NUCLEAR CRITICALITY SAFETY PROGRAM (NCSP)
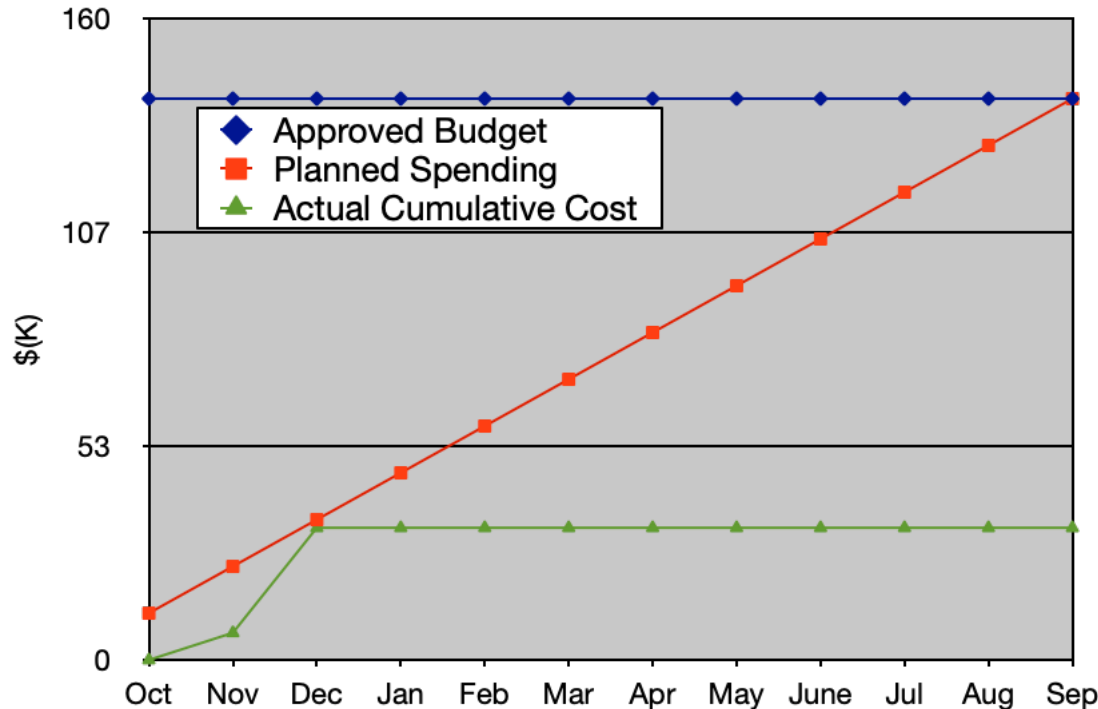
FY2024 1st QUARTER REPORTS

NCSP Element and Subtask: AM4	Reference: DP0909010
M&O Contractor Name: BNL	Date of Report: January, 2024
Point of Contact Name: Gustavo Nobre	
Point of Contact Phone: 631-344-5205	

BUDGET

BNL FY24 AM4

1. Carryover into FY 2024 = $ 70,024
2. Approved FY 2024 Budget = $ 70,000 (Enacted CR)
3. Total FY 2024 Budget w/Carryover: $140,024
4. Actual spending for 1st Quarter FY 2024 = $32,972
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $7,001
   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	
	(blue)		(green)		(yellow)		(red)

QUARTER	TASK	STATUS	ISSUES/PATH FORWARD
Q1	Provide a status report on generating a draft document defining the TNSL code or software interface in the NCSP Quarterly Progress Report. (AM4)	(green)	Using Zr as a test case, we began examining the approximations underlying the URR probability table method using the underlying cross section probability distribution. We also began examining how

			to perform a unified RRR-URR-Fast region evaluation consistent with the underlying cross section probability distribution.
Q2	Provide a status report on generating a draft document defining the TNSL code or software interface in the NCSP Quarterly Progress Report. (AM4)		
Q3	Provide a status report on generating a draft document defining the TNSL code or software interface in the NCSP Quarterly Progress Report. (AM4)		
Q4	Provide a status report on generating a draft document defining the TNSL code or software interface in the NCSP Quarterly Progress Report. (AM4)		

ACCOMPLISHMENTS

- AM4 - Thermal Scattering and Self-Shielding in GNDS/FUDGE
  - Collaborating with LLNL on a future FUDGE release

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
 AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

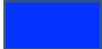|	
NCSP Element and Subtask: AM1, 2, 3, 5 **M&O Contractor Name**: LANL **Point of Contact Name:** Joetta Goda/Bob Little **Point of Contact Phone:** 505-667-2812/505-665-3487	**Reference:** DP0909010 **Date of Report:** January 19, 2024
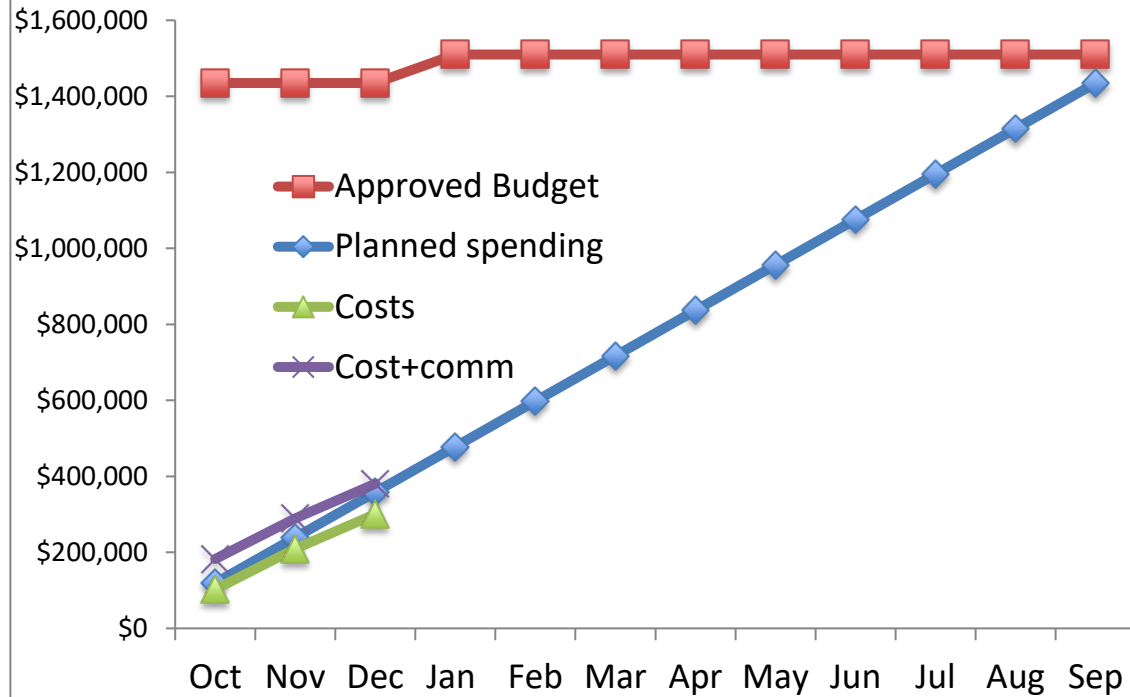
BUDGET

1. Carryover into FY 2024 = $75,000
2. Approved FY 2024 Budget = $1,435,000
3. Total FY 2024 Budget w/Carryover = $1,510,000
4. Actual spending for 1st Quarter FY 2024 = $300,672
   plus commitments of $79,987 for total of $380,660
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
   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	
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 a status report on LANL participation in US and International analytical methods collaborations (AM1)	🟦	

Q1	Provide a status report on ENDF/B-VIII.1 nuclear data and covariance data testing activities (AM1)	■	
Q1	Provide a status report on summer intern work activities (AM1)	■	
Q1	Provide a status report on NJOY maintenance and user support activities (AM2)	■	
Q1	Provide a status report on LANL participation in US and International analytical methods collaborations (AM2)	■	
Q1	Provide a status report on Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 activities (AM3)	■	
Q1	Provide a status report on LANL participation in proposed benchmark intercomparison study (AM5)	■	
Q2	Provide a status report on MCNP6 user support (AM1)		
Q2	Provide a status report on LANL participation in US and International analytical methods collaborations (AM1)		
Q2	Provide a status report on ENDF/B-VIII.1 nuclear data and covariance data testing activities (AM1)		
Q2	Provide a status report on MCNP6 and Whisper progress activities (AM1)		
Q2	Provide a status report on MCNP 6.3.1 updates and verification/validation results (AM1)		
Q2	Provide a status report on NJOY maintenance and user support activities (AM2)		
Q2	Provide a status report on LANL participation in US and International analytical methods collaborations (AM2)		
Q2	Provide a status report on Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 activities (AM3)		
Q2	Test on-the-fly temperature dependent S(alpha, beta) scattering with the new data fields for Be and O in BeO using MCNP6 and deliver the new data files to LANL (AM3)		
Q2	Provide a status report on LANL participation in proposed benchmark intercomparison study (AM5)		

Q3	Provide a status report on MCNP6 user support (AM1)		
Q3	Provide a status report on LANL participation in US and International analytical methods collaborations (AM1)		
Q3	Provide a status report on ENDF/B-VIII.1 nuclear data and covariance data testing activities (AM1)		
Q3	Provide MCNP6 Criticality training course (AM1)		
Q3	Provide status report on the integration of MCNP V&V, Whisper, and LABS benchmark suite. (AM1)		
Q3	Provide a status report on NJOY maintenance and user support activities (AM2)		
Q3	Provide a status report on LANL participation in US and International analytical methods collaborations (AM2)		
Q3	Provide a status report on Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 activities (AM3)		
Q3	Provide a status report on LANL participation in proposed benchmark intercomparison study (AM5)		
Q4	Provide a status report on MCNP6 user support (AM1)		
Q4	Provide a status report on LANL participation in US and International analytical methods collaborations (AM1)		
Q4	Provide a status report on ENDF/B-VIII.1 nuclear data and covariance data testing activities (AM1)		
Q4	Provide a report on the impact of the available temperature treatments within the thermal neutron scattering and resolved resonance regions (AM1)		
Q4	Provide a report on Whisper 2.0 updates (AM1)		
Q4	Provide a status report on NJOY maintenance and user support activities (AM2)		
Q4	Provide a status report on LANL participation in US and International analytical methods collaborations (AM2)		
Q4	Update the resonance reconstruction library to process EDA resonance parameters (which requires the use of the general R-matrix formalism in combination with relativistic kinematics) and create a comprehensive test suite (AM2)		
Q4	Start the development work of a covariance processing component for a modernized NJOY and demonstrate initial capabilities: reading		

|			
	covariance data from ENDF files, perform basic covariance testing, conversion of covariance matrices to and from uncertainties and correlation matrices (AM2)		
Q4	Provide a status report on Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6 activities (AM3)		
Q4	Provide a final report for the project. (AM3)		
Q4	Provide a status report on LANL participation in proposed benchmark intercomparison study (AM5)		

ACCOMPLISHMENTS

- AM1 - MCNP® Maintenance and Support, Uncertainty Analysis Development, and Modernization
  - Education
    - Mentoring of new staff, postdoc, and students within the Monte Carlo Codes group.
    - Three MCNP6 classes taught with 67 total students. See separate summary of MCNP classes for full breakdown of classes and attendance information.
    - Over the summer, the Monte Carlo Codes and Nuclear Data teams co-mentored an RPI graduate student working on on-the-fly temperature treatment of thermal neutron scattering. The summer student efforts included:
      - Working with W. Haeck on defining an alternate ACE thermal neutron scattering formalism to hold the temperature-dependent data.
      - Working with M. Rising and C. Josey on the MCNP team to work on writing and integrating new reading, interpreting, and sampling functions for this newly structured data.
      - This work culminated in a paper/presentation at the ANS M&C topical meeting in Niagara Falls, CA, 2023 (see AM3)
    - New Monte Carlo Team staff member, C. Weaver, attended several MCNP6 class sessions to become more familiar with the uses of the MCNP code.
    - Scheduled an MCNP6 criticality class to be taught at Y-12 in FY24 Q3.
  - R&D Work
    - M. Rising attended the 2023 ICNC conference Oct. 1-6, 2023. The two papers/presentations given at this conference were provided in the FY23 Q4 report. A separate foreign trip report has already been submitted to NCSP regarding the details of this trip.
    - The Whisper open-source release is pending LANL Feynman Center for Innovation (FCI) approval. FCI has raised some concerns on licensing Whisper as open-source after having been released alongside MCNP6 through RSICC. We are iterating with FCI to find the best path forward; once approved the code will be made available on GitHub.
      - Update: There are no further updates from FCI since the FY23 Q4 report.
    - The Whisper code is being prepared for inclusion of ENDF/B-VIII.0 covariance data.

- Investigated Whisper USL calculations using ENDF/B-VIII.0 nuclear data and processed covariances. See 2023 User Symposium presentation LA-UR-23-30432 (provided with FY23 Q4 report)
- Have found some unusual ENDF/B-VIII.0 covariance data that are cause for concern for use within Whisper. We are actively working with the nuclear data team to find the issue and a subsequent resolution to this issue so that we can proceed with incorporating ENDF/B-VIII.0 covariance data into Whisper.
  - Supported sensitivity and nuclear data adjustment calculations for a journal article on the MUSIC criticality benchmarks. This journal paper is authored by A. McSpaden, J. Hutchinson, M. Rising, R. Sanchez, N. Thompson, and G. McKenzie.
  - Studied new analytic k-effective sensitivity benchmarks that can be used by the MCNP code to more robustly verify the KSEN feature in the code. A 2024 PHYSOR paper by C.A. Weaver, M.E. Rising, J.A. Kulesza, C.M. Perfetti, and P.A. Vaquer entitled "Analytic Sensitivity Coefficients for General Multigroup Infinite Medium k-Eigenvalue Problems," was submitted on this topic. The final paper/presentation will be included in a future NCSP quarterly report.
  - Preparing for the MCNP6.3.1 release planned to be completed in FY24 Q2 or FY24 Q3. This includes finalizing all code changes, updating documentation, and performing testing. One noteworthy change is related to support for the upcoming ENDF/B-VIII.1 nuclear data release. See the MCNP Data, ENDF/B-VIII.1 beta testing section for more information.
- MCNP Support and Maintenance
  - Support MCNP6 users. MCNP Forum, website, email, direct interactions, etc.
  - Continuous MCNP public website updates posted online.
  - The 2024 MCNP User Symposium is scheduled for August 19-22, 2024.
  - Continued to support help requests sent in through the mcnp_help@lanl.gov help service desk.
  - Consolidating and archiving past V&V results in repository
- MCNP Data
  - ENDF/B-VIII.0 Covariance Library for Whisper
    - See comments in R&D section above.
  - ENDF/B-VIII.1 beta testing
    - We presented two talks on data testing of ENDF/B-VIII.1 beta2 during the November CSEWG meeting.
    - The upcoming ENDF/B-VIII.1 data may be the first nuclear data released by the LANL Nuclear Data Team for MCNP use that has a conflicting 2-digit library identification (ID) number with a previously released nuclear data library. Because the historic 2-digit library ID limitation within the MCNP6 code is a concern for the current and all future nuclear data library releases, a more generic and flexible library naming and identification method was implemented in MCNP6, specifically enabled within the upcoming MCNP6.3.1 release. This enhanced handling of the nuclear data by MCNP will be tested with the ENDF/B-VIII.1 beta releases.
    - ENDF/B-VIII.1 covariance data not yet been processed or tested at this point.
- Publications, Reports, and Presentations

Note: The item marked as [DRAFT] will be finalized and fully released in a future quarterly report.

- Jesson Hutchinson, Alexander R. Clark, Juliann Lamproe, Nicholas Thompson, Alexander McSpaden, and Theresa Cutler, "Neutron Noise Analysis of the Neptunium Subcritical Observation (NESO) Experiment," Los Alamos Report presentation (LA-UR-23-32770) submitted to and accepted at the ANS Winter 2023 conference. (Note that this report was previously submitted to NCSP during FY23)
- [DRAFT] Colin A. Weaver, Michael E. Rising, Joel A. Kulesza, Christopher M. Perfetti, and Pablo A. Vaquer, "Analytic Sensitivity Coefficients for General Multigroup Infinite Medium k-Eigenvalue Problems," Los Alamos Report full paper (LA-UR-23-31844) submitted to 2024 PHYSOR conference.

- AM2 - NJOY Development and Maintenance, Uncertainty Analysis Development, and Modernization
  - NJOY2016:
    - 1 update to NJOY2016 was released: NJOY2016.73. This update fixes the following issues:
      - Fix an issue in ACER for thermal scattering leading to energy values being out of order when plotting the coherent elastic scattering cross section (this issue only affects plots, the thermal scattering ACE files do not change).
      - Increased allocation of an array in LEAPR to accommodate ENDF/B-VIII.1 thermal scattering evaluations and added a check to avoid an infinite loop when using a very fine beta grid. In addition, LEAPR will now warn the user about potential excessive calculation times and print out progression in the phonon expansion sum when the phonon expansion order is large.
      - Added logic to MODER to read background R-matrix element information from LRF=7 resonance parameter data.
      - Updated RECONR to use background R-matrix element information from LRF=7 and added test 81 using ENDF/B-VIII.1 Sr88.
      - Fixing a few things related to intel compiler warnings and errors.
    - The Sr88 work was validated in collaboration with ORNL (Marco Pigni).
    - As a side note: current ENDF/B-VIII.1 beta3 processing has not shown any issues in NJOY2016.
    - We also worked on another update following a report that the Euler-Mascheroni constant in NJOY2016 was incorrect (this constant is used in the calculation of the Coulomb wave functions so it impacts charged particle channels in LRF=7 evaluations). The update was released on January 16, but the work was done in Q1 FY24.
    - Presented a status report on NJOY during the November CSEWG meeting.
    - User support:
      - Various questions on the GitHub issues trackers
      - An NJOY class was given at the NEA/OECD in the beginning of December. The NJOY class materials were updated, and the class now includes ENDFtk and ACEtk for data exploration and plotting purposes. The feedback was extremely positive.
      - We migrated our covariance processing scripts---which automate the running of NJOY and reformat the output into a more user-friendly JSON format---to the internal LANL GitLab instance re-git.lanl.gov. In the process, we added some minimal documentation and an easier user interface, so that the tools are more easily used by others and can be controlled from the command line.
    - NJOY21:
      - ACEtk development:
        - We are working on updates to ACEtk to better integrate it into LANL codes and libraries like avalanche. This is not completed yet.
      - ENDFtk development:
        - We made a few quality of life changes to the MF9/MF10 interface so that the user can retrieve a given excited state.

- Scion development progress:
  - A number of updates were made for use in the NJOY class. Specifically, we updated the arithmetic operations to be able to calculate the total scattering cross sections for thermal scattering. See example below.

ENDF/B-VIII.1b Li7-Li7D thermal scattering cross section data
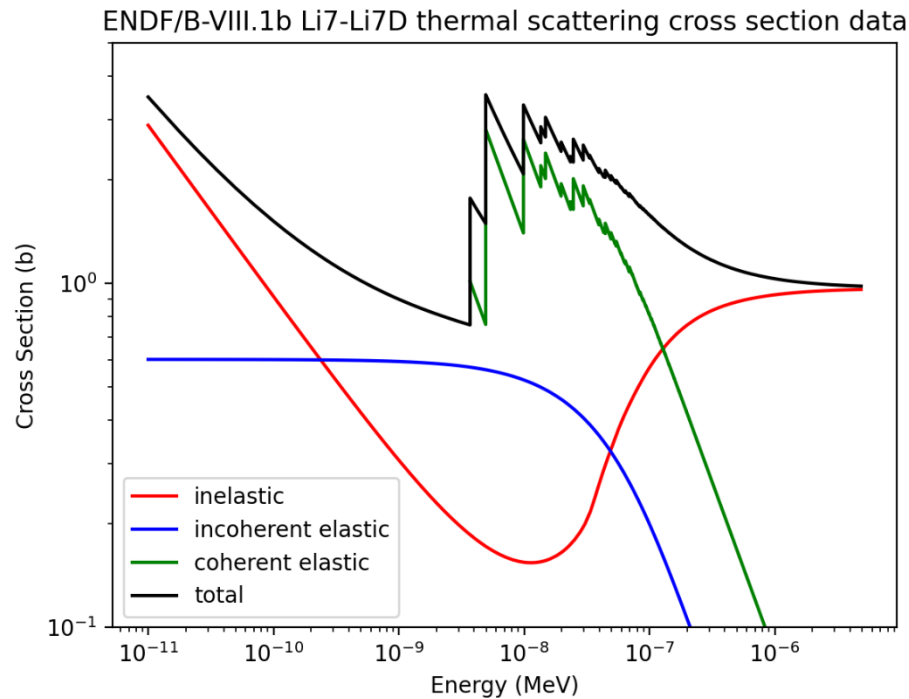
- AM3 - Development of an Adaptive-in-temperature Method for fast on-the-fly Sampling of Thermal Neutron Scattering Data in MCNP6
  - Conference paper proceedings were published from M&C 2023. In addition, a special edition journal paper was submitted to Nuclear Science and Engineering (NSE) based on the contents provided in the conference.
    - Reference: Camden E. Blake and Wei Ji, "Adaptation of Temperature Dependent Thermal Neutron Libraries for Fast On-The-Fly Monte Carlo Sampling at Arbitrary Temperatures," Proceedings of M&C 2023, The International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering, Niagara Falls, Ontario, Canada, August 13-17, 2023.
  - Evaluation functions for each of the different fitting functions were developed to be used in the Monte Carlo sampling procedures. Sampling times for the various fitting functions were compared with a non-OTF dataset. The OTF treatment generally caused a slowdown in the sampling of thermal scattering event. Due to the small portion of the neutron tracking in thermal energy with $S(\alpha,\beta)$ law in the entire MCNP simulation, the slowdown is expected to be small for general MCNP simulations using the OTF treatment. Further optimization will be explored to best store the OTF dataset and sample from it without slowdown as the next step research.

- Investigated the potential of different evaluation techniques for the OTF data. This involved the classic polynomial evaluation, Horner's Method, and Clenshaw's recursion algorithm. Neither of the methods showed potential in speeding up the sampling time due to the relatively low orders used to store the OTF coefficients.
- Began an interpolation analysis of the grids that are provided through ENDF/B-VIII.0. This is to see whether the grids that are provided are fine enough to ensure that interpolation can be used accurately in the generation of sampling distribution.
  - AM5 - Proposed Benchmark Intercomparison Study
    - Beta-eff results for 10 benchmarks were transmitted to Jeremy Bez at IRSN. These were calculated with MCNP6.2 and ENDF/B-VIII.0.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
 AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	Camden E. Blake and Wei Ji, "Adaptation of Temperature Dependent Thermal Neutron Libraries for Fast On-The-Fly Monte Carlo Sampling at Arbitrary Temperatures," Proceedings of M&C 2023, The International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering, Niagara Falls, Ontario, Canada, August 13-17, 2023.
Q2	
Q3	
Q4	

NCSP Element and Subtask: AM3, 4, 5, 9 **M&O Contractor Name**: LLNL **Point of Contact Name:** Catherine Percher **Point of Contact Phone:** (925) 579-4226	**Reference:** DP0909010 **Date of Report:** January, 2024
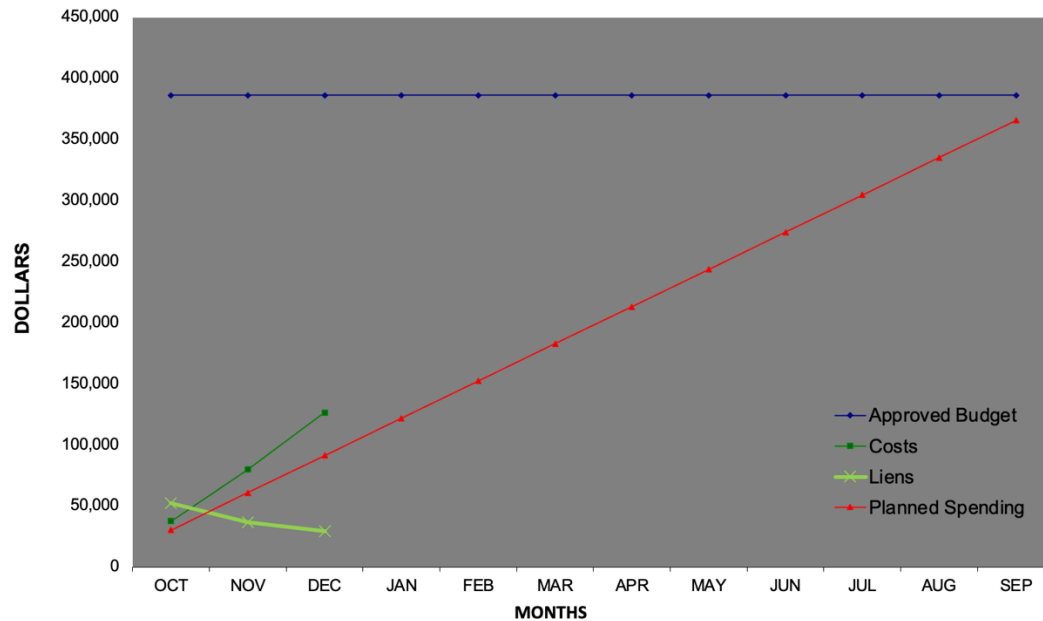
BUDGET

1. Carryover into FY 2024 = $ 126,382
2. Approved FY 2024 Budget = $260,000
3. Total FY24 budget w/Carryover = $386,382
4. Actual spending for 1st Quarter FY 2024 = $126,637
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $ 20,800
    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 slide rule application activities (AM3)		
Q1	Provide a status report on thermal scattering and self-shielding in GNDS/FUDGE activities. (AM4)		
Q1	Provide a status report on proposed benchmark intercomparison study activities. (AM5)		

Q1	Provide a status report on COG data library generation and testing activities. (AM9)		
Q2	Provide a status report on slide rule application activities (AM3)		
Q2	Provide a status report on thermal scattering and self-shielding in GNDS/FUDGE activities. (AM4)		
Q2	Provide a status report on proposed benchmark intercomparison study activities. (AM5)		
Q2	Provide a status report on COG data library generation and testing activities. (AM9)		
Q3	Provide a status report on slide rule application activities (AM3)		
Q3	Provide a status report on thermal scattering and self-shielding in GNDS/FUDGE activities. (AM4)		
Q3	Provide a status report on proposed benchmark intercomparison study activities. (AM5)		
Q3	Provide a status report on COG data library generation and testing activities. (AM9)		
Q4	Provide a status report on slide rule application activities (AM3)		
Q4	Provide a status report on thermal scattering and self-shielding in GNDS/FUDGE activities. (AM4)		
Q4	Provide a status report on proposed benchmark intercomparison study activities. (AM5)		
Q4	Provide a status report on COG data library generation and testing activities. (AM9)		

ACCOMPLISHMENTS

- AM3 – Slide Rule Application
    - No activity for LLNL this period. IRSN will present a status report on the Slide Rule project at the NCSP TPR.
- AM4 - Thermal Scattering and Self-Shielding in GNDS/FUDGE
    - Processed the 2nd ENDF/B-VIII.1 beta release at room temperature, including generating URR probability tables for all targets with URR parameters, and processing all TNSL evaluations that are valid at room temperature (56 materials) and provided the library to the V&V team for testing. The results were reported at CSEWG on some issues that came up during processing and testing. We were closely involved in testing and fixing issues in ENDF/B-VIII.1 candidate evaluations both before and after the beta-2 release, leading up to the beta-3 release in early Q2.

- AM5 - Proposed Benchmark Intercomparison Study
  - IRSN is evaluating beta-eff results from participating labs and preparing a summary report for review, which LLNL provided in FY23. A kick-off meeting for the shielding intercomparison is scheduled for January 19, 2024.
- AM9 – COG Data Library Generation and Testing
  - Working on improving our capability to generate ACE-formatted libraries directly from FUDGE, including fixing several issues in the URR probability table writer and streamlining the process of generating ACE libraries at multiple temperatures.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

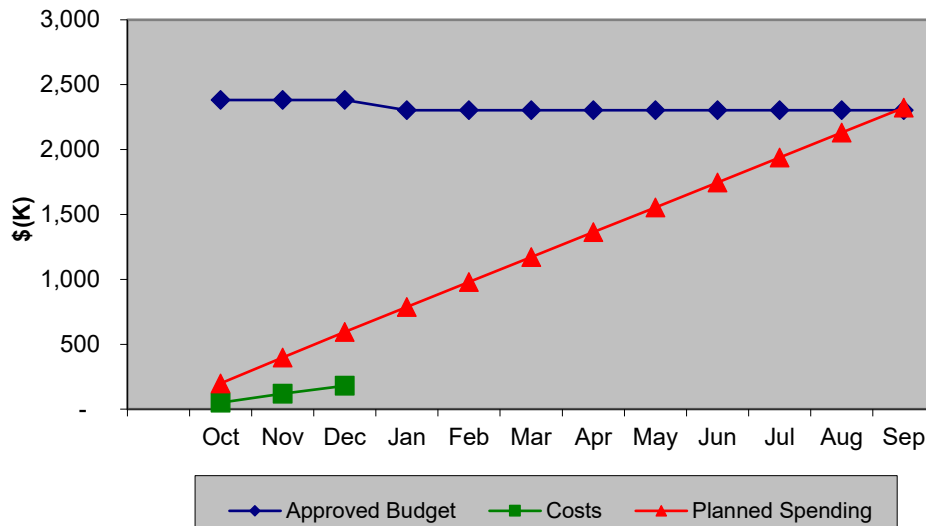| Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	Mattoon, C, "FUDGE / GIDIplus development and ENDF-VIII.1 Testing," LLNL-PRES-857358, Presented at the Cross Section Evaluation Working Group (CSEWG) Meeting, November 15, 2023.
Q2	
Q3	
Q4	

NCSP Element and Subtask: AM1, 2, 3, 6, 10, 17	Reference: DP0909010
M&O Contractor Name: ORNL	Date of Report: January 20, 2024
Point of Contact Name: Doug Bowen	
Point of Contact Phone: (865) 576-0315	

BUDGET

FY24 Analytical Methods

(Chart showing $ (K) on y-axis from - to 3,000, months Oct through Sep on x-axis, with lines for Approved Budget, Costs, and Planned Spending)

1. Carryover into FY 2024 = $122K
2. Approved FY 2024 Budget = $2,260 (includes carryover)
3. Total FY 2024 Budget w/Carryover = $2,382K (includes carryover)
4. Actual spending for 1st Quarter FY 2024 = $180K
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $

NOTE: Include commitments as part of spending

Decrease in budget Dec-to-Jan is a transfer from RSICC and SCALE to cover ND staff with NCSP Manager Approval. A total of $78.8k was transferred in G2 from AM to ND in Dec. 2023.

MILESTONES

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

Complete	■ (blue)	On Schedule	■ (green)		Behind Schedule	■ (yellow)	Missed Milestone	■ (red)

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)	■ (blue)	
Q1	Provide status on RSICC activities (AM1)	■ (blue)	
Q1	Provide status reports on ORNL participation in US and International Analytical Methods collaborations and provide	■ (blue)	

	brief trip summary report to NCSP Manager on items of NCSP interest. (AM2)		
Q1	Provide status on TSUNAMI upgrades. (AM2)		
Q1	Provide status on VADER. (AM2)		
Q1	Provide status on Sampler improvements. (AM2)		
Q1	Provide status on CSAS improvements. (AM2)		
Q1	Provide status on SCALEHELP. (AM2)		
Q1	Provide status on SCALE 7.0 support. (AM2)	v	
Q1	Provide status on SCALE training (other than stats). (AM2)		
Q1	Publish a quarterly newsletter. (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 VALID activities (AM17)		
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 TSUNAMI upgrades. (AM2)		
Q2	Provide status on VADER. (AM2)		
Q2	Provide status on Sampler improvements. (AM2)		
Q2	Provide status on CSAS improvements. (AM2)		
Q2	Provide status on SCALEHELP. (AM2)		

Q2	Provide status on SCALE 7.0 support. (AM2)		
Q2	Provide status on SCALE training (other than stats). (AM2)		
Q2	Publish a quarterly newsletter. (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 VALID activities (AM17)		
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 TSUNAMI upgrades. (AM2)		
Q3	Provide status on VADER. (AM2)		
Q3	Provide status on CSAS improvements. (AM2)		
Q3	Provide status on MAVRIC improvements. (AM2)		
Q3	Provide status on SCALEHELP. (AM2)		
Q3	Provide status on SCALE 7.0 support. (AM2)		
Q3	Provide status on SCALE training (other than stats). (AM2)		
Q3	Publish a quarterly newsletter. (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 VALID activities (AM17)		
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 TSUNAMI upgrades. (AM2)		
Q4	Provide status on VADER. (AM2)		
Q4	Provide status on Sampler improvements. (AM2)		
Q4	Provide status on CSAS improvements. (AM2)		
Q4	Provide status on SCALEHELP. (AM2)		
Q4	Provide status on SCALE 7.0 support. (AM2)		
Q4	Provide status on SCALE training (other than stats). (AM2)		
Q4	Publish a quarterly newsletter. (AM2)		
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 VALID activities (AM17)		

ACCOMPLISHMENTS

- AM1 - Radiation Safety Information Computational Center (RSICC)
  - Distribution of available and newly packaged software for Q1 of FY2024
    - Distributed 1466 software packages.
    - 149 SCALE, 1216 MCNP®, and 1 COG packages distributed.
    - RSICC quarterly report issued.
  - Quarter University Requests   NCSP Direct Requests
     1   196   43

FY2024 University Distributions		
Month	**MCNP®**	**SCALE**
October	42	18
November	51	20
December	11	5
January		
February		
March		

April		
May		
June		
July		
August		
September		
Total	104	43

- AM2 - SCALE/KENO/TSUNAMI Maintenance and Support/Cross-Section Generation/Modernization
  Due to limited allowable budget in this quarter, only two tasks were partially supported, and this report summarizes those activities. Travel costs and time spent for ICNC 2023 was a part of costs which were committed last in FY23 Q4 but costed out in FY24 Q1.
  - **Enhance FULCRUM visualization capabilities:**
    - **Add capability to visualize particle tracks in FULCRUM**: A new capability to log fission track information into a standardized HDF5-based format has been implemented in KENO. With this, a corresponding ability to visualize fission track information onto a 2-D geometry in Fulcrum has likewise been implemented. This feature allows for a user-selectable visualization of fission tracks by generation and particle number.
  - Provide a status report on TSUNAMI upgrades
    - **Direct Perturbation Capability:** Capability to apply user-defined perturbation to the cross section data for the given nuclide-reaction pair has been implemented in CE KENO. V&V testing for the new CE data perturbation capability is still progressing.
  - Provide a status report on VADER – No Efforts
  - Provide a status report on Sampler improvements – No Efforts
  - Provide a status report on CSAS improvements – No Efforts
  - Provide a status report on SCALEHELP – No Efforts
  - Provide a status report on SCALE 7.0 support – No Efforts
  - Provide a status report on SCALE training (other than stats) – No Efforts
  - Publish a Quarterly newsletter – No Efforts

- AM3 - AMPX Maintenance & Modernization
  - Work on AMPX was presented at the CSEWG meeting in November (Brookhaven National Laboratory). Highlights included the status of ENDF/B-VIII.1 processing with AMPX, issues encountered with the thermal scattering law sublibrary, continued work on thermal scattering, and important fixes for photonuclear library processing (sponsored by a partnership between NNSA and NioWAVE).
  - For the accurate processing of cryogenic moderator thermal scattering libraries, a refined scheme for the grid in the cosine of the scattering angle (μ) had been developed in previous quarters. A version of this code was used to correct multigroup data that was released with the SCALE 6.3.2 patch. The code is under testing and review.

- o Several thermal scattering libraries in ENDF/B-VIII.1 Beta 2 have a large number of Bragg edges, which process into intractably large files in the current SCALE CE library format. Prototype code that reduces the on-disk footprint of these files has been developed and is under refinement and preparation for inclusion with an upcoming SCALE 7.0.0 beta release.

- **AM6 – Slide Rule Application**
  - o ORNL staff reviewed all simulation results provided by all participants and compiled by IRSN and sent comments back,
  - o ORNL staff is waiting for an updated version of the report from IRSN.

- **AM10 – Proposed Benchmark Intercomparison Study**
  - o The SCALE B-eff values generated during Q4 FY24 were compared to experimental values and sent to IRSN. IRSN is coordinating the final report for the intercomparison between SCALE (ORNL), COG (LLNL) and MCNP (IRSN). IRSN scheduled a meeting to happen in January 2024 to discuss about the shielding intercomparison.

- **AM17 – Expansion of the Verified, Archived, Library of Inputs and Data (VALID)**
  - o Lisa Reed and Alex Lang are coordinating the sensitivity/uncertainty phase of the LEU-SOL-THERM-016, -017, and -018 models (25 cases). These models are awaiting final review and approval into VALID.
  - o Veronica Karriem is performing the sensitivity/uncertainty analysis for the 28 cases in LEU-COMP-THERM-060. Travis Greene will be coordinating the review of these models before a final review and approval into VALID.
  - o LEU-COMP-THERM-096 and -097, originated by Alex Shaw, are in the final review stages before the Quality Assurance Coordinator review: 19 models in LCT-096 and 24 in LCT-097.
  - o U233 sensitivity calculations are currently in review with Alex Shaw to complete the keff/sensitivity suite for U233 models currently in VALID.
  - o Lisa Reed is currently modeling PU-MET-THERM-004 (4 cases); these are the TEX plutonium assemblies.
  - o Travis Greene reviewed LEU-COMP-THERM-029 (12 cases), LEU-COMP-THERM-061 (10 cases), MIX-COMP-THERM-006 (50 cases), MIX-COMP-THERM-007 (27 cases), and PU-SOL-THERM-031 (20 cases). These models, except PST-031, were generated by Midshipmen Brandt and Mulig from the U.S. Naval Academy. These are all hafnium absorbing models listed in the ISCBEP Handbook and are currently in the sensitivity/uncertainty phase of analysis.

PUBLICATIONS

Quarter	Publication Reference
	Example:
	Author, "Title", LA-UR-18-27731, October 1, 2019

Q1	Travis Greene, William (B.J.) Marshall, Kursat Bekar, "Deteministic-Monte Carlo Hybrid Methods for Eigenvalue Sensitivity Coefficient Calculations," International Conference on Nuclear Criticality Safety, Sendia, Japan, October 2023.
Q1	Douglas Bowen, "Application of Holdup Measurement Results to Criticality Safety Evaluations," ORNL Software and Data Expo, Knoxville, TN, September 2023.
Q1	William (B.J.) Marshall, "Lost and Found Opportunities Around the Chlorine Worth Study," International Conference on Nuclear Criticality Safety Proceedings, (October 2023).
Q1	William (B.J.) Marshall, Alex Shaw, Travis Greene, Karl Florida, Brant Purcel, Stu Blair, "The Case for and Against a Gadolinium Bias in SCALE: Round 2," International Conference on Nuclear Criticality Safety Proceedings, (October 2023).
Q1	William (B.J.) Marshall, "Lost and Found Opportunities Around the Chlorine Worth Study," International Conference on Nuclear Criticality Safety Proceedings, (October 2023).
Q1	William (B.J.) Marshall, Alex Shaw, Travis Greene, Karl Florida, Brant Purcel, Stu Blair, "The Case for and Against a Gadolinium Bias in SCALE: Round 2," International Conference on Nuclear Criticality Safety Proceedings, (October 2023).

NCSP Element and Subtask: AM1	**Reference:** DP0909010
M&O Contractor Name: PNNL	**Date of Report:** January, 2024
Point of Contact Name: Travis Zipperer	
Point of Contact Phone: (206) 528-3474	

BUDGET

FY24 Analytical Methods

Legend: Approved Budget — Costs — Planned Spending
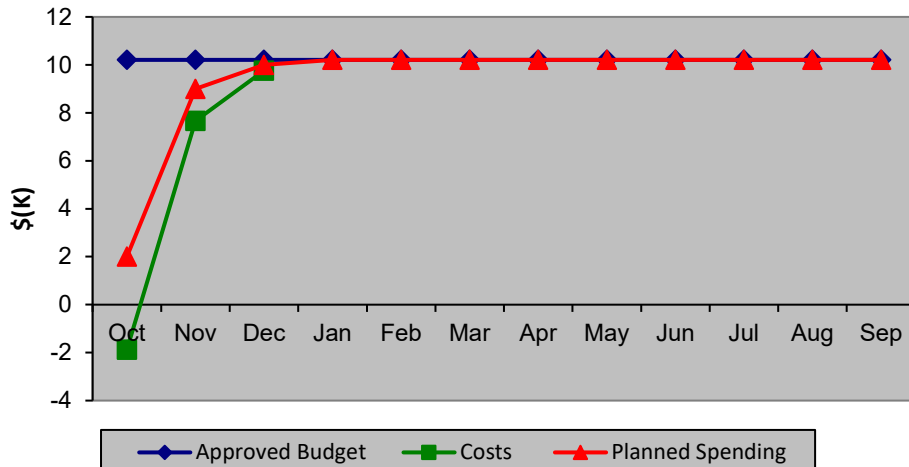
1. Carryover into FY 2024 = $10,208
2. Approved FY 2024 Budget = $0
3. Total FY2024 Budget w/Carryover = $10,208
4. Actual spending for 1st Quarter FY 2024 = $9,760
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $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 of Sum-of-Fractions analysis for nuclide mixtures (AM1)		
Q2	Provide a status of Sum-of-Fractions analysis for nuclide mixtures (AM1)		
Q3	Provide a status of Sum-of-Fractions analysis for nuclide mixtures (AM1)		
Q4	Provide a status of Sum-of-Fractions analysis for nuclide mixtures (AM1)		

ACCOMPLISHMENTS

- AM1 – Analysis of Sum-of-Fractions for Nuclide Mixtures
    - Q1: Presented at ICNC in Sendai on the SoF method in October
    - Q1: Finalizing Technical Report – Technical Editor completed their review in December

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	Travis Zipperer, Andrew Prichard, Travis Greene, BJ Marshall, and Alex Lang, "Evaluation of the Sum-of-Fractions Methodology for Water and Polyethylene Moderated Systems", The 12th International Conference on Nuclear Criticality Safety, Sendai, Japan, October 1-6, 2023. PNNL-SA-185366
Q2	
Q3	
Q4	

NCSP Element and Subtask: AM1 **M&O Contractor Name:** Y12 **Point of Contact Name:** Kevin Reynolds **Point of Contact Phone:** (865) 241-9067	**Reference:** DP0909010 **Date of Report:** January, 2024
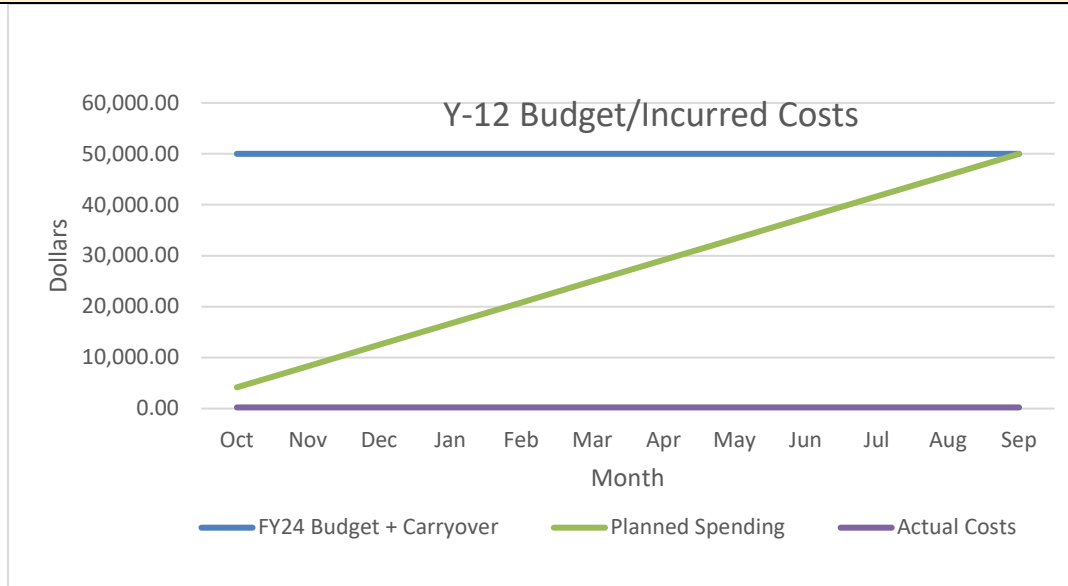
BUDGET

1. Carryover into FY 2024 = $ 20,000.00
2. Approved FY 2024 Budget = $30,000.00
3. Total FY 2024 Budget w/Carryover = $50,000.00
4. Actual spending for 1st Quarter FY 2024 = $227.54
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
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 on proposed benchmark intercomparison study activities. (AM1)		
Q2	Provide status on proposed benchmark intercomparison study activities. (AM1)		
Q3	Provide status on proposed benchmark intercomparison study activities. (AM1)		

Q4	Provide status on proposed benchmark intercomparison study activities. (AM1)		

ACCOMPLISHMENTS

- AM1 – Proposed Benchmark Intercomparison Study
  - ○

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
 AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: IPD3 **M&O Contractor Name**: LANL **Point of Contact Name:** Joetta Goda **Point of Contact Phone:** 505-667-2812	**Reference:** DP0909010 **Date of Report:** January 19, 2024
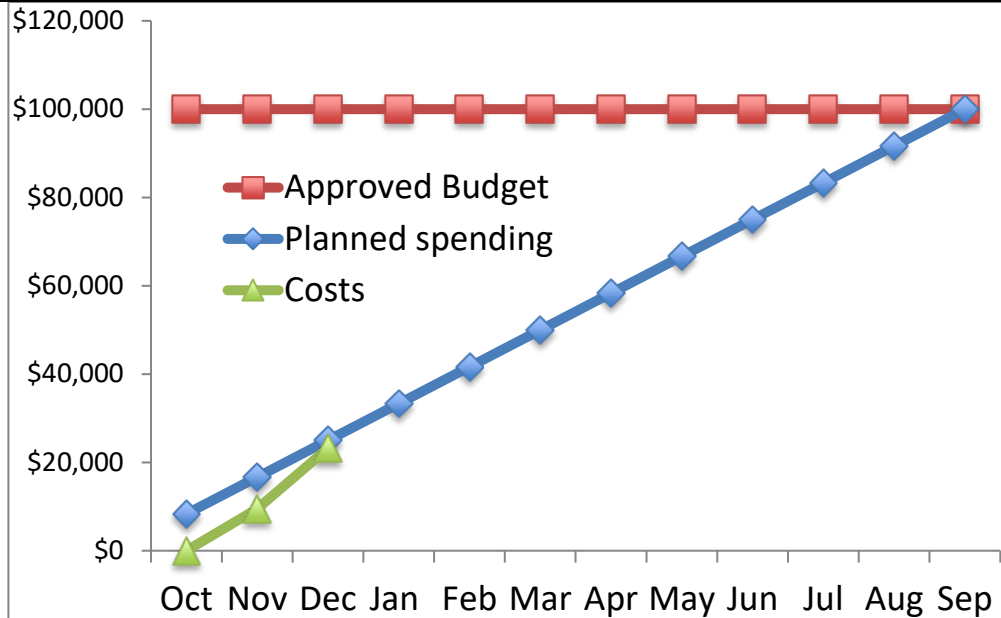
BUDGET

1. Carryover into FY 2024 = $0
2. Approved FY 2024 Budget = $100,000
3. Total FY2024 Budget w/Carryover = $100,000

Q1	$23,219	$0	$23,219
Q2		$0	$0
Q3		$0	$0
Q4		$0	$0

4. Actual spending for 1st Quarter FY 2024 = $23,219
5. Projected carryover into FY 2025 = $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 IT support activities at NNSS (IPD3)	🟦	
Q2	Provide a status report on IT support activities at NNSS (IPD3)		
Q3	Provide a status report on IT support activities at NNSS (IPD3)		
Q4	Provide a status report on IT support activities at NNSS (IPD3)		

ACCOMPLISHMENTS

- IPD3 – IT support at NNSS
    - *JLON IT is in the process of making major upgrades to NTS SLAN, which should drastically improve access within the DAF.*
    - Continuing weekly visits to NCERC to troubleshoot issues.
    - Maintaining networks, security upgrades.
    - Inspection of equipment for Control Room Upgrades.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter

    AND
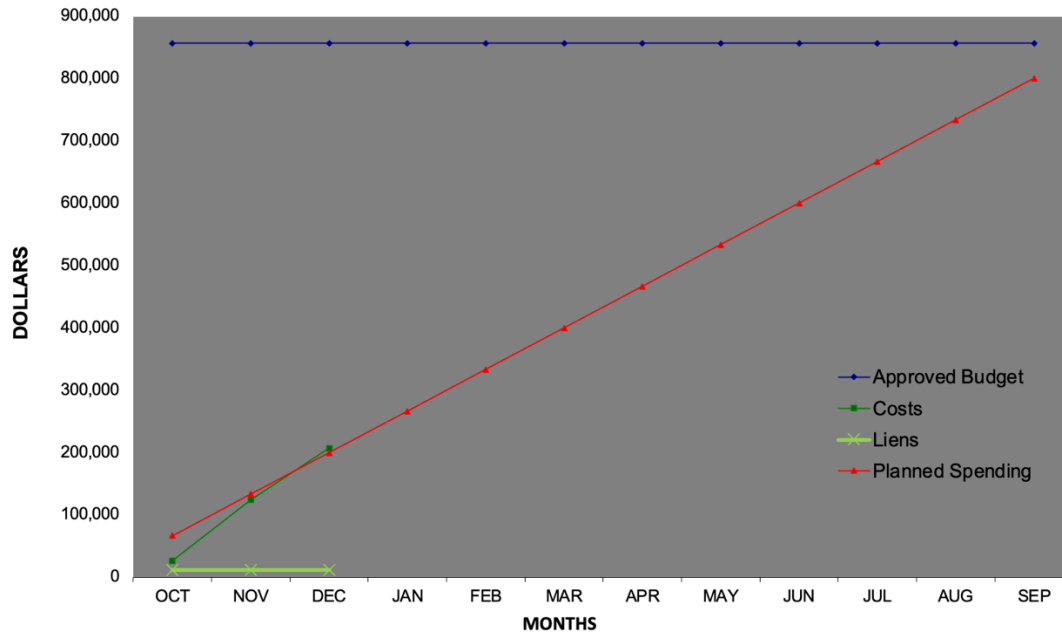- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: IPD1, 2, 5	Reference: DP0909010
M&O Contractor Name: LLNL	Date of Report: January, 2024
Point of Contact Name: Catherine Percher	
Point of Contact Phone: (925) 579-4226	

BUDGET

1. Carryover into FY 2024 = $156,774
2. Approved FY 2024 Budget = $700,000
3. Total FY24 Budget w/Carryover = $856,774
4. Actual spending for 1st Quarter FY 2024 = $207,092
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $56,000

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	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)	⬛	
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 a status report on IT support at NNSS (IPD5)	■	
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 on IT support at NNSS (IPD5)		
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 on IT support at NNSS (IPD5)		
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 on IT support at NNSS (IPD5)		
ACCOMPLISHMENTS			

- IPD1 - Conduct ICSBEP for Benchmarks of the 5-Year Plan and publish annual revision to the Handbook
  - Finalized editing of 2023 benchmark evaluations (formatting and integration into the handbook file structure), including five (out of 8) NCSP benchmarks
  - Finalized editing of 2022 benchmark evaluations, including three (out of 7) NCSP benchmarks- unanticipated task due to retirement and inaccessibility of previous editor (L. Scott)
  - Updated all handbook documentation for combined 2022/2023 release
  - Five NCSP benchmarks are anticipated at the 2024 ICSBEP Technical Program Review, to be held in April 2024 at LLNL
    - Pulsed-Neutron Die-Away Experiments with HDPE and PMMA Targets (LLNL)
    - TEX-HEU Critical Benchmarks with Hafnium (LLNL)
    - High Multiplication Subcritical Benchmark at Sandia National Laboratory LEU SPR/CX Facility (LLNL)
    - Flattop Reevaluation (LANL)
    - PU-MET-FAST-047: Jupiter Plutonium and Lead Void Critical Experiments (LANL)
- IPD2 - Maintain the NCSP Website and Systems
  - Updated documents, links, calendars, taskings, newsletters, photos/portraits, created art for updated banners.
  - Maintained lists of email subscribers for various "group" emails used by NCSP management.
  - Deployed NCSP 2024 Technical Program Review registration and information page
  - Maintained and updated registration pages for NCSP Hands-on classes for FY24 schedule
- IPD5 - IT Support at NNSS
  - Replacement for Brian Musick obtained her clearance in Q1 (Rosie Acero) and classified IT support has also been supplemented by LLNL main site personnel
  - Provided ISSM/ISSO and System Administrator 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 throughout the quarter.
  - NTS-SLAN SharePoint site creation for user account creation/tracking (On-going)
  - Transitioning System Administrator role for NTS-LAN to LANL support team

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019

Q1	none
Q2	
Q3	
Q4	

NCSP Element and Subtask: IPD3, 4, 5	Reference: DP0909010
M&O Contractor Name: ORNL	Date of Report: January 20, 2024
Point of Contact Name: Doug Bowen	
Point of Contact Phone: (865) 576-0315	

BUDGET

FY24 Information Preservation and Dissemination

Legend: Approved Budget — Costs — Planned Spending

1. Carryover into FY 2024 = $71K
2. Approved FY 2024 Budget = $150K
3. Total Approved FY 2024 Budget w/Carryover = $221K
4. Actual spending for 1st Quarter FY 2024 = $15K
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
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 the development of the NCSP repository at OSTI.gov. (IPD3)	[blue]	
Q1	Provide a status report on the development of the NCSP LFE database (IPD4)	[green]	

Q1	Provide a status report about the progress on the HPRR CAAS benchmark. (IPD5)		
Q2	Provide a status report on the development of the NCSP repository at OSTI.gov. (IPD3)		
Q2	Provide a status report on the development of the NCSP LFE database (IPD4)		
Q2	Provide a status report about the progress on the HPRR CAAS benchmark. (IPD5)		
Q3	Provide a status report on the development of the NCSP repository at OSTI.gov. (IPD3)		
Q3	Provide a status report on the development of the NCSP LFE database (IPD4)		
Q3	Provide a status report about the progress on the HPRR CAAS benchmark. (IPD5)		
Q4	Provide a status report on the development of the NCSP repository at OSTI.gov. (IPD3)		
Q4	Provide a status report on the development of the NCSP LFE database (IPD4)		
Q4	Provide a status report about the progress on the HPRR CAAS benchmark. (IPD5)		

ACCOMPLISHMENTS

- IPD3 – Nuclear Criticality Safety Repository
  - Description of Project Services
    - OSTI.GOV will curate individual records associated with the Nuclear Criticality Safety Program (NCSP) to be made discoverable at OSTI.GOV.
  - Completed Work
    - Curation for this quarter has been completed. The team prioritized new records and curated 50 new records. The team then focused on the second batch of usable records with 513 records curated from this set. During this quarter, we curated 3 Tech Reports, 556 Conference Products, and 4 Accepted Manuscripts. This makes for a cumulative 3,697 records curated so far.

Product Type	Existing Curated	New Curated	Totals	Cumulative
Tech Reports	2	1	3	832
Conference Products	508	48	556	2747
Accepted Manuscripts	3	1	4	116
Patents	0	0	0	1
Books	0	0	0	1
Totals	513	50	563	→ 3697

- o Current Work
  - ▪ Per customer direction, team members are prioritizing curation of new records on delivery. The team is presently continuing the curation of the usable records from the second 10,000 searches, with a current focus on conference products.
- o Projected Work
  - ▪ With the completion of the searches for the second half of the Bibliography document, a spreadsheet containing the metadata of the 9,943 records with matches was submitted for analysis and completed. The NCSP Team will continue the curation process for those records that were determined to be usable. Additionally, new records for the NCSP project will be prioritized for curation when they are released to the team.
- o Work in Q1 was reduced to adjust for FY24 CR funding schedule.
- IPD4 – Learning From Experience (LFE) database
- IPD4 – Learning from Experience (LFE) database
  - In FY2024 Q1, ORNL (Bowen/Prichard), IRSN (Bardelay), and the UK (Davis, Hill, Payne) discussed topics to get the LFE Database running on the NCSP website.
    - Create a programme plan
    - Determine the logistics of where the database will 'sit'
    - Getting people to start using the database and advertising it
    - Understand how best to populate data and events
    - How to gather feedback from organisations
    - How to implement improvements into the database. Pam Williams at LLNL has been providing advice about what can be implemented in a website format.
- IPD5 – Oak Ridge Health Physics Research Reactor CAAS Benchmark Evaluation
  - o A subgroup of reviewers was created for the updated evaluation submission to SINBAD. A first version of the evaluation update is planned to be finished during Q2, with at least the evaluated results related to neutron fluence experiments with different shield.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND

- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: IPD1	Reference: DP0909010
M&O Contractor Name: SRNS	Date of Report: January, 2024
Point of Contact Name: Scott Finfrock	
Point of Contact Phone: 803-557-1317	

BUDGET

SRS IP&D 1 Funds FY24

Chart: $K Values (y-axis, $0 to $35) vs FY24 Quarter (x-axis, 1 to 4)
Legend: Apprvd Budget, Costs, Plan Spnd
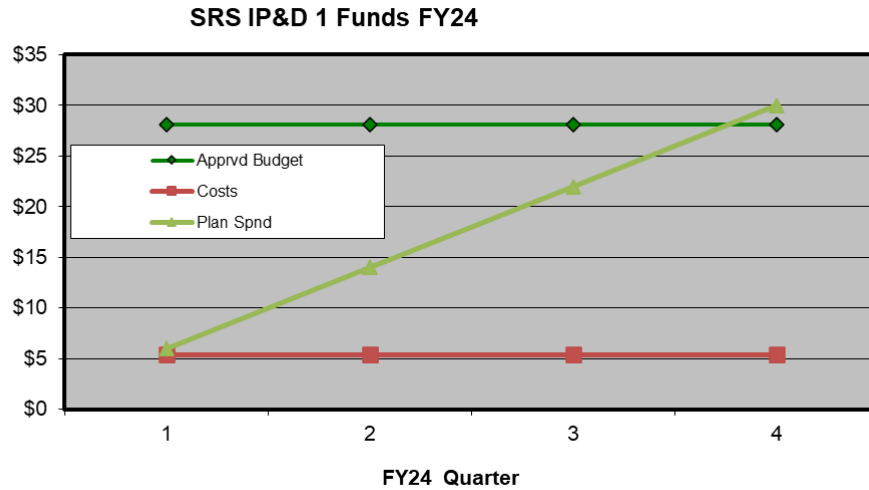
1. Carryover into FY 2024 = $16,122
2. Approved FY 2024 Budget = $28,050
3. Total FY 2024 Budget w/Carryover = $44,172
4. Actual spending for 1st Quarter FY 2024 = $5,387
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $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)	[blue]	
Q1	Complete beta version of new database. (IPD1)	[blue]	
Q2	Provide status reports on progress with CritView. (IPD1)	[green]	

Q3	Provide status reports on progress with CritView. (IPD1)	🟩	
Q3	Complete verification testing and finalize code/database version. (IPD1)	🟩	
Q4	Provide status reports on progress with CritView. (IPD1)	🟩	
Q4	Obtain clearance for public release of the code and data. (IPD1)	🟩	
Q4	Deliver final product (code and database) to LANL. (IPD1)	🟩	

ACCOMPLISHMENTS

- IPD1 – ARH-600 Reissue (CritView)
  - Beta version of CritView code complete
  - Beta version of revised CritView database complete

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

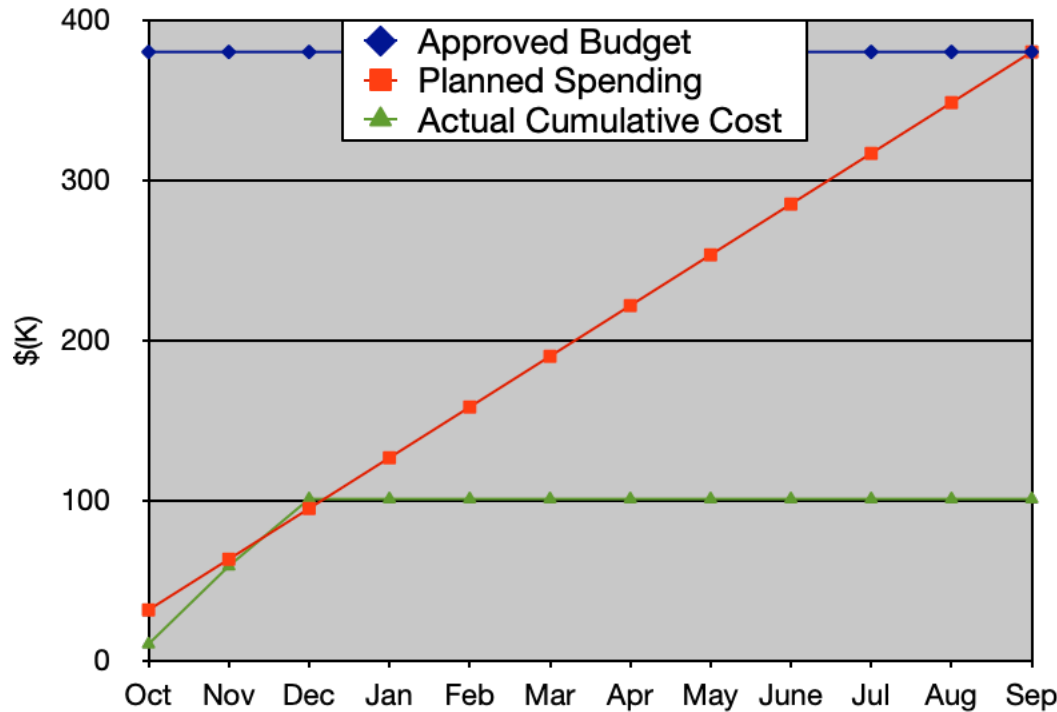| NCSP Element and Subtask: ND1	Reference: DP0909010
M&O Contractor Name: BNL	Date of Report: January, 2024
Point of Contact Name: Gustavo Nobre	
Point of Contact Phone: 631-344-5205	

BUDGET

1. Carryover into FY 2024 = $ 44,146
2. Approved FY 2024 Budget = $ 336,000 (Enacted CR)
3. Total FY 2024 Budget w/Carryover = $ 380,146
4. Actual spending for 1st Quarter FY 2024 = $ 101,009
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025= $ 19,007
   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 on all ND1 activities in the NCSP Quarterly Progress Reports. (ND1)		Maintenance and development of ADVANCE, implemented wiki page to store automated reports on files.

Q1	If mandated by CSEWG, release new ENDF library. (ND1)	🟩	Adjusted timeline for ENDF/B-VIII.1 release, identified issues needed to be addressed before Beta3 release
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 ND1 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 ND1 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 ND1 activities in the NCSP Quarterly Progress Reports. (ND1)		
Q4	If mandated by CSEWG, release new ENDF library. (ND1)		

ACCOMPLISHMENTS

- ND1 - National Nuclear Data Center (NNDC) Support to the NCSP
  - ENDF/B library management
    - Coordinated and hosted 2023 CSEWG/NDAG meetings in BNL
    - Presented at CSEWG about the status of ENDF/B-VIII.1 release
    - Identified improvement needs necessary for Beta3 release
    - Coordinated evaluation contributions, file uploads, reviews, fixes, in preparation for ENDF/B-VIII.1-Beta3 release, which should be released early FY24 Q2
  - ENDF/B evaluations
    - Coordinated collaboration plans with RPI, NNL, ORNL to work on 90,91Zr evaluations.
  - ADVANCE:
    - We have been actively involved in the development and maintenance of the update_wikis job and its associated code. During the execution of the "update_wikis" job as part of a ENDF library's repository CI/CD pipeline, it automatically updates the repository's Wiki with information about changes made to the ENDF library, ensuring that they remain up-to-date and accurate for users in the scientific community.

	• Our contributions also extend to guidance on adding isotopes to the Wiki. Whether users need to manually add a few entries or automate the process for numerous entries, comprehensive instructions are available. Additionally, insights are provided into backing up, restoring, or deleting repository Wikis, offering a well-rounded approach to managing these essential resources for the ENDF library.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter

  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: ND1, 2, 2a **M&O Contractor Name**: LANL **Point of Contact Name:** Joetta Goda/Bob Little **Point of Contact Phone:** 505-667-2812/505-665-3487	**Reference:** DP0909010 **Date of Report:** January 19, 2024
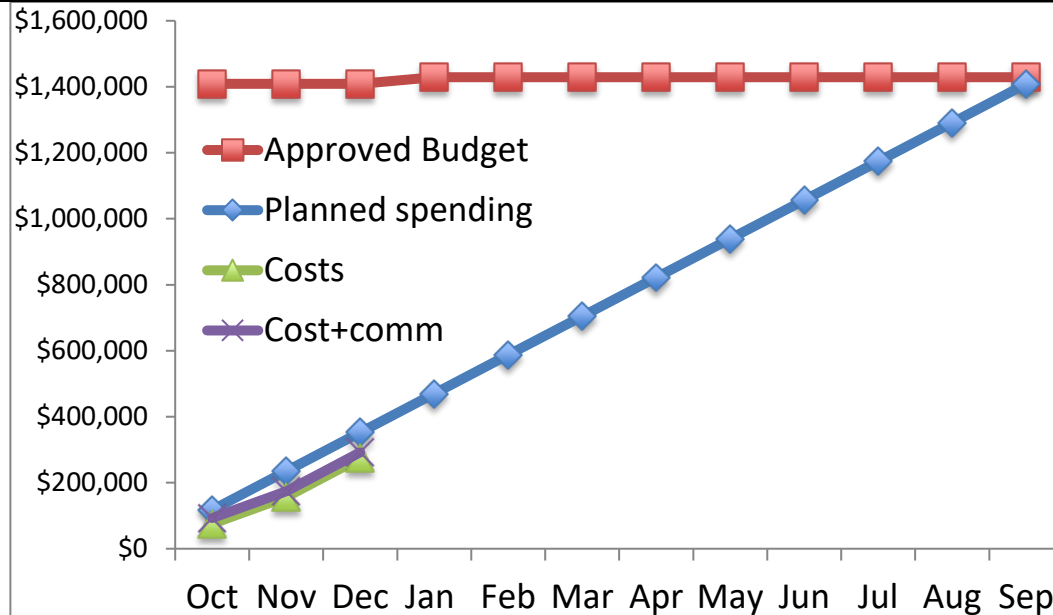
BUDGET

1. Carryover into FY 2024 = $20,000
2. Approved FY 2024 Budget = $1,409,000
3. Total FY24 Budget w/Carryover = $1,429,000
4. Actual spending for 1st Quarter FY 2024 = $274,676
   plus commitments of $17,467 for total of $292,143
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
   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 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.1 at CSEWG. (ND1)		

|			
Q1	Provide a status report on Nuclear Data measurements at LANSCE (ND2)	█	
Q1	Provide status report on Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium-240 (ND2a)	█	
Q2	Provide a status report on LANL participation in US and International Nuclear Data collaborations. (ND1)		
Q2	Provide a status report on Nuclear Data measurements at LANSCE (ND2)		
Q2	Provide status report on Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium-240 (ND2a)		
Q3	Provide a status report on LANL participation in US and International Nuclear Data collaborations. (ND1)		
Q3	Provide a status report on Nuclear Data measurements at LANSCE (ND2)		
Q3	Provide status report on Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium-240 (ND2a)		
Q4	Provide a status report 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 a status report on Nuclear Data measurements at LANSCE (ND2)		
Q4	Deliver nuclear data measurements as indicated in Appendix B of the Five-Year plan. (ND2)		
Q4	Provide status report on Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium-240 (ND2a)		

ACCOMPLISHMENTS

- ND1 – Nuclear Data Evaluation and Testing
  - Light Nuclei
    - Extended the analysis of the ^{13}C system to higher energies ($E_n \sim 10$ MeV) by adding more data and including the alpha+^{9}Be channel. The status of this analysis was reported (virtually) at the IAEA's Technical Meeting on Neutron Standards, Vienna, 9-13 October 2023, in the presentation "Recent Light-Element Standards-Related Work at Los Alamos," by G. Hale, M. Paris, and H. Sasaki (LA-UR- 23-31876).
    - Reviewed the data testing results for the n+^{9}Be file submitted for ENDF/B-VIII.1 beta3, and decided to revert back to the ENDF/B-VIII.0 version, except for changes that had been made in the capture cross section that substantially improved the agreement with

Flattop critical assemblies. The changes involved allowing resonance structure in the capture cross section at MeV energies. We are looking also at the (n,2n) spectra in the VIII.0 file as a possible source of discrepancies in the data testing for Be-reflected critical assemblies.

- Continued to collect new n+^{6}Li data for the ^{7}Li analysis and alpha+^{13}C data for the ^{17}O analysis that will form the basis of our next ENDF evaluations of n+^{6}Li and n+^{16}O cross sections.

o Cl-35

- A new Cl35 evaluation that based on both the new CoH calculation and LENZ experimental data for (n,p) was produced. The file was processed with NJOY to create an ACE file, and we confirmed the file properly works with MCNP simulations.
- The Cl35 covariance evaluation is underway. We expect an initial covariance file will be prepared by the end of January.

o La-139

- We have constructed the covariances and just need to compare them to experimental uncertainties then put them into ENDF format. However, we are still planning an adjustment of the uncertainties as it is well known that the uncertainties from Kalman underestimate the experimental uncertainties. We show in the figure below an example of the correlation matrix (left) and Kalman uncertainties (right).
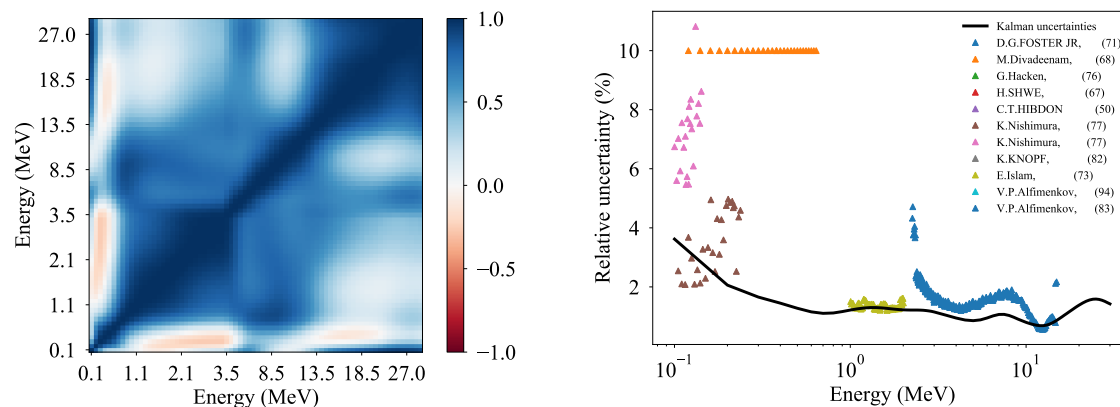
Correlation matrix (left) and Kalman uncertainties (right) for the total cross section for neutron-induced reactions on ^{139}La.

o Ta-181

- A minor correction has been made to the Ta181 evaluation - (n,2n) cross section in the threshold region was decreased by adjusting optical model real volume depth and radius for the second emitted neutron.
- Work on formatting the cross-reaction correlations is in the final stage.

o Actinides

- Consistent nu-bar evaluation supported by a model code to provide better evaluated nu-bar for minor Pu-isotopes

- - - The evaluation was re-run with updated Pu nubar sensitivities to include more flexibility in the model. This was to try to resolve previous mismatch between CGMF and experimental data for ^{238}Pu in particular, but also at higher incident energies.
      - There were continued discussions on the model flexibility question and quality of the experimental data for ^{238}Pu. As a result, we investigated the <TKE> needed to match all 5 nubar values to ENDF at thermal to check the systematics.
      - We had a discussion on how to format MF=31 covariances between isotopes.
    - U-238 PFNS
      - Performed several evaluations of the U-238 PFNS. Getting close to a final result.
      - Re-did experimental UQ of Chi-Nu experimental data for the evaluation as we needed data on a slightly different grid. Thanks to our experimental colleagues for re-running their data to agree with the evaluation grid.
    - Pu-240 PFNS
      - Reviewed Chi-Nu Pu-240 PFNS paper from evaluator viewpoint.
      - Did experimental UQ of Chi-Nu Pu-240 PFNS.
      - Did experimental UQ of Smith Pu-240 PFNS (only other n-induced Pu-240 PFNS).
 - Publications and Presentations
    - I Stetcu, Consistent nuclear data evaluations for criticality safety, contributing talk at the 12th International Conference on Nuclear Criticality (ICNC 2023), Sendai, Japan. (note that this presentation was submitted with the FY23 Q4 report)
    - D. Neudecker et al., "Templates of expected measurement uncertainties"' (https://doi.org/10.1051/epjn/2023014), EPJ Nuclear Sci. Technol. 9, 35 (2023). This publication makes use of UQ work undertaken as part of NCSP evaluations.
- ND2 – Nuclear Data Measurements at LANSCE
  - U-233 PFNS at Chi-Nu (experiment to be conducted during FY25)
    - An order was placed for ^{233}U from ORNL NIDC. Work on making foils at LLNL is ready to begin once this order is delivered, and the PPAC components are already purchased.
  - Cl-35 (n,p) (experiment to be conducted with LENZ at Lujan during FY24-FY25)
    - Since this is the first effort of moving the LENZ instrument for measuring (n,p) and (n,α) reactions to the Lujan Center, a beam characterization study was deemed crucial. This study included beam-induced background estimations at Flight Path 12. Beam images were taken for characterizing the beam size and shape as well as the uniformity of the beam spot. Based on this initial study, additional collimators were designed and fabricated to further optimize the beam quality to fit to high precision (n,z) reaction studies such as ^{35}Cl(n,p).
  - U-233 (n,gamma) (DANCE analysis completed during FY22)
    - The ^{233}U(n,γ) capture to fission ratio results were presented at the IAEA Technical Meeting of the International Nuclear Data Evaluation Network on Nuclear Data Evaluation of Fissile Actinides held in Vienna, Austria, from 20 to 23 November 2023 (LA-UR-23-32057). The data were sent to EXFOR.
  - Nd-143 analysis of previous DANCE and DICER data (analysis completed in FY23)

- - The 143Nd results were presented in the 2023 Fall Meeting of the Division of Nuclear Physics of the APS and JPS (DNP-2023) held in Hawaii from the 27th of November to the 2nd of December, 2023 (LA-UR-23- 33028).
  - Pu-239 transmission measurements at DICER (experiment planned for FY24)
    - A re-evaluation of the sample canisters was deemed necessary due to concerns that were raised during the experiment safety review. Instead of the Teflon canisters that were proposed, tungsten containers, sealed with Pb spherical plugs will be used. Those canisters were used in a previous experiment at DICER and they appear to be resilient to corrosion and leakage. A cartoon of the canister is shown in the next figure. Effort was put into inspecting multiple W canisters and Pb plugs, that are within the engineering tolerances, suitable for an experiment at DICER.
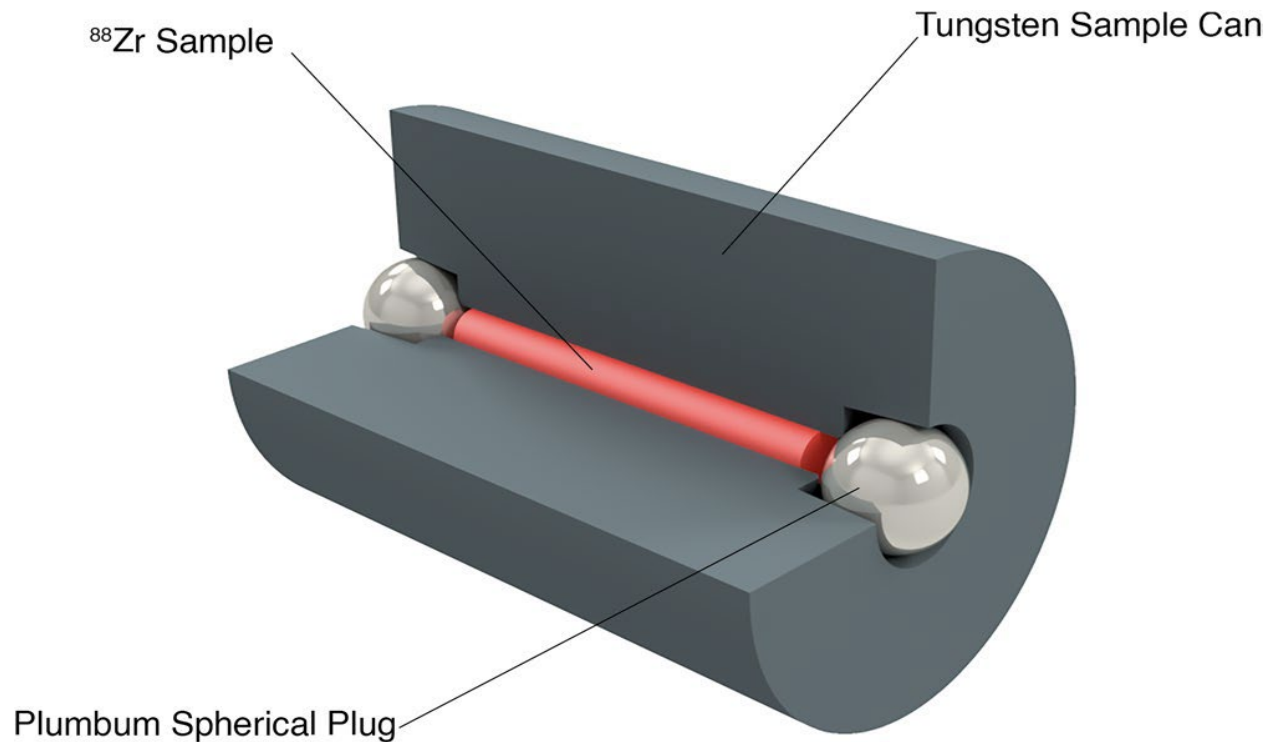
  - Cs-133 (n,gamma) measurement at DANCE (experiment planned for FY25)
    - Several possible ^{133}Cs compounds were considered and studied in the selection of the sample material. The most suitable of them seems to be CsF. The ^{133}Cs(n,γ) and ^{19}F(n,γ) cross sections are shown in the figure below.
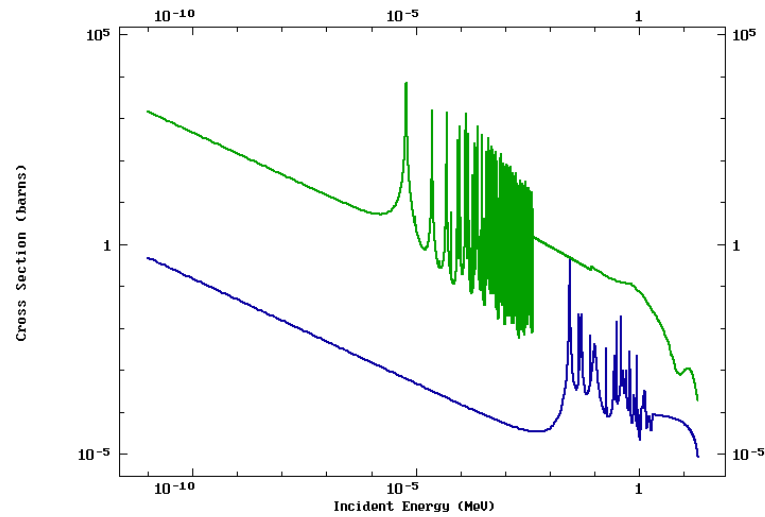
^{133}Cs(n,γ) (green line) and ^{19}F(n,γ) (blue line) ENDF/B-VIII.0 cross sections as a function of the incident neutron energy.

- ▪ Calculations to estimate the sample mass and beamtime required for the experiment are being performed.
- o Cs-133 transmission experiment at DICER (experiment planned for FY25)
  - o Substantial effort was put into procuring two pure Cs foils of 1cm in diameter and 1um/8um in thickness that will be installed in the DICER sample canisters. Cs is pyrophoric, therefore the request included to avoid the use of hydrogenated oils, since hydrogen compounds are not favorable for neutron transmission. Unfortunately, the search of a neutron transmission-suitable atmosphere was not fruitful.
  - o Instead, the CsF compound was found to be the most suitable so far for a neutron transmission experiment since fluorine is practically neutron transparent. Calculations were performed to estimate two suitable amounts of materials to target different incident neutron energies. A 2.5 and a 20 mg sample were found to be efficient for an experiment at DICER. The following images show the expected neutron transmission for 1e-3 at/b (2.5 mg) and 8e-3 at/b (20 mg) at DICER. ENDF/B-VIII.0 resonance parameters were used to perform the estimations.
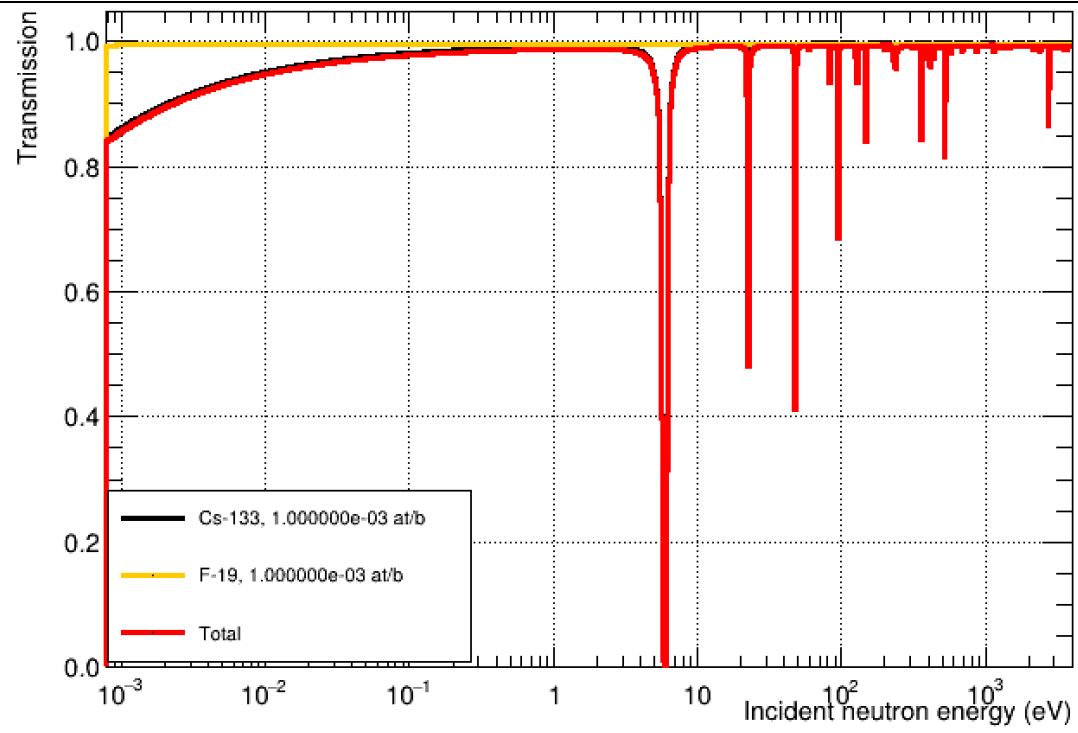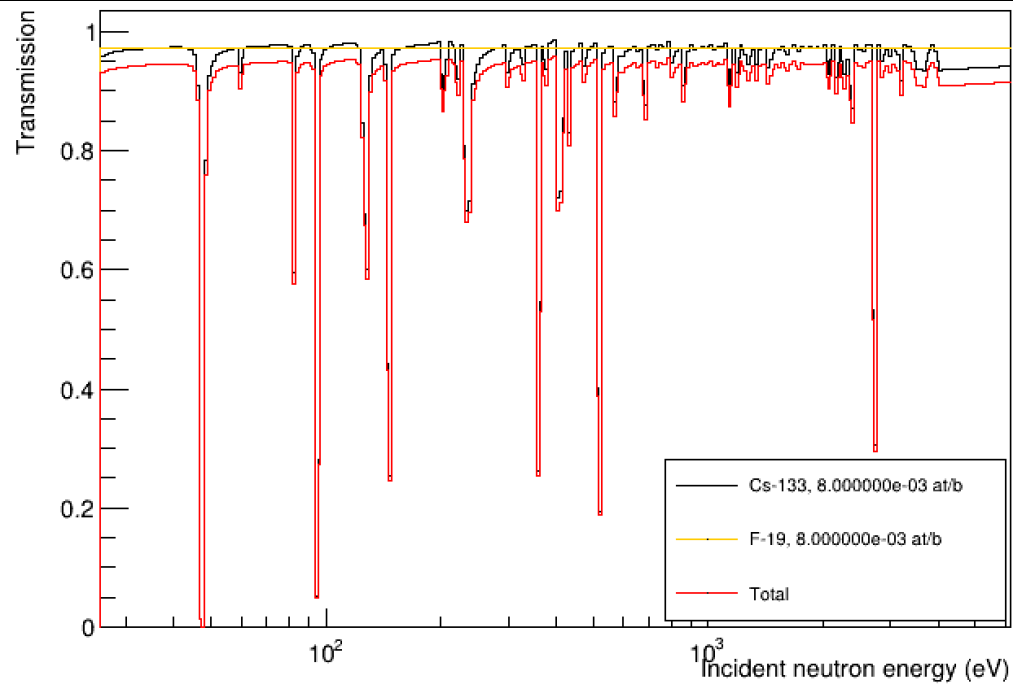
- ND2a – Prompt Fission Neutron Spectra (PFNS) Measurement of Plutonium 240 (Chi-Nu analysis completed during FY23)
  - A draft paper on the LANSCE/Chi-Nu measurement of ^{240}Pu(n,f) prompt fission neutron spectra has been prepared, and is expected to be ready for submission to Phys. Rev. C in Q2.
- CSEWG (Cross-cutting all tasks)
  - As noted in the Winter 2023 NCSP Newsletter, Los Alamos had 28 participants at the November CSEWG meeting, a dozen more than any other Laboratory!
  - We chaired the Covariance session.
  - Los Alamos contributed 14 presentations on topics that included:
    - Neutron, charged-particle, and fission-product yield evaluations
    - Covariance evaluations
    - Data testing and validation of ENDF/B-VIII.1 beta
    - LANSCE experiments and analyses

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter

AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	G. Hale, M. Paris, and H. Sasaki, "Recent Light-Element Standards-Related Work at Los Alamos," presented at IAEA Technical Meeting on Neutron Standards, Vienna, Austria, 9-13 October 2023 (LA-UR-23-31876).
Q1	D. Neudecker et al., "Templates of expected measurement uncertainties," (https://doi.org/10.1051/epjn/2023014), EPJ Nuclear Sci. Technol. 9, 35 (2023) (LA-UR-23-23484).
Q1	Esther Leal Cidoncha, "Measurement of the neutron-induced capture-to-fission cross section ratio in U-233 at LANSCE," presented at IAEA Technical Meeting of the International Nuclear Data Evaluation Network on Nuclear Data Evaluation of Fissile Actinides, Vienna, Austria, 20-23 November 2023 (LA-UR-23-32057).
Q1	Esther Leal Cidoncha, Athanasios Stamatopoulos, and Paul Kohler, "R-Matrix analysis of the neutron-induced cross sections on Nd-143 measured at LANSCE," presented at the 2023 Fall Meeting of the Division of Nuclear Physics of the APS and JPS (DNP-2023), Hawaii, 27 November - 2 December, 2023 (LA-UR-23-33028).
Q2	
Q3	
Q4	

NCSP Element and Subtask: ND12, 13	Reference: DP0909010
M&O Contractor Name: LLNL	Date of Report: January, 2024
Point of Contact Name: Catherine Percher	
Point of Contact Phone: (925) 579-4226	

BUDGET

1. Carryover into FY 2024 = $92,363
2. Approved FY 2024 Budget = $430,000
3. Total FY24 Budget w/Carryover = $522,363
4. Actual spending for 1st Quarter FY 2024 = $
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $34,400

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 thermal scattering law evaluations and methods development (ND12)		
Q1	Provide a status report on PPAC target fabrication (ND13)		
Q2	Provide a status report on thermal scattering law evaluations and methods development (ND12)		

Quarter	Deliverable		
Q2	Provide a status report on PPAC target fabrication (ND13)		
Q3	Provide a status report on thermal scattering law evaluations and methods development (ND12)		
Q3	Provide a status report on PPAC target fabrication (ND13)		
Q4	Provide a status report on thermal scattering law evaluations and methods development (ND12)		
Q4	Provide a status report on PPAC target fabrication (ND13)		

ACCOMPLISHMENTS

- ND12 – Thermal Scattering Law Evaluations and Methods Development
  Generation and Benchmarking of Thermal Neutron Scattering Cross Sections in Support of Advanced Nuclear Reactor Concepts
  - NCSU progressed on the TSL evaluations of U_3Si_2 and U_3O_8 (NCSP's Appendix B materials). Initial thermal scattering data sets are under examination.
  - NCSU completed work on the TSL evaluations that will be part of ENDF/B-VIII.1 release (see past QPRs for a listing of the specific evaluations). This represents 66 new and updated evaluations. All evaluations progressed to Phase 3 stage.
  Development and Implementation of a Modern Doppler Broadening Approach Including Atomic Binding Effects
  - NCSU progressed on the integration of the Doppler broadening operation into *FLASSH*. The integrated capability is undergoing testing.
  Development and Implementation of Machine Learning Methods for Thermal Scattering Law Evaluations
  - NCSU progressed on the integration of NeTS modules into the Monte Carlo code Serpent. In addition, optimization continues on the speed of executing Serpent-NeTS analysis.
- **ND13 – PPAC Target Fabrication- MIHL**
  - The hardware was prepped for the electrodeposition and we are waiting for the enriched ^{233}U from ORNL before the targets can be fabricated. The PPAC chamber purchase request has been made and the contract with a vendor is in progress. On track for MIHL item for completing fabrication of the ^{233}U PPAC this year.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference

	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	none
Q2	
Q3	
Q4	

NCSP Element and Subtask: ND1, 2, 3, 6, 9 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, 2024

BUDGET

FY24 Nuclear Data

Chart legend: Approved Budget, Costs, Planned Spending. Y-axis: $(K) from - to 2,500. X-axis: Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
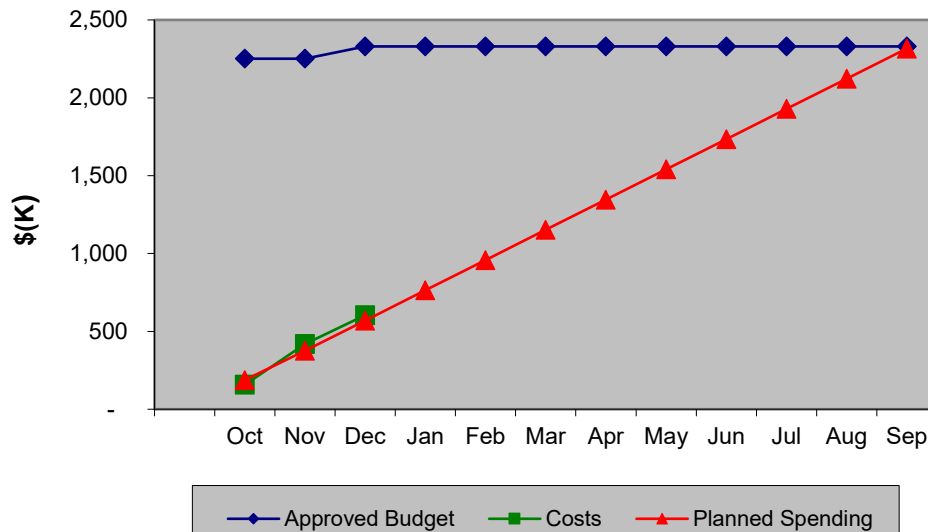
1. Carryover into FY 2024 = $256K
2. Approved FY 2024 Budget = $
3. Total FY 2024 Budget w/Carryover = $2,251K
4. Actual spending for 1st Quarter FY 2024 = $604
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $

NOTE: Include commitments as part of spending

Increase in budget Dec-to-Jan is a transfer from RSICC and SCALE to cover ND staff with NCSP Manager Approval. A total of $78.8k was transferred in G2 from AM to ND in Dec. 2023.

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 all Nuclear Data measurement activities (ND1)		
Q1	Provide a status report 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)		

Q	Deliverable	Status	
Q1	Complete cross-section measurement deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND1)	🟩 (green)	
Q1	Provide a status report on all Nuclear Data evaluation and testing activities (ND2)	🟦 (blue)	
Q1	Provide a status report 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 (ND2)	🟦 (blue)	
Q1	Complete cross-section evaluation deliverables per the nuclear data schedule in Appendix B (ND2)	🟩 (green)	
Q1	Provide a status report on all isotopic sample lease activities (ND3)	🟦 (blue)	
Q1	Provide a status report on all SAMMY nuclear data evaluation code modernization activities (ND6)	🟦 (blue)	
Q1	Provide a status report on evaluation of thermal and resolved resonance ranges of UO2 and PUO2 activities (ND9)	🟦 (blue)	
Q2	Provide a status report on all Nuclear Data measurement activities (ND1)		
Q2	Provide a status report 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 deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND1)		
Q2	Provide a status report on all Nuclear Data evaluation and testing activities (ND2)		
Q2	Provide a status report 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 (ND2)		
Q2	Complete cross-section evaluation deliverables per the nuclear data schedule in Appendix B (ND2)		
Q2	Provide a status report on all isotopic sample lease activities (ND3)		

Q2	Provide a status report on all SAMMY nuclear data evaluation code modernization activities (ND6)		
Q2	Provide a status report on evaluation of thermal and resolved resonance ranges of UO2 and PUO2 activities (ND9)		
Q3	Provide a status report on all Nuclear Data measurement activities (ND1)		
Q3	Provide a status report 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 deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND1)		
Q3	Provide a status report on all Nuclear Data evaluation and testing activities (ND2)		
Q3	Provide a status report 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 (ND2)		
Q3	Complete cross-section evaluation deliverables per the nuclear data schedule in Appendix B (ND2)		
Q3	Provide a status report on all isotopic sample lease activities (ND3)		
Q3	Provide a status report on all SAMMY nuclear data evaluation code modernization activities (ND6)		
Q3	Provide a status report on evaluation of thermal and resolved resonance ranges of UO2 and PUO2 activities (ND9)		
Q4	Provide a status report on all Nuclear Data measurement activities (ND1)		
Q4	Provide a status report 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 deliverables per the nuclear data schedule in Appendix B of the 5 Year Plan (ND1)		
Q4	Provide a status report on all Nuclear Data evaluation and testing activities (ND2)		

Q4	Provide a status report 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 (ND2)		
Q4	Complete cross-section evaluation deliverables per the nuclear data schedule in Appendix B (ND2)		
Q4	Provide a status report on all isotopic sample lease activities (ND3)		
Q4	Provide a status report on all SAMMY nuclear data evaluation code modernization activities (ND6)		
Q4	Provide a status report on evaluation of thermal and resolved resonance ranges of UO2 and PUO2 activities (ND9)		

ACCOMPLISHMENTS

- **Status report on all nuclear data support activities.**
  - Attendance of **INDEN meeting** at IAEA on structural material evaluations (Vienna).
  - Attendance of **INDEN meeting** at IAEA on fissile nuclei evaluations (Vienna).
  - ORNL contributions to new **ENDF/B-VIII.1 library paper**.
  - ORNL testing and processing of the new **ENDF/B-VIII.1 library.**
  - All ND group member attended the **CSEWG meeting** at BNL.
  - Staff members attended the **NDAG meeting** at BNL.
  - Luiz Leal awarded the Seaborg Medal at the **ANS winter meeting**.

- ND1 - Nuclear Data Measurements
  - No **Zr-92** experiments performed due GELNA break down. RF window broke, no replacement, new windows are on order, expect to be delivered beginning 2024. No operation of GELINA is anticipated until spring.
  - Began development of Python-based data-reduction software to replace aging Geel codes. Comparison between current AGL (Geel) code and new Python code continues, weighting function scheme does not match perfectly yet.
  - **Natural Zr** capture data reduction for several sample thicknesses continued (low priority).

- ND2 – Nuclear Data Evaluations and Testing
  - ^{233}**U evaluation**: test of the criticality benchmarks and related discussion. Particular focus was devoted to improve the benchmark performance of thermal solution, which in the current beta2 ENDF release, is showing degraded performance by overestimating the benchmark criticality. A new file was submitted for the beta3 ENDF release showing an improved performance even over ENDF8 library. In doing this, particular attention was paid to the average magnitude of the capture channel whose correct magnitude is difficult because of its small magnitude compared to the fission channel.

- o **35,37Cl** set up of the working directory for the RRR evaluation analysis including SAMMY inputs and measured data. A large portion of transmission data measured on natural sample between 8 keV and about 1 MeV was found missing in the EXFOR entry. This set of data was recovered and sent to NNDC for proper inclusion into the EXFOR library. Initial testing shows reasonable agreement with the measured data except, of course, for the (n,p) reaction channel above 300 keV. The current evaluation uses the energy dependent boundary condition B=S(E). Some work is needed to adapt the current evaluation to the formally correct B=-l boundary condition. This work is in progress.
  - o ^{14}N initial work to implement in SAMMY a set of parameters developed by multi-channel analysis of the 15N compound nucleus.
  - o **V** capture and transmission data analysis and evaluation for data using various sample thickness have been finalized. Data file for EDNF library was produced performance tested. A publication is in preparation.
  - o The ^{139}**La** evaluation has progressed, focusing on the *R*-external function parameters appropriate to describe the cross sections in the thermal region as well as above the resolved resonance region (that is, above 40 keV). Preliminary fitting of parameters for the unresolved resonance region has been performed from 40 keV to 100 keV.
  - o The evaluation of **copper** isotopes was revisited and discussed at the INDEN meeting in December. INDEN colleagues (Roberto Capote and Andrej Trkov) suggested files for ^{63,65}**Cu** that reduce the elastic scattering cross section above 100 keV (above the resolved resonance region). Preliminary testing of the files shows that this allows good integral benchmark performance while having elastic scattering angular distributions that derive from the Popov differential data.

- ND3 - Isotopic Sample Leases to Support ND1 ND Measurements
  - o Extending the lease for ^{92}Zr sample due to return end of FY24 Q2.
  - o Zr94 lease approved by DOE. Sample fabrication started.

- ND6 – SAMMY Nuclear Data Evaluation Code Modernization
  - o Presented an overview of SAMMY developments at CSEWG.
  - o Development and testing of the SAMMY code for the multiple incident channel module of great importance for light nuclei evaluations. Evaluation work on the 7Be compound nucleus was used for additional tests of the new module. The testing and development for the multiple incident channel module for one isotope samples was finished and is now available on the external facing SAMMY web site.
  - o Currently SAMMY relies on the fact that the index of all adjustable parameters into the covariance matrix is strictly monotonically increasing as determined by an initial ordering of resonance, broadening, normalization, and resolution parameters. The updates to make this order no longer necessary continued this quarter and the updated code is now ready for review. The updates include the use of a common C++ parent class for all objects, except resonance parameters, for all types of adjustable parameters. The update was made more difficult as adjustment flags are sometimes in stored in two different variables. An attempt was made to eliminate this duplication, but it is still present for some cases, especially for miscellaneous parameters. This update will be invaluable in the update of SAMAMR functionality (sequential fitting of different experiments with different normalizations and experimental conditions). This is currently only available for a very restricted set of parameters and only if no pup'ed parameters (parameters that are included in the covariance but are not adjusted) are present. It is also not very user-friendly.
  - o Work continued to convert the documentation from a word document to LaTex, with emphasis on the URR.

- o Work started to read and write the external R-Matrix parameters to an ENDF formatted files. SAMMY can use and fit these parameters but is not currently able to save them into an ENDF formatted file for inclusion into nuclear data libraries.

- ND9 – Evaluation of Thermal and Resolved Resonance Ranges of UO_2 and PUO_2
  - o Preliminary work on experimentally validating the methods has started, with the goal of submitting a proposal for measurements at the SNS for the next beam cycle. Isotopes that contain a resonance in the thermal range are being scrutinized to determine the best material to obtain high-resolution, double-differential scattering cross sections from.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	Marco Pigni, Dorothea Wiarda, Jordan McDonnell, "Light Elements R-matrix Analyses with the SAMMY Code towards the Foundation of Charged-particle Nuclear Data Libraries," Cross Section Evaluation Working Group Meeting, Upton, NY, November 2023.
Q1	Marco Pigni, Jordan McDonnell, Chris Chapman, Goran Arbanas, "ORNL contributions to the ENDF/B-VIII.1 library," Cross Section Evaluation Working Group Meeting, Upton, NY, November 2023.
Q1	Jordan McDonnell, Jesse Brown, Chris Chapman, Bk Jeon, Kang Seog Kim, Dorothea Wiarda, "AMPX Status 2023,"Cross Section Evaluation Working Group Meeting, Upton, NY, November 2023.
Q1	Chris Chapman, "Validating TSLs for ENDF/B-VIII.1," Cross Section Evaluation Working Group Meeting, Upton, NY, November 2023.
Q1	Chris Chapman, Dorothea Wiarda, William (B.J.) Marshall, "Impact of Light Water Covariance on Integral Benchmarks," International Conference on Nuclear Criticality Safety, Sendia, Japan, October 2023.
Q1	Marco Pigni, Dorothea Wiarda, Jordan McDonnell, "Light Elements R-matrix Analyses with the SAMMY Code towards the Foundation of Charged-particle Nuclear Data Libraries," Consultancy Meeting of the International Nuclear Data Evaluation Network on Light Elements, IAEA, Vienna, Austria, August 2023.
Q1	Chris Chapman, Kemal Ramic, Jesse Brown, Goran Arbanas, STATUS REPORT OF JOINT RPI/ORNL NCSP TASK FOR THERMAL NEUTRON TOTAL CROSS SECTION MEASUREMENTS, ORNL/TM-2023/3116, UT-Battelle, LLC, Oak Ridge National Laboratory (November 2023).
Q1	Marco Pigni, Jordan McDonnell, Klaus Guber, Resonance Parameter Evaluation of n+88Sr reactions for ENDF/B-VIII.1 Library, ORNL/LTR-2023/3004, UT-Battelle, LLC, Oak Ridge National Laboratory (December 2023).

Q1	Chris Chapman, Marco Pigni, Klaus Guber, Goran Arbanas, R-matrix Resolved Resonance Region Evaluation of 140,142Ce, ORNL/TM-2023/2924, UT-Battelle, LLC, Oak Ridge National Laboratory (November 2023).
Q1	Chris Chapman, William (B.J.) Marshall, Dorothea Wiarda, "Impact of Light Water Covariance on Integral Benchmarks," International Conference on Nuclear Criticality Safety, Sendia, Japan, October 2023.

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, 2024
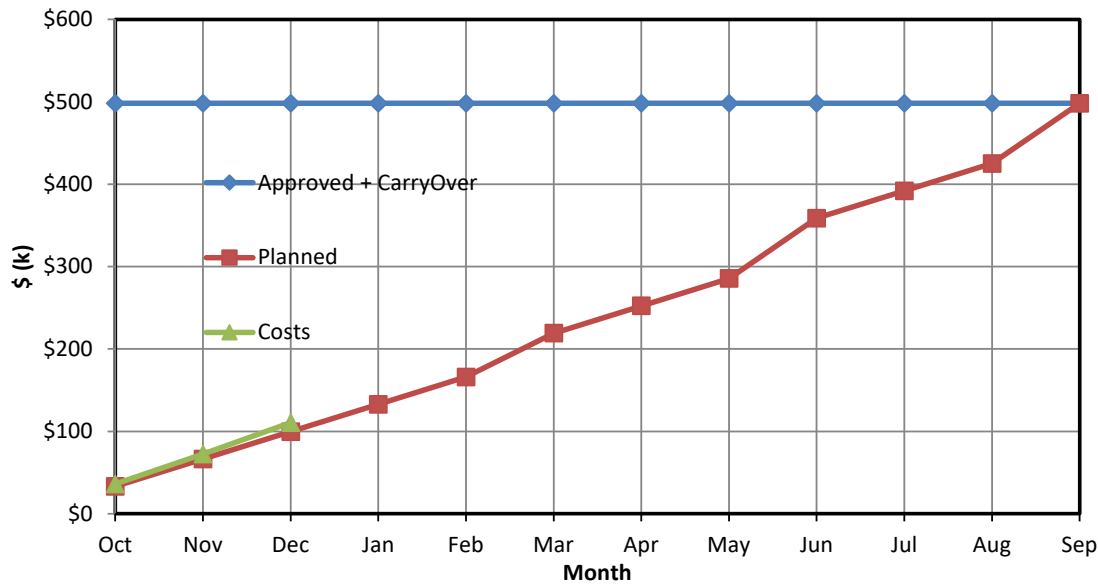
BUDGET

1. Carryover into FY 2024 = $ -81,753
2. Approved FY 2024 Budget = $ 580,000
3. Total FY 2024 Budget w/Carryover = $498,248
4. Actual spending for 1st Quarter FY 2024 = $110,594
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
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)		

Q1	Provide status report on all LINAC refurbishment activities (ND3)	🟦	
Q1	Complete initial engineering plan for LINAC Control System (ND3)	🟦	
Q1	Complete SAT of TPV Accelerator Section. (ND3)	🟩	Estimated completion in Q3
Q1	Place contract for refurbishment services support (RSS). (ND3)	🟩	
Q1	Place contracts for new RF Windows and elbows based on selection of UHV flange design. (ND3)	🟩	
Q1	Extend the Financial Assistance Award (FAA) funding grant through CY2025 with cost escalation. (ND3)	🟦	
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	Design and procurement of currently funded auxiliary system components. (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	Develop and publish new refurbishment project plan with updated timelines and projected costs. (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	Initiate priority procurements for new project plan and schedule new LINAC shutdown date and demolition activities (ND3)		

ACCOMPLISHMENTS

- **ND1** – Resonance Region Nuclear Data Measurement Capability at RPI
  - **Fe-54**
    - Completed production level resonance parameter fits to RPI transmission and capture data with and without data covariance matrices.
    - Obtained preliminary resonance parameters for Fe-54 evaluation up to 1 MeV using RPI and EXFOR data.
    - Continued validation measurements for neutron beam imager using a collimated Cs-137 source.
  - **Fast Neutron Scattering**
    - Determined new relative neutron detection efficiencies for EJ-301 detectors using a Stuck SIS-3305 10-bit digitizer.
    - Developed and validated detailed MCNP model of RPI high energy neutron scattering system.
    - Presented preliminary results from 181Ta and Teflon high energy quasi-differential measurements for validation of ENDF/B-VIII.I beta 2 Ta-181 and F-19 evaluations at CSWEG.
    - Completing final validation of experiment for journal publication and release in ENDF/B-VIII.I whitepaper.
  - **URR improvements to SAMMY**
    - Implemented self-shielding correction of capture yield and fitting of URR parameters in SAMMY.
    - Began work on transmission correction for multi-isotope samples.
- **ND3** – RPI/ORNL: LINAC 2020 Nuclear Data Capabilities Maintenance Plan
  - Created a new project timeline based on financial constraints.
  - Reached agreement with vendor on continued production of accelerator sections.
  - Developed an accelerator control plan.

PUBLICATIONS

Any publications that have Completed your institution's review cycle during the quarter AND are publicly releasable.

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	Siemers, G. et al., "High Energy Quasi - Differential Neutron Emission Measurements of Ta-181 and F-19", CSWEG Annual Meeting, Brookhaven, NY, USA (2023). Y. Danon, K. Cook, A. Golas, S. Singh, and B. Wang, "Overview of Nuclear Data Measurement and Analysis at RPI", CSWEG Annual Meeting, Brookhaven, NY, USA (2023).
Q2	
Q3	
Q4	

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 19, 2024
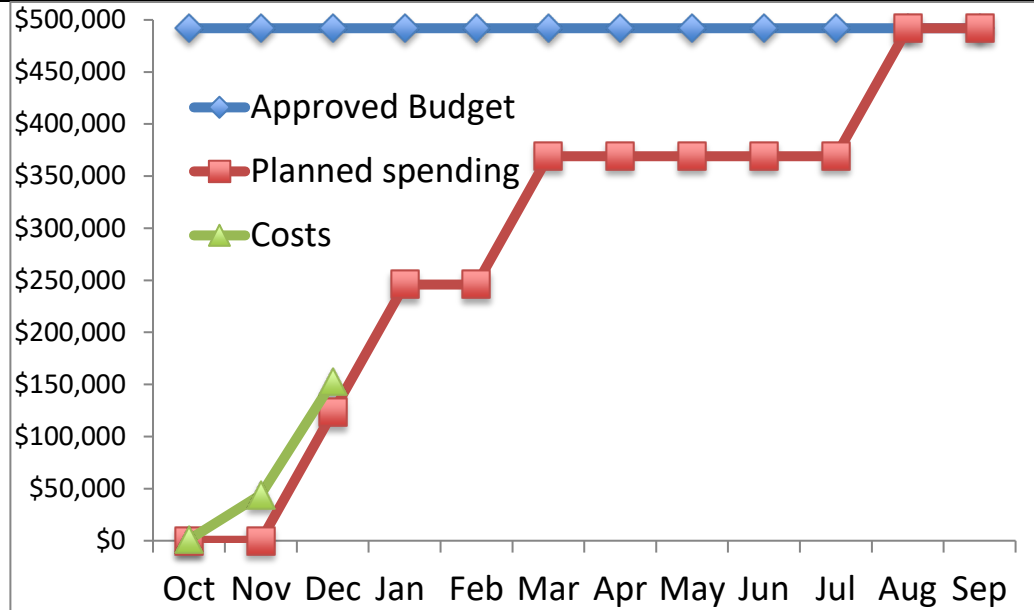
BUDGET

1. Carryover into FY 2024 = $0
2. Approved FY 2024 Budget = $492,000
3. Total FY 2024 Budget w/Carryover = $492,000

	Spending	Commitments	Total
Q1	$152,875.00	$22,339.32	$175,214
Q2			$0
Q3			$0
Q4			$0

4. Projected carryover into FY 2025 = $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 all hands-on criticality safety training activities (TE3)		
Q1	Provide a status report on the development of a university pipeline for CS professionals (TE6)		
Q2	Provide a status report on all hands-on criticality safety training activities (TE3)		
Q2	Provide a status report on the development of a university pipeline for CS professionals (TE6)		

Q3	Provide a status report on all hands-on criticality safety training activities (TE3)		
Q3	Provide a status report on the development of a university pipeline for CS professionals (TE6)		
Q4	Provide a status report on all hands-on criticality safety training activities (TE3)		
Q4	Provide a status report on the development of a university pipeline for CS professionals (TE6)		

ACCOMPLISHMENTS

- TE3 – Conduct Hands-On Criticality Safety Training Course at NCERC
    - Conducted December Manager's/CSO Class
    - Nancy Watts at NCERC-FO supports DAF access for students.
    - New background for photos

- TE6 – Development of University Pipeline for Criticality Safety Professionals
   - Commitment is UNM contract

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: TE1, 3, 8	**Reference:** DP0909010
M&O Contractor Name: LLNL	**Date of Report:** January, 2024
Point of Contact Name: Catherine Percher	
Point of Contact Phone: (925) 579-4226	

BUDGET

1. Carryover into FY 2024 = $35,479
2. Approved FY 2024 Budget = $390,000
3. Total FY24 Budget w/Carryover = $425,479
4. Actual spending for 1st Quarter FY 2024 = $111,919
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $ 31,200

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 hands-on training at the DAF (TE1)		
Q1	Provide a status report classroom criticality safety training (TE3)		
Q1	Provide a status report on development of university pipeline for CS professionals. (TE8)		

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

ACCOMPLISHMENTS

- TE1 – Conduct Hands-on Training at the DAF (TACS)
  - Participated in all TE telecons
  - Provided hands-on TACS instruction for December NCERC Manager's course- **MIHL item of providing an extra course in FY24**
- TE3 – Classroom Criticality Safety Training
  - Updated lecture material after conversion to new templet, updated quiz and test questions
- TE8 - Development of University Pipeline for Criticality Safety Professionals
  - Taught UCBerkeley NCS course, providing biweekly lectures, mentored students through term projects, and provided 1 day hands-on approach to critical training with the Inherently Safe Subcritical Assembly (ISSA) at LLNL
  - S. Coleman won best (Most Interesting) poster at ICNC in Japan in October 2023 for "Criticality Safety Evaluation Project Development for University of California Berkeley Nuclear Criticality Safety Pipeline Course"- paper provided in FY23Q4 QPRs

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
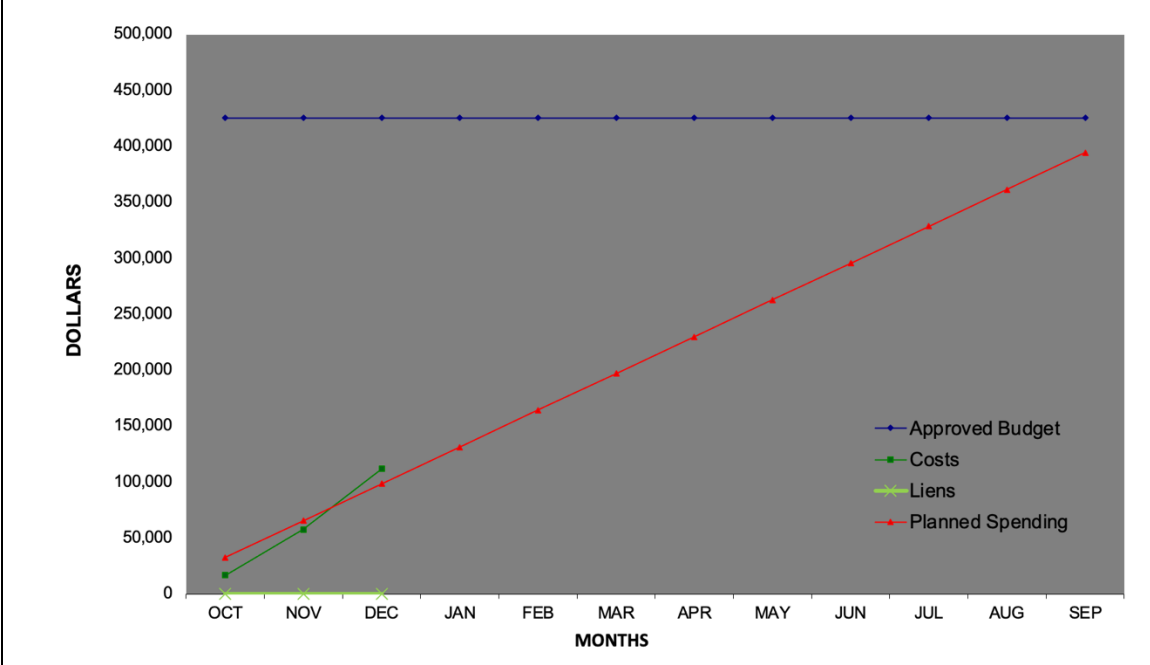 AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.	
Quarter	**Publication Reference** **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	none
Q2	
Q3	
Q4	

NCSP Element and Subtask: TE1, 11, 14	Reference: DP0909010
M&O Contractor Name: ORNL	**Date of Report:** January 20, 2024
Point of Contact Name: Doug Bowen	
Point of Contact Phone: (865) 576-0315	

BUDGET

FY24 Training and Education

Chart: $(K) on Y-axis (0 to 400), months Oct through Sep on X-axis. Legend: Approved Budget, Costs, Planned Spending.

1. Carryover into FY 2024 = $12K
2. Approved FY 2024 Budget = $340K
3. Total FY 2024 Budget w/Carryover = $352K
4. Actual spending for 1st Quarter FY 2024 = $21K
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $

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 revision of LA-12808 Nuclear Criticality Safety Guide. (TE11)		

Q1	Provide a status report on nuclear criticality safety training and pipeline development (TE 14)	▮	
Q2	Provide a status report on implementation of the NCS training program (TE1)		
Q2	Provide a status report on revision of LA-12808 Nuclear Criticality Safety Guide. (TE11)		
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 revision of LA-12808 Nuclear Criticality Safety Guide. (TE11)		
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 revision of LA-12808 Nuclear Criticality Safety Guide. (TE11)		
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
  - Bowen/Henley worked to solidify the rosters for the January/February 2-week courses working with NCSP Manager and T&E coordinators at Sandia and NCERC. Planning virtual meetings held with POCs and instructors at all three portions of the course (lecture, Sandia, NCERC) starting in early December 2023.
  - Bowen working with NCERC POC and LANL T&E POC for AWE Rad Worker 2 requirements. MSTS has tightened up the requirements, so ORNL/LANL are working to resolve outstanding issues. Worked as a team to prepare for AWE and BWXT students for the January 2024 2-week course.
  - Successfully completed the December 1-week Manager/CSO hands-on course at NCERC. The course had 15 students, total.
  - Held several 2-week lecture improvement sessions with lecture week instructors to adjust agenda and some course material updates based on instructor and student feedback.
  - Continued planning efforts for a Y-12 special course (2-week version) in May 2024 at Y-12.
  - Began transition of course transition to an ORNL tool called GAXIS to assist with communication and execution of the courses.
- TE11 - Revision of the LA-12808 Nuclear Criticality Safety Guide

- o Bowen is drafting this document and is making steady progress. The content is aligned with ANS-8 standards content and will include subcritical and critical data as in previous drafts. Carryover funding is being used to complete this document. Significant progress made since last quarter.
- TE14 - Nuclear Criticality Safety Training and Pipeline Development
  - o There is no report in quarter 1 due to the budget freeze. Due to GA Tech and TAMU schedules, most work is completed over the summer break.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	Douglas Bowen, "OVERVIEW AND CURRENT PROGRESS OF THE DOE/NNSA NUCLEAR CRITICALITY SAFETY PROGRAM TRAINING AND EDUCATION PROGRAM," International Conference on Nuclear Criticality Safety, Sendi, Japan, October 2023.
Q2	
Q3	
Q4	

NCSP Element and Subtask: TE1	Reference: DP0909010
M&O Contractor Name: Sandia National Laboratories (SNL)	Date of Report: January, 2024
Point of Contact Name: David Ames	
Point of Contact Phone: (505)844-4697	

BUDGET

1. Carryover into FY 2024 = $88,831
2. Approved FY 2024 Budget = $240,000
3. Total FY 2024 Budget w/Carryover = $328,831
4. Actual spending for 1st Quarter FY 2024 = $26,629
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $

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
  - o Human Factors support for 1-week NCERC Manager course at the NFO on December 17.
  - o Human Factors module updated for 2-week Hands-on course.
  - o Preparations are underway for a Hands-on criticality safety class for NCS professionals to be presented January 29 – February 2.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

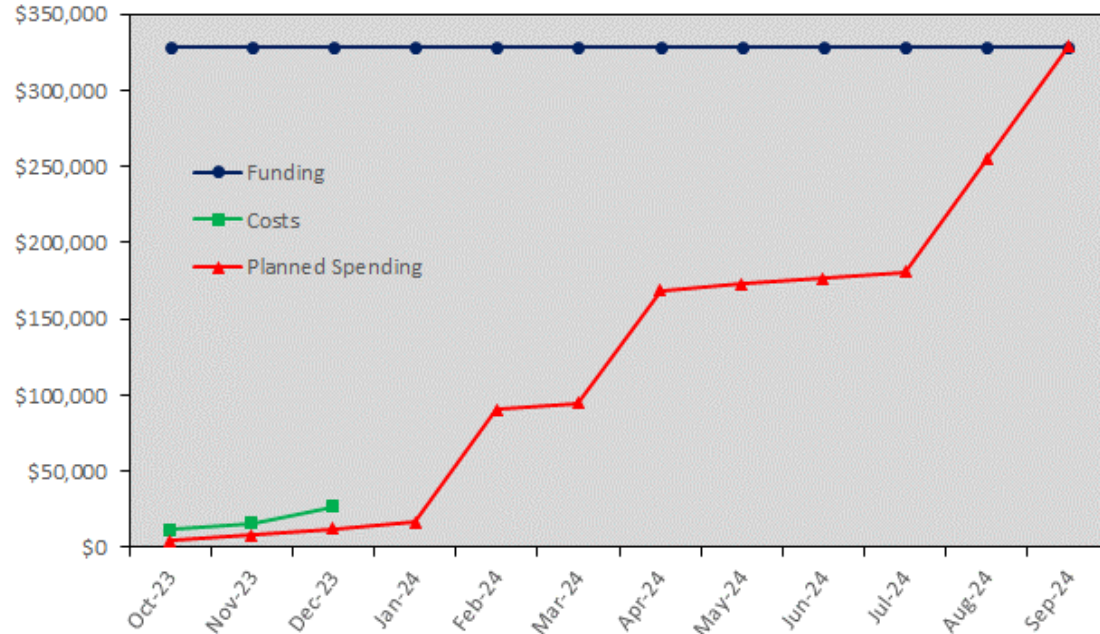Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: TE1	Reference: DP0909010
M&O Contractor Name: Y12	Date of Report: January, 2024
Point of Contact Name: Kevin Reynolds	
Point of Contact Phone: (865) 241-9067	

BUDGET

Y-12 Budget/Incurred Costs

1. Carryover into FY 2024 = $102,399.54
2. Approved FY 2024 Budget = $0.00
3. Total FY 2024 Budget w/Carryover = $102,399.54
4. Actual spending for 1st Quarter FY 2024 = $10,268.67
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
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 of Y-12 activities to support the hands-on training courses. (TE1)		
Q2	Provide a status report of Y-12 activities to support the hands-on training courses. (TE1)		
Q3	Provide a status report of Y-12 activities to support the hands-on training courses. (TE1)		
Q4	Provide a status report of Y-12 activities to support the hands-on training courses. (TE1)		

ACCOMPLISHMENTS

- TE1 - Conduct Hands-On Criticality Safety Training Course
  - ○

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
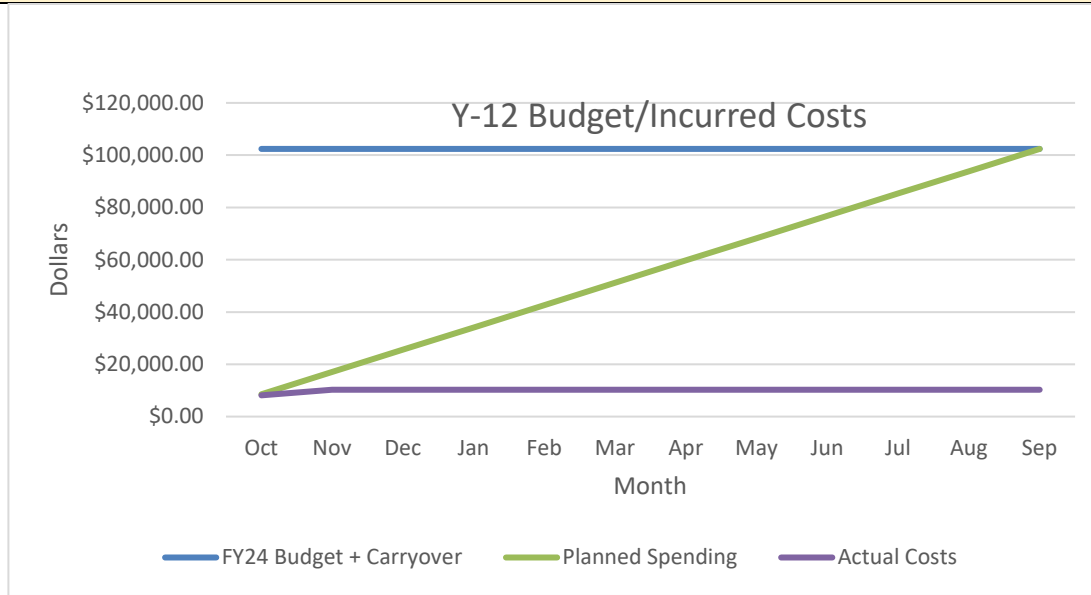 AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: TS6	Reference: DP0909010
M&O Contractor Name: BNL	Date of Report: January, 2024
Point of Contact Name: Gustavo Nobre	
Point of Contact Phone: 631-344-5205	

BUDGET

1. Carryover into FY 2024 = $ 13,991
2. Approved FY 2024 Budget = $ 131,000 (Enacted CR)
3. Total FY 2024 Budget w/Carryover = $ 144,991
4. Actual spending for 1st Quarter FY 2024 = $ 2,456
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $ 7,250

   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)		Most of the work is done with interns of the Summer period.

Q1	Successful completion of the NCSP Technical Program Review. (TS7)	■	Some of the planning and preparation efforts for the TPR Meeting began on Q1 but most of it is expected to happen in Q2.
Q2	Provide NCSP Manager annual report of succession planning efforts. (TS6)		
Q2	Successful completion of the NCSP Technical Program Review. (TS7)		
Q3	Provide NCSP Manager annual report of succession planning efforts. (TS6)		
Q3	Successful completion of the NCSP Technical Program Review. (TS7)		
Q4	Provide NCSP Manager annual report of succession planning efforts. (TS6)		
Q4	Successful completion of the NCSP Technical Program Review. (TS7)		

ACCOMPLISHMENTS

- TS6 – ND Succession Planning
  - Most of the work is done with interns during the Summer period, so nothing was charged on Q1.
- TS7 – TPR meeting planning
  - Some of the planning and preparation efforts for the TPR Meeting began on Q1 but most of it is expected to happen in Q2

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter

  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.
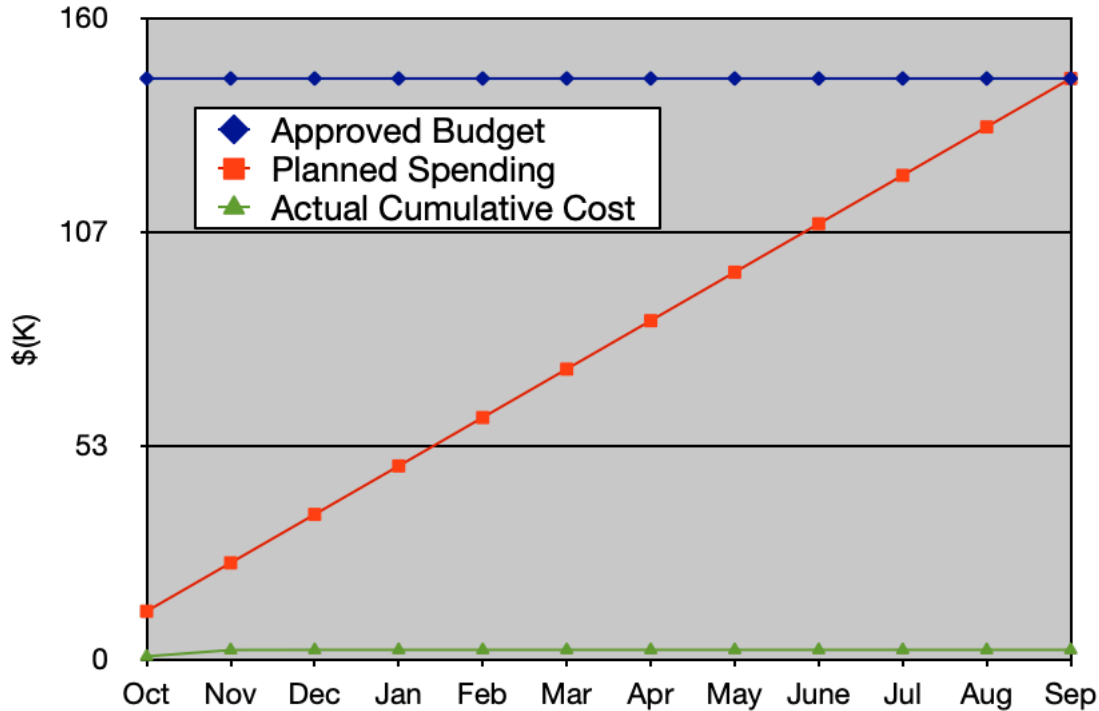
Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019

Q1	
Q2	
Q3	
Q4	

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 2024
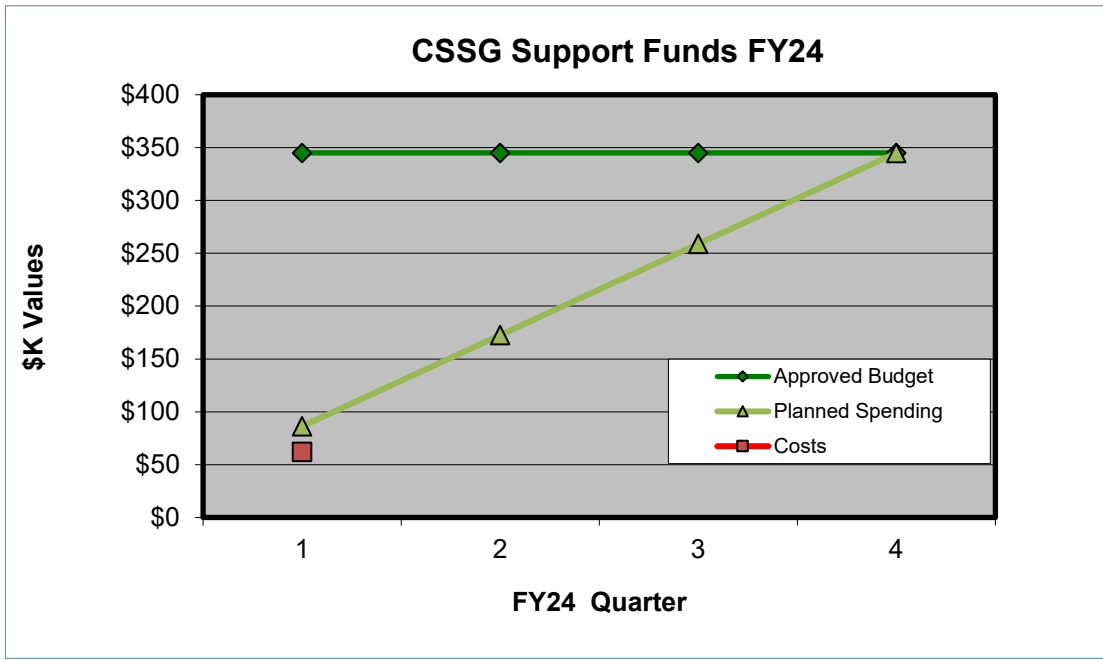
BUDGET

1. Carryover into FY 2024 = $ 0
2. Approved FY 2024 Budget = $ 345,000
3. Actual spending for 1st Quarter FY 2024 = $62,079
4. Actual spending for 2nd Quarter FY 2024 = $0
5. Actual spending for 3rd Quarter FY 2024 = $0
6. Actual spending for 4th Quarter FY 2024 = $0
7. Projected carryover into FY 2025 = $132,760

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)		Allocation required for New Member Percher
Q2	Provide NCSP Manager report of activities. (TS1)		None
Q3	Provide NCSP Manager report of activities. (TS1)		None
Q4	Provide NCSP Manager report of activities. (TS1)		None.

ACCOMPLISHMENTS

- TS1 – CSSG – Support for the Criticality Safety Support Group
  - Regularly scheduled Teams Meetings
  - Deputy Chair and New Member appointed
  - Completed response for Tasking 2023-02, *Role of CSSG Emeritus Members*

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: TS4, 5	Reference: DP0909010
M&O Contractor Name: LANL	Date of Report: January, 2024
Point of Contact Name: Joetta Goda	
Point of Contact Phone: 505-667-2812	

BUDGET

1. Carryover into FY 2024 = $0
2. Approved FY 2024 Budget = $100,000
3. Total FY24 Budget w/Carryover = $100,000

Q1	$34,811	$0	$34,811
Q2		$0	$0
Q3		$0	$0
Q4		$0	$0

4.
   Projected carryover into FY 2025 = $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)	🟦	
Q1	Provide a report on CSSG activities (TS5).	🟦	
Q2	Provide NCSP Manager report on succession planning efforts. (TS4)		

Q2	Provide a report on CSSG activities (TS5).		
Q3	Provide NCSP Manager report on succession planning efforts. (TS4)		
Q3	Provide a report on CSSG activities (TS5).		
Q4	Provide NCSP Manager report on succession planning efforts. (TS4)		
Q4	Provide a report on CSSG activities (TS5).		

ACCOMPLISHMENTS

- TS4 – AM, IE, ND Succession Planning
  - Some students working this quarter
- TS5 – LANL CSSG Funding

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
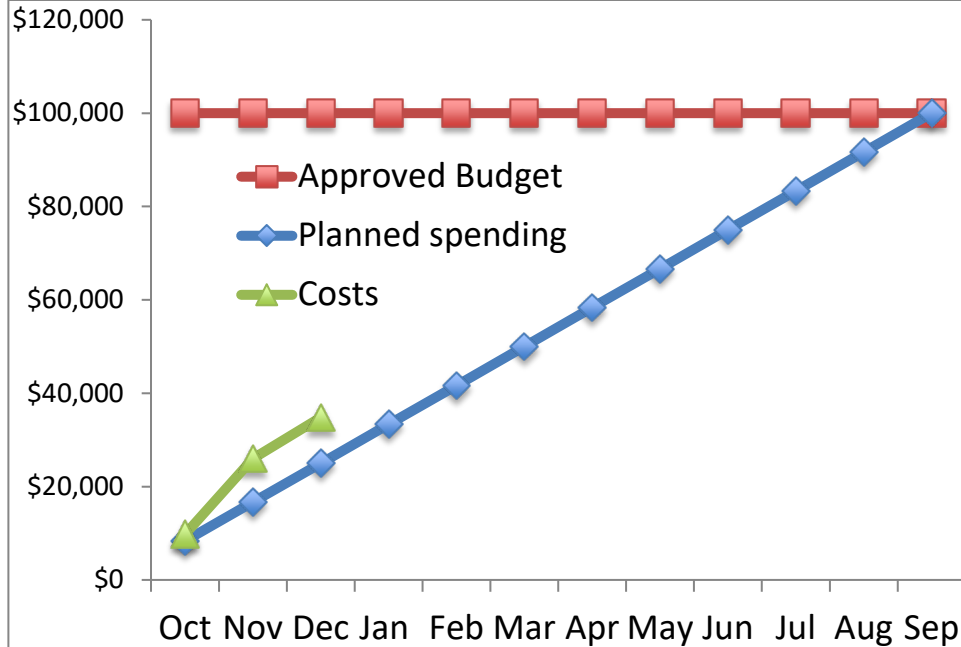 AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: TS5	**Reference:** DP0909010
M&O Contractor Name: LLNL	**Date of Report:** January, 2024
Point of Contact Name: Catherine Percher	
Point of Contact Phone: (925) 579-4226	

BUDGET

1. Carryover into FY 2024 = $36,942
2. Approved FY 2024 Budget = $145,000
3. Total FY24 budget w/Carryover = $181,942
4. Actual spending for 1ˢᵗ Quarter FY 2024 = $
5. Actual spending for 2ⁿᵈ Quarter FY 2024 =$
6. Actual spending for 3ʳᵈ Quarter FY 2024 = $
7. Actual spending for 4ᵗʰ Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $11,600

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 succession planning efforts. (TS5)		D. Siefman left to become a professor at UCBerkeley. We expect to have him continue working with us on NCSP projects and bring in PhD students. Plan to open another PostDoc posting.
Q2	Provide a status report on succession planning efforts. (TS5)		
Q3	Provide a status report on succession planning efforts. (TS5)		

Q4	Provide a status report on succession planning efforts. (TS5)		

ACCOMPLISHMENTS

- TS5 - AM, IE, ND Succession Planning
    - o Converted E. Aboud from a PostDoc to full time staff.
    - o Mentored graduate student E. Hudec to write parts of the SCX high multiplication subcritical benchmark

PUBLICATIONS

Any publications that have

- Completed your institution's review cycle during the quarter

    AND
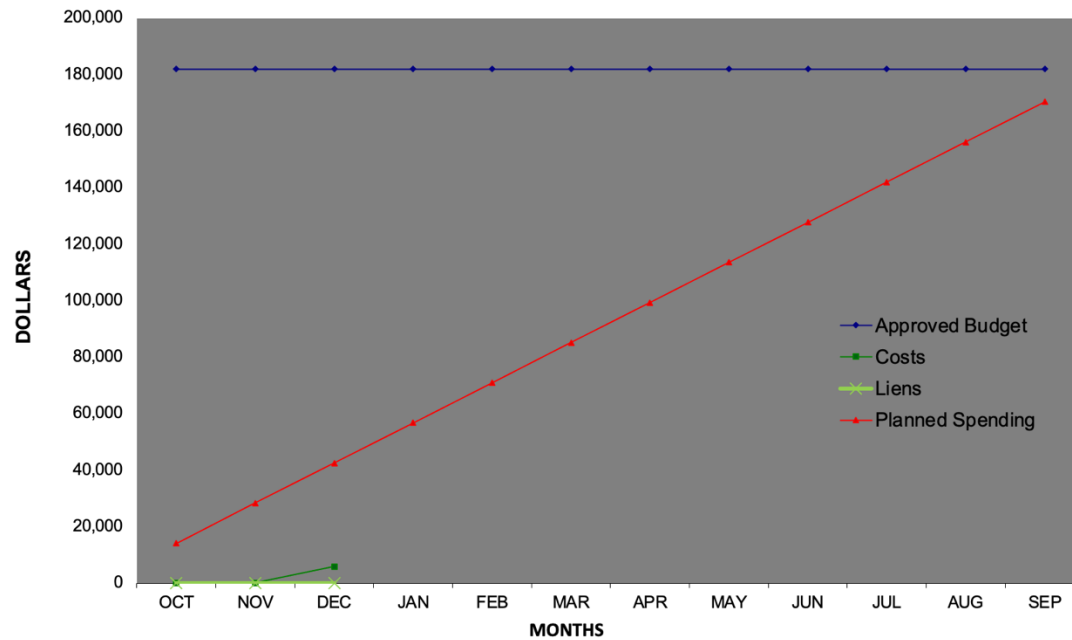
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Quarterly Progress Report (FY-2024 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 16, 2024

BUDGET
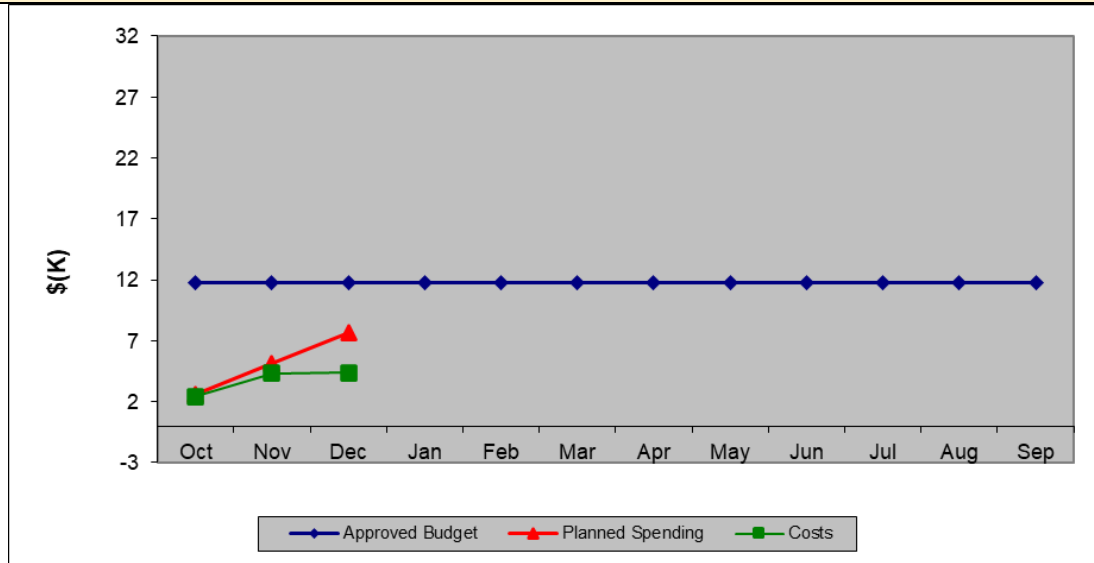
1. Carryover into FY 2024 = $2k
2. Approved FY 2024 Budget = $29k ($10k w/CR)
3. Total FY 2024 Budget with Carryover = $29k ($12k CR)
4. Actual spending for 1st Quarter FY 2024 = $4k
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
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)		

NCSP Quarterly Progress Report (FY-2024 Q1)

ACCOMPLISHMENTS

- TS9 – Support for NDAG Chair activities
  - Attend ICNC-2023 (Sendai, Japan)
    - Present technical paper on "Thermal Neutron Scattering Law of UBe_{13} and $PuBe_{13}$"
    - Chair nuclear data session
  - Participate in NR/NCSP RPI LINAC Program Review
  - Participate in October IE Face-to-Face meeting at SNL
  - Participate in CSEWG Meeting at BNL
    - Chair CSEWG Validation Committee session
    - Participate in CSEWG Executive Committee meeting
  - Chair November 2023 NDAG Meeting during Nuclear Data Week at BNL
  - Coordinate Nuclear Data Mission & Vision update
  - Actively participate on several CEdTs
  - Actively participate in monthly IE meetings.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
 AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference
	Example: Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

NCSP Element and Subtask: TS2, 7, 8, 13	Reference: DP0909010
M&O Contractor Name: ORNL	Date of Report: January 20, 2024
Point of Contact Name: Doug Bowen	
Point of Contact Phone: (865) 576-0315	

BUDGET

FY24 NCSP Technical Support

Legend: Approved Budget · Costs · Planned Spending

1. Carryover into FY 2024 = $24K
2. Approved FY 2024 Budget = $1069K
3. Total FY 2024 Budget w/Carryover = $1093K
4. Actual spending for 1st Quarter FY 2024 = $135K
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $

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)		

Q1	Manage 5-year plan development and maintenance and oversee the IER process and manage main 5-year plan and IER 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 an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS13)	🟦	
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 IER process and manage main 5-year plan and IER 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 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 IER process and		

	manage main 5-year plan and IER 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 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 IER process and manage main 5-year plan and IER 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 an update of NDA Technical Support Group and NDA Technical Infrastructure Project activities. (TS13)		

ACCOMPLISHMENTS

- TS2 - Support for Lead Lab to Execute the NCSP
  - Bowen worked with ORNL admins to prepare the venue and to participate in other planning efforts for the DOE Community of Practices Workshop scheduled for February 2024.
  - Quarterly report support
    - Executed the NCSP FY2023 Q4 quarterly report meeting for the NCSP manager.

- - - Sent requests to each TM for their Q4 reports.
        - Posted non-IE version of the Q3 report on the website for NCSP accomplishments.
        - Requested foreign trip reports based on Appendix C. Updated the website with the reports/information received.
    - FY24 Five-Year Plan:
        - Integral experiment section of the 5-year plan was drafted and updated because of the status of IER work at the end of the fiscal year published in Nov. 2023 on schedule.
    - CSCT Scribe – took minutes for the monthly meetings in October, November, & December 2023.
    - Fall and Winter 2023 Newsletters generated and published.
    - Access Database:
        - Updates made to the Access database to support the NCSP management team as needed and to eventually use the Access database to generate the 5-year plans.
    - Supported meetings as necessary; attended virtual meetings and in-person meeting at the Winter ANS meeting.
    - Supported Mission and Vision meetings as necessary to support the revised document.
    - MGT Team (Miller) led IE status update meetings, as necessary. Bowen and Henley assisted with this effort as needed.
    - Conducted NCSP Management Team meetings to discuss the status of NCSP execution work.
- TS7 - AM, ND Succession Planning
    - Utilized succession planning funding for new staff development for AM and ND ORNL NCSP tasks.
    - Iyad Al-Qasir has started in the ND group and will utilize this funding to train into his ND task roles.
- TS8 - NCSP Program Management Tools Development
    - No work to support this effort in Q4. No significant updates to G2 have been completed by ORNL G2 staff in Q4.
- TS13 - NDA Technical Support Group and NDA Technical Infrastructure Project
    - No activity in FY24 Q1 other than conceptual planning efforts for holdup measurement course in FY24.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter

    AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference
	Example:
	Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	Douglas Bowen, "American Nuclear Society ANS-8 Standards Forum," ANS Winter Meeting, Washington DC, November 2023.
Q1	Douglas Bowen, "ANS-8 Nuclear Criticality Safety Consensus Standards – Current Initiatives," ANS Winter Meeting, Washington DC, November 2023.

| Q1 | Douglas Bowen, "ANS-8 Nuclear Criticality Safety Consensus Standards -- Current Initiatives," Transactions of the American Nuclear Society, 682-684, (November 2023). |

NCSP Element and Subtask: TS3, 12 **M&O Contractor Name**: Sandia National Laboratories (SNL) **Point of Contact Name:** David Ames **Point of Contact Phone:** (505)844-4697	**Reference:** DP0909010 **Date of Report:** January, 2024

BUDGET

Sandia TS – Technical Support
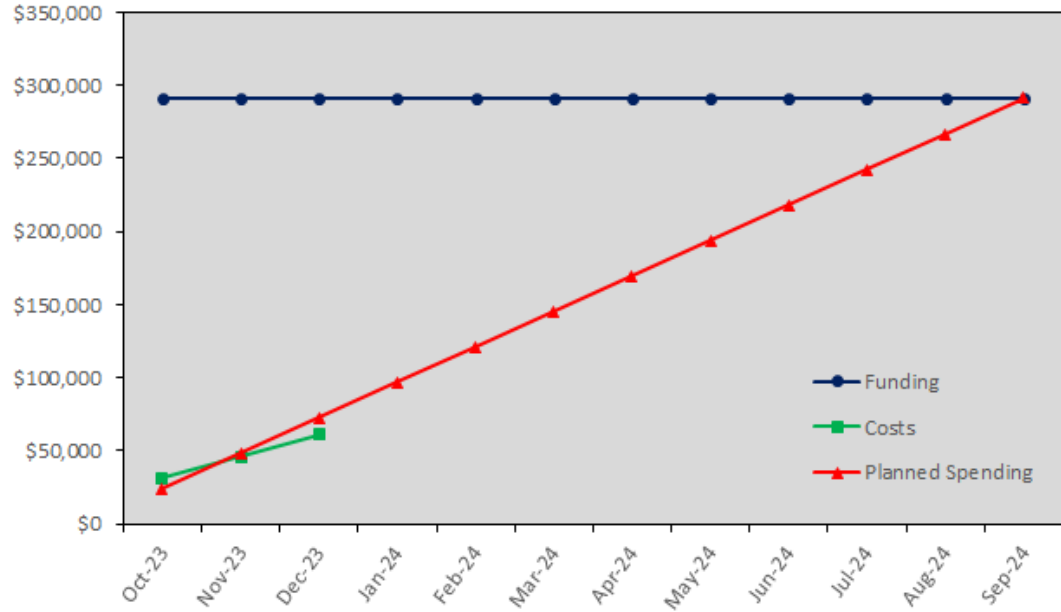
1. Carryover into FY 2024 = $11,226
2. Approved FY 2024 Budget = $280,000
3. Total FY 2024 Budget w/Carryover = $291,226
4. Actual spending for 1st Quarter FY 2024 = $61,297
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
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 annual report of succession planning efforts. (TS3)		
Q1	Provide a summary of NCSP IER support (TS12)		

Q2	Provide annual report of succession planning efforts. (TS3)		
Q2	Provide a summary of NCSP IER support (TS12)		
Q3	Provide annual report of succession planning efforts. (TS3)		
Q3	Provide a summary of NCSP IER support (TS12)		
Q4	Provide annual report of succession planning efforts. (TS3)		
Q4	Provide a summary of NCSP IER support (TS12)		

ACCOMPLISHMENTS

- TS3 – Support for Experimentalist Succession Planning
  - Matrixed employee performing as an experimenter and supporting the Hands-on Courses.
  - Actively participating in the NCS community by attending conferences and publishing papers.
- TS12 - NCSP IER Manager Support
  - Performed duties as the 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 MIHLs.
    - Interacted with NCSP Management Team, provided technical advice, and assisted on a broad scope of items (e.g., 5 year plans, IE priorities, MIHL lists items).
    - Run monthly IE meetings, distribute agenda and notes.
    - Participate in various IER team meetings and assisted IER team members with requested items.
    - Reviewed reports and processed through approval in IER database (team members and NCSP manager) or ensured BCR submission.
    - Processed BCR submissions and helped with MIHL item changes.
    - Track Non-NCSP IERs and work with site and NCSP management team to initiate new ones, as added.
    - Updated team memberships per site leads direction.
    - Facilitated discussions between NCSP management team, LANL, and LLNL about issues associated with a few IERs and clarification on prioritization.
    - Worked in the IER database, assisted others with issues using database, work with G2 developers on database improvement items.
  - Very minor progress on NCSP IE Manual Revision and the IE section for the Mission & Vision document.

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	D. Ames, G. Harms, E. Lutz and M. Dupont, "Experiments to Measure the Effect of Tantalum on Critical Systems," SAND2023-07341C, *ICNC-2023, Full Paper, Sendai, Japan (Oct. 2023).*
	W. Cook, E. Lutz, D. Ames, A. Raster, G. Harms, J. Miller and J. Cole, "Design of UO_2-BeO Critical Experiment at Sandia," SAND2023-09380D, *ICNC-2023, Poster, Sendai, Japan (Oct. 2023).*
	D.E. Ames, G.A. Harms, E. Lutz, and M. Dupont, "Critical Experiments Targeting the Epithermal/Intermediate Cross Sections of Tantalum," SAND2023-0733C, *ANS Winter Meeting, ANS-2023, Accepted Summary Paper, Washington DC (Nov. 2023).*
Q2	
Q3	
Q4	

NCSP Element and Subtask: TS **M&O Contractor Name:** Y12 **Point of Contact Name:** Kevin Reynolds **Point of Contact Phone:** (865) 241-9067	**Reference:** DP0909010 **Date of Report:** January, 2024

BUDGET

Y-12 Budget/Incurred Costs

Legend: FY24 Budget + Carryover — Planned Spending — Actual Costs

1. Carryover into FY 2024 = $11,017.03
2. Approved FY 2024 Budget = $25,000.00
3. Total FY 2024 Budget w/Carryover = $36,017.03
4. Actual spending for 1st Quarter FY 2024 = $0
5. Actual spending for 2nd Quarter FY 2024 = $
6. Actual spending for 3rd Quarter FY 2024 = $
7. Actual spending for 4th Quarter FY 2024 = $
8. Projected carryover into FY 2025 = $
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 of Y-12 activities to support the NCS program. (TS)		
Q2	Provide a status report of Y-12 activities to support the NCS program. (TS)		
Q3	Provide a status report of Y-12 activities to support the NCS program. (TS)		
Q4	Provide a status report of Y-12 activities to support the NCS program. (TS)		

ACCOMPLISHMENTS

- TS program support activities:
  - ○

PUBLICATIONS

Any publications that have
- Completed your institution's review cycle during the quarter
  AND
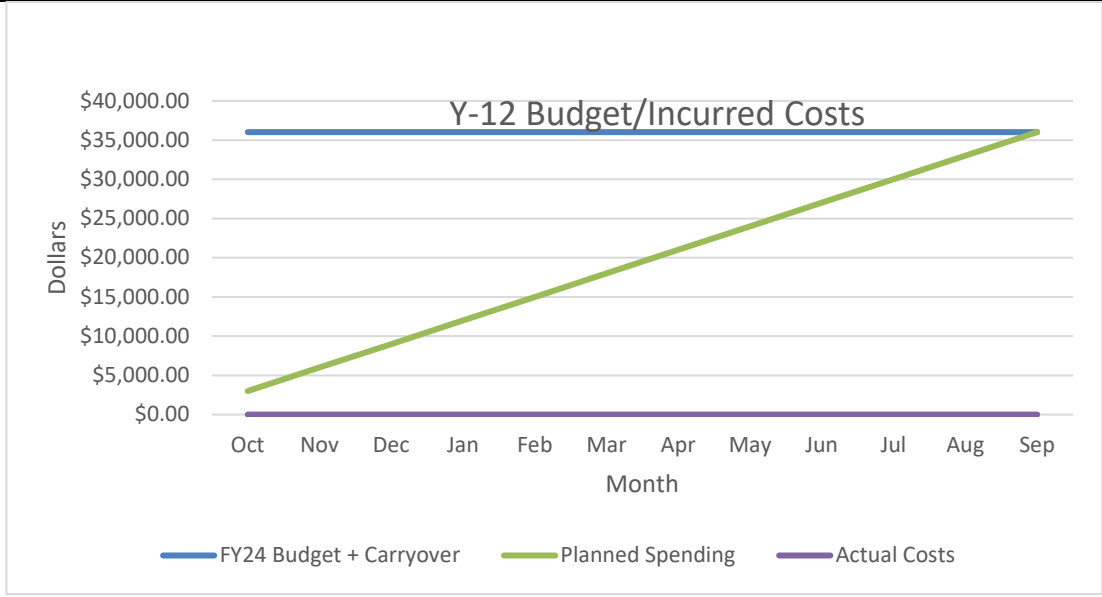- Are publicly releasable

Should be submitted to Marsha Henley, henleym@ornl.gov with your quarterly report.

Quarter	Publication Reference **Example:** Author, "Title", LA-UR-18-27731, October 1, 2019
Q1	
Q2	
Q3	
Q4	

Summary of MCNP Classes in FY 2024 – Q1

[1]M.E. Rising, [1]A.R. Clark, and [1]C.A. Weaver
[1] Monte Carlo Codes (XCP-3), LANL

FY2024 – Q1 classes are highlighted in red.

Total Students

- **FY2024 – Q1**   **67 students**   **(Intermediate, Intro, Variance Reduction)**
- **FY2024 – Q2:**   **TBD students**   **(Intro, Intermediate)**
- **FY2024 – Q3:**   **TBD students**   **(Intermediate, Criticality, Safeguards, Health Physics, Criticality, Intro)**
- **FY2024 – Q4:**   **TBD students**   **(Unstructured Mesh, NJOY)**
- **FY2024 – TOTAL:**   **67 students**

In FY24, a balance of in-person and online classes are offered.

Classes sponsored by DOE-NNSA-NCSP

- **Criticality Calculations with MCNP6   (LANL-AM1)**
  - **Apr 29 – May 2, 2024**   **in-person @ Y12**   **TBD students**
  - **June 3 – 7, 2024**   **in-person @ LANL**   **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.

- **Sensitivity-Uncertainty Tools & Practices for NCS Validation (LANL-TE4)**
  - **TBD**   **TBD**   **TBD students**

  Joint LANL & ORNL effort, covering background material and specific usage of MCNP6-Whisper and SCALE-KENO-TSUNAMI-TSURFER. D. Bowen coordinates scheduling at DOE sites.

Other Classes - supported by student registration fees.

- **Introduction to MCNP6**   **(**includes 1/2 day on criticality calculations, without NCS validation & Whisper)
  - **Oct 23 – 27, 2023**   **online**   **39 students**
  - **Mar 4 – 8, 2024**   **in-person @ OECD-NEA**   **TBD students**
  - **June 17 – 21, 2024**   **online**   **TBD students**

- **Intermediate MCNP6**
  - **Oct 2 – 6, 2023**   **in-person @ LANL**   **16 students**
  - **Mar 11 – 15, 2024**   **in-person @ OECD-NEA**   **TBD students**
  - **Apr 8 – 12, 2024**   **online**   **TBD students**

- **Variance Reduction with MCNP6**
  - **Dec 4 – 8, 2023**   **in-person @ LANL**   **12 students**

- **Unstructured Mesh with Attila4MC**
  - **July 22 – 26, 2024**   **in-person @ LANL**   **TBD students**

- **MCNP6 for Nuclear Safeguards Practitioners**
  - **Apr 29 – May 3, 2024**   **in-person @ LANL**   **TBD students**

- **Practical MCNP for the Health Physicist, Radiological Engineer, and Medical Physicist**
  - **May 20 – 24, 2024**   **in-person @ LANL**   **TBD students**

- **NJOY**
  - **Aug 26 – 30, 2024**   **in-person @ LANL**   **TBD students**

2024 Q1 – SCALE Training Courses Report for the Nuclear Criticality Safety Program

Class Name	Source Terms for Advanced Reactor Spent Fuel Applications
Class Dates	October 2–6, 2023
Location	Oak Ridge National Laboratory, Oak Ridge, TN
Number of Attendees	11
Short Description	In this training course, participants learned how to generate the core nuclide inventory for several advanced reactor configurations, and how to analyze and post-process these data for use as input in other computational tools. Participants learned: how to use SCALE's TRITON reactor physics sequence to generate core inventory data in the form of ORIGEN nuclide concentration files (f71); how to perform decay calculations of the determined inventory with ORIGEN; how to interrogate the f71 files with the OBIWAN utility to ensure a thorough understanding of the available cases, the data at each position, and the applied normalizations. The TRITON portion of this training focused on the TRITON 3D sequence with the KENO-VI and Shift Monte Carlo neutron transport codes. The data post-processing included the generation of an easy-to-use inventory interface file (II.JSON) and relevant examples for further post-processing. This training course provided best practices for generating f71 files and teach multiple approaches to interrogate and modify the output. The training was presented using SCALE 6.3.1. Previous experience with TRITON or ORIGEN was required.

Class Name	SCALE/ORIGEN Standalone Fuel Depletion, Activation, and Source Term Analysis
Class Dates	October 9–13, 2023
Location	Oak Ridge National Laboratory, Oak Ridge, TN
Number of Attendees	16
Short Description	This was a hands-on training course that covered the use of ORIGEN for depletion and decay analysis, nuclide inventories, decay heat, and radiation emissions and spectra calculations. Instruction was provided to enable all participants to: • Understand what ORIGEN is: ORIGEN's capabilities for depletion and decay analysis, type and role of nuclear data and nuclear data libraries, capabilities of other modules in the ORIGEN family (ORIGAMI, OBIWAN, OPUS, ARP). • Gain confidence in creating, validating, and running input with SCALE's graphical user interface, Fulcrum. • Learn best practices for determining nuclide inventories, decay heat, and radiation emissions and spectra in spent nuclear fuel and activated materials. • Gain hands-on experience through interactive tutorials and challenging real-world workshop problems: perform typical calculations with ORIGEN and ORIGAMI; determine nuclide inventories, decay heat, radiation emissions; generate ORIGEN reactor libraries using TRITON; generate and apply ORIGEN activation libraries; post-process, view, and analyze results. The training was presented using SCALE 6.3.1. No prior knowledge of SCALE was required.

Class Name	SCALE Criticality Safety Calculations
Class Dates	October 23–27, 2023
Location	Oak Ridge National Laboratory, Oak Ridge, TN
Number of Attendees	12
Short Description	This training course, which is appropriate for novice through advanced users, provided instruction on the use of the CSAS criticality safety sequences in SCALE, which use KENO and Shift Monte Carlo codes for criticality safety calculations. KENO-V.a is a fast 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 3D generalized geometry Monte Carlo code that allows for versatile modeling of complex geometries. Shift is available with both KENO-V.a and KENO-VI geometry capabilities. Both versions of KENO and Shift provide convenient, efficient methods for modeling repeated and nested geometry configurations such as lattices. Both versions of KENO and Shift can use ENDF/B-VIII.0 or ENDF/B-VII.1 cross-section data distributed with SCALE to perform either continuous energy (CE) or multigroup (MG) calculations. This training course used the Fulcrum user interface for interactive model setup, 2D and 3D visualization, computation, and output review. Instruction was also provided on the SCALE material input and resonance self-shielding capabilities and Fulcrum's capabilities for visualizing fluxes, reaction rates, and cross-section data. The training was presented using SCALE 6.3.1. No prior knowledge of SCALE was required.

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

Reference			AWE Contributions and POCs			
AWE Reference	Task Description	NCSP Reference	FY2023 AWE Contribution	AWE Technical POC	Collaborator POC	DOE Lab
INTEGRAL EXPERIMENTS						
AWE-IE2	Development of Passive Neutron Spectrometer (PNS)	LLNL-IE1	Fully commission TLD version of the PNS; Perform validation irradiations at NPL; develop unfolding tools for directionality	P. ANGUS	P. MAGGI	LLNL
Passive Neutron Spectrometer has been developed and deployed alongside LLNL sphere et al at the Godiva intercomparison in both gold and TLD configurations. Discussions have now been recently held regarding the SPECTRA-UF unfolding code and access for international labs.						
AWE-IE3 **IER 406**	Cf-252 CAAS benchmark	LLNL-IE1	Perform/support PNS(TLD) measurements with a shadow cone	P. ANGUS	D. HEINRICHS F. TROMPIER	LLNL IRSN
Dependent on completion of IE2.						
AWE-IE5	Correction factor for dosimetry linked to orientation of the victim	LLNL-IE1	Participate in experiment design; use PNS data to determine directional components of neutron fields (Godiva, Flattop, LLNL RCL)	P. ANGUS	P. MAGGI F. TROMPIER	LLNL IRSN
Dependent on completion of IE2 (unfolding tools for directionality). Linked with IE11 (International inter-comparison)						
AWE-IE6	ICSBEP shielding benchmark for shipping containers	Proposal FY20-25 (Low priority Experiment for FY2022)	Participate in experiment design; PNS(TLD) could be deployed as primary measurement device AWE to do some preliminary design	P. ANGUS	S. KIM	LLNL
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.	P. ANGUS	T. CUTLER	LANL
Discussions being held with UKAEA to set up a session to discuss the code and our applications. US will share measurement data with the UK, enabling analysis using UK unfolding tools and comparison with US codes.						
AWE-IE9	AWE/LLNL NCT 5 year measurement campaign	LLNL-IE1	Participate in experiment design, measurements and reporting	N. KELSALL	W. ZYWIEC	LLNL
Measurement campaign undertaken at the DAF in October/November 2023, with the next campaign planned for February/March 2024.						
AWE-IE10	NAD Research & Development	LLNL-IE1	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.						

Reference			AWE Contributions and POCs			
AWE Reference	Task Description	NCSP Reference	FY2023 AWE Contribution	AWE Technical POC	Collaborator POC	DOE Lab
AWE-IE11 **(IER 538)**	NAD Exercise	LLNL-IE1	Produce experiment design; participate in exercise; produce final report. Repeat even years.	P. ANGUS	P. MAGGI	LLNL
Next international inter-comparison is anticipated in June 2024.						
AWE-IE12	CIDAAS testing	Proposal FY19-20	Deploy AWE CIDAAS for test irradiation. Repeat odd years as needed	T. BIRKETT S. GARBETT	D. HEINRICHS P. MAGGI J. GODA	LLNL LLNL LANL
The next test planned for March 2024 (using Godiva) has been delayed until May 2024.						
AWE-IE13	Characterization of AFRRI TRIGA reactor radiation field AWE will provide onsite measurement	LLNL-IE1 SNL-IE1ST2	Provide support to experiment design	P. ANGUS	A. ROMANYUKHA G. HARMS	LLNL SNL
AFRRI visit undertaken in February 2023 to discuss experimental plan with participants. UK involvement in the characterization (August 2023) was cancelled at very late notice due to UK/US clearance issues. However, US will share their measurement data with the UK, enabling analysis using UK unfolding tools and comparison with US codes.						
TRAINING AND EDUCATION						
AWE-TE1	Hands-on criticality safety training	ORNL-TE1	AWE personnel to attend training course	C. HODKINSON	D. BOWEN B. MYERS D. HEINRICHS G. HARMS	ORNL LANL LLNL SNL
Three assessors expected to attend course planned for Q2 of this financial year.						

APPENDIX E: International Collaboration with the Institut de Radioprotection et de Sûreté Nucléaire (IRSN) for FY2024

IRSN has an active and growing program of collaboration with the NCSP that aims to underpin and enhance IRSN's nuclear criticality safety. IRSN will provide its expertise and capabilities to support the NCSP's mission and vision so that the collaboration is mutually beneficial to both organizations.

| IRSN Reference | IER # | REFERENCE | | | IRSN Contribution / POC | | | |
		Task Title	DOE Reference	IRSN Contribution	IRSN Technical POC	DOE Technical POC	DOE LAB
ANALYTICAL METHODS							
IRSN-AM13		Benchmark intercomparison study	ORNL-AM10	Beta-eff calculation comparisons and shielding benchmarks in 2024. IRSN leading.	J. BEZ, R VUIART	D. BOWEN	ORNL
IRSN-AM13		Benchmark intercomparison study	Y12-AM1	Beta-eff calculation comparisons and shielding benchmarks in 2024. IRSN leading.	J. BEZ, R VUIART	K. REYNOLDS	Y12
IRSN-AM13		Benchmark intercomparison study	LANL-AM5	Beta-eff calculation comparisons and shielding benchmarks in 2024. IRSN leading.	J. BEZ, R. VUIART	J. ALWIN	LANL
IRSN-AM13		Benchmark intercomparison study	LLNL-AM5	Beta-eff calculation comparisons and shielding benchmarks in 2024. IRSN leading.	J. BEZ, R VUIART	D. HEINRICHS	LLNL
Q1 Status							
Almost all Beta-eff results have been communicated to IRSN. Comparison and writing of the report is ongoing.							
IRSN-AM5		Update of the slide rule	LLNL-AM3	Additional calculations, and work on an operational document.	J. HERTH	D. HEINRICHS	LLNL
IRSN-AM5		Update of the slide rule	ORNL-AM6	Additional calculations, and work on an operational document.	J. HERTH	D. BOWEN	ORNL
Q1 Status							
Updating the 2019 IRSN report 2019-00266 to include the separate document with phases 3 and 4 results and incorporating received feedback.							
IRSN-AM8		Analytical Methods Working Group	ORNL-AM2	IRSN participation in NCSP Analytical Methods Working Group and TPR meeting	S. PIGNET	D. BOWEN	ORNL
IRSN-AM8		Analytical Methods Working Group	LANL-AM1	IRSN participation in NCSP Analytical Methods Working Group and TPR meeting	S. PIGNET	J. ALWIN	LANL

| IRSN Reference | IER # | REFERENCE | | | IRSN Contribution / POC | | | |
		Task Title	DOE Reference	IRSN Contribution	IRSN Technical POC	DOE Technical POC	DOE LAB
Q1 Status							
IRSN will participate to AMWG meeting, we are considering to propose a presentation.							
IRSN-AM9		Cross sections processing validation	ORNL-AM3	User experience on AMPX.	V. JAISWAL	D. BOWEN	ORNL
Q1 Status							
Ongoing work involving the comparison of cross section processing using AMPX, GAIA and NJOY on a series of ICSBEP benchmarks. Special attention to covariance matrix processing.							

INTEGRAL EXPERIMENTS							
HIGH PRIORITY TASKS							
IRSN-IE25	296	TEX/MOX	LANL-IE33	Leading the design: CED2 to be finalized in 2024 (take into accountreviewers feedbacks), provide material for the experiment, support LANL for CED3a	M. BROVCHENKO	J. GODA	LANL
IRSN-IE25	296	TEX/MOX	LLNL-IE3	Leading the design: CED2 to be finalized in 2024 (take into accountreviewers feedbacks), provide material for the experiment, support LANL for CED3a	M. BROVCHENKO	C. PERCHER	LLNL
Q1 Status							
New version of the CED-2 report was provided to the CED Team. Review provided by LANL and LLNL is being taken into account. Regular meetings with technical exchanges on the experimental design.							
IRSN-IE41	499	Thermal/Epithermal Experiments (TEX) with Chlorine	LLNL-IE1	LLNL will provide CED3A and CED3B. Participation to the experiments.	R. VUIART	C. PERCHER	LLNL
Q1 Status							
No update							
IRSN-IE46	518	High Multiplication Subcritical (Multiplicity) Benchmark Experiments	LANL-IE33	External Review of ICSBEP evaluation	W. MONANGE	J. GODA	LANL
Q1 Status							
IRSN has still not received the ICSBEP benchmark, and so cannot begin the external review. It will be difficult to do a quality review in the time remaining.							
IRSN-IE51	479	TEX HEU with poly at very low temperatures	LLNL-IE1	Participation to the experiment (at least 2 or 3 configurations expected by LLNL)	J. BEZ	C. PERCHER	LLNL

IRSN Reference	IER #	REFERENCE			IRSN Contribution / POC			
		Task Title	DOE Reference	IRSN Contribution	IRSN Technical POC	DOE Technical POC	DOE LAB

Q1 Status							
Exchanges with Eric Aboud about chiller improvements.							
IRSN-IE52	602	Dosimetry collaboration with Armed Forces Radiobiology Research Institute (AFRRI)	LLNL-IE1	International dosimetry exercise in 2024, IRSN participates	F. TROMPIER	D. HEINRICHS	LLNL
Q1 Status							
The exercise is planned with four people from IRSN administrative work on going.							
New Action		Critical Experiments using LANL ARIES rods (MOX)	LANL, SNL	CED0 – Explore possible needs for this experiment.	V. JAISWAL	J. GODA	LANL
Q1 Status							
Discussion with J. Goda and N. Thompson about the ARIES rods. Preliminary version of the CED0 drafted.							
		MEDIUM PRIORITY TASKS					
IRSN-IE27	498	GODIVA Shielding benchmark	ORNL-IE1	Participation to the measurements campaign	F. TROMPIER	D. BOWEN, R. CUMBERLAND	ORNL
IRSN-IE27	498	GODIVA Shielding benchmark	LANL-IE33	Participation to the measurements campaign	F. TROMPIER	J. GODA	LANL
Q1 Status							
No update							
IRSN-IE34	567	MUSIC subcritical configurations	LANL-IE3	External Review CED4A	J-B CLAVEL	J. HUTCHINSON	LANL
Q1 Status							
LANL asked IRSN to be as external reviewer for the MUSIC benchmark scheduled for 2025. Unfortunately, today, IRSN can't make a firm commitment. It will be possible to discuss it again next fall to see if somebody in the staff can do it.							
IRSN-IE48	520	TEX Pu-240 Experiment	LLNL-IE1	Participation to the experiments	M. BROVCHENKO	C. PERCHER	LLNL
Q1 Status							
Not funded by NCSP							
New Action		Neutron Noise at Fukushima	LANL	Working plan definition	W. MONANGE	J. HUTCHINSON	LANL

| IRSN Reference | IER # | REFERENCE | | | IRSN Contribution / POC | | | |
		Task Title	DOE Reference	IRSN Contribution	IRSN Technical POC	DOE Technical POC	DOE LAB
Q1 Status Exchanges with Japanese on a NDA to get data							
LOW PRIORITY TASKS							
IRSN-IE42	121	Neptunium Subcritical Observations (NeSO) experiment	LANL-IE3	Independent review of the ICSBEP evaluation.	W. MONANGE	J. HUTCHINSON	LANL
Q1 Status No update.							
IRSN-IE45	517	Integral Experiments for Validation of Molybdenum Neutron Cross Sections on the whole energy spectrum	LANL-IE3	Review of CED2 report	J. BEZ	N. THOMPSON	LANL
Q1 Status No update							
IRSN-IE47	537	Copper Critical Experiment	LANL-IE3	IRSN is a collaborator	J-B. CLAVEL	T. CUTLER, K. AMUNDSON	LANL
Q1 Status No update							
IRSN-IE53	551	True Intermediate Energy System with Pu-239 and Pu-240	LANL-IE3	Contribution to CED2	TBD	J. GODA	LANL
Q1 Status Not funded by NCSP							
IRSN-IE56	578	Jupiter ZPPR high 240 plates benchmark report	LANL-IE3	Support for review of CED4A	M. BROVCHENKO	J. GODA	LANL
Q1 Status Reviewed of CED3b completed by Mariya Brovchenko : exhaustive work from LANL, new information on Pu plates.							
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

| IRSN Reference | IER # | REFERENCE | | | IRSN Contribution / POC | | | |
		Task Title	DOE Reference	IRSN Contribution	IRSN Technical POC	DOE Technical POC	DOE LAB
Q1 Status							
IRSN Review reported in IE section.							
IRSN-IPD2		LFE Database	ORNL-IPD4	Sharing experience on French LFE database	A. BARDELAY	D. BOWEN	ORNL
Q1 Status							
Participation to monthly meetings. Database model reviewed by IRSN.							
TRAINING AND EDUCATION							
IRSN-TE1		Hands-on criticality safety training	ORNL-TE1	IRSN attendance to NCSP classes Possible lectures by IRSN working with NCSP training and education coordinator	S. PIGNET	D. BOWEN	ORNL
IRSN-TE1		Hands-on criticality safety training	SNL-TE1	IRSN attendance to NCSP classes Possible lectures by IRSN working with NCSP training and education coordinator	S. PIGNET	G. HARMS	SNL
IRSN-TE1		Hands-on criticality safety training	LLNL-TE1	IRSN attendance to NCSP classes Possible lectures by IRSN working with NCSP training and education coordinator	S. PIGNET	C. PERCHER	LLNL
IRSN-TE1		Hands-on criticality safety training	LANL-TE3	IRSN attendance to NCSP classes Possible lectures by IRSN working with NCSP training and education coordinator	S. PIGNET	J. GODA	LANL
Q1 Status							
No update							