Proceedings of the 35th European Safety and Reliability & the 33rd Society for Risk Analysis Europe Conference
Edited by Eirik Bjorheim Abrahamsen, Terje Aven, Frederic Bouder, Roger Flage, Marja Ylönen
 Published by Research Publishing, Singapore.
doi: 10.3850/978-981-94-3281-3_ESREL-SRA-E2025-P3583-cd

Capturing variations of successes from failure events to entrench resilient performance identification

Prosper A. Kwei-Narh

Institute for Energy Technology (IFE), Norway. E-mail: prosper.kwei-narh@ife.no

Rossella Bisio

Institute for Energy Technology (IFE), Norway. E-mail: rossella.bisio@ife.no

Awwal Arigi

Institute for Energy Technology (IFE), Norway. E-mail: awwal.arigi@ife.no

Abstract

Resilient individual and organizational performance is akin to the boxing rope-a-dope technique. The purpose of adopting this technique is to lean on the boxing rope to increase the distance between oneself and the opponent on attack to reduce the impact of the punches. Similarly with individual and organizational resilient performance, sometimes success is not only about avoiding a problem (anticipation), improving a current state or minimizing the loss and risk (coping) but of restoring a performance potential (adaptation). This distinction is often buried when we analyze events and consider outcomes as either a failure or success. What may count as success is contingent on the situation and there is the need to broaden the perspective by which we assess individual and organizational outcomes as successes or failures. We propose and highlight how redefining organizational outcomes, from the dominant, either failure-***or***-success approach, to an approach that highlight various forms of human agency in coping and adaptation will enrich our understanding of organizational issues. We raise this discussion and illustrate our approach using incidents drawn from the nuclear industry event reports revealing successes embedded in evident failure events. This speaks to the need to recognize resilient capabilities, when displayed during organizational events.

Keywords: Learning from events, Learning from failures and success, Resilience capabilities, Nuclear Power Plants, Licensee Event Reports.

1. Introduction

A dominant philosophy that undergirds our social sphere is a rational approach to specify clear outcomes and goals and define the actions and processes by which we can reach those goals. Event outcomes and processes are judged either as failures or successes by how well they match the pre-specified expectations. In organizational learning from incidents (Lukic et al., 2012), we seek to uncover the causal factors that precipitated an unwanted outcome through ‘problemistic’ search (Levitt & March, 1988) for causal factors to inform subsequent changes in routines and behaviors that are essential to reaching the desired objective. Learning from incidents thus involve paying close attention to failures leading to better understanding of the causes of events (Huber, 1991) and improved performance (Cannon & Edmondson, 2005; Ellis & Davidi, 2005).

Failures have had a significant impact on our learning from events because failures provide a rich source of information on what worked and what didn’t work (Cannon & Edmondson, 2005; Dahlin et al., 2018), changes mental models (Ellis et al., 2014), and inform follow-up activities to reduce the future occurrence of an event (Argote et al., 2021). Learning from events is fundamental to organizational resilience (Duchek, 2020), defined as the organizations “ability to anticipate potential threats to cope effectively with adverse events, and to adapt to changing conditions”

(Duchek, 2020, p. 220). Resilience involves anticipation, adaptation and coping, yet learning from events may focus more on the failures without including successful outcomes where the adaptation and coping is displayed. Therefore, we argue for including successful performance identification in event analyses and by so doing highlight and capture areas of resilient organizational capabilities.

Recognizing that the organizational environment is complex and uncertain, with varying risk profiles, outcomes are difficult to specify a priori. Focusing on a failure OR success dichotomy will lead to missed opportunities to uncover moments of resilience where failures were mitigated and thus position the organization to learn from what went right and build on that in subsequent performance cycles (see theorizing and empirical work of Erik Hollnagel and colleagues (Hollnagel, 2013, 2014; Lindberg et al., 2010). There are always variations in everyday performance, which may provide interesting insights into organizational processes.

Outcomes of actions to resolve organizational challenges vary, ranging from normal successes, extraordinary successes, recovery successes (Skjerve et al., 2017) to the well-recognized failures. *Normal success* is what is achieved in performing routine work; *extraordinary success* is performing better than expected, creating or improving systems, or to exploit unexpected favorable conditions to reach a stage that is more than what is expected; *recovery success* occurs when individuals through their operational activities return the plant to the expected state after a disturbance or anomaly (Skjerve et al., 2017). We find in this discussion of successes the observation that successes are about anticipation, coping, and adaptation to demanding conditions. Human, technological, and organizational factors contribute to event outcomes, yet we limit the scope of this work to the human factors. Our focus on human aspect of successes (in spite of failures) is to underscore that resilient performance is both a development and utilization of resilient capability (Duchek, 2020) and also complements resilient system engineering (Madni & Jackson, 2009). In this vein, the objective of the paper is to demonstrate the importance of extracting successes from 'failed' events to highlight areas of resilient organizational capabilities. We present selected nuclear events and our re-examination (rather than re-analysis) to reveal successes which could have been highlighted in the event reports. Simultaneously, we identify our own examples of what could be regarded as conditional successes. *Successes* are among other things demonstrated in good use of routines, and effective teamwork, even in failure incidents described in event reports conducted in Nuclear Power Plants.

2. Learning from failure events

Organizations survive when they extract lessons and learn from events (such as critical incidents, near misses, and severe accidents) that occur within and outside their domains (Dahlin et al., 2018; Ellis & Davidi, 2005; Giustino et al., 2021; Lukic et al., 2012). Organizational learning from incidents/events is a form of organizational learning that is guided by reflecting on the extent to which organizational routines and behaviors meets expected target/goals (Levitt & March, 1988). Organizations learn directly from their own experience or indirectly from other organizations (Levitt & March, 1988).

The nuclear industry learnt a lot from the 'Big Three' nuclear events; Three Mile Island, Chernobyl, and Fukushima Daichi. From the Three Mile Island event was learned the nature of severe reactor core degradation (Rempe et al., 2012), while the Chernobyl event stimulated a focus on safety culture and the need to further understand the behavior of radioactive chemicals (Beresford et al., 2016; INSAG, 1991). The Fukushima Daichi event focused attention on emergency management in case of events outside design basis, reactor safety, improved control room design and operator actions (Rempe et al., 2012). All these learning have contributed to increasing the resilience of the nuclear industry.

Major events are rare in high reliability organizations, yet smaller scale events are frequent and contain the opportunities for learning for the focal plant and for the industry on the broader level. We used events reported in the United States Nuclear Regulatory Commission (NRC) publicly available Licensee Event Reports database (NRC, n.d.). The licensee event report (LER) is a requirement mandating licensees to inform the NRC of ***any*** event that may affect the safety of its operations grouped according to (1) the potential or actual effect of consequences; and (2) resulting onsite and offsite response actions. The report is to identify root causal factors, the role of human factors and "significant corrective action taken or planned to prevent recurrence" (NRC, n.d.).

The database contains a rich source of information, but some events test the resilience capabilities of the plant more than others. We chose events that are indicative of various challenges such as general transients that require significant human interventions indicative of resilience[a]. We also chose other events such as alerts and emergencies as these small failures are early signals of forthcoming dangers (Cannon & Edmondson, 2005). We also reasoned that even if the LER is designed for reporting failures, it captured moments of emergent resilience, thanks to the performance variability introduced in the process by the human behavior. The following describes our approach and the provisional conclusions we made from the re-examination.

3. Illustrative examples of extracting success from failures in reported events

Events were extracted from the licensee event report database, and different categories of events were chosen based on the demands it posed to workers demanding resilient performance. We reproduce snippets of some of these events to highlight the learning from events and the successes that can be extracted despite these failures. While our extraction of successes from events are limited, we believe our approach inspires a systematic re-examination of several events to identify valuable demonstration of human and organizational resilient capacity. We searched directly for transient events, events with the potential to degrade plant conditions such as alerts, or events where safety barriers are compromised. Event severity and/or potential to be severe also played a role in our selection. We simultaneously present both the event and our extraction of success (for the sake of space, the LER numbers are included for the interested reader). We extracted *successes by isolating information that indicates* during the event: workers speedily detected events, reverted to or reconfigured appropriate routines or procedure, engaged in timely intervention to mitigate a problem, deployed the right competency and used expertise in a relevant way.

3.1. *Transient events*

Transient events are associated with changes in the reactor coolant system temperature, or pressure, or both due to changes in the reactor power output. Illustrative events occurred at Palisades (LER#2552011007) and Arkansas Nuclear One (LER#3132013001). The Palisades Nuclear Power Plant was at the time a licensed 2,565 MWt pressurized water reactor. The plant stopped operation since 2022 (may be restarted).

> At Palisades, on September 25, 2011, a short circuit fault was created during planned maintenance activities on a direct current (DC) electrical distribution panel. The fault was caused by the accidental contact between bus bar connectors within the panel, causing a partial loss of DC electrical system power, an automatic reactor trip and multiple safety system actuations. The root cause of the event was improper adherence to risk management process in the maintenance of the panel. In addition, a shut trip breaker set-point was outside acceptable ranges and they misfunctioned during the event.

This loss of one train of power was handled within expected responses with no safety consequence.

The Arkansas Nuclear One, a licensed 2.568MWt pressurized water reactor was in Mode 6 for a refueling outage when a significant event happened that caused a fatality.

[a] We thank an anonymous reviewer from the US-NRC for suggesting this focus.

the temporary lift assembly collapsed due to failure of one of the structural columns, resulting in the Stator falling onto the turbine deck and rolling down into the ANO-1 train bay adjacent to Unit 2 resulting in one fatality, multiple injuries, structural damage to the Unit-1 and Unit-2 turbine buildings, and damage to non-vital systems and electrical equipment.

Despite the failure, Unit 2 operators manually initiated the emergency feedwater to maintain cooling function.

3.2. *Events that can degrade plant safety*

An example under this category was an event at Palisades Nuclear Power Plant (LER#2552003003).

> On March 25, 2003, at 1116 hours, with the plant in Mode 6 (refueling), a loss of offsite power occurred while installing a signpost. The signpost penetrated a buried conduit, damaging a control power cable associated with both offsite power feeds. As a result, the safety-related and non-safety related buses de-energized, which caused a loss of shutdown cooling [BP] flow for 20minutes before power was restored. The Alert was downgraded to an Unusual Event at 1231 hours. The Unusual Event was exited on March 27, 2003, at 1737 hours, when offsite power was fully restored.

Although this event was considered as likely to degrade plant safety, there were discernible successful performance. This involves *the flexibility in adapting to the local condition, and the correct decision to connect switchyard bus with startup transformer.* This is both indicative of normal successes and extraordinary successes in line with Skjerve and colleague's guideline.

Another alert event connected with an increased risk of plant degradation occurred at Lucie 1 Nuclear Power Plant (LER#3352018001)

> At 1258 hours on October 29, 2018, the control room at St. Lucie Unit 1 was alerted to abnormal water levels in the 4B feedwater heater (FWH) while the plant was in Mode 1 (full reactor power). Operators could not immediately determine the cause but noticed at 1304 hours that the water level at 1B steam generator began to decrease. Thus, at 1317 hours a manual scram of the reactor was initiated so that 1B steam generator doesn't exceed procedural limits. Investigation revealed that the failure was due to a foreign material within the level column which obstructed the float aim and disturbed the 4B FWH drain valve.

We can deduce that the *monitoring activities of operations personnel were effective*, and although an initial troubleshooting did not unveil the cause, and with field operators still assessing the problem; *the unit supervisor and shift manager promptly reached a decision and entered the rapid down power procedure. Operators and managers undertook effective surveillance and decision making*.

At the Nine Mile Point Unit 2, a series of events including the loss of process computer required the demonstration of resilient capabilities. This plant is a licensed 3,988 MWt boiling water reactor in operation since 1988. Snippets of the relevant event as described (LER#4101991017):

> At 0548 hours on August 13, 1991, Nine Mile Point Unit 2 (NMP2) experienced a turbine trip and reactor scram when the "B" Phase Main Transformer developed an internal fault. The transformer fault also created an electrical disturbance throughout the normal electrical distribution system. This electrical disturbance resulted in the loss of five non-safety related Uninterruptible Power Supplies (UPS). As a result, the Control Room lost most Balance of Plant (BOP) instrumentation and all annunciation which created several conflicting indications of reactor status.

Successful actions that the control room operators undertook in this event include *verified the reactor scram, identified and re-energized the failed UPS's, identified the cause of the reactor scram, and cooled down the reactor to terminate the emergency event*. Station Shift Supervisor shutdown the reactor to determine plant conditions. Effective teamwork is demonstrated.

Another event illustrative of resilient performance occurred at Vogtle 1 on 20th March, 1990. This is a licensed 3.625MWt Westinghouse Four-Loop pressurized water reactor operating since 1987. The event (LER#4241990006) involved a loss of offsite power leading to unwanted loss of residual heat removal.

> At the time of the event, Unit 1 was in Mode 6 (refueling) at 0% rated thermal power. Several

> systems were out of operation and undergoing maintenance, but the reactor coolant system (RCS) was in md-loop operation with the temperature at approximately 90 degrees F. At 0820 hours, a driver of a fuel truck in the switchyard backed into a support for the phase "C" insulator for the Unit 1 Reserve Auxiliary Transformer (RAT) 1A. This caused the insulator and line to fall, triggering a phase to ground fault. This caused a trip on Unit 1 RAT 1A and Unit 2 RAT 2B breakers. A loss of offsite power (LOOP) situation ensued, with RCS heating up to 136-degree F. The loss of power rendered the emergency notification system inoperable for more than 15 minutes, alarms that should have annunciated didn't, but the containment and RCS integrity was restored by 1050 hours.

The analysis of the causal factor for this event was cognitive personnel error, as the driver failed to use the correct backing procedures. There were also a lot of latent issues such as improper calibration of numerous sensors and switches that could not be reset when they were tested. The organization therefore surmised that jacket water high temperature switches were likely to have caused both trips. The *success we could point to here was the expertise and coordination displayed by the plant emergency director and plant personnel to resolve the issue*.

3.4. *Events with potential for radioactive release or reactor core damage*

Here, we highlight the South Texas Plant 1 event (LER# 4982024004) involving the loss of offsite power (LOOP) that resulted in automatic reactor trip, actuation of emergency diesel generators, and auxiliary feedwater pumps. The South Texas Nuclear Power Plant is a licensed 3,853MWt pressurized water reactor in operation since 1988. The event occurred when both Units 1 & 2 were at 100% power, there was a reactor trip due to fire in the switchyard that started at Unit 1 and affected Unit 2.

> Unit 1 - 07/24/2024 (0702) - Unit 1 reactor trip due to fire in the switchyard that affected reactor coolant loops. The 345kV North Bus and the Unit 1 Generator tripped. All stand-by-diesel-generators automatically actuated and sequenced on a Loss of Offsite Power. All four Reactor Coolant Pumps (RCP) lost power.
>
> Unit 2 - 07/24/2024 (0703) - Report of explosion and fire in the switchyard.

Successful operator actions that restored plant to its safe operating status is *the knowledge and use of correct procedures (entering the various technical specifications), effectively used teamwork behaviors, and knowledge management to restore the plant and mitigate potential effects of the event*.

An event at Comanche Peak Nuclear Power Plant (LER# 4452024001) is also illustrative. The plant is a licensed 3.612MWt Westinghouse Four-Loop pressurized water reactor. Relevant details of the event as included in the event report are as follows:

> On March 05, 2024, Units 1 and 2 were operating at 100% power. At 0720 the Uninterrupted Power Supply, Heating, Ventilation, and Air Conditioning (UPS HVAC) X-02 unit tripped, which caused the station to lose the ability to properly control the temperature of the UPS and Distribution Rooms during a postulated emergency condition. Several systems, such as Component Cooling Water (CCW) Unit 1, Train A (1-A), became inoperable. The station restored the safety function after approximately nine minutes and station then connected UPS HVAC X-01 to CCW Train 2-A approximately 41 minutes after the event, which restored temperature control to all four UPS and Distribution Rooms.

Beyond the failure, *the workers managed to use established routines and understanding or operating processes to resolve the challenges contained in the event*.

4. Discussion

The purpose of this paper is to highlight why redefining event outcomes to capture the variations of successes in addition to failure trains us towards identifying and further developing the areas of resilient organizational capabilities. We focus on learning from events, where there is the tendency to gravitate focus towards failures rather than failures and successes. In recognition of the variability in performance, and that resilience involves both engineering (organizational and technological) and human factors, we propose and highlight a re-examination (rather than a detailed re-analysis) of failed events to identify embedded successes. In so doing, we hope to point leaders and event investigators to consider pertinent information about successes, in addition to failures, that signal the location of organization resilient capability. Below, we highlight the practical implication of our propositions to learning from events, organizational resilience, and future studies

4.1. Learning from events

Most of the events we chose involve loss of offsite power, and the risk of losing control over the plant is very high. In all the reviewed cases, the events uncovered the technical and non-technical factors that triggered the event. However, the focus was on failures, and this was the case for all 6 events reviewed. Undoubtedly, the LER database requirement was to report incidents and situations that did not meet acceptance criteria (NRC, n.d.). The traditional focus of learning from failure (Lukic et al., 2012) helped to give better understanding to the issues and to generate several useful interventions to forestall future occurrence of the problem. Some of these involved new training, overhauling of components that exhibited less than optimal functioning, and updating the relevant procedures.

One observation that can be made regarding learning from failures is that the report and the requirement specifications were formulated at a time when learning from failure was the dominant paradigm. Scholars have been sounding the call to examine successes and failures in event analyses at least since 2005 (Ellis & Davidi, 2005). As we have shown in our re-examination of these failure cases, there are many successes embedded in the event outcome that could be highlighted to enhance resilience. A lot of scholars and practitioners also acknowledge the contribution of Safety I&II theorizing to understand high reliability organizations, possibly changing their practices. There is not yet, to our knowledge, a shared effort for defining methods to train future event analyses activities towards identifying and highlighting success to underscore resilient performance when enacted.

Attempting to capture successes simultaneously to capturing failures may mean a lot of information will be collected and analyzed. While advanced document analyses technology could help in these tasks, it raises questions about the issue of threshold value for what counts as successes. A good resolution might be to use the event as a starting point and acquire information on worker's behavior during the event and the reasons for the actions that they undertook. Did workers undertake any behavior within safety margins that demonstrated anticipation, coping, and adaptation? For instance, a lot of the events we reviewed involve a loss of offsite power or loss of power that affected the annunciation, instrument and control, and communication. In the Lucie 1 event, it was not possible to engage in troubleshooting to determine the nature of the problem, yet the managers decided to make a call which forestalled a possible severe event. Thus, the recognition of successes should consider the state of complimentary systems so that the successes can be highlighted, especially for extraordinary successes. Integrating the defense-in-depth philosophy could help categorize successes.

As we pointed out at the introduction, there is the need to highlight how the various successful actions at critical junctures of the event changed the course of the event. Highlighting the contributions of organizational members to preventing, mitigating and restoration of the plant after an event allows the safety aspirations to permeate the organization more than when employees only learn about failure. In the nuclear industry especially, there is the tacit agreement that we design for safety so if the system functions as intended, there is no requirement to look at the system again. There is also the assumption that successful performance may be caused by stable design factors, rather than sometimes embedded in the variable human behaviors.

Unlike previous learning from events which has focused on factors that impeded information search either because of the complexity of the failure (Haunschild & Sullivan, 2002) or magnitude of the failure (Baumard & Starbuck, 2005), we proposed routine events have a lot of learning potential (e.g., Cannon & Edmondson, 2005). This positions the organizations to identify areas of weaknesses before the problems multiply into significant events. In the events we reviewed, the events were resolved when the appropriate routines were engaged. Thus, an issue we could highlight is what factors affect the use of routines, especially in non-routine events. Experience in dealing with similar cases builds a response memory for staff and the organization. Behavioral rather than cognitive experience ensures that workers can adapt and reuse procedures when confronted with abnormal plant conditions. Our proposal to learn from success does not entail relying on spurious successes as a clutch for refusal to learn (Min et al., 2024).

4.2. Resilient capability

Resilience is a multidimensional and multifaceted construct. Duchek (2020) described how some authors have conceptualized resilience as an outcome, as a process, and also as a capability. In the capability approach, resilience is described in the ability to anticipate, cope, and adapt to a situation. Our results demonstrated that it was the coping and adaptation that was often demonstrated during events. This suggest that the workers evaluated and possessed a correct understanding of the system and possess the expertise and knowledge to engage in the correct intervention. Resilience capability therefore is a resource that depends on other existing resources such as knowledge, expertise, and experience (Evenseth et al., 2022). Our proposal in this paper is in line with resilience as a capability that can be tapped and utilized by recognizing the various demonstration of successes even when the initial anticipation of the problem was sub-optimal. Our re-examination of events to extract successes (albeit in a limited way) indicates consistently that sharp-end worker knowledge and expertise are significant levers for resilient performance. The ability to achieve coordination and make use of organizational and technical resources also play a significant role. Knowledge of the relevant routines and its use, as well as the use of knowledge in innovative ways through experience is essential for demonstration of resilience.

In view of our conceptualization of resilience as anticipation, coping and adaptation (Duchek, 2020), it is interesting that all evidence we obtained pointed towards coping and adaptation rather than towards anticipation of the problems. It may thus be that the problem of classification of failures must deal with problems of anticipation (i.e., had actors and system designers anticipated the problem, there won't have been a need to cope with and adapt to the problem). The challenge with such a conceptualisation is that the environment is complex, and it is not possible to specify, a priori, all the possible situations that will confront workers in complex technological systems like nuclear power plants. Furthermore, seemingly mundane decisions and weak system information have unpredictable consequences. We may thus be pointing more towards acknowledging and highlighting coping and adaptation, while not overlooking the expectation to anticipate problems. Future studies can be designed to look more critically into what anticipatory capacities can be deployed in highly reliable organisations.

4.3. Limitation

Our extraction of successes is based on limited information so we may have overestimated some core behaviors as successes. Subject matter experts may classify these behaviors as routines (further perpetuating the inability to include successes in event analyses), however, their expertise can place events and actions in a more consequential manner than we managed to do. For instance, we may have considered a routine as successful because it mitigated an event, yet subject matter experts may determine that had that same action been performed at a different point in time (earlier or later), the course and outcome of the event could have been totally different. That may for them suggest a failure in anticipation, thus there is the need to justify why resilience in nuclear power plants should be about attention to coping and adaptation, in addition to anticipation. We could also contact relevant plants and gain their reflection on successes, since the primary objective of LERs was not to capture success and failure.

5. Conclusion

This paper proffered that there are many instances of resilient capabilities displayed in unexpected events that organizations face. To identify and utilize these capabilities, we will need to examine failure cases to recognize success (even if they are qualified successes) so that organizations can learn from both failures and successes. While our extraction of successes from events are limited, we believe our approach inspires a systematic re-examination of several events to identify valuable demonstration of human and organizational resilient capacity.

Acknowledgement

The authors wish to thank the Institute for Energy Technology (IFE), the OECD-NEA HTO Project, US NRC for the licensee event report database, anonymous reviewers from the Halden HTO Programme Review Group, and an anonymous ESREL2025 Conference reviewer for very constructive feedback on an initial version of the paper.

References

Argote, L., Lee, S., & Park, J. (2021). Organizational Learning Processes and Outcomes: Major Findings and Future Research Directions. *Management Science*, *67*(9), 5399-5429. https://doi.org/10.1287/mnsc.2020.3693

Baumard, P., & Starbuck, W. H. (2005). Learning from failures: Why it May Not Happen. *Long Range Planning*, *38*(3), 281-298. https://doi.org/https://doi.org/10.1016/j.lrp.2005.03.004

Beresford, N. A., Fesenko, S., Konoplev, A., Skuterud, L., Smith, J. T., & Voigt, G. (2016). Thirty years after the Chernobyl accident: What lessons have we learnt? *Journal of Environmental Radioactivity*, *157*, 77-89. https://doi.org/https://doi.org/10.1016/j.jenvrad.2016.02.003

Cannon, M. D., & Edmondson, A. C. (2005). Failing to Learn and Learning to Fail (Intelligently): How Great Organizations Put Failure to Work to Innovate and Improve. *Long Range Planning*, *38*(3), 299-319. https://doi.org/https://doi.org/10.1016/j.lrp.2005.04.005

Dahlin, K. B., Chuang, Y.-T., & Roulet, T. J. (2018). Opportunity, Motivation, and Ability to Learn from Failures and Errors: Review, Synthesis, and Ways to Move Forward. *Academy of Management Annals*, *12*(1), 252-277. https://doi.org/10.5465/annals.2016.0049

Duchek, S. (2020). Organizational resilience: a capability-based conceptualization. *Business Research*, *13*(1), 215-246. https://doi.org/10.1007/s40685-019-0085-7

Ellis, S., Carette, B., Anseel, F., & Lievens, F. (2014). Systematic Reflection:Implications for Learning From Failures and Successes. *Current Directions in Psychological Science*, *23*(1), 67-72. https://doi.org/10.1177/0963721413504106

Ellis, S., & Davidi, I. (2005). After-event reviews: drawing lessons from successful and failed experience. *Journal of applied psychology*, *90*(5), 857.

Evenseth, L. L., Sydnes, M., & Gausdal, A. H. (2022). Building Organizational Resilience Through Organizational Learning: A Systematic Review [Review]. *Frontiers in Communication*, *7*. https://doi.org/10.3389/fcomm.2022.837386

Giustino, M., Miguel, P. V., & Zdenko, S. (2021). *Ten years of lessons learned from operating experience in nuclear power plants* (EUR 30624 EN, Publications Office of the European Union, Issue.

Haunschild, P. R., & Sullivan, B. N. (2002). Learning from Complexity: Effects of Prior Accidents and Incidents on Airlines' Learning. *Administrative Science Quarterly*, *47*(4), 609-643. https://doi.org/10.2307/3094911

Hollnagel, E. (2013). A tale of two safeties. *Nuclear Safety and Simulation*, *4*(1), 1-9.

Hollnagel, E. (2014). *Safety-I and safety-II: the past and future of safety management*. CRC Press. https://doi.org/10.1201/9781315607511

Huber, G. P. (1991). Organizational Learning: The Contributing Processes and the Literatures. *Organization Science*, *2*(1), 88-115. https://doi.org/10.1287/orsc.2.1.88

INSAG. (1991). *Safety Culture*. INTERNATIONAL ATOMIC ENERGY AGENCY. https://www.iaea.org/publications/3753/safety-culture

Levitt, B., & March, J. G. (1988). Organizational learning. *Annual review of sociology*, *14*(1), 319-338.

Lindberg, A.-K., Hansson, S. O., & Rollenhagen, C. (2010). Learning from accidents – What more do we need to know? *Safety Science*, *48*(6), 714-721. https://doi.org/https://doi.org/10.1016/j.ssci.2010.02.004

Lukic, D., Littlejohn, A., & Margaryan, A. (2012). A framework for learning from incidents in the workplace. *Safety Science*, *50*(4), 950-957. https://doi.org/https://doi.org/10.1016/j.ssci.2011.12.032

Madni, A. M., & Jackson, S. (2009). Towards a Conceptual Framework for Resilience Engineering. *IEEE Systems Journal*, *3*(2), 181-191. https://doi.org/10.1109/JSYST.2009.2017397

Min, J., Yasuda, N., & Kim, T. (2024). Learning in the gray zone: Harmful organizational learning from safety deviations in nuclear power plants. *Journal of Business Research*, *185*, 114883. https://doi.org/https://doi.org/10.1016/j.jbusres.2024.114883

NRC. (n.d.). *§50.73 Licensee event report system*. Retrieved 06.10.2024 from https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0073.html

Rempe, J., Farmer, M., Corradini, M., Ott, L., Gauntt, R., & Powers, D. (2012). Revisiting Insights from Three Mile Island Unit 2 Postaccident Examinations and Evaluations in View of the Fukushima Daiichi Accident. *Nuclear Science and Engineering*, *172*(3), 223-248. https://doi.org/10.13182/NSE12-3

Skjerve, A. B., Viitanen, K., Axelsson, C., Bisio, R., Koskinen, H., & Liinasuo, M. (2017). Learning from Successes in Nuclear Operations: A Guideline. 27th European Safety and Reliability Conference, ESREL 2017,