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Water Law - Act of God Defense - Flood Damage From Reservoir Overflow - Barr v. Game, Fish & (and) Parks Comm'n, 497 P.2d 340 (Colo. Ct. App. 1972)

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COMMENT

WATER LAW — ACT OF GOD DEFENSE — FLOOD DAMAGE FROM RESERVOIR OVERFLOW — *Barr v. Game, Fish & Parks Comm'n,* 497 P.2d 340 (Colo. Ct. App. 1972).

THE Colorado Game, Fish and Parks Commission had almost completed construction of a dam and spillway on Clay Creek when, in June of 1965, heavy rains fell over the Clay Creek drainage basin resulting in a flood of unprecedented magnitude.[1] The Commission, in their design and construction of the dam and reservoir, left a ridge on one side of the reservoir basin at a lower elevation than the dam crest.[2] A combination of this dam height and a limited spillway capacity[3] caused the flood waters to overflow the low point in the ridge. The result was considerable damage to the property of numerous plaintiffs situated below the ridge. In a suit by these plaintiffs, judgment was entered against the Commission.

On appeal, the defendant Commission argued that the flood was of such magnitude that it was an act of God, and therefore no liability could be attached to the incident. The Colorado Court of Appeals refused to accept this argument on the grounds that the evidence was sufficient to show that defendant's engineers could have foreseen a flood of this magnitude by use of the maximum probable flood technique. As foreseeability precludes the act of God defense, the defendant Commission was held liable under Colorado's absolute liability statute[4] for damages resulting from overflow from a reservoir.[5]

Initially, the opinion of the court appears to adhere to the accepted precedent that proven foreseeability of a given occurrence will preclude the act of God defense.[6] However, the court

[1] The peak flow at the reservoir site was 158,000 cubic feet of water per second of time (c.f.s.). The previous high flow of water in Clay Creek was 27,500 c.f.s. Barr v. Game, Fish and Parks Comm'n, 497 P.2d 340, 342 (Colo. Ct. App. 1972).

[2] The dam crest elevation was 3,670 feet above sea level. The low point in the ridge was at 3,666 feet above sea level. *Id.*

[3] The plans indicated that the spillway was designed to discharge a flow of 33,000 c.f.s. The spillway as built, however, would discharge only 4,500 c.f.s. *Id.*

[4] "The owners of the reservoirs shall be liable for all damages arising from leakage or overflow of the waters therefrom or floods caused by breaking of the embankments of such reservoirs." COLO. REV. STAT. ANN. § 148-5-4 (1963).

[5] Barr v. Game, Fish and Parks Comm'n, 497 P.2d 340 (Colo. Ct. App. 1972).

[6] *See* Annot., 169 A.L.R. 517, 534 (1947). *See generally* Comment, 18 WASH. & LEE L. REV. 336 (1961).

in *Barr* has created a standard of foreseeability based on what the reasonable engineer should have foreseen tested by the engineering technique of maximum probable flood prediction. This comment will compare the novelty of this test to earlier Colorado case law and examine the potentially serious ambiguities created by this change in the law.

I. COLORADO PRECEDENT

The Colorado precedent on the act of God defense and its application under the statute of liability for reservoir overflow is fragmented and sparse. Prior to *Barr,* the Colorado courts were never forced to consider the multi-faceted aspects of the problem in any one case. It is possible, however, through a conjunctive analysis of this precedent to discover the basis for the court's holding in *Barr.*

In an early construction of the overflow statute, the Colorado Supreme Court, in *Garnet Ditch & Reservoir Co. v. Sampson,*[7] held that the statute placed an absolute liability upon the reservoir owner for damage caused by seepage, overflow, or flood resulting from dam failure, and therefore reasonable care and foresight by the owner does not excuse liability. Although the act of God defense was not in issue since there was no storm or flood upon which to base it, the court indirectly addressed the problem by stating that "unless an exception appears in the statute we must presume that none was intended . . . ."[8]

The court directly faced the availability of the act of God defense in an action brought under the overflow statute in *Ryan Gulch Reservoir Co. v. Swartz.*[9] Contrary to the dicta in *Garnet,* the court held that an act of God or the common enemy is a good defense under the statute. Although the sufficiency of proof of act of God was not in issue, the court commented that the uncontroverted evidence of the defendants was sufficient to prove that the rainstorm could not have been foreseen and therefore could be designated an act of God.[10] This comment by the court implies that if an occurrence is foreseeable it is not an act of God.

This interpretation of *Ryan* is reinforced by *Greeley Irrigation Co. v. Von Trotha*[11] where the court considered the issue

[7] 48 Colo. 285, 110 P. 79 (1910).
[8] *Id.* at 289, 110 P. at 80. Justice Campbell, in a dissenting opinion, felt that act of God must be an exception to the absolute liability imposed by the statute. *Id.* at 297, 110 P. at 1136.
[9] 77 Colo. 60, 234 P. 1059 (1925).
[10] *Id.* at 68, 234 P. at 1062.
[11] 48 Colo. 12, 108 P. 985 (1910).

of an act of God defense in a case not involving the overflow statute. The court approved an instruction on the question of what constitutes an extraordinary flood: that through the "exercise of reasonable foresight and prudence the natural consequences of such a flood could not be foreseen and guarded against."[12]

In sum, the Colorado standard on act of God, as evidenced by *Ryan* and *Greeley Irrigation,* is reasonable and prudent foreseeability. Any occurrence which is reasonably foreseeable does not constitute an act of God. The evidence in both cases further indicates that foreseeability will be tested by a direct comparison with prior occurrences.[13]

II. *Barr v. Game, Fish and Parks Commission*

Barr specifically reaffirms the holding in *Ryan* by acknowledging that the act of God defense is available under the statute of liability for overflow from a reservoir.[14] But, probably because of the scarcity of Colorado precedent and the lack of a direct ruling upon what specifically constitutes an act of God, the court turned to Nebraska for its definition of the defense.

A. *Act of God — Standard*

The *Barr* court states:

> In *Baum v. County of Scott's Bluff,* 172 Neb. 225, 109 N.W. 2d 295 [1961], the court defined an act of God as follows: "In order for a flood to come within the term act of God, it must have been so unusual and extraordinary a manifestation of nature as could not under normal conditions have been reasonably anticipated or expected. . . . *An act of God does not necessarily mean an operation of natural forces so violent and unexpected that no human foresight or skill could possibly have prevented its effect.* It is enough that the flooding should be such as human foresight could not be reasonably expected to anticipate and whether it comes within this description is ordinarily a question of fact."[15]

This definition appears to differ from the Colorado rule derived from *Ryan* and *Greeley Irrigation* since the standard of reasonable foreseeability is not tied to prior occurrences. The *Baum* court held that the test is whether a reasonable man,

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[12] *Id.* at 22, 108 P. at 988.

[13] In *Greeley Irrigation* the evidence was that the "extraordinary flood" was one of the largest which had occurred in the vicinity. *Id.* at 12, 108 P. at 985. In *Ryan* the evidence was of an unusual and unprecedented flood resulting from a cloudburst. Ryan Gulch Reservoir Co. v. Swartz, 77 Colo. 60, 234 P. 1059 (1925).

[14] 497 P.2d at 343.

[15] *Id.* (emphasis added by the Colorado Court of Appeals).

exercising reasonable human foresight, could have foreseen an occurrence of the magnitude which actually occurred. The facts in *Baum,* however, belie this conclusion. The evidentiary question, which was held to be of sufficient weight to submit the issue to the jury, was whether or not the storm which occurred was greater than *recorded prior occurrence.*[16]

The test applied by Nebraska courts to the foreseeability of any particular occurrence is clarified by an examination of the precedent upon which *Baum* relied. The definition of act of God was taken from *Cover v. Platte Valley Public Power & Irrigation District*[17] where the Nebraska court presumed that if rainfall of a larger than ordinary amount has occurred in the past, it will occur again. *Cover,* in turn, relied on *Webb v. Platte Valley Public Power & Irrigation District*[18] where it was stated that "[t]he evidence is that it was not an unprecedented rain; that many other similar rains had occurred in the vicinity; and that defendant . . . could reasonably have anticipated that such rains would happen again."[19]

It is apparent from the foregoing that the *Baum* standard of reasonable foreseeability is in application tested by comparison with prior occurrence. Thus, the court in *Barr,* by adopting the definition of act of God from Nebraska, simply clarified the existing law implied in the Colorado cases of *Ryan* and *Greeley Irrigation.* In application, the rules of both states on act of God are essentially the same: an occurrence which can be reasonably foreseen, tested by comparison with prior occurrence, is not an act of God. The importance of *Barr,* however, rests with the changes it makes in the standard of foreseeability and the unique test which the court applies.

B. *Test — Maximum Probable Flood*

The *Barr* court modifies the basic act of God rule by redefining the reasonable man and foreseeability. Relying on *Ryan* and *Baum,* the court holds that a flood greater than recorded prior occurrence, but reasonably foreseeable *by an engineer* (as opposed to a reasonable man) is a foreseeable flood, thereby precluding the act of God defense. Furthermore, such an expert must "foresee" through the engineering technique of maximum probable flood prediction, a test *based* upon prior occurrence. In the technique, that "prior occur-

[16] 172 Neb. 225, 235, 109 N.W.2d 295, 302 (1961).
[17] 162 Neb. 146, 75 N.W.2d 661 (1956).
[18] 146 Neb. 61, 18 N.W.2d 563 (1945).
[19] *Id.* at 70, 18 N.W.2d at 568.

rence" is one which occurred in a meteorologically similar area, not necessarily the same basin, and through a process of transposition and factoring for such variables as soil moisture and antecedent conditions, the resultant predicted flood is of greater magnitude than any previous occurrence in the basin.[20]

The court, therefore, has made two modifications in the existing law; substituting an engineer for the reasonable man and applying a test *based* upon prior occurrence rather than the prior occurrence itself. What are the ramifications of these changes by the *Barr* court?

III. The Effect of *Barr* on Small Dam Builders and Owners

The definition of act of God adopted by *Barr* includes the phrase " 'so unusual and extraordinary a manifestation of nature as could not *under normal conditions* have been reasonably anticipated or expected.' "[21] The definition of "normal conditions" is a key element of what a reasonable person should foresee. The court applies the maximum probable flood prediction technique to this aspect of the problem. However, according to hydrologists, the flood discharges predicted by use of the technique "represent flood discharges that may be expected from the *most severe combination of critical meteorologic and hydrologic conditions* that are reasonably possible in the region."[22] Certainly a layman cannot be expected to con-

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[20] The storm transposition method of maximum probable flood prediction involves the transposing of a storm which actually occurred in a hydrometeorologically similar area over the basin in question. The storm is then oriented over the basin to obtain maximum reasonable fit of the storm to the basin. Factors such as ground elevation and dew point are then applied to obtain release of maximum moisture content. The precipitation which results is then factored by values for such variables as infiltration characteristics and maximum reasonable antecedent soil moisture in order to obtain the predicted runoff of the maximum probable flood. *See* Bureau of Reclamation, U.S. Dept. of Interior, Design of Small Dams 19-61 (1960).

The predicted probable maximum flood is always greater than recorded prior occurrence because the method is a *maximizing* process of recorded prior occurrence. In the Texas gulf coast area, a hurricane region, predicted probable maximum values approach equality with recorded prior occurrence. In the experience of the engineering firm whose experts are quoted by the *Barr* court, the probable maximum flood has never been less than 1.05 times larger than recorded prior occurrence and that was in the Texas gulf coast area. In the Colorado plains region the average relationship is a probable maximum flood of 1.33 to 5 times larger than recorded prior occurrence. Interview with William W. Wheeler, Jr., W.W. Wheeler & Associates, Inc., in Englewood, Colorado, Oct. 11, 1972.

[21] 497 P.2d at 343 (emphasis added).

[22] V. Chow, Handbook of Applied Hydrology § 25-26 (1964) (emphasis added). As a matter of fact the storm transposition method approved by the court in *Barr* is "the greatest maximizing process for a given basin . . . ." *Id.* § 9-63.

sider as "normal" the conditions involved in this technique. Thus the court has created a much higher requirement of foreseeability by equating normal conditions with those severe conditions presumed in the technique.

This redefinition places a heavy burden on the average small dam owner. Possibly in response to this, the court has complemented this higher level of foreseeability by holding that "if the flow of water which occurred in the Clay Creek basin was reasonably foreseeable by defendant's *engineers,* then it may not be designated an act of God."[23] Presumably an engineer would have the capability to use the technique and understand what the court means by "normal conditions." But does this substitution of an engineer for the reasonable man in *Barr* mean that everyone planning a dam and reservoir of whatever size needs an engineer's analysis? If not, to whom does this holding apply?

According to expert opinion, the engineering design technique of maximum probable flood analysis is "confined to the determination of spillway requirements for *high dams* [such as that found in *Barr*], but in unusual cases [the maximum probable flood] may constitute the design flood for local protection works where an exceptionally high degree of protection is advisable and economically obtainable."[24] In contrast, *Barr* and the absolute liability statute involved, apply to *all* reservoir dams in Colorado.[25] This expansion of the technique to all reservoir dams is unfortunate not only because it contradicts the engineering standards enunciated above, but also because it overlooks the fact that practicing engineers do not always use the maximum probable flood technique in the design of *all* reservoir dams. When engineers design *small* dams they normally use criteria similar to those set forth by the Bureau of Reclamation:

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[23] 497 P.2d at 343 (emphasis added).

[24] V. CHOW, *supra* note 22, § 25-26.

[25] COLO. REV. STAT. ANN. § 148-5-13 (1963) provides:

> None of the provisions of sections 145-5-5 to 148-5-14 shall be construed as relieving the owners of any such reservoir from the payment of such damages as may be caused by the breaking of the embankments thereof, but in the event of any such reservoir overflowing, or the embankments, dams or outlets breaking or washing out, the owners thereof shall be liable for all damage occasioned thereby.

The sections mentioned above refer to small dams which do not require the State Engineer's approval for construction, and owners who do not comply with the State Engineer's inspection and instructions for maintenance. *Barr* and the absolute liability statute probably do not apply to the extremely small reservoir known as livestock water tanks which are covered in COLO. REV. STAT. ANN. §§ 8-17-1 to -16 (1963).

If	*Then*
(1) Failure of structure would result in probable loss of human life.	(1) Inflow design flood is equivalent to the *maximum probable flood.*
(2) Failure would cause great damage to property and project operation but loss of human life is not envisioned.	(2) Inflow design flood may be as much less than maximum probable as that obtained by assumption A.
(3) Failure would cause only loss of structure with little damage to property and project operation.	(3) Inflow design flood may be as much less than maximum probable as that obtained by assumption B.[26]

Following these guidelines an engineer would use a design flood of lesser magnitude in two of the three situations.

Thus, because a layman lacks the training and expertise to use the maximum probable flood technique, a strict interpretation of *Barr* requires him to consult an engineer in the design of a dam and reservoir of any size. The engineer is then forced to abandon his normal design criteria and apply the maximum probable flood technique regardless of the size of the structure or the potential damage if the structure should fail. Engineering services are expensive and the design and construction costs of a small structure capable of handling a flood of such large magnitude can be grossly disproportionate to the benefits derived from the structure itself. The resultant economic impact upon the layman owner-builder is such that many small dams and reservoirs could not be built solely because of the effect of *Barr*.

The court can avoid placing this economic burden on the small reservoir owner-builder by limiting this decision to the facts of the case, *i.e.*, large structures. Because of the definition of act of God adopted from *Baum*, the standard in situations involving small structures *could* be a reasonable man exercising reasonable human foresight to be tested by prior occurrences. However, until the court so limits the holding of *Barr*, it is incumbent upon the lawyer advising *any* reservoir

[26] BUREAU OF RECLAMATION, U.S. DEPT. OF INTERIOR, DESIGN OF SMALL DAMS 43 (1960). Assumption *A* involves the reduction by a statistical factor of the precipitation predicted for probable maximum and then application of that reduced precipitation to probable maximum antecedent soil conditions. Under assumption *B* the reduced precipitation of assumption *A* is applied to antecedent soil conditions of less than probable maximum magnitude. *Id.*

The American Society of Civil Engineers (ASCE) Task Force on Spillway Design Floods adopted similar criteria for when to use a design flood of lesser magnitude than maximum probable. 90 ASCE JOURNAL OF HYDRAULICS DIVISION 296-98 (1964). A Standard Project Design Flood is usually 40 to 60% of maximum probable. V. CHOW, *supra* note 22, § 25-26.

owner or builder to emphasize the gamble involved in not obtaining an engineer to design the structure to handle a maximum probable flood.

IV. CONCLUSION

The defendant in *Barr* contended "that the trial court abolished the defense of act of God by holding that damages occasioned by this flood were not an act of God."[27] If the case is strictly interpreted to hold that a maximum probable flood is the test of the foreseeability of a design engineer as to whether the defense is available, the defendant's contention is well-founded. A maximum probable flood is of such magnitude that, except in areas such as "hurricane alleys," the chances of an occurrence closely approaching maximum probable are remote. That being the case, the act of God defense is seldom if ever available under such an interpretation of *Barr*.

The court could have avoided the problems and burdens created by this decision. The central problem in such cases is who should bear the cost of damage caused by the overflow from a reservoir. Since the absolute liability statute is established law, it is suggested that justice would be better served if the statute were strictly applied without exceptions, resulting in a single issue of proximate cause. The court would then have to answer only one question: would the damage which occurred have occurred if the subject dam and reservoir were not there? If the answer is yes, the defendant is not liable. If the answer is no, the defendant is totally liable. If the answer is that only a proportionate amount is attributable to the existence of the dam, the defendant is liable for only that proportionate amount.

The result in *Barr* is the same as it would be under the above proximate cause analysis; but because of the ambiguities and differing potential applications of the case, whether the results under different fact situations would be as commendable is not clear.

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[27] 497 P.2d at 342.