G-205 Root Cause/Incident Investigation Workshop

Target Audience

Engineers, scientists, analysts, managers and other regulatory professionals concerned investigating significant events that occur at licensed facilities. This course version has been tailored to address the needs of individuals conducting root cause analysis investigations in commercial nuclear power, nuclear material and security situations for NRC or Agreement State Licensed Activities.

Course Objectives

Terminal Objective
Given a case study exercise:
1. Work together in teams to conduct complex root cause investigations, engage in interviews, analyze data, prepare a root cause analysis report, and present a final management summary to the class.
2. Use root cause analysis methods to identify root and contributing causes that led to the event or incident.
3. Identify all potential causes using fault tree analysis, event and conditional factor plus analysis, barrier analysis, MORT analysis, and other technologies as appropriate.

Supporting Objectives
1. Apply the following root cause analysis methods and techniques to the team case study:
    *   Event and Conditional Factors Analysis + (ECFA+)
    *   Fault Tree Analysis
    *   Pareto Analysis
    *   The 5-Whys Technique
    *   Critical Incident Technique (CIT)
    *   Barrier Analysis
    *   Management Oversight and Risk Tree Analysis (MORT)
2. Identify any cross cutting components and aspects of safety culture during the investigation of case study scenario.
3. Conduct fact finding interviews as needed conduct a structured interview with role play participants in the case study project.
4. Write root cause and supporting cause statements that communicate what must be corrected to prevent event reoccurrence.
5. Prepare and present a final team management summary.

Application of Learning

The students will be simulating a root cause event using a case study based on actual or plausible events related to either reactor operations, nuclear materials or nuclear security. Students will participate as a member of a team to conduct a root cause analysis using MORT and other RCA techniques. Students will review documents related to the event including event description, facility operating and environmental conditions, policies and procedures. Students will also be provided the opportunity to interview and solicit information from facility representatives using role play situations with instructor(s). Students will prepare a final report and present their findings to the class. Feedback will be provided to individuals and the group on their application of RCA techniques, decision processes, interview techniques and the RCA report.

4-hour Webinar - To be conducted the Wednesday prior to the classroom phase (1-5 pm ET)	Travel to Course Location (Monday)	Classroom Day 2 (Tuesday)	Classroom Day 2 (Wednesday)	Classroom Day 3 (Thursday)	Classroom Day 4 (Friday)
		Classroom morning session runs from 8 am – 12 pm			
1-Welcome 2-Initiating the RCA: • Significant Operational Event • NRC Investigation Process • Integrating Safety Culture 3-RCA Techniques • Fault tree analysis (FTA) • Event and causal factor analysis (ECFA) • Barrier analysis • Management Oversight and Risk Tree analysis (MORT) • Critical Incident Technique • The 5-Whys technique • Pareto analysis 4-Writing Root Cause Statements • Basic component • Root vs Contributing • Exercise		1-Welcome 5- Fact Finding Techniques • Document/record review • Interviewing • Asking questions to get the right answers • Active Listening 6-Event and Causal Factor Analysis • Overview • Fundamentals • Start and Stop Rules • Procedure for ECFA 11-Change Analysis • Concepts • Deviations • Comparison 7-Fault tree analysis • Basic Concepts • Fundamentals • Developing the Fault Tree • Class Example and Walkthrough	8-Pareto Analysis • Advantages • Application 9-The Five-Whys • Problem statements • Answering the questions • Problem resolution 10-The Critical Incident Technique • Application • Five Steps • Evaluation 12-Barrier Analysis • Hazard-Barrier-Target • Barriers and Controls • Procedure for Barrier Analysis	Knowledge Check – Review of previous day's material 13-Management and Oversight Risk Tree • Introduction • General Approach • Application of MORT to Investigations • Procedure for MORT Analysis • Walkthrough using Question Set • Mini-Mort	Knowledge Check – Review of previous day's material 14-Case Study Summary Prepare for Out Brief – 1 hour • Presentations Start @ 9:00 • 30 minutes to present • 15-minute "Mgmt review" • 3 Presentations Close
Pre-Work - Assigned at webinar and completed before classroom phase		Lunch			
		Classroom afternoon session runs from 1 – 4:30 pm. **Course ends at 2 pm on Friday.**			
Students will complete a Root Cause Statement exercise. Students will review case study assignment, charter and event notification to prepare for classroom activities.		Team Case Study Assignment: • Establish Team roles • Review the case study against NRC procedures and AIT Charter • Document review and data collection • Apply RCA techniques: FTA, ECFA+ • Document who you need to interview • Develop questions	Team Case Study Assignment: • Document review and data collection • Apply RCA techniques: CIT, H-B-T, FTA, Pareto, 5 Whys, ECFA+ • Conduct initial interviews	Team Case Study Assignment: Applying MORT and Barrier Analysis to the RCA and Finalizing the Report • Conduct follow-up interviews • Demonstrate use of MORT chart • Demonstrate use of two other RCA techniques • Prepare draft "Out-Brief" presentation	Team Case Study Assignment: Document review and data collection • Apply RCA techniques: Mini-MORT, CIT, H-B-T, MORT, FTA, Pareto, 5 Whys, ECFA+ • Conduct Follow-up interviews • Finalize report • Prepare 30 min "Out-Brief" presentation