failure to warn of an impending detonation as operational, and thus outside the exemption, it could also hold a failure to warn of health hazards discretionary if *any* governmental reason for the omission is advanced. Unlike a warning of a detonation, however, a warning of health risks involves some policy considerations. The question is whether the policy factors involved in the decision implicate separation of powers concerns.

The quality-of-discretion test avoids a conclusory application of labels by evaluating the nature of the policymaking in the decision not to warn. This new test adopts a balancing approach which assesses the impact of the decision on separation of powers concerns. Under this approach, a court must balance the harm to the plaintiff from the governmental decision not to warn of health risks against the interests of the decision-maker. The result is potential liability for the government's failure to warn nuclear testing plaintiffs of the health risks posed by nuclear fallout.

Christine M. Doyle

Nuclear Testing and Inverse Condemnation

INTRODUCTION

The fifth amendment[1] prohibits the government from "tak-

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[1] U.S. CONST. amend. V provides that "private property [shall not] be taken for public use, without just compensation." To enforce this proscription, plaintiffs may bring an inverse condemnation action "against a governmental entity having the power of eminent domain to recover the value of property which has been appropriated in fact, but with no formal exercise of the power." Thornburg v. Port of Portland, 233 Or. 178, 179 n.1, 376 P.2d 100, 101 n.1 (1962). *Accord* Agins v. City of Tiburon, 447 U.S. 255, 258 n.2 (1980); United States v. Clark, 445 U.S. 253, 257 (1980).

Federal district courts, concurrent with the Court of Claims, have original jurisdiction to hear taking claims for property with value not exceeding $10,000. 28 U.S.C. § 1346(a)(2) (Supp. III 1979). For claims involving property worth larger sums, the Court of Claims has sole original jurisdiction. *Id.* § 1491.

ing"[2] private property for public use without just compensation. Nuclear testing victims may therefore bring an inverse condemnation action to obtain compensation where test detonations have taken their property.[3] A plaintiff could premise a taking claim on radioactive fallout contamination of soil or water that destroys the present use and enjoyment of land.[4] In fact, natives of the Marshall Islands presently have two petitions before the Court of Claims which allege that nuclear test detonations destroyed the habitability of their island atolls.[5]

Although courts have never developed a clear formula to identify compensable fifth amendment claims,[6] fairness is at the

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[2] In United States v. General Motors Corp., 323 U.S. 373 (1945), the Court stated:

> In its primary meaning, the term "taken" would seem to signify something more than destruction, for it might well be claimed that one does not take what he destroys. But the construction of the phrase has not been so narrow. The courts have held that the deprivation of the former owner rather than the accretion of a right or interest to the sovereign constitutes the taking. Governmental action short of acquisition of title or occupancy has been held, if its effects are so complete as to deprive the owner of all or most of his interest in the subject matter to amount to a taking.

Id. at 378.

[3] Although this comment focuses on real property, the government can also take personal property. *See, e.g.*, King v. United States, 427 F.2d 767 (Ct. Cl. 1970) (plaintiffs claimed that the government had taken their crops as a result of flooding following the construction of a dam); Daily v. United States, 90 F. Supp. 699 (Ct. Cl. 1950) (court held that the government had taken plaintiff's squash crop as a result of an airport expansion). For nuclear testing cases where plaintiffs alleged a taking, see Bartholomae Corp. v. United States, 135 F. Supp. 651 (S.D. Cal. 1955) (court refused to find a taking where plaintiff alleged that testing at the Nevada Test Site violently shook its building and caused plaster to crack), *aff'd*, 253 F.2d 716 (9th Cir. 1957); Kabua v. United States, No. 549-81-L (Ct. Cl., filed Sept. 9, 1981) (natives of Rongelap Atoll in the Marshall Islands presently are litigating their claims that nuclear testing in the area has left their atoll uninhabitable); Juda v. United States, No. 172-81-L (Ct. Cl. filed March 16, 1981) (natives of Bikini Atoll, an actual test site, are litigating claims that detonations rendered their atoll uninhabitable).

[4] *See* text accompanying notes 72-91 *infra*.

[5] Kabua v. United States, No. 549-81-L (Ct. Cl. filed Sept. 9, 1981); Juda v. United States, No. 172-81-L (Ct. Cl., filed March 16, 1981). *See Issues in Nuclear Testing Litigation: An Introduction*, 15 U.C. DAVIS L. REV. 997, 998 n.3 [hereinafter cited as *Issues in Nuclear Testing*].

[6] Penn Central Transp. Co. v. New York City, 438 U.S. 104, 123 (1978); Goldblatt v. Hempstead, 369 U.S. 590, 594 (1962).

heart of any taking analysis.[7] The guarantee of payment derives from the belief that it is not always equitable to place public burdens upon the shoulders of a few people.[8] In nuclear testing litigation, courts therefore must determine whether the government may concentrate the cost of property destruction upon a few landowners or whether public compensation is due.[9]

In *Penn Central Transportation Co. v. New York City*,[10] the United States Supreme Court placed particular emphasis on the fairness of disproportionately burdening a few people with the cost of a government program. The plaintiff contended that a historical landmark law, which barred altering the facade of its building, peculiarly affected its property.[11] Focusing on fairness, however, the Court found that the plaintiff was not "solely burdened and unbenefited."[12] The law affected over 400 parcels, and the burden on owners was offset by the benefit that all citizens, including the plaintiff, derived from the preservation of landmarks.[13]

The fairness doctrine stated in *Penn Central* should apply to compensate nuclear testing plaintiffs for the taking of their land. They have suffered special, disproportionate damage to their property as a consequence of nuclear testing that the govern-

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[7] Berger, *A Policy Analysis of the Taking Problem*, 49 N.Y.U. L. REV. 165, 166-67 (1974).

[8] Penn Central Transp. Co. v. New York City, 438 U.S. 104, 123 (1978); Armstrong v. United States, 364 U.S. 40, 49 (1960).

[9] *See* Michelman, *Property, Utility, and Fairness: Comments on the Ethical Foundations of "Just Compensation" Law*, 80 HARV. L. REV. 1165, 1169 (1965). *See also* Kratovil & Harrison, *Eminent Domain—Policy and Concept*, 42 CALIF. L. REV. 596, 597 (1954).

[10] 438 U.S. 104 (1978). Although *Penn Central* involves the regulatory taking of property, its reasoning still applies to instances of government invasion and occupation. The history of the taking clause reflects a movement from a physical toward a nonphysical definition of taking. W. STOEBUCK, NONTRESPASSORY TAKINGS IN EMINENT DOMAIN 17-18 (1977). Consequently, both forms of taking are now covered by the inquiry of whether property interests have passed from the private landowner to the government. *Id.* at 18. For a review of the historical development and merger of these two taking concepts, see Sax, *Takings and the Police Power*, 74 YALE L.J. 36, 36-60 (1964). Regarding the unique problems surrounding regulatory takings, see Bowden & Feldman, *Take It or Leave It: Uncertain Regulatory Taking Standards and Remedies Threaten California's Open Space Planning*, 15 U.C. DAVIS L. REV. 371 (1981).

[11] Penn Central Transp. Co. v. New York City, 438 U.S. 104, 133-35 (1978).

[12] *Id.* at 134.

[13] *Id.* at 134-35.

ment conducted in the interest of national defense.[14] They have been required to shoulder burdens of tests that benefit the entire nation.

Certainly, the national defense program, like *Penn Central's* landmark law, benefits the plaintiffs as well as all citizens of the United States and residents of its protectorates such as the Marshall Islands. However, nuclear testing plaintiffs have suffered burdens of greater intensity than the burden in *Penn Central.* The Marshall Island plaintiffs contend that the testing destroyed the present use of their land.[15] Their claims are not premised upon the mere economic impact of government regulation;[16] rather, they point to radiation contamination as the instrument of destruction.[17] Finally, the government based its selection of the Marshall Islands and Nevada test sites on the need to subject the fewest number of people to the risk of radiation exposure.[18] The government therefore selected the natives

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[14] Because of radiation contamination, both Bikini Island and Eneu Island of the Marshall Islands are presently uninhabitable. In identical letters dated June 1, 1979, Ruth G. Van Cleve, Director of the Office of Territorial Affairs, informed Tomaki Juda of the Kili-Bikini Council and Henchi Balos of the Marshall Islands Parliament that:

> All of us here deeply regret that Eneu Island cannot be useful for residence for at least another 20-25 years since we understand the deep feelings of the people of Bikini and their hopes that even though Bikini Island is not useable now, Eneu Island possibly might have been. This is not now possible.

These two letters are attached to plaintiffs' petition in Juda v. United States, No. 172-81-L (Ct. Cl., filed March 16, 1981).

In Kabua v. United States, No. 549-81-L (Ct. Cl., filed Sept. 9, 1981), the plaintiffs assert that because of nuclear testing in the region the "plant, animal and fish life and the fishing rights and the atoll itself have become so contaminated with radiation that said atoll has not been and is not now fit for human habitation, or for use or consumption, and will not be so for the foreseeable future." Plaintiffs' petition at 7.

[15] In Penn Central Transp. Co. v. New York City, 438 U.S. 104 (1978), the Court specifically found that the law did not impair the present use of the property. *Id.* at 135. *See* note 14 *supra,* for the assertion that the government destroyed the present use of the Marshall Islands plaintiffs' property. *See also Issues in Nuclear Testing, supra* note 5, at 1001-02 n.11.

[16] The plaintiff in *Penn Central* asserted that the landmark preservation law deprived it of a gainful use of its air rights. Penn Central Transp. Co. v. New York City, 438 U.S. 104, 130 (1978).

[17] *See* note 14 *supra.*

[18] *Health Effects of Low Level Radiation: Joint Hearing Before the Subcomm. on Oversight and Investigations of the House Comm. on Interstate and*

of the Marshall Islands and the residents of towns such as St. George, Utah,[19] to absorb this danger in order to protect the greater population of the United States.[20] Fairness dictates that a minority should not shoulder this extreme burden for the public benefit without compensation.[21]

While the importance of nuclear testing to national defense might influence a court's analysis, history indicates that this factor should aid rather than hinder a plaintiff's case. Professor Joseph Sax notes that early continental commentators argued that the crown must compensate citizens whenever the army seized private property in order to wage war.[22] In 1803, St. George Tucker recorded his view that the taking provision in the United States Constitution derived from outrage over the military's seizure of property during the Revolutionary War.[23] Conse-

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Foreign Commerce and the Health and Scientific Research Subcomm. of the Senate Labor and Human Resources Comm. and the Senate Comm. on the Judiciary, 96th Cong., 1st Sess., Vol. II, 1410-23 (1979) (reports of the Atomic Energy Commission regarding the location of a proving ground for atomic weapons) [hereinafter cited as *Health Effects Hearings*]; H. ROSENBERG, ATOMIC SOLDIERS 25-32 (1980). *See also Issues in Nuclear Testing, supra* note 5, at 997-98 nn.2-3.

[19] St. George, Utah, has become the focal point of congressional efforts to compensate civilian victims of nuclear testing. *See generally* Hatch, *Nuclear Testing: A Nation's Fatal Experiment*, 16 TRIAL 42 (April, 1980); 125 CONG. REC. S6677 (daily ed. May 24, 1979) (remarks of Sen. Hatch and residents of southern Utah). Presently, S. 1483, 97th Cong., 1st Sess. (1981), is before the Senate. This bill would provide plaintiffs living in areas affected by fallout from atmospheric tests with a rebuttable presumption that radiation exposure caused certain diseases. However, the bill would place a ceiling on the amount of recovery. *See* Comment, *Governmental Liability for Nuclear Testing Under the Federal Tort Claims Act*, 15 U.C. DAVIS L. REV. 1003, 1005 n. 8 (1982) [hereinafter cited as *Nuclear Testing under the FCTA*].

[20] *See* authorities cited in note 18 *supra*.

[21] In Armstrong v. United States, 364 U.S. 40 (1960), the Court maintained that the "Fifth Amendment's guarantee . . . [is] designed to bar Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole." *Id.* at 49.

[22] *See* Sax, *supra* note 10, at 56-57. Sax refers to the writers Pufendorf, Burlamaqui, and Bynkershoek.

[23] TUCKER'S BLACKSTONE COMMENTARIES 305-06 (appendix) (1803) *quoted in* Sax, *supra* note 10, at 58. Tucker stated:

> That [provision] which declares that private property shall not be taken for public use without just compensation, was probably intended to restrain the arbitrary and oppressive mode of obtaining supplies for the army, and other public uses, by impressment, as

quently, the history of the taking clause suggests that individuals should not finance the national defense. The public at large should instead bear the burden.

Indeed, under present case law, the government cannot impress a citizen's property during war without compensation.[24] Even though national defense grants broad powers to acquire munitions by eminent domain, the government must pay for each seizure if it takes the property from a citizen.[25] Nothing would seem to justify variance from these rules in the case of peacetime testing of weapons through which the government seeks to arm the military before war.

While fairness is at the heart of every taking analysis,[26] it alone is too amorphous a concept to guide either courts or litigants. Indeed, courts have not enunciated any workable broad standard beyond the general fairness principle. Consequently, nuclear testing victims must grapple with what one commentator terms a "crazy-quilt pattern of Supreme Court doctrine"[27] to ascertain whether they should receive just compensation.

I. The Invasion Cases

One line of authority that is advantageous to landowners who

> was too frequently practiced during the revolutionary war, without any compensation whatever.

Id.

[24] 1 Nichols' the Law of Eminent Domain § 1.44[4] (rev. 3d ed. 1981) [hereinafter cited as 1 Nichols]. *See* Todd v. United States, 292 F.2d 841 (Ct. Cl. 1961) (taking found where Secretary of War declared a danger zone in Chesapeake Bay during World War II and deprived plaintiffs of their property rights in fishing locations). During peacetime, national defense concerns play a reduced role. Consequently, less justification exists for arguing that national defense should bar finding a taking during peacetime, when courts have declared a taking during wartime.

[25] 1 Nichols, *supra* note 24, at § 1.44[4]. *See* United States v. Felin & Co., 334 U.S. 624 (1948) (seizure of pork products during war required compensation). The *Felin* Court noted that "[t]he war did not repeal or suspend the Fifth Amendment." *Id.* at 651. *See* Mitchell v. Harmony, 54 U.S. (13 How.) 115 (1851) (compensation required where troops seized plaintiff's mules, wagons, and goods during war against Mexico). *See also* United States v. New River Collieries Co., 262 U.S. 341 (1923); United States v. Cohen Grocery Co., 255 U.S. 81 (1921); United States v. 15.3 Acres of Land, 154 F. Supp. 770 (M.D. Penn. 1957).

[26] Berger, *supra* note 7, at 166-67.

[27] Dunham, Griggs v. Allegheny County *in Perspective: Thirty Years of Supreme Court Expropriation Law*, 1962 Sup. Ct. Rev. 63.

are victimized by nuclear testing will grant them compensation whenever the government invades and makes use of private property.[28] The Supreme Court best articulated this "invasion theory" in *United States v. Causby*.[29] There, the Court held that low flights of military planes over the plaintiffs' land that had destroyed their poultry business constituted the taking of an air easement.[30] Writing for the majority, Justice Douglas declared that if the frequency and altitude of the flights destroyed the property's use, then the government had effectively entered and taken exclusive possession of the land.[31]

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[28] Michelman, *supra* note 9, at 1184-85. Although not happy with this "invasion test," Michelman notes its one significant attribute:

> [C]ourts, while they sometimes do hold nontrespassory injuries compensable, *never* deny compensation for a physical takeover. The one incontestable case for compensation (short of formal expropriation) seems to occur when the government deliberately brings it about that its agents, or the public at large, 'regularly' use or 'permanently' occupy, space or a thing which theretofore was understood to be under private ownership.

Id. at 1184 (emphasis in original).

For examples of cases applying the invasion test, see Griggs v. Allegheny County, 369 U.S. 84 (1962); United States v. Causby, 328 U.S. 256 (1946); United States v. Cress, 243 U.S. 316 (1917); United States v. Lynah, 188 U.S. 445 (1903); Transportation Co. v. Chicago, 99 U.S. (9 Otto) 635 (1878); Pumpelly v. Green Bay Co., 80 U.S. (13 Wall.) 166 (1871).

Scholars have also proposed other standards to resolve the taking issue. A frequently discussed idea is the "diminution in value" theory, which requires compensation where extensive regulation leaves land almost valueless. *See* Pennsylvania Coal Co. v. Mahon, 260 U.S. 393 (1922); Berger, *supra* note 7, at 170; Michelman, *supra* note 9, at 1184; Sax, *supra* note 10, at 41-46. The "enterprise" theory requires compensation when regulation promotes a governmental enterprise. *See id.* at 61. The "spillover" theory allows government to mediate private conflicts that involve spillover uses of land without compensating either party. *See* Sax, *Takings, Private Property and Public Rights*, 81 YALE L.J. 149, 155-86 (1971). The "noxious use" theory allows the government to regulate harmful activities without compensating property owners. *See* Berger, *supra* note 7, at 172; Michelman, *supra* note 9, at 1196-1201; Sax, *supra* note 10, at 48. Finally, to determine whether a taking has occurred under the "utility and fairness" theory requires consideration of the efficiency gains, settlement costs, and demoralization costs resulting from government activities and regulations. *See* Michelman, *supra* note 9, at 1214.

[29] 328 U.S. 256 (1946).

[30] *Id.* at 261-62.

[31] *Id.* at 261. Justice Douglas wrote that "[i]f, by reason of the frequency and altitude of the flights, respondents could not use this land for any purpose, their loss would be complete. It would be as complete as if the United States

The invasion theory requires that the government's physical invasion of the land either completely ousts the plaintiff or interferes to such a degree with his property rights that he is deprived of its use and enjoyment.[32] The invasion must be pervasive. Only in an extreme case will invasion by smoke, odors, or gases constitute a taking.[33] Noise and vibration rarely amount to

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has entered upon the surface of the land and taken exclusive possession of it." *Id.*

A few state courts have extended *Causby* to cases where the property did not lie directly under the aircraft's flight path. Aaron v. City of Los Angeles, 40 Cal. App. 3d 471, 115 Cal. Rptr. 162 (2d Dist.), *cert. denied*, 419 U.S. 1122 (1974); Thornburg v. Port of Portland, 233 Or. 178, 376 P.2d 100 (1962); Martin v. Port of Seattle, 64 Wash. 2d 309, 391 P.2d 540 (1964), *cert. denied*, 379 U.S. 989 (1965). In *Thornburg*, the court relied on a nuisance theory, maintaining that "[a] nuisance can be such an invasion of the rights of a possessor as to amount to a taking, in theory at least, anytime a possessor is in fact ousted from the enjoyment of his land." 233 Or. 178, 183, 376 P.2d 100, 105. Lower federal courts, however, have rejected the nuisance theory and refused to extend the scope of *Causby* beyond direct overflights. *See, e.g.*, Batten v. United States, 306 F.2d 580 (10th Cir. 1962), *cert. denied*, 371 U.S. 955 (1963); Freeman v. United States, 167 F. Supp. 541 (W.D. Okla. 1958). *See generally* Note, *Reexamining the Supreme Court's View of the Taking Clause*, 58 TEX. L. REV. 1447, 1459-62 (1980) [hereinafter cited as *View of the Taking Clause*].

[32] 2 NICHOLS' THE LAW OF EMINENT DOMAIN § 6.2 (rev. 3d ed. 1981) [hereinafter cited as 2 NICHOLS]. *See, e.g.*, Griggs v. Allegheny County, 369 U.S. 84 (1962) (Court held that an airport had acquired insufficient land for a runway approach and that the direct overflight of plaintiffs' home constituted a taking); Portsmouth Harbor Land & Hotel Co. v. United States, 260 U.S. 327 (1922) (Court held that the repeated firing of coastal defense guns over plaintiff's island resort constituted the taking of a servitude); United States v. Lynah, 188 U.S. 445 (1903) (Court held that raising a river's water level above its natural height, thus interfering with the property's drainage, was a physical invasion); Fromme v. United States, 412 F.2d 1192 (Ct. Cl. 1969) (one flooding of private property and the potential for flooding every fifteen years due to the construction of a levee on channel held insufficient to constitute the taking of an easement).

Courts are unwilling, however, to declare a taking where the government destroys a future, speculative use rather than a present interest. Penn Central Transp. Co. v. New York City, 438 U.S. 104, 135-36 (1978); Ortega Cabrera v. Municipality of Bayamon, 562 F.2d 91 (1st Cir. 1977). Moreover, in deciding whether there has been a destruction of the present use, courts consider the property as a whole and will not "divide a single parcel into discrete segments and attempt to determine whether rights in a particular segment have been entirely abrogated." *Penn Central Transp. Co.*, 438 U.S. at 130-31.

[33] *See* Richards v. Washington Terminal Co., 233 U.S. 546 (1915); Pennsylvania R.R. v. Angel, 41 N.J. Eq. 316, 7 A. 432 (1886); Cogswell v. New York, New Haven and Hartford R.R., 103 N.Y. 10, 8 N.E. 537 (1886). *See also* Balti-

a taking.[34] However, the invasion theory may provide a plaintiff with a basis for recovery where nuclear contamination, concussion, or noise destroys the present use and enjoyment of his land. Like low-flying airplanes, radioactive fallout invades the superadjacent airspace and affects the land below.[35] Noise and concussion may also adversely affect a property owner's rights, although it is less certain that they will constitute takings.[36] These latter effects of nuclear testing may not constitute invasions that will amount to takings.[37]

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more & P.R. Co. v. Fifth Baptist Church, 108 U.S. 317 (1883).

[34] *See* Batten v. United States, 306 F.2d 580 (10th Cir. 1962), *cert. denied*, 371 U.S. 955 (1963). *See also* Town of East Haven v. Eastern Airlines, Inc., 331 F. Supp. 16 (D. Conn. 1971); Bennett v. United States, 266 F. Supp. 627 (W.D. Okla. 1965); Schubert v. United States, 246 F. Supp. 170 (S.D. Tex. 1965); Leavell v. United States, 234 F. Supp. 734 (E.D.S.C. 1964); United States v. 3276.21 Acres of Land (Miramar), 222 F. Supp. 887 (S.D. Cal. 1963); Avery v. United States, 330 F.2d 640 (Ct. Cl. 1964). *See generally* Spater, *Noise and the Law*, 63 MICH. L. REV. 1373 (1965).

[35] For discussion of the effects of radiation on real property, see Kabua v. United States, No. 549-81-L (Ct. Cl., filed Sept. 9, 1981); Juda v. United States, No. 172-81-L (Ct. Cl., filed March 16, 1981); notes 3 & 14 *supra*. *See generally Health Effects Hearings, supra* note 18, Vol. II, at 2365-2440 (studies and letters regarding plutonium content of soil samples taken in Utah). Soil samples taken in Utah following the extensive nuclear blast tests conducted nearby in Nevada showed plutonium contents between 2.2 and 3.8 times those found anywhere else in the United States. *Id.* at 2366.

Senator Orrin Hatch (R-Utah) also reports that the mapping of fallout after the Nevada atmospheric tests detailed 26 patterns that deposited varying levels of fallout across Utah and other states. Hatch, *supra* note 19, at 43. Substantial work was required to negate the continuing danger of radiation exposure before natives of the Enewetok Atoll in the Marshall Islands could return. Congress appropriated $12,400,000 for the rehabilitation and resettlement of Enewetok Atoll. Pub. L. No. 95-134, 91 Stat. 1159 (1977).

Radioactive particles have also escaped as byproducts of nuclear warhead assembly. Researchers have discovered plutonium particles in the surface dust of land located downwind from the Rocky Flats Nuclear Weapons Plant in Jefferson County, Colorado. Developers were just beginning home constructions on the site at the time of this discovery. *Plutonium Hazard in Respirable Dust on the Surface of Soil*, SCIENCE, Aug. 6, 1976, at 488 [hereinafter cited as *Plutonium Hazard*]. Because of this soil contamination, the City of Rocky Flats has refused to zone the land for commercial and residential structures. The Good Fund, Ltd. v. Church, Civ. No. 75-M-1111 (D. Colo., filed Oct. 22, 1975). *See also* Hageman, *Nuclear Waste Disposal: Potential Property Value Impacts*, 21 NAT. RESOURCES J. 789, 804-06 (1981).

[36] *See* authorities cited in note 34 *supra*.

[37] *See* text accompanying notes 38-52 *infra*.

No court has ever decided whether nuclear contamination, noise, or concussion sufficiently invade property to constitute a taking.[38] Some courts seem to require invasion by both physical and visible matter before they will declare a taking.[39] One federal court, for example, held that invasion by noise, vibration, and smoke did not constitute a taking.[40] Since noise, smoke, and vibration all involve the movement of particles that may be analogous to radioactive matter, this case casts doubt on a court finding a taking from invasion by nuclear testing. This is especially so since the overwhelming majority of courts still cite this case with approval.[41]

One state has concluded, however, that the intrusion of invisible, airborne fluoride compounds constitutes invasion in a tres-

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[38] In Bartholomae Corp. v. United States, 135 F. Supp. 651 (S.D. Cal. 1955), *aff'd*, 253 F.2d 716 (9th Cir. 1957), the court had the opportunity to determine whether concussion could constitute a sufficient invasion. The plaintiff alleged that because of two nuclear tests 150 miles to the southwest, which violently shook several buildings and cracked some plaster, the government had taken its property. 253 F.2d at 718. The court, however, decided that there was no taking because the damage was minute, thus avoiding any discussion of invasion. 135 F. Supp. at 654. The Ninth Circuit affirmed. 253 F.2d at 118. *See Issues in Nuclear Testing, supra* note 5, at 1000 n.5; *see also* notes 56-57 *infra*, for further discussion of *Bartholomae*.

[39] *E.g.*, Batten v. United States, 306 F.2d 580 (10th Cir. 1962) (taking denied for noise, smoke, and vibration from aircraft), *cert. denied*, 371 U.S. 955 (1963); Nunnally v. United States, 239 F.2d 521 (4th Cir. 1956) (taking denied where concussion and noise from neighboring military proving grounds affected plaintiff's property); Bennett v. United States, 266 F. Supp. 627 (W.D. Okla. 1965) (taking denied where property affected by concussion of sonic booms during six-month period).

[40] Batten v. United States, 306 F.2d 580 (10th Cir. 1962), *cert. denied*, 371 U.S. 955 (1963). The *Batten* court declared: "We are cited to no decision holding that the United States is liable for noise, vibration or smoke without a physical invasion. . . . Absent such physical invasion recovery has been uniformly denied." 306 F.2d at 584. This statement implicitly declares that noise, vibration, and smoke are not forms of physical invasion sufficient to constitute a taking.

[41] *See* Ancarrow v. City of Richmond, 600 F.2d 443, 446 (4th Cir. 1979); Kirk v. United States, 451 F.2d 690, 694 (10th Cir. 1971); Town of East Haven v. Eastern Airlines, Inc., 331 F. Supp. 16, 32 (D. Conn. 1971); Bennett v. United States, 266 F. Supp. 627, 629-30 (W.D. Okla 1965); Schubert v. United States, 246 F. Supp. 170, 172 (S.D. Tex. 1965); Leavell v. United States, 234 F. Supp. 734, 738 (E.D.S.C. 1964); United States v. 3276.21 Acres of Land (Miramar), 222 F. Supp. 887, 890-91 (S.D. Cal. 1963); Avery v. United States, 330 F.2d 640, 645 (Ct. Cl. 1964).

pass action.[42] These fluoride compounds contaminated the forage and water, making the property unfit as pasture.[43] The court declared that a physical invasion would result from the intrusion of visible or invisible matter or even from the intrusion of energy "which can be measured only by the mathematical language of the physicist."[44] Some authority therefore supports the contention that the physical effects of a nuclear blast may so invade surrounding property that they constitute a taking.

The physical effects of a nuclear blast are distinct from smoke, noise, and vibration for two reasons. First, smoke, noise, and vibration generally do not totally destroy the plaintiff's property or entirely deprive the plaintiff of its use.[45] On the other hand, radiation contamination may cause long-term destruction of the use and enjoyment of land.[46] In reviewing earlier cases that had denied taking claims based on smoke, noise, or vibration, one court asserted that the extent of damage and not the means of invasion controls.[47] Consequently, "[w]hat courts have in fact said, when denying recovery for this sort of claim, is that they have not found the interference great enough to meet the 'substantial destruction or deprivation test.' "[48]

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[42] Martin v. Reynolds Co., 221 Or. 86, 94, 342 P.2d 790, 794 (1959), *cert. denied*, 362 U.S. 918 (1960).

[43] Batten v. United States, 306 F.2d 580, 585 (10th Cir. 1962), *cert. denied*, 371 U.S. 955 (1963). In Richards v. Washington Terminal Co., 233 U.S. 546 (1913), where smoke substantially deprived an owner of the use and enjoyment of land, the Court granted compensation. *Id.* at 557-58.

[44] *See* note 14 *supra*.

[45] United States v. Certain Parcels of Land, 252 F. Supp. 319, 324 (W.D. Mich. 1966). Ongoing highway construction adversely affected property owned by a school district. The school board contended that "the noise, vibration, obstruction to sight and vision, dirt and filth coming from said highways . . . are so intense, severe and great as to render the said 'Union High School' ineffective and useless for the purpose of educating students in said facility." *Id.* at 321. The court held that the extent of the injury and not invasion controlled. *Id.* at 324, *citing* Board of Educ. v. Palmer, 88 N.J. Super. 378, 212 A.2d 564 (1965); Thornburg v. Port of Portland, 233 Or. 178, 376 P.2d 100 (1962).

[46] United States v. Certain Parcels of Land, 252 F. Supp. 319, 324 (W.D. Mich. 1966). The court in Batten v. United States, 306 F.2d 580 (10th Cir. 1962), *cert. denied*, 371 U.S. 955 (1963), found that smoke, noise, and vibration neither totally destroyed plaintiffs' property interests nor rendered their land uninhabitable. 306 F.2d at 585. The court implied that if it had found the property to be uninhabitable, it would have declared a taking. *Id.* at 584-85.

[47] United States v. Causby, 328 U.S. 256, 259, 263-67 (1946).

[48] One authority even cites *Causby* for the proposition that liability for tak-

Second, radiation, unlike smoke, noise, or vibration, is inherently dangerous.[49] One recent study links childhood leukemia in southern Utah to fallout from the nuclear detonations in Nevada.[50] Veterans and civilians now claim that radiation exposure around domestic test sites led to the contraction of cancer.[51] Natives of the Marshall Islands also claim that radiation contamination left some of their island property uninhabitable.[52] Smoke, noise, and vibration precedents therefore should not control nuclear testing cases. Courts should find that the physical effects of a nuclear blast constitute a form of invasion upon which an aggrieved landowner may base a taking claim.

II. The Treatment of Separate Aspects of Nuclear Invasion

While the invasion theory outlines a broad standard for obtaining compensation for a taking of property, further inquiry into the specific nature of the injury is necessary to establish the requisite degree and type of invasion. The litigant must analogize specific aspects of nuclear testing injury to precedent from other contexts to determine whether the invasion results in a taking. Nuclear detonations can damage property through noise, concussion, and radiation contamination of air, soil, and water.[53]

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ings depends on whether the government's physical action constitutes a substantial interference with the possession, use, and enjoyment of land. 2 Nichols, *supra* note 32, at § 5.781.

[49] *See Issues in Nuclear Testing, supra* note 5, at 998 n.3; *Nuclear Testing Under the FTCA, supra* note 19, at 1009 n. 22.

[50] Lyon, Klauber, Gardner, & Udall, *Childhood Leukemias Associated with Fallout from Nuclear Testing*, 300 New England J. of Med. 397 (1979). For a detailed summary of the scientific research linking cancer to radiation, see Note, *Radiation Injury and the Atomic Veteran: Shifting the Burden of Proof on Factual Causation*, 32 Hastings L.J. 933, 938-43 (1981).

[51] *See, e.g.*, Allen v. United States, 527 F. Supp. 476 (D. Utah 1981); Appleson, *A-Test Vets, Families Fight Cancer and U.S. Government*, 68 A.B.A. J. 26 (1982). *See generally Health Effects Hearings, supra* note 18, Vol. II, at 387-428 (collected newspaper accounts of fallout causing cancer); Hatch, *supra* note 19.

[52] *See, e.g.*, Kabua v. United States, No. 549-81-L (Ct. Cl., filed Sept. 9, 1981); Juda v. United States, No. 172-81-L (Ct. Cl., filed March 16, 1981).

[53] For example, the February 2, 1951, test at the Nevada Test Site shattered two storefront windows in Las Vegas. H. Rosenberg, *supra* note 18, at 34. In Bartholomae Corp. v. United States, 133 F. Supp. 651 (S.D. Cal. 1955), *aff'd*, 253 F.2d 716 (9th Cir. 1957), the plaintiff claimed that the concussion from

Although analogy to precedents in other contexts indicates that invasion by noise or concussion alone may be insufficient to constitute a taking,[54] water, air, and soil contamination should be sufficient in appropriate cases.[55]

A. Noise and Concussion Affecting the Use and Enjoyment of Land

Only one reported case has explored whether damage to real property from the concussion of a nuclear blast constitutes a taking. In *Bartholomae Corp. v. United States*,[56] the court found no taking because the injury to the property was insubstantial and because the accident was a single, isolated occurrence.[57] Even where substantial damages are involved, however, courts will probably not find a taking from concussion that is not accompanied by contamination.

Indeed, courts will tolerate significant shock and noise without finding a taking. The United States Supreme Court, for example, has refused to declare that the concussion of sonic booms is a form of trespass.[58] A lower federal court denied a taking claim based on the shock of sonic booms.[59] In the latter case, the gov-

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bomb tests caused property damage. In both Kabua v. United States, No. 549-81-L (Ct. Cl., filed Sept. 9, 1981) and Juda v. United States, No. 172-81-L (Ct. Cl., filed March 16, 1981), plaintiffs contend that radiation has so contaminated the plant and fish life on which they depend for food that consumption is dangerous. Radiation contamination has harmed dairy farming and livestock production in areas surrounding the Nevada Test Site. *See generally Health Effects Hearings, supra* note 18, Vol. I, at 521-1403 (testimony of Dan S. Bushnell, attorney for Iron County Sheepman), Vol. II, at 2336-64 (Pendleton report on the accumulation of Iodine-131 in people and milk).

[54] *See* note 34 and accompanying text *supra*.

[55] *See* notes 43-52 and accompanying text *supra*.

[56] 135 F. Supp. 651 (S.D. Cal. 1955), *aff'd*, 253 F.2d 716 (9th Cir. 1957), discussed at note 38 *supra*.

[57] *See* note 38 *supra*. The trial court held that "a single isolated and unintentional act of the United States resulting in damage or destruction of property is not taking in a constitutional sense." Bartholomae Corp. v. United States, 135 F. Supp. 651, 654 (S.D. Cal. 1955), *aff'd*, 253 F.2d 716 (9th Cir. 1957).

[58] Laird v. Nelms, 406 U.S. 797 (1972). The plantiff sued under the Federal Tort Claims Act (FTCA) to recover for damages caused by sonic booms. The Court refused to consider the impact of air waves striking the ground to be a form of invasion. *Id.* at 800. Consequently, the invasion necessary for trespass was lacking. *Id.*

[59] Bennett v. United States, 266 F. Supp. 627 (W.D. Okla. 1965).

ernment intentionally caused the sonic booms as part of a test program.[60] The program ran for six months and generated periodic sonic booms over a major city.[61] The court nonetheless found no taking.[62]

Courts have also found that other types of shock and noise were insufficient to constitute takings. In one case, a federal court denied compensation to a plaintiff who resided next to a military proving ground, despite serious noise and concussion from ongoing test explosions.[63] The court relied on the facts that plaintiff's land suffered no physical damage and that none of the aircraft flew directly over the plaintiff's property.[64] Even where the military fired coastal defense guns over a plaintiff's island resort, the Supreme Court required repeated trespasses over a period of years before it found a taking.[65] In that case, however, the individual invasions did little harm, and only the cumulative effect was substantial enough to create a taking.[66]

These cases indicate that by themselves, concussion or noise caused by nuclear detonations probably will not constitute a taking. One commentator dismally prophesied that, no matter how aggravating noise may be, it can never be the successful basis of a taking claim.[67] Consequently, plaintiffs should focus on

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[60] *Id.* at 628.

[61] *Id.*

[62] *Id.* at 629-30.

[63] Nunnally v. United States, 239 F.2d 521 (4th Cir. 1956).

[64] *Id.* at 534. The court held that "damages which are the incidental result of lawful government action, without any direct invasion of private property, are consequential; they do not constitute a taking under the Fifth Amendment." *Id. Contra* Atwater v. United States, 106 Ct. Cl. 196 (1946). The plaintiffs' property lay next to an Army aerial gunnery range. Although the land sustained no damage and no actual trespass occurred, the court found a temporary taking. *Id.* at 207-08. The court relied on the fact that over half of plaintiffs' land was designated a safety zone and access to it was controlled. *Id.* at 205-07. During the period that the gunnery range operated, the plaintiffs did not visit the property and had no knowledge of the Army's activity on the neighboring land. *Id.* at 206. *Accord* Eyherabide v. United States, 345 F.2d 565 (Ct. Cl. 1965) (temporary taking found where Navy's gunnery range occasionally fired at targets on plaintiffs' land and directly invaded property).

[65] Portsmouth Harbor Land & Hotel Co. v. United States, 260 U.S. 327, 330 (1922).

[66] *Id.* at 330. For earlier cases involving the same parties, see Portsmouth Harbor Land & Hotel Co. v. United States, 250 U.S. 1 (1919); Peabody v. United States, 231 U.S. 530 (1913).

[67] Spater, *supra* note 34, at 1388-89. Spater remarked that "one strongly

radiation contamination in alleging a taking from nuclear testing.

B. Soil, Water, and Air Contamination

Following any nuclear test explosion, the risk always exists that radioactive particles will escape the test area through soil, water, or air contamination.[68] This is true even with underground testing.[69] Contamination that destroys the present use and enjoyment of land should constitute a taking.

Cases involving government water projects in which adverse consequences extended beyond the areas intended to be affected are analogous to nuclear testing cases.[70] In water project cases, courts have held that the overflow of private land by permanent backwater is a taking.[71] Intermittent but inevitable overflows

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suspects that noise alone, no matter how aggravating . . . cannot constitute a taking as defined by the cases; i.e., a displacement of the landowner by a direct or physical invasion of the government." *Id.*

[68] *See Issues in Nuclear Testing, supra* note 5, at 999 n.4, 1001 n.11.

[69] *See id.* at 999 n.4.

[70] Like water projects, nuclear testing may be viewed as a government enterprise. A plaintiff could therefore apply the enterprise theory as well as the invasion theory to his case. *See* note 28 *supra*. Sax proposes this rule:

> [W]hen an individual or limited group in society sustains a detriment to legally acquired existing economic values as a consequence of government activity which enhances the economic value of some governmental enterprise, then the act is a taking, and compensation is constitutionally required; but when the challenged act is an improvement of the public condition through resolution of conflict within the private sector of society, compensation is not constitutionally required.

Sax, *supra* note 10, at 37.

The enterprise theory's merit is unclear since Sax appears to have refuted it in a later article. *See* Sax, *supra* note 28, at 150. However, this did not deter the plaintiff in Penn Central Transp. Co. v. New York City, 438 U.S. 104 (1978), from relying on it. *Id.* at 135.

[71] United States v. Cress, 243 U.S. 316, 328 (1917); North v. United States, 94 F. Supp. 824, 825 (D. Utah 1950). *See also* United States v. Lynah, 188 U.S. 445, 468-70 (1903); Pumpelly v. Green Bay Co., 80 U.S. (13 Wall.) 166, 177-78 (1871). *Cf.* United States v. Kansas City Life Ins. Co., 339 U.S. 799 (1950) (taking found where government permanently raised the level of a river to the high water mark, resulting in an undersurface invasion of land that prevented its drainage and use for farming); United States v. Dickinson, 331 U.S. 745 (1947) (Supreme Court resolved the issue of when a taking by permanent flooding was complete for statute of limitation purposes).

also require compensation.[72]

A plaintiff must establish two elements to prove a taking in a water project case. First, federal waters must invade the property.[73] Second, the invasion must be so permanent that the plaintiff's land is practically destroyed, or the invasion must be so recurrent that an easement is created.[74] Courts should treat radiation contamination like flooding where these two elements are present. Thus, a plaintiff could establish a taking by showing an invasion of his property by federally generated radiation that either practically destroyed it or often recurred.

The flooding cases are particularly analogous to the Marshall Islands situation. The Marshall Islanders allege in their petitions to the Court of Claims that the fallout from several nuclear tests settled on their island atolls.[75] This fallout has so disrupted the use and enjoyment of the land that the island atolls are not fit for habitation and will not be so within the near future.[76]

Nuclear testing has also adversely affected land use in the area surrounding the Nevada Test Site. Recent testimony and

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[72] United States v. Cress, 243 U.S. 316, 328 (1917); North v. United States, 94 F. Supp. 824, 827-28 (D. Utah 1950); Fromme v. United States, 412 F.2d 1192, 1197 (Ct. Cl. 1969).

[73] North v. United States, 94 F. Supp. 824, 825 (D. Utah 1950).

[74] *Id. But see* Stockton v. United States, 214 Ct. Cl. 506 (1977) (single flooding constituted a taking where land was below contour line of a reservoir and the government failed to acquire it as part of a dam and reservoir project).

[75] In Kabua v. United States, No. 549-81-L (Ct. Cl., filed Sept. 9, 1981), the Rongelapese plaintiffs allege that:

> The United States detonated 23 atomic and hydrogen bombs at Bikini Atoll between June 30, 1946 and July 22, 1958 and during that same period, detonated 42 nuclear devices at Enewetak Atoll, also of the Marshall Islands. . . . One of the tests, the 1954 "Bravo" shot, an experimental thermonuclear device, was the largest explosion ever detonated by the United States . . . and was at least 750 times more powerful than the atomic bomb dropped on Hiroshima.
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> . . . .
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> The Department of Energy of the United States government has recognized that Rongelap Atoll was in the radiological fallout areas of the Bravo (February, 1954), Union (April, 1954), and Yankee (April, 1954) tests of Operation Castle carried out at Bikini, and of the Zebra test (May of 1948) (*sic*) of Operation Sandstone carried out at Enewetak.

Plaintiff's petition at 5-6.

Juda v. United States, No. 172-81-L (Ct. Cl., filed March 16, 1981) involves similar allegations. The atoll there involved Bikini, a former nuclear test site.

[76] *See* note 14 *supra*.

evidence given before Congress attributes large numbers of livestock deaths to radiation exposure.[77] Soil samples taken in Utah reveal higher than normal levels of plutonium.[78] Increased health hazards have also made doubtful the safety of residing in some areas around the test site.[79]

Courts have found forms of government invasion other than flooding to constitute takings. The deposit of large amounts of earth from highway projects on private land requires compensation.[80] Similarly, governmental discharge of sewage onto private property requires compensation.[81] Finally, extreme air pollution that results from government activities may constitute a taking.[82]

The present conditions in Rocky Flats, Colorado, exemplify the impact of contamination on the use of property and the potential of contamination to result in takings. The Rocky Flats Nuclear Weapons Plant, a nuclear facility that manufactures and reprocesses component parts for nuclear weapons, is located there. Recent studies have revealed higher than normal levels of plutonium, americium, and uranium in the soil downwind from the plant.[83] Based on the perceived danger from this nuclear contamination, the city halted the construction of homes and commercial structures by denying rezoning requests.[84] The land may serve only agricultural purposes.[85] One developer, whose

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[77] *Health Effects Hearings, supra* note 18, Vol. I, at 521-1403, Vol. II, at 1410-1983, 2469-2624 (testimony, studies, and documents concerning livestock deaths and illness related to nuclear testing); *Low Level Radiation Effects on Health: Hearings of the Subcomm. on Oversight and Investigations of the House Comm. on Interstate and Foreign Commerce*, 96th Cong., 1st Sess. 510-1188 (1979) (material submitted by Dr. Harold A. Knapp) [hereinafter cited as *Low Level Hearings*].

[78] *See* note 35 *supra*.

[79] *Low Level Hearings, supra* note 77, at 1-509; *Health Effects Hearings, supra* note 18, Vol. I, at 1-284, 355-530, Vol. II, at 2042-2336, 2636-2857 (testimony, documents, and studies concerning the radiation exposure of people living near the Nevada Test Site).

[80] 2 NICHOLS, *supra* note 32, at § 6.23[2].

[81] *Id.*

[82] *Id.* at § 6.31. *See also* Richards v. Washington Terminal Co., 233 U.S. 546 (1913); Comment, *Air Pollution Under Theory of Inverse Condemnation*, 15 S. TEX. L.J. 57 (1974).

[83] Hageman, *supra* note 35, at 804-06; *Plutonium Hazard, supra* note 35, at 488.

[84] Hageman, *supra* note 35, at 805.

[85] *Id.*

land has been so restricted, has sued for loss of his property value.[86] Property values are also affected by a Department of Housing and Urban Development requirement that all prospective home buyers receive notice of soil contamination.[87]

By using analogies to government water project cases, courts should find takings where radiation contamination destroys the present use and enjoyment of land. Both the Marshall Islands and Rocky Flats, Colorado, illustrate that radiation contamination can so severely affect property use and value that it is for all practical purposes a taking.

CONCLUSION

One of the asserted purposes of the taking clause is to bar the government from inequitably imposing public burdens upon a few people.[88] Nonetheless, as part of the nuclear testing program, government officials selected isolated areas with sparse populations to bear the burden of harmful fallout.[89] To serve the taking clause's asserted purpose, the government should compensate landowners who have for all practical purposes lost their property because of radiation contamination.

Inverse condemnation suits have succeeded where government-caused flooding was involved.[90] Courts have also awarded compensation where direct overflights of government aircraft were so low and frequent that they destroyed the present use and enjoyment of property.[91] Courts should analogize to these cases and find a taking where radiation contamination destroys the present use and enjoyment of land.

David B. Durrett

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[86] The Good Fund, Ltd. v. Church, Civ. No. 75-M-111 (D. Colo., filed Oct. 22, 1975).

[87] Hageman, *supra* note 35, at 805.

[88] *See* text accompanying notes 6-9 *supra*.

[89] *See* text accompanying notes 18-19 *supra*.

[90] *See* text accompanying notes 70-74 *supra*.

[91] *See* text accompanying notes 29-31 *supra*.