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A new method for counting surviving neutrons in neutron lifetime measurements, using bottled ultracold neutrons, which provides better characterization of systematic uncertainties and enables higher precision than previous measurement techniques will be described. An active detector that can be lowered into the trap has been used to measure the neutron distribution as a function of height and measure the influence of marginally trapped UCN on the neutron lifetime measurement. In addition, measurements have demonstrated phase-space evolution and its effect on the lifetime measurement. The current state of the experiment aimed at obtaining a precision of 0.25 s for the neutron lifetime and plans for an upgrade that will allow a precision of less than 0.1 s will be described.

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