



**Quality Analysis of the
Computerized Accident/Incident Reporting System (CAIRS)
and the Occurrence Reporting and Processing System (ORPS)**

June 2009





Introduction



- **Three parameters were selected to measure the quality of the data in CAIRS:**

Timeliness: The interval between the injury date and the date the case was recorded

Coding: The completeness of data coding for 10 data fields

Corrective Actions: The distribution of types of corrective actions taken or recommended

- **One parameter was selected to measure ORPS quality:**

Timeliness: The time intervals between categorization and notification and between categorization and updates or final date



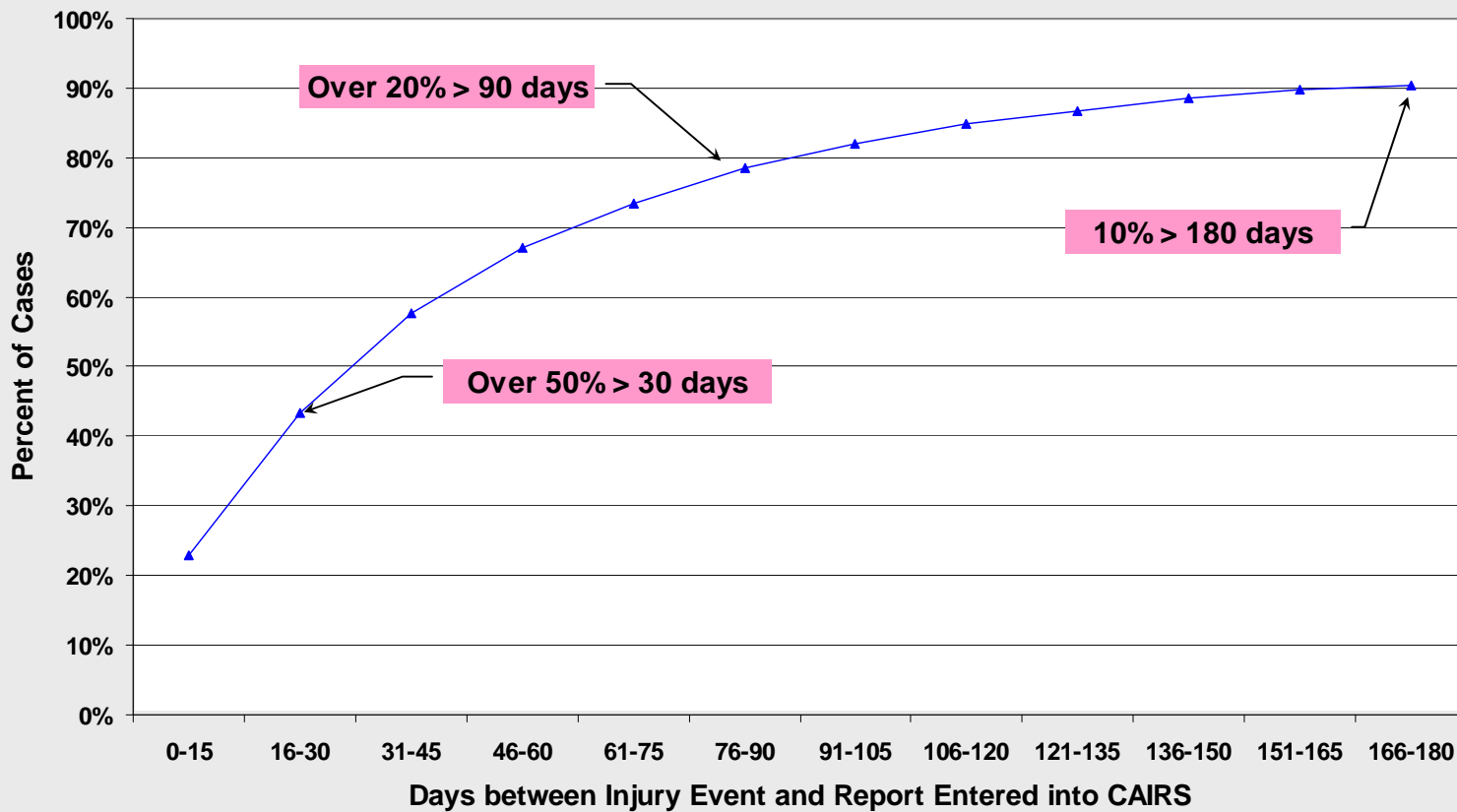
Calculating Timeliness



- To compute the timeliness indicator, CAIRS data were downloaded to an Excel™ spreadsheet and compared using the “DAYS360” function. This counts the number of days between two dates—the event date and the date the case was entered into CAIRS. This function counts weekends as days and assumes that each month is thirty (30) days long.
- DOE M 231.1A, *Environment, Safety and Health Reporting Manual*, requires DOE organizations to upload their cases to CAIRS twice a month (by the 15th and by the last day of the month). Based on this, most cases should be entered within fifteen (15) days of occurrence, and nearly all cases should be entered within thirty (30) or thirty-one (31) days of occurrence.
- Note that some cases may be legitimately reported after these dates. For example, an injury may not meet the recordability criteria at the time of the injury event. Over a period of time, the injury or illness may worsen to the point that one of the recording criteria is met. See Slide 10 for some examples.



Figure 1. Overall DOE CAIRS Timeliness, CY 2006–2007
(Data as of October 20, 2008)





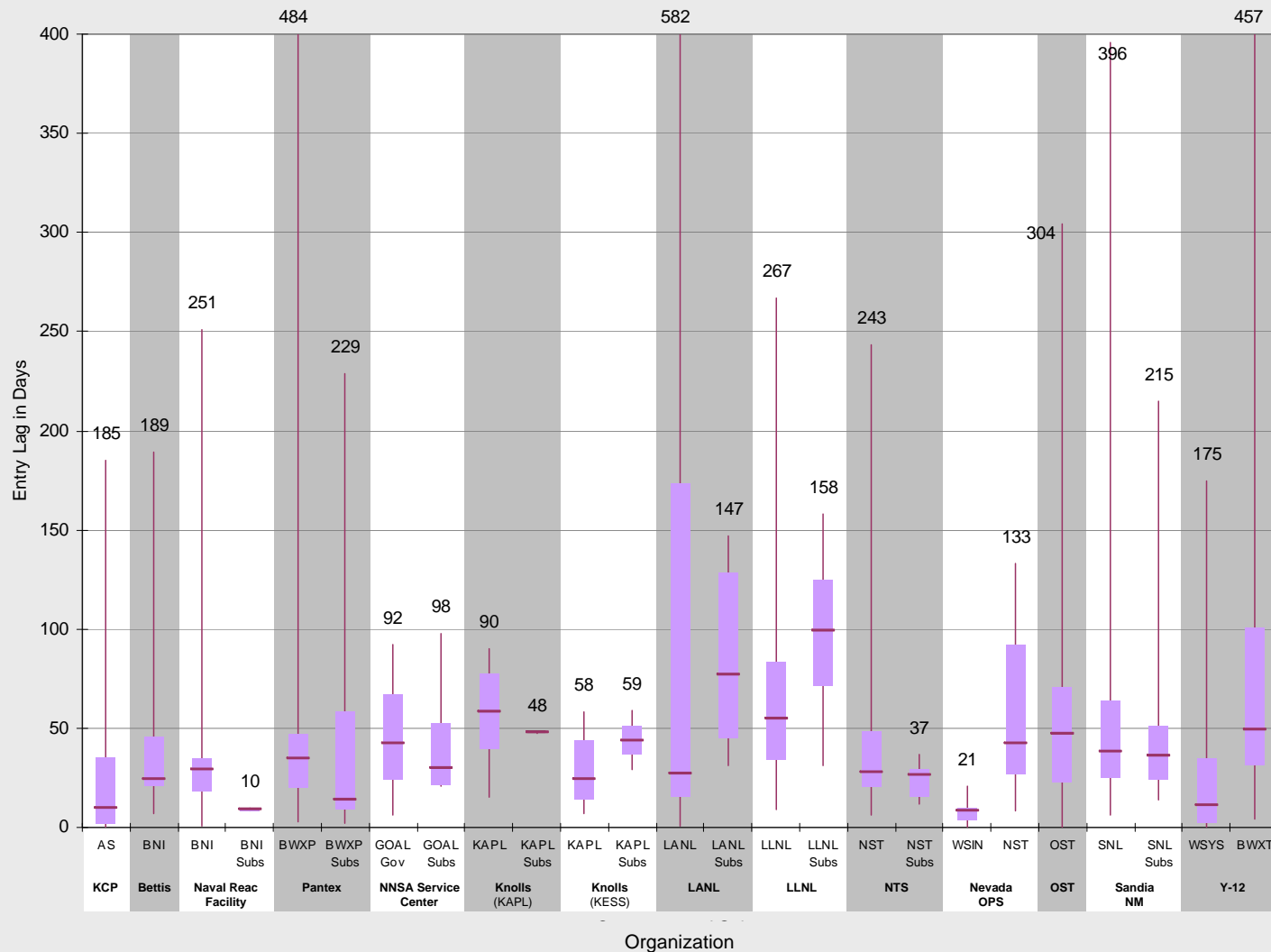
Key to the CAIRS Timeliness Graphs



- Figures 2–6 display the CAIRS recording timeliness by those DOE organizations, contractors, and subcontractors who worked more than one million hours per year.
- The **magenta** line within each bar is the median number of days between injury/illness event and date recorded in CAIRS.
- The bars represent the 25–75 percent range of recording timeliness, while the vertical lines above and below indicate the maximum and minimum days to record. The maximum number of days is written above each vertical line.



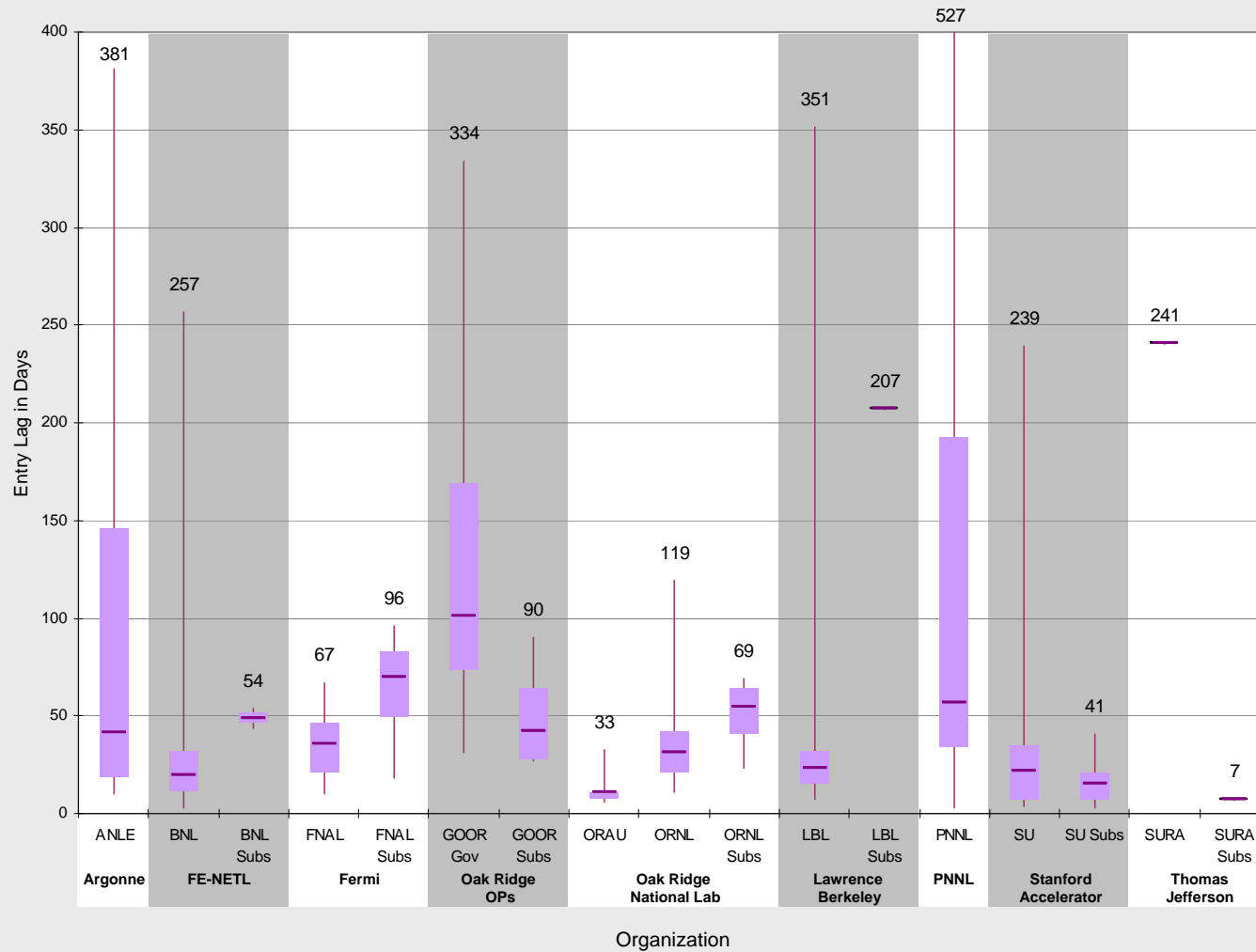
Figure 2. CAIRS Timeliness by Major Organizations, Contractors, and Their Combined Subcontractors in NNSA



Data as of 2/20/2009, for calendar year 2007. Major organizations are defined here as those who provide more than one million (1,000,000) labor hours per year. Click [here](#) for organization names and numbers of cases.



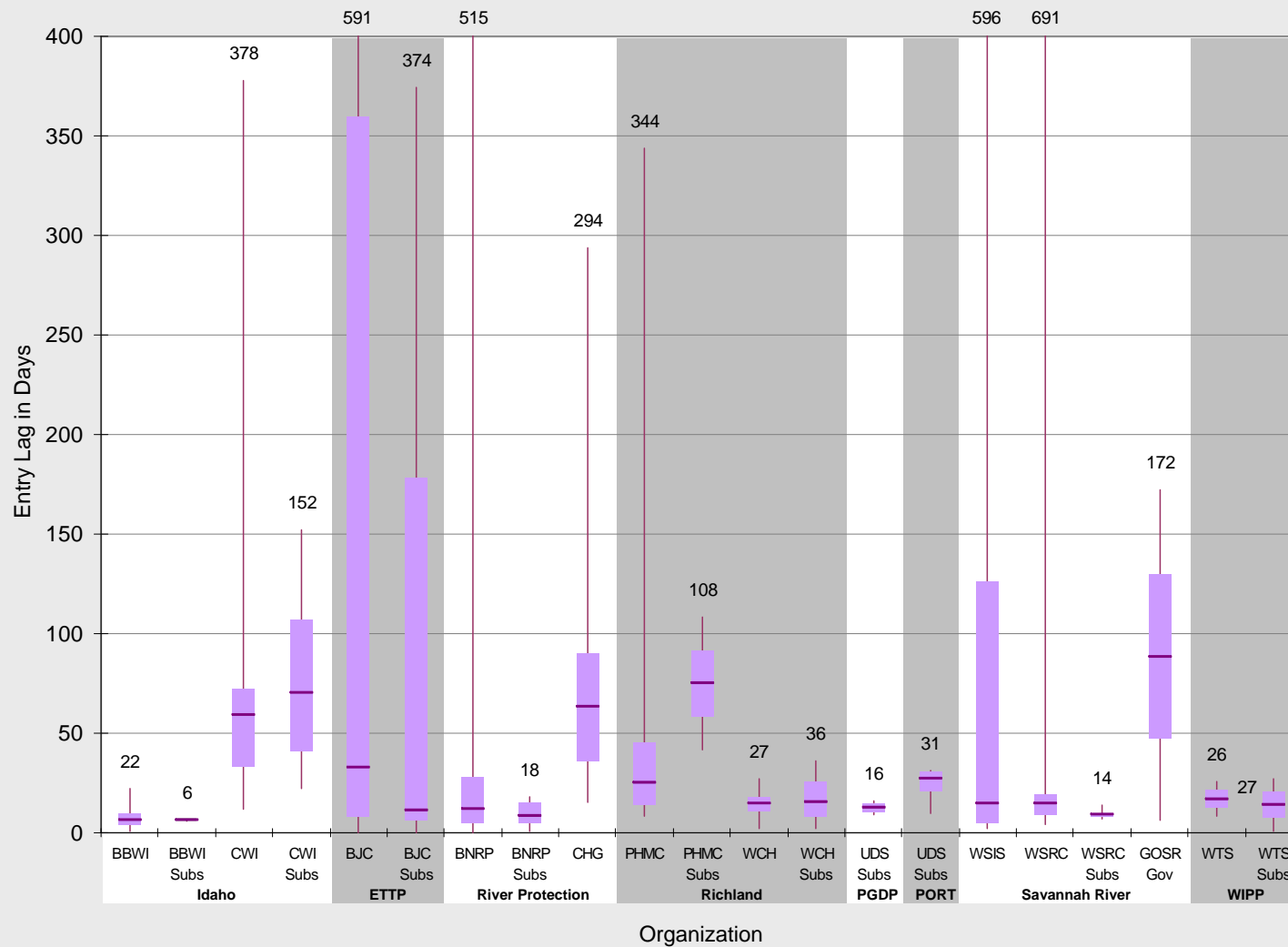
Figure 3. CAIRS Timeliness by Major Organizations, Contractors, and Their Combined Subcontractors in the Office of Science



Data as of 2/20/2009, for calendar year 2007. Major organizations are defined here as those who provide more than one million (1,000,000) labor hours per year. Click [here](#) for organization names and numbers of cases.



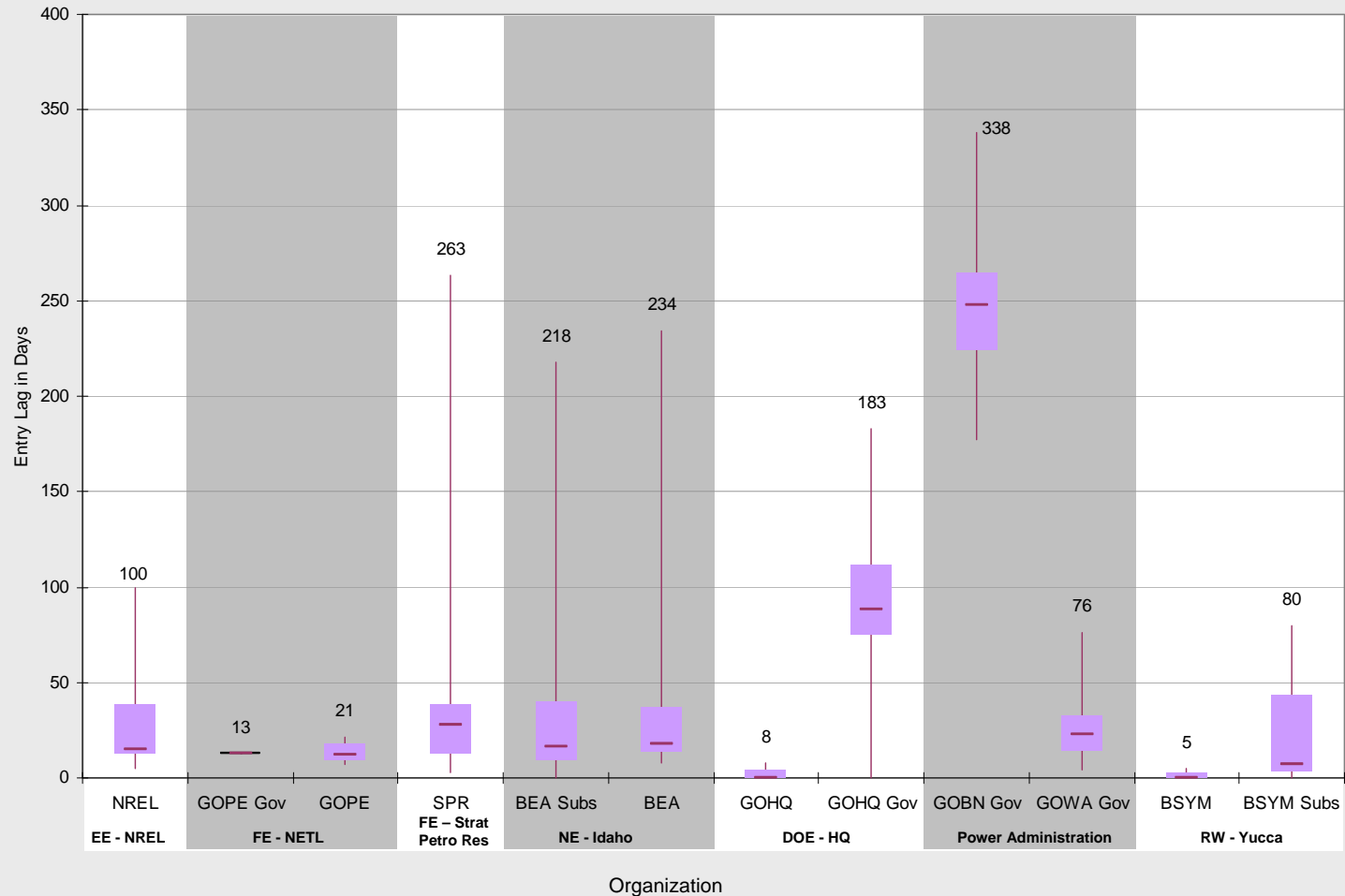
Figure 4. CAIRS Timeliness by Major Organizations, Contractors, and Their Combined Subcontractors for Environmental Management



Data as of 2/20/2009, for calendar year 2007. Major organizations are defined here as those who provide more than one million (1,000,000) labor hours per year. Click [here](#) for organization names and numbers of cases.



Figure 5. CAIRS Timeliness by Other DOE Organizations



Data as of 2/20/2009, for calendar year 2007. Major organizations are defined here as those who provide more than one million (1,000,000) labor hours per year. Click [here](#) for organization names and numbers of cases.



Table 1. Cases that Were Recorded more than Five Hundred (500) Days after the Injury Date



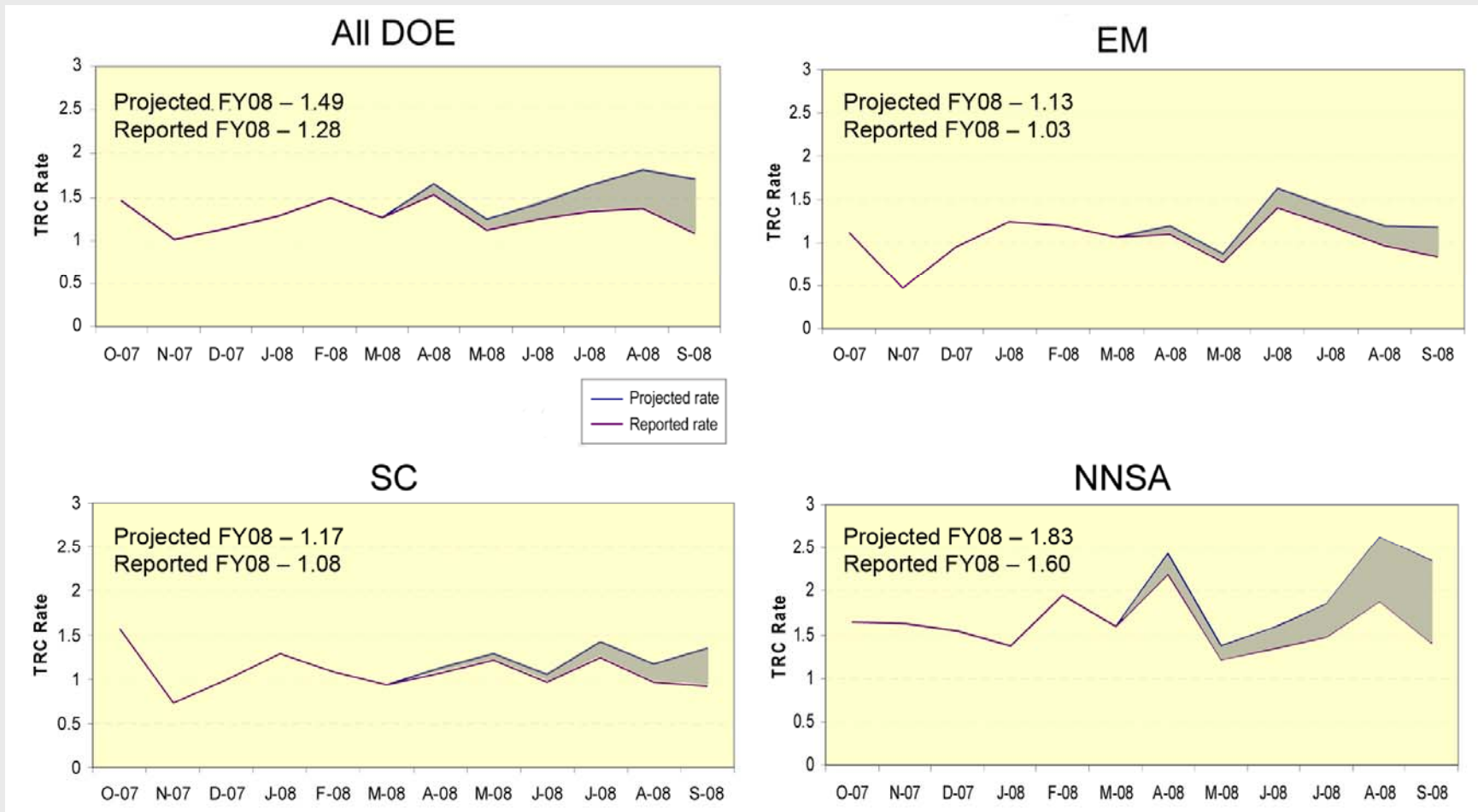
Injury	Event	Lost Days	Restricted
Knee strain *	Stepping down	35	145
Lower back pain	No event identified	0	0
Neck strain	Lifting	0	0
Chest muscle strain *	Training	0	0
Knee sprain *	Walking	5	32
Carpal tunnel	Office	0	0
Hand	Struck by	0	7
Hearing loss	Loud environment	0	0

* Same contractor, all 3 cases entered on September 8, 2008

Injuries and illnesses may not always be recordable on the date they occur.



Figure 6. Example of Projecting Current Rates, Based on Applying a Delay Factor into Current Data



Data, shown here as of 10/9/2008, are misleading because so many reports are entered late. The projected FY08 rates were calculated by applying the timeliness data to each respective PSO.



Quality of Data Coding in CAIRS



- Coding allows CAIRS users to sort and analyze massive quantities of data with relative ease. Codes are specified for the following¹.
 - Event *
 - Body part
 - OSHA type
 - Injury type *
 - Source *
 - Direct cause *
 - Accident type
 - Activity *
 - Occupation *
 - OSHA Code
- Coding is required to be provided for some descriptors; for those indicated above with an asterisk (*), coding is not required.
- For each recorded case, if each of these descriptors contains a valid code, the case is scored 100 percent. Valid codes are those that do not signify “unknown” or “not specified.”
- The overall quality score for an organization is the percent of cases recorded that scored 100 percent for valid coding.
- Many contractors provide codes for each of these topics and score 100 percent, as shown in the chart and graphs that follow. HSS provides coding for the non-required codes, as resources allow. However, there has been a decrease recently in the overall quality of the coding.
- The impacts of missing codes are shown in Slides 14 and 15.

¹ For a description of each code, click [here](#).

* Coding is not required.



Table 2. Quality of Data-Coding for DOE Sites: Quality Scores and Counts of Missing Codes for Indicated Descriptors, by Site



Site Code	Site Short Name	Quality Score (%)	Quality Score for Required Coding only	Number of cases	Event*	Direct Cause*	Body Part	Accident Type	OSHA Type	Activity*	Injury Type	Occupation*	Source*	OSHA Code
AMES	Ames Lab	100.0	100.0	2	0	0	0	0	0	0	0	0	0	0
ANLE	Argonne East	92.7	100.0	55	2	3	0	0	0	0	0	1	1	0
BNL	Brookhaven	95.6	100.0	68	3	0	0	0	0	0	0	0	0	0
DOEHQ	DOE HQ	83.3	97.98	48	3	4	0	0	0	0	1	0	2	0
ETTP	East TN Tech Park	61.3	81.3	75	27	1	13	0	0	25	14	15	19	0
FNAL	Fermi	4.9	78.0	41	9	38	9	0	0	9	9	10	11	0
HANF-RL	Hanford RL	92.7	100.0	82	0	5	0	0	0	0	0	1	0	0
HANF-RP	Hanford RP	77.2	100.0	101	3	5	0	0	0	2	0	6	16	0
INEL	Idaho	46.0	89.3	150	19	76	16	0	0	17	16	18	19	0
KCP	Kansas City Plant	92.5	97.5	40	1	2	0	0	0	0	1	0	1	0
LANL	Los Alamos	6.5	43.2	352	213	324	167	0	0	213	199	221	217	0
LBL	Lawrence Berkeley	27.7	91.6	83	10	57	7	0	0	8	7	8	10	0
LLNL	Lawrence Livermore	88.7	100.0	292	1	1	0	0	0	0	0	5	26	0
NETL	NETL	100.0	100.0	17	0	0	0	0	0	0	0	0	0	0
NREL	NREL	91.7	100.0	12	1	0	0	0	0	1	0	0	0	0
OR	Oak Ridge Ops	83.3	100.0	12	0	2	0	0	0	0	0	0	0	0
ORNL	Oak Ridge Natl Lab	26.2	99.2	126	5	28	0	0	0	1	1	6	64	0
PGDP	Paducah	89.5	100.0	19	1	0	0	0	0	1	0	0	2	0
PNNL	Pacific NW Natl Lab	90.5	100.0	63	4	1	0	0	0	0	0	0	1	0
PORT	Portsmouth	73.3	100.0	15	1	4	0	0	0	0	0	0	0	0
PPPL	Princeton	100.0	100.0	9	0	0	0	0	0	0	0	0	0	0
PTX	Pantex	89.7	100.0	29	2	0	0	0	0	1	0	0	2	0
SLAC	Stanford Accel	91.7	97.9	48	0	2	0	0	0	0	1	1	0	0
SNLA	Sandia NM	7.3	76.5	327	79	303	77	0	0	78	77	78	79	0
SRS	Savannah	52.6	89.6	154	20	67	16	0	0	18	16	22	21	0
TJNA	Thom Jeff	100.0	100.0	5	0	0	0	0	0	0	0	0	0	0
Y12	Y12 Site	19.3	79.7	202	58	162	41	0	0	58	40	61	60	0

* Not required. For a description of each code, click [here](#).



Figure 7. Impact of Missing Data on Performing Injury Type Trending, FY 2008

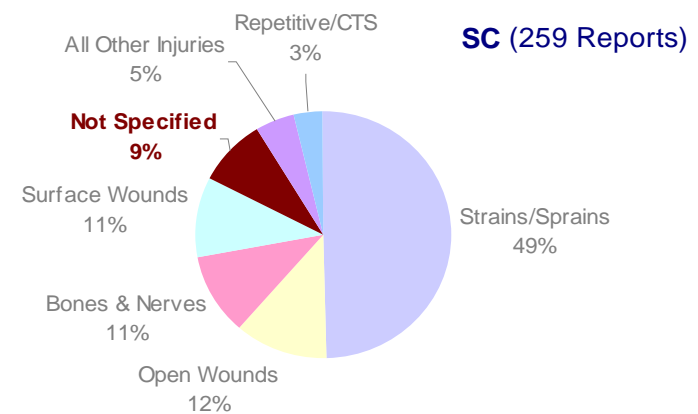
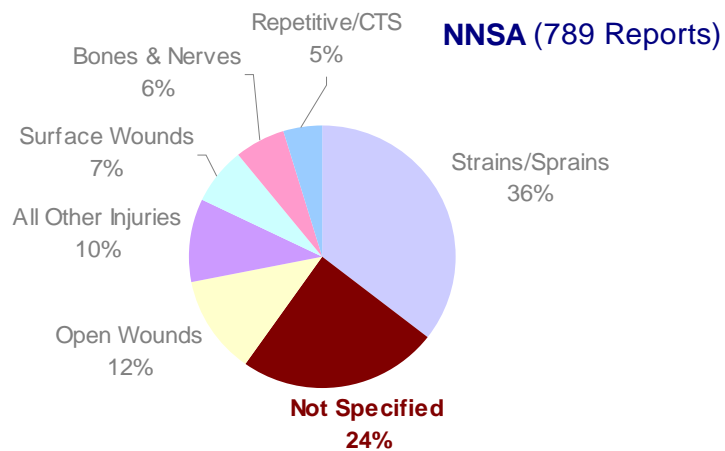
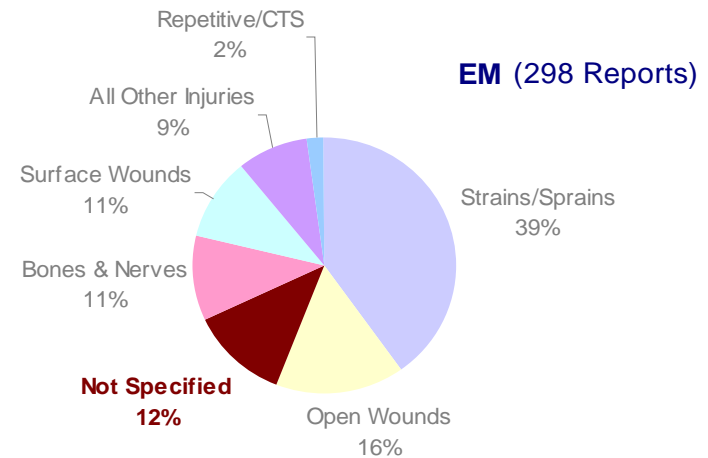
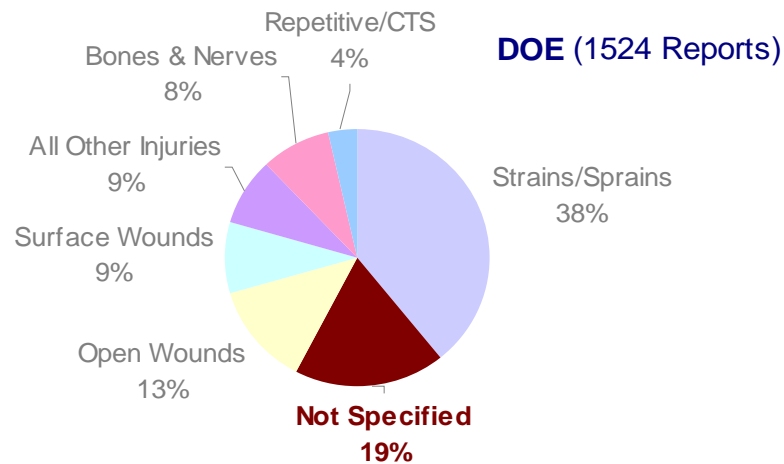




Figure 7a. Impact of Missing Codes on Trending Activity at the Time of Injury, FY 2008

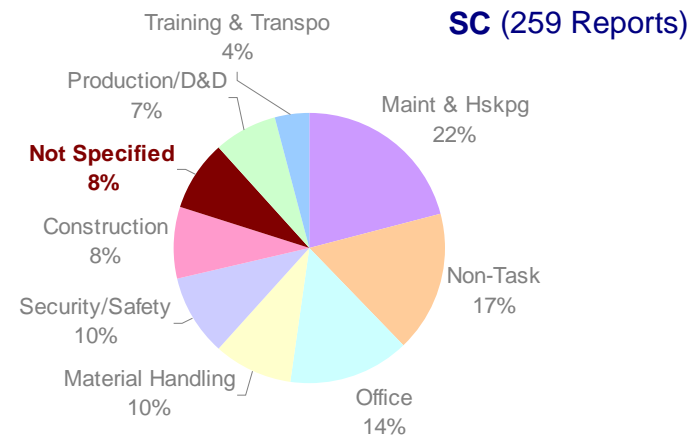
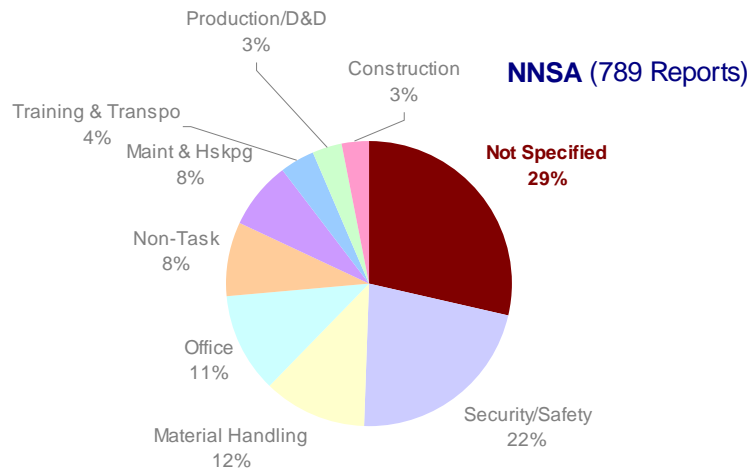
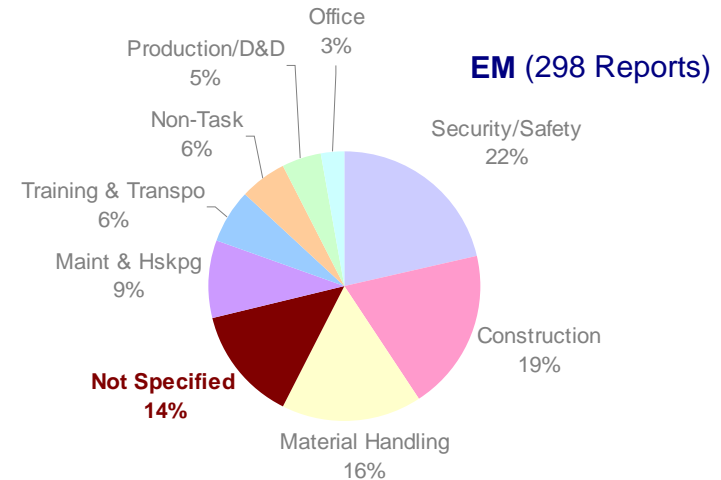
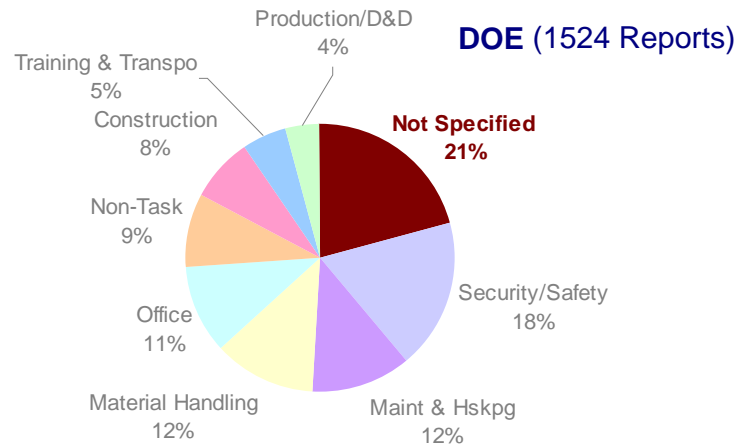
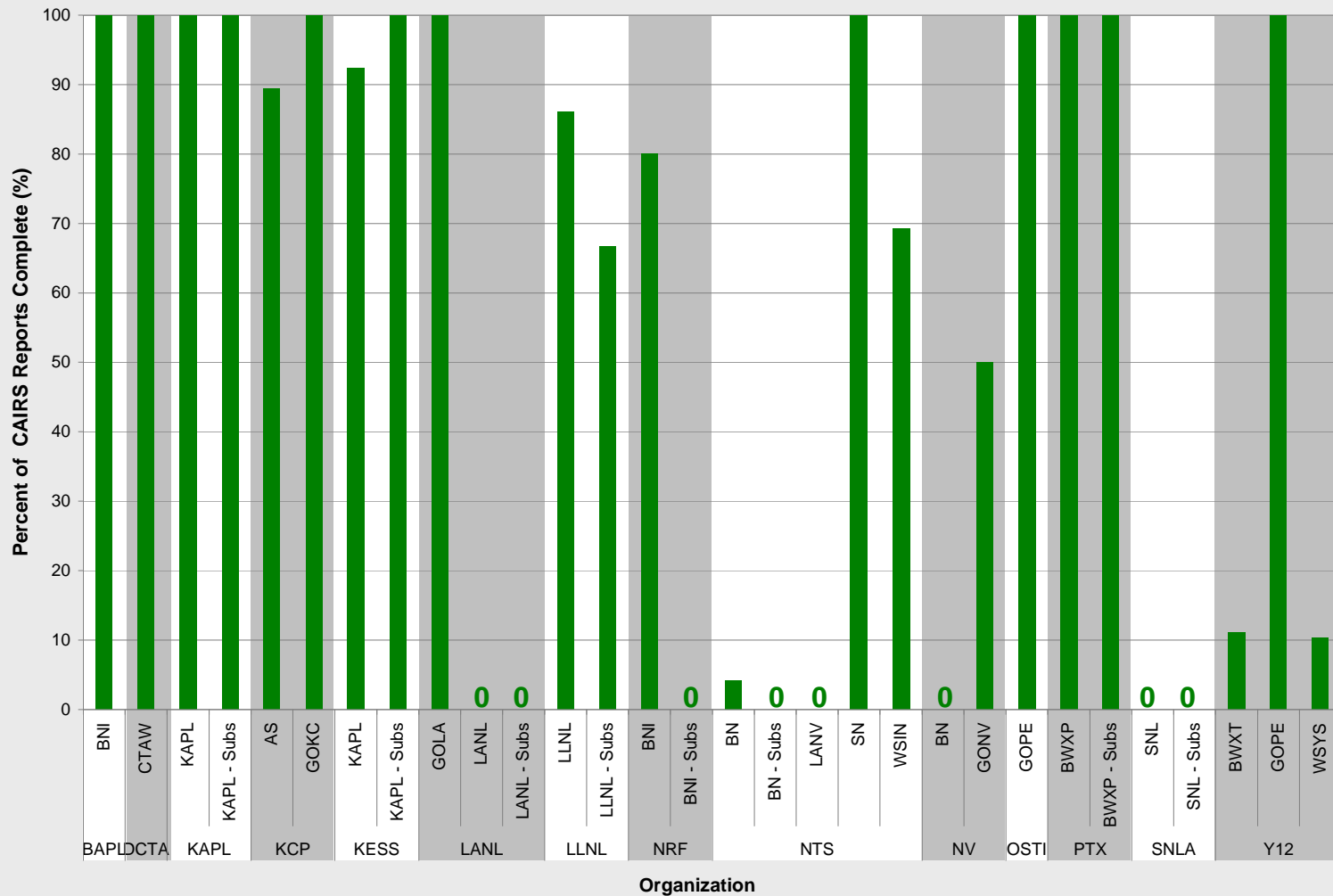




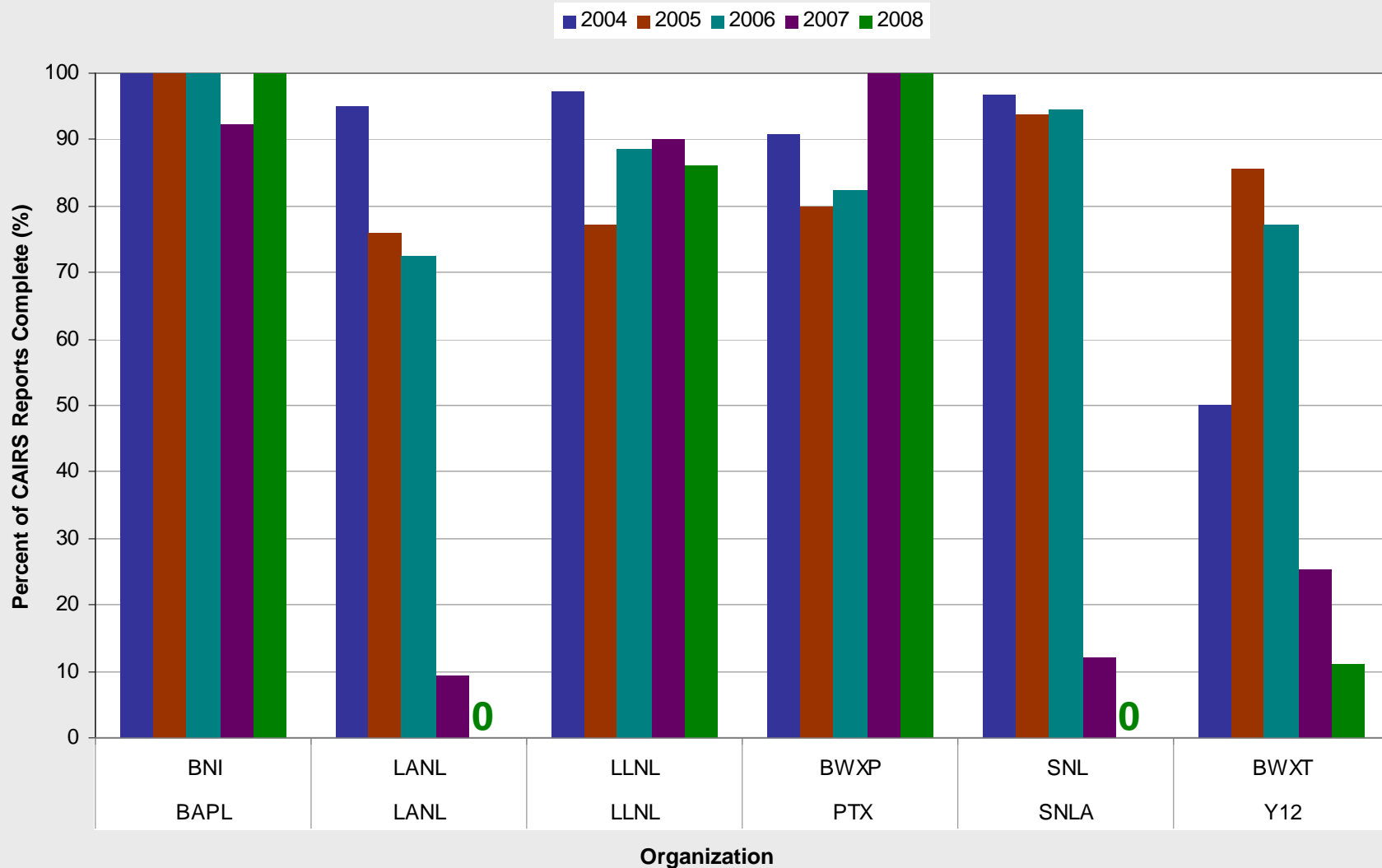
Figure 8. Completeness of Reporting for Organizations by Site
NNSA: 2008



Some organizations are providing 100 percent data coding. A “0” indicates that no reports scored 100 percent. Click [here](#) for organization names and numbers of cases. All data current as of 2/27/2009.



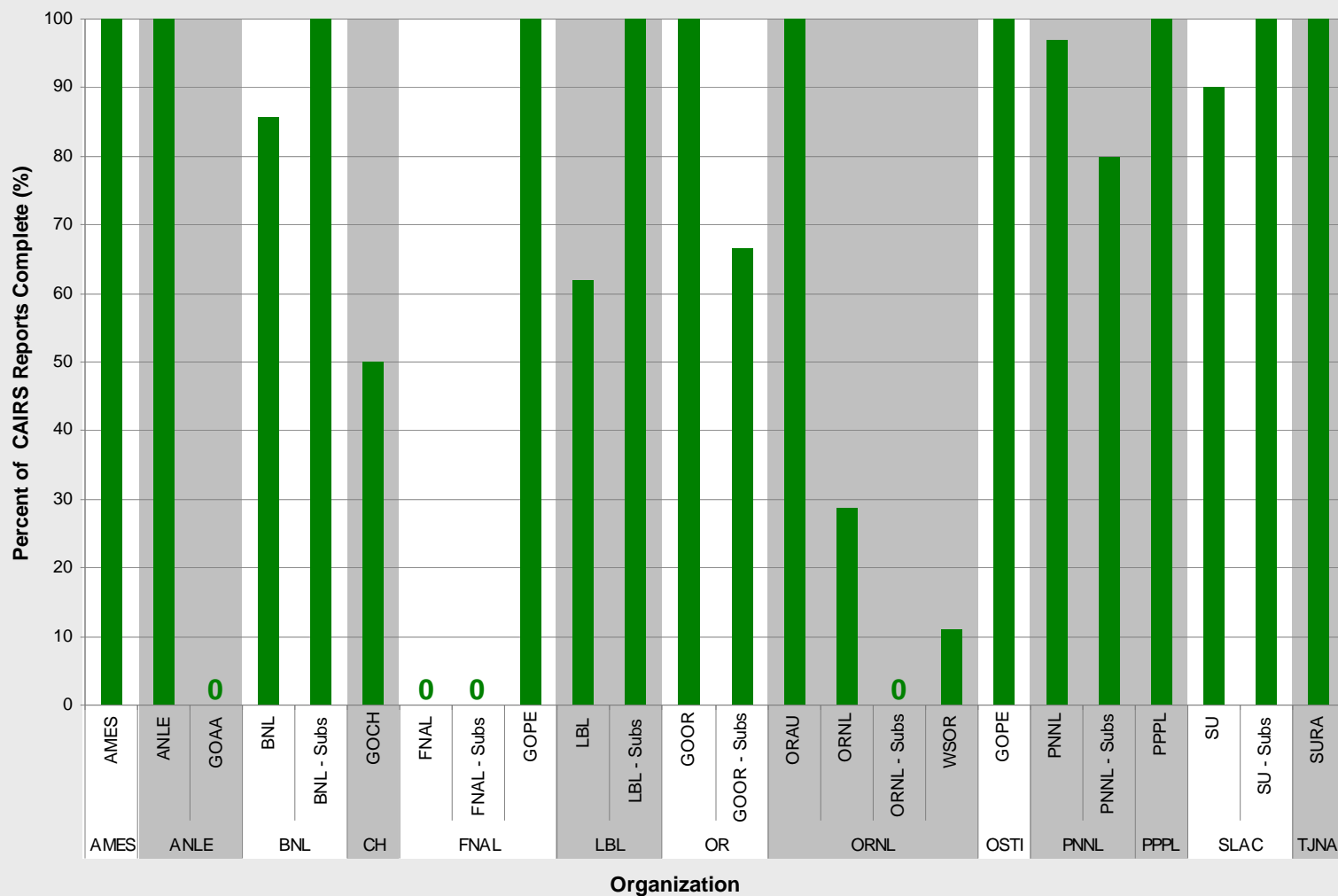
Figure 8a. Completeness of Reporting for Selected Organizations by Site
NNSA: 2004–2008



There has been an overall decrease in coding completeness, although some contractors are providing a high level of coding. A “0” indicates that no reports scored 100 percent. Click [here](#) for organization names and numbers of cases.



Figure 9. Completeness of Reporting for Organizations by Site
Office of Science: 2008

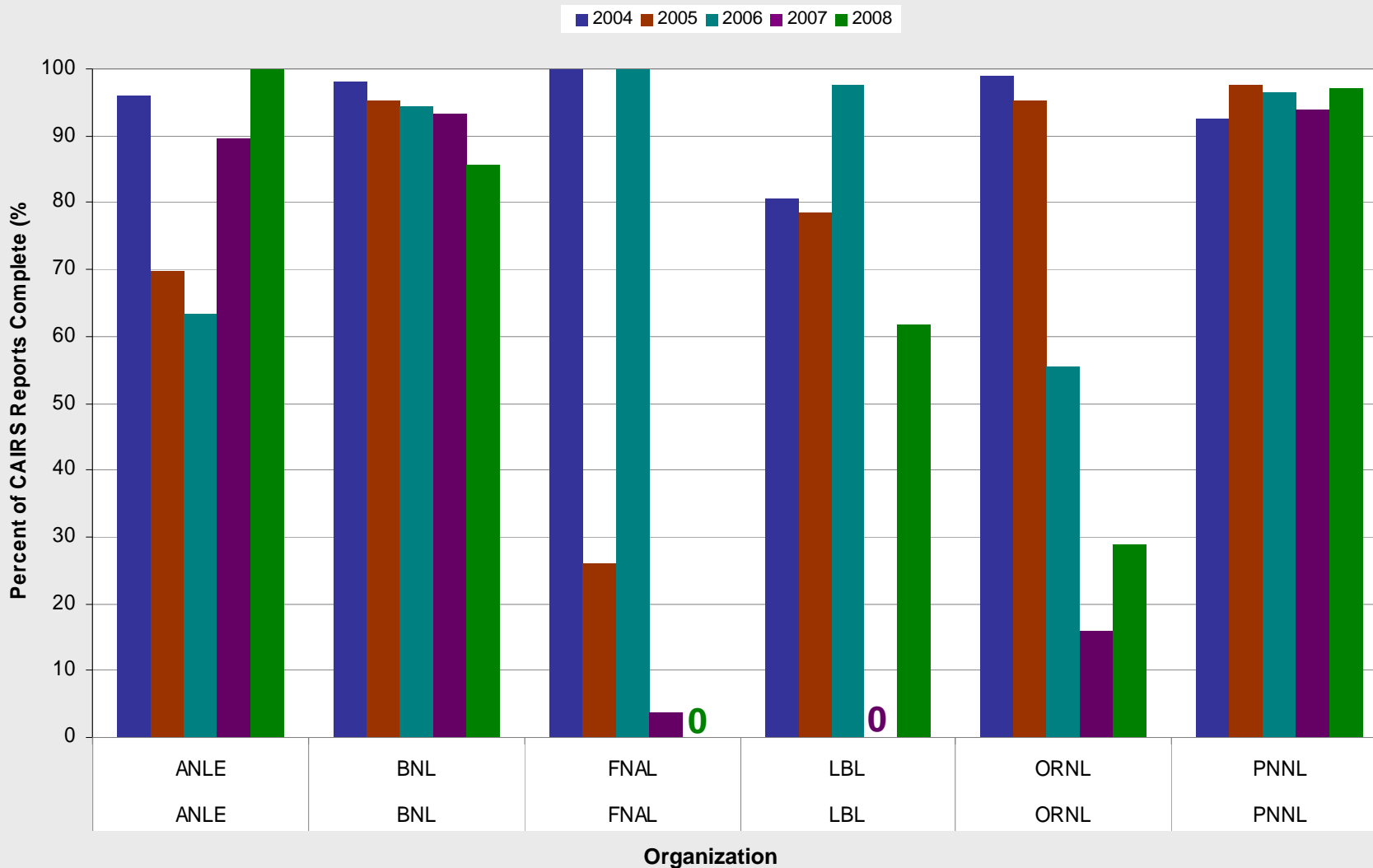


Several organizations are providing 100 percent data coding.

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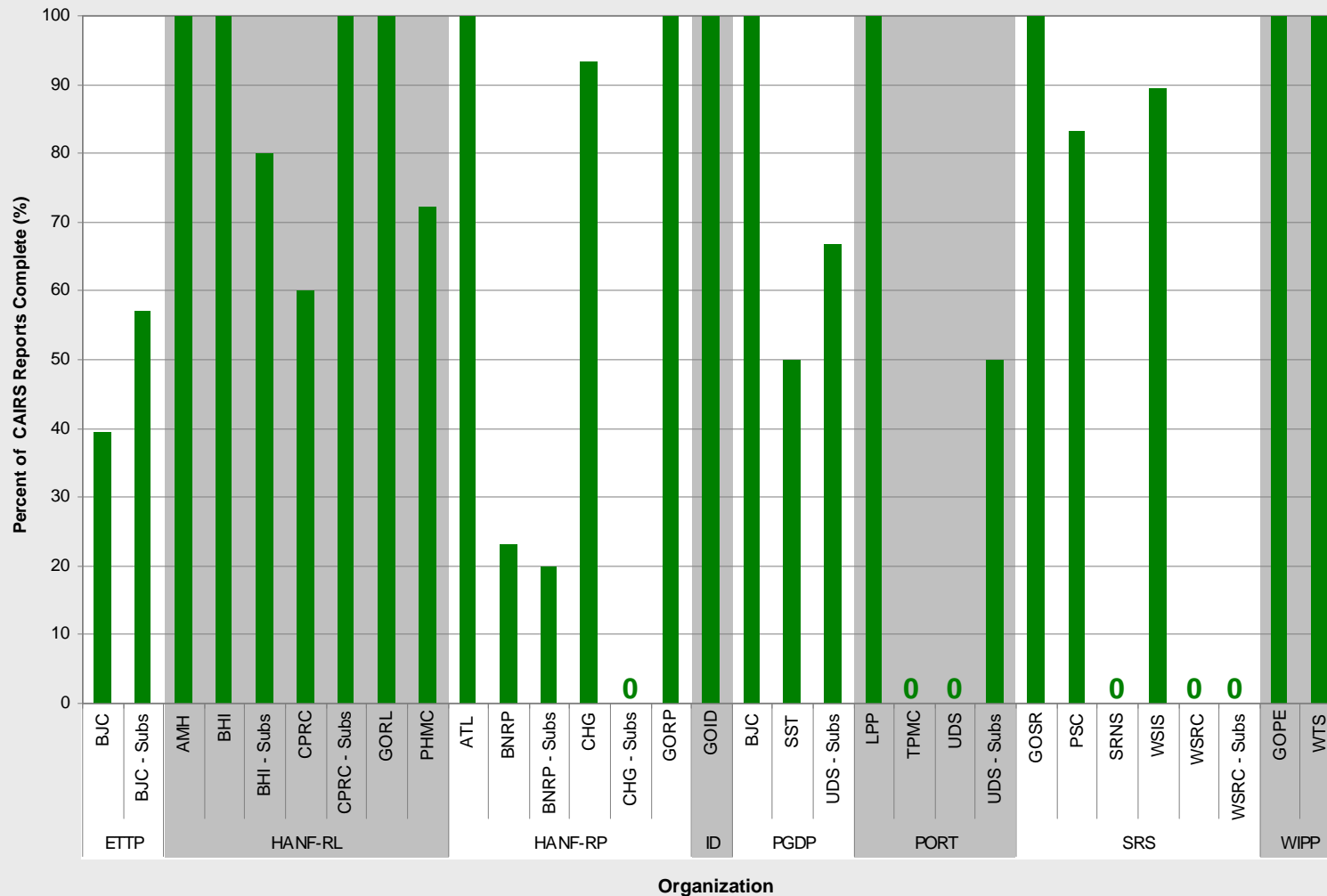
Figure 9a. Completeness of Reporting for Selected Organizations by Site
Office of Science: 2004–2008



Note that there is variable trending in data coding quality from 2004–2008.
A “0” indicates that no reports scored 100 percent. Click [here](#) for organization names and numbers of cases.



Figure 10. Completeness of Reporting for Organizations by Site
Environmental Management: 2008

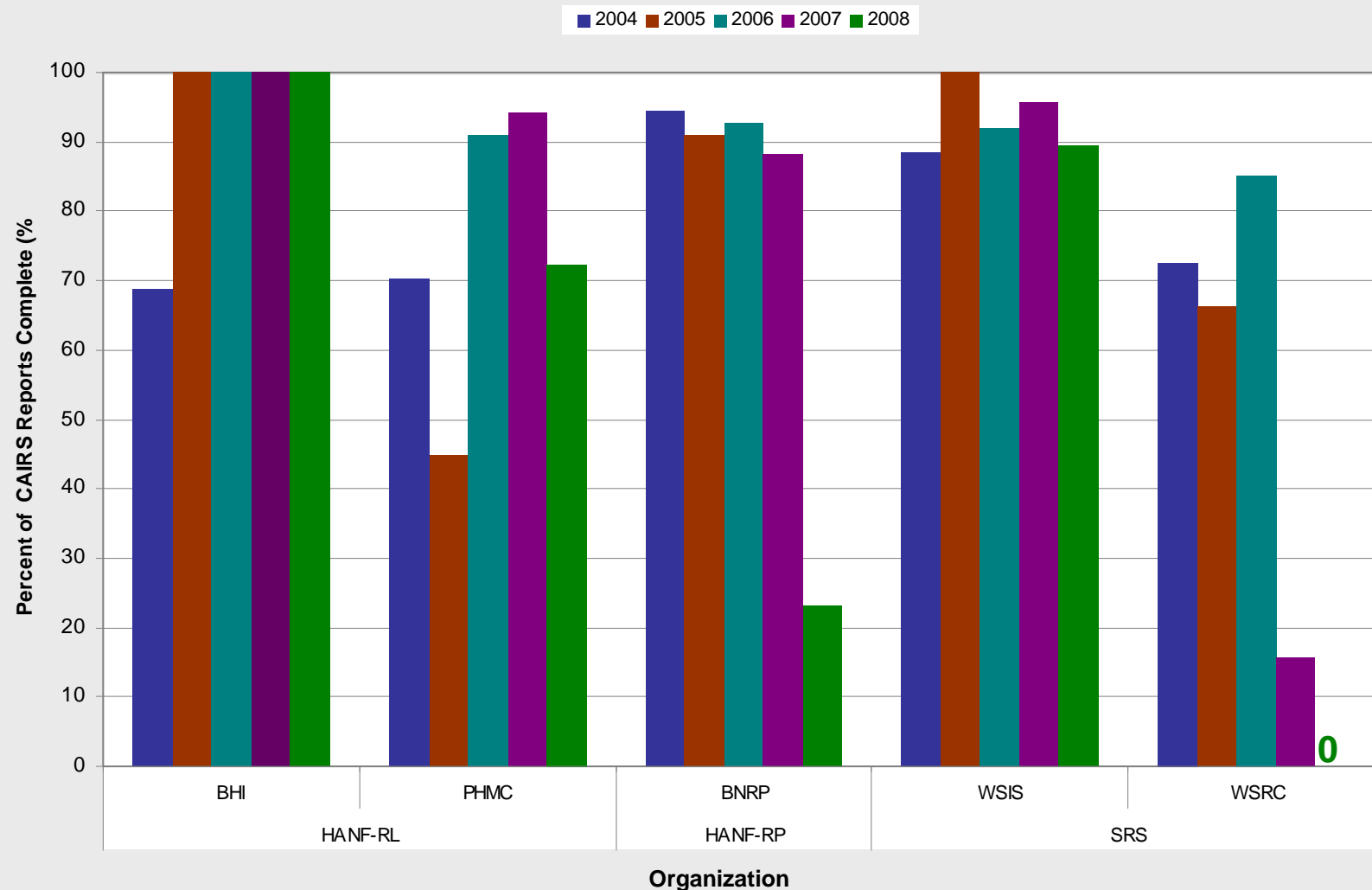


Some organizations are providing 100 percent coding.

A "0" indicates that no reports scored 100 percent. Click [here](#) for names of organizations and numbers of cases.



Figure 10a. Completeness of Reporting for Selected Organizations by Site
Environmental Management: 2004–2008



Note that there is variable trending in the data coding quality from 2004–2008.
A “0” indicates that no reports scored 100 percent. Click [here](#) for organization names and numbers of cases.



Evaluation of Corrective Actions Described in CAIRS Case Submissions



- For each case in CAIRS, the corrective actions taken or recommended were manually assigned to one of the following categories:
 - Engineering control
 - Procedural change, further evaluation
 - Training or meeting
 - Counseling the individual
 - None or N/A
- These categories are hierarchical, with engineering control as the most protective and “none” as the least protective.
- Depending on the circumstance, a corrective action involving PPE would be assigned to the category of procedural change, training, or individual counseling.
- Corrective actions are not coded in CAIRS, but must be manually identified from text fields in the CAIRS database.
- For each case in CAIRS, the most protective corrective action for that case was selected if more than one action was reported.
- Examining the distribution of corrective action categories may provide a qualitative assessment of the thoroughness of incident investigations.



Table 3. Distribution of Corrective Actions Recorded in CAIRS for April 2008



Type of Corrective Action	Percent (Number of cases reviewed)
Systemic Actions	70% (110)
• Engineering Control (most protective action)	• 13% (20)
• Procedural Changes	• 36% (57)
• Training/Meeting	• 21% (33)
None or N/A	21% (33)
Individual Actions – Injured Employee Counseled	9% (14)

These results are for the cases in CAIRS that occurred during April 2008.



ORPS Timeliness



- DOE M 231.1A, *Environment, Safety and Health Reporting Manual*, requires DOE organizations to categorize, notify, and finalize or update occurrence events in accordance with specified time limits.
- Timely recognition and reporting are important for DOE operations.
- Timely closure of ORPS events is linked to correction of identified hazards.
- The timeliness days were computed by calculating the differences between the first and the second dates.
 - For Days from Categorization to Notification, the Excel function, NETWORKDAYS, was used, since DOE M 231.1A specifies business days.
 - For the Days from Categorization to Update or Final, the Excel function, DAYS360, was used, since DOE specifies calendar day periods.
- These slides were created using ORPS data from 2008, as of 3/13/2009. Open cases were calculated as if their final date was 3/13/2009. Out of a total of 1,270 events, 72 were still open on that date.



Key to the ORPS Timeliness Analyses Graphs

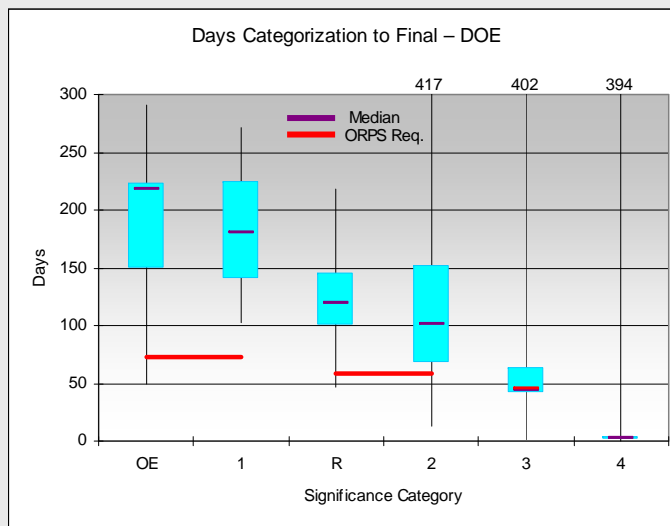
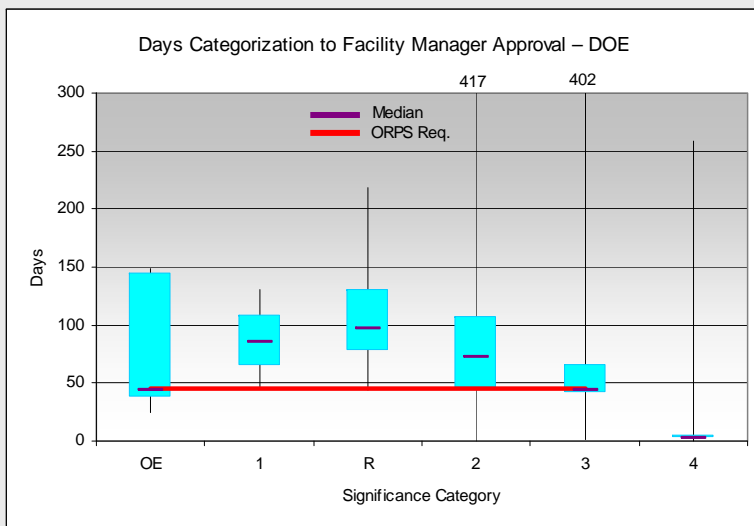
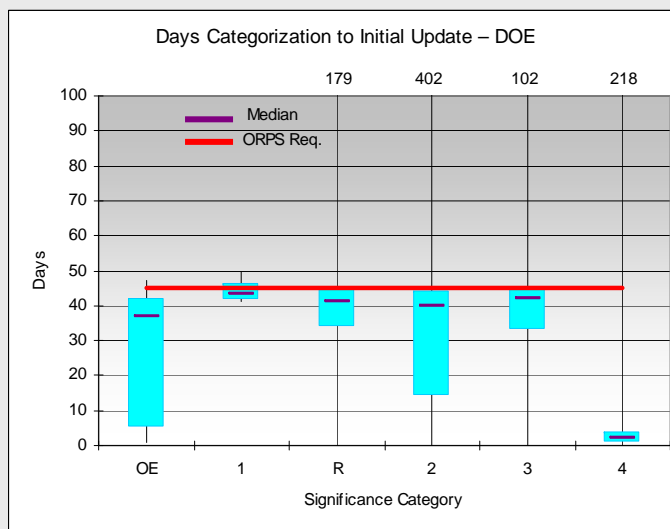
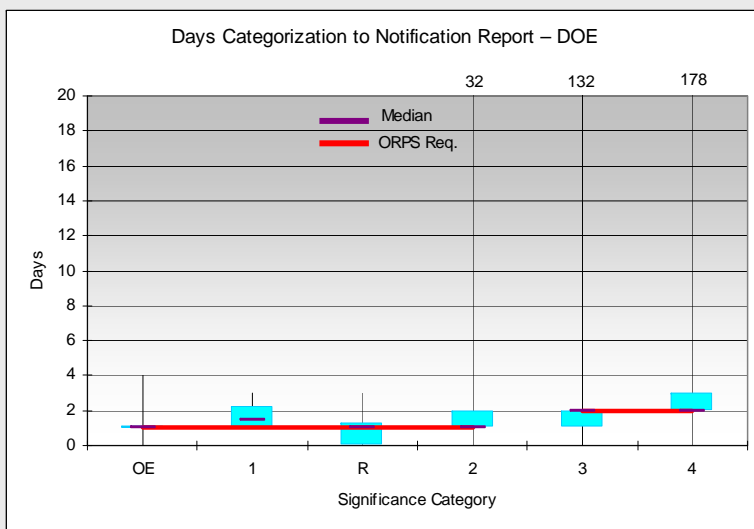


- The data in the next set of slides display four timeliness (number of days) measures:
 - Categorization to Notification
 - Categorization to Update
 - Categorization to Facility Manager Approval
 - Categorization to Final
- For each graph, the median time is displayed as a **magenta** line within an **aqua** box that represents the 25–75 percent range of days. The vertical lines above the **aqua** boxes are the upper and lower ranges of days. Where the upper limit is larger than the scale of the graph, the number of days is written in.
- A **red** line indicates the DOE timeliness requirement (which varies, depending on the Significance Category of the event).

Significance Category	Description	Required Approvals
1	Significant impact	Facility Manager DOE Facility Representative DOE Program Manager
2	Moderate impact	Facility Manager DOE Facility Representative
3	Minor impact	Facility Manager DOE Facility Representative DOE Program Manager
4	Some impact	Facility Manager
OE	Operational Emergency Occurrences; the most serious occurrences	Facility Manager DOE Facility Representative DOE Program Manager
R	Recurring	Facility Manager DOE Facility Representative



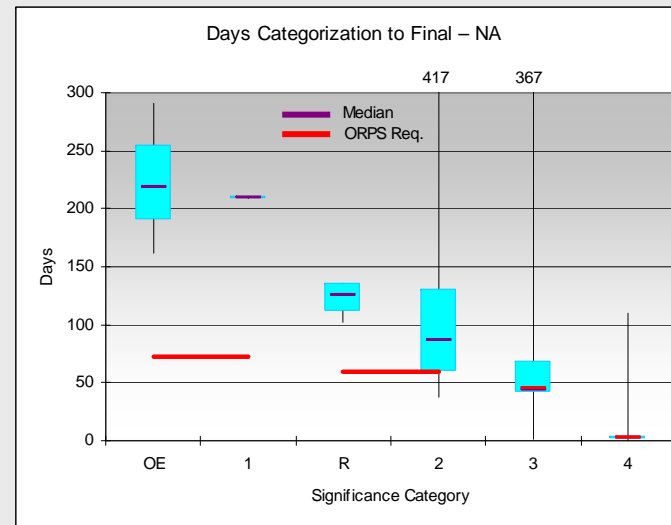
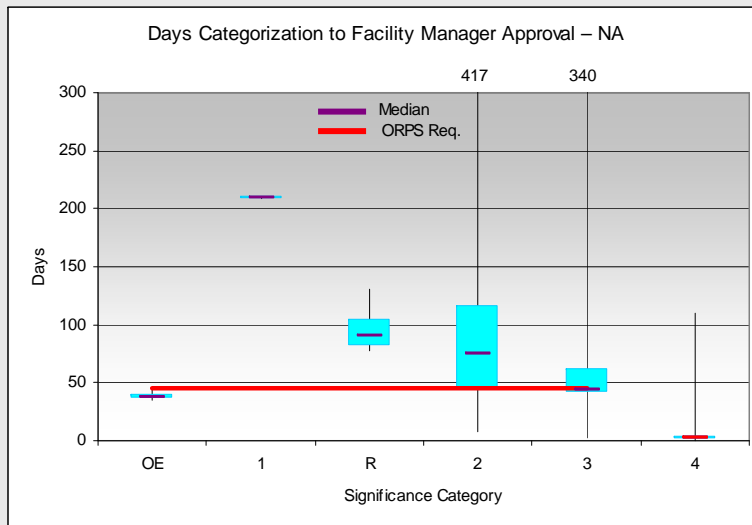
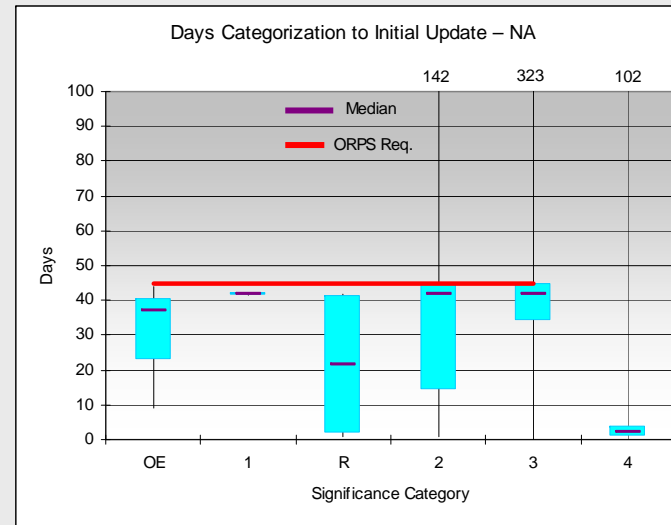
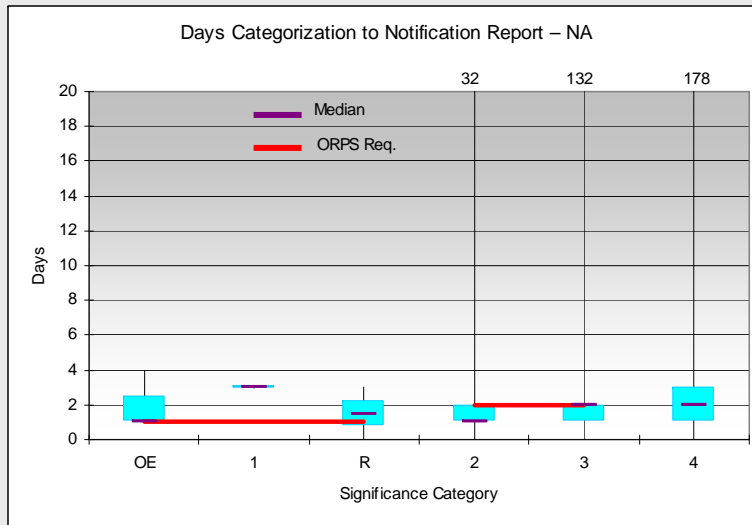
Figure 11. 2008 ORPS Timeliness: DOE
(Data as of 3/13/2009)



Click [here](#) for counts of ORPS Events by Significance Category.



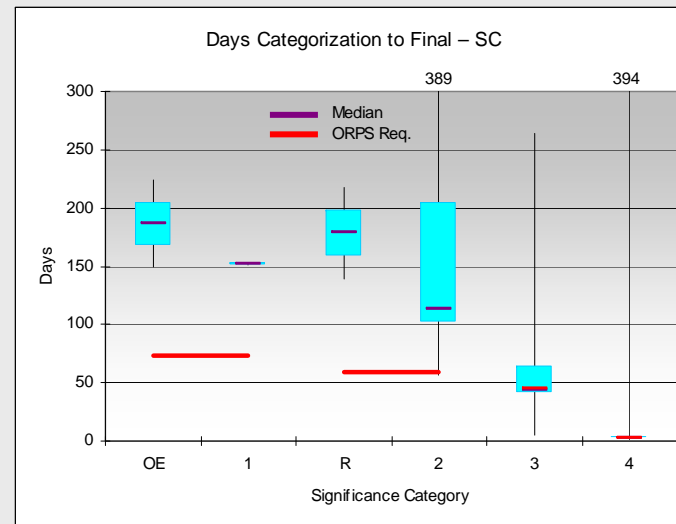
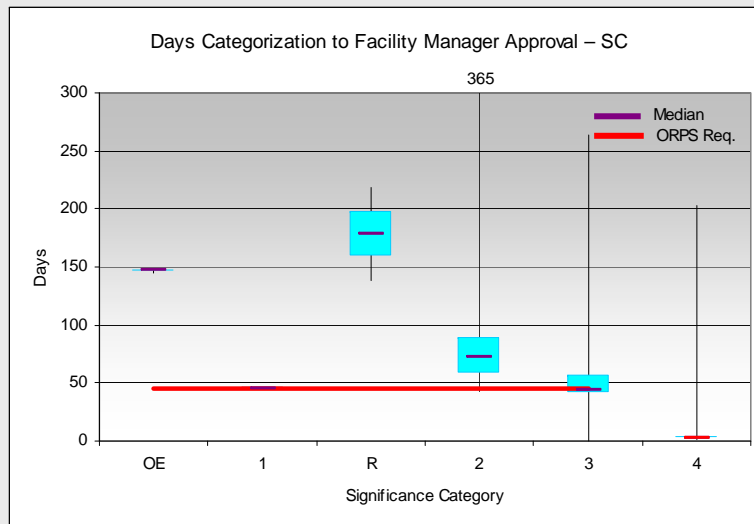
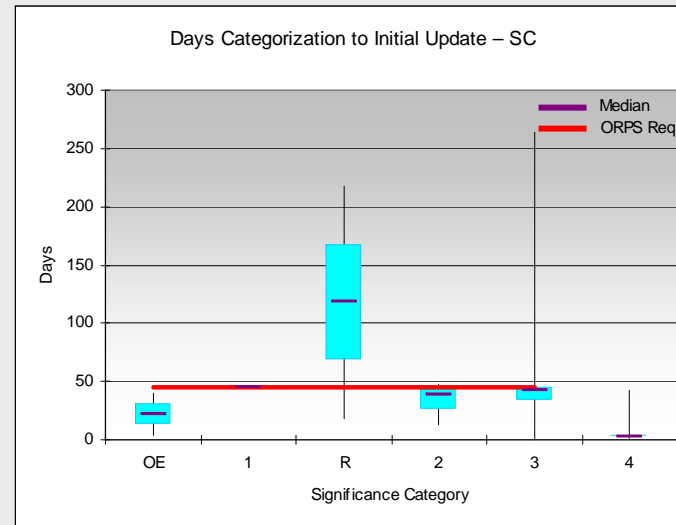
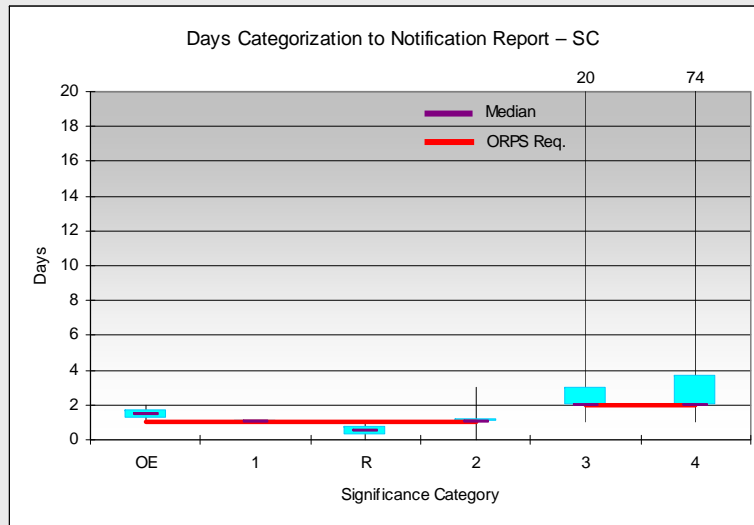
Figure 12. 2008 ORPS Timeliness: NNSA
(Data as of 3/13/2009)



Click [here](#) for counts of ORPS Events by Significance Category.



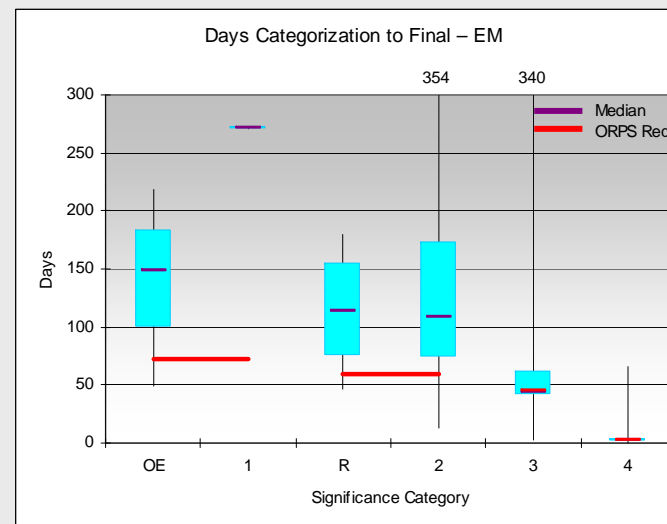
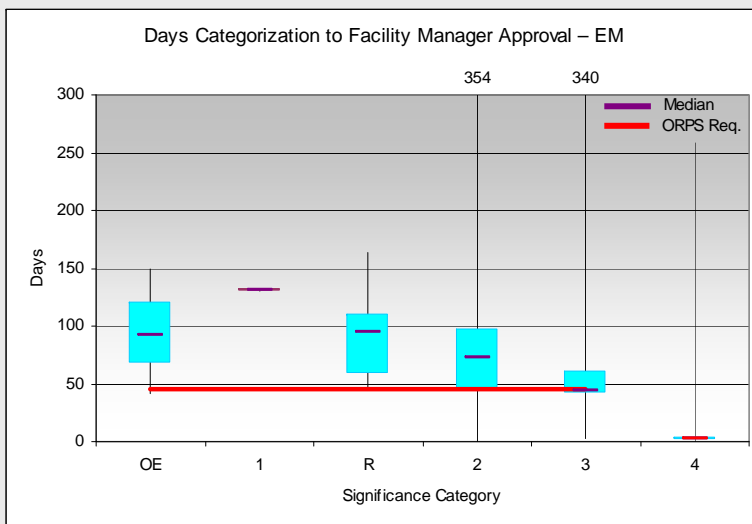
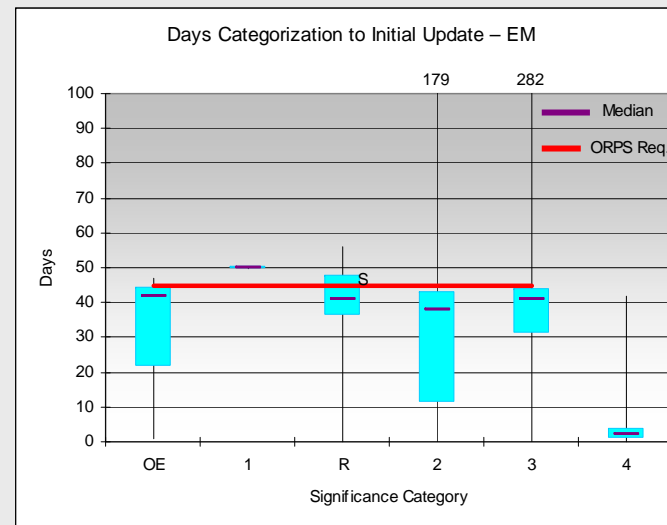
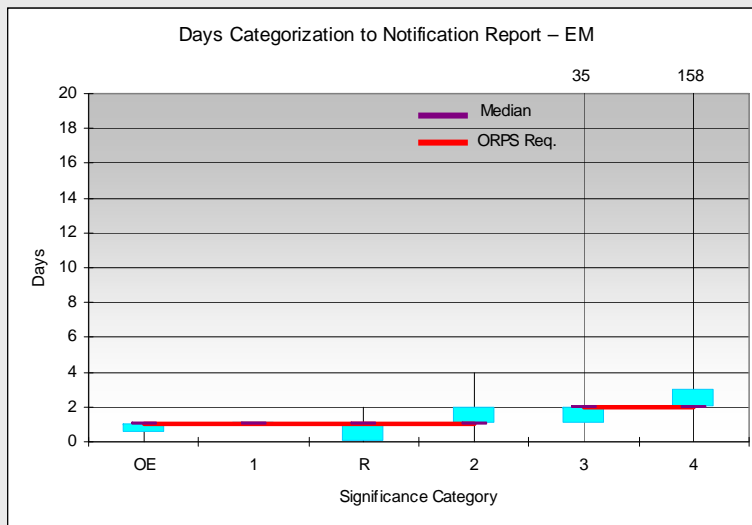
Figure 13. 2008 ORPS Timeliness: Office of Science
(Data as of 3/13/2009)



Click [here](#) for counts of ORPS Events by Significance Category.



Figure 14. 2008 ORPS Timeliness: Environmental Management
(Data as of 3/13/2009)



Click [here](#) for counts of ORPS Events by Significance Category.