LEGAL LIABILITY FOR DAM FAILURES

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I. INTRODUCTION

In assessing the potential liability for a dam failure in the United States, it is best to start with several premises. First, each state is a separate jurisdiction free to impose its own theories of recovery as well as limitations on liability. Thus, legal standards in Maine may be inapplicable to California. Second, even though legal principals may vary by jurisdiction, principals of engineering apply universally. Third, in today's litigious society it is safe to assume that in the case of a catastrophic dam failure, extensive litigation will ensue. Any competent lawyer, representing the victims, will sue all possible wrongdoers in seeking redress. Lawsuits will therefore most probably be filed against everyone remotely connected to the dam's existence, including the architects, engineers, contractors, sub-contractors and consultants involved in the original construction, as well as those responsible for any subsequent modifications. Potential defendants would clearly include the owners and operators of the facility, quite possibly the state engineer or private dam safety inspectors, and conceivably any insurance company which performed a safety inspection of the facility. Fourth, regardless of the jurisdiction, should a dam failure result in loss of life, personal injury or substantial property damage, it is fairly certain today that most jurisdictions will fashion a means to compensate the victims. The basis for these premises is that the overriding purpose of modern tort law is to compensate an innocent victim for any injuries caused by the wrongful acts of another.

It should be noted that accidents and tragedies are all too common in the normal course of operations of a dam and its reservoirs. For example, drownings and less serious accidents occur; canoes and other recreational craft can pass over the top of the dam, and boaters may be trapped in the toe of the dam. See e.g., Andrews v. United States, 801 F.2d 644 (3rd Cir. 1986) (six drownings and one survivor when two motorboats went over crest of dam.) In addition, loss of life and serious injuries are highly foreseeable during construction of any major project, such as a

dam. See e.g., Granite Construction Co. v. Superior Court of Fresno County, 100 Cal App. 3d 465, 197 Cal. Rptr. 3 (5th Dist. 1983), where seven construction workers fell to their deaths when scaffolding collapsed during construction of a pumped storage facility.

However, for purposes of this article, we are dealing only with the liability issues that arise out of the sudden failure of a dam. Failure is defined in terms of the uncontrolled release of reservoir water. Such a failure may be of a massive, catastrophic nature, as with the well known Teton Dam Disaster, or of a lesser magnitude. The purpose of this article is to outline the legal liability issues that arise from these failures. In doing so, we shall often look to non-dam cases to ascertain the appropriate legal standards since general legal theories of recovery often transcend specific applications.

Our perspective will be that of the innocent victims of the failure. We do not deal with the problems that may arise between the owner of the dam and those responsible for the design, engineering or construction of the facility. Those issues generally involve traditional matters of contract law, and are often addressed in a written contract between these parties.

II. THEORIES OF LEGAL LIABILITY

A. NEGLIGENCE

1. General Standard of Care

Negligence is the most commonly utilized cause of action both in general tort litigation and in dam failure cases. Negligence is defined in terms of the failure to exercise the standard of care of a reasonable person under similar circumstances. This standard in turn is based upon the reasonable foreseeability of the risk. Charvoz v. Bonneville Irr. Dist., 235 P.2d 780, 783 (Utah 1951). The legal duty of reasonable care becomes a calculus of three components: the risk of an

accident occurring, the magnitude of harm should the risk materialize, and the availability of alternatives.

The classic formula was expressed by the distinguished jurist, Judge Learned Hand, in Conway v. O'Brien, 111 F.2d 611, 612 (2nd Cir. 1940):

> The degree of care demanded of a person by an occasion is the resultant of three factors: The likelihood that his conduct will injure others, taken with the seriousness of the injury if it happens, and balanced against the interest which he must sacrifice to avoid the risk. All these are practically not susceptible of any quantitative estimate, and the second two are generally not so, even theoretically. For this reason a solution always involves some preference, or choice between incommensurables, and it is consigned to a jury because their decision is thought most likely to accord with commonly accepted standards, real or fancied.

In terms of dam safety, we can rephrase Judge Hand's factors as follows:

a) How likely is a dam to fail?

b) What are the potential consequences should it fail?

c) What safety precautions are available?

It is important to emphasize that the ultimate question though is not foreseeability per se, but whether in light of that foreseeability, how a reasonable person would have acted, taking into account the potential magnitude of harm, and the alternatives available. For example, if a specified flood were foreseeable, but highly improbable, should a dam engineer design the structure to handle that degree of flooding, or to meet a lesser standard? In this respect, if litigation ensues after a dam failure, both plaintiffs and defendants would introduce expert testimony on the standard of care to be exercised under the circumstances. The appropriate standard would then be determined by the trier of fact, which is usually a jury. Except when there

is no reasonable dispute over the issue, the foreseeability of harm arising from defendant's conduct is a question of fact for the jury. Diamond Springs Lime Co. v. American River Constructors, 16 Cal. App. 3d 581, 597, 94 Cal. Rptr. 200, 207 (1971).

It should be noted that although negligence analysis primarily deals with case law, the requisite duty of care may also be established by statutes, regulations, contracts, or professional codes. Architects and engineers must comply with statutory and administrative requirements, such as building codes. These sources of conduct will usually establish the minimum standard of care to which the professional must adhere. Violation of a statute or ordinance therefore constitutes negligence. Burran, Jr. v. Dambold, 422 F.2d 133 (10th Cir. 1970); Henry v. Britt, 220 So.2d 917 (Fla. Ct. App. 1969).

2. Architects and Engineers[1]

The concept of architect/engineer liability is not novel. The Code of Hammurabi provided that in the case of "a house being so carelessly built as to cause death to the owner's son", the builder's son was to be put to death. See Witherspoon, Architects and Engineer's Liability, 16 D.L.J. 406 (1967). Obviously, the law is not so Draconian today, but the culpable architect/engineer may still find "an ounce of flesh" being exacted in civil liability.

The general American standard of care of an architect was set forth in an early Maine case, Coombs v. Beede, 89 Me. 187, 188-89, 36 A. 104, 105 (1896):

> The undertaking of an architect implies that he possesses the skill and ability . . . sufficient to enable him to perform the required services at least ordinarily and reasonably well . . . But the undertaking does not imply or warrant a satisfactory result . . . An error of judgment is not necessarily evidence of a want of skill or

[1]Architects and engineers are used interchangeably in this context because the courts have treated them similarly for liability purposes.

> care, for mistakes and miscalculations are incident to all the business of life.

This standard is still generally accepted in that an architect/engineer is not an absolute insurer of his work. Thus, he is not strictly liable for errors that may occur. See e.g. K-Mart Corp. v. Midcon Realty Group of Connecticut, Ltd., 489 F. Supp. 813, 819 (D. Conn. 1980); Chapel v. Clark, 117 Mich. 638, 76 N.W. 62 (1898); Chubb Group of Insurance Cos. v. C.F. Murphy & Associates, 656 S.W.2d 766 (Mo. Ct. App. 1983); Van Ornum v. Otter Tail Power Co., 210 N.W.2d 188, 201 (N.D. 1973); LaRossa v. Scientific Design Co., 402 F.2d 937, 942-43 (3rd Cir. 1968) (no strict liability in New Jersey for designing or engineering a plant); Stuart v. Crestview Mutual Water Co., 34 Cal. App. 3d 802, 811-12, 110 Cal. Rptr. 543, 549-50 (1973) (engineers not strictly liable in tort); Swett v. Gribaldo, Jones & Associates, 40 Cal. App. 3d 573, 575, 115 Cal. Rptr. 99, 101 (1st Dist. 1974) (no strict liability for soil engineers in 200 unit development); C.F. Abdul-Warth v. Arthur G. McKee & Co., 488 F. Supp. 306 (E. D. Pa. 1980).

Thus, in the absence of a specific agreement, the architect/engineer does not employ or guarantee a perfect plan or satisfactory result. As expressed in City of Mounds View v. Walijarvi, 263 N.W.2d 420, 424 (Minn. 1978):

> The reasoning underlying the general rule as it applies . . . to architects . . . is relatively straightforward. Architects . . . engineers, and others deal in somewhat inexact sciences and are continually called upon to exercise their skilled judgment in order to anticipate and provide for random factors which are incapable of precise measurement. The indeterminate nature of these factors makes it impossible for professional service people to gauge them with complete accuracy in every instance. Thus . . . an architect cannot be certain that a structural design will interact with natural forces as anticipated. Because of the inescapable possibility of error which inheres in these services, the law has traditionally required, not perfect results, but rather the exercise of that skill and judgment which can be reasonably expected from similarly situated professionals . . . .

In rejecting strict liability as a basis for liability, the court stated:

> If every facet of structural design consisted of little more than the mechanical application of immutable physical principles, we could accept the rule of strict liability which . . . [plaintiff] proposes. But even in the present state of relative technological enlightenment, the keenest engineering minds can err in their most searching assessment of the natural factors which determine whether structural components will adequately serve their intended purpose. Until the random element is eliminated in the application of architectural sciences, we think it fairer that the purchaser of the architect's services bear the risk of such unforeseeable difficulties.

Id. In other words, the courts recognize that engineering is not an exact science; totally risk-free engineering is unachievable.

A minority of jurisdictions have reached a contrary result. See Broyles v. Brown Engineering Co., 151 S.2d 767, 772 (Ala. 1963); Board of Education v. Del Bianco & Assoc., 372 N.E.2d 953, 959 (Ill. 1978); Tamarac Dev. Co. v. Delamater, Freund & Assoc., 675 P.2d 361, 365 (Kan. 1984).

At a minimum, the architect/engineer impliedly promises to exercise the standard of reasonable care required of members of the profession. See Klein v. Catalano, 386 Mass. 701, 7l8, 437 N.E.2d 514, 525 (1982). Milton v. Womack, Inc. v. House of Representatives, 509 So.2d 62, 64 (La. Ct. App.); writs denied, 513 So.2d 1208, 1211 (La. 1987). See also, Housing Authority of City of Carrollton v. Ayers, 211 Ga. 728, 733, 88 S.E.2d 368, 373 (1955) ("The law imposes upon persons performing architectural, engineering, and other professional and skilled services the obligation to exercise a reasonable degree of care, skill, and ability, which generally is taken and considered to be such a degree of care and skill as, under similar conditions and like surrounding circumstances, is ordinarily employed by their respective professions.") See also, Clark v. City of Seward, 659 P.2d 1227 (Alaska 1983); A.L.I., RESTATEMENT (SECOND) OF TORTS ' 299A (1977).

Architects are also charged with knowing the building restrictions imposed by the appropriate jurisdiction, such as through a city's building or zoning code. Bebb v. Jordan, 111 Wn. 73, 189 P. 553 (1920); Maritime Construction Co. v. Benda, 262 So.2d 20 (Fla. Ct. App. 1972).

It should be noted that while architects and engineers are not normally subject to strict liability for their work, a caveat is that those who intentionally undertake or join in an abnormally dangerously activity may be held to bear the consequences resulting from harm to others. Doundoulakis v. Town of Hempstead, 42 N.Y.2nd 440, 448, 368 N.E.2nd 24, 29 (1977).

To reiterate, the generally accepted standard of care required of an architect/engineer today is to exercise the same standard of care, skill and diligence as others in the profession ordinarily exercise under like circumstances. See Cowles v. City of Minneapolis, 128 Minn. 452, 151 N.W. 184 (1915) (case involved a civil engineer). In a subsequent case involving an architect, the Minnesota Supreme Court elaborated upon the general standard as follows:

> The circumstances to be considered in determining the standard of care, skill, and diligence to be required . . . include the terms of the employment agreement, the nature of the problem which the supplier of the service represented himself as being competent to solve, and the effect reasonably to be anticipated from the proposed remedies upon the balance of the system."

City of Eveleth v. Ruble, 302 Minn. 249, 254, 225 N.W.2d 521, 524-5 (1974). A similar standard was adopted in Pennsylvania:

> An architect is bound to perform with reasonable care the duties for which he contracts. His client has the right to regard him as skilled in the science of the construction of buildings, and to expect that he will use reasonable and ordinary care and diligence in the application of his professional knowledge to accomplish the purpose for which he is retained. While he does not guarantee a perfect plan or a satisfactory result, he does by his contract imply that he enjoys ordinary skill and ability in his profession and that he will exercise these attributes without neglect and with a certain exactness of performance to effectuate work properly done.. . .

> While an architect is not an absolute insurer of perfect plans, he is called upon to prepare plans and specifications which will give the structure so designed reasonable fitness for its intended purpose, and he impliedly warrants their sufficiency for that purpose.

Bloomsburg Mills, Inc. v. Sordoni Construction Co., 401 Pa. 358, 361, 164 A.2d 201, 203 (1960); See also Seiler v. Levitz Furniture Co., 367 A.2d 999, 1007-8 (Del. 1976).

In Aetna Insurance Co. v. Hellmuth, Obata & Kassabaum, Inc., 392 F.2d 472, 477 (8th Cir. 1968), the court stated:

> The standard of care applicable is that of ordinary reasonable care required of a professional skilled architect under the same or similar circumstances in carrying out his technical duties in relation to the services undertaken by his agreement. This includes the knowledge and experience ordinarily required of a member of that profession and includes the performance of skills necessary in coping with engineering and construction problems, which skills are ordinarily not possessed by laymen.

To be realistic, in the case of a major catastrophe such as the Hyatt Regency Skywalk collapse in Kansas City, it will be very difficult for the architect/engineer to escape a finding of negligence short of settling the case. Detailed examinations of structural and systems failure will usually lead to human error as the cause. In general, see H. PETROSKI, TO ENGINEER IS HUMAN (1982). Once human error is identified as a cause of the accident, then lawyers for the victims will often be able to translate the human error into legal negligence.

In addition to legal liability, engineering failures, as with the Hyatt Regency Kansas City disaster, may result in the loss of the responsible party's professional license. See Duncan v. Missouri Board for Architects, Professional Engineers and Land Surveyors, 744 S.W.2d 524 (Mo. Ct. App. 1988).

3. Parties Protected by the Duty of Care

The duty of reasonable care extends to those foreseeably injured by the negligence, and not just those in contractual privity with the defendant. See e.g. Navajo Circle, Inc., v.

Development Concepts, 373 So. 2d 689 (Fla. Ct. App. 1979), where a condominium association and a unit owner were allowed to seek damages to the roof and the exterior walls from the architect for negligently supervising the construction and subsequent repairs of the roof, and also from the contractor for negligently constructing the roof. See also Kristek v. Catron, 7 Kan. App. 2d 495, 644 P.2d 480 (1982) (contractor liable to a third party); Seiler v. Levitz Furniture Co., 367 A.2d 999 (Del. 1976) (liability of architect/engineer to tenant); Heigh v. Wadsworth, 361 P.2d 849 (Okl. 1961) (contractor liable to purchaser's tenant); Waldor Pump & Equipment Co. v. Orr-Schelen-Meyerson & Co., 386 N.W.2d 375 (Minn. App. 1986); Montijo v. Swift, 219 Cal. App. 2d 351, 33 Cal. Rptr. 133 (1963); Lumber Products, Inc. v. Hiriart, 255 So.2d 783, 787 (La. Ct. App. 1971); S.K. Whitty & Co., Inc. v. Laurence L. Lambert & Assoc., 576 So.2d 599 (La. Ct. App. 1991); Evans v. Howard R. Green Co., 231 N.W.2d 907, 913 (Iowa 1975); Mudgett v. Marshall, 574 A.2d 867 (Me. 1990); Miller v. DeWitt, 59 Ill. App. 2d 38, 112, 208 N.E.2d 249, 284 (Ill. 1965) ("The architects may be liable for negligence in failing to exercise the ordinary skill of their profession, which results in the erection of an unsafe structure whereby anyone lawfully on the premises is injured.") In terms of measuring the potential liability to third parties, the court in Coburn v. Lenox Homes, Inc., 186 Conn. 370, 375 441 A.2d 620, 624 (1982) stated:

> A duty to use care may arise from a contract, from a statute, or from circumstances under which a reasonable person, knowing what he knew or should have known, would anticipate that harm of the general nature of that suffered was likely to result from the act or failure to act.

Liability thus extends, as per ordinary negligence principles, to any person who foreseeably and with reasonable certainty might be injured by a failure to exercise reasonable care. Potential third party claimants include contractors, sub-contractors, construction workers, sureties, tenants, neighbors, visitors, lenders and workers. With respect to dam failures, therefore, this class of

foreseeable victims could include the resident population, tourists, travelers, recreational users, workers, commercial enterprises, utilities and governmental entities.

The architect's duty also extends to those injured during construction and not just upon completion of construction. The general duty of care is again based upon reasonable foreseeability. See Evans v. Howard R. Green Co., 231 N.W.2d 907 (Iowa 1975); Miller v. DeWitt, 59 Ill. App. 2d 38, 112, 208 N.E.2d 249, 284 aff'd in part and rev's in part on other grounds, 37 Ill. 2d 273, 226 N.E.2d 630 (1965); Caldwell v. Bechtel, Inc., 631 F.2d 989 (D.C. Cir. 1980); Holt v. A. L. Salzman & Son, 88 Ill. App. 2d 306, 232 N.E.2d 537 (1967). (These cases involved workers injured during construction.)

Consequently, the potential scope of liability is quite extensive.

4. Design and Construction of a Dam

Because of the potential risk involved with a dam failure, the standard of care frequently imposed by courts is that one must use care commensurate with the undertaking; i.e., the duty of reasonable care is measured by the magnitude of the project. Obviously, the standard of care is a sliding one. While slight care might be required for a small stock-watering pond in an unpopulated rural area, it would be grossly improper to use slight care in designing, constructing, or maintaining a large dam overlooking a major population area. As stated in a Maine case involving blasting:

> Care must be taken by a defendant in proportion to the danger involved. In other words, ordinary care depends on the circumstances of each particular case. Where the risk is great a person must be especially cautious.

Albison v. Robbins & White, Inc., 116 A.2d 608, 612 (Me. 1959).

Similarly, Minnesota has held that since the standard of care is in proportion to the risk of injury, the owner must build a dam to meet such extraordinary floods as may be reasonably

anticipated. Willie v. Minnesota Power & Light Co., 250 N.W. 809 (Minn. 1933). See also, City Water Power Co. v. City of Fergus Falls, 113 Minn. 33, 37, 128 N.W. 817, 818 (1910). (The owner is bound to exercise in construction and maintenance of the dam a degree of care proportionate to the injuries likely to result to others if it proves insufficient.) See also Herro v. Board of County Road Commissioners for County of Chippewa, 368 Mich. 263, 118 N.W.2d 271 (1962); and Dover v. Georgia Power Co., 168 S.E. 117, 118 (Ga. Ct. App. 1933) (Due care is "in proportion to the extent of the injury which will be likely to result to third persons...") See also Mackay v. Breeze, 269 P. 1026, 1027 (Utah 1928) ("The degree of care required to prevent the escape of water is commensurate with the damage or injury that will probably result if the water does escape").

As stated in the basic treatise on tort law, PROSSER & KEETON ON THE LAW OF TORTS 171 (5th Ed. 1984),

> [I]f the risk is an appreciable one, and the possible consequences are serious, the question is not one of mathematical probability alone. The odds may be a thousand to one that no train will arrive at the very moment that an automobile is crossing a railway track, but the risk of death is nevertheless sufficiently serious to require the driver to look for the train and the train to signal its approach...As the gravity of the possible harm increases, the apparent likelihood of its reoccurrence need be correspondingly less to generate a duty of precaution.

To reiterate, as expressed in a Utah case:

> [T]he degree of care increases in proportion to the hazards to be anticipated; and that because of the dangers inherent in the management of flowing waters, the concept of ordinary care and prudence under the particular circumstances requires that its management not to left to novices, but should only be entrusted to persons of some experience and skill in the management of such waters, who would have an awareness of the various hazards in the failure to properly control them and would therefore exercise the degree of foresight and precaution which people of such experience

> and skill would observe to avoid injury or damage to others and their property.

Erickson v. Bennion, 28 Utah 2d 371, 374, 503 P.2d 139, 140-41 (1972). If the risk is high enough, therefore, liability approaches strict liability.

In addition, the higher the level of expertise, or degree of training and education, of the person, the greater the standard of care one is held to. For example, if an emergency life-saving operation must be performed on the side of the road, a general practitioner would not be held to the same standard as a skilled surgeon under these circumstances. See A.L.I. RESTATEMENT (SECOND) OF TORTS ' 299A, Comment d (1977). Thus, an expert designing, building, or operating a dam will be held to the same degree of care as other experts of the same background, training, education, and experience. Implicit in the requisite standard or care is the duty to stay current in the field. It is also important for engineers to recognize the limits of their expertise; they should not try to do work, particularly of a life-threatening nature, beyond their expertise.

If a recognized professional standard of care is established, then that standard will generally provide the minimal legal duty. In this respect, if, for example, the Corps of Engineers' probable maximum flood (PMF) spillway requirements are viewed as the appropriate standard for high-hazard dams, then that standard will control the legal outcome in that failure to meet the PMF requirements would ordinarily result in liability. Note that this rule of tort liability does not mandate in a legislative or regulatory way that the dam be designed and maintained to pass the probable maximum flood. What it means though is that the risk of legal liability will be substantial if the dam collapses for failure to pass the PMF. Similarly, failure to adhere to a statutory/regulatory provision will generally lead to legal liability.

Parenthetically, it should be noted that the question is not whether a similar event has occurred before, but the foreseeability of the risk that this particular mishap will occur. Even if a

dam has not failed in the past under similar circumstances, liability may still exist if reasonable design, construction, operation, inspection, or maintenance procedures should have anticipated and prevented the dam failure. Thus, the dam builder and owner is required to foresee such floods as a reasonably prudent person, acquainted with all the surrounding circumstances, would anticipate. Anderson v. Rucker Brothers, 186 P. 293, 294 (Wash. 1919). Factors to be considered include the nature and habits of the stream, the features of the surrounding country, the snow and rain falls, and other conditions likely to cause freshets. Anderson v. Rucker Brothers, 183 P. 71, 72 (Wash. 1919).

Reasonable foreseeability also includes designing a structure in such a way that it will not be rendered unsafe because of the foreseeable actions of a third party, such as through inadequate maintenance. However, liability will not ensue simply because the subsequent negligence of a third party is conceivable, or "remotely possible," but only in those situations where the subsequent negligence is reasonably probable. Mathis v. United Engineers & Constructors, Inc., 554 A.2d 96, 100 (Pa. Super. 1989).

5. Inspection and Maintenance

Negligence can apply to the design, construction, operation, or maintenance of a dam. It may also consist of failing to inspect a dam, or negligence in the actual inspection of the facility. Negligence thus consists either of a failure to act in the first instance, or, if one has in fact acted, the failure to act in a reasonable manner. Since dam failures do not usually occur without warning, there will normally be ample clues, signs, and warnings of impending failure if people are looking for them. Inspections are therefore a critical means of averting dam failures.

A classic case is Curtis v. Dewey, 93 Idaho 847, 475 P.2d 808 (1970), where defendants had boarded up the spillway of their dam, neglected to maintain the toe of the dam properly, and waited until back waters were almost overspilling the top of the dam before opening the

headgates. In addition, they received warning at least one day prior to the failure that the dam's condition was critical. The breach occurred during the one hundred year flood. It was held plaintiffs established a prima facie case of negligence.

A similar example is Hayashi v. Alameda County Flood Control & Water Conservation District, 343 P.2d 1048 (Cal. Ct. App. 1959), where a 60-foot break in a levee occurred. Large particles of debris, such as logs, stumps and brush had collected in the stream near the break obstructing its flow. Plaintiffs warned defendants on January 5, 1956 and on other occasions of the break and potential dangers. No repairs were made. On January 15, 1956 and January 26, 1956, large quantities of water carrying debris flowed onto plaintiff's land. The court held plaintiff was under a duty to repair after notice; that is, "the party erecting... [the levee] is under a duty to maintain it in such a condition as not to cause injury because of negligent maintenance." *Id.* at 1051. The court felt sufficient time existed to repair the damaged levee. Pursuant to the common law, a landowner is responsible for changes caused by the negligent disrepair of an artificial structure. *Id.* at 1052, citing A.L.I., RESTATEMENT (SECOND) OF TORTS ' 365.

Similarly, negligence in maintenance can be shown by repeated warnings and long knowledge of streams of water seeping out of a dam. In addition, the outflow increased in the period shortly before the dam's failure. Bowling v. City of Oxford, 267 N.C. 552, 148 S.E. 2d 624 (1966).

An especially egregious example of at least negligence, if not wanton and wilful misconduct by today's standards, occurred in Carlson v. A & P Corrugated Box Corp., 364 Pa. 216, 72 A.2d 290 (1950). State officials informed the dam owner the structure was unsafe and would probably fail in a flood. The timber crib in the center of the dam had badly decayed in the 30 years since installation, the dam had settled, numerous leakages existed, and the spillway was inadequate. Defendant's officers promised to make the dam safe, and to breach the spillway to

within 4 feet of the upstream level. In fact, no action was taken and the dam subsequently failed. If such a scenario occurs today, the defendants would be holding themselves open to punitive damages.

The purchaser of an unsafe dam is liable for damages if he fails to make it safe or maintain it. Town of Monroe v. Connecticut River Lumber Co., 68 N.H. 89, 39 A. 1019 (1984). In such a situation liability might be imposed even if the new owner did not discover the safety problem if a reasonable inspection should have discovered the problem. Richland County v. Anderson, 129 Mont. 559, 291 P.2d 267 (1955). Thus, if the owner knew, or reasonably should have known of the defective condition, liability will ensue. Dye v. Burdick, 262 Ark. 124, 553 S.W.2d, 833 (1977).

Liability on the part of a dam inspector could be based upon one of two theories: (1) failure to inspect the site, or (2) negligence in the actual inspection of the site. The gist of either theory is that a timely, competent inspection would have discovered the problem(s) in time to prevent the ensuing disaster.

An illustrative case in the analogous situation of bridge inspections is Ingram v. Howard-Needles-Tammen & Bergendorf, 234 Kan. 289, 672 P.2d 1083 (1983). The Kansas Turnpike Authority contracted out the annual safety inspections of its turnpike bridges to a firm of consulting engineers. The deceased, while driving a truck across a bridge, struck a 4' by 5'4" hole on the bridge caused by deck deterioration in its final stages. The truck swerved, hit the guardrail, and fell 25-30' to the ground, killing the driver. Defendants had performed annual safety inspections on the turnpike bridges since 1957, filing a report on their findings after each inspection. The bridge in question was inspected in 1978, with an inspection report dated October 25, 1978 being submitted to the Authority. The fatal accident occurred on February 20, 1979, less than a year after the inspection.

The Supreme Court of Kansas upheld a verdict of $710,000 against the consulting engineers and the Turnpike Authority, holding the engineers "had a legal duty to exercise reasonable care in conducting an annual safety inspection which it owed to the decedent -- and to other members of the traveling public," *Id.* at 292-3, 672 P.2d at 1086. This duty extends to the public even though the engineering firm was hired by the Authority as part of its trust agreement with the bondholders.

Defendants did not help their case by stating in the introduction to the annual safety inspection reports that the entire turnpike has been given a close and complete inspection by its consulting engineers and architects with particular attention being given "to items which might impose a hazard to public safety or result in increased future maintenance if not promptly corrected." In a published report it was stated that while the safety of the bridges may not be readily apparent to the turnpike patron, "The safety of the structures is apparent, however, to the structural engineers who regularly perform the annual inspection." *Id.* at 293-4, 672 P.2d at 1087. It should be noted inferentially that while such statements help publicize the engineering firm and create "goodwill" for it, the words used could be construed as a form of representation amounting to a guarantee or warranty.

Factually, as a defense, the engineers claimed all they were required to perform was a visual inspection. Expert testimony for the plaintiffs successfully established that the professional standard of care encompassed much more than a visual inspection. It also seems that the actual inspection of the 345 bridges and all other facilities was made by two engineers in a period of approximately five days. Earlier reports on the bridge in question noted severe deterioration from 1964 to 1974 with no major repairs being undertaken.

Inspectors should fully detail their observations, in writing, to the client. It is the client's determination, as with a patient receiving advice from a physician, as to the course of action to be

pursued. The inspector's duty is to fully disclose the deficiencies with recommendations to the client. The purpose of providing full documentation to the client is to limit the inspector's liability against claims both by injured third parties and the client who could otherwise claim "he wasn't told."

It is impossible in an engineering sense to guarantee a structure will never fail. Yet, an owner of even relatively small dams, such as a homeowner association, can take several simple steps to minimize the risk. These measures consist of education, monitoring and review. Education consists of instructing employees and members in danger signs to look out for, and safety measures to be implemented. The purpose is not, of course, to convert lay people into expert engineers, but rather to utilize simple visual observations for clues of underlying structural problems, as well as to notice anything unusual. Experts can subsequently assess any problems discovered during the routine observations. Easily observable phenomena include:

Animal burrows and trails
Cave-ins
Concrete disintegration at the top of the dam and elsewhere
Cracks and cracking
Damage to instruments
Dips in the crown of the dam
Discoloration
Displacement, such as rip-rap, erosion and bald spots
Misalignment
Rodent holes
Ruts
Sand boils
Seepage
Settlement or displacement
Sink-holes
Swirls or funnels around the spillway
Trees and bushes growing on the dam
Use of the dam by ATV's and other off-road vehicles
Whirlpools

These precautions constitute a continuous process as long as the dam stores water. Indeed, anything unusual, or any changes, should be observed and checked.

Monitoring consists of periodic, perhaps daily, site checks. Review consists of periodically reviewing and updating the educational and monitoring steps, as well as determining if changes in downstream development necessitate modifications in the dam's operation and physical structure.

A regular operation and maintenance program should be implemented, including preparation of an operations manual. The operator must be aware of the rules imposed by outside sources, including statutory, regulatory and licensing. Routine maintenance and periodic professional inspections are essential. A detailed schedule should be laid out and followed. Special maintenance items should be specially noted. Warning and evacuation plans should be worked out for downstream areas at risk if a structure fails. These plans should be periodically reviewed, tested, and updated. Critical personnel and telephone numbers should be kept up to date.

It is also critical that thorough records be maintained of the structure, including routine inspection reports. Any problems reported should be documented with the appropriate resolution of the problem. Thorough documentation will not, by any means, preclude legal liability, but it should help in minimizing damages by demonstrating good faith and reasonable conduct.

6. Operations During a Flood

A special situation occurs when floodwaters pass through or over a dam, flooding out downstream residents. The general rule in this country is that the operator of a dam may permit floodwaters to pass over the dam in an amount equal to the inflow, but will be liable if any excess amount is discharged. The basic premise behind the rule is that a downstream plaintiff would have been damaged in any event by the flood, so he should not be allowed to recover damages simply because of the "fortuitous" fact that a dam was built with insufficient capacity to capture

the flood. It should be pointed out that simply passing on a storm's inflow can cause devastating downstream damage in the case of a major storm or flood. However, it is assumed that defendant's acts did not in fact cause plaintiff's injuries since the damage would have occurred irrespective of the dam's existence. Bradford v. Stanley, 328 So.2d 328, 330 (Ala. 1978); City of Piqua v. Morris, 98 Ohio St. 42, 120 N.E. 300 (1918). Such a result can occur when a storm is of such intensity, as were Hurricanes Connie and Diane in Connecticut in 1955, that the plaintiff would have been washed away regardless of a dam's existence. No legal liability arises because there is no causation in fact. Krupa v. Farmington River Power Co., 147 Conn. 153, 157 A.2d 914 (1959). A similar result will occur when the operator may have been negligent in maintaining the dam but the storm was of such force that the dam would not have held even with perfect maintenance. Bratton v. Rudnick, 283 Mass. 556, 186 N.E. 669 (1933).

Consequently, no duty generally exists on the part of a dam owner to operate the dam as a flood control mechanism for the benefit of lower riparian interests. Any cause of action must be based upon the negligent release of excessive water. The dam owner is essentially free to pass on the natural flow of the stream. See, e.g., Baldwin Processing Co. v. Georgia Power Co., 112 Ga. App. 92, 143 S.E.2d 761 (1965), Ireland v. Henrylyn Irr. Dist., 113 Colo. 555, 160 P.2d 364 (1945), Rockford Paper Mills, Inc. v. City of Rockford, 311 Mich. 100, 18 N.W.2d 379 (1945); Trout Brook Co. v. Willow River Power Co., 267 N.W. 302 (Wisc. 1936); Crawford v. Cobbs & Mitchell Co., 253 P. 3 (Ore 1927).

Conversely, liability is incurred when a greater flow of water is released than is naturally flowing in the stream. Beauton v. Connecticut Light & Power Co., 125 Conn. 76, 3 A.2d 319 (1938); Graham v. City of Springfield, 23 Ill. App. 3d 427, 319 N.E.2d 252 (1974). This liability is especially true when "foreign" waters are being diverted into the reservoir. Smith v. East Bay Municipal Utility District, 265 P.2d 610 (Cal. Ct. App. 1954); Trout Brook Co. v. Willow River

Power Co., 221 Wisc. 616, 267 N.W. 302 (1936). Liability can thus exist for altering the natural flow of the stream. Gutierrez v. Rio Rancho Estates, Inc., 93 N. Mex. 755, 605 P.2d 1154 (1980).

Some authority also exists, based upon the general duty of foreseeability of risk, that the operator of a dam has a duty to draw down a reservoir when heavy runoff is expected. In Bruton v. Carolina Power & Light Co., 217 N.C. 1., 6 S.E.2d 822 (1940), the North Carolina Supreme Court held a power company was required to use ordinary care in anticipating flood conditions from an ordinary freshet as might be reasonably expected or foreseen, and to use reasonable care in the manipulation thereof and in guarding against any undue acceleration or retardation of the flood water. *Id.* at 9, 6 S.E.2d at 828. In this case though, defendant prevailed because its charts disclosed it began to release the water before it had completely reached the crest of the dam, and controlled the discharge such that the reservoir was maintained at approximately the same level until the water level below the dam receded within the banks of the river. See also, Kunz v. Utah Power & Light Co., 526 P.2d 599 (9th Cir. 1975). In this case the discharge did not exceed the natural flow of the stream. However, the operator had in the past skimmed the crest off spring floods, thereby inducing a reliance expectancy on the part of downstream farmers, who converted their crops from those that would survive flooding to those that would be damaged by flooding. In another case, People v. City of Los Angeles, 34 Cal.2d 695, 698, 214 P.2d 1, 3 (1950), the court stated that completing a new dam did not increase the dam owner's obligations "unless the city operated the dam long enough and in such a manner that lower owners could reasonably rely on the continuance of that operation."

Similarly, in a non-dam case, Salt River Valley Water Users Association v. Giglio, 113 Ariz. 190, 199, 549 P.2d 162, 171 (1976), the court allowed recovery to homeowners who purchased homes in a floodplain. They successfully claimed that defendant's irrigation canal had inadequate spillways and, thus, caused flooding. An unusual rainfall approximated the 100-year

flood. Liability was found even through the canal was not operated as a flood control device. Once the floodwaters entered the canal system, the association was under a duty to exercise reasonable care in disposing of that water.

As an added caveat, even if the operator is legally free to pass on the natural flow, courts may impose a duty to warn the downstream occupants of the high volumes of water that will be released. See, e.g., Chrysler Corp. v. Dallas Power & Light Co., 552 S.W.2d 742 (Tex. Ct. Civ. App. 1975); Ford Motor Co. v. Dallas Power & Light Co., 499 F.2d 400 (5th Cir. 1974).

B. STRICT LIABILITY

For our purposes, the major, alternative legal theory of relief to negligence is strict liability. If this approach is used, we realistically do not concern ourselves with the degree of care exercised by defendant, or the reasonableness of his conduct. Strict liability essentially imposes liability as a risk or cost of doing business. This theory primarily concerns itself with the liability of the owner or operator of the facility as compared to the engineer or contractor who, as we saw earlier, is generally held to a negligence standard.

Strict liability is derived from the old English case of Rylands v. Fletcher, L.R. 3 Eng. IR. App. Cas 330 (1868), where defendants constructed a reservoir on adjacent land in Lancashire with the owner's permission. Abandoned mine shafts underlaid the area, which is similar to the Scranton, Pennsylvania, region of the United States. Upon partial filling by defendants, the shafts gave way under pressure, causing water to flow through defendants' workings, into plaintiff's, destroying them in the process.

The court ruled for plaintiffs, holding that when one brings onto his land, and collects and keeps there anything likely to do mischief if it escapes, and it is a nonnatural use of the land, he must keep it at his peril. If not, he is prima facie answerable for all the damages that are the

natural consequences of its escape. As developed by the British courts, the rule is that the defendant is liable when he damages another by a thing or activity unduly dangerous and inappropriate to the place where it is maintained, in the light of the character of the place and its surroundings.

While Rylands v. Fletcher certainly represents a highly unusual, "Rube Goldberg" scenario, a similar situation occurred in Minnesota a few years later. Defendants excavated a tunnel from their land on an island extending under the bed of the Mississippi River. The water in the river broke through the roof of the tunnel and undermined plaintiff's land. The court followed Rylands v. Fletcher in invoking liability. Cahill v. Eastman, 18 Minn. 324, 10 Am. Rep. 184 (1871). See also, Williams v. Jader Fuel Co., Inc., 944 F.2d 1388 (7th Cir. 1991).

Rylands v. Fletcher initially met a lukewarm reception in the United States but has now become generally accepted. Critical in the early rejection of Rylands v. Fletcher was the belief that the doctrine would have hindered an expanding civilization and industrialization. However, social values have changed over the past century. Today we have a fault system of liability, which is partially based upon the entrepreneurial risk of doing business. We also place more emphasis on victim compensation today and less on the economic needs of the defendant.

The concept of strict liability has been widely extended to activities considered abnormally dangerous or ultra hazardous. The basis of strict liability for ultra hazardous activities is the risk of harm and the potential magnitude of that harm should the risk materialize. In such a situation, liability does not depend upon such factors as intent, recklessness, knowledge, negligence, moral blameworthiness, or any other degree of culpability. Nor does it depend on the degree of care that the defendant exercised or failed to exercise. Rather, liability is based simply upon the risks involved.

However, the application of strict liability has its limits. One generally accepted restriction is that strict liability is confined to those consequences which lie within the extraordinary risk created. Lee v. Mobil Oil Corp., 203 Kan. 72, 74, 452 P. 2d 857, 860 (1969). In this sense, the defendant is not an insurer for everything that might go wrong.

Recognized exceptions to strict liability include Acts of God, Sutliff v. Sweetwater Water Co., 182 Cal. 34, 186 P. 766 (1920); Golden v. Amory, 329 Mass. 484, 109 N.E.2d 131 (1952), acts of agencies of the state (e.g., war), and malicious acts of third parties (e.g., sabotage). See e.g., Wheatland Irrigation District v. McGuire, 539 P.2d 1128 (Wy. 1975), where the dam's rupture was purportedly caused by sabotage. See also, Gutierrez v. Rio Rancho Estates, Inc., 94 N.M. 84, 87, 607 P.2d 625 (Ct. App. 1979), aff'd. on other grounds, 93 N.M. 755, 605 P.2d 1154 (1980); Wigal v. City of Parkersburg, 81 S.E. 554 (W. Va. 1914). Thus, courts have generally held that the owner of the reservoir cannot be held liable where the escape of water was caused by third party acts which the owner could neither control nor anticipate. Albig v. Municipal Authority of Westmoreland County, 502 A.2d 658 (Pa. Super. 1985); See also Cohen v. Brockton Sav. Bank, 320 Mass. 690, 71 N.E. 2d 109 (1947); Box v. Jubb, L.R.4. (Ex. Div.) 76 (1879).

For some courts, if the activity is one of common usage, that is, an activity customarily carried on by much of society, or by many people in the community, then strict liability is inappropriate. Certain activities, such as driving an automobile, are so widespread that it is considered inappropriate to subject the operator to strict liability, even though, as we all know, auto accidents occur daily with tragic consequences. Conversely, strict liability was imposed when a gasoline tanker exploded in flames after falling off an overpass. See Siegler v. Kuhlman, 81 Wash. 2d 448, 502 P.2d 1181 (1972).

Similarly, the normal or customary irrigation of farm land may not constitute an ultra hazardous activity carrying the risk of strict liability. See e.g. Clark v. Di Prima, 241 Cal.App.2d

823, 51 Cal Rptr. 49 (1966) (Case involved irrigation ditch-not a large dam.); Mackay v. Breeze, 72 Utah 305, 269 P. 1026 (1928) (Rylands v. Fletcher held inapplicable to water in irrigation ditches and canals.); Chicago & North Western Ry. Co. v. Tyler, 482 F.2d 1007 (8th Cir. 1973); Peter v. Talent Irrigation Dist., 258 Ore. 140, 482 P.2d 170 (1971). (Irrigation of orchard land in a dry area is not considered exceptional or unusual and the risk of serious harm created by the activity is minimal such that Fletcher is inapplicable.) See also Wheatland Irr. Dist. v. McGuire, 537 P.2d 1128 (Wy. 1975).

While strict liability for ultra-hazardous activities has become widely accepted in the United States, its application to dam failures has been more limited. There are not many relevant cases. Most of the decisions are older and several are based on policy considerations. For example, Rylands v. Fletcher was rejected by Texas in a famous case involving the escape of salt water from ponds constructed to store runoff from oil wells. It was technologically impossible to produce oil without drawing up salt water. Under the circumstances, the Texas Supreme Court did not want to hinder the oil industry. Turner v. Big Lake Oil Co., 128 Tex. 155, 96 S.W.2d 221 (1936). See also, Barnum v. Handschieger, 103 Neb. 597-98, 173 N.W. 593, 594 (1919) where the court stated:

> It seems that the owner of a dam erected across a natural stream for the purpose of raising water for irrigation or power, or other useful purposes, in the event of damage from breaking, is liable only for negligent construction or maintenance. The Act of God is of course always a defense.

A slight majority of states reject strict liability in dam failures, including a relatively recent 1972 New Hampshire opinion. Moulton v. Groveland Paper Co., 289 A.2d (N.H. 1972). Two early cases in Connecticut and Vermont also rejected strict liability in dam failure situations. See Beautor v. Connecticut Light & Power Co., 125 Conn. 76, 3 A.2d 315 (1938) and Lapham v. Curtis, 5 Vt. 371 (1833), although these states have subsequently accepted the doctrine of strict

liability. See Whitman Hotel Corp. v. Elliott & Watson Engineering Co., 137 Conn. 562, 79 A.2d 591 (1951) and Malloy v. Lane Construction Corp., 123 Vt. 500, 194 A.2d 398 (1963) (blasting case). A series of older cases in California also reject strict liability. See e.g. Sutliff v. Sweetwater Water Co., 182 Cal. 34, 186 P. 766 (1920). However, considering the extent to which California has substantially expanded legal liability in recent years, the continued validity of these older cases is in doubt. See also Wheatland Irr. Dist. v. McGuire, 537 P.2d 1128 (Wy. 1975) (Wyoming case law involves irrigation ditches and not major dams); Bowling v. Town of Oxford, 267 N.Car. 552, 148 S.E.2d 624 (1966) (Liability only for negligence in the original construction or subsequent maintenance of the dam); Kunz v. Utah Power & Light Co., 117 Idaho 901, 792 P.2d 926 (1990) (liability only for negligence in the construction, maintenance or operation of the system).

In addition, Maine and New Hampshire reject the general doctrine of strict liability. See Reynolds v. W. H. Hinman Co., 145 Me. 343, 75 A.2d 802 (1950). New Hampshire has recently reemphasized its traditional disfavor of strict liability. Bagley v. Controlled Environment Corp., 503 A.2d 823 (N.H. 1986) (case involved the release of hazardous wastes by defendant on neighboring lands).

Conversely, recent Massachusetts and Florida opinions adopt the doctrine of strict liability in dam failure cases. See Clark-Aiken Co. v. Cromwell-Wright Co., 367 Mass. 70, 323 N.E.2d 876 (1975), and Cities Service Co. v. State of Florida, 312 So.2d 799, 801 (Fla. App. 1975). The Florida case involved the breach of a phosphate settling pond, causing one billion gallons of phosphate slime to escape, "killing countless numbers of fish and inflicting other damages." The court, in adopting Rylands v. Fletcher, set out policy grounds that are widely applicable today: In early days it was important to encourage persons to use their land by whatever means were available for the purpose of commercial and industrial development. In a frontier society there

was little likelihood that a dangerous use of land could cause damage to one's neighbor. Today our life has become more complex. Many areas are overcrowded, and even the non-negligent use of one's land can cause extensive damages to a neighbor's property. Though there are still many hazardous activities which are socially desirable, it now seems reasonable that they pay their own way. Society should not ask an innocent neighbor to bear the burden thrust upon him as a consequent of an abnormal use of the land next door. The doctrine of Rylands v. Fletcher was therefore applied in Florida.

The A.L.I. RESTATEMENT (SECOND) OF TORTS (1979) essentially adopts Rylands v. Fletcher in imposing liability for ultra hazardous activities, which necessarily involve a risk of serious harm to others, cannot be eliminated by the exercise of utmost care, and are not a matter of common usage. Factors to be considered include the high degree of risk, the potential gravity of harm should the risk materialize, the exercise of reasonable care, whether or not the activity is one of common usage, the appropriateness of the activity to the locality, and its value to the community *Id.* at ' 520. A reading of the cases indicates that the major factor is the nature and extent of the risk. This analysis, particularly the emphasis on risk, proved critical in the previously mentioned Massachusetts case of Clark-Aiken Co. v. Cromwell-Wright Co., 367 Mass. 70, 89-90, 323 N.E.2d 876, 887 (1975).

A major policy consideration today for imposing strict liability upon landowners who undertake abnormally dangerous activities is the high risk of harm posed to others. These landowners should compensate the innocent victims for their injuries. See Doundoulakis v. Town of Hempstead, 42 N.Y.2d 440, 448, 368 N.E.2d 24, 27 (1977). By way of analogy in dam cases, the collection and storage of a large quantity of water on a hillside reservoir upstream from a residential community may well constitute an abnormally dangerous activity. The consequences of such a breach are likely to be catastrophic.

Strict liability has also been imposed in situations where defendant has constructed a dam, or part of a dam such as flash boards, expecting it to give way in a flood. In such a case, the potential risk of downstream flooding is so great that liability is imposed. Thus, while the defendant is not an insurer of the safety of its dam, he must use ordinary care in its operation. A defendant cannot provide a device such as flashboards, with the intention that they shall give way in a flood, and then escape liability to those injured below the dam. Pursuant to an old rule of law, one must use his property so as not to injure his neighbors. Winchester Water Works Co. v. Holiday, 45 S.W.2d 9 (Ky.Ct.App. 1932). See also, Wargo v. Connecticut Light & Power Co., 127 Conn. 629, 18 A.2d 924 (1941). Such a practice today could be considered reckless conduct, thereby subjecting the operator to an award of punitive damages.

Occasionally a state will enact a statute that imposes strict liability in dam failures. For example, New Hampshire has a statute that makes it unlawful to have a "dam in disrepair." N. H. REV. STAT. ANN. § 482.42. Violation of the statute gives rise to civil liability. The New Hampshire Supreme Court stated:

> We are of the opinion and hold that RSA 482.42 provides a standard of conduct on the part of dam owners intended to protect against damage from the flooding of the land of others by their dam.

Moulton v. Groveland Paper Co., 289 A.2d 68, 70-71 (N.H. 1972). In this situation, the legal cause of action is technically negligence and not strict liability, but the result is effectively the same. A similar statute exists in Utah:

> The owner of any ditch, canal, flume or other watercourse shall maintain the same in repair so as to prevent waste of water or drainage to the property of others . . .

UTAH CODE ANN. §73-1-8. However, this statute has been consistently interpreted to impose liability only for negligence, and not strict liability. See e.g. Mackay v. Breeze, 72 Utah 305, 269 P. 1026 (1928); Erickson v. Bennion, 28 Utah 2d 371, 503 P.2d 139 (1972).

C. "ACTS OF GOD" AND THE PROBABLE MAXIMUM FLOOD

A commonly asserted defense in dam failure cases is that the failure was caused by an "Act of God", i.e., an eventuality outside human contemplation, such as a catastrophic storm. If the storm is beyond human capacity to anticipate, then liability will not lie. See e.g. Golden v. Amory, 329 Mass. 484, 488, 109 N.E.2d 131, 133 (1952). See also Sutliff v. Sweetwater Water Co., 182 Cal. 34, 186 P. 76 (1920). Negligence simply does not exist. Charvoz v. Bonneville Irr. Dist., 235 P.2d 780, 783 (Utah 1951).

The Act of God defense generally entails the following requirements: unforeseeability by reasonable human intelligence and the absence of a human agency causing the alleged damage. Thus, if a similar storm had occurred before, could be anticipated using modern techniques, or were otherwise reasonably foreseeable, even if not probable, claiming an Act of God will not successfully serve as a defense.

As explained in Curtis v. Dewey, 93 Idaho 847, 849, 475 P.2d 808, 810 (1970), the "Act of God" defense is based on the premise that

> negligence cannot be predicated upon a failure to anticipate that which was so extraordinary and utterly unprecedented as to have eluded the foresight of a reasonable man. If, therefore, a person builds a dam embankment on or beside a waterway sufficient to withstand the maximum flow of water which might be expected, and his structure is destroyed by a flow which would not have been anticipated by a reasonably prudent man, then the resulting flood would be considered such an extraordinary flow of water as to amount to an "Act of God" and that person would not be negligent and not liable for damages caused by the flood.

A modern case, citing an earlier 1916 opinion, laid out these factors in analyzing the Act of God defense:

> On passing upon what is or what is not an extraordinary flood or whether it should have been anticipated and provided against, the

> question to be decided is: 'Considering the rains of the past, the topographical and climatic conditions of the region and the nature of the drainage basin as to the perviousness of the soil, the presence or absence of trees or herbage which would tend to increase or prevent the rapid running off of the water, would or should a reasonably prudent man have foreseen the danger and provided against it?'

Frank v. County of Mercer, 186 N.W.2d 439, 443 (N. Dak. 1971), quoting from Soules v. Northern Pac. Ry. Co., 157 N.W. 823, 824 (N. Dak. 1916). As stated in a picturesque, old English case, a landowner in constructing a reservoir "is bound to provide against the ordinary operation of nature but not against her miracles." Greenock Corp. v. Caledonian Railway, [1917] A.C. 556, 572. In a more recent case, the Alabama Supreme Court explained the standard as follows:

> In its legal sense an 'Act of God' applies only to events in nature so extraordinary that the history of climatic variations and other conditions in the particular locality affords no reasonable warning of them.

Bradford v. Stanley, 355 So.2d 328, 330 (Ala. 1978). The same standard appears in Kennedy v. Union Electric Co. of Missouri, 358 Mo. 504, 518, 216 S.W. 2d 756, 763 (1948). In this case the rainfalls were not "so unprecedented that they could not have been anticipated" since higher average rainfalls had occurred 38 years earlier. *Id.* See also, Corrington v. Kalicak, 319 S.W.2d 888 (Mo. 1959).

It is not an Act of God when the rains are foreseeable based on normal climatic conditions, and any resulting harm could be prevented through the design of proper drainage channels. United States v. J.B. Stringfellow, Jr., 661 F. Supp. 1053, 1061 (C.D. Calif. 1987) (case involved toxic waste dump). As expressed elsewhere:

> Although a rainfall may be more than ordinary, yet if it be such as has occasionally occurred at irregular intervals, it is to be foreseen that it may occur again; and a party engaged in a public work, the construction of which involves the change or restraint of the flow of

> water in a natural channel, is guilty of negligence if it fails to make reasonable provision for the consequences that will result from such extraordinary rainfalls as experience shows are likely to recur.

Fairbury Brick Co. v. Chicago, R.1 & P.R. Co., 79 Neb. 854, 860, 113 N.W. 535, 537 (1907). Thus, if similar rainfalls or stream overflows have occurred in the past, an Act of God defense should fail.

In a sense major storms and earthquakes are random events, which may or may not strike a specific geographic area at an unknown time in the future. Some areas may escape unscathed from severe natural forces for millennia. Obviously though, designers of skyscrapers in Los Angeles and San Francisco should use design criteria to minimize the risk of collapse from earthquakes even if they never experience the major earthquake, "The Big One," that is a known seismic risk.

Consequently, the defense is generally limited to truly unforeseeable events, and not situations involving unusual, but not unprecedented rainfalls. See. e.g. Anderson v. Highland Lake Co., 258 S.W. 218 (Tex. Ct. Civ. App. 1924); Webb v. Platte Valley Public Power & Irr. Dist., 146 Neb. 61, 18 N.W.2d 563 (1945).

If, therefore, the injury, which the flood caused, might have been avoided or prevented by human prudence, foresight, and care reasonably to be expected from the defendant, but not exercised, liability exists. Perkins v. Vermont Hydro-Electric Corp., 177 A. 631 636, (1934); See also, Dougherty v. California-Pacific Utilities Co., 546 P.2d 880 (Utah 1976). In this respect, an Act of God defense will generally fail if the amount of rain falls within the probable maximum precipitation (PMP) or the floodwaters are within the probable maximum flood (PMF) ranges, even if such an event had not previously occurred in the area.

Failure of the Act of God defense will not automatically result in liability. Defendant would still have to be found negligent in light of the foreseeability of the risk. For example, only

so much protection can be afforded utility poles against hurricanes, which are foreseeable in much of the coastal United States. On the other hand, we do not reasonably expect utility poles to be knocked over by a mild gust of wind, or foreseeable snowfall. Bowman v. Columbia Telephone Co., 406 Pa. 455, 179 A.2d 197 (1962).

While the defense has been successfully asserted in some cases, see e.g., Frank v. County of Mercer, 186 N.W.2d 439 (N.D. 1971); Benavides v. Gonzalez, 396 S.W.2d 512 (Tex. Ct. Civ. App. 1965); Trout Brook Co. v. Willow River Power Co., 221 Wisc. 616, 267 N.W. 302 (1936); Bratton v. Rudnick, 186 N.E. 669 (Mass. 1933), it has received at best, a mixed reaction by courts in dam failure cases. For example, if the injury is caused in part by an Act of God, and in part by the negligent act of defendant, the defense fails. By way of illustration, a railroad had misshipped a passenger's trunk, which was lost in the infamous Johnstown Flood of 1889. The court viewed the tragic flood as an Act of God, but since the railroad was at fault in mishandling the luggage, it was held liable for the plaintiff's lost luggage. Wald v. Pittsburgh, C.C. and St. L.R. Co., 162 Ill. 545, 44 N.E. 888 (1896). See also, Dougherty v. California-Pacific Utilities Co., 546 P.2d, 880 (Utah 1976). Diamond Springs Lime Co. v. American River Constructors, 16 Cal. App. 3d 581, 94 Cal. Rptr. 200 (1971), Beauton v. Connecticut Light & Power Co., 125 Conn. 76, 3 A.2d 315 (1938); Perkins v. Vermont Hydro-Electric Corp., 106 Vt. 367, 177 A. 631 (1934). Dye v. Burdick, 262 Ark. 124, 138-39, 553 S.W.2d 833, 839 (1977) (Act of God must be sole proximate cause of the damage to plaintiffs with no negligence on the part of appellees contributing to the cause in any way); Charvoz v. Bonneville Irr. Dist., 235 P.2d 780 (Utah 1951).

However, if the Act of God is so overwhelming as of its own force to produce the injury independently of defendant's negligence, the defendant will not be liable. Perkins v. Vermont Hydro-Electric Corp., 177 A. 631, 636 (Vt 1934). There are two ways of viewing the situation. In a sense, the Act of God either supersedes defendant's negligence, or defendant's negligent act was

not a cause in fact of the incident. Defendant's act did not cause the damage since the injury would have occurred anyway.

Thus, if the superior force would have produced the damage on its own, there is no liability. However, if the defendant's negligence coincides with the natural cause, there is liability. For example, if a flood, caused by an Act of God, would not of its own have damaged the plaintiff's property, then defendant will be liable for all resulting damage to plaintiff caused by its dam failure, which added to the flood waters. There is no need to apportion damages in this situation since defendant's maintenance of the dam was in fact the sole cause of plaintiff's damages. Carlson v. A & P Corrugated Box Corp., 364 Pa. 216, 72 A. 2d 290 (1950). The burden is on the defendant of proving that the unprecedented flood would have produced the same result not withstanding the release of any additional waters. Oklahoma City v. Tarkington, 63 P.2d 689, 691 (Okla. 1936).

Whether or not a flood is so extraordinary and unprecedented as to constitute an "Act of God" is normally a question of fact for the jury. Lee v. Mobil Oil Corp., 203 Kan. 72, 452 P.2d 857 (1964); Ferderer v. Northern Pacific Ry. Co., 77 N. Dak. 169, 42 N.W.2d 216 (1950).

A classic Colorado case illustrates the weakness of the Act of God defense, and sheds some light on the current debate over the Corps of Engineers PMF requirements. In Barr v. Game, Fish & Parks Commission, 497 P.2d 340 (Colo. Ct. App. 1972), design plans called for a spillway capacity of 33,000 cubic feet per second (cfs). The actual spillway constructed had a 4,500 cfs capacity. The probable maximum flood was 200,000 cfs, although the previously known high flow of water was 27,500 cfs. The peak of the flood that occurred was 158,000 cfs with an estimated 75,000-100,000 cfs passing over the top of the dam. Defendants claimed Act of God. The court rejected this defense, holding that the defendants were negligent in designing an inadequate spillway. Since the flow of water was reasonably foreseeable, there was no Act of

God. The foreseeability of the risk, that is, the probable maximum flood, was the key to liability.

Similarly, an Act of God defense is not going to win when the defendant has boarded up the spillway, neglected to maintain the toe of the dam properly, waited until the back waters were almost running over the top of the dam before opening the headgates, and had received a warning at least one day prior to the breaking of the dam that its condition was critical. Such conduct amply justifies a jury verdict that the defendant has negligently operated a dam. See Curtis v. Dewey, 93 Idaho 847, 849, 475 P.2d 808, 810 (1970). To the same extent is a New Mexico case where the operator let sand and silt accumulate and failed to open a check gate. Little v. Price, 74 N. Mex. 626, 397 P.2d 15 (1964).

In this respect, it is critical to note that while high levels of precipitation may, as a factual matter, be a force of nature, i.e., an Act of God, inadequate design, construction or maintenance are Acts of Man, and will be adjudicated as such. The designer needs to consider not only the PMP, but also successive storms, downstream flooding and debris flows in calculating the PMF.

To summarize, the Act of God defense thus generally fails if the event should reasonably have been anticipated in light of past knowledge, or if antecedent negligence on the part of the defendant exacerbates the situation. While the past is prologue with respect to actually occurring events, foreseeability is based not only upon the historical past, but also upon that which modern technology and science allows us to project into the future.

D. THE RISKS OF COMPLYING WITH MINIMAL GOVERNMENT OR PROFESSIONAL STANDARDS

As we saw earlier, professionals will be liable for failing to comply with statutory and regulatory requirements. However, compliance with such a standard does not preclude legal liability. It is clear that compliance with a generally accepted industry or professional standard of care, or with government regulations, establishes only the minimal standard of care. Courts may

assess a higher standard of care, utilizing the "reasonable person" standard and foreseeability of risk as the criteria. Judicial rejection of the governmental or professional is not routine, but it does occur often enough to transcend the unusual. It is fair to say that persons, who rely blindly upon a governmental or professional standard of care, pose great danger to others, and present a legal risk to themselves, when they know or reasonably should know that reasonable prudence requires higher care. Thus, the industry custom may itself be held "negligent."

The most famous case in this respect is another Judge Learned Hand opinion, The T. J. Hooper, 60 F.2d 737 (2d Cir. 1932). The case involved a lawsuit by the owner of two barges lost in a storm. The tug company argued it was not liable in failing to equip the tug boats with radio receiving sets. The contention was premised on the general custom among coastwise carriers at the time not to equip tugs with radio receivers. Had the tug been so equipped, the captain would have received timely warning of the approaching storm and presumably would have, through the exercise of good prudence, stayed in port. The opinion noted "an adequate receiving set . . . can now be got at small cost and is reasonably reliable if kept up; obviously it is a source of great protection to their tows." *Id.* at 729.

In rejecting the defense of compliance with a generally accepted industry standard, Judge Hand wrote:

> Is it then a final answer that the business had not yet generally adopted receiving sets? There are, no doubt, cases where courts seem to make the general practice of the calling the standard of proper diligence . . . Indeed in most cases reasonable prudence is in fact common prudence; but strictly it is never its measure; a whole calling may have unduly lagged in the adoption of new and available devices . . . Courts must in the end say what is required; there are precautions so imperative that even their universal disregard will not excuse their omission.

Id. at 730.

More recently the Washington Supreme Court reached a similar result in Helling v. Carey, 84 Wash.2d 514, 519 P.2d 981 (1974). Plaintiff was periodically treated for eye problems by defendant ophthalmologist. However, she was not checked for glaucoma because no symptoms manifested themselves. The worldwide standard of the profession was not to routinely test patients under the age of 40 for glaucoma absent specific symptoms. The reason for this standard of care was that the incidence of glaucoma was exceedingly low for patients under the age of 40 (the rate is 1/25,000). As it turned out, plaintiff, who was 32, suffered from glaucoma, with a sustained loss of vision.

The Court held for plaintiff, in effect holding that the universal standard of care was deficient. The opinion was based on several factors: the simplicity and reliability of the test, the lack of judgment required of the professional in reading the test results, the safety of the test and the relative inexpensiveness of it. The Court proceeded to cite Justice Hand's remarks in The T. J. Hooper that Courts must in the end determine what is required.

Thus, as stated elsewhere, "Evidence of custom in the trade may be admitted on the issue of the standard of care, but is not conclusive." Coburn v. Lenox Homes, Inc., 186 Conn. 370, 381, 441 A.2d 620, 626 (1982).

A good example of where compliance with a governmental standard was inadequate to preclude legal liability is Gryc v. Dayton Hudson Corp., 197 N.W.2d 727 (Minn. 1980). A 4-year old girl received severe burns upon her upper body. She was wearing pajamas made of untreated cotton. The material met the federal standards of product flammability. Plaintiff established at trial that (1) the government standards were clearly inadequate at the time of the accident, (2) the apparel manufacturers were vigorously fighting any change in the government standards, (3) durable flame retardant chemicals, that would have significantly increased the safety of the product, were commercially available, and (4) the defendant was aware of these facts.

Consequently, it was found that the defendant acted in a reckless, wanton, and/or malicious disregard of the rights of others in marketing the fabric. The verdict of $750,000 compensatory and $1,000,000 punitive damages was therefore affirmed on appeal.

Similar results were reached in Raymond v. Riegel Textile Corp., 484 F.2d 1025 (1st Cir. 1973) (standard promulgated under the "Flammable Fabrics Act" was outdated); Burch v. Amsterdam Corp., 366 A.2d 1079 (D.C. Cir. 1976) (when manufacturer knows of greater dangers not included in statutorily mandated warning, it should warn the product users of the dangers and precautions). A federal court in Kansas recently reaffirmed this approach. See Alvarado v. J.C. Penney Co., Inc., 735 F. Supp. 371, 374 (D. Kan. 1990) (plaintiff can attempt to demonstrate by a preponderance of the evidence that a regulatory or administrative standard does not meet the necessary level of safety); see also, Contini v. Hyundai Motor Co., 840 F. Supp. 22 (S.D.N.Y. 1993).

While many of the cases appear clear-cut on their face, they are not always so. The critical fact is that the courts retain the power to override professional or industry standards as inadequate. The reality is that judges and juries may find that the avoidable tragedies warrant compensation from the "wrongdoers." Thus, compliance with minimal, or non-existent government regulations or professional standards, may not protect the owner/operator if reasonable prudence would justify a higher standard of care.

By way of example, many states do not require emergency action plans. Failure to prepare such a plan though could risk substantial liability if a tragedy results which could have been averted. In this respect, the professional standard may impose a greater duty than some states require. Time will often be of the essence in minimizing the risk to downstream populations in cases of imminent or actual dam failures. The existence of a viable emergency action plan, which has been periodically tested and updated, can well reduce the threat to the

downstream population even if the dam cannot be saved. Indeed, failing to plan can be construed as planning to fail. If we think in terms of Judge Learned Hand's factors for negligence analysis, the ease of preparing, and periodically updating, a plan outweighs the risk of not doing it. It is also important to note that the American Society of Civil Engineers recommends preparation of an emergency action plan.

E. THE RISKS INHERENT IN DESIGN TRADE-OFFS

While in some sense there must always be a trade-off between safety, performance (efficiency), and cost (economics), the practical reality is that, in the eyes of a jury mesmerized by a skillful attorney, trade-offs will often seem callous when balanced against the lives lost or severe injuries incurred as a result of the decision. The exercise of discretion on the part of the designer or operator may well appear to constitute a "reckless disregard" of the rights of the victim, since the injury was foreseeable.

Some judgement calls appear blatantly wrong in hindsight and can give rise to substantial litigation. The classic example is of the Ford Pinto. Ford's engineers discovered during crash tests that the Pinto's gas tank had a substantial risk of exploding in rear-end collisions. They also recognized that occupants of a Pinto, who would otherwise have survived the accident, could die in such an accident because of the fiery explosion. Installation of a $10 part would have minimized the risk of resulting explosions, but Ford's management vetoed the addition. A California jury was shocked when it heard evidence that Ford weighed a $10 part greater than human lives. The ensuing verdict was $125 million, which was subsequently reduced to $3.5 million. See Grimshaw v. Ford Motor Co., 119 Cal. App. 3d 757, 174 Cal Rptr. 348 (1981).

Even close cases can go against the defendant though. A good example is Dawson v. Chrysler Corp., 630 F.2d 950 (3rd Cir. 1980). Plaintiff, a police officer, was rendered a

quadriplegic when he lost control of his police car on a rain-slicked road and crashed into a telephone pole. The car struck the pole in a backward direction at a 45 degree angle on the left side of the vehicle. Point of impact was the left rear wheel well. The vehicle literally wrapped itself around the pole. The pole ripped through the body of the car and crushed plaintiff between the seat and the "header" area of the roof. Plaintiff claimed the vehicle was defective because it did not have a full, continuous steel frame extending through the door panels, and a cross member running through the floor board between the posts located between the front and rear doors of the vehicle. Plaintiff alleged that with such a design the car would have bounced off the pole with little injury to plaintiff, who incidentally was not using his seat belt.

Plaintiff successfully recovered a verdict of $2,064,863.19 in spite of Chrysler's evidence that the vehicle met all federal requirements, and that plaintiff's design theory would create a greater risk of injury in most auto accidents. The Chrysler design in question absorbed the impact of most crashes like an accordion, and decreased the rate of deceleration on the occupants of the vehicle. In addition, plaintiff's design would add between 200 and 300 pounds to the weight of the vehicle, and about $300 to the price of the vehicle. Yet plaintiff won. The reason is obvious. It has to do with the risks of defendant going to trial with a severely injured victim for whom the jury understandably feels sympathy.

Dawson v. Chrysler Corp. is significant in another respect. In dam safety analysis we are frequently dealing with incremental damage that can be averted with varying design modifications and regimes, recognizing that there is no 100% safe design. Dawson is a case where defendant designed the vehicle to reduce the risk in the riskiest type of auto accident, a head-on collision. To have chosen plaintiff's design would have resulted in a greater risk of death or serious bodily injury to a larger number of persons, as well as increased gasoline consumption and a higher cost to purchasers, which factors would adversely affect society at large.

For the courts and the jury, the specific risks posed to plaintiff through defendant's design outweighed the increased costs to society necessitated by plaintiff's design proposal. The law, through the mechanism of litigation, tends to focus narrowly on the rights and liabilities of the parties before it. In such a situation the jury understandably has compassion for a severely injured victim. The judges on the appellate tribunals are also only human, and can be expected to feel sympathetic to the innocent victim. Thus, the question all too often becomes what could defendant have done to reduce the risk presented to this victim, and not what could defendant have done to reduce the risk to society in general.

Sometimes though a design trade-off will be accepted. For example, in Wright v. United States, 568 F. 2d 153 (1977), a highway bridge was designed for a 25-year design frequency flood, which the state highway department felt was all they could justify expending, taking into account the expected traffic on the road. The approach road washed away in a storm that could be expected to occur only once every 42 or 55 years. Unable to traverse the washed-out road, a car went out of control with the two occupants dying. No liability was found against the federal government which built the bridge, based upon a design of the state of Utah, which also assumed maintenance of the bridge upon completion.

III. CAUSATION

One of the key requirements of establishing liability on the part of a defendant is causation; that is, showing that the defendant's wrongful act resulted in the victim's injuries. Plaintiff must prove with reasonable certainty that the damages complained of resulted from defendant's acts or omissions. In other words, defendant's misdeed must have caused plaintiff's injury. Plaintiff has the burden of proof on this element of liability as with the other requirements

of establishing a cause of action. Such proof need not be made with absolute certainty though. In cases involving conflicts in evidence (which is usually the situation), it is for the jury to weigh the evidence and reach determinations of fact. See e.g. English Village v. Boettcher and Lieurance Construction Co., Inc., 640 P.2d 1282, 1285 (Kan.App. 1982).

An older case held that once plaintiff establishes the breaking of a dam, and resulting injury, the plaintiff has made out a prima facie case. The burden then shifts to defendant to show the dam was not negligently constructed or maintained. The owner should be required to show the exercise of a degree of care commensurate with the injury that might occur in the event the dam should break. Barnum v. Handschiegel, 103 Neb. 594, 598, 173 N.W. 593, 594 (1919).

In many instances, plaintiff will be able to establish precisely what went wrong. For example, upon completion of the Teton Dam Collapse investigations, a clear picture of the disaster emerged. Specific causation was established. Such will often be the situation with a major engineering disaster, resulting in a tragic loss of life. These detailed investigations may not occur though with "lesser" incidents.

Even when direct evidence of the "cause" of the break is lacking, circumstantial evidence may carry the case for the plaintiff. For example, evidence in one case showed that for a long period of time prior to the dam's collapse, a sizable stream of water was running from a point at which the foot of the earthen dam rested upon the abutting hillside and that water was seeping through the dam in the vicinity of the drain pipe. For two days prior to the collapse of the dam, the volume of water flowing away from the foot of it was increasing and of a muddy color. In addition, a month prior to collapse the owner was notified by the superintendent of a highway construction crew that water in sufficient volume to fill to half capacity two 24 inch culverts was flowing away from the foot of the dam and that its source was neither an escape of water through the valve of the drain pipe nor recent rainfall, The court had no problem under these facts in

letting the issue of negligence go to jury. Bowling v. City of Oxford, 267 N.C. 552, 148 S.E.2d 624 (1966). Under these circumstances, negligence on the part of the dam owner is clear even if the technical cause of the accident remains unknown.

Usually expert technology will be needed to establish the proof of fault on the part of defendant. However, there may be circumstances in which non-expert testimony can be used to establish the requisite standard of care based upon common sense observations of the terrain, or other factors. See e.g., Knight v. Utah Power & Light Co., 209 P.2d 221, 224 (Utah 1949). See also, Milton J. Womack, Inc. v. House of Representatives, 509 So.2d 62, 66 (La. Ct. App.); writs denied, 513 So. 2d 1208, 1211 (La. 1987), an architect malpractice case, where the court stated: "When the matter in question is one that can typically be understood without assistance from an expert, when a lay person can infer negligence, then expert testimony is not required."

However, it will be especially difficult without expert testimony to convince a court of that which appears impossible. By way of illustration, in a case involving alleged overflowing by backwaters, plaintiffs' lands were eight feet above the river water level. The court noted this contention "would be contrary to natural laws and forces because unconfined water cannot run uphill and the water entering the creek from the river could not rise higher than its elevation in the river." Crisafulli v. State, 41 App. Div. 2d 695, 343 N.Y.S. 2d 138, 140 (1973).

Expert testimony might well be required not only on the issue of causation of the dam break, but also to determine the extent of damages caused by the break. In this respect, it might be necessary to distinguish between the damages that would have occurred anyway during a storm due to precipitation and flooding, and the incremental flooding caused by the dam break. A Canadian case, for example, stands for the proposition that defendants are only liable for the "excess" of the flooding. Johnson & Johnson v. Dundas, 4 D.L.R. 624, 638 (Ont. 1945). Such evidence may, of course, be presented by experts using hydrographs. See e.g., Ansley v. Tarrant

County Water Control & Improvement Dist. No. 1, 498 S.W.2d 469 (Tex. Ct. Civ. App. 1973). (This case involved periodic flooding and not a dam break.)

In one case plaintiffs used as a witness the testimony of a workman who laid a new pipe into a mine lake reservoir as part of a water supply system. His testimony clearly established that he was well conversant with soil conditions and structural stability at the site where the dam failed. However, it may be that plaintiffs did not need expert testimony to establish their case since it was clear, partially through the witness' testimony, that the "dam," or retaining wall, consisted of mud, sticks, wire and other improper materials. It should be no surprise that a dam so constructed should suddenly break. See Shell v. Town of Evarts, 296 Ky. 602, 178 S.W.2d 32 (1944).

Many times though it will be impossible to establish precisely what went wrong, thereby leaving a gap in the victim's evidence. Such a weakness need not be fatal to plaintiff's case though because of the legal doctrine commonly known as *res ipsa loquitur*- "the thing speaks for itself." The origin of the doctrine will shed light on its meaning. In the 1847 case of Byrne v. Boadle, 2 H. & C. 722, 159 Eng. Rep. 299 (1863), plaintiff was walking on the sidewalk next to a bakery and flour warehouse. Without warning, a barrel of flour fell from the second story knocking the plaintiff unconscious. Plaintiff subsequently revived consciousness without any idea of what occurred. Even at the trial, he was unable to produce any evidence except that he was hit by a barrel of flour. He could not explain any other aspects of the accident. Defendant, recognizing the gap in plaintiff's case, did not present any evidence, but legally argued plaintiff should lose because he could not establish causation.

The court rejected defendant's plea, and held for plaintiff. The gist of the judges' opinion was that this type of accident does not normally occur in the absence of negligence, and since it

presumably was defendant's flour, Defendant should present any evidence that would refute liability on his part.

As generally applied, the doctrine of *res ipsa loquitur* involves two requirements: First, the accident normally would not have occurred in the absence of negligence; and second, defendant was in exclusive control and dominion of the instrumentality which caused the accident. It is sometimes also said that an additional requirement is that plaintiff be free of fault in the accident. Once plaintiff establishes a prima facie case through *res ipsa loquitur*, the burden of proof shifts to the defendant to rebut the presumption of negligence.

A good example of the application of *res ipsa loquitur* is when a dam gives way without warning on a sunny day. Dams constructed and maintained with the requisite degree of care do not in the ordinary course of events break by the pressure of the water held in the reservoir. See e.g. City Water Power Co. v. City of Fergus Falls, 128 N.W. 817 818 (Minn. 1910); East Liverpool City Ice Co. v. Mattern, 101 Ohio St. 62, 127 N.E. 408 (1920).

Res ipsa loquitur does not apply in every unexplained situation though. Remember that one of the prerequisites is that the accident would normally not have occurred in the absence of negligence. The mere happening of an event does not raise a presumption of negligence. Foy v. Atlantic Gulf & Pac. Co., 4 A.2d 757, 763 (Md. 1939). For example, if a dam fails in an area which historically has a history of periodic floods, the failure may not have been due to negligence. See e.g. New Brantner Extension Ditch Co. v. Ferguson, 307 P.2d 479, 482 (Colo. 1957).

Res ipsa loquitur also does not apply when the precise cause of an accident has been established. Day v. National U.S. Radiator Corp., 241 La. 288, 301-2, 128 So.2d 660, 665 (1961).

IV. DAMAGES

Damages from a dam break may be substantial. While we readily think of the downstream devastation, including loss of life, personal injuries, property damage, and disaster relief, other costs and consequences may also be great. These impacts include repairing or reconstructing the structure, revenue losses to the owner or operator occasioned by the failure of the structure, and losses to a wide ambit of the facility's beneficiaries, such as hydroelectric irrigation and water supply, flood control, and recreational benefits. Farms, homes, and businesses may be inundated. Insurers and real estate lenders, such as banks, may incur substantial losses. Governmental bodies may suffer direct losses, as well as relief and recovery obligations. Environmental damage may be severe. Clean-up and recovery efforts may cover extensive periods of time. Utility services may be interrupted, other businesses adversely affected, and jobs lost. For our purposes though, we are presently concerned with the legal liability costs of the failure.

In most cases the compensable damages recoverable by the victim are relatively clear. The general purpose of damages is to compensate the victim for the loss, that is, to place the victim, as closely as possible, to the position he was in prior to the injury; in other words, "to make the victim whole". In some situations the assessment can be fairly accurate, as with the diminution in value of real property, the costs of repair, and the value of any chattels, i.e., personal property, lost or destroyed. Restoration costs could involve reconstruction or replacement of damaged structures, such as bridges, even if the cost of restoration might exceed the diminution in value. Moulton v. Groveton Paper Co., 323 A.2d 906 (N.H. 1972). Also relatively easy to compute would be certain forms of personal injuries, such as medical expenses and loss of earnings. Less easy to calculate, and thus much more speculative and subjective, are such intangibles as the pain and suffering incurred by the victims, as well as the value to be placed on any loss of life. Such damages may be large. For example, a 33 year old woman

rendered a quadriplegic in the Hyatt Regency skywalk collapse, received a verdict of $15 million. See, Firestone v. Crown Center Redevelopment Corp., 693 S.W.2d 99 (Mo. 1985). Total damages in a dam failure can be high. By way of illustration, Congress appropriated $400 million to compensate the victims of the Teton Dam failure.

In recent years, partially as a result of the Buffalo Creek Dam Disaster on February 26, 1972, a new, much more indefinite element of damages has entered the picture: emotional distress of the survivors. This case involved the collapse of a coal-waste impoundment, which released over 130 million gallons of sludge into a 17-mile hollow, killing 125 persons, injuring over 1,000 others, and leaving 4,000 homeless. Most of the survivors settled with Pittston Company, whose subsidiary owned the dam. However, 643 residents sued Pittston, seeking $64 million in damages. Almost all 643 plaintiffs alleged severe emotional distress. Plaintiffs were sufficiently able to plead emotional distress on the part of survivors, including a class of 33 victims who were absent from the valley at the time of the flood. The court held the "absent" plaintiffs stated a cause of action for emotional distress damages. Plaintiff's complaint alleged negligence, gross negligence and wanton, willful, reckless and intentional disregard of the lives and property of plaintiffs. Thus, the case went beyond "simple negligence." See Prince v. Pittston Co., 63 F.R.D. 28 (S.D. W. Va. 1974), Note, *Mental Distress-Summary Judgment Improper Where Plaintiffs Allege Severe Mental Distress Despite their Absence From Location of Tortuous Activity*, 63 Geo. L.J. 1179 (1975), and Note, 36 ATLA L.J. 293 (1976).

The case was settled for $13.5 million with roughly $6 million distributed to 625 plaintiffs for the psychic impairment claims. Each survivor received between $7,500 and $10,000 after expenses and legal fees. Stern, *The Anguish of Buffalo Creek*, TRIAL MAGAZINE 40, 43 (April 1977).

Prince v. Pittston Co. can be distinguished on the basis that it is a federal district court opinion applying what it believes to be West Virginia law. In addition, the case was also at an early, procedural stage of the litigation. However, the West Virginia Supreme Court subsequently cited Prince v. Pittston Co. as standing for the proposition that emotional damages can be recovered for an intentional wrong. Harless v. First National Bank In Fairmont, 246 S.E.2d 270, 276 (W. Va. 1978). As we have seen, there are many situations in which victims can plead an intentional, or grossly reckless act, thereby setting the stage for both punitive and emotional distress damages.

V. CONCLUSION

One added comment should be made here. It should be emphasized that tort law in general, whether the theory is negligence or strict liability, is moving in the direction of victim compensation. Consequently, as in Dawson v. Chrysler Corp., discussed above, most courts strain to invoke liability, particularly when personal injury or death is involved. The odds are substantial that regardless of the theory cited, the result will be a finding of liability in the case of a dam failure involving loss of life.

The duty of care can arise even though a uniform professional consensus is lacking. By way of illustration, experts often disagree on how to compute the PMP, and thus the PMF. Such differences of professional opinion though are over details, and not the existence of the PMP concept. Most experts will also reach agreement on at least a minimal PMP. Thus, courts consider the PMP in establishing a minimal duty of care.