Power Outage: "How Can Japan Safely Restart Its Nuclear Energy Program Post-Fukushima?"



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Black Swan Events

- High impact Hard to predict Extreme Outliers -Complex disasters
- Mother Nature + Physics = Unpreventable & Unpredictable
 - Fukushima = Black Swan



A Cascading Event

- Natural Event leads to Artificial Event, a Human Tragedy, and leads to a Crisis Systems Failure
 - Earthquake damaged Infrastructure Large scale disaster management (DM) needs
 - Bégan isolation of nuclear plant
 - Tsunami = Loss of 1st responders
 - Stretched DM resources Lost sea ports
 - Nuclear plant further isolation and destruction
 - Human Tragedy Increased scale of DM
 - Loss trust/confidence

Crisis Systems Failure

Overwhelmed Onsite

National Government & Corporate Stepped in to take command

Caused additional complexities

Crisis Systems Failure

The symptoms of crisis systems failure

- Leadership confusion (panic/confusion/vacuum & plant isolationism)
- Who has the ultimate decision authority? Unified command?
- Responding to the impossible
- Response incrementalism, i.e., keeping up, instead of keeping ahead of the crisis
- Failure in the capability curve

Crisis Systems Failure

Leadership

- Lack of clarity at the top
- No formal communication between government representatives at site and senior government leadership
 - Island/isolated response at site
- Confused mission clarity

Lessons Learned

- Black Swans are Real and Crisis Systems Failure Happen
 - Overwhelming local/prefectural & National resources
 - Must have a fundamental belief (<u>possibilistic</u> analysis)
 - Worse on worse drills/exercises
 - Organism chart v. organizational chart
 - Leadership inversion from collaborative to authoritarian needed to cope with system failure

Lessons Learned

Emergency Management Issues

- Stretch capability curve both technical and human
 - Capability response centers
 - Plan for long-term response
 - Lifeline for other technical resources

Resilience

- Evacuations much more difficult than thought beforehand, e.g. contamination of bodies
- Include the population affected to assist- avoid victimology

Learning Lessons (Learned lessons)

- Learn right lessons of the past otherwise built-in Latent Organizational Weaknesses
- Learning the wrong lessons can be worse than learning no lessons

Learn tomorrow's lessons today

- Consider Emotion state of leaders
- Improve Crisis leadership skills
- One lesson is contingency planning. Have we thought through the crisis leadership abilities of the nuclear industry and government?
- Social media/transboundary nature of crisis
- Need scholarly research
- No more heroes Daini heroism

Crisis Systems Failure Insights Cynefin Framework



Decisions in Multiple Contexts

	CHARACTERISTICS	THE LEADER'S JOB	DANGER SIGNALS	DANGER SIGNALS
SIMPLE	Repeating patterns and consistent events Clear cause-and-effect relationships evident to every- one; right answer exists Known knowns Fact-based management	Sense, categorize, respond Ensure that proper processes are in place Delegate Use best practices Communicate in clear, direct ways Understand that extensive interactive communication may not be necessary	Complacency and comfort Desire to make complex problems simple Entrained thinking No challenge of received wisdom Overreliance on best practice if context shifts	Create communication channels to challenge orthodoxy Stay connected without micromanaging Don't assume things are simple Recognize both the value and the limitations of best practice
COMPLICATED	Expert diagnosis required Cause-and-effect relationships discoverable but not immediately apparent to everyone; more than one right answer possible Known unknowns Fact-based management	Sense, analyze, respond Create panels of experts Listen to conflicting advice	Experts overconfident in their own solutions or in the efficacy of past solutions Analysis paralysis Expert panels Viewpoints of nonexperts excluded	Encourage external and internal stakeholders to challenge expert opinions to combat entrained thinking Use experiments and games to force poople to think outside the familiar
COMPLEX	Flux and unpredictability No right answers; emergent instructive patterns Unknown unknowns Many competing ideas A need for creative and innova- tive approaches Pattern-based leadership	Probe, sense, respond Create environments and experiments that allow patterns to emerge Increase levels of interaction and communication Use methods that can help gener- ate ideas: Open up discussion [as through large group methods]: set barriers; stimulate attractors; encourage dissent and diversity; and manage starting conditions and monitor for emergence	Temptation to fall back into habitual, command-and-control mode Temptation to look for facts rather than allowing patterns to emerge Desire for accelerated resolution of problems or exploitation of opportunities	Be patient and allow time for reflection Use approaches that encourage interaction so patterns can emerge
CHAOTIC	High turbulence No clear cause-and-effect rela- tionships, so no point in looking for right answers Unknowables Many decisions to make and no time to think High tension Pataen-based loadership	Act, sense, respond Look for what works instead of seeking right answers Take immediate action to reestablish order (command and control) Provide clear, direct communication	Applying a command-and-control approach longer than needed "Cult of the leader" Missed opportunity for innovation Chaos unabated	Set up mechanisms (such as parallel teams) to take advantage of opportunities afforded by a chaotic environment Encourage advisers to challenge your point of view once the crisis has abated Work to shift the context from chaotic to complex

Source: HBR A Leader's Framework for Decision Making, Snowden and Boone, Nov 2007

Crisis Event Response

Crisis	Emotions	Decision Making	Crisis Response	Sensemaking	Leadership
Simple	Low	Collaborative	Readiness	Positive	Collaborative
Complex	High	Naturalistic	Resilience	Collective	Authoritarian/ non-linear
Chaotic	Death Anxiety	Instinctual	Situational	Doubt & Pessimism	Warrior Ethos

Source: Casto 2014

Continuing Policy Crisis

TIME TO RECOVERY



A detailed analysis of 16 wellknown corporate crises found that while perceptions of management and brand equity value took just over a year (4.7 quarters) to rebuild, investment potential took nearly two years, and overall corporate reputation almost four years to recover.



Source: Post Crisis: Engage - or Fly Low? Moran and Gregory, Brunswick Insight 2014

Policy Crisis

Crisis	Political	Public	Action	Recovery
Routine	Collaborative	Latent public: Problem is there, but public does not recognize it Disinterested & disengaged Unaware	Positive	Collaborative
Extreme	Authoritarian & nonpartisan	Aware public: Groups recognizes that a problem exists Interested & engaged	Hesitant	Trust/Confidence/Co operation
Dangerous	Leadership Panic	Active public: Group is aware of the problem and organizes to respond to it. Advocacy	Frozen in inaction	Stop the bleeding reduce severity Openness Crisis Response (unity) Still in crisis

References: 4 types of publics Tench, R. & Yeomans, L. (2006). Exploring Public Relations. England: Pearson Education Limited. Grunig, J. E. & Hunt, T (1984). Managing Public Relations. New York: Holt, Rinehart and Winston Clarke, L., & Chess, Caron leadership panic Kasperson, R. SARF

Government Actions

- Cleanup Fukushima is essential to restart
- Must provide oversight to the NRA....this is key!!!!!!!
- Develop a Risk Policy Statement through public hearings
- Develop a Safety Culture Policy Statement
- Still in a policy crisis

Government Actions

- Establish a "backfit" process along with a 50.59 process to review current or updated analysis and determine whether the plants should be retrofitted based upon the new information.
- Establish a requirement for a full safety evaluation every 10 years (international community does this) to reconfirm the plant safety analysis.
- Impose severe accident management requirements on the industry Add a requirement that each nuclear plant have a specific control room simulator, that is, a "site specific" simulator.

Utility actions

- Independent oversight in control room
- Create Independent/External Safety Review Boards.
- Require a "severe accident advisor" in each control room. This
 person would be extensively trained in severe accidents and would
 provide advice to the control room operators in the event of a
 severe accident. This would be temporary until secondary
 assessments are completed and appropriate countermeasures
 installed.
 - Train operators NOW on extreme events

NRA Actions

- Convey risk Policy Statement
- Improve the employee pipeline source and competence of NRA
- Most importantly, establish an "international regulator academy" to educate new and experienced regulators on the techniques of regulation and inspection from international partners

NRA Actions

Implement a "change management program" for the employees at the new NRA. Including revising the mission, values and vision statements.

Add one site inspector for an interim period specifically to inspect severe accident management activities. This would be temporary until secondary assessments are completed and appropriate countermeasures installed.

NRA Actions

- Boost the quantity and competence of on-site inspectors. Improved training programs for this staff and require more stringent competence criteria. Also, compare the number of on-site inspectors to those in other nations to ensure that the number of inspectors assigned to the site is appropriate.
- Establish a "hotline" for accepting public comments and respond to those questions.
- Enhance severe accident training requirements for onsite inspectors.

Enhancing Public Confidence



The Domestication of the Second Fire

Only the elites had access to technology



The Sorcerer's apprentice overtaken by his own invention

Source: The Domestification of the second fire: Pretre

The Domestication of the Second Fire

Nature was untainted and untouched until nuclear power



Seemingly no solution to nuclear energy and waste – no acceptable and accepted solution

Public Opposition



Controlling fear & panic

- How societal constraints impact solutions (social solutions v. technical solutions)
- Having the "will" to communicate with the public -Releasing SPEEDI – panic or rational behavior?
- Managing optimistic bias & defeatism
- The Role of Emotional Intelligence
- Victimology: responders as victims

Risk Perceptions Between American Students and Japanese Students – Much Alike, Some different





Cognitive Representation of Risk Perceptions : A Comparison of Japan and the United States Journal of Cross-Cultural Psychology 1991 22: 11 Randall R. Kleinhesselink and Eugene A. Rosa

Americans – Unknown, new Japanese – Known, old Both - Dread





Cognitive Representation of Risk Perceptions : A Comparison of Japan and the United States Journal of Cross-Cultural Psychology 199122: 11 Randall R. Kleinhesselink and Eugene A. Rosa

Gaining Public Trust, Confidence & Cooperation

There are two forms of public trust

- Relational
- Confidence
- Studies conclude shared values immensely important to public trust
- Studies conclude that the function of confidence is control, based on knowledge of the past or constraints on the future.

Earle TC, Siegrist M, Gutscher H. Trust, risk perception, and the TCC model of cooperation. Chapter 1 in Siegrist M, Earle TC, Gutscher H (eds). Trust in Cooperative Risk Management London: Earthscan, 2007.

Public Trust, Confidence & Cooperation



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NRA chairman questions utilities' attitudes toward nuclear safety

The utilities "have not taken the accident that occurred in Fukushima seriously enough," Nuclear Regulation Authority Chairman Shunichi Tanaka said at a press conference, adding that such an attitude has in part caused the delay in the NRA safety assessment of reactors.

Actions to improve Public Confidence

- Media tours/access/Embedded media (full access)
- Record all calls/video commitment to release future accidents tránscripts

Actions to improve Public Confidence

- Fix emergency preparedness
 - Using social media...Twitter information sharing transparency
 - Enhance sheltering procedures
 - Realistic emergency planning & Realistic evaluation drills
 - Real-time Telemetry of environmental conditions (radiological)
 - Text message for reactor shutdowns/emergency classifications/abnormal conditions/directions e.g. sheltering/evacuation (much like the earthquake notification system.
 - Flex stockpile equipment (KI/dosimeters/Radiation pagers/PC's etc)
 - Annual notification of emergency preparedness status/actions
 - Written certification/legal accountability/commitment from the government that the emergency measures are in place

University Research

- National competition on explaining health effects of radioactivity (scholarships)
- Research on impacts of Article 9 & crisis leadership
- University research: Moving from "peacetime leadership to a war-footing"; collaborative, adaptive & authoritative leadership

Conclusions

- What is regulator's role for restarting and safety operation of nuclear power in Japan?
 - Technical Evaluation
 - Confirmation of nuclear safety
 - Listening to the public
- How can Japanese government and nuclear energy industry restore the confidence of general public especially women?
 - Demonstrating shared values
 - Constraints on the future operation of nuclear power (risk acceptance)
 - How can we make nuclear energy safe enough?
 - Conversations with the public on the level of risk acceptance
 - National government must provide oversight to the NRA on the level of risk acceptance