



DEPARTMENT OF THE ARMY  
U. S. ARMY CORPS OF ENGINEERS, GREAT LAKES AND OHIO RIVER DIVISION  
550 MAIN STREET  
CINCINNATI, OH 45202-3222

CELRD-PDP (335)

14 November 2025

MEMORANDUM FOR Regional Integration Team Planner CECW-LRD (Attn: Tina Teed)  
441 G Street NW, Washington D.C.

SUBJECT: Corporate Certification of the Analysis of River Navigation and Operational Lock Throughput (ARNOLT) model, version 1.0.

1. References:

- a. Memorandum, CECW-P, dated 25 Aug 2003, Subject: Planning Centers of Expertise.
- b. Engineer Circular (EC) 1105-2-412, dated 31 March 2011 (expired 31 March 2013), Subject: Assuring Quality of Planning Models.
- c. Memorandum, CECW-P, dated 18 May 2018, Subject: Delegation of Model Certification.
- d. US Army Corps of Engineers. Assuring Quality of Planning Models - Model Certification/Approval Process: Standard Operating Procedures. Feb 2012.

The Planning Center of Expertise for Inland Navigation and Risk-Informed Economics Division (PCXIN-RED) recommends corporate certification of the Analysis of River Navigation and Operational Lock Throughput (ARNOLT) model, version 1.0. The Planning Center of Expertise for Inland Navigation and Risk-Informed Economics Division (PCXIN-RED) is the model developer and maintains model support, documentation, and training materials.

2. PCXIN-RED is the proponent for this model to be certified for corporate application pursuant to EC 1105-2-412 (ref. b and c) in support of inland navigation and related planning and operations efforts. The ARNOLT model was developed using the theoretical foundations and intent to replace the previously certified Waterway Analysis Model (WAM). The PCXIN-RED managed a formal internal and external of the model for theoretical correctness, computational accuracy, and usability of the model related to economic outputs and calculations. The review team consisted of subject matter experts from Oak Ridge National Laboratories (DOE-ORNL) and the following PCXIN-RED staff: Beth Cade, Review Manager; Jennifer Thomas, Economist/Review Manager; James Nowlin, Economist; Lance Awsumb, National Technical Specialist, and Nick Smith, Economist.

CELRD-PDP (PCXIN-RED)

SUBJECT: Corporate Certification of ARNOLT, version 1.0, Model for Planning and Operations Support of Inland Navigation Applications

3. I concur with the findings and recommendation of Mr. Patrick Donovan, Co-Technical Director of the PCXIN and of the Review Team. Based on the totality of the information contained within the package, I certify the ARNOLT version 1.0 for corporate use in planning and operational support of inland navigation and related efforts.

4. The point of contact for this memo is Ms. Beth Suter, PCXIN-RED Review Manager at 304-399-9082 and [beth.a.suter@usace.army.mil](mailto:beth.a.suter@usace.army.mil).

4 Encls

1. PCXIN-RED Recommendation – ARNOLT Certification
2. Model Review Plan
3. ARNOLT v1.0 Users Manual
4. ARNOLT Lifecycle Development Quality Assurance Plan
5. Documentation of Model Review

*Daniel P Linkowski* 18 Mar 2024

Dan Linkowski  
Chief: LRD Planning & Policy  
Director: PCXIN-RED