

Responding to a Black Swan

Principles and protocols for
responding to unexpected
catastrophic events

The Black Swan



What is it?



Safety-system failures at Japan's Fukushima Daiichi nuclear plant, structural compromise of the New Orleans levees, and the collapse of the World Trade Center towers remind us of the tragic losses brought on by Black Swan events. While each event was possible, none was adequately anticipated because of a lack of information, imagination and perspective.

The Black Swan concept, which dates back several centuries¹, was based on the mistaken notion that all swans are white. But in the late 17th century, black swans were observed in Australia, revealing the shortcomings in our knowledge, imagination and perspective.

Black Swan skeptics retrospectively assert that catastrophic events are predictable because post-event investigations identify design flaws, inadequate maintenance, or other patterns that should have signaled an event's likely occurrence. Yet these same experts fail to predict these events. Fukushima Daiichi serves as a good example. The plant was rated for a 19-foot tidal surge when 46-foot surges are experienced every 30 years on average and four such surges have occurred in the past 30 years.

Knowledgeable, well-intentioned people make reasonable decisions limited by information availability, individual imagination and personal perspective. At times, these decisions omit the possibility of a Black Swan event. During others, high-impact events are deemed to be so unlikely that it is unreasonably expensive to prepare for them. Because negative events emanate from outside these boundaries of expectation, they will continue to plague companies and governments.²

What should leaders do? Are there ways to deal with a negative high-impact, low-probability event that was either unidentified or thought to be so unlikely that no prior preparations were made?

Black Swans are unpredictable. And some high-impact, low-probability events are so unlikely as to not reasonably warrant expensive preventive measures be put in place. However, for both of these, there are cost effective steps you can take to prepare to respond. In this paper, we focus on responding to negative, unpredicted and unplanned for high-impact, low-probability events – collectively referred to as Black Swans. The principles and protocols presented here can help you minimize the impact of these events and position your organization to recover as quickly and effectively as possible.

¹ The Black Swan concept was first introduced by the poet Juvenal whose phrase "rara avis in terris nigroque simillima cygno" or "a rare bird in the lands, and very like a black swan" characterized rare occurrences before the discovery of black swans in 1697. In 2007, Nassim Nicholas Taleb further defined and popularized the concept of Black Swan events in his book, *The Black Swan*.

² While some Black Swan events are desirable and produce positive outcomes, the focus of this document is on those events having extremely adverse outcomes.

How to respond to an unexpected catastrophic event

The catastrophic nature of a Black Swan event necessitates a robust and flexible set of principles and protocols to minimize its impact and enable a rapid recovery.

We think of Black Swans as rare events but, in the aggregate, they occur with regularity. What's more, Black Swans are likely to become more common. The world population is expected to reach 7 billion by mid-2012, with the majority of people concentrated in coastal cities that are increasingly reliant on advanced technologies. These growing population clusters are highly vulnerable to the natural and technological disasters that trigger Black Swans.

Traditional business continuity plans prescribe specific methods for responding to disastrous but predictable events. Carefully delineated procedures may aid in responding to a Black Swan event but are unlikely to adequately cover all emergency conditions and situation-management needs.

Fortunately, the principles and protocols presented here can help you tame a Black Swan. These concepts and approaches – based on lessons learned from previous catastrophic events – provide a framework and guidelines that are readily adaptable to changing circumstances so as to achieve an effective response and the most favorable outcome.

The principles and protocols presented here are designed to aid:

- ▶ Chief risk officers facilitating the implementation of event-response processes
- ▶ Chief operating officers leading the event response
- ▶ Chief executive officers and boards of directors overseeing the event response

A Black Swan event, by our definition, is unexpected and catastrophic. What's needed are easily adaptable principles and protocols to guide your organization's response.

This executive-level involvement is necessary to provide a broad, impartial perspective and to garner and coordinate the deployment of necessary internal and external resources for combating these significant events.

While any organization can face a Black Swan, those most likely to be challenged include:

- ▶ Nuclear power plants
- ▶ Oil refineries
- ▶ Oil and gas extractors
- ▶ Chemical plants
- ▶ Hazardous-waste transport and storage facilities
- ▶ Aerospace and defense companies
- ▶ State governments and federal agencies, including the military

Rare birds

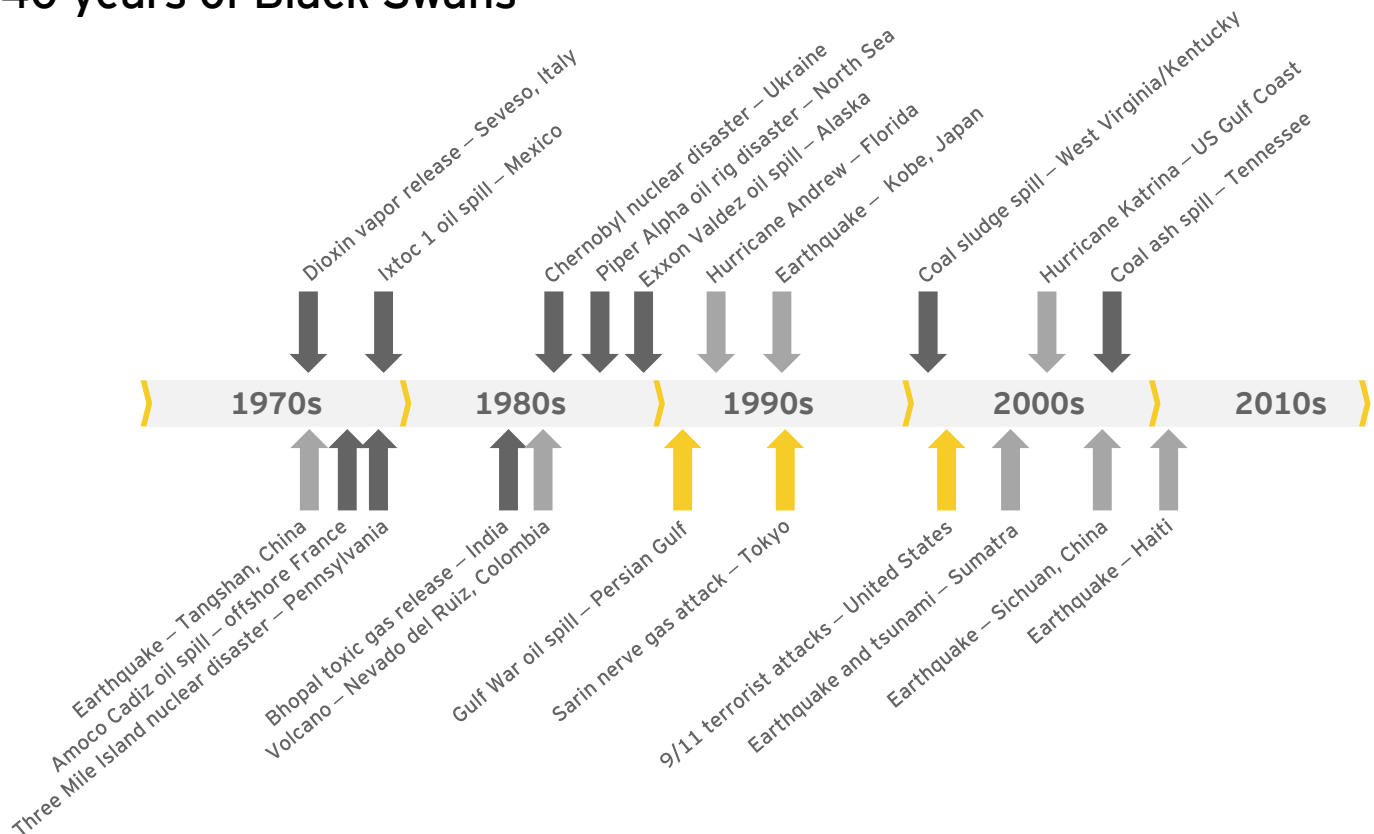
Black Swan events evolve from one or a combination of factors, including unintended human error, negligence, malicious actions, or acts of nature. Regardless of their causes, they are alike in that they:

- ▶ Occur unpredictably or unexpectedly
- ▶ Develop rapidly and continue for days, weeks, and even months
- ▶ Are catastrophic in scale and broad in scope
- ▶ Present hazards beyond immediate financial risks, jeopardizing lives, long-term health, and the environment
- ▶ Involve significant asset damage or loss
- ▶ Often require significant corporate and/or government resources to effectively resolve



Black Swan response principles

40 years of Black Swans



Underlying effective catastrophic-event management is a set of broadly applicable principles. Applying these throughout the event response will improve the overall outcome. These principles include:

- ▶ **Definition, ownership, and communication of catastrophic-event response protocols.** The time to adopt and train on catastrophic-event management protocols is before a Black Swan occurs. Doing so enables organization leaders to calmly think through and robustly debate the framework for their response. While actual events will never exactly match what is developed and practiced, by undertaking the exercise, the organization will be better equipped to respond should disaster occur. The lack of coordination among federal, state and local governments in the response to Hurricane Katrina is an example of what can happen when there is inadequate preparation for a catastrophic event that has a wide range of “owners.”

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Response principles

- ▶ Definition, ownership and communication of catastrophic-event response protocols
- ▶ Clearly defined, pre-established emergency management goals and values
- ▶ Empowerment of local responders to take action
- ▶ Parallel planning and execution
- ▶ Inventories of financial, personnel, physical and knowledge resources
- ▶ Leverage of external perspective and experience
- ▶ Avoidance of false economy
- ▶ Rejection of political motivations
- ▶ Confrontation of moral and ethical dilemmas
- ▶ Consideration of contrarian challenges



Grounding a potential Black Swan

Following the eruption of Iceland's Eyjafjallajökull volcano in the spring of 2010, European aviation authorities came under sharp criticism for canceling thousands of flights – the largest peacetime air travel disruption in history. Recent research, however, revealed the airborne volcanic ash was unusually small, sharp and hard, and would have been highly damaging to jet engines and fuselages. So aviation authorities made the right decision – even at a high financial cost – and circumvented a Black Swan situation.

► **Clearly defined, pre-established emergency management goals and values.** Emergency response managers and field operators face many time-critical decision and action points. And while little time may exist to debate a course of action, effective event management demands that all efforts be focused on achieving the desired outcomes. When leaders establish clearly defined emergency management goals and values, responders are provided with the objectives needed to rapidly formulate decisions and assess the effectiveness of response actions – even before a formal response plan is developed.

► **Empowerment of local responders to take action.** Local responders experience an event first hand and in real time. These individuals often witness changes in conditions that either warrant immediate action or provide an opportunity to significantly reduce the event's impacts. Enabling responders to act in a manner consistent with the organization's goals and values and in accordance with established emergency response procedures frequently results in a more rapid resolution and containment of adverse conditions.

► **Parallel planning and execution.** Seldom does the first response to a Black Swan terminate the event. Consequently, backup plans are typically developed to readdress accident conditions should the current response fail.

Parallel planning and execution is about prioritization. It encourages the simultaneous progress of several response options, pre-staging later actions so they can be immediately implemented should the preceding response action fail. This approach greatly reduces the time delay experienced between actions, thereby helping to minimize the duration and impact growth of the event.

► **Inventories of financial, human, physical and knowledge resources.** Effective Black Swan response typically requires significant financial, human, physical and knowledge resources. All too often, needed and available resources are not applied, hindering recovery by allowing event conditions to linger and worsen. During the New Orleans portion of the Hurricane Katrina event, city school buses sat empty in parking lots instead of being used to transport those in the city to a safe location. Additionally, food, pharmaceutical, and other supplies located in stores were not collected by local authorities to provide to those trapped within the city and were instead pilfered by criminals and sold on the black market. Had local, state and federal officials been more thorough in inventorying all available assets, they could have better combated this event.

While artificialities may at times restrict availability, event managers are sometimes unaware of the resources available to them. This lack of awareness stems from an expected unfamiliarity with some internal business functions and external industry and government supports. Although some resource inventories exist within preplanned emergency response procedures, it is important for response leaders to continually survey team members and outside supporters to build complete inventories of financial, human, physical and knowledge resources. Resource availability data should be accompanied by the appropriate deployment and use-restriction information.

► **Leverage of external perspective and experience.** No organization possesses the entire body of global disaster management knowledge and experience. And while organization leaders necessarily maintain control over event-response actions, the optimal mitigation approaches may be presented by an organizational outsider. Consequently, it is important for those responding to a Black Swan to be receptive to external perspectives and prepared to incorporate these into the event's management.

► **Avoidance of false economy.** Too often, catastrophic events are fought using a single-solution approach. Only after that solution fails is another pursued, allowing the event's impact to grow in scale and scope.

False economy is a primary reason organizations don't plan and execute response options in parallel. Make no mistake, developing and staging multiple responses elevates costs. But these often pale in comparison to the recovery cost for an accident that expands in duration and geography.

► **Rejection of political motivations.** All organizations are political to one degree or another and, unfortunately, politics can influence crisis response. Internal or external teams may resist working together. Companies may hesitate to communicate with employees, government agencies or the public. Government agencies may fail to release information to citizens or other governments. Politicians may even make decisions based on favoritism or to garner support from specific constituencies. Chernobyl is a particularly pointed example of political considerations determining aspects of a Black Swan event's response. The Soviet government withheld information about the accident until radioactive material emanating from the plant was detected by neighboring countries.

Regardless of the reason, political factors usually diminish event response effectiveness. Therefore, responders at all levels – and particularly those possessing the highest decision-making authority – must commit to rejecting politics when combating a Black Swan.



- ▶ **Confrontation of moral and ethical dilemmas.** The person leading the Black Swan event response often faces very tough choices. Should assets be sacrificed at high cost to the company and shareholders in an attempt to mitigate the disaster? Should the government be called on to organize evacuations at the cost of upsetting the lives of community members and risking their injury during the transit? Should the lives of workers be placed at risk to protect the well-being of the larger community, even when it's not certain such a response is absolutely necessary? These decisions are never easy to make and often there is not a clearly right or wrong answer. A recent example is the overflowing of the Mississippi River and government's decision to open drainage waterways that subsequently destroyed farms and small towns in order to save New Orleans and Baton Rouge.

Moral and ethical dilemmas require a principled leader who is dedicated to making decisions based on well-grounded values. When decisions are made based merely on what is legally

defensible, politically expedient, or self- or company-serving, the leader and organization lose the confidence of the public, government and employees, ultimately to the detriment of event response. Such decisions damage the organization's reputation and adversely impact its business operations for periods extending well beyond the disaster.

- ▶ **Consideration of contrarian challenges.** Contrarian viewpoints can seem disruptive and time-consuming but play an important role in effective event management. Such challenges prevent groupthink, help prevent logic errors, and generally serve to make decisions more robust. To ensure a contrarian challenge, organizations should consider appointing a "devil's advocate" who probes available data and questions the consensus response.

Contrarian viewpoints from outside the organization should be considered as well. Because these people don't train or work with the leadership team, they provide a more differentiated perspective against which to evaluate the event response.

Black Swan response protocols

Black Swan response protocols provide a framework for action that can be easily adapted to each unique situation. Because Black Swans are unexpected, predefined procedures are often of little value. Rather, what is needed are protocols that guide response to these catastrophic events. Key Black Swan response protocols include the following:

- ▶ **Event recognition.** Effectively responding to a Black Swan begins with the ability to quickly recognize and report that one is occurring. This requires clear definitions, enabling personnel to recognize the onset of a catastrophic event and to initiate the event response protocol.

Black Swans occur in a situation state:

- ▶ Outside the business continuity plan and asset design basis limits
- ▶ Inside total loss and abandonment conditions

Defining the boundaries of these two states is necessary to the early recognition and implementation of response protocols. The definition set is completed with the addition of methods for reporting the onset of such events.

- ▶ **Organizational deployment.** Rapid staffing of the offsite event response organization, led by a single decision-maker – typically the COO – is critical to early containment of event conditions and minimization of adverse impacts. The decision-maker serves as the individual accountable for the organization's event response, including actions taken, not taken, and changed.

Reporting to the decision-maker is a multidisciplinary team representing the organization's breadth of functional area perspectives and expertise. These individuals advise the decision-maker and oversee the implementation of response actions. External experts provide additional unique experiences for combating the accident as needed.

Finally, the event response organization must be supported logistically to be effective. Such logistics include a centralized war room equipped with primary and backup communication mechanisms such as video and teleconferencing capabilities, internet access, and two-way radio communication. This enables interaction between stakeholders and responders and provides near real-time incident and environmental data streaming. The war room should also be equipped with analytical tools, include an appropriate press briefing area, and provide for the safety, security and well-being of the response team.

- ▶ **Situation assessment.** Emergency response managers must clearly understand the event-specific issues faced and outcomes desired in order to effectively select and execute appropriate actions. Without a well-defined focal point, these managers risk selecting and performing either inefficient or inappropriate actions, expending resources on low value-adding activities and enabling the unnecessary expansion of adverse impacts.

Assembling a complete and accurate situation assessment is never easy. Emergency response managers should acquire verifiable situation data from multiple, redundant sources near the point of occurrence as well as technical data related to affected and available assets. Based on this best available information, critical event issues can then be defined across a response timeline predicting the evolution of the crisis. Critical situation parameters and goals are added to establish clear time frames for action.

- ▶ **Alternative identification.** Rarely does a single decision option optimally address all issues of concern. In the case of Black Swans, many initially selected response actions fail. Consequently, response managers should seek to identify a large body of alternatives prioritized for implementation by their estimated ability to yield a maximum number of desired outcomes. For example, at Fukushima Daiichi, temporary diesel generators could have restored emergency power more rapidly than the temporary transmission lines that were used.

Response protocols

- ▶ Event recognition
- ▶ Organizational deployment
- ▶ Situation assessment
- ▶ Alternative identification
- ▶ Alternative selection
- ▶ Alternative execution
- ▶ Continuous improvement



Alternative identification starts with the development of option trees that identify those actions and resources needed to address each critical event parameter. Taken together, these option trees reveal the one or more actions that will most effectively address event conditions. Furthermore, the remaining options represent the backup alternatives should those initially selected fail to bring the situation under control.

- ▶ **Alternative selection.** Faced with credible options, high risks and limited resources, the emergency response manager must carefully choose the course of action to be pursued. Each response alternative should be evaluated for its associated risks and consequences, benefits, and the organization's implementation capabilities. Performance models and risk evaluation tools should be used, when available, and critical assumptions documented for future reference.

Final selection of the Black Swan response action should be the deliberate act of the designated decision-maker. The alternative selected should be well defined, its risks and consequences understood, and required actions clearly communicated, providing direction, backup contingencies, and termination criteria.

- ▶ **Alternative execution.** Effective and efficient execution of the selected event response option is critical to optimally resolving the Black Swan. Achieving this involves development and communication of implementation plans, including individual roles and responsibilities, rapid deployment of equipment and personnel resources, robustly maintained communications channels, continuous condition monitoring, ongoing situation reassessment, and decision reevaluation and adjustment.

Execution of catastrophic event management plans should follow the established performance standards and procedures for predicted events. These methods often provide the point-of-execution details for the Black Swan response.

- ▶ **Continuous improvement.** Ideally, Black Swans are resolved quickly. Unfortunately, they tend to continue longer than desired, and the consequences persist for days, weeks, or even months. This calls for continuous improvement – both during and after the event.

Continuous improvement involves critical, ongoing performance assessment of all levels of the organization and the incorporation of lessons learned into decisions, procedures, and training and coaching programs.

Conclusion

The path forward

Black Swans are unexpected, unpreventable, and catastrophic. We don't know when they'll occur, what form they'll take, where they'll strike, whom they'll effect, or how they'll be resolved. But we can be prepared to respond.

The principles and protocols presented here can help guide your organization's response to a Black Swan event. Implemented proactively, these approaches and guidelines can position your organization to recover as quickly and effectively as possible.

Working with your organization's leadership and operations teams, Ernst & Young can help you create, enhance and validate processes for managing catastrophic events. We offer proven methodologies and leading practices to help you:

- ▶ **Identify.** Ernst & Young can work with you to assess your risk appetite and to identify the catastrophic risks related to your operations.
- ▶ **Diagnose.** We can help you evaluate and understand whether your organization's characteristics align with the principles of effective Black Swan response and identify those protocols already in place as well as those that are lacking.
- ▶ **Design.** Once there is agreement on the diagnostic results, we can advise you on the development of initiatives to close the principles and protocols gaps specific to your organization. We can also help you create the technology, training, and change management supports necessary to achieve your vision.

- ▶ **Deliver and sustain.** By supporting the implementation of your improvement initiatives, Ernst & Young can help position your organization to respond to Black Swan events as quickly and effectively as possible, minimizing their impact and expediting your recovery.

The benefits of such an approach are meaningful and clear:

- ▶ Protection of human life, health, and well-being
- ▶ Reduction in damage to and loss of assets
- ▶ Minimized environmental impact and lower cost of cleanup
- ▶ Faster return to core business operations
- ▶ Protected or even improved reputation

Black Swans will always be with us. They are unexpected and often unavoidable. However, by applying the principles and protocols presented here, leaders can equip themselves to respond to the Black Swan.

Traits for effective response

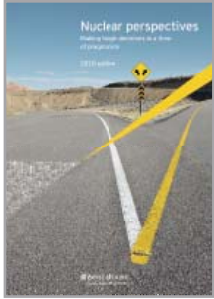
- ▶ Safety-conscious work environment
- ▶ Appreciation of the organization's unique risks
- ▶ Questioning attitude
- ▶ Willingness to identify and report problems
- ▶ Openness to internal and external operating experience and support
- ▶ Robust technical competence at all levels

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EYG no. BT0130

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