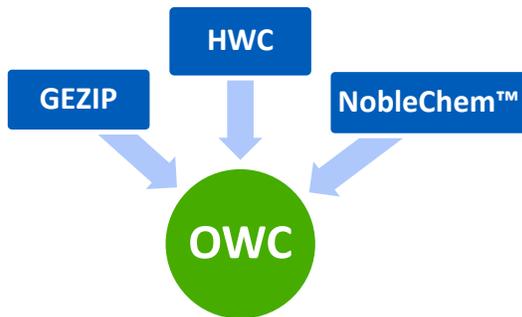


Optimum Water Chemistry



Overall Strategy for BWR Chemistry Control

Optimum water chemistry (OWC) describes the adoption of zinc injection (GEZIP), hydrogen water chemistry (HWC), and NobleChem™ by the BWR fleet. When used in conjunction with adequate control of contaminant concentrations in the primary coolant of a BWR, OWC provides proven mitigation of both intergranular stress corrosion cracking (IGSCC) and dose rate increases.



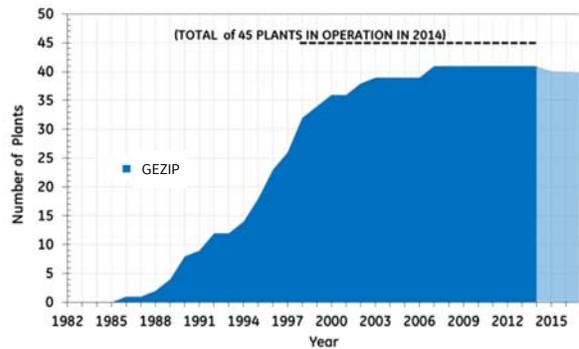
BWR Operating Experience (as of October 2014)

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

Adoption of GEZIP in the GEH BWR Fleet*

GEZIP was developed after early BWR experience showed that plants with a natural low-level Zn source in the feed water (from brass condenser tubing) had consistently lower recirculation piping post-shutdown dose rates. GEZIP was the earliest OWC technology to be adopted by the GEH BWR fleet.

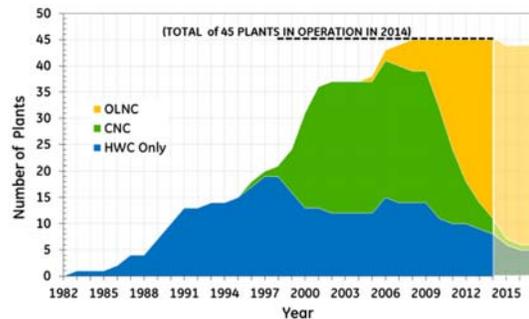
Adoption of GEZIP in GEH BWR fleet* outside Japan



Adoption of HWC and NobleChem™ in GEH BWR Fleet*

CNC and OLNC were developed to allow plants to mitigate IGSCC without elevated main steam line dose rates, which are caused by high hydrogen injection rates. The OLNC process improves mitigation by reducing the time between NobleChem™ reapplications. OLNC is the OWC technology adopted most rapidly by the GEH BWR fleet*.

Adoption of HWC and NobleChem™ in GEH BWR fleet* outside Japan



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

For more information, contact your GE Hitachi Nuclear Energy sales representative or visit us at www.ge-energy.com/nuclear

