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A Sad Tale of the Deepwater Horizon Disaster, Normal Accidents, and Our Appetite for Risk

Thomas C. Galligan, Jr.*

INTRODUCTION

Michael Beard, the protagonist of Ian McEwan's 2010 novel, *Solar,* is a man whose appetites consume him. He has insatiable needs for food, alcohol, fame, money, and sex. As the novel and his life proceeds, he seems to consume more and more and more of each (and, as a result, he grows!). At the same time, his consuming habits are, for the most part, immune to the restraining force of any overarching morality. As the novel concludes,[1] the effects of Beard's dishonesty, gluttony, serial sexual encounters, egomania, and greed are headed at one another at such explosive speed and intensity that the reader might imagine Beard in Mr. Creosote's chair—about to blow.[2] Typically, McEwan's darkly comedic tale includes more than a touch of irony. For my purposes here, one of the ironies is that Beard's last

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1. The final scene of the novel is actually not unlike the final episode of The Sopranos in which the viewers ask themselves if the characters' lives are all just going to continue to some tragic or inevitable end or whether the nuclear Soprano family is about to be shot down in a restaurant. Likewise, with Michael Beard—will he wriggle out of his mess or is he about to drop dead? We will never know.

2. In the Monty Python film *The Meaning of Life,* Mr. Creosote eats and drinks so much that one last morsel causes him to literally explode, albeit while continuing to live.

quest for fame and fortune involves the development and implementation of an alternative energy employing solar power. Thus, Beard is a do-gooder trying to save the planet but he is doing it for all the wrong reasons; he is a futurist crippled by some good old vices.

Like Michael Beard, we twenty-first century citizens of the world have some insatiable appetites. And many of our appetites—cars, computers, lights, air travel, marine transport, television, satellite radio, air conditioning, heat—require energy. In order for us to enjoy our lives the way we want to enjoy them, we need energy. And a lot of the energy we have consumed and continue to depend upon requires fossil fuel. We are addicted to things that need oil and/or gas. And, while we may argue about how much oil and gas is left and where it may be, we must all agree that the supply is limited. And we must agree that we have, over the years, begun to seek oil and gas in harder and harder to reach places, including under the seas. And we must also agree that our need for fossil fuel has required us to depend upon other nations for some of our oil supply and that our dependency requires us to ship oil and gas by pipeline or ship or truck over great distances. We must also agree that the risks of disaster are great when the extraction process goes awry or when the transport results in spills. People working on a well can be killed or hurt; the environment can be damaged; innocent bystanders might sustain injury; and the economy can be disrupted.

Today, the many interrelated systems through which we seek, discover, extract, transport, and consume fossil fuels are big and complex. And they are risky. The Deepwater Horizon disaster is a tragic and brutal example of what happens when those risks materialize. So, what do we do? And, what can we learn from the Deepwater Horizon disaster? Can we somehow change to minimize future risk? If we can minimize risk, how can we do so? Or, are such disasters simply inevitable in a dangerous, complex world? These are just a few of the questions I will seek to raise here and to initially address, although complete solutions are beyond this paper and probably beyond our current knowledge.

THE DEEPWATER HORIZON—A BRIEF SUMMARY

For purposes of this essay, I will very briefly summarize the events that took place in the Gulf of Mexico during the spring and

summer of 2010. On April 20, a blowout occurred in a well being drilled from a semi-submersible rig, the Deepwater Horizon. The Deepwater Horizon was owned by Transocean. Maritime law generally treats a semi-submersible rig as a vessel[3]—a factor that impacts some of the analysis below because it means some or all of the legal issues arising from the disaster are governed by maritime law. At the time of the blowout, the Deepwater Horizon was chartered to a venture in which BP was the controlling investor. The blowout resulted in an explosion and fire. Eleven men died; others were injured. The Deepwater Horizon listed and then sank.

As the tragedy played out, oil spewed from the wellhead and drifted towards land. As oil swirled through the water, the media swirled around the story. Several efforts to cap the well or otherwise contain the leak failed until, finally, the relevant actors contained the spill in July. In the meantime, oil had spread throughout the Gulf of Mexico and had reached land in several Gulf States. Fisheries were affected. The local economies from fishing to boating to tourism were adversely impacted. President Obama ordered a moratorium on offshore drilling. Congress held hearings. BP set up a mandated claims adjustment process and agreed to create a twenty billion dollar fund to compensate the injured. Affected people and businesses filed claims with BP and they also filed lawsuits against BP and other involved parties. Investigations were conducted. Law schools and others held symposia; law review articles were written.

HUMAN NATURE AND THE HUNT FOR BLAME

Inevitably, after a disaster like this, people want to know who is responsible. And, I daresay, we humans love a story, as my allusion to *Solar* proves about me. And, like many humans, I usually want my explanatory story to have a villain. If I find a Michael Beard, I feel better. I feel better because I tell myself that I am not like him. I tell myself that I do not selfishly live my life like he did. I tell myself that I am not motivated by self-interest and greed. I tell myself that I am a moral agent and that my morality exercises a real curbing effect on my more primal

3. *See, e.g.*, Bonmarito v. Penrod Drilling Corp., 929 F.2d 186 (5th Cir. 1991).

tendencies. I tell myself that certainly the Michael Beards of the world are few and far between. I tell myself that if it were not for the villain none of this would have happened. So, in the aftermath of disaster, I want to know who did what wrong and I want to know why. I sleep better when I can point to the wrongdoer. When I find a Michael Beard, I do not ask myself just how much like Michael Beard I might be or how some of his traits are endemic to us as people and as a culture. I sigh a sad breath and keep on living my (energy consuming) life. But is the villain real or is he or she a fictional creation to make me feel better?

As the litigation and investigations continue in the Deepwater Horizon cases we will seek to identify what went wrong and exactly why. That is what tort litigation and investigation is all about. We seek out and identify those at fault and we seek to make them pay for the damages that they caused. Moreover, after a disaster in a regulated industry, we wonder where the regulators were and what they were thinking. As for offshore drilling, we have learned that the regulatory scheme was flawed; the relationships between the regulators and the regulated were close—so close that the Minerals Management Service (MMS) has been restructured as the Bureau of Ocean Energy (BOE) in the wake of the spill to limit the effects of any possible agency capture. Once we fix those relationships, will our future be safer?

INEVITABLE ACCIDENTS, NORMAL ACCIDENT THEORY, AND TORT LAW

Are some accidents and even some fault—as in tortious behavior—inevitable in the complex systems we have created? It may be that even after we fix the regulatory scheme, if indeed we can, that there is still risk and perhaps even unacceptable risk. It may be that in complex and dangerous systems, accidents are inevitable.[4] If that is the case, what can we do? And, how can we analyze those systems and perhaps improve our plight? As a torts teacher, this question fascinates me because it gets to the heart of what I have spent much of my adult life teaching and writing

4. Critically, inevitable does not mean that the accident is not the result of what the tort lawyer and judge call fault. It may be that an actor's negligence was inevitable. In the law we often refer to an inevitable accident as one occurring without fault. That is not the way in which I use the word in this piece.

about. Has it all been for nothing if some accidents are simply inevitable?

In his groundbreaking work, *Normal Accidents*,[5] Charles Perrow laid out a framework for analysis, "normal accident theory," that I will use to shape my essay here. While others have relied on and built upon Perrow's framework,[6] I will use his statement of the theory as the groundwork for my discussion. And I will not do the detail of his analysis justice; I will focus on its broad outlines.

NORMAL ACCIDENT THEORY EXPLAINED

Perrow opines that as we develop new complex technologies we increase risk for "operators, passengers, innocent by-standers, and for future generations."[7] Some of these systems have catastrophic potential.[8] Perrow believes that there are things to be done to minimize certain risks—and I will talk extensively about how tort law and regulation together can do that. He also believes that certain risks are, from a systemic perspective, inevitable.[9] It is these inevitable accidents that he calls "normal."[10]

To Perrow, an accident is an "unintended and untoward event"[11] that "involves some damage to people, objects, or to both."[12] He reserves the term accident for serious matters that disrupt a subsystem or array of units or the whole system itself.[13] It is the characteristics of high risk systems that make accidents "normal" or "inevitable." Those characteristics are the foci of his

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5. CHARLES PERROW, NORMAL ACCIDENTS: LIVING WITH HIGH-RISK TECHNOLOGIES (Princeton Univ. Press 1999) (1984).

6. *See id.* at 353-87. While I had heard of and read about Perrow's work over the years, I was reintroduced to it when reading Bill Davidow's fascinating new book, *Overconnected*, which analyzes the internet's effect on our lives, our financial systems, and more. *See* WILLIAM H. DAVIDOW, OVERCONNECTED: THE PROMISE AND THREAT OF THE INTERNET (2011).

7. PERROW, *supra* note 5, at 3.

8. I shall include in the catastrophic effects the loss of life, personal injury, long-term debilitating effects of a disaster, adverse economic impact, and environmental impact.

9. PERROW, *supra* note 5, at 3.

10. *Id.* at 3-4.

11. *Id.* at 63.

12. *Id.* at 64.

13. *Id.*

analysis.

Understanding those system characteristics might allow us to minimize risk, rather than constantly seeking the person or component to "blame."[14] That is, it may not just be Michael Beard that is to blame. What are the characteristics of the systems of which he is a part that might lead to his fault and potential disaster?

Perrow's theory postulates that the more complex the system and the more tightly coupled the system, the more likely it is that there will be normal accidents.[15] Complex systems are more likely to present failures by operators or failures in design that are not easily or readily identified or understood. Additional safety features may do little more than increase system complexity or encourage supervisors to push for more or faster operation.

In tightly coupled systems "processes happen very fast and can't be turned off, the failed parts cannot be isolated from other parts, or there is no other way to keep the production going safely."[16] Thus, recovery from the failure is impossible. Of course better organization or design might, but will not necessarily, improve the safety record.[17]

Before considering various particular areas in which normal accidents might occur, such as nuclear power plants, petrochemical plants, air travel, marine travel, dams, mines, lakes, space, nuclear weapons, and DNA, Perrow identifies some common themes in those systems or activities. First he notes that operator error is often high on the list of causal factors.[18] This fact is consistent with my intuition that we humans like to find someone to blame. But in a tone that indicates that he is unsatisfied with that conclusion, Perrow opines that an operator confronted with an unusual and unforeseen event is between a rock and a hard place.[19]

Perrow also repeatedly points out that the operator, like all of us, creates his or her own reality or expectation of what is going on and then interprets events in light of that construct. If what is

14. *Id.* at 4.
15. *Id.* at 4-5.
16. *Id.* at 4.
17. *Id.* at 5.
18. *Id.* at 9.
19. *Id.*

happening is, in fact, inconsistent with that construct, the operator will not accurately interpret the events, and the operator will not know that his underlying assumptions are incorrect until things have seriously begun to unravel. If the system is tightly coupled, by the time the real events become clear to the operator, the possibility that it is too late to fix things will be much greater.

MINIMIZING OPERATOR ERROR—AN INITIAL INQUIRY

I would like to interject several thoughts here. First, it seems that even if some accidents are inevitable, we must search for ways that systems will minimize or reduce operator error. I have a colleague who, when talking about our efficiency at Colby-Sawyer College, is constantly emphasizing training. He is right. And, in the accident setting it seems basic that training can minimize or reduce risk. It may not—per Perrow—eliminate risk, but it can reduce it. Likewise, I believe that the threat of liability can act as a deterrent to operators and managers. Knowing that the failure to exercise due care either in operation or in preparing operators to do their job, or in designing systems to sensibly mitigate the harsh effects of operator error, will result in liability would incentivize people to pay the reasonable costs of avoiding the error or its effects.[20] If I may have to pay a cost, I will take account of it when I decide what to do and how to do it. Accident costs are but one of the costs of one's activities.

Sociologically, shifting away from the deterrent effect of tort law, and returning to something I said earlier, the conclusion that it was operator error that caused an accident satisfies our yearning to find a "villain." When I say villain I do not necessarily mean some evil person somewhere. Rather I mean concluding that operator error was to blame for a disaster satisfies our human need to find a responsible person and then to sigh and say: "If only that person had done his or her job properly this terrible thing would not have happened." That conclusion and the sad peace that comes from it may distract us from another causal factor such as inadequate training, inadequate design, pressure to produce at dangerously high levels, managerial decisions to not

20. *See generally* Thomas C. Galligan, Jr., *Death at Sea: A Sad Tale of Disaster, Injustice, and Unnecessary Risk*, 71 LA. L. REV. 787, 809-12 (2011) [hereinafter Galligan, *Death at Sea*].

invest in safety, or inadequate government regulation. So, finding an operator who is (partly) responsible because he or she somehow erred should not be either the goal or the end of the inquiry.

NORMAL ACCIDENT THEORY CONTINUED—THE IMPORTANCE OF ORGANIZATION

Back to Perrow, after noting the frequency with which operator error is listed as a causal factor, he points out that "great events have small beginnings"[21] and that transformation processes involving "chemical reactions, high temperature and pressure, or air, vapor, or water turbulence"[22] are particularly prone to small failures that quickly get out of control.

Perrow also notes the importance of organization in his analysis. That is, because a normal accident may result from the "mysterious interaction of failures, those closest to the system, the operators, have to be able to take independent and sometimes quite creative action."[23] This fact counsels one to create decentralized governance structures under which operators have the power and authority to act. At the same time, if the system is tightly coupled and the effects of a failure spread fast, then no single operator can ever be aware or able to deal with the entire system or an impending accident. This fact counsels centralized governance[24] structures that control operators. "But systems cannot be both decentralized and centralized at the same time."[25] Therefore, there is a tension and the best or optimal governance structure is not obvious, clear, or even possible.

Consider the governance quandary in the context of a semi-submersible floating rig.[26] Even if everyone on the rig worked for the same entity (something that never happens), there would still

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21. PERROW, *supra* note 5, at 9.
22. *Id.* at 10.
23. *Id.*
24. On governance complexities and the BP disaster, see generally, Hari M. Osofsky, *Multidimensional Governance and the BP Deepwater Horizon Oil Spill,* 63 FLA. L. REV. 1077 (2011).
25. Perrow, *supra* note 5, at 10.
26. Let us assume without deciding that a semi-submersible rig is a complex system that is tightly coupled. Between floating in one place, dealing with environmental factors, and drilling for oil or natural gas, this does not seem to be an unrealistic conclusion. But even if the system is not complex or tightly coupled, we can still learn from the Perrow theory.

be the tension Perrow notes regarding central and decentralized governance. An added level of complexity is whether the centralization, to the extent it exists, should have the master of the vessel at the top of the pyramid or the person in charge of drilling operations at the top of the pyramid. A third complexity involves the extent to which on the ground (as opposed to on the rig) personnel should play a role (and what role) in the centralized governance of the system (assuming some level of centralization is desired).

To make matters even more complex, how does meaningful centralization (if desired) occur where the master of the vessel (rig) works for one company and the head of drilling operations (the company man) works for another? That is, the master of the vessel works for the vessel owner and the head of drilling operations works for the drilling principal. And, some of the workers on the rig may be employed by third party contractors.[27] Finally, what roles do the on-the-ground folks play in the common situation where multiple entities are engaged in the drilling operation?

Certainly, the optimist might say, the parties can work all that out between themselves by contract and conversation before anything goes wrong. I am an optimist but my glasses are not that rose-colored! Can we really expect multiple entities to agree beforehand how they will allocate authority among themselves to deal with unforeseen and unfamiliar failures before they happen and that quickly trigger other problems throughout the system as the whole event escalates towards a possibly catastrophic accident? I do not think so.

In the context of the Deepwater Horizon there is another factor involved: no one seemed to know what to do to fix it once things went wrong. To the layperson, who is not a geophysicist or an environmental engineer, it appears that once the explosion occurred and the leak began, no one knew how to fix it. That is, it took about three months to figure out how to stop the leak. Since

27. For instance, at least some of those regularly working on the Deepwater Horizon worked for someone other than Transocean (the rig owner) or BP (the principal partner in the drilling operation), such as Haliburton, the entity in charge of the cement pouring needed to seal the well. Moreover, another entity, Cameron International Corp., manufactured the blow out preventer.

it appears we did not know how to fix things when they went wrong, I am dubious that before events occur reasonable people could contractually (and practically) allocate responsibility for dealing with unknown and unanticipated events that lead to system failures we do not know how to repair. And, even if we came up with a contractual allocation and better warnings and better designs and better training methods, would people follow them and use them or would they ignore them?

As Perrow states, "[o]ur ability to organize does not match the inherent hazards of some of our organized activities. Better organization will always help any endeavor. But the best is not good enough for some that we have decided to pursue."[28]

TORTS AND BETTER ORGANIZATION

The best may not be good enough but, as a torts teacher and commentator, let me here emphasize the middle sentence—better will always help. Tort liability and the threat of tort liability can help us encourage entities to undertake to make their organizations better. How much better? As good as one can reasonably expect—i.e., reasonable care. No better, no worse. But if we can reasonably expect better, the threat of tort liability should cause it to happen. If not, then our society should expect that the actors who did not exercise reasonable care to improve their organizational structures to avoid a foreseeable risk should pay if that failure in fact and legally caused that foreseeable risk to arise and injure others. This improved organization, by definition, cannot prevent an inevitable accident but it may delay it; it may reduce its expected frequency; and it may mitigate its harsh consequences.

NORMAL ACCIDENTS AND TECHNOLOGY

Thus, improving organizations will not eliminate normal accidents, and Perrow is equally pessimistic that improving technology will eliminate normal accidents in high risk/highly complex/tightly coupled endeavors. As noted, some safety devices or redundancies may only increase the number of unexplained, unexpected failures that cause system accidents. Some

28. PERROW, *supra* note 5, at 10.

technological improvements will lead only to increased pressure to run systems longer, faster, and harder because they supposedly make the system safer.

To the legal economist, increasing operations or speed is an example of increasing the frequency or level of an activity.[29] Thus, increasing the frequency or level of an activity may increase the number of accidents or increase the amount of care necessary to limit the frequency of an accident or mitigate the harshness if one occurs. That is what is reasonable from an efficiency standpoint.

THE VICTIMS OF NORMAL ACCIDENTS

In refining his analysis, Perrow considered the definition and scope of possible accident victims. I will linger here to explore his definitions and scope of victims and apply and compare his victim categories to the Deepwater Horizon and to other disaster victims. I will focus particularly on how Perrow's categories relate to the way we compensate real victims for their injuries.

A. First Party Victims

According to Perrow, the first-party victims are the operators of the system. These "include not only those actually running the system . . . but others in attendance on regular shifts, such as first-level supervisors, maintenance personnel, low-level engineering personnel, and laborers and assisting personnel."[30] In the context of the Deepwater Horizon, the first-party victims would include everyone on board the rig the night of the explosion who was involved in the production and exploration for oil and natural gas and who suffered some injury. Clearly, the eleven workers who were killed were first-party victims.[31] So are the workers who may have suffered some physical injury in the explosion or aftermath or severe emotional distress as a result of the episode, as well as any who must undergo medical monitoring as a result of exposure to any toxins released during the blast.

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29. *See* STEVEN SHAVELL, ECONOMIC ANALYSIS OF ACCIDENT LAW 2 (1987).

30. PERROW, *supra* note 5, at 67.

31. In a way, the law makes the survivors of those killed who might receive some death benefit or recover in wrongful death first-party victims as well. Or they may be treated as third-party victims, as discussed *infra*, whose right to recover is based on their relationship with the decedent first-party victim.

1. First Party Victims and Their Rights

How do Perrow's first-party victims fare under current American systems for compensating injured workers, including the tort system? Does their treatment result in liability (and recovery) that is consistent with our notions of corrective justice and the deterrence function of tort law? The answer is complex and nuanced, and as such, the discussion here cannot hope to provide a conclusive answer, but we can hope to raise and analyze some of the critical issues.

2. Assumption of the Risk

Let us begin the effort with an overly simplified economic view of the world of risk, which is both unsatisfactory and unpersuasive. That view provides that the first-party victim should not recover at all because his or her wage for working in a dangerous job already includes a risk premium. That is, the worker should not recover because the wage he or she receives already compensates him or her for the risk of being injured, albeit at an appropriately discounted rate which takes into consideration the expected frequency of any injury and the anticipated severity of that injury should it occur.[32] Implicit in the argument is the idea that the employer has already built the cost of the employee's injury into its cost and pricing structures

32. Judge Richard Posner weaves this thinking into his analysis in *United States Fidelity & Guarnty. Co. v. Jadranska Slobodna Plovidba* when he says, in relation to the Learned Hand formula for negligence:

> If a shipowner were to follow a practice that flunked the Hand formula – that in other words was not cost-jusitified . . . – then he would have to pay his stevedores higher rates, to compensate them for the additional risk to their employees, the longshoremen, whom the stevedores must compensate under 33 U.S.C. § 904, regardless of fault, for any injury the longshoremen sustain in the course of their employment.

683 F.2d 1022, 1028-29 (7th Cir. 1982). The claim there was for vessel negligence under 33 U.S.C. § 905(b) (2006) which authorizes a longshoreman to file suit against a vessel owner for negligence, even if the vessel owner is his or her employer. In that context, Judge Posner is saying that the worker would clearly have demanded more pay if the worker had understood that the shipowner engaged in negligent practices. One wonders how the worker would know this fact beforehand. A more general discussion of the bargaining that goes on between prospective employees and employers appears in the next three paragraphs of text *infra*.

through the wages it pays.

Perrow appropriately doubts that the contention is tenable and I agree with him. As Perrow noted, "[t]here is no clear relationship between risk and pay."[33] Sharing Perrow's skepticism, I add my own intuitive sense that most workers do not know just how dangerous a job is before they sign on. In addition, even workers who sign on for a dangerous career, knowing those risks, still might have little or no knowledge of particular assignments that may be more dangerous than their job as a whole on average.

In the case of a rig out on the sea, even if a worker encounters a particularly dangerous situation, he or she has little or no real choice about what to do. Walking away is impossible and demanding higher pay as a realistic option is comical. The possibility that the workers together could protest the working conditions and refuse to work would require them to go against their natural inclinations to be loyal to their employers. And because the rig is a vessel there would be a flavor of mutiny in the air, although mutiny technically arises in the military context.

Thus, the argument that the worker is paid for risk through wages, assumes that the worker has some meaningful bargaining power when deciding what to do, for whom, and for how much. The worker's ability to walk away depends upon alternative available employment in the areas in which he or she is competent to work. There does not seem to be much of that available in today's America. Of course a strong union might play some role in encouraging safety because its bargaining power is superior to the single worker's, but in general, the strength of unions in America has not been increasing.

Finally, the argument that the worker should not be able to recover for injuries he or she suffers because he or she is compensated for those risks through the negotiated wage is, at its core, an assumption of the risk argument. In those terms the argument provides that the worker, in accepting the employment and accepting the wage, has accepted the risks of the employment. The tort lawyer and student knows well that the injustice of the assumption of risk defense[34] in the work place context was one of

33. PERROW, *supra* note 5, at 67.

34. The more accurate statement would note that the injustice was

the very driving forces behind reform movements geared to provide injured workers some recourse against their employers. Assumption of the risk as a defense in the workplace setting was essentially rejected then and was further eroded with the widespread adoption of comparative fault.[35] It has been rejected in fact and law and should also be rejected in theory.

3. First Party Victims and Workers' Compensation

So, what rights do first party victims have? In many American jurisdictions their rights against their employers are defined by the relevant workers' compensation statute. Workers' compensation schemes generally provide a worker who is injured in the course and scope of employment with a no-fault right to recover certain defined and limited benefits from the employer.[36]

Typically the no-fault recovery is for two-thirds of the worker's lost wages, medical expenses, and perhaps an additional scheduled amount depending upon the injury.[37] But, as a trade-off for this no-fault recovery the employer is immune from the employee's negligence claim.[38] As a result, the negligent employer faces less than the full deterrent impact of the tort system because its liability for workers' compensation is less than what it would pay under the tort system—full lost wages, damages for pain and suffering, damages for mental anguish, and any other applicable damages. Of course, since the employer is also liable for injuries (no-fault) for which it might not be liable in tort, the overall deterrent effect of workers' compensation vis-à-vis tort liability under a negligence regime would seem to be an empirical issue dependent upon the particular context under examination.

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amplified by the operation of the doctrine of contributory negligence as a bar to recovery and the fellow servant rule—the "unholy trinity." *See* Boggs v. Blue Diamond Coal Co., 590 F.2d 655, 658-59 (6th Cir. 1979); Thomas C. Galligan, Jr., *The Dreadful Remnants of The Osceola's Fourth Point*, 34 RUTGERS L.J. 729, 735 (2003).

35. *See generally* Murray v. Ramada Inns, Inc., 521 So.2d 1123, 1129-30 (La. 1988).

36. *See generally* FRANK L. MARAIST & THOMAS C. GALLIGAN, JR., LOUISIANA TORT LAW § 11.06 (2d ed. 2004).

37. 2 DAN B. DOBBS, THE LAW OF TORTS § 392 (2001).

38. *Id.* § 395.

4. First Party Victims' Rights Against Third Parties

Even if the first party victim is limited to recovering workers' compensation from the employer, he or she also has the possibility of recovering in tort from any third party tortfeasor who is not the employer.[39] These third party tortfeasors face the full deterrent effect of the tort system. But, depending upon the relevant system involved, the third party tortfeasor may or may not have any ability to control or improve the system. Thus the potential liability of third persons may not reduce the system's risk.[40]

Additional negative implications for the system's operation and its potential failure arise if third parties who are working on or in the system are less experienced, less knowledgeable, and less skilled. If that is the case the possibility of accidents may actually increase.[41] In that context, torts might play a key role in assuring higher quality work by third parties. At the same time, if the employer of an injured employee is in the best position to hire competent third parties and, because of the workers' compensation laws, the employee cannot sue his or her employer if it fails to exercise reasonable care in hiring competent third parties, then some of the deterrent power of torts may be lost.

The various interlaced relationships are further complicated by the fact that there will often be reciprocal indemnity agreements entered into between the employer and third parties, whereby each contracting party agrees to indemnify the other against any tort suits by their employees. If reciprocal indemnity agreements are in place then each party to the contract (or its insurer) will ultimately bear the financial brunt of any tort recovery by its employees against another entity involved in the system. But the deterrent impact of that liability is vague and indirect at best: it incentivizes A to seek to make B safer because if B negligently injures one of A's employees, A will ultimately bear the brunt of B's liability under the reciprocal indemnity

39. Under various schemes some third parties may be immune from a tort suit because they have either borrowed the employee or because a statute or jurisprudence treats them as a "statutory" employer and grants immunity. Absent such special cases the third party would be liable in tort.

40. If the third party were a component manufacturer potential liability might result in a safer system. Likewise, if the third parties are employers of workers involved in the system potential liability might improve the system.

41. *See* PERROW, *supra* note 5, at 362.

agreement. It is confusing at best.

5. First Party Victims at Sea: Herein of the Deepwater Horizon and Underdeterrence

The world is even more confusing in the Deepwater Horizon litigation because the Deepwater Horizon is a vessel. Therefore, some of those workers on board the vessel were seamen. These are workers who have meaningful employment on a vessel that is substantial in nature and duration. Seamen do not have a right to recover workers' compensation benefits from their employer. Rather, under the Jones Act,[42] which incorporates the relevant portions of the Federal Employers Liability Act,[43] the seaman has a right to recover in negligence from his or her employer. Theoretically then, the seaman's employer faces the full deterrent impact of the tort system. However, for any system to optimally deter, the defendant or potential defendant must face the potential of full, actual damages.

If potential damages are less than the actual damages the victim suffered, then the relevant tort regime will underdeter. It will not provide optimal deterrence because it will not, as discussed below, force actors to take account of all the accident costs their activities pose. In that context the rule that limits liability is a negative externality. It is a cost the actor need not pay, and, as stated above, if the actor need not pay it, then he or she will not consider it in deciding what to do and how to do it. If the defendant faces greater than full damages then the relevant tort regime will overdeter.

Under the Jones Act, as interpreted, potential defendants face less than the full costs of the injuries they cause because they are not liable, in a wrongful death case, for the survivors' loss of society damages.[44] That is, there is no recovery for the loss of care, comfort, or companionship arising out of the wrongful death. This failure to allow recovery for loss of society damages is contrary to the majority rule on land. It is out of date with contemporary notions about the value of relationship itself. And it

42. 46 U.S.C. § 30104 (2006).
43. 45 U.S.C. § 51 (2006).
44. *See generally* Galligan, *Death at Sea*, *supra* note 20, at 793-97.

raises inconsistencies which I have addressed elsewhere.[45]

This sad state of undercompensatory affairs is not limited to seamen under the Jones Act. It is also true of any death where liability was subject to the Death on the High Seas Act (DOHSA).[46] DOHSA applies to any death on the high seas or any death, wherever it occurs, that proximately arises from an injury incurred on the high seas.[47] Like the Jones Act, DOHSA does not provide the survivors with the right to recover for loss of society arising out of the wrongful death of a loved one.[48] Therefore, in the workplace injury setting, if DOHSA applies,[49] the liability of any tortfeasor is undercompensatory and tort law achieves less than optimal deterrence.

To further undermine the deterrent power of tort liability in the maritime setting, some courts have extended the liability limiting reach of the Jones Act and DOHSA to maritime settings to which those statutes do not specifically apply.[50] The reason for that expansion and why I believe it was not supported by precedent or persuasive policy are beyond the scope of this paper; however, even if I am wrong on my reading of the law, the result is still that defendants throughout maritime industry face less than optimal deterrence from the tort system.

6. Perrow at Sea and Less Than Optimal Deterrence

In that regard, the positive deterrent impact tort law might have within Perrow's normal accident theory vis-à-vis first party victims is less than optimal. The offshoot of less than optimal tort deterrence is that the normal accident—the inevitable accident—arising out of the maintenance and operation of high risk, complex, tightly coupled systems might occur sooner or more often than it otherwise would. Or the effects of those inevitable

45. *See id.* at 799-815.

46. 46 U.S.C. § 30302 (2006).

47. Motts v. M/V Green Wave, 210 F.3d 565, 569-72 (5th Cir. 2000).

48. 46 U.S.C. § 30303 (2006). The inconsistencies within the DOHSA regime are even more stark than they are under the Jones Act since Congress in 2000 amended DOHSA to allow recovery of loss of society damages to the survivors of victims killed in high seas "commercial aviation" disasters, but no one else. *See* 46 U.S.C. § 30307 (2006).

49. The complexities of when DOHSA would apply are discussed in Galligan, *Death at Sea*, *supra* note 20.

50. *See* Galligan, *Death at Sea*, *supra* note 20, at 803-08.

accidents might be more serious than they otherwise would because tort law is not optimally encouraging system owners to take reasonable measures to mitigate the harsh effects of the inevitable accident.

B. Second Party Victims

In Perrow's taxonomy, second party victims are those associated with the system as suppliers or users but who cannot influence it.[51] In the context of the Deepwater Horizon, most of those on board the rig had influence over the system so they would not be second party victims. However, in the maritime setting, Perrow notes that passengers could be second party victims. On land a second party victim may be someone delivering a package to a plant when an accident occurs. To some extent second party victims have accepted some risk associated with the system.[52] For instance, they know the ship might sink or that a high risk, complex plant is not the safest of places. But they really cannot do much of anything to prevent the accident or minimize its impact.

What rights do second party victims have against system operators or managers? They do not have the right to recover for workers' compensation from the operator[53] because they are not employees of the operator or manager. They do have the right to recover in negligence if they can establish fault. If they cannot establish fault they would generally not recover at all. In order for tort law to achieve optimal deterrence, second party victims would have to have the right to recover full actual damages. And, for the passengers, if the death or accident occurred on the high seas, the survivors would not recover full damages because they would not recover their loss of society damages under the DOHSA.

C. Third Party Victims

Perrow's third party victims are innocent bystanders. These are people who have no involvement in the system.[54] In the context of the Deepwater Horizon, third party victims include

51. PERROW, *supra* note 5, at 68.
52. *Id.*
53. The delivery person may have the right to recover workers' compensation from his or her employer but not from the system operator.
54. PERROW, *supra* note 5, at 68.

everyone who was injured as result of the explosion or leak but who played no role on the rig. This would include governmental stewards of damaged natural resources, fishers whose economic livelihood was impaired, landowners whose property was damaged by oil, and the thousands of business owners who suffered economic injury as a result of the spill in terms of lost sales, lost revenues and more. What rights do these folks have under our legal system?

Generally, anyone who suffered property damage has a garden variety negligence claim based in negligence against the tortfeasor. The injured property owner may also have a strict liability claim against the system operator for engaging in an ultrahazardous or abnormally dangerous activity.[55] Commercial fishers could also recover for their losses under the general maritime law even though they did not have any ownership or proprietary interest in the property.[56] Governmental entities responsible for natural resources traditionally enjoyed an action for public nuisance.

However, in many jurisdictions, those who suffered economic loss, but not property damage, as a result of the tortfeasor's negligence might not be able to recover for that economic loss, absent a proprietary interest in the thing damaged.[57] This economic harm rule is justifiably subject to criticism since it results in severe underdeterrence and limits recovery even in cases to which its real purpose (avoiding uncertain or double recovery) does not apply.[58] But its harsh effects remain.

Happily, in the oil spill context, Congress has replaced the no recovery economic harm rule in oil spill cases and now allows recovery under the Oil Pollution Act of 1990[59] (OPA) from a responsible party, even if the injured party did not have an ownership interest in the thing damaged.[60] Under the OPA, all of the parties identified above—the governmental entities, the

55. *See* discussion *infra* notes 68-87 and accompanying text.

56. *See, e.g.*, Union Oil Co. v. Oppen, 501 F.2d 558, 567-71 (9th Cir. 1974); RESTATEMENT (SECOND) OF TORTS § 821C cmt. h, illus. 11 (1979).

57. *See, e.g.*, Robins Dry Dock & Repair Co. v. Flint, 275 U.S. 303 (1927).

58. *See* Thomas C. Galligan, Jr., *Contortions Along the Boundary Between Contracts and Torts*, 69 TUL. L. REV. 457, 512-20 (1994).

59. 33 U.S.C. §§ 2701-2762 (2006).

60. *Id.* § 2702(b)(2)(B)-(C).

property owners, and others—have a right to recover.[61] The OPA imposes strict liability, and although liability is initially capped,[62] if the responsible party is grossly negligent or violates an applicable regulation there is no cap.[63] Of course if the cap applies and/or applicable tort rules do not take account of all actual injures, the liability scheme will not achieve optimal deterrence.

Potential Deepwater Horizon third party victims would include rescue and cleanup workers who may suffer some personal injury either now or in the future as a result of exposure to spilled oil or the dispersant used to break up the oil as it travelled towards shore. Their current injuries may include fear of developing disease, increased risk of developing some condition, or medical monitoring to detect any possible disease or injury early on. A full discussion of those types of liability is beyond us here, but I do not feel that I am out on a limb when I say that the tort system has not settled on generally agreed upon rules to govern such claims. There is inconsistency from jurisdiction to jurisdiction, and until those rules are clearly articulated and consistently applied, the probability that torts will optimally deter seems low.

D. Fourth Party Victims

Fourth party victims of normal accidents are "future" claimants. They are

> fetuses being carried at the time of exposure; the would-be children that damaged parents will not be able to conceive; stillborn or deformed children conceived after exposure; and all those people who will be contaminated in the future by residual substances, including those substances that will become concentrated as they move up the food chain.[64]

Hopefully, all the categories of fourth party victims identified above are not included in the Deepwater Horizon disaster. But there certainly will be such victims in other catastrophes. What is

61. *Id.* § 2702(b).
62. *See infra* notes 79-82 and accompanying text.
63. 33 U.S.C. § 2704(a) & (c).
64. PERROW, *supra* note 5, at 69.

said above about third party claims for fear of developing a disease, increased risk of developing a disease, and medical monitoring is certainly true of "future" plaintiffs. The law has not arrived at a clear, consistent way to deal with such claims; thus the possibility of achieving optimal deterrence is remote.

SO, WHAT ROLE DOES TORT LIABILITY HAVE IN PREVENTING THE INEVITABLE ACCIDENT?

Having analyzed the categories of victims Perrow identified and what rights they may have under the tort system, and having tried to briefly apply the schema to the Deepwater Horizon disaster, let us step back and consider a meta-concern. Just how does tort law fit together with Perrow's schematic? Does it have any role to play at all? I have obviously shown above that I believe torts does have a role to play—it can incentivize investments in safety. I have pointed out examples of where I believe an appropriately designed tort system could make the world and systems safer. But it is worth reiterating that from Perrow's perspective, a normal accident is inevitable. Thus, by definition, the accident will occur even in the system where everyone is exercising reasonable care. So, here, I intend to examine the issue above the fray of the particular legal context and view it from a more theoretical stance.

An accident is going to occur, *but* Perrow does not say how soon or how often. So a tort system gauged to encourage optimal investments in safety *still* has an important role to play. Just what is a "fault based" tort system gauged to encourage optimal investments in safety? It is a system in which the Learned Hand formula for negligence plays a key and starring role. Hand most cogently set forth that formula in an admiralty case, *United States v. Carroll Towing Co.*[65] As I have described the formula before:

> Judge Learned Hand provided an algebraic or economic definition of negligence in a series of cases decided in the 1940's. His formulation merits consideration now. According to Judge Hand, an actor was negligent when the burden of avoiding an accident (B) was less than the *ex ante* (before hand) probability of an accident occurring

65. 159 F.2d 169, 173 (2d Cir. 1947).

> times the anticipated severity of the accident if it occurred (P x L). The product of P times L represents the ex ante cost of the accident. Thus, if B is less then P x L the defendant who fails to undertake that burden (B) is negligent. As such, Hand's formula encourages actors to behave efficiently by spending up to but not over the ex ante "cost" of the accident. Phrased differently, society wants an actor to spend $99 (B) to avoid a $100 accident (P x L); she is negligent if she fails to do so. Alternatively, society does not want her to spend $101 to avoid that same accident. So if B is $101 and P x L is still $100, letting the accident happen and leaving the loss on the victim is good for society, at least if it is *societas economicus*.[66]

What role would an economically based negligence or fault system play within Perrow's normal accident theory? While it may not totally avoid the normal accident, as noted above, it might delay it, make it less frequent, or mitigate its harshness if one does occur.

In the context of the Deepwater Horizon, if one treats an oil spill as an inevitable accident, one might still argue that preserving liability for fault-based injuries is appropriate if fault can be shown to have aggravated the possibility of the occurrence, hastened its occurrence, or aggravated the death and injury that would have occurred if the defendant had exercised reasonable care.

From a torts perspective, what happens if a normal accident occurs and the owner or manager of the system that caused the accident exercised reasonable care in the way it *operated* the system? First, simply because management exercised reasonable care in operating the system does not mean that the system was designed with reasonable care. Thus, if the injured victims could prove negligent design then a negligence claim should still be viable. To fail to allow that claim to go forward would thwart the deterrent aspect of tort law.

Additionally, there is always the possibility that the decision to undertake the activity in and of itself is unreasonable. That is,

66. Thomas C. Galligan, Jr., *Strict Liability in Action: The Truncated Learned Hand Formula*, 52 LA. L. REV. 323, 331 (1991).

one might argue the activity is, given current knowledge, more risky than useful. If that is the case, then engaging in the activity itself is unreasonable and doing so is negligence under the Hand formula.[67] Certainly, the magnitude of the potential loss is critical in applying the Hand formula, and when we do not know how to stop a risk if it arises, the potential loss is even greater. The benefits of recognizing a negligent activity claim are clear: optimal deterrence. The drawbacks are doubts that a jury, or even a judge, is in an appropriate position to weigh all the costs and benefits of an activity. In the offshore drilling context, if the plaintiffs in a case involving an offshore disaster argued that offshore drilling in and of itself was negligent, how could a jury or judge ever accurately consider all the costs and benefits of the activity—risk of death, injury, and pollution versus increased supply of oil and natural gas, jobs, national security, etc.? Even if they could grasp the breadth of the issues, is it their role to do so? I have great faith in the jury system but all might not agree.

But, what if there is no negligence at all in conducting the system operations, in design, or in engaging in the activity in and of itself? What role in that case for torts? One possibility would be to let the loss fall on the victims. Another would be to impose strict liability on the operator. One simple reason for strict liability would be that the owner garners the profit from the activity so let him or her bear the loss, as opposed to innocent or more innocent victims.

Another rationale for strict liability would be to legally treat the inevitable accident arising from a high risk, complex, tightly coupled system that injures others as the paradigmatic ultrahazardous or abnormally dangerous activity.[68] Strict liability for engaging in an ultrahazardous activity is imposed under the Third Restatement of Torts Liability for Physical and Emotional

67. This discussion is reminiscent of the argument concerning "bad" products. *See, e.g.*, RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmts. d & e (1998). In the product liability context, the argument is whether there should ever be liability for making a bad product—one that is more risky than useful—even if it is properly manufactured and designed, and adequate warnings are provided. *See generally* Halphen v. Johns-Manville Sales Corp., 484 So.2d 110 (La. 1986).

68. *See* RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL AND EMOTIONAL HARM § 20 (2010); RESTATEMENT (SECOND) OF TORTS §§ 519, 520 (1977); RESTATEMENT OF TORTS § 520 (1938).

Harm section 20 under the following circumstances:

> (a) An actor who carries on an abnormally dangerous activity is subject to strict liability for physical harm resulting from the activity.
>
> (b) An activity is abnormally dangerous if:
>
> > (1) the activity creates a foreseeable and highly significant risk of physical harm even when reasonable care is exercised by all actors; and
> >
> > (2) the activity is not one of common usage.[69]

In the context of offshore drilling, the court would first have to decide whether the doctrine of strict liability for engaging in an ultrahazardous[70] or abnormally dangerous activity applies in a maritime case. If the court decided to apply the doctrine under general maritime law, then, if the plaintiff established the relevant criteria, a court would impose strict liability.

Under Perrow's normal accident theory, inevitable accidents arise out of high-risk activities, thereby satisfying the "foreseeable and highly significant risk of physical harm" criterion of section (b)(1). Moreover, since the normal accident is inevitable, it is risky even when reasonable care is exercised, satisfying the second half of (b)(1). None of the activities that Perrow analyzes, with the possible exception of air travel, are matters of common usage. Thus, they seem particularly appropriate for the imposition of strict liability at the activity level.

Interestingly, in the oil spill context, Congress has imposed

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69. RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL AND EMOTIONAL HARM § 20 (2010).

70. The Restatement (Third) actually entitles the relevant section "abnormally dangerous activities," as did the Restatement (Second) of Torts; however, the Restatement (Third), in moving away from analyzing the appropriateness of the activity to the place in which it is conducted actually hearkens back to the Restatement. *Compare* RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL AND EMOTIONAL HARM § 20 (2010) *with* RESTATEMENT (SECOND) OF TORTS §§ 519, 520 (1977). The First Restatement of Torts called the relevant activities for which strict liability was imposed "ultrahazardous." RESTATEMENT OF TORTS § 520 (1938). Whatever the title or precise elements, the three Restatements sections on activity-based strict liability are clearly related to one another and the relationship is close. All three impose liability without negligence on dangerous activities which are dangerous even when reasonable care is exercised and which are not matters of common usage.

limited strict liability upon those responsible for oil spills. The OPA deals with various aspects of responsibility for oil spills and their clean-up. A "responsible party"[71] is strictly liable[72] for various categories of damage, including "[d]amages for injury to, or economic losses resulting from destruction of, real or personal property, which shall be recoverable by a claimant who owns or leases that property."[73] Thus, under the OPA, if a person was designated as a "responsible party," he or she would be strictly liable for covered damage, unless the responsible party could prove, by a preponderance of the evidence, that the spill was solely caused by an act of God, an act of war, a third party act or omission, or some combination of the above.[74] Before recovering under the OPA, a claimant must present his or her claim.[75] After presentment, a damaged person may recover from the responsible party or from the Oil Spill Liability Trust Fund (up to one billion dollars for any single incident)[76] but the claimant may not recover from the Fund while litigation is pending to recover those same damages.[77] For the most part, federal courts have exclusive jurisdiction over OPA claims.[78]

The responsible party's liability in a case involving a spill from a vessel, would be subject to a liability cap depending upon the vessel's size and type.[79] However, the cap is inapplicable[80] if the claimant establishes that the spill was proximately caused by the responsible party's gross negligence, willful misconduct, or the "violation of an applicable Federal safety, construction, or operation regulation."[81] The responsible party also loses the benefit of the cap if the violation of the applicable regulation was committed by "an agent or employee of the responsible party, or a person acting pursuant to a contractual relationship with the

71. 33 U.S.C. § 2702(a) (2006).
72. Kenneth M. Murchison, *Liability Under the Oil Pollution Act: Current Law and Needed Revisions*, 71 LA. L. REV. 917, 927 (2011).
73. 33 U.S.C. § 2702(b)(2)(B).
74. *Id.* § 2703(a); *see also* Murchison, *supra* note 72, at 930.
75. 33 U.S.C. § 2713(a).
76. 26 U.S.C. §9509(c)(2)(A)(i) (2006).
77. 33 U.S.C. § 2713(b)(2).
78. *Id.* § 2717(b).
79. *Id.* § 2704(a).
80. The cap is also inapplicable to removal costs, but those are not at issue in our hypothetical. *See id.* § 2704(b)(2).
81. *Id.* § 2704(c).

responsible party (except where the sole contractual arrangement arises in connection with carriage by a common carrier by rail)."[82] The "responsible party" and anyone subject to liability under the OPA can bring an action for contribution.[83] The OPA does not deal with wrongful death or personal injury claims. Nor does it deal with collision claims in admiralty. Additionally, "[e]xcept as otherwise provided" it does not displace maritime law[84] and it expressly preserves liability under state law.[85] And, it states that the United States may even impose additional liability.[86]

Whatever the legal niceties concerning strict liability for engaging in an ultrahazardous or abnormally dangerous activity, or those involved in determining the scope of liability under the Oil Protection Act of 1990, there is a sound theoretical basis for imposing strict liability on the manager of the high risk, complex, tightly coupled system that causes injury even in the absence of negligence. That theoretical basis arises out of Judge Guido Calabresi's groundbreaking book, *The Costs of Accidents: A Legal and Economic Analysis.*[87] Therein, Calabresi notes that when considering deterrence and potential liability at the activity level, it may make sense even in the absence of "negligence" to impose liability on the cheapest cost avoider—the person in the best position to avoid the cost.

In the context of an activity which imposes risk but which is not being conducted negligently, the cheapest cost avoider might well be the person in the best position to come up with a safer way to accomplish the same end, or the person in the best position to

82. *Id.* § 2704(c)(1). Additionally, the responsible party loses the benefit of the cap if it

> [F]ails or refuses – (A) to report the incident as required by law and the responsible party knows or has reason to know of the incident; (B) to provide all reasonable cooperation and assistance requested by a responsible official in connection with removal activities; or (C) without sufficient cause, to comply with an order issued under subsection (c) or (e) of section 1321 of this title or the Intervention on the High Seas Act (33 U.S.C. 1471 et seq).

Id. § 2704(c)(2).

83. *Id.* § 2709.

84. *Id.* § 2751(e).

85. *Id.* § 2718(a).

86. *Id.* § 2718(c).

87. GUIDO CALABRESI, THE COSTS OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS (1970).

identify alternative activities which may achieve the same or similar benefits at less risk. In the case of offshore drilling, the drillers and their related entities are clearly in a better position to identify safer ways to conduct the activity. Those in charge of the operations are in a much better position to achieve improved safety than the workers, the fish, the land-based business owners, or anyone else.

Whether liability, if it exists, is based on negligence or strict liability, any rule that limits the potential liability of the organizations engaged in the activity to less than the actual injuries they cause will reduce the deterrent effect of tort law. That is, if a legal rule limits the liability to less than the actual damage caused, then the actor, when deciding what to do and how to do it, will not face or consider all of the costs of its activities. It will not face all the potential accident costs because of the liability-limiting rule. As a result, it will not face the full deterrent effect of potential liability, and tort law will not achieve optimal investments in safety. This is the same problem we discussed above in regards to the Jones Act and DOHSA, and the inability to recover loss of society damages in a wrongful death case arising under either or both of those two statutes.

In the atomic energy context, the Price-Anderson Act[88] limits the liability of a nuclear power company, essentially to the amount of any insurance available in the private market.[89] Our law is rife with statutes limiting the liability of certain industries or activities.[90] In the maritime setting, in addition to the limited liability of the Jones Act and DOHSA in wrongful death, there is also the Limitation of Liability Act.[91]

The Limitation of Liability Act was originally passed in 1851 to encourage investment in maritime shipping and commerce. It allows a vessel owner (and some others) to limit liability to the post-voyage value of the vessel if the liability is incurred without the privity or knowledge of the owner.[92] The vessel owner creates a fund equal to the post-accident value of the ship (not including

88. 42 U.S.C. § 2210 (2006).
89. Patrick J. Bonner, *Limitation of Liability: Should it be Jettisoned After the Deepwater Horizon?*, 85 TUL. L. REV. 1183, 1191 (2011).
90. *See id.* at 1185-94.
91. 46 U.S.C. §§ 30501-30512 (2006).
92. *Id.* § 30505(a)-(b).

the hull insurance). The claimants then share in the fund in proportion to the value of their claims. Personal injury and wrongful death claimants share with other claimants, but if the vessel is a seagoing vessel and the fund is not adequate to provide the personal injury and wrongful death claimants with recovery equal to at least $420 times the gross tonnage of the vessel, the owner must provide the difference, up to $420 per ton, but no more.[93]

Is the Limitation of Liability Act necessary today? Does it serve a sound social policy? Do any of the many liability devices we have created? As one commentator has said, these limits on liability may exist

> for the better of our overall society or as a trade-off for some other more compelling need. There are many areas in our jurisprudence where juries and trials are bypassed, the amount of damages is limited for certain parties, or the jury's damage verdict is changed, all for the greater good of our society.[94]

The economic argument in favor of limitation would be that somehow or other these beneficial activities create some good or benefit that they cannot capture through the operation of the market and therefore their costs must be lowered in order to make up for the positive externality the activity creates.[95]

But, is the theoretical reason for some special treatment for certain activities always present when a legislature bestows a boon such as limited liability? Does the legislature undertake the appropriate cost-benefit analysis and provide the appropriate fix? If so, someone would expect to see that calculation reflected in the legislative history. Or, is a liability limitation merely the result of a special interest group flexing its muscle?

And, even where some positive externality may exist or be present, is liability limitation the way to fix it? Clearly the

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93. *Id.* § 30506(b).

94. Bonner, *supra* note 89, at 1185.

95. It is worth emphasizing that limiting liability is the result of a decision that somehow the market is not working because the existence of the externality indicates a market failure. Normal market pricing mechanisms are failing to take into account some benefit. That is, people are not willing to pay for all of the benefits that the activity creates.

answer is no; there are other vehicles such as subsidies or tax breaks. A subsidy would be funded from the public fisc or perhaps some tax on users of the relevant thing or participants in the relevant activity. One example of subsidies or support to bring about projects allegedly having positive externalities in the form of economic benefits is subsidies or tax breaks to build stadiums for athletic events. Another example is publicly backed financing through government-guaranteed bonds. As noted, another way to deal with the positive externality or benefit problem is to provide a tax break; a tax break would result in lower revenue for the governmental entity involved.

Moreover, when a liability limitation is created to serve some supposedly more compelling need, the ones who suffer (i.e., the ones who "pay the tax") are the people who do not recover as a result of the limitation or the people who recover less than they would have without the limitation. Where the liability limitation is in the form of a cap, i.e., a $500,000 cap on damages or general damages, it is the people who are the most seriously injured who bear a disproportionate burden. There is a ring of inequity about that. Interestingly, I am not aware of any situation in which the net profits or salaries of those engaged in the dangerous activity are also capped.

PERROW'S CONCLUSIONS AND TORTS

Circling back to Perrow's analysis, what broad conclusions does he draw and what lessons do those conclusions provide for the tort student? He stated:

> I have a most modest proposal, but even though modest and, I think, realistic, it is not likely to be followed. I propose using our analysis to partition the high-risk systems into three categories. The first would be systems that are hopeless and should be abandoned because the inevitable risks outweigh any reasonable benefits . . . ; the second, systems that we are either unlikely to be able to do without but which could be made less risky with considerable effort (some maritime transport), or where the expected benefits are so substantial that some risks should be run, but not as many as we are now running . . . . Finally, the third group includes those

> systems which, while hardly self-correcting in all respects, are self-correcting to some degree and could be further improved with quite modest efforts (chemical plants, airliners and air traffic control, and a number of systems we have not examined carefully . . . .[96]

Banning an activity seems to be a rather radical option and Perrow reserves it for the truly hopeless high risk system. In the context of the Deepwater Horizon, the President's post-disaster moratorium on deepwater drilling was a type of ban, whether justified or not. I do not mean to imply that the ban was appropriate or that offshore drilling on the high seas is an activity belonging in Perrow's first category; I mean only to point out a real world example of a ban.

The second category of systems for Perrow includes some marine transport. He believes that marine transport, as it existed when he wrote, was an error inducing system.[97] It is error inducing for many reasons, including organization, pressure to perform, weather and more. Tort law can continue to play and must play a key role in making these second category systems safer. To the extent tort law does not adequately compensate the victims who suffer injury as a result of accidents within those systems, it is not fixing the system; it is contributing to the preservation of worse systems. In the maritime context, I must remind the reader of the liability-limiting aspects of the Jones Act and DOHSA in wrongful death cases to which they apply, and the Limitation of Liability Act. As for those systems, which Perrow opines can be made safer with more modest efforts, tort liability should still play a key role because if tort law optimally deters, the world will be a safer place!

SYNCHRONICITY

Interestingly, as Perrow concluded his work, he asked a simple question: "What is to be done"?[98] He rejected the idea that the causes or main problems are dumb operators, technology, capitalism, and greed.[99] No, his culprit is none of the above.

96. PERROW, *supra* note 5, at 304.
97. *Id.* at 173.
98. *Id.* at 339.
99. *Id.*

Rather, his culprit is "externalities."[100] "These are the social costs of an activity . . . that are not reflected in the price of the activity."[101] As I have argued above, externalities are a huge potential problem in achieving optimal deterrence through torts and they are just as big a problem for Perrow. Here our analyses have truly come together. Thus, I believe our societal sights should be set.

We need to create rules to limit the effects of externalities. We need to come up with ways to encourage actors, particularly those engaged in high risk activities, to consider all of the costs of their activities, including all of the activity costs. We need to make Michael Beard and the rest of us pay for all the costs of satisfying our appetites.

100. *Id.*
101. *Id.* at 341.