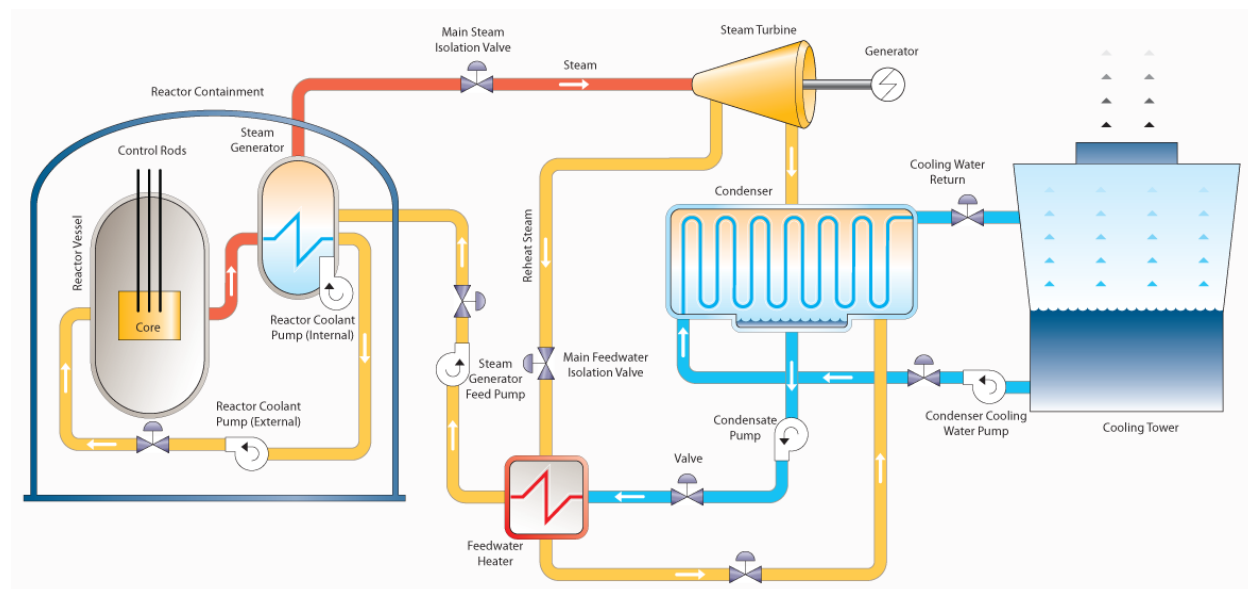


Nuclear Power Plants

Analysis of Boric Acid in cooling water PWRs

Nuclear Power plants produce 12.3% of the world's energy supply. Controlling and maintaining these power plants is of the utmost importance to secure safety and efficient operation. In pressurized water reactors (PWRs), Boric acid (B-10 Isotope) is added to the primary coolant system water as a neutron scavenger in order to control the nuclear reaction. Boron readily absorbs neutrons and increasing or decreasing its concentrations in the reactor coolant will therefore affect the neutron activity correspondingly. Concentrations in this primary coolant vary from zero to 2,000 ppm or more (depending on the stage of the fuel cycle). The Boron concentration is regulated through the plants Chemical and Volume Control System (CVCS). With the ADI2045TI and its proven titration method, the Boron concentration can be analyzed continuously without the need for testing in the laboratory. Calibration is not required for this system. On-line monitoring of boric acid in PWR primary coolant systems guarantee's optimal and efficient reactivity adjustment for 100% power output.



Schematic: example of Nuclear Pressurized Water Reactor Process

Application: On-Line monitoring of boric acid in cooling water by potentiometric titration. The intelligent software of the ADI 2045TI can automatically adapt to the varying process range and switch titrant burette concentrations to ensure the highest accuracy is achieved throughout the full measuring range (high – low).

Typical Range: 0 – 2000 ppm Boron

Remarks: Examples of other applications in the nuclear power industry are silica, sodium, nickel, zinc, calcium, magnesium and chloride