

List of known ADDER v. 1.1.0 bugs and design defects

The Advanced Dimensional Depletion for Engineering of Reactors (ADDER) Software is under continued development at Argonne National Laboratory by the Research and Test Reactor (RTR) Department. In order to satisfy the NQA-1 requirements used for the software, ADDER's development follows a rigorous Software Quality Assurance Plan (SQAP). Rather than being updated every time a modification is made to the software base, the GitHub repository is updated by the developers following a formal release of the software under the SQAP. The timeline of these releases is flexible and is subject to change.

The following list is intended to document known bugs and design defects identified by the ADDER users and developers and currently being addressed as part of the next software release. The users should be aware of these software issues before using the software in order to avoid unintended erroneous results. If you encounter any bug not listed below, please notify the ADDER development team.

Please send any question or comment to adder@anl.gov.

1. Critical Search Operation Convergence Check Bug (Notification 12/15/2025)

Type: Error

Description: During the criticality search operation in ADDER, an early reject check is done for each iteration of a new control group position. If this early reject check passes (i.e., if the 99.5% confidence interval of the calculated k-effective is anywhere within the target range), additional histories are run. Due to a bug introduced in ADDER v1.1.0 development, no additional histories are actually run. Instead, the final convergence check is performed using the same results as used in the early reject check.

This bug causes potentially valid critical positions to be discarded, which can increase the length of the calculation. The critical search operation should still converge if the early reject check produces a k-effective whose 95% confidence interval is entirely within the target range.

How to avoid the issue pending corrective action: Pending a fix, users must be aware that the final results of the critical search operation should not be affected, but the calculation time can increase. However, if the runtime is excessive or if convergence issues occur—potentially due to this bug—users are advised to contact the development team.