

Fuel Cycle Annual Operating Experience Report 2016

Purpose:

The Fuel Cycle Operating Experience Program is designed to support technical and licensing staff, inspectors, and management by providing insights that can inform future inspections and licensing reviews. The purpose of this annual report is to provide an analysis that identifies trends to improve fuel cycle programs.

Discussion:

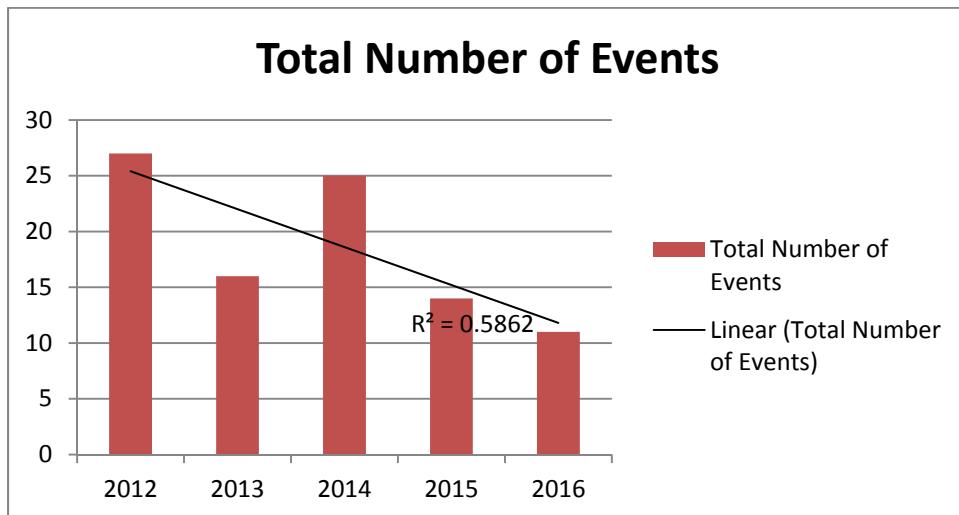
High-level Trends:

Fuel cycle events are reported under Title 10 of the *Code of Federal Regulations* (10 CFR) 70.50, "Reporting Requirements," 10 CFR 70.74, "Additional Reporting Requirements," and Part 70, Appendix A, "Reportable Safety Events." Table A below shows the total number of events reported per fuel cycle facility during the 2012–2016 period. Security-related, fitness for duty, and retracted events are not included in this data set.

	2012	2013	2014	2015	2016	TOTAL
Global Nuclear Fuel - Americas	8	2	2	0	2	14
Nuclear Fuel Services	1	0	6	1	3	11
Louisiana Energy Services	0	1	0	2	1	4
Babcock & Wilcox Technologies	1	1	0	3	1	6
Paducah	4	3	4	0	0	11
Columbia Fuel Fabrication Facility	2	0	0	1	2	5
AREVA	2	2	1	2	2	9
Honeywell	9	7	12	5	0	33
TOTAL	27	16	25	14	11	93

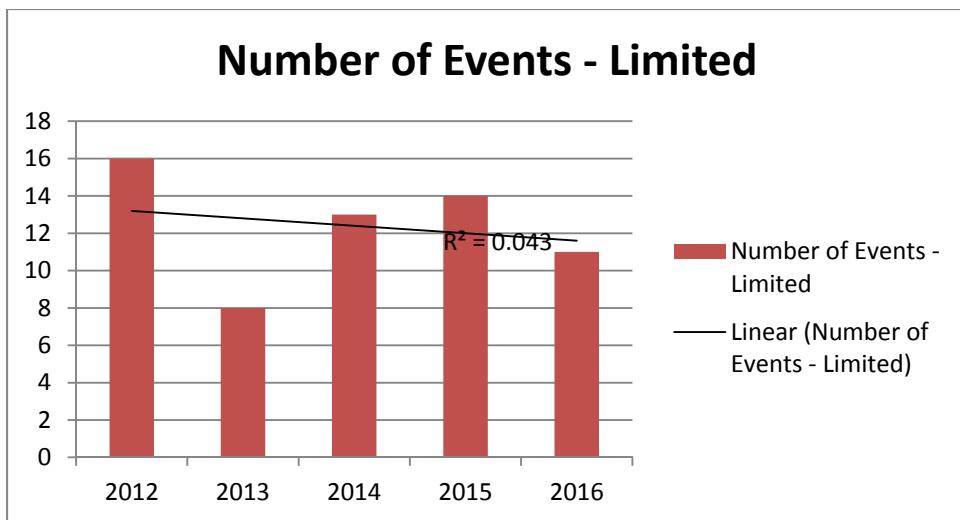
Table A - Total Number of Events per Fuel Facility per Year

Graph A is a linear regression of the total number of events per year. Although the trend line is decreasing, limited data and an analysis of the associated residual plot suggest that the slope of the regression line has a reasonable margin of error.



Graph A – Linear Regression of Total Events

After reviewing all of the events in detail, several insights were gained that led the staff to run a sensitivity case. First, 27 of the 93 events were related to contaminated workers that received unplanned medical treatment. All but 3 of these events were reported in 2012, 2013, and 2014. Furthermore, of those 27 events, approximately 89 percent were reported by Honeywell. Since the data in the first 3 years of the period was heavily weighted by events involving unplanned medical treatment for contaminated workers, this sensitivity case only counts 1 unplanned medical treatment for contaminated worker event for Honeywell in 2012, 2013, and 2014, instead of the 8, 6, and 9 events reported during those years, respectively. Second, the U.S. Nuclear Regulatory Commission (NRC) ceased regulatory oversight activities at the Paducah facility in the fall of 2014, as such, Paducah did not provide any data for the last 2 years of the period and averaged almost 4 events per year from 2012–2014. For the purposes of this sensitivity case, all of the Paducah events were removed from the overall total. Graph B is a linear regression of the sensitivity case. Since the first 3 years of the period were heavily weighted by events involving unplanned medical treatment for contaminated workers and the Paducah facility, the trend line is essentially flat indicating a relatively stable number of events per year. Similar to Graph A, Graph B has limited data and an analysis of the associated residual plot suggests that the slope of the regression line has a reasonable margin of error. The results from both Graphs A and B collectively suggest that the trend in events per year at fuel cycle facilities ranges from relatively stable to slightly decreasing.



Graph B – Linear Regression of Limited Number of Events (Sensitivity Case)

Event Screening Process:

The event screening process consists of three steps: (1) determine the applicable performance areas, 2) determine the safety significance, and (3) determine the contributing factors that led to the event. The performance areas are Criticality Safety, Operations Safety (includes chemical and fire hazards), Emergency Preparedness, Radiation Safety (occupational and public), and Material Control and Accounting. The determination of safety significance is based on several inputs: (1) the event resulted in, or reasonably could have resulted in, moderate or significant safety consequences, (2) the event is associated with an escalated enforcement action as described in the NRC Enforcement Policy, and (3) the event revealed a programmatic breakdown with a wide ranging extent of condition. An event that does not meet any of the three criteria associated with safety significance event is considered to be a low safety significant event.

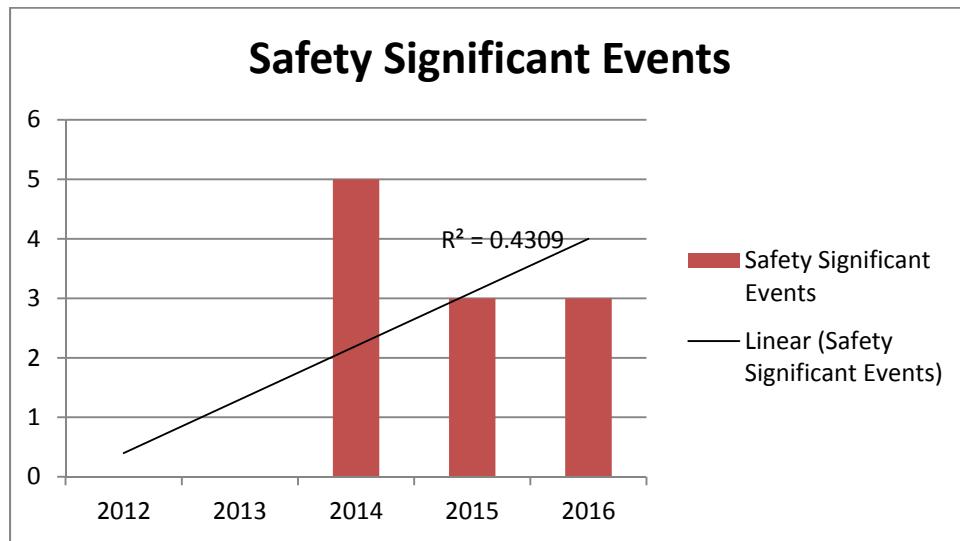
The screening process is performed by technical staff in the Division of Fuel Cycle Safety, Safeguards, and Environmental Review with expertise in the respective performance areas, and by the facility project manager. During the event screening, the group reviews the initial event notification information, license event reports, and applicable inspection reports in order to make the various determinations.

Event Screening Results:

Performance Areas – 48 of the 93 events related to either the criticality safety or operations safety performance area (26 in criticality safety and 22 in operations safety). The other 45 events related to the emergency preparedness, radiation safety, and material control and accounting performance areas. Of these 45 events, 35 of them involved the radiation safety performance area. Of those 35 radiation safety events, 27 of them were related to contaminated workers that received unplanned medical treatment. As noted in the sensitivity case, the unplanned medical treatment to contaminated worker events comprised 29 percent of the total events over the five-year period. Furthermore, from that 29 percent, the vast majority (i.e., about 89 percent) were reported by the Honeywell facility, which significantly contributed to

the total number of radiation safety events. Only eight events were reported in the emergency preparedness performance area and two events in the material control and accounting performance area.

Safety Significance – 11 of the 93 events were determined to be safety significant. Graph C below is a linear regression of the safety significant events per year, which indicates an increasing trend. However, similar to both Graphs A and B previously, Graph C has limited data and an analysis of the associated residual plot suggests that the slope of the regression line has a reasonable margin of error. The staff reviewed the 11 safety significant events and noted that 6 of the events were related to criticality safety, 4 were related to operations safety, and 1 was related to emergency preparedness.



Graph C – Linear Regression of Safety Significant Events

Contributing Factors - After reviewing all of the contributing factors that led to the safety significant events, the staff noted that failures and degradations of management measures was the most frequently occurring factor. More specifically, failing to maintain configuration management, inadequate procedures, and ineffective maintenance were the most common examples of management measure failures and degradations.

Conclusions:

Based on the analysis above, the staff concludes that:

1. The trend in events per year ranges from relatively stable to slightly decreasing.
2. The trend in safety significant events per year is slightly increasing.
3. The majority of the total events and safety significant events is associated with the criticality and operations safety performance areas.
4. The most frequent contributing factor that was associated with the safety significant events was a failure or degradation in management measures (e.g., configuration management, procedures, maintenance.)