

ORNL NCSP FY 2021 Budget Summary and Highlights

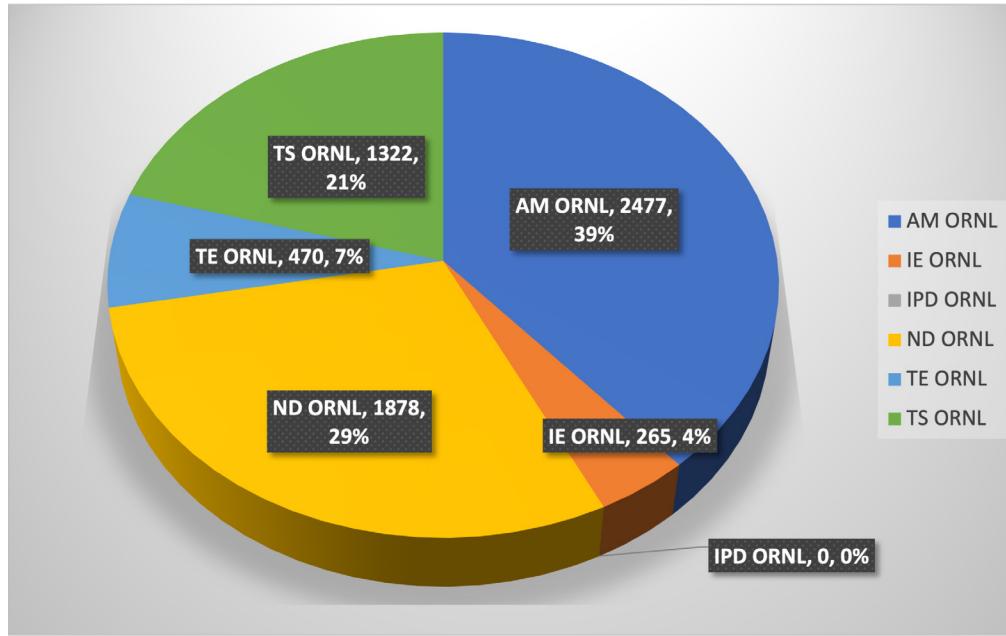
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Nuclear Criticality, Radiation Transport, and Safety
Nuclear Fuel Cycle and Energy Division
Oak Ridge National Laboratory

NCSP Technical Program Review
February 15, 2022

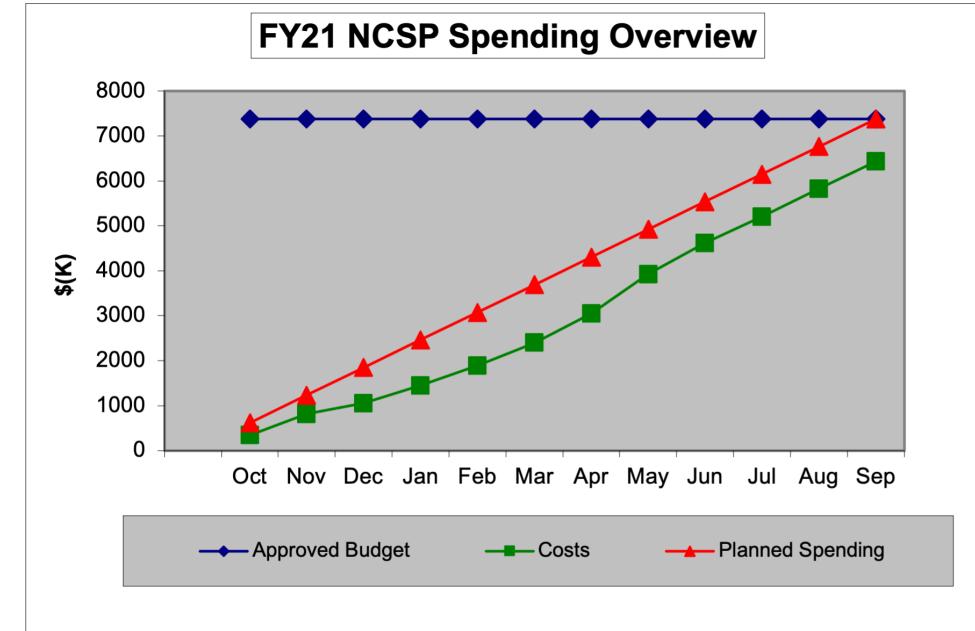
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Budget and Spending

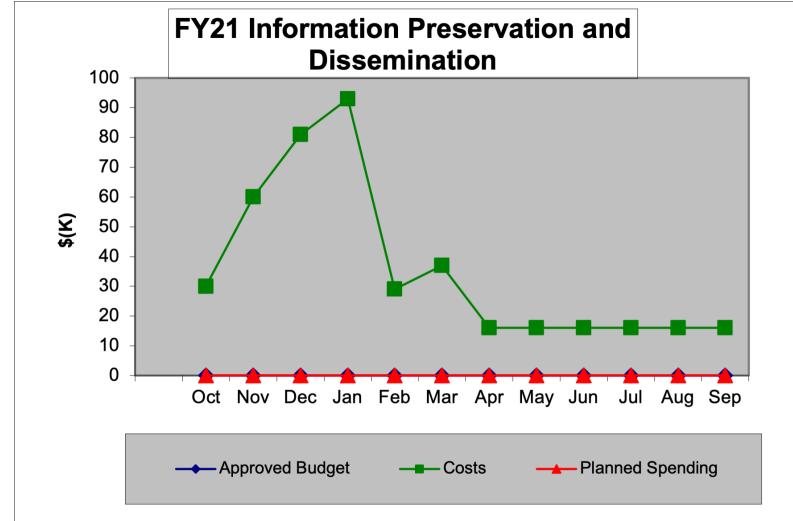
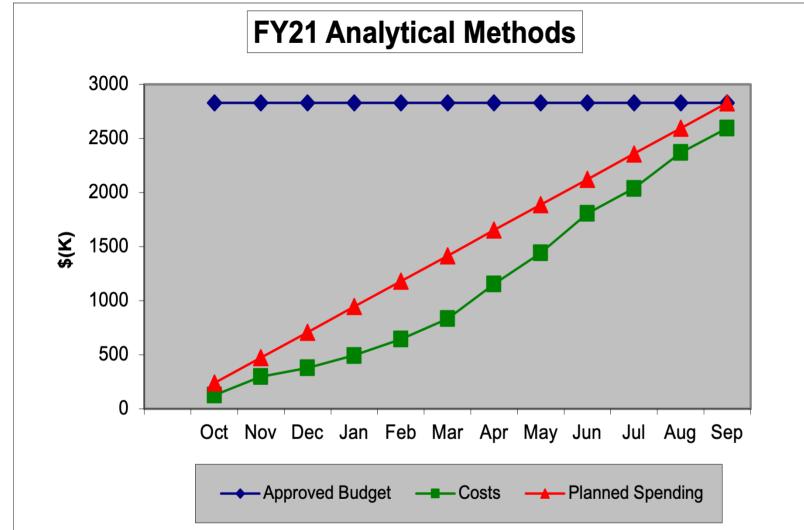


- FY 2020 Carryover: \$1,124K (~17.9%)
- FY 2021 Carryover: \$949K (~12.9%)
- Final FY 2021 Budget: \$6,627K per Rev. 0 of the NCSP 5-year Plan
- Spending accelerated as we went into Q2



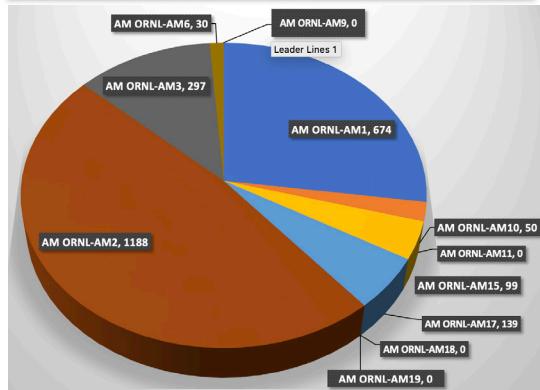
FY20 Carryover	\$1,124K
FY21 Approved budget (inc. C/O)	\$7,384K
Actual spending for FY21Q1	\$1,050K
Actual spending for FY21Q2	\$1,350K
Actual spending for FY21Q3	\$2,218K
Actual spending for FY21Q4	\$1,817K

Spending Details (1)



Task Name/Title	FY21 (\$k)
AM	
ORNL-AM1	
Radiation Safety Information Computational Center (RSICC)	674
ORNL-AM10	
Proposed Benchmark Intercomparison Study	50
ORNL-AM11	
Proposed 1D Multipoint Analytical Benchmark Intercomparison	0
ORNL-AM15	
The Effects of Temperature on the Propagation of Nuclear Data Uncertainty in Nuclear Criticality Safety Calculations	99
ORNL-AM17	
Expansion of the Verified, Archived, Library of Inputs and Data (VALID)	139
ORNL-AM18	
Determination of Appropriate Integral Parameters for Critical Experiment	0
ORNL-AM19	
Analysis of Sum-of-Fractions for Nuclide Mixtures	0
ORNL-AM2	
SCALE/KENO/TSUNAMI Maintenance and Support/Cross-Section Generation/Modernization/etc.	1188
ORNL-AM3	
AMPX Maintenance & Modernization	297
ORNL-AM6	
Slide Rule Application	30
ORNL-AM9	
Sensitivity / Uncertainty Comparison Study with a Focus on Upper Subcritical Limits	0
Grand Total	2477

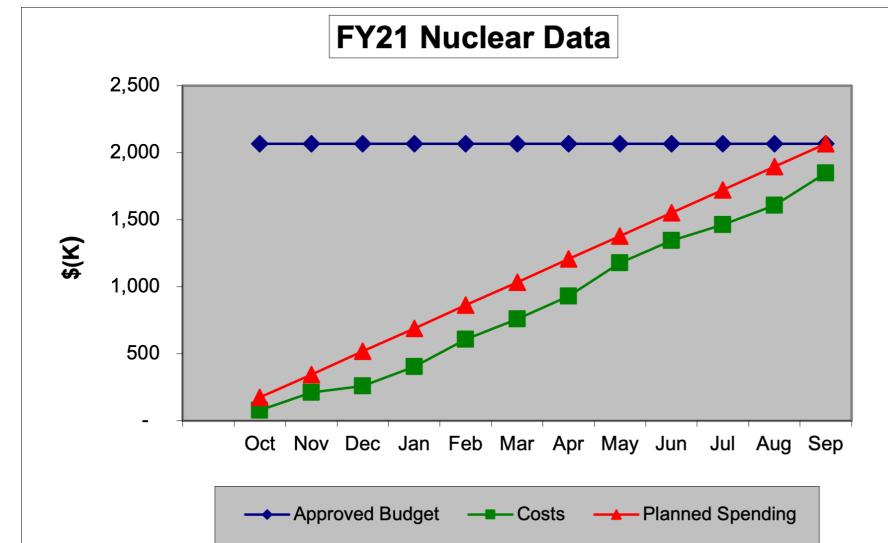
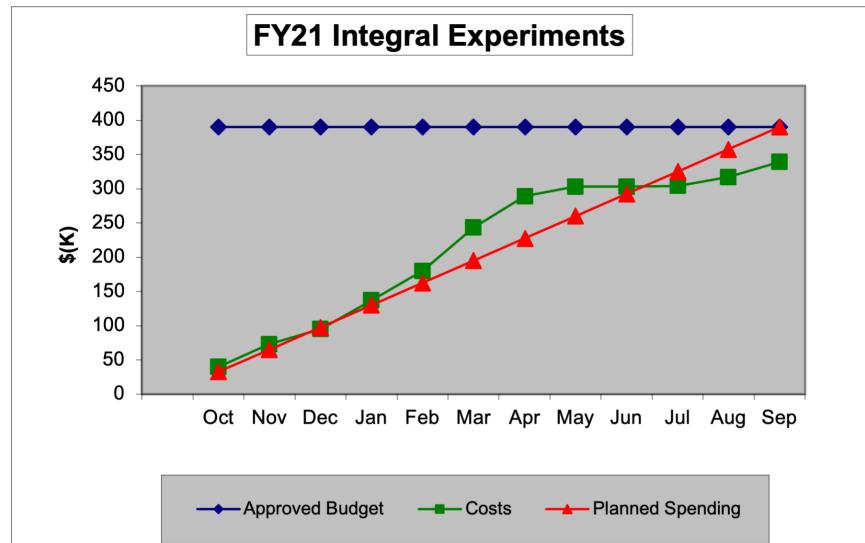
FY20 Carryover	\$418K
FY21 Approved budget (inc. C/O)	\$2,895K
Actual spending for FY21Q1	\$378K
Actual spending for FY21Q2	\$452K
Actual spending for FY21Q3	\$974K
Actual spending for FY21Q4	\$789K



Task Name/Title	FY21 (\$k)
IPD	
ORNL-IPD4	
Development of Experimental Uncertainty Correlation Data Needed to Support Modern Validation Data Adjustment Methods	0
ORNL-IPD5	
Oak Ridge Health Physics Research Reactor CAAS Benchmark Evaluation	0
ORNL-IPD7	
Preserving the "Howard Dyer" Library at ORNL	0
Grand Total	0

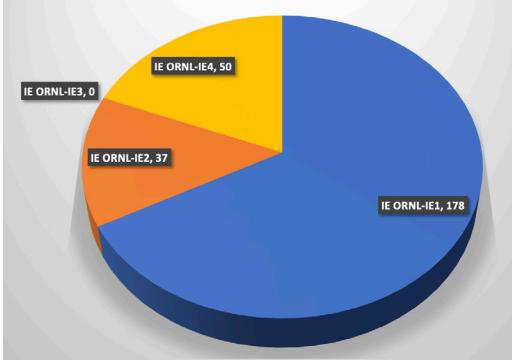
FY20 Carryover	-\$8K
FY21 Approved budget (inc. C/O)	\$0K
Actual spending for FY21Q1	\$81K
Actual spending for FY21Q2	-\$44K
Actual spending for FY21Q3	-\$21K
Actual spending for FY21Q4	\$0K

Spending Details (2)



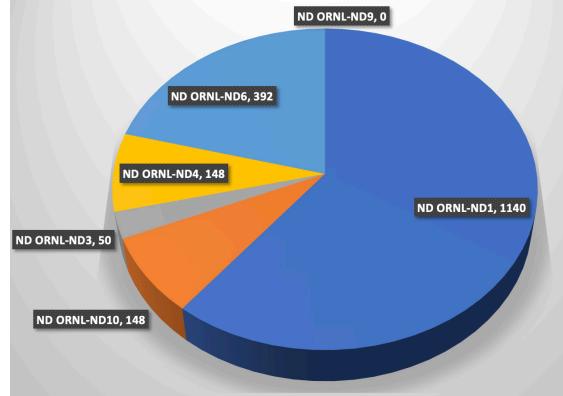
Task Name/Title	FY21 (\$k)
IE	
ORNL-IE1	
IE CEDT Support	178
ORNL-IE2	
Provide support for LANL Criticality Experiments Safety Committee	37
ORNL-IE3	
Perform Programmatic Experiments	0
ORNL-IE4	
Funding to support U-233 ZPPR plate shipments to DAF NCERC	50
Grand Total	265

FY20 Carryover	\$125K
FY21 Approved budget (inc. C/O)	\$390K
Actual spending for FY21Q1	\$95K
Actual spending for FY21Q2	\$148K
Actual spending for FY21Q3	\$60K
Actual spending for FY21Q4	\$36K

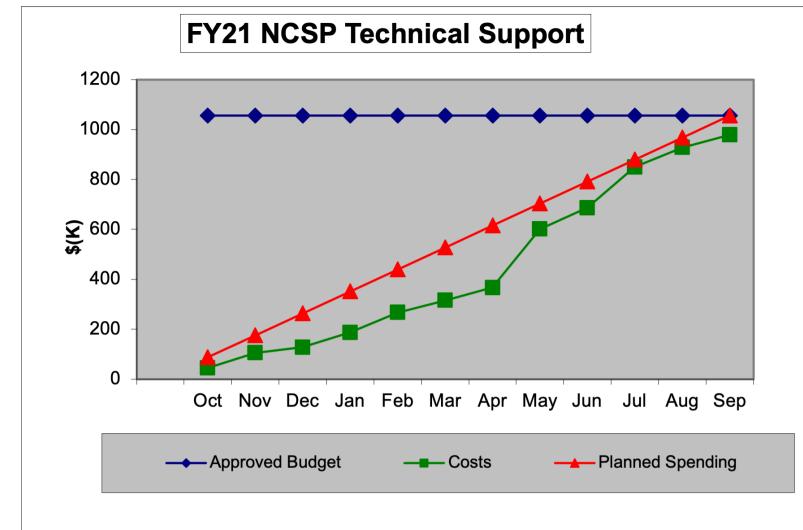
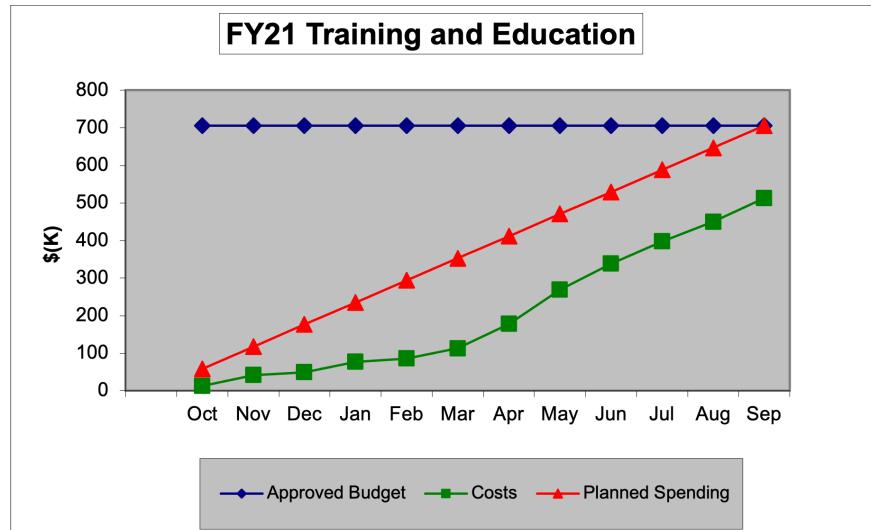


Task Name/Title	FY21 (\$k)
ND	
ORNL-ND1	
Nuclear Data Measurement and Evaluation	1140
ORNL-ND10	
Monte Carlo Evaluation of Differential and Integral Data	148
ORNL-ND3	
Isotopic Sample Leases to Support ND1 ND Measurements	50
ORNL-ND4	
Thermal Neutron Total Cross Section Measurements for Improvement of Criticality Calculations and Propagation of Scattering Kernel Uncertainties	148
ORNL-ND6	
SAMMY Nuclear Data Evaluation Code Modernization	392
ORNL-ND9	
Evaluation of Thermal and Resolved Resonance Ranges of UO2 and PUO2	0
Grand Total	1878

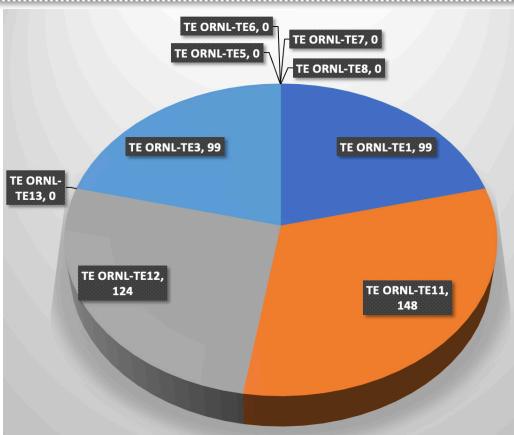
FY20 Carryover	\$91K
FY21 Approved budget (inc. C/O)	\$2,069K
Actual spending for FY21Q1	\$258K
Actual spending for FY21Q2	\$502K
Actual spending for FY21Q3	\$584K
Actual spending for FY21Q4	\$503K



Spending Details (3)

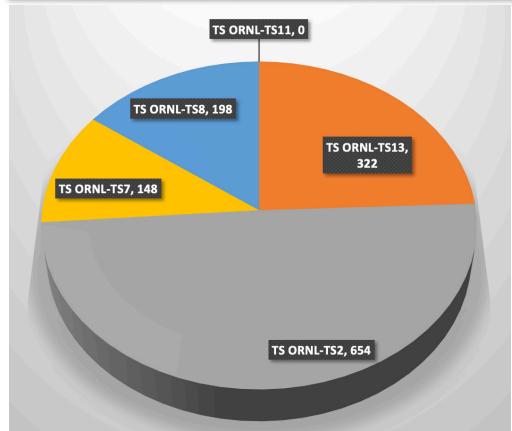


Task Name/Title	FY21 (\$k)
TE	
ORNL-TE1	
Manage and Provide Instruction for the DOE Nuclear Criticality Safety Training & Education Program	99
ORNL-TE11	
Revision of the LA-12808 Nuclear Criticality Safety Guide	148
ORNL-TE12	
Design of an Subcritical/Critical Assembly at ORNL for Use with the CSO/FMH Courses	124
ORNL-TE13	
NDA NCSET Module	0
ORNL-TE3	
Hand-calculation Primer Expansion, LA-14244-M	99
ORNL-TE5	
On-Site Introductory Training for the NCS Practitioner on Modern Approaches to Validation using Sensitivity and Uncertainty Analysis Tools	0
Grand Total	470

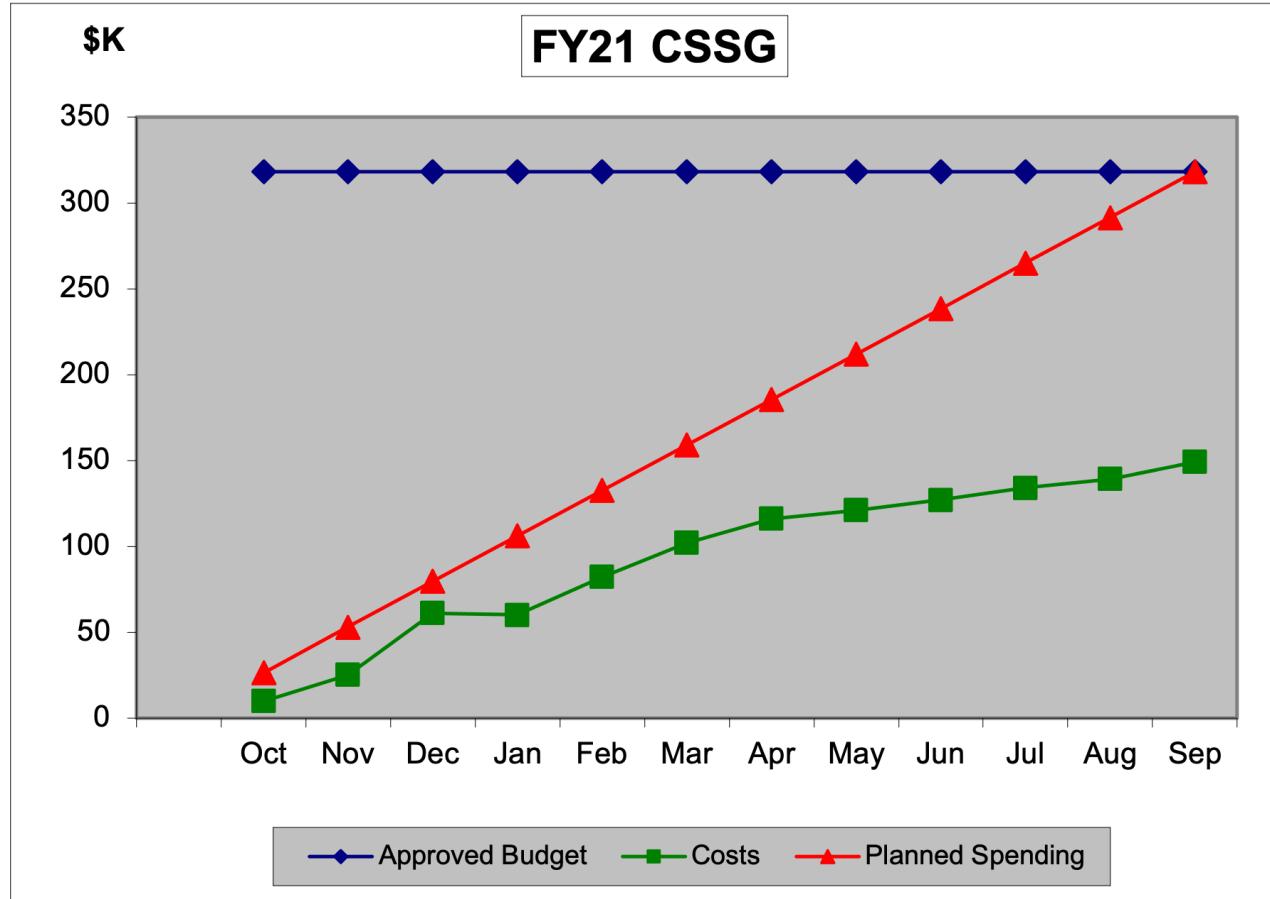


Task Name/Title	FY21 (\$k)
TS	
ORNL-TS11	
NCSP IE task Support	0
ORNL-TS13	
NDA Technical Support Group and NDA Technical Infrastructure Project	322
ORNL-TS2	
Technical Support	654
ORNL-TS7	
AM, ND Succession Planning	148
ORNL-TS8	
NCSP Program Management Tools Development	198
Grand Total	1322

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ORNL-TS8	
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Spending Details (4)



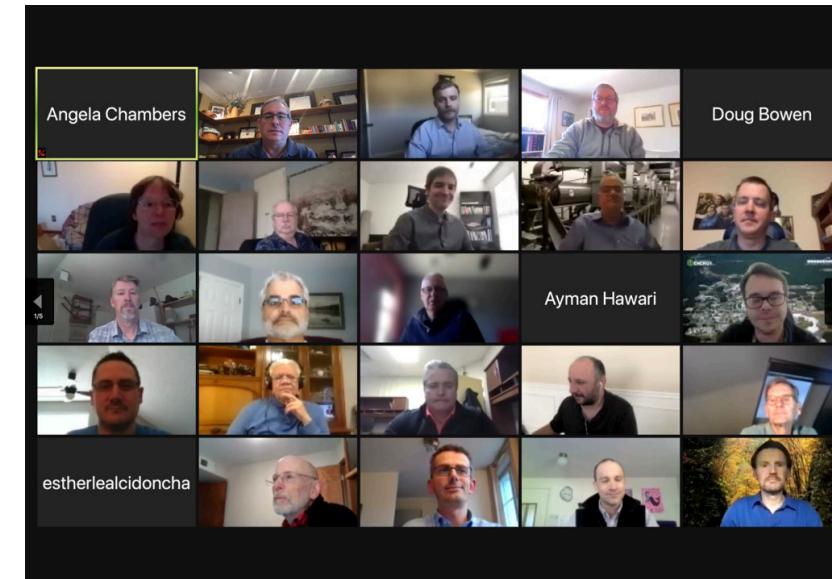
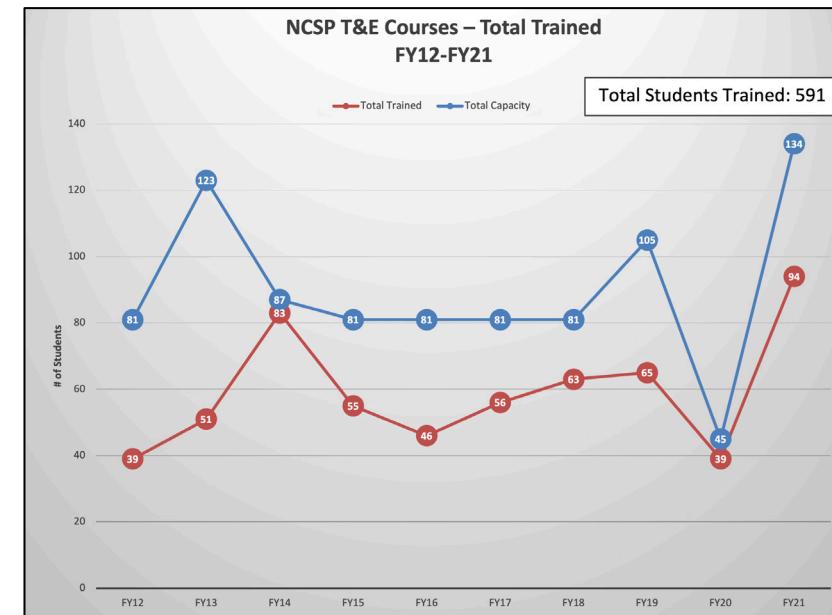
FY20 Carryover	\$110K
FY21 Approved budget (inc. C/O)	\$325K
Actual spending for FY21Q1	\$61K
Actual spending for FY21Q2	\$41K
Actual spending for FY21Q3	\$25K
Actual spending for FY21Q4	\$22K

Highlights

- **AM**
 - SCALE 6.3 in final stages of being released to RSICC
 - RSICC code distributions: 631 SCALE, 1343 MCNP, 1603 University Requests, and 58 NCSP direct requests (3635 codes total)
 - Criticality Slide Rule collaborations with IRSN and LLNL in progress – great progress made in FY2021
- **IPD**
 - Health Physics Research Reactor shielding benchmark report defended at the ICSBEP TRP meeting in FY22Q1
- **IE**
 - IER-498, CED-2, completed; IER Team Lead: Riley Cumberland
 - IER 304, CED-2, completed; IER Team Lead: Justin Clarity
- **ND**
 - GELINA neutron production target completed (Y-12 lead with ORNL support)
 - Zr-90 capture & transmission measurements completed
 - Zr-91 stable isotope lease completed
 - Report provided to NCSP for $^{63}\text{Cu}/^{65}\text{Cu}$ evaluations
 - Cerium $^{140,142}\text{Ce}$ resolved resonance region evaluations completed
- **TE**
 - ORNL coordinated and participated in 9 NCSP 1- and 2-week training courses; 94 students completed course
 - Coordinated and participated in NCERC CSO/Manager 1-week course
 - Completed final design of a subcritical assembly; finalizing fuel shipping, criticality analysis, validation, and ORNL location work
 - Hand calculation Primer revision drafted with a website companion in progress
- **TS**
 - 5-year plans published on schedule by August 8th
 - IRSN MOU 5-year extension completed in FY21Q1
 - Naval Reactors/NCSP completed in FY22Q1 for use of the RPI LINAC for NCSP nuclear data measurements and collaborations
 - Upgrades made to the IER database working with SNL, ORNL, and NNSA

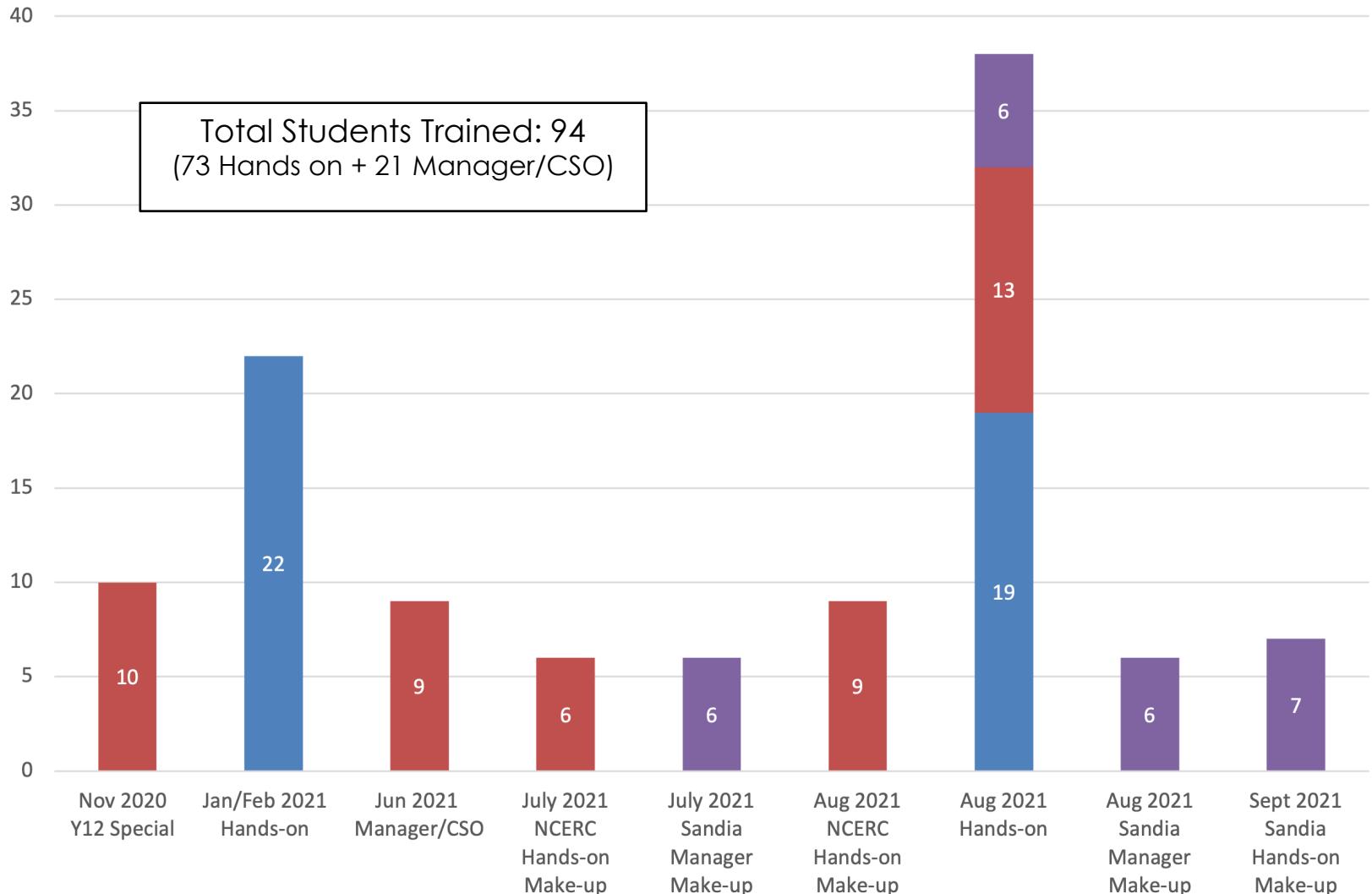
COVID Impacts

- Travel restrictions affected international collaborations and conference participation
- ORNL/ISOTEK U-233 ZPR plate DSA work to support NCERC U-233 shipments delayed
- Technical Program Review meeting held virtually
 - 68 presentations provided (more than ever before)
 - 181 registrants; from 90-130 attended the meeting at any given time
- Budget Execution Meeting held virtually for the second year in a row
 - DAF/NNSS tours not conducted
- Training & Education course impacts
 - Jan/Feb 2021 2-week hands-on course – lecture week performed virtually; 2nd week at SNL and NCERC postponed
 - Apr 2021 1-week manager course at Sandia postponed
 - Class capacity limit – 105 students per year – was reduced to accommodate COVID-19 restrictions
 - Make up courses scheduled to continue training course and to eliminate student backlog (see training slide)
 - 94 students participated and completed the courses in FY21 – the most in any year since 2011
- Inefficiencies in some aspects of working remotely
 - Mentoring, idea sharing/collaboration, succession planning, etc.



FY21 NCSP Training & Education Courses

■ NATM ■ NCERC ■ Sandia



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