

***Summary of Assessments
Performed in FY 20 by SNL
QA POC for FY 19 SNL SFWD
Milestone Deliverables***

***Nuclear Fuel Cycle &
Supply Chain***

***Prepared for
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Nuclear Technology Research & Development
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Sandia xxxx***

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**U.S. DEPARTMENT OF
ENERGY**

Summary of Assessments Performed in FY 20 by SNL QA POC for FY 19 SNL SFWD Milestone Deliverables

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1. Acronyms and Definitions

Item	Definition
ASME	The American Society of Mechanical Engineers. Publishers of the NQA-1 guidance.
DMS	Document Management System
DOE	US Department of Energy
EIMS	Enterprise Information Management Services
FCT	Fuel Cycle Technologies
FY	Fiscal Year
M#	Milestone level number
NFCSC	Nuclear Fuel Cycle and Supply Chain
NQA-1	A quality assurance standard for nuclear facilities and related activities, published by the American Society of Mechanical Engineers (ASME). The standard includes guidance for software quality assurance (SQA) within Subpart 2.7.
NTRD	Nuclear Technology Research and Development
QA	Quality Assurance
QAPD	Quality Assurance Program Document
QA POC	Quality Assurance Point of Contact
QRL	Quality Rigor Level
PICS:NE	Performance Information Collection System – Nuclear Energy
R&A	Review and Approval
SFWD	Spent Fuel and Waste Disposition
SNL	Sandia National Laboratories
WPM	Work Package Manager
WP	Work Package

2. Executive Summary

The Sandia National Laboratories (SNL) staff is meeting the requirements of the Nuclear Fuel Cycle and Supply Chain (NFCSC) Quality Assurance Program Document (QAPD)¹. Each of the 46 SFWD FY 19 packages for SNL were reviewed. Six of the 46 packages had incorrect QRL categories, but technical reviews were always found to be appropriate.

No major corrective actions are assigned, but recommendations have been made to adjust the identified QRL items. Additional and minor PICS:NE checkbox errors are recognized. Future training will be geared to ensure proper QRL categorizations and other check box entries in future cases

3. Assessment Purpose and Scope

An internal assessment was conducted of Sandia National Laboratories FY 19 work activities, as required by the FY 2020 Level 4 Milestone # M4SF-20SN010802042, to verify compliance of work package products with the Nuclear Fuel Cycle and Supply Chain (NFCSC) Quality Assurance Program Document (QAPD) Revision 6 and where relevant, Revision 5.

4. Assessment Team

The Assessment Team consisted of:

1. Chris Camphouse, Manager and Quality Assurance Point of Contact (QA POC) Lead (8842)
2. Michael Wallace, QA POC team member (8844)

5. Assessment Results

The Assessment was conducted over the summer of 2020 at Sandia National Laboratories. This assessment was performed by reviewing program documentation and records. The assessment was conducted on all 46 of the FY 19 SFWD Work Packages (WP's).

The assessment verified that the appropriate reviews were conducted (in accordance with the QAPD Rev. 6). As that guidance notes, the higher the QRL number, the lower the associated rigor of technical review required. The QRL level assignments were confirmed by reviewing the documentation available in the Performance Information Collection System, Nuclear Energy (PICS: NE) database, and when necessary through subsequent communications with Work Package Manager (WPM). Although appropriate levels of review were confirmed where relevant, 6 of the 46 packages had incorrect QRL level category assignments.

Also, the assessment verified that the required training had been effectively implemented and that documentation and records were complete, were available and easily retrievable, and that

¹ Nuclear Technology Research and Development (SFWD) Quality Assurance Program Document (QAPD), Revision 5, 1/15/2018, and Nuclear Fuel Cycle and Supply Chain (NFCSC) Revision 6, 10/07/2019. *The latest revision of that guidance is Revision 6 which was signed in late FY 19 but published in October of FY 20. As the Revision History page of that document reflects, there are no substantive changes. Because the cited revision 5 was the guiding document for FY 19 and because of the overlap, it is listed here. Also we note that the NFCSC QAPD also applies to all SFWD products.*

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they were submitted to the laboratory's record system. Lastly, the assessment verified that QAPD, Appendix E cover sheets and PICS: NE Deliverable Forms were used, that they were properly completed (with some exceptions as noted here), and that they were included in the laboratory's record system.

The following points summarize the assessment results:

- There were 19 M2 deliverables included in the assessment for FY 19, and 18 of those were QRL 3 products. One was categorized as QRL 4.
- There were 15 M3 deliverables included in the assessment for FY 19, and 11 of those were QRL 3 products. The remaining four deliverables were categorized as QRL 4.
- There were 10 M4 deliverables for FY 19 and nine were categorized as QRL 4. The remaining deliverable was categorized as QRL 3.
- There were two M5 deliverables for FY 19 and both were categorized as QRL 4.
- There were six deliverables which had incorrectly categorized the QRL level. These findings have been shared with the relevant WPMs. Future versions of those packages will assign the correct QRL category. In all cases, although the category diverged from the ideal assignment, appropriate technical reviews were conducted where necessary.
- A handful of deliverables had some minor entry errors with regard to check boxes for DOE 414.1[a] categorization, Record category, and STI type. Subsequent training will emphasize attention to these details.

The attached NFCSC QA Checklist in Attachment 1 provides further details. This standardized form was newly issued to each participating laboratory in FY 20, and is intended to streamline assessments and provide a uniform template for reporting.

6. Corrective Actions

No major corrective actions are assigned, but recommendations have been made to adjust the identified QRL items. Additional and minor PICS:NE checkbox errors are recognized, and subsequent annual training will be geared to ensure proper check box entries in future cases.

7. Assessment Conclusions

All SNL SFWD milestone activities that were closed in FY 2019 were reviewed for compliance to the NFCSC QAPD Revision 6. All packages were technically reviewed where appropriate, but six of the 46 packages were incorrectly categorized with respect to QRL levels. WPMs have been informed and future training will be emphasized to ensure proper categorizations moving forward.

8. Advisory Guidance for current WPMs

- The refresher training update in FY 20 emphasizes a goal for WPMs to complete the FCT QAPD Appendix E Document Cover sheet and include it in their milestone deliverables.
- WPMs are also advised to ensure that any product receiving a technical or peer review be assigned a QRL 3 or QRL 2 category respectively.

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- Because of the interface design, QRL 4 entries into PICS:NE will not permit the registration of any review. Therefore, if a QRL 4 product was reviewed, the authors and WPMs cannot effectively document this in the PICS:NE system.
- WPMs are also advised to ensure that any product not receiving a technical or peer review be assigned a QRL 4 category. QRL 3 and/or QRL 2 designations require a documentation of a formal review. There are no relevant QRL 1 designations at this time.
- WPMs will receive reinforcement in future training to complete the full set of PICS:NE Deliverable Form boxes for any QRL category. In particular, the DOE 414.1[a] checkbox should be selected for almost every product other than obvious programmatic memos. Also, most documents qualify as General Records so this box should be typically selected. Finally added attention to the STI category is desired. Typically, all technical products are both formally reviewed and are STI.
- Previous assessments for this project scope have been limited to M2 deliverables. In line with expanded expectations for greater uniformity of reporting starting in FY 20, every Milestone number category is addressed here and will be addressed in future internal assessments.

9. Observations

Although the NFCSC QAPD was revised in early FY 20, it was considered desirable to apply that update in evaluating the FY 19 relevant products. That was done and is primarily reflected by the fact that work products are no longer uploaded to the Document Management System (DMS).

ATTACHMENT 1 – FY 19 NUCLEAR FUEL CYCLE AND SUPPLY CHAIN (NFCSC) ASSESSMENT CHECKLIST, REV. 2

Table A-1. Assessment of SFWD FY 19 M2 Milestone products under the NFCSC Checklist

QAPD Ref. Sect.	Quality Assurance Requirements	Sat ²	Unsat ³	N/A	Verification Conducted
	REQUIREMENT: 1 - PROGRAM				
Section 1.1	Verify that your national laboratory conducting SFWD work activities is maintaining its interface document, describing the application of their QA program (including implementing procedures), in compliance with the latest issued SFWD QAPD revision.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified</i>
	REQUIREMENT: 2 - TRAINING				
Section 2.0, POC Responsibilities	Verify that personnel (Work Package Managers and associated laboratory technical staff) have received the required training (which may include self-study).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified</i>
Section 3.0	REQUIREMENT: 3 - QA REQUIREMENTS FOR WORK PERFORMED BY THE NATIONAL LABORATORIES				
Section 3.1	QUALITY RIGOR LEVEL 1 REQUIREMENTS				
Section 3.1, Table 1.0	Verify activities are conducted in accordance with an established NQA-1-2000 (or later version) quality assurance program.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>No QRL-1 tasks exist.</i>

² Satisfactory

³ Unsatisfactory

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QAPD Ref. Sect.	Quality Assurance Requirements	Sat ²	Unsat ³	N/A	Verification Conducted
Section 3.1, Table 1.0	Verify software design, development, and testing meets the requirements of NQA-1-2000 (or later version), for Design Control, and, Test Control. In addition, a work package may specify that the activities meet the requirements of NQA-1 Subpart 2.7 Quality Assurance Requirements for Computer Software for Nuclear Facility Applications.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>No QRL-1 tasks exist.</i>
Section 3.2	QUALITY RIGOR LEVEL 2 REQUIREMENTS				
Section 3.2, Table 2.0	Verify activities are conducted in accordance with the Laboratory's DOE-approved quality assurance program.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>No QRL-2 tasks exist.</i>
Section 3.2, Table 2.0	Verify that milestones / deliverables with a Quality Rigor Level 2 received a Peer Review in accordance with NFCSC QAPD Appendix C or a procedure that meets the requirements for Peer Review as specified in Appendix C of the NFCSC QAPD	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>No QRL-2 tasks exist.</i>
Section 3.3	QUALITY RIGOR LEVEL 3 REQUIREMENTS				
Section 3.3, Table 3.0	Verify activities are conducted in accordance with the Laboratory's DOE-approved quality assurance program.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified.</i>
Section 3.3, Table 3.0	Verify that milestones / deliverables with a Quality Rigor Level 3 received a technical review in accordance with NFCSC QAPD Appendix B of the NFCSC QAPD or a procedure that meets the requirements specified in Appendix B of the NFCSC QAPD.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified: However, in some cases the review was not documented in PICS:NE directly. Future training will emphasize the importance of documenting reviews for all QRL 3 items.</i>
Section 3.4	QUALITY RIGOR LEVEL 4 REQUIREMENTS				
Section 3.4, Table 4.0	Verify that Laboratory QA requirements apply to the work activity and no additional NFCSC QA requirements (such as QRL-1/NQA-1, QRL-2 or QRL-3) are applied.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified.</i>

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QAPD Ref. Sect.	Quality Assurance Requirements	Sat²	Unsat³	N/A	Verification Conducted
Section 3.4, Table 4.0	Verify, as applicable, that if a QRL-4 milestone / deliverable provides input to a final QRL-2 or QRL-3 milestone / deliverable, that a note was added in the "Comments" section on the Deliverable Form in PICS: NE, stating that review requirements (i.e., peer review, technical review, etc.) will be documented in the final QRL-2 or QRL-3 milestone / deliverable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified. However, in some cases technical reviews were conducted for QRL 4 products. Future training will emphasize the importance of correctly assigning the QRL level. If a product is technical and therefore reviewed, a QRL 4 level should not be assigned.</i>
Section 6.0	GENERAL IMPLEMENTATION REQUIREMENTS				
Section 6.2	Verify that a QRL designation has been assigned to the milestone / deliverable that is associated with the work package.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified. QRL designations were always assigned, but in some cases, those were not correct. Future training will continue to emphasize the importance of correctly assigning the QRL level.</i>
Section 6.3	Verify that the QRL designation (associated to a particular milestone / deliverable) has been changed accordingly, if the work package has been changed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>No work package changes have been identified and no QRLs have been changed from original levels for any of the assessed packages. At least one of the incorrect QRL categorizations is planned for change before the end of the current fiscal year as a result of this assessment.</i>
Section 6.4	Verify that the QA requirements identified in a work package, including the designated Quality Rigor Level(s) are flowed down to other participants, contractors and/or subcontractors through the appropriate contractual or work control process.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>No products flow down to other participants for the packages reviewed.</i>

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QAPD Ref. Sect.	Quality Assurance Requirements	Sat²	Unsat³	N/A	Verification Conducted
Section 6.6	Verify records are controlled and maintained at your national laboratory site, using each lab's record management system and procedures.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified that all deliverables are archived with the appropriate SNL record management system.</i>
Section 6.10	Verify each deliverable having a QRL-1, -2, -3 or -4 designation, includes a standardized Document Cover Sheet (Appendix E). If the PICS: NE system permits, complete information entered into the PICS: NE Deliverable Form, and listing the names of all reviewers, satisfies this requirement, including the requirement for signatures on the Document Cover Sheet (Appendix E).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Verified in PICS: NE and through emails to work package managers.</i>
Appendix A	If applicable, verify the SFWD Nuclear Data activities meet the requirements established in Appendix A of the NFCSC QAPD.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>No Nuclear Data activities apply to the packages that were reviewed.</i>
Appendix D	If applicable, verify NEUP University assessment work completed during the year, meets the requirements of Appendix D of the NFCSC QAPD.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>No NEUP activities apply to the packages that were reviewed.</i>