cell. The catalytic recombiner within the cell would do its best, but there would be an oxygen-rich atmosphere within the cell. At a 1:1 loading of hydrogen atoms in the Pd, the 3 cm rod of 0.3 cm diameter would contain 23 milliequivalents of hydrogen atoms, corresponding to 5.7 millimoles of oxygen molecules in the cell. If the cell free volume were [illegible] cc, the pressure of oxygen gas would be 1.2 atm, or some 18 psi absolute. If one wanted to load the cell so that it remained hydrogen rich, in the presence of hydrogen loading of the cathode, the equivalent of 36 psi of hydrogen would need to be added, to combine with the oxygen (or to load the cathode), and an additional 35 psi of hydrogen in order to bring the cell to 20 psi gauge.

So we are somewhat concerned that the gas leads to each cell not leak at all, and would like to make sure that there is a mass and materials balance when the cells are opened, so that no significant amount of heavy water has escaped.

While cells that do not "load" to the requisite 0.92 D:Pd level would indeed serve as controls, we believe it highly desirable to run a number of cells on light water equal to the number of experimental cells. Of course, these are not directly comparable, and the purpose of having light-water cells would not be to do anything nearly so silly as to compare the power dissipation at equal current in the two cells, as has been done by some experimenters. The purpose, rather, would be to see whether such light-water cells (which are much easier to experiment with and considerably cheaper) would ever provide appearance of "excess heat". If there is an experimental artifact, it might for some reason exhibit itself more readily in connection with light-water cells, which would be a blessing to allow it to be tracked down and vanquished more readily.

Two other concerns have to do with the performance of the catalyst and with possible high-frequency oscillations in the electrochemical current.

The paper notes that at high current densities the presence of large deuterium (or hydrogen) and oxygen bubbles "disrupted the electrolyte continuity," and one would like to be very sure that the stabilized current did not change substantially during a small fraction of the time. The validity of the experimental results is totally dependent on the cell current being maintained truly constant, so that when the average of the fluctuating cell voltage is measured, the product of the constant current by this average voltage (and the time) is the true energy input.

Concluding remarks.

This is a serious effort to obtain reliable calorimetric data on heavy water electrolyzed in a cell with a palladium cathode. It is larger in scale and has more electrochemical expertise than the work of Tom Droege of Fermilab, who obtains excellent data but no excess heat.

We have found no specific experimental artifact responsible for the finding of excess heat, but we would like to see eventually (as would the experimenters!) a larger effect and one that can be more reliably exhibited. Alternatively, a larger number of light-water cells might more readily exhibit the phenomenon if it not "real", and this would seem to be a relatively easy way to challenge the hypothesis that the peculiarity is specific to heavy water.

Sincerely yours,