

February 27, 2008

CCN 212794

Shannon A. Brennan
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SUBJECT: Contract No. DE-AC07-05ID14517 - Transmittal of the Annual National Spent Nuclear Fuel Quality Assurance Program Trending Report DOE/SNF/TREND-2007 for Calendar Year 2007

Dear Ms. Brennan:

This letter formally transmits the annual National Spent Nuclear Fuel Program (NSNFP) Quality Assurance Program Trend Report DOE/SNF/TREND-2007 for Calendar Year 2007. The scope of the analysis covers NSNFP and NSNFP supplier deficiency reports that were generated between 2004 and 2007.

The 2007 trend report documents the analysis of NSNFP deficiencies for the identification of adverse trends. No deficient trends requiring management action were identified as a result of this analysis.

The report provides the deficiency report data, tables and figures that were used to support the analysis. Organizations addressed by this report should evaluate the information for applicability to their respective work processes. The report can be viewed and retrieved from:

<http://nsnfp.inel.gov/program/>

Please contact T. L. Morgan at (208) 526-9141 or me at (208) 526-3512 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Don A. Armour".

Don A. Armour, QA Staff Manager
National Spent Nuclear Fuel Program

kjb

Enclosure

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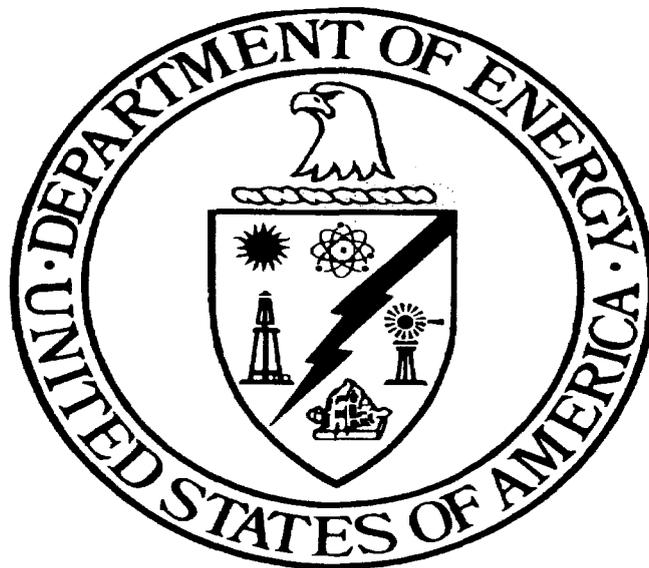
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United States Department of Energy

National Spent Nuclear Fuel Program

Quality Assurance Program Annual Trending Report

January–December 2007



February 2008

U.S. Department of Energy

Assistant Secretary for Environmental Management

Office of Nuclear Material and Spent Fuel



National Spent Nuclear Fuel Program Quality Assurance Program Annual Trending Report

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WBS# C.B.30.03.02.02.QA

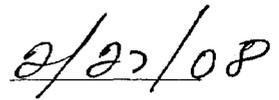
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Under DOE Idaho Operations Office
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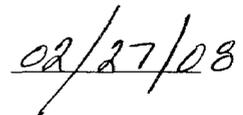


National Spent Nuclear Fuel Program QA
Document Preparer

D. A. Armour


(Signature)

Date:



National Spent Nuclear Fuel Program
QAS Manager

SUMMARY

The 2007 National Spent Nuclear Fuel Program (NSNFP) trend report documents the analysis of Quality Assurance (QA) deficiencies for the identification of trends adverse to quality in the NSNFP. The scope of the analysis covers the NSNFP and NSNFP supplier deficiency reports that were generated between January 2004 and December 2007. The January 2004 date signifies four years of data for the current NSNFP Quality Program.

Deficiencies or Conditions Adverse to Quality (CAQs) are identified within the NSNFP as Deficiency Reports (DRs), Corrective Action Requests (CARs) or deficiencies Corrected During an Audit (CDA). Condition Reports (CRs), also included in the analysis are deficiencies/CAQs issued to the NSNFP by the Department of Energy Environmental Management and Office of Civilian Radioactive Waste Management independent oversight organization that assesses the NSNFP on an annual basis. The DRs/CARs/CDAs/CRs are tracked in the NSNFP QA Corrective Action Tracking Trending System database. During calendar year 2007, eight deficiencies were identified for the NSNFP. The data for this reporting period was categorized and evaluated for emerging trends.

There were no deficient trends identified as a result of this analysis that require NSNFP management to take corrective action.

NSNFP

The evaluation of NSNFP data showed an initial decline in number of deficiencies from ten in 2004, to five (all CDAs) in 2005, however the data for 2006 and 2007 is showing a gradual increase i.e., six in 2006 and eight in 2007. The analysis of the NSNFP CAQ cause codes showed that for 2007 four of the eight (50%) of the CAQs were caused by personnel error and three of the eight (38%) of the CAQs were attributed to procedural problems. Further analysis of this data shows that there is an upward trend in the number of CAQs caused by procedural problems i.e., one in 2004, zero in 2005, two in 2006, and three in 2007. The number of CAQs caused by personnel problems has gone from seven in 2004 to five in 2005 and three in 2006, however, in 2007 the number took a slight increase to four. In conclusion the number of CAQs identified has been increasing since 2005, the number of CAQs attributed to procedural problems is increasing and the number of CAQs attributed to personnel error is no longer improving. It is recommended that the NSNFP management and staff pay closer attention to the execution of procedures and processes.

NSNFP Suppliers

During 2007, the only active government sector supplier to the NSNFP was the Idaho National Laboratory (INL) Management and Operations contractor, Battelle Energy Alliance. The NSNFP surveillance of the INL Procurement Organization resulted in one deficiency (07-SUPP-S-001-DR-001) related to administrative oversight to scan procurement quality records. The records were scanned and verified and the DR was closed on January 18, 2007. There were no adverse trends or impacts when compared with the other NSNFP Supplier DRs in past years.

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National Spent Nuclear Fuel Program Quality Assurance Program Annual Trending Report

1. INTRODUCTION

1.1.1 Purpose and Scope

The 2007 National Spent Nuclear Fuel Program (NSNFP) trend report documents the analysis of quality assurance (QA) deficiencies for the identification of trends adverse to quality in the NSNFP. The scope of the 2007 NSNFP trend report includes the NSNFP and NSNFP supplier deficiencies that were issued between January 2004 and December 2007.

The analysis performed meets the requirements set forth in Section 16.2.6, "Quality Trending" of DOE/RW-0333P, *Quality Assurance Requirements and Description* (QARD). The trend analysis was performed in accordance with procedure NSNFP 16.03, *Quality Assurance Trending*. The results are presented in the following sections.

1.1.2 Description of Trending Process and Methodology

Conditions adverse to quality (CAQs) are categorized as conditions adverse to quality and significant conditions adverse to quality, and are documented as a Deficiency Report (DR) or Corrective Action Request (CAR), respectively. A condition adverse to quality identified and corrected during an assessment is categorized as a CDA; these conditions are included in the trending analysis process in the same manner as a DR. CDAs/DRs and CARs are assigned subject codes and direct cause codes. CARs are also assigned a root cause code based on formal root cause analysis. Codes are recorded in the NSNFP QA Corrective Action Tracking Trending System (CATTs) to facilitate analysis. The codes are sorted by calendar year into two groups: the NSNFP and the suppliers to the NSNFP. Any identified deficiencies from external assessments of the NSNFP, such as those performed by the Department of Energy (DOE) Environmental Management (EM) and Office of Civilian Radioactive Waste Management (RW) independent oversight audit team, reported as condition reports (CRs), were combined with the NSNFP reports for analysis and trending. Other sources of trending information are also used for analysis such as previous NSNFP QA trend analysis reports.

During 2007, eight NSNFP deficiencies were generated. The 2007 NSNFP internal audit (07-NSNF-AU-001) identified one CDA and one DR. The NSNFP surveillance 07-NSNF-S-001 identified one DR. During the performance of work activities the NSNFP staff initiated one DR. The 2007 external EM/RW audit (07-DOE-AU-002) of the NSNFP identified four CRs. For the purpose of this trend report, the CDAs, DRs, and CRs were grouped as NSNFP CAQs to perform the trending analysis of the overall NSNF Program.

Subject codes are assigned to the CDAs/DR/CAR and CRs that reflect the primary QARD requirement that is violated. Direct cause codes are the apparent cause of a condition adverse to quality. Root cause codes reflect the identified root cause that results from formal analysis. The first two codes, subject and direct cause, are subjective and are validated by review of the DRs/CARs during analysis. Root cause codes reflect the results of formal analysis (only required for CARs) and do not require validation.

Subject codes, direct cause codes, and root cause codes are used to compare the frequency of occurrence of like deficiencies. Codes are sorted by organization for each calendar year to identify an increase in the frequency of occurrence over time. Where an increase in frequency is identified, each

individual CDA/DR/CAR and CR is evaluated to validate that common issues are identified and determine if an adverse trend is present.

Subject codes and direct cause codes are evaluated by Pareto analysis for each NSNFP group. This analysis identifies the most frequent occurrence of deficiency codes. CDA/DRs/CARs and CRs are evaluated for the highest occurrence of a code to validate that common issues are identified. The highest occurrence of a code that reflects a common issue may represent an indicator of an adverse trend.

The DRs/CARs and CRs are evaluated for timeliness of corrective action, including (as applicable) a discussion of ineffective or overdue corrective actions for each organization. The duration of closed and open DRs/CARs and CRs are compared by calendar year to determine if an adverse trend in timeliness of corrective action is present.

Potential adverse trends are evaluated against the criteria for trends adverse to quality in Procedure NSNFP 16.03, Quality Assurance Trending. If the analysis finds the trend to be adverse to quality, then a review of open and recently completed corrective actions is performed to determine whether mitigating actions are in process that may resolve the adverse trend. If there are no mitigating actions, then an evaluation of the trend for a significant condition adverse to quality is performed to determine whether a CAR will be issued to the responsible NSNFP organization.

2. ANALYSIS

2.1.1 National Spent Nuclear Fuel Program

The NSNFP is composed of a Program Support Organization (PSO) and a Quality Assurance Staff (QAS) organization. The DRs are assigned to each organization recognizing unique responsibilities. However, the analysis evaluated the data as representative of one organization.

During 2007, eight CAQs were identified involving the NSNFP. Four of the eight deficiencies were self identified by the NSNFP. The remaining four deficiencies were identified as condition reports (CRs) from the 2007 external EM/RW audit (07-DOE-AU-002) of the NSNFP. For the purpose of this trending report, the four deficiency reports and four CRs were grouped together for analysis of the overall NSNF Program.

2.1.2 Subject Codes

The subject codes for the NSNFP CAQs fell into four subject areas. In order to try and make the data more meaningful the subject codes were categorized within their general subject area, e.g., B.12.1.2 “Ensure personnel are indoctrinated and trained, as needed, to achieve initial proficiency; maintain proficiency; and to adapt to changes in technology, methods, or job responsibilities.” was sorted as subject area B which is “Quality Assurance Programs.” The distribution of subject codes presented in the Pareto figure shows that the eight CAQs for 2007 were associated with three different subject areas; six were attributed to the “QA Program” subject area. The subject areas and codes assigned to the eight 2007 deficiencies are summarized below.

NSNFP generated CAQs

Deficiency report 07-NSNF-S-001- DR-001 describes a condition affecting the Quality Assurance Program or subject area (B). The subject code assigned was B.02.5 “Items not intended to perform a safety function but whose failure could impair the capability of other items to perform their intended safety or waste isolation function.”

Deficiency report 07-NSNF-AU-001-CDA-001 describes a condition affecting the Quality Assurance Program or subject area (B). The subject code assigned was B.12.1.2 “Ensure personnel are indoctrinated and trained, as needed, to achieve initial proficiency; maintain proficiency; and to adapt to changes in technology, methods, or job responsibilities.”

Deficiency report 07-NSNF-AU-001-DR-001 describes a condition affecting the Control of Measuring and Test Equipment or subject area (L). The subject code assigned was L.07.06 “Measuring and test equipment calibration documentation shall include the following information: Results of the calibration and statement of acceptability.”

Deficiency report 07-NSNF-8.15.07-DR-001 describes a condition affecting the Quality Assurance Program or subject area (B). The subject code assigned was B.10.4 “The review shall be performed by individuals other than the preparer.”

CRs generated by EM/RW audit 07-DOE-AU-002.

Condition report NSNFP- (EM) - 07-D-021 describes a condition affecting the Quality Assurance Program or subject area (B). The subject code assigned was B.12.1.4 “Ensure indoctrination and training are completed prior to performing the work.”

Condition report NSNFP- (EM) - 07-D-022 describes a condition affecting the Quality Assurance Program or subject area (B). The subject code assigned was B.05.1 “Planning elements shall include, as appropriate: Definition of the work scope, objectives, and a listing of the primary tasks involved.”

Condition report NSNFP- (EM) - 07-D-023 describes a condition affecting the Quality Assurance Program or subject area (B). The subject code assigned was B.01.3.1.3 “The matrix shall identify: Where exceptions to QARD requirements have been taken including justification.”

Condition report NSNFP- (EM) - 07-D-024 describes a condition affecting the Scientific Investigation or subject area (U). The subject code assigned was U.02.2.4 “Scientific notebooks shall contain the following: Description of the work as it was performed and results obtained names of individuals performing the work, and dated initials or signature, as appropriate, of individuals making the entries.”

Evaluation

During the 2007 reporting period the eight CAQs identified problems in three subject areas. Six of the CAQs identified problems related to the “QA Program” subject area. Figures 1 and 2 shows a CAQ increase in the “Quality Program” area after two years of relatively no problems. This in itself would indicate a significant increase in QA Program problems. Further evaluation of the specific subject codes within the QA Program reveals that there is no real significant increase in any one “QA Program” subject code. Two of the CAQs concerned training issues, one dealt with the program matrix, one with document reviews, and two with work planning documentation. Therefore, it is determined that there is no adverse trend indicated by the above data.

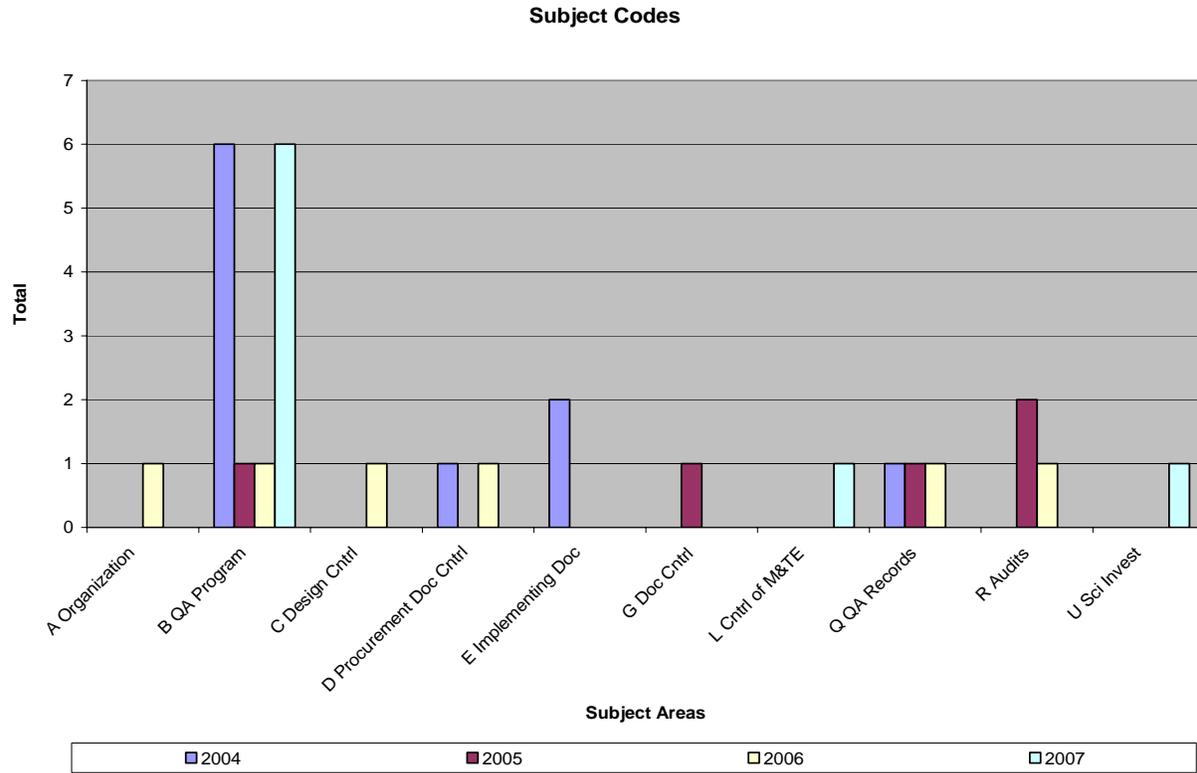


Figure 1

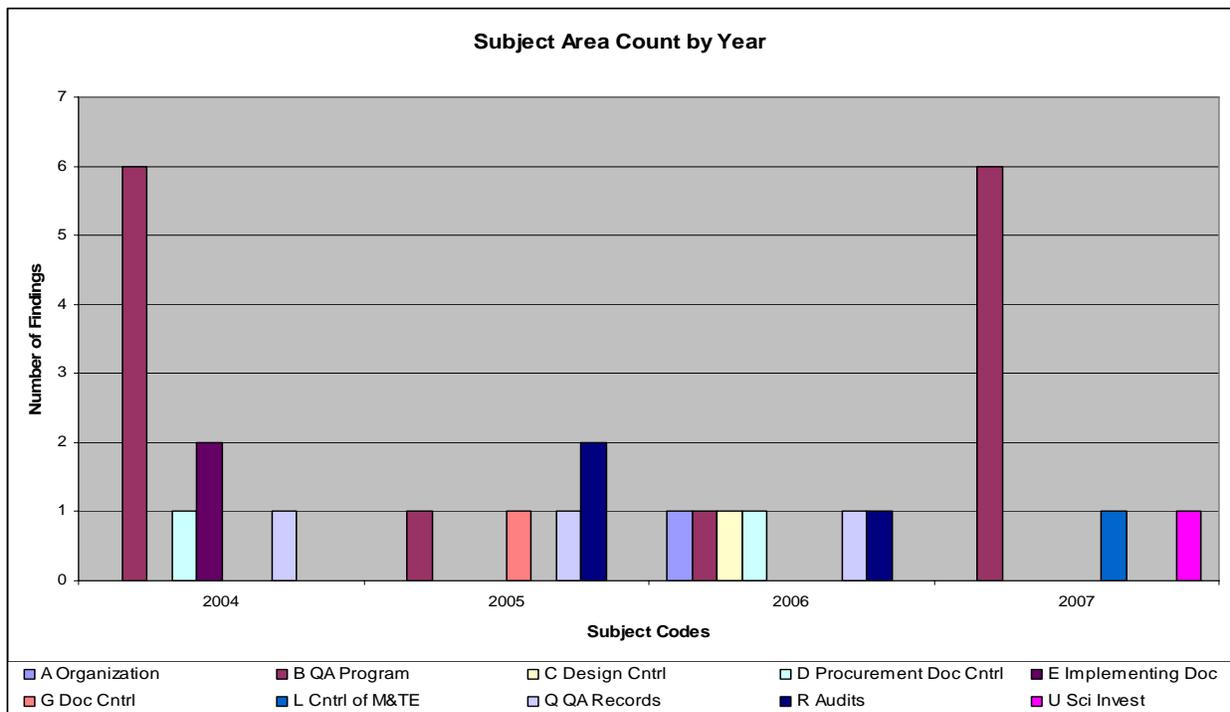


Figure 2

2.1.3 Direct Cause Codes

In order to make the data more meaningful the direct cause codes were categorized within their general causal categories, e.g., direct cause code 01.B.d(1) “Inadequate/Wrong Procedure Requirements: Updates not incorporated” is a subset of general causal category 01 “Procedures/Implementing Documents.” The CAQs evaluated for this trend analysis period fell into one of five general causal categories. The distribution of subject codes presented in the Pareto figure shows that the eight deficiencies for 2007 were associated with three different direct causal categories: Personnel – Human Performance problems, Training problems and Procedures/Implementing Document problems. The direct causal categories and associated direct cause codes are as summarized below.

NSNFP generated CAQs

Deficiency report 07-NSNF-S-001- DR-001 describes a condition caused by Personnel – Human Performance problems or cause code (02). The cause code assigned was 02.A.d “Lack of Attention to a Task: Procedure not used or used improperly.

Deficiency report 07-NSNF-AU-001-CDA-001 describes a condition caused by Training problems or cause code (04). The cause code assigned was 04.C.a “Inadequate Training Methods: Incomplete training.”

Deficiency report 07-NSNF-AU-001-DR-001 describes a condition caused by Personnel – Human Performance problems or cause code (02). The cause code assigned was 02.A.d “Lack of Attention to a Task: Procedure not used or used improperly.

Deficiency report 07-NSNF-8.15.07-DR-001 describes a condition caused by Personnel – Human Performance problems or cause code (02). The cause code assigned was 02.A.d “Lack of Attention to a Task: Procedure not used or used improperly.

CRs generated during the conduct of EM/RW audit 07-DOE-AU-002.

Condition report NSNFP- (EM) - 07-D-021 describes a condition caused by Procedures/Implementing Document problems or cause code (01). The cause code assigned was 01.B.g(4) “Implementing documents/process: Does not describe how the requirement will be implemented.”

Condition report NSNFP- (EM) - 07-D-022 describes a condition caused by Procedures/Implementing Document problems or cause code (01). The cause code assigned was 01.B.g(2) “Implementing documents/process: Incomplete”

Condition report NSNFP- (EM) - 07-D-023 describes a condition caused by Procedures/Implementing Document problems or cause code (01). The cause code assigned was 01.B.g(4) “Implementing documents/process: Does not describe how the requirement will be implemented.”

Condition report NSNFP- (EM) - 07-D-024 describes a condition caused by Personnel – Human Performance problems or cause code (02). The cause code assigned was 02.A.f “Lack of Attention to a Task: Lack of direction.”

Direct Cause Evaluation

Evaluation of Direct Cause Code shows that the number of findings attributed to Personnel Problems was decreasing from 2004 to 2006 with a one finding increase in 2007. The CAQs attributed to procedural problems has been slowly increasing during this four year reporting period. The increase in procedural problems and the possible increase in personnel related problems, management and staff need to pay closer attention to the execution of NSNFP procedures.

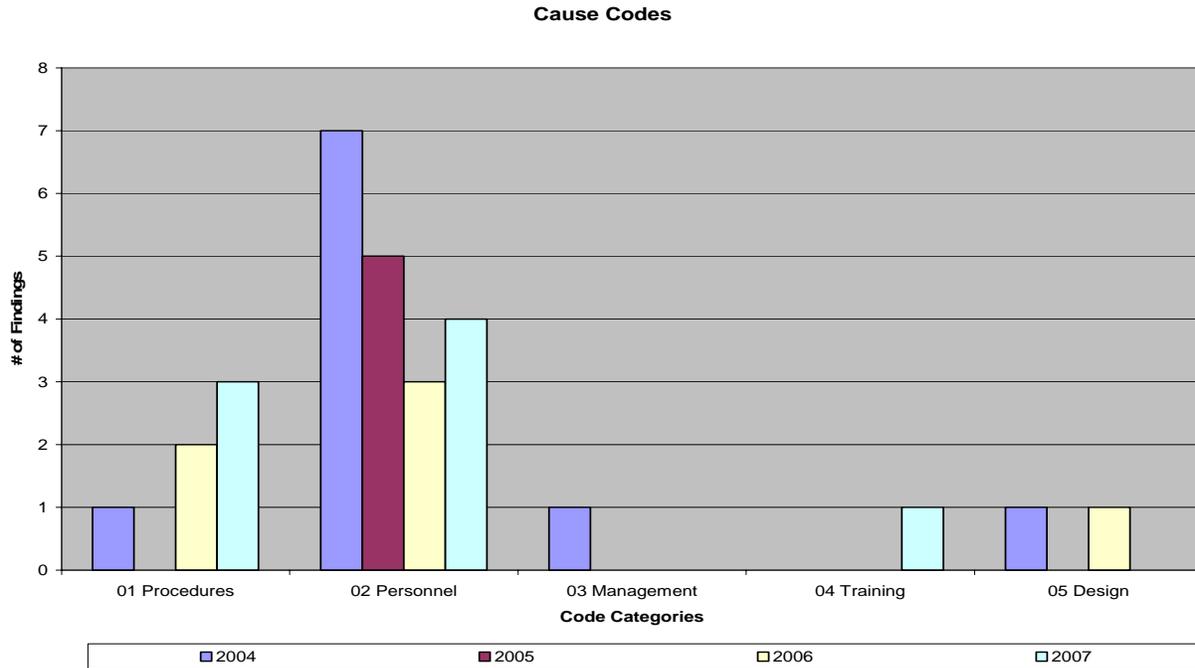


Figure 3

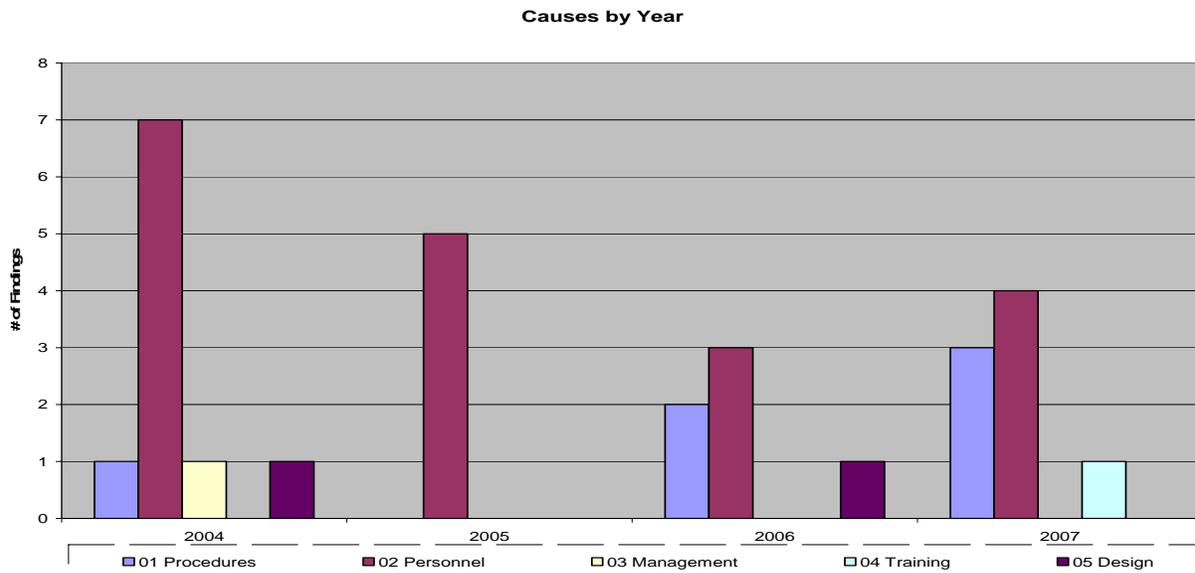


Figure 4

2.1.4 Root Cause Codes

There were no significant conditions adverse to quality identified during 2004 to 2007, therefore, there were no root cause analysis performed. No further action is required as a result of this evaluation.

2.1.5 National Spent Nuclear Fuel Program Suppliers

During 2007, the only active government sector supplier to the NSNFP was the Idaho National Laboratory (INL) Management and Operations (M&O) contractor, Battelle Energy Alliance (BEA). The NSNFP surveillance of the INL Procurement Organization (07-SUPP-S-001) resulted in one deficiency. No additional surveillances have been performed in 2007 due to the lack of activity in this area. Therefore, there are no indications of adverse trends for the NSNFP suppliers for 2007.

3. CORRECTIVE ACTION TIMELINESS

The DRs/CARs/CRs were evaluated for timeliness of corrective action. Data for NSNFP was evaluated by calendar year to determine if an adverse trend in timeliness of corrective action was present. Overall performance has improved in providing timely corrective action. The NSNFP QAS organization tracks and reports on a biweekly basis a summary report of all open DRs, at present there are no open findings. Figure 4 shows the timeliness of DR closure for the NSNFP.

The CDAs were not included in the computed timeliness average, because the CDAs are singular incidents that are closed during the assessment, resulting in zero days for closure.

3.1.1 National Spent Nuclear Fuel Program

The NSNFP PSO and QAS organizations work to the same program management procedures. All NSNFP data was combined to show the programs timeliness in CAQ closure. Figure 5 shows that the timeliness is improving. CDAs were not included when creating this chart.

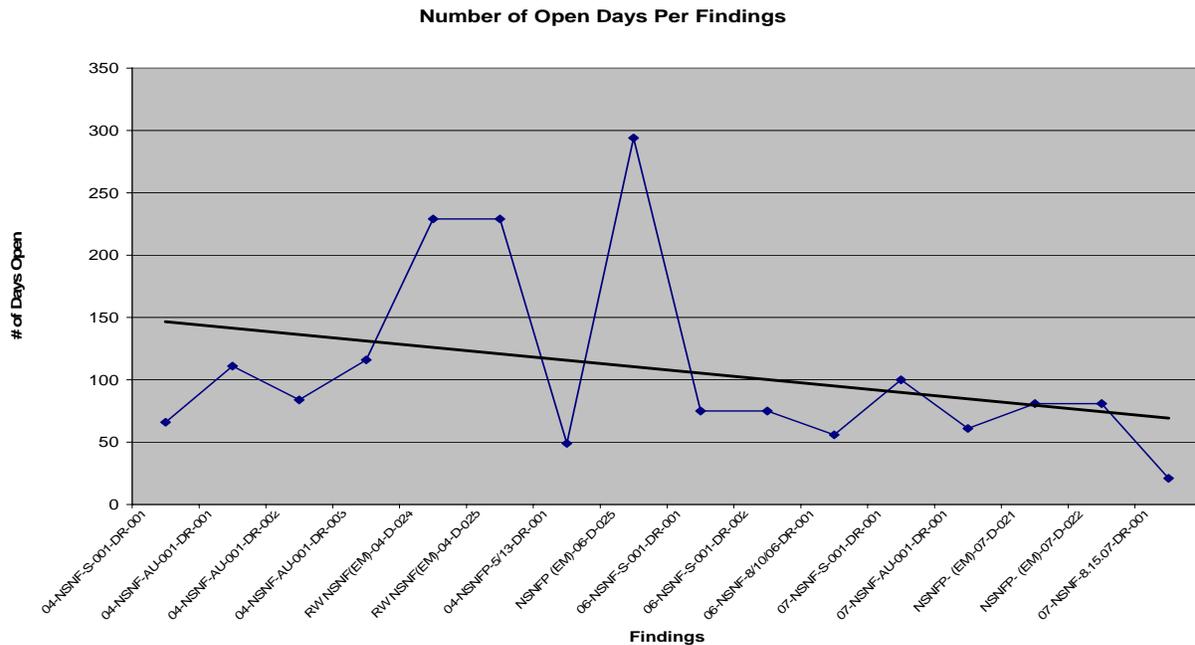


Figure 5

The average closure time for NSNFP deficiency reports is decreasing as shown in figure 6. CDAs were included in this chart data due to the fact that in 2005 all the findings were closed during the audits and surveillance. The method for determining the timeliness for the external generated CAQs closure is now based on NSNFP actions to close the CAQ as tracked in CATTs.

As shown in figure 6 the average closure times for NSNFP CAQs are improving. Figure 6 shows that in 2004 the average closure time was 88 days, zero days in 2005, 83 days in 2006 and finally 43 days in 2007.

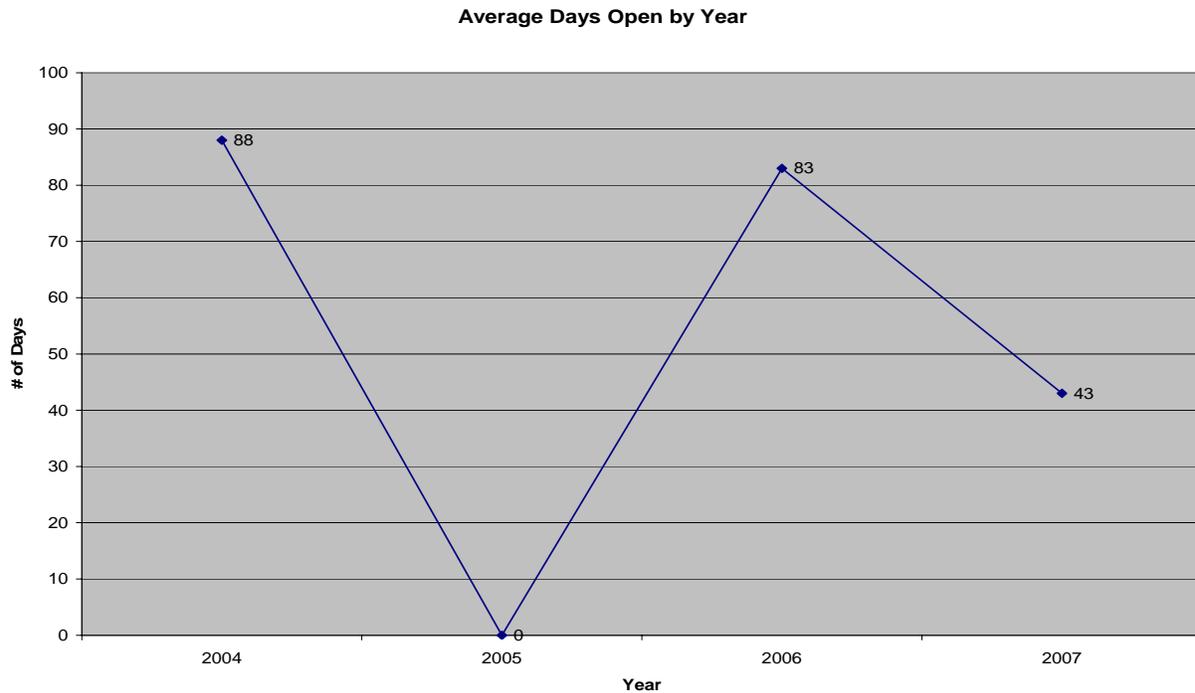


Figure 6

3.1.2 National Spent Nuclear Fuel Program Suppliers

During 2006, the NSNFP supplier surveillance (07-SUPP-S-001) of the INL procurement organization identified one deficiency related to scanning procurement quality records. The timeliness of corrective action closure was 34 days, which included the INL holiday curtailment. There were no findings identified for NSNFP suppliers in the remaining calendar year 2007.

4. RESULTS

Data for the NSNFP and NSNFP suppliers were analyzed to identify organization-specific adverse trends. Subject codes, direct cause codes, root cause codes, and timeliness of corrective action completion were evaluated. As a result of this analysis no deficient trends were identified that identify a condition adverse to quality.

NSNFP

The evaluation of NSNFP data showed a relative steady number of deficiencies for the reporting period. The data shows that there were 10 CAQs in 2004, five in 2005 (all CDAs), six DRs in 2006 and eight in 2007. The number of CAQs for the last three years shows a slow increase. The majority of the CAQ have been minor in nature, e.g., missing signature on a training record, editorial comment on a procedure, etc.

The 2007 reporting period identified eight CAQs, these CAQs were related to three subject areas. Six of the CAQs identified problems related to the QA Program subject area. Evaluation of this data shows that the problems in this area are on the rise after two years of relatively no problems. This would indicate a significant increase in QA Program problems. Further evaluation of the CAQ subject codes within the QA Program area revealed that there is no real significant increase in any one area within the QA Program, i.e., two of the CAQ subject codes concerned training issues, one dealt with the program matrix, one with document reviews, and two with work planning documentation. It is determined that there is no adverse trend indicated by the above data.

Evaluation of direct cause code data shows that the number of findings attributed to Personnel Problems decreased from 2004 to 2006, and had a one finding increase in 2007. The analysis showed that three of six (50%) CAQs in 2006 and four of eight (50%) in 2007 were attributed to Personnel Error. The CAQs attributed to Procedural Problems has been slowly increasing during this four year reporting period. It was determined that there is no adverse trend indicated by the above data. The increase in procedural problems and with the possible increase in personnel related problems, management and staff need to pay closer attention to the execution of NSNFP procedures.

National Spent Nuclear Fuel Program Suppliers

During 2007, the only active government sector supplier to the NSNFP was the INL M&O contractor BEA. The one surveillance performed on the NSNFP Supplier was reported in the 2006 trend report. As a result of a NSNFP surveillance of INL Procurement Organization, one DR was identified and closed. There was no adverse impact.

5. BIBLIOGRAPHY

1. National Spent Nuclear Fuel Quality Program Annual Trending Report, January–December 2004.
2. National Spent Nuclear Fuel Quality Program Annual Trending Report, January–December 2005.
3. National Spent Nuclear Fuel Quality Program Annual Trending Report, January–December 2006.

Appendix A - Deficiency Reports Data

Appendix A

NSNFP Deficiency Reports Data

CAR NO.	Subject Code	Direct Cause	Root Cause	Days Open
04-NSNF-S-001-DR-001	D.01.3	02 A d	-	66
04-NSNF-AU-001-CDA-002	B.12.2.4	02.A	-	0
04-NSNF-AU-001-CDA-001	B.10.7	02.A	-	0
04-NSNF-AU-001-DR-001	B.10.1	02.A.a	-	111
04-NSNF-AU-001-DR-002	Q.02	02.A.b.	-	84
04-NSNF-AU-001-DR-003	E.05	02.A	-	116
RW NSNF(EM)-04-D-024	B.01.3	01.B.g.(4)	-	229
RW NSNF(EM)-04-D-025	B.04.4	03.A.c	-	229
04-NSNFP-5/13-DR-001	B.10.2	05.B.b	-	49
04-NSNF-S-003-CDA-001	E.05	02.A	-	0
04-SUPP-AU-001-CDA-001	I.02	04.C.a	-	0
05-NSNF-S-002-CDA-001	Q.02.1.2	02.A.d	-	0
05-NSNF-AU-001-CDA-001	B.06.2	02.A	-	0
05-NSNF-AU-001-CDA-002	R.07.2	02.A	-	0
NSNFP(EM)-05-D-027	R.06.6	02.A.b.	-	0
NSNFP(EM)-05-D-028	G.09.5	02.A.d	-	0
05-SUPP-AU-002-CDA-001	L.03.1.1	02.A.d	-	0
06-NSNF-AU-001-CDA-001	B.01.2.3	01.B	-	0
NSNFP (EM)-06-D-025	Q.02.2	02.A.b.	-	294
NSNFP (EM)-06-D-026	R.01.1	02.A.b.	-	0
06-NSNF-S-001-DR-001	D.01.3.1.2	01.B.g.(4)	-	75
06-NSNF-S-001-DR-002	C.02.7	05.D.d	-	75
06-NSNF-8/10/06-DR-001	A.02	02.A.f	-	56
07-SUPP-S-001-DR-001	Q.05.2	02.A.d	-	34
07-NSNF-S-001-DR-001	B.02.5	02.A.d	-	100
07-NSNF-AU-001-CDA-001	B.12.1.2	04.C.a	-	0
07-NSNF-AU-001-DR-001	L.07.6	02.A.d	-	61
NSNFP- (EM)-07-D-021	B.12.1.4	01.B.g.(4)	-	81
NSNFP- (EM)-07-D-022	B.05.1	01.B.g.(2)	-	81
NSNFP- (EM)-07-D-023	B.01.3.1.3	01.B.g.(4)	-	0
NSNFP- (EM)-07-D-024	U.02.2.4	02.A.f	-	0
07-NSNF-8.15.07-DR-001	B.10.4	02.A.d	-	21

Appendix B - ACRONYMS

Appendix B

ACRONYMS

CAR	Corrective Action Request
CATTS	NSNFP Corrective Action Tracking Trending System
CAQ	Condition Adverse to Quality
CDA	Corrected During Audit
CR	Condition Report (EM/RW)
DOE	U.S. Department of Energy
DR	Deficiency Report
EDF	Engineering Design File
EM	DOE Office of Environmental Management
DOE-ID	U.S. Department of Energy Idaho Operations Office
NSNFP	National Spent Nuclear Fuel Program
PSO	NSNFP Program Support Organization
QA	Quality Assurance
QAS	NSNFP Quality Assurance Staff
QARD	RW Quality Assurance Requirements and Description
RW	Office of Civilian Radioactive Waste Management
SNF	Spent Nuclear Fuel

Appendix C - Cause Codes

Appendix C - Cause Codes

Code	Description	Code	Description
01	PROCEDURES/IMPLEMENTING DOCUMENTS	04 B b	Lesson plan need improvement
01 A	Procedure not used	04 B c	Training instructions need improvement
01 A a	No/incomplete documents/procedure	04 B d	Testing need improvement
01 A b	Lost/missing documents/procedure	04 B e	Continued/Refresher training need improvement
01 A c	Procedure difficult to use	04 C	Inadequate training methods
01 A d	Procedure not available or inconvenient to use	04 C a	Incomplete training
01 A e	Procedure use not required but should be	04 C b	Inadequate facilities
01 B	Inadequate/wrong procedure	04 C c	Continuous training inadequate
01 B a	Typographical error	04 C d	Inadequate testing or measure of aptitude
01 B b	Sequence wrong	05	DESIGN/SCIENTIFIC INVESTIGATION
01 B c	Technical facts/data wrong	05 A	Design Documents/ Scientific Investigation
01 B d	Requirements:	05 A a	Documents do not exist
01 B d (1)	updates not incorporated	05 A b	Data/computation wrong, incomplete, or less than adequate
01 B d (2)	not covered/addressed	05 A c	Requirements:
01 B e	Wrong documents/procedure used	05 A c (1)	not identified
01 B f	Wrong revision used	05 A c (2)	incorrectly identified
01 B g	Implementing documents/process:	05 A d	Scientific investigation not performed per study plan
01 B g (1)	not adequate/can't be followed	05 A e	Problems not anticipated in design or investigation
01 B g (2)	Incomplete	05 A f	Equipment environment not considered
01 B g (3)	does not exist	05 B	Technical Review
01 B g (4)	Does not describe HOW the requirement will be implemented	05 B a	Review not performed
01 B h	Conflicting instructions	05 B b	Review inadequate
01 C	Error in following the procedure	05 B c	Reviewer lack of independence
01 C a	Format confusing	06	FABRICATION/INSTALLATION
01 C b	More than one action per step	06 A	Fabrication/installation
01 C c	Multiple references	06 A a	Fabrication/installation error
01 C d	No signoff space	06 A b	Fabrication/installation not per design
01 C e	Checklist misused	06 A c	Wrong sequence fabrication/installation
01 C f	Information/Data/Computation wrong or incomplete	06 A d	Wrong material
01 C g	Ambiguous instructions	06 A e	Defective material
01 C h	Inadequate limits/parameters	06 A f	Lack of proper tools used for fabrication/installation
01 D	Self imposed requirement - not needed for QARD compliance	06 B	Quality Control
02	PERSONNEL - HUMAN PERFORMANCE	06 B a	No inspection
02 A	Lack of attention to a task	06 B b	Wrong inspection instructions
02 A a	Carelessness	06 B c	Wrong inspection technique
02 A b	Oversight	07	RELIABILITY SYSTEM
02 A c	Work overload	07 A	Inadequate Preventative Maintenance
02 A d	Procedure not used, or used improperly	07 A a	No preventative maintenance for equipment
02 A e	Wrong revision used	07 A b	Inadequate preventative maintenance for equipment
02 A f	Lack of direction	07 B	Unreliable Equipment
02 B	Lack of Qualification	07 B a	Equipment past design lifetime
03	MANAGEMENT SYSTEM	07 B b	Equipment repeated failure, previous corrective action inadequate
03 A	Standards, Policies, Administrative Controls (SPAC)	08	SOFTWARE
03 A a	No SPAC	08 A	Computer software controls
03 A b	SPAC not used	08 A a	Inadequate software design
03 A c	Inadequate communication of SPAC	08 A b	Inadequate validation, verification or testing
03 A d	SPAC Recently changed	08 A c	Defects:
03 A e	Inadequate drawings/prints	08 A c (1)	Inadequate defect report
03 A f	Inadequate accountability	08 A c (2)	Inadequate defect resolution
03 B	Immediate supervision	08 A d	Inadequate software maintenance
03 B a	Inadequate job/task analysis	08 A e	Inadequate software identification
03 B b	No preparation/planning	08 B	Inadequate user information manuals
03 B c	Inadequate selection of performer(s)	08 C	Inadequate control of usage
03 B c (1)	Individual not qualified	08 D	Inadequate data update
03 B c (2)	Team selection not balanced/adequate	09	PROCUREMENT
03 B d	Performers not trained	09 A	Vendor not in the Approved Supplier List
03 B e	No supervision during work	09 B	Vendor not qualified
03 B f	Infrequent task	09 C	Receiving inspection
03 C	Communications	09 C a	No receiving inspection
03 D	No/late communication	09 C b	Inadequate Receiving inspection
03 E	Misunderstood verbal communication	10	MISCELLANEOUS OR MULTIPLE AREAS
03 F	Audits/Evaluations	10 A	Multiple Causes Present
03 F a	No Audits/Evaluations	10 B	Material/Equipment Inadequate
03 F b	Audit checklist misused	10 C	Unknown
04	TRAINING	10 D	Natural Causes
04 A	No training	10 E	Planned Failure
04 A a	Decided not to train		
04 A b	No learning objective		
04 B	Lack of understanding		
04 B a	Learning objectives need improvement		