



BlueDragon™

Critical Thinking and Complex
Problem Solving Workshops

“Skills to Help Us Thrive in the
Age of Artificial Intelligence”

Effective December 1, 2018

Presented by:



DLE
TECHNICAL SERVICES, LLC



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What is BlueDragon?

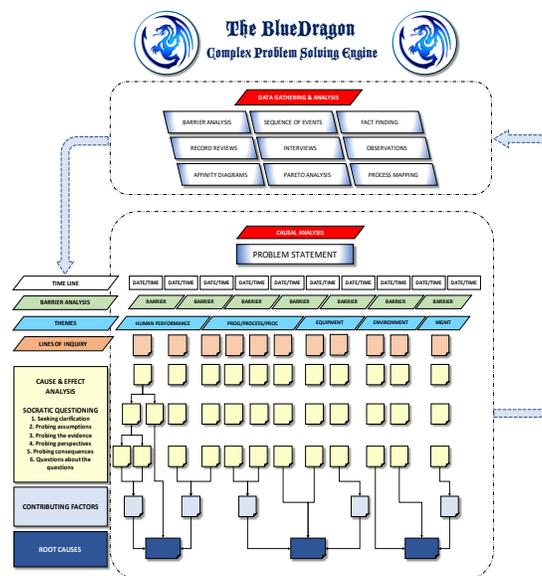
A Critical Thinking and Complex Problem Solving Method

According to the World Economic Forum,¹ the top two skills that humans need to thrive in the fourth industrial revolution (i.e. the age of Machine Learning and Artificial Intelligence), are “Critical Thinking” and “Complex Problem Solving.” BlueDragon is a complex problem solving method that is founded on developing the student’s critical thinking skills, coupled with innovative “Lean” and “Agile” tools and techniques that help to quickly and accurately identify the root causes and contributing factors that are causing human performance issues, equipment malfunctions and organizational and programmatic breakdowns.

Our Complex Problem Solving Engine (Figure 1) is an accurate, scalable, flexible, repeatable, efficient and cost-effective method that provides a disciplined approach to gathering and analyzing data, developing lines of inquiry and conducting rigorous causal analysis to identify root causes and contributing factors in the most efficient manner. In most cases, BlueDragon cuts many man-weeks from traditional root cause analyses and accident investigations. The process is structured to eliminate much of the bias and undue influence that often plagues such analyses and can be easily scaled down to conduct apparent cause evaluations. More importantly, BlueDragon can be used proactively to identify root causes before they cause significant events.

BlueDragon was developed and refined by the author after more than 28 years as a root cause practitioner in the commercial nuclear power industry and the Federal Government. The author focused on creating a method that is simple to understand and used by a wide range of groups; from University students who need real-world problem-solving and critical thinking skills before entering the workforce, to Federal Government and regulated industries that are required to perform root cause analysis for complex and significant problems and take actions to prevent recurrence. BlueDragon workshops demystify root cause analysis and clear up many misconceptions about how root causes are identified. The workshops’ MBA approach uses 14 case studies to allow participants to practice critical thinking tools and techniques and develop proficiency using the BlueDragon Complex Problem Solving Engine. Additionally, BlueDragon does not require the use of proprietary software, making it affordable and arguably the most cost-effective method on the market.

Figure 1
BlueDragon’s Complex Problem Solving Engine



¹ Source: World Economic Forum, Future of Jobs Report, 2016; based on a survey of business leaders from major global employers.



What Makes BlueDragon Different?

1. Harvard MBA approach: Our workshops are taught using an MBA approach that is anchored by 14 case studies. The case studies provide run time using the BlueDragon Complex Problem Solving Engine, allowing participants to develop proficiency in conducting apparent cause and root cause analysis (a graded approach depending on the significance of the event). The case studies showcase the BlueDragon disciplined and analytical approach, integrating the use of data analysis and critical thinking tools, reinforcing how to gather, organize and analyze data to identify root causes and contributing factors for events and accidents. The BlueDragon tools can also be proactively used to identify the causes of adverse or negative trends.
2. BlueDragon directly addresses two key problem areas that are typically found at many complex, operating facilities and scientific environments; **recurring performance problems** and **safety performance**.
 - ✓ Recurring Performance Problems: BlueDragon provides a more accurate definition of “root cause” (i.e. the current accepted definition allows root cause efforts to fall short), and ensures that the deepest-seeded root causes and contributing factors are identified so that corrective actions will have a much higher likelihood of preventing recurrence.
 - ✓ Safety Performance: BlueDragon is one of the most efficient and effective methods for conducting safety/accident investigations; it is scalable, efficient and more importantly, can be proactively applied when negative performance trends are identified.
3. BlueDragon uses Lean concepts to eliminate waste in conducting root cause analysis, as well as the Four Values of the “Agile Manifesto,” to dramatically improve the effectiveness of your root cause analyses, apparent cause analyses and accident investigations.

BlueDragon:

- ✓ Makes Root Cause Analysis simple to understand;
- ✓ Provides a more accurate definition of Root Cause than the industry standard;
- ✓ Demystifies the anatomy of an event and how root causes are identified;
- ✓ Clarifies the difference between data analysis and causal analysis;
- ✓ Develops comprehensive lines of inquiry from multiple perspectives;
- ✓ Streamlines the RCA and investigation process and reduces needed resources;
- ✓ Can be scaled down to address low significance issues (apparent causes); and,
- ✓ Can be used proactively to identify root causes before they result in major events.

Our Customer Value Proposition

BlueDragon provides more accurate and repeatable results while reducing the time it takes to conduct an analysis by as much as 75% and cutting the size of the investigative team by 50% or more.



A Few of BlueDragon's Clients



Stoller Newport News Nuclear
A Subsidiary of Huntington Ingalls Industries



Bechtel Selects BlueDragon for Implementation in its Four Business Units World-wide

- In the spring of 2017, Bechtel conducted an extensive benchmarking effort to evaluate 10 industry recognized root cause analysis methods. After an extensive review, Bechtel selected BlueDragon as their method of choice for a pilot program for their Nuclear business unit.
- In the second quarter of 2018, BlueDragon workshops were taught at Bechtel projects: the Uranium processing Facility in Oak Ridge, TN and the Pueblo Chemical Agent Destruction Pilot Plant in Pueblo, CO. The response was overwhelmingly positive.
- In August 2018, Bechtel awarded DLE Technical Services a master services agreement to bring BlueDragon workshops to all four of their Global Business Units: Nuclear and Environmental; Infrastructure; Chemical, Oil and Gas; and Mines and Metals.
- In the 3rd and 4th quarters of 2018, Rob completed high level RCAs for Bechtel at the Infrastructure Global Business Unit and the Blue Grass Chemical Agent Destruction Plant.

Projects Implementing BlueDragon Root Cause and Apparent Cause

- Bechtel's Uranium Processing Facility (Oak Ridge, TN)
- Bechtel's Pueblo Chemical Agent Destruction Pilot Plant (Pueblo, CO)
- CNS Y-12 National Security Complex (Oak Ridge, TN)
- CNS Pantex Plant (Amarillo, TX)
- Lawrence Livermore National Security (Bechtel, BWXT, AECOM) at LLNL
- Savannah River Nuclear Solutions (Fluor/SN3) at the Savannah River National Lab
- URS CH2M Hill Oak Ridge (Oak Ridge, TN)
- Nuclear Fuel Services (NFS) (Erwin, TN)



What are Customers Saying?

“The most useful and practical training ever received!”

“Through our implementation of the BlueDragon methodology, CNS is achieving a very positive culture change at our plants by providing a consistent and effective set of tools to managers to aid them in the identification of true root causes. We just completed a major BlueDragon analysis of some issues that came up in a multimillion dollar project. The process received rave reviews from the Vice Presidents that were engaged in the process and were recipients of the results.”

➤Chris Clark, Director of Contractor Assurance at Consolidated Nuclear Security LLC (Pantex and Y-12 National Security Complex)

“Just tell your prospective clients to call me and I’ll let them know how effective and efficient the BlueDragon method is.”

➤Harold Conner, PhD, PE, Nuclear Services and Engineering Manager for AECOM at UCOR (URS|CH2M Oak Ridge LLC)

“On behalf of Fluor B&W Ports, I would like to offer my personal thanks for teaching your DLE Root Cause and Event Investigation course at our Piketon, OH training facilities... We sent a wide cross section of our personnel to attend the training, including managers, operators, mechanics and safety representatives, and the feedback we received has been extremely positive. You did an outstanding job of helping our personnel understand the fundamentals of causal analysis that will help us create an excellent problem solving organization. Your material was top notch and your subject matter expertise and delivery of the course content were way above average. Again, I thank you for providing excellent training that has contributed to improving our problem-solving culture at Fluor B&W Portsmouth.”

➤Dennis Carr, Program Manager, Fluor B&W Portsmouth

“The BlueDragon Root Cause workshops you provided at both Depleted Uranium Hexafluoride Conversion Facilities DUF6 sites were extremely well received by our staff as well as the DOE and their Technical Support representatives in attendance. It increased our ability to discern and dissect our problems, and provided an important addition to the UDS “toolbox”. By more effectively identifying the causes of our issues and events we were able to target our Corrective Actions to mitigate recurrence and improve our overall performance. Your understanding and use of the BlueDragon root cause method is best-in-class. On behalf of UDS and myself, I extend my sincerest appreciation.”

➤Paul Kreitz, President – Uranium Disposition Services





What are Participants Saying?

- *"I think this can revolutionize the current processes used by the DOE." (Rich R. - Sept 2016)*
- *"The BlueDragon Root Cause Analysis course is very well structured and professionally laid out much like an MBA course. First, the root cause concepts are presented and then fun and entertaining team exercises drive home the concepts by challenging the participants with interesting real-world case studies." (Jay Gingrich, MBA, PMP – March 2018)*
- *"A great course! Should be folded into the Nuclear Regulatory Commission, the Department of Energy and commercial industries. (Martin M. - Sept 2016)*
- *"BlueDragon on a larger scale can revolutionize work for [our company]. It eliminates waste, promotes questioning attitudes and gives real fact-based causes to go fix and eliminate recurrence." (Jimmy H. – March 2018)*
- *The BlueDragon approach was fantastic! BlueDragon techniques are a great way to efficiently improve operations and safety. They will help you complete your mission." (Martin M. - Sept 2016)*
- *"This course brings together a collection of established and proven quality tools in a manner that can be efficiently applied in any situation with the rigor necessary to solve the problems." (Tammy P. - Sept 2016)*
- *"When implemented on a larger scale, BlueDragon can improve/transform fossil, hydro, nuclear [sites'] means of improving performance." (Mike A. – March 2018)*
- *"It should help us reinvigorate our corrective action process and assist us in getting the deeper systematic issues that are hindering our performance." (Tim W. – Feb 2018)*
- *"I was blown away. This workshop should be taught to every [college] graduating senior, to give them real-world problem-solving skills." (Cody W. – May 2017)*
- *"Having rated myself at the onset of training as a 2 out of 10 [in root cause analysis], I have to say I now feel very comfortable with the idea of facilitating a root cause. The case studies were the most beneficial tool for retention. The coaching during the cases was in my opinion where the most learning took place." (Jimmy H. – March 2018)*
- *"Method seems to be faster than any other method being used [in the industry]." (Erick S. – May 2017)*
- *"Rob is an expert with a world of knowledge." (Sean L. – May 2017)*
- *"It's not easy to sit in a course for 9-hrs a day, but the workshop was so engaging that time just flew by!" (Rebecca R. – May 2017)*
- *"The framework and logic behind BlueDragon really resonated with me as an excellent approach; really easy to comprehend and follow." (Lorena W. – March 2018)*
- *"I really liked that [Rob] stretched us and gave multiple opportunities to fill in detailed learning as we went. [Rob] lifted the cloud of waste (and the cloud of proprietary software) so you can see the cause-and-effect relationships." (Mindy B. – March 2018)*



BlueDragon™ Workshops

BlueDragon 3-day workshops are for personnel that are problem-solvers that are seeking to become apparent cause analysts and root cause facilitators and team leaders. BlueDragon 2-day workshops are geared towards Colleges, Universities and everyday users that require problem solving skills to support their job functions. BlueDragon 1-day workshops are for oversight personnel and regulators that require a good understanding of how root causes are identified under the BlueDragon method, and their roles and responsibilities as RCA overseers. BlueDragon 1/2-day workshops are for managers that require a good understanding of how root causes are identified under the BlueDragon method. The following is an outline of our 3-day workshop.

1.1. How Learning Takes Place

Learning at BlueDragon workshops takes place primarily in two ways:

- Experiential learning: the practical and repetitive application of BlueDragon tools and techniques for root cause and problem-solving that are founded on Socratic Questioning. There are 14 Case Studies of increasing difficulty that allow the attendees to practice key skills needed to conduct effective apparent cause, root cause or event investigations; and,
- Through the cognitive development of critical thinking and problem-solving skills that evolve with repetitive application. Critical thinking and problem-solving skills are given a jump-start during the workshops but must continue to be nurtured through the routine use of the BlueDragon tools in day-to-day problem-solving.

1.2. Terminal and Enabling Objectives

The workshops were developed to help participants become proficient in applying the BlueDragon tools and techniques to the extent that they can support, participate in or facilitate apparent cause and root cause evaluations and significant event investigations. Using Case Studies, emphasis is placed on applying the BlueDragon tools and techniques to solve problems or events involving human errors, equipment performance and organizational and programmatic issues.

Terminal Objective

After completion of the BD-301 workshop, students will have improved their Critical Thinking skills and developed an understanding of the BlueDragon Complex Problem Solving Engine so that they can participate in, facilitate or even lead apparent cause and root cause analyses or safety and accident investigations, in an efficient and effective manner.

Enabling Objectives

On completion of this workshop, the participants will be able to:

- Define the basic terminology used in root cause evaluations, such as root cause, apparent cause, causal factors, extent of condition, extent of the cause, and generic implications;
- Understand the regulations that drive the identification of root causes and actions to prevent recurrence;



- Describe the Anatomy of an Event and what had to have failed for an event to take place;
- Describe the difference between symptoms and underlying causes, and how to determine whether underlying causes are root causes;
- Follow the BlueDragon Diagram to collect and analyze data, develop lines of inquiry and conduct cause & effect analysis to identify root causes and contributing factors for most problems and events;
- Evaluate Human Performance issues, Equipment malfunctions and Organizational and Programmatic (O&P) weaknesses;
- Validate whether identified causal factors are root causes and establish effective corrective action plans that directly address identified causes and manage and prioritize corrective actions to prevent recurrence;
- Understand the importance of standardizing effective corrective measures, distributing lessons learned and operating experience to other parts of the organization, indoctrinating (training) the staff on important enhancements to improve performance, and celebrating successes along the way; and
- Effectively communicate the results of root cause and event investigations to management and regulators.





1.3. Key Skills, Knowledge and Behaviors

The following skills, knowledge and behaviors are considered essential for success in conducting root cause evaluations and event investigations, and have been incorporated into the 3-day workshop.

Skills	Knowledge	Behaviors
<ul style="list-style-type: none"> • How to conduct interviews and ask the kind of questions that support causal analysis. • How to conduct data analysis using tools such as Affinity Diagrams and Pareto Charts. • How to conduct cause and effect analysis using multiple lines of inquiry. • How to use causal analyses tools such as Ishikawa, Fault Tree Analysis and Events and Causal Factors Charts, and how these are combined into the BlueDragon Diagram. • Techniques for capturing data on post-its, organizing the data and maintaining the proper cause and effect relationships. • How to construct time lines. • How to conduct a Barrier Analysis to identify all of the different physical and administrative barriers that are in effect during an event. • How to determine & validate whether a causal factor is a root cause. • How to prepare corrective action plans that effectively prevent recurrence and are within the company's capabilities to implement. 	<ul style="list-style-type: none"> • An understanding of problem solving fundamentals. • A comparison of the structure behind the BlueDragon, Lean, Six Sigma, Design Thinking, Ford 8D and the Toyota Way methods. • An understanding of the cause and effect relationships and how they will lead to root causes. • An understanding of how to differentiate between direct causes, apparent causes and root causes. • Approaches to conducting data gathering, causal analysis & documenting the results. • An understanding of how to increase the rigor of the analysis by adding lines of inquiry based on the significance and complexity of the event being analyzed. • Knowledge of the guidelines for preparing effective corrective action plans that prevent recurrence, and of the types of corrective actions are not to be credited for preventing recurrence. • Knowledge of the guidelines for preparing root cause reports. 	<ul style="list-style-type: none"> • Root cause analysts do not jump to conclusions before conducting the causal analysis. • Rigor is applied in conducting root cause analysis, proportional to the significance and consequences of the events being analyzed. • Excellent problem solvers use causal analysis tools and agile methods as much as possible in day-to-day problem solving, at work and at home. • Root cause analysts have a questioning attitude and a curiosity of what latent weaknesses lay deep within the organization. • Root cause analysts are open to feedback and new information that may change their conclusions. • Management verifies that a rigorous process and methodology were used to identify the root causes, but do not second-guess the analysis without having gone through the process themselves.



1.4. Assessment of Student Performance

Assessment of student performance takes place throughout this course in different ways. The assessment activities and are aligned to the overall objectives for course and include:

- Instructor assessment: The instructor will guide participants on a journey of learning and discovery through structured discussions where the instructor can assess the students' understanding of the concepts and paradigm shifts being presented, and provide direct feedback and additional information to ensure that the participants have grasped the concepts.
- Case Studies: To ensure the students develop the skills necessary to conduct root causes and event investigations, the course includes 14 Case Studies that build on each other, to develop proficiency in using the BlueDragon tools and techniques for problem solving. The instructor monitors and assesses the students' performance on a real-time basis and provide feedback and coaching as necessary to ensure the required skills are developed.
- Management Oversight: members of the client's management team are invited to attend the last hour of the second day, when students will be completing an in-depth case study on a serious injury that also involves organizational and programmatic issues. The teams will practice how to best communicate with managers and managers will be encouraged to ask questions and challenge the results.
- Final Case Study: The final Case Study calls for one-on-one interactions between participants and the instructor, where the participants must demonstrate their knowledge and understanding of the tools and techniques for determining root causes and contributing factors.
- Quiz: There is a 10 question quiz at the end of the course based on the Enabling Objectives, to test the student's retention of key concepts taught during the class. Any quiz questions that the students miss are immediately remediated during a post-quiz discussion.





1.5. Professional Development Units and Continuing Education

Effective October 1, 2014, the Project Management Institute (PMI), the world's largest project management member association, named DLE Technical Services, LLC as a Registered Education Provider (R.E.P.). R.E.P.s are organizations that have been approved by PMI to help project managers achieve and maintain the Project Management Professional (PMP®), Program Management Professional (PgMP®) and other PMI professional credentials. These organizations have met PMI's rigorous quality criteria for course content, instructor qualification, and instructional design².



The 3-day BlueDragon Problem Solving Method™ workshop awards 27 Professional Development Units (PDU) under Category A of the PMI Continuing Certification Requirements program. The 27 PDUs earned from this workshop may be applied toward project management "contact hours" required to be eligible for PMI certification exams and to the maintenance of PMI Credentials such as PMP®, PgMP® and PMI Risk Management Professional (PMI-RMP®).

DLE Technical Services is an Approved Registered Education Provider for the Project Management Institute (PMI) since 2014.



Participants of the BlueDragon Problem Solving Method™ 3-day workshop (BD-301) will receive a certificate of completion and 27 credit hours from PMI.



² For additional information on the Project Management Institute, visit: www.pmi.org



BlueDragon's Creator and Primary Instructor

Rob De La Espriella: President, DLE Technical Services, LLC

BlueDragon was created by Rob De La Espriella, a subject matter expert (SME) in root cause analysis (RCA) and event investigations since 1990. For over 28 years, Rob has led, facilitated, taught or conducted root cause analysis and complex problem solving efforts at nuclear power plants, the US Nuclear Regulatory Commission (NRC), the US Department of Energy (DOE), and Engineering firms in the US and Canada and Switzerland.

Rob was a member of the Florida Power & Light team that won the Deming Prize in 1990, the first and only company in the world outside of Japan to win the award. During and after FPL's quest for the Deming, Rob received extensive training on RCA tools and techniques and became an instructor in 1991. Since then he has led or facilitated hundreds of root cause evaluations, audits, assessments and problem-solving efforts. In 1995, Rob received two awards from the Nuclear Regulatory Commission for leading root cause teams at their Region I office in King of Prussia, PA and the Millstone Nuclear Plant, and for bringing Total Quality Management Concepts to the NRC. In 2003 and 2005, the Institute of Nuclear Power Operations (INPO) listed Rob's Nuclear Assurance organization as one of the strongest in the US, and Rob attributes that recognition, in large part, to teaching root cause and problem-solving skills to his staff and creating a problem-solving culture. Also in 2005, Rob was asked by the World Association of Nuclear Operators (WANO) to support improvement initiatives in Slovenia and South Africa.



Since launching DLE in 2006, Rob has been sought out as a root cause SME to facilitate or support root causes of complex technical issues and safety accidents (including near fatalities) at the DOE National Labs, DOE Gaseous Diffusion and Depleted Uranium Hexafluoride Conversion Facilities, and at the National Security Complex at Y-12. Rob was the lead root cause evaluator on the team that investigated an explosion that took place at Idaho National Laboratory's Experimental Breeder Reactor (EBR-1) in 2011. He was also sought out by Atomic Energy of Canada Limited to conduct an eight-week causal evaluation of their management systems, which had posted losses of \$1.2 Billion in five years.

In 2011, Rob began teaching his Critical Thinking and Complex Problem Solving method, and in 2016 this method was given the trademark name "BlueDragon." The 3-day BlueDragon workshops are approved by the Project Management Institute, and BlueDragon is rapidly gaining market share among the best known RCA methods in the industry.

Teaching root cause analysis and critical thinking to our future leaders is one of Rob's professional passions. In 2016, Rob launched an initiative to bring valuable, real-world critical thinking and complex problem-solving tools and techniques to colleges and universities. Since January 2017, Rob has awarded free tuition to over 60 college students and faculty to attend BlueDragon workshops. He has also taught BlueDragon tools and techniques to Design Thinking Teams at Princeton's Keller Center for Entrepreneurship during the summers of 2016, 2017 and 2018. Rob remains an active root cause practitioner and provides consultation support to commercial and government clients.



About DLE Technical Services, LLC

1. Small Business Status



DLE Technical Services, LLC was established in 2006 and was certified by the Small Business Administration as a 8(a) Small Disadvantaged Business from 2009 to 2018. It is also certified by VetBiz as a 100% Veteran Owned Small Business (VOSB) and is registered in the System for Award Management (SAM).

2. Point of Contact (POC)

The following person is authorized to negotiate on DLE's behalf:

Name of POC: Rob De La Espriella, President, DLE Technical Services, LLC
POC Address: 4634 SW Long Bay Drive
POC Telephone: (772) 341-1093
POC E-mail: rob.dle@dle-services.com

3. Representations and Certifications

- a) DUNS #: 623686834
- b) DLE Technical Services, LLC is certified by the Project Management Institute as a "Registered Education Provider."
- c) DLE Technical Services, LLC is registered in SAM and the representations and certifications for DLE are available in the SAM website.
- d) DLE Technical Services, LLC is also a certified VOSB and our certification can be verified on <https://www.vip.vetbiz.gov>.
- e) DLE Technical Services, LLC was an 8(a) Small Disadvantaged Business and our 8(a)-expiration date was August 2018. DLE remains a small disadvantaged business.

