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LLNL-TR-448611

Performance Analysis: ITS Data through March 30, 2010

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Disclaimer

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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Contents

1.0 Summary

Data from ITS was analyzed to understand the issues at LLNL, to identify issues that may require additional management attention, to identify noncompliances that meet the threshold for reporting to the DOE Noncompliance Tracking System (NTS) or to the DOE Safeguards and Security Information Management System (SSIMS). In this report we discuss assessments and issues entered in ITS and compare the number and type presently entered in ITS to previous time periods. Issues reported in ITS are evaluated and discussed. The results of the issue analysis are summarized in the table below. The analysis did identify one nuclear safety noncompliance that meets the threshold for reporting to the DOE NTS.

Table 1. Summary of Safety and Security Subjects

WSH Management Issues	Legend
Beryllium	Data within this subject was within expected variation or there was a decreasing trend in the data
Biological Safety	
Electrical Safety	
Emergency Program	
Explosive Safety	
Fire Safety	Data within this subject met a common test and will be analyzed in future quarterly analyses
Integrated Safety Management System (ISMS)	
Occupational Medicine	
Other Industrial Hygiene	
Other Industrial Safety	
Other Significant Condition Noncompliances	The analysis determined that data within this subject represents a significant, systemic or repetitive noncompliance reportable to DOE
Nuclear Safety Management Issues	
Nuclear Operations	
Packaging and Transportation	
Quality Assurance	
Radiation Protection	
Classified Information Security Management Issues	
Physical Security	
Information Protection	
Other Functional Areas	
Environmental	
Facility Management	
Packaging and Transportation (Non-Nuclear)	
Quality Assurance (Non-Nuclear)	
Training and Qualifications	

2.0 Introduction

All of the data in ITS is analyzed and discussed in this report; however, the primary focus of this report is to meet requirements for performance analysis of specific functional areas. The DOE Office of Enforcement expects LLNL to "implement comprehensive management and independent assessments that are effective in identifying deficiencies and broader problems in safety and security programs, as well as opportunities for continuous improvement within the organization" and to "regularly perform assessments to evaluate implementation of the contractor's processes for screening and internal reporting." LLNL has a self-assessment program, described in the document applicable during this time period, DES-0048, "LLNL Assessment Program," that includes line, management and independent assessments. LLNL also has in place a process to identify and report deficiencies of nuclear, worker safety and health and classified information security requirements.

In addition, the DOE Office of Enforcement expects that "issues management databases are used to identify adverse trends, dominant problem areas, and potential repetitive events or conditions" (page 15, DOE *Enforcement Process Overview*, June 2009). LLNL requires that all worker safety and health, nuclear safety and classified information security noncompliances be tracked as "deficiencies" in the LLNL Issues Tracking System (ITS). Data from the ITS are analyzed for worker safety and health (WSH), nuclear safety noncompliances and classified information security (CIS) that may meet the threshold for reporting to the DOE Noncompliance Tracking System (NTS) or the Safeguards and Security Information Management System (SSIMS).

This report meets the expectations defined by the DOE Office of Enforcement to evaluate implementation of internal processes for screening and reporting, review the assessments conducted by LLNL, analyze the noncompliances found in these assessments, and evaluate the data in the ITS database to identify adverse trends, dominant problem areas, and potential repetitive events or conditions. The report attempts to answer three questions:

Is LLNL evaluating its programs and state of compliance?
What is LLNL finding?
Is LLNL appropriately managing what it finds?

The results from analyzing the deficiencies are presented in accordance with the two primary NTS reporting thresholds for WSH, nuclear safety noncompliances and CIS: 1) those related to certain events or conditions and 2) those that are management issues. In addition, WSH noncompliances were also analyzed to determine if any fell under the "other significant condition" threshold.

This report identifies deficiencies that meet the criteria for (1) reporting to the DOE NTS or SSIMS as a significant, systemic or repetitive noncompliance; (2) safety subjects meeting a common test because the number of entries meets the test criteria or because of management concern, and should be analyzed in future quarterly analyses; (3) safety subjects within expected variation not requiring further analysis; and (4) safety subjects having a downward trend not requiring further analysis. It is possible for a collection of deficiencies to be systemic, but do not

meet the significant level of reporting to DOE. When a safety subject is determined to meet a common test, the Performance Analysis and Reporting Section (PARS) of the Contactor Assurance Office will analyze these safety subjects in future performance analyses and include them in the quarterly report.

3.0 Assessments and Issues

Method

Internal assessments at LLNL include internal independent assessments chartered by the Director's Office, management self-assessments chartered by either the functional area managers, the principal associate director or the associate director (as of the date the data was pulled). DOE and regulatory agencies conduct external assessments. The results of all these types of assessments are entered into ITS. In addition, deficiencies, observations and corrective actions identified during the analysis of events, such as illnesses/ injuries and occurrences, are also entered into ITS.

Data on assessments conducted from 2005 through March 2010 were pulled in April 2010 using the ITS Basic Assessment Information report. This report includes all assessments performed, whether or not the assessment resulted in a reported observation or deficiency. The report also includes those assessments that have not been assigned a Completion/ Final Report Date or a Date Final Report Received in ITS. The ITS allows for assessments to be designated by type. For this analysis, the assessment types were binned into the following eight assessing method categories:

- "External" includes the assessment types: external-LSO MAR, external-LSO surveillance and external-other.
- "Internal Independent" includes the assessment types; internal independent, IAOD audit, and LLNL parent org FMA.
- "Management Self" includes the assessment type: management self.
- "Walkthrough" includes the assessment type: walkthrough.
- "Readiness Review" includes the assessment type: readiness review.
- "Event" includes the assessment types: Event-Illness/ Injury CAR, Event-Occurrence Event-Below ORPS reportable and Security Incident.
- "Quick ITS" includes the assessment type: quick ITS.
- "Other" includes the assessment types: NCAR and Other.

The data was reviewed to determine if the frequency or types of assessments changed during this period. A control chart for individual measurements was used to look at variation of internal assessment data. It can be considered a way of performing a statistical test, a test whether the process is in a state of control. One control chart was used to analyze variation within internal assessment data referred to as a Frequency Control Chart. The Frequency Control Chart in this case plots the internal assessment frequency over quarters.

Along with the frequency of internal assessments, the control charts provide a means to evaluate and compare the number of assessments per quarter to seven key elements:

1) Centerline: the average number of assessments over the time period (mean)
2) One standard deviation: one times the average moving range divided by a constant with value 1.128 both above and below the mean

3) Upper warning limit (UWL): two times the average moving range divided by a constant with value 1.128 above the mean
4) Upper Control-limit (UCL): three times the average moving range divided by a constant with value 1.128 above the mean
5) Lower warning limit (LWL): two times the average moving range divided by a constant with value 1.128 below the mean
6) Lower control-limit (LCL): three times the average moving range divided by a constant with value 1.128 below the mean

The key element, UCL, is a common calculation for control charts. In an ideal world, the majority of one's data would lie within the UCL, and the LCL.

The moving range is defined as $| x_i - x_{i-1} |$, where x is the number of internal assessments for a specific quarter. It can also be defined as the absolute difference between two successive data points, in this case quarterly assessment counts. The constant discussed above, referred to as d_2 in the *Introduction to Statistical Quality Control* is defined as the mean of the distribution of the relative range and is used in calculating the estimate of the standard deviation, which is defined as the average moving range divided by this constant (d_2). The value of d_2 ranges anywhere from 1.128 to 3.931 depending on how many observations are in each sample. Since each data point in the control charts used in this analysis are based on individual counts and not a sample average, the moving range instead of the range is used. Since the moving range is calculated using two successive data points, our value of n=2. Therefore the value of d_2 for n=2 is defined as 1.128 in Table VI in the *Introduction to Statistical Quality Control* (Montgomery, 1997).

With these charts, we are looking for *special causes of variation*. This type of variation can be found by using common tests. The below common tests are called action limits, as listed in "Introduction to Statistical Quality Control:"

1) One data point falling above the UCL or below the LCL
2) Two consecutive points above the UWL or below the LWL
3) Four out of five points in a row are more than one standard deviation from the mean in the same direction
4) Eight consecutive points plot on one side of the centerline

Theoretically, if a process is 'in-control' then none of the data points will fall outside of the UCL. The other three action limits are other rules for detecting nonrandom patterns on a control chart. If data reaches or exceeds an action limit, the assessment data are analyzed further.

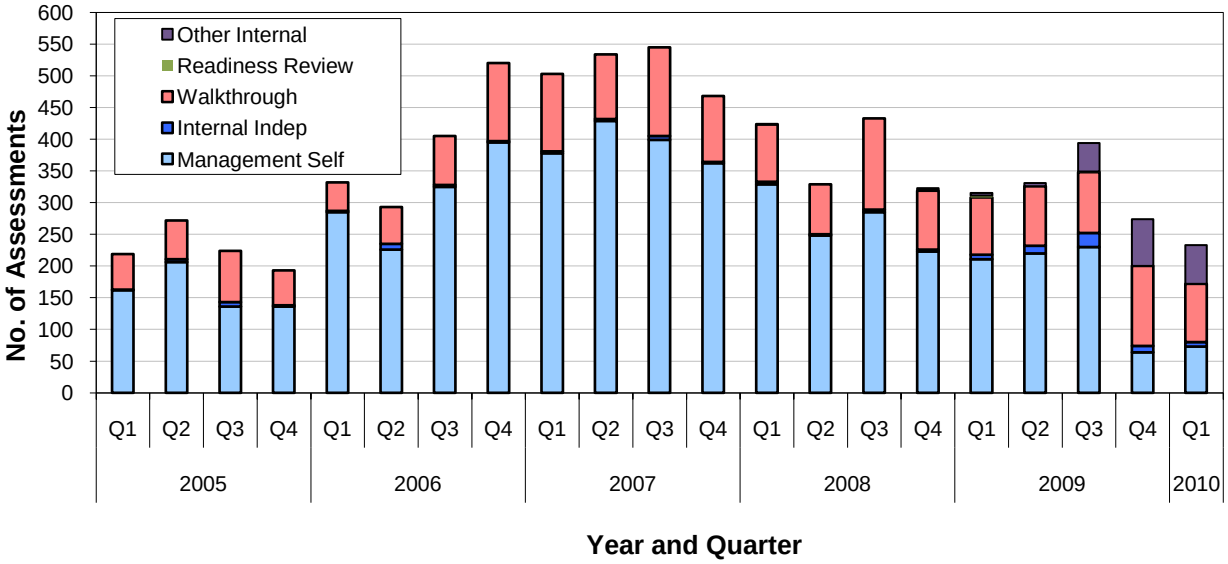
Results

During the 12-month period ending March 2010, LLNL entered 587 management self-assessments, 498 walkthroughs, 189 other internal assessments, 58 internal independent assessments, 34 Quick ITS assessments, and 4 readiness reviews. During this same 12-month period, 222 external assessments and 135 events were also entered into ITS.

There has been a decreasing trend in the number of internal assessments entered into ITS from the third quarter in 2007, as shown in Figure 1. There was an increase from the second quarter in 2009 to the third quarter in 2009. One possible reason for this increase is the 29 Industrial

Hygiene Baseline Surveys completed in the third quarter of 2009. Evaluating the number of assessments each Principal Directorate (PD) responded to in the third quarter of 2009, there was no one PD that appeared to have responded to significantly more assessments than historically shown. Some PDs did have a slight increase in the third quarter in 2009 (figure not shown).

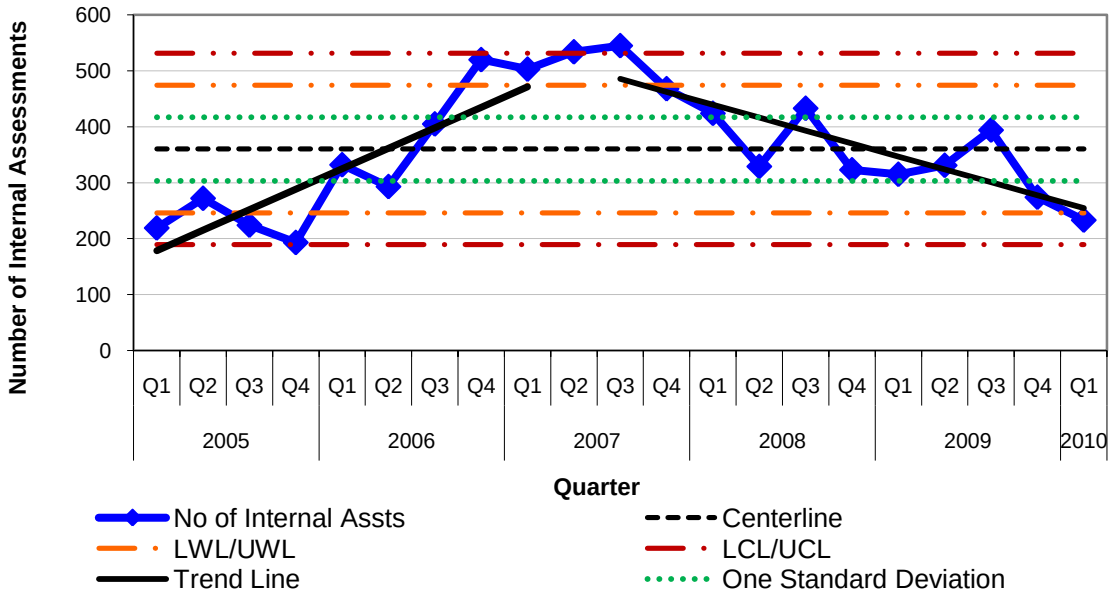
Figure 1. The number of Internal Assessments by Type and Quarter



The number of assessments categorized as type "Other" increased in the three most recent quarters, as shown in Figure 1. Prior to the third quarter in 2009, MOVIs were being categorized as management self-assessments. During the third and fourth quarter of 2009 and the first quarter of 2010, directorates were categorizing all observations, verifications and inspections as assessment type "other" or "walkthrough." After the first quarter of 2010, the assessment type Management Observations, Verifications and Inspections (MOVI) described in PRO-0053 was made an option in ITS. Because of these changes the apparent increase of the "Other" assessment type is expected to be temporary.

When evaluating the number of assessments conducted each quarter using the process control chart shown in Figure 2, none of the recent points meet a common test. In observationally reviewing Figure 2, there appears to be an increasing trend in the number of internal assessments from the first quarter in 2005 to the first quarter in 2007 and a decreasing trend from the third quarter in 2007 to the first quarter in 2010, suggesting that this process has a nonrandom pattern. After testing these potential trends using simple linear regression, both the increasing and decreasing trends were statistically significant (p-value < 0.01), and are shown in Figure 2 as two separate trend lines. This supports the observation that the number of assessments entered into ITS has decreased since the third quarter in 2007.

Figure 2. Internal Assessment Count Control Chart



We identified two possible explanations for the reduction. It is possible that some assessments had been completed during 2009 and 2010, but not entered in ITS. Alternatively, it is possible that the assessment process changed and fewer unique assessments were conducted in 2009 and so far in 2010.

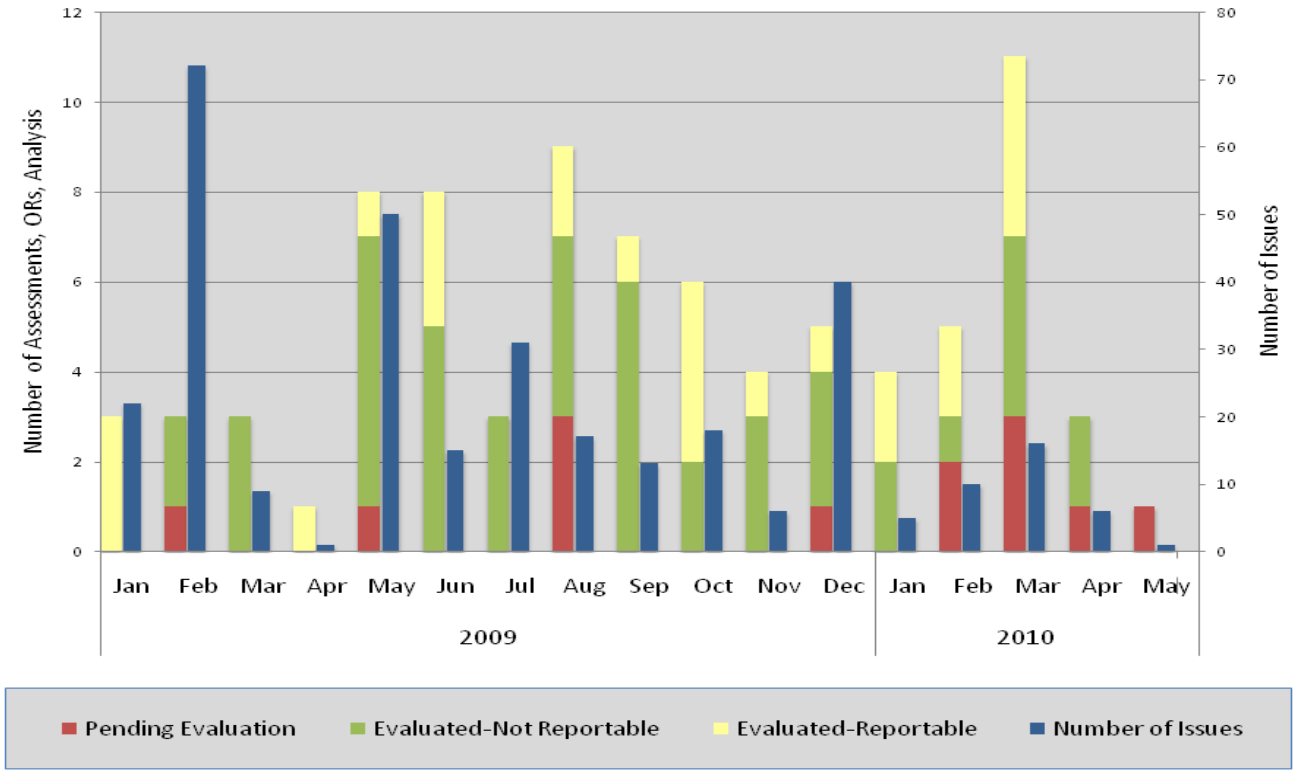
The data in ITS for the Institutional Assessment Plan (IAP) were pulled. This report provides a list of the planned internal and external assessments. There are 836 internal assessments on the IAP and 229 of these did not have an Assessment Completion/ Final Report Date in ITS, which means these assessments were not included in the assessment analysis in Figures 1 and 2. All of these assessments have due dates after June 30, 2010. Therefore, it is not possible that the assessments have been conducted but not entered in ITS. Of the 229 assessments without an Assessment Completion/ Final Report Date, 50 (22%) assessments are in functional areas related to nuclear safety and WSH. Eighty eight (38%) are within the safeguards and security functional area and may be related to CIS.

Soon after contract transition, discussions began regarding changing the structure and processes for conducting management and independent assessments. Prior to contract transition, most assessments were conducted by the directorates, following requirements in the ES&H Manual that prescribe the topical areas and frequency for self-assessments, subject matter inspections

and facility inspections. This practice resulted in unique entries in ITS for each assessment at each location. The directorate scheduled these assessments and inspections independent of each other. In late 2008, LLNL assigned a central organization to manage most of the facilities and to inspect them. Also in 2008, responsibility for conducting self-assessments of ESH-related functional/ topical areas began to transition from the directorates to the Quality Assurance Office. This, too, would result in fewer unique assessments and inspections being entered into ITS. Figure 2 shows that the change started soon after contract transition as the decreasing trend begins around October 2007 as shown above.

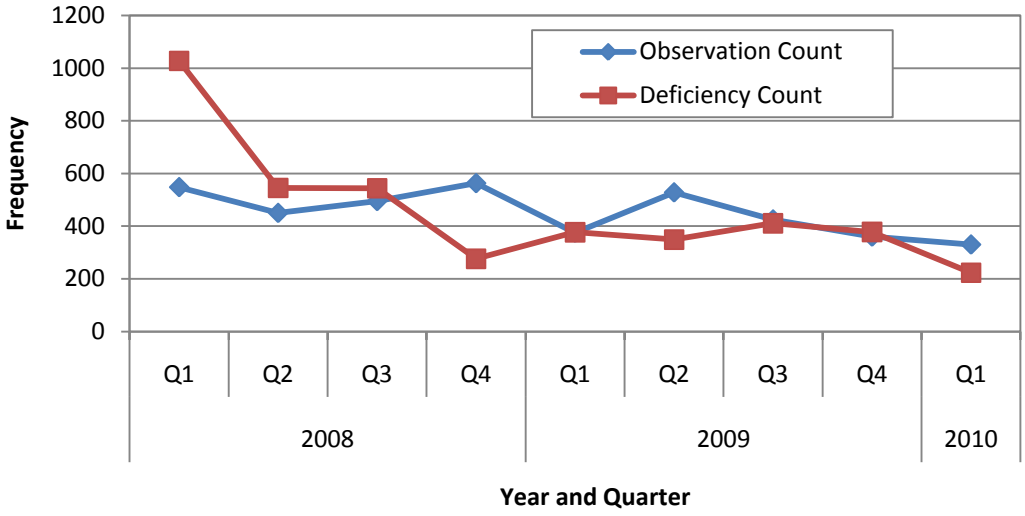
LLNL evaluates certain assessments, occurrences and analysis reports to determine whether NTS-reportable deficiencies were identified. For the first quarter in 2010, 18 reports were made available for evaluation and assignment of an assessment response owner. Figure 3 shows the number of reports completed each month and subject to evaluation for noncompliance reporting. A total of 13 reports are pending a noncompliance evaluation, as shown in Figure 3. The reports pending evaluation are shown in red. These reports pending an evaluation have either not been reviewed for WSH and/ or nuclear safety noncompliances, or the noncompliance evaluation documentation is pending entry into ITS. In the previous analysis there were 14 reports pending noncompliance evaluations that were issued in 2009; however, as of this quarter, there are only six pending noncompliance evaluations for those issued in 2009.

Figure 3. Assessments, Final Occurrence Reports and Analyses Reports Issued Each Month and Their Evaluation Status



The average number of issues per assessment conducted since 2006 is three. This quarter the average was two. So far in 2010, 56% of all assessments completed and entered into ITS had at least one issue and a total of 330 observations and 223 deficiencies were entered in ITS from all sources. Figure 4 shows that the number of issues entered into ITS has decreased since 2007, but has been fairly steady since early 2008; the statistical tests based on simple linear regression support this conclusion. The number of deficiencies has a statistically significant decreasing trend over time from 2005 - 2010 (p-value < 0.01), but not from early 2008 – 2010 (p-value > 0.05). The number of observations, however, has a significantly increasing trend over time from 2005 - 2010 (p-value < 0.01), but not from early 2008 – 2010 (p-value > 0.05).

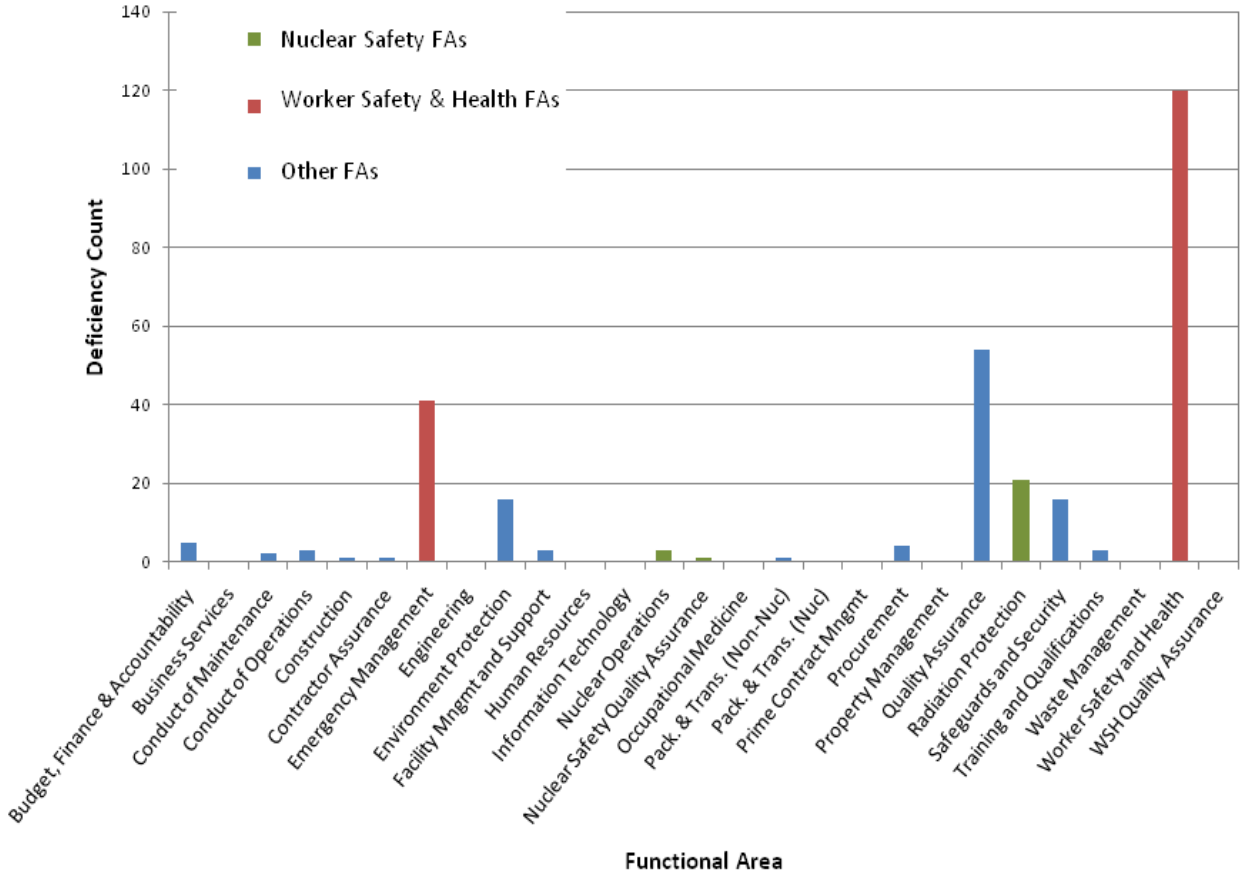
Figure 4. The Number of ITS Deficiencies and Observations Per Quarter



There was a decrease in the number of deficiencies identified and entered in ITS in this quarter (when compared to the previous quarter). This may be attributed to improved compliance, a reduction in the number of assessments, a reduction in the scope of assessments, delays in updating data in ITS or other changes.

The data extracted from the LLNL Issues Tracking System (ITS) comprised 19,238 deficiencies identified under all functional areas, with identification dates in 2005, 2006, 2007, 2008, 2009 and 2010. The data also included 98 deficiencies without a designated functional area, with only four in open status. Of the 19,238 deficiencies, 14,075 were designated in the following three WSH functional areas: emergency management, occupational medicine and worker safety and health; and the following three nuclear safety functional areas: nuclear operations, packaging and transportation, radiation protection. The safeguards and security functional area comprised 301 deficiencies. Figure 5 displays deficiencies across all functional areas and highlights those related to WSH (red) and nuclear safety (green). Subjects in the safety functional areas and in the safeguards and security functional area were analyzed using control charts; results are discussed below.

Figure 5. Number of Deficiencies in 2010 Per Functional Area



Deficiencies categorized within the quality assurance (QA) functional area and for which the nuclear safety question is marked "yes" are also discussed in this report. Of the 19,238 deficiencies in the data set, 3,216 were identified as QA deficiencies; and of these, 290 (9%) were marked as nuclear safety noncompliances using the nuclear safety question in ITS.

In 2010, 62% of deficiencies entered into ITS, were marked as WSH site-reportable deficiencies, which is more than in 2009 (57%), 20% of deficiencies were marked as nuclear safety site-reportable deficiencies, which is more than in 2009 (17%), and one percent (1%) were marked as CIS site-reportable deficiencies, which is less than in 2009 (4%) as shown in Table 2.

Table 2. ITS Deficiencies Entered, Site-reported and NTS-reported Noncompliances

Year	Qrt	Observations Entered into ITS	Deficiencies Entered into ITS	WSH Site Reported Noncompliances (NCs)	WSH NCs reported to NTS	NS Site Reported NCs	NS NCs reported to NTS	CIS Site Reported NCs
2008	**Q1**	548	1028	681 (66%)	3 (< 1%)	62 (6%)	3 (5%)	8 (1%)
	Q2	450	545	331 (61%)	4 (1%)	54 (10%)	2 (4%)	6 (1%)
	Q3	495	544	372 (68%)	6 (2%)	65 (12%)	3 (5%)	6 (1%)
	Q4	563	276	184 (67%)	2 (1%)	47 (17%)	1 (5%)	12 (4%)
2009	**Q1**	375	377	213 (57%)	5 (2%)	62 (16%)	1 (2%)	35 (9%)
	Q2	528	349	173 (50%)	2 (1%)	45 (13%)	1 (2%)	7 (2%)
	Q3	425	411	223 (54%)	6 (4%)	74 (18%)	4 (7%)	13 (3%)
	Q4	360	378	252 (67%)	2 (<1%)	70 (19%)	2 (3%)	5 (1%)
2010	**Q1**	330	223	139 (62%)	6 (4%)	45 (20%)	0 (0%)	3 (1%)

Six (3%) of the WSH and nuclear safety site-reportable deficiencies were reported to the DOE NTS in 2010, counting a NUC/ WSH noncompliance report as a report for nuclear safety and a report for WSH. This ratio is fairly consistent with 2009. At this time. LLNL does not have access to the assessment tab of the SSIMS; however, DOE has been notified of gaps identified in the CIS regulatory compliance assurance program via a memo from the LLNL Deputy Director.

4.0 Noncompliances Related to Events or Conditions

DOE expects that noncompliances associated with certain Occurrence Reporting and Processing System (ORPS) reporting criteria be reported, regardless of the severity of the noncompliance. LLNL uses the NTS reporting thresholds specified in the DOE Enforcement Process Overview, Appendices A and B and described in DES-0083, "Identifying, Reporting, and Tracking Noncompliances with DOE Safety and Security Requirements."

Occurrences are promptly reviewed for NTS-reportable WSH and nuclear safety noncompliances, as they are reported into the ORPS. The initial review is based on the description of the occurrence; however, after the occurrence is further characterized and analyzed for causes, additional information may be available that identifies noncompliances that should be reported. The Contractor Assurance Office works with the directorate point of contacts to make this determination.

4.1 Worker Safety and Health Results

LLNL submitted 39 occurrence reports to ORPS from April 2009 to March 2010. Fourteen occurrences met the DOE NTS reporting threshold for WSH. Each occurrence was evaluated for possible noncompliances, nine were identified to have a WSH noncompliance(s) associated with the event and these noncompliances have been submitted to the NTS:

(1) NTS--LSO-LLNL-LLNL-2009-0008, "Near Miss Involving Non-authorized Energized Work in Building 691"
(2) NTS--LSO-LLNL-LLNL-2009-0012, "Near Miss-Non-Energized Electrical Cable Cut Without Proper Energy Isolation"
(3) NTS—LSO-LLNL-LLNL-2009-0017, "Discovery of Modified, Exterior, 2nd Floor Hand Rail System at Building 432"
(4) NTS—LSO-LLNL-LLNL-2009-0018, "Worker Receives Electric Shock When Finger Enters into Broken Light Switch Casing in Building 235 Kitchen"
(5) NTS-LSO-LLNL-LLNL-2010-0003, "Machining of Legacy Part Leads to Indeterminate Beryllium Exposure of Machinist"
(6) NTS-LSO-LLNL-LLNL-2010-0005, "Energized Electrical Conductor Cut Without Energy Isolation in Building 391"
(7) NTS-LSO-LLNL-LLNL-2010-0013, "Vehicle Safety Features not Sufficiently Addressed by the Laboratory"
(8) NTS-LSO-LLNL-LLNL-2010-0007, "Personal Air Monitoring Sample Above ACGIH TLV for Silica Dust"
(9) NTS-LSO-LLNL-LLNL-2010-0010, "Unexpected Discharge of Flammable Gas While Drilling into Gas Cylinder with a Hand Drill"

The other five occurrences that met the DOE NTS reporting threshold for WSH were determined to not constitute a WSH noncompliance. All of the WSH noncompliance evaluations have been completed and documented in ITS using the noncompliance evaluation field.

4.2 Nuclear Safety Results

LLNL submitted 39 occurrence reports to ORPS from April 1, 2009 to March 31, 2010. Each occurrence was evaluated for possible noncompliances. Of these occurrence reports, seven were reported under a reporting criteria that satisfied DOE Office of Enforcement criteria for mandatory reporting of noncompliances to the Noncompliance Tracking System:

(1) "Building 153 Evacuated Due to Toxic Gas Monitoring System Alarm" [NA--LSO-LLNL-LLNL-2009-0023]
(2) "Operational Emergency Not Needing Further Classification - Roadside Vegetation Fire At Site 300" [NA—LSO-LLNL-LLNL-2009-0025]
(3) "Operational Emergency Not Needing Further Classification - Wildland Fire At Site 300" [NA—LSO-LLNL-LLNL-2009-0025]
(4) "Movement Of Combustible Fuel In Proximity Of Facility Not Analyzed Per Safety Basis" [NA—NVSO-LLNV-LLNV-2009-0002]
(5) "Hydrogen Excess Flow Shutoff Valve TSR Violation in Building 332" [NA—LSO-LLNL-LLNL-2009-0036]
(6) "Storage of Accountable Legacy Tritiated Oil in Building 331" [NA—LSO-LLNL-LLNL -2009-0038]
(7) "Building 332 Safety Basis Violation Relative to Functional Testing of the Mobile Weapons Platform" [NA—LSO-LLNL-LLNL-2010-0015]

Each of these occurrences was evaluated for noncompliances with nuclear safety requirements and for reportability to the DOE Noncompliance Tracking System. Based on the results of these evaluations, the seven occurrence reports were dispositioned as follows:

(1) The toxic gas alarm reported in NA--LSO-LLNL-LLNL-2009-0023 was determined by causal analysis to have been a spurious event. No noncompliance with DOE Nuclear Safety Requirements existed, and the event was therefore not reportable to the NTS.
(2) The fire reported in NA-LSO-LLNL-LLNL-2009-0025 was an operational emergency determined to not be the result of LLNL activities. No noncompliance with DOE Nuclear Safety Requirements existed, and the event was therefore not reportable to the NTS.
(3) The fire reported in NA-LSO-LLNL-LLNL-2009-0026 was an operational emergency for which no noncompliance with DOE Nuclear Safety Requirements existed. The event was therefore not reportable to the NTS.
(4) The failure to conduct the analysis required by the Joint Actinide Shock Physics Experimental Research (JASPER) facility safety basis constituted an NTS-reportable noncompliance with the DOE Quality Assurance Rule (10 CFR 830, Subpart A). LLNL submitted report NTS-NSO--LLNV-NTS-2009-0001 to the Noncompliance Tracking System on September 4, 2009.
(5) As a Criteria 3A(2) occurrence, the incorrect specification of the hydrogen excess flow shutoff valve reported in NA-LSO-LLNL-LLNL-2009-0036 constituted an NTS-reportable noncompliance with the DOE Quality Assurance Rule (10 CFR 830, Subpart

A). LLNL submitted report NTS-LSO-LLNL-LLNL-2009-0020 to the Noncompliance Tracking System on November 23, 2009.

(6) As a positive Unreviewed Safety Question (USQ), the inadequate hazard analysis reported in NA-LSO-LLNL-LLNL-2009-0038 of legacy tritiated oil constituted an NTS-reportable noncompliance with the DOE Quality Assurance Rule (10 CFR 830, Subpart A). LLNL submitted report NTS-LSO-LLNL-LLNL-2010-0009 to the Noncompliance Tracking System on May 5, 2010.

(7) As a Criteria 3A(3) occurrence, the failure reported in NA—LLNL-LLNL-2010-0011 to follow an LSO Condition of Approval regarding locations for Mobile Weapons Platform testing constituted an NTS-reportable noncompliance with the DOE Quality Assurance Rule (10 CFR 830, Subpart A). LLNL submitted report NTS-LSO—LLNL-LLNL-2010-0011 to the Noncompliance Tracking System on May 14, 2010.

All of the nuclear safety noncompliance evaluations have been completed and documented in ITS using the noncompliance evaluation field.

5.0 Method for Analyzing for Management Issues

Management issue noncompliances are defined as repetitive noncompliances, programmatic (i.e. systemic) issues and intentional violations or misrepresentations. One goal of this analysis is to identify a programmatic issue through a review of multiple deficiencies within the same safety subject. Secondarily, the analysis may identify a previously overlooked repetition of the same type of deficiency. A programmatic problem generally involves some weakness in administrative or management controls or their implementation, to such a degree that a broader management or process control problem exists. A repetitive problem is generally two or more different events that involve substantially similar conditions, locations, equipment, or individuals. Repetitive problems tend to be narrower in scope than programmatic problems. Analysis included a three-step process of first looking at the data as a whole to identify visual variations; second, performing statistical tests of the sets of data gleaned from the first step, and third, evaluating this remaining set of data by reviewing the context of the noncompliances, such as, discovery method, location in terms of facility, the compliance code, and the description of the noncompliance.
The process for analyzing this data was to review the deficiencies by quarter, looking for groupings with large numbers of deficiencies, observed changes in the number of deficiencies, or other observations that look different from what is expected. Then, if the numbers appeared to be of interest, a control chart for individual measurements was created for the safety subjects within the seven functional areas related to WSH and nuclear safety listed above and the security subjects within the safeguards and security functional area. In this analysis report, a new methodology for control charting is being introduced - the "Individual-X/ MR" method, described in *The Introduction to Statistical Quality Control* (Montgomery, 1997).

A control chart can be considered a way of performing a statistical test, a test whether the process is in a state of control. Control charts were used to look at variation for safety and security subjects; a control chart referred to as the Frequency Control Chart. This control chart plots the deficiency frequency and sometimes the observation frequency per quarter along with the number of assessments within a quarter for that particular safety or security subject. The number of assessments, which in previous analyses was included in the control chart, is not plotted prior to the fourth quarter of 2008 since the functional area for assessments became a required field in ITS at this time.

Along with the frequency of deficiencies, these control charts consist of four key elements:

1) *Centerline*: the average number of deficiencies over the time period (mean)
2) *One Standard Deviation:* one times the average moving range divided by a constant with value 1.128 above the mean
3) *Upper warning limit (UWL)*: two times the average moving range divided by a constant with value 1.128 above the mean
4) *Upper Control-limit (UCL)*: three times the average moving range divided by a constant with value 1.128 above the mean

The UCL is a key element of control charts. In an ideal world, the majority of one's data would lie within the UCL, as defined above and a lower control limit (LCL), which is three times the average moving range divided by a constant below the mean.

The moving range is defined as $| x_i - x_{i-1} |$, where x is the number of deficiencies, and sometimes observations identified in a specific quarter. It can also be defined as the absolute difference between two successive data points, in this case quarterly deficiency counts. The constant discussed above (1.128), referred to as d_2 in the *Introduction to Statistical Quality Control* is defined as the mean of the distribution of the relative range and is used in calculating the estimate of the standard deviation, which is defined as the average moving range divided by this constant (d_2). The value of d_2 ranges anywhere from 1.128 to 3.931 depending on how many observations are included in each sample. Since each data point in the control charts used in this analysis are based on individual counts and not a sample average, the moving range, instead of the range is used. Since the moving range is calculated using two successive data points, our value of n=2. Therefore the value of d_2 for n=2 is defined as 1.128 in Table VI (Montgomery, 1997).

In this analysis, the primary concern was the number of deficiencies above the two upper limits, the UWL and UCL. The number of deficiencies in a quarter cannot be below one or zero, and in many cases the Lower Warning Limit and LCL would have been below one or zero had it been incorporated in the control charts. Therefore, the following two other key elements, which are typically part of a control chart are not shown in the charts in this analysis:

5) *Lower warning limit (LWL)*: two times the average moving range divided by a constant with value 1.128 below the mean
6) *Lower control-limit (LCL)*: three times the average moving range divided by a constant with value 1.128 below the mean

In many cases, the control limits were adjusted and calculated for a more narrow time period compared to what the control chart displays. The purpose is to calculate the control limits based on the time period with less variability, which will produce the tightest controls. If this was done for a control chart, it will be noted on the bottom of the control chart. In some cases, where the frequency of deficiencies is rare over the time period, the frequency of deficiencies was converted to the rate of deficiencies per year and this rate is used as each data point on the control chart. The centerline becomes the average rate of deficiencies per year, but the calculation of the UCL and UWL does not change. This control chart is referred to as the Deficiency Rate per Year Control Chart. Note that the x-axis becomes the date the deficiency was identified, and not the quarter identified in.

With these charts, we are looking for *special causes of variation*. This type of variation can be found by using common tests. Four of the common tests are called action limits, as listed in "Introduction to Statistical Quality Control:"

1) One data point falling above the UCL or below the LCL
2) Two consecutive points above the UWL or below the LWL
3) Four out of five points in a row are more than one standard deviation from the mean in the same direction
4) Eight consecutive points plot on one side of the centerline

Theoretically, if a process is 'in-control' then none of the data points will fall outside of the UCL. The other three action limits are other rules for detecting nonrandom patterns on a control chart. If data reaches or exceeds an action limit, a more detailed examination of the specific deficiencies will occur in order to determine if repetitive, programmatic or systemic weaknesses exist that may be reportable to the DOE Noncompliance Tracking System. If the subject meets one of the test criteria above, but has already been reported to NTS, further explanation will not be provided.

The four final tests of variation or common tests are not considered action limits:

1) One data point above the UWL
2) Single increase in data points for the quarter in question,
3) Recent increasing trend for more than one quarter
4) An unusual or nonrandom pattern in the data

These are used to identify subjects that may be of interest and will be further analyzed. If further analysis concludes that the subject does not require reporting to management or NTS and analyzed for root cause, the subject is determined to need control chart analysis in future quarterly analyses. When a subject is determined to meet a common test, the Performance Analysis and Reporting Section (PARS) of the Contactor Assurance Office will analyze these subjects in future performance analyses and include them in the quarterly report.

Some of the common tests described above are more conservative than the typical set of decision rules for detecting nonrandom patterns on control charts listed in, "Introduction to Statistical Quality Control." These non-typical common tests are meant to detect subjects that should be analyzed using control charts in future quarterly analyses to watch for potential nonrandom patterns.

6.0 Worker Safety and Health Management Issues

Worker safety and health includes programs in chronic beryllium disease prevention, biological safety, electrical safety, emergency preparedness, explosive safety, fire safety, integrated safety management, occupational medicine, and other safety and health subjects. Data from 2005 – March 2010, were extracted from ITS in April 2010 using the ITS Basic Issue Report. The results from the analysis are described below.

6.1 Chronic Beryllium Disease Prevention Program

The visual analysis step did not warrant further analysis of deficiencies categorized as related to beryllium identified in ITS. Therefore this safety subject will not be discussed or analyzed further in this quarterly report.

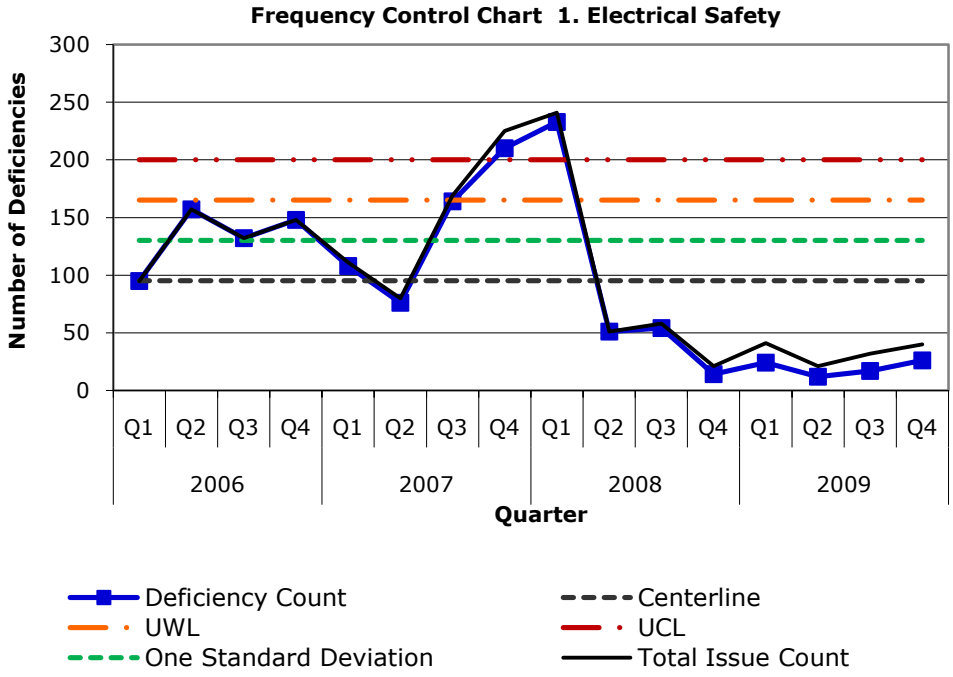
6.2 Biological Safety

The visual analysis step did not warrant further analysis of deficiencies categorized as related to biological safety identified in ITS. Therefore this safety subject will not be discussed or analyzed further in this quarterly report. This safety subject was analyzed in detail in the last quarterly performance analysis and the information analyzed in the last analysis is no different from information available in ITS in this analysis.

6.3 Electrical Safety

The visual analysis step did not warranted further analysis of deficiencies categorized as electrical safety; however, this safety subject was determined last quarter to need continued analysis in this quarter due to an increase in deficiencies in the third quarter of 2009. Therefore this safety subject was analyzed using a control chart.

In 2005 a point was above the UCL, an issue that has been discussed in previous reports. This point made it difficult to view the limits from 2006 through 2009. Therefore, the analysis of electrical safety deficiencies does not include data from 2005, as shown in Frequency Control Chart 1. Since the first quarter in 2006 to the fourth quarter in 2009 there appears to be a decrease in electrical safety deficiencies, which was determined to be statistically significant (p-value < 0.05); however, a common test was recently met, recent increases in the number of electrical safety deficiencies and this safety subject will be discussed further.



During this quarter, 26 electrical safety deficiencies were identified, which is an increase since the last two quarters, as shown in Frequency Control Chart 1. These 26 deficiencies are owned by all six Principal Directorates (PDs), assigned to eleven different compliance codes in fifteen different facilities. At most, five of the 26 deficiencies were categorized under one compliance code, *Electrical equipment is not being properly protected or maintained.* Four of these five are owned by the NIF and Photon Science (N&PS) PD, with one owned by the Weapons and Complex Integration (WCI) PD. More specifically, 13 of the 26 deficiencies are owned by N&PS with 12 from NIF 2009 annual walkabouts and a safety walk. These 13 deficiencies were found in four different facilities and scattered among six different compliance codes.

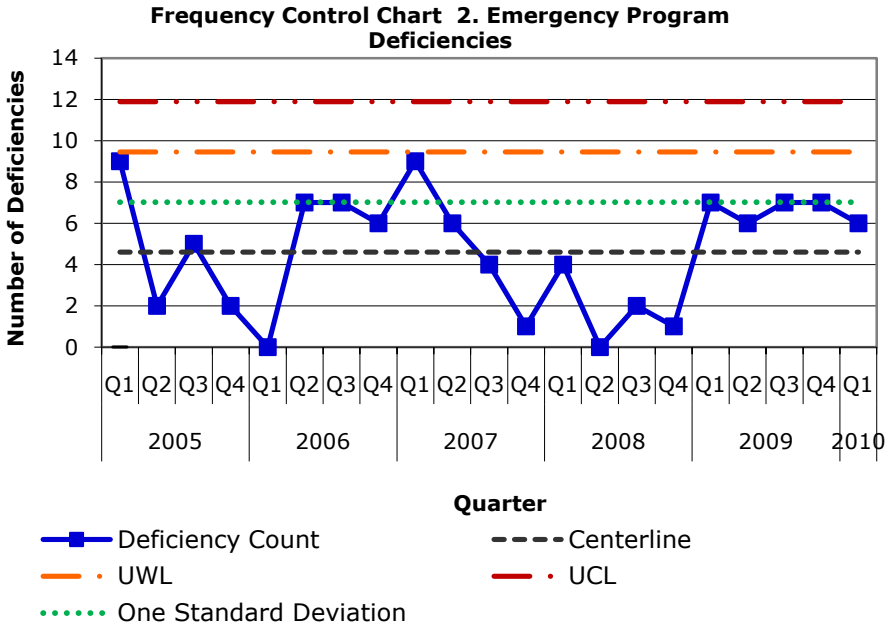
Electrical safety observations identified in 2009 were also reviewed. Ten of the 27 observations were worded as actions, not observations. It is also noted that 16 observations were assigned electrical safety compliance codes, possibly indicating that the observations may be deficiencies. These 16 observations were identified in Operations and Business (O&B) Principal Directorate (PD), Director's Office and Science and Technology (S&T) PD.

Although a common test was met, an increase in deficiencies for two consecutive quarters, there doesn't appear to be any significant, systemic or repetitive noncompliances. This safety subject will be analyzed using control charts in future quarterly analyses.

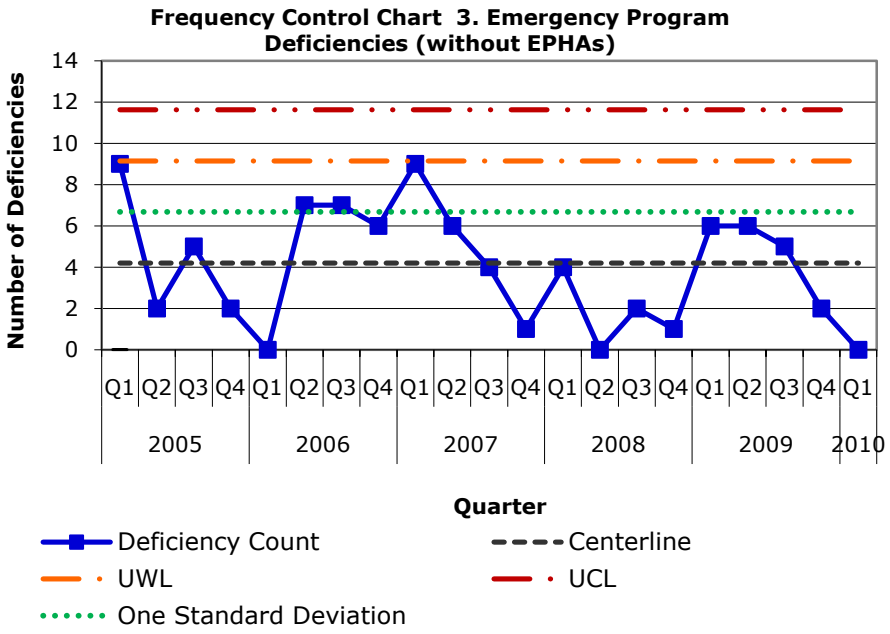
☐ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

6.4 Emergency Program

The visual analysis step warranted further analysis using a control chart of deficiencies categorized as emergency program. A common test was met in the control chart analysis, an unusual or non-random pattern in the data. Since the fourth quarter in 2008 Frequency Control Chart 2 has shifted from data being below the centerline to being above the centerline. Forty two percent (42%) of deficiencies in 2009 and 2010 are from the annual EPHAs with the majority of deficiencies from the EPHAs owned by the O&B PD. Since a common test was met, an unusual or non-random patter in the data, this safety subject was analyzed further.



During this quarter there were six emergency program deficiencies identified, as shown in Frequency Control Chart 2. All six deficiencies were from Emergency Planning Hazard Assessments (EPHAs) with the O&B PD as the response owner. In 2009 37% of emergency program deficiencies were from EPHAs and 100% in 2010; however, prior to 2009, none of the emergency program deficiencies were from EPHAs, suggesting that the unusual pattern is due to the entry/ identification EPHA deficiencies as of 2009. Frequency Control Chart 3 shows the frequency of emergency program deficiencies, excluding those deficiencies from EPHAs. This shows that the unusual/ nonrandom pattern does not exist without the emergency program deficiencies from EPHAs.



The reason that emergency program deficiencies are not identified from EPHAs prior to 2009 is that prior to 2008, EPHA exercises utilized a command and control model where the scenario was simulated and only leadership was involved, which, at the time was acceptable to DOE. As of 2008, this model changed to include full participation, which resulted in an improvement in the EPHAs, and an increase in emergency program issues, both deficiencies and observations (discussed in the next paragraph). Also, the entry of emergency management issues in ITS has improved and a backlog of issues are being entered into ITS. This improvement is in response to a finding from the HS-63 Inspection of Emergency Management regarding a lack of timely ITS entry, specifically, "LLNS has not ensured that correction actions are identified and tracked in a timely manner and that corrective actions are effective in resolving identified weaknesses, as required by the LLNL Environment, Safety, and Health Manual and DOE Order 151.1C." When looking at emergency program observations, it appears that these observations have been increasing since the fourth quarter of 2007, as shown in Frequency Control Chart 4. There are a total of 243 observations in ITS identified in 2008–2010. Table 3 displays which assessments found the majority of emergency program observations. Forty nine percent of emergency program observations are from annual EPHAs.

There appears to be a shift in emergency program observations from 2007 to 2008 in Frequency Control Chart 4. As discussed above, prior to 2008, EPHA exercises utilized a command and control model where the scenario was simulated and only leadership was involved, which, at the time was acceptable to DOE. However, as of 2008, this model changed to include full participation, which resulted in an improvement in the EPHAs, and an increase in emergency program observations. Also, the entry of emergency management issues in ITS has improved and a backlog of issues are being entered into ITS. This improvement is in response to a finding from the HS-63 Inspection of Emergency Management regarding a lack of timely ITS entry, specifically, "LLNS has not ensured that correction actions are identified and tracked in a timely manner and that corrective actions are effective in resolving identified weaknesses, as required by the LLNL Environment, Safety, and Health Manual and DOE Order 151.1C."

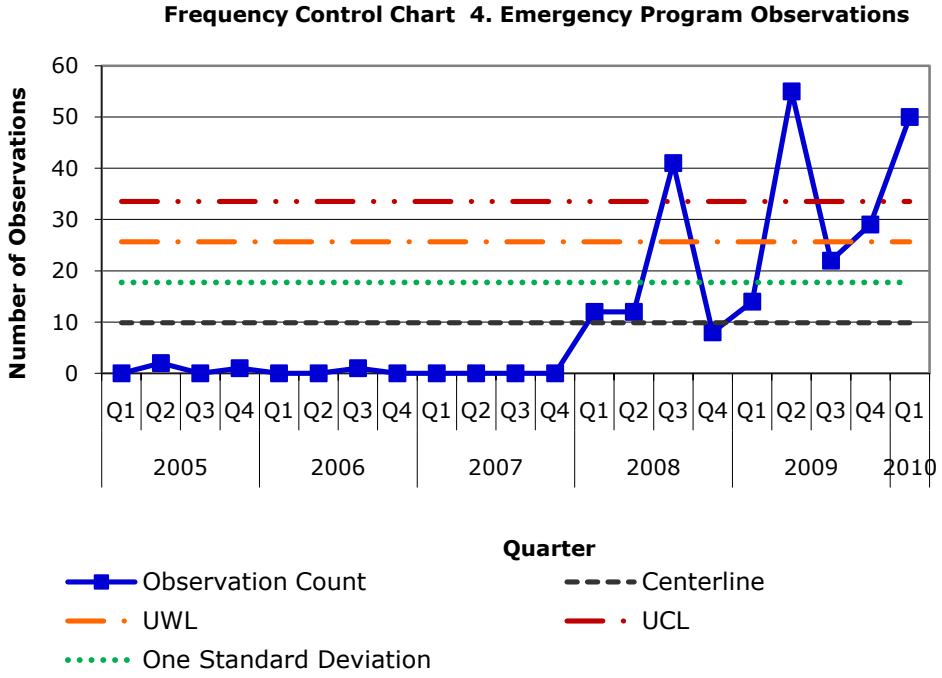


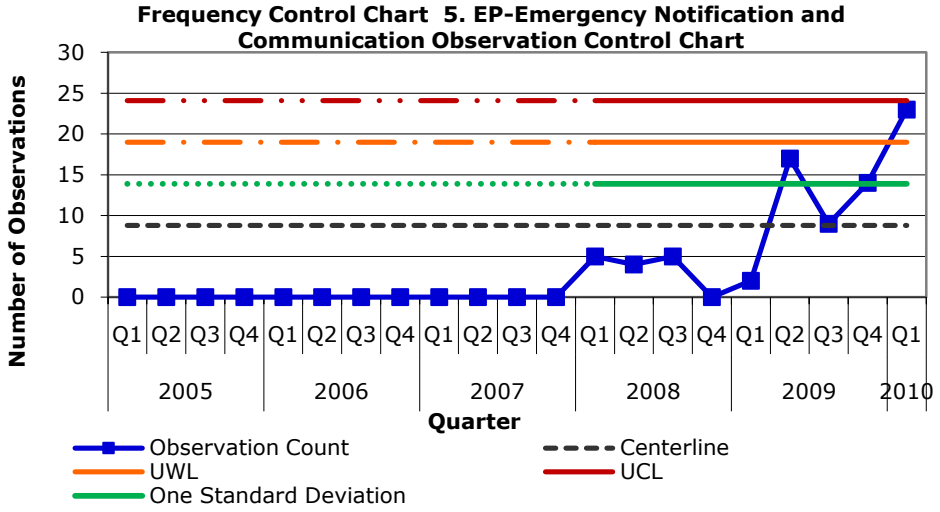
Table 3. Assessments Identifying the Majority of Emergency Program Observations

Summary Asst Title	2008	2009	2010
FY08 EPO Self-Assessment	13		
FY08 Emergency Planning Hazard Assessments	24		
FY08 Shelter-in-Place Drills	13		
Shaker 2009 Site-Wide Exercise		18	
FY09 Termination Recovery & Waste Removal		17	
FY09 Emergency Planning Hazard Assessments		28	
FY10 Emergency Planning Hazard Assessments		17	
FY10 Emergency Planning Hazard Assessments			49
Deficiency Count and Percent of All Deficiencies for year	**50 (68%)**	**80 (67%)**	**49 (98%)**

Eighty percent of emergency program observations identified in 2008 - 2010 are owned by the O&B PD. Sixty four percent of observations identified in 2008-2010 were categorized in Emergency Notifications and Communications and in Emergency Training, Drills and Exercise subtopics. These subtopics are analyzed further, below.

Emergency Notifications and Communications

During this quarter there was an increase in emergency notification and communication observations with 23 identified in the first quarter of 2010, as shown in Frequency Control Chart 5. All 23 of these observations were from annual EPHAs and 83% are owned by the O&B PD. Since a common test was met, one point above the UWL (close to the UCL), this safety subject will be discussed further.



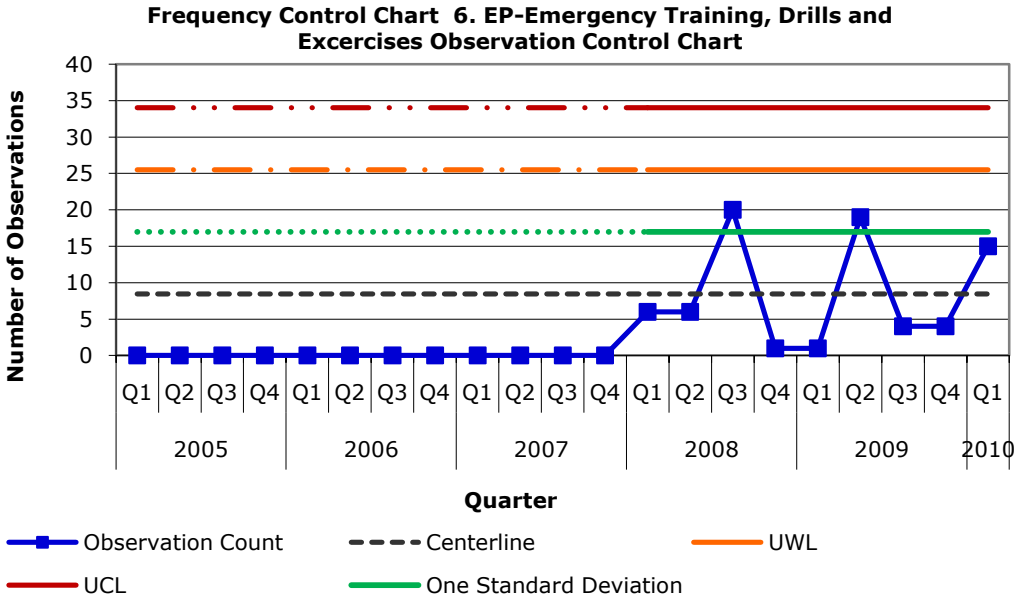
Note: Control Limits are Based on last Nine Quarters

Since the issues discussed in this section are observations and not deficiencies, the probability of concluding that these represent a reportable systemic or repetitive noncompliance is low. There is concern, however, that deficiencies may be incorrectly categorized as observations.

The EPHA reports are prepared and signed by a Performance Assurance Specialist and the Emergency Program Manager within the Emergency Programs Organization and these individuals are responsible for categorizing these issues as deficiencies and observations. To verify the categorization, a 25% sample was taken of emergency notification and communication observations from 2009 and 2010 to review if the issue type was properly selected. The subject matter expert for emergency programs reviewed this sample and concluded that all of the observations were properly categorized as observations and that none of the observations were requirements in DOE O 151.1C.

Emergency Training Drills and Exercise

During this quarter there were 15 emergency training, drills and exercise observations identified and all of them were from FY10 EPHAs, owned by the O&B PD, as shown in Frequency Control Chart 6. Since none of the common tests were met, this subject will not be discussed further.



Note: Control Limits are Based on last Nine Quarters

The issues identified in the Emergency Program safety area met a common test. The majority of these are observations in the area of emergency notifications and communication and appear to have resulted from a change in the conduct of the EPHA exercises. Further analysis concludes that these observations do not represent a programmatic (systemic) or repetitive noncompliance reportable to DOE.

☐ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

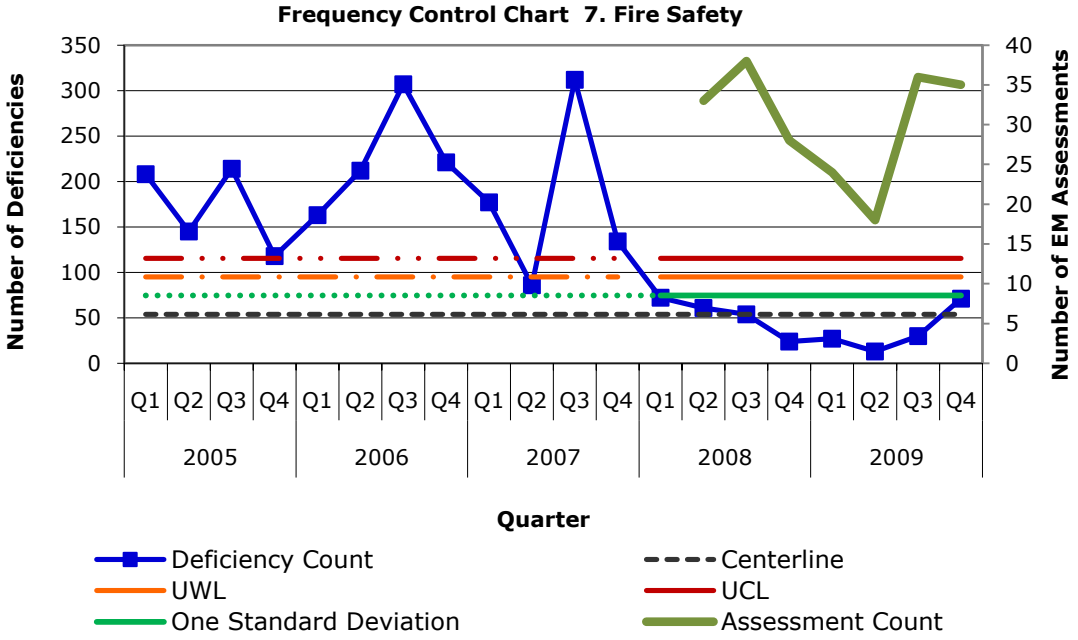
6.5 Explosive Safety

The visual analysis step did not warrant further analysis of deficiencies categorized as explosive safety identified in ITS. Therefore this safety subject will not be discussed or analyzed further this quarter.

6.6 Fire Safety

The visual analysis step did not warranted further analysis of deficiencies categorized as fire safety; however, this safety subject was determined last quarter to need continued analysis in this quarter due to an increase in deficiencies in the third quarter of 2009. Therefore this safety subject was analyzed using a control chart. A common test was met in the control chart analysis, two recent consecutive increases in the data. This quarter, 71 fire safety deficiencies were identified, an increase from the previous quarter, creating a recent increasing trend; therefore this subject will be analyzed further.

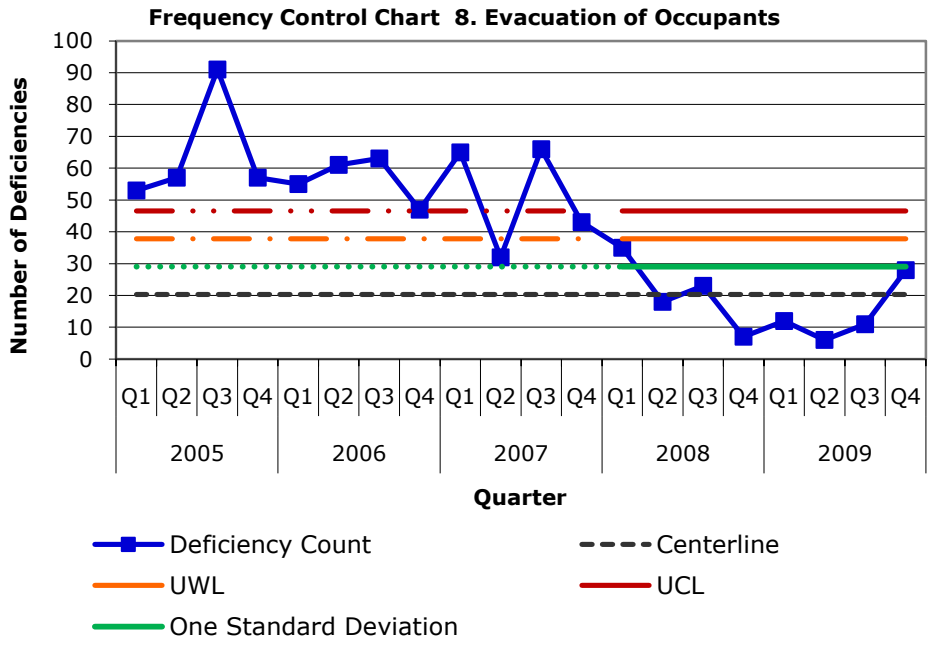
Based on Frequency Control Chart 7, there has been a decreasing trend in fire safety deficiencies since the third quarter in 2007. This decreasing trend is statistically significant (p-value < 0.01); on average for every increase in time (quarter) the number of fire safety deficiencies decreases by 11. The majority of fire safety issues identified since 2005 are deficiencies (98%) and are mainly categorized under three subtopics, evacuation of occupants, fire prevention and fire suppression. Each subtopic is discussed and analyzed further.



Note: Control Limits are Based on last Nine Quarters

Evacuation of Occupants

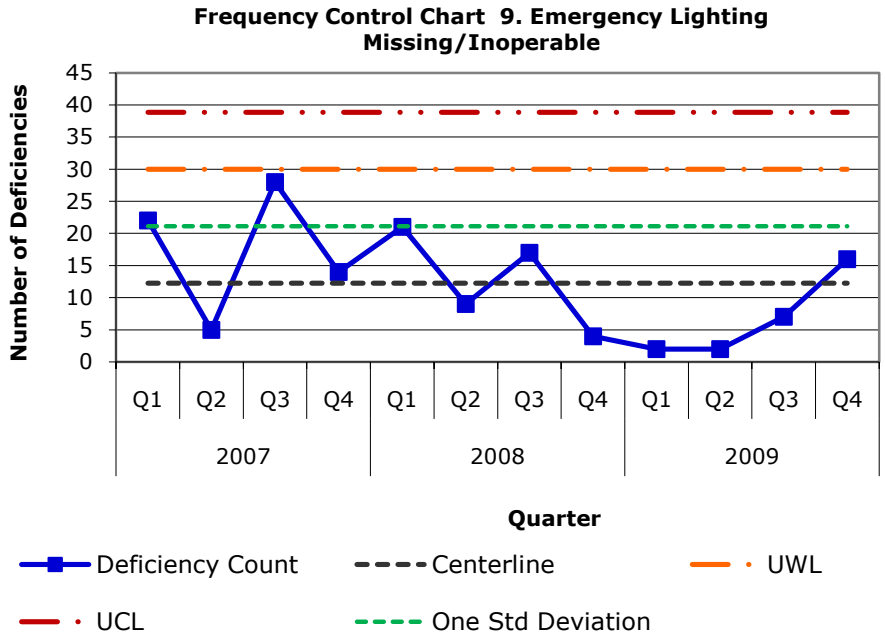
As mentioned above, the majority of fire safety deficiencies were categorized as three subtopics, evacuation of occupants being one of the three and control charts were used to analyze these deficiencies. The subject, evacuation of occupants presents a frequency pattern that is similar to fire safety. The trend is generally decreasing over time, but a recent increasing trend over two quarters, as shown in Frequency Control Chart 8, which is a common test. Therefore this subject will be analyzed further.



Note: Control Limits are Based on last Nine Quarters

In the fourth quarter of 2009, there were six ITS assessment entries for Tri-annual Facility Self Assessments of certain facilities, conducted by the ES&H Team 2. These six assessments, addressing more than six facilities, resulted in 18 deficiencies categorized with the subtopic of evacuation of occupants, comprising 64% of the evacuation of occupant deficiencies identified in the fourth quarter of 2009. All of these 18 deficiencies are owned by the O&B PD and 11 of the 18 deficiencies were categorized within the compliance code: *Illumination of means of egress (emergency lighting) is missing or not fully operable.*

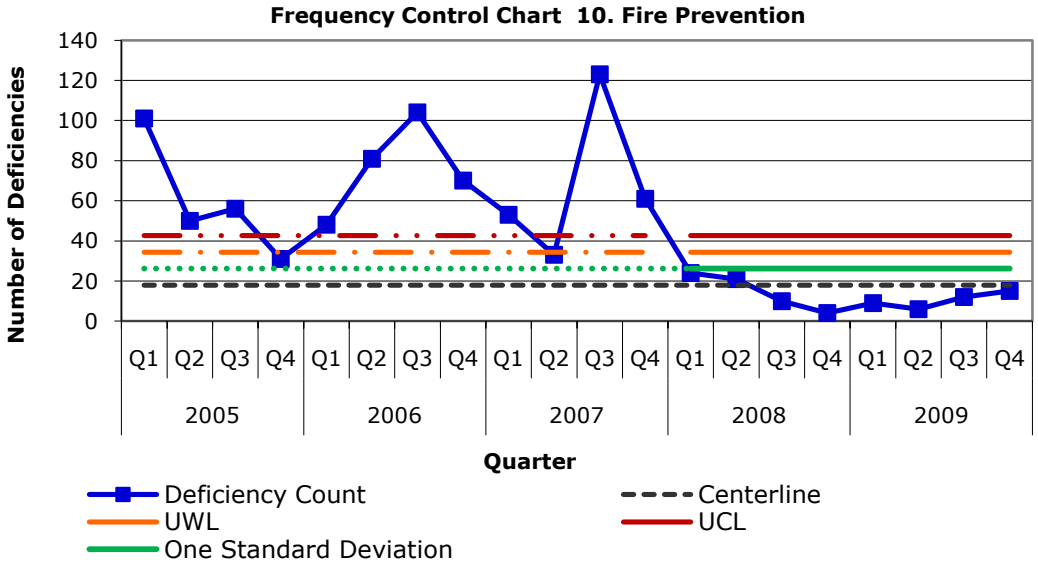
This compliance code, *Illumination of means of egress (emergency lighting) is missing or not fully operable* was analyzed using a control chart from 2007 through 2009 to see if this process is in a state of control. Based on the control chart analysis, Frequency Control Chart 9, there were two recent consecutive increases in emergency lighting missing/ inoperable deficiencies, a common test and this subject was analyzed further.



During this quarter, there were 16 deficiencies categorized using this compliance code, as shown in Frequency Control Chart 9. The majority of these are from formal self-assessments of buildings within the O&B PD. The reason for the increase in the fourth quarter of 2009 is that 69% of these deficiencies were from formal self-assessments, whereas in the first, second and third quarters of 2009, there were no deficiencies from formal self assessments, only walkthroughs and housekeeping assessments There does not appear to be a systemic noncompliance at this time. It appears that the increase in the number of deficiencies is due to an increase in assessments performed in the fourth quarter of 2009. This safety subject will be analyzed using a control chart in future quarterly analyses to watch for continued increases in these deficiencies.

Fire Prevention

As mentioned above, the majority of fire safety deficiencies were categorized as three subtopics, fire prevention being one of the three and a control chart was used to analyze these deficiencies. The subject, fire prevention, like evacuation of occupants presents a frequency pattern that is similar to fire safety, but not as distinct. The trend is generally decreasing over time, but there was a recent increasing trend over two quarters, as shown in Frequency Control Chart 10, which is a common test. Therefore this subject will be analyzed further.



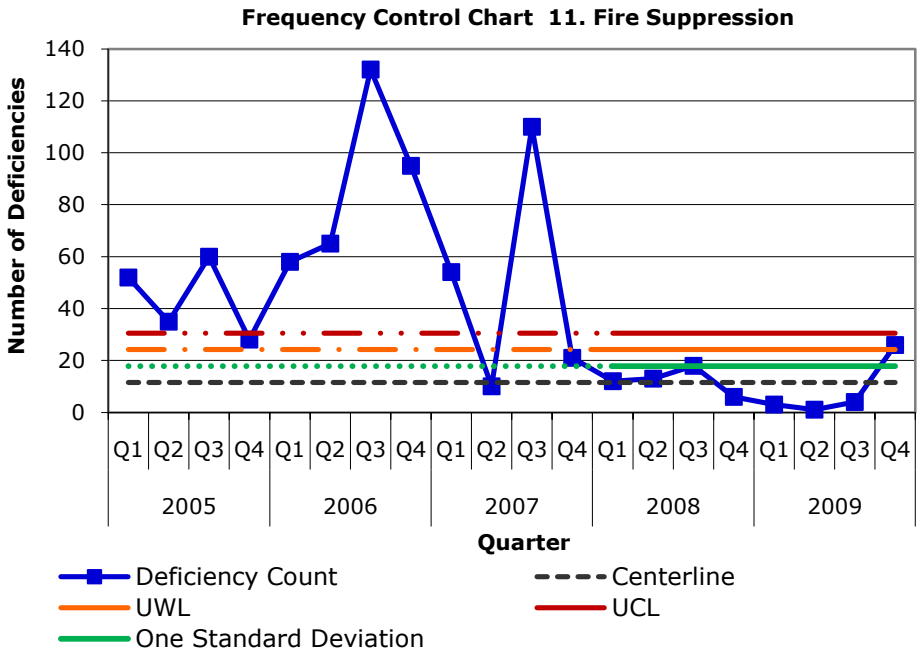
Note: Control limits are based on most recent nine quarters

During this quarter there were 15 fire prevention deficiencies identified with eight of the 15 from formal self assessment of buildings and all eight owned by the O&B PD. Twenty seven deficiencies were identified in the third and fourth quarters of 2009, the quarters where the increasing trend begins. Seventeen of the 27 deficiencies identified in the third and fourth quarters of 2009 were categorized as, *Integrity of fire barrier and/or smoke barrier is compromised (due to holes in rated walls, missing ceiling tiles, blocked/wedged fire doors, etc.).*

The 17 fire/ smoke barrier deficiencies where the integrity is compromised are owned by four PDs across eleven different facilities. A more detailed look at these deficiencies revealed that eight of the seventeen have to do with ceiling tiles missing or broken and all but one are owned by the O&B PD with three from formal self assessments of buildings. This is a very common deficiency that can result from the need to access the space above the hung ceiling and forgetting to put the tile back in place**.** It is unclear why three of these deficiencies remain uncorrected until a formal assessment is performed. These eight deficiencies do not appear to represent a systemic issue at this time since this is a common deficiency found during assessments; however, there is concern when these types of deficiencies, ceiling tiles missing/ broken are found by formal self-assessments instead of work observations or walkthroughs. This subject will be analyzed during the next quarterly analyses to watch for continued increases in this deficiencies and the method of discovery (e.g. formal self assessments).

Fire Suppression

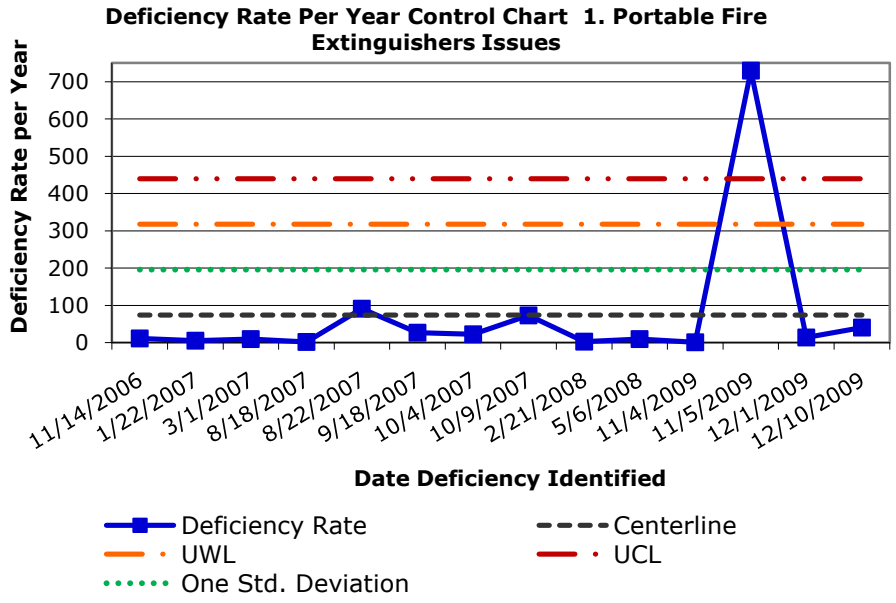
As mentioned above, the majority of fire safety deficiencies were categorized as three subtopics, fire suppression being one of the three and a control chart was used to analyze these deficiencies. The subject, fire suppression like evacuation of occupants and fire prevention presents a frequency pattern that is similar to fire safety. The trend is generally decreasing over time, but there was a recent increasing trend over two quarters, as shown in Frequency Control Chart 11, which is a common test. Also a point was above the UWL, which is also a common test. Therefore this subject will be analyzed further.



Note: Control Limits are Based on last Eight Quarters

During this quarter there were 26 fire suppression deficiencies identified, as shown in Frequency Control Chart 11, which is a large increase from the last four quarters and these 26 deficiencies caused a point to be above the UWL, as discussed above.

These 26 fire suppression deficiencies were found in several facilities, with nine of the 26 in four facilities. Eighteen of the 26 deficiencies are from the tri-annual facility self assessments conducted and owned by the O&B PD. Within the subject of fire suppression are six compliance codes. The six compliance codes were analyzed with control charts, and only one of the six compliance codes had a point above the UCL, as shown in Deficiency Rate Control Chart 1, *Portable fire extinguishers are missing, obstructed, not readily accessible by employees, not functional and/or not the proper type.* The point is above the UCL in Deficiency Rate Control Chart 1 because there were three of these deficiencies identified within a day of each other, suggesting that as of November 2009, around two portable fire extinguisher deficiencies are identified every day. Obviously, Deficiency Rate Control Chart 1 does not support a rate per year of 700, since these deficiencies are considered rare. The three deficiencies identified within a day of each other are from the tri-annual facility self-assessments, but on 11/ 4/ 2009 this assessment focused on different facilities than the one on 11/ 5/ 2009. The deficiency identified on 11/ 4/ 2009 is actually two deficiencies rolled into one, *Portable fire extinguisher missing B411/OS R1335 & R1660.*



In 2009 there were five deficiencies identified and given the compliance code, *Portable fire extinguishers are missing, obstructed, not readily accessible by employees, not functional and/or not the proper type.* These five deficiencies are from three different assessments, in three different facilities and across three different PDs with O&B owning three of the five. The issue descriptions are provided below in Table 4. Based on these descriptions all of the deficiencies are examples of fire extinguish maintenance. Based on a discussion with a fire safety engineer, the collection of all extinguishers in the three facilities is greater than 100 extinguishers. Therefore five fire extinguisher maintenance deficiencies out of 100 is not considered a systemic noncompliance and is not reportable to the DOE NTS. Since a common test was met, this safety subject will be analyzed using control charts in future quarterly analyses

Table 4. Portable Fire Extinguishers Deficiencies Identified in 2009

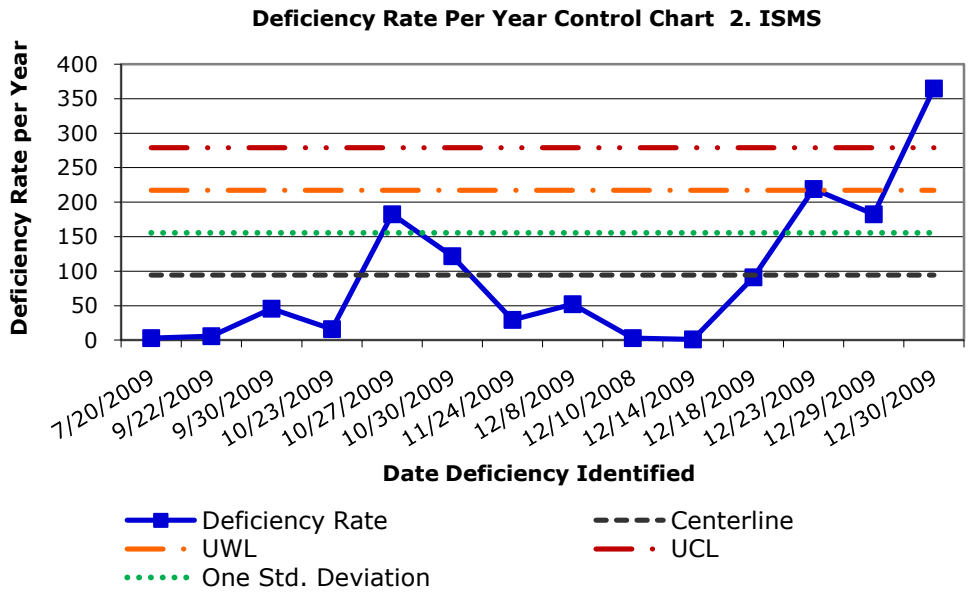
Issue Description	Issue Owning PD	Source
Argon pad area has no fire extinguisher	N&PS	NIF 2009 Annual Walkabout
There is a blocked fire extinguisher in the central hallway on the first floor	S&T	FY10 PLS LSO Surveillance
The existing fire extinguisher needs a new hanger so it can be hung on the wall.	O&B	Formal Facility Self Assessment
Replace water fire extinguisher which has no charge	O&B	Formal Facility Self Assessment
Portable fire extinguishers are missing, obstructed, not readily accessible by employees, not functional and/or not the proper type.	O&B	Formal Facility Self Assessment

In summary, none of the fire safety data within the different subjects discussed above represents a systemic or repetitive noncompliance reportable to DOE; however, all of the fire safety subjects did meet a common test and will be analyzed using control charts in future quarterly analyses.

☐ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

6.7 Integrated Safety Management System (ISMS)

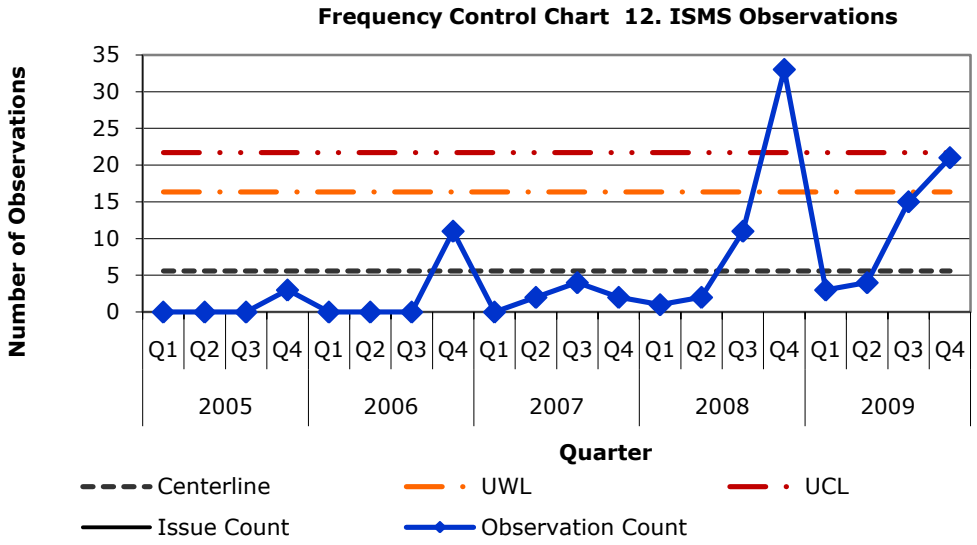
The visual analysis step warranted further analysis using a control chart of deficiencies categorized as ISMS. There is a point above the UCL in Deficiency Rate Control Chart 2, which is an action limit and this safety subject will be analyzed further to resolution.



During this quarter, there was a large increase in the number of ISMS deficiencies identified. In previous quarters, LLNL identified fewer than four ISMS deficiencies per quarter; however, in this quarter, 21 were identified. These 21 deficiencies account for 81% of all ISMS deficiencies (n=26) identified in ITS. In fact, the first quarter of 2009 was the first time this safety subject was used to categorize a deficiency. Eighteen of the 21 ISMS deficiencies identified this quarter are owned by the Science and Technology (S&T) PD, with the other three owned by the WCI PD. Eleven of the 18 owned by S&T were identified during the "2009 PLS Work Observation" assessment. The other deficiencies are from a variety of different assessments, audits and work observations.

In reviewing all ISMS deficiency descriptions provided in ITS (n=26) there are some commonalities between the 26. Four of the 26 deficiencies are related to a lack of read and sign of the Integration Work Sheet (IWS), all from the S&T PD, specifically the Physics Directorate. Eight are related to something missing from the IWS, health hazard communications, a worker, current links, procedures, and specifics on whether a hazard is toxic. All eight of these deficiencies are owned by the S&T PD. Four of the deficiencies are related to a hazard not identified, with two from the S&T PD and two from the WCI PD. Based on this information and given that the majority of the common deficiencies are owned by the S&T PD, this collection of issues does not represent an institutional, significant, systemic or repetitive noncompliance.

Since this is the first time ISMS deficiencies have needed control chart analysis, observations were also analyzed using control charts. During this quarter 21 observations were identified, making a data point above the UWL, and close to the UCL, as shown in Frequency Control Chart 12. Since a common test was met, this safety subject as it relates to observations will be analyzed further.



Of the 21 ISMS observations identified this quarter, 18 are owned by the S&T PD, with the other three owned by the WCI PD. Nine of the 18 owned by S&T were identified during the "2009 PLS Work Observation" assessment. The other observations are from a variety of different assessments, incident/ events and work observations.

In reviewing each observation description, there are some commonalities between them, something missing in the IWS (n=5), hazard not identified (n=2), something not current in an IWS (n=3) or lack of read and sign (n=4). All commonalities are within the same PD and observations identified by other PDs are not related to one another; however this issue, as it relates to other PDs is discussed in more detail in section 8.4, Quality Assurance (Non-Nuclear) and the determination of whether this is a systemic issue will be made in that section.

This analysis of IWS related deficiencies and observations in this section and in section 8.4 responds to the opportunity for improvement from an external assessment of the LLNL Integrated Safety Management System performed in November 2009 that states, "LLNL should consider evaluating whether repetitive deficiencies related to pressure system device testing and data accuracy and IWS training, read and sign requirements warrant further analysis as institutional issues."

☐ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

6.8 Occupational Medicine

The visual analysis step did not warrant further analysis of deficiencies categorized as occupational medicine identified in ITS. In both 2008 and 2009, there were a total of five occupational medicine deficiencies identified. Therefore this safety subject will not be discussed or analyzed further in this quarterly report.

6.9 Other Industrial Hygiene

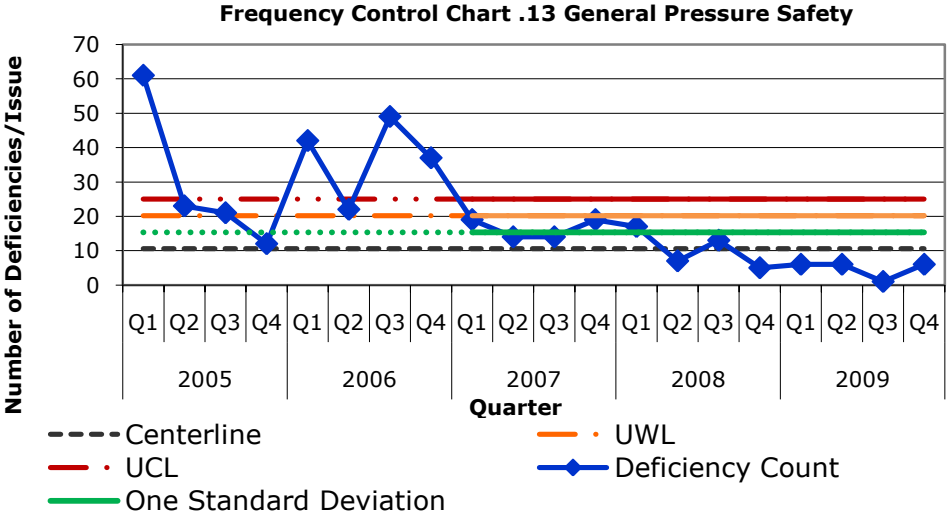
The visual analysis step did not warrant further analysis of deficiencies categorized as industrial hygiene identified in ITS. Therefore this safety subject will not be discussed or analyzed further in this quarterly report.

6.10 Other Industrial Safety

The visual analysis step did not warrant further analysis of deficiencies categorized as industrial safety identified in ITS. Pressure safety deficiencies will be analyzed in response to an opportunity for improvement from an external assessment of the LLNL Integrated Safety Management System performed in November 2009 that states, "LLNL should consider evaluating whether repetitive deficiencies related to pressure system device testing and data accuracy and IWS training, read and sign requirements warrant further analysis as institutional issues."

Pressure Safety

The control chart analysis, Frequency Control Chart 13 shows an increase in pressure safety deficiencies this quarter; however there is also a decreasing trend in pressure safety deficiencies since 2005 and this trend is statistically significant (p-value < 0.01). On average, for every increase in time (one quarter), the number of pressure safety deficiencies decreases by two. Since a common test was met, an increase in the quarter in question, this safety subject will be analyzed further.



During this quarter there was a slight increase in pressure safety deficiencies with a total of six in the fourth quarter of 2009, as shown in Frequency Control Chart 13. These six deficiencies are from six different assessments with five of the six owned by the S&T PD and one owned by the O&B PD. Four of the six deficiencies are related to pressure relief devices, one not being tested, and three past inspection or expired. All four of these deficiencies are owned by the S&T PD across three different organizations.

Reviewing all deficiencies from 2009, eight deficiencies are related to pressure relief devices (PRDs) not being tested, expired or past inspection. All eight of these deficiencies are owned by the S&T PD, across five different organizations with five of the eight from internal sources, walkthroughs and management self assessments. Based on output from the Pressure Test Record System database, the S&T PD owns 29% of the 2,842 PRDs at the Laboratory, with NIF, S&T and WCI owning the majority of all PRDs in the database. Therefore 1% of S&T PRDs are not being tested, are expired or past inspection. Initially it was thought that this issue might be a systemic issue within the S&T PD. However, since no points on Frequency Control Chart 12 are above any of the limits, including the centerline and these PRDs out of compliance only account for 1% of PRDs within the S&T PD, this issue is not considered systemic at this time. Since a common test was met, this safety subject will be analyzed in future quarterly analyses.

☐ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

6.11 "Other Significant Condition" Noncompliances

Method

The WSH "Other Significant Condition" NTS reporting threshold is defined as, "a condition or hazard that has the potential to cause death or serious physical harm (injury or illness). " This would include, at a minimum, significant noncompliances with high relative risk, as defined in DES-0083. These deficiencies are identified in ITS, as having an issue significance of one.

Two methods were used to review ITS data for deficiencies that may meet the "Other Significant Condition" NTS reporting threshold:

1. A review of all issue significance one deficiencies with identification dates starting in December 2009 through March 2010.

2. Review of all deficiencies with compliance codes that suggest an issue significance of one, but were downgraded.

There were no issue significant one deficiencies entered into ITS in 2009 and so far in 2010.

There were four deficiencies assigned a compliance code with a suggested issue significance of one in the first quarter or 2010, but downgraded to another issue significance, as shown in Table 5. The criteria in Figure 1 Risk Matrix and Table 1 Severity of Issue Guide, from PRO-0042-00, "Issues and Corrective Action Management" were used to review whether the selected significance was supported for the issue. For an issue to be assigned a significance of a one, the severity of consequence would have to be either "High" or "Catastrophic" and the probability "Likely" or "Frequent." If an issue has a severity of consequence of "Medium", "Low" or "Negligible" and the probably is "Unlikely" or "Extremely Unlikely," then the issue significance would be a two or lower, and the issue would not meet the WSH "Other Significant Condition" NTS reporting threshold.

Table 5. Deficiencies Downgraded from an Issue Significance One in 2010

Seq	Issue Sig	Issue Sub-Topic	Deficiency Description	Compliance Code Description
1	3	Continuous Air Monitoring	Experienced, senior workers either forgot or disregarded established response procedures for TAM alarms.	Required Continuous Air Monitoring Systems (CAMS) are not present or are inoperative. (e.g., radioactive filter systems).
2	2	General Electrical Safety	An energized electrical conductor was not put into an electrically safe work condition before being cut.	Exposed electrical wiring, contacts, or equipment is energized above a Class One hazard per Document 16.1, (50 volts or greater, and greater than 5 milliamperes of available current) and is readily accessible to contact by individual(s).
3	3	General Industrial Safety	The facility should review the use of gloves (e.g. knives and sharps, high explosives) and verify the IWS and work practices are consistent (29885.1)	Appropriate industrial safety personnel protective equipment (PPE) is not being used or is being used incorrectly (e.g., safety shoes, safety glasses, hardhats, etc.).
4	3	Machinery and Power Tools	Machine guard missing (30396.2)	Personnel are operating powered machinery and the required point of operation guarding is missing, guarding or interlock(s) is defeated, or guards are improperly installed or adjusted.

One of the four deficiencies from Table 5, sequence 2 was a noncompliance that was already reported to the DOE NTS:

1. "Energized Electrical Conductor Cut Without Energy Isolation in Building 391," [NTS-LSO-LLNL-LLNL-2010-0005]

Based on a review of deficiency descriptions for sequence 1, 3 and 4 from Table 5, sequences 3 and 4 were downgraded appropriately.

The sequence 3 deficiency from Table 5 doesn't say appropriate PPE was not being used, which in certain cases could warrant an issue significance one deficiency, but that the use of PPE should be reviewed. This issue was discussed with the issue owner to verify that workers were not working with highly consequential material without wearing appropriate PPE. This issue arises from an audit of an IWS and work performed under that IWS. The IWS was revised without management's knowledge to say that gloves are required when workers are working with EXACTO knives for cutting tape etc. The management doesn't agree with this change, nor did they know about it; the issue is for the facility to review the use of gloves for knives and sharps. The action taken was to remove this requirement from the IWS. Also, during this same audit, a worker touched an explosive without wearing gloves, which was appropriate for this type of explosive. The auditor did not understand that not all explosives require gloves. This particular part of the issues was not an IWS violation. Based on this information, it is apparent that this was not an issue with a consequence of high or catastrophic that would cause it to be an issue significant one deficiency. Therefore this issue was appropriately downgraded and does not meeting threshold of reporting to the DOE NTS as an "Other Significant Condition."

The sequence 4 deficiency was discussed with the action owner and the assurance manager. It was explained that the issue was one of missing an "equipment" guard, (the equipment being a door crank for a vacuum chamber). The consequence of an "equipment" guard vs. a "machine" guard missing is not as severe, and based on Table 1 from PRO-0042, the severity of consequence would most likely be medium. If the severity of consequence was high, the probability of this issue recurring anywhere at the Laboratory would be less than frequent. Therefore this issue was appropriately downgraded and does not meeting threshold of reporting to the DOE NTS as an "Other Significant Condition."

Sequence deficiency 1 from Table 5 was determined to be a nuclear safety noncompliance that meets the threshold for reporting to the DOE NTS and a NTS report is in the process of being drafted.

7.0 Nuclear Safety Management Issues

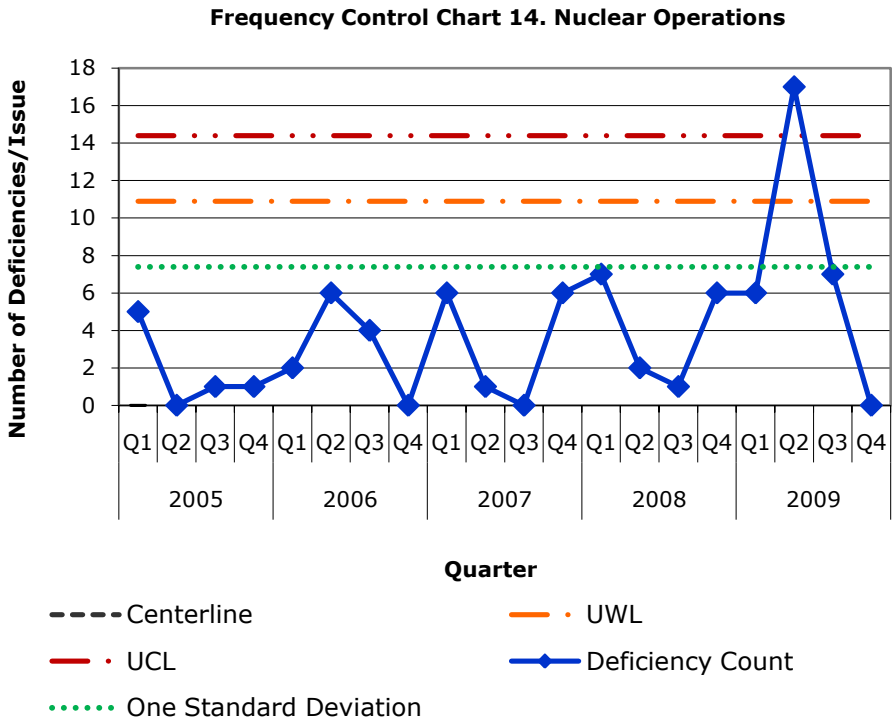
Nuclear safety includes safety programs in nuclear operations (safety basis, criticality safety, safety basis , system engineering), nuclear packaging and transportation, quality assurance, and radiation protection. Data from 2005 – March 2010, were extracted from ITS in April 2010 using the ITS Basic Issue Report. No nuclear safety subjects were identified in the previous analysis as needing follow-up analysis. Based on the frequency of deficiencies by functional area in the most recent quarters, three of the four nuclear safety related functional areas were analyzed using control charts:

- nuclear operations,
- quality assurance,
- radiation protection

As discussed in the sections below, the analysis for nuclear safety did identify one nuclear safety subject with increased deficiencies in this quarter.
In addition to the above nuclear safety management issues, two WSH related safety subjects: electrical and fire safety, were identified as requiring further analysis related to nuclear safety compliance. During the visual analysis step, an increase in the number of electrical and fire safety deficiencies flagged as nuclear safety were identified. As discussed in the previous performance analysis report, these deficiencies were mainly from one Principal Directorate (PD). After feedback was provided to the directorate, it was found that a problem resulted from changes to the ITS Excel uploading report. This report allows directorates to upload large amounts of ITS entry information into ITS using Excel. The Excel uploading report was corrected so that it no longer shifted columns and mistakenly flagged WSH deficiencies as nuclear safety. The directorate is now working through the backlog of WSH deficiencies mistakenly flagged as nuclear safety. Therefore these WSH safety subjects will not be analyzed for nuclear safety compliance using control charts.

7.1 Nuclear Operations

The visual analysis step did not warranted further analysis using a control chart of deficiencies categorized as the nuclear operations functional area; however, all nuclear safety functional areas are analyzed using control charts regardless of the visual analysis step. There is a point above the UCL in Frequency Control Chart 14, which is an action limit; however, in previous performance analyses, the point above the UCL in the second quarter of 2009 led to finding a reportable noncompliance related to the USQ Process Entry Condition.



During this quarter there were no deficiencies categorized in the nuclear operations functional area, as shown in Frequency Control Chart 14 and none of the nuclear operation topics or subtopics revealed the need for control chart analysis. Criticality safety deficiencies will not be discussed since there has only been one deficiency since January 2008. Therefore this functional area will not be discussed further.

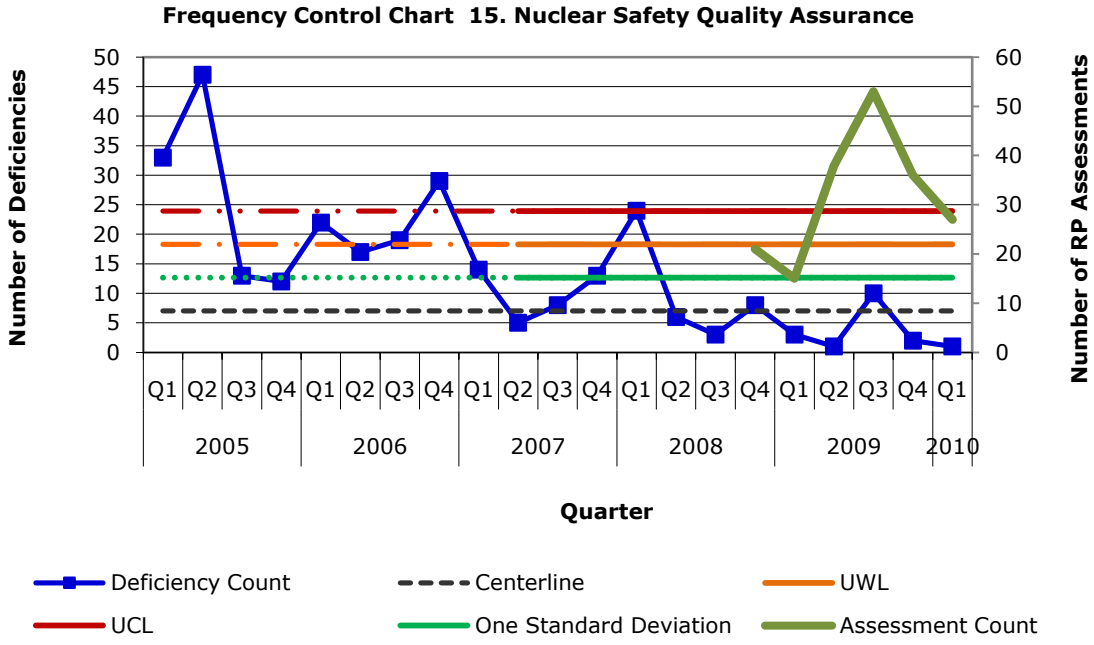
☐ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

7.2 Packaging and Transportation

The visual analysis step did not warrant further analysis of deficiencies categorized as nuclear packaging and transportation identified in ITS. Therefore this safety subject will not be discussed or analyzed further in this quarterly report.

7.3 Quality Assurance

The visual analysis step did not warranted further analysis using a control chart of deficiencies categorized as the quality assurance (nuclear) functional area; however, all nuclear safety functional areas are analyzed using control charts regardless of the visual analysis step. None of the common tests were met in the control chart analysis. As discussed in the previous quarterly analysis there is a statistically significant decreasing trend in nuclear safety related QA deficiencies from the first quarter in 2005 to the first quarter in 2010 (p-value < 0.01), as shown in Frequency Control Chart 15. Based on the results of simple linear regression, on average with every increase in time (quarter), the number of nuclear safety related QA deficiencies decreases by one, which is consistent with the analysis performed last quarter. The decreasing trend in nuclear safety related QA deficiencies can be attributed to the introduction of more binning options for nuclear safety noncompliances. Additional safety basis compliance codes were introduced in January 2008 and additional functional areas were introduced in October 2008. Also, since ITS allows the selection of only one compliance code for each deficiency, the Performance, Analysis and Reporting Section (PARS) of the Contractor Assurance Office encourages users to select the appropriate safety area (or best-fit compliance code) first when binning deficiencies. For example, if a nuclear safety deficiency would better fit in the radiation protection functional area compared to the QA functional area, because the radiation protection functional area offers more specifics related to the noncompliant condition, then PARS would prefer it be categorized as radiation protection and not QA. Therefore, it is not surprising that the number of nuclear safety related deficiencies have decreased over time.



During the last two quarters, 63 assessments were performed that were categorized as quality assurance. Twenty-six of these assessments were related to IWS training for specific IWS' for the S and Z Programs and Strategic Operations, and 26 were external-NNSA Livermore Site Office surveillances.

For the last two quarters, three issues were categorized as related to nuclear safety quality assurance, as shown in Frequency Control Chart 15; this number continues to decrease since the third quarter in 2009. Two of these deficiencies were formally reported to either the DOE Noncompliance Tracking System or the Occurrence Reporting Processing System. The other deficiency was from the Livermore Site Office Periodic Issues Report.

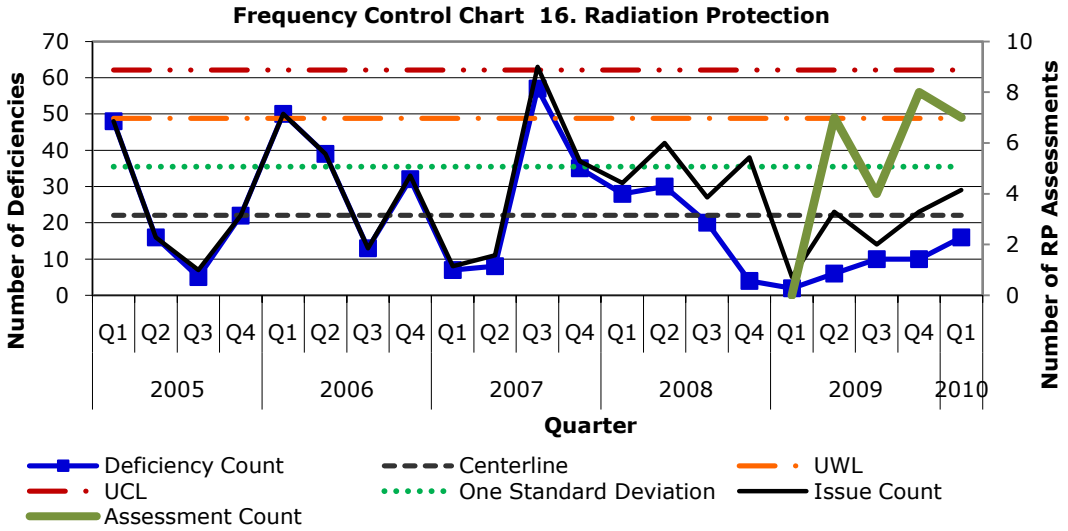
Since 2005, there have been 3,216 deficiencies categorized as QA, with 290 (9%) related to nuclear safety based on the nuclear safety question in ITS. This percentage is consistent with the results from the last two previous analysis reports. The majority of nuclear safety related QA deficiencies since 2005 fall within two criterion: 47% in criterion four (Management/ Documents and Records) and 20% in criterion two (Management/ Personnel Training and Qualification). Since none of the common tests were met, this functional area will not be discussed further.

Since none of the common tests were recently met, even with adjusting the limits on Frequency Control Chart 15, there is no new nuclear safety QA programmatic or systemic noncompliance to analyze further. However this functional area will be analyzed every quarter.

☐ Significant, Systemic or Repetitive ☐ Meets Common Tests ☒ Within Expected Variation ☒ Downward Trend

7.4 Radiation Protection

The visual analysis step warranted further analysis using a control chart of radiation protection deficiencies. There has been an increase in radiation protection deficiencies since the first quarter in 2009, as shown in Frequency Control Chart 16, which is a common test. Along with an increase in deficiencies is an increase in radiation protection related assessments. Therefore this safety subject will be analyzed further.



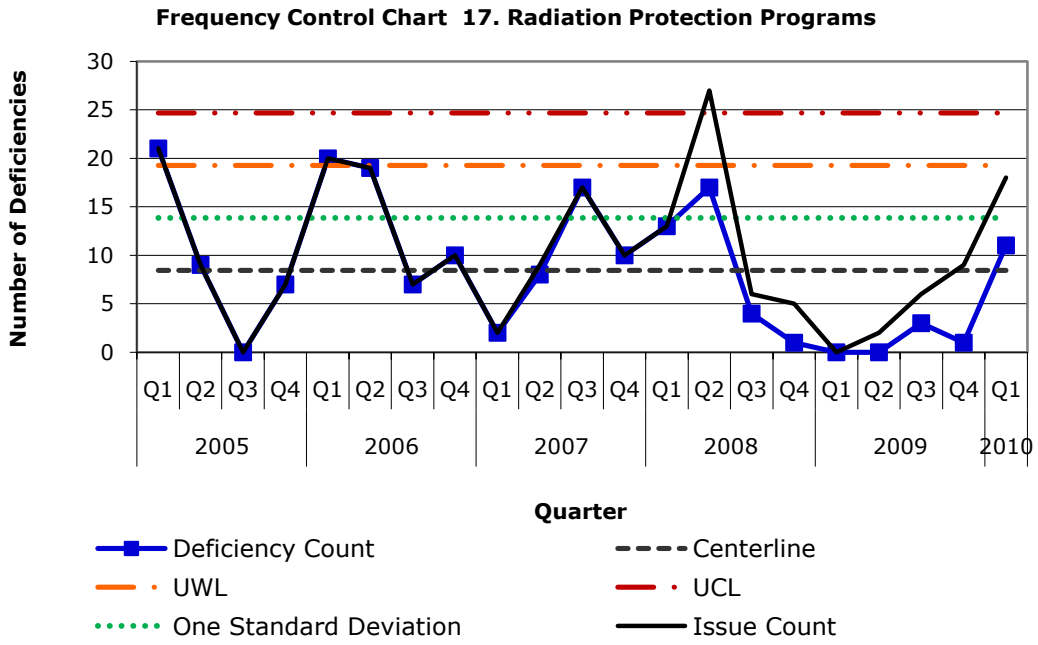
During this quarter there were 16 radiation protection related deficiency identified, as shown in 16. Twelve of these deficiencies are from an audit of the training and qualification program for Radiation Control Technicians (RCTs), three are from 10 CFR 835.102 audits and one is from the HS-64 assessment. The majority of these deficiencies are related to radiation protection programs.

Since the fourth quarter in 2008 49 radiation protection deficiencies have been identified, 13 deficiencies were found during 10CFR835.102 audits and as mentioned above 12 were identified from the audit of the training and qualification program for RCTs. Sixty nine percent (69%) of these deficiencies were categorized as three safety subjects, radiation protection programs, radiation protection records and monitoring of individuals and areas. These safety subjects will be analyzed further.

There has also been an increase in radiation protection assessments. The 10CFR835.102 audits have been contributing to this increase, and also the radiation protection facility assessments of different PDs and buildings. There were none of these facility assessments performed in the first and third quarters of 2009, one reason for the increase in assessments in the second and fourth quarters of 2009 and the first quarter in 2010.

Radiation Protection Programs

As mentioned above, the majority of radiation protection deficiencies were categorized as three safety subject, radiation protection programs being one of the three and a control chart was used to analyze these deficiencies. There was an increase in radiation protection program deficiencies this quarter, as shown in Frequency Control Chart 17, which is a common test. Therefore this safety subject was analyzed further.



During this quarter there were 11 radiation protection program deficiencies identified, as shown in Frequency Control Chart 17. Including all of 2009, there were a total of 15 radiation protection program deficiencies. Eight of the 11 deficiencies are from an internal independent audit performed by the Hazards Control Department Radiation Safety Section (RSS) of the training and qualification program for Radiation Control Technicians (RCTs) assigned to Hazard Category 3 and above nuclear facilities. This audit focused on compliance with the requirements of DOE O 5480.20A, "Personnel Selection, Qualification, Training and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities." In accordance with the requirements of that Order, the audit was conducted using the objectives and criteria described in DOE-STD-1070-94, "Guidelines for Evaluation of Nuclear Facility Training Programs." The results of the audit are described in detail in the audit final report [Ref: RSS-10-008, "Audit of the Training and Qualification Program for Radiological Control Technicians" (January 29, 2010)].

The eight deficiencies from the RCT training program audit were all categorized under the compliance code S-RS-RA.01, "*People responsible for the radiological protection program do not have the appropriate training and skills*." All of these deficiencies are owned by the Directors Office PD.

Further evaluation of the audit results by CAO/ PARS revealed that the audit had determined the RCTs assigned to LLNL Hazard Category 2 and 3 nuclear facilities are adequately trained and qualified for their assigned duties. The audit further determined that the RCT training and qualification program fully met the criteria from DOE-STD-1070-94 in most areas. The deficiencies identified by the audit all related to *administration* of the RCT training program, not to the skills and capabilities of RCTs assigned to LLNL Hazard Category 2 and 3 nuclear facilities. Based on this evaluation, the systemic weakness in *administration* of the RCT training program evidenced by these deficiencies was reported to the DOE Noncompliance Tracking System (NTS) on May 19, 2010, as a noncompliance with various requirements of 10 CFR 835, "Occupational Radiation Protection" [Ref: NTS--LSO-LLNL-LLNL-2010-0012, "Programmatic Weakness in Administration of RCT Training and Qualification Program"].

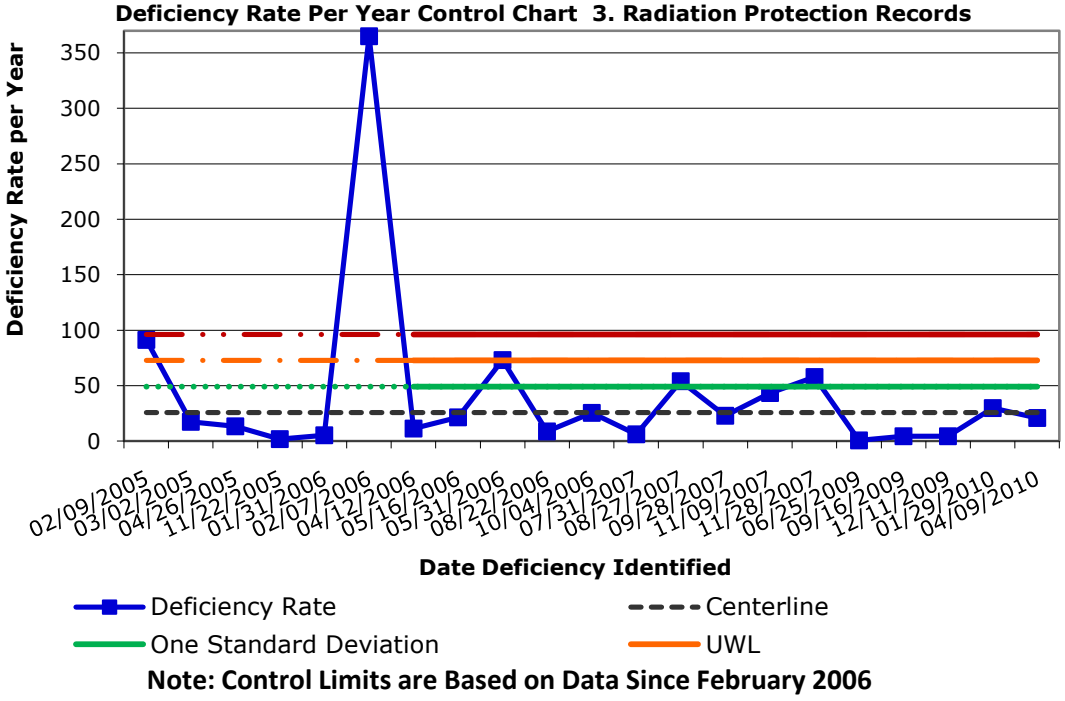
The remaining three deficiencies are from three 10 CFR 835.102 triennial audits performed by the Radiation Safety Section of the radiation protection programs in each of three facilities (B332, B334, and B239) operated by the LLNL Nuclear Materials Technology Program (NMTP). All three of these deficiencies cited the failure of NMTP to enter into ITS deficiencies identified by the prior triennial audit of each facility's radiation protection program. Further evaluation by CAO/ PARS traced this failure to NMTP personnel changes resulting from the 2008 involuntary separation at LLNL, at which time entry of the deficiencies into ITS was overlooked. Again, these three deficiencies were administrative in nature and did not reflect upon the adequacy of the radiation protection programs within NMTP generally and in the three affected facilities specifically.

It can therefore be concluded that none of the 11 radiation protection program deficiencies entered into ITS during the reporting period reflected inadequacies in the ability of LLNL radiation protection personnel to perform their assigned duties.

Frequency Control Chart 17 also shows an increase in radiation protection programs observations with a total of twenty identified in 2009 and 2010. Sixteen of the 20 are from two different assessments titled, "HS-64 Review" and "Tritium Facility Modernization Building 331." A review of these observations confirms that they were correctly categorized as observations and no further analysis is needed.

Radiation Protection Records

As mentioned above, the majority of radiation protection deficiencies were categorized as three safety subject, radiation protection records being one of the three and a control chart was used to analyze these deficiencies. No common tests were recently met on Deficiency Rate Control Chart 3. During this quarter there were four radiation protection record deficiencies from the same assessment titled, "Audit of the Training and Qualification Program for RCTs." Since these four deficiencies were identified soon after a deficiency identified in December 2009, the deficiency rate as of January 2010 is 30 deficiencies per year, or close to three per month, as shown in Deficiency Rate Control Chart 3.

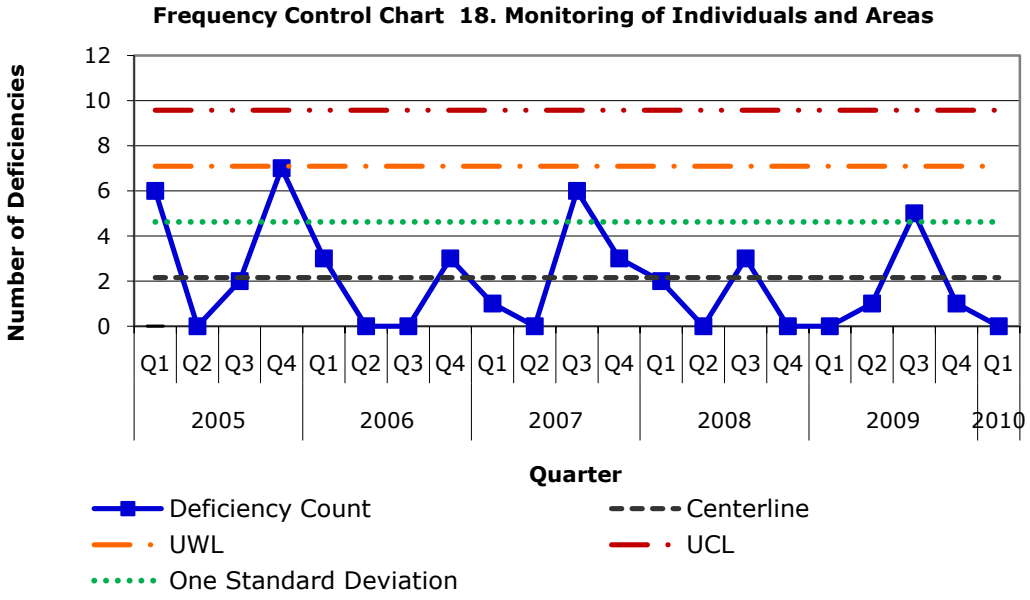


As discussed in the radiation protection program section above, the systemic weakness in *administration* of the RCT training program evidenced by these deficiencies was reported to the DOE Noncompliance Tracking System (NTS) on May 19, 2010, as a noncompliance with various requirements of 10 CFR 835, "Occupational Radiation Protection" [Ref: NTS--LSO-LLNL-LLNL-2010-0012, "Programmatic Weakness in Administration of RCT Training and Qualification Program"].

Even though the limits in Deficiency Rate Control Chart 3 were adjusted to exclude the point above the UCL in February of 2006, none of the common tests were recently met. Therefore this safety subject will not be discussed further.

Monitoring of Individuals and Areas

As mentioned above, the majority of radiation protection deficiencies were categorized as three safety subject, monitoring of individuals and areas being one of the three and a control chart was used to analyze these deficiencies. No common tests were recently met on Frequency Control Chart 18. During this quarter there were no deficiencies categorized as "monitoring of individuals and areas." In the third quarter of 2009 there were five "monitoring of individuals and areas" deficiencies, all of which were identified during 10 CFR 835.102 internal audits with four of the five categorized in the following compliance code, *Radiation instruments used for monitoring and contamination control are not periodically maintained and calibrated, are inappropriate for the radiation or environmental conditions, or are not routinely tested for operability*. All four of these were identified in the same facility from the same assessment, a 10CFR835.102 audit of Building 331. This assessment report was evaluated by the nuclear safety regulatory compliance assurance engineer as part of the engineer's follow-up for all 10CFR835.102 audits and the collection of deficiencies was not determined to meet the NTS reporting threshold for nuclear safety. Since the data for this safety subject is within expected variation, this safety subject will not be discussed further.



In summary, none of the radiation protection data within the different subjects discussed above represents a systemic or repetitive noncompliance reportable to DOE; however, some of the radiation protection subjects did meet a common test and will be analyzed using control charts in future quarterly analyses.

☐ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

8.0 Classified Information Security Management Issues

Classified information security deficiencies are categorized within the safeguards and security functional area and are required to have the classified information security question in ITS marked as "Yes" at the issue level. In addition, if multiple issues are rolled into one issue, the systemic/ repetitive question should be marked "yes."

In general there were numerous instances found where multiple deficiencies were entered as one issue, and the systemic/ repetitive question was marked as "no," for example,

(1) Individual deficiencies associated with checklist questions #, #, #, #, #, #, and/ or # for VTR Stations a, b, c, x, and y are shown on attachment 3 and need to be corrected
(2) Thirteen percent (13%) of the records reviewed for non-employees granted clearances in FY08 indicate they did not receive their Initial Security Briefing (SC9560) prior to or in conjunction with receiving the Comprehensive Briefing (SC0002). The initial briefing and the comprehensive briefing cover different topical areas; both briefings are required prior to being granted an (L or Q) access authorization.
(3) More than 35 percent of the in-service repositories reviewed did not have the required adhesive label affixed to the outside of the repository indicating that the repository was authorized for storage of classified information.

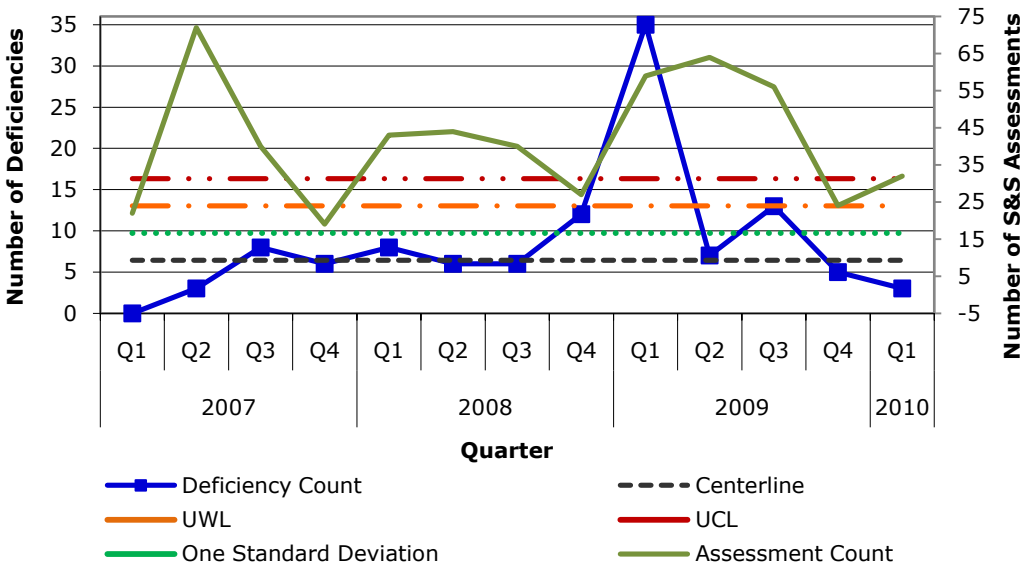
This makes the analysis very difficult and an important, systemic or repetitive issue could be missed by summarizing multiple deficiencies as one issue. Ideally, each deficiency would be entered as a unique issue and an issue that describes multiple deficiencies would be marked as systemic/ repetitive using the ITS question. This marking is required unless strong evidence shows the collection of issues is not systemic/ repetitive.

Based on a visual look at the frequency of deficiencies by security subject in the most recent quarters, two security subjects will be analyzed using control charts:

- information protection,
- physical security

During this quarter there were three classified information security (CIS) deficiencies identified, as shown in Frequency Control Chart 19. This is the fewest CIS deficiencies identified since the second quarter in 2007.

Frequency Control Chart 19. CIS Safeguards and Security



Note: Control Limits exclude point above UCL in calculation

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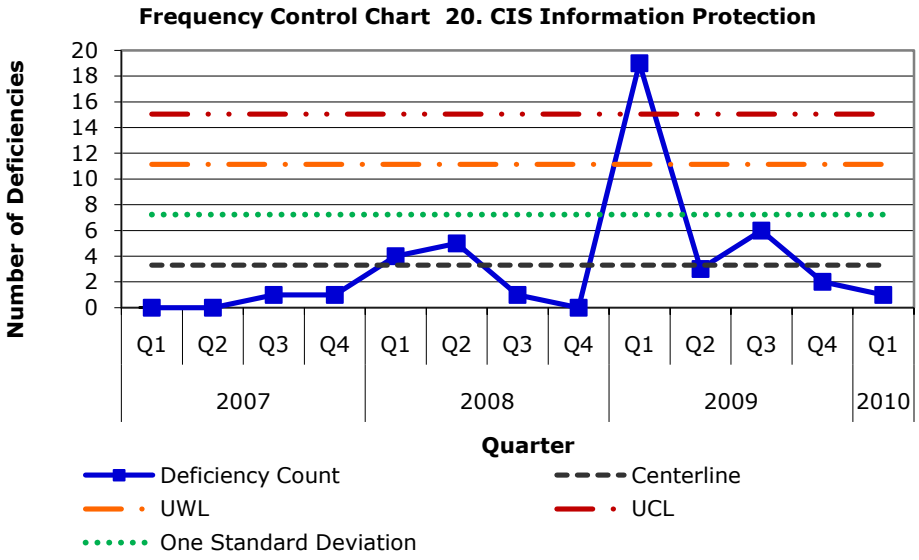
In the first quarter of 2009 there was a point above the UCL on Frequency Control Chart 19, which is an action limit. This point and another in the third quarter in 2009 were both above the UWL, which is also an action limit. Since this is the first time CIS deficiencies have been analyzed across the institution, these deficiencies will be analyzed further.

In the first quarter of 2009, 35 CIS deficiencies were identified. Nineteen of these deficiencies were categorized as information protection and this security subject is discussed in more detail below.

In the third quarter of 2009, 13 deficiencies were identified and categorized as information protection and physical security deficiencies. More specifically, six of the 13 were categorized as information protection, CMPC-control of classified matter. This security subject will be discussed in more detail below. Six of the 13 were from a Locks and Keys management self-assessment with all deficiencies categorized as physical security, access control. This security subject will be discussed in more detail in the next quarterly report.

8.1 Information Protection

The visual analysis step warranted further analysis using a control chart of classified information security (CIS) information protection deficiencies. A point was above the UCL in the first quarter of 2009, as shown on Frequency Control Chart 20, which is an action limit and this security subject will be analyzed further to resolution.



The 19 deficiencies indentified in the first quarter of 2009 were from seven different management self assessments. Ten of these deficiencies were owned by the Global Security PD and 15 of the 19 were categorized as CMPC-control of classified matter across five different PDs. The CIS deficiencies categorized as CMPC-control of classified matter will be analyzed further since a data point is above the UCL, an action limit.

CMPC-Control of Classified Matter

There are 29 CIS deficiencies in ITS related to CMPC-control of classified matter. These deficiencies were first identified in the first quarter of 2008. Table 6 displays 13 deficiencies, based on the description provided that were similar to at least one other deficiency.

Table 6. Common CIS CMPC-Control of Classified Matter Deficiencies

Summarized Issue Description	Frequency	Issue Owning PAD
Buddy check operations are not consistent with the plan	2	GS owns both
Combinations change issue	3	GS owns 2 S&T owns 1
Lack of Training	2	GS owns 1 DO owns 1
Repos missing stickers/ labels	4	S&T owns 2 WCI owns 1 N&PS owns 1
SF700 form not up to date	2	GS owns both

In two instances the deficiency description, although listed as one deficiency provides information that more than one of the same deficiency was found. In one of the Global Security owned combination change deficiencies, the description states there were eight repositories without the combination change requested. The majority of combination change deficiencies are owned by one PD, which is not an indication of an institutional, systemic issue.

All four repository missing stickers/ labels deficiencies also indicate more than one instance of the deficiency. The two deficiencies owned by Science and Technology indicate a total of 19 deficiencies (entered as two), the one deficiency owned by N&PS states that "Some repositories…..", and the one deficiency owned by Weapons and Complex Integration states that, "More than 35 percent of the in-service repositories….." Since these four deficiencies accumulate to multiple deficiencies with repositories missing stickers/ labels among three different PDs, the collection of these deficiencies appears to be a systemic noncompliance related to CIS. The requirement to apply the sticker/ label was an internal LLNL self-imposed requirement; however, the sticker is not the mechanism for determining if classified information can be stored in a repository. General Services Administration (GSA) establishes the national standard for security containers authorized to store classified material and DOE Order requires that only GSA approved containers be used to store classified material. LLNL, through their Classified Matter Protection and Control policy as well as the Locks Keys & Tesa (LK&T) policy requires GSA security containers for storage of classified material. The recently released LLNL LK&T policy (SOM-PRO-09-003636 dated April 26, 2010), modifies the labeling requirement making the sticker/ label optional and leaving the discretion to the Directorate/ Program.

Since the missing sticker/ label does not pose a risk to CIS and the requirement to have the sticker is now optional, this potential systemic issue, now not a noncompliance does not meet the threshold for reporting to the DOE Office of Enforcement.

☒ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

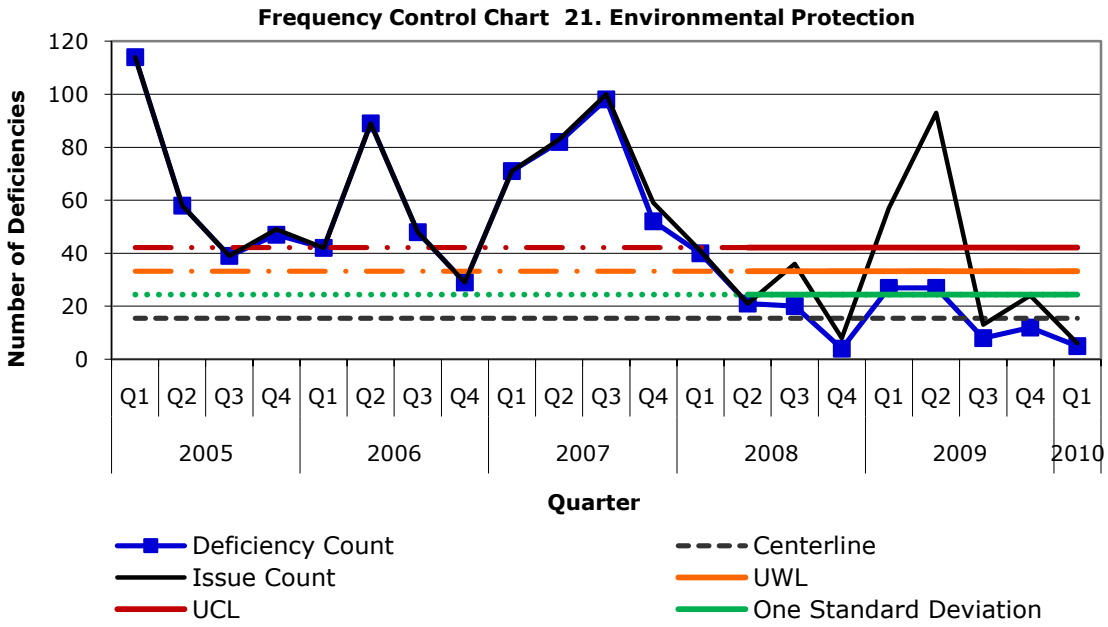
8.2 Physical Security

The visual analysis step warranted further analysis using a control chart of classified information security (CIS) physical security deficiencies. This security subject was analyzed using a control chart; however, it was determined that more time is needed to analyze these deficiencies. More specifically, input is needed from the CIS regulatory compliance assurance engineer who started in late July 2010. Therefore this security subject will be analyzed for a systemic/ repetitive noncompliance in the next quarterly analyses.

9.0 Other Functional Areas

9.1 Environment

The visual analysis step did not warranted further analysis using a control chart of deficiencies categorized as the environment functional area; however, this functional area is analyzed using control charts regardless of the visual analysis step. None of the common tests were met in the control chart analysis, as shown in Frequency Control Chart 21. There were 17 deficiencies categorized as environmental protection in the two most recent quarters. Frequency Control Chart 21 shows a statistically significant decreasing trend in environmental protection deficiencies and observations, excluding the second quarter in 2009 (p-value < 0.05). On average, for every increase in time (one quarter) the environmental protection issue count decreased by two.



Note: Control Limits were calculated for the last eight quarters

In the second quarter of 2009, there was an increase in the number of observations identified, compared to previous quarters. Seventy-nine percent of these observations were from the assessment titled, "LSO LLNL Independent Environmental Management System Audit." Four deficiencies were also identified from this assessment. All issues from this assessment are owned by Environmental Protection Directorate.

Eighty three percent (83%) of all environment deficiencies are related to waste and water quality. The majority of waste related deficiencies (98%) are hazardous waste and the majority of water quality related deficiencies (78%) are discharges to sanitary sewer.

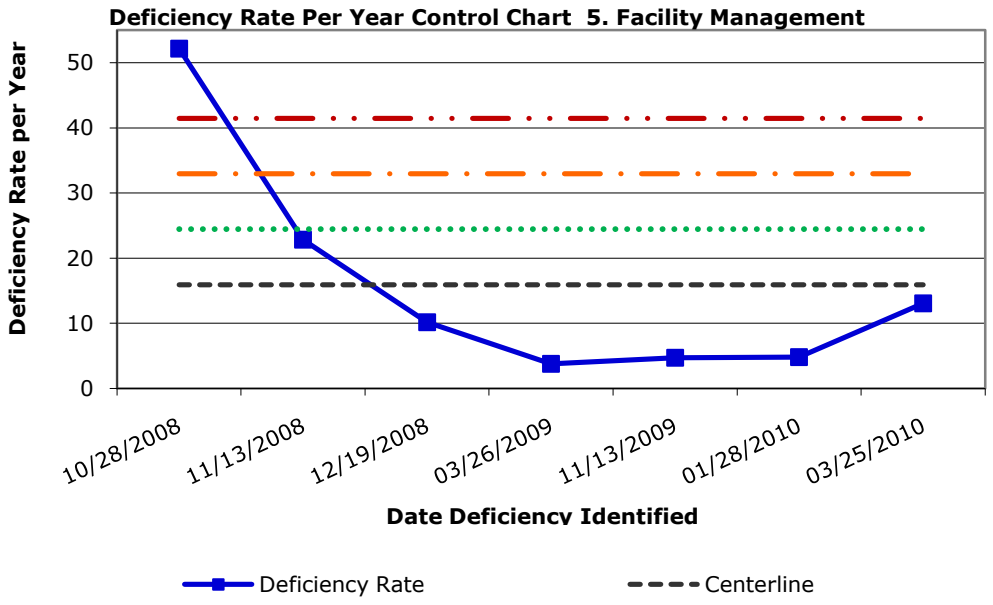
Since no common test was met, this functional area will not be discussed further.

☐ Significant, Systemic or Repetitive ☐ Meets Common Tests ☒ Within Expected Variation ☒ Downward Trend

9.2 Facility Management

The visual analysis step did not warranted further analysis using a control chart of deficiencies categorized as the facility management functional area; however, this functional area is analyzed using control charts regardless of the visual analysis step.

There were six deficiencies categorized as facility management in the two most recent quarters. The rate per year of facility management deficiencies did increase in March 2010 to 13 facility management deficiencies per year or about one per month, which is a common test. Also, although it is not recent, there was a point above the UCL in October 2008, since two facility management deficiencies were identified within seven days of each other. Both of these deficiencies were identified during NIF management self-assessments. Although these deficiencies were categorized in the facility management functional area, they were assigned fire safety related compliance codes. Therefore these two deficiencies were also analyzed in the fire safety section of this report (Section 6.6).



There are only 11 facility management related deficiencies identified in ITS. Table 7 displays the summarized issue description. At least 10 of the 11 should have been categorized under a safety subject instead of the facility management subject.

Table 7. Facility Management Deficiencies Identified in ITS

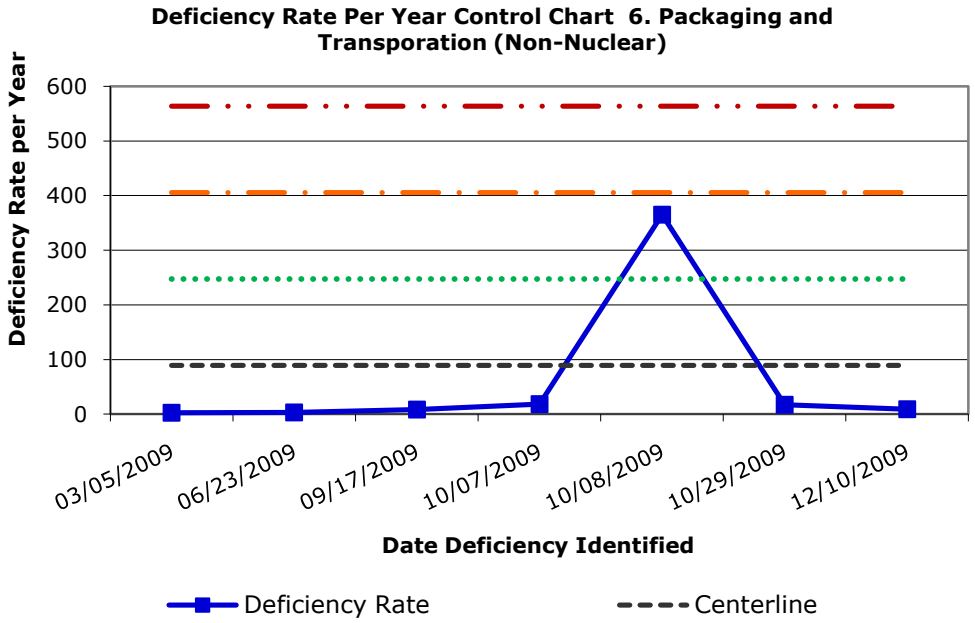
Summarized Issue Description	Subject Issue Should Have Been Categorized As
Hole in north end of B165	
Fire door D006 is not fully closing	Emergency Management-Fire Safety-Fire Prevention
No exit sign above door	Emergency Management-Fire Safety-Evacuation of Occupants
Fall protection harness is incorrect for forklift in Depot	WSH-Industrial Safety-Fall Protection
Grit from roofing materials (shingle type grit) has accumulated on the asphalt around parts of the facility. The grit tends to be slippery and could be a slip hazard and the buildup in some areas is heavy enough to impede runoff during the rain.	WSH-Industrial Safety-Walking/ Working Surfaces
Step stool missing rubber feet	WSH-Industrial Safety-Ladders/ Scaffolding
Step stool missing rubber feet	WSH-Industrial Safety-Ladders/ Scaffolding
Temporary construction barrier not in place to prevent unauthorized personnel from entering construction work zone.	WSH-Industrial Safety-Construction Area
Site 200 exterior lighting assessment of parking lots, street lights and pathway lights conducted identifying lighting issues.	WSH-Industrial Safety-Walking/ Working Surfaces
Building X access control issues	S&S-Physical Security-Access Control
Perimeter locking hardware issues	S&S-Physical Security-Access Control

Since these deficiencies are not deficiencies with facility management, but deficiencies in other functional areas, the collection of deficiencies categorized as facility management do not represent a systemic issue and will not be discussed further.

☐ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

9.3 Packaging and Transportation (Non-Nuclear)

The visual analysis step did not warranted further analysis using a control chart of deficiencies categorized as the packaging and transportation (Non-Nuclear) functional area; however, this functional area is analyzed using control charts regardless of the visual analysis step. None of the common tests were met in Deficiency Rate Control Chart 6.



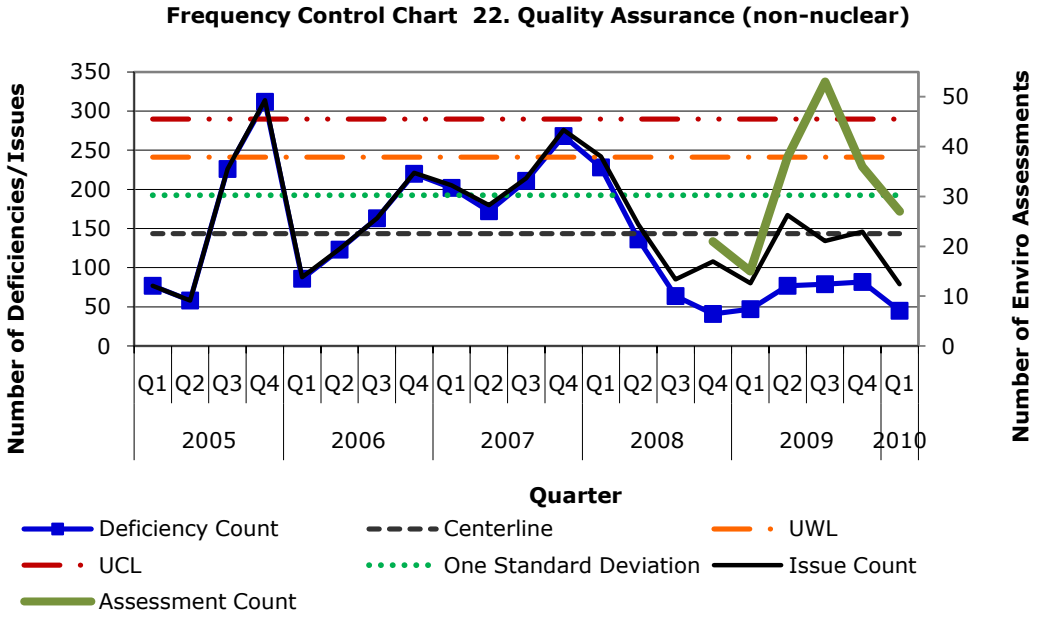
There are 11 non-nuclear packaging and transportation deficiencies identified in ITS. One point is close to the UWL on Deficiency Rate Control Chart 6, implying that as of October 2009, one non-nuclear packaging and transportation deficiency is identified per day. Since these deficiencies are rare, the only reason a point is close to the UWL is because two non-nuclear packaging and transportation deficiencies were identified within one day of each other in October 2009. Both of these issues were from one assessment, the FY-09 Packaging and Transportation Safety Receipt Inspection. In fact, eight of the 11 non-nuclear packaging and transportation deficiencies are from this same assessment. The Packaging and Transportation Safety Quality Assurance Program requires that inspections be performed on packages upon receipt at LLNL to identified any noncomformances with new Department of Transportation requirements. This one ITS assessment entry is used to capture all receipt inspection deficiencies found during the fiscal year, the reason that the issue date identified is not the same date for all deficiencies from this assessment.

Since the data is within expected variation, this functional area will not be discussed further.

☐ Significant, Systemic or Repetitive ☐ Meets Common Tests ☒ Within Expected Variation ☐ Downward Trend

9.4 Quality Assurance (Non-Nuclear)

The visual analysis step did not warranted further analysis using a control chart of deficiencies categorized as the quality assurance (Non-Nuclear) functional area; however, this functional area is analyzed using control charts regardless of the visual analysis step. None of the common tests were recently met in Frequency Control Chart 22; however, the ratio of deficiencies to observations changed around the fourth quarter in 2008. Prior to mid-2008 most issues were deficiencies. Recently quality assurance (Non-Nuclear) issues are categorized as both deficiencies and observations. Therefore this functional area will be analyzed further.



During this quarter there were 45 non-nuclear quality assurance deficiencies identified, a decrease from last quarter, as shown in Frequency Control Chart 22. There were also 34 observations identified. Thirty eight percent (38%) of the deficiencies and 62% of the observations identified in the first quarter of 2010 are owned by the National Ignition Facility and Photon Science (N&PS) Principal Directorate (PD) with the majority of these from walkabouts and management reviews. Global Security owns 53% of the deficiencies with the majority from IWS/ SP Training Verifications and Responsible Official Inspections of BSL-2 Laboratories.

The N&PS, Directors Office (DO) and Weapons Complex Integration (WCI) PDs own 84% of observations in 2008 – 2010. N&PS observations are from a variety of different assessments, the "NIF Beryllium Review 2008," "NIF 2009 Laser Operations Safety Assessment," walkabouts, lessons learned etc.

Fifty-seven percent (57%) of the observations owned by the DO PD were from the "LSO LLNL Independent Environmental Management System Audit." Twenty-three percent (23%) of the observations owned by the WCI PD are from a grinder station management self assessment.

Twenty nine percent of all observation identified in 2008 – 2010 are Integrated Work Sheet (IWS) related and 82% of these are owned by the N&PS PD. In reviewing each observation description, there are some commonalities between them, as shown in Table 8.

Table 8. IWS Observations Categorized as QA from 2008 - 2010

Summarized Issue Description	GS PD	N&PS PD	WCI PD
IWS not converted to task based	1	0	1
Lack of read/sign IWS	1	19	0
Hazard/Controls not identified	2	7	0
Something not current in IWS	1	17	0
Something missing from IWS	2	23	0
Training and IWS related	2	3	0

IWS issues categorized as the quality assurance functional area, appear to be similar to the IWS issues categorized as the worker safety and health functional area under the Integrated Safety Management System (ISMS) subtopic, described in Section 6.7 of this report. These two data sets were merged together to review the commonalities with data from 2009 and 2010. The first observation is that PDs categorize IWS issues under different functional areas. The S&T PD categorizes them under the ISMS subtopic within the worker safety and health functional area and the GS, N&PS and WCI PD categorize them under the quality assurance (QA) functional area within different QA criterion.

Table 9 displays IWS observations from both functional areas. The majority of IWS observations are owned by the N&PS and S&T PDs. Based on the IWS issues described in Table 9 and given that this collection of IWS issues are across three main PDs, there appears to be a systemic issue related to incomplete IWS work packages, either a lack of read/ sign, lack of hazard/ control identification, something not current in the IWS, something missing from the IWS or training related issues.

Table 9. IWS Observations Categorized as QA and WSH from 2009 - 2010

Summarized Issue Description	GS PD	N&PS PD	S&T PD	WCI PD
IWS not converted to task based	1	0	0	1
Lack of read/sign IWS	1	19	4	0
Hazard/Controls not identified	2	7	2	0
Something not current in IWS	1	17	3	0
Something missing from IWS	2	23	5	0
Training and IWS related	2	3	3	0

One concern when the number of observations increases, is whether the observations were properly categorized as observations instead of deficiencies. There appears to be confusion as to when an issue related to an IWS is an observation or deficiency. The ES&H Manual Document 2.2, "LLNL Institution-Wide Work Control Process" was reviewed to determine when some of the common IWS related issues should be categorized as a deficiency. After reviewing ES&H Manual Document 2.2 and consulting with the ITS working group and some work control subject matter experts, it was determined that the categorization of some IWS issues is dependent on whether work is being performed. In many cases, the ITS descriptions reviewed in this analysis do not provide this detail, making it impossible for the CAO Performance Analysis and Reporting Section to determine if IWS related issues were assigned a correct issue type.

Recall that a deviation from ES&H Manual Document 2.2 is considered a WSH noncompliance, since this document is an implementing procedure in the LLNL Worker Safety and Health Program. Therefore, when an IWS issue is a deficiency, regardless of the functional area selected, the WSH field should be marked as "Yes" in ITS.

This collection of IWS related observations appears to indicate a systemic issue with IWS work packages. At this time, however, we can't conclude that it reveals a systemic noncompliance. While some of these issues may have been mis-categorized as observations when they actually are deficiencies, the changes to ES&H Manual Document 2.2 became applicable as of May 21, 2010, after the time period when many of these issues were identified and entered in ITS.

It appears that additional guidance may be helpful to the individuals entering or screening the issues in ITS. This guidance should be aimed at improving the quality of IWS-related issues in ITS so the analysis will provide better conclusions in the future. The LLNL ITS working group, and members of the ISM QA working group are developing a set of compliance codes related to work control and IWS-related noncompliances.

This subject will continue to be evaluated and the results reported next quarter. This analysis of IWS related deficiencies and observations in this section and in section 6.7 responds to the opportunity for improvement from an external assessment of the LLNL Integrated Safety Management System performed in November 2009 that states, "LLNL should consider evaluating whether repetitive deficiencies related to pressure system device testing and data accuracy and IWS training, read and sign requirements warrant further analysis as institutional issues."

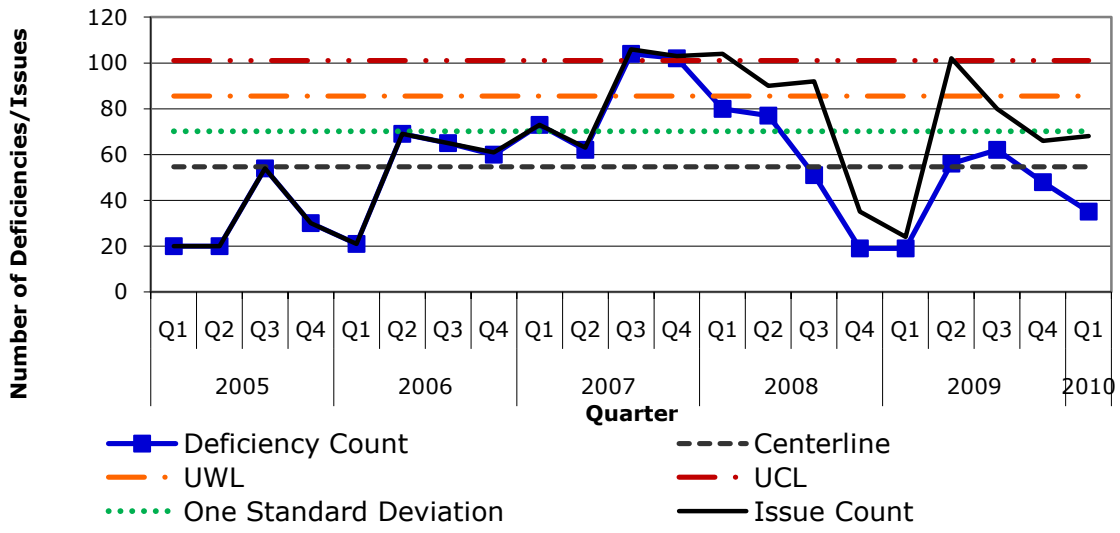
☒ Significant, Systemic or Repetitive ☒ Meets Common Tests ☐ Within Expected Variation ☐ Downward Trend

9.5 Training and Qualification

Training and qualification deficiencies can be categorized under the training and qualification functional area and under certain topics, subtopics and compliance codes. This analysis includes training and qualification data from a collection of training related functional areas, topics, subtopics and compliance codes. The data is not restricted to the issues assigned the training and qualification functional area by the entry screener.

The visual analysis step did not warranted further analysis using a control chart of deficiencies categorized as training and qualification; however, these type of deficiencies are analyzed using control charts regardless of the visual analysis step. None of the common tests were recently met in Frequency Control Chart 23.

Frequency Control Chart 23. Training and Qualification



During this quarter there were 35 training related deficiencies, is a decrease from the previous two quarters, as shown in Frequency Control Chart 23. Forty percent (40%) of these training deficiencies were from IWS training verifications for the S Program and Strategic Operations, and 23% were from the audit of the training and qualification program for Radiological Control Technicians (RCTs). A noncompliance report was submitted to the DOE Noncompliance Tracking System in May 2010 regarding a programmatic weakness in the administration of the RCT training and qualification program.

There were also 33 training related observations identified during this quarter, as shown in Frequency Control Chart 23. Forty five percent (45%) were from EPHA facility evaluated drills and this specific subtopic is discussed in section 5.4 of this report. Twenty four percent (24%) of training related observations were from the self-assessment of the Radioactive and Hazardous Waste Management Requirement training program.

Since none of the common tests were recently met, this safety subject will not be analyzed further.

☐ Significant, Systemic or Repetitive ☐ Meets Common Tests ☒ Within Expected Variation ☐ Downward Trend

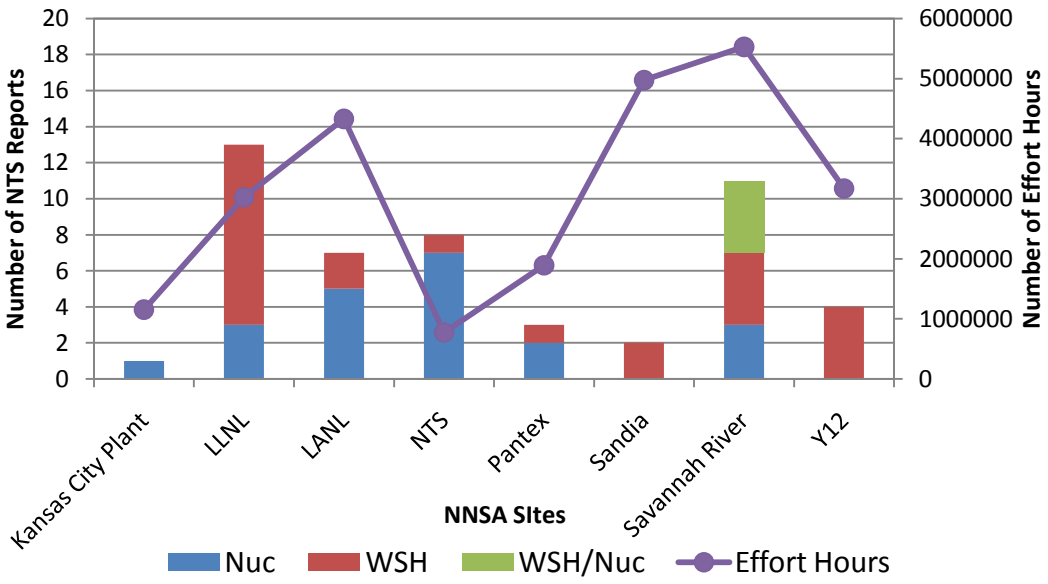
10.0 DOE Reported Noncompliances

This section first evaluates the number of noncompliances reported to the DOE NTS across the complex and then evaluates the number of noncompliances reported to the DOE NTS by LLNL.

10.1 Noncompliances Reported Across the Complex

The DOE NTS has 43 sites in the system that can report either WSH and/ or nuclear safety noncompliances. There are no noncompliance reports in the system for 23 of the 43 sites as of June 1, 2010. Of those sites that reported noncompliances to the NTS in 2010, LLNL reported the second highest number of noncompliances (figure not shown). Considering only NNSA sites, LLNL reported the highest number of noncompliance reports so far in 2010 and has the fifth highest number of effort hours, as shown in Figure 6. LLNL's noncompliance reporting appears to have been higher than other sites because in early 2010, LLNL was eliminating the backlog of noncompliances identified in assessment reports from 2008 and 2009.

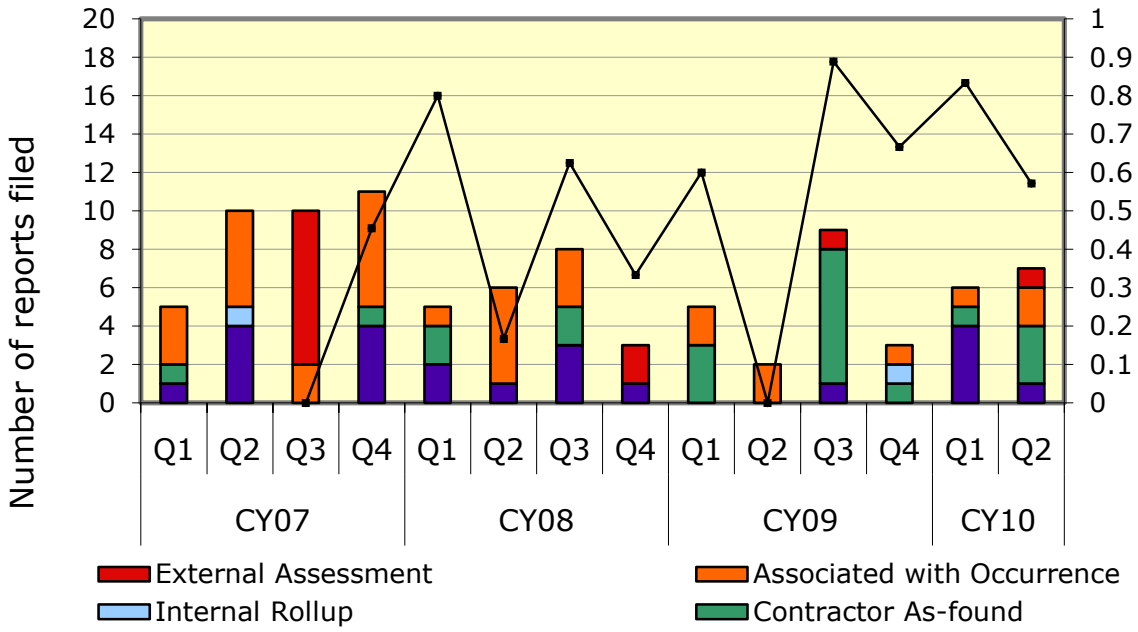
Figure 6. Noncompliances Reported to the DOE NTS in 2010



10.2 LLNL Reported Noncompliances

DOE expects subcontractors to report noncompliances that they identify at a higher rate than noncompliances identified by other or by event. For the first six months of 2010, the percent self-identified is 69%, which is an improvement compared to 2008 and consistent with 2009. The ratio is slightly above the LLNL target for self-identification. The variability between quarters and the sources of the reported noncompliances are shown in Figure 7.

Figure 7. Discovery Method for Noncompliances Reported to NTS.



LLNL reported a total of 20 WSH and nuclear safety noncompliances to the DOE NTS in 2009; fourteen (70%) were self-identified. In the first six months of 2010, LLNL reported 13 WSH and nuclear safety noncompliances to the DOE NTS. Nine of these were self-identified:

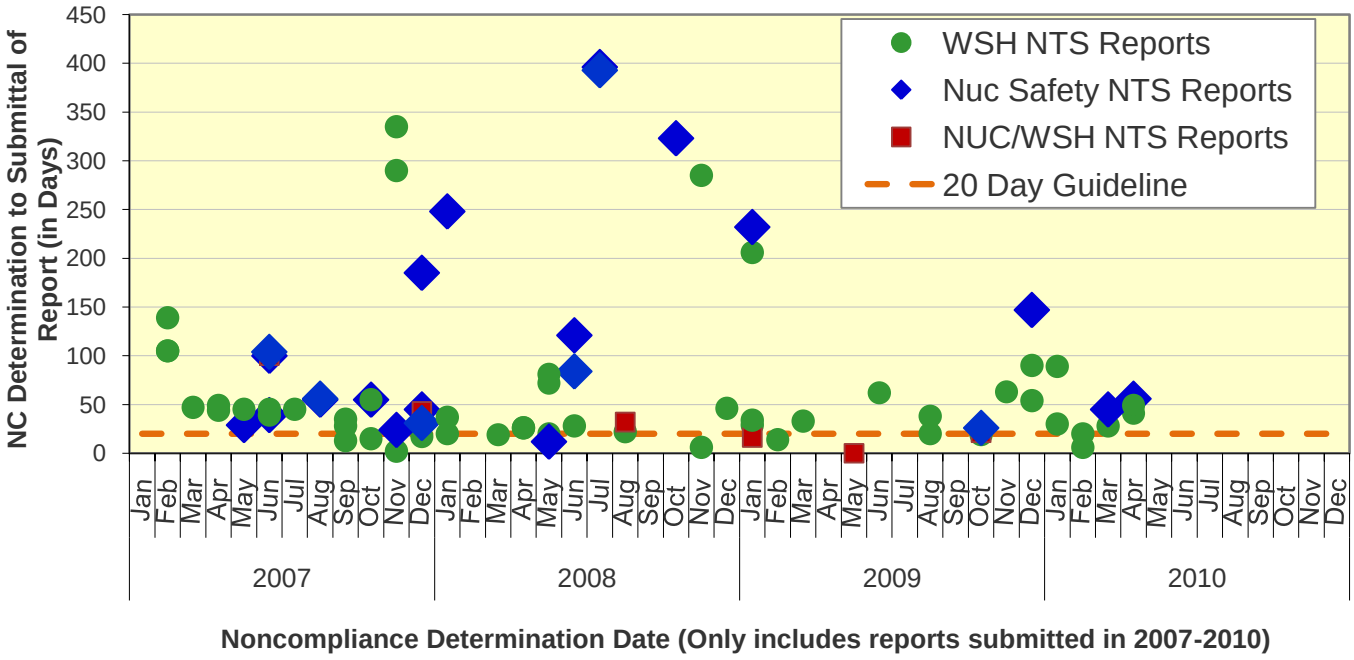
1. "Programmatic Noncompliance with the Maintenance of Boilers at LLNL"
2. "Peroxidizable Chemicals are not Consistently Tested"
3. "Machining of Legacy Part Leads to Indeterminate Beryllium Exposure of Machinist"
4. "Lack of Engineering Documentation or Modified Load Plates for Fork Truck Attachments"
5. "Programmatic noncompliance with 10CFR851 related to the procured services safety program for service subcontractors"
6. "Discrepant as Found Condition of Tritiated Oil in Building 331"
7. "B332 Safety Basis Violation Relative to Functional Testing of the Mobile Weapons Platform"
8. "Programmatic Weakness in Administration of RCT Training and Qualification Program"
9. "Vehicle Safety Features not Sufficiently Addressed by the Laboratory"

The four noncompliances were identified by an external organization or by events:

1. "Energized Electrical Conductor Cut without Energy Isolation in Building 391"
2. "Personal Air Monitoring Sample Above ACGIH TLV for Silica Dust"
3. "Systemic weaknesses in the LLNL Injury/ Illness Reporting Program"
4. "Unexpected Discharge of Flammable Gas While Drilling Into Gas Cylinder with a Hand Drill"

DOE expects contractors to report noncompliances within 20-days of determination of the noncompliances. LLNL has been improving its report timeliness; however, one noncompliance took more than 100 days to report, as shown in Figure 8. This nuclear safety noncompliance was identified in December 2009 and reported in May 2010. It was a positive unreviewed safety question and also reported as an occurrence.

Figure 8. Timeliness of Reporting Noncompliances to the NTS



When the average number of days to report a noncompliance to the DOE NTS is calculated for each year, it is based on the date the noncompliance was determined, which is how Figure 8 is displayed. The average number of days for 2010 has been 40 days, which is less than in 2009, when it was 60 days and in 2008 when it was 109 days. The delayed reporting in 2008 was due to a back log of noncompliances from assessment reports. These noncompliances were determined to be either a WSH or nuclear safety noncompliances in 2008, but the noncompliances were not reported to the DOE NTS until 2009. In comparison, although LLNL did not meet the Office of Enforcement's expectation in 2010, the timeliness of submitting noncompliances to the DOE NTS has improved.

Target completion dates for actions related to NTS reported noncompliances can be extended with justification noted in the NTS system. If an action is in response to an external or internal independent assessment, the extension must be granted by the LLNL deputy director or DOE/ LSO. Table 10 describes the percent of actions completed on-time and extended Lab-wide and also by Principal Directorate (PD). For all actions, completed in 2010 as of June 1, 2010, 92% have been completed on-time. This is less than in 2009, but more than in 2008. Three PDs have completed all actions on time so far in 2010: Directors Office (DO), NIF and Photon Science (N&PS), and Operations and Business (O&B).

Table 10. Percent of Actions Extended and Completed On-time, by Principal Directorate

By PD	% Extended of all actions due			% Completed On-time of actions completed		
	CY08	CY09	CY10 (as of June)	CY08	CY09	CY10 as of June
DO	6% (6/95)	17% (13/76)	15% (12/80)	88% (81/92)	93% (71/73)	100% (21/21)
GS	36% (5/14)	(3/2)	N/A (0/0)	100% (14/14)	100% (2/2)	N/A (0/0)
N&PS	20% (2/10)	3% (1/31)	35% (7/20)	100% (10/10)	100% (32/32)	100% (13/13)
O&B	29% (16/56)	54% (20/37)	71% (22/31)	58% (33/57)	88% (35/40)	100% (6/6)
S&T	10% (1/10)	4% (1/26)	6/3	100% (8/8)	100% (26/26)	50% (1/2)
WCI	3% (4/121)	34% (19/56)	45% (25/46)	92% (97/106)	100% (48/48)	70% (7/10)
Lab-Wide	**11%**	**25%**	**38%**	**85%**	**96%**	**92%**

There has been an increase in the percent extended when comparing 2008 (11%) and 2009 (25%) to 2010 (38%). Four PDs had an increase in their percent extended so far in 2010 compared to 2009, N&PS, O&B, Science and Technology (S&T) and Weapons and Complex Integration. S&T extended two actions more than once so far in 2010.

11.0 Conclusion

The control chart analysis identified two subjects to have either a significant, systemic or repetitive issue as an observation, not a deficiency (i.e. noncompliance), (1) CIS related information protection and (2) IWS related issues.

There were four deficiencies of repositories missing stickers/ labels that indicated more than one instance of the deficiency. The two deficiencies owned by Science and Technology indicate a total of 19 deficiencies (categorized as two), the one deficiency owned by NIF and Photon Science states that "Some repositories…..", and the one deficiency owned by Weapons and Complex Integration states that, "More than 35 percent of the in-service repositories….." Since these four deficiencies accumulate to multiple deficiencies with repositories missing stickers/ labels among three different Principal Directorates, the collection of these deficiencies appears to be a systemic noncompliance related to CIS. The requirement to apply the sticker/ label was an internal LLNL self-imposed requirement that was recently made to be an optional requirement, leaving the discretion to the Directorate/ Program.

Since the sticker/ label is not the mechanism for determining if classified information can be stored in a repository, the missing stickers/ labels do not pose a risk to CIS. Now that the LLNL imposed requirement to have the sticker/ label is now optional, this systemic issue, which is currently not a noncompliance does not meet the threshold for reporting to the DOE Office of Enforcement. (Section 7.2 – Information Protection)

Recommendation: *Screeners or ORBs, need to ensure that issues are listed as one issue in ITS, or if one issue summarizes multiple issue, check the systemic/repetitive button in ITS.*

There are multiple instances of Integrated Work Sheet (IWS) observations across more than one Principal Directorate, suggesting a systemic issue related to incomplete IWS work packages, either a lack of read/ sign, lack of hazard/ control identification, something not current in the IWS, something missing from the IWS or training related issues. As observations, this systemic issue is not reportable to the DOE Office of Enforcement; however, it appears there is confusion as to what constitutes a noncompliance related to IWSs. Due to this confusion, guidance will be established and issued for some of the more common IWS issues as to whether they should be categorized as a deficiency or observation in ITS in hopes to offer some consistency. Note this guidance is applicable as of May 21, 2010, when changes to Document 2.2 were implemented. (Section 8.4 – Quality Assurance (Non-Nuclear))

It should also be noted that the LLNL Issues Tracking System (ITS) working group, along with LLNL members of the ISM Quality Assurance Working Group, are working on a set of compliance codes related to work control that will include IWS related noncompliances as a means to categorize issues in ITS.

Recommendation: *PARS will provide guidance related to common IWS issues and the proper issue type to select in ITS.*

The analysis did suggest five related safety subject deficiency counts that should be analyzed in future quarterly analyses. These safety subjects will be observed over future quarters for consecutive increases in the number of the deficiencies or points above the control limits:

- Electrical (Section 5.3 – Electrical Safety)
- Fire Safety (Section 5.6 – Fire Safety)
- Integrated Safety Management System (Section 5.7 – ISMS)
- Other Industrial Safety (Section 5.10 – Other Industrial Safety)
- Radiation Protection Programs (Section 6.4 – Radiation Protection)

Recommendation: *Include the five subjects listed above in future performance analysis.*

Pressure safety deficiencies were analyzed this quarter because of an opportunity for improvement from the external assessment of the LLNL Integrated Safety Management System performed in November 2009 that states, "LLNL should consider evaluating whether repetitive deficiencies related to pressure system device testing and data accuracy and IWS training, read and sign requirements warrant further analysis as institutional issues." Although there was an increase since last quarter in pressure safety deficiencies, there is a decreasing trend in these deficiencies since 2005 and this trend is statistically significant (p-value < 0.01). On average, for every increase in time (one quarter), the number of pressure safety deficiencies decreases by two. Since no common tests were met and the Pressure Relief Devices (PRDs) out of compliance in 2009 only account for 1% of PRDs within the one Principal Directorate, this issue is not considered systemic at this time. (Section 5.10 – Other Industrial Safety)

Deficiencies categorized as the facility management functional area were analyzed this quarter and out of the 11 facility management related deficiencies identified in ITS, at least 10 of these should have been categorized under a safety subject instead of the facility management subject. (Section 8.2 – Facility Management)

Recommendation: *Screeners and ORBs need to ensure that deficiencies categorized under the facility management functional area are actually facility deficiencies. If they might be better categorized in a safety related functional area, e.g. WSH, the compliance code should be changed.*

There were no issue significant one deficiencies. Of the four deficiencies entered in ITS in 2010 and downgraded from a suggested issue significance of one, to a different issue significance, one was determined to meet the nuclear safety threshold for reporting to DOE. This deficiencies was described as, "Experienced, senior workers either forgot or disregarded established response procedures for Tritium Activity Monitor alarms." (Section 5.11 – Other Significant Condition Noncompliances)

Recommendation: *Complete the evaluation and report the apparent systemic noncompliance related to workers disregarding established response procedures for TAM alarms.*

For this quarter, 57% of the noncompliances reported to the DOE NTS were self-identified, which is a decrease compared to last quarter. So far for 2010 the percent self-identified is 69%, which is an improvement and is consistent with 2009 and is above the LLNL target for self-identification. (Section 9.2 – LLNL Reported Noncompliances)

On average, it took LLNL 40 days to report noncompliances to the DOE NTS so far in 2010. Although LLNL did not meet the Office of Enforcement's expectation of prompt reporting within 20 days after determining a noncompliance exists, the timeliness of submitting noncompliances to the DOE NTS has improved for those determined to be noncompliances in 2010 and reported in 2010. (Section 9.2 – LLNL Reported Noncompliances)

For all NTS reported actions, completed in 2010, 92% of actions have been completed on-time, which is less than 2009. There has been an increase in the percent extended when comparing 2008 (11%) and 2009 (25%) to 2010 (38%). (Section 9.2 – LLNL Reported Noncompliances)

12.0 Definitions

Correlation: The strength of the linear relation between two quantitative variables (e.g. observations and deficiencies).

Correlation Coefficient (Rho): A number between -1 and 1 which measures the degree to which two variables are linearly related. If there is perfect linear relationship with positive slope between the two variables, we have a correlation coefficient of 1; if there is positive correlation, whenever one variable has a high (low) value, so does the other. If there is a perfect linear relationship with negative slope between the two variables, we have a correlation coefficient of -1; if there is negative correlation, whenever one variable has a high (low) value, the other has a low (high) value. A correlation coefficient of 0 means that there is no linear relationship between the variables.

Correlation Test (Pearson): The statistical significance of *r* is tested using a t-test. The hypotheses for this test are:

H_0: rho = 0
H_a: rho <> 0

A low p-value for this test (less than 0.05 for example) means that there is evidence to reject the null hypothesis in favor of the alternative hypothesis, or that there is a statistically significant relationship between the two variables.

P-value: The probability of wrongly rejecting the null hypothesis if it is in fact true. Examples of null hypotheses used in this analyses:

H_0: The process is in a state of control
H_0: rho (correlation coefficient) = 0

Simple Linear Regression: Simple linear regression aims to find a linear relationship between a response variable and a possible predictor variable by the method of least squares and production of a regression equation. A regression equation allows us to express the relationship between two variables algebraically. It indicates the nature of the relationship between two variables. In particular, it indicates the extent to which you can predict a variable by knowing another, or the extent to which variables are associated with one another.

Standard deviation: A way to measure how far the observations are from their mean. It is also referred to as a measure of spread.

State of Control: The extent of variation of the output of the process does not exceed that which is expected on the basis of the natural statistical variability of the process. None of the data points fall outside of the Upper or Lower Control Limits.

Statistically Significant: The probability (usually less than 5 percent or less than a p-value of 0.05) that a finding or result is caused by something other than just chance.

13.0 References

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