CPR1000		Laundry Rinsing Filter CPR1000	
			
Service	Borated Water	Service	Water
Micron Rating	5 μ	Micron Rating	5 μ
Code Class	CL-2	Code Class	VIII
Design Pressure	2727 psig	Design Pressure	87 psig
Design Temperature	230°F	Design Temperature	158°F
Design Flow	24 GPM	Design Flow	44 GPM
Vessel Size	4 inches	Vessel Size	16 inches

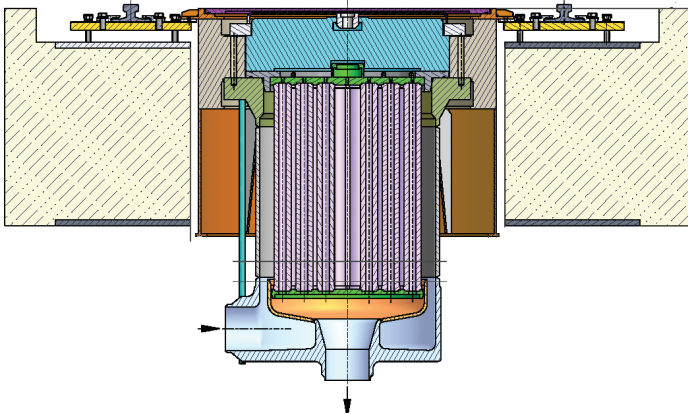
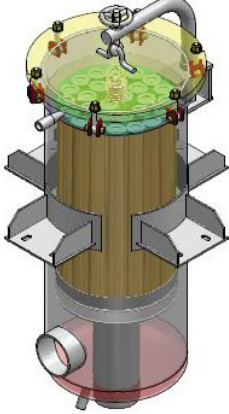
① Filters (Continued)

Reactor Coolant/Makeup Water Filter AP1000		Demin Outlet Filter and WLS After Filter AP1000	
			
Service	Reactor Coolant Water	Service	Reactor Water
Micron Rating	0.1 - 0.25 μ	Micron Rating	5 μ
Code Class	III	Code Class	VIII
Design Pressure	3100 psig	Design Pressure	150 psig
Design Temperature	200°F	Design Temperature	250°F
Design Flow	250 USGPM	Design Flow	250 USGPM
Vessel Size	14 inches	Vessel Size	16 inches

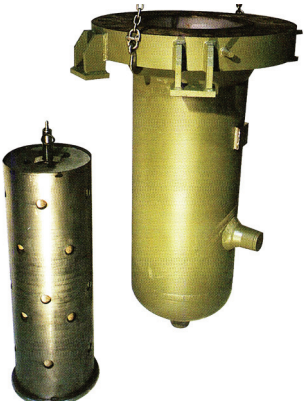

Resin File Filter AP1000		WLS Waste Pre-Filter AP1000	
			
Service	Reactor Water	Service	Waste Water
Micron Rating	5 μ	Micron Rating	25 μ and Oil Droplet
Code Class	VIII	Code Class	VIII
Design Pressure	150 psig	Design Pressure	150 psig
Design Temperature	250°F	Design Temperature	250°F
Design Flow	250 GPM	Design Flow	100 USGPM
Vessel Size	16 inches	Vessel Size	16 inches

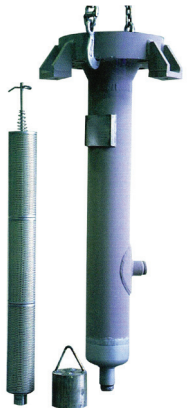

① Filters (Continued)

RCP Seal Injection Filter US-EPR		RCP Seal Outlet Filter US - EPR	
			
Service	Reactor Coolant Water	Service	Reactor Water
Micron Rating	1 μ	Micron Rating	25 μ
Code Class	CL-3	Code Class	CL-3
Design Pressure	3046 psig	Design Pressure	174 psig
Design Temperature	212°F	Design Temperature	212°F
Design Flow	80 SGPM	Design Flow	16 SGPM
Vessel Size	14 inches	Vessel Size	14 inches

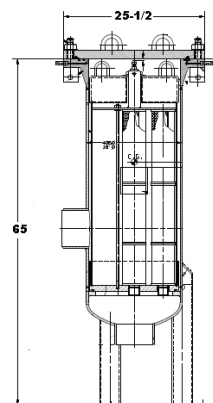
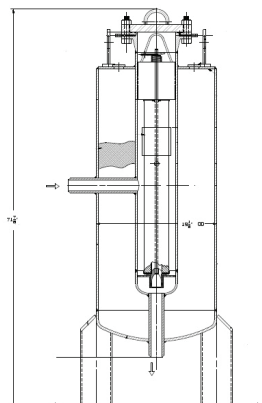
Resin File Filter AP1000		WLS Waste Pre-Filter AP1000	
			
Service	Reactor Coolant	Service	Reactor Coolant
Micron Rating	1 μ	Micron Rating	5 μ
Code Class	CL-3	Code Class	CL-3
Design Pressure	174 psig	Design Pressure	262 psig
Design Temperature	212°F	Design Temperature	262°F
Design Flow	238 SGPM	Design Flow	200 GPM
Vessel Size	20 inches	Vessel Size	20 inches

① Filters (Continued)



Primary Heat Transport Filter CANDU-6		Moderator Purification Filter CANDU-6	
			
Service	Filter D ₂ O	Service	D ₂ O, H ₂ O
Micron Rating	0.45 - 5 μ	Micron Rating	5 μ
Code Class	CL-1	Code Class	CL-3
Design Pressure	1870 psig	Design Pressure	240 psig
Design Temperature	200°F	Design Temperature	200°F
Design Flow	880 IGPM	Design Flow	420 IGPM
Vessel Size	24 inches	Vessel Size	24 inches

Gland Seal Filter and Fuelling Machine High Pressure Filter CANDU-6		Disposable Filters CANDU-6	
			
Service	Filter D ₂ O	Service	D ₂ O, H ₂ O
Micron Rating	1 - 5 μ	Micron Rating	0.45 - 5 μ
Code Class	CL-3	Code Class	CL-3
Design Pressure	2200 psig	Design Pressure	150, 204 psig
Design Temperature	200°F	Design Temperature	200°F
Design Flow	70 IGPM	Design Flow	420 GPM
Vessel Size	6 inches	Vessel Size	16, 20 inches

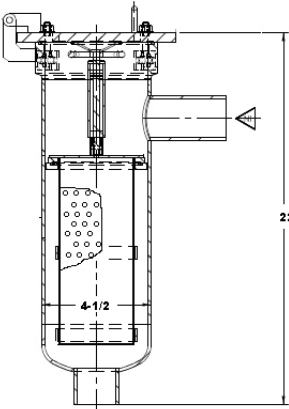

① Filters (Continued)

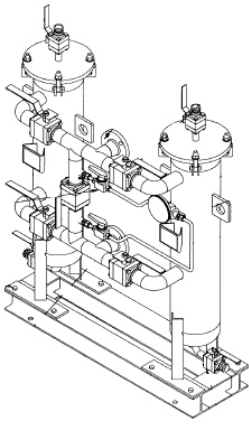
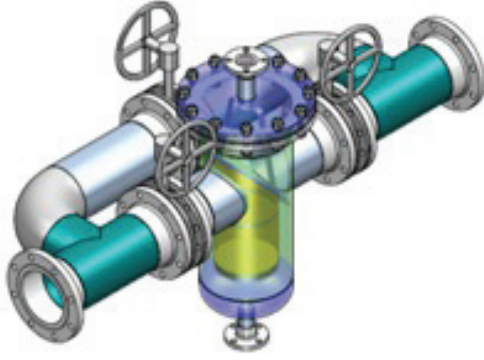
Spent Fuel Bay Cooling & Purification Filter CANDU-6		Spent Fuel Bay Vacuum Cleaning Filter CANDU-6	
			
Service	Demineralized Water	Service	Demineralized Water
Micron Rating	5 μ	Micron Rating	5 μ
Code Class	VIII	Code Class	VIII
Design Pressure	150 psig	Design Pressure	100 psig
Design Temperature	120°F	Design Temperature	120°F
Design Flow	264 IGPM	Design Flow	60 IGPM
Vessel Size	16 inches	Vessel Size	6 inches

② Filter Cartridges and Filter Baskets


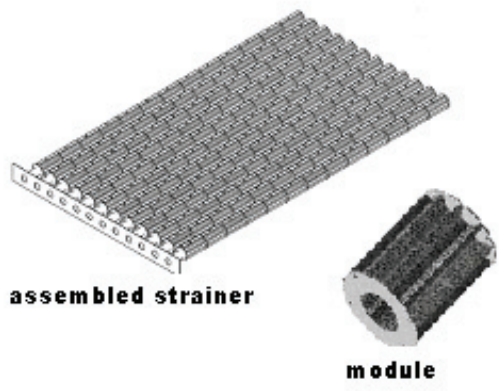
Filter Cartridges and Filter Baskets	
	
Validation of filter cartridges is conducted by the following tests:	
<ul style="list-style-type: none"> • Bubble Point Test 142mm • Reverse Bubble Point • Maximum Sustained Pressure • Hydraulic Shock Test • Differential Pressure/Flow Rate • Radiation Aging • Boron Susceptibility Test 	<ul style="list-style-type: none"> • Single Pass Crud Retention Test for 100 Micron Cartridges • Multi Pass Efficiency Crud Retention Test for Cartridges Below 100 Micron • Radiation Susceptibility Tests- Silica Leachability, Tensile Test, Pore Size Test

③ Strainers


Sealing Liquid & Seal Water Strainer US-EPR		Pipe Line Y Strainer	
			
Service	Demin Water & Borated Water	Service	Process Water
Micron Rating	100 - 200	Micron Rating	50 - 500 mesh
Code Class	CL-3	Code Class	Section III
Design Pressure	174 psig	Design Pressure	150 psig
Design Temperature	212°F	Design Temperature	650°F
Design Flow	77 SGPM	Design Flow	25 GPM
Vessel Size	4 inches	Vessel Size	4 inches

Duplex Strainer		Blow Down Strainer	
			
Service	Reactor Coolant	Service	Process Water
Micron Rating	50 - 500 mesh	Micron Rating	50 - 500 mesh
Code Class	CL-3	Code Class	Section III
Design Pressure	174 psig	Design Pressure	150 psig
Design Temperature	212°F	Design Temperature	650°F
Design Flow	100 GPM	Design Flow	25 GPM
Vessel Size	6 inches	Vessel Size	4 inches

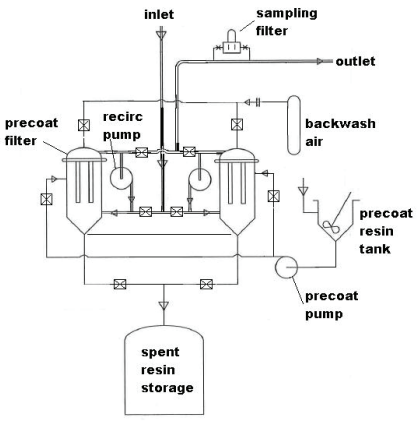
④ Emergency Core Cooling (ECC) Strainers

ECC Strainer CANDU-6		ECC Strainer Module	
			
Service	LOCA Generated Deris in Emergency Coolant	Service	LOCA Generated Debris in Emergency Coolant
Micron Rating	1/16 inch opening	Micron Rating	1/16 inch opening
Code Class	Section III	Code Class	Section III
Design Pressure	Atmospheric	Design Pressure	Atmospheric
Design Temperature	650°F	Design Temperature	650°F
Design Flow	4500 GPM	Design Flow	Per Spec
Vessel Size	30 ft x 6 ft x 5 ft	Vessel Size	To Suit Plant

⑤ Ion Exchange Columns

Ion Exchange Column

<p>Deep bed ion exchange columns are used for deionizing reactor coolant or condensate water. These are filled with bead type resins. Cation, anion or mixed resins can be used to remove undesirable ionic species. A pre filter and after filter must be used with deep bed ion exchange columns to protect the resin and downstream equipment from discharged resin fines.</p>

⑥ Filter Demineralizers

Filter Demineralizer

<p>Precoat filters perform simultaneous filtration and ion exchange. Filter septa is precoated with powdered resin. As the water flows through precoat septa, the suspended particles adhere to the precoat media. As water passes through the precoat resin, the ion exchange process takes place. Spent resin is back flushed.</p>

⑦ Hydrogen Recombiners

Recombiner



Hydrogen is released into the nuclear plant containment area under LOCA conditions. In the longer term under normal operation, radiolysis and corrosion can also increase hydrogen levels to the extent that a potentially explosive mixture of hydrogen and air could be present. To mitigate hydrogen concentration, passive catalytic recombiners are installed in the containment. Recombiners use a catalyst made of porous material treated with metals such as platinum and palladium. The catalyst provides sites where hydrogen and oxygen atoms from air come into close vicinity and chemically react to form water, thus reducing hydrogen concentration.

⑧ Restrictive Orifices & Flow Elements

Restrictive Orifices and Flow Elements



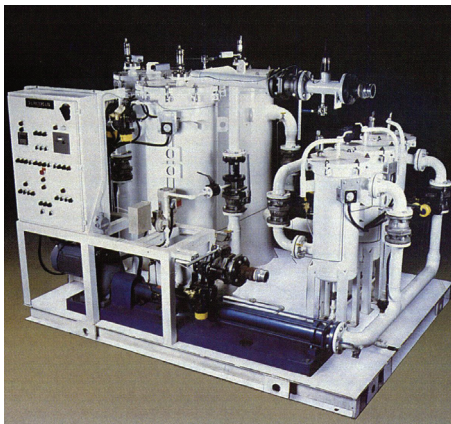
There are many orifices used in a nuclear plant. Their main purpose is to reduce downstream pressure.

Flow Elements are designed for precise measurement of flow to within 1% accuracy.

Accuracy deteriorates due to corrosion and abrasion of precisely machined bores and profile. Therefore non corrosive material which is abrasion resistant is used.

⑨ Separators

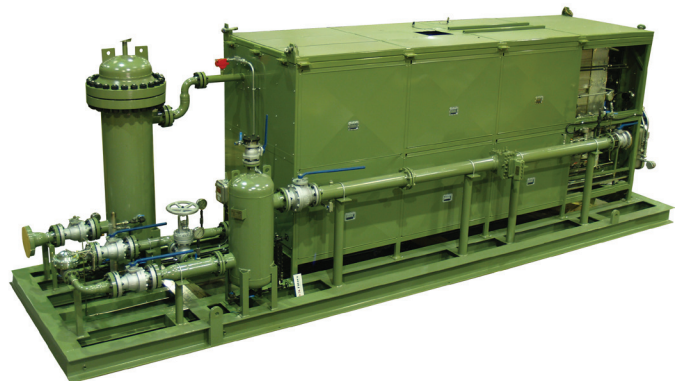
Oil Water Separators



Drain water is usually contaminated with hydrocarbon oils from machine oil leakage. Prior to disposal drain water should be stripped of oil and contaminants. Oil Water Separator removes hydrocarbon oils and suspended contaminants. These units include pre filters and coalescers. A metered acid/base injection system can be incorporated for pH control if desired.

⑩ Fuel Gas Conditioning Systems

Fuel Gas Conditioning Systems



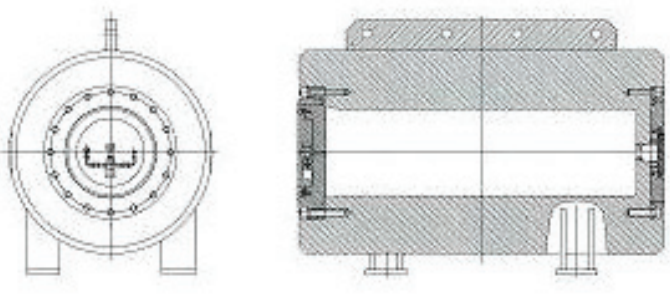

Fuel Gas Conditioning Systems are used to process natural gas fuel for the auxiliary power supply turbines. Turbines require fuel gas which is dry and at temperatures above its dew point.

Cleaning is accomplished through the use of filters and coalescers which remove suspended particles and moisture.


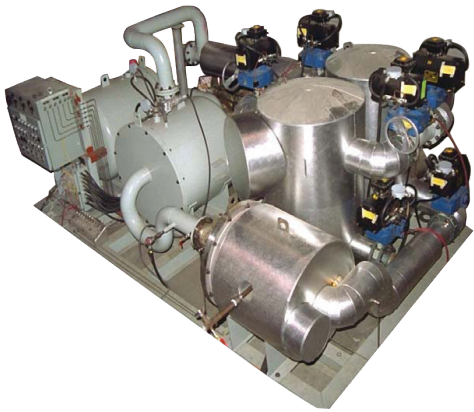
Heating to above dew point is done to avoid formation of hydrates. Electrical or Cata-Dyne™ heating is used.

Pressure reduction is done to regulate pressure for the type of turbine.

11 Radioactive Material Transportation Packages

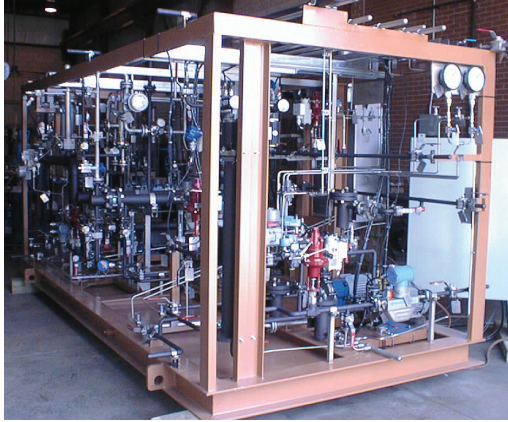
Irradiated Material Transportation Packages	ECC Strainer Module
	
<p>The Irradiated Material Transportation Package is designed to safely transport radioactive material such as zirconium specimens and spent fuel bundles within a nuclear plant building.</p>	<p>The Multi Purpose Transportation Package is designed to safely transport radioactive material from a nuclear plant to the disposal site. The unit is designed to withstand a severe fall and mounts on a special trailer.</p>

12 Vapour Recovery Dryers

Single Tower D ₂ O Vapor Recovery Dryer CANDU-6	Dual Tower D ₂ O Vapor Recovery Dryer CANDU-6
	
<p>The Single Tower D₂O Vapor Recovery Dryer removes heavy water vapor from reactor buildings. It consists of a tower filled with desiccant. Wet air is forced into the desiccant tower which absorbs water moisture. Dry air is re-circulated into the building. Desiccant is regenerated by passing hot air through it. Moisture is picked up by the hot air and condensed to recover heavy water.</p>	<p>The Twin Tower Dryer works the same way as a Single Tower Dryer, except that it provides continuous operation because one tower is regenerating while the other is adsorbing.</p>

13 Engineered Module Systems

Engineered Module Tritium Removal Facility LPCE Skid



The Liquid Phase Catalytic Exchange Skid is a part of the Tritium Removal Plant. It is designed to remove tritium from tritiated heavy water to the deuterium gas phase. The skid consists of two packed bed catalyst columns (mounted off the skid), transfer pumps, heaters, filters and nitrogen heat exchangers. The nitrogen heat exchanger is used to regenerate and dry the catalyst.

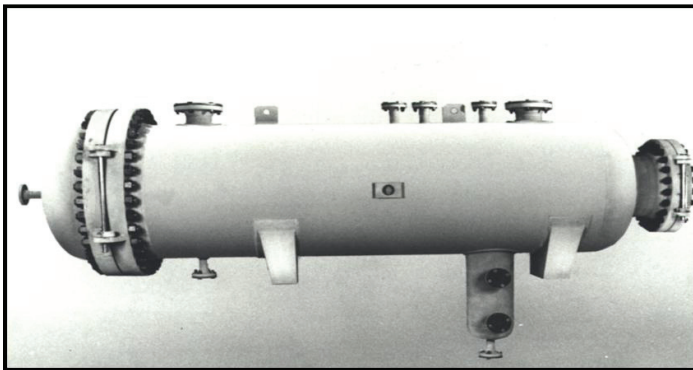
Engineered Module Tritium Removal Facility Dryer Skid



The Dryer Skid is a part of the Tritium Removal Plant. It is designed to remove heavy water from deuterium gas. Deuterium gas containing heavy water flows to the pre-dryer condenser to condense heavy water vapor that is collected. Cold saturated D_2 gas is then processed in a multistep process in a desiccant dryer. Dried D_2 gas and condensed heavy water are transferred downstream for further processing.

14 Pressure Vessels & Tanks

Pressure Vessels



Pressure Vessels are designed to ASME pressure vessel code. They operate at high pressures from approximately 150 psi to over 3000 psi. Pressure vessels can be a simple empty tank for storage of fluids under high pressure or it can incorporate a complex interior in order to achieve a particular process.

Tanks



Tanks are usually designed for atmospheric or low pressure. Their main usage is for storage or mixing of liquids. CCI Thermal custom designs and manufactures pressure vessels and tanks in accordance with ASME code and plant specific requirements.



As a leader in advanced heating and filtration solutions with facilities across North America, CCI Thermal Technologies Inc. manufactures five of the top brands in industrial heating in addition to a comprehensive line of engineered industrial filtration products including:



Explosion-Proof Gas Catalytic Heaters

Cata-Dyne™ is the industry standard in infrared gas catalytic heaters, enclosures, pipeline systems and accessories. Customers across a wide range of industries rely on Cata-Dyne™ to supply them with safe, reliable, efficient and versatile infrared catalytic heating equipment for a variety of applications in both hazardous and non-hazardous environments.



Heaters for the Harshest Environments

Ruffneck™ is renowned for its rugged, reliable and versatile heavy-duty explosion-proof heaters, heating systems and heating accessories. Ruffneck™ has a long and proud history of supplying quality heating products for the harshest industrial environments to a worldwide customer base for over 30 years. Ruffneck™ is well-known in the industry for its "ship the heat in a week" policy, where 95% of all standard orders are shipped within one week of order placement.



Engineered Electric Heat

Caloritech™ electric heaters, heating elements and heating accessories are well-known in the industry for their quality, reliability, performance and versatility. In addition to standard "off the shelf" industrial heaters and heating systems components, Caloritech™ also offers engineered heating solutions custom designed, manufactured and tested to satisfy customer specifications. No matter what your application or environment, Caloritech™ has a solution to fit your heating needs.



Engineered Filtration Systems

3L Filters™ has satisfied the most demanding industrial filtration requirements for over 40 years. A broad range of standard and custom products includes liquid filters, strainers, separators, pressure vessels, and engineered products and systems. 3L Filters has special expertise for nuclear, petrochemical, water treatment and environmental applications.



Electric Explosion-Proof Heaters

Norseman™ is the most technologically advanced line of explosion-proof electric air heaters and heating accessories, including both forced air heaters and natural convection heaters, as well as unit heaters, panel heaters and thermostats. Norseman™ offers innovative, low maintenance solutions for a wide range of applications in a variety of industrial and commercial environments. Custom engineered heaters or heating systems are available for specialized applications.



Infrared Ovens

DriQuik™ is the market leader in infrared drying ovens and automated pre-finishing systems. DriQuik™ pioneered radiant oven technology in the 1930s and has since been setting the industry standard in infrared radiant heating systems and components for over 75 years.

Visit www.ccithermal.com for detailed product information.

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