

# Cost Estimating Community of Practice

# **5th Annual Symposium**

August 3-5, 2021 Los Alamos National Laboratory

WORKING TOGETHER: ONE MISSION, ONE VISION, ONE NSE

## **WELCOME**



On behalf of the Cost Estimating Analysis Group (CEAG) Council and the National Nuclear Security Administration (NNSA), I would like to welcome you to the Fifth Annual Cost Estimating Community of Practice (CECOP) Symposium hosted by Los Alamos National Laboratory (LANL).

As a nation, we are slowly coming out of the COVID-19 global pandemic and moving towards a familiar normal. We had hoped to welcome you to beautiful Los Alamos to participate in this year's CECOP Symposium in person; however, constraints on essential travel have prompted us to host this event virtually.

CECOP was formed by the NNSA's eight sites and the Department of Energy's (DOE's) Headquarters for the purpose of exchanging cost estimating best practices through collaborative relationships within government, industry, and the Nuclear Security Enterprise (NSE). The collective scientific and

technological expertise that spans the DOE's and the NNSA's laboratories should be shared and fostered to ensure that we all can be agile and responsive to our nation's needs to enhance our estimating capabilities across the complex.

A special welcome to our distinguished keynote speakers: David Turk and Ranae Woods. David Turk is the Deputy Secretary of the U.S. Department of Energy, Washington, D.C. Before Mr. Turk's nomination, he served as the Deputy Executive Director of the International Energy Agency (IEA), where he focused on helping countries around the world tackle clean energy transitions. Ranae Woods is the Technical Director for Cost and Economic Analysis Research, Air Force Cost Analysis Agency, Deputy Assistant Secretary for Cost and Economics, Office of the Assistant Secretary of the Air Force for Financial Management and Comptroller, Washington, D.C. Ms. Woods has supported the Air Force and Navy throughout her career in the area of costs analysis and industrial engineering. LANL extends a warm welcome to our keynote speakers and thanks them both on behalf of LANL and CECOP for participating in this event.

This year's event will include presentations from an array of site representatives in the areas of cost estimating policy, capital project estimate practices, risk management, and data analysis for application in weapons programs. This virtual event will continue to provide an excellent learning platform to share and grow in the areas of cost estimating.

May your experience at this Symposium be pleasant and filled with a wealth of information and opportunities to network virtually.

Sincerely, James Owen

Associate Laboratory Director for Weapons Engineering Los Alamos National Laboratory

# **COST ESTIMATING ANALYSIS GROUP**



The Cost Estimating Analysis Group (CEAG) is a nuclear security enterprise (NSE) wide working group sponsored by National Nuclear Security Administration (NNSA) management with membership from the nuclear weapons design and production agencies. CEAG is a principal source for cultivating expertise, experience and excellence for NNSA cost estimating capabilities.

CEAG leads a focused effort to continue to improve NNSA's and each site's ability to forecast the scope, resources, and funding required for program execution, while also developing associated skill sets and fostering communication, collaboration, and information sharing. CEAG leverages existing individual capabilities, evaluates models, and conducts requested analysis to support the needs of NNSA.

CEAG is based on the following principles:

- Emphasis on enterprise-wide perspective in addition to and aligned with site perspectives
- Participation from all NNSA sites
- Mutual respect and transparency with open and honest dialogue among all members and participants
- Sites negotiate their deliverables, resources, and intellectual property issues

results

The CEAG Council is comprised of representatives from across the NSE, integrating the knowledge and expertise of professionals at the sites and NNSA and is chaired by NA-MB, Management and Budget. CEAG is chartered to lead independent cost estimate reviews and other cost analysis efforts as requested by NNSA leadership or from the nuclear weapons design and production agencies and approved by CEAG.

#### 2021 CEAG Council Members and Site Representatives include:

Site	Council Members	Site Representatives
NNSA	Cash Fitzpatrick - CEAG Chair	
CNS	Eric White	David Zimmerman
KCNSC	Michelle Oakes	Megan Ladwig and Cameron Ayers
LANL	Tri Duc Tran	Brian Temple and Tanya Moore
LLNL	Carol Meyers	Veronica Garza and Chris Adams
NNSS	Casey Hulet	Krista Lathery
SNL	Jonell Samberson	Phil Chamberlin and Duff Lill
SRS	Jason Wilson	Carter Hopkins
Council Support Team		
NNSA	Kathleen Lane	Maura Lapoff

• Encourage original and innovative analytic approaches with potential to develop insight and confidence in

# COST ESTIMATING COMMUNITY OF PRACTICE



The Cost Estimating Community of Practice (CECOP) is focused on training, exchanging, and promoting cost estimating methodologies and best practices in support of the unique mission and conditions relating to the Nation's nuclear security enterprise. CECOP as chartered by the Cost Estimating Analysis Group (CEAG) is responsible for developing working groups such as the Historical Data Working Group and the Modeling Working Group in addition to planning and hosting an annual CECOP symposium. To date the symposium has included cost estimating professionals from the NNSA, Department of Energy, Department of Defense, National Aeronautics and Space Administration, National

Reconnaissance Office, U.S. Government Accountability Office, industry, and other experts in the field. The planning, programming, budgeting, and evaluation of major modernization programs for the nuclear weapons stockpile along with the capital acquisition necessary to support this mission involves complex, dynamic, and interdependent processes across the nuclear security enterprise. Preparing estimates for these activities requires an integrated, holistic approach. CECOP provides communication, community building, and knowledge exchange through working groups and yearly symposia to improve nuclear security enterprise estimating.

CEAG sets the priorities for CECOP and develops its values and guiding principles. In addition, CEAG draws specific expertise from CECOP for CEAG projects. The continued success of CECOP is one of CEAG's highest priorities. As the parent organization, CEAG Council Members are actively involved in CECOP and nominate members from their site to serve on the CECOP Planning Committee which is responsible for planning the annual CECOP symposium and organizing various information exchange meetings and educational opportunities throughout the year.



Prior to his nomination as Deputy Secretary, Turk was the Deputy Executive Director of the International Energy Agency (IEA), where he focused on helping countries around the world tackle their clean energy transitions. He also directed reports on the digitalization of energy systems, the future of clean hydrogen, and a project tracking progress on a wide range of clean energy technologies.

During the Obama-Biden Administration, Turk coordinated international technology and clean energy efforts at DOE. During this time, he helped spearhead the launch of Mission Innovation—a global effort to enhance clean energy innovation.

Turk also served as Special Assistant to the President and Senior Director at the U.S. National Security Council, where he coordinated interagency

**MR. DAVID M. TURK** legislative affairs efforts by the full range of national security agencies and provided legislative advice to National Security Council decision-making. He also previously worked at the U.S. Department of State, including as Deputy Special Envoy for Climate Change and helping to coordinate New Start Treaty ratification efforts in the U.S. Senate.

Earlier in his career, Turk worked in both the U.S. Senate, primarily on national security issues, and as the Staff Director of the National Security Subcommittee of the House Oversight Committee.

Turk was born in Quito, Ecuador and raised in Rock Falls, Illinois. He is a graduate of both the University of Illinois at Urbana-Champaign and the University of Virginia Law School. He and his wife, Emily Turk, have three children.



**MS. RANAE P. WOODS** 

Ranae P. Woods, a Senior Level executive, is the Technical Director for Cost and Economic Analysis Research, Air Force Cost Analysis Agency, Deputy Assistant Secretary for Cost and Economics, Office of the Assistant Secretary of the Air Force for Financial Management and Comptroller, Washington, D.C.

Mrs. Woods began her career as a cost analyst and industrial engineer in the Navy Cost Analysis Intern Program for the Naval Center for Cost Analysis where she supported the development of cost estimates for a wide variety of Navy weapon systems. Since 1993, she has held a wide variety of cost analysis positions within the Air Force as well as a career broadening position within the Office of the Deputy Chief of Staff, Strategic Plans and Programs

The 2021 CECOP Planning Committee is:

2021 CECOP Symposium Planning Committee Members			
Kathleen Lane	NNSA	Frankie White	LANL
Maura Lapoff	NNSA	Nathan Clough	SNL
Megan Ladwig	KCNSC	Phil Chamberlin	SNL
Austin Aslin	LANL	Anita Dotson	SNL
Cory Carnes	LANL	Carla Jordan	SNL
Jennifer Casias	LANL	Charles Luce	SNL
Teresa Sparks	LANL	Jamie Morris	SNL
Cameron Stern	LANL	Leone Young	SNL

If you are interested in helping us plan CECOP please reach out to a planning committee member from your site or write to cecop@nnsa.doe.gov

# AGENDA

		Day 1 Presentations All times ET	Day 1 T
11:00 AM	11:05 AM	Welcome and Opening Remarks	
11:05 AM	12:00 PM	Keynote - David M. Turk	
12:00 PM	12:30 PM	NNSA's New Programmatic Cost Estimating Policy Cash Fitzpatrick Cash Fitzpatrick from NNSA will discuss the agency's new "Programmatic Cost Estimating" policy related to the establishment of its Programming, Analysis and Evaluation (PA&E) office. The presentation will cover an overview to PA&E, as well as how NNSA's new roles and responsibilities affect stockpile modernization programs, capital acquisition projects, and the PPBE process writ large.	<b>Stochastic and Arithmetic Forecasting of Conting</b> <i>Ste</i> Steve Wageman from SNL will describe an alternative "top-down" stocha their forecast, and more importantly for most organizations, to probabilis
12:30 PM	01:00 PM	The ITER Project: Lessons Learned on a Mega Project John P. Tapia and Joseph L. Onstott John Tapia and Joseph Onstott from LANL will provide background to the ITER project from its inception to the current status of its construction and assembly. Their talk will provide a brief explanation on the various paths to fusion energy and why the Office of Science has chosen ITER as one of its flagship facilities.	an updated bottom-up uncertainty and fisk analysis.
01:00 PM	01:15 PM	Break	Break
01:15 PM	02:00 PM	Best Practices for Evaluating the Readiness of Technology for Use in Acquisition Programs and Projects John Ortiz John Ortiz from the General Accounting Office (GAO) will discuss the importance of a technology readiness assessment (TRA) in evaluating the maturity of various technologies before they are used in government projects. The presentation will look at the TRA guide, developed by the GAO (GAO-20-48G), which provides the framework for conducting high-quality TRAs. GAO's TRA guide establishes best practices that can be used to determine a project's technology readiness.	Discrete Event Simula Thomas Cook from NNSA will focus on the development of discrete event quantities for a specified confidence level. These analyses have been used requirements to produce plutonium pits and depleted uranium parts to n
02:00 PM	02:30 PM	Balancing Near- and Long-Term Tasks in Early-Stage Capital Project SchedulesRobert Fatzinger and Alfred LevinsonRobert Fatzinger and Alfred Levinson from Technomics, Inc. will discuss the difficultiesin balancing short- and long-term schedule tasks in the performance of Department of Energy (DOE) Order (0) 413.3B projects.These projects range between 5 and 20 years long but require schedule estimates as early as year one. This presentation will seekto investigate a method of critical path schedule risk analysis to provide greater fidelity in early phase schedules while appropriately accounting for the risk and uncertainty of long-term major tasks.	
02:30 PM	02:45 PM	Break	Break
02:45 PM	03:15 PM	An Integrated Cost and Security Community Analysis Terry Josserand Terry Josserand from Sandia will provide real examples of when seemingly innocuous cost data compilation created security implications pertinent to both the Cost and Security Communities of the NSE.	
03:15 PM	03:45 PM	Procedures, Handbooks, Training Materials Available to CECOP Kathleen E. Lane Materials that have been created for various needs have been made available for the community. Kathleen Lane will highlight these materials along with where they can be found such as Weapons Systems Cost Estimating Guidance for WDCR, BCR and BCR Update, Independent Cost Estimate Reviewer Handbook and training materials, and project artifacts based on the Lewis and Clark Corps of Discovery inspired by the presentation on calculating risk on this information provided to CECOP in 2020.	
03:45 PM	04:15 PM	Capital Projects Estimating for Maximum Productivity Todd James Proffitt Todd Proffitt, manager of the LANL estimating department, will discuss the operations of his group. The LANL estimating depart- ment produces over 150 estimates a year for their customers who need quality estimates quickly. This presentation will focus on the tools, templates, and programs they use to maintain extremely high levels of productivity and proficiency.	
04:15 PM	04:15 PM	End of Day 1	

### raining All times ET

#### gency or Management Reserve Requirements and Drawdown

ven W. Wageman

astic model for parametrically evaluating the actual use of cost reserves relative to istically forecast remaining reserve requirements and drawdown without conducting

#### ation as a Tool for Cost Estimating

Thomas Cook

t simulation models of both production processes to estimate equipment types and d to estimate the necessary facility size, associated equipment needs, and manpower meet the annual production rate requirements set by Congress. 

	Day 2 Presentations All times ET Day 2 T		
11:00 AM	11:05 AM	Welcome and Opening Remarks	
11:05 AM	12:00 PM	Keynote - Ranae P. Woods	
12:00 PM	12:30 PM	Cost Estimating Reviewer Handbook and Training –A CECOP Success Story Shivam Bhakta and Katie Goodner Shivam Bhakta from NNSA and Katie Goodner from SNL will present a success story of how cooperation within the NSE can build key capabilities over time. The presentation will highlight the tailored materials for a Cost Estimate Reviewer handbook and training to be used on the W87-1 and W80-4 as well as universally applicable materials that can be used by any site within the nuclear security enterprise.	Introductory Foundation Mr. Peter Braxton from Technomics, Inc. will introduce foundational topics such
12:30 PM	01:00 PM	Predicting Demolition and Disposition Costs in the Nuclear Security Enterprise Zachary Matheson Zachary Matheson from NNSA will review a cost model developed for Demolition and Disposition (D&D) activities. This effort involved assembling a database of historic data from past D&D projects across DOE, normalizing using standard techniques, and generating a cost estimating relationship (CER) to predict future D&D project costs.	analysis to account for cost improvement in repetitive processes and inflati
01:00 PM	01:15 PM	Break	Break
01:15 PM	02:00 PM	Cost Growth In Early Stage Capital Acquisitions: A Root Cause Analysis Jeff Beck and Christopher Massey Jeff Beck and Christopher Massey from Technomics, Inc. will discuss a root cause analysis on cost growth in early capital acqui- sition projects meant to modernize NNSA's aging infrastructure. This analysis traced project changes across key mission gates, starting with approval of mission need through conceptual design and budget submission, highlighting key scope and cost evolu- tions throughout its analysis of alternatives and conceptual design studies.	Introductory Foundation Mr.
02:00 PM	02:45 PM	A Comparison of Risk Assessments Used at TA-55: Qualitative Assessment, Quantitative Assessment Through Acumen Risk®, and Holistic Assessment Through an Analytical Hierarchy Process John Sherwood and Paul Ryan Kniss John Sherwood and Paul Ryan Kniss frm LANL will use a case study to demonstrate and critique three types of risk assessment that seek to provide prioritized mitigation options for program managers: Traditional qualitative assessment, Acumen Risk®, and holistic assessment using an analytical hierarchy process.	
02:45 PM	03:00 PM	Break	Break
03:00 PM	03:30 PM	Enhancing NNSA's Modeling Capability for Minor Construction Projects Abhijeet Deshmukh and Shivam Bhakta Abhijeet Deshmukh and Shivam Bhakta from NNSA will review a modeling capability they developed to estimate costs of General Plant Project (GPP) and minor construction projects. This effort collected and normalized information from multiple DOE facility and planning databases to create a cultivated database of historical construction projects.	
03:30 PM	04:00 PM	A New Approach to Programmatic Equipment Categorization <i>Gabriel Andrade</i> Gabriel Andrade from LANL will present a new approach to programmatic equipment categorization. This approach presents a method that can be used at all sites and allows for consistency in equipment categorization, data analysis, cost estimation, and other planning efforts.	
04:00 PM	04:00 PM	End of Day 2	

## aining All times ET

#### ns of Cost Estimating and Analysis

Peter Braxton

ch as data collection, data normalization, and data analysis, and the fundamental elationships, or CERs. They'll explain standard approaches such as learning curve tion and escalation to adjust for changing price levels over time.

Continue ns of Cost Estimating and Analysis . Peter Braxton

	Day 3 Presentations All times ET Day 3 T		
11:00 AM	11:05 AM	Welcome and Opening Remarks	
11:05 AM	11:35 AM	W76-2 Modification Program Lessons Learned Josiah Bigelow Josiah Bigelow from SNL will describe some of the lessons learned relevant to the Cost Estimating Community of Practice regarding the success of the W76-2 Modification Program.	
11:35 AM	12:05 PM	Developing Analytically Sound Requirements to Better Inform Acquisition Decisions Jeff Beck, Alfred Levinson and Christopher Massey Jeff Beck, Alfred Levinson, and Christopher Massey from Technomics, Inc. will discuss the techniques that were developed for modeling future requirements using historic data that informs program planning while providing program managers insights into the risks and uncertainties surrounding them. These techniques help to develop clear requirements which in turn reduce cost and schedule overruns.	NNSA Planning, Programm Gaylia C. Crandall, Aaron Gaylia Crandall, Aaron Burkhalter, and Richard Caballero from NNSA will in roles and responsibilities, PPBE as a continuous cycle, the distinction betw cesses and NNSA PPBE Policy (NAP-130.1) and related NNSA business one
12:05 PM	12:35 PM	Improving Cost Estimation Through Better Data Dr. Jon Wright Dr. Jon Wright from SNL will review and discuss the findings and recommendations of a recent General Accounting Office (GAO) report that highlighted the inconsistencies of financial data collection across the enterprise. The report specifically highlights that "without a common work breakdown structure (WBS), NNSA cannot ensure that it can collect reliable financial data across its sites."	
12:35 PM	01:05 PM	Framework for an Escalation Analysis Charlie Loelius Charlie Loelius from NNSA will present on a study done on capital acquisition escalation. The Office of Programming, Analysis, and Evaluation (NA-MB-90) performed a comparative study of existing public and private construction escalation rates by devel- oping a set of selection criteria and focusing on similarity to NNSA's historic projects for materials and labor mix, transparency of index methodology and data, and available historic data for normalizing past projects.	
01:05 PM	01:20 PM	Break	Break
01:20 PM	02:05 PM	CNS Full Analytical Cost and Time System (FACTS) Historical Database and Empirical Toolset Eric White and Christopher CarabettaEric White from Y-12, along with Christopher Carabetta, will discuss the system his estimating organization uses to capture historical costs, scope, and schedule that is then used to produce high-quality estimates of future efforts. The Full Analytical Cost and Time System (FACTS) enables historical project discovery and knowledge management, cost and schedule estimate validation, rapid ROM estimation, parametric risk analysis, and process improvement.	
02:05 PM	02:35 PM	Weapons Program Programmatic Equipment—Procurement Cost Analysis   Manhong (Mandy) Smith   Manhong (Mandy) Smith from LANL will discuss the techniques developed and used to analyze and categorize historical equipment costs in the Weapons Program to increase the accuracy of future replacement cost estimates.	
02:35 PM	03:20 PM	BME Capacitor Respin Rapid Estimate Development John E. Colbert, Rhonda A. Dukes, and April Treacy John E. Colbert and Rhonda A. Dukes of SNL along with April Treacy of KCNSC will review the process used across the enterprise to develop quick reaction cost and schedule estimates in response to a technical issue discovered in widely used Base Metal Electrode (BME) capacitors. These capacitors were in almost two dozen components across two NNSA programs.	
03:20 PM	03:30 PM	End of Symposium/Closing Remarks	

ming, Budgeting, and Evaluation PPBE on B. Burkhalter, Richard A. Caballero introduce the NNSA PPBE process. This course will include discussions about: PPBE ween DOE PPBE and DoD PPBE, how the PPBE process fits within congressional proerations policies (BOPs).

# PRESENTERS



#### GABRIEL A. ANDRADE, SCIENTIST, LOS ALAMOS NATIONAL LABORATORY

A New Approach to Programmatic Equipment Categorization

Gabriel Andrade is a staff member at Los Alamos National Laboratory in the Weapons Infrastructure and Planning Office. He obtained a BS and PhD in Chemistry from New Mexico State University and the University of Delaware, respectively. Before coming to LANL he was a postdoctoral researcher at the U.S. Army Research Laboratory. His current focus is in planning efforts for capital acquisition projects and programmatic equipment.



W76-2 Modification Program Lessons Learned

Josiah Bigelow is a Systems Engineer at Sandia National Laboratories working in the Nuclear Deterrence and Modernization area dedicated to developing safe, secure, trusted, and mission-capable weapon designs and architectures using rapid development cycles, innovative design methodologies, and advanced evaluation techniques.

#### JEFF BECK, PROJECT MANAGER, TECHNOMICS, INC.

Cost Growth in Early Stage Capital Acquisitions: A Root Cause Analysis

Developing Analytically Sound Requirements to Better Inform Acquisition Decisions

Jeff Beck is a Project Manager at Technomics, Inc. He currently is working with clients at DOE to plan and execute capital acquisition projects. He brings over 11 years of experience in cost, program, portfolio, and budget analysis supporting all phases of the Planning, Programming, Budgeting, and Evaluation (PPBE) cycle for various government agencies, including the National Geospatial-Intelligence Agency,

Director of National Intelligence, Missile Defense Agency and DOE NNSA. Most recently, Jeff has provided programmatic and operational support for Analysis of Alternatives (AoA) and assists the development of the NNSA's Defense Program's 25 Year Infrastructure Capital Acquisition portfolio. He has experience supporting long-term planning and early-stage capital acquisition projects for the NNSA by developing life-cycle cost estimates, schedule estimates, and requirements analysis.



#### SHIVAM BHAKTA, GENERAL ENGINEER, NATIONAL NUCLEAR SECURITY **ADMINISTRATION**

Enhancing NNSA's Modeling Capability for Minor Construction Projects

Cost Estimating Reviewer Handbook & Training – A CECOP Success Story

Shiv Bhakta is a General Engineer / Analyst in NNSA's Office of Studies, Estimates, and Analyses. (MB-921). Shiv develops analytical products in support of NNSA's Planning, Programming, Budgeting, and Evaluation (PPBE) and acquisition processes. In his

time with the NNSA, Shiv has supported analyses for capital acquisition projects (BCA, pre-AoA) and for the weapon programs. He joined the NNSA from ExxonMobil, where he developed and led cost estimates, as well as provided strategic competitiveness insights to Exxon's Regional Project Organization. He holds a BS in Chemical Engineering and a BS in Economics from the University of Houston. Shiv joined the NNSA from a recent sabbatical backpacking the globe with his fiancé, where they explored southeast Asia and Japan.



Peter Braxton has more than 20 years of cost analysis experience. While at Technomics, Inc., he has led strategic planning, data collection, cost and risk research, and curriculum development efforts for agency-level clients throughout DOE, DOD, and the intelligence community. He currently supports the Cost Assessment Data Enterprise (CADE) project, performing training, outreach, curriculum review, and contract data analysis. He served as ICEAA's inaugural Vice President for Professional Development, and received awards for Service to Society (2013) and Education (2007, 2019). He has taught extensively in North America, Europe, and Australia.

## AARON B. BURKHALTER, PMI-PBA, PROGRAM ANALYST, NNSA

NNSA Planning, Programming, Budgeting, and Evaluation PPBE

Aaron Burkhalter is a Program Analyst for the DOE, NNSA, Defense Programs (DP). Assists with cost, scope, schedule, risk, quality, and financial activities to ensure the nation sustains safe, secure, and effective nuclear weapons. He reports to the Senior Program Analyst who, in turn, directly reports to the Assistant Deputy Administrator (ADA) for Stockpile Management (NA-12) and Directors for program and budget activities including the Stockpile Stewardship Management Plan (SSMP) across the Nuclear Security Enterprise. Emphasis is on research, development, and production of the Stockpile Management (SM) program and funding activities

#### JOSIAH BIGELOW, R&D S&E SYSTEMS ENGINEER, SANDIA NATIONAL LABORATORIES

#### MR. PETER BRAXTON, SUBJECT MATTER EXPERT, TECHNOMICS, INC.

Introductory Foundations of Cost Estimating and Analysis



#### CHRIS CARABETTA, BENCHMARKING ADVISOR, BOOZ ALLEN HAMILTON

CNS Full Analytical Cost and Time System (FACTS) Historical Database and Empirical Toolset

Chris Carabetta's expertise includes competitive benchmarking, cost optimization, organizational effectiveness, guantitative financial and statistical analysis, and industrial capital project best practices. Before working for Booz Allen, Chris advised more than 22 project owners on over 120 global capital projects, ranging among small plant-based projects, commercialization of new-to-industry process technology,

and multi-billion-dollar megaprojects. He led five major capital effectiveness benchmarking studies that quantified project performance across global portfolios, with the aim of improving capital project system design. Chris holds a BS in Engineering Science and Mechanics from Penn State, an MS in Engineering Mechanics from Rensselaer Polytechnic Institute, and an MBA from Georgetown University.



#### **RICHARD A. CABALLERO, CONTRACTOR, NNSA**

NNSA Planning, Programming, Budgeting, and Evaluation PPBE

Rich Caballero has been a Leidos support contractor to the DOE, NNSA, Defense Programs (DP) since 2013, supporting the NA-12 Resource Management Team led by Gayl Crandall. The team coordinates NA-12 activities and deliverables for the Programming, Planning, Budgeting, and Evaluation (PPBE) processes. Prior to that, Rich worked in Los Alamos from 1996 through 2010, and at NNSA Headquarters on detail from LANL to NA-14 from 2010 through 2013.



#### JOHN E. COLBERT, MANAGER PROJECT MANAGEMENT, SANDIA NATIONAL LABORATORIES

BME Capacitor Re-Spin Rapid Estimate Development

John Colbert, Manager of the W88 Alt 370 and W87-1 Program Management team, joined Sandia in 2017 with more than 35 years of industry experience in contracting, estimating and pricing, business operations, and performance measurement reporting supporting a number of major military weapon system programs in missile defense, surveillance, and aircraft sustainment. As a manager for over 20 years, John

has led large teams on major competitive proposal activities as well as leading multi-functional business teams executing weapon system program management activities.



# **ADMINISTRATION**

Discrete Event Simulation as a Tool for Cost Estimating

Thomas Cook is an analyst within the Office of Programming, Analysis, and Evaluation, as a 2020–2021 NNSA graduate fellow (NGFP). His educational background is in chemistry, inspired by calorimetric measurements of heat from a burning peanut and electroplating a nickel coin with copper. He received a PhD in Chemistry from Stanford University. His graduate work focused on covalent immobilization of various discrete metal complexes on carbon surfaces for electrocatalytic alcohol oxidation or dioxygen reduction reactions.

#### GAYLIA C. CRANDALL, CPA, PMP, LEAD PROGRAM ANALYST, NNSA

NNSA Planning, Programming, Budgeting, and Evaluation PPBE

Gayl Crandall is a Senior Program Analyst for the DOE, NNSA, Defense Programs

(DP). To ensure the nation sustains safe, secure, and effective nuclear weapons, Gayl executes cost, scope, schedule, risk, quality, and financial activities. Gayl's direct reporting responsibility is to the Assistant Deputy Administrator (ADA) for Stockpile Management (NA-12) and Directors for program and budget activities including the Programming, Planning, Budgeting, and Evaluation (PPBE) aspects of implementing the Stockpile Stewardship Management Plan (SSMP) across the Nuclear Security Enterprise. The emphasis of Gayl's work is on research, development, and production of the Stockpile Management (SM) program and funding activities. Gayl is a career DOE NNSA Program Analyst/Budgeteer, and manages/executes Billions of Dollars yearly for the Office of Stockpile Management.

# **ADMINISTRATION**



Dr. Abhijeet Deshmukh currently works as a General Engineer with the Office of Management and Budget (MB-90). Currently, he is working on several MB Studies such as, but not limited to, AoA analyses, review of construction cost estimates in CD1 process, development of CER models for minor construction projects, and development of guidance reports.

Before joining NNSA, Dr. Deshmukh worked as a project manager for a construction general contractor in the Washington, DC metropolitan area. He oversaw all phases of multimillion-dollar construction projects that included, but was not limited to, facilities renovation and mechanical/electrical system upgrades for government projects. His previous experience includes civil engineering performing post disaster on site damage assessments of infrastructure systems, critical facilities, businesses, and industries. Dr. Deshmukh has an MS and PhD from Purdue University and his research focused on capacity building of critical infrastructure under disaster situations.

#### THOMAS COOK, NNSA GRADUATE FELLOW, NATIONAL NUCLEAR SECURITY

#### ABHIJEET DESHMUKH, GENERAL ENGINEER, NATIONAL NUCLEAR SECURITY

#### Enhancing NNSA's Modeling Capability for Minor Construction Projects



#### **RHONDA A. DUKES, PROJECT MANAGER, SANDIA NATIONAL LABORATORIES**

Base Metal Electrode (BME) Capacitor Re-Spin Rapid Estimate Development

Rhonda Dukes is a project manager for Systems Engineering on the B61-12 LEP. She joined Sandia in 1997 in the Supply Chain Organization and was the subcontract manager for Sandia's largest ever capital line item construction project encompassing three new buildings and related equipment before transferring to Project Management in 2015. She is a dedicated project management professional with a drive for excellence and a passion for developing effective teaming environments.

She is frequently sought out to lead cross functional teams through the development of large cost estimates including the integration of the F-35 war fighter with the B61-12, a major Replan of the application-specific integrated circuit (ASICs) technology produced at Sandia's MESA Complex in addition to the BME capacitor estimate.



#### **ROBERT FATZINGER, DIRECTOR, TECHNOMICS**

Balancing Near- and Long-Term Tasks in Early-Stage Capital Project Schedules

Robert Fatzinger is a skilled program manager and cost estimator bringing a unique combination of federal acquisition experience from both government and industry. He is a Certified Estimating Professional and Project Management Professional as well as a licensed Certified Public Accountant in Virginia. Robert currently supports NA-MB in the deployment of financial analysis systems and development of cost, schedule, and risk analysis. His industry experience includes direct participation in

DHS major acquisition programs, major acquisitions in the intelligence community, and US Navy nuclear shipbuilding and repair. As a contractor, Robert served as program manager for TSA's \$500M Passenger Screening Program Integrated Logistics Support. He previously served on the CIA's Office of the Inspector General audit team assigned to independently review the cost schedule and technical performance of large classified acquisition programs. Robert also worked in planning, scheduling, and material supply on the first two Nimitz Class Aircraft Carrier refueling and complex overhaul contracts at Newport News Shipbuilding.



#### CASH FITZPATRICK, DIRECTOR OF NA-MB-90, NATIONAL NUCLEAR SECURITY **ADMINISTRATION**

NNSA's New Programmatic Cost Estimating Policy

Cash Fitzpatrick is the manager of the NNSA's Office of Analysis and Evaluation in the Office of Management and Budget (NA-MB). In this role, Cash oversees a range of analytical and policy functional areas, including cost estimating, analyses of alternatives, and planning studies across the entire NNSA. He previously worked for the Office of Cost Policy and Analysis, DOE's Renewable Energy Programs, and the

Office of Cost Analysis for the DOE-CFO. He holds a BS and an MS in Environmental Engineering from Cal Poly and Massachusetts Institute of Technology, respectively.



Office

Katie maintains responsibility for ensuring the consistent development and

implementation of project management processes across the five Centers in Sandia's Global Security Division. A large portion of Katie's time is dedicated to working directly with project teams to build large cost estimates that require independent review and approval. As a testament to the efficacy of the Cost Review Framework (CRF), she has created a tailored approach using the CRF as means for obtaining consistent reviews. Over the course of Katie's career at Sandia, she has worked across multiple organization including Surveillance, where she served as the project manager to all major weapon system components, and in the Systems Engineering organization, where she provided project management to several weapon system programs. Before working at Sandia, Katie worked as a project manager for Honeywell's Federal Manufacturing and Technology (FM&T) plant. Katie is PMP certified and holds a BA in Technical Writing from the University of New Mexico and an MS in Program Management from George Washington University.



# LABORATORIES

An Integrated Cost and Security Community Analysis

Terry Josserand is a Principal Technical Systems Analyst at Sandia National Laboratories. Over the past 12 years, Terry has been involved in developing and reviewing estimates and analyses for nuclear weapon systems, secure transporters, satellite programs, and many other national security efforts. His recent interests are in comprehending the balance to both protect and share national security data in an evolving institutional, technological, and methodologically driven landscape.

# LABORATORY

Hierarchy Process

Ryan Kniss is a Technical Project Manager for the Process Modeling and Analysis Group (E-2) at LANL. He has published several reports using an analytical hierarchy process to organize and analyze complex decision alternatives. Ryan holds a Master of Business Administrations and a Bachelor of Business Administration from the University of New Mexico.



#### **KATIE GOODNER, PROJECT MANAGER, SANDIA NATIONAL LABORATORIES** Cost Estimating Reviewer Handbook and Training–A CECOP Success Story

#### Katie Goodner is a project manager for Sandia's Global Security Division Portfolio

#### TERRY JOSSERAND, PRINCIPAL TECHNICAL SYSTEMS ANALYST, SANDIA NATIONAL

#### PAUL RYAN KNISS, TECHNICAL PROJECT MANAGER, LOS ALAMOS NATIONAL

#### A Comparison of Risk Assessments Used at TA-55: Qualitative Assessment, Quantitative Assessment Through Acumen Risk<sup>®</sup>, and Holistic Assessment Through an Analytical



#### **KATHLEEN E. LANE, DETAILEE TO NA-MB-92 FROM SANDIA NATIONAL** LABORATORIES, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Procedures, Handbooks, Training Materials Available to CECOP

Kathy Lane has worked in project management since her first job out of college supporting government, civil, and private industry projects. Her support has included day-to-day cost and schedule operations, including earned value management. Kathy has also consulted on project management systems defining policy and procedures for new project management and business systems, and defining requirements,

implementing, training and providing system administration on project management software such as Microsoft Project and Oracle's Primavera as well as Computerized Maintenance Management Systems software.



#### ALFRED LEVINSON, LEAD ANALYST, TECHNOMICS, INC.

Balancing Near and Long Term Tasks in Early Stage Capital Project Schedules

Developing Analytically Sound Requirements to Better Inform Acquisition Decisions

Alfred "Lev" Levinson is a lead analyst for Technomics, Inc. with over 6 years of experience in analysis and project management. For the last 3 years, Lev supported the NNSA, providing support mainly in the area of Analysis of Alternatives (AoA) Leadership including cost, schedule, and risk analysis. He has served as the contractor

lead for the Power Sources, Energetic Materials Characterization and Digital Infrastructure Capability Expansion AoAs providing key leadership and guidance to ensure on time product. He also has supported other NNSA initiatives, including the Programmatic Recapitalization Working Group and the Capital Acquisition Planning Process. Lev holds a BS in Mechanical Engineering from the Virginia Commonwealth University and is a Certified Associate in Project Management from the Project Management Institute and an ICAgile Certified Professional.



## CHARLIE LOELIUS, MANAGER OF THE OFFICE OF ENTERPRISE MODELING AND POLICY

#### (NA-MB-922), NATIONAL NUCLEAR SECURITY ADMINISTRATION

Framework for an Escalation Analysis

Charlie Loelius is the manager of NA-MB-922, Enterprise Modeling and Policy within the National Nuclear Security Administration. Charlie has worked with the Office of Analysis and Evaluation (NA-MB-92) and its predecessor office for four years as a cost estimator and now spearheads development of new cost modeling capabilities for the

NNSA. Charlie received a PhD in nuclear physics from Michigan State University and his BS in physics and philosophy from Rutgers University.



#### CHRISTOPHER MASSEY, SENIOR COST ANALYST, TECHNOMICS, INC.

Cost Growth in Early-Stage Capital Acquisitions: A Root Cause Analysis

Mr. Christopher Massey is the Director of Energy Analytics-Based Program management, cost analysis, portfolio management, policy and guidance development,

Management (EAPM) at Technomics, Inc. He works to help clients within the DOE plan, manage, and execute projects and has over 10 years of experience in project cost training, and budgetary analysis for various government agencies, including the NRO, AFCAA, AFRL, HQMC, NASA, and DOE NNSA. Mr. Massey is currently providing programmatic and operational support to a portfolio of Analysis of Alternatives (AoA) worth over \$20 billion in capital acquisition and assisting the development of the NNSA Defense Program's 25 Year Infrastructure Capital Acquisition portfolio. He has supported various planning and early stage capital acquisition projects within NNSA in the development of parametric life-cycle cost estimates, schedule estimates, risk analysis, and requirements analysis.

#### ZACHARY MATHESON, PHYSICAL SCIENTIST, NATIONAL NUCLEAR SECURITY **ADMINISTRATION**



Zachary Matheson received a dual PhD in Nuclear Physics and Computational Math, Science, and Engineering from Michigan State University in 2019. His dissertation research focused on predicting spontaneous fission yields of exotic nuclei. A highlight of Zachary's grad student career was giving a presentation on the element oganesson, the only element named after a living person, at a conference organized by Yuri Oganessian himself. As a graduate student, Zachary spent 6 months at LLNL performing massive fission calculations on one of the lab's high-performance computers, which paved the way for him to join the NNSA after graduation as a NNSA Graduate Fellow in the Office of Advanced Simulation and Computing (NA-114). In the ASC Program, Zachary wrote papers on hot topics such as machine learning and quantum computing. In June 2020, Zachary moved into his current position in the Office of Programming, Analysis, and Evaluation (NA-MB-90), where he uses modeling and simulation to support NNSA planning and budgeting.

## **ROBIN OLIVER, RISK MANAGER, LOS ALAMOS NATIONAL LABORATORY**

Safran Risk vs. Acumen Risk

Robin Oliver currently serves as the Risk Manager at LANL in the Program Performance Service Division. Robin has over 29 years working within the DOE system. She has worked at both Pantex and LANL. She is a risk expert in line-item projects and small projects, and she is an expert user with many different types of risk software. Robin has always had superior performance and leadership in risk management and continuous dedication to the Laboratory. Robin has worked as a Risk Lead/Analyst for the LANL Capital Project Directorate for the last 5 years and served as the Risk Coordinator for the LANL Environmental Program for approximately 10 years prior. During this time, she has provided programmatic





#### Developing Analytically Sound Requirements to Better Inform Acquisition Decisions

#### Predicting Demolition and Disposition costs in the Nuclear Security Enterprise

risk support to the Directorate for implementing sound risk management principles in accordance with DOE Guidance 413.3-7, Risk Management Guidance. Her typical duties include leading project risk assessments; developing and implementing a risk management plan; and identifying, guantifying, and analyzing project cost and schedule risk impacts using Primavera® Risk Analysis and Deltek Acumen Risk®software to determine appropriate management reserve values for the project baseline. She has also taken on the role as manager and has agreed to work with her department head to further streamline our risk analyst software by testing the use of the Safran tool.



#### JOSEPH L. ONSTOTT, PROJECT CONTROLS MANAGER, LOS ALAMOS NATIONAL LABORATORY

The ITER Project: Lessons Learned on a Mega Project

Joseph Onstott is a Project Controls Manager for Weapons Engineering and Science at LANL. Joseph rejoined the Laboratory in 2020 following an 11-year assignment as the manager for cost and budget at ITER where he developed many of the project controls, budgetary, and financial systems in use today. Joseph helped prepare ITER's current baseline and was a key player in managing costs from the project start up to the beginning of onsite assembly.



#### JOHN ORTIZ, SENIOR OPERATIONS RESEARCH ANALYST, GOVERNMENT **ACCOUNTABILITY OFFICE**

Best Practices for Evaluating the Readiness of Technology for Use in Acquisition Programs and Projects

John Ortiz is a member of the Science, Technology Assessments, and Analytics team within the United States Government Accountability Office (GAO), which is the oversight, insight, and foresight entity of the U.S. Congress. John is the project lead for GAO's Technology Readiness Assessment (TRA) best practices guide used to evaluate

the readiness of technology for use in acquisition programs and projects. His 30 years of service at the GAO encompasses a wide range of technology reviews and assessments across the majority of executive branch agencies that includes the Departments of Commerce, Defense, Energy, Health and Human Services, Homeland Security, and Justice. John currently serves as GAO's technology expert on the Operation Warp Speed's COVID-19 Vaccine Development and Manufacturing, the NNSA's Lithium Capability and Depleted Uranium acquisition efforts, and the Army's Next Generation Combat Vehicle. He is also leading a technology assessment of the Department of Homeland Security Countering Weapons of Mass Destruction's effort to acquire BioDetection for the 21st century system to replace BioWatch as the early warning system used to detect potentially catastrophic aerosolized biological attacks.

John received his BS/BA in Accounting, and MS in Management of Technology from University of Alabama in Huntsville, Alabama.



#### TODD PROFFITT, ESTIMATING MANAGER, LOS ALAMOS NATIONAL LABORATORY

Capital Projects Estimating for Maximum Productivity

Todd Proffitt is the Estimating Manager at LANL. He is an experienced cost estimator with 35 years of construction experience. Having served in roles ranging from a laborer in the field, to representing owners on major commercial office building projects, there is no aspect of the construction industry that he has not experienced.

# LABORATORY Hierarchy Process

John is a Postdoctoral Research Associate in the Process Modeling and Analysis Group (E-2) at LANL. He received his PhD in Environmental Engineering from

Clemson University in 2020. His dissertation explored ecological economics modeling strategies, including methods to quantify the environmental impacts of supply chains throughout the U.S. economy. John has previously worked at Argonne National Laboratory as a computational research aide in the Global Security Sciences Division. Although he is relatively new to LANL, John has worked on multiple decision support projects that blend his process modeling and economic analysis skillsets.

# NATIONAL LABORATORY

Mandy Smith is a postdoctoral researcher at LANL. She graduated from the University of Florida with an MS in Finance from the Warrington College of Business and a PhD in Applied Economics in 2016. Before she came to LANL, she worked at Presbyterian Healthcare Services as a data scientist for 2+ years. She is now working with the Information Systems and Modeling Group (A 1) and Weapons Infrastructure and Planning Office in the areas of data analytics, visualization, and modeling.



#### JOHN P. TAPIA, DIRECTOR, ACCELERATOR STRATEGY OFFICE, LOS ALAMOS NATIONAL LABORATORY

The ITER Project: Lessons Learned on a Mega Project John Tapia is currently on a joint appointment with LANL and Stanford Linear Accelerator Center (SLAC), serving as the Director of the Accelerator Strategy Office at LANL and the Director of Project Management at SLAC. Following the establishment of the International Nuclear Fusion Research and Engineering Megaproject organization (ITER) in southern France, John was part of the initial team that created its Project Controls Office and developed its first cost and schedule estimates.



#### JOHN SHERWOOD, POSTDOCTORAL RESEARCH ASSOCIATE, LOS ALAMOS NATIONAL

A Comparison of Risk Assessments Used at TA-55: Qualitative Assessment, Quantitative Assessment Through Acumen Risk<sup>®</sup>, and Holistic Assessment Through an Analytical

#### MANHONG (MANDY) SMITH, POSTDOCTORAL RESEARCHER, LOS ALAMOS

#### Weapons Program Programmatic Equipment – Procurement Cost Analysis



#### APRIL TREACY, PROGRAM MANAGER, PROJECT MANAGER, KANSAS CITY NATIONAL SECURITY CAMPUS HONEYWELL FEDERAL MANUFACTURING & TECHNOLOGIES (FM&T), LLC

BME Capacitor Re-Spin Rapid Estimate Development

April Treacy is a program manager at FM&T and is responsible for managing integrated scheduling across three major weapons programs (B61-12 LEP, W88 Alt 370, and W87-1). She joined FM&T in 2014 and has held various leadership roles in Contract Management and Integrated Scheduling. Her various contributions at FM&T include B61-12 Site Acceptance Review, PMO Lead for the BME Respin Team, and

she has led implementation of multiple process improvements across NSE sites to ensure data integrity of customer reporting.

April has 15 years of leadership and strategic execution experience. Before FM&T, April held multiple leadership positions over 9 years at Enterprise Holdings Inc., where she managed operations and was responsible for overall profit and loss results of multiple locations including airport operations.

April has formal training in Primavera P6, Acumen, and Earned Value Management. In 2020, she graduated from Honeywell Aero PM Academy and Kansas City Emerging Leaders programs.



#### **STEVEN W. WAGEMAN, PROJECT MANAGER, SANDIA NATIONAL LABORATORIES**

Stochastic and Arithmetic Forecasting of Contingency or Management Reserve Requirements and Drawdown

Steve Wageman possesses over 40 years of management experience and has consulted for or was directly employed by many different organizations and industries such as the DOE, Boeing, and the US Army Corps of Engineers. He is currently working on the Risk Team for the W80-4 LEP Design Agency at Sandia National Laboratories. Steve previously served as the Risk Engineering Program Manager for the transit

authority in Seattle, WA, where he was responsible for risk management and analysis on a \$72B portfolio of capital projects. He is a Certified Cost Professional (CCP), Certified Estimating Professional (CEP), Earned Value Professional (EVP), and Planning and Scheduling Professional (PSP) through AACE International, a Project Management Professional (PMP) and Risk Management Professional (PMI-RMP) through the Project Management Institute, and a Certified Professional Classroom Trainer (CTT+) through CompTIA. Steve was previously an Authorized Primavera Instructor through Oracle Corporation and is also a graduate of the Stanford University Strategic Decision and Risk Management Professional Certificate Program.



#### **ERIC WHITE, ESTIMATING MANAGER, CONSOLIDATED NUCLEAR SECURITY, Y12**

CNS Full Analytical Cost and Time System (FACTS) Historical Database and Empirical Toolset

Eric White has been a member of Association for the Advancement of Cost Engineering (AACE) for 7 years, 3 years of which he served at the East Tennessee Section President. He has been the Consolidated Nuclear Security (CNS) Enterprise Estimating Manager at Pantex and Y 12 for 8 years focused on consolidating estimating processes, procedures, and tools. We will be talking about one of these tools today.

Eric has been involved with infrastructure improvement, weapon programs, and project management for the last 13 years.

Before Eric's position as a DOE contracting employee, he worked as an industrial engineer for Boeing Aerospace manufacturing commercial and military hardware.

Mr. White has a BS in Industrial Technology from Tennessee Technological University and an MS in Engineering Management from the University of Tennessee.



Jon Wright is a Sandia National Laboratories staff member within the System Analysis and Decision Support organization. Jon is a key contributor to analytical and process development of early and mid-lifecycle cost estimation of major nuclear defense programs. Jon has actively participated with the Cost Estimating Analysis Group (CEAG) through various cost guidance development projects and with the Cost Estimating Community of Practice (CECOP) through their annual symposium. In addition to cost analysis, Jon focuses on early risk and uncertainty assessments of weapon projects and has led or assisted with implementation of risk calculation methodologies for numerous Modernization efforts. This experience enabled him to be a critical influence on the CEAG W87-1 Weapon Design and Cost Report (WDCR) Requirements Document. Beyond his contributions within the cost community, Jon is currently leading a ND-wide Technology Maturation project that proposes a SNL-universal technology development framework and governance architecture for improved technology integration into the stockpile. During his time at SNL before joining Systems Analysis, Jon acted as Risk Analyst for the B61-12 Life Extension Program (LEP) and as a systems-to-component product team interface (point-of-contact) for Surety products. Jon has a PhD in Materials Science and Engineering from the University of Florida.

### **DR. JON WRIGHT, SYSTEMS ANALYST, SANDIA NATIONAL LABORATORIES**

Improving Cost Estimating Through Better Data

# LIST OF ACRONYMS

Acronym	Definition
AACE	Association for the Advancement of Cost Engineering
AC	Actual Cost
ADS	Activity Data Sheet (EPAT)
AF	Air Force
AFCAA	Air Force Cost Analysis Agency
AFP	Approved Funding Program
AHJ	Authority Having Jurisdiction
AI	Artificial Intelligence
ALDW	Associate Laboratory Directorate for Weapons
ALDW-PO	Associate Laboratory Directorate for Weapons-Program Office
АоА	Analysis of Alternatives
ARM	Active Risk Manager
BCR	Baseline Cost Report
BME	Base Metal Electrode
BOE	Basis of Estimate
ВОР	Business Operating Policy
C2DB	Capital Cost Database
CAAG	Cost and Acquisition Assessment Group
CADE	Cost Assessment Data Enterprise
CAM	Control Account Manager
CBC	Cincinnati Business Center
CCEA	Certified Cost Estimator/Analyst
ССР	Certified Cost Professional
CEAG	Cost Estimation Analysis Group
CEBoK®	Cost Estimating Body of Knowledge
CECOP	Cost Estimating Community of Practice
CEG	Cost Execution Guidance
CEP	Certified Estimating Professional
CEPE	Cost Estimation and Program Evaluation
CER	Cost Estimating Relationship
CFO	Chief Financial Officer
СММ	Capability Maturity Model
CNS	Consolidated Nuclear Security (operates Y-12 and Pantex)
COTS	Commercial Off The Shelf
СРА	Certified Public Accountant
CR	Continuing Resolution
CRA	Cost Risk Analysis
CRES	Comprehensive Records and Estimating System

CRF	Cost Review Framework
CSPER-C	Cost, Schedule, and Phasing Estimation
CUA	Cost Uncertainty Analysis
CURA	Cost Uncertainty and Risk Analysis
D&D	Demolition and Disposition
DA	Design Agency
DBSE	Documents Based Systems Engineering
DOD	Department of Defense
DOE	Department of Energy
DOE 0 413.3B	Program and Project Management for
DP	Defense Programs
DPBPS	Defense Programs Business Process Sys
DS	Decision Support
DSW	Directed Stockpile Work
EAC	Estimate at Completion (also known as
EM	Environmental Management
EOC	Elements of Cost
EPAT	Enterprise Portfolio and Analysis Tool
EPIC-R	Engineering Program Internal Change
ES&H	Environment, Safety and Health
ETC	Estimate to Complete (also known as R
EVM	Earned Value Management
EVMS	Earned Value Management System
EVP	Earned Value Professional
EVT	Earned Value Type
FACTS	Full Analytical Cost and Time System
FAR	Federal Acquisition Regulation
FM&T	Federal Manufacturing & Technologies
FPM	Federal Program Manager
FPO	Federal Program Office
FY	Fiscal Year
FYNSP	Future Years Nuclear Security Program
GAO	Government Accounting Office
GOCO	Government owned, Contractor operat
GPP	General Plant Projects
GWBS	Government Work Breakdown Structur
IBR	Integrated Baseline Review
IC	Integrated Contractors
ICE	Independent Cost Estimate

Relationships for Construction
]
the Acquisition of Capital Assets
item
Total Cost)
– Request
emaining Cost)
ed (Facilities)
e

ICEAA	International Cost Estimating and Analysis Association
ICER	Independent Cost Estimate Reviewer
ICR	Independent Cost Review
IFMS	Integrated Financial Management System
IP	Implementation Plans
IPL	Integrated Priority Lists
IT	Information Technology
ITER	"The Way" in Latin, international nuclear fusion research and engineering megaproject
JTA	Joint Test Assemblies
KCNSC	Kansas City National Security Campus
LANL	Los Alamos National Laboratory
LCCE	Life Cycle Cost Estimate
LEP	Life Extension Program
LLNL	Lawrence Livermore National Laboratory
LOE	Level of Effort
M&0	Management and Operations
MBSE	Model Based System Engineering
ML	Machine Learning
MORS	Military Operations Research Society
MRS	Material Requirements Schedule
MTS	Machine Tool Services
NA-194 NNSA	Office of Non-Nuclear Components
NA-APM NNSA	Office of Acquisition and Project Management
NA-MB NNSA	Office of Management and Budget
NA-MB-90 NNSA	Office of Programming, Analysis and Evaluation
NA-MB-92 NNSA	Office of Analysis and Evaluation
NAP	NNSA Policies
NAP-130.1	Planning, Programming, Budgeting, and Evaluation (PPBE) Process
NDAA	National Defense Authorization Act
NMSU	New Mexico State University
NNSA	National Nuclear Security Administration
NPR	Nuclear Posture Review
NQA	Nuclear Quality Assurance
NRO	National Reconnaissance Office
NSE	Nuclear Security Enterprise
NVA	Non Value Add
NWAP	Nuclear Weapons Acquisition Professional
NWBS	NNSA Work Breakdown Structure
NWC	Nuclear Weapons Council
0&S	Operating and Support

and the

-

OCL	Obligational Control Level
ОМВ	Office of Management and Budget
OPM	Office of Personnel Management
ORNL	Oak Ridge National Laboratory
OSD	Office of Secretary of Defense
P&PD	Planning and Programming Directive
РА	Production Agency
PDM	Program Decision Memorandum
PE	Project Engineer
РМ	Program Management
PM2L	PM Tool developed by Oak Ridge Nation
РМВ	Program Management Baseline
PMI	Project Management Institute
PMI-ACP	PMI-Agile Certified Practitioner
РМО	Program Management Office
РМР	Project Management Professional
PPBE	Planning, Programming, Budgeting an
PPFG	Planning, Programming and Fiscal Guid
PRT	Product Realization Team
PSP	Planning and Scheduling Professional
PT&C	Project, Time & Cost
PWS	Performance Work Statement
РХ	Pantex
QRA	Quantitative Risk Analysis
R&D	Research and Development
RBA	Risk & Benefit Analysis
RFP	Request for Proposal
RIMS	The Risk Management Society
RIMS-CRMP	RIMS Certified Risk Management Profe
ROTs	Requirements over Target (aka Unfund
SA	Summary Account
SCORE	Scope, Complexity, Options, Risks, Excu
SCURA	Schedule and Cost Uncertainty and Ris
SER	Schedule Estimating Relationship
SGA	Strategic Gap Analysis
SME	Subject Matter Expert
SNL	Sandia National Laboratories
SOW	Statement of Work
SRS	Savannah River Site
SRTE	Savannah River Tritium Enterprise

nallaboratory
d Evaluation
dance
ssional
ed Reguirements)
irsions
k Analysis

SSMP	Stockpile Stewardship Management Plan
TAC	Total Available to Cost (or New Budget Authority plus prior year Uncosted Obligations)
TCMF	Total Cost Management Framework
ТОС	Total Ownership Cost
TRA	Technology Readiness Assessment
USAF	United States Air Force
USCG	United States Coast Guard
USMC	United States Marine Corps
USN	United States Navy
VOC	Voice of Customer
WA	Work Authorizations
WBS	Work Breakdown Structure
WDCR	Weapon Design and Cost Report
WIP	Weapon Intern Program

# NOTES

# **CECOP SYMPOSIUM 2022**

The Sixth Annual CECOP Symposium will be held in Washington, DC August 2 & 3 2022



# NOTES

# NOTES



