Department of Energy
Under Secretary for Nuclear Security
Administrator, National Nuclear Security Administration
Washington, DC 20585

National Nuclear Security Administration

January 31, 2023

The Honorable Joyce L. Connery
Chair, Defense Nuclear Facilities Safety Board
625 Indiana Avenue NW, Suite 700
Washington, DC 20004

Dear Chair Connery:

Consistent with the Board's letter dated January 6, 2022, please find the attached *Fiscal Year 2022 Annual Metrics Report on Nuclear Criticality Safety Programs*. This metrics report includes a series of tables and satisfies the annual reporting requirement established for closure of Defense Nuclear Facilities Safety Board Recommendation 97-2, *Continuation of Criticality Safety at Defense Nuclear Facilities in the Department of Energy (DOE) Complex*.

If you have any specific questions regarding the report, please contact Kevin Hahn, National Nuclear Security Administration, who has overall responsibility for the consolidated report, at (505) 379-5131. Larry W. Perkins, Office of Environmental Management (EM), (865) 599-3636, is responsible for the EM information; and Joanna Serra, Office of Science (SC), (301) 903-6136, is responsible for the SC information.

Sincerely,

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2022
ANNUAL METRICS REPORT
To
THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD
January 2023

NUCLEAR CRITICALITY SAFETY PROGRAMS

National Nuclear Security Administration
United States Department of Energy
Washington, DC 20585

Purpose

A Defense Nuclear Facilities Safety Board (DNFSB) letter dated January 6, 2022, requested that the Department of Energy (DOE) provide an annual metrics report on the nuclear criticality safety criteria listed below in its Annual Report on Nuclear Criticality Safety (NCS) Programs. The Board's letter modified the annual reporting requirement established for closure of DNFSB Recommendation 97-2, *Continuation of Criticality Safety at Defense Nuclear Facilities in the Department of Energy (DOE) Complex,* which requires DOE to provide a report and briefing on the requested subject areas for its various NCS programs.

The points-of-contact for this report are Kevin Hahn, National Nuclear Security Administration (NNSA), 505-845-4106, Dr. Larry W. Perkins, Office of Environmental Management (EM), 865-599-3636, and Joanna Serra, Office of Science (SC), 301-903-6136.

The requested metrics include:

1. A **summary of the health of the criticality safety program** as assessed by each DOE field office and DOE program office, consistent with DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy;*

   The following qualitative grades are used:
   - Excellent
     - The program elements consistently exceed the requirements.
     - Many program elements are considered best in class and worthy of consideration by each DOE site.
   - Good
     - The program elements meet the minimum requirements, or any minor noncompliances are actively being corrected or improved.
   - Marginal
     - The program elements meet most of the minimum requirements, with one or more significant associated elements identified below the minimum program requirements.
     - This level of performance typically warrants a Headquarters federal response including assist visits or additional assessments, and compensatory measures may be required to continue operations.
   - Unacceptable
     - The program elements do not meet minimum requirements with more than a few significant associated elements identified below the minimum program requirements such that operations cannot be executed safely.
     - This level of performance warrants a Headquarters federal response and typically results in a pause in operations or stop work.

The Field Office provides the overall performance of the site which is broken into program health and operational implementation. The DOE program office will either concur with this opinion or provide a different opinion in the summary discussion. Note that Nuclear Criticality

Safety Program support as well as support to other offices, agencies, universities, countries, etc. could be noted in the health summary but has not been factored into the program or operational implementation health grades.

- The program health grade is based on items such as contractor staffing levels, quality, timeliness and backlog of NCS Evaluations, adequate funding, NCS procedures and policies…etc.

- The operational implementation grade is based on items such as those events and issues affecting the handling and processing of nuclear materials…i.e., infractions, conduct of operations, implementation of NCS in operating procedures…etc.

- The **number and a short description of criticality safety infractions per site-specific criteria** identified by each of the following: the contractor, DOE field office, and DOE headquarters;

    - Note that the short description (summary) is a Federal point-of-view of the significance of any trends or concerns based on the infractions.

- The **number and a short description of identified non-compliances with DOE Order 420.1**, *Facility Safety*, and the American National Standards Institute/American Nuclear Society-8 series of criticality safety standards identified by each of the following: the contractor, DOE field office, and DOE headquarters;

    - Note that the short description (summary) is a Federal point-of-view of the significance of any trends or concerns based on the non-conformances.

- The **total number of criticality safety issues** in the issues management system for each of the following categories: open at the start of the FY, added during the FY, closed during the FY, open for longer than six months (only those still open at the time of reporting), and open for longer than one year (only those still open at the time of reporting). Opportunities for Improvement and Observations shall not be included, and;

    - Note that the short description (summary) is a Federal point-of-view of the significance of any trends or concerns based on the issues.

- **Contractor and federal criticality safety staffing levels**, including the number of qualified staff, average years of experience in criticality safety, the number of staff in training for initial qualification, and the number of vacancies. Also include for each the contractor and federal staff the numbers of staff hired and staff lost during the year.

    - The number of qualified NCS engineers reflects the number of staff qualified to independently perform criticality safety work consistent with site-specific criteria.

    - The “experience” metric is an average of the years of experience in criticality safety for the qualified staff at the time of reporting.

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Lawrence Livermore National Laboratory (LLNL)

1. LLNL Overall Performance

Field & Program Office Assessment	Program Health: Excellent
	Operational Implementation: Good

Note: The scope of this evaluation includes Nevada National Security Site (NNSS) operations that are executed under the LLNL Nuclear Criticality Safety (NCS) Program.

Summary: LLNL has had a history of stable and exceptional NCS Program performance over the years, which continued in FY22 with NCS performance metrics resulting in an Excellent (highest) grade, and current program health remaining strong with quality NCS products such as evaluations and infraction reports that were delivered in a timely fashion. The LLNL NCS Division (NCSD) has provided outstanding technical support to Superblock, Radioactive & Hazardous Waste Management, and LLNL operations at the NNSS. Numerous Criticality Safety Administrative Memoranda were issued for work related to equipment installation and process changes in support of these LLNL organizations, including three Tier 1 projects in Superblock. The NCSD also completed a WCI List A-Priority Criticality Safety Evaluation (CSEv) for assembly operations in support of the upcoming Nimble subcritical experiment, enabling the mission.

Other accomplishments included the NCSD Leader and a staff member receiving a DOE NA-50 Excellence Award for leadership in NCS, and that staff member receiving an Excellence in Publishing Award from the Physical and Life Sciences Directorate for her contributions to a paper focused on nuclear data, as well as an ES&H Gold Award for identifying a safety concern and creative solution for a new operation in the Device Assembly Facility (DAF), an ES&H Bronze Award for extraordinary leadership and productivity for CS support, and a WCI Spot Award for outstanding DNFSB interactions. The NCSD Leader was also selected as an external member of the CNS (Y12/PX) Nuclear Criticality Safety Committee, reflecting the reputation of the LLNL NCSD, and expanding LLNL's network and access to lessons learned. Further, LLNL has been exchanging information with the U.K. Atomic Weapons Enterprise (AWE) and Y12 on the Nuclear Measurements Corporation's criticality accident alarm system (CAAS) and replacement options, including a new AWE design, which will assist in the B332 CAAS replacement project looking forward.

Going above and beyond, LLNL continued its contributions through longstanding Criticality Safety Support Group membership, providing significant portions of national hands-on NCS training course instruction, developing and teaching the UC Berkeley NCS pipeline course, and designing and evaluating NCS-relevant critical experiments working with US and international criticality safety groups [Y-12, LANL, Hanford, UK National Nuclear Laboratory, and L'Institut de Radioprotection et de Sûreté Nucléaire (IRSN)] to address NCS needs. In conjunction with the National Criticality Experiments Research Center, LLNL hosted the third international dosimetry intercomparison exercise at NNSS, with dosimetrists from seven DOE labs and others testing their nuclear accident dosimeters to support criticality emergency response preparedness. LLNL also successfully completed its first two Pulsed-Neutron Die-Away experiments in B255, which will become benchmark experiments to help improve CS modeling for the complex.

Furthermore, one of the NCSD staff members was selected as the Chairwoman of the International Criticality Safety Benchmark Evaluation Project (ICSBEP), leading the efforts for improving nuclear data for CS modeling, which will benefit the entire complex and increase LLNL awareness of benchmark topics. This NCSD staff member was also the General Chair of the American Nuclear Society NCSD Topical Meeting, increasing LLNL's visibility and esteem in the complex. Further, the LLNL NCS Division continued its leadership role this period as NNSA POC for Joint Operations Weapons Operations Group (JOWOG)-30-23 while taking on new tasks, including assisting in organizing the next International Conference on Nuclear Criticality Safety as a Member of the International Scientific Advisory Committee. LLNL also hosted the 2022 International Conference on Nuclear Data for Science and Technology, which the NCSD supported as a Member of the International Program Committee.

Based on the strong leadership on NCS program best practices and assistance to other sites, the program health of the LLNL NCS program is graded as Excellent. The program elements consistently exceed requirements and are considered best in class and worthy of consideration by each DOE site. The minor non-compliances are actively being corrected or improved.

Operational implementation at LLNL is graded as Good, as evidenced by very close and effective collaboration between operations personnel and NCS staff. Assessments performed through the year did not identify any significant issues that would indicate a failure to effectively implement the NCS program. One infraction was identified at the NNSS which is expected to be actively corrected and improved.

Succession planning remains an important focus area in preparation for anticipated NCSD retirements and attrition, as well as increasing demands from multiple programs for NCS expertise, including two large LLNL Nuclear Materials Technology Program (NMTP) efforts (i.e., modernizing Superblock and installing a glovebox line at DAF). The NCSD currently has three vacancies for technical positions and one administrative vacancy, but LLNL is attentive to improving staffing, and has hired three summer students, three FTEs, one postdoc, one graduate student, one half-time contractor, one DOD secondee, and is pursuing an additional contractor.

The NNSA Headquarters office agrees with these health grades.

2. LLNL Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	2	0	0

Summary: The infractions reported are due to exceeding the cumulative CSI limit of 100 in a staging bunker, as well as a few containers found without assigned CSI values and/or required CSI labels in this and a second staging bunker. These infractions indicate a moderate implementation concern that the LFO and NFO will be tracking in coordination.

3. LLNL Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
1	1	0

Summary: LFO does not note a significant trend or concern from these non-compliances.

4. LLNL Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
9	6	8	1	4

Summary: The lack of procedures to track and prevent inadvertent fissile material accumulations is still open since the last DNFSB Annual Report, which is only of moderate significance since historic measurements found only small amounts of accumulations. This issue is not considered an imminent risk at this time.

OR#21-30 Degradation of the Safety Significant Criticality Alarm System (CAAS) in Building 332 serves as a reminder of the system's aging and technical obsolescence and its need for continued refurbishment and planned replacement. *OR#22-37 B332 TSR Violation – Potential Discrepancies Impacting TSR Alarm Setpoints for the CAAS* reflects the need for better integration between the LLNL Radiation Calibration Lab and facility operators regarding CAAS maintenance activities.

In general, there are issues open for longer than a year because they are relatively lower significance compared to other issues, and given finite resources, higher significance safety issues are prioritized. As documentation issues, their open status is also not expected to normalize deviation or cause behavior of operators to shift, as might be the case for field CS issues (e.g., improper postings or unnecessary controls/infraction traps). Furthermore, LFO does not currently note a substantial negative trend or concern based on them. The first issue relates to a CSEv assumption not supported by a basis, but conceptually understood such that operations can continue safely until formally documented. A second came from the same assessment and pertained to a different CSEv assumption – LLNS still needs to select the exact basis, and LFO is continuing to follow up. In the interim, other facility controls not credited in the CSEv help address the issue to support safe operation. Based on additional LFO encouragement, LLNS has

stated they will close these two issues soon. The third issue is a noncompliance with requirements that will be removed in the next CSP document update due to not being needed, thus resolving the issue. The fourth addresses inconsistent versions of an ANS Standard in different documents with a projected completion date of 2/1/23.

5. LLNL Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	9	25	8	1	6	3
Federal	1	1.6	0	0	0	0

Nevada National Security Site (NNSS)

1. NNSS Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Note: Program Health and metrics data is for the NNSS M&O Contractor Mission Support and Test Services (MSTS) only. Other programs that perform work at NNSS such as Los Alamos and Lawrence Livermore report their metrics through their own program mechanisms.

Summary: The MSTS Nuclear Criticality Safety (NCS) Program has completed all scheduled facility walk-throughs and assessments on time as well as performed walk-throughs prior to the start of active operations performed by MSTS. The staff remains engaged in all criticality safety work at NNSS through the attendance of staff in operations planning meetings, performance of NCS evaluations, reviews and/or revisions of procedures and facility documents, the administration of the Criticality Control Review (CCR) process and providing support for the revision of safety basis documents. MSTS also participates in the Joint Criticality Safety Committee. During this reporting period a revision to the MSTS NCS Program was submitted and subsequently approved by NFO.

The NNSA Headquarters office agrees with these health grades.

2. NNSS Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: The MSTS program has had no infractions during this reporting period.

3. NNSS Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
2	0	0

Summary: Two issues were identified during the contractor ANS 8.19 assessment and entered into the issue tracking system. The issues were specific to the level and periodicity of criticality safety training for Fire and Rescue responders to nuclear facilities. Corrective actions are being developed and are being implemented.

4. NNSS Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	2	0	0	0

Summary: There were two issues identified during the reporting period. Both issues are actively being addressed.

5. NNSS Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	4	15	0	1	0	1
Federal	1	13	0	0	0	0

Los Alamos National Laboratory (LANL)

1. LANL Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Note: The scope of this evaluation includes Nevada National Security Site operations that are executed under the LANL Nuclear Criticality Safety Program (NCSP).

Summary: The LANL NCSP is a healthy safety management program (SMP), enabling critically safe operations, while addressing multiple longstanding challenges that will further improve the program. DOE operational awareness activities, Federal and Contractor performed assessments and self-assessments, routine interface between NNSA/NA-LA criticality safety program oversight staff and their LANL NCS Division (NCSD) counterparts, and the FY22 LANL NCSP performance metric ranking of "Satisfactory" all confirm that the program elements meet DOE and consensus standard requirements with only a few minor weaknesses which are actively being improved.

Of particular note, significant efforts were made to complete the 'backlog' of 2013/14 Evaluation of the Safety of the Situation (ESS) deficient criticality safety evaluation documents (CSEDs) – a substantial multi-year effort to address potential fire-water introduction into gloveboxes and other CSED deficiencies. [For completeness, it is acknowledged that 7 of the original 438 deficient CSEDs are pending final completion.] In addition, LANL began piloting a new criticality safety control which limits glovebox combustible loading to 100 KW for certain seismically-qualified gloveboxes, thereby enabling higher mass limits in the gloveboxes where this criticality safety control is credited. As described in the DSA, "With the combustible controls in place, glovebox windows and upper gloves will not be damaged ... Thus, for glovebox fires, no fire suppression water is expected to enter the glovebox." With this control, water-ingress into these gloveboxes from the fire suppression system is deemed to be not credible for the purpose of evaluating criticality safety and higher mass limits are defensible. It is noted that this new 100 KW control is also credited in several new CSEDs, thereby resolving some of the 'backlog' CSEDs previously described. Finally, the ESS for the July 2021 glovebox 'waterfall event' (caused by water introduction into the Zone 1 ventilation system ductwork) was approved by NA-LA, permitting re-start of the TA-55 Negative Pressure Circulating Chilled Water (NPCCW) and Positive Pressure Circulating Chilled Water (PPCCW) systems (pending a DSA page change).

Notwithstanding this progress, challenges remain to efficiently implementing criticality safety requirements to support 30 pits-per-year (ppy) program requirements. One of the primary concerns is timely implementation of approved DOE-STD-3007-compliant CSEDs which have been written to resolve the aforementioned 2014 ESS. While the 'backlog' is substantially complete, a significant number of new and revised CSEDs have been issued but not implemented in the facility – more than 50. This delay in posting the new CSED limits and controls necessitates the facility's continued reliance upon ESS-imposed criticality safety limits because previously posted limits and controls were deemed, by definition, inadequate and non-compliant with consensus codes and standards. Some of this delay has been due to hesitancy of Operations

to accept the 100 KW combustible loading control administrative control limit – a DSA-specified key element of the TA-55 Transient Combustible Loading SMP.

A loss of eight (8) criticality safety engineers (CSEs) from the NCSD this year is also concerning. However, the completion of the 'backlog' CSEDs (and the significant workload that this work entailed) lessens the impact of this personnel reduction, and current staffing (including both Contractor and Sub-Contractor CSEs combined) is considered acceptable and adequate. A new staffing analysis is being developed to better reflect the current workload. LANL leadership is highly engaged and are working to improve staff retention including efforts to revise the LANL NCS CSA qualification standards, thereby making the requirements for achieving senior qualified analyst (SQA) qualification more reasonable and appropriate for the expected performance level. LANL NCSD leadership has also developed an Immersion Program which allows analysts to embed in PF-4 Operations groups for on-the-floor training and experience (i.e., hands in gloves).

For completeness, it is acknowledged that LANL did receive concerns from the DNFSB this year which "identified weaknesses in the NCERC criticality safety program." [Reference DNFSB letter dated June 16, 2022, that enclosed Staff Issue Report *Review of the Integrated Criticality Safety Program at the National Criticality Experiments Research Center, Nevada National* Security Site dated December 14, 2021] NA-LA Criticality Safety Program Oversight Staff and the LANL NCSD have aggressively pursued corrective actions to the identified weakness, to include an increased focus on safety oversight of the NCERC activities. Starting in FY23, DOE is committed to addressing NCERC activities in this report as a stand-alone section. Today, however, the above evaluation also reflects the NCERC criticality safety program, as well.

The NNSA Headquarters office agrees with these health grades.

2. LANL Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	1	0	0
Level 4	17	0	0
Level 5	47	1	0
Program Non-Compliances	1	0	0

Summary: As discussed in last year's DNFSB Annual Metrics Report, LANL's System Description (SD) 130, *LANL Nuclear Criticality Safety Program*, revised the criticality safety infraction reporting levels in FY21 "… clarifying the infraction severity level 1 thru 4, this

change additionally redefined Level 5 as not an infraction because no criticality safety parameter was impacted (which is consistent with infraction reporting with other NNSA sites) and broke up the previous non-compliance (NC) infraction severity level into 3 sub-categories: NC-Low, NC-Medium and NC-High." As expected, the FY22 LANL NCSP performance metrics show that this change did not significantly skew the number and/or significance of criticality safety infractions – the revision to the reporting levels was simply to clarify these levels. That said, there was one [SD 130] NC-Medium infraction in FY22. This infraction involved the unintended creation of hydride parts in a glovebox where neither the criticality safety evaluation document (CSED) nor the criticality safety posting (CSP) anticipated and/or analyzed hydride parts AND the appropriate Potential Process Deviation protocol per TA55-AP-522, *Nuclear Criticality Safety Program at TA-55*, was not followed (i.e., a conduct of operations concern).

As similarly identified by the LANL NCS Division's performance metrics for FY21, there continues to be areas for improvement for both criticality safety infraction severity and well as recurring/similar infractions. In FY21, there were 20 L4 infractions (partial loss of control), 2 L3 infraction and 1 NC-med infraction, whereas in FY22, there were 17 L4 infractions (partial loss of control). 1 L3 infraction and 1 NC-medium infraction. This is an indication of sustained underlying Conduct of Operations issues. Individual FY22 metrics similarly show this weakness: both the criticality infraction and the similar infraction indices are identified as 'needs improvement'. These observations reinforce a continuing need exists for the NCS program to engage facility, engineering and operations management and all technical staff personnel to ensure their understanding of the responsibilities as defined by LANL SD130, *Nuclear Criticality Safety Program*, and in the flow down of facility specific NCS implementation policies and procedures.

It is noted that there were no criticality safety infractions at NCERC, NNSS during this reporting period.

3. LANL Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: No Program Non-Compliances were found.
Note: This metric reports program non-compliances with DOE orders and standards, typically found through formal assessments. This should not be confused with LANL's non-compliance category of infractions, which are typically conditions found which indicate a non-compliance with the site's SD 130, *LANL Nuclear Criticality Safety Program* (e.g., identifying a process with no controls and/or no evaluations when they should have them).

4. LANL Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
87	101	141	26	6

Summary: As a result of operational awareness activities, external assessments, internal self-assessments and other review activities resulted in 101 new NCS issues of various significance in FY22. None-the-less, continuous and active management of the issue management system resulted in closure of 141 issues. LANL NCSD is applying adequate resources to resolving several long-standing open issues, but additional time is needed for evaluation and procedure revisions, some training updates, and some are follow-on actions to initial issues. For completeness, it is noted that five of the six open issues open longer than 12 months are associated with issues identified in the May 2021 DOE Enterprise Assessments (EA) Assessment Report of the Triad National Security, LLC Nuclear Criticality Safety Program at the Los Alamos National Laboratory. The sixth open issue is an opportunity for improvement (OFI) identified for NCERC – the development of an alternative method to establish an upper subcritical limit (USL) value >0.97 for well-defined and controlled operations, including radiation test objects (RTOs). Closure of each of these (not simple) issues open for longer than one year is being actively managed by LANL.

5. LANL Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	11	7.49 years	8*	8	4	5
Federal	1	16	2	0	0	0

Summary: NCSD staffing with subcontractors is 27.5 FTE (17.5 fully qualified, 7 task-qualified, 2 in-training). Six of the eight in-training NCS analysts are task-qualified (facility and/or calculations).

As shown above, LANL NCSD lost eight criticality safety engineers in FY22. As mentioned in the overall summary above, this loss should be considered manageable with the completion of the 'backlog' CSEDs (and the significant workload that this work entailed) and current staffing (including both Contractor and Sub-Contractor CSEs combined) is considered acceptable and adequate. A new staffing analysis is being developed to better reflect the current workload. LANL leadership is highly engaged and are working to improve staff retention including efforts to revise the LANL NCS CSA qualification standards, thereby making the requirements for achieving senior qualified analyst (SQA) qualification more reasonable and appropriate for the expected performance level. LANL NCSD leadership has also developed an Immersion Program which allows analysts to embed in PF-4 Operations groups for on-the-floor training and experience (i.e., hands in gloves).

The Federal in-training Criticality Safety Program Oversight staff members are expected to be fully qualified in FY23.

Sandia National Laboratories (SNL)

1. SNL Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Excellent

Summary: The Program Health grade is Good based on an SNL's significant improvements. Although a small program with a low risk, SNL continues to formalize their program and makes a concerted effort to learn from other sites (e.g., observing the annual criticality safety drill at the LLNL Superblock facility, supporting assessments at other DOE facilities). SNL initiated and continually updates a *Program Improvement Plan* started in FY16 to drive program improvements. In FY22, the SNL Criticality Safety Program (CSP) created metrics for the first time and provided them to SFO for FY21. In FY22, there were significant staffing changes over four levels of management including the Executive Champion, Program Owner/Director, Senior Manager, and Department Manager. These changes occurred within a three-month window; however, the CSP continued to execute well during this transition. There is a concern around staffing with the loss or reduction in time for two qualified engineers including the Deputy Program Lead. This is coupled with the need to increase support for the new Combined Radiation Environments for Survivability Testing (CREST) facility currently in the Critical Decision (CD)-1 phase of design which may require a Criticality Accident Alarm System. To plan for the possibility of retirements and staff loss, the CSP proactively established a pipeline of graduate students at universities for staffing and has enrolled two on staff graduate students into their qualification process. In FY22, SNL continued training for four staff to address the need for resources.

The Operational Implementation grade is Excellent. The grade is based on excellent support completing analyses for multiple locations, coordinating with line organizations to perform these analyses, and developing controls that were easy to understand and implement as written. The number of infractions and non-compliances for an eighth year was low with one infraction/non-compliance which was identified during a CSP annual facility assessment. The low number of infractions is due to the CSP being well integrated into line activities and training. Facility assessments have continued to improve with reports resulting in an increase in positive communication with line organizations. Facility assessments were performed ahead of the expected schedule and were used for training new engineers which sometimes led the assessments. The CSP has assisted with facility specific training at several locations where fissile material is handled on a non-routine basis to create a better understanding of controls while building relationships with line organizations. Floor level support (time in facility) during operational activities increased significantly and a database has been developed for tracking time in each facility by the CSP engineers when activities are occurring. In FY22, SNL has implemented DOE O 420.1C CN3, *Facility Safety* which includes ANSI/ANS-8.23-2019, *Nuclear Criticality Accident Emergency Planning and Response* with a few SFO approved exemptions. In FY22, the CSP completed criticality safety training of over 75 emergency management responders and firefighters for the first time. This training has strengthened relationships not only with those organizations, but also with facility line organizations.

The SNL CSP has provided support the DOE complex and to other international agencies. In FY22, procedures, processes, charters, and other documents were provided to LANL, LLNL, SRS, Y-12 and PNNL. SNL completed assessments of the nuclear criticality safety program implementations at LLNL, NNSS, and PNNL. SNL provided training for the United Kingdom, University of New Mexico, and NNSA ESH-20 CSP hands-on training classes, and performed experiments for the French.

The NNSA Headquarters office agrees with these health grades.

2. SNL Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	1	0	0

Summary: SNL had a single criticality safety infraction in FY22 which is a typical rate (NA-SS-SNL-4000-2022-0013, *CSI Containers Moved Without Updating Tracking Sheet*). On July 21, 2022, the SNL CSP was performing their annual facility assessment of the Radioactive and Mixed Waste Management Facility (RMWMF) Manzano Storage Bunker (MSB). At the RMWMF MSB, the Criticality Safety Index (CSI) array log in the MSB did not match the physical inventory. The CSP determined that despite the inventory discrepancies, all criticality safety controls remained intact. The log was last updated in March 2022 stating that there were 37 containers in the MSB, but there were only 31 containers in the bunker. This indicated that the CSI Tracking Form was not being filled out properly. It was determined, through radiation protection records, that three material moves had been made since January 2022. The first move occurred in January which included one container moving which was not logged out. A second move also occurred in January which included five containers moving which was not logged out. Then in February, the same five containers from the second January move were returned to the MSB resulting in a double accounting into the CSI summation.

SFO staff were present during the SNL CSP assessment and observed the response. The SNL CSP demonstrated an excellent understanding of the response to a low-risk infraction at a facility which infrequently deals with fissile materials. As a log keeping error for a CSI storage array, this resulted in no safety concerns; however, the SNL CSP performed a causal analysis to determine actions to reduce the frequency of this occurring. The SNL CSP is recognized as being proactive and exceptional in their approach in this and previous infractions.

3. SNL Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
1	0	0

Summary: There was one non-compliance identified in the FY22 during the CSP assessment of MSB as discussed previously. In addition, there were eight OFIs mostly related to updates in procedures, training, training exemptions, and log sheets. None of these OFIs were a non-compliance with DOE O 420.1 or ANS standards but were steps to more formalize processes.

4. SNL Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
1	1	1	1	0

Summary: There was one issue *Open at the Start of the Year* identified in the eight 2021 self-assessments for the Auxiliary Hot Cell Facility (AHCF) that applied across Technical Area (TA)-V. There was one issue *Added During the Year* identified during the seven 2022 self-assessments for the RMWMF MSB discussed previously.

5. SNL Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	6	11	3	1	1	1
Federal	1	20	1	0	0	0

Summary: Although there are six qualified staff, only one is dedicated full time and the remaining staff support the SNL CSP from 25% to 50%.

Pantex

1. Pantex Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Note: The Program Health grade reflects the combined performance of the contractor at Y-12, Pantex and the Uranium Processing Facility (UPF). However, the Operational Implementation grade is specific to implementation at this site.

Summary: At Pantex, the NCS program remains in the midst of a large improvement effort with many actions associated with the Pantex NCS Improvement Plan completed in FY 2022, but several actions are still being worked. Pantex is effectively prioritizing these actions and progress is being closely monitored. Among those completed in FY 2022 were improvements to NCS training through cross-training of Pantex NCS Engineers at Y-12 for additional production facility experience, implementation of NCS controls and NCS integration into the change control process for tooling and containers and implementing an enterprise wide NCS issues management process. Overall, the NCS program health is considered 'Good'.

Pantex lost one qualified NCS engineer during FY 2022 but NCS staffing at Pantex remains adequate to support the improvement actions as well as mission needs with recent staffing increases of NCS engineers in training. Due to the simplicity of the NCS requirement set at Pantex, NCS infractions are rare. Of note, the one issue open for longer than a year is associated with completion of the Pantex improvement plan's actions. Given that the areas needing improvement have been identified by CNS and are being worked to closure, the operational implementation at Pantex is considered to be 'Good'.

The NNSA Headquarters office agrees with these health grades.

2. Pantex Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Occurrences	0	0	0
Deficiencies	0	0	0
Minor Non-Compliances	0	0	0

Summary: There were no NCS infractions at Pantex in FY 2022.

3. Pantex Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: There were no identified program non-compliances at Pantex in FY 2022.

4. Pantex Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
3	7	4	3	1

Summary: Five of the seven issues added during the year were identified by NPO and DOE Headquarters during an NPO led NCS assessment of Pantex. The remaining two issues added during the year and three issues open at the start of the year were identified through CNS quarterly Management Self-Assessments. No concerns were identified in review of all ten issues and the length of time taken to close issues is adequately managed. The single issue open longer than one year tracks the Pantex Improvement Plan.

5. Pantex Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	4	12.3 years	2	1	2	0
Federal	2	13 years	1	0	0	0

Note: Criticality Safety Federal oversight of Pantex, Y-12 and UPF is performed by the NPO.

Y-12 National Security Site (Y-12)

1. Y-12 Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Note: The Program Health grade reflects the combined performance of the contractor at Y-12, Pantex and the Uranium Processing Facility (UPF). However, the Operational Implementation grade is specific to implementation at this site.

Summary: The Nuclear Criticality Safety Program (NCSP) at Y-12, Pantex, and UPF is described in document E-SD-2026, *Nuclear Criticality Safety Program Description*. At Y-12, the NCS program is very mature and is implemented through a number of organizations and long-established procedures. A number of management oversight processes are in place by CNS to monitor the health of the NCS program, including the Nuclear Criticality Safety Committee (NCSC), the Nuclear Criticality Safety Advisory Council (NCSAC) and the Corrective Action Review Board (CARB). Additionally, CNS has established a number of additional tools for monitoring the performance and health of the NCS program, including the Health Survey tool (since 2019) and the NCS Integrated Schedule (since 2020). The level of oversight and the quality of the oversight provided through CNS's processes exceeds expectations.

A substantial number of improvement efforts have been undertaken in recent years to improve NCS program elements identified as weak following a number of events in 2017 and 2018 and the associated investigations and program reviews that ensued. In March 2021, document YAREA-F-1956, *Roadmap for Improving the Y-12 Nuclear Criticality Safety Program*, was published. This document summarized the corrective and improvement actions across virtually every NCS program element following the 2017 and 2018 events including those actions completed and those outstanding. In April 2022, CNS completed the remaining actions identified in the "Roadmap", marking a significant milestone for the overall health of the NCS Program. Additional improvement efforts were undertaken in FY 2022 to develop comprehensive NCS Program metrics to better describe the status of different program elements with objective criteria and measurable data. Given the number of NCS program improvement tasks completed, adequacy of program funding is a non-issue.

CNS has a large NCS staff and annually measures staffing needs against the site baseline (i.e. budget and work scope). CNS continues to hire in excess of the mission need to account for NCS engineer attrition; however, attrition still remains a program concern with the loss of thirteen qualified staff in FY 2022 alone. CNS has taken steps to cross train and rotate NCS engineers to meet workload demands across the three sites (Y-12, Pantex, UPF). The staffing element of the program is graded as 'Good', but improvements are necessary to avoid trending toward 'Marginal' for this element. Overall, the NCS program health is considered 'Good'.

As previously mentioned, the NCSP at Y-12 is implemented via a mature suite of administrative and technical procedures. Incorporation of NCS requirements into work execution and physical configuration documentation is considered to meet expectations; however, several issues related to requirement flow-down or improper implementation were identified during FY 2022.

Reviews of these issues and their causes did not identify any common-causes, and actions to improve requirement flow-down and prevent recurrence were taken in all cases.

Operational execution to NCS requirements presents additional issues/concerns. A high-level concern that NPO has across both Y-12 and Pantex is regarding disciplined operations (i.e. CONOPS). A joint NPO/CNS "Disciplined Operations Council" is working improvement actions in this area at both sites, with a focus on training improvements and line management reinforcement of expectations through floor-level engagement. Additionally, the complexity of certain requirement sets leads to execution issues, particularly regarding fissile material container loading, handling, and storage. Some improvements have been completed, with more underway, to improve execution in container loading, handling and storage activities. In April 2022, CNS published document YAREA-F-0157, *Improvements in Reducing NCS Related Personnel Errors*, which details several long-term actions intended to address these execution issues and simplify container loading and handling requirements. CNS's progress in FY 2022 on these actions was adequate but additional improvement is still needed in this area as several actions suffered delays in schedule.

CNS additionally dispositioned several 'legacy' noncompliant conditions, including a decades-old "Wood River Junction" drum with a noncompliant loading and removing material from out-of-service Reduction Salvage equipment which contained elevated uranium hold-up. In July of 2022, CNS concluded a multi-year effort to disposition a backlog of briquettes significantly improving the safety of storage on site. These accomplishments represent a large effort from both Production and Engineering to effectively manage legacy materials and equipment using a risk-based prioritization scheme.

A number of examples of a strong questioning attitude by individuals on the floor were observed in FY 2022. The CNS Disciplined Operations organization is also conducting "Systematic Reviews" of processes, which evaluate procedure content relative to actual floor-level performance in a step-by-step manner. These reviews have yielded hundreds of procedure improvements and identified several previously unidentified issues on the floor. Given the areas of strength, along with the areas of needed improvement, the overall assessment of NCS operational implementation at Y-12 is 'Good'.

The NNSA Headquarters office agrees with these health grades.

2. Y-12 Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Occurrences	3	1	0
Deficiencies	23	2	0
Minor Non-Compliances	19	0	0

Summary:
The site-specific definitions for Deficiency and Minor Non-compliance are included below to aid the discussion.

- Deficiency: A condition inconsistent with the intended process and resulting in an NCS requirement violation. At least two unlikely, independent, and concurrent changes in process conditions are still necessary before a criticality accident is possible, but there has been a deviation from a Criticality Safety Approval (CSA)/Criticality Safety Requirements (CSR)/Criticality Safety Evaluation (CSE), an NCS-related program, or an NCS-related operating procedure. The conditions resulting from the deviation are not within the normal conditions considered in the supporting CSE. At the discretion of the NCS engineer, a condition that does not meet the above criteria may be elevated to a deficiency if it warrants more attention than that of a Minor Non-compliance.
- Minor Non-compliance: An NCS-related condition inconsistent with the intended process, but not significant enough to qualify as an NCS deficiency or NCS occurrence.

Due to the number of fissile material operations, associated NCS requirements, and the site-specific infraction criteria, Y-12 experiences a number of infractions yearly. A total of 48 infractions were identified for FY 2022. Container loading and handling issues accounted for a large number of the infractions (17). This category typically accounts for the highest percentage of violations each year. Progress to address this area of infractions continued to meet expectations in FY 2022, but additional emphasis on this area is necessary to ensure actions are being effectively prioritized. In FY 2022, progress continued on the Container Improvement Plan, efforts continued toward container loading requirement simplification, and enhanced material form code training was implemented to better align material form codes to NCS limits on material form.

Another area of infraction trends was in regard to waste. A campaign was undertaken in FY 2021 to identify “low equity” items throughout the nuclear facilities that historically have been considered to be of no NCS consequence. This campaign resulted in the identification of the “Raschig Ring Drum” detailed in occurrence report NA--NPO-CNS-Y12NSC-2022-0006. The Raschig Ring Drum represents a complex NCS issue due to the lack of information regarding the loading, combined with the large geometry drum and the excess uranium indicated through non-destructive assay measurements. Despite these complexities and the difficulty in performing work associated with the drum due to the number of unknowns, CNS has methodically moved to exhaust the most viable paths for additional information such that the safety of the situation can be better understood for subsequent actions. CNS’s approach thus far has been adequate, effectively balancing risk with the benefits of the proposed actions. Overall, responses to site abnormal conditions involving fissile material were conservative and timely.

3. Y-12 Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: There were no identified program non-compliances at Y-12 in FY 2022.

4. Y-12 Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
17	23	20	23	10

Open – Open on or before 10/1/2021
Added – Added from 10/1/2021 to 9/30/2022

Summary: Table 4 identifies a number of issues associated with the Y-12 NCS program which have been open for greater than 6 months or a year. In all instances, issue closure is tied to completion of the identified corrective actions and improvement actions if applicable. Issues that require revision and implementation of the NCS approval documentation as an action typically necessitate a longer duration to close despite the condition in the field being made safe and stable well before the documentation is revised. Some issues result in actions intended to evaluate potential solutions to the original non-compliance. Such issues can involve several iterations of an action plan to allow for the results of an evaluation and creation of the additional actions that capture the identified path forward. The necessary time to perform these steps often leads to extending issue duration, which is considered by NPO to be acceptable. Additionally, the issue significance level may drive a corrective action effectiveness review to be performed, which is typically conducted 3-6 months from completion of all actions. This naturally leads to an extended duration for some issues. Four of the ten issues open longer than one year are associated with the two open NPO NCS Management Concerns. Some issues, particularly the large percentage of issues related to general handling and labeling requirements, have been open for a duration considered by NPO to be unreasonably long. In these instances, NPO staff ensure these issues are escalated to more senior levels of management to ensure they receive the resources to drive timely closure. However, in general, CNS displays reasonably timely issue resolution and only one issue was escalated in FY 2022 by NPO Staff.

5. Y-12 Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	28	12.3	16	13	9	10
Federal	2	13	1	0	0	0

Note: Criticality Safety Federal oversight of Pantex, Y-12 and UPF is performed by the NPO.

Uranium Processing Facility (UPF)

1. UPF Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Note: The Program Health grade reflects the combined performance of the contractor at Y-12, Pantex and the Uranium Processing Facility (UPF). However, the Operational Implementation grade is specific to implementation at this site.

Summary: The Nuclear Criticality Safety Program (NCSP) at Y-12, Pantex, and UPF is described in document E-SD-2026. The primary focal points for the UPF NCS organization throughout FY 2022 was the issuance of the first version of the UPF Documented Safety Analysis, and oversight of design, procurement, and construction activities to ensure the requirements set was adequately protected throughout. The UPF project employs the same NCS command media in use at Y-12, with some appropriate adaptations to support a project environment. The suite of command media and guidance documentation at UPF is thorough and has resulted in the production of high quality CSEs. NCS staffing for the project is adequate, and no issues have been noted with CNS's ability to modify staffing levels based upon project demand. Overall, the NCS program health is considered 'Good'.

The UPF project has done well in establishing and managing a large set of NCS requirements through the project phases – engineering, procurement, and construction. While ultimate implementation of the vast majority of NCS requirements into verified as-built configurations and operating procedures is years away, the project has continued to perform NCS requirement implementation tasks to support successful testing and startup. Additionally, the UPF DSA was approved by NPO in FY 2022, marking a significant milestone in the project. Thus, NCS operational implementation at UPF is considered 'Good'.

The NNSA Headquarters office agrees with these health grades.

2. UPF Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: There were no identified program non-compliances at the UPF project in FY 2022.

3. UPF Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	4	1	0	0

Summary: The four issues added during the year for UPF related to documentation errors. Two of the issues have the potential to result in changes in the field. One of the issues identified an unanalyzed credible abnormal condition in a UPF CSE. No concerns were noted with regards to issues management at UPF.

4. UPF Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	16	25	0	9	2	0
Federal	2	13	1	0	0	0

Note: Criticality Safety Federal oversight of Pantex, Y-12 and UPF is performed by the NPO.

Summary: There was a net loss in staffing for FY 2022 but no indicated staffing vacancies. This reduction in staffing level is consistent with the UPF NCS staffing plan going forward. With the extension of the project schedule, the period of time over which the remaining NCS activities will be completed has been extended, resulting in the need for less staff at any given time.

Savannah River Plutonium Processing Facility (SRPPF)

1. SRPPF Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: N/A

Summary: Savannah River Nuclear Solutions has continued to support the staffing needs of the project and has responded in a timely manner to increase staffing and also to replace staffing as necessary. The project is at the preliminary design stage and is developing preliminary Nuclear Criticality Safety Evaluations in concert with the preliminary design. No non-compliances have been identified with the project's implementation of the site criticality safety program. No findings have been identified from reviews of preliminary Nuclear Criticality Safety Evaluations.

The NNSA Headquarters office agrees with these health grades.

2. SRPPF Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: No non-compliances were identified on SRPPF's implementation of the site Criticality Safety Program.

3. SRPPF Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	0	0	0	0

Summary: No criticality safety issues were identified from NNSA review of the project's implementation of the site criticality safety program or reviews of preliminary Nuclear Criticality Safety Evaluations. Also, the SRNS criticality safety staff identified no issues during FY22.

4. SRPPF Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	9	20.8	7	0	5	0
Federal	1	11	0	0	0	0

Pacific Northwest National Laboratory (PNNL)

1. PNNL Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: The Program Health grade is Good based on PNNL's substantial program improvements where the program elements meet the minimum requirements, with only one minor noncompliance in application of ANSI N13.3, *Dosimetry for Criticality Accidents*, which is actively being corrected. In FY22, procedures, processes, evaluations, and other documents were updated and improved due in part to full staffing levels and new Nuclear Criticality Safety (NCS) program management. PNNL completed dozens of operational reviews of fissile material handling activities and developed the necessary criticality safety evaluations in a timely manner.

The Operational Implementation grade is Good based on PNNL's effective record of self-identification. In FY22, PNNL has met or exceeded the minimum operational implementation requirements. The number of infractions and non-compliances for a third year was low with no infractions and two non-compliances. The non-compliances were regarding the emergency responder training for a criticality event and ANSI N13.3 implementation. These were identified during unscheduled management self-assessments where the later was initiated at the prompting of the site office. No non-compliances were identified during the criticality safety program annual assessment. Operational improvements are actively solicited and acted upon.

In FY22, PNNL made substantial program improvements. These improvements, and more importantly the continuous improvement mentality, was noted in the annual NCS assessment. Five noteworthy practices and four opportunities for improvement were identified by an external team of NCS experts with no findings. The NCS Program is on an upward trajectory and fully staffed.

Additionally, the NCS Program has reviewed and updated existing criticality safety evaluations to remove unnecessary controls and reduce operational burden. The NCS Program has reviewed and updated all NCS related training and all the associated NCS procedures. These reviews and program improvements continue as an ongoing process. The NCS Program hired two criticality safety engineers (CSE) this year and qualified three individuals as CSE-Analysts with one that also dual qualified as a CSE-Representative. The NCS Program has been doing monthly development sessions to further enhance the technical competency of the NCS staff. The NCS Program also completed two NCS forums which provided lessons learned from across the complex to the fissionable material supervisors and line managers. The criticality safety committee met twice and upper management at PNNL continues to be engaged in NCS and is providing support in the form of communication with mid-level management for research, operations, and facility modifications.

The Field and Program Offices agree as to the assessment of the PNNL NCS Program Health and Operational Implementation.

2. PNNL Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Violation	0	0	0
Infraction	0	0	0
Discrepancy	1	0	0
Deviation	4	0	0

Summary: The identified discrepancy was regarding the safety software used to track fissionable material and another software program utilized by waste operations that interfaces with the safety software. The safety software failed to default to a conservative state regarding fissile material location following a hard computer reset when a material movement was initiated but not yet completed. The nonconservative transaction was not identified for about two weeks; however, no fissile material limits were challenged. PNNL developed and implemented a software routine that automatically compares key parameters after every transaction and an email is generated to notify principal individuals of any discrepancies between the two software systems and prompts a real-time evaluation.

Three deviations were due to out-of-date postings identified by staff during field observations. The fourth deviation was issued when it was discovered that an NCS control was not proceduralized. Either the mass limit or 'sum of fraction divisor' (SOFD) limit could be utilized in the facility's fissionable material tracking system (safety software). Where the mass limit conservatively bounds the SOFD limit, but this is not reciprocated for the SOFD. When the safety software utilized the SOFD limit, a manual evaluation was required to ensure the mass limit was not exceeded but this did not occur as it was not proceduralized. The safety software allowed the option to select the SOFD limit which could potentially exceed the fissionable material mass limits. Evaluation of every instance of this possibility was performed and determined to have not occurred. Measures were put in place to ensure the mass limits were being used by the fissile material tracking software. The software will be updated to conduct both the mass limit and sum of fraction limit checks as specified in the appropriate criticality safety evaluation, specification, and/or determination.

3. PNNL Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
1	1	0

Summary: DOE O 420.1C Chg 3 (LtdChg), *Facility Safety*, invokes ANSI/ANS-8.23-2019, *Nuclear Criticality Accident Emergency Planning and Response*, which invokes ANSI N13.3-

2013 (R2019), *Dosimetry for Criticality Accidents*. ANSI N13.3 provides requirements for application to the PNNL Nuclear Accident Dosimetry program. PNSO identified that the ANSI N13.3 requirements were not implemented in the NCS Program nor were these requirements subsequently flowed down into the Radiation Protection (RP) Program as necessitated by the Standard. The RP Program and NCS Program partnered on a management self-assessment to identify gaps between ANSI N13.3 requirements and the PNNL Nuclear Accident Dosimetry Program. While determined to be not fully compliant with all ANSI N13.3 requirements, the PNNL Nuclear Accident Dosimetry Program is in full compliance with 10 CFR 835 requirements and there is a solid program structure present. A strong technical basis for the program is established, with most ANSI N13.3 gaps consisting of individual requirements within, or subsets of larger requirements sets. An implementation plan has been developed for the identified gaps and resolution is in progress.

A second compliance gap was identified by the contractor regarding the ANSI/ANS 8.23 emergency responder training criteria. It was determined by PNNL that the current nuclear criticality training for the Hanford emergency response personnel was not fully meeting the criteria within ANSI/ANS 8.23. While determined to not be fully compliant with all ANSI/ANS 8.23 requirements, there is a solid program structure present with a historically robust program on the Hanford Site. The areas missing are subsets of larger focus areas regarding what a nuclear criticality accident is, the specific characteristics of such an accident, and the hazards associated with reentry. Additionally, Hanford Site service agreement governing the interactions between the Hanford Site entities and PNNL does not specify the ANSI/ANS requirements. Due to a federally planned transition of fire services from Hanford to the City of Richland Fire Department the NCS Program developed training for the City of Richland emergency responders that fully meets the ANSI/ANS 8.23 criteria.

4. PNNL Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	2	1	0	0

Summary: Two issues were added to the issues management system in FY22. These issues are associated with the two non-compliances identified above.

5. PNNL Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	4	9.6	1	1	2	0
Federal	1	9	1	0	1	0

Summary: Of the four qualified, three are dedicated fulltime and one supports PNNL NCS at 40%.

Richland Central Plateau Cleanup Company (CPCCo)

1. CPCCo Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: The contractor retains highly trained and experienced criticality safety engineers with minimum turnover. Furthermore, the NCS program is well established and mature. Criticality Safety Staff have been responsive during ORP staff transition and loss of federal NCS personnel. The program elements meet requirements resulting in an overall qualitative grading of Good.

EM HQ agrees with this summary.

2. CPCCo Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Criticality	0	0	0
Violation	0	0	0
Infraction	0	0	0
Discrepancy	0	0	0
Deviation	0	0	0

Summary: The bulk of current activities for Central Plateau primarily involve slightly greater than exempt quantities of fissile material in packaged waste drums. The contractor is preparing for future D&D removal of significant quantities of fissile material at three former processing facilities. These types of activities have not occurred in the last year.

3. CPCCo Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: The contractor's criticality safety staff continues to ensure that fissile material activities adhere to the requirements of the approved Criticality Safety Program.

4. CPCCo Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	0	0	0	0

Summary: No adverse issues were identified during FY2022. One opportunity for improvement was identified and included in the issues management system and will be closed in December 2022.

5. CPCCo Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	2	30+	0	0	0	0
Federal	2	12	0	1	0	0

Note: Federal staffing is combined for CPCCo, WTP, and Tank Farms.

Summary: The number of qualified criticality safety engineers is adequate to address current day-to-day activities. Qualified sub-contractor criticality safety engineers are available on an as-needed basis for reviews of criticality safety evaluations. In anticipation of eventual staff retirements, two individuals have been identified as candidates to qualify as criticality safety engineers. Additionally, efforts continue in trying to find a full-time criticality safety representative for upcoming work in the three former processing facilities to be deactivated.

River Protection WTP

1. WTP Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: N/A

Summary: WTP is transitioning to facility start-up but has not fully transitioned from a construction site to an operational facility. No fissile operations have commenced, and no infractions have occurred. Two separate contractors manage construction and start-up and operations. Staff recruitment and turnover is being tracked to monitor these levels for facility startup. No infractions.

EM HQ agrees with this summary.

2. WTP Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: The contractor had completed its annual self-assessments, and work continues to schedule an independent assessment for 2023.

3. WTP Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	0	0	0	0

Summary: No issues for FY2022.

4. WTP Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	3	8	2	0	1	0
Federal	2	12	0	1	0	0

Note: Federal staffing is combined for CPCCo, WTP, and Tank Farms.

River Protection Tank Farms

1. Tank Farms Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: The contractor retains highly trained and experienced criticality safety engineers. Furthermore, the NCS program is well established and mature. The contractor has maintained good retention with minimal turnover of existing NCS staff. Overall, the safety management program is ensuring Criticality Safety Engineers provide necessary support. Criticality Safety Staff have been responsive during ORP staff transition and loss of federal NCS personnel. The program elements meet requirements resulting in an overall qualitative grading of Good.

EM HQ agrees with this summary.

2. Tank Farms Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: There were no infraction in FY2022

3. Tank Farms Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: There were no program non-compliances in FY2022

4. Tank Farms Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
4	1	1	4	4

Summary: The contractor is working through the issues management program to close out the remaining 4 issues that have been open greater than 1 year.

5. Tank Farms Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	2	28	0	0	0	0
Federal	2	12	0	1	0	0

Note: Federal staffing is combined for CPCCo, WTP, and Tank Farms.

222S Laboratory

1. 222S Labs Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: The contractor is transitioning from an existing blue sheet NCSP to a new stand-alone program. No infractions were reported. This work is progressing as expected and facility operations continue via blue sheet. The program elements meet requirements resulting in an overall qualitative grading of Good.

EM HQ agrees with this summary.

2. 222S Labs Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: No non-compliances were identified in the two self-assessments performed by 222S laboratory staff. One opportunity for improvement was noted about clarification on training for staff.

3. 222S Labs Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
1	0	1	1	1

Summary: The one item open for longer that one year is to clarify the training for the laboratory staff. The change requires DOE approval, and the priority was the USQ program. This item will be addressed in the criticality program document submitted to DOE for approval.

4. 222S Labs Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	1	20+ years	1	0	0	0
Federal	2	12	0	1	0	0

Note: Federal staffing is combined for CPCCo, WTP, and Tank Farms and HLMI. The contractor has a second person scheduled to complete training when the new 222S labs criticality program is approved.

Idaho Flour Idaho LLC

1. Flour Idaho Overall Performance

Field & Program Office Assessment	Program Health: Excellent
	Operational Implementation: Good

Summary: (10/1/21 to 12/31/21) Up to the conclusion of the contract Flour Idaho ran a compliant program.

EM HQ agrees with this summary.

2. Flour Idaho Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: No nuclear criticality safety infractions were identified during the portion of the year that Fluor Idaho operated the Idaho Cleanup Project.

3. Flour Idaho Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: No program non-compliances were identified during the portion of the year that Fluor Idaho operated the Idaho Cleanup Project.

4. Flour Idaho Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	1	0	0	0

Summary: Nothing specific to note regarding issues.

5. Flour Idaho Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	3	23	0	0	0	0
Federal	1	25	1	0	0	0

Idaho Environmental Coalition LLC

1. Idaho Environmental Coalition Overall Performance

Field & Program Office Assessment	Program Health: Excellent
	Operational Implementation: Good

Summary: (1/1/22 to 9/30/22) IEC has run a compliant program for the 9 months of the fiscal year after they assumed the contract.

EM HQ agrees with the summary.

2. Idaho Environmental Coalition Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	1	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: The contractor self-identified one nuclear criticality safety infraction in 2022.

Noncompliance 2022-001 was identified during a review of remote-handled TRU waste operations. Alternate non-destructive assay measurements were performed on a waste box that was transferred from contact-handled TRU waste operations to remote-handled to complete size-reduction and repackaging of the contents. Measurement uncertainty was not applied to the fissile mass determination from the newer assay results. Consideration of the appropriate uncertainty resulted in the container exceeding the fissile mass limit of the criticality safety evaluation implemented for the waste processing operation.

3. Idaho Environmental Coalition Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: No program non-compliances were identified during FY22.

4. Idaho Environmental Coalition Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
1	2	0	0	1

Summary: The issue that is over a year old is a revision to the Integrated Waste Treatment Unit criticality safety evaluation. The current evaluation is ~10 years old and shows that criticality in the IWTU is beyond extremely unlikely. The revision is being actively worked by IEC.

5. Idaho Environmental Coalition Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	2	21	1	2	2	0
Federal	1	25	1	0	0	0

Oak Ridge UCOR

1. UCOR Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: The UCOR NCS program has performed well with the workload that was included in the previous contract. However, this workload is expected to grow significantly in fiscal year (FY) 2023 due to the newly awarded contract. The new UCOR contract will continue what they have traditionally worked on in the past and include the work scope of the Transuranic Waste Processing Center (TWPC). With this enlarged scope of work additional staffing may be needed to complete this additional workload. Additional oversight will be conducted as this new contract is performed.

EM HQ agrees with the summary.

2. UCOR Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: UCOR did not have any nuclear criticality safety infractions for FY22.

3. UCOR Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: UCOR did not have any non-compliances for FY22.

4. UCOR Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	0	0	0	0

Summary: UCOR NCS program did not have any issues entered in their issues management system.

5. UCOR Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	4	20	0	0	0	0
Federal	2	4.5	0	1	0	0

Note: Federal oversight is combined for UCOR, Isotek Systems, LLC (Isotek), and Transuranic (TRU) Waste Processing Center (TWPC).

Oak Ridge Isotek

1. Isotek Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: The Isotek NCS Program overall has performed great. Isotek prepared, went through a DOE Operational Readiness Review (ORR), and started a new down blending process during FY 2022. Though during the duration of this heightened activity there were four, level five, infractions, Isotek has quickly addressed these infractions. The Isotek NCS group has worked well with the operations personnel. The NCS staff have provided a continuous presence during operational practice and operations to provide assistance and clarification for personnel.

EM HQ agrees with this summary.

2. Isotek Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	4	0	0

Summary: Isotek accumulated four Nuclear Safety Infractions for FY 2022. Infractions were discovered as Isotek prepared and went through the ORR and startup of down blending operations in building 2026. The following are summaries of the four Nuclear Criticality Safety Infractions:

1. The spare orifice plate assemblies, (crucial to the NCS program controls on the down blending operations and were not installed) that were intended to be used as spares were not properly handled and stored as controlled material. This infraction was closed through the revision of an operations procedure to ensure that the orifices were properly handled.
2. During the Building 2026 DOE Operational Readiness Review (ORR), prior to the actual process starting, it was determined that scales used to weigh oxides in the hot cells were not considered “NMC&A Equipment”. However, these scales are similar to the scales used at 3019, which are considered “NMC&A Equipment”. NMC&A personnel stated they were instructed by OREM that the 2026 scales did not need to be certified as NMC&A equipment due to the way they are counting the material within the NMC&A program once it is down blended. It was concluded that the technical basis for the measurement control program was not properly documented and referenced in the

NMC&A Plan. The NMC&A Plan was revised to address the issues discovered. However, the scales used in the hot cells will continue to be calibrated as they are utilized to meet NCS controls.

3. During the Building 2026 DOE ORR, it was determined that IPC operating procedure Notes contained action steps and procedural requirements. An extent of condition was performed and all operating procedures that had action steps in a note were revised to address this issue.
4. During the Building 2026 DOE ORR, it was determined that the criticality safety analysis does not adequately document the required margins associated with the criticality safety analysis. All NCS personnel were briefed on the need to address mass measurement uncertainties in each NCSE and all NCSEs were reviewed to determine which needed to be revised to address this infraction. This infraction is still open pending the completion of the revisions to the NCEs, which is expected to be completed in early FY 2023.

3. Isotek Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: Isotek did not have any non-compliances in FY 2022.

4. Isotek Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	0	0	0	0

Summary: Isotek did not have any NCS issues entered in their issues management system.

5. Isotek Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	5	31	0	0	0	0
Federal	2	4.5	0	1	0	0

Note: Federal oversight is combined for UCOR, Isotek, and TWPC.

Oak Ridge TWPC

1. TWPC Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: The NCS program at TWPC has functioned well for the FY 2022 and is in good health. The TWPC NCS group will be replaced by the UCOR NCS group in FY 2023 because the work being conducted at TWPC will be under the new UCOR contract. Additional oversight will be conducted as this transition is completed and the NCS program is absorbed into the UCOR NCS program.

EM HQ agrees with this summary.

2. TWPC Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: TWPC did not have any NCS infractions in FY 2022.

3. TWPC Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: TWPC did not have any non-compliances in FY 2022.

4. TWPC Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	0	0	0	0

Summary: TWPC did not have any NCS issues entered in their Issues Management System in FY 2022.

5. TWPC Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	3	32	0	0	0	0
Federal	2	4.5	0	1	0	0

Note: Federal oversight is combined for UCOR, Isotek, and TWPC.

Savannah River Nuclear Solutions (SRNS)

1. SRNS Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: Continuing with the same reporting methodology started in FY2021's report, the DOE-SRS-EM field office will only address EM oversighted functions as NNSA will report separately on their area, Savannah River Plutonium Processing Production Facility (SRPPF). DOE-SR-EM provides criticality safety coverage for SRNS operating facilities and the Surplus Plutonium Disposition (SPD) project. While SPD is an NNSA project, it is being constructed within an existing operating facility owned by EM and therefore DOE-SR supports criticality safety for SPD.

For SRNS's overall program health, DOE-SR gave a rating of "Meets Expectations" during each of FY2022's monthly performance reviews. For SRNS's overall operational implementation, DOE-SR gave a rating of "Meets Expectations" during each of FY2022's monthly performance reviews.

SRNS has adequately managed its self-assessment schedule oversighting their operating facilities throughout the performance period. NCS procedures and policies are mature. SRNS NCS conducts its activities in accordance with Criticality Safety Program Description Document (CSPDD) N-NCS-G-00136, and the Criticality Safety Manual, SCD-3. All criticality safety issues are appropriately addressed, and satisfactory remedies implemented or in progress. The SRNS Nuclear and Criticality Safety Engineering (N&CSE) organization has maintained adequate staffing levels to support their mission.

EM HQ agrees with this summary assessment.

2. SRNS Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	6	0	0
Level 5	8	0	0

Summary: SRNS documents their criticality safety related issues in the Site Tracking, Analysis and Reporting (STAR) system and produces good summarizations and trend analysis in their quarterly metrics reporting. No criticality safety infractions were identified by DOE that were not first identified by SRNS. Of the six Level 4 CS Infractions, 4 were operational procedure errors, 1 was a configuration control error, 1 was a process error, but no NCS controls were violated in any of the

cases. Of the eight Level 5 CS Infractions, 5 were associated with CS training requirements, 2 were procedure errors, and 1 was a configuration control error.

3. SRNS Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: SRNS continues its trend in FY2022 to have no program non-compliances.

4. SRNS Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
2	12	7	4	0

Note: No. of Issues = No. of Criticality Safety Findings + No. of Category 3C (Criticality Safety) ORPS Reportable Occurrences + No. of Non-3C ORPS and Other Notable Occurrences.

Summary: SRNS has competently tracked their criticality safety related issues entered into the Site Tracking, Analysis and Reporting (STAR) system and exhibits good behavior and response to issues, as seen in the metrics data to not show lingering issues.

Of the four issues open longer than 6 months, one issue had 23 actions to address the issue and was open for 11 months (now closed) and dealt with surveillance requirements for storage of the High Flux Isotope Reactor (HFIR) fuel. Another was open for 8 months (now closed) and was delayed to allow time for a separate contract organization to update configuration controlled drawings for a fuel handling tool that inadvertently released a fuel assembly. Another was open for 7 months (now closed) and was delayed to allow time for a separate contract organization to update configuration controlled drawings for a fuel handling tool (different tool, but similar to the incident discussed above) that inadvertently released a fuel assembly. The fourth issue is still open (now aged at 19 months as of 1/25/2023) and deals with finding an effective solution to ensuring that required personnel are receiving timely CS training (administrative training only; not operations training). The issue was first identified at one facility and has now evolved to impact a site-wide training identification and documentation issue for two contractors (SRNS and BSRA) and so is complex in nature, thereby requiring more time to effectively resolve.

5. SRNS Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	21	22.2	15	6	9	2
Federal	2	2	0	2	0	2

Note: Federal oversight is combined for Savannah River Nuclear Solution (SRNS), Savannah River Mission Completion (SRMC), and Savannah River National Laboratory (BSRA/SRNL).

Summary: The Federal Staffing matrix shows a data snapshot at the end of FY2022. At the beginning of FY2022, SRS had three qualified DOE Criticality Safety Engineers and one person in training. At the end of FY2022, SRS was reduced to two qualified DOE Criticality Safety Engineers, having lost the two most experienced engineers, and having the training candidate successfully complete their CS qualification in August 2022.

Savannah River Mission Completion (SRMC)

1. SRMC Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: For SRMC'S overall program health, DOE-SR gave a rating of "Meets Expectations" during each of FY2022's monthly performance reviews. For SRMC'S overall operational implementation, DOE-SR gave a rating of "Meets Expectations" during each of FY2022's monthly performance reviews.

SRMC has adequately managed its self-assessment schedule on their operating facilities throughout the performance period. NCS procedures and policies are mature. SRMC NCS conducts its activities in accordance with the adopted program documents from SRNS: Criticality Safety Program Description Document (CSPDD) N-NCS-G-00136, and the Criticality Safety Manual, SCD-3. The SRMC Nuclear and Criticality Safety Engineering (N&CSE) organization has maintained adequate staffing levels to support their mission, having increased their numbers since the last reporting period.

EM HQ agrees with the summary assessment.

2. SRMC Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: No criticality safety infractions at any level were discovered during FY2022. No Findings (which are documented in the Site Tracking, Analysis and Reporting (STAR) system) were resulted in any of the assessments or investigations into criticality safety issues for FY2022.

3. SRMC Program Non-Compliances

Identified by:		
Contractor	**Field Office**	**DOE Headquarters**
0	0	0

Summary: SRMC continues its trend in FY2022 to have no program non-compliances.

4. SRMC Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	0	0	0	0

Note: No. of Issues = No. of Criticality Safety Findings + No. of Category 3C (Criticality Safety) ORPS Reportable Occurrences + No. of Non-3C ORPS and Other Notable Occurrences.

Summary: As there were no criticality safety infractions during FY2022, there are no issues that were opened during FY2022.

5. SRMC Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	7	13	1	0	3	0
Federal	2	2	0	2	0	2

Note: Federal oversight is combined for SRNS, SRMC, and BSRA/SRNL.

Summary: SRMC is a new conglomerate company that resulted from the combination of two previous companies, Savannah River Remediation (SRR) and Parsons Infrastructure and Technology Group, Inc. (Parsons) during FY2022. The SRMC Nuclear and Criticality Safety Engineering (N&CSE) organization has maintained adequate staffing levels to support their mission, having increased their numbers of qualified criticality safety staff from three to seven since the last reporting period.

The Federal Staffing matrix shows a data snapshot at the end of FY2022. At the beginning of FY2022, SRS had three qualified DOE Criticality Safety Engineers and one person in training. At the end of FY2022, SRS was reduced to two qualified DOE Criticality Safety Engineers, having lost the two most experienced engineers, and having the training candidate successfully complete their CS qualification in August 2022.

Savannah River National Laboratory (BSRA/SRNL)

1. SRNL Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: For SRNL's overall program health, DOE-SR gave a rating of "Meets Expectations" during each of FY2022's monthly performance reviews. For SRNL's overall operational implementation, DOE-SR gave a rating of "Meets Expectations" during each of FY2022's monthly performance reviews.

SRNL has maintained its self-assessment schedule on their operating facilities throughout the performance period. NCS procedures and policies are mature. SRNL NCS conducts its activities in accordance with Criticality Safety Program Description Document (CSPDD) N-NCS-G-00136, and the Criticality Safety Manual, SCD-3. All criticality safety issues are appropriately addressed, and satisfactory remedies implemented or in progress.

EM HQ agrees with the summary assessment.

2. SRNL Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: No criticality safety infractions were identified in FY2022.

3. SRNL Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: No program non-compliances were identified in FY2022.

4. SRNL Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	0	0	0	0

Note: No. of Issues = No. of Criticality Safety Findings + No. of Category 3C (Criticality Safety) ORPS Reportable Occurrences + No. of Non-3C ORPS and Other Notable Occurrences.

Summary: As there were no criticality safety infractions during FY2022, there are no issues that were opened during FY2022.

5. SRNL Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	0	0	0	0	0	0
Federal	2	2	0	2	0	2

Note: Federal oversight is combined for SRNS, SRMC, and BSRA/SRNL.

Summary: SRNL does not directly have criticality safety staffing but rather uses SRNS contracted personnel to implement its criticality safety program. SRNL has more than adequate resources within SRNS to deal with any criticality safety issues that may arise.
The Federal Staffing matrix shows a data snapshot at the end of FY2022. At the beginning of FY2022, SRS had three qualified DOE Criticality Safety Engineers and one person in training. At the end of FY2022, SRS was reduced to two qualified DOE Criticality Safety Engineers, having lost the two most experienced engineers, and having the training candidate successfully complete their CS qualification in August 2022.

Environmental Management Los Alamos (EMLA)

1. EMLA Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: The Cleanup contractor has worked diligently to update the program description documents to grow the program. Procedural updates are nearing completion with strong federal alignment. Previously identified programmatic concerns appear to have been corrected. The Cleanup contractor has improved integration with other functional areas which has resulted increased self-identification of issues, of which the cleanup contractor is adequately managing closure.

EM-HQ agrees with this summary.

2. EMLA Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	1	0	0
Level 5	0	0	0

Summary: On 3/29/22 at ~1030 am during their annual Fissile Material Operational Review of Drum storage locations, NCS discovered a >200 FGE and ≤ 300 FGE drum comingled with two <325 FGE and ≤520 FGE SWBs in Dome 33 (Note: these are Tech-46 drums). *From a criticality perspective, the configuration is safe and stable.* It should be noted that this configuration has been addressed in NCSE-20-003 and is allowed. However, this NCSE has not yet been implemented; with implementation to be completed after the revision of pertinent operation procedures and implementation matrix

3. EMLA Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: No program non-compliances were identified during FY2022.

4. EMLA Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
2	1	0	1	1

Summary: There are three open IM items.

- N3B-IM-2022-0186: This pertains to the criticality safety infraction listed in section 2.
- N3B-IM-2023-0017: CMP Size Reduction MSA Finding: CS-PRE-1
- N3B-IM-2021-0119: N3B-NCSE-20-003, R0 NCSE for Array Storage of Waste Drums at Area G has been issued and requires implementation. A phased implementation will be needed.

5. EMLA Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	6	14	0	0	1	0
Federal	0	0	0	0	0	0

Note: EM-LA is not authorized to hire a criticality safety analyst at this time. Due to a limited mission scope involving criticality, EM-LA relies on HQ reach back to support oversight activities as needed.

Waste Isolation Pilot Plant (WIPP)

1. WIPP Overall Performance

Field & Program Office Assessment	Program Health: Good
	Operational Implementation: Good

Summary: WIPP Nuclear Criticality Safety Program Health in FY 2022 is good based on the continuation of qualification process for the WIPP Nuclear Safety personnel, on the experience of the WIPP Nuclear Criticality Safety Team (including both NWP in-house personnel and subcontractors), on the identifications and completions of improvement items identified in the WIPP Nuclear Safety Basis Process Improvement Plan, on the implementation of the current version of MCNP code for Nuclear Criticality Safety Evaluations (NCSEs), and on the revision of the NCSE to incorporate new shielded container designs.

The Prevention of Inadvertent Criticality Program in Chapter 6 of WIPP DSA/TSR Revision 8, dated September 2022, as approved by Carlsbad Field Office Safety Basis Approval Authority describes the essential elements of the WIPP Nuclear Criticality Safety Program. TRU Waste accepted for disposal at the WIPP facility is required to be characterized and certified to meet the requirements of the WIPP Waste Acceptance Criteria (WAC) prior to being approved for shipment to the WIPP. Nuclear Criticality Safety Evaluations analyze the activities involved in the handling and disposal of TRU Waste and demonstrate the criticality incredibility of said activities. The Nuclear Criticality Safety Evaluations for CH- and RH-TRU Waste are documented in WIPP-016, *Nuclear Criticality Safety Evaluation for Contact-handled Transuranic Waste at the Waste Isolation Pilot Plant,* and WIPP-020, *Nuclear Criticality Safety Evaluation for Remote-handled Waste at the Waste Isolation Pilot Plant*, respectively. The current WIPP-016, Revision 7, dated September 2022, added new Appendix H to consolidate the Shielded Container analysis and to document the evaluation of four new container designs. The Nuclear Criticality Safety Program meets the requirements of DOE Order 420.1C, *Facility Safety,* Chapter III, "Nuclear Criticality Safety".

The WIPP WAC applies to generator sites that ship waste to the WIPP facility for disposal, and identifies fissile mass limits, special reflector/moderator mass limits, waste container types, and waste characteristics approved for disposal at WIPP. The fissile mass limits in the WIPP WAC are derived from the CH and RH NCSEs (i.e., WIPP-016 and WIPP-020) and are specific to the WIPP waste handling, storage, and disposal configurations. These NCSEs include evaluations of credible upset scenarios during waste handling, disposal, and storage at WIPP. The evaluations concluded that no credible criticality accident scenarios exist for CH waste container storage, handling, and disposal activities at the WIPP. Because the evaluation also demonstrates that a criticality at the WIPP is not credible, criticality alarm and detection systems are not required. The operational procedures are adequate and support the safe implementation of the WIPP Nuclear Criticality Safety Program to achieve the WIPP mission(s). The operational implementation is thus graded as good.

EM HQ generally agrees with this summary.

2. WIPP Criticality Safety Infractions

Infraction Category	Identified by:		
	Contractor	Field Office	DOE Headquarters
Level 1	0	0	0
Level 2	0	0	0
Level 3	0	0	0
Level 4	0	0	0
Level 5	0	0	0

Summary: There were no criticality safety infractions at WIPP during the FY2022.

3. WIPP Program Non-Compliances

Identified by:		
Contractor	Field Office	DOE Headquarters
0	0	0

Summary: There were no WIPP Nuclear Criticality Safety Program non-compliances identified at WIPP during FY2022.

4. WIPP Issues from the Issues Management System

Open at the Start of the Year	Added During the Year	Closed During the Year	Open for Longer than 6 Months	Open for Longer than 1 year
0	1	0	1	0

Summary:

- CBFO ICE-1303 captured the DOE EA-31 identified OFI in their 2022 Assessment Report on Training and Qualification: (OFI-NWP-2) WP-14-TR.01 requires subcontractor personnel to “meet the qualification requirements for the job function to be performed.” For the two primary subcontractor personnel used by the NWP nuclear safety organization (one for safety basis work and one for nuclear criticality safety work), training and qualification equivalencies were documented. However, NWP has not developed the applicable task cards (NS-T2, NS-T3, NS-T4, and NS-T5) to which the equivalencies should have been granted for the subcontractor who develops and maintains the DSA and TSR.

- NWP entered WI22-1610 to address the ICE-1303 which remains open.

5. WIPP Staffing

Organization	Qualified	Average Experience	In Training	Staff Lost	Staff Hired	Vacancies
Contractor	2	1	1	0	0	0
Federal	2	0	0	1	0	1

Summary: WIPP M&O Contractor has one NCS Engineer whose qualifications should be signed off by his manager soon given that the NCS Engineer has completed the NCSE-01 qualification card requirements. Another NCS Engineer is currently in training (in the process of going through the qualification card NCSE-01). The WIPP M&O Contractor also has two qualified subcontracted NCS Engineers (one with NCSE-01/NCSE-02 and another with NCSE-01 qualification cards).

CBFO possesses two DOE Technical Qualification Program Nuclear Safety Specialist qualified individuals who can provide adequate oversight of the contractor's Nuclear Criticality Safety Program Activities at WIPP. CBFO is in the process of recruiting additional Nuclear Engineer to supplement the current team in replacing the lost staff due to a retirement last year. In addition, CBFO has two contracted professionals specialized in all areas of nuclear safety from its Carlsbad Technical Assistance Contractor to provide excellent service support for the Nuclear Criticality Safety Program when necessary.