

A Precision Model for Organizational Transformation Within the DOE/NNSA Nuclear Weapons Complex

Mark Bodnarczuk
Executive Director
Breckenridge Institute

www.breckenridgeinstitute.com

Over the past two decades, the National Nuclear Security Administration's (NNSA) vision for transforming the Nuclear Weapons Complex has focused on site closures, consolidating foot prints, constructing new facilities like the Uranium Processing Facility (UPF), and more recently the consolidation of Management and Operating (M&O) contracts at facilities like the Y-12 National Security Complex (Y-12), and Pantex. The main driver for these changes is that the international security environment has changed dramatically since the end of the Cold War. As described by the *2010 Nuclear Posture Review Report*, while the threat of global nuclear war has become increasingly remote, the risk of nuclear attack has actually increased with the immediate danger of nuclear terrorism.¹ These changes in the nuclear threat environment have altered the hierarchy of America's nuclear concerns and strategic objectives. The massive nuclear arsenal we inherited from the Cold War era of bipolar military confrontation is poorly suited to address the challenges posed by suicidal terrorists and unfriendly regimes seeking nuclear weapons. Therefore, it has been essential that the U.S. better align its nuclear policies and posture to our most urgent priorities – preventing nuclear terrorism and nuclear proliferation. One of the key elements of this strategy is arms control, including the New Strategic Arms Reduction (START) Treaty that officially entered into force of law February 5, 2011. The *bottom-line* is that the role that the DOE/NNSA Nuclear Weapons Complex must play in addressing this new international security environment has irrevocably changed from the Cold War era.

The recently published the National Research Council's Report (NRC Report) and the report published by the National Academy of Public Administration (NAPA Report) are the latest in a series of studies that evaluate the leadership and management of science and engineering (S&E) within the Department of Energy (DOE) Nuclear Weapons Complex.² The NRC Report describes the historical research base and evolving mission of Los Alamos (LANL), Lawrence Livermore (LLNL), and Sandia (SNL) that were formerly "weapons-only" Labs, to a new role of being National Security Labs. This new role means that Labs need to identify, compete for, and win large lucrative mission-related Work-for-Others projects (WFO), while maintaining nuclear weapons as their core mission. This new role also requires Labs to develop more competitive cost and pricing models, so they can compete against each other and with other Federally Funded Research & Development Centers (FFRDC) that are funded by DOD, DHS, NASA, etc. One of the biggest challenges that Labs face is decreasing the cost of overly bureaucratic Laboratory support services that are built around DOE/NNSA mandated programs in areas such as security, ESH&Q, administration, human resources, facilities management, and financial management, *and at the same time* increasing the effectiveness and reliability of these services – what Jim Collins calls both-and-thinking, rather than either-or-thinking.³ If DOE/NNSA and its M&O contractors are going to be successful in this new role, the current vision of transformation must be broadened to include *organizational* transformation. The precision model of organizational transformation described below can be used as a foundation upon which to build organizational transformation strategies at the three weapons Labs and across the DOE/NNSA Nuclear Weapons Complex.

The Structure and Dynamics of Organizational Transformation

As defined in the business literature, organizational transformation refers to deep, fundamental, (often radical) changes in an organization's mission, structures, systems, culture, processes, and ways-of-working, as opposed to incremental improvements. This standard definition normally assumes that

some form of consolidation, reengineering, restructuring, or organizational culture change occurs as a part of (or the driver for) a transformation process. As commonly described, transformation initiatives are undertaken in response to the forces and demands of the business environment that require an organization to radically change how it does business and how it operates in order to survive in the market place. Over the last 25 years, this kind of organizational transformation has been called many things, including reengineering, rightsizing, and more recently cultural change. But the basic goal of all these approaches has been more or less the same; e.g., to make fundamental changes in how a company organizes and uses its human, material, and financial resources to act on (and react to) the frenetic pace of change in the business environment.

But the day-to-day experience of leading and managing organizations within the DOE/NNSA Nuclear Weapons Complex teaches us that the process of transformation is not always as “dramatic” and “radical” as has been portrayed in the business literature. Rather, organizational and behavioral transformation is a property of all authentic change at the individual, interpersonal, departmental, and organizational levels. *From the human challenges* of mastering the skills required to dismantle a piece of equipment, gaining deeper insight into leading and managing more effectively, resolving destructive conflict between departments or organizations, or improving communication and building trust between DOE/NNSA and its M&O contractors; *to the organizational challenges* of improving, replacing, or reconfiguring a department or entire organization’s structures, systems, and culture, the process of organizational and behavioral transformation is the underlying mechanism of all deep, meaningful, sustainable change. The model of organizational transformation presented below describes what that mechanism is, and how it works in simple, concrete, and precise terms.

Organizational transformation in Labs like LANL, LLNL, SNL, and Plants like Pantex, Y-12, and Kansas City has two elements: change and transition. The *change* required to improve, replace, or reconfigure an organization’s structures, systems, and resources in response to customer demands and the frenetic pace of change in the nuclear and non-nuclear international security environment is situational and tends to happen quickly; e.g., M&O contracts are changed; functional “silos” are consolidated with new leadership; organization charts are reconfigured so the right people work together on the right tasks to get the job done; and managers are directed to achieve more aggressive performance goals with fewer human, financial, and material resources. *Transition* is the protracted cultural, psychological, and behavioral process that individual managers and staff members go through to learn new ways-of-working and to let go of the old organizational reality and identity that they had before the change took place. Over time, individual managers and staff members on both the scientific and administrative sides must gain ownership in (and come to terms with) what their new role in the new organization demands of them.

The most important lesson to be learned from dozens of documented transformation initiatives is the necessity to manage *both* change and transition throughout the entire process.⁴ On the one hand, too much change within too short a time-span overwhelms people with learning new ways-of-working and interacting. Too much change and failing to lead people through transition almost guarantees that organizational transformation will not happen. On the other hand, if there is *too little* change, or if the changes are not focused on the underlying *Common Causes* in the organization’s structures, systems, and culture, organizational and behavioral transformation won’t happen either. Multiple initiatives that create too little change fatigue organizational morale and undermine trust because managers and staff members come to view these failed attempts cynically as the “flavor of the month.”⁵

But actually achieving organizational transformation within the DOE/NNSA Nuclear Weapons Complex requires a more precise definition of what organizational structures, systems, and culture *are*, and how they *interact* with each other, than is commonly held by managers. The Breckenridge Equation

is a meta-model that describes the structure and dynamics of organizational transformation by identifying the constituents of organizational culture and then formulating them into an “equation” that describes how organizational culture actually works in day-to-day operations. The four terms of the Breckenridge Equation (shown below) can be used as a “lens” through which to view strategic and tactical operations that allows managers in both Federal and M&O contractor organizations to understand the structure and dynamics of organizational transformation and organizational culture in simple, concrete, and precise terms.⁶

COI ↔ POI ↔ ROI = Current Results

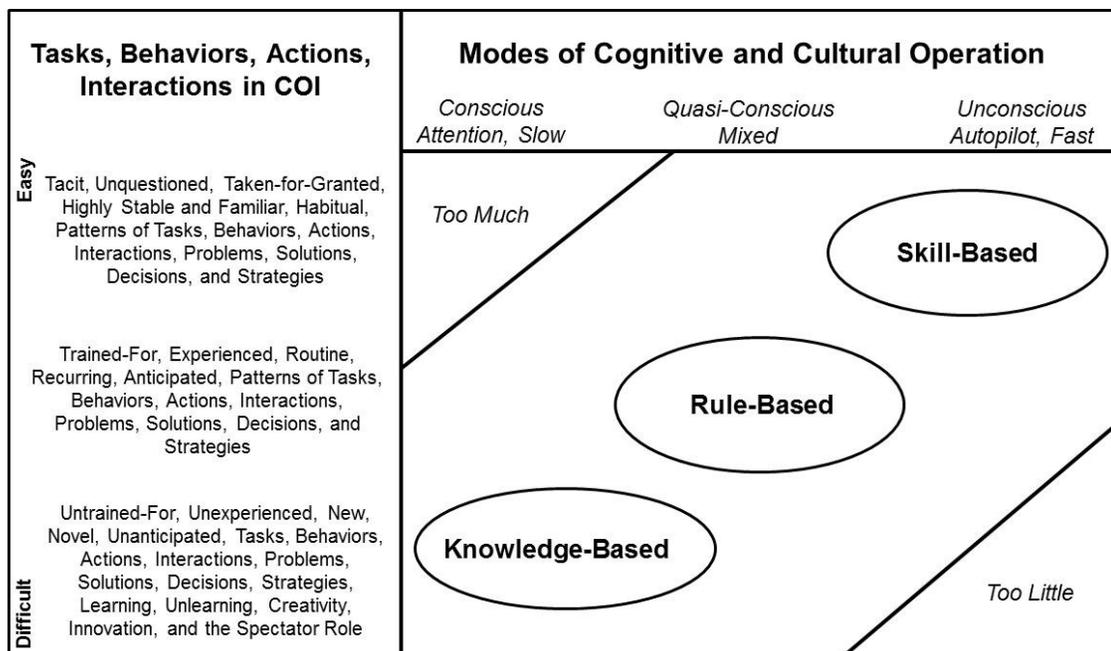
The four terms work together to create and maintain an organization’s culture. More specifically, day-to-day operations, behaviors, and interactions between managers and staff members at the M&O contract, organizational, departmental, interpersonal, and individual levels tend to occur as patterns-of-interaction (POI) within the context-of-interaction (COI) that is composed of an organization’s structures, systems, and resources. The interaction of POI and COI function like a group-learning process that creates a repository-of-interaction (ROI) which becomes the shared assumptions, beliefs, values, and attitudes that are the foundation of a Laboratory’s day-to-day operations. Over time, the first three terms of the equation settle down on a configuration within the larger context-of-interaction of nuclear and non-nuclear international security issues in the external environment, and the interaction of the first three terms produces the Current Results shown above.

Over time, the configuration of all four terms reaches a state-of-equilibrium and solidifies within the larger context of the forces, pressures, and demands from the external environment. As David Hanna suggests, “All organizations are perfectly designed to get the results they get! For better or worse, the system finds a way of balancing its operation to attain certain results.”⁷ If an organization like LANL, LLNL, or SNL is more or less successful at achieving its mission, goals, and objectives, the configuration of the first three terms migrates from the cognitively intense Knowledge-Based level, to routine-expected Rule-Based level, and ultimately to the autopilot Skill-Based level of activity where it slips below the surface of organizational awareness, goes on autopilot and becomes “the way it’s done around here” (see the description of POI below for more details on this natural migration process).⁸

When new Lab employees or sub-contractors are hired, they are forced to compare the ways-of-working that they have developed while in former jobs with how their new organization does business, and try and make sense of these new ways-of-working. “Seasoned” managers and staff members at a given Lab or Plant (COI) have internalized the organization’s attitudes, beliefs, and ways-of-seeing (ROI) and ways-of-working and decision-making long-ago (POI), so these attitudes and beliefs about how things should be done or not done (ROI), along with ways-of-working and decision-making (POI) shape and define day-to-day operations and the results the organization actually gets (Current Results). The four terms function interdependently, so the history of an organization’s actual results reinforce the other three terms like a “social mirror” that reflects the way things should be done at a given Lab or Plant. Employees that cannot (or will not) internalize these new ways-of-working don’t normally stay in an organization. Rather they self-select-out of (or are ejected from) that organization’s culture much like the antibodies and the immune system reject/defeat disease-causing bacteria from the human body. The protracted cultural, psychological, and behavioral process that individual managers and staff members go through to learn new ways-of-working (POI) within a new organizational context (COI) and to let go of the old organizational reality and identity that they had before they came to the new organization (ROI) is the essence of how organizational and behavioral transformation actually works in day-to-day operations. In the final analysis, it’s important to remember that organizations are collective-cultural entities that are led, managed, and changed, one person at a time.⁹ A more detailed explanation of each of the four terms of the Breckenridge Equation is given below.

COI = Context-of-Interaction: The COI term of the equation includes the organizational structures, systems, and resources within which people work, and includes everything that people can see, hear, feel, and experience in an organization, including organizational climate as distinct from organizational culture. It includes buildings, facilities, equipment, IT infrastructure, geographic location, etc. as well as formally espoused and documented policies, procedures, guidelines, standards, process descriptions, documented work-practices, plans, strategies, goals, measurements, and formal rules at the M&O contract, organizational, departmental, interpersonal, and individual levels that define how managers and staff members should work and interact within the organization. The COI is the most *visible* part of an organization’s culture and functions like a “stage” upon which the day-to-day, week-to-week, and month-to-month activities of the organization are “acted out” by managers and staff members. The configuration of structures, systems, and resources in Labs and Plants has been shaped and defined by (and still reflects) the assumptions, beliefs, values, and attitudes of founders and leaders that have resulted in the organization’s history of successes and failures since the Manhattan Project (ROI).¹⁰

POI = Patterns-of-Interaction: The POI term includes behaviors, tasks, actions, interactions, decision-making, ways-of-working, strategies, various levels of performance, and patterns-of-interaction between departments and individual managers and staff members. The figure below shows the natural tendency for tasks, behaviors, actions, and interactions to *migrate* from cognitively intensive conscious attention to unconscious autopilot operations that are done out of habit, seamlessly, without consciously thinking about them at the M&O contract, organizational, departmental, interpersonal, and individual levels.¹¹



Skill-based activities performed on autopilot are a double-edge sword and can be an organization’s greatest ally (when done effectively) or self-defeating by perpetuating performance problems, and derailing repetitive attempts to create positive change and transformation. Perhaps the greatest challenge to creating and maintaining a “Safety Culture” across the DOE/NNSA Nuclear Weapons Complex is to understand (and intentionally control for) this natural cognitive and cultural tendency for ways-of-working (POI) to migrate from Rule-Based (formal, written) to Skill-Based (informal, unwritten) patterns of performance. As I’ve mentioned elsewhere, the “gap” between the formal (written) rules for how things get done in an organization (COI), and the informal (unwritten) rules for how things “really get done” (POI) is one of the biggest barriers to organizational transformation, and

one of most important Common Causes of ineffective organizational performance across the DOE/NNSA Nuclear Weapons Complex.¹²

ROI = Repository-of-Interaction: The ROI term of the equation is a collective repository of group-history and group-learning that creates assumptions, beliefs, values, and attitudes about what works (and doesn't work) in an organization that functions like a lens through which managers and staff members at Labs and Plants "see" and interpret day-to-day operations and the realities of organizational life at the M&O contract, organizational, departmental, interpersonal, and individual levels. The ROI contains an organization's body of knowledge, including its unique capabilities and intellectual property and accumulated operational and business experience that allow it to create its products and services for DOE/NNSA, DOD, DHS, NASA, and other funding agencies. Some of the key contents of the ROI include: a) the operational philosophy and empirical-historical foundation upon which decisions are made; b) criteria for what behaviors and attitudes actually get rewarded or discouraged; c) a shared understanding and group definition of what specific POI and COI "mean" within a specific cultural context; and d) what people actually think, feel, believe, and assume, but do not say publicly because they exist in the Left-Hand Column (ROI), as opposed to socialized norms, espoused perspectives, and publicly acceptable dialogue that exist in the Right-Hand Column (COI) and the actual behaviors and ways-of-working of Division and Department managers and staff members (POI).¹³ The ROI also includes the organization's operational history of financial and non-financial results; key events, stories, and heroes; prohibitions; rituals, ceremonies, traditions; and "folk wisdom" about how things should (or should not) be done. The contents of the ROI are what are commonly referred to by organizational theorists like Edgar Schein as "organizational culture" which is a much more narrow definition than the definition of culture described by the Breckenridge Equation.¹⁴

Current Results: The Current Results term consists of an organization's *actual* financial and non-financial results at the M&O contract, organizational, departmental, interpersonal, and individual levels as opposed to the *intended* results codified by the goals or key performance indicators in organization-wide strategic plans, departmental AOPs, or performance criteria in the individual performance appraisals of managers and staff. An organization's Current Results emerge naturally as the *indirect* outcome of the interaction of the first three terms of the Breckenridge Equation, within the broader context of the international security environment within which the Lab or Plant is embedded. As mentioned earlier, all organizations are perfectly aligned to get the results they get – good and bad. Because all four terms function interdependently, an organization's actual results reinforce the other three cultural elements like a "social mirror" that reflects the way things *are*; the unique organizational reality and culture within a given Lab or Plant.

The key insight that the Breckenridge Equation provides for organizational transformation within the DOE/NNSA Nuclear Weapons Complex is that organizational culture is composed of *all four terms* working together at the same time to create and maintain organizational culture, with each term being a distinct (but interdependent) factor that interacts with the others to produce an organization's financial and non-financial results. It is the interaction of all four terms that *creates* and *maintains* organizational culture, so a leader's ability to create, manage, or transform their organization's culture requires them to have a working knowledge of how the four terms work and interact with each other. Each of the terms has a degree of elasticity and can absorb incremental changes and improvements that can be handled using the standard tools and methods of "change management." But when the equilibrium and interdependent "balance" of the configuration of one or more terms has been disrupted sufficiently either by internal or external forces or demands, an organization should undertake the task of reconfiguring all four terms. The unique role of leadership is the ability to create, manage, and transform organizational culture, so it's important for leaders to have the operational knowledge and wisdom needed to "tease apart" the difference between the need for incremental change, and the need for organizational transformation. The process of: a) "unfreezing" the current configuration of the four

terms, b) improving, replacing, or configuring an organization's structures, systems, and resources, and then c) "refreezing" the structures, systems, and culture into a new *intentional* configuration that gets different (improved) results, defines the essence of what organizational transformation *is* and how it *works*.

Why the Transformation of the DOE/NNSA Complex Has Been So Difficult

Using the Breckenridge Equation as a "lens" through which to view the organizational cultures at the Labs and Plants across the DOE/NNSA Nuclear Weapons Complex, allows us to identify three main reasons why sustainable change and organizational transformation have been so difficult to achieve to-date. The *first* reason is that over the past two decades, attempts to transform the Nuclear Weapons Complex have focused only on improving, replacing, or reconfiguring the context-of-interaction (COI) in the hopes of creating sustainable change and improvement. But trying to create positive change by reorganizing, changing leadership, changing contractors, implementing new management programs, installing new equipment, building new facilities, replacing and updating IT infrastructure, issuing increasingly prescriptive DOE Orders and directives in the hopes of improving performance, retraining managers and staff – again, and having Laboratory support services functions develop increasingly prescriptive internal policies and procedures for Lab managers and employees to follow (all of which are associated with the COI term) does not address the root cause "cultural" issues that are found in the other three terms of the equation.

COI ↔ POI ↔ ROI = Current Results

The key indication that an issue is "cultural" and requires changes to all four terms (not just COI) is the existence of patterns of organizational behavior that span long-periods of time and are invariant under changes in leadership, organizational structure, policies, and management strategy. History has shown that the management and leadership problems described by the NRC and NAPA Reports pre-date the existence of NNSA by more than a decade and are woven into the fabric of the DOE's "culture." The NRC Report documents the existence of these issues back to 1995, but many of the same problems date back to the late 1980s when the Defense Nuclear Facilities Safety Board (DNFSB) was formed to provide oversight for DOE, and Secretary Watkins created and deployed 38 Tiger Teams across the DOE enterprise in an attempt to transform the ESH&Q performance across the Complex. The issues described by the NRC Report span the Administrations of five U.S. Presidents (Reagan, H.W. Bush, Clinton, W. Bush, and Obama), nine Secretaries of Energy (Herrington, Watkins, O'Leary, Pena, Richardson, Abraham, Bodman, Chu, and Moniz), and re-organizations, changes in both Federal and M&O leadership, and flavor-of-the-month "change" initiatives too numerous to recount.¹⁵ Most of these change initiatives have failed in the execution phase as *Invisible Bureaucracy* frustrated and undermined effective implementation because managers did not address the POI and ROI terms of the equation. This is why previous change initiatives have seemed to have the full support of senior managers in both Federal and M&O contractor organizations, but have died a slow death – and no one knows why...

Over time, focusing improvement and corrective actions only on COI creates a *gap* between the formal (written) rules for how things get done in the Labs and Plants (COI), and the informal (unwritten) rules for how things "really" get done (POI), which is the *second* reason why organizational transformation has been so difficult to achieve within the DOE/NNSA Nuclear Weapons Complex.¹⁶ When seen through the "lens" of the Breckenridge Equation, it becomes clear that Lab and Plant managers and staff members who observe a "gap" in day-to-day operations are forced into a Pragmatic Paradox because they receive conflicting, contradictory, or duplicitous messages which tacitly communicate that the only way to keep the *informal rules* for how things "really" get done (POI) is to break the *formal rules* that are documented in written policies and procedures (COI). For example, an organization's

formal (written) rule is that contracts should be developed according to the formally written procedures and “formality of operations” associated with COI, but the informal (unwritten) rules for how some contracts “really” get done (POI) is to “shape” the statement of work until the ESH&Q requirements are defined so as to avoid overly bureaucratic steps in the review process (COI) because the actual work described in the contract-documents would never get done on time if the manager followed the formal rules and went “by the book.” So the questions that Lab and Plant managers should be asking themselves when developing a strategy for organizational transformation include, “How wide is the ‘gap’ between the formal and informal rules for how things get done; e.g., the gap between POI and COI? What are the underlying causes of the gap in the POI and ROI? What has management done to-date to try to narrow the gap and has this actually worked? From a ‘Safety Culture’ perspective, do managers and staff members at Labs and Plants tacitly see the ‘gap’ between POI and COI as requiring them to perform *routine violations* of written policies and procedures in order to get the job done; e.g., to what extent are they being forced into the Pragmatic Paradox to get the job done?”¹⁷

The *third* reason why transformation has been so difficult to achieve to-date is because Labs and Plants across the DOE/NNSA Weapons Complex have been more or less successful at achieving their mission and programmatic goals (Current Results), despite the numerous past failures in safety, security, business practices, performance, and public criticism referenced in the NRC Report, GAO reports too numerous to name, and elsewhere.¹⁸ Because all four terms function interdependently, the Labs’ and Plants’ Current Results have reinforced the other three cultural terms like a “social mirror” that reflects the way things *are* and has solidified into the organizational reality that managers and staff members live within. When viewed through the “lens” of the Breckenridge Equation we see that: a) the operational success at being premier weapons science Labs and nuclear and non-nuclear Plant-Production facilities, combined with b) the difficulty that M&O contractors have had in creating authentic organizational transformation because they have lacked adequate funding support, been overwhelmed by overly bureaucratic management systems and programs mandated by DOE/NNSA Orders and requirements, and have not had a precision model for organizational transformation, and shaped by c) the fact that some DOE/NNSA employees lack the technical competence to adequately and effectively oversee the work performed by their M&O contractors and consequently have tolerated (and been embarrassed by) M&O contractors’ ineffective performance – all these things (and more) have *unintentionally rewarded and reinforced* ineffective behaviors (POI) and the strongly held attitudes and beliefs on the part of Labs and Plants that “we’re doing okay” (ROI).

The cultural configuration of the a, b, and c elements described in the previous paragraph has prevented the organizations across the Complex from believing that they are actually on a “burning platform” and need to transform their organizations. But deep sustainable change almost always requires a burning platform – and there are two kinds. The *reactive* kind is when leaders wait until a situation has gone critical to act. Alternatively, leaders who adopt the *proactive* kind of burning platform realize that while the situation may be just “difficult” right now, it probably will become “critical” down the road if they allow operations to continue on the current path. So proactive leaders establish a new direction for their organization, set the platform on fire, and tell managers and staff, “we’re going that way” as they move toward a new end-state vision. The organizational and individual “success” that Laboratory and Plant managers and staff members have achieved over the years is one of the biggest barriers to creating a sense of urgency around a credible and compelling business case and end-state vision of organizational transformation. A broader, more challenging, and related question that the DOE/NNSA and its M&O contractors should be asking echoes the burning platform that Jim Collins ignites in his book, *How the Mighty Fall* where Collins asks, “Is America renewing its greatness, or is America dangerously on the cusp of falling from great to good?... History shows, repeatedly, that the mighty can fall.”¹⁹ In much the same way, “Are the Labs and Plants that constitute the DOE/NNSA Nuclear Weapons Complex renewing their greatness, or are they dangerously on the cusp of falling from great to good unless they succeed at transforming themselves *now* for their new role in the 21st Century and beyond?”

The More You Know, the More You See

I was once on a scuba diving trip to the Great Barrier Reef in Australia, and one of the dive masters who knew a lot about marine life would always say, “The more you know, the more you see.” With over 1,500 species of fish, 1,000 species of mollusks and crustaceans, and 600 species of coral, it was easy for divers to get overwhelmed by the sheer number of types of sea life living on the reef. It was also easy to misidentify species if a diver had an inadequate (or incorrect) knowledge of marine biology. Before each dive, two marine biologists would give workshops on the scientific and taxonomical principles of marine life which taught us how to recognize the differences between the myriad fish, coral, and the other sea life that we would likely encounter during the next dive. This new knowledge paid big dividends because we were able to identify subtle but important differences in what formerly seemed like an overwhelming visual array of sea life pulsating on the reef.

The process of change, transition, and organizational transformation described in this paper has some important things in common with this diving example. When trying to develop and execute a strategy for transforming an organization within the DOE/NNSA Nuclear Weapons Complex, it’s easy for leaders and managers to get overwhelmed or side-tracked by the sheer number of variables in tactical and strategic operations because (like the coral reef) even a Laboratory Division or Department with less than 100 people is a complex goal-seeking organism composed of structures, systems, human-financial-physical resources, and culture that interacts with other equally complex organizational units within a Laboratory or Plant, and then between other Labs and Plants. In the absence of precision models that are reliable predictors of organizational and human behavior, it’s easy for Federal and M&O contractor managers to misidentify and misdiagnose what’s actually happening in an organization by focusing on symptoms and causal factors, rather than the underlying “root causes” of organizational performance and culture. Without a precision model that describes the dynamic interaction between an organization’s structures and systems (COI); ways-of-working and patterns of organizational and individual behavior (POI); attitudes, beliefs, tacit, unquestioned, taken-for-granted assumptions about how work should be done and decisions should be made (ROI); and an organization’s actual results that function like a “social mirror” and reflects the organization’s reality; managers are more likely to misidentify and misdiagnose what’s actually happening in an organization, and what it would take to transform it.

So if the Labs are going to continue to evolve toward their new role as National Security Labs by identifying, competing for, and winning mission-related WFO projects, while maintaining nuclear weapons as their core mission; and if they are to succeed at decreasing the cost of overly bureaucratic Laboratory support services that are built around DOE/NNSA mandated programs in areas such as security, ESH&Q, administration, human resources, facilities management, and financial management, *and at the same time* increasing the effectiveness and reliability of these services; then they must learn to “see” their day-to-day operations differently. Leaders and managers at the M&O contract, organizational, departmental, interpersonal, and individual levels could use the Breckenridge Equation as a “lens” through which to identify the barriers to organizational transformation described in the previous section, which includes:

- Developing corrective actions that address the behaviors and ways-of-working associated with the POI term, and the attitudes and beliefs associated with the ROI term, rather than limiting their corrective actions and improvements to the COI term of the equation,
- Working diligently to identify and narrow the “gap” between the formal (COI) and informal (POI) ways-of-working at all organizational levels, and to more clearly understand (and intentionally control for) the natural cognitive and cultural tendency for ways-of-working (POI)

and belief and attitudes (ROI) to migrate from the routine-expected Rule-Based level, to the autopilot Skill-Based level of activity, and

- Understanding that the success that the Labs and Plants across the DOE/NNSA Nuclear Weapons Complex have achieved over the years has been achieved *despite* the cultural configuration of the a, b, and c elements of the third reason described earlier.

Learning to see organizations through the “lens” of the four terms of the equation takes a considerable amount of time and practice, because deep learning almost always requires us to unlearn other ways of seeing and understanding the world around us. Using the precision model described here to understand the structure and dynamics of organizational transformation will help reveal underlying patterns of organizational and individual behavior that happen all around us, but are not well understood or seen to be what they are. But once you’ve learned to see differently, you’ll never see your organization or the people in it the same way again.

* To find another article written by Mark Bodnarczuk that is a commentary on (and response to) the NRC Report use an Internet search engine like Google or Bing to search for the title, *Why Transforming the DOE/NNSA Nuclear Weapons Complex Is So Difficult (Part I)*, and *Why Transforming the DOE/NNSA Nuclear Weapons Complex Is So Difficult (Part II)*.

¹ The substance of this section is based on the *Nuclear Posture Review Report*, April 2010, published by the Department of Defense, p. iv ff.

² See National Research Council, *Managing for High-Quality Science and Engineering at the NNSA National Security Laboratories*, Prepublication, (Washington, DC: The National Academies Press, 2012), and The Report by a Panel of the National Academy of Public Administration, *Positioning DOE’s Labs for the Future: A Review of DOE’s Management and Oversight of the National Laboratories* (Washington, DC: The National Academy of Public Administration, January 2013).

³ See James C. Collins and Jerry I. Porras, *Built to Last: Successful Habits of Visionary Companies*, (New York: Harper Business, 1994), pp. 43-44.

⁴ See John Kotter, “Leading Change: Why Transformation Efforts Fail” in *Harvard Business Review*, January 2007, Reprint R0701J; John Kotter, *Leading Change*, (Cambridge, MA: Harvard Business Press, 1996), and John Kotter and Dan Cohen, *The Heart of Change: Real Life Stories of How People Change Their Organizations*, (Cambridge, MA: Harvard Business School Press, 2002).

⁵ Deming describes the distinction between *Common Causes* and *Special Causes* in W. Edwards Deming, *Out of Crisis*, (Cambridge, MA: MIT Center for Advanced Engineering Study, 1982), p. 309 ff.

⁶ For a more complete discussion of the Breckenridge Equation see, Mark Bodnarczuk, *Making Invisible Bureaucracy Visible: A Guide to Assessing and Changing Organizational Culture*, (Boulder, CO: Breckenridge Press, 2009), p. 23 ff.

⁷ See David Hanna, *Designing Organizations for High Performance*, (New York: Addison-Wesley Publishing Company, 1988), p. 36.

⁸ For a description of Knowledge-Based, Rule-Based, and Skill-Based performance levels see, James Reason and Alan Hobbs, *Managing Maintenance Error*, (Burlington, VT: Ashgate, 2003), p. 27 ff.; and James Reason, *Managing the Risks of Organizational Accidents*, (Burlington, VT: Ashgate, 1997), p. 68 ff.

⁹ This principle is called the Individual-Collective Paradox and is described in more detail in, Mark Bodnarczuk, *Making Invisible Bureaucracy Visible: A Guide to Assessing and Changing Organizational Culture*, (Boulder, CO: Breckenridge Press, 2009), pp. 42 ff.

¹⁰ For a detailed discussion of this history see, Richard Rhodes, *The Making of the Atomic Bomb*, (New York: Simon & Schuster, 1986), and Richard Rhodes, *Dark Sun: The Making of the Hydrogen Bomb*, (New York: Simon & Schuster, 1995).

¹¹ This diagram is an adaptation of the three levels of performance developed by the distinguished Danish control engineer Jens Rasmussen. For a description of the original model see, James Reason and Alan Hobbs, *Managing Maintenance Error*, (Burlington, VT: Ashgate, 2003), p. 27 ff.; and James Reason, *Managing the Risks of Organizational Accidents*, (Burlington, VT: Ashgate, 1997), p. 68 ff.

¹² For a discussion of this Common Cause, see Mark Bodnarczuk, *Why Transforming the DOE/NNSA Nuclear Weapons Complex Is So Difficult (Part I)*, and Mark Bodnarczuk, *Why Transforming the DOE/NNSA Nuclear Weapons Complex Is So Difficult (Part II)*.

¹³ For a discussion of the Left-Hand Column see, Peter Senge, *The Fifth Discipline*, (New York: Currency Doubleday, 1990), p. 196 ff.; Chris Argyris, Robert Putnam, and Diana McLain Smith, *Action Science*, (San Francisco: Jossey-Bass

Publishers, 1985), pp. 340-341; and Mark Bodnarczuk, *Making Invisible Bureaucracy Visible: A Guide to Assessing and Changing Organizational Culture*, (Boulder, CO: Breckenridge Press, 2009), p. 58.

¹⁴ See Edgar Schein, *Organizational Culture and Leadership*, 4th Edition, (San Francisco, CA: Jossey-Bass, 2010). For a comparative analysis of the way the Breckenridge Equation defines organizational culture, and the way it is defined by other writers in the business literature see, Mark Bodnarczuk, *Making Invisible Bureaucracy Visible: A Guide to Assessing and Changing Organizational Culture*, (Boulder, CO: Breckenridge Press, 2009), p. 25.

¹⁵ See Mark Bodnarczuk, *Why Transforming the DOE/NNSA Nuclear Weapons Complex Is So Difficult (Part I)*, (Boulder, CO: Breckenridge Press, 2012), p. 4.

¹⁶ For a discussion of this Common Cause see, Mark Bodnarczuk, *Making Invisible Bureaucracy Visible: A Guide to Assessing and Changing Organizational Culture*, (Boulder, CO: Breckenridge Press, 2009), p. ix.

¹⁷ For a more detailed discussion of the distinction between errors and violations see, James Reason and Alan Hobbs, *Managing Maintenance Error*, (Burlington, VT: Ashgate, 2003), p. 55; and James Reason, *Managing the Risks of Organizational Accidents*, (Burlington, VT: Ashgate, 1997), p. 72 ff.

¹⁸ See National Research Council, *Managing for High-Quality Science and Engineering at the NNSA National Security Laboratories*, Prepublication, (Washington, DC: The National Academies Press, 2012), p. 36.

¹⁹ See Jim Collins, *How the Mighty Fall: And Why Some Companies Never Give Up*, (New York: Harper Collins Publishers, 2009), p. 2.