Oxide layers are being considered as corrosion barriers and tritium permeation barriers for blanket systems using flowing Pb-Li. Promising laboratory results have been shown for both applications for alumina and other oxides. Recent work examining the microstructure of thermally grown alumina on a commercial FeCrAlY alloy which was then exposed to Pb-Li for 1000h at 800°C showed abnormally large alumina grains after the exposure. The grain size increased by an order of magnitude at a time and temperature where minimal grain growth would be expected. This observation is consistent with previous work examining yttria coatings in Li at 800°C where significant grain growth also was observed. This change in microstructure may critically effect the durability and/or the properties of oxides and explain the poor permeability results of alumina layers exposed to Pb-Li. Higher resolution characterization is being conducted on these alumina layers before and after exposure to PbLi to determine any changes in chemistry in the bulk material and on the alumina grain boundaries. Additional experiments will be conducted to confirm this results on other substrates and determine the extent to which the oxide properties are effected by this change in microstructure.