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APPRECIATIVE INTELLIGENCE AND GENERATIVITY: A CASE STUDY OF ROCKY FLATS NUCLEAR WEAPONS FACILITY CLEANUP

Tojo Thatchenkery and Irma Firbida

ABSTRACT

This chapter provides an in-depth analysis of the cleanup and closing of the nuclear weapons facility at Rocky Flats (RF), Colorado, United States, which was completed 60 years ahead of schedule and $30 billion under budget. We demonstrate how the events leading to the successful completion of the project was an instance of generativity made possible by the Appreciative Intelligence of the project leaders and participants. At the end of the Cold War, production at RF was terminated and experts considered cleaning up of the dangerous facility technically impossible, risky, and impractical. Yet, working in collaboration with contractors, local officials, and community leaders, the RF team achieved extraordinary results. After the unprecedented cleanup, 4,000 acres were transferred to the U.S. Fish and Wildlife Service and became

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a national wildlife refuge. Generativity is an approach to life that directs our actions toward positive outcomes. For generativity to happen, stakeholders in the RF project had to care about the environment around them for innovative solutions to emerge. Instead of stagnation or blind acceptance of circumstances, they chose to reframe and find new ways to perceive situations facing them. This case study shows that individuals with high Appreciative Intelligent acknowledge present circumstances, choose to reframe, see possibilities for the future, and take the necessary actions to achieve them. They also expand their Appreciative Intelligence beyond their personal lives. At RF, despite the imminent closing of the plant, stakeholders generated socially responsible solutions and transformed a public liability into a community asset.

INTRODUCTION

In October 2005, the United States Department of Energy [DOE] completed the cleanup of Rocky Flats (RF), a nuclear weapons facility located near Denver, Colorado, 60 years ahead of schedule and $30 billion under budget. Leading the closing effort was Frazer Lockhart, Manager of the RF project, who was subsequently awarded the 2007 Service to America Science and Environment Medal by the nonprofit, nonpartisan Partnership for Public, recognizing his contribution to the field of science and environment.

The U.S. government created the Superfund Program in 1980 to clean up a large number of dangerous toxic waste sites. On top of the list was the RF facility that manufactured plutonium triggers for nuclear warheads for four decades. With the Cold War ending in 1992, the W-88 Trident Warhead Program was cancelled, and RF production was officially ended (US DOE Rocky Flats Project Report, 2006). Experts had judged that cleaning up of this dangerous facility would be technically impossible, risky, and impractical. The estimated cleanup bill was at $37 billion and projected 70 years for completion. However, the RF team successfully remediated RF in just 10 years, at a cost of $7 billion (Science and Environment Medal Recipient [SEMR] profile, 2007).

The scope of what was accomplished in this project was remarkable. According to the DOE , "the cleanup project personnel removed 21 tons of weapons-usable nuclear materials; decontaminated and demolished 800 structures comprising 3 million square feet; drained 30,000 liters of plutonium solution; stabilized and packaged 100 tons of high-content plutonium residue; performed environmental cleanup actions at 130 sites; dispositioned millions of classified items and excess property; and safely shipped more than 600,000 cubic meters of radioactive waste to a safe disposal site – enough to fill a string of railcars 90 miles long" (SEMR, 2007). Following the unprecedented cleanup, 4,000 acres were transferred to the U.S. Fish and Wildlife Service and have become a national wildlife refuge, similar to the National Parks. The transfer also allowed conserving the rare and unique tall grass prairie found along Colorado's Front Range. Deer now outnumber humans at RF (Rocky Flats Nuclear Weapons Site Becomes a Wildlife Refuge, 2007).

A nuclear weapons facility to a wildlife refuge? Yes. We will show that RF's transformation is an instance of organizational generativity made possible by the high Appreciative Intelligence of leaders and workers, which resulted in an extraordinary cleanup and closing as well as the final transformation of RF. We will discuss the nature of Appreciative Intelligence and its components and qualities, the linkage between Appreciative Intelligence and generativity, and how the competencies and qualities of Appreciative Intelligence led to generativity at RF through the use of a case study.

The analysis is based on an interview with Frazer R. Lockhart, site manager at the time of project completion, and on several published materials, including the work of Kim Cameron and Mark Lavine (2006) outlined in their book, *Making the Impossible Possible: Leading Extraordinary Performance – The Rocky Flats Story.*

THE NATURE OF APPRECIATIVE INTELLIGENCE

Appreciative Intelligence is the ability to perceive the positive inherent generative potential in a given situation and to act purposively to transform the potential to outcomes (Thatchenkery & Metzker, 2006). It is the ability to reframe a given situation to recognize the positive possibilities embedded in it that are not apparent to the untrained eye, and to engage in the necessary actions so that the desired outcomes may unfold from the generative aspects of the current situation. The components of Appreciative Intelligence are reframing, appreciating the positive, and seeing how the future unfolds from the present.

Let us begin with the first component of Appreciative Intelligence, reframing. Framing is the basic psychological process in perception where a person constructs or interprets a context, issue, or scenario in a certain way (Thatchenkery & Metzker, 2006, p. 6). Reframing is framing reality in a new and positive way, which opens our minds to seeing new connections between ideas, people, or situations.

Appreciating the positive, the second component in Appreciative Intelligence, is a process of discovery akin to the scientific experiment. It is easy to miss the positive results if one is not observing keenly or from the right orientation. This component is similar to the "have" focus type of appreciation identified by psychologist Mitchel Adler and Nancy Fagley (2005). People with Appreciative Intelligence focus on what they have in their lives, noticing, acknowledging, and feeling good about what they have instead of what they do not have.

The third component of Appreciative Intelligence, seeing how the future unfolds from the present, is the critical last step for generating successful outcomes. Beyond reframing or recognizing positive possibilities, one must know what to do in the current moment. The future possibility must be realized in the existing reality through purposive action. A person with high Appreciative Intelligence can execute a breakdown of her actions into a series of workable and time-sensitive small steps.

Individuals who have Appreciative Intelligence demonstrate four qualities: persistence, conviction that one's actions matter, tolerance for uncertainty, and irrepressible resilience. The first quality, persistence, is a critical ability of individuals with high Appreciative Intelligence. Persistence is the ability to continue with a project. People with Appreciative Intelligence plant seeds and persevere to help them grow. While some individuals doubt about the potential of seeds, individuals with Appreciative Intelligence believe in their ability to help those seeds grow to become trees by watering and fertilizing them and by dealing with any challenging circumstances and environments.

The second quality, conviction that one's actions matter, is demonstrated by individuals with high Appreciative Intelligence by the proactivity that they show. This quality is related to self-efficacy, or the conviction that one has the abilities to perform a particular task in a certain environment by getting the necessary motivation, cognitive resources, and actions (Stajkovic & Luthans, 1998). As Bandura (2000) pointed out, individuals create their own belief systems , which allow them to be more proactive and in control of their own lives. Wilkins (1976) also explained the self-fulfilling-prophecy concept and stated that the way we behave depends

more on our beliefs about what we are capable of doing than by what we are really capable of achieving. Indeed, we are motivated to act when we believe that with our actions we can produce desired effects and prevent undesired ones. Such beliefs impact our thoughts, feelings, actions, choices, and how much effort we will use on certain tasks or how resilient we will be when confronted with challenges (Bandura, 2000). Furthermore, people with strong self-efficacy are open to new experiences and take on more challenging tasks, increase their efforts if they think they might fail, and recover quickly after unexpected failures (Klohnen, 1996).

The third quality of Appreciative Intelligence is tolerance for uncertainty, or the ability to successfully reach toward the unknown, take risks, and to come to terms with the discomfort of uncertainty or ambiguity, even to feel comfortable with it. Uncertainty and ambiguity are related to cognitive dissonance, "the discomfort people feel when new ideas or experiences seem to contradict what we already know or believe" (Thatchenkery & Metzker, 2006, p. 25). When facing dissonance, not only do we want to reduce it, but we also try to avoid unfamiliar situations that would likely intensify such dissonance (Festinger, 1957). When we encounter incongruent information, we must either find a way to relate the new and unfamiliar to something that is familiar or change our current belief or knowledge systems, something that is very hard to do.

We may think of uncertainty or ambiguity as dealing with two seemingly contradictory ideas at one time, not knowing an answer, not knowing how to solve a problem, or not foreseeing the results of a given situation. Nevertheless, new knowledge, ideas, and opportunities to frame reality differently and to turn negative situations into positive outcomes arise out of the messiness and chaos of ambiguity (Thatchenkery & Metzker, 2006). Certainly, there are benefits that arise from the process of resolving or making sense of contradictory ideas, and ambiguity can spark new ideas or products and generate mental energy, excitement, and creative tension.

For many leaders today, the feeling of being "up in the air" is very difficult. They would rather deal with a negative conclusion than show patience and resilience in discovering if the ending will be positive or negative (Thatchenkery & Metzker, 2006, p. 27). Living one of the philosophies of Starbucks founder Howard Schultz (1997, p. 1), they "risk more than others think safe." Leaders with high Appreciative Intelligence are able to deal with new or risky situations on a number of levels. First, they are able to deal with their own dissonance long enough to investigate the seemingly contradictory pieces of information, thoughts, or beliefs until they make

sense of the new with the old. Second, they have the ability to tolerate the longer periods of uncertainty required to develop innovative products or start a new organization – to take an entrepreneurial risk. They are able to control or ignore the discomfort of not knowing if or when a product or organization would become profitable, or investments would be returned, long enough to innovate the product or start the new venture.

The fourth quality of Appreciative Intelligence, irrepressible resilience, is the ability to bounce back from difficult situations. This skill allows individuals to maintain strength against adversity and to succeed in the face of harsh conditions. "Irrepressible resilience is the quality of not buckling under stress and returning to a state of strength despite weakening forces around" (Thatchenkery & Metzker, 2006, p. 30). Siebert (2005) wrote that individuals respond to setbacks in different ways and that highly resilient individuals have an important advantage over non-resilient individuals as they "get through the distress, orient quickly to the new reality, and cope with immediate challenges. They bounce back and often spiral upward, stronger than before" (Siebert, 2005, p. 2).

Individuals who have high resilience are more capable of learning along the road from the blocks and problems they encounter and to use such knowledge to deal with future challenges (Salovey, Bedell, & Mayer, 1999). According to Frederickson's broaden and build theory, people's positive emotions open the way for expanded cognition and behavior, which in turn build their physical, intellectual, and social resources, thus helping make them more resilient in the future (Fredrickson, 2001). Besides being open to new experiences, resilient individuals are insightful, and those characteristics make possible to create innovative solutions and to act on them (Klohnen, 1996).

LINKAGE BETWEEN APPRECIATIVE INTELLIGENCE AND GENERATIVITY

Generativity is defined as "having the ability to originate, produce, or procreate." (The Free Dictionary by Farley, as retrieved in http://www.thefreedictionary.com/generativity.) The etymology of the word "generate" is "Latin *generare, generat-*, to produce, from *genus, gener-*, birth" (The American Heritage Dictionary, 2000).

In 1950, psychoanalyst Erik Erikson introduced his theory of human development and life cycle that included generativity versus stagnation as

one stage of development. He described generativity as "a concern for establishing and guiding the next generation" (1950, p. 267). He believed that performing socially valued work is also an expression of generativity (Erikson, 1950).

Generativity is an approach to life and one that can direct our actions. Generativity is also a perspective that is globally and socially responsible. It starts with questioning the status quo and it involves the creation of what will be passed on to future generations. Kenneth Gergen coined the term "generative capacity" as "the capacity to challenge the guiding assumptions of the culture, to raise fundamental questions regarding contemporary social life, to foster reconsideration of that which is taken for granted, and thereby to generate fresh alternatives for social action" (1994, p. 109).

The generative process starts with acknowledging the past and present circumstances. For generativity to happen one has to care about things, and one has to want things to happen. Instead of stagnation or blind acceptance of life circumstances, one chooses to reframe and find the best way to see a situation. We are not merely subject to circumstances of life. We have the ability to shape what comes to us. Organizational generativity starts with the creation of an environment where the status quo is challenged. It is in this climate where the active participation of the members of the organization makes it possible to innovate and create systems that are socially responsible for the benefit of future generations.

As articulated by Thatchenkery and Metzker (2006), individuals who possess Appreciative Intelligence acknowledge present circumstances and choose to reframe. They see what is possible. They create a future important to them and take necessary actions to achieve such future. Individuals with Appreciative Intelligence are able to change the environment around them. Furthermore, successful leaders and innovators expand their Appreciative Intelligence beyond their personal lives and extend it to the organizational structure. Appreciative Intelligence is indeed an individual ability that has an enormous impact in larger systems. Individuals with high Appreciative Intelligence create environments in which generativity starts with learning from challenges. Furthermore, they use innovation to create infrastructures, corporate cultures, or systems necessary for success and transformation.

In the case study we will discuss how the Appreciative Intelligence demonstrated by individuals at RF resulted in organizational generativity that converted an environmental eyesore and security risk into a wildlife refuge despite the imminent closing of the nuclear plant. Indeed, the leaders and workers were able to generate socially responsible solutions and

transform a public liability into a community asset in a record time and with significant savings.

CASE STUDY: HOW THE COMPETENCIES AND QUALITIES OF APPRECIATIVE INTELLIGENCE LED TO GENERATIVITY AT ROCKY FLATS

This case study shows how the RF team and other leaders involved demonstrated the components and qualities of Appreciative Intelligence and how they led to organizational generativity despite the imminent closing of the nuclear plant.

First, the RF team created a climate of positive collaboration between the U.S. DOE and local residents, between other federal agencies such as the Environmental Protection Agency (EPA) and Federal Bureau of Investigation (FBI), and among divisions within the DOE. The project had to appreciatively accommodate several technical and people management challenges. Due to RF's history of problems, leaders went the extra mile to rebuild trust with surrounding communities, between the community and various federal agencies, and above all among themselves – DOE's workforce at RF. Appreciative Intelligence was also evident in the contract management as well as in the creation of incentives for the contractor if cleanup was efficiently executed.

The extent of innovative practices initiated and implemented during the project was impressive. The RF project received much recognition, such as the Grand Award of the American Council of Engineering Companies in the environmental category, the Project of the Year by the American Academy of Environmental Engineers as well as by the Project Management Institute, and the 2006 Secretary of Energy's Project Management Improvement Award.

Many leaders of the various entities involved in the site's closure, namely Kaiser-Hill (K-H) Company LLC, a joint venture of CH2M HILL and Kaiser Engineers, DOE, EPA, and the unions and the workforce were key to the success of this complex project. As discovered on many occasions during the interview with Lockhart and in analyzing the various published materials, their focus was on leadership, engagement, partnership, innovation, and in finding responsible ways for cleaning and closing the site. The credit for the success of this project goes to many individuals whose

appreciative behaviors perpetuated an innovative climate and kept the vision focused on a socially responsible cleanup operation.

The components of Appreciative Intelligence (reframing, appreciating the positive, and seeing how the future unfolds from the present) made organizational generativity possible in the RF project. Leaders and workers at RF also demonstrated the four qualities of Appreciative Intelligence. The high Appreciative Intelligence of people involved in the RF project allowed them to be generative, to see more possibilities to create a future important to them and generations to come, and they took action to achieve such future. In the next section we will discuss how the components and qualities of Appreciative Intelligence led to generativity atRF.

Reframing

Reframing by RF leaders led to organizational generativity in many instances in the RF project. For instance, RF leaders acknowledged at the project's outset that the environment included hostile relationships between the unions and contract managers, between DOE and the contractors, and between RF and the surrounding communities. Accepting the current situation guided them into the development of a strategy of action for project completion. They realized that one challenge was to engage regulators, activists, and surrounding communities that were considered enemies. They reframed their own mental models to see the antagonistic groups as cocreators of a solution. They reframed their experience of them as adversary groups that constantly challenged them to one of concerned citizens who cared about the environment and who wanted to partner with the project in building a positive future for current and future generations. Moving forward, RF leaders created generative processes by focusing their efforts to bring other stakeholders to align with the new vision and become part of something big.

According to Lockhart (2007), another challenge they had was finding out what motivated RF's highly skilled workforce, a majority of which had been working there most of their lives. First, they identified that workers had an incredible amount of pride and patriotism for the work they did during the Cold War. They made the radioactive heart for most of the nuclear weapons in the United States and only a few people in the world could do a task of such magnitude. Their mission was to keep their country safe. However, when the Cold War ended, they were no longer perceived as heroes. RF leaders reframed the situation by selecting motivation as having

value to the workforce. They engaged workers in accepting their situation and facilitating the reframing of their motivation to work on the site closure, thus, enabling them to focus on the new national mission of cleaning up the site.

Indeed, the RF workforce was fully committed to the cleanup and closure. They patriotically embraced their new mission as they did when they worked making weapons. Even more, they acquired "a reputation as world-class decommissioning workers" (KH/DOE Brochure). Those workers believed they had won the Cold War and made a difference (Lockhart, 2007), but they no longer knew what their work was. RF leaders treated workers as being very capable and valuable and they helped them become the best they could be. As vouched in the RF Report (2006), the workers' engagement in the process of closing and transitioning RF derived from a dedication to the new vision and mission. Even though they knew their jobs were not going to last forever, they reframed their situation and found new meaning in their work.

Lockhart and other leaders became appreciative of the workforce. Although the workers were highly skilled, they did not receive recognition for their talents and their willingness to overcome challenges (Lockhart, 2007). RF leaders demonstrated their Appreciative Intelligence by bringing to surface what was best in the workforce, maintaining, and retraining it. Such reframing resulted in an exceptionally high retention of about 80 percent of the workforce along with a large number of innovations by the workers (Lockhart, 2007). When RF was finally closed, K-H's president Nancy Tuor acknowledged that the workers had successfully completed an environmental cleanup considered to be one of the biggest and highly complex in U.S. history. According to Tuor, it was their dedication that led to remarkable success of the project (Hansen, 2005). This successful result was possible by the reframing by the RF leaders.

Appreciating the Positive

RF leaders were deliberate in creating a positive context at RF and the surrounding communities, which allowed for incredible creativity and contributions of the workforce and other stakeholders to the success of the project. At project's outset, the RF leadership developed a deep understanding of the environment. As Lockhart stated, the site had a very challenging climate originating from the very secret and classified mission of

the facility. Workers were not permitted to talk about their work. Besides, a lot of people opposed the manufacturing of nuclear weapons. The RF team had to overcome years of built-up mistrust and hostility (Lockhart, 2007). With the purpose of earning credibility, RF leaders made a conscious choice to understand the surrounding communities. They started meeting with those communities and listened to them. Such intentional engagement allowed the RF team to see the real power of the communities, something they had not realized before. Lockhart (2007) affirmed that they realized that those communities were the most important stakeholders and started seeing them as cocreators of solutions and partners in a mission.

Lockhart (2007) explained that focusing on the communities and reframing their meetings to have a listening environment led to open dialogue. However, it took a while to accomplish it. First, they had monthly pizza meetings with local community government, DOE staff, and some of the activist groups. Eventually, they began openly discussing what they were working on, including technical issues. The newly created climate in those meetings encouraged openness and trust, and people started to converse and share much more than they did before (Lockhart, 2007). Listening and having open discussions gave way to appreciating the power of the communities, which for many years had not been recognized. At first, communities felt they were not listened and they would often write to their Congressman to complain about RF (Lockhart, 2007). Appreciating the positive of the communities allowed RF leaders to see the possibility of having them become powerful allies. Furthermore, reframing from antagonism to appreciation subsequently led to partnership and generation of ideas for working together in the closure.

RF leaders also understood the importance of Congress and the media and they intentionally created partnerships with both (RF Report, 2006). A key lesson from this project was the significance of positive strategies and partnerships with Congress and the media. As always, when stakeholders are not happy and have issues of concern they reach members of the Congress and the media for assistance. Their newly created positive relationships with Congress and the media facilitated decisions at DOE (RF Report, 2006). Also, Congressional support was critical to reaching mandated funding levels, which were eventually achieved thanks to alignment of regulators, stakeholders, and DOE to a common vision (RF Report, 2006). Coming up with a shared vision required a great deal of intentionality. Thus, leaders created a climate to cultivate relationships and the outcome of their deliberate efforts was receiving the much-needed support.

DOE leaders also purposely built trust with multiple stakeholders. They started having frequent meetings to give updates on project progress, which led to open dialogue and communication of messages (RF Report, 2006). Lockhart (2007) confirmed that they needed to discuss conceptual plans, and dialogue opened the door for generative discussions where multiple viewpoints were brought up (Lockhart, 2007).

DOE also funded a citizens' panel to determine a plutonium soil cleanup level that would be acceptable to the community. Indeed, DOE routinely allowed key stakeholders to become familiar with proposals and to give feedback (RF Report, 2006). Many RF leaders have been given credit for their efforts in proactively engaging others. For instance, DOE's manager Mark Silverman and K-H's manager Bob Card had a great deal of energy to the vision of closure that led to align staff and other executives with the new mission and to receive the support they needed to accomplish their desired outcomes (RF Report, 2006). Like Lockhart, Silverman, and Card, many RF leaders influenced and helped others reframe and focusing on what they had. Achieving positive outcomes originated from appreciating the positive that existed in others and focusing on their worth. RF leaders were deliberate in creating a positive context, consciously allowing others to contribute to the project and remaining open to creating shared possibilities.

Seeing How the Positive Future Unfolds from the Present

Even though the RF site was in a very unfavorable and regulatory environment with a workforce that initially lacked motivation, RF leaders saw a positive future unfolding from the present and came up with specific and actionable ideas. They saw how they could transform the present situation in order to accomplish their goals and they took action. Furthermore, many DOE and K-H leaders made enormous contributions toward creating an accelerated closure schedule (RF Report, 2006) of a complex massive facility that was structurally built as if it was never going to close.

An action proven to be significant to the accelerated closure was "projectizing" of the cleanup and closure. Implementing a project meant to have deadlines, a beginning and an end, a budget, as well as criteria for performance. RF leaders applied project-planning tools in a disciplined manner (RF Report, 2006). DOE was used to work in programs, but not in projects. However, as stated in the RF Report (2006), when DOE and K-H leaders realized that a project format was necessary to accomplish cleanup and

closure, they agreed in "projectizing" the site. Using such format required strong leadership, and DOE and K-H surely had it (RF Report, 2006). Working in new ways such as with a project format was a success and earned the RF project several awards such as Project of the Year, one of the most prestigious project management awards that recognizes and honors superior and exemplary project management (FDCH Regulatory Intelligence Database, 2006).

Partnerships among parties were intentionally created and they led to the unparalleled cooperation proven to be critical to the project's success (RF Report, 2006). For instance, the DOE and K-H partnership paved the way for success of the most complex environmental cleanup project in U.S. history (FDCH Regulatory Intelligence Database, 2006). They were also united and consistent in the messages sent to others. Indeed, they created a unified closure project message "Get it done" (RF Report, 2006, pp. 1–14). The partnership of DOE and K-H was a complex one. Upon arrival at RF, K-H realized that a change in culture and processes was needed if they were to accomplish their goals. K-H asked a lot of questions and engaged KF leaders and workforce in double loop or generative learning. Double loop learning is a term coined by Argyris and Schon (1996) to describe a level of learning that questions the status quo and aims at increasing the capacity of people to change the conditions that exist at the time and which may lead to transformational change (Argyris & Schon, 1996; Cummings & Worley, 2009). With time, DOE leaders learned to appreciate K-H's questioning and their "thinking-outside-the-box" attitude (Lockhart, 2007). They built a great relationship that subsequently made possible a new contract between them in 2000, which was signed as a Single Source Justification Contract, as the RF Field Office felt that K-H had a closure project baseline that was credible and achievable (RF Report, 2006).

K-H leaders were interested in doing things in a different way. Lockhart said that K-H leaders were better performers. Not only were they more innovative, but they also helped others reframe. Certainly, K-H didn't have any investment in nuclear weapons. K-H was interested in cleaning up the place and helped RF staff blow up some of their paradigms (Lockhart, 2007). They held a vision of the future and, at the same time, remained open to options.

RF leaders moved from reframing and focusing in the positive to creating steps to complete the project by taking different approaches. They shaped their future with their decisions and actions and by going the extra mile to make the project a success. Through their strong leadership, they held their vision of the future state and enrolled others in such a vision. For instance,

Mark Silverman, the first DOE site manager, focused on cleanup and closure and provided strong leadership by aligning other executives and getting the support of workers to the closure vision (RF Report, 2006). Likewise, Bob Card, manager of CH2MHill (K-H partner company), was a highly creative person with a "think-outside-the-box" attitude. Card didn't stay with the DOE system and was open to see new perspectives as he tried new approaches to make things happen (Cameron & Lavine, 2006).

The vision and actions of leaders like Silverman and Card were continued by their successors. For instance, Alan Parker, who took over after Bob Card left RF, continued engaging others in the already established vision and actions. Parker focused on having a culture that encouraged improvement as he gave more incentives to workers. Giving incentives to perform worked very well at RF. Further, Park worked closely with the union, which resulted in the establishment of a productive relationship between union and management (Cameron & Lavine, 2006).

RF leaders also knew of the significance of sending clear and simple messages. DOE and K-H leaders understood that they needed the acceptance of the community to accomplish their cleanup mission. Therefore they took joint action to obtain it. They engaged the media, reporters, editors, and federal, state, and local officials by developing and communicating broadly a clear and consistent message based on the vision and mission of the cleanup and closure (RF Report, 2006).

RF Leaders were able to take specific actions to get to a desired future state. They created steps that built on one another and created the momentum for change in individuals and their environments, which ultimately led to the positive outcomes of the project. The components of Appreciative Intelligence and the organizational generativity observed in the RF case are summarized in Fig. 1 below.

Persistence

Persistence of RF leaders in keeping their vision and relentless commitment to closure was also critical to success. For example, when the RF management recognized the appropriateness of using a "project" format, they persuaded DOE officials in Washington, D.C. (RF Report, 2006). However, it took time to get such approval as DOE officials were used to work on programs, and not on projects. Indeed, it took many wasted staff hours and broken stakeholder relationships to work things out at RF (RF Report, 2006). Nevertheless, there are many stories of workers' and leaders'

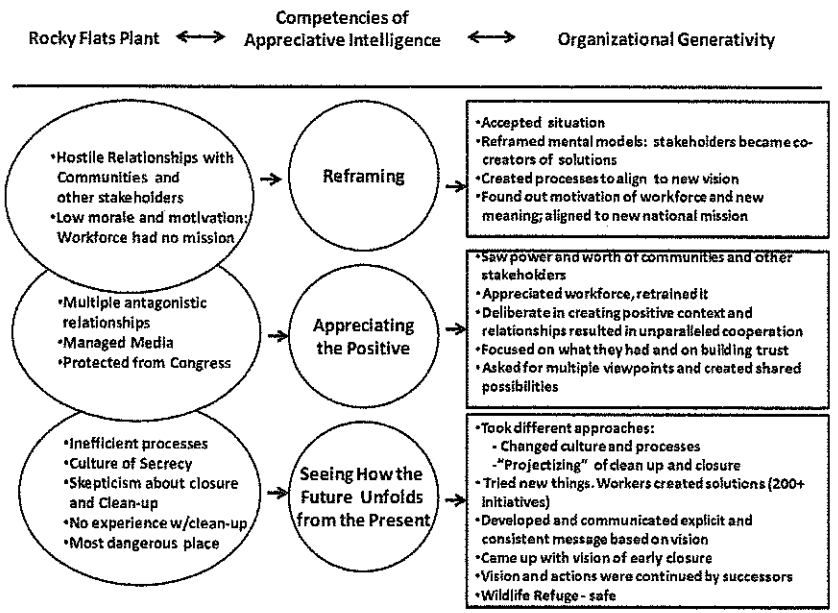

Fig. 1. Components of Appreciative Intelligence and generativity as exemplified in the Rocky Flats project.

persistence as they continued to think about solutions and be creative and innovative. In fact, their persistence paid off as they came up with many low-cost and low-tech chemical decontamination solutions to clean deeply contaminated surfaces to levels that were not imaginable before (KH/DOE Brochure).

The RF team also solved significant challenges by making use of technological innovation while working under new models of government contracting (KH/DOE Brochure). Barbara Mazurowski, site Manager from 2000–2002, implemented the final closure contract and championed safety and quality. Mazurowski developed a comprehensive administrative and technical procedures to implement the new contracting procedures and obtain high performance from contractors. She was persistent and ensured that safety was assigned the highest importance and that incentives for cost and schedule performance were never given preference over safety (RF Report, 2006). Safety improved significantly and workers became involved in planning the work and identifying hazards resulting in them finding several safer and cost-effective solutions (KH/DOE Brochure).

Learning to work in new ways became essential at RF. Learning involves persistence and acceptance of failure as part of the process. Accepting failure was also common among the RF team. They recognized the challenging ambiguous environment at RF that was also conducive to innovation and experimentation. As pointed out by Cameron and Lavine (2006), there were many things that didn't work at RF, but it was acceptable to fail. They knew they were going in the right direction, but they didn't know what they were doing, as they had to figure things out along the way. If they "didn't have the answer" they "would take risks" and "figure it out and get it done" (pp. 137–139). Still, they persisted and were continuously learning. For example, a RF leader was known as being able to hear others say "No" and to find other ideas to solve problems, even when the ideas were not his. "Nos" were opportunities to do things in different ways (Cameron & Lavine, 2006).

Likewise, even though leaders of DOE and K-H had to overcome many challenges, they kept their vision and saw obstacles as motivators to create solutions. A DOE senior executive stated that there was not a single turning point at RF; instead, it took many people who spent a great deal of effort to working together, trying to do their best, working things out when they had problems, and learning to trust each other along the way (Cameron & Lavine, 2006).

RF leaders went beyond familiar ways of proceeding. For example, before the vision of accelerated closure was articulated, no expectation existed that the closure could be accomplished in the near future or as a defined project with specified schedules. When they developed the vision of accelerated closure, they created and implemented a "closure project," which was added to the contract signed in 2000 (RF Report, 2006). Perseverance in this case led to achieving greater goals not originally envisioned, and the end result was an unprecedented success.

Conviction that One's Actions Matter

RF leaders had the conviction that their actions mattered. They believed that they were effective in dealing with bureaucracies within federal agencies as well as reaching to the restive community. Their perceptions determined what they would do and how they would interpret the results of their actions. As the project unfolded, they took on more challenging assignments and recovered quickly when some of the tasks failed.

RF leaders believed that their abilities and behaviors mattered to building credibility, and reflected and interpreted their impact. They were committed to follow through on promises in order to maintain trust. For example, Cameron and Lavine (2006, p. 174) wrote about an executive who "would move mountains" in order to do what he promised. For another K-H executive, walking the talk was important for building relationships based on trust and honesty with regulators. Even though he made mistakes when moving forward, others continued to trust him because of the integrity he demonstrated. Certainly, it was important for RF leaders to be credible and transparent. For instance, they put out news releases when they encountered problems because they didn't want others to report to the media before them. Transparency and open communication were important to them and they worked hard to a maintain them (Cameron & Lavine, 2006).

Lockhart and other leaders were confident that they could bring about their motivation and mental resources to bring the same workforce to clean up the site. The workers who built the weapons were also retrained to do the cleanup. About 80 percent of the workers had been working at RF for many years. According to Lockhart, they "turned 180 degrees." (Lockhart interview, 2007). RF leaders believed they could influence others and make things work, and they did. For instance, there was a focus on being financially generous and compassionate toward the workers to aid them working out of their jobs (Lockhart, 2007).

RF leaders as well as the workforce had a "yes-I-can-do" attitude and the conviction that they had the power to produce desired outcomes. "When it came to cleaning up RF, the words 'no' and 'can't be done' were not in the workers' vocabulary. They overcame these potential roadblocks through determination and by attempting to approach problems with new perspectives" (KH/DOE Brochure: 13). Lockhart stated that for many years many people, including activists, state governments, and surrounding communities, didn't think RF's cleanup was possible. However, that "taped into their sense of personal challenge. They said, "Yes, we can do it" (Lockhart, 2007). Certainly, workers didn't say they couldn't do certain tasks related to the cleanup. They were determined to confront problems and worked around any obstacles by thinking outside the box and finding solutions (KH/DOE Brochure). Likewise, the vision of an accelerated closure was created by K-H leaders when they started questioning the length of time and the amount of money estimated for the cleanup and closing of the site (KH/DOE Brochure). They started to believe they could accomplish the early closure and they achieved their vision.

Tolerance for Uncertainty

Many RF leaders acknowledged that they didn't have the answers for situations they faced. Hence they had to figure out things as the work was being done. K-H CEO Nancy Tuor stated that challenges at RF were similar to the challenges of "going to the moon – no one knew how to do it when we started" (KH/DOE Brochure: 3). For instance, Tuor took the challenge of making safety and efficiency a priority. She carried that message to other DOE sites and to other countries coping with cleaning up Cold War nuclear waste, which was something that hadn't been done before. Such pursuit earned her recognition as one top newsmaker of 2005 and received an Award of Excellence in 2006 (Engineering News-Record, 2006).

There was willingness to take risks and openness to experimentation at RF, which facilitated creativity and innovation. Indeed, workers found innovative ways to use many off-the-shelf products. For instance, some innovations like the ones related to waste packaging were critical to closure acceleration (KF Report). Their innovations saved a great deal of money at RF, and such innovations were also used in other DOE sites, which meant that the savings became even larger (KH/DOE Brochure).

RF leaders possessed the ability to suspend feelings of discomfort and to bear uncertainty for a long time. The workforce also had the ability to manage the discomfort of not knowing how to fix problems and spent enough time in a situation that allowed them to come up with many innovations.

As Lockhart (2007) affirmed, RF leaders also "learned under fire." Certainly, they "learned on the go, sometimes moving piece-meal through processes as many policies to facilitate accelerated closure were not yet developed and key decisions had not yet been made. Various strategies and activities were conducted without a complete game plan and without a coherent notion on how the pieces would fit together at the end. Because of the groundbreaking nature of attempting a first of-its-kind accelerated cleanup and closure project, RF had to pioneer processes" (RF Report, 2006, pp. 1–8). The team had to push to have things done in different ways and apply lessons learned along the path, and persistence and tolerance for uncertainty paid off as trust and engagement of the workforce were built.

Similarly, RF workers shared the risks of success and failure. New performance goals were set and safety had become a priority. As a K-H radiation safety manager stated, the working environment at RF was uncertain and dangerous every day. Even though the RF teams knew they were not going to have jobs, they did their work in a very safe manner. Their work

was so challenging and dangerous that a program of radiation protection was maintained until the day the site was closed (Hansen, 2005).

RF leaders turned negative situations into positive outcomes. Their open-mindedness enabled them to view problems from diverse perspectives. Open-mindedness was critical to success at RF and it made the wildlife refuge a reality. Lockhart (2007) said that the original idea in 1989 was to reindustrialize the site. The team's flexibility and openness allowed the idea of having a wildlife refuge to emerge. Even though all the parties wanted an outcome that would benefit generations to come, they didn't know how it would look like. Lockhart said that they formed a group called the "Future Use Working Group" charged with deliberating on the site's future. The group, composed of about 55 persons with a broad representation from the Denver metro area, deliberated for over a year and concluded that they did not want to have an industrial park. They decided to preserve the entire land as open space. RF leaders agreed to that decision and knew they had to find a way to make it happen, but did not know how. "The answer was to pass a law" and Congress supported "the Rocky Flats National Wildlife Refuge Act" (Lockhart, 2007). The Government Accountability Office's report indicated that one action that influenced the project's success was the decision by Congress "to create a wildlife refuge at Rocky Flats, removing uncertainty about future uses, and allowing regulators, along with citizens and the DOE, to set firm cleanup levels" (Hartman, 2006). Undoubtedly, this would not have happened if the RF team had not been able to bear with uncertainty and chaos of multiple interests.

Beyond tolerating their own uncertainty, RF leaders coped with the reactions to uncertainty in others. By bringing new ideas into the open, they caused discomfort in others by displacing old ideas and beliefs. Such discomfort in others could potentially impact others' acceptance and credibility. However, they helped others deal with uncertainty, often by reframing situations to help them see what was positive, how the future could unfold from the present, and by encouraging persistence until what was unknown became known.

Irrepressible Resilience

The ability to reframe or reinterpret a given situation enabled RF leaders to perceive that a positive consequence could be built from even the most drastic or devastating circumstances. Rather than experiencing a position

of impossibility and, therefore, a situation without hope or remedy, they showed the capacity to see what was possible and to generate plans of action with concrete steps to get to the envisioned positive state. For instance, Lockhart stated that the process of partnering with the communities was very stressful and slow. It took many months for people to "vent their anger." He realized they needed to listen rather than telling what they were doing. Then, their focus changed "to inform them more" about what they were doing (Lockhart, 2007). Even though it took many years to get to a positive stage, the initial negative environment didn't stop RF leaders, and their resilience allowed them to adapt and move ahead.

Lockhart was one of the plant's leaders who had been with the site for many years. He was appointed the RF manager and was charged with leading the final stage of the project. An article by U.S. Newswire (2003) confirmed that Lockhart held the vision for the accelerated closing of RF and his role was central to the success of the project. Lockhart had been with the site for 18 years and he was at the forefront of the process of involving the surrounding communities in the project. Despite the weakening forces around him, namely anger and upset, his continuous interactions with the communities allowed the change of a challenging situation into an opportunity to thrive and create dialogue. Lockhart confirmed that initially they could not negotiate with the communities. He realized that they needed to find better ways to start a dialogue with those communities. In spite of the initial anger and lack of communication, Lockhart persisted and bounced back with each challenge. It took a couple of years to figure out a communication and public outreach strategy and that path to having communication with the communities was understandably painful and slow (Lockhart, 2007).

Over a period of time, Lockhart and team learned to turn almost any change into an advantage. Though the project team and contractors felt overwhelmed, they eventually became flexible, adapted, and moved back into a positive emotional state as well as began work on the crisis or situation at hand. They ultimately survived despite the challenges. They framed their situation for a better view of the future and addressed the present with the belief that they could achieve their goal.

As previously stated, things were not easy at RF. For instance, oftentimes RF leaders faced lack of support, and they were aware of the many priorities for the country that came before RF. However, they kept thinking about possibilities to get the needed support and took action to get it. For instance, a DOE manager said that they were resilient and struggled trying to convince members from other states to support their project (Cameron & Lavine, 2006). Their persistence and resilience paid off when

DOE entered agreements with other states forming partnerships to clean up and close nuclear waste sites.

Not only did RF leaders inherit a demoralized workforce, but they also faced a community who hated them. The large-scale protests against RF that started in 1978 had continued, as illustrated in the recently released book *Full Body Burden: Growing Up in the Nuclear Shadow of Rocky Flats* (Iversen, 2012). Still, RF leaders facilitated its transition from manufacturing nuclear weapons to cleaning up the site. Their Appreciative Intelligence allowed them to see the potential of the workforce and remove existing barriers, even though such changing of attitudes took years. Further, RF leaders were aware that difficulties were going to continue until the day of closure, and they continued overcoming challenges and creating a climate of trust and communication. For example, they started listening to the workers and acted on safety concerns. When management listened to the workers, progress was made on safety issues. Workers came to know that leaders listened to them and their concerns. In the end, all the safety measures taken in the project produced "returns greater than the investment" (RF Report, 2006, pp. 6–22).

K-H leaders demonstrated resilience in many ways. At times there were disagreements between DOE and K-H, which made things very difficult. Even though discussing problems was uncomfortable, they understood the significance to do so and they worked things out (RF Report, 2006) and they were able to move ahead. For instance, when they arrived at RF, they quickly learned that the place had to be changed in a drastic manner. No cleanup work was being done. Accepting a new contractor with an entirely different vision was taxing. However, as Cameron & Lavine (2006) write, it was an opportunity to find ways toward a desirable situation and even though mistakes were made, they managed to pave the way to achieve their goals. K-H leaders did not give up and they learned from failures and difficult situations. The qualities of Appreciative Intelligence and the organizational generativity observed in the RF case are illustrated in Fig. 2.

CONCLUDING REFLECTIONS

Generativity is an approach to life that can direct our actions. It starts with questioning the status quo and it involves the creation of globally and socially responsible results that will be passed on to future generations. For generativity to happen, one has to care about things and one has to want things to happen.

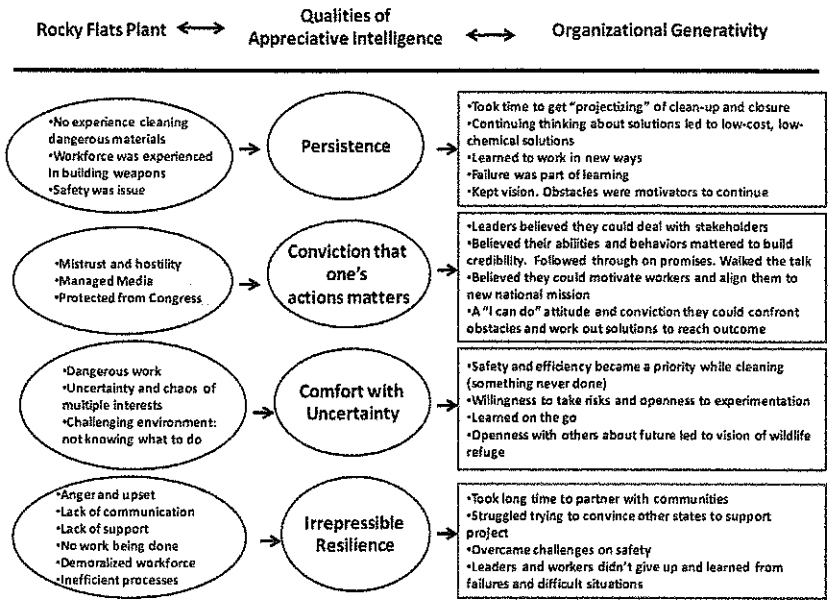

Fig. 2. Qualities of Appreciative Intelligence and generativity as exemplified in the Rocky Flats project.

Generativity is not merely being subject to circumstances of life and stagnation and is not about blind acceptance of those circumstances. It is not about ignoring reality and dreaming about a positive future either. The generative process starts with acknowledging the past and present circumstances and choosing to reframe and find the best way to see a situation. Generativity is having the ability to shape what comes to us. Individuals with high Appreciative Intelligence create environments in which generativity starts with learning from challenges. Furthermore, they use innovation to create infrastructures, corporate cultures, or systems necessary for success and transformation.

The case study explicates how RF leaders demonstrated their Appreciative Intelligence and were able to help people around them develop theirs by creating an environment of partnership and engagement. They served as models to the workforce and other stakeholders, and the organizational climate at RF became positive and supportive. Considering that RF was scheduled to permanently close made the project's success more noteworthy as the workforce achieved extraordinary results even when they knew that

at the end of the project they were not going to have jobs. They were committed to being part of creating something bigger than their lives. They focused on generating an outcome that would benefit generations to come.

Those individuals demonstrated their Appreciative Intelligence by acknowledging present circumstances and choosing to reframe. They saw what was possible and created a future important to them, and they took the necessary actions to achieve such future. Furthermore, they expanded their Appreciative Intelligence beyond their personal lives and extended it to the organizational structure. Their Appreciative Intelligence led to generativity by way of creating an environment in which learning to work in new ways became the norm. In such environment innovation flourished and the numerous innovations reached further ground as they were implemented in other projects.

The RF cleanup project showed what was possible with generativity and commitment of leaders and workers with high Appreciative Intelligence. The active collaboration and dialogue among the public, private, and nonprofit sectors which created innovative reframing and new possibilities resulted in generating new visions such as the early closure of the plant. Further, the Appreciative Intelligence demonstrated led to organizational generativity that converted an environmental eyesore and security risk into a wildlife refuge despite the imminent closing of the plant. Those leaders and workers were able to generate socially responsible solutions as they transformed a public liability into a community asset in a record time and with significant savings. The skeptics who thought the cleanup would never happen were pleasantly surprised. Finally, the RF project left a roadmap for similar reframing and generativity in a variety of environmental cleanup efforts for the U.S. DOE and theEPA.

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THE MACON MIRACLE: THE MAGIC OF INTERGENERATIONAL DESIGN FOR THE FUTURE OF EDUCATION

Cheri Torres, Trevor Warner, Kathy Becker, Kimberley Seitz, Melissa Robania and Jim Pulliam

ABSTRACT

We live in a time of great change. Community leaders around the world face dilemmas in every aspect of human living systems – social, economic, and environmental. We sit at a crossroads: do we try to fix what clearly is not working any longer or do we step up and design something new to achieve our desired outcomes? The leadership of Bibb County Schools (BCS) – faced with this very dilemma – stepped up to redesign their education system in a bold and exciting way. The road ahead was challenging and not at all guaranteed, but the conviction and strong leadership in the County was undaunted. This case study shares how BCS district, Macon, GA, is engaged the whole education system along with community leaders in a generative process to accelerate whole system positive change. Ultimately, their desired outcome was to generate a new

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