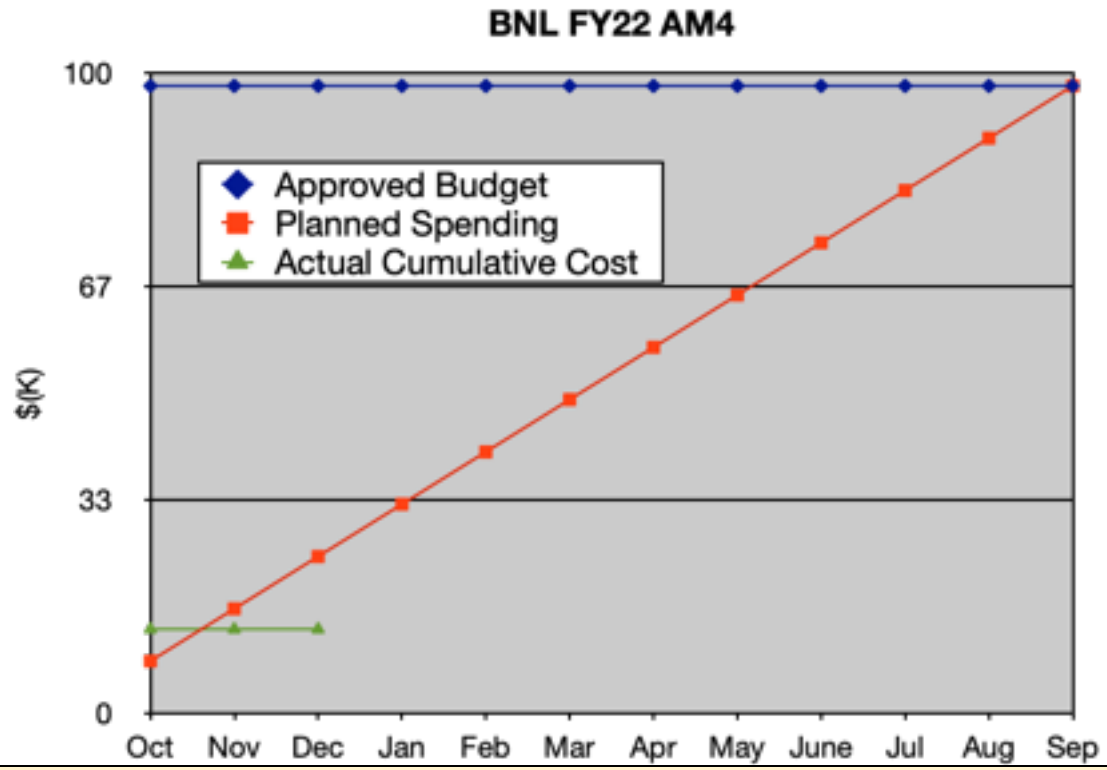
NUCLEAR CRITICALITY SAFETY PROGRAM (NCSP)

FY2022 1st QUARTER REPORTS

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: AM4 **M&O Contractor Name**: BNL **Point of Contact Name:** David Brown **Point of Contact Phone:** 631-344-2814	**Reference:** DP0909010 **Date of Report: 22** January, 2022

BUDGET



1. Carryover into FY 2022 = $ 3,298
2. Approved FY 2022 Budget = $ 48,000
3. Total FY 2022 Budget w/Carryover: $51,298
4. Actual spending for 1st Quarter FY 2022 = $13,144
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

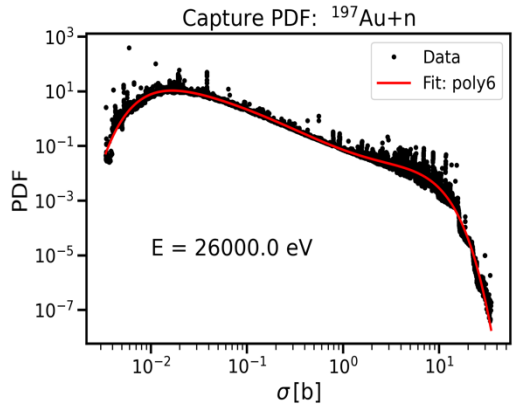
Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide a status report on generating a draft document defining the TNSL code or software interface in NCSP Quarterly Progress Report. (AM4)		In Q2, BNL will focus on finalizing the GNDS-2.0 specifications document for submission to WPEC in May 2022.

			At the CSEWG annual meeting during Nuclear Data Week, it was noted that the legacy ENDF/B format ran out of MAT numbers for TSL evaluations. CSEWG has adopted a format rule change as a work-around but BNL still needs to reassign numbers to support the large number of new TSL materials developed by the NCSP. This issue does NOT affect the new GNDS-2.0 format.
Q2	Provide a status report on generating a draft document defining the TNSL code or software interface in NCSP Quarterly Progress Report. (AM4)		
Q3	Provide a status report on generating a draft document defining the TNSL code or software interface in NCSP Quarterly Progress Report. (AM4)		
Q4	Provide a status report on generating a draft document defining the TNSL code or software interface in NCSP Quarterly Progress Report. (AM4)		

ACCOMPLISHMENTS

- AM4 - Thermal Scattering and Self-Shielding in GNDS/FUDGE
  - The GNDS-2.0 format is finalized. This release includes the new TSL formats supporting mixed moderators as well as a large number of other interesting changes. The focus of Q2 work will be on editing the specifications for final submittal by the May 2022 WPEC meeting.
  - With NPT student M. McLaurin, M. Vorabbi is developing a ML approach to "universal" precalculated capture cross section probability distribution functions as to speed up calculations in the unresolved resonance range. Figure to right is the capture cross section PDF computed with FUDGE (black) and with a fit using one of BNL's more successful functional forms.



PUBLICATIONS

Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

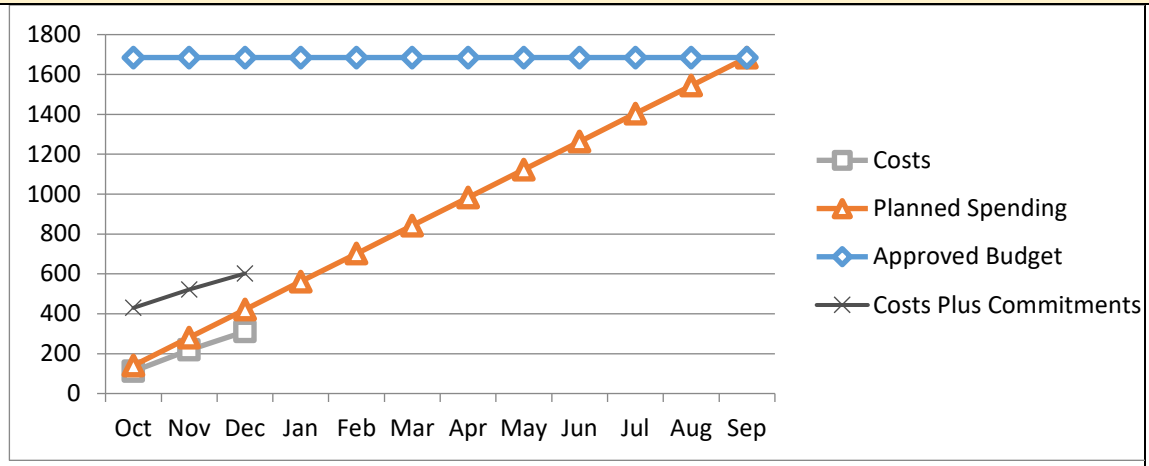
Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal

Q1	N/A		
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: AM1, 2, 3, 5, 7 **M&O Contractor Name**: LANL **Point of Contact Name:** Joetta Goda/Bob Little/Jen Alwin **Point of Contact Phone:** 505-667-2812/505-665-3487/505-667-7252	**Reference:** DP0909010 **Date of Report:** January 21, 2022

BUDGET



1. Carryover into FY 2022 = $50,000
2. Approved FY 2022 Budget = $ 1,635,000
3. Total FY 2022 Budget w/Carryover = $1,685,000
4. Actual spending for 1st Quarter FY 2022 = $310,627 (plus end of Q1 commitments of $291,167 for a total of $601,794)
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $0

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide a status report on MCNP6 user support (AM1)		
Q1	Provide status reports on LANL participation in US and International analytical methods collaborations (AM1)		
Q1	Provide reports on summer intern work accomplished (AM1)		
Q1	Issue an MCNP V&V report, including MCNP6 automated acceleration and convergence (AM1)		

Q1	Provide a status report on NJOY maintenance and user support (AM2)		
Q1	Provide status reports on LANL participation in US and International analytical methods collaborations (AM2)		
Q1	Provide status on Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 (AM3)		
Q1	Provide status reports on LANL participation in US and International analytical methods collaborations (AM5)		
Q1	Provide status on incorporation of benchmark Experiment Correlations into the Whisper NCS software (AM7)		
Q2	Provide a status report on MCNP6 user support (AM1)		
Q2	Provide status reports on LANL participation in US and International analytical methods collaborations (AM1)		
Q2	Provide status of all MCNP6 and Whisper progress at the NCSP Technical Program Review (AM1)		
Q2	Provide a status report on NJOY maintenance and user support (AM2)		
Q2	Provide status reports on LANL participation in US and International analytical methods collaborations (AM2)		
Q2	Update NJOY2016 to process new ENDF/B formats for mixed coherent/incoherent elastic thermal scattering and to properly handle recent IAEA photo-nuclear libraries that specify anisotropic angular distributions (AM2)		Completed early
Q2	Provide status on Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 (AM3)		
Q2	Provide status reports on LANL participation in US and International analytical methods collaborations (AM5)		
Q2	Provide status on incorporation of benchmark Experiment Correlations into the Whisper NCS software (AM7)		
Q3	Provide a status report on MCNP6 user support (AM1)		

Q3	Provide status reports on LANL participation in US and International analytical methods collaborations (AM1)		
Q3	Provide MCNP6 Criticality training course (AM1)		
Q3	Provide a status report on NJOY maintenance and user support (AM2)		
Q3	Provide status reports on LANL participation in US and International analytical methods collaborations (AM2)		
Q3	Provide status on Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 (AM3)		
Q3	Provide status reports on LANL participation in US and International analytical methods collaborations (AM5)		
Q3	Provide status on incorporation of benchmark Experiment Correlations into the Whisper NCS software (AM7)		
Q4	Provide a status report on MCNP6 user support (AM1)		
Q4	Provide status reports on LANL participation in US and International analytical methods collaborations (AM1)		
Q4	Issue an expanded MCNP V&V report, specifically targeting additional unstructured mesh models of criticality benchmarks (AM1)		
Q4	Create ENDF/B-VIII.0-based covariance data library for MCNP/Whisper (AM1)		
Q4	Obtain approval to open-source the Whisper code and release it on GitHub (AM1)		
Q4	Provide a status report on NJOY maintenance and user support (AM2)		
Q4	Provide status reports on LANL participation in US and International analytical methods collaborations (AM2)		
Q4	Complete the GNDStk component of NJOY21 that will provide an interface (C++ and python) for GNDS 2.0 standard compliant files. (AM2)		
Q4	Provide status on Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 (AM3)		

Q4	Provide data files and report for h-h2o and graphite on-the-fly S(alpha,beta) temperature effects. (AM3)		
Q4	Provide status reports on LANL participation in US and International analytical methods collaborations (AM5)		
Q4	Issue final report on all LANL results related to the ICSBEP Benchmark Comparison Study (AM5)		
Q4	Provide status on incorporation of benchmark Experiment Correlations into the Whisper NCS software (AM7)		
Q4	Deliver final modified version of Whisper to LANL with an ANS conference paper to disseminate the work (AM7)		

ACCOMPLISHMENTS

- AM1 - MCNP® Maintenance and Support, Uncertainty Analysis Development, and Modernization
  - Education
    - Four online MCNP6 classes with 118 students: See separate summary of MCNP classes.
    - Thesis committee member for UNM graduate student working in area of criticality calculations.
    - Mentorship of year-round graduate research assistant.
    - Research mentorship of two UNM graduate students working on plutonium solution density predictive capabilities
  - R&D Work
    - Region-dependent sensitivity-uncertainty data for NCS validation. Graduate research student (B. Riedel) transitioned to year-round status (UNM).
    - Subcritical multiplication methods investigation and impact of correlated fission multiplicity models in criticality calculations. A journal article submission is in progress (UNM).
    - Studying improved subcritical multiplication calculation efficiency through fission-matrix-based importance sampling. Submitted abstracts to NCSD topical meeting (UNM).
    - Further investigation of nuclear data adjustment augmented by machine learning using Whisper benchmarks, sensitivities and covariance data. Graduate student (P. Grechanuk) defended PhD entitled “Applying Machine Learning Algorithms to Identify Problematic Nuclear Data within Nuclear Transport Simulations.” A final journal article submission is in progress (OSU).
    - MCNP6.3 code feature freeze and further internal testing of release candidate. Development of features, improvements and bugfixes halted to focus on finalizing documentation, V&V, installation and more related to the RSICC release.
    - Compiled results of USL comparison from IRSN, LANL, and ORNL into paper for ANS NCSD Topical meeting.
  - MCNP Support and Maintenance
    - Support MCNP6 users. MCNP Forum, website, email, direct interactions, etc.
    - Began modernizing MCNP public website.

        - Continue to modernize MCNP coding, utilities, and update the release notes and code manual documentation.
        - Updating V&V testing framework for consistency, extensibility, and automation.
        - Consolidating and archiving past V&V results in repository
        - Fixed, reviewed and merged minor, but long-standing S(a,b) bug. Will be in 6.3 release.
    - MCNP Data – ENDF/B-VIII.0 Covariance Library
        - Working on completing ENDFtk covariance sections
        - Preparing a complete library for use by EUCLID team. Official release requires more testing and machinery.
- AM2 - NJOY Development and Maintenance, Uncertainty Analysis Development, and Modernization
    - User Support
        - Following the CP2011/CP2020 work, we continue to addressed a number of questions concerning the ACE format for charged particle data
        - Various questions on the GitHub issues trackers
        - Working with folks at NNL, AWE, Y-12, and XEnergy to improve offline builds. Lots of people asking for the same thing!
    - NJOY2016
        - One update to NJOY2016 (NJY2016.66) was finalized and is currently under review:
        - This constitutes a major update of NJOY to accommodate the latest IAEA photonuclear data library (which uses non-isotropic photon distributions) and the mixed mode elastic scattering ENDF format (adopted in the ENDF format in November 2020).
        - The following is an overview of the major changes made to NJOY for this update:
            - LAW=61 is now allowed for photonuclear ACE libraries (the secondary angular distributions are now tabulated in all cases instead of being assumed isotropic when using LAW=1 LANG=1)
            - Some photonuclear libraries use MF6/MT18 but with a neutron multiplicity equal to 1 instead of nubar. A warning is now printed when this is encountered and the multiplicity is replaced with the appropriate nubar data.
            - thermal scattering ACE files now support mixed mode elastic scattering (both coherent and incoherent elastic scattering are used), with appropriate updates to THERMR and MODER
            - The XSS array and its size is now set in the common acecm module. Writing out the ACE file and locator checking for photonuclear and thermal scattering files has been enabled as well (previously only available for incident neutron and charged particle ACE files).
        - In addition, the following minor issues were fixed as well:
            - fixed a typo in a reaction name printed by the ACER output (issue #195)
            - fixed a crash in ERRORR using ENDF/B-VIII.0 U235 for MF34 covariance data (issues #122 and #203)
            - increased the size of an array when processing photonuclear ACE files (issue #204)
            - extended the CLAW (iwt=9,10) weight function to cover 1e-5 – 2e7 eV
            - fixed issues with ACELAW=33 for continuous energy neutron, charged particle and photonuclear files (issue #212)
            - fixed an issue when using the special charged particle interpolation law (INT=6) in RECONR
            - fixed an issue with MODER not being able to handle MF28 (atomic relaxation data) when converting ASCII to binary

        - For more information: https://github.com/njoy/NJOY2016/blob/develop/README.md
    - NJOY2021
        - ACEtk development progress: continuous energy ACE files for incident neutrons and charged particles are now fully functional and awaiting code review before merging into the development branch.
    - Two NJOY presentations were made at CSEWG during Nuclear Data Week in November 2021.

- AM3 - Development of an Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 (RPI)
    - Reviewed and understood current data structure of S(alpha, beta) law-based thermal neutron scattering cross sections used in MCNP6 and other Monte Carlo transport codes.
    - Familiarized and conducted preliminary efforts on the generation of S(alpha, beta) and subsequent beta, alpha cumulative probability functions at different temperature using NJOY.
    - Understood and conceptualized new data structure of S(alpha, beta) law-based thermal neutron scattering cross sections that can enable on-the-fly sampling in MCNP6.
- AM5 - Proposed Benchmark Intercomparison Study
    - We have been in communication with IRSN on completion of MCNP6 results for ENDF/B-VIII.0, incorporating results of revisions and previous feedback as well as updates to ENDF/B-VIII.0.
- AM7 - Incorporation of Benchmark Experiment Correlations into the Whisper Nuclear Criticality Safety Software (University of Michigan)
    - Modified Whisper version is being finalized with clean version and diff version being developed for transmission to LANL

PUBLICATIONS

Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

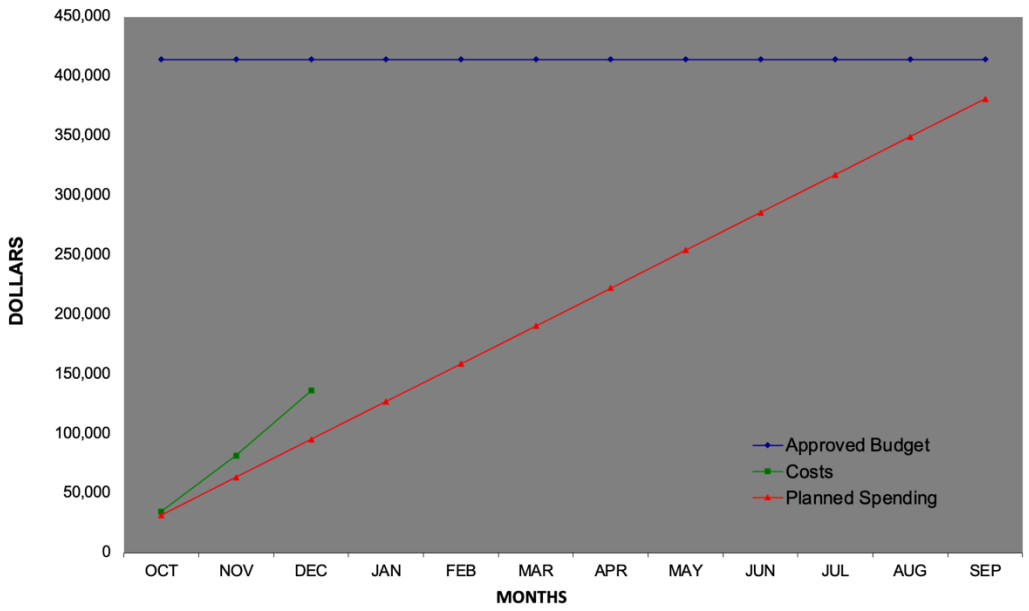
Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1	M.E. Rising, C.J. Josey, J.A. Kulesza, A.R. Clark, D. Timmons, and J.L. Alwin, "Improved Verification and Validation Testing and Tools including Nuclear Criticality Safety Applications with the MCNP6.3(R) Code," submitted to Nuclear Criticality Safety Division Topical Meeting (NCSD 2022), Los Alamos Report, **LA-UR-21-30313** (2021).	Yes	
Q1	J.L. Alwin, J. Clarity, F. Fernex, L. Leal, N. Leclaire, B.J. Marshall, M.E. Rising, K. Spencer, M.R. MacQuigg, and E. Saylor, "Sensitivity/Uncertainty Comparison Study Involving IRSN, LANL, and ORNL Tools to Support Validation," submitted to Nuclear Criticality Safety Division Topical Meeting (NCSD 2022), *Los Alamos Report*, **LA-UR-21-30153** (2021).	Yes	
Q1	J.L. Alwin, J.D. Hutchinson, N.A. Kleedtke, A.R. Clark, T.E. Cutler, W. Haeck, R.C. Little, D. Neudecker, M.E. Rising, T.A. Smith, and N.W. Thompson, "Investigating Fission Reaction Rate Ratio Sensitivities,"	Yes	

	submitted to Nuclear Criticality Safety Division Topical Meeting (NCSD 2022), Los Alamos Report, **LA-UR-21-30259** (2021).		
Q1	M.E. Rising and A.R. Clark, "Development of a New Fixed-source Sensitivity Tally Capability in the MCNP(R) Code," submitted 15th International Conference on Nuclear Data for Science and Technology (ND2022), *Los Alamos Report*, **LA-UR-21-30306** (2021).	Yes	
Q1	T.E. Cutler, J.D. Hutchinson, D. Neudecker, W. Haeck, A.R. Clark, and M.E. Rising, "Reactivity Coefficient Measurements and Sensitivity Studies," submitted to Nuclear Criticality Safety Division Topical Meeting (NCSD 2022), Los Alamos Report, **LA-UR-21-30075** (2021).	Yes	
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: AM2, 3, 4, 5 **M&O Contractor Name**: LLNL **Point of Contact Name:** Catherine Percher **Point of Contact Phone:** (925) 579-4226	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $ 88,109
2. Approved FY 2022 Budget = $327,000
3. Total FY 2022 budget w/Carryover = $ 415,109
4. Actual spending for 1st Quarter FY 2022 = $ 136,190
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $ 35,000 (8%)

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status on Multi-Physics methods for simulation of criticality excursions (AM2)		
Q1	Provide status on slide rule application (AM3)		
Q1	Provide a status report on generating a draft document defining the TNSL code or software interface. (AM4)		

Q1	Provide status on proposed intercomparison study (AM5)		
Q2	Provide status on Multi-Physics methods for simulation of criticality excursions (AM2)		
Q2	Provide status on slide rule application (AM3)		
Q2	Provide a status report on generating a draft document defining the TNSL code or software interface. (AM4)		
Q2	Provide status in NCSP Quarterly Progress Report (AM5)		
Q3	Provide status on Multi-Physics methods for simulation of criticality excursions (AM2)		
Q3	Provide status on slide rule application (AM3)		
Q3	Provide a status report on generating a draft document defining the TNSL code or software interface. (AM4)		
Q3	Provide status in NCSP Quarterly Progress Report (AM5)		
Q4	Provide status on Multi-Physics methods for simulation of criticality excursions (AM2)		
Q4	Provide status on slide rule application (AM3)		
Q4	Provide a status report on generating a draft document defining the TNSL code or software interface. (AM4)		
Q4	Provide status in NCSP Quarterly Progress Report (AM5)		

ACCOMPLISHMENTS

- AM2 – Multi-Physics Methods for Simulation of Criticality Excursion
  - A simplified multi-physics simulation model is in development. Detailed part drawings have been requested from LANL for development of a detailed, high-fidelity simulation model.
- AM3 – Slide Rule Application
  - LLNL participated in Slide Rule videoconferences on October 1 and November 23, 2021. LLNL COG and IRSN MCNP+VESTA and MCNP+FISPACT-II results for delayed fission gammas from Pu-239 systems are in excellent agreement. ORNL discovered the reason for their discrepant SCALE results was due to use of an insufficiently fine (302-group) energy group structure. Good results were obtained with a higher fidelity 1597-group structure in December 2021. Note that the ORNL methodology uses ORIGEN which requires multi-group cross sections for the activation calculation. IRSN is continuing to research the impact of spatial discretization of the fission source.

- AM4 - Thermal Scattering and Self-Shielding in GNDS/FUDGE
  - COG and MERCURY produce excellent results using TNSL data processed from File 7 using SABtoCOG and FUDGE. MCNP and COG results using NJOY processed data into ACE format shows discrepancies at extreme angles near $\mu = -1$ and +1. These accomplishments were presented by Caleb Mattoon in his presentation "TNSL improvements in FUDGE," at CSEWG on November 17, 2021.
  - Matteo Vorabbi (BNL) et al. summarized the status of self-shielding in the unresolved resonance region in FUDGE in his presentation "Unifying the URR PT approaches and covariance work in a consistent framework" at CSEWG on Nov. 15, 2021.
- AM5 - Proposed Benchmark Intercomparison Study
  - A total of 3,382 high-precision COG (k-eff) ICSBEP benchmark results, and 21 beta-eff benchmark results, using ENDF/B-VII.1, ENDF/B-VIII.0 and JEFF-3.3 have been provided to Nicolas Leclaire (IRSN) for inclusion in the study as follows:

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PU: 766     U233: 193     MIX: 356     HEU: 1054     IEU: 206     LEU: 807     β-eff: 21
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PUBLICATIONS

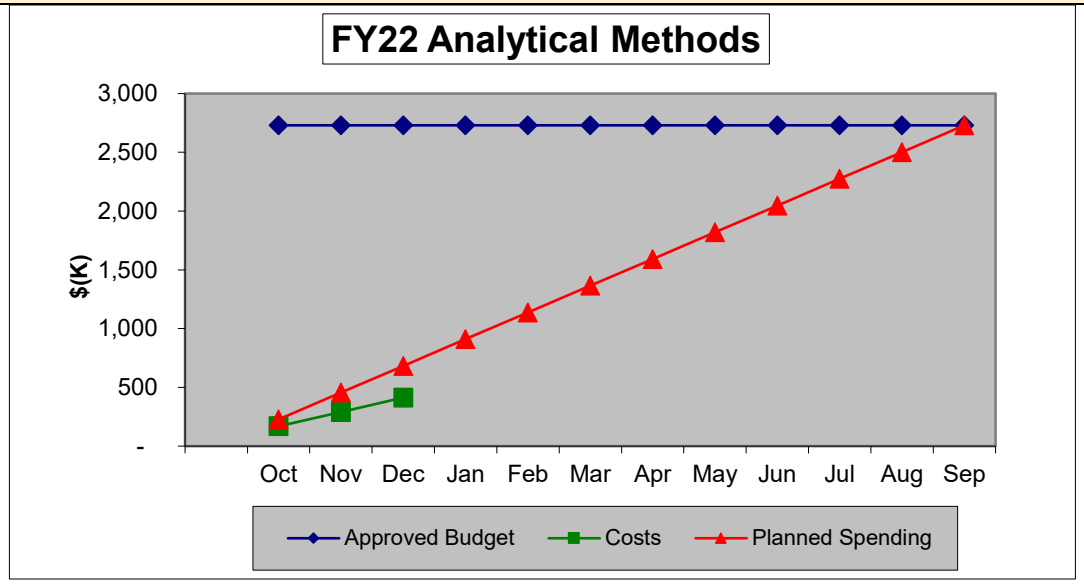
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference	Sent to NCSP? Yes/no	If no, status of submittal
Q1	C. M. Mattoon et al., "Thermal Neutron Scattering Law (TNSL) Implementation and Testing in FUDGE," LLNL-TR-828141, October 15, 2021	Yes	
Q1	C. M. Mattoon, "TNSL improvements in FUDGE," LLNL-PRES-828123, October 19, 2021	Yes	
Q1	M. Vorabbi, "Unifying the URR PT approaches and covariance work in a consistent framework," November 15, 2021	No	BNL to provide.
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: AM1, 2, 3, 6, 10, 15, 17, 18, 19 **M&O Contractor Name**: ORNL **Point of Contact Name:** Doug Bowen **Point of Contact Phone:** (865) 576-0315	**Reference:** DP0909010 **Date of Report:** January 20, 2022

BUDGET



1. Carryover into FY 2022 = $235K
2. Approved FY 2022 Budget = $ 2,495L
3. Total FY 2022 Budget w/Carryover = $2,730K
4. Actual spending for 1st Quarter FY 2022 = $413K
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Continue distribution of available and newly packaged software to the NCS community requesters (at no direct cost to them) and provide distribution totals quarterly. (AM1)		
Q1	Provide status on RSICC activities (AM1)		
Q1	Provide status reports on ORNL participation in US and International Analytical Methods collaborations and		

	provide brief trip summary report to NCSP Manager on items of NCSP interest. (AM2)		
Q1	Provide status on SCALE/KENO/TSUNAMI maintenance and support activities (AM2)		
Q1	Provide status on AMPX maintenance and modernization activities (AM3)		
Q1	Provide status on Slide Rule application activities (AM6)		
Q1	Provide status on proposed benchmark intercomparison study activities (AM10)		
Q1	Provide status on effects of temperature on propagation of nuclear data uncertainty in calculations (AM15)		
Q1	Provide status on VALID activities (AM17)		
Q1	Provide status on determination of appropriate integral parameters for critical experiment (AM18)		
Q1	Provide status on analysis of Sum-of-Fractions for Nuclide Mixtures (AM19)		
Q2	Continue distribution of available and newly packaged software to the NCS community requesters (at no direct cost to them) and provide distribution totals quarterly. (AM1)		
Q2	Provide status on RSICC activities (AM1)		
Q2	Provide status reports on ORNL participation in US and International Analytical Methods collaborations and provide brief trip summary report to NCSP Manager on items of NCSP interest. (AM2)		
Q2	Provide status on SCALE/KENO/TSUNAMI maintenance and support activities (AM2)		
Q2	Issue an annual SCALE maintenance report to the NCSP Manager. (AM2)		
Q2	Provide status on AMPX maintenance and modernization activities (AM3)		

Q2	Provide status on Slide Rule application activities (AM6)		
Q2	Provide status on proposed benchmark intercomparison study activities (AM10)		
Q2	Provide status on effects of temperature on propagation of nuclear data uncertainty in calculations (AM15)		
Q2	Provide status on VALID activities (AM17)		
Q2	Provide status on determination of appropriate integral parameters for critical experiment (AM18)		
Q2	Provide status on analysis of Sum-of-Fractions for Nuclide Mixtures (AM19)		
Q3	Continue distribution of available and newly packaged software to the NCS community requesters (at no direct cost to them) and provide distribution totals quarterly. (AM1)		
Q3	Provide status on RSICC activities (AM1)		
Q3	Provide status reports on ORNL participation in US and International Analytical Methods collaborations and provide brief trip summary report to NCSP Manager on items of NCSP interest. (AM2)		
Q3	Provide status on SCALE/KENO/TSUNAMI maintenance and support activities (AM2)		
Q3	Provide status on AMPX maintenance and modernization activities (AM3)		
Q3	Provide status on Slide Rule application activities (AM6)		
Q3	Provide status on proposed benchmark intercomparison study activities (AM10)		
Q3	Provide status on effects of temperature on propagation of nuclear data uncertainty in calculations (AM15)		
Q3	Provide status on VALID activities (AM17)		
Q3	Provide status on determination of appropriate integral parameters for critical experiment (AM18)		

Q3	Provide status on analysis of Sum-of-Fractions for Nuclide Mixtures (AM19)		
Q4	Continue distribution of available and newly packaged software to the NCS community requesters (at no direct cost to them) and provide distribution totals quarterly. (AM1)		
Q4	Provide status on RSICC activities (AM1)		
Q4	Provide status reports on ORNL participation in US and International Analytical Methods collaborations and provide brief trip summary report to NCSP Manager on items of NCSP interest. (AM2)		
Q4	Provide status on SCALE/KENO/TSUNAMI maintenance and support activities (AM2)		
Q4	Publish annual newsletter to users to communicate software updates, user notices, generic technical advice, and training course announcements. (AM2)		
Q4	Document AMPX modernization and technical support for SCALE CE, multigroup, and covariance libraries and report status annually to the NCSP Manager. (AM3)		
Q4	Provide status on AMPX maintenance and modernization activities (AM3)		
Q4	Provide status on Slide Rule application activities (AM6)		
Q4	Provide status on proposed benchmark intercomparison study activities (AM10)		
Q4	Provide status on effects of temperature on propagation of nuclear data uncertainty in calculations (AM15)		
Q4	Provide status on VALID activities (AM17)		
Q4	Provide status on determination of appropriate integral parameters for critical experiment (AM18)		
Q4	Provide status on analysis of Sum-of-Fractions for Nuclide Mixtures (AM19)		

ACCOMPLISHMENTS

- AM1 - Radiation Safety Information Computational Center (RSICC)

- Distributed 969 software packages.
- 191 SCALE, 421 MCNP®, and 0 COG packages distributed.
- RSICC quarterly report issued.
- Note: More than 40% of the distributions of MCNP® and SCALE are to U.S. university students in nuclear engineering department or programs.
- Quarter 1: University Requests 406; NCSP Direct Requests 14

FY2022 University Distributions		
Month	MCNP®	SCALE
October	89	24
November	59	41
December	36	16
January		
February		
March		
April		
May		
June		
July		
August		
September		
Total	184	81

- AM2 - SCALE/KENO/TSUNAMI Maintenance and Support/Cross-Section Generation/Modernization/etc.
  - Collected feedback for WPNCS SG-8, leading "Preservation of Expert Knowledge and Judgement Applied to Criticality Benchmarks (SG-8)" (https://code.ornl.gov/ww5/wpncs-sg8-feedback-form), email to ww5@ornl.gov
  - Developed a new SCALE criticality calculations and held for a full virtual class
  - Retired Jupiter linux cluster (over 500 cores for SCALE testing and development) at ORNL and moved to virtual machines
  - Finalized SCALE 6.3.0 in late December—awaiting RSICC review, includes
    - Shift geometry improvements deployed in Oak Ridge Advanced Nested Geometry Engine (ORANGE) in SCALE 6.3
      - designed to handle both MCNP-style surface-based geometry definitions and volume-based KENO-style geometry definitions, including "holes" which are very useful for making local geometry substitutions
      - CPU and GPU tracking support
      - Open-source component also released within Exascale Computing Project (ECP)
      - 3D geometry renders complex geometry up to 5x faster
    - ENDF/B-VIII.0 data
    - Corrections to AMPX and SCALE 6.3.0 bound libraries for thermal scattering
    - VADER trending analysis code

        - TSUNAMI speed improvements
    - Performed work on subcontract with Purdue for comparison of MCNP/Whisper, SCALE/TSUNAMI, and a new Physics-based Coverage Mapping (PCM) method for bias assessment
    - Continued VALID validation suite expansion
    - Miscellaneous maintenance efforts for CSAS, TSUNAMI, and AMPX

- AM3 - AMPX Maintenance & Modernization
    - Provided final libraries for the SCALE-6.3 release, including the data package file generation necessary for external distribution of the data.
    - Continued work on implementing new mixed-elastic thermal neutron scattering format. Determined best way forward will be to combine incoherent elastic with incoherent inelastic so that minimal changes to SCALE transport codes will be required. Efforts underway to ensure backwards compatibility with existing ENDF TSL files.
    - Presented AMPX developments over the past year to the CSEWG meeting, including the SCALE-6.3 data iterations and covariance fix-up implementations. Participated in discussions concerning the correct processing and use of TSL data.
    - Started the process of incorporating the new linear algebra interface to Trilinos such that the continuous integration system will build and test the machinery. Once this is merged, we will be able to use the same linear algebra interface software across SCALE, AMPX, and SAMMY.

- AM6 – Slide Rule Application
    - Two meetings happened in the quarter to discuss the progress on the plutonium cases and to assess the discrepancies between ORNL, IRSN and LLNL results
    - ORNL solved calculation issues and all the participants (IRSN, LLNL and ORNL) now agree very well for all 5 cases studied.
    - IRSN is the lead on writing and submitting two papers about the task at the Nuclear Criticality Safety Division Topical Meeting in June 2022
    - Further communication will be by email to work on the papers

- AM10 – Proposed Benchmark Intercomparison Study
    - Work was focused on documentation of benchmark work in papers for the upcoming Nuclear Criticality Safety Division (NCSD) topical conference.

- AM15 – The Effects of Temperature on the Propagation of Nuclear Data Uncertainty in Nuclear Criticality Safety Calculations
    - Addressed a bug in generation of resonance parameter sensitivities by group that was causing the energy ranges to be incorrectly set after broadening
    - Transferred current work from the retiring jupiter computing cluster to the artemis cluster and created scripts for using the slurm workload manager on the artemis cluster

- AM17 – Expansion of the Verified, Archived, Library of Inputs and Data (VALID)
    - Work supported a paper for the NCSD topical meeting directly related to the recent work on VALID expansion. Technical work has been focused on preparing models generated with the USNA Midshipmen in Q2 and Q3 for review in VALID.

- AM18 – Determination of Appropriate Integral Parameters for Critical Experiment
  - No work was completed due to staff availability limitations.

- AM19 – Analysis of Sum-of-Fractions for Nuclide Mixtures
  - Introductory meeting on scope of work was held 1/7/2022. Work cannot begin by ORNL without progress from PNNL work scope.

PUBLICATIONS

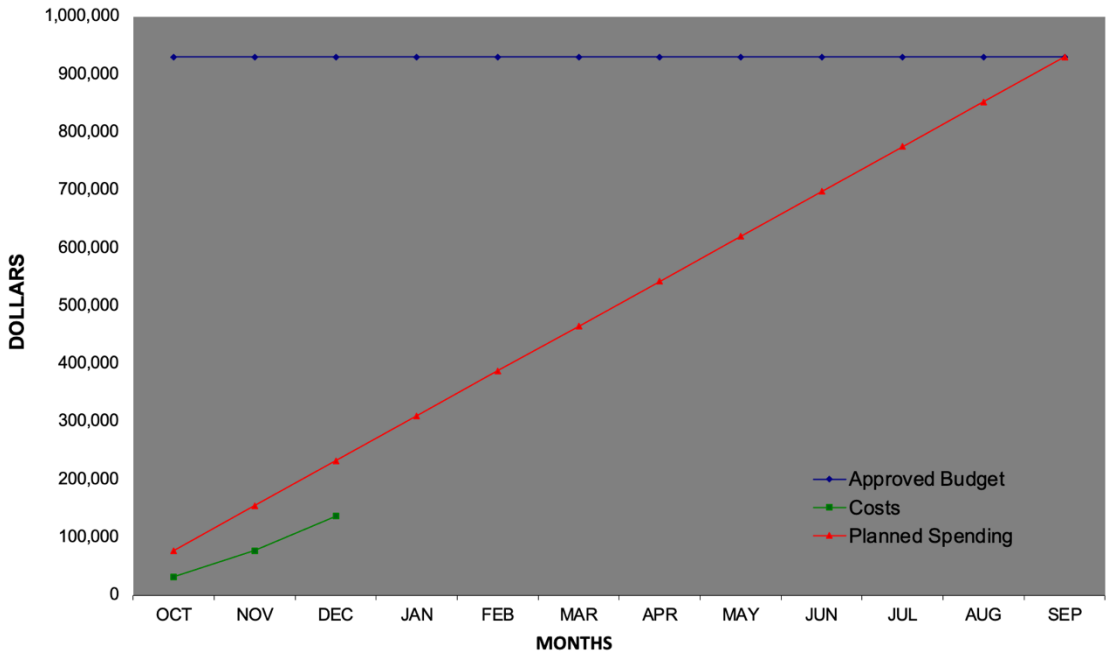
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1	Pulled from ORNL RES system	yes	
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: IPD1, 2, 5, 6, 7 **M&O Contractor Name**: LLNL **Point of Contact Name:** Catherine Percher **Point of Contact Phone:** (925) 579-4226	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $51,366
2. Approved FY 2022 Budget = $879,000
3. Total FY 2022 Budget w/Carryover = $ 930,366
4. Actual spending for 1st Quarter FY 2022 = $ 136,905
5. Actual spending for 2nd Quarter FY 2022= $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $ 77,500 (8%)

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Manage all aspects of the DOE NCSP participation in the ICSBEP as required to ensure the finalizing and publishing ICSBEP evaluations per IE schedule. (IPD1)		The 2020 edition of the ICSBEP Handbook will be published by February 2022.

NCSP Quarterly Progress Report (FY-2022 Q1)

Q1	Provide status reports on LLNL participation in US and International IPD collaborations (including ICSBEP). (IPD1)		
Q1	Maintain, operate, and modernize the NCSP website, databases, and provide user assistance as required. (IPD2)		
Q1	Provide status report on IT support at NNSS (IPD5)		
Q1	Provide status report on benchmark evaluation of LLNL 'Pulsed Spheres' (IPD6)		
Q1	Provide the NCSP manager an update of NDA website support. (IPD7)		
Q2	Manage all aspects of the DOE NCSP participation in the ICSBEP as required to ensure the finalizing and publishing ICSBEP evaluations per IE schedule. (IPD1)		
Q2	Provide status reports on LLNL participation in US and International IPD collaborations (including ICSBEP). (IPD1)		
Q2	Maintain, operate, and modernize the NCSP website, databases, and provide user assistance as required. (IPD2)		
Q2	Provide a status report for the evaluation of the LLNL "Hot Box" for inclusion in the ICSBEP Handbook. (IPD4)		
Q2	Provide status report on IT support at NNSS (IPD5)		
Q2	Provide status report on benchmark evaluation of LLNL 'Pulsed Spheres' (IPD6)		
Q2	Provide the NCSP manager an update of NDA website support. (IPD7)		
Q3	Manage all aspects of the DOE NCSP participation in the ICSBEP as required to ensure the finalizing and publishing ICSBEP evaluations per IE schedule. (IPD1)		
Q3	Provide status reports on LLNL participation in US and International IPD collaborations (including ICSBEP). (IPD1)		

Q3	Maintain, operate, and modernize the NCSP website, databases, and provide user assistance as required. (IPD2)		
Q3	Provide a status report for the evaluation of the LLNL "Hot Box" for inclusion in the ICSBEP Handbook. (IPD4)		
Q3	Provide status report on IT support at NNSS (IPD5)		
Q3	Provide status report on benchmark evaluation of LLNL 'Pulsed Spheres' (IPD6)		
Q3	Provide the NCSP manager an update of NDA website support. (IPD7)		
Q4	Manage all aspects of the DOE NCSP participation in the ICSBEP as required to ensure the finalizing and publishing ICSBEP evaluations per IE schedule. (IPD1)		
Q4	Provide status reports on LLNL participation in US and International IPD collaborations (including ICSBEP). (IPD1)		
Q4	Maintain, operate, and modernize the NCSP website, databases, and provide user assistance as required. (IPD2)		
Q4	Provide a status report for the evaluation of the LLNL "Hot Box" for inclusion in the ICSBEP Handbook. (IPD4)		
Q4	Provide status report on IT support at NNSS (IPD5)		
Q4	Provide status report on benchmark evaluation of LLNL 'Pulsed Spheres' (IPD6)		
Q4	Provide the NCSP manager an update of NDA website support. (IPD7)		

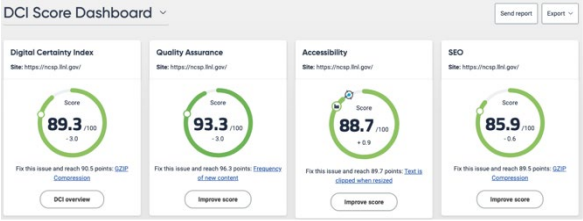
ACCOMPLISHMENTS

- IPD1 - Conduct ICSBEP for Benchmarks of the 5-Year Plan and publish annual revision to the Handbook
  - The 2021 ICSBEP meetings were convened on October 11-14 and December 13-16, 2021, as summarized in LLNL-MI-829200 and LLNL-MI-830264 – see Publications. Three new NCSP evaluations were approved at these meetings (completing CED-4a) pending resolution of TRG comments:
    (a) HEU-MET-INTER-011, CURIE: 235U Unresolved Resonance Region Experiment, Jeff Favorite (LANL)
    (b) HEU-MET-MIX-021, TEX-HEU Baseline Assemblies: HEU Plates with Polyethylene Moderator and Polyethylene Reflector, Jesse Norris (LLNL)
    (c) FUND-ORELA-ACC-GRAPH-PNSDT-001, Benchmark of Neutron Thermalization in Graphite Using the Slowing-Down-Time ORELA Experiment, Ayman Hawari (NCSU)
  - Four new and one legacy NCSP evaluations are in preparation for the 2022 ICSBEP meeting:
    (d) ALARM-REAC-SST-SHIELD-001, Neutron Fluence and Element 57 Dose Responses to a Bare and Steel-Reflected Pulse of the ORNL HPRR, M. Dupont (ORNL)
    (e) IER305, 7uPCX fuel with Mo sleeves (SNL)

(f) IER441, Epithermal 7uPCX lattices, Justin Clarity (ORNL)
(g) IER480, Pu ZPPR benchmark optimized for Polyethylene and Lucite thermal scattering, Catherine Percher (LLNL)
(h) IER488, HEU Critical and Subcritical Measurements (LANL)

- OECD NEA is soliciting nominations for a new ICSBEP Chair and Deputy Chair until March 31, 2022.

- IPD2 - Maintain the NCSP Website and Systems
  - Converted site to new platform in Drupal with accessibility dashboard scores in excess of 80% as required for 504 conformance. Ran and provided various analytics reports.
  - Maintained/updated documents, videos, foreign trip reports, T&E course dates, links, calendars, taskings, newsletters, photos/portraits, and created art for banners.
  - Maintained contact(s) information/portraits and lists of email subscribers for the different "group" emails used by NCSP.
  - Obtained missing reports and provided links to the LA-12808 and LA-13638 reference sets.
  - Created Cvent site for TPR registration and running registrant reports throughout open period of registration.
  - Transitioning T&E course registration to Cvent site to prevent further cyberattacks.
  - Working to improve site navigation.



- IPD5 - IT Support at NNSS
  - Provided OISSO and ISSO support for Nevada IT including required weekly NTS-SLAN/NCERC system updates, monthly "authenticated" scans for NCERC network devices, and system upgrades as required. Created and renewed NTS-SLAN accounts. Completed and submitted the annual "self-assessment" for the NTS-SLAN system to the OCIO, which was approved and accepted.
  - Replaced two physical servers with newer equipment as part of the NTS-SLAN Life Cycle without any impact to users.
  - Identified a network issue impacting data transfer rates on NTS-SLAN in coordination with the LANL Network Group. Initiated purchase of network equipment to replace current equipment, which when received and installed will resolve this issue.
- IPD6 - Benchmark Evaluation of LLNL 'Pulsed Spheres'
  - The status of this proposed SINBAD benchmark was reported at the 2021 ANS Winter Meeting on December 1, 2021 – see Publications. The draft evaluation has been submitted to internal review.
- IPD7 - LLNL - NDA Website Support
  - Maintenance and minor updates to site.

PUBLICATIONS

Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

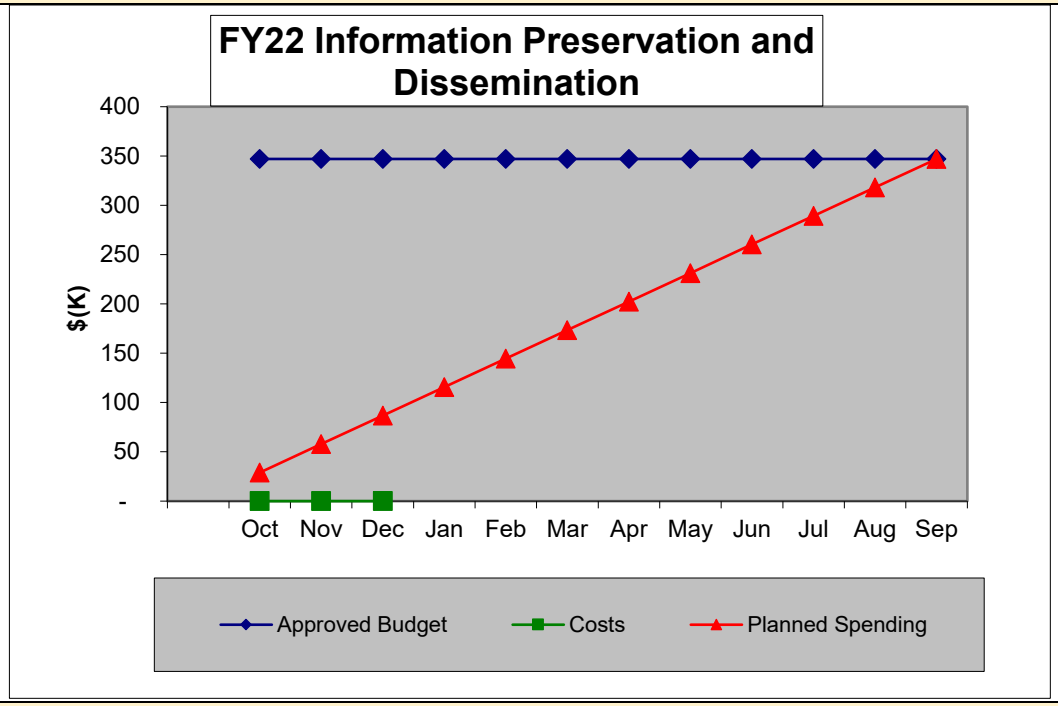
Quarter	Publication Reference	Sent to NCSP? Yes/no	If no, status of submittal
Q1	Dave Heinrichs et al., "Report on the 2021 ICSBEP and SINBAD Technical Review Group (ZOOM) Meeting," LLNL-MI-829200, October 31, 2021.	Yes	
Q1	Soon S. Kim et al., "Evaluation of Polyethylene and Blank Pulsed Sphere Experiments Using Deuteron Transport Feature in COG," 2021 ANS Winter Meeting, December 1, 2021.	Yes	
Q1	Dave Heinrichs et al., "Report on the Second 2021 ICSBEP/IRPhE Technical Review Group (ZOOM) Meeting," LLNL-MI-830264, December 31, 2021.	Yes	

Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: IPD3, 5 **M&O Contractor Name**: ORNL **Point of Contact Name:** Doug Bowen **Point of Contact Phone:** (865) 576-0315	**Reference:** DP0909010 **Date of Report:** January 20, 2022

BUDGET



1. Carryover into FY 2022 = $2K
2. Approved FY 2022 Budget = $345K
3. Total Approved FY 2022 Budget w/Carryover = $347K
4. Actual spending for 1st Quarter FY 2022 = $0K
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide a status report on development of NCSP repository at OSTI.gov. (IPD3)		
Q2	Provide a status report on development of NCSP repository at OSTI.gov. (IPD3)		

Q3	Provide a status report on development of NCSP repository at OSTI.gov. (IPD3)		
Q4	Provide a status report on development of NCSP repository at OSTI.gov. (IPD3)		

ACCOMPLISHMENTS

- IPD3 – Nuclear Criticality Safety Repository
  - There is not enough funding to initiate a contract with OSTI. This is not anticipated until at mid-FY22Q3.
- IPD5 – HPRR Benchmark
  - Q4-FY21:
    - The HPRR shielding evaluation was sent to the ICSBEP committee for a presentation at the 2021 ICSBEP TRG meeting
    - Work was performed with the independent reviewer Dave Heinrichs to update the evaluation
    - The updated evaluation was defended during the 2021 ICSBEP TRG meeting in September 2021. The evaluation was not accepted for a 2022 publication in the database and a subgroup was created to update the evaluation and submit it again to the TRG in 2022
  - Q1-FY22:
    - The evaluation is being updated according to the comments received during the 2021 ICSBEP TRG meeting in September 2021
    - OECD-NEA is still working on a document with all the comments and actions items concerning the HPRR evaluation and will send it to ORNL when ready

PUBLICATIONS

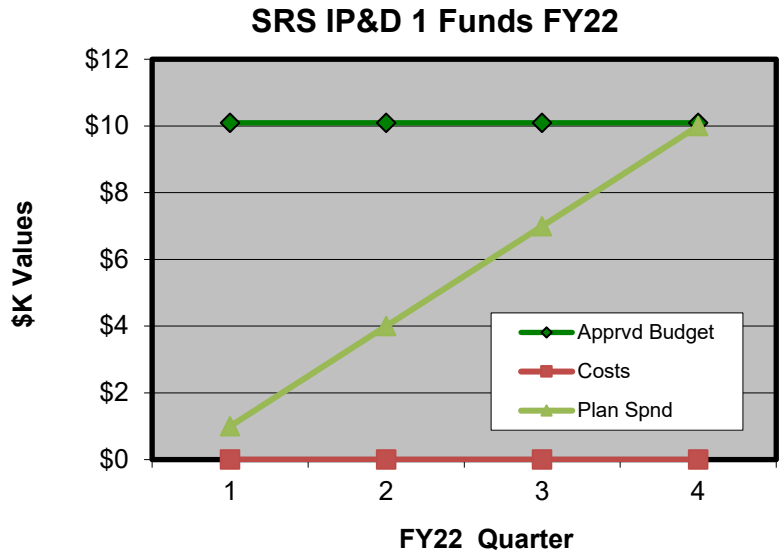
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	**Publication Reference** **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	**Sent to NCSP? Yes/no**	**If no, status of submittal**
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: IPD1 **M&O Contractor Name**: SRNS **Point of Contact Name:** David Erickson **Point of Contact Phone:** 803-557-1315	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $95
2. Approved FY 2022 Budget = $10,000
3. Total FY 2022 Budget w/Carryover = $10,095
4. Actual spending for 1st Quarter FY 2022 = $0
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $TBD

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status reports on progress with CritView. (IPD1)		Work in FY21 included generating 2 documents. The first documents the digitization of curves from LA-10860. The second documents new SCALE calculations. These documents are both in the review/approval stage. Once completed they will be reviewed for public release and made available to the NCSP. The information from these documents will be incorporated into an upcoming revision to the CritView database and code.

Q1	NCSP Approved Scope for FY21. (IPD1)		The Scope for FY22 is not finalized.
Q2	Provide status reports on progress with CritView. (IPD1)		
Q2	TBD based on Approved Scope. (IPD1)		
Q3	Provide status reports on progress with CritView. (IPD1)		
Q3	TBD based on Approved Scope. (IPD1)		
Q4	Provide status reports on progress with CritView. (IPD1)		
Q4	Provide updated CritView database for user testing. (IPD1)		

ACCOMPLISHMENTS

- IPD1 – ARH-600 Reissue (CritView)
  -

PUBLICATIONS

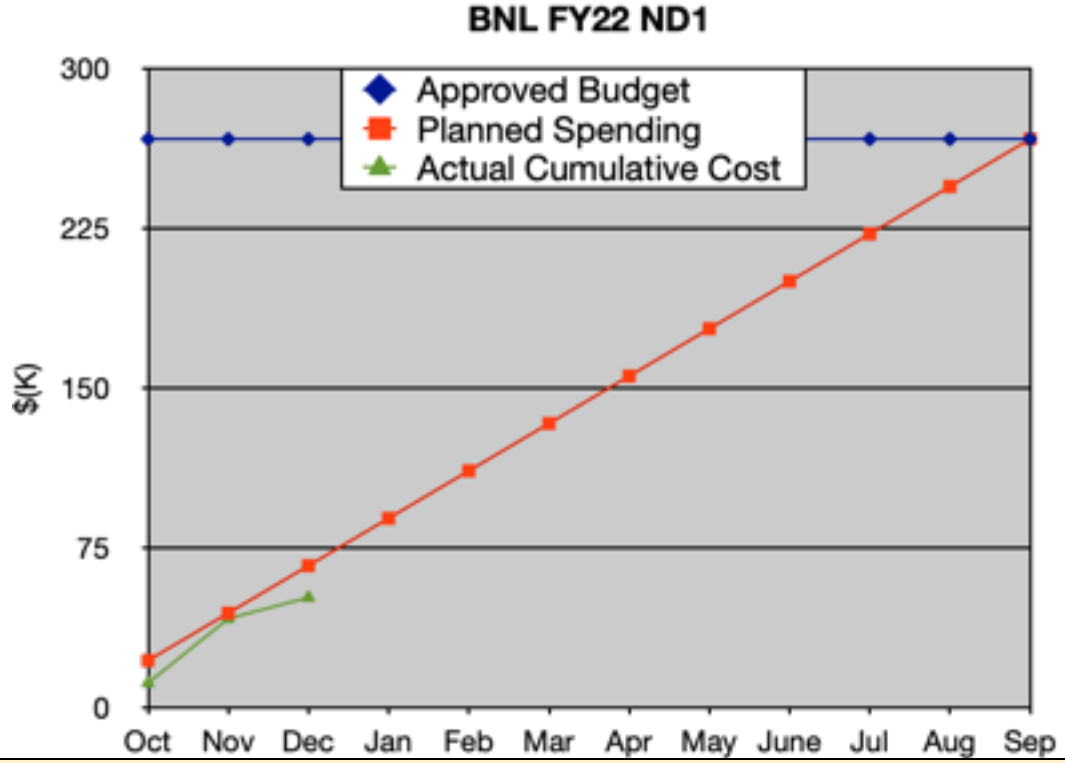
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: ND1 **M&O Contractor Name**: BNL **Point of Contact Name:** David Brown **Point of Contact Phone:** 631-344-2814	**Reference:** DP0909010 **Date of Report: 22** January, 2022

BUDGET



1. Carryover into FY 2022 = $ 39,209
2. Approved FY 2022 Budget = $ 267,000
3. Total FY 2022 Budget w/Carryover = $306,209
4. Actual spending for 1st Quarter FY 2022 = $51,837
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Maintain and upgrade ADVANCE code system by performing data verification of new NCSP evaluations and performing quality assurance on the data as required. Provide status reports		Due to revised BNL cybersecurity posture, the next major upgrade to ADVANCE is delayed. In short, we are finding it difficult to connect the NNDC GitLab instance (outside of the BNL firewall) to the Kubernetes cluster (inside the firewall).

	on all nuclear data activities in the NCSP Quarterly Progress Reports. (ND1)		As a result, ADVANCE must be run "by hand", defeating the purpose of a continuous integration system. Nevertheless, build reports are being forwarded to evaluation reviewers.
Q1	If mandated by CSEWG, release new ENDF library. (ND1)		The next ENDF/B library release is postponed until 2024. However, ENDF/B beta releases were also delayed by lack of evaluation review system. An evaluation review system being piloted in Q2. Once evaluations pass this review and enter the "Phase II" branch, then validation of new evaluations can begin.
Q2	Maintain and upgrade ADVANCE code system by performing data verification of new NCSP evaluations and performing quality assurance on the data as required. Provide status reports on all nuclear data activities in the NCSP Quarterly Progress Reports. (ND1)		
Q2	If mandated by CSEWG, release new ENDF library. (ND1)		
Q3	Maintain and upgrade ADVANCE code system by performing data verification of new NCSP evaluations and performing quality assurance on the data as required. Provide status reports on all nuclear data activities in the NCSP Quarterly Progress Reports. (ND1)		
Q3	If mandated by CSEWG, release new ENDF library. (ND1)		
Q4	Maintain and upgrade ADVANCE code system by performing data verification of new NCSP evaluations and performing quality assurance on the data as required. Provide status reports on all nuclear data activities in the NCSP Quarterly Progress Reports. (ND1)		
Q4	If mandated by CSEWG, release new ENDF library. (ND1)		

ACCOMPLISHMENTS

NCSP Quarterly Progress Report (FY-2022 Q1)

- ND1 - National Nuclear Data Center (NNDC) Support to the NCSP

  - BNL organized the annual CSEWG Meeting as part of Nuclear Data Week from November 15-19, 2022. For the second year, due to COVID-19 travel restrictions, the CSEWG annual meeting was held virtually. The meeting included 74 talks over 4 days, concluding with a session of WANDA meeting planning and the NCSP Nuclear Data Advisory Group Meeting. There were 175 registered attendees. The CSEWG Meeting Minutes are in preparation and should be ready in Q2. To the right we show a screenshot from the meeting showing the small fraction of CSEWG members who are allowed to have operational cameras on their lab computers!

  - In the October 2022 CSEWG executive committee meeting, CSEWG adopted a meeting Code of Conduct modeled on the American Physical Society's. This Code of Conduct will help us ensure that future CSEWG meetings are conducted in a professionally appropriate and constructive manner. The Code of Conduct is posted at https://indico.bnl.gov/event/13121/page/385-code-of-conduct.

  - In Q1, BNL developed an evaluation review system that integrates into the current GitLab workflow. This system re-imagines the evaluation reviews conducted by V. McLane pre-2000 and includes an automated generation of review forms. The system is being piloted in Q2 of FY22.

PUBLICATIONS

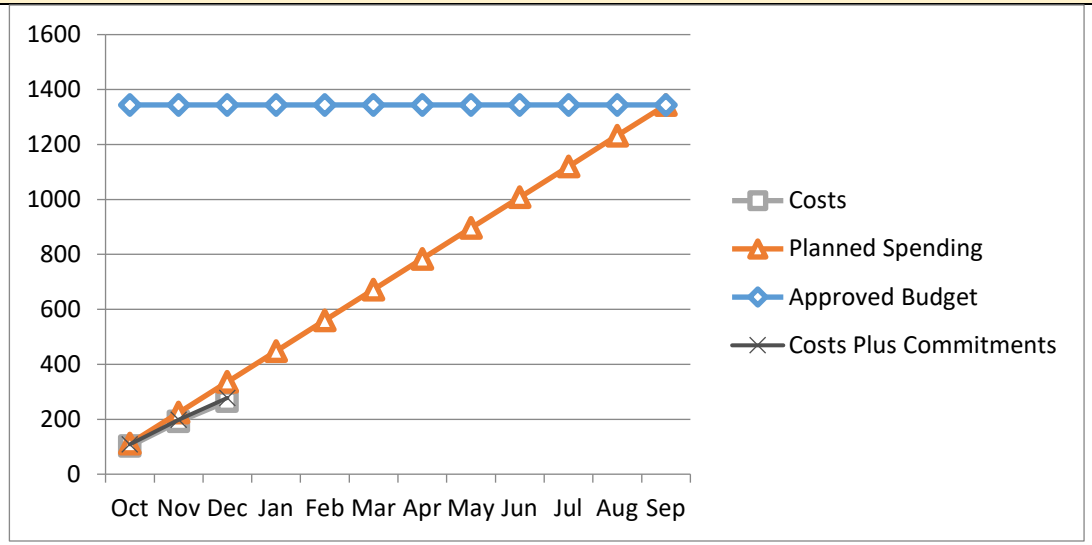
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1	N/A		
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: ND1, 2, 3 **M&O Contractor Name**: LANL **Point of Contact Name:** Joetta Goda/Bob Little/ Jen Alwin **Point of Contact Phone:** 505-667-2812/505-665-3487/505-667-7252	**Reference:** DP0909010 **Date of Report:** January 21, 2022

BUDGET



1. Carryover into FY 2022 = $25,000
2. Approved FY 2022 Budget = $ 1,319,000
3. Total FY22 Budget w/Carryover = $1,344,000
4. Actual spending for 1st Quarter FY 2022 = $265,403 (plus end of Q1 commitments of $12,188 for a total of $277,591)
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status report on LANL participation in US and International Nuclear Data collaborations. (ND1)		
Q1	Conduct CSEWG Evaluation and Covariance sessions. (ND1)		
Q1	Report data testing results with ENDF/B-VIII.0 and additional beta release cross sections at CSEWG. (ND1)		

Q1	Provide status report on Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium-240 (ND2)		
Q1	Provide status report on Unresolved and Fast Measurements of Uraunium-233 (n,gamma) (ND3)		
Q2	Provide status reports on LANL participation in US and International Nuclear Data collaborations. (ND1)		
Q2	Provide status report on Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium-240 (ND2)		
Q2	Provide status report on Unresolved and Fast Measurements of Uraunium-233 (n,gamma) (ND3)		
Q3	Provide status reports on LANL participation in US and International Nuclear Data collaborations. (ND1)		
Q3	Provide status report on Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium-240 (ND2)		
Q3	Provide status report on Unresolved and Fast Measurements of Uraunium-233 (n,gamma) (ND3)		
Q4	Provide status reports on LANL participation in US and International Nuclear Data collaborations. (ND1)		
Q4	Deliver nuclear data evaluations as indicated in Appendix B of the Five Year plan. (ND1)		
Q4	Provide status report on Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium-240 (ND2)		
Q4	Obtain final experimental results for Pu-240 PFNS at LANSCE, finalize data analysis, and deliver data to evaluators (ND2)		
Q4	Provide status report on Unresolved and Fast Measurements of Uraunium-233 (n,gamma) (ND3)		
Q4	Finalize acquisition of U-233 thick target capture data, finalize data analysis, and deliver data to evaluators (ND3)		

ACCOMPLISHMENTS

- ND1 – Nuclear Data Evaluation and Testing
  - Los Alamos speakers presented a dozen papers at the CSEWG Meeting during Nuclear Data Week in November 2021. Also, two papers were presented during the NDAG Meeting held the same week.

- As Chairs of three of the eight CSEWG Standing Committees, Los Alamos scientists organized and led the following sessions at CSEWG: Evaluation [transport and neutrons], Evaluation [FPY and decay}, and Covariances.
- Actinides
  - U-235 prompt fission neutron spectra based on LANSCE high-energy emission data from Chi-Nu. Kelly Keegan from P-3 delivered in Q1 Chi-Nu experimental PFNS. Those data have been included in several test evaluations. One evaluated PFNS gives good results for the bulk of the incident neutron energy range, but needs a bit more work at other incident energies.
  - Consistent evaluation of PFNS and nu-bar
    - U-235
      - Finished the report on the model testing for the PFNS using CGMF (LA-UR-21-30882). There are several models that have an impact on the tail of the PFNS, but no single one that completely hardens the tail to the level of the current evaluations/experimental data. We tested a fit of the PFNS with the baseline version of CGMF and with some of these model changes. The fit to the baseline CGMF produces an unphysical parameter space.
      - We have tried various variants of U-235 nu-bar priors and evaluations. The question is what parameterization (with or without bend(s) at ~0.7 MeV, 2nd chance fission, etc.) should be used as the experiments give ambiguous results. We included a better PPP correction and tried out smoothing algorithms. The problem seems to really be in the physics description of CGMF and correct parameterization. We also tried two more versions of the U-235 PFNS for the evaluation at thermal.
      - Because we have still seen unphysical bumps at the openings of multi-chance fission, in T-2, we re-fit the fission barriers for 235U(n,f) to the ENDF/B-VIII.0 fission cross section. Sensitivities for the various TKE parametrizations are now being calculated again with these new multi-chance fission probabilities and will be used for the optimization.
    - U-238: We have started on uncertainty quantification of experimental data.
- Light Isotopes
  - n+Li-6
    - We added corrected data from the measurement of Bai et al. of ^{6}Li(n,t)^{4}He angular distributions at incident neutron energies between 0 and 3 MeV to our analysis of reactions in the ^{7}Li system. Those data did not change much the results we had obtained from an earlier analysis, as was reported at the recent IAEA meeting on Neutron Data Standards (LA-UR-21-31976).
  - n+Be-9
    - The updated n+9Be file from last FY doesn't represent an improvement over ENDF/B-VIII.0 at least as regards integral (and quasi-integral) tests.
    - We continue to explore reasons for this lack of improvement on these benchmarks.
    - Ongoing investigations of the observed data:
      - 9Be(n,el) angular distributions being checked for consistency, energy/angle resolution, completeness of the existing data deck and other possible causes in the existing energy range (< 5 MeV) and above
      - consistency of 9Be(n,2n) with 9Be(n,inl) data
    - developing new evaluation configuration to address existing data and those to higher energy
  - n+O-16

- review of previous ENDF/B evaluations
  - ENDF/B-VI.8 (April, 2001) LANL n+16O evaluation (by Chadwick, Hale & Young): evaluation done prior to Harissopulos 2005 data; ENDF/B-VI.8 is preferred by IAEA integral benchmarks
  - ENDF/B-VII.1 treated Harissopulos 2005 as "definitive"
  - JENDL-4.0 adopted ENDF/B-VII.0 (prior to Harissopulos 2005 data), which is equivalent to VI.8
- added inelastic 16O(0+; 6.05 MeV) and 16O(3-; 6.13 MeV) channels to EDAf90 R-matrix configurations
- augmented data deck:
  - more complete set of 16O(n,el) angular distributions and polarization data
  - 16O(n,n2) inelastic angular distributions
  - including 13c(alpha,n0) and 13c(alpha,n1) angular distributions 2021 data from Notre Dame
  - comparison with LENZ(2017) data from LANL (by Kuvin & Lee) with ENDF/B-VIII.0 parameters: good agreement below 6.25 MeV
  - new, preliminary evaluation compared with 2021 OU (Brandenburg & Meisel) and 1973 Bair & Haas data: significant improvement above E_alpha > 5.0 MeV (previous upper limit)

- performed consistency study of low energy (alpha,n0) data
- presently incorporating any missing data and investigating normalizations of Cierjacks' '68 and '83 datasets
- writing 17O system paper for Phys. Rev. C publication

▪ Presented status of light-isotope evaluation work at CSEWG (LA-UR-21-31398).

- Ta-181
  - ▪ Following discussions with ORNL/KAPL evaluators EMPIRE calculated capture below 100 keV (URR) has been adjusted to reproduce URR results within fraction of percent. Although these data will not be used in the final evaluation a full consistency among URR and EMPIRE calculations in the UR region is essential due to ENDF-6 format incapacity to properly treat inelastic scattering in the unresolved region. In response to comments received during the CSEWG meeting capture cross sections between 100 keV and 1 MeV are being adjusted to agree with a set of most trusted experiments (overall spread of measurements is about 30%). The Kalman filter is used to improve reproduction of experimental (n,2n) cross sections without compromising good performance on neutron spectra and other reaction channels. Work has started on determining covariances.
  - ▪ A presentation on progress was made during the CSEWG meeting in November, 2021 (LA-UR-21-31368).
- Validation / Data Testing
  - ▪ We validated several (on the order of >30) LANL Pu-239 test files and >5 INDEN Pu-239 test files to test data for the new ENDF/B-VIII.1 beta-release including the newest NCSP-funded nu-bar and (n,f) cross sections.
  - ▪ A talk was given at CSEWG Nov. 2021 about validating our new LANL Pu-239 file for a beta release (LA-UR-21-31248).

- ND2 – Prompt Fission and Neutron Spectra (PFNS) Measurement of Plutonium-240
  - As indicated in the last quarterly, the Pu-240 PPAC was received from Livermore in mid-September (original schedule was March). Before we could take data in the beam, LANSCE suffered a major component failure that caused three-four weeks of down time. We were hopeful at that time that sufficient beam time could be obtained during the run cycle that ended in December 2021 for the experiment to happen, but

warned of the risk that that might not be possible. Indeed, after considering all of the options, beam time was not made available for the Pu-240 PFNS measurement during that run cycle.
  - We did take Pu-240 spontaneous fission data with the PPAC for about three weeks. This data is required to subtract background for the PFNS measurement.
  - The plan is to obtain the PFNS data when the next run cycle begins in June 2022. We expect to take data through August. Several options are being explored to enhance the efficiency of the experiment. Because of the various delays, final data analysis will not be complete until the end of CY 2022 or early in CY 2023.
- ND3 – Unresolved and Fast Measurements of U233 (n, gamma)
  - As reported last quarter, all production data have been acquired using DANCE and NEUANCE. Data analysis continues. Events from DANCE in coincidence with events from NEUANCE have been tagged as fission events. The rest of the DANCE events have been left untagged. The purpose of tagging is to define the shape of the fission γ-ray spectrum that can be subtracted from the untagged spectrum. The neutron scattering background has been studied using a Pb-208 sample. The background subtraction method will be applied bin by bin over the full neutron energy spectrum because all the background components are energy dependent.
  - We have been communicating with evaluators from IRSN and ORNL. We have discussed topics such as measurement technique, strengths, limitations, optimal neutron binning, and when results will be transmitted. We will continue to communicate with the evaluators.
  - A presentation on the status of this work was made during the November 2021 NDAG Meeting (LA-UR-21-31520).
- ND4 – 95-Mo Neutron Capture and Transmission Measurements
  - Note that this task was successfully completed as scheduled during FY21. The report from FY21 Q4 stated: A paper ("Improved 95Mo neutron resonance parameters" by P. E. Koehler, LA-UR-21-28567) describing the results of this work was submitted to Phys. Rev. C. Also, the data and SAMMY files were transmitted to Luiz Leal (IRSN) during September.

PUBLICATIONS

Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

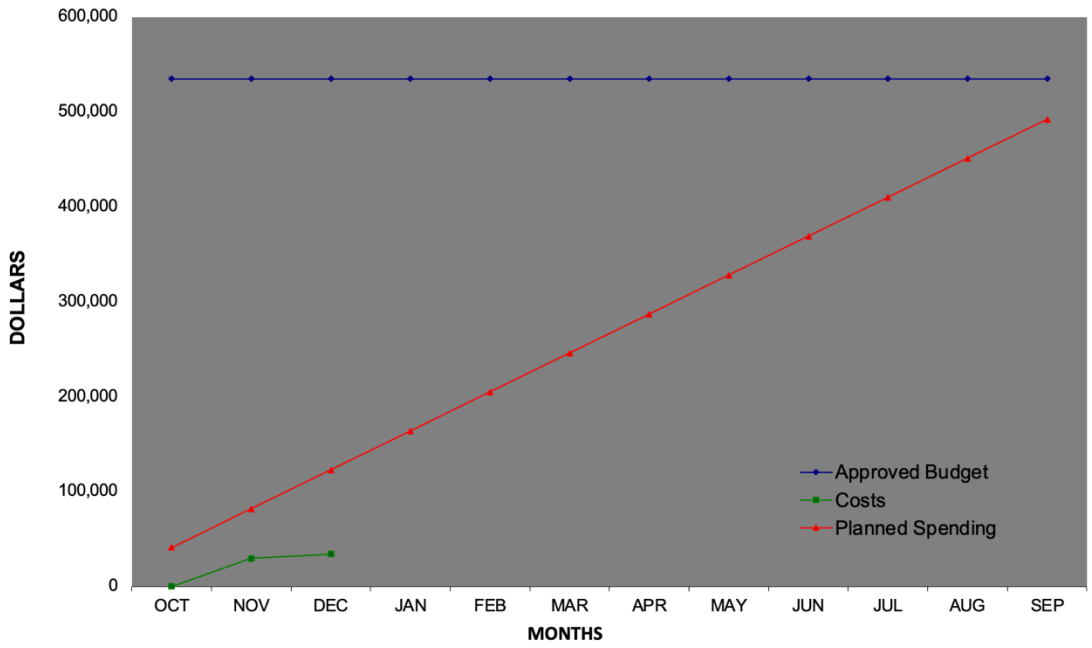
Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1	Amy Lovell and Denise Neudecker, "Correcting the PFNS for more consistent fission modeling," LA-UR-21-30882, November 1, 2021.	Yes	
Q1	Matthew Mumpower and Denise Neudecker, "LANL Update to Pu-239 in the fast energy range,"LA-UR-21-31243, presented at CSEWG, November 2021.	Yes	
Q1	Denise Neudecker, "Updates from the Covariance Session Committee," LA-UR-21-31165, presented at CSEWG, November 2021.	Yes	
Q1	Denise Neudecker, "Validating the LANL versus INDEN Pu-239 file in the fast range," LA-UR-21-31248, presented at CSEWG, November 2021.	Yes	

Q1	Ester Leal Cidoncha, Aaron Couture, and Gencho Rusev, "U-233 (n,γ) measurements at LANSCE," LA-UR-21-31520, presented at NDAG, November 2021.	Yes	
Q1	Paul E. Koehler et al., "149Sm Results from DICER Plus DANCE," LA-UR-21-31180, presented at NDAG, November 2021.	Yes	
Q1	M. Herman and T. Kawano, "Ta-181 – fast neutron evaluation," LA-UR-21-31368, presented at CSEWG, November 2021.	Yes	
Q1	G. Hale and M. Paris, "Progress on Light Element Standard Cross Sections at Los Alamos," LA-UR-21-31976, presented at Technical Meeting on Neutron Data Standards 2021 (on-line), IAEA Vienna, Austria, December 8, 2021.	Yes	
Q1	G. Hale and M. Paris, "TN update plans and advances for O-16 and Be-9," LA-UR-21-31398, presented at CSEWG, November 2021.	Yes	
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: ND2, 5, 7, 8, 10, 11 **M&O Contractor Name**: LLNL **Point of Contact Name:** Catherine Percher **Point of Contact Phone:** (925) 579-4226	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $ 113,175
2. Approved FY 2022 Budget = $396,000
3. Total FY 2022 Budget w/Carryover = $ 509,175
4. Actual spending for 1st Quarter FY 2022 = $ 48,281*
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $ 42,500 (8%)

***NOTE:** Includes $14,384 for December NCSU spending which will not cost at LLNL until January.

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status on LLNL/NCSU nuclear data activities on generation and benchmarking of thermal neutron scattering sections (ND2)		
Q1	Provide status on LLNL/NCSU nuclear data activities on development and implementation		

	of modern doppler broadening approach (ND5)		
Q1	Provide status on 'Alpha-N' benchmark measurements (ND7)		
Q1	Provide status on fission TPC measurement study (ND8)		
Q1	Provide status on development and implementation of machine learning methods for thermal scattering law evaluations (ND10)		
Q1	Provide status report PPAC target fabrication progress (ND11)		Task complete.
Q1	Fabricate the Pu240 PPAC targets and fission detector components (ND11)		Task complete.
Q2	Provide status on LLNL/NCSU nuclear data activities on generation and benchmarking of thermal neutron scattering sections (ND2)		
Q2	Provide status on LLNL/NCSU nuclear data activities on development and implementation of modern doppler broadening approach (ND5)		
Q2	Provide status on 'Alpha-N' benchmark measurements (ND7)		
Q2	Provide status on fission TPC measurement study (ND8)		
Q2	Provide status on development and implementation of machine learning methods for thermal scattering law evaluations (ND10)		
Q2	Provide status report PPAC target fabrication progress (ND11)		
Q2	Assemble and test the Pu240 fission detector (ND11)		
Q3	Provide status on LLNL/NCSU nuclear data activities on generation and benchmarking of thermal neutron scattering sections (ND2)		

Q3	Provide status on LLNL/NCSU nuclear data activities on development and implementation of modern doppler broadening approach (ND5)		
Q3	Provide status on 'Alpha-N' benchmark measurements (ND7)		
Q3	Provide status on fission TPC measurement study (ND8)		
Q3	Provide status on development and implementation of machine learning methods for thermal scattering law evaluations (ND10)		
Q3	Provide status report PPAC target fabrication progress (ND11)		
Q4	Deliver thermal neutron scattering data evaluations as indicated in Appendix B of the 5-Year Plan. (ND2)		
Q4	Provide status on LLNL/NCSU nuclear data activities on generation and benchmarking of thermal neutron scattering sections (ND2)		
Q4	Provide status on LLNL/NCSU nuclear data activities on development and implementation of modern doppler broadening approach (ND5)		
Q4	Provide status on 'Alpha-N' benchmark measurements (ND7)		
Q4	Provide status on fission TPC measurement study (ND8)		
Q4	Provide status on development and implementation of machine learning methods for thermal scattering law evaluations (ND10)		
Q4	Provide an update on the development and testing of NeTS modules for selected materials such as light water, graphite, etc. (ND10)		
Q4	Provide status report PPAC target fabrication progress (ND11)		P

ACCOMPLISHMENTS

- ND2 - Generation and Benchmarking of Thermal Neutron Scattering Cross Sections in Support of Advanced Nuclear Reactor Concepts
  - NCSU completed the TSL evaluations for uranium carbide and submitted it to NNDC for inclusion in the ENDF/B-VIII database.
  - NCSU submitted updated TSL evaluations for Be-metal, Be+Sd, and CaH2 to NNDC.
  - NCSU submitted the ORELA benchmark report to the inclusion in the ICSBEP database.
- ND5 - Development and Implementation of a Modern Doppler Broadening Approach Including Atomic Binding Effects
  - NCSU completed a Doppler broadening module for inclusion into the *FLASSH* code. This combines the ability to perform TSL evaluation and Doppler Broadening for a given material within the same computational platform.
- ND7 - 'Alpha-N' Benchmark Measurements
  - The Geant4-based simulation of the recent AmBe measurements has been expanded to include the AmBe source capsule, and general room features to study the effects of neutron scatter within the capsule and room return on the measured spectrum. Analysis improvements developed during the AmBe data processing are being applied to the Beryllium data from the Ohio University deployment with some modifications to account for differences in detector configuration.
  - New data acquisition modules are in hand allowing for a system expansion which will quadruple the detection efficiency. This upgrade requires new detector modules and frame upgrades for completion.
- ND8 - Study: Fission TPC Measurement of the U-233/U-235 (n,f) Cross Section Ratio
  - LLNL is assessing the status of the Fission TPC equipment after the last experimental run to estimate the costs required to refurbish and maintain the instrument. LLNL initiated a parallel effort to simulate the effectiveness of a reduced-channel count Fission TPC to make the measurement. Such an instrument would have a reduced cost of maintenance and operation but could possibly sacrifice measurement accuracy. LLNL is attempting to quantity this potential tradeoff.
- ND10 – Development and Implementation of Machine Learning Methods for Thermal Scattering Law Evaluations
  - The training of the feed forward network (FFN) has progressed to establish a 3-D (α, β, T) ability. Testing using light water TSL data continues and is demonstrating the feasibility of the Neural Thermal Scattering (NeTS) approach. Consideration of establishing NeTS capabilities for other materials is currently underway.
- ND11 - Fabricate the Pu240 PPAC targets and fission detector components
  - LLNL completed fabrication and delivery in FY-2021. The 240Pu PFNS measurement is scheduled to commence at LANSCE in the next run cycle starting in June 2022 and will continue throughout the summer.

PUBLICATIONS

Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

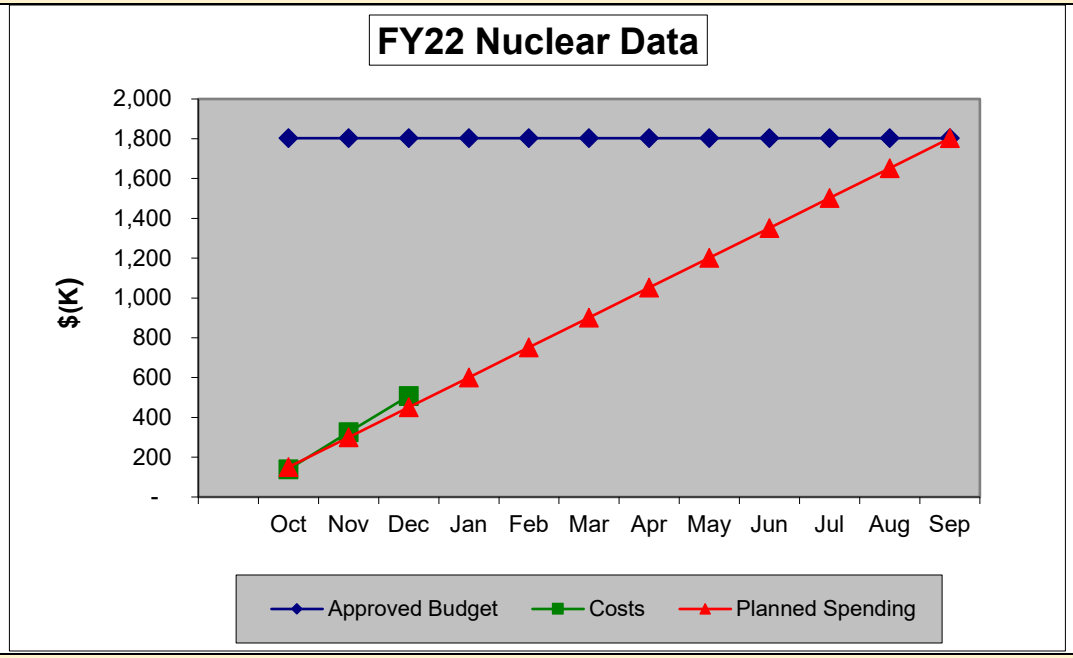
Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1	Jonathan Crozier, "Uranium Carbide and Uranium-Metal TSL Evaluation and Cross Sections," CSEWG Meeting, November 17, 2021.	Yes	
Q1	Nina C. Fleming et al., "*FLASSH* 1.0: Full Law Analysis Scattering System Hub," 2021 ANS Winter Meeting and Technology Expo, December 3, 2021.	Yes	

Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: ND1, 3, 4, 6, 10 **M&O Contractor Name**: ORNL **Point of Contact Name:** Doug Bowen **Point of Contact Phone:** (865) 576-0315	**Reference:** DP0909010 **Date of Report:** January 20, 2022

BUDGET



1. Carryover into FY 2022 = $221K
2. Approved FY 2022 Budget = $ 1,582
3. Total FY 2022 Budget w/Carryover = $1803K
4. Actual spending for 1st Quarter FY 2022 = $508K
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND1)		
Q1	Provide status reports on ORNL participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest (ND1)		

Q1	Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND1)		COVID-19 has delayed cross section measurements at GELINA by 12 months, that is all experiments are about 12 months behind original schedule. Appendix B will be adjusted
Q1	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND3)		
Q1	Provide status reports on ORNL participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest (ND3)		
Q1	Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND3)		
Q1	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND4)		
Q1	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND6)		
Q1	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND10)		
Q2	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND1)		
Q2	Provide status reports on ORNL participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest (ND1)		
Q2	Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND1)		
Q2	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND3)		
Q2	Provide status reports on ORNL participation in US and International Nuclear Data		

	collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest (ND3)		
Q2	Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND3)		
Q2	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND4)		
Q2	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND6)		
Q2	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND10)		
Q3	Provide status reports on all nuclear data support activities in NCSP Quarterly Progress Reports (ND1)		
Q3	Provide status reports on ORNL participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest (ND1)		
Q3	Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND1)		
Q3	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND3)		
Q3	Provide status reports on ORNL participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest (ND3)		
Q3	Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND3)		

Q3	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND4)		
Q3	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND6)		
Q3	Provide status reports on all activities in NCSP Quarterly Progress Reports (ND10)		
Q4	Provide status reports on all nuclear data support activities in NCSP Quarterly Progress Reports (ND1)		
Q4	Provide status reports on ORNL participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest (ND1)		
Q4	Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND1)		
Q4	Provide status reports on all nuclear data support activities in NCSP Quarterly Progress Reports (ND3)		
Q4	Provide status reports on ORNL participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest (ND3)		
Q4	Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND3)		
Q4	Provide status reports on all nuclear data support activities in NCSP Quarterly Progress Reports (ND4)		
Q4	Provide status reports on all nuclear data support activities in NCSP Quarterly Progress Reports (ND6)		

Q4	Document SAMMY modernization progress and report status annually to the NCSP Manager (ND6)		
Q4	Provide status reports on all nuclear data support activities in NCSP Quarterly Progress Reports (ND10)		

ACCOMPLISHMENTS

- **ND1** - Nuclear Data Measurement and Evaluation
  - **Status report on all nuclear data support activities.**
    - Attendance of all ND personnel at the annual CSEWG meeting at BNL with several presentation
    - Attendance of several ND personnel at the WPEC meeting
    - Attendance of several ND personnel at the IAEA meeting on Nuclear Data Processing
    - Attendance of several NDWG meeting (WANDA2022)
    - Attendance of several ND personnel NDAG meeting
    - Attendance of the MSR2021(Molten Salt Reactor) workshop
    - Attendance to the INDEN meeting at IAEA on Fissile actinides and the CSEWG nuclear data week including the work on the presentations (RES ID https://res.ornl.gov/pub/preview/169852). Both presentations focused on **235U URR** evaluation and **239PU** neutron multiplicities. In the CSWEG meeting updates to the copper evaluations were also presented (RES ID https://res.ornl.gov/pub/preview/170095)
    - Attendance of INDEN meeting on structural materials at IAEA. The meeting focused material such as Fe and Cu of interest for the NCSP and currently included in the APPENDIX B. As in the CSEWG nuclear data week meeting, the updates to the copper evaluations were presented
    - Attendance of several ND personnel at the ANS winter meeting, presentations were given in the NCSP session.
    - Continue to work and mentor new staff for data analysis of experimental data.

  - **Complete cross-section measurement and evaluation deliverables per the nuclear data schedule in Appendix B of the 5-year plan.**
    - Travel to JRC-Geel is canceled due to COVID-19.
    - **Zr-90** transmission data sorted in TOF spectra and reduced to transmission.
    - Created SAMMY input to use old ORELA data for a metallic Zr-90 sample for 80m and 200m flight path. Comparison with ENDF data.
    - Natural Zr capture data reduction continued.
    - Regular meetings to discuss progress on cerium. Evaluation is finished. Covariances had to be manually increased from SAMMY output due to unrealistically small uncertainties. ENDF file has been created & confirmed to be processed by NJOY & AMPX. Files are going through final checking stages before submission to NNDC, planned by the end of Q2.
    - **233-U** evaluation: an ENDF was generated with RRR up to 2.5 keV and preliminary tests of a large set of benchmarks are in progress. Work in the URR above 2.5 keV was performed but not included in the latest ENDF file

- Work on the evaluation of neutron reactions on **63,65Cu** has continued, focusing especially on treatments of the elastic scattering angular distributions. The goal is to produce an evaluation of the elastic scattering angular distributions that simultaneously is consistent with the established cross section data and improves criticality benchmark performance. The candidate evaluations were tested against several copper-sensitive ICSBEP benchmarks. While these first candidates did not improve performance compared to the ENDF/B-VIII.0 evaluation, the path forward is becoming clearer.
- The evaluation of **139-La** and the fitting of resonance parameters continued.
- The evaluation of **V** and the fitting of resonance parameters has been started.
- **Hafnium** – Calculated upper limit of possible transmission measurements and determined that new measurements would significantly extend the existing resolved resonance range. Determined that uncertainty of processing of the oxide samples used in the previous experiments warrants new experiments (water in the sample and hence stoichiometry of the sample is questionable). Efforts underway to find samples used for JEFF evaluation & determine their viability for possible transmission measurements.
- Discussion on **181Ta** evaluation with NNL colleagues about the generation of the ENDF for the RRR+URR sections (file2). The inclusion of the inelastic scattering channel in file2 for average resonance parameters is not supported by the available processing codes. Therefore, the inclusion in the 181Ta ENDF of the cross sections of all available channel in the URR (2.5--100 keV) calculated from the average resonance parameters is currently the only option to generate a consistent ENDF file. Due to this also the covariance matrix must be converted from file 32 file 33 accordingly. This work is in progress.

- **Y12 ND1** – GELINA depleted Uranium target cost estimate and construction
  - The GELINA target was shipped to JRC-Geel in December 2021.

- **ND3** - Isotopic Sample Leases to Support ND1 ND Measurements
  - Zr-91 sample is ready to be shipped in January 2022.

- **ND4** - Thermal Neutron Total Cross Section Measurements for Improvement of Criticality Calculations and Propagation of Scattering Kernel Uncertainties
  - Preliminary results from generating scattering kernel uncertainties for polyethylene & polystyrene were analyzed. Results suggest a different method for generating uncertainties might be required, as the impact on total cross section was minimal. Further analysis, as well as investigating potential other uncertainty quantification techniques, are ongoing.

- **ND6** – SAMMY Nuclear Data Evaluation Code Modernization
  - The 0K framework was extended to include all supported resolved resonance algorithms in SAMMY. This included the removal of most global parameters in the resolved resonance calculation methods. Exceptions are self-indication experiments and direct capture. The removal of global parameters is important for modularization, which allows different pieces of SAMMY to be used in new applications
  - The new C++ class that allows for efficient storage of isotope dependent derivatives (some derivatives (like resonance parameters) are only non-zero for the given isotope, others (like normalization for a sample with more than one isotope) are non-zero for all isotopes, is now used

everywhere in SAMMY. Thus, code that previously needed to know the type of the parameters can now just retrieve it via the new C++ class which does the zero suppression.

- Work started to consolidate the program flow in SAMMY. The flow was still based on the legacy model where each module used to be an external program. This led to, among other things, the code dispatching to the various resolution broadening modules in five different places. This issue has been consolidated by having one function that does the doppler and resolution broadening, calling the relevant module in the right order. Ultimately his will allow to make a better API for SAMMY.
- Due to division-specific changes in the computing structure at ORNL and changes in the SCALE Continuous integration (CI), the CI scripts for SAMMY needed to be updated. Automated testing of SAMMY has continued uninterrupted.
- A conversion of the SAMMY module to LaTeX was started, which will allow easier inclusion of new features into the manual going forward. The LaTeX files are kept in the same version control system as the code itself, automatically tracking all manual changes.

- **ND10** - Monte Carlo Evaluation of Differential and Integral Data
  - Bayesian Monte-Carlo Evaluation Framework for Imperfect Nuclear Data – ANS Winter meeting 2021 – Pub ID 170806 – Authors: Jesse M Brown, Goran Arbanas, Andrew Holcomb, Dorothea Wiarda

PUBLICATIONS

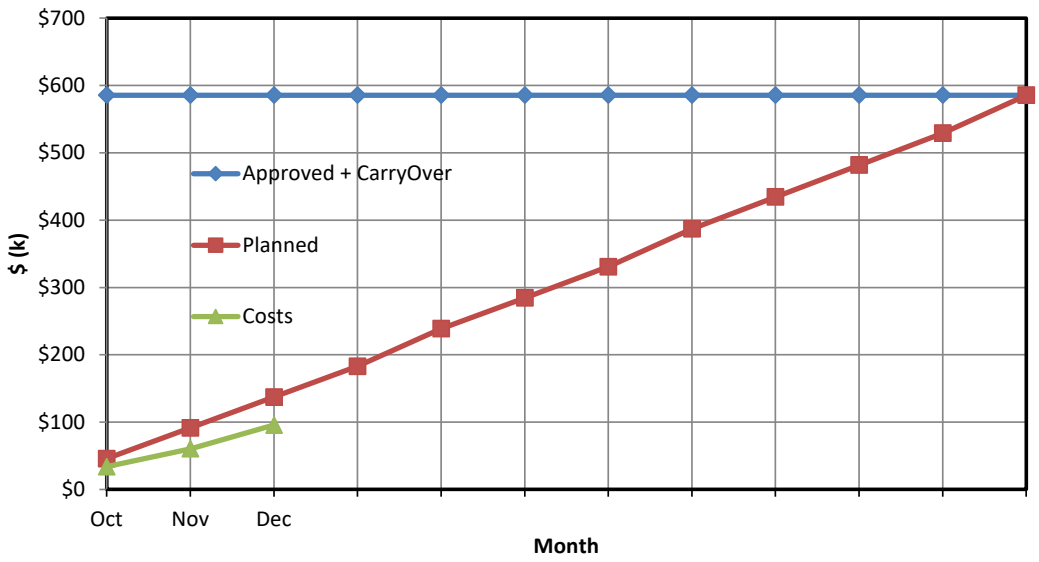
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference Example:	Sent to NCSP? Yes/no	If no, status of submittal
Q1	Received and sent separately	yes	
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: ND1, 3 **M&O Contractor Name**: RPI **Point of Contact Name:** Yaron Danon **Point of Contact Phone:** 518-276-4008	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $114,524 (ND 1,2,3)
2. Approved FY 2022 Budget = $471,000
3. Total FY 2022 Budget w/Carryover = $585,524
4. Actual spending for 1st Quarter FY 2022 = $95,594
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status reports on all resonance region nuclear data measurement activities. (ND1)		
Q1	Provide status reports on RPI participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest. (ND1)		
Q1	Complete analysis of measurement from previous year (ND1)		

NCSP Quarterly Progress Report (FY-2022 Q1)

Q1	Provide status report on all LINAC refurbishment activities (ND3)		Provided a report during ANS meeting
Q1	Complete SOL 1 Accelerator Section RF Conditioning. (ND3)		In progress
Q2	Provide status reports on all resonance region nuclear data measurement activities. (ND1)		
Q2	Provide status reports on RPI participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest. (ND1)		
Q2	Provide status report on all LINAC refurbishment activities (ND3)		
Q2	Complete TPV Accelerator Section RF Conditioning. (ND3)		
Q3	Provide status reports on all resonance region nuclear data measurement activities. (ND1)		
Q3	Provide status reports on RPI participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest. (ND1)		
Q3	Complete nuclear data measurements (transmission/capture or scattering) per the nuclear data schedule in Appendix B of the 5 year plan. (ND1)		
Q3	Provide status report on all LINAC refurbishment activities (ND3)		
Q3	Start fabrication of 2nd batch of speed of light structures 2, 3 and 4 (ND3)		
Q4	Provide status reports on all resonance region nuclear data measurement activities. (ND1)		
Q4	Provide status reports on RPI participation in US and International Nuclear Data collaborations, and for foreign travel, provide a brief trip summary report to NCSP Manager on items of NCSP interest. (ND1)		
Q4	Complete measurements data analysis and provide the data to ORNL as needed to support the evaluation		

	effort per the nuclear data schedule in Appendix B of the 5 year plan (ND1)		
Q4	Provide status report on all LINAC refurbishment activities (ND3)		
Q4	Complete delivery of solenoids and quadrupoles components (ND3)		

ACCOMPLISHMENTS

- ND1 – Resonance Region Nuclear Data Measurement Capability at RPI
  - Designed a mid-energy transmission experiment to measure the total cross section of Fe54.
  - Collected transmission data for Fe54, U238, and Natural Fe during a week-long LINAC experiment.
- ND3 – RPI/ORNL: LINAC 2020 Nuclear Data Capabilities Maintenance Plan
  - U-link setup for windows testing was shipped to RPI.

PUBLICATIONS

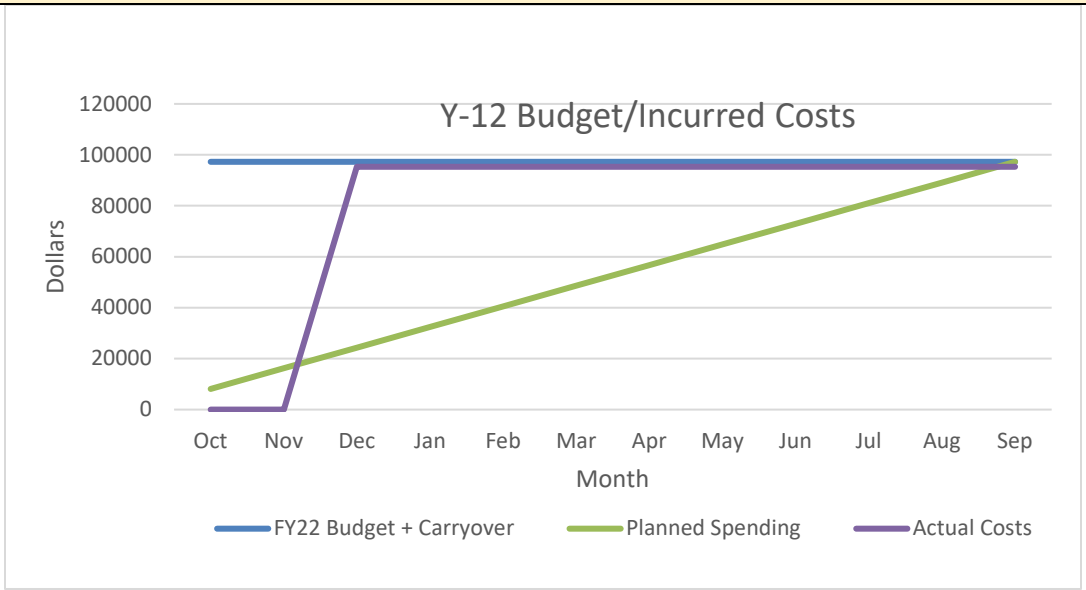
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1	Yaron Danon, Peter Brand, Michael Bretti, Brian Epping, and Timothy Trumbull, “RPI LINAC refurbishment and upgrade project”, Transactions of the American Nuclear Society, Volume 125, 2021	Yes	
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: ND1 **M&O Contractor Name**: Y12 **Point of Contact Name:** Kevin Reynolds **Point of Contact Phone:** (865) 241-9067	**Reference:** DP0909020 **Date of Report:** January 28, 2022

BUDGET



1. Carryover into FY 2022 = $ 97,266.06
2. Approved FY 2022 Budget = $0K
3. Total FY 2022 Budget w/Carryover = $97,266.06
4. Actual spending for 1st Quarter FY 2022=$95,316.16 ($95k commit from GELINA work costed)
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	As necessary, provide a status report of the fabrication of a depleted uranium/molybdenum target per IRMM/GELINA specifications to the NCSP Manager. (ND1)		GELINA Delivered. Project Complete.
Q2			
Q3			

Q4			

ACCOMPLISHMENTS

- ND1 - Y-12 Fabrication of New Uranium Target for IRMM/GELINA for Cross-section Measurements – delivered; project complete.

PUBLICATIONS

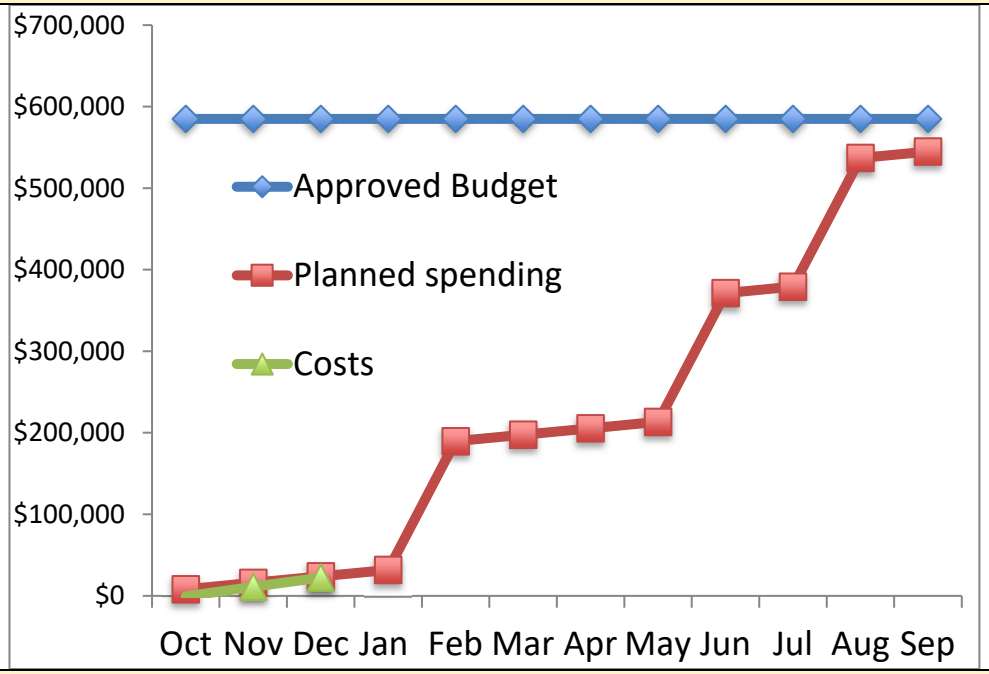
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference example)	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TE3, 6 **M&O Contractor Name**: LANL **Point of Contact Name:** Joetta Goda **Point of Contact Phone:** 505-667-2812	**Reference:** DP0909010 **Date of Report:** January 3, 2022

BUDGET



1. Carryover into FY 2022 = $45,000
2. Approved FY 2022 Budget = $540,000
3. Total FY 2022 Budget w/Carryover = $585,000
4. Actual spending for 1st Quarter FY 2022 = $22,365
   +$18,314 committed = $40,679
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status reports on all training activities to the NCSP Manager (TE3)		
Q1	Provide status reports on development of university pipeline for CS professionals (TE6)		
Q2	Provide status reports on all training activities to the NCSP Manager (TE3)		

Q2	Provide status reports on development of university pipeline for CS professionals (TE6)		
Q3	Provide status reports on all training activities to the NCSP Manager (TE3)		
Q3	Provide status reports on development of university pipeline for CS professionals (TE6)		
Q4	Provide status reports on all training activities to the NCSP Manager (TE3)		
Q4	Provide status reports on development of university pipeline for CS professionals (TE6)		

ACCOMPLISHMENTS

- TE3 – Conduct Hands-On Criticality Safety Training Course at NCERC
  - Preparations ongoing for February CSE class
- TE6 – Development of University Pipeline for Criticality Safety Professionals
  - Presentation planned for TPR

PUBLICATIONS

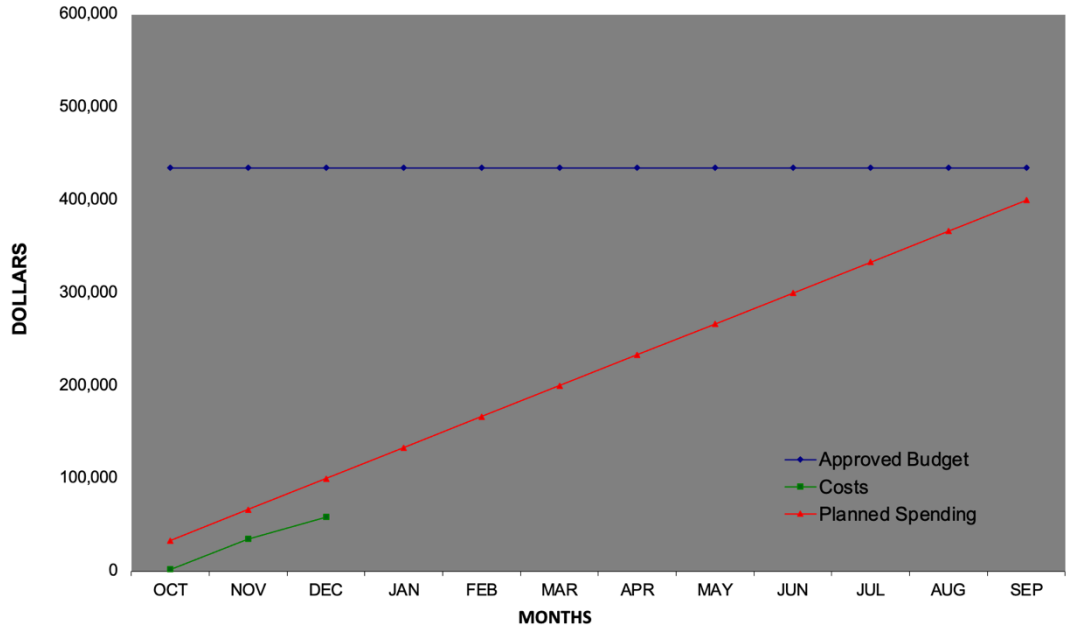
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TE1, 3, 8 **M&O Contractor Name**: LLNL **Point of Contact Name:** Catherine Percher **Point of Contact Phone:** (925) 579-4226	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $44,699
2. Approved FY 2022 Budget = $390,000
3. Total FY 2022 Budget w/Carryover = $434,699
4. Actual spending for 1st Quarter FY 2022 = $58,417
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $ 35,000 (8%)

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status report on hands-on training at the DAF (TE1)		
Q1	Provide status report classroom criticality safety training (TE3)		
Q1	Provide status report on development of university pipeline for CS professionals. (TE8)		

Q2	Provide status report on hands-on training at the DAF (TE1)		
Q2	Provide status report classroom criticality safety training (TE3)		
Q2	Provide status report on development of university pipeline for CS professionals. (TE8)		
Q3	Provide status report on hands-on training at the DAF (TE1)		
Q3	Provide status report classroom criticality safety training (TE3)		
Q3	Provide status report on development of university pipeline for CS professionals. (TE8)		
Q4	Provide status report on hands-on training at the DAF (TE1)		
Q4	Provide status report classroom criticality safety training (TE3)		
Q4	Provide status report on development of university pipeline for CS professionals. (TE8)		

ACCOMPLISHMENTS

- TE1 – Conduct Hands-on Training at the DAF (TACS)
  - Participated in all telecons for preparations for the FY22 courses
- TE3 – Classroom Criticality Safety Training
  - Participated in all telecons for preparations for the FY22 courses
- TE8 - Development of University Pipeline for Criticality Safety Professionals
  - Provided virtual Fall 2021 semester criticality safety course at UCBerkeley, including hands-on training at the LLNL Inherently Safe Subcritical Assembly

PUBLICATIONS

Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

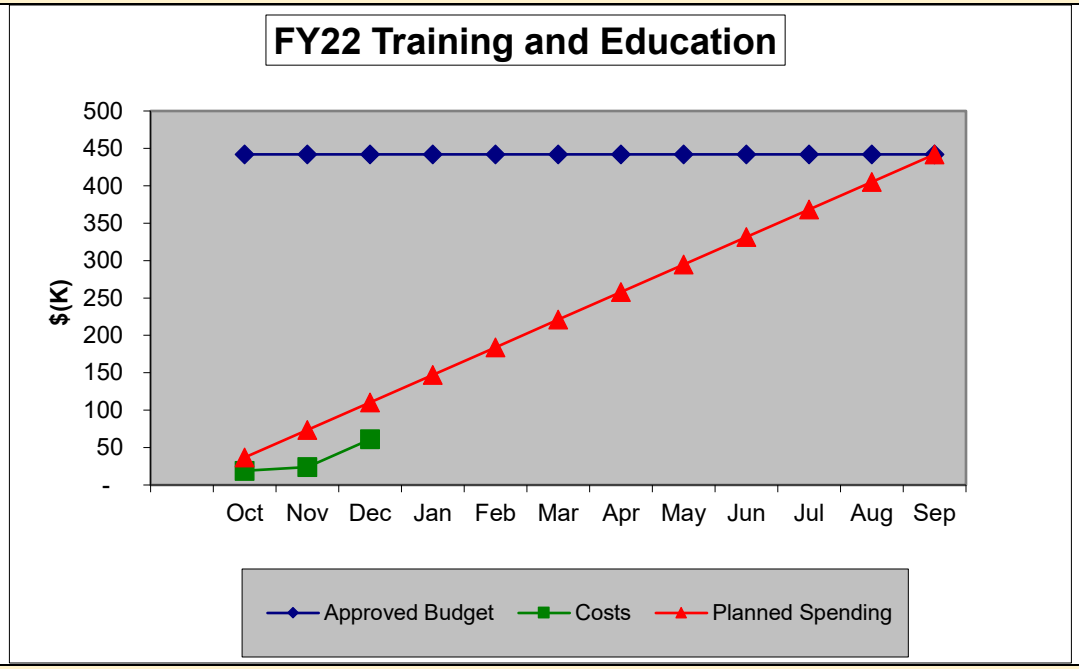
Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			

Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TE1, 3, 11, 12, 14 **M&O Contractor Name**: ORNL **Point of Contact Name:** Doug Bowen **Point of Contact Phone:** (865) 576-0315	**Reference:** DP0909010 **Date of Report:** January 20, 2022

BUDGET



1. Carryover into FY 2022 = $193K
2. Approved FY 2022 Budget = $249K
3. Total FY 2022 Budget w/Carryover = $442K
4. Actual spending for 1st Quarter FY 2022 = $61K
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide a status report on implementation of the NCS training program (TE1)		
Q1	Provide a status report on hand-calculation primer expansion, LA-14244-M (TE3)		Continue working at current pace until project is complete. Subcontractor used for work is retired and is limited to how much time that can be spent on the project.

NCSP Quarterly Progress Report (FY-2022 Q1)

Q1	Provide a status report on revision of LA-12808 Nuclear Criticality Safety Guide. (TE11)		Limited resources to direct to this task due to attrition. Anticipate completing this by the end of the FY.
Q1	Provide a status report on design of a Subcritical/Critical Assembly at ORNL for Use with the CSO/FMH Courses. (TE12)		Y-12 delays for shipping costs in FY21Q4 and ORNL issues with finalizing the list of ORNL sites to house the assembly, this task is delayed. Anticipate completion of final report by FY22Q3.
Q1	Provide a status report on nuclear criticality safety training and pipeline development (TE 14)		Awaiting sufficient funding from NNSA to set up a subcontract with all parties to begin work. Only CR1 funds have been available to date (01-20-2022).
Q2	Provide a status report on implementation of the NCS training program (TE1)		
Q2	Provide a status report on hand-calculation primer expansion, LA-14244-M (TE3)		
Q2	Provide a status report on revision of LA-12808 Nuclear Criticality Safety Guide. (TE11)		
Q2	Provide a status report on design of a Subcritical/Critical Assembly at ORNL for Use with the CSO/FMH Courses. (TE12)		
Q2	Provide a status report on nuclear criticality safety training and pipeline development (TE 14)		
Q3	Provide a status report on implementation of the NCS training program (TE1)		
Q3	Provide a status report on hand-calculation primer expansion, LA-14244-M (TE3)		
Q3	Provide a status report on revision of LA-12808 Nuclear Criticality Safety Guide. (TE11)		
Q3	Provide a status report on design of a Subcritical/Critical Assembly at ORNL for Use with the CSO/FMH Courses. (TE12)		
Q3	Provide a status report on nuclear criticality safety training and pipeline development (TE 14)		
Q4	Provide a status report on implementation of the NCS training program (TE1)		
Q4	Provide a status report on hand-calculation primer expansion, LA-14244-M (TE3)		
Q4	Provide a status report on revision of LA-12808 Nuclear Criticality Safety Guide. (TE11)		

Q4	Provide a status report on design of a Subcritical/Critical Assembly at ORNL for Use with the CSO/FMH Courses. (TE12)		
Q4	Provide a status report on nuclear criticality safety training and pipeline development (TE 14)		

ACCOMPLISHMENTS

- TE1 - Manage and Provide Instruction for the DOE Nuclear Criticality Safety Training & Education Program
  - ORNL has archived FY21 files and documents in project SharePoint site and scheduled all FY22 activities. Bowen set up preparatory telecon for the Jan/Feb 2-week hands-on course mid-December to begin logistical preparations. Bowen/Hudson/Henley worked on student rosters and ensuring the student load in each course was reasonable. Worked with LLNL in Q1 to develop a waiting list capability on the NCSP website to allow students to register for courses that are full in the event there are cancellations. Bowen contacted site NCS managers to solicit students for the for courses in FY22. Bowen also discussed initial preparations for planning the CSO/Manager course Pilot at Sandia in April 2022. After the 2-week course is complete in February, planning efforts for the CSO course will begin.
- TE3 - Hand-calculation Primer Expansion, LA-14244-M
  - By the end of FY22Q1, the Primer draft was nearly complete except for the expansion of the Solid Angle Method and example problems and the Appendix content. The Primer in its current form is nearly 300 pages now. Further, a website tool to complement the example problems is in development by a subcontractor. Progress has been good but slower than expected. Budget for the project is based on carryover for this task and we are under budget for this task. Anticipate completion by the end of FY22Q3.
- TE11 - Revision of the LA-12808 Nuclear Criticality Safety Guide
  - Due to the lack of resources, this task has been delayed but work is in progress. The scope for this document will be similar to but much larger than LA-12808 and will extensively reference NCS community references and guidance. This update to the Nuclear Safety Rule will be completed by the end of the FY using carryover funding and are under budget for this task.
- TE12 - Design of an Subcritical/Critical Assembly at ORNL for Use with the CSO/FMH Courses
  - This task has been delayed due to extensive delays in the fuel shipping cost estimate from Y-12. This was received in FY22Q1 (early) but not a high fidelity estimate. Some project delays have occurred due to COVID and visiting all the potential ORNL sites to house the subcritical assembly. All design calculations have been completed but the calculations need to be independently reviewed. Anticipate completion of this task (final design report) by the end of the FY.
- TE14 - Nuclear Criticality Safety Training and Pipeline Development
  - Awaiting sufficient funding from NNSA to set up a subcontract with all parties to begin work. Only CR1 funds have been available to date (01-20-2022). After CR2 funds are available, a subcontract will be set up for each of the task collaborators.

PUBLICATIONS

Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference	Sent to NCSP?	If no, status of submittal

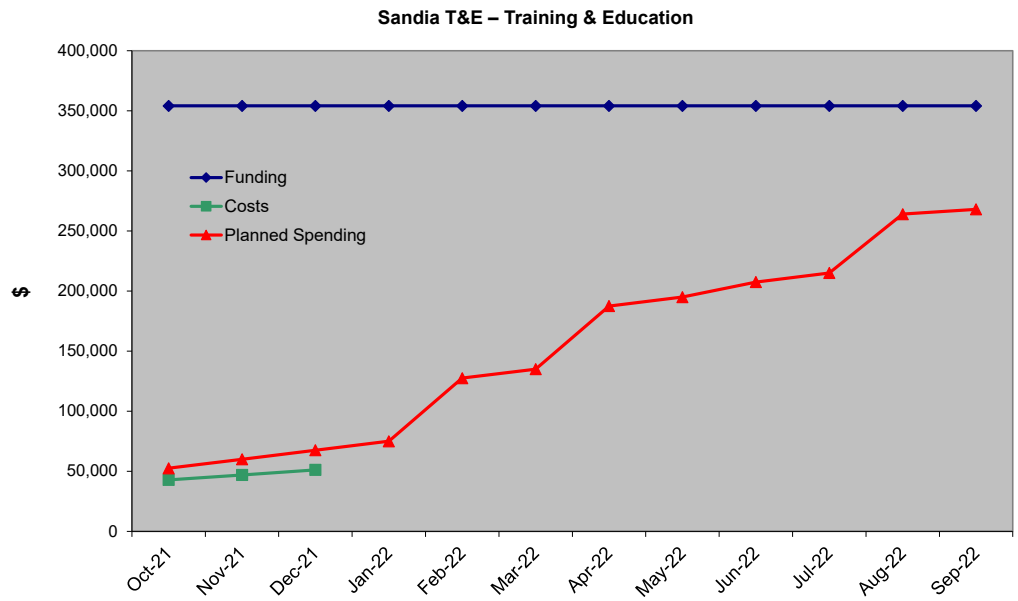
NCSP Quarterly Progress Report (FY-2022 Q1)

	Example: Author, "Title", LA-UR-18-27731, October 1, 2019	**Yes/no**	
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

51NCSP Element and Subtask: TE1 **M&O Contractor Name**: Sandia National Laboratories (SNL) **Point of Contact Name:** Gary A. Harms **Point of Contact Phone:** (505)845-3244	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $ 131,150
2. Approved FY 2022 Budget = $223,000
3. Total FY 2022 Budget w/Carryover = $354,150
4. Actual spending for 1st Quarter FY 2022 = $51,170
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Conduct hands-on training classes at Sandia and provide Human Factors and Equipment Reliability module support to the LANL training classes in accordance with the approved schedule. (TE1)		
Q2	Conduct hands-on training classes at Sandia and provide Human Factors and Equipment Reliability module support to the LANL training classes in accordance with the approved schedule. (TE1)		

Q3	Conduct hands-on training classes at Sandia and provide Human Factors and Equipment Reliability module support to the LANL training classes in accordance with the approved schedule. (TE1)		
Q4	Conduct hands-on training classes at Sandia and provide Human Factors and Equipment Reliability module support to the LANL training classes in accordance with the approved schedule. (TE1)		

ACCOMPLISHMENTS

- TE1 - Prepare for and Conduct Hands-on Criticality Safety Training at SNL
  - The Sandia portion of a make-up Hands-On criticality safety class for NCS professionals was delivered September 27 – October 1 that costed this FY
  - Preparations were made for a Hands-On criticality safety class for NCS professionals to be presented in January/February

PUBLICATIONS

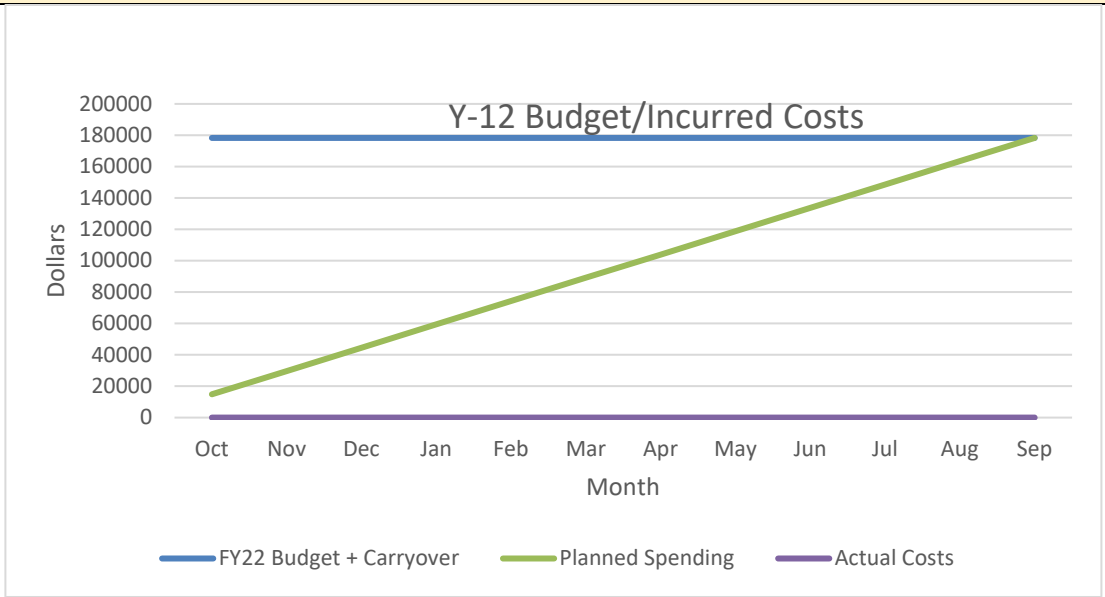
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TE1 **M&O Contractor Name**: Y12 **Point of Contact Name:** Kevin Reynolds **Point of Contact Phone:** (865) 241-9067	**Reference:** DP0909020 **Date of Report:** January 28, 2022

BUDGET



1. Carryover into FY 2022 = $178,302.73
2. Approved FY 2022 Budget = $ 0.00
3. Total FY 2022 Budget w/Carryover = $178,302.73
4. Actual spending for 1st Quarter FY 2022 = $0.00
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022= $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Conduct hands-on training classes at NFO and NCERC to support the training classes in accordance with the approved schedule. (TE1)		No travel.
Q2	Conduct hands-on training classes at NFO and NCERC to support the training classes in accordance with the approved schedule. (TE1)		No travel.

Q3	Conduct hands-on training classes at NFO and NCERC to support the training classes in accordance with the approved schedule. (TE1)		No Travel
Q4	Conduct hands-on training classes at NFO and NCERC to support the training classes in accordance with the approved schedule. (TE1)		No travel

ACCOMPLISHMENTS

Prepared for teaching of the January NCSP Class (Haught).

PUBLICATIONS

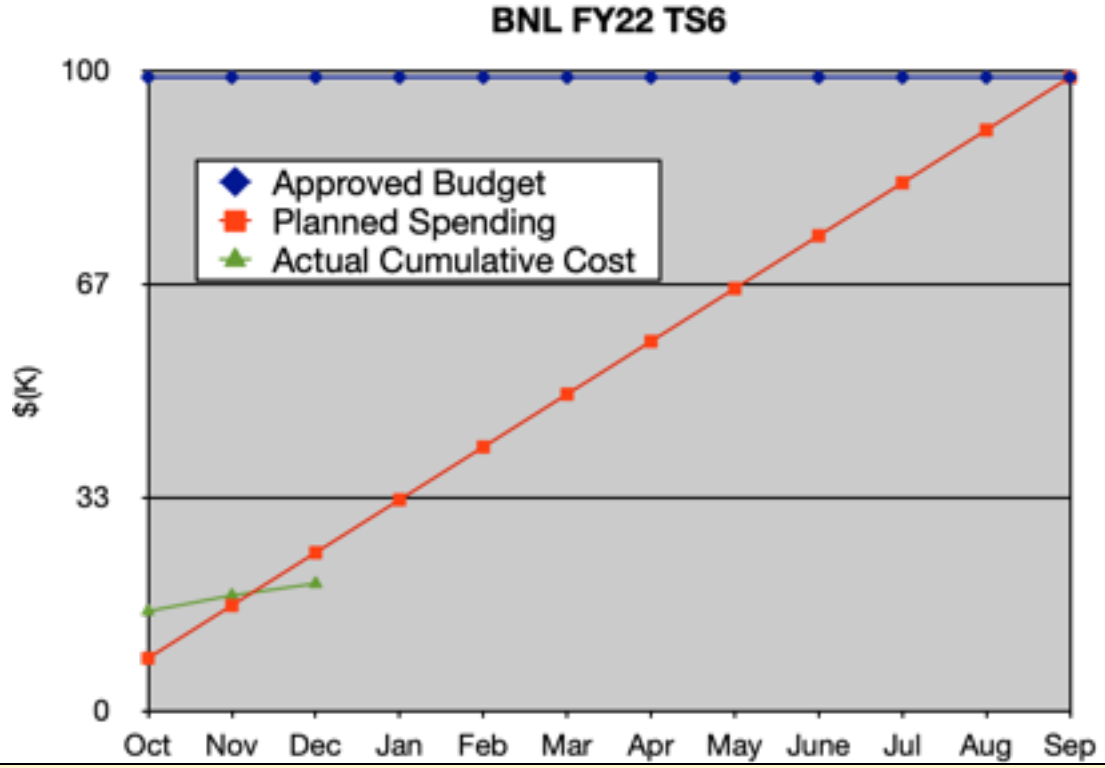
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference example)	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TS6 **M&O Contractor Name**: BNL **Point of Contact Name:** David Brown **Point of Contact Phone:** 631-344-2814	**Reference:** DP0909010 **Date of Report**: 22 January, 2022

BUDGET



1. Carryover into FY 2022 = $ 5,915
2. Approved FY 2022 Budget = $99,000
3. Total FY 2022 Budget w/Carryover = $104,915
4. Actual spending for 1st Quarter FY 2022 = $19,925
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

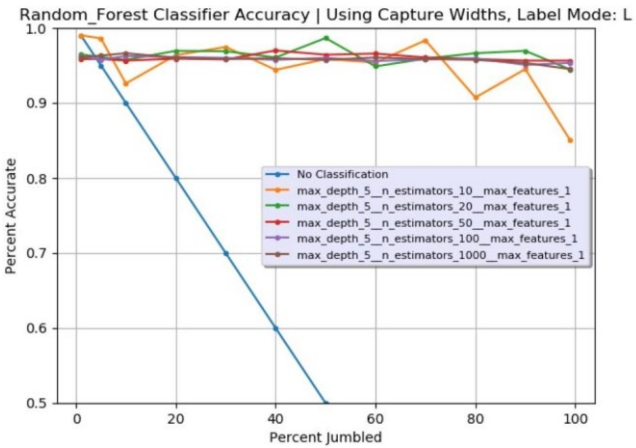
Complete	On Schedule	Behind Schedule	Missed Milestone

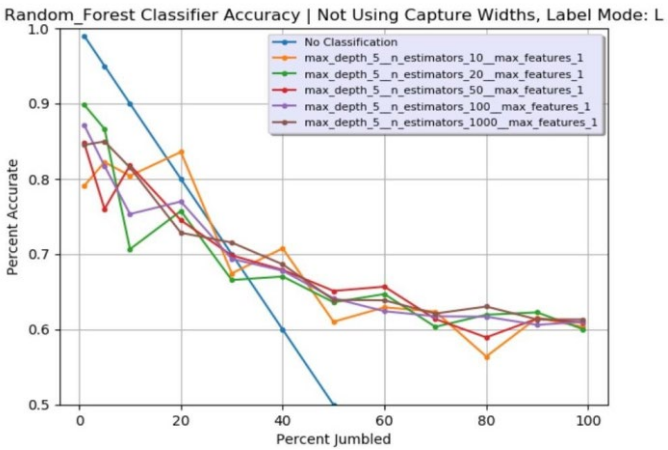
QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide NCSP Manager annual report of succession planning efforts. (TS6)		K. Mbacke (NPT student) will continue to develop codes to extract resonance parameter averages from the *Atlas of Neutron Resonances* through Spring 2022.

			Work on the resonance quantum number reclassification project will resume in earnest in summer with SULI students. In the meantime, BNL will submit first group of resonance quantum number classification papers (we hope!) in Q2.
Q2	Provide NCSP Manager annual report of succession planning efforts. (TS6)		
Q3	Provide NCSP Manager annual report of succession planning efforts. (TS6)		
Q4	Provide NCSP Manager annual report of succession planning efforts. (TS6)		

ACCOMPLISHMENTS

- TS6 – ND Succession Planning
  - With the help of M. Fucci (student funded by NCSP), we have optimized scikit-learn classifier parameters. This allows us to routinely and controllably achieve optimal quantum number assignments using only the resonance energies and widths and no detailed shape information. Correct orbital angular momentum assignments can be achieved 98% of the time using measured capture widths, with worse performance without the capture widths. As our method does not use resonance shape information, it can be applied to p & d wave resonances reliably.





  - In an effort to discern the provenance of average resonance parameters in the *Atlas of Neutron Resonances*, NPT student K. Mbacke has been working with BNL members to develop new methods for average resonance parameter extraction. Results are encouraging and the methodology has already been integrated into the ML code described above.

PUBLICATIONS

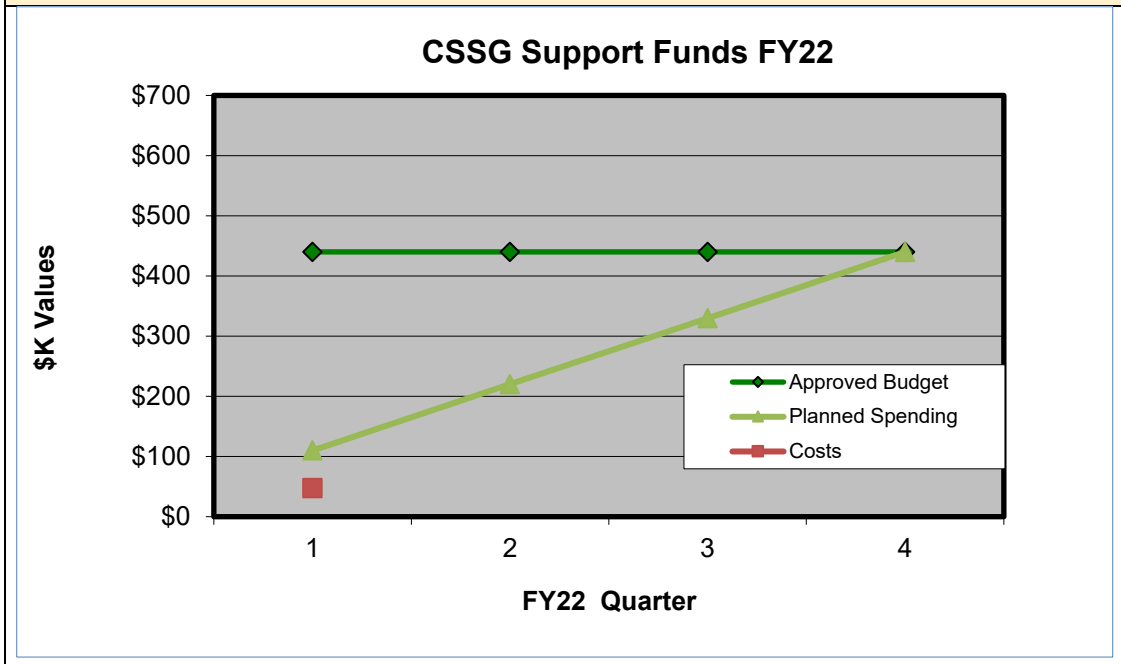
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

`NCSP Element and Subtask: TS1 **Task Title**: CSSG Support **Point of Contact Name:** David Hayes **Point of Contact Phone:** 505-667-4523	**Reference:** DP0909010 **Date of Report:** January 24, 2022

BUDGET



1. Carryover into FY 2022 = $ 0
2. Approved FY 2022 Budget = $ 440,000
3. Actual spending for 1st Quarter FY 2022 = $47,376
4. Actual spending for 2nd Quarter FY 2022 = $
5. Actual spending for 3rd Quarter FY 2022 = $
6. Actual spending for 4th Quarter FY 2022 = $
7. Projected carryover into FY 2023 = $0

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide NCSP Manager report of activities. (TS1)		No issues.
Q2	Provide NCSP Manager report of activities. (TS1)		
Q3	Provide NCSP Manager report of activities. (TS1)		
Q4	Provide NCSP Manager report of activities. (TS1)		

ACCOMPLISHMENTS

- TS1 – Activities
  - CSSG Telecons
  - CSSG Panel Session at Winter ANS

PUBLICATIONS

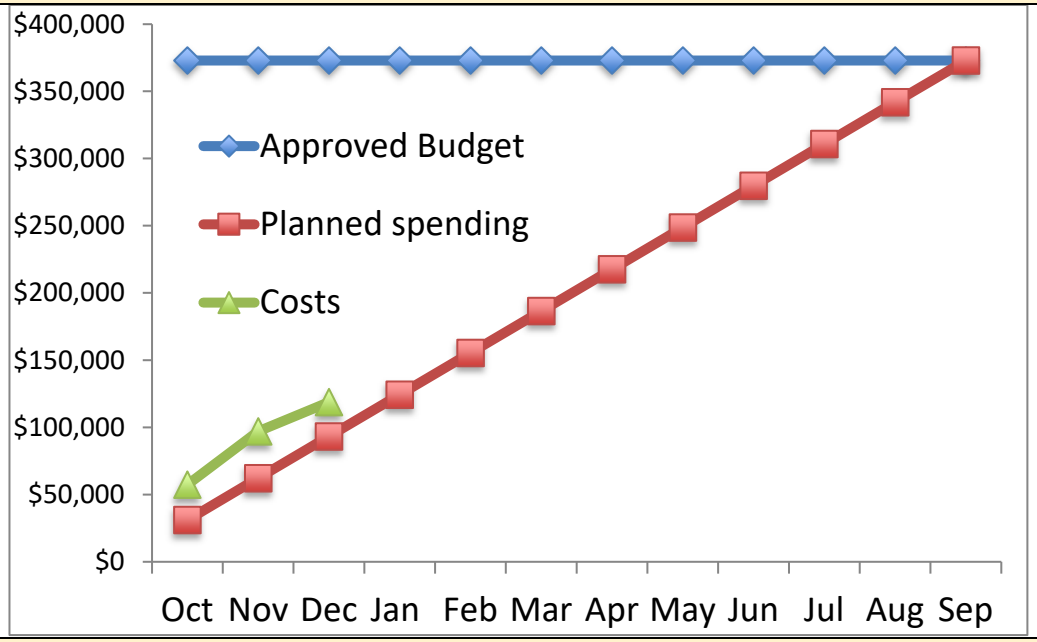
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TS4 **M&O Contractor Name**: LANL **Point of Contact Name:** Joetta Goda **Point of Contact Phone:** 505-667-2812	**Reference:** DP0909010 **Date of Report:** January 3, 2022

BUDGET



1. Carryover into FY 2022 = $ 100,000
2. Approved FY 2022 Budget = $148,000
3. Total Budget w/Carryover = $248,000
4. Actual spending for 1st Quarter FY 2022 = $118,813 (no commitments)
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $0

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide NCSP Manager report on succession planning efforts. (TS4)		
Q2	Provide NCSP Manager report on succession planning efforts. (TS4)		
Q3	Provide NCSP Manager report on succession planning efforts. (TS4)		

Q4	Provide NCSP Manager report on succession planning efforts. (TS4)		

ACCOMPLISHMENTS

- TS4 – AM, IE, ND Succession Planning
  - Students mentored in ICSBEP evaluations
  - Succession planning for AM/ND

PUBLICATIONS

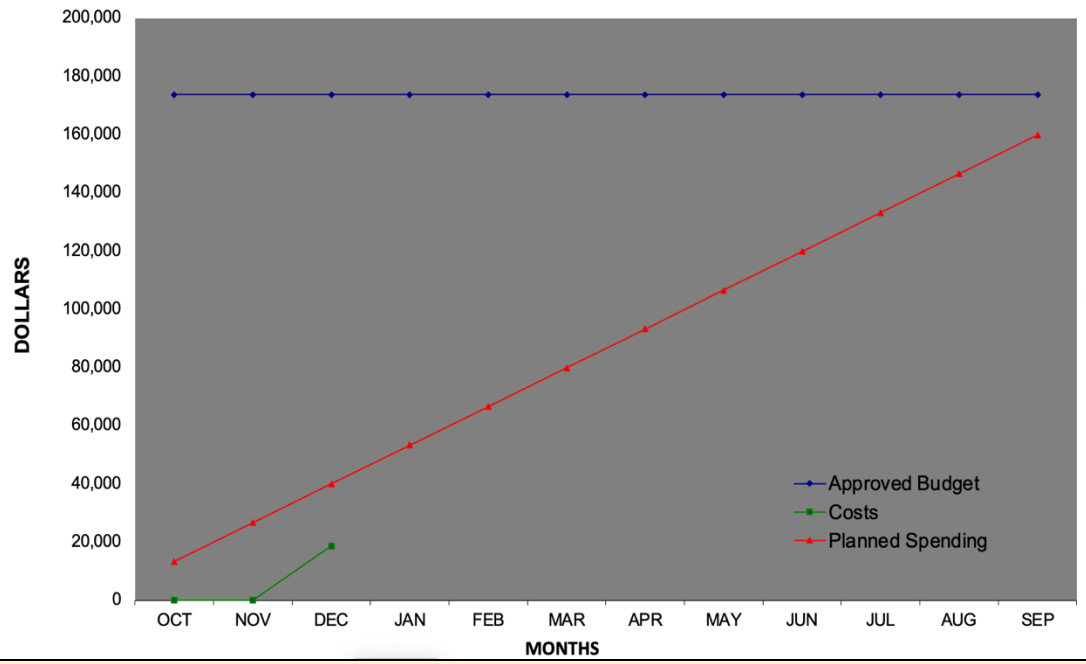
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TS5 **M&O Contractor Name**: LLNL **Point of Contact Name:** Catherine Percher **Point of Contact Phone:** (925) 579-4226	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $24,797
2. Approved FY 2022 Budget = $149,000
3. Total FY 2022 budget w/Carryover = $173,797
4. Actual spending for 1st Quarter FY 2022 = $18,751
5. Actual spending for 2nd Quarter FY 2022 =$
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $14,000 (8%)

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide NCSP manager report on succession planning efforts. (TS5)		Hired new PostDoc starting Jan 2022, mainly to support IE projects
Q2	Provide NCSP manager report on succession planning efforts. (TS5)		
Q3	Provide NCSP manager report on succession planning efforts. (TS5)		

Q4	Provide NCSP manager report on succession planning efforts. (TS5)		

ACCOMPLISHMENTS

- TS5 - AM, IE, ND Succession Planning
  - D. Siefman attended ANS meeting, J. Norris participated in IE telecons

PUBLICATIONS

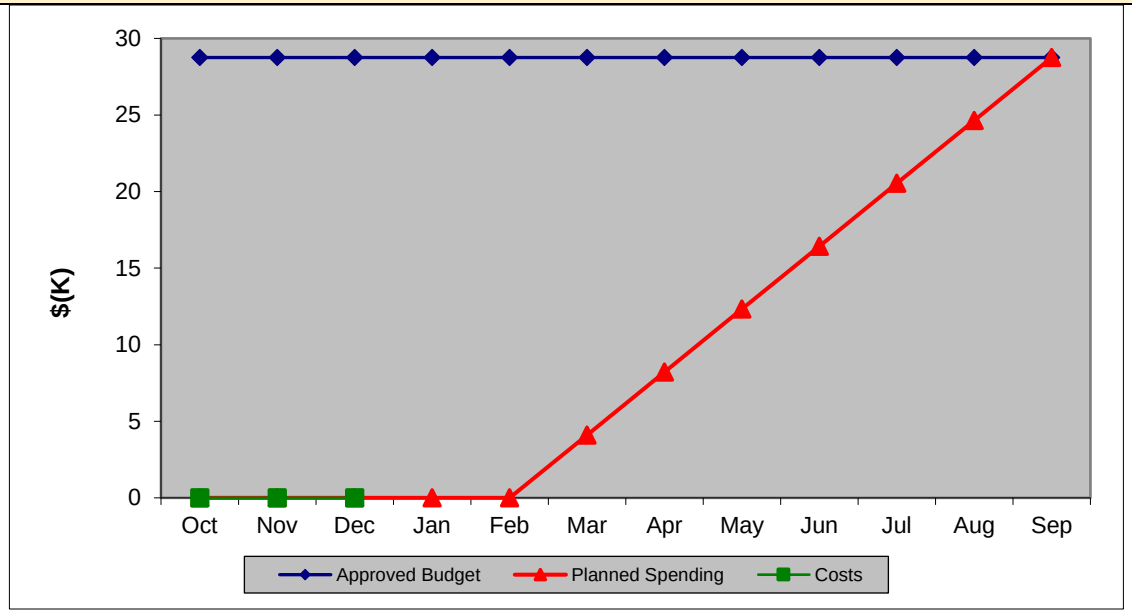
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TS9 **M&O Contractor Name**: NNL **Point of Contact Name:** Mike Zerkle **Point of Contact Phone:** (412) 476-6188	**Reference:** DP0909010 **Date of Report:** January 21, 2022

BUDGET



1. Carryover into FY 2022 = $29k
2. Approved FY 2022 Budget = $0k
3. Total FY 2022 Budget with Carryover = $29k
4. Actual spending for 1st Quarter FY 2022 = $0k
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide status report on all NDAG chair activities (TS9)		
Q2	Provide status report on all NDAG chair activities (TS9)		
Q3	Provide status report on all NDAG chair activities (TS9)		
Q4	Provide status report on all NDAG chair activities (TS9)		

ACCOMPLISHMENTS

- TS9 – Support for NDAG Chair activities
  - Participated in NR/NCSP RPI LINAC Program Review
  - Participated in Oct 2021 virtual ICSBEP/IRPhEP/SINBAD TRG meeting
  - Participated in Nov 2021 IAEA TM on TSL nuclear data processing for zirconium hydride
  - Participated in Nov 2021 CSEWG meeting as Validation Committee Chair
  - Chaired Nov 2021 NDAG meeting
  - Participated in Dec 2021 virtual ICSBEP/IRPhEP/SINBAD TRG meeting
  - Participated in several NDWG and WANDA-2022 planning meetings
  - Supported several CEdTs

PUBLICATIONS

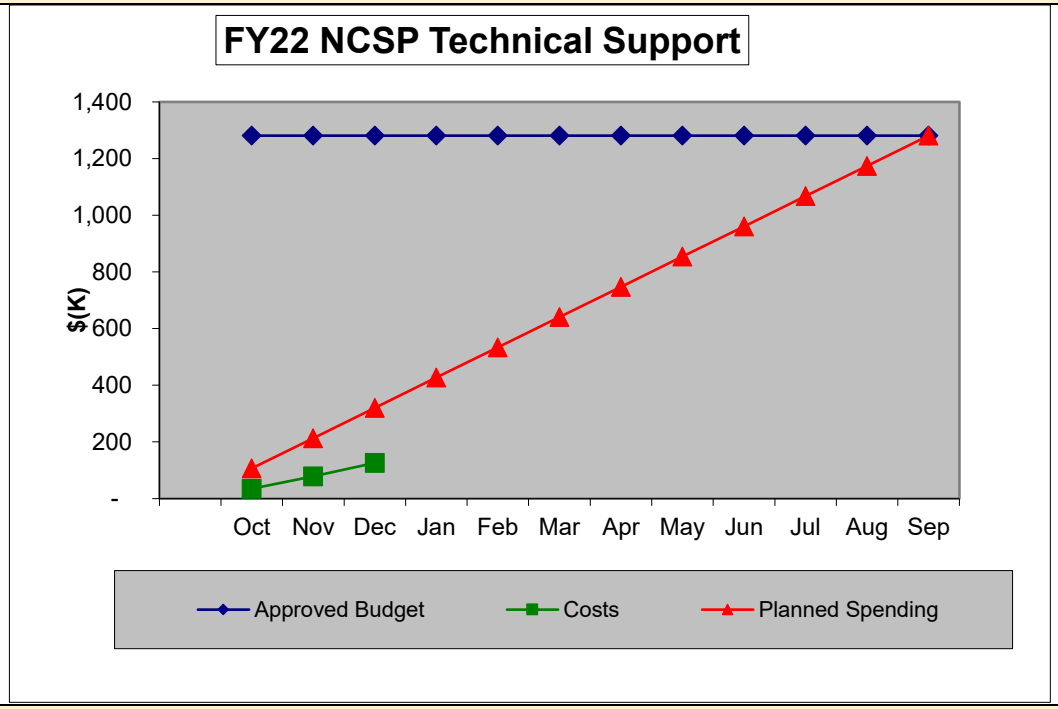
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1	J. L. Wormald, J. C. Holmes, M. L. Zerkle, “Comparative Critical Mass Calculations for NNL and ENDF/B-VIII.0 Zirconium Hydride Thermal Neutron Scattering Laws,” PHYSOR-2022 (submitted). J. L. Wormald, J. C. Holmes, M. L. Zerkle, “Thermal Neutron Scattering Law Evaluation for Zirconium Carbide and Critical Mass Calculations,” PHYSOR-2022 (submitted).	No No	Submit after acceptance Submit after acceptance
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TS2, 7, 8, 13 **M&O Contractor Name**: ORNL **Point of Contact Name:** Doug Bowen **Point of Contact Phone:** (865) 576-0315	**Reference:** DP0909010 **Date of Report:** January 20, 2022

BUDGET



1. Carryover into FY 2022 = $ 0
2. Approved FY 2022 Budget = $1,203K
3. Total FY 2022 Budget w/Carryover = $1,203K
4. Actual spending for 1st Quarter FY 2022 = $126K
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Maintain up-to-date spreadsheet of proposed tasks for NCSP Manager after the NCSP proposal review meeting and through the final task prioritization effort by the NCSP Management Team. (TS2)		

NCSP Quarterly Progress Report (FY-2022 Q1)

Q1	Manage 5-year plan development and maintenance and oversee the CEDT process and manage main 5-year plan and Integral Experiment Request Milestones. (TS2)		
Q1	Provide NCSP Manager annual report of succession planning efforts (TS7)		
Q1	Provide NCSP Manager a status report of progress on the new IER system in G2 (TS8)		
Q1	Provide the NCSP manager an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS13)		Lack of engagement of Federal Project Manager of the NDA program. No work performed in Q1. Mission and vision completed in FY21Q2: https://nda.llnl.gov/docs/ORNL_TM-2021_2009_NDA_Mission_and_Vision-FINAL.pdf
Q2	Maintain up-to-date spreadsheet of proposed tasks for NCSP Manager after the NCSP proposal review meeting and through the final task prioritization effort by the NCSP Management Team. (TS2)		
Q2	Manage 5-year plan development and maintenance and oversee the CEDT process and manage main 5-year plan and Integral Experiment Request Milestones. (TS2)		
Q2	Provide NCSP Manager annual report of succession planning efforts (TS7)		
Q2	Provide NCSP Manager a status report of progress on the new IER system in G2 (TS8)		
Q2	Provide the NCSP manager an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS13)		
Q3	Maintain up-to-date spreadsheet of proposed tasks for NCSP Manager after the NCSP proposal review meeting and through the final task prioritization effort by the NCSP Management Team. (TS2)		
Q3	Manage 5-year plan development and maintenance and oversee the CEDT process and manage main 5-year plan and Integral Experiment Request Milestones. (TS2)		

Q3	Provide NCSP Manager annual report of succession planning efforts (TS7)		
Q3	Provide NCSP Manager a status report of progress on the new IER system in G2 (TS8)		
Q3	Provide the NCSP manager an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS13)		
Q4	Maintain up-to-date spreadsheet of proposed tasks for NCSP Manager after the NCSP proposal review meeting and through the final task prioritization effort by the NCSP Management Team. (TS2)		
Q4	Manage 5-year plan development and maintenance and oversee the CEDT process and manage main 5-year plan and Integral Experiment Request Milestones. (TS2)		
Q4	Organize and lead the Budget Execution Meeting and assist NCSP Manager in finalization of approved tasks for next FY (TS2)		
Q4	Publish final Five-Year Plan. (TS2)		
Q4	Provide NCSP Manager annual report of succession planning efforts (TS7)		
Q4	Provide NCSP Manager a status report of progress on the new IER system in G2 (TS8)		
Q4	Provide the NCSP manager an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS13)		

ACCOMPLISHMENTS

- TS2 - Support for Lead Lab to Execute the NCSP
  - Prepare and maintain elements of NCSP Plan and associated activities:
    - Monitor Five-Year Plan progress,
    - Review/revise task list,
    - Schedule/participate in meetings and teleconferences.
    - Manage and provide oversight/coordinate efforts for the NCSP Information, Preservation, and Dissemination task element.
    - Manage and provide oversight/coordinate efforts for the NCSP Training and Education Program task element.
  - Participated in NCSP management team and other NCSP-related meetings, as required by the NCSP Manager.

- Prepared Q4 QPRs into a single bookmarked PDF file for use in QPR. Conducted Q4 telecon.
- Henley completed work on the FY21 Winter Newsletter working with site task managers
- Participated in CSSG telecons and assisted with CSSG tasks as necessary.
- Led and participated telecons and WebEx meetings as necessary to track NCSP MGT team actions and deliverables.
- Bowen worked with John Miller to oversee IE work for the IE Section of the 5-year plan
- Working on NCSP website enhancements and fixes and updates for accomplishments, foreign travel reports, and planning calendars.
- Proposal call delayed until FY23.
- Began FY22 Technical Program Review (TPR) planning efforts and started working with LLNL on a registration site on the NCSP website. TPR will be virtual in FY22 and will be hosted by ORNL via Zoom with IT oversight. TPR scheduled for the week of Feb. 14, 2022.

- TS7 - AM, ND Succession Planning
  - In FY22Q1 – no succession planning funds used this quarter. Kemal Remic will use some of this funding when he starts in Q2. Junior NCS staff will also utilize this funding to learn more about NCSP tasks and to work alongside experienced staff.
- TS8 - NCSP Program Management Tools Development
  - Miller/Bowen continue to work to ensuing all IER team members and leads have access to the IER system. In Q1 Bowen/Miller worked with Brady Wenrich on FY22 priorities for the IER G2 database. Funding being managed at HQ and funds will be transferred from ORNL to HQ to fund G2 subcontractors to work these priorities.
- TS13 - NDA Technical Support Group and NDA Technical Infrastructure Project
  - D. Bowen supported the revision of the ANSI/ANS-8.28 standard for NDA administrative requirements in NCS programs. ANS-8.28 is currently in the NCS consensus committee ballot process. Bowen had a telecon with Chambers, Berg, and Dolin regarding the "reboot" of the NDA program in FY21Q1; however, neither Berg (NNSA project manager) nor Dolin (TSG chair) have prioritized the use of these funds for the goals and attributes in the NDA mission and vision document (https://nda.llnl.gov/docs/ORNL_TM-2021_2009_NDA_Mission_and_Vision-FINAL.pdf). NDA Mission and Vision was completed in FY21Q2.

PUBLICATIONS

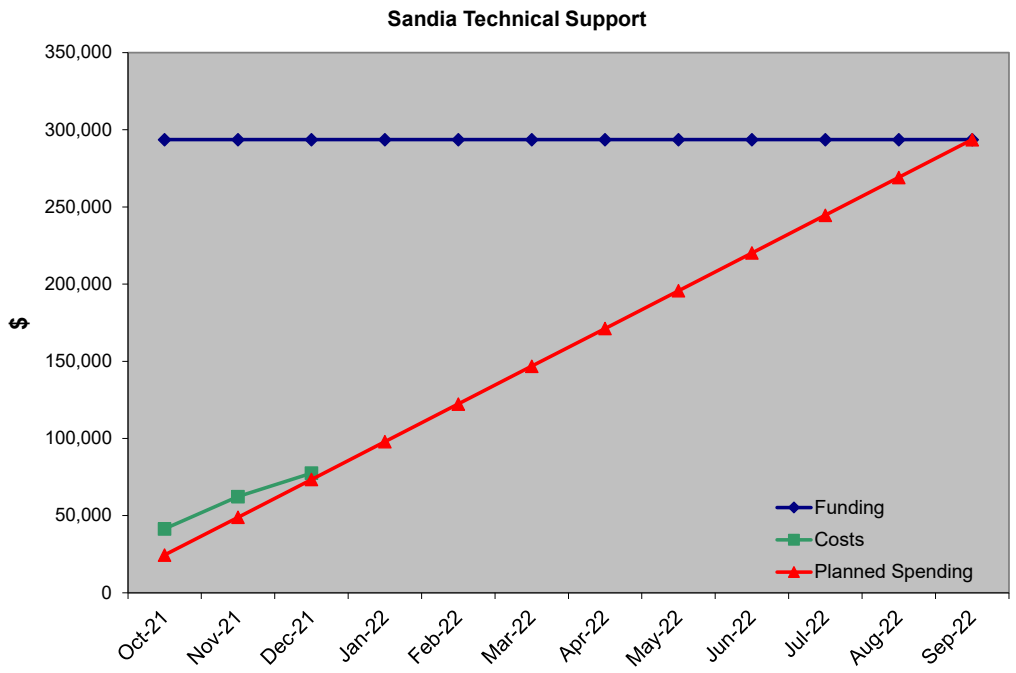
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TS3, 12 **M&O Contractor Name**: Sandia National Laboratories (SNL) **Point of Contact Name:** Gary A. Harms **Point of Contact Phone:** (505)845-3244	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $ 45,602
2. Approved FY 2022 Budget = $ 248,000
3. Total FY 2022 Budget w/Carryover = $293,602
4. Actual spending for 1st Quarter FY 2022 = $77,535
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide NCSP Manager with report of succession planning efforts. (TS3)		
Q1	Provide the NCSP manager with a summary of NCSP CEdT support (TS12)		

Q2	Provide NCSP Manager with report of succession planning efforts. (TS3)		
Q2	Provide the NCSP manager with a summary of NCSP CEdT support (TS12)		
Q3	Provide NCSP Manager with report of succession planning efforts. (TS3)		
Q3	Provide the NCSP manager with a summary of NCSP CEdT support (TS12)		
Q4	Provide NCSP Manager with report of succession planning efforts. (TS3)		
Q4	Provide the NCSP manager with a summary of NCSP CEdT support (TS12)		

ACCOMPLISHMENTS

- TS3 – Support for Experimentalist Succession Planning
  - Matrixed employee performing as an experimenter.
  - Year-round Ph.D. student intern supporting the critical experiment team.
  - Both are actively participating in the NCS community by attending conferences and publishing papers.
- TS12 - NCSP C_EdT Manager Support

Performed duties as the C_EdT (IE) Manager in support of the IE program element.

- Interacted with the site task mangers to track and assist progress on various IER milestones and MHLs, for example:
  - Working with LANL and LLNL to ensure progress on IER 547 procurement items.
  - Tracking progress/updates on Hf items (NNL).
  - Processed BCR submissions (~9).
- Assisted IER team members with requested items, and participated in several different IER team meetings, for example:
  - Interfacing with LANL, ORNL, PNNL, SNL on IER 557
  - Providing support to SNL on IER 523
  - Supporting IER 537 meetings
- Reviewed documents submitted for approval and ensure approval by NCSP Manager and capture in G2.
- Interacted with NCSP Management Team, provided technical advice, and assisted on a broad scope of items.
- Facilitated IE meetings with all sites: issuing meeting agenda and minutes.
  - Reported projected final milestone completions and IERs moved out to future FYs.
- Worked in the IER database, assisted others with issues using database, work with G2 developers on database improvement items.
- Progress on NCSP IE Manual Revision

PUBLICATIONS

NCSP Quarterly Progress Report (FY-2022 Q1)

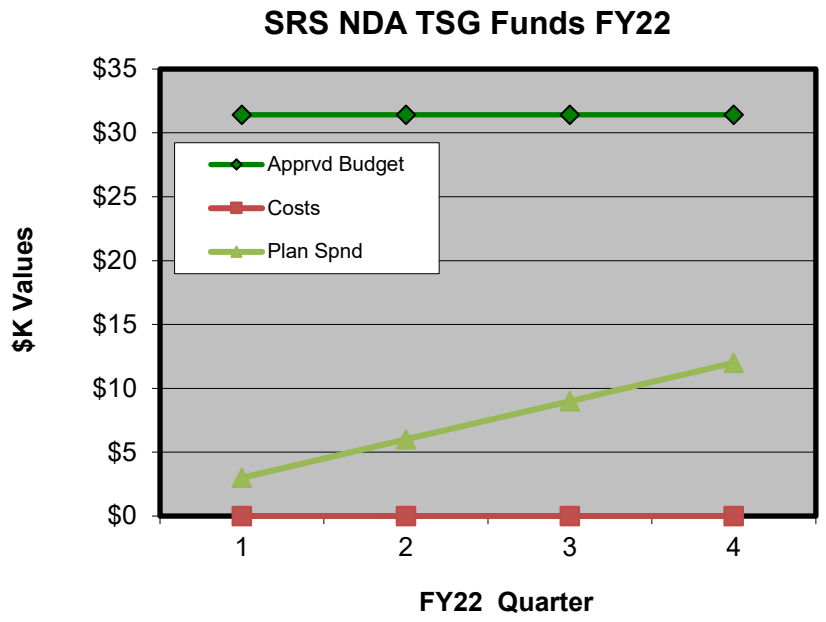
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.			
Quarter	**Publication Reference** **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	**Sent to NCSP? Yes/no**	**If no, status of submittal**
Q1	E. C. Lutz and D. E. Ames, “Space Nuclear Thermal Propulsion Critical Assembly Boron Worth Experiments,” SAND2021-8245 C, presented at the 2021 ANS Winter Meeting, Nov. 30 – Dec. 3, 2021.	Yes	
Q2			
Q3			
Q4			

$45,602.42
$191,299.53
$131,150.42

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: TS15 **M&O Contractor Name**: SRNS **Point of Contact Name:** David Erickson **Point of Contact Phone:** 803-557-9445	**Reference:** DP0909010 **Date of Report:** January, 2022

BUDGET



1. Carryover into FY 2022 = $31,400
2. Approved FY 2022 Budget = $0
3. Total FY 2022 Budget w/Carryover = $31,400
4. Actual spending for 1st Quarter FY 2022 = $0
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $TBD

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS15)		No activity associated with this task.
Q2	Provide an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS15)		

Q3	Provide an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS15)		
Q4	Provide an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS15)		

ACCOMPLISHMENTS

- TS15 - NDA Technical Support Group and NDA Technical Infrastructure Project
  -

PUBLICATIONS

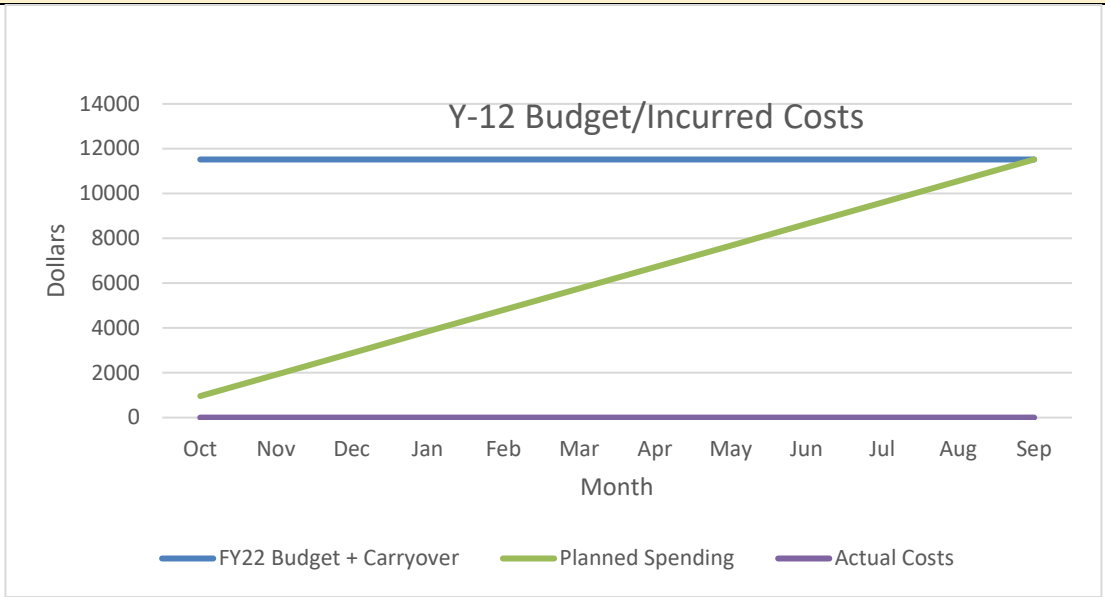
Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

NCSP Quarterly Progress Report (FY-2022 Q1)

NCSP Element and Subtask: Technical Support & CSSG (TS) **M&O Contractor Name**: Y12 **Point of Contact Name:** Kevin Reynolds **Point of Contact Phone:** (865) 241-9067	**Reference:** DP0909020 **Date of Report:** January 28, 2022

BUDGET



1. Carryover into FY 2022 = $ 11,519.47
2. Approved FY 2022 Budget = $0
3. Total FY 2022 Budget w/Carryover = $11,519.47
4. Actual spending for 1st Quarter FY 2022 = $
5. Actual spending for 2nd Quarter FY 2022 = $
6. Actual spending for 3rd Quarter FY 2022 = $
7. Actual spending for 4th Quarter FY 2022 = $
8. Projected carryover into FY 2023 = $

NOTE: Include commitments as part of spending

MILESTONES

STATUS (copy color code and paste below in 'STATUS' field)

Complete	On Schedule	Behind Schedule	Missed Milestone

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide the NCSP manager an update of Program activities (including CSSG)		Attended first CSSG meetings and am on writing team for new tasking related to NCS Program concerns and Contract turnover activities.
Q2	Provide the NCSP manager an update of Program activities (including CSSG)		
Q3	Provide the NCSP manager an update of Program activities (including CSSG)		
Q4	Provide the NCSP manager an update of Program activities (including CSSG)		

ACCOMPLISHMENTS

- Attended 2 CSSG Meetings as new member to the team. ☺
- No travel.

PUBLICATIONS

Any publications created during the quarter should be submitted to Marsha Henley, henleym@ornl.gov.

Quarter	Publication Reference example)	Sent to NCSP? Yes/no	If no, status of submittal
Q1			
Q2			
Q3			
Q4			

Summary of MCNP Classes in FY 2022 – Q1

M.E. Rising[1], J.L. Alwin[2]
[1] Monte Carlo Codes (XCP-3), [2] Radiation Transport Applications (XCP-7), LANL

FY2022 – Q1 classes are highlighted in red.

Total Students

- **FY2022 – Q1** **118 students** **(Intro, Intermediate, VR, UM)**
- **FY2022 – Q2:** **-- students** **(Intermediate, Advanced)**
- **FY2022 – Q3:** **-- students** **(Intro, Intermediate, Criticality)**
- **FY2022 – Q4:** **-- students** **(Intro, NJOY)**
- **FY2022 – TOTAL:** **118 students**

Due to COVID-19 & travel restrictions, in-person classes & site visits were cancelled. All classes are currently being conducted online. Importantly, offering online classes has significantly increased class enrollment.

Classes sponsored by DOE-NNSA-NCSP

- **Criticality Calculations with MCNP6 (LANL-AM1)**
  - **June 20-23, 2022** **online** **TBD students**

  MCNP criticality class for NCS & reactor physics practitioners, with focus on best practices. Includes 1 day on NCS validation using MCNP6-Whisper. NCS participants at DOE sites do not pay registration fees.

Other Classes - supported by student registration fees.

- **Introduction to MCNP6** (includes 1/2 day on criticality calculations, without NCS validation & Whisper)
  - **Nov 15 – 19, 2021** **online** **36 students**
  - **Jun 6 – 10, 2022** **online** **TBD students**
  - **Aug 22 – 26, 2022** **TBD** **TBD students**
- **Intermediate MCNP6**
  - **Oct 4 – 8, 2021** **online** **39 students**
  - **Jan 31 – Feb 4, 2022** **online, OECD-NEA** **TBD students**
  - **Apr 11–15, 2022** **online** **TBD students**
- **Advanced MCNP6 Features & Utilities**
  - **Feb 7 – 11, 2022** **online, OECD-NEA** **TBD students**
- **Unstructured Mesh with Attila4MC**
  - **Oct 18 – 22, 2021** **online** **20 students**
- **Variance Reduction**
  - **Nov 29 – Dec 1, 2021** **online** **23 students**
- **NJOY**
  - **Aug 29 – 31, 2022** **TBD** **TBD students**

2022 Q1 – SCALE Training Courses Report for the Nuclear Criticality Safety Program

Class Name	SCALE/TRITON Lattice Physics and Depletion
Class Dates	Oct 11 – 14, 2021
Location	Virtual - Oak Ridge National Lab, Oak Ridge, TN
Number of Attendees	11
Short Description	SCALE supports a wide range of reactor physics analysis capabilities. SCALE reactor physics calculations couple neutron transport calculations with ORIGEN to simulate the time-dependent transmutation of various materials of interest. TRITON is SCALE's modular reactor physics sequence for a wide variety of system types. Attendees of this course will learn how to use TRITON for depletion analysis. The TRITON training material is centered around using the NEWT 2-D transport module for 2-D depletion analysis and briefly touches on 3-D depletion analysis. The course will instruct users on the use of KENO in place of NEWT for 3-D Monte Carlo-based depletion; however, KENO is not covered in depth within this course. Additional applications of TRITON are incorporated into the training, including the creation of ORIGEN libraries for rapid spent fuel characterization calculations, and defining appropriate unit cell calculations of various reactor types for cross section processing. No prior knowledge of SCALE is required.

Class Name	SCALE/ORIGEN Standalone Fuel Depletion, Activation, and Source Term Analysis Course
Class Dates	Oct 18 – 21, 2021
Location	Virtual - Oak Ridge National Lab, Oak Ridge, TN
Number of Attendees	21
Short Description	This is a hands-on class that covers the use of ORIGEN for isotopic depletion, decay, decay heat, and radiation source-terms calculations. The course features the use of the Fulcrum consolidated SCALE graphical interface and its' plotting capabilities for displaying nuclear data and results. Participants will learn about ORIGEN's capabilities and nuclear data, how to generate ORIGEN libraries, and how to use ORIGEN for activation, spent fuel, and nuclear safeguards applications. This class introduces the ORIGAMI tool for convenient characterization of spent nuclear fuel with radially and axially varying burnup. Advanced applications including simulation of chemical processing, continuous feed and removal are also covered. No prior knowledge of SCALE is required.

Class Name	Nuclear Data Fundamentals and AMPX Library Generation
Class Dates	Nov 1 – 4, 2021
Location	Virtual - Oak Ridge National Lab, Oak Ridge, TN
Number of Attendees	4
Short Description	This course takes the participants through the fundamentals of the nuclear data pipeline, from the creation of Evaluated Nuclear Data File (ENDF) libraries, through processing with the AMPX code suite, to end use in SCALE. In addition to their use in SCALE, AMPX libraries are used in the CASL VERA high-fidelity multi-physics code suite; provide depletion, activation, and decay data for ORIGEN, which is integrated in a wide range of tools; and generate covariance data used in sensitivity

	uncertainty (S/U) calculations. This course is relevant for all users interested in understanding the sources, approximations and important differences in nuclear data libraries as well as for the advanced practitioners wishing to learn to process nuclear data libraries on their own. Those interested in generating custom libraries, whether from international sources such as the Joint European Fission Fusion (JEFF), the Japanese Evaluated Nuclear Data Library (JENDL), among others, or generating special purpose libraries with customized group structures and weighting spectra will find this course particularly useful. The course is focused on the practical use of the AMPX nuclear data processing code distributed with SCALE and includes demonstrations and in-class exercises, in addition to theoretical lectures. Participants will learn how nuclear data, along with associated uncertainty information, is generated before it enters the ENDF library. They will then be guided through the building of processed libraries for neutron transport in continuous-energy and multi-group formats. Nuclear data uncertainty information and its propagation to quantities of interest through S/U methods will be discussed and the associated AMPX processing capabilities will be demonstrated. Detailed discussion of nuclear data validation will be presented. The course will conclude with lectures on fission product yield and decay data and associated uncertainties, along with demonstrations of their use in SCALE. No prior knowledge of SCALE or AMPX is required.

Class Name	SCALE Criticality Safety Calculations
Class Dates	Nov 8 – 11, 2021
Location	Virtual - Oak Ridge National Lab, Oak Ridge, TN
Number of Attendees	19
Short Description	This course provides instruction on the use of the KENO Monte Carlo codes for criticality safety calculations and is appropriate for beginning through advanced users. KENO V.a is a fast and easy-to-use code that allows users to build complex geometry models using basic geometrical bodies such as cuboids, spheres, cylinders, hemispheres, and hemicylinders. KENO-VI is a 3-D generalized geometry Monte Carlo code that allows for versatile modeling of complex geometries. Both versions of KENO provide convenient, efficient methods for modeling repeated and nested geometry configurations such as lattices. Both versions of KENO use ENDF/B-VII.0 or ENDF/B-VII.1 cross-section data distributed with SCALE to perform either continuous energy (CE) or multigroup (MG) calculations. KENO includes a 2D color plotting capability and produces easy-to-navigate HTML output. This class uses the Fulcrum user interface for interactive model setup, visualization, computation, and output review. The KENO3D tool is still used in SCALE 6.2 for 3-D visualization. Instruction is also provided on the SCALE material input and resonance self-shielding capabilities and Fulcrum capabilities for visualizing fluxes, reaction rates, and cross-section data. No prior knowledge of SCALE is required.

STATUS REPORT
on the
International Collaboration with the Atomic Weapons Establishment (AWE)

Reference			AWE Contributions and POCs			
AWE Reference	**Task Description**	**NCSP Reference**	**FY2018 AWE Contribution**	**AWE Technical POC**	**Collaborator POC**	**DOE Lab**
Analytical Methods						
AWE-AM1	Slide rule update	ORNL-AM6 LLNL-AM3 IRSN-AM5	Perform calculations; attend meetings; review analysis and reports	R. JONES	M. DULUC	ORNL
AWE effort currently on hold due to lack of resource.						
INTEGRAL EXPERIMENTS						
AWE-IE1	Inaugural international inter-comparison of nuclear accident dosimetry using Flattop	LLNL-IE1 IRSN-IE15	Co-author final report (CED-4b)	P. ANGUS	D. STONE	LLNL
Report completed and issued by C. Wilson before his departure in 2019. Next inter-comparison exercise anticipated to be 2021.						
AWE-IE2	Development of Passive Neutron Spectrometer (PNS)		Fully commission TLD version of the PNS; Perform validation irradiations at NPL; develop unfolding tools for directionality	P. ANGUS	D. STONE	LLNL
3x PNS developed and built. Irradiations at NPL, planned for March 2020 (with potential involvement from US community), impacted by COVID-19 pandemic.						
AWE-IE3 **IER 406**	Cf-252 CAAS benchmark	LLNL-IE1 IRSN-IE28	Perform/support PNS(TLD) measurements with a shadow cone	P. ANGUS	D. HEINRICHS	LLNL
Dependent on completion of IE2.						
AWE-IE4 **IER 175**	Godiva-IV CAAS benchmark	ORNL-IE4 IRSN-IE27	Review of experiment design. Provide measurement capability as required	T. BIRKETT	J. SCORBY	ORNL
AWE involvement complete. Any further work dependent on future ORNL programme.						
AWE-IE5	Correction factor for dosimetry linked to orientation of the victim	LLNL-IE1 IRSN-IE29	Participate in experiment design; use PNS data to determine directional components of neutron fields (Godiva, Flattop, LLNL RCL)	P. ANGUS	D. HEINRICHS	LLNL
Dependent on completion of IE2 (unfolding tools for directionality). Linked with IE11 (International inter-comparison)						
AWE-IE6	ICSBEP shielding benchmark for shipping containers	LLNL-IE13 IRSN-IE36	Participate in experiment design; PNS(TLD) could be deployed as primary measurement device AWE to do some preliminary design	P. ANGUS	S. KIM	LLNL

Reference			AWE Contributions and POCs			
AWE Reference	**Task Description**	**NCSP Reference**	**FY2018 AWE Contribution**	**AWE Technical POC**	**Collaborator POC**	**DOE Lab**
Not started due to long lead time (2023) and dependence on PNS availability (see IE2). Scope definition required.						
AWE-IE7 **IER 153**	Measure fission neutron spectrum shape using threshold activation detectors	LANL-IE3	Provide input into foil selection; use AWE unfolding codes to provide independent analysis. TBC AWE to provide foil suggestions per MYERS	P. ANGUS	T. CUTLER B. MYERS	LANL
Awaiting LANL to advise on the extent of AWE involvement.						
AWE-IE8	Diagnostic development for measurement of correlated leakage radiations	LLNL-IE1	A feasibility study is being developed at AWE to ascertain suitable counting scenarios and methods. An experimental design will then be produced in the following years based upon the outcomes of this study	N. KELSALL	D. HEINRICHS	LLNL
An internal AWE report has been issued summarizing the outcome of the fast neutron liquid scintillation trials conducted at the DAF in 2019. This will inform future measurement aspirations but the schedule for measurement campaigns is on hold during the COVID-19 pandemic.						
AWE-IE9	(Neutron multiplicity experiments) AWE/LLNL NCT 5 year measurement campaign	LLNL-PROPOSAL 18	Participate in experiment design, measurements and reporting	N. KELSALL	D. HEINRICHS	LLNL
AWE has issued an internal report summarizing the results from analysis of bulk material measurements. Modified version of this report has been shared with the NCSP. MOD funding has been obtained for a measurement campaign at DAF, anticipated to take place in the latter half of the 2022-23 UK financial year.						
AWE-IE10	Enhanced methods of criticality accident dosimetry.	LLNL-IE1 IRSN-30 IRSN-33 Naval Dosimetry Center	Develop prototypes, participate in design, execution and reporting of dosimetry experiments	P. ANGUS	F. TROMPIER	LLNL
No progress to date. Potentially use IE11 as an opportunity to compare & test any new instrumentation.						
AWE-IE11	International inter-comparison of nuclear accident dosimetry AWE to assist in preliminary design FY19 and FY20	LLNL-IE18 SNL-IE4	Produce experiment design; participate in exercise; produce final report. Repeat 2 - 3 years	P. ANGUS	D. STONE	LLNL
Next international inter-comparison is anticipated in 2022.						
AWE-IE12	CIDAAS testing	Proposal 20	Deploy AWE CIDAAS for test irradiation. Repeat 2 - 3 years	T. BIRKETT	J. SCORBY	LLNL
AWE successfully tested CIDAAS in May 2018 and provided support to CED-4. Technical report detailing the results has been issued. New design of visual alarm procured, which will be evaluated during the next available Testing Visit.						
AWE-IE13	Characterization of AFRRI TRIGA reactor radiation field	LLNL-IE18 SNL-IE4	Provide support to experiment design	P. ANGUS	A. ROMANYUKHA	LLNL

Reference			AWE Contributions and POCs			
AWE Reference	**Task Description**	**NCSP Reference**	**FY2018 AWE Contribution**	**AWE Technical POC**	**Collaborator POC**	**DOE Lab**
	AWE will provide onsite measurement					
AWE was fully prepared for July 2019 trial, prior to the regulatory shut-down of TRIGA. If trial is re-scheduled for 2022 AWE will be able to support it, provided sufficient notice is given.						
INFORMATION PRESERVATION AND DISSEMINATION						
AWE-IPD1	Conduct benchmark evaluations of legacy IEU integral experiments Requires no NCSP funding	LLNL-IPD1	Assess feasibility of sponsoring PhD; determine availability of data	R. JONES	D. HEINRICHS	LLNL
Considered unlikely to make any material progress.						
TRAINING AND EDUCATION						
AWE-TE1	Hands-on criticality safety training	ORNL-TE1 LANL-TE1 LLNL-TE1 LLNL-TE3 SNL-TE1 IRSN-TE1	AWE personnel to attend training course	R. JONES	D. BOWEN B. MYERS D. HEINRICHS G. HARMS S. EVO (IRSN)	ORNL
No AWE personnel attended courses during the reporting period. Currently no AWE personnel are expected to attend courses in the next quarter.						

Status report of international collaboration with IRSN for FY2022

	REFERENCE		IRSN Contribution / POC			
IRSN Reference	**Task Title**	**DOE Reference**	**FY 2022 IRSN Contribution**	**IRSN Technical POC**	**DOE Technical POC**	**DOE LAB**
ANALYTICAL METHODS						
IRSN-AM5	Update of the slide rule	ORNL-AM6 LLNL-AM3 AWE-AM1	Contribution to doses computation benchmarks, comparison with COG and SCALE results	M. DULUC	D. BOWEN D. HEINRICHS R. JONES	ORNL LLNL AWE
Q1 Status Meeting on 11/18 with UK AEA/IAEA/LLNL: use of FISPACT for the DFG dose rate estimation. Presentation of IRSN results. Sent SCALE IRSN data sets and results to ORNL. ORNL has identified the origin of the results inconsistencies: the neutron cross-section library used (302 energy groups) lacked accuracy at low energy. Using a 1597-group structure solved the problem. There is one case left (H/Pu=10) that requires further analysis. Meeting on 01/13/2022 with IRSN/ORNL/LLNL. Two NSCD full papers expected on February 1st.						
IRSN-AM8	Analytical Methods Working Group	LANL-AM1 ORNL-AM2 LLNL-AM3	IRSN participation to NCSP Analytical Methods Working Group, NDAG meeting, and TPR meeting	S. PIGNET	J. ALWIN B.J. MARSHALL D. HEINRICHS	NCSP
Q1 Status IRSN will make presentations at the Analytical Methods Working group meeting (February 2022).						
IRSN-AM9	Cross sections processing validation	ORNL-AM3	AMPX training - Development of an interface between GAIA and AMPX and test interface capabilities.	R. ICHOU	A. HOLCOMB D. BOWEN	ORNL
Q1 Status AMPX workshop to be organized. IRSN waiting for clearance approval.						

	REFERENCE		IRSN Contribution / POC			
IRSN Reference	**Task Title**	**DOE Reference**	**FY 2022 IRSN Contribution**	**IRSN Technical POC**	**DOE Technical POC**	**DOE LAB**
IRSN-AM13	Benchmark intercomparison study	LLNL-AM5 ORNL-AM10 LANL-AM5 FY22-02	Definition of common set of developed benchmark models. Extension 2022-2024	N. LECLAIRE	D. HEINRICHS B.J. MARSHALL J. ALWIN	LLNL ORNL LANL

Q1 Status

Analysis of the results for U233 and MCT series after extension of the number of common cases (FY2021) was done. Analysis of inconsistencies between results on all series is still ongoing.

IRSN is waiting for LANL MCNP results with ENDF/B-VIII.0 library.

Report concerning previous achievements (criticality benchmarks) is underway. No progress concerning the extension to other types of benchmarks (TSL, shielding..) (Extension FY22-02)

INTEGRAL EXPERIMENTS						
IRSN-IE6 **IER 306**	Rh experiment	SNL-IE1	IRSN is leading the design. In 2022, design optimization to accommodate Rh cost	N. LECLAIRE	G. HARMS	SNL

Q1 Status

CED-2 report was sent to NCSP review team mid-0ctober. Comments from BJ Marshall received by IRSN. Waiting for further comments.

IRSN-IE7 **IER 305**	Mo experiment	SNL-IE1	IRSN has led the design. Participation in the experiments. Analysis of results.	N. LECLAIRE	G. HARMS	SNL

Q1 Status

All sleeves were sent to Sandia. New grids are being manufactured to adapt the assembly pitch. SNL will write the CED-3a report. Waiting for opportunity to make experiments in 2022.

Full NCSD paper (IRSN-SNL) will be presented (June 2022).

	REFERENCE		IRSN Contribution / POC			
IRSN Reference	**Task Title**	**DOE Reference**	**FY 2022 IRSN Contribution**	**IRSN Technical POC**	**DOE Technical POC**	**DOE LAB**
IRSN-IE11 **IER 297**	TEX - Hf baseline experiments (HEU)	LLNL-IE4	Contribution to ICSBEP evaluation of the baseline experiments	M. BROVCHENKO	C. PERCHER	LLNL
Q1 Status LLNL submitted an ICSBEP evaluation of the experiments. IRSN did a review of the document and will proceed in 2022 to model the benchmarks with MORET.						
IRSN-IE11 **IER 532**	TEX-Hf experiments	LLNL-IE4	Participation to experiments Contribution to the analysis of the experiments (CED-4)	M. BROVCHENKO	C. PERCHER	LLNL
Q1 Status No update.						
IRSN-IE27 **IER 498**	GODIVA CAAS benchmark	ORNL-IE1	Participation in the design. IRSN can provide technical support and instrumentation	F. TROMPIER	D. BOWEN R. CUMBERLAND	ORNL
Q1 Status: Waiting for information on schedule and type of instrumentations requested.						
IRSN-IE30 **IER 538**	Intercomparison of criticality dosimetry around GODIVA	LLNL-IE1	Participation to the experiment. Provide IRSN NAD for irradiation, reading of dosimeters analysis of results on site	F. TROMPIER	D. HEINRICHS	LLNL AWE
Q1 Status: Experiments planned for the spring 2022. IRSN will participate as standard participant. Experiment is scheduled in May 2022.						
IRSN-IE34 **IER 488**	MUSIC (HEU) critical and Subcritical measurements.	LANL-IE3	Analysis of results, contribution to CED4	W. MONANGE	J. HUTCHINSON	LANL
Q1 Status						

	REFERENCE		IRSN Contribution / POC			
IRSN Reference	**Task Title**	**DOE Reference**	**FY 2022 IRSN Contribution**	**IRSN Technical POC**	**DOE Technical POC**	**DOE LAB**
Experiment has been performed in 2021 February. IRSN is currently doing the data analysis and the simulations. Status will be discussed during the IRSN_LANL meeting planned on 01/21.						
IRSN-IE41 **IER 499**	Thermal/Epithermal Experiments (TEX) with Chlorine and Lithium	LLNL-IE1	Participation in experiments design.	M. BROVCHENKO	D. HEINRICHS	LLNL
Q1 Status No update.						
IRSN-IE42 **IER 121**	Neptunium Subcritical Observations (NeSO) experiment	LANL-IE3	Independent review of the ICSBEP evaluation.	W. MONANGE	J. HUTCHINSON	LANL
Q1 Status Experiment has been performed. IRSN is waiting for preliminary analysis from LANL. Status will be discussed during the IRSN_LANL meeting planned 01/21.						
IRSN-IE45 **IER 517**	Integral Experiments for Validation of Molybdenum Neutron Cross Sections on the whole energy spectrum	LANL-IE3	Participation in experiments design and CED reports. In 2022, participation to CED1 review	N. LECLAIRE	D. HAYES T. CUTLER	LANL
Q1 Status ANS winter meeting (Dec 2021) paper presenting the results of the CED-1 report was sent by J. Godda to IRSN. Discussions with IRSN on the collaboration will take place end of January 2022. Comparison of sensitivity profiles for configurations in thermal energy spectrum (MIRTE experiments) is proposed by IRSN.						
IRSN-IE46 **IER 518** **FY20-29**	High Multiplication Subcritical (Multiplicity) Benchmark Experiments	LLNL-IE1 SNL-IE1 LANL-IE3	Participation in experiments. IRSN will provide detectors for comparison.	W. MONANGE	D. HEINRICHS G. HARMS J. HUTCHINSON	LLNL SNL LANL
Q1 Status Experiment is planned for this year (2022). IRSN is waiting for experiments schedule. IRSN will use its detectors. IRSN needs additional information to manufacture the detector casing, questions sent to Gary.						

	REFERENCE		IRSN Contribution / POC			
IRSN Reference	**Task Title**	**DOE Reference**	**FY 2022 IRSN Contribution**	**IRSN Technical POC**	**DOE Technical POC**	**DOE LAB**
IRSN-IE47 **IER 537**	Copper Critical Experiment	LANL-IE3	Participation in CED reports. IRSN is interested to understand results of various experiments including ZEUS experiments results Contribution to CED2 review	J-B. CLAVEL	J. HUTCHINSON	LANL
Q1 Status Status on LANL progress will be done during IRSN_LANL meeting planned 01/21						
IRSN-IE49 **IER 547**	TEX Pu with poly at very low temperatures - Surrogate measurement support	LLNL-IE1	Contribution to analysis of results for optimization of IER 479 design	J. BEZ	C. PERCHER	LLNL
Q1 Status First calculations started. IRSN has sent questions on information received at the end of 2021 (email requesting data sent 01/05/2022). Some data updates are necessary from LLNL.						
IRSN-IE50	Pulse Neutron Experiments for Resonance Parameter Evaluation of Absorbing Materials	FY22-15	Evaluation and support for experiments	L. LEAL	C. PERCHER/D. SIEFMAN	LLNL
Q1 Status Ongoing activity: LLNL has carried out investigation of historical experiments employing measurement technique that are envisioned in this task.						
IRSN-IE51	Thermal/Epithermal Experiments (TEX)-Plutonium Additional Mixed Spectrum Configurations	FY22-16	Contribution to CED1 report.	M. BROVCHENKO	C. PERCHER	LLNL
Q1 Status No update.						
INFORMATION PRESERVATION AND DISSEMINATION						
IRSN-IPD1	ICSBEP reviewing	LLNL-IPD1	IRSN ICSBEP reviewing tasks are reported in the IE tasks	S. PIGNET	D. HEINRICHS	LLNL

	REFERENCE		IRSN Contribution / POC			
IRSN Reference	**Task Title**	**DOE Reference**	**FY 2022 IRSN Contribution**	**IRSN Technical POC**	**DOE Technical POC**	**DOE LAB**
Q1 Status Participation to the December 2021 status meeting.						
NUCLEAR DATA						
IRSN-ND1	Contribution to new evaluations	ORNL-ND1 NNL-ND1 RPI-ND1	Contribution to new evaluations and validation in accordance with the milestone schedule in Appendix B	L. LEAL	D. BOWEN T. TRUMBULL	ORNL NNL RPI
Q1 Status Work on Mo-95 resonance evaluation from LANL, benchmark testing and RP improvements Finished U233 RR evaluation + RPC. Work on the URR underway; Work with ORNL on Hf sample preparation for new measurements; Work on the RR + URR for Pu239 underway; Rh103 completed and delivered to BNL; Work on the URR for Gd155 and Gd157; Work on the Fe54 and Fe56 RR evaluation; Work on the F19 resonance evaluation.						
TRAINING AND EDUCATION						
IRSN-TE1	Hands-on criticality safety training	ORNL-TE1 LANL-TE3 LLNL-TE1 SNL-TE1	IRSN attendance to NCSP classes. Possible lectures by IRSN working with NCSP training and education coordinator.	S. PIGNET	D. BOWEN	NCSP
Q1 Status Waiting for visibility on travel. (Travel plans contingent upon the sanitary situation.)						

Additional information:

- TEX-MOX : working on design solutions to address heat issues. CED2 may be available for NCSP comments on December 2022, if NCSP agrees to schedule the experiments in 2023 or 2024.