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ATTN RULEMAKINGS AND ADJUDICATIONS STAFF
SECRETARY, US NUCLEAR REGULATORY COMMISSION
WASHINGTON DC 20555-0001

Re: RIN 3150-AG76: Combustible Gas Control in Containment (67FR50374)
§D: Hydrogen Monitoring Requirements (67FR50377)

ATS has developed and qualified an in-containment Class 1E hydrogen detector for a foreign light water cooled nuclear power plant. Some of our lessons learned during this process may be useful to the commission in evaluating the proposed rulemaking.

1. During the qualification process, ATS discovered a radiation damage mechanism in a high-quality commercial (i.e. category 3) combustible gas detector that was not predicted based on a review of construction materials. The mechanism involved an interaction between multiple materials and resulted in severely degraded calibration of the detector.
2. Testing revealed that combustible gas detectors are susceptible to damage from aerosols typical to a post accident containment environment. Two mechanisms of aerosol related damage were observed: (a) poisoning of the sensing elements (typically by alkali metals and/or borates in containment spray) resulting in severe decalibration or electrical failure and (b) clogging resulting in failure to sense ambient hydrogen. We have found that these mechanisms are not amenable to reliable analysis without verification testing.

Based on these observations, we believe that commercial grade hydrogen detectors located inside containment would probably not function reliably in a post accident environment without verification based modifications. Furthermore, the more severe an accident (and hence the greater the need for reliable hydrogen detection) the less likely the sensors would operate properly due to (a) increased radiation exposure and (b) increased aerosol loading (including high-solids aerosols associated with core damage or corium-concrete interactions).

Similarly, we suspect that remote sampling lines associated with monitors located outside of containment may be susceptible to clogging with high-solids aerosols during a severe accident.

We are concerned that the proposed reclassification of hydrogen monitoring equipment from category 1 to category 3 may not be in the public's best interest. To whatever extent "*hydrogen monitors are needed to implement severe accident management strategies*," they must be operable under severe accident conditions. Our experience indicates that, unless a comprehensive qualification program is implemented, commercial grade hydrogen detectors are likely to be inoperable under severe accident conditions.

Therefore, unless risk assessment indicates no need whatsoever for hydrogen monitoring, we recommend that containment hydrogen monitoring equipment be subject to comprehensive qualification testing. Inasmuch as this requirement may be as burdensome on licensees as the status quo, we suggest that it may be prudent to retain the safety-related status of hydrogen monitors.

Respectfully,

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