surface area, the relative neutron efficiency for calcium nitrate and tetrachloroethylene, and the measured Ar^{37} production rate in the calcium nitrate detector. The Ar^{37} production rate derived in this manner for the solar neutrino detector is 0.1 atom per day. However, this fast neutron background effect can be greatly diminished by flooding the tank chamber with water to provide a fast neutron shield. The means of accomplishing this has already been described, see Figure 2.

There are background effects from internal natural alpha emitters. The most serious one arises from protons generated by the reaction $Cl^{35}(\alpha,p)Ar^{38}$ that have sufficient energy to produce Ar^{37} by the $Cl^{37}(p,n)Ar^{37}$ reaction. The yield of this reaction was measured by dissolving Rn^{222} in tetrachloroethylene, and removing the Ar^{37} by a helium purge. The yield measured was 1.7×10^{-10} atoms of Ar^{37} per Rn^{222} decay. The tetrachloroethylene was monitored for natural alpha emitters by sampling each railroad tank car at the time the tank was filled. This was accomplished by evaporating a liter sample and alpha-counting the residue. The tank walls (A-201-B steel) were carefully cleaned by shot blasting, and the piping was cleaned by acid dipping. The tank surface, and the piping was alpha-counted to determine the surface alpha emission rate. The total alpha emission rate from the metal surfaces and the liquid is approximately 10^8 alphas per day. Thus, the internal alpha production rate for Ar^{37} is estimated to be 0.02 atom per day from (α,p) processes.

Internal alpha particles can also produce Ar^{37} by the direct reaction $S^{34}(\alpha,n)Ar^{37}$ if the liquid contains sulfur. The yield for this reaction was measured by dissolving Rn^{222} in carbon disulfide, and removing the Ar^{37} by helium purge. A yield of 1.8×10^{-7} Ar^{37} atoms per Rn^{222} decay was observed. The sulfur content of the tetrachloroethylene used is below 1 ppm, hence the