ORNL NCSP Training and Education Support for FY2023

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## ORNL Approved Training and Education Tasks for FY2023

<table>
<thead>
<tr>
<th>ORNL Training and Education (TE) Tasks</th>
<th>Budget ($K)</th>
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<tr>
<td>ORNL-TE1</td>
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<tr>
<td>Manage and Provide Instruction for the</td>
<td>240</td>
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<tr>
<td>DOE Nuclear Criticality Safety Training</td>
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<td>and Education Program</td>
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<tr>
<td>ORNL-TE11</td>
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<td>Revision of the LA-12808 Nuclear</td>
<td>Carryover</td>
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<td>Criticality Safety Guide</td>
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<td>ORNL-TE14</td>
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<tr>
<td>Nuclear Criticality Safety Training</td>
<td>100</td>
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<tr>
<td>and Pipeline Development</td>
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<td><strong>Grand Total</strong></td>
<td><strong>340</strong></td>
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ORNL TE1—Manage and Provide Instruction for the DOE Nuclear Criticality Safety Training and Education Program

• Q1
  – Archived FY 2022 course materials in accordance with the course procedure
  – Planning for the 2-week hands-on course in Jan 2023 was initiated

• Q2
  – Planned and executed the 2-week Hands–on course (26 NATM/13 Sandia/14 NCERC) from Jan. 23 – Feb. 02, 2023
    • One student attended Sandia portion due to failing course the in FY2022
  – Planning for the 1-week Sandia Manager/CSO course in April 2023 was initiated

• Q3
  – Planning for the 1-week NCERC Manager/CSO course in June 2023 was initiated
  – 1-week CSO/Manager Sandia course completed on schedule April 17-21, 2023, for 15 students
  – 1-week CSO/Manager NCERC course completed on schedule June 5-9, 2023, for 13 students

• Q4
  – Planned and executed the 2-week Hands–on course (29 NATM/15 Sandia/12 NCERC) from Aug. 7 – 18, 2023
    • One student became sick with COVID and another had a family illness and had to leave the second week

743 Students trained through FY23Q4 since 2011
NCSP Training and Education Course Statistics

- Capacity for the 2-week course
  - 16 students at Sandia
  - 15 students at NCERC

- Capacity for the 1-week MGR/CSO course is
  - 16 students at Sandia
  - 15 students at NCERC

- FY2023 total capacity
  - 2-week course x 2 courses per year: 62
  - 1-week course x 2 courses per year: 31

- FY2024
  - Offering an additional MGR course at Sandia/NCERC
  - Allows for 62 total students in this course
  - Total capacity for both courses:
    - 124 students per year
• **Status**: Complete

• Document completed in FY2022 – ORNL external review completed in April 2023

• Website complement completed and provided to LLNL for an addition to NCSET module #9 for Hand Calculations*

• Addition of new example problems in progress for typical NCS applications (single-unit and array problems)

• Solid angle method chapter has been revised due to variability of applicability

• Web-based sample problem complement completed in FY2023
  – All data needed to complete a problem will be available
  – HTML format—to be linked to NCSP website (NCSET modules) and linked to the NCSP training course
  – Graduate student work delayed by COVID-19 and transition to a new purchase order system

• NCSD topical paper submitted

• Follow-on papers on hand calculations to be published by authors

* Issues with implementation on NCSP website
ORNL TE11—Revision of the LA-12808 Nuclear Criticality Safety Guide

• In progress using carryover funding – delayed

• Contents
  – New subcritical limits
  – Updated critical mass curves for $^{233}$U, $^{235}$U, and $^{239}$Pu
  – Standards-driven outline
  – Use of modern references and experiences
  – Focus on the importance of conduct of operations and how this can impact process analysis
ORNL TE14—Nuclear Criticality Safety Training and Pipeline Development (university proposal)

- Walid Metwally will provide a detailed presentation on this ORNL task

- Goal – speed up T&Q process at DOE sites
  - All DOE sites should benefit from this program

- Phase 1 – Program development
  - Outline the certificate program
  - Lecture material development
  - Record lectures
  - Material review
  - Website development
  - Exercise development

- Phase 2 – Hands-on training development
  - Recruiting
  - Course delivery
  - Student travel for hands-on training at Sandia, NCERC or the ORNL subcritical assembly
This work was supported by the NCSP, funded and managed by the NNSA for DOE