

**An Analysis of the Passive Autocatalytic Recombiner Performance under a Design Basis Accident
for an Implementation into the KNGR**

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Abstract

A new, simpler device called a catalytic recombiner or passive autocatalytic recombiner (PAR) has been developed for cost-effective control of combustible gases. PARs, which are stainless steel sheet metal boxes open at the top and bottom and contain many vertical flat catalytic cartridges or plates, recombine hydrogen and oxygen in the 1-cm-wide flow channels between them. For an implementation of PARs into the Korean Next Generation Reactor (KNGR), the number of PARs within the containment was derived out with a conservative approach to meet design requirements, based upon an evaluation of different PAR performance models under design basis accident. Whereas the Passive Hydrogen Recombination System (PHRS) for combustible gas control consists of two redundant PAR groups, it was evaluated that four PARs should be provided inside the containment above the operating deck and two PARs inside the IRWST steam space above normal water level. At detailed design stage of the KNGR, if PARs are practically implemented into KNGR design, the design of KNGR-specific PAR equipment depending upon allowable spaces and anticipated gas flow pattern within the containment will be required.