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| **ISSUE** | **REFERENCE** |
| Finding 04- HDI software work flows and work practices do not identify the software quality assurance requirements and activities to a level of detail commensurate to the complexity of the task and providing a standardized process to assure consistent and acceptable results based on the complexity and significance of the item in accordance with PNNL ROD 548, Section 3, Quality Assurance Program; Section 6, Instructions, Procedures, and Drawings; Section 4, Design Control; and Section 25, Quality Assurance Requirement for Computer Software for Nuclear Facility Applications.  Analyze software quality issues that have been documented as part of recent events, and develop an integrated plan for addressing the software quality issues. | A-01908 |
| Finding 02- PNNL ROD 548, Section 4, Design Control, does not point to Section 12, Test Control, for performance of software testing in accordance with NQA-1-2000, Requirement 3, Section 801.5.  Update ROD 548 software requirements to properly reference software test control from design control | A-01906 |
| Finding 03- PNNL ROD 548, Section 25, Quality Assurance Requirement for Computer Software for Nuclear Facility Applications, does not point to ROD 548 Section 5, Procurement Document Control, and Section 8, Identification and Control of Items, for software acquisition activities, in accordance with NQA-1-2000, Subpart 2.7, Section 3.1, Procured Software and Software Services. | A-01907 |
| Finding 01- PNNL ROD 548, ASME-NQA-1-2000 Quality Assurance Requirements for Nuclear Facility Application, identifies that the NQA-1-2000 software requirements are only applicable to nuclear safety software; and the PNNL QAPD identifies that software design controls are only applicable to safety software design. However, the NQA-1-2000 software quality requirements are applicable to both safety and non-safety quality-affecting software.  Update ROD 548 software requirements to indicate that NQA-1 subpart 2.7 requirements apply to both safety and non-safety software. | A-01905 |
| The use of Software Quality practitioners is only upon request from the project, not integrated or embedded in the process. This contributes to the lack of consistency and rigor in implementation, which is contrary to HDI (User of Develop Software Analysis), which prescribes the project must engage a Software Quality Practitioner to assist the Analyst in implementing Safety Software requirements. Also, this is contrary to DOE Order 414.1 D Criterion 3 Management and Document of Records, which states, a process is established and implemented to detect and prevent quality problems. (S-17-PNSO-PNNL-016-FOl) | A-01946 |
| Observation 01- PNNL ROD 548 identifies several F&O procedures as implementers, however those procedures are not related to software, and do not reference the requirements pointing to these procedures. | OTS-04515 |
| Observation 02- The safety software definitions and the safety software grading levels identified in the PNNL QAPD should be reviewed and revised to align with the DOE grading levels. | OTS-04516 |
| Observation 03- The criteria and categorization for quality affecting, non-safety software is not identify in HDI nor is the applicable software elements associated with each software categorization level defined. | OTS-04517 |
| Observation 04- The software quality rigor assessment performed using the SWQA tool should identify the basis for the software classification. | OTS-04518 |
| Observation 05- PNNL Software HDI workflows only identify to engage a SQP-BH if the software is classified as safety or business critical. Quality should be engaged to help determine the software classification to ensure the software is correctly categorized at the beginning of the process. | OTS-04519 |
| Observation 06- The PNNL Software Quality Assurance (SQA) Work Activities template is a quality record which identifies the processes and procedures to be completed to satisfy the SQA requirements, a SQP or a Quality Engineer (QE) is not involved in the development and approval of the quality affecting record. | OTS-04520 |
| Observation 07- Software design requirements are records and a template for document these requirements/specifications should be included as an exhibit with the applicable workflows. | OTS-04521 |
| Observation 08- HDI software workflow Exhibit- Configuration Management is not identified as an Exhibit in Analyze and Design PNNL Business System, Construct PNNL Business System, and Manage PNNL Business System Change. | OTS-04522 |
| Refine the EPR software questions. Refine the definitions of NA, low, medium, high software risk.  OTS; Quality (Bob Daudt). OFIs 1, 2 & 3 to be completed by the Quality Manager (Bob Daudt). The EPR questions and guidance for NA, Low, Medium, and High will be reviewed and revised as necessary. | OTS-04551  (EED SQA Assessment) |
| Improved, simpler connections/relationships between EPR risk level and associated SQA requirements.  OTS; Quality (Bob Daudt). OFIs 1, 2 & 3 to be completed by the Quality Manager (Bob Daudt). The HDI “Use or Develop Software” workflow will be reviewed and revised as necessary. This is an 18-24 month activity. | OTS-04551  (EED SQA Assessment) |
| O01- PNNL ROD 548 and ROD 939 identifies several F&O engineering procedures as implementing documents, however in some instances the referenced procedure is not the correct document. | OTS-04635 |
| The Facility Design Authority role is not used as applicable at PNNL per DOE O 414.1D and NQA-1. (FY2018-L2-1 - Draft) | DOE SSQA Audit July 2018 |
| For the non-NQAP software, there was very little documented evidence of the safety software Work Activities as directed by the “How Do I” (HDI). (FY2018-L2-2 - Draft) | DOE SSQA Audit July 2018 |
| Project Managers (PM) and the Project Management Office Directors (PMOD) have the authority to make decisions in areas they are not necessarily trained in, such as Safety Software. (FY2018-L2-3 - Draft) | DOE SSQA Audit July 2018 |
| The Purchase Order for the FRAM software from Canberra was reviewed and it was discovered that there was no clause related to the requirements for safety software flowed down to the vendor. There were no records seen on how any of the other acquired software applications in the sample were obtained. (FY2018-L2-4 - Draft) | DOE SSQA Audit July 2018 |
| The Information Resource Inventory (IRI) and Software Quality Assistant (SQA) user interfaces for the Software Inventory database are outdated and provide different views of the database information. An updated software package for IRI is being considered but has not yet been funded. This can cause problems as neither of the systems independently gives all of the information necessary to have an accurate status of the software. (FY2018-L3-1 Draft) | DOE SSQA Audit July 2018 |
| The NQAP states that software needs to be graded and the supporting information stored. Some of the software reviewed during this assessment did not have this supporting information. (FY2018-L3-2 Draft) | DOE SSQA Audit July 2018 |
| PNNL maintains an official records management system, Hewlett Packard Records Manager (HPRM). Because records submittal to this repository is not required until project closeout, interim records are often stored on project drives/repositories, which can make it difficult to find information. (FY2018-L3-3 Draft) | DOE SSQA Audit July 2018 |
| Existing software that was not previously approved under a quality assurance program consistent with DOE O 414.1D, and has been identified as safety software, remains operable without the currently required paperwork. (FY2018-L3-4 Draft) | DOE SSQA Audit July 2018 |
| PNNL does not have a training program for those who develop and test safety software. (FY2018-L3-5 Draft) | DOE SSQA Audit July 2018 |
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