

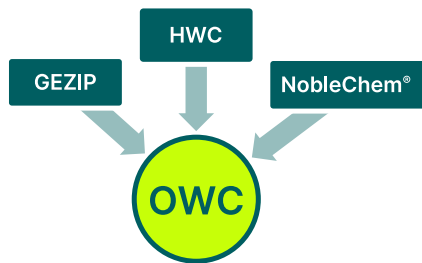


HITACHI

OPTIMUM WATER CHEMISTRY

Overall Strategy for Boiling Water Reactor (BWR) Chemistry Performance

Optimum Water Chemistry (OWC) encompasses the implementation of GE Vernova Hitachi Nuclear Energy (GVH) Zinc Injection (GEZIP), Hydrogen Water Chemistry (HWC), and NobleChem® within the global BWR fleet. When employed in conjunction with effective control of contaminant concentrations in primary BWR coolant, OWC offers worker dose reduction and proven mitigation of intergranular stress corrosion cracking (IGSCC) extending asset service life.

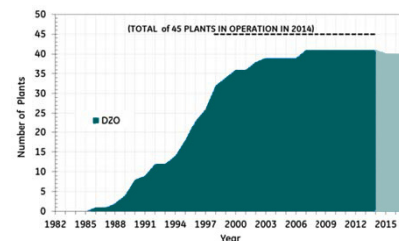


BWR Operating Experience (as of October 2014)	
Adoption Chronology	GEZIP Injection of zinc oxide depleted to an isotopic concentration of less than 1% Zn-64 to reduce Co-60 incorporation onto piping surfaces ~ 760 years
	Hydrogen Injection (HWC) Injection of hydrogen into the feedwater of a BWR to drive recombination of oxidizing species generated in the cores of BWRs ~ 760 years
	Classic NobleChem® (CNC/NMCA) Deposition of noble metals on reactor piping and internals during a refueling outage to increase efficiency of HWC ~ 310 years
	On-Line NobleChem® (OLNC) Deposition of noble metals on reactor piping and internals during reactor operation to increase efficiency of HWC ~ 120 years

Adoption of GEZIP in the GVH BWR Fleet*

GEZIP was developed following early BWR operating experience, which demonstrated that plants with a natural low-level zinc source in the feedwater (from brass condenser tubing) consistently exhibited lower recirculation piping post-shutdown dose rates. GEZIP was the first OWC technology to be adopted by the GVH BWR fleet.

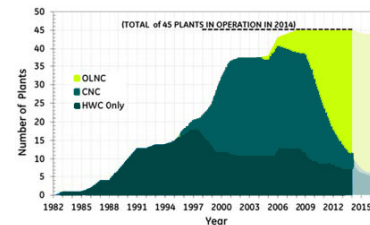
Adoption of GEZIP in GVH BWR fleet* outside Japan



Adoption of HWC and NobleChem® in GVH BWR Fleet*

GVH NobleChem® was developed to enable BWRs to mitigate IGSCC without elevating main steam line dose rates, which are caused by high hydrogen injection rates. The On-Line NobleChem® (OLNC) process improves mitigation by reducing the time between reapplications. OLNC is the OWC technology most rapidly adopted by the GVH BWR fleet*.

Adoption of HWC and NobleChem® in GVH BWR fleet* outside Japan



For more information, contact your GE Vernova Hitachi Nuclear Energy sales representative.

Learn more at governova.com/nuclear



* GVH BWR fleet includes BWRs (outside Japan) for which GVH was the OEM.

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