and obtaining lower counter backgrounds. Pulse rise-time analysis was first used starting with run 18, and has been used in all subsequent experiments.[2] The design of the counters was modified so that the X-rays from the ^{55}Fe source, used to calibrate the energy and rise-time gains, illuminated the active volume of the counter in a more uniform manner. The composition and total pressure of the filling gas and the counter dimensions were varied somewhat to optimize energy resolution and pulse rise-time discrimination of ^{37}Ar decay events. Beginning with run 36 a new anticoincidence counter and shield arrangement was used. To improve the detection of gamma rays a NaI(Tl) crystal 30-cm diameter by 20-cm thick having a well 5-cm diameter and 10-cm deep was used as an anticoincidence counter. The counters were shielded by an annular shield of mercury 20-cm thick. The pulse recording system described in reference 2 was used in all experiments.

Recently we have had success in building counters that have very low total background counting rates. These lower counter backgrounds resulted from various cleaning techniques and choice of materials. The main radioactive contaminants that were apparently eliminated were potassium and tritium. Three counters are in service that have background counting rates in the NaI anticoincidence counter and shield mentioned above of 0.5 counts in 35 days in the energy region 1.5 to 5 keV with fast pulse rise-times. These counters were used in runs nos. 37, 38, and 39. Figure 1 shows the rise-time (amplitude of the differentiated pulse) versus energy plot for the 1st 35-day count of run no. 37.

The 3.8×10^5 liter detector tank is located in a chamber set below the exit tunnel so that the space surrounding the tank can be flooded with water to provide a fast neutron shield. This space was filled with water after run 20, and the water was left in place through run 37. Following run 37