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# All is Number: Mathematics, Divisibility and Apportionment Under Burlington Northern

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# ALL IS NUMBER: MATHEMATICS, DIVISIBILITY AND APPORTIONMENT UNDER *BURLINGTON NORTHERN*

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## I. INTRODUCTION

In *Burlington Northern & Santa Fe Railway Co. v. United States* ("*Burlington Northern*"), the U.S. Supreme Court, *inter alia*, held[1] that under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"),[2] the contamination of the abandoned "Arvin" facility, a portion of which had been leased from several railroads ("Railroads") by the principal owner-operator, Brown & Bryant ("B&B"), was capable of divisibility "apportionment" based on multiplying three factors: (a) time of operation, (b) area owned or leased, and (c) volume and toxicity of waste disposed.[3] In this calculation, the product, which was rounded up to give 6%, was further adjusted for uncertainty by a multiplier of

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1. Burlington Northern and Santa Fe Ry. Co. v. United States, 129 S. Ct. 1870 (2009).

2. Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-07 (2010).

3. *Burlington Northern*, 129 S. Ct. at 1882.

150% to make the Railroads' liability 9%.[4] Since B&B was defunct, liability was never apportioned to B&B.[5] Although the District Court for the Eastern District of California had previously held that the site's "arranger,"[6] Shell Oil Company ("Shell"), should be apportioned 6% of liability based on waste disposal alone, that holding was upheld by the Ninth Circuit but reversed by the Supreme Court on appeal.[7] At the same time, the Supreme Court explicitly affirmed the existing standard for divisibility as set forth in Section 433A of the *Restatement (Second) of Torts* ("Restatement"), and longstanding federal case law.[8] However, in holding that the district court did not abuse its discretion in apportioning liability as it did, the Supreme Court lost an opportunity to correct the district court's methodology *under the Restatement standard* in two respects: (1) the district court's use of multiple theories of apportionment in determining the extent of liability for a single harm, and (2) its use of questionable assumptions in weighing the influence of those theories.

First, the district court broke down a single, but divisible, liability (a harm capable of apportionment) into multiple components.[9] This had never been found appropriate under the *Chem-Dyne* and Restatement standard affirmed by the Supreme Court.[10] In pre-*Burlington* cases, apportionment of a single harm was only held appropriate in a few instances.[11] Even then, this only occurred when *one* theory of divisibility was alleged, because that increased both the reliability of the underlying data and the likelihood of a proportional

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4. *Id.*

5. *See id.* at 1876; *see also* United States v. Atchison, Topeka & Santa Fe Ry. Co., No. CV-F-92-5068 OWW, No. CV-F-96-6226 OWW, No. CV-F-96-6228 OWW, 2003 U.S. Dist. LEXIS 23130 at *242-50 (E.D. Cal. July, 14, 2003).

6. *See* 42 U.S.C. § 107(a)(3) (2010); 42 U.S.C. § 9607(a)(3) (2010) (imposing liability on "any person who . . . arranged for disposal or treatment . . . of hazardous substances." Such persons are also termed "generators" in common CERCLA terminology).

7. *Burlington Northern*, 129 S. Ct. at 1880.

8. *Id.* at 1880-1882.

9. *Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *259-61.

10. *See* United States v. Chem-Dyne Corp., 572 F. Supp. 802 (S.D. Ohio 1983); RESTATEMENT (SECOND) OF TORTS, § 433A (1965).

11. *See In re* Bell Petroleum Servs., Inc., 3 F.3d 889, 894 (5th Cir. 1993); Coeur d'Alene Tribe v. Asarco, Inc., 280 F. Supp. 2d 1094, 1120 (D. Idaho 2003); United States v. Broderick Inv. Co., 862 F. Supp. 272, 276 (D. Colo. 1994); Hatco Corp. v. W.R. Grace & Co., 836 F. Supp. 1049, 1087-88 (D.N.J. 1993); *rev'd on other grounds*, 59 F.3d 400 (3d Cir. 1995).

relationship between a defendant's contribution to the harm and the harm itself.[12] Where multiple theories (such as the three "factors" invoked by the district court) are used, there is a greater chance that a court will find itself simply weighing the equities to arrive at a fair balance among the defendants; an exercise more properly associated with contribution *allocation* than divisibility *apportionment.*

Second, the district court employed a flawed method of calculating the Railroads' apportioned share of liability. The district court multiplied fractions, or percentages, assigned to *all three* theories of divisibility together to arrive at an apportioned share for the Railroads. Since multiplication of fractions only yields incrementally smaller fractions, this method may not account for all the harm, and therefore may create a serious inequity by leaving the plaintiff with an artificially-created *unapportioned* share. Even if the district court had relied upon multiplying independent variables such as area by time to arrive at an apportioned share for the Railroads, multiplication of those factors would have been inappropriate under the facts presented in *Burlington Northern.* Multiplication of area by time is only reasonable where those variables are proportional to the harm, which was not the case at the Arvin site.

This paper first outlines the pre-*Burlington Northern* divisibility defense established over nearly three decades of federal litigation, and analyzes the jurisprudence underlying both theoretical divisibility and apportionment of a single harm under the Restatement. Next it examines two questionable aspects of the district court's *Burlington Northern* method of apportionment: the use of multiple theories, and the multiplication of percentages to arrive at a final apportionment of liability. Lastly, it suggests alternative methods to resolve the differences among the three theories of apportionment.

## II. *PRE-BURLINGTON NORTHERN* DIVISIBILITY

### *A. Background*

In 1980 Congress passed CERCLA without any language addressing joint and several liability, although liability under Section 107(a) of CERCLA was always strict.[13] As a result, federal courts

12. *See infra* pp. 36-47.

13. While liability under CERCLA was always strict, that is, no-fault, it was the federal courts - with the tacit approval of Congress - which imposed joint and

were forced to define the common-law parameters of CERCLA liability, which they did in a series of cases setting the standard of strict, joint, and several liability that still prevails.[14] Specifically, federal courts turned to the Restatement to flesh out CERCLA liability based on common-law tort principles.[15] In 1986, when CERCLA was reviewed and amended by the Superfund Amendments and Reauthorization Act (SARA), Congress again chose not to mandate joint and several liability.[16] Yet, during debate on the bill, Representative Dingell said that nothing in the legislation was intended to change the application of the uniform federal rule of joint and several liability enunciated in the *Chem-Dyne* case."[17]

Due to clear Congressional approval of the *Chem-Dyne* scheme of joint and several liability, rulings in nearly every circuit stem from the Restatement;[18] either through the direct adoption of the Restatement formulation or through the adoption of one of the major cases which themselves were based on the Restatement.[19] Section

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several strict liability based on the principles of the Restatement. *See* 42 U.S.C. § 9607(a) (2010); *see also Bell Petroleum*, 3 F.3d at 894.

14. *See Bell Petroleum*, 3 F.3d at 895 (stating that "[a]lthough joint and several liability is commonly imposed in CERCLA cases, it is not mandatory in all such cases. Instead, Congress intended that the federal courts determine the scope of liability"); *see also* United States v. Alcan Aluminum Corp., 990 F.2d 711 (2d Cir. 1993); United States v. Alcan Aluminum Corp., 964 F.2d 252 (3d Cir. 1992); O'Neil v. Picillo, 883 F.2d 176, 178 (1st Cir. 1989); United States v. Monsanto Co., 858 F.2d 160, 171-173 (4th Cir. 1988); *Chem-Dyne Corp.*, 572 F. Supp. 802.

15. RESTATEMENT (SECOND) OF TORTS, § 433A (1965).

16. U.S. v. Brighton, 153 F.3d 307, 329 (6th Cir. 1998).

17. *Id.*; *See* 132 CONG. REC. 29,716, 29,737 (daily ed. Oct. 8, 1986) (statement of Representative Dingell, explaining that "nothing in this legislation is intended to change the application of the uniform Federal rule of joint and several liability enunciated in the Chem-Dyne case" and that "the standard of potentially responsible parties at Superfund sites is strict, joint and several, unless the responsible parties can demonstrate that the harm is divisible," and statement of Representative Glickman indicating that SARA follows the result in Chem-Dyne and "traditional and evolving principles of common law").

18. *See e.g.*, Chem-Nuclear Sys., Inc. v. Bush, 292 F.3d 254 (D.C. Cir. 2002); United States v. Hercules, Inc., 247 F.3d 706 (8th Cir. 2001); *Alcan*, 990 F.2d 711; *Bell Petroleum*, 3 F.3d 889; *Alcan*, 964 F.2d 252; United States v. Meyer, Inc., 889 F.2d 1497 (6th Cir. 1989); *O'Neil*, 883 F.2d at 178; *Monsanto*, 858 F.2d at 171-73; United States v. Newmont USA Ltd., No. CV-05-020-JLQ, 2008 U.S. Dist. LEXIS 82922, at *141 (E.D. Wash. Oct. 7, 2008); Washington v. United States, 922 F. Supp. 421 (W.D. Wash. 1996); *Chem-Dyne*, 572 F. Supp. 802.

19. *See, e.g.*, *Bell Petroleum*, 3 F.3d 889; *Alcan*, 990 F.2d 711; *Alcan*, 964 F.2d 252; *Chem-Dyne Corp.*, 572 F. Supp. 802. Note that, although a Third Restatement

433A of the Restatement states: "(1) damages for harm are to be apportioned among two or more causes where (a) there are *distinct* harms, or (b) there is a reasonable basis for determining the contribution of each cause to a *single* harm; (2) damages for any other harm cannot be apportioned among two or more causes"[20] Section 433A of the Restatement has been adopted in some form by every federal court that has addressed this issue, including the Supreme Court in *Burlington Northern*, and imposes joint and several liability in CERCLA cases unless a party is able to prove that: (1) distinct harms exist at a site, or (2) a single harm is present but that it is theoretically divisible.[21]

If a party can prove that distinct harms exist at a site, liability for the harm is apportioned according to each party's contribution. Alternatively, if the party can prove that a single yet theoretically divisible harm exists, the party must also prove a *reasonable basis for apportionment* before liability will be apportioned.[22] In *Bell Petroleum,* the U.S. Circuit Court of Appeals for the Fifth Circuit described single, yet divisible, harms as "not so clearly . . . severable into distinct parts, [yet] still capable of division upon a reasonable and rational basis, and of fair apportionment *among the causes responsible* . . . ."[23] The burden of showing both a reasonable basis of division *and* that the harm is capable of apportionment rests on the party seeking to avoid joint and several liability.[24]

The main reason divisibility has been difficult to establish is that when a party seeks to show distinct harms, or a harm capable of division, the harm at issue is the damage caused *to the environment.*[25]

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has since been issued, the federal courts continue to cite the RESTATEMENT (SECOND) OF TORTS as governing in the CERCLA context. For example, the First Circuit, in a 1989 CERCLA case, stated explicitly that the rule adopted by the majority of courts, and the one we adopt, is based on the RESTATEMENT (SECOND) OF TORTS. *See O'Neil*, 883 F.2d at 178.

20. RESTATEMENT (SECOND) OF TORTS § 433A (1965) (emphasis added).

21. A third argument sometimes made is that a defendant's waste, even when mixed with other wastes at the site, did not contribute to the harm at the site. *See Alcan*, 964 F.2d at 268.

22. *Bell Petroleum*, 3 F.3d at 895.

23. *Id.* (emphasis added).

24. *Chem-Dyne Corp.*, 572 F. Supp. at 810.

25. *See* O'Neil v. Picillo, 883 F.2d 176, 179 (1st Cir. 1989) (noting that where wastes of varying (and unknown) degrees of toxicity and migratory potential

Thus, in proving that the harm at a Superfund site is divisible, a defendant must take into account a number of factors relating not just to the contribution of a particular defendant *to* the harm, but also to the *effect* of that defendant's waste on the environment, including the "relative toxicity, migratory potential, degree of migration or 'synergistic capacities' of the hazardous substances at issue."[26] Even if a party's waste stream can be separately accounted for, its effect on the site and on other parties' wastes at the site must also be taken into account.[27] Thus, even where a given defendant can prove through documentary or testimonial evidence the precise quantity and nature of the waste it contributed to a Superfund site, it may have difficulty establishing that the harm is capable of reasonable apportionment unless that defendant can also show a clear correspondence between that evidence and a resulting but divisible *harm*.

In general, prior to *Burlington Northern*, although the majority of defendants raising divisibility defenses were unsuccessful, there were three separate theories for apportioning a single harm that defendants used in their defense: (1) the *volume* or quantity of waste disposed ("volumetric apportionment"); (2) the *geographical* location of waste at a site ("geographic apportionment"); or (3) the *temporal* duration of a defendant's association with a site.[28]

Volumetric apportionment has frequently been asserted as a divisibility theory. Parties arguing volumetric apportionment often attempt to prove that the quantity of waste each party contributed to the site is measurable *and* commensurate to the amount of harm caused.[29] There are two general problems that defendants using this method have encountered. First, they were typically unable to

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commingle, it simply is impossible to determine the amount of environmental harm caused by each party).

26. United States v. Agway, Inc., 193 F. Supp. 2d 545, 548 (N.D.N.Y. 2002).

27. *See* United States v. Monsanto Co., 858 F.2d 160, 172 (4th Cir. 1988) (explaining that "[c]ommon sense counsels that a million gallons of certain substances could be mixed together without significant consequences, whereas a few pints of others improperly mixed could result in disastrous consequences.").

28. *See infra* pp 7-9.

29. *See, e.g., In re* Bell Petroleum Serv., Inc. , 3 F.3d 889, 904 (5th Cir. 1993) (claim based on volume of disposal by series of plant owners of chromium from same plant over time); Coeur d'Alene Tribe v. Asarco, Inc., 280 F. Supp 2d 1094, 1120 (D. Idaho 2003) (deciding claim based on volume of mine tailings containing similar levels of same contaminants).

precisely quantify the volume of waste contributed,[30] and secondly, they were usually unable to show a proportional correlation between their waste volume and the amount of harm caused.[31] Due to these problems, this type of divisibility defense has, more often than not, been unsuccessful.[32]

Geographic apportionment is also a common basis of divisibility claims. A party generally argues that if it were able to identify an area of the site or facility where its waste was deposited and could show

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30. *See, e.g.*, *O'Neil*, 883 F.2d at 179 (holding unreliable transporter records insufficient to establish reasonable basis for volumetric apportionment); Chesapeake & Potomac Tel. Co. v. Peck Iron & Metal Co., 814 F. Supp. 1269, 1279 (E.D. Va. 1992) (finding battery count insufficient for volumetric apportionment due to varying amounts of lead in the batteries).

31. *See, e.g.*, *Monsanto Co.*, 858 F.2d at 170-72 (holding that harm could not be apportioned based on volume without information regarding chemical interaction); United States v. Manzo, 279 F. Supp. 2d 558, 572 (D.N.J. 2003) (rejecting volume of lead as apportionment theory based on insufficient evidence, including "independent factors such as relative toxicity and migratory potential."); *Agway, Inc.*, 193 F. Supp. 2d at 551-52 (finding no volumetric apportionment since defendant offered no evidence concerning relative toxicity, migratory potential, degree of migration and synergistic capacities of the hazardous substances); United States v. Vertac Chem. Corp., 966 F. Supp. 1491, 1504 (E.D. Ark. 1997) (rejecting volumetric apportionment based on number of barrels because where "hazardous substances are commingled, a defendant cannot rely on merely volumetric evidence.").

32. *See, e.g.*, *O'Neil*, 883 F.2d at 179 (holding markings on several hundred of 10,000 barrels and unreliable transporter records insufficient to establish reasonable basis for volumetric apportionment); *Monsanto Co.*, 858 F.2d at 170-72 (due to commingling of waste, harm could not be apportioned based on volume without information regarding the effects of the interaction of the various chemicals that were spilled at the site); *Manzo*, 279 F. Supp. 2d at 573 (rejecting amount of lead contamination from defendants' property as compared to total lead at the site for purposes of volumetric apportionment theory based on insufficient evidence, including "independent factors such as relative toxicity and migratory potential."); *Agway, Inc.*, 193 F. Supp. 2d at 551-52 (holding no reasonable basis for volumetric apportionment based on wastes sent to site, since defendant offered no evidence concerning effect of commingling of waste at the site, including relative toxicity, migratory potential, degree of migration and synergistic capacities of the hazardous substances.); *Vertac Chem. Corp.*, 966 F. Supp. at 1504 (rejecting volumetric apportionment claim based on production capacity or number of barrels because where "hazardous substances are commingled, a defendant cannot rely on merely volumetric evidence"); *Chesapeake*, 814 F. Supp. at 1279 (holding battery count could not be used for volumetric apportionment due to numerous variables, including that various types of batteries accepted at the site contained different amounts of lead).

that its waste only contributed to harm related to that area, then that party should only be liable for those costs incurred in the cleanup of that location.[33] Prior to *Burlington Northern,* these arguments generally failed for two reasons: first, it is difficult to prove that waste deposited on a specific area of a site was not moved or did not migrate to another area;[34] and second, because it is the *harm* that must be apportioned and not the geographic parameters of the site itself, if evidence of disposal is incomplete or inconclusive or a defendant's liability is premised on factors other than disposal, the harm may be regarded as not capable of division geographically.[35] A

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33. *See, e.g.*, Chem-Nuclear Sys., Inc., v. Bush, 292 F.3d 254, 261 (D.C. Cir. 2002) (considering claim that defendant's eighty drums were geographically divisible); United States v. Brighton, 153 F.3d 307, 318-320 (6th Cir. 1998) (considering claim by Township of geographic apportionment based on disposal of waste in discrete portion of landfill); United States v. Rohm & Haas Co., 2 F.3d 1265, 1280 (3d Cir. 1993), *rev'd on other grounds* United States v. E.I. Dupont de Nemours and Co., 432 F.3d 161 (3d Cir. 2005) (considering geographic divisibility claim based on proof that 10% of site area owned by defendant); Durham Mfg. Co. v. Merriam Mfg. Co., 294 F. Supp. 2d 251, 267 (D. Conn. 2003) (considering geographic divisibility claim by site owner-operator arguing its plume was distinct from another plume emanating from neighboring facility); United States v. Newmont USA Limited, No. CV-05-020-JLQ, 2008 U.S. Dist. LEXIS 82922, at *141, 158 (E.D. Wash. Oct. 7, 2008) (considering claim that harm divisible based on limited "footprint" of mining).

34. *See, e.g.*, *Brighton*, 153 F.3d at 318-320 (disapproving Township's geographic apportionment claim based on disposal of waste in discrete portion of landfill, because defendant failed to show waste had not been moved at the site, lack of information concerning disposal of waste by individual residents, and evidence of maintenance performed by the Township on the whole of the landfill); *Durham Mfg.*, 294 F. Supp. 2d at 267 (rejecting geographic divisibility claim by site owner-operator who argued its plume was severable from another plume emanating from neighboring facility, because plumes commingled in groundwater and harm was, therefore, not divisible); Washington v. United States, 922 F. Supp. 421, 430 (W.D. Wash. 1996) (rejecting geographic divisibility claim because waste commingled and defendants argued harm was divisible based on distinct harms); *See also* United States v. Broderick Inv. Co., 862 F. Supp. 272, 276 (D. Colo. 1994).

35. *See, e.g.*, *Rohm & Haas Co.*, 2 F.3d at 1280 (finding that proof of 10% of site ownership by defendant not sufficient by itself to establish divisible harm); *Chem-Nuclear Sys.*, 292 F.3d at 255 (rejecting claim that waste from 80 drums was geographically divisible because defendant had not proven it was not liable for additional waste at the site); *Newmont*, 2008 U.S. Dist. LEXIS at *158 (rejecting Newmont's claim that harm was divisible based on its limited "footprint" of mining in the early "exploration" period of operation for failure of proof and, possibly, as inconsistent with finding that Newmont was liable as an "operator");

third possible theory, the temporal theory of divisibility based on relative periods of ownership or operation, has rarely been asserted and requires a very specific set of facts that are not often present at CERCLA sites.[36]

It is significant that, in the few pre-*Burlington Northern* cases where the divisibility defense were successful, only *one* of the above theories was relied upon in each case. For example, in *Bell Petroleum*, where a series of plant owners discharged similar waste containing the same single hazardous substance, chromium, over varying periods of time, divisibility of a single harm was found based on *volumetric* apportionment alone.[37] Similarly, in *Peck Iron & Metal* to *Coeur D'Alene Tribe v. Asarco Inc.*, mining waste, including tailings, were disposed of by a number of mining operations leaving much of the Coeur D'Alene basin in Idaho contaminated with cadmium, lead, and zinc.[38] Evidence showed that all tailings from the area contained *relatively similar levels* of cadmium, zinc, and lead, with differences from mine to mine being insignificant. Based on these facts, the court found a "reasonable relationship" existed between the *volume* of waste produced alone and the harm done at the site.[39] In *United States v. Broderick Investment. Co.*,[40] the defendant argued that the harm was divisible based on *geographic* apportionment because the site consisted of two lots, each with its own soil and groundwater contamination which had not become commingled. There the court held the defendant jointly and severally liable only for the harm done by the plume emanating from its own lot.[41] Finally, in a suit by W.R. Grace for recovery of response costs incurred by Grace in cleaning up a site formerly owned by Hatco

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*Manzo*, 279 F. Supp. 2d at 574 (holding ownership of a portion of the site by party also liable as a transporter insufficient to establish harm capable of geographic apportionment).

36. *See* Hatco Corp. v. W.R. Grace & Co., 836 F. Supp. 1049, 1087-88 (D.N.J. 1993), *rev'd on other grounds*, 59 F. 3d 400 (3d Cir. 1995) (apportioning liability based on time period of operation for portions of site used jointly by two defendants).

37. 3 F.3d 889, 904 (5th Cir. 1993).

38. 280 F. Supp 2d 1094, 1120 (D. Idaho 2003); 814 F. Supp. 1269 (E.D. Va. 1992).

39. *Coeur d'Alene Tribe,* 280 F. Supp. 2d at 1120.

40. 862 F. Supp. 272, 276 (D. Colo. 1994).

41. *Id.* at 277.

Corporation,[42] the court held each party liable for contamination on those portions of the site exclusively used by one company or the other, on the theory that they constituted *distinct* harms, but with regard to those portions of the site used jointly, apportioned liability primarily based on *time period* of operation.[43]

It is no accident that, where a single harm was held capable of apportionment, these cases all involved only *one* persuasive theory of divisibility.[44] That is because to establish divisibility of a single harm, a defendant must show both that the harm is theoretically divisible and that it is capable of reasonable apportionment. To do so, both the causes and the harm must be measurable in such a way that the first is uniformly proportional to the second. In most CERCLA factual scenarios where divisibility is colorable, there will be only one way to do that. Although they are inexorably linked, theoretical divisibility and apportionment are discussed separately below.

### *B. Theoretical Divisibility*

A finding of divisibility of a single harm (as opposed to "distinct" or separate harms)[45] requires a threshold determination that, as a

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42. 836 F. Supp. 1049, 1088 (D.N.J. 1993), *rev'd on other grounds*, 59 F.3d 400 (3d Cir. 1995).

43. *Id.* at 1087-88. The court stated: "This method is satisfactory because it directly links the manufacturing and waste disposal activities with the harm to the environment." *Id.* However, note that in apportioning harm by time period of operation, the court took into consideration "other factors" such as "the chemical properties and migratory potential of the various substances at the site and natural events such as surface water run-off due to precipitation and seasonal fluctuations in the water table," including going so far as to calculate "overall percentages of responsibility for each category of contaminant." *Id.* at 1088.

44. *In re* Bell Petroleum Servs., Inc., 3 F.3d 889, 904 (5th Cir. 1993) (finding divisibility based on volumetric apportionment alone); *Coeur d'Alene Tribe*, 280 F. Supp. at 1120 (finding divisibility based on volume of waste alone); *Broderick Inv. Co.*, 862 F. Supp. at 276 (finding divisibility based on geographic apportionment alone); *Hatco Corp.*, 836 F. Supp. at 1088 (apportioning liability based on time period of operation with regard to portions of site used jointly).

45. The difference between a harm that is "distinct" and a single harm capable of apportionment is not always clear. RESTATEMENT (SECOND) OF TORTS § 433A (1965) states that "(1) Damages for harm are to be apportioned among two or more causes where (a) there are distinct harms, or (b) there is a reasonable basis for determining the contribution of each cause to a single harm." RESTATEMENT (SECOND) OF TORTS § 433A cmts. b, c give the following as examples of "distinct"

matter of law, the harm is theoretically divisible.[46] But, in order to show that a single harm is *theoretically* divisible, a defendant raising the defense must first have a *theory* of divisibility that can provide a reasonable basis for apportionment of the harm. Is the harm, for example, capable of apportionment on the basis of volume of waste contributed, area of contamination owned, or time period of operation? To answer that question, a court adhering to the principles of *Chem-Dyne* and the Restatement can be expected to be receptive only to the one theory, if it exists, that provides a proportional correspondence between cause and harm. Multiple theories indicate

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harms: (1) two defendants wound the plaintiff simultaneously, one shooting him in the arm, the other in the leg: each wound is a separate harm; (2) two defendants operating the same plant at different times pollute a stream; each has caused a separate harm, limited in time; (3) the plaintiff is hurt by one tortfeasor, then treated by a negligent physician; the earlier tortfeasor is liable for the entire damage, but the physician is only liable for the harm due to his own negligence; (4) the plaintiff breaks one leg as a result of the negligence of one tortfeasor, and later a second tortfeasor breaks the other: each broken leg is a separate harm; (5) the plaintiff is struck by an automobile driven by one tortfeasor, fracturing his skull; another driver then negligently runs over his leg, breaking it; the first is liable for both fractures, the second only for the broken leg. *See* RESTATEMENT (SECOND) OF TORTS § 433A cmts. b, c illus. 1, 2. In *Broderick Inv. Co.*, the defendant had argued that there were *separate and distinct* geographic areas of contamination. Although the court did not specifically find that the harm was divisible into separate harms, it appears to have concluded that the two contaminant plumes did in fact constitute distinct harms. *See Broderick Inv. Co.*, 862 F. Supp. at 277. But note that in *Bell Petroleum*, which presented a fact scenario similar to the Restatement's example, above, of *distinct* harms consisting of a stream polluted by two successive owners of the same plant, the court found the polluted stream and aquifer presented a *singular* harm divisible based on volumetric apportionment. *Bell Petroleum*, 3 F.3d at 909 (Parker, J., dissenting) (". . . the majority is correct that the *single* chromium harm . . . is the sort theoretically capable of apportionment") (emphasis added).

46. *See* United States v. Burlington Northern, 129 S. Ct. 1870, 1881; *Bell Petroleum,* 3 F.3d at 896; United States v. Chem-Dyne Corp., 572 F. Supp. 802, 811 (S.D. Ohio 1983); *see also* Bruce S. Gelber, *Alive and Well: CERCLA Liability After Burlington Northern*, SUPERFUND AND NAT. RESOURCE DAMAGES LITIG. COMM. NEWSL, (American Bar Association) March 2010, at 6 ("To succeed in apportioning liability for a single harm, a defendant must show both that (1) the harm is theoretically capable of apportionment, and that (2) there is sufficient evidence in the record to allow a court to apportion liability for such harm and the resulting costs.") (citing United States v. Hercules, Inc., 247 F.3d 706, 718 (8th Cir. 2001)).

uncertainty, where the connection between cause and harm can become increasingly attenuated through complicating factors.[47]

Initially, it is important to recognize that, as a matter of law, most harms are neither separable into distinct harms nor, if singular, capable of apportionment.[48] Examples given in the Restatement of single harms that are not capable of apportionment are death, a broken leg, a single wound, destruction of a house by fire, or the sinking of a barge.[49] "By far the greater number of personal injuries, and of harms to tangible property," the Restatement continues, "are thus normally single and indivisible."[50] In such cases, "if the defendant is liable at all, he is liable for the entire indivisible harm which he has caused."[51]

However, the Restatement states that there are certain harms that "while not so clearly marked out as severable into distinct parts, are still capable of division upon a reasonable and rational basis, and of fair apportionment among the causes responsible."[52] Examples of such singular harms capable of apportionment given by the Restatement are: (1) destruction of a farmer's crop by cattle—divisible among the owners of the cattle on the basis of the number

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47. *See, e.g.*, United States v. Monsanto Co., 858 F.2d 160, 170-72 (4th Cir. 1988) (finding that due to commingling, no apportionment based on volume without information regarding the effects of the interaction of the various chemicals disposed); Durham Mfg. Co. v. Merriam Mfg. Co., 294 F. Supp. 2d 251, 267 (D. Conn. 2003) (rejecting geographic divisibility claim based on commingling of groundwater contaminant plumes); United States v. Manzo, 279 F. Supp. 2d 558, 573 (D.N.J. 2003) (rejecting volumetric apportionment based on insufficient evidence, including "independent factors such as relative toxicity and migratory potential."); United States v. Agway Inc., 193 F. Supp. 2d 545, 551-52 (N.D.N.Y. 2002) (finding no basis for volumetric apportionment since no evidence as to relative toxicity, migratory potential, degree of migration and synergistic capacities of the hazardous substances); Washington v. United States, 922 F. Supp. 421, 430 (W.D. Wash. 1996) (rejecting geographic divisibility claim because waste was commingled); Chesapeake & Potomac Tel. Co. v. Peck Iron & Metal Co., 814 F. Supp. 1269, 1279 (E.D. Va. 1992) (holding battery count insufficient for volumetric apportionment due to numerous variables).

48. *See* RESTATEMENT (SECOND) OF TORTS § 433A , cmt. 1, § 2 (1965) ("Certain kinds of harm, by their very nature, are normally incapable of any logical, reasonable, or practical division. . . .By far the greater number of personal injuries, and of harms to tangible property, are . . . normally single and indivisible.").

49. *Id.*

50. *Id.*

51. *Id.*

52. *Id.* at cmt. d § 1.

owned by each, because of "the reasonable assumption that the respective harm done is proportionate to that number;"[53] (2) pollution of a stream by two or more factories—apportioned among the owners of the factories on the basis of the respective quantities discharged by each, because "the interference with the plaintiff's use of the water may be treated as divisible in terms of degree;"[54] (3) ten sheep killed by five dogs—divisible on the basis of ownership of a certain number of dogs by each defendant; (4) flooding of a farmer's land from an irrigation ditch—divisible on the basis of the volume of water contributed by each tortfeasor; and (5) the pollution of a downstream riparian owner's water by oil—divisible on the basis of the percentage of oil contributed by each polluter.[55] In all these examples, a direct connection between a harm and its causes depends upon one theory of divisibility alone, and on the proportionality of the causes to the harm: that is, similarity among the causes and homogeneity of the harm.

For instance, in the first example above, the harm is deemed divisible on the basis of the number of errant cows alone.[56] This assumes that each cow caused the same amount of damage; that is, there is a direct correlation between the number of cows and the harm done to the field. But what if the harm had not been caused just by cattle, but by a whole menagerie? Say barn doors are left open by the farmer's neighbors and sheep, cows, dogs, horses, pigs, chickens, cats, *and* cows wander into his field; each of which has its own unique way of inflicting harm upon his crop to varying degrees. The *harm* is still a trampled crop, although it may or may not remain uniform, but would the number of animals by itself still provide a reasonable *measure* of that harm? It seems unlikely.

Similarly, the second example above assumes that the "pollution" all be of the same kind. Why? Because the Restatement reasons that

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53. *Id.*

54. *Id.*

55. *Id.*; *see* RESTATEMENT (SECOND) OF TORTS, § 433A, subsection 1, cmt. d, illus. 3, 4, 5 (1965).

56. *Id.* at cmt. d ("[W]here the cattle of two or more owners trespass upon the plaintiff's land and destroy his crop, the aggregate harm is a lost crop, but it may nevertheless be apportioned among the owners of the cattle, on the basis of the number owned by each, and the reasonable assumption that the respective harm done is proportionate to that number.")

the harm caused by the pollution is "divisible in terms of degree."[57] But when one speaks of *degrees* or quantities of pollution, without more, one is not distinguishing between *types* of pollution: the assumption of the Restatement's drafters must have been that only one kind of pollution was involved, where quantity alone would provide a reasonable correlation between the actions of the defendants and the harm.[58] Should one tortfeasor have contributed, say, PCBs, while the other discharged heated, non-contact cooling water (also a "pollutant"), it is clear that volume of pollution alone would not necessarily correspond to the harm caused by each tortfeasor.[59] Thus, it appears that for a defense of divisibility to be successful, the causes of the harm must all be similar and therefore quantifiable, capable of being reduced to a number or percentage by which the harm, which itself must also be uniform, can be measured.

The Restatement's Illustrations under Comment (d) further demonstrate that divisibility of a single harm is only appropriate when there is sufficient proportionality of cause to harm to conclude that the only significant variable is one of "degree." In Illustration three (example three above), basing divisibility on the number of dogs owned by each defendant requires "that all of the dogs are of the same general size and ferocity."[60] But what if the dogs were of the same number and ownership but of varying breeds and temperament? Shouldn't such evidence also be taken into account? Perhaps yes, but would the number of dogs owned by each tortfeasor *alone* still provide a basis for divisibility? Probably not. In Illustrations four and five (examples four and five above) the harm is caused by water

57. *Id.* ("[W]here two or more factories independently pollute a stream, the interference with the plaintiff's use of the water may be treated as divisible in terms of degree, and may be apportioned among the owners of the factories, on the basis of evidence of the respective quantities of pollution discharged into the stream.")

58. For example, the notes to section 433A of the Restatement indicate that this hypothetical is based in part on a case in which three oil companies independently caused pollution of a creek used by rice farmers for irrigation. The "pollutant" consisted of "salt water," no distinction being made by the court among the kinds of pollution contributed by each company. *See* Phillips Petroleum Co. v. Hardee, 189 F.2d 205, 208 (5th Cir. 1951). The releases originated from "salt water disposal systems" maintained by the companies, although the plaintiffs alleged the salt water contained "other contaminating and injurious substances." *Id.* at 207-08.

59. *See* 40 C.F.R. § 302.4 (2010) (describing Polychlorinated biphenyls (PCBs) as listed hazardous substances); 33 U.S.C. § 1362(6) (2010) (listing "heat" as a pollutant).

60. RESTATEMENT (SECOND) OF TORTS, § 433A, subsection 1, cmt. d, illus. 3.

in the first instance, and by "oil" in the second. Since in both examples the type of harm caused by all tortfeasors was the same (water in the first case, oil in the second), the volume contributed by each provided a reasonable basis for apportionment. However, let's assume a third scenario, where one tortfeasor discharges water and the other oil, so that the resulting harm is caused by neither water nor oil but by an emulsion. Would volume alone still provide a "reasonable basis of apportionment" making the singular harm (pollution by oil and water) divisible? Probably not, since the harm, even if uniformly distributed, could no longer be apportioned based simply on the amount of oil *or* water released. This should demonstrate the difficulty of making theoretical divisibility determinations in CERCLA cases (which are usually much more complex than the Restatement's illustrations) involving multiple contaminants of varying toxicity, interactive potential, and migratory capability.

The district court in *Burlington Northern* glossed over the threshold question of theoretical divisibility; concluding only that "a 'single harm' may be divisible because it is possible to discern the degree to which different parties contributed to the damage."[61] Although the court of appeals directly addressed this question,[62] it merely concluded that "[t]here is no dispute here on the first, purely legal question—whether the harm is capable of apportionment."[63] The Supreme Court merely adopted this finding, noting only that "both the [d]istrict [c]ourt and the [c]ourt of [a]ppeals agreed that the harm... although singular, was theoretically capable of apportionment."[64]

However, one might wish that the Supreme Court had examined this question more closely. As should be apparent from the

61. *Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *238.

62. United States v. Burlington Northern Co., 502 F.3d 781, 801 (9th Cir. 2007) (emphasis in original) (citation omitted) ("We inquire, *first*, whether the particular harm at issue in the case is theoretically capable of apportionment . . . That question is one of law, reviewed de novo. *Second*, we review for clear error whether the defendant submitted evidence sufficient to establish a reasonable basis for the apportionment of liability . . . ."). Note that the court of appeals further clarified that the harm (the contamination and/or its cleanup costs) was "conceptually" allocable, but only "with perfect information," which the court ultimately found lacking.

63. *Id.*

64. Burlington Northern v. United States, 129 S. Ct. 1870, 1881 (2009).

Restatement's examples, not all harms are theoretically capable of apportionment just because, as the district court stated, "it is possible to discern the degree to which different parties contributed to the damage."[65] Those circumstances where apportionment is appropriate, according to the Restatement, are more limited: apportionment is only appropriate when both the causes and the harm can all be accounted for and bear a proportional relationship to one another. In such cases, to prove a reasonable basis for apportionment, no "heroic labor" is required—the facts themselves would seem to demand such treatment.[66] Conversely, where conditions appropriate for apportionment are *not* present, no amount of effort would appear sufficient to the task. This would be like attempting to hammer a square peg into a round hole, unless that effort was really equitable *allocation* masquerading as divisibility *apportionment*. Since theoretical divisibility is a question of law, one hopes that greater attention would be paid to this threshold matter by courts in future "divisibility" cases. As one writer states:

> . . .according to both the Second Restatement and the Supreme Court, the apportionment inquiry is a two-step process. If Burlington Northern is understood to imply that courts have misunderstood the nature of the second step, that understanding warrants re-examination of the first step. The requirement that a harm be 'theoretically capable of apportionment' must have some substantive content, or neither the Second Restatement nor the Supreme Court would have bothered articulating it.[67]

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65. *Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist, LEXIS at *238.

66. *See* Burlington Northern and Santa Fe Ry. Co. v. United States, 129 S. Ct. 1870, 1885-86 (2009) (Ginsburg, J., dissenting) (describing the district court's sua sponte "equitable apportionment analysis" as "an heroic labor," since neither the Railroads nor Shell had, in the words of the district court, "offered helpful arguments to apportion liability." That is, the issue had not been developed or argued before the district court. For that reason, Justice Ginsburg would have remanded the case to the district court to "give all parties a fair opportunity to address that court's endeavor to allocate costs.").

67. Steve C. Gold, *Dis-Jointed? Several Approaches to Divisibility after Burlington Northern*, 11 VT. J. ENVTL. L. 307, 334 (2009).

### C. Apportionment

To establish divisibility, a defendant asserting the defense must prove that a singular harm is reasonably capable of apportionment.[68] A defendant must show a correspondence between the causes that give rise to liability,[69] which are capable of division, and the harm, which is not (unless the harm is divisible into *distinct* harms, it is only capable of *apportionment*). This relationship can be illustrated as follows. Where $C_x$ represents the causes of a defendant asserting the defense, $C_n$ represents *all other* actions or causes, and $H$ represents a single harm (whether regarded as the contamination itself or EPA's costs of cleaning it up),[70] the harm is theoretically divisible by applying a percentage corresponding to the following fraction:

$$\frac{C_x}{C_x + C_n}$$

In that case, a single but theoretically divisible harm, $H$, capable of reasonable apportionment into $H_a$ and $H_b$, could be depicted as in Figure 1 below, where $x$ and $n$ are expressed in units of causation

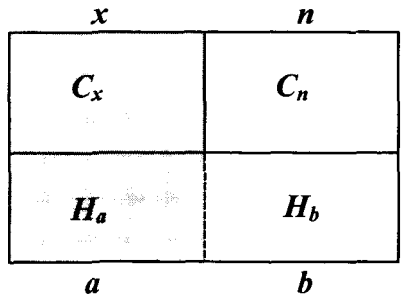
68. *See* RESTATEMENT (SECOND) OF TORTS § 433A (1965) ("Damages for harm are to be apportioned among two or more causes where (a) there are distinct harms, or (b) there is a reasonable basis for determining the contribution of each cause to a single harm.").

69. It should be emphasized that proof of "causation" (in the traditional tort sense) is not required in CERCLA cases, where liability is statutory and strict, if not always joint and several. *See In re* Bell Petroleum Servs,, Inc., 3 F.3d 889, 893 (5th Cir. 1998); Amoco Oil Co. v. Borden, Inc., 889 F.2d 664, 670 n. 8 (5th Cir. 1989) ("[I]n cases involving multiple sources of contamination, a plaintiff need not prove a specific causal link between costs incurred and an individual generator's waste."); *See also* United States v. Alcan Aluminum Corp., 990 F.2d 711, 721 (2d Cir. 1993); United States v. Alcan Aluminum Corp., 964 F.2d 252, 266 (3d Cir. 1992). A better term might be "nexus," that is, a connection between the defendant and the site which, if proved, establishes the elements of proof required for strict liability. *See, e.g.*, United States v. Burlington Northern Co., 502 F.3d 781, 796-97 (9th Cir. 2007) (discussing "causation" in its ill-fated opinion). For simplicity, the term "cause" is used here to mean those actions by a party (or, in the case of a site "owner," its legal status), which make it liable under section 107(a) of CERCLA, 42 U.S.C. § 9607 (2010).

70. *See infra* n. 78.

(such as numbers of barrels, or acres owned), ***a*** and ***b*** in units of apportioned harm (such as acres of a lost crop, or damages proportional to the harm), and the ratio $x : n = a : b$.

Figure 1




This figure illustrates several key points regarding apportionment. First, in order to apportion a single harm, both the causes and the harm must be *capable of measurement.*[71] As demonstrated by the Restatement's examples, measurement requires both *quantitative* consistency in the measure used and *qualitative* uniformity in the thing being measured: the causes, collectively, and the harm must each be capable of representation by common units of measure of uniform significance. This is essential in order to ensure proportionality of cause to harm.

For example, in measuring sugar, one cannot use incompatible measures. So many pounds of sugar cannot be added to so many liters of sugar to get a meaningful total—all the units of measure must be of the same type. Similarly, the medium measured must be of uniform quality. It cannot consist of sugar in varying forms (cubes, powder, granules) or contain impurities which are unknown or unevenly distributed. Each unit of measurement must have equal "weight" or significance. The environmental impact of a gallon of water cannot reasonably be compared to that of a gallon of crude oil. Therefore, to provide a reasonable means of apportionment, each unit of measure (with regard to the causes) must reflect similar actions by

71. The two measures need not necessarily be the same. In the figure above, for example, the defendant's actions ($x$) correspond to portion of the total harm ($a$); but $x$ may be one unit of measure, say cows, whereas $a$ may be another, say acres of a field trampled by cows.

all defendants, and (with regard to the resulting damage) the same type and degree of harm.

This is apparent if we return to the Restatement's examples. In example one above, the harm, a despoiled field or a portion of one, is presumably capable of measurement by acres or say, numbers of ears of corn lost. Either way, it is capable of apportionment by units of measure that will consistently reflect both the degree and type of harm caused. Similarly, the number of cows alone is assumed to provide a consistent measure of the causes contributing to the harm. Each cow is considered to have caused the same amount and type of harm. In example two, the type of "pollution" is presumed to be all of the same kind, and therefore the causes can be reasonably divided according to the volume of "pollution" contributed by each factory alone. The harm, interference with the plaintiff's "use" of the water polluted, may be measured by the quantity of water lost or by a damages figure proportional to it. In example three (the Restatement's Illustration 3), the number of dogs alone provides a consistent measure since all the dogs are presumed to have contributed equally to the harm. Similarly, the harm may be measured by the number of dead sheep without any distinction of quality or value being made among the sheep. Finally, in examples four and five (Illustrations four and five), the quantity of water or oil released alone is considered a reasonable measure on which to base apportionment because the oil and water are each presumed uniform in composition and destructiveness.

Second, Figure 1 shows that in apportioning a divisible harm, *all the harm must be accounted for.* Apportionment cannot leave a phantom unapportioned share for the innocent plaintiff to absorb (thus, $C_x + C_n$ in the figure above must account for all the harm, $H$). As the Supreme Court stated in *Burlington Northern*: "[u]nder the Restatement, when two or more persons acting independently caus[e] a distinct or single harm for which there is a reasonable basis for division *according to the contribution of each*, each is subject to liability only for the portion of the total harm that he has himself caused."[72] Therefore, in order for a harm to be divisible, 100% of the

72. Burlington Northern v. United States, 129 S. Ct. 1870, 1881 (2009). (emphasis added) (quoting RESTATEMENT (SECOND) OF TORTS § 433A, 881 (1965); also citing William M. Prosser, HANDBOOK OF THE LAW OF TORTS, pp. 313-314 (St. Paul, West Pub. Co. 4th ed. 1971).

harm must be ascribed to its various causes.[73] Under the Restatement's Section 433A, where apportionment is appropriate, one defendant should not be held jointly and severally liable for separate harms or that portion of a single but divisible harm *which is attributable to another tortfeasor or cause.* In other words, a harm is divisible when there is a reasonable basis for determining the contribution of *each cause* to a single harm.[74] The Restatement provides that "[t]he rules stated in this Section apply whenever *two or more causes have combined* to bring about harm to the plaintiff, and *each* has been a substantial factor in producing the harm."[75] The court in *Saporito* cited § 433A(1)(b) when it confirmed that "when there is a single harm, apportionment is appropriate *only if there are multiple causes.*"[76]

A corollary to the aforementioned would be that no one party can be theoretically liable for *all* of a *singular* harm (that is, 100% liable) because that would render the harm incapable of apportionment. Under § 433A(1)(b), there must be "a reasonable basis for determining the contribution of *each cause* to a single harm"—otherwise the harm is not capable of apportionment.[77] § 433A's Comment i, subsection (2), states: "harms which are normally incapable of any logical, reasonable, or practical division include *where either cause would have been sufficient in itself to bring about the result.*"[78] This concept may not apply, however, in the case of *distinct* harms. For example, the Restatement contains an Illustration of two distinct harms where a plaintiff is struck by one car which fractures his skull, then another that breaks his leg; the first driver is

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73. *Burlington Northern*, 129 S. Ct. at 1881.

74. RESTATEMENT (SECOND) OF TORTS, § 433A(1)(b)(2) (1965) (emphasis added).

75. Id. at § 433A cmt. a (emphasis added).

76. United States v. Saporito, 684 F. Supp. 2d 1043, 1061- 62 (N.D. Ill. 2010) (emphasis added).

77. RESTATEMENT (SECOND) OF TORTS, § 433A (1)(b)(2) (1965) (emphasis added).

78. *Id.* at subsection (2), cmt. i (emphasis added); *See* Gold, *supra* note 68, at 346-54 ("proper judicial treatment of multiple sufficient causes in the context of CERCLA liability should result in joint and several liability"); Gelber, *supra* note 47, at 7 ("in cases where each party's contribution to the contamination on its own would have been sufficient to warrant the response action taken by the United States, the harm is not capable of being divided along any rational lines.").

held liable for both fractures but the second only for the broken leg.[79] This indicates that one defendant could be liable for 100% of a *divisible* harm (that is, two *distinct* harms) while another is not.[80]

Furthermore, apportioned liabilities should never *exceed* 100%. Apportioning a single harm is like dividing a pie; one may not want to leave any in the pan unapportioned/uneaten, but one also cannot create pieces that are not there in the first place or give the same piece to two or more people. Should apportioned liabilities overlap so they total more than 100% it would be the same as determining that, with regard to the redundant portion, two or more defendants are jointly and severally liable for that portion—thus defeating the whole purpose of apportionment. Therefore, the portion of a single harm which is *not* caused by a defendant asserting divisibility must be caused by other tortfeasors or some other intervening cause or causes.[81] Under the Restatement, these can be innocent causes (such as a force of nature, innocent conduct of the plaintiff or a third party, or a pre-existing condition) or contributory negligence by the plaintiff.[82] Consequently, the underlying assumption is that if a single harm *is* divisible and a defendant can show it is only responsible for a portion of that harm, then *some party or parties or other causes are responsible for the rest*, whether or not a judgment can be obtained from them. Therefore, apportionment should never leave the plaintiff with an *unapportioned* share, even though under the Restatement, a tort plaintiff may be found responsible for certain shares apportioned to innocent causes or contributory negligence[83] for which the defendant is not responsible.[84]

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79. RESTATEMENT (SECOND) OF TORTS § 433A subsection 1, cmt. c, illus. 2 (1965) ("Successive injuries").

80. *See id. But see* Reichold v. United States Metals Ref. Co., 655 F. Supp. 2d (D.N.J. 2009).

81. *See generally* RESTATEMENT (SECOND) OF TORTS § 433A cmts. e-f § 1 (1965).

82. *Id.* Note, however, that many of these common-law tort principles of the Restatement, tied to "causation," do not easily transfer to the CERCLA statutory, no-fault context, in which "negligence" and "causality" in the traditional tort sense are not relevant. Therefore, for example, the concept of "innocent" causes as a defense to joint and several liability is not applicable in CERCLA cases, although a parallel exists in the "third-party" and "act of God" defenses of CERCLA §107(b).

83. Note that contributory negligence is inapplicable in the strict liability CERCLA context, although there is a parallel in the event of counterclaims against the United States based on alleged federal agency liability. *See* 42 U.SC. § 107(a)(3)(2010), 42 U.S.C. § 9607(b) (2010); *see also* William B. Johnson,

Third, unless the government's costs can be shown to reasonably correspond to a *distinct* portion of the harm,[85] apportionment of a *singular* harm can entail ascribing a fraction or percentage to an individual defendant's liability. In order to do so, *both the numerator and denominator* ($C_x$ and $C_x + C_n$, respectively, in the example above) in addition to being comprised of common units of measure of the same importance, must be reasonably capable of proof. In most cases, particularly multiple "arranger" cases,[86] one or the other will not be capable of proof.[87] For example, for an "arranger" party alleging divisibility based on volume, the fraction representing that divisible apportionment, $D_v$, can be written:

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*Liability of federal government under § 107(a) of Comprehensive Environmental Response, Compensation, and Liability Act*, 127 A.L.R. Fed. 511, §8 (1995).

84. The question of whether or not the plaintiff should be forced through the application of divisibility to absorb so-called "orphan" shares, that is, shares attributable to insolvent or defunct responsible parties, was not directly addressed by the Supreme Court in Burlington Northern. *See Burlington Northern*, 129 S. Ct. 1870. RESTATEMENT (SECOND) OF TORTS § 433A cmt. h (1965) gives as an example of an inequitable application of divisibility: leaving the plaintiff to recover from an insolvent or deceased defendant. The EPA's "orphan share" policies were designed to allow government negotiators the discretion to grant limited past cost credit for certain "orphan" shares as an incentive to settlement, precisely because a jointly and severally liable defendant is not legally entitled to such a credit. Yet, the Supreme Court did not scruple to leave the plaintiff government to cover most of its costs, which the Court appears to have attributed either to the non-liable Shell or the defunct "orphan" B&B. (Note that "orphan" shares attributable to insolvent defendants should not be confused with the concept of unapportioned shares discussed in this article: an "orphan" share is a share that can be quantified and attributed but is uncollectible; an unapportioned share is a portion of the harm that cannot be attributed to any specific cause.) *See* STEVEN A. HERMAN, ENVIRONMENTAL PROTECTION AGENCY, INTERIM GUIDANCE ON ORPHAN SHARE COMPENSATION FOR SETTLORS OF REMEDIAL DESIGN/REMEDIAL ACTION AND NON-TIME CRITICAL REMOVALS, June 3, 1996.

85. This would occur where divisibility is based on separate and distinct harms, as opposed to a single harm capable of apportionment. *See* RESTATEMENT (SECOND) OF TORTS § 433A (1965) cmt. b § 1.

86. That is, multiple "generator" cases, where the responsible parties would be liable under § 107(a)(3) of CERCLA, which imposes liability on "any person who . . . *arranged* for disposal or treatment . . . of hazardous substances . . . at any facility . . . containing such hazardous substances." 42 U.S.C. § 9607(a)(3) (2010) (Emphasis added).

87. *See* Gold, *supra* note 68, at 332 (citing RESTATEMENT (SECOND) OF TORTS § 433A) cmt. d §§ 1(1965)).

$$D_v = \frac{V_x}{V_x + V_n}$$

where $V_x$ represents the volume of waste contributed by that party, and $V_x + V_n$ represents the total volume of waste disposed of by *all* responsible parties. Where *either* $V_x$ or $V_n$ cannot be established with certainty, no "reasonable basis for apportionment" can be proven even where a single harm is *theoretically* capable of apportionment. One example can be found in the case of *O'Neil v. Picillo*, where alleged divisibility based on the number of drums sent to a site by generator or "arranger" defendants was rejected because it was impossible to say whether or not more had been contributed by each defendant.[88] A *numerator* for each defendant could not be established with any certainty. Similarly, where the total volume disposed cannot reasonably be determined, as where disposal records are incomplete or missing, the *denominator* applicable to all defendants also cannot be determined.

On the other hand, with regard to owner-operators, geographic or temporal evidence regarding divisibility may be determined relative to total site area or time in operation with relative certainty—although such measures may have no relevance at all to generator/transporter liability.[89] As an example, divisibility based on area, $D_a$, could be written:

$$D_a = \frac{A_x}{A_x + A_n}$$

This requires both that the site area "owned" by the party alleging the defense, $A_x$, and the total site area, $A_x + A_n$, be capable of proof.

88. 883 F.2d 176. 181-83 (1st Cir. 1989).

89. Liability under CERCLA § 107(a) is limited to certain classes of defendants: current "owner/operators" of contaminated "facilities" under § 107(a)(1); owner/operators "at the time of disposal" under § 107(a)(2); "generators" (sometimes called "arrangers") under § 107(a)(3); and "transporters" to sites "selected by such persons" under § 107(a)(4). 42 U.S.C. §§ 9607(a)(1) – (a)(4) (2010). Due to differences of proof, a distinction is often made between "generator/transporter" or "owner/operator" responsible parties.

Since "owner" liability is strict,[90] such a showing might be relatively easy for a site "owner," whereas the same proof as regards a "generator" responsible party could be extremely imprecise or subject to numerous complicating factors. The same could be said of time: an "owner/operator" attempting to prove the numerator and denominator in the following equation, where $D_t$ is the percentage of time in operation,

$$D_t = \frac{T_x}{T_x + T_n}$$

might have no difficulty establishing the numerator, the precise time of its ownership or operation, $T_x$, relative to total time in operation, $T_x + T_n$, whereas such a measure might have no bearing on the liability of a "generator" defendant who may have sent various types of waste to a site over a long period of time but sporadically and in varying quantities. Thus, it should be obvious that a major difficulty in establishing divisibility is presented by cases that involve different *classes* of responsible parties. Divisibility in an "owner" case, such as the *Burlington Northern* case (the Supreme Court having absolved the only generator, Shell, of liability), may be easier to establish than in a case involving multiple responsible parties which include *both* owner/operators and generator/transporters since a common unit of measure will be difficult to find in such cases.

Even more problematic is the question of *proportionality*: qualitative uniformity among the causes of the harm as well as across the harm itself. Even where an "owner" alleging divisibility can show the precise acreage owned or time in operation, this may be meaningless as a template for apportionment unless those units of measure are uniformly related to the harm (as where production records indicate uniform disposal practices over time of the same contaminant).[91] Therefore, even where a numerator and denominator can be proven as to a *single* theory, the resulting fraction may still not provide a reasonable basis for apportionment because qualitative uniformity across both the causes and the harm may be difficult or

90. *See* CERCLA § 107(a)(1) (2010), 42 U.S.C. § 9607(a)(1) (2010) (imposing no-fault liability on facility "owners" and "operators").

91. *See In re* Bell Petroleum Servs., Inc., 3 F.3d 889, 903 (5th Cir. 1993).

impossible to establish. Where a volumetric theory is alleged, for example, "variable toxicity, variable mobility, and potential interactions among the different chemicals in the mix" may make it "unreasonable to simply assume that volume is a reasonable proxy for harm."[92] The same could be said with regard to theories of area and time. Mobility of contaminants could just as easily doom a theory of divisibility based on area as on volume, and temporal divisibility may be impossible to establish in the face of intermittent disposal, as well as commingled and chemically interactive or degradable contamination over time.

Finally, in finding a measure of the *harm* in CERCLA cost-recovery actions, there is often a question as to whether the "harm" is the environmental degradation that results from the actions of the defendants or the costs to the government of cleaning it up.[93] In *Burlington Northern*, the Ninth Circuit examined this question by postulating three views of the tort concept of "harm" in the statutory CERCLA context: (a) the initial "disposal," (b) the site "contamination" itself, and (c) the costs of remediating the contamination. The Ninth Circuit concluded that, "[i]t is most useful for purposes of determining divisibility to view the 'harm' under CERCLA as the contamination traceable to each defendant."[94] The cost of cleanup, the court went on, is "analogous to the damages recovered in a tort suit," not the injury.[95] It appears, therefore, that for costs to act as a surrogate for the harm, they must be proportional to it. However, many costs of cleanup at Superfund sites are not proportional to the harm addressed, and for that reason may not provide an adequate measure of the harm for divisibility purposes.[96] Certain costs, for example, may be incurred despite the extent, volume, *or* toxicity of the contamination; such as costs of drilling off-

92. *Id.*

93. *See* Gelber, *supra* note 47, at 3.

94. United States v. Burlington Northern & Santa Fe Ry. Co., 502 F.3d 781, 798 (9th Cir. 2007).

95. *Id.*

96. *See* Gelber, *supra* note 47, at 7 ("Even if a defendant can prove its contribution to the contamination, it may be difficult to divide the costs. For example, defendants will have trouble establishing a reasonable basis for apportioning site-wide costs—such as costs of investigation and remedy development efforts—because such fixed costs normally are not proportionate to the degree of contamination." (citing United States v. Alcan Alum. Corp., 97 F. Supp. 2d 248, 274–75 (N.D.N.Y. 2000), *aff'd*, 315 F. 3d 179 (2d Cir. 2003)).

site monitoring wells to detect migration of a contaminant plume in groundwater.[97] Thus, even where some costs may be proportional to the harm, others (such as investigative costs, certain indirect costs, and remedy selection costs) may *not* be, since they would have been incurred as a result of the defendants' actions whether the harm was divisible or not and no matter what remedial measures were required.[98]

## III. DIVISIBILITY AFTER *BURLINGTON NORTHERN*

### *A. Has The Law Of CERCLA Divisibility Changed?*

In a word, no.[99] As mentioned above, in its opinion in *Burlington Northern,* the Supreme Court affirmed the district court's holding

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97. *Id.* (stating that "[d]efendants will have trouble establishing a reasonable basis for apportioning . . . costs of investigation and remedy development efforts.")

98. *See, e.g.,* United States v. Bell Petroleum Servs., Inc., 64 F.3d 202, 206 (5th Cir. 1995) (holding that even though court previously ruled design and construction costs of alternate water supply system were unrecoverable as inconsistent with the National Contingency Plan (NCP), ruling did not apply to costs of focused feasibility study for the same work); Landsford-Coaldale Joint Water Auth. v. Tonolli Corp., 4 F.3d 1209, 1218-19 (3d Cir. 1993) (monitoring and evaluation costs are recoverable if there is a reasonable risk, even if it may not materialize, that defendant's actual or threatened release would contaminate property); Dedham Water Co. v. Cumberland Farms Dairy, Inc., 889 F.2d 1146, 1157-58 (1st Cir. 1989) (holding that response costs, including investigative costs, are recoverable even though defendant's contamination did not physically migrate to and in fact contaminate plaintiff's wells); Colorado v. Idarado Mining Co., 735 F. Supp. 368, 371 (D. Colo. 1990) (holding defendants jointly and severally liable for the costs of state's investigation); Artesian Water Co. v. Gov't of New Castle County, 659 F. Supp. 1269 (D. Del. 1987), aff'd, 851 F.2d 643 (3d Cir. 1988) (holding county liable for Artesian's monitoring and evaluation expenses, even if Artesian incurred no further response costs cognizable under CERCLA); United States v. Wade, 577 F. Supp. 1326, 1333 n.4 (E.D. Pa. 1983) (holding costs "spent on investigating, monitoring, testing, and evaluating" the site "traceable to the wastes of virtually any party" as a matter of law).

99. *See* United States v. Iron Mountain Mines, Inc., No. 91-0768-JAM-JFM, 2010 WL 1854118 at *6 (E.D. Cal. May 5, 2010) (order denying defendants' motion for reconsideration) ("Despite Defendants efforts to argue that Burlington Northern established new law regarding apportionment, Plaintiffs are correct that Burlington Northern does not constitute a change in law as required for reconsideration. Burlington Northern simply reiterated the law as established in 1983 by Chem-Dyne, and then examined the record to resolve a factual question of whether the record supported apportionment."); *see also* Ashley II of Charleston, L.L.C. v. PCS Nitrogen, No. 2:05-cv-2782-MBS, 2010 WL 3893599, at *41

that, of the three responsible parties, Shell (a generator), B&B (the majority owner-operator), and the Railroads (minor owner-operators), the Railroads were responsible for 19% of the geographic area, 45% of the time of disposal, and 66.6% (two-thirds) of the principal contaminants at the site.[100] Multiplying these together yielded around 6%.[101] Perhaps somewhat uncomfortable with this result, which, after all, apportions a *miniscule* share to the Railroads relative to any of the three factors taken alone, the district court then applied an uncertainty factor of 50% (in effect, a multiplier of 150%) to bring the Railroads' share to 9%.[102] Thus the Railroads, found to be responsible for 19% of the site area, 45% of the period of operation of the site, and at least two-thirds of the waste disposed of on their *own* property, were ultimately held responsible for only 9% of the total harm. Since the principal site owner-operator, B&B, was defunct, and the Supreme

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(D.S.C. Sept. 30, 2010) ("The court concurs with the *Iron Mountain Mines* court that *Burlington Northern* did not change the law with regard to divisibility, but merely recognized a reasonable basis for apportionment based on the facts of a particular case.")

100. There is some question as to whether the district court intended its 2/3 multiplier for waste volume/toxicity to apply to site-wide contamination or just the Railroad parcel. *See* United States v. Atchison, Topeka & Santa Fe Ry. Co., No. CV-F-92-5068 OWW, No. CV-F-96-6226 OWW, No. CV-F-96-6228 OWW, 2003 U.S. Dist. LEXIS 23130 at * 259-60, ¶ 489 (E.D. Cal. July, 14, 2003).

101. *Id.* at ¶¶ 488-89 (highlighting the district court's calculations regarding the Railroad's share of liability). The Railroad parcel was found to consist of 0.9 acres of the entire site area of 4.7 acres, or 19% of the site area (rounded down from 19.1%). The court found the Railroads' parcel was leased for 13 years of a total of 28 years of operation. Note that elsewhere in the opinion, *see, e.g.*, ¶476, this period is 29 years, which would yield 44.8%, whereas 13 divided by 28 gives 46.4%. But in any case, the court concluded that the lease period was 45% of total time period of operation. The court then applied its 2/3 multiplier for waste/toxicity, discussed in more detail infra (that is, .19 x .45 x 2/3, which yields 5.7%), to get "the relative figure of 6%." The court then concluded that "[a]llowing for calculation errors up to 50%, the Railroads under no theory of release of contaminants can be liable for more than 9% of the total Site CERCLA response costs . . . ." *Id.* at ¶ 489. What the court meant by "calculation" errors is open to speculation: it seems unlikely that arithmetical mistakes alone could account for such a large margin of error. Yet the court did in fact apply a 150% multiplier to bring its 6% to 9%, just one percent conveniently shy of the 10% the court also concluded was the upper bound of the contribution of releases on the Railroad parcel to "the *volume* or *mass* of the overall site contamination." *Id.* (emphasis added).

102. Burlington Northern & Santa Fe Ry. Co. v. United States, 129 S. Ct. 1870, 1882 (2009).

Court held that the only other viable defendant, Shell, was not liable as an "arranger,"[103] the plaintiff United States government (in effect, the U.S. taxpayers) was left to absorb the vast majority of costs expended in cleaning up the Site.[104]

While the district court's calculations as to the time period of operation and percentage of property owned by the Railroads are fairly straightforward, the court's use of a two-thirds multiplier for hazardous substances releases is shrouded in mystery. In all of the court's lengthy, 191-page amended opinion, that included, according to the Ninth Circuit, eighty pages of factual findings,[105] the only rationale for this conclusion appears in one sentence, the conclusion itself: "[e]stimates are that these two chemicals [Nemagon and dinoseb] contributed to 2/3 of overall Site contamination."[106] It is unclear whose estimates those were. Nemagon and dinoseb were two of the three principal chemicals of concern released at the Site, the other being Shell's soil fumigant, "D-D." Nemagon and dinoseb were attributed to releases on the Railroad parcel, but they were *also* released on the B&B parcel.[107] Inexplicably, the court excluded Shell's D-D from its conclusions regarding releases on the Railroad parcel. Yet, as the Ninth Circuit pointed out, the record showed that "[a]ll three chemicals were on the Railroad parcel at some time;" leading that court to term the district court's decision to use a two-thirds multiplier a "basic factual error."[108] Indeed, the district court's findings of fact clearly show that D-D "rigs," "nurse tanks," and "bobtails," from which D-D leaks and spills regularly occurred, were all parked at various times on the Railroad parcel.[109]

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103. *Id.* at 1880.

104. *See Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at * 115, ¶ 287 ("In total, EPA has spent at least $7,809,683.46 . . . analyzing and remediating the Site, not including interest . . . ."). Judgment was entered for the United States against the Railroads in the amount of $702,871.51 plus interest, as well as a declaratory judgment for the United States against the Railroads for 9% of future costs. *Id.*, at *273.

105. United States v. Burlington Northern & Santa Fe Ry. Co., 502 F.3d 781, 802 (9th Cir. 2007).

106. *Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *259, ¶ 488.

107. *Id.* at *21-22, ¶47, 51.

108. *Burlington Northern*, 502 F.3d at 804.

109. *Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *17-18, ¶¶26-41.

Moreover, the court found that the "*volume* of hazardous substances releasing activities on the B&B property is a least ten times greater than any Railroad parcel releases," leading to the conclusion that "based on the considerable evidence of the relative levels of activity and number of releases on the two parcels, the Railroad parcel could not have contributed to more than 10% of the *volume or mass* of the overall site contamination."[110] Since the district court found that releases on the Railroad parcel were responsible for only 10% of the *volume* of site contamination, its use of a two-thirds multiplier for hazardous substance releases attributable to the Railroads implies either that it regarded the Railroad parcel releases requiring remediation (which it concluded, despite its *contra* factual findings, were limited to Nemagon and dinoseb) to be site-wide and much more toxic than those on the B&B parcel, or the court intended the two-thirds multiplier to apply only to the Railroad parcel on the theory that there was no cross-migration of those contaminants to the B&B parcel. However, the district court did not say which it believed, and it is unclear whether either view is supported by the factual record.[111]

Whichever the district court intended, the Supreme Court adopted the district court's two-thirds multiplier in its decision, stating that the district court had concluded that "only spills of two chemicals, Nemagon and dinoseb (not D-D), substantially contributed to the contamination that had *originated* on the Railroad parcel and that those two chemicals had contributed to two-thirds *of the overall site contamination* requiring remediation."[112] Therefore, the Supreme Court appears to have accepted that the two-thirds multiplier represented the contribution of releases from the Railroad parcel, for which the Railroads were deemed responsible, to site-wide

110. *Id.* at *259-60, ¶¶ 488-89 (emphasis added).

111. *See, e.g., Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at ¶¶ 239-51 (finding that "EPA detected 1,2-DCP [a component of D-D] at approximately 1200 parts per billion (ppb), greatly in excess of the MCL of 5 ppb" in groundwater. *Id.* at *97-98, ¶ 246. However, it appears that the primary risk to drinking water supplies may have been posed by "DBCP" migrating in the groundwater. DBCP is a constituent of Nemagon. The court found that DBCP, "due to its toxicity" in "very small quantities . . . in the low parts per billion, could ruin drinking water supplies." *Id.* at *74, ¶ 190. Thus, the Railroad's releases might have been regarded as more toxic than the B&B parcel releases if Nemagon had not also been released on the B&B parcel. But the record shows otherwise).

112. *Burlington Northern*, 129 S. Ct. at 1882 (emphasis added).

contamination. It is certainly plausible that the Supreme Court reached the conclusion that the district court found the Railroad releases to be twice as harmful as the B&B releases by taking both volume *and* toxicity into consideration. Therefore, the better reading of the district court's opinion may be that the two-thirds multiplier was intended to represent the percentage of "overall site contamination," including both soil and groundwater contamination, attributable to releases from the Railroad parcel, as the Supreme Court itself may have believed.[113]

Although the district court's approach to apportionment was eccentric, it must be stressed that the Supreme Court in *Burlington Northern* did not make new law by affirming that approach. Rather, the Court simply ruled that the record before the district court was sufficient to support it.[114] At the same time, as if to emphasize the narrowness of its holding, the Supreme Court explicitly reaffirmed the existing legal standard for CERCLA joint and several liability, citing favorably decisions from the First, Third, Fourth, Fifth, Sixth, Eighth, and District of Columbia Circuits, which themselves had reaffirmed that standard.[115] The Court emphasized that the proper standard for divisibility comes from the Restatement (Second) of Torts, stating that "[n]ot all harms are capable of apportionment. . . CERCLA defendants seeking to avoid joint and several liability bear the burden of proving that a reasonable basis for apportionment exists."[116] The Court cited the seminal opinion of *United States v. Chem-Dyne*, noting that the *Chem-Dyne* approach has been fully

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113. *Id.*

114. *Id.* at 1881 (the question before the Supreme Court was "whether the record provided a reasonable basis for the district court's conclusion that the Railroads were liable for only 9% of the harm caused by contamination at the Arvin facility," the Court stating "we conclude that the facts contained in the record reasonably supported the apportionment of liability." *Id.* at 1882-83.) Note that, to buttress its holding that the record supported the district court's apportionment, the Supreme Court also cited evidence from the district court's opinion that the spills which occurred on the Railroads' parcel "contributed to no more than 10% of the total site contamination," and also observed that had the district court "limited its apportionment calculations to the amount of time the Railroad parcel was in use and the percentage of the facility located on that parcel, it would have assigned the Railroads 9% of the response costs." *Id.* at 1883. Thus the court does not appear to have explicitly affirmed one apportionment method over another.

115. *Id.* at 1881.

116. *Id.*

embraced by various federal appeals courts.[117] Divisibility, even after *Burlington Northern,* thus remains a heavy burden for responsible parties under Section 107 of CERCLA. *Burlington Northern* did not change the basic standard for divisibility under existing CERCLA case law and the Restatement. Furthermore, because the Supreme Court held that the only party to the suit found liable under CERCLA's "arranger" provisions, Shell, was *not* liable, it is important to recognize that the Court's divisibility holding applied only to the Railroads.[118] That is, its divisibility holding is even further limited in scope: it only concerns "owner/operator" liability under CERCLA Section 107(a)(1).[119]

Courts deciding CERCLA "divisibility" cases subsequent to *Burlington Northern* have cited the case only to re-affirm the legal standard for divisibility established by *Chem-Dyne.*[120] Defendants' motions for partial summary judgment as to divisibility have been denied in other cases subsequent to *Burlington Northern* in light of the intensely factual nature of the divisibility issue, and so that the

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117. *See id.* at 1880; *see also* United States v. Alcan Aluminum Corp., 964 F.2d 252, 269 (3d Cir. 1992).

118. *Id.* ("Having concluded that Shell is not liable as an arranger, we need not decide whether the court of appeals erred in reversing the district court's apportionment of Shell's liability for the cost of remediation.")

119. *Id.*

120. *See, e.g.*, Reichhold v. United States Metals Ref. Co., 655 F. Supp. 2d 400, 448 (D.N.J. 2009) (quoting *Burlington Northern* as stating the "seminal opinion" on apportionment is *Chem-Dyne* and the "starting point for divisibility of harm analyses in CERCLA cases" is Section 433A of the Restatement). However, note that *Reichhold* appears wrongly decided under the standard set by the Supreme Court in *Burlington Northern.* In *Reichhold,* the current owner Reichhold sued a former owner-operator under CERCLA Section 107 for certain costs Reichhold incurred cleaning up the site. The court, citing *Burlington Northern,* in effect split the baby by "apportioning" half the costs to each party because, the court stated, either party's actions alone would have caused the entire harm. *Reichhold,* at 448-49. Since under the Restatement this is an indivisible harm, this case would appear to be flawed based on that question alone (see RESTATEMENT (SECOND) OF TORTS § 433A cmt. 1 § 2 (1965) "joint and several liability is imposed where either cause would have been sufficient in itself to bring about the result"); yet the court compounded its error in "apportioning" liability by splitting costs equally between the parties based on what can only be called equitable considerations, contrary to the Supreme Court's admonition to avoid confusing apportionment with equitable allocation. *Id. See Burlington Northern,* 129 S. Ct. at 1882, n. 9 ("equitable considerations play no role in the apportionment analysis").

evidentiary record can be more fully developed.[121] In addition, the federal courts have ruled against defendants claiming an entitlement to apportionment under *Burlington Northern*.[122]

In *Saporito*, the court held the defendant, James Saporito, a current site owner, jointly and severally liable despite an alleged divisibility defense. The court found his partial ownership of equipment used in the metal plating process that led to the contamination of the facility dispositive, citing Section 876 of the Restatement (Second) of Torts, which provides that apportionment is not appropriate for joint venturers.[123] The court held that the defendant had neither met his burden of proof as to divisibility of the harm he jointly caused, nor had he established a reasonable basis for apportionment, and granted the government's motion that the defendant was jointly and severally liable.[124] In another recent ruling, the District Court for the Eastern District of California held specifically that *Burlington Northern* did not represent a change in the law of CERCLA divisibility.[125] In this instance, the defendants asked the court to reconsider a 2002 order granting partial summary judgment for the plaintiffs that the defendants were jointly and severally liable and rejecting the defendants' divisibility defenses.[126] The defendants argued that *Burlington Northern* represented a "change in law" mandating reconsideration.[127] The court rejected that argument and agreed with the plaintiffs that *Burlington Northern* "does not constitute a change

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121. *See* ITT Corp v. Borgwarner, Inc., No. 1:05-CV-674, 2009 U.S. Dist. LEXIS 62792 at *16 (W.D. Mich. July 22, 2009); *See also* Evansville Greenway and Remediation Trust v. S. Indiana Gas and Elec. Co., Inc., 661 F. Supp. 2d 989 (S.D. Ind. 2009).

122. *See* United States v. Saporito, 684 F. Supp. 2d 1043 (N.D. Ill. 2010); Appleton Papers Inc. v. George A. Whiting Paper Co., 2009 WL 3931036 (E.D. Wis. Nov. 19, 2009).

123. *Saporito*, 684 F. Supp. 2d at 1062; *See* Gold, *supra* note 68, at 338-46 (discussing "concert of action" theories).

124. *Saporito*, 684 F. Supp. 2d at 1064.

125. *See* United States v. Iron Mountain Mines, Inc., No. 91-0768-JAM-JFM, 2010 WL 1854118 at *6 (E.D. Cal. May 5, 2010) (order denying defendants' motion for reconsideration); *see also* Ashley II of Charleston LLC v. PCS Nitrogen, No. 2:05-cv-2782-MBS, 2010 WL 3893599, at *41 (D.S.C. Sept. 30, 2010) ("The court concurs with the *Iron Mountain Mines* court that *Burlington Northern* did not change the law with regard to divisibility, but merely recognized a reasonable basis for apportionment based on the facts of a particular case.").

126. *Iron Mountain Mines*, 2010 WL at *2.

127. *Id.* at *4.

in law . . . [but] simply reiterated the law as established in 1983 by Chem-Dyne."[128] The Supreme Court in *Burlington Northern* merely held that the factual record supported the lower court's decision, the California court stated.[129]

Furthermore, even though the district court's *Burlington Northern* opinion reveals some confusion between *apportionment* based on divisibility of harm, and equitable *allocation*, the Supreme Court itself clearly distinguished between the two.[130] The Court made clear in a footnote that the district court erred in making reference to equitable considerations, which the Supreme Court said play no role in the apportionment analysis.[131] Equitable factors come into play in the contribution context only, the Court stated, citing § 113(f)(1) of CERCLA, which states that in resolving contribution claims, a court may allocate response costs among liable parties using such equitable factors as the court determines are appropriate.[132] Thus, the Court did not give encouragement to those who would argue for a melding of the two procedures in the interests of judicial economy or for other reasons.

The distinction between apportionment of divisible liability and allocation in the contribution context cannot be overemphasized, since the two are often confused. As an example, one has only to look at the district court's opinion in *Burlington Northern*, which the Supreme Court clearly stated was erroneous insofar as the district court made reference to equitable considerations favoring apportionment.[133] A determination of theoretical divisibility is a matter of law and can be resolved at the liability phase of CERCLA litigation, although factual development as to apportionment may be

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128. *Id.* at *6.

129. *Id.* (quoting *Burlington Northern*: "we conclude that the facts contained in the record reasonably supported the apportionment of liability." 129 S. Ct. at 1882-83).

130. 129 S. Ct. at 1882, n. 9.

131. *Id.*

132. *Id.*

133. *Id. See* Reichold, Inc. v. United States Metals Ref. Co., 655 F. Supp. 2d 400 (D.N.J. 2009); Halliburton Energy Services, Inc. v. NL Indus., 648 F. Supp. 2d 840, n. 31 (S.D. Tex. Aug. 18, 2009) (restating the Supreme Court's finding in Burlington Northern that the CERCLA apportionment analysis is different from the allocation analysis, and equitable factors play no role in apportionment).

necessary.[134] Allocation, on the other hand, is applied among jointly liable defendants asserting contribution claims against one another, and usually requires a separate proceeding conducted *after* the liability phase of multi-party CERCLA litigation and the development of a separate set of facts which may include equitable considerations.[135]

In short, there would appear to be nothing in the Supreme Court's opinion to alter the established jurisprudence of CERCLA divisibility as articulated by federal courts over the past three decades.[136] The opinion is unusual only in its approval of the district court's discretion in two respects: (1) its *sua sponte* consideration of multiple theories of divisibility in apportioning harm,[137] and (2) its resolution of the considerable differences in results produced by those theories through multiplication alone.[138] In the vast majority of CERCLA fact scenarios, neither approach is likely to be repeated in the future by a

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134. *See, e.g.*, United States v. Broderick Inv. Co., 862 F. Supp 272, 276 (D. Colo. 1994) ("Under the Restatement and Bell, the decision of whether to impose joint and several liability turns on whether there is a reasonable basis for dividing liability. This is a question of law . . . . the actual apportionment of the harm is a question of fact.") (citing *In re* Bell Petroleum Servs., 3 F.3d 889, 896 (5th Cir. 1993)).

135. *See* United States v. Brighton, 153 F.3d 307, 318-20 (6th Cir. 1998) (rejecting the "Gore" factors for purposes of apportionment, the court stated: "We distinguish the divisibility defense to joint and several liability from the equitable allocation principles available to defendants under CERCLA's contribution provision. The former is legal, the latter equitable."); United States v. Alcan Aluminum Corp., 964 F.2d 252, 270, n.29 (3d Cir. 1992) (holding the "divisibility" inquiry "is best resolved at the initial liability phase and not at the contribution phase since it involves precisely relative degrees of *liability*.") (emphasis in original); United States v. Monsanto Co., 858 F.2d 160,171 n.22 (4th Cir. 1988) ("equitable factors are relevant in subsequent actions for contribution [but] . . . are not pertinent to the question of joint and several liability, which focuses principally on the divisibility among responsible parties of the harm to the environment.").

136. Note that *Chem-Dyne*, 572 F. Supp. 802 (S.D. Ohio 1983), as demonstrated above, has been followed by the federal courts up to and including the Supreme Court in its 2009 *Burlington Northern* opinion. *See* 129 S. Ct. 1870 (2009).

137. As noted above, the defense of divisibility was not briefed by either side before the district court. Thus, in the words of Justice Ginsburg, dissenting, the district court "undertook a heroic labor" in striving "independently" to perform its own apportionment analysis, "*sua sponte*." *Burlington Northern*, 129 S. Ct. at 1885-86.

138. See *infra* pp 36-47.

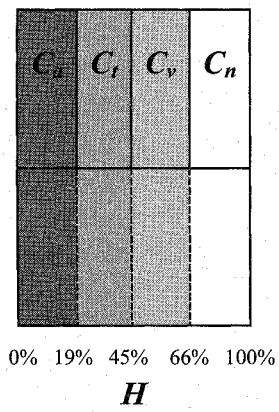
district court adhering to the principles of *Chem-Dyne* and the Restatement affirmed in *Burlington Northern.*

### *B. Dueling Theories*

Perhaps the most unusual feature of the district court's approach to divisibility in *Burlington Northern* was the court's use of multiple factors or theories of divisibility to arrive at an apportionment. This was so alien to the decades-old standard set down in *Chem-Dyne* that it casts doubt on the possible future use of such a method by any federal court adhering to that standard in the overwhelming majority of cases. This is because the use of multiple factors, each of which really constitutes a separate theory of divisibility, may create such uncertainty as to render their use ineffectual in proving by a preponderance of the evidence that a reasonable basis exists for apportioning a single harm. This is even more troubling where the results under each theory diverge significantly.

Using the percentages the district court assigned to the Railroads based on area, time, and waste volume/toxicity, 19%, 45% and 66.6%, respectively, Figure 2 represents the three theories of divisibility presented in *Burlington Northern*, where $\boldsymbol{C}$ represents the causes, respectively, of ownership ($\boldsymbol{a}$ or area), operation ($\boldsymbol{t}$ or time), and disposal ($\boldsymbol{v}$ or volume/toxicity), and $\boldsymbol{H}$, the single harm associated with those causes.

Figure 2




As previously mentioned, the Supreme Court pointed out that the district court confused apportionment with equitable allocation—nevertheless the Supreme Court held it "harmless" error.[139] The district court did, in fact, include a recital in its opinion of the "Gore factors" which it said should be taken into account in "apportioning" liability.[140] These are equitable factors adopted by the federal courts in contribution *allocation* pursuant to § 113(f)(1) of CERCLA, which requires allocation "using such equitable factors as the court determines are appropriate." The "Gore factors" as recited by the district court include, *inter alia*, "the ability of the parties to demonstrate that their contribution of a discharge [,] release or disposal of a hazardous waste can be distinguished," "the amount of the hazardous waste involved," and "the degree of involvement by the parties in the generation, transportation, treatment, storage, or disposal of the hazardous waste."[141] This indicates that the district court may simply have regarded its three "factors" as "equitable factors" to be balanced in arriving at an *allocation*, not as separate

139. *Burlington Northern,* 129 S. Ct. at 1883.

140. United States v. Atchison, Topeka & Santa Fe Ry. Co., No. CV-F-92-5068 OWW, No. CV-F-96-6226 OWW, No. CV-F-96-6228 OWW, 2003 U.S. Dist. LEXIS 23130 at *242, ¶ 463 (E.D. Cal. July, 14, 2003).

141. *Id.*

theories of divisibility *apportionment.*[142] However, in finding the harm theoretically divisible, the district court did indicate that it regarded the harm as divisible based on at least two *separate* theories of divisibility, time period of ownership/operation and volume/toxicity of hazardous substance releases: "[t]his is a classic 'divisible in terms of degree' case, *both* as to the time period in which defendants' conduct occurred, and ownership existed, *and* as to the estimated maximum contribution of each party's activities that released hazardous substances that caused Site contamination."[143] Therefore, there is some basis in the district court's opinion for regarding its "factors" as separate theories of divisibility, each of which *alone* might demonstrate a reasonable basis for apportionment. The Ninth Circuit seems to have adopted this view, since its opinion struck down all three "factors" sequentially as if they were, in fact, separate theories of divisibility.[144] The Ninth Circuit concluded that, with regard to "land area," "the mere percentage of land owned by one PRP relative to the entire facility cannot *alone* be a basis for apportionment."[145] Similarly, with regard to "period of ownership" the court stated: "[j]ust as the district court's land area calculations did not correspond to the harms in this case, its simple fraction based on the time that the Railroads owned the land cannot be *a basis for apportionment.*"[146] Further, with regard to the third "factor," "types of hazardous products," the Ninth Circuit found that "the district court clearly erred in its attempt *to rely on* the proportion of hazardous products present on the Railroad parcel."[147]

While each theory might have constituted a self-sufficient means of apportionment given adequate factual development showing proportionality to the harm, the district court did not rely on one, but all three.[148] However, in the context of apportionment, as opposed to allocation, more is not more but less, because taken *together* the three

142. In fact, the district court placed its recital of the "Gore" factors under a section heading titled "Equitable Apportionment," indicating the court's confusion as to which principle, allocation or apportionment, it was following. *Id.* at *240.

143. *Id.* at *240, ¶ 462 (emphasis added).

144. United States v. Burlington Northern and Santa Fe Ry. Co., 502 F.3d 781, 802-4 (9th Cir. 2007).

145. *Id.* at 802 (emphasis added).

146. *Id.*, at 803 (emphasis added).

147. *Id.*, at 804 (emphasis added).

148. *Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *259-60.

theories only create uncertainty. Assuming the harm is theoretically divisible on the basis of any one of the three theories diagramed in Figure 2, the Railroads might have been found liable for 66.6% under one theory, 45% under another theory, and 19% under a third: a 47.6% difference. Even if the harm is considered theoretically divisible under any *one* of these three theories, under *all* of them the divergence among the results is nearly 50%. What do such wide differences in result imply? Are we to expect that, where multiple theories of apportionment are urged, all are *equally proportional* to the harm? Consider, for example, whether a division of liability based on land area, giving 19% to the Railroads on the assumption that the "degree" of ownership of a portion of the Site constituted a proportional relationship to the total site harm, is *just* as proportional to that harm as the percentage of time that parcel was in operation relative to the total period of Site operation, 45%, or the percentage of hazardous substance disposal on the Railroad parcel, 66.6%? Doesn't this juxtaposition call into question whether *any* of the three separate theories alone are proportional to the harm? And how, exactly, would multiplication of those percentages, none of which would seem to be proportional to the harm *separately*, cure this deficiency?

Such a high degree of uncertainty would appear to make any attempt at apportionment of the harm the "arbitrary apportionment for its own sake" the Restatement condemns, as cited by the Supreme Court in *Burlington Northern.*[149] As Judge Parker stated in his dissenting opinion in *Bell Petroleum*:

> [w]hile *certainty* of proof is not required in civil cases, probability is. Evidence by 'fifty-one percent,' or to the extent of 'more likely than not,' is deemed sufficiently reliable for resolution of civil disputes. But proof by *less*

149. Burlington Northern v. United States, 129 S. Ct. 1870, 1881 (2009). Note that, as mentioned above, the district court actually applied a 150% multiplier to its 6% apportioned share for the Railroads, getting 9% as the Railroad's apportioned share, although the court did not provide a rationale for using that multiplier. *Atchison, Topeka & Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *65.

> *than this amount* is unacceptably speculative; and amounts to mere *possibility*, not probability.[150]

In *Township of Brighton* the Sixth Circuit held:

> [d]ivisibility analysis is not an invitation to courts to attempt to 'split the difference.' If they are in doubt, district courts should not settle on a compromise amount that they think best approximates the relative responsibility of the parties. Rather, if they are in doubt, they should impose joint and several liability. Only if they have a reasonable basis for dividing causation should they actually apportion the damages.[151]

As emphasized above, if one examines the few pre-*Burlington Northern* CERCLA cases in which divisibility has been successfully raised, there is a common thread: only *one* theory of divisibility prevailed.[152] It would seem, therefore, that a theory of divisibility has the best chance of success if there are no *other* possible theories of divisibility or other evidence to be considered. In fact, where the defense has been successful, one theory of divisibility has been found dispositive and other possible theories to be considered, as well as other complicating factors such as toxicity, mobility, and synergistic effects of the contaminants have been found similar for all other defendants or of minimal significance to the divisibility analysis.[153] This indicates that in the overwhelming majority of cases where divisibility of harm is alleged, evidence as to the extent of that harm will probably depend on *one theory alone*, not the multiple theories

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150. *In re* Bell Petroleum Servs, Inc., 3 F.3d 909-10 (5th Cir. 1993) (quoting William M. Prosser, THE HANDBOOK OF THE LAW OF TORTS, 222 § 42 (2nd ed. 1955) ("[M]ere possibility of . . . causation is not enough . . . and when the matter remains one of pure speculation or conjecture . . . or the probabilities are at best evenly balanced . . . it becomes the duty of the court to direct a verdict for the defendant.")).

151. United States v. Brighton, 153 F.3d 307, 319 (6th Cir. 1998).

152. *See Bell Petroleum*, 3 F.3d at 894; Coeur d'Alene Tribe v. Asarco, 280 F. Supp. 2d 1094, 1120 (D. Idaho 2003); United States v. Broderick Inv. Co., 862 F. Supp. 272, 276 (D. Colo. 1994); Hatco Corp. v. W.R. Grace & Co., 836 F. Supp. 1049, 1087-88 (D.N.J. 1993).

153. *See Bell Petroleum*, 3 F.3d at 894; *Coeur d'Alene Tribe*, 280 F. Supp. 2d at 1120; *Broderick*, 862 F. Supp. at 276; *Hatco*, 836 F. Supp. at 1087-88.

of divisibility the district court took into consideration in *Burlington Northern*.

The few pre-*Burlington Northern* cases where the defense has been successful bear this out. For example, in *Bell Petroleum*, the Fifth Circuit found divisibility where a series of plant owners conducting substantially the same chrome-plating operations discharged similar waste, containing the same hazardous substance, chromium, over different periods of time.[154] The *Bell Petroleum* court held that defendant Sequa met its burden of proving there was a rational basis for apportioning liability among the defendants on a *volumetric* basis.[155] The court reasoned that, although it is not possible to determine with absolute certainty the exact amount of chromium each defendant introduced, there was "sufficient evidence from which a reasonable and rational approximation of each defendant's individual contribution to the contamination" could be made.[156] This included evidence of chrome flake purchases during each operator's tenure, the value of chrome-plating done by each, summaries of sales, time in operation, and witness testimony regarding the wastewater disposal practices of each defendant and the amount of chrome-plating done by each.[157] However, it is important that the court, although relying upon evidence of a widely disparate nature, ultimately made its determination of divisibility based on *one* theory alone: volume.[158] Additionally, it appears that the court adopted that approach largely because *no other significant variables affected the result.* In its opinion, the Fifth Circuit affirmed the *Chem-Dyne* approach to divisibility based on the Restatement, citing with approval *U.S. v. South Carolina Recycling and Disposal, Inc.*[159] In that case, the Fourth Circuit affirmed the imposition of joint and

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154. *Bell Petroleum*, 3 F.3d at 903.

155. *Id.* at 904 (emphasis added). Note that the appeals court in *Bell* chastised the district court below for "rejecting apportionment because of competing theories," stating that "[t]he existence of competing theories of apportionment is an insufficient reason to reject all of those theories." *Id.* Nevertheless, the court found divisibility based on only *one* theory, volumetric contribution.

156. *Id.* at 903.

157. *Id.* at 904-5.

158. *Id.* at 903-4.

159. United States v. South Carolina Recycling and Disposal, Inc., 653 F. Supp. 984 (D.S.C. 1986), *aff'd* in part and vacated in part, United States v. Monsanto Co., 858 F.2d 160 (4th Cir. 1988).

several liability against generator defendants claiming divisibility based on evidence of their volumetric contributions; noting that the defendants had presented "[n]o evidence. . .showing a relationship between waste volume, the release of hazardous substances, and the harm at the site."[160] The Fourth Circuit noted that "volumetric contributions provide a reasonable basis for apportioning liability *only* if it can be reasonably assumed, or it has been demonstrated, that *independent factors had no substantial effect on the harm to the environment.*"[161] The Fifth Circuit in *Bell Petroleum* drew from this an affirmative: that volume *could* be a reasonable basis for apportioning liability in a situation in which independent factors had no substantial effect on the harm to the environment.[162] Accordingly, the Fifth Circuit concluded that, as a matter of law, there was a reasonable basis for apportionment based on evidence of the respective quantities of waste disposed of by each defendant, and remanded the case for volumetric apportionment.[163] The Fifth Circuit was quick to point out, however, that the facts in *Bell Petroleum* were conducive to this result largely because of the absence of other complicating factors such as are found at most Superfund sites, so that the harm caused by each defendant was proportionate to the volume discharged by each:

> [a]s is evident from our previous discussion of the jurisprudence, most CERCLA cost-recovery actions involve numerous, commingled hazardous substances with synergistic effects and unknown toxicity. In contrast, this case involves only one hazardous substance—chromium—and no synergistic effects. The chromium entered the groundwater as the result of similar operations by three parties who operated at mutually exclusive times. Here, it is reasonable to assume that the respective harm done by each of the defendants is proportionate to the volume of

160. *Monsanto Co.*, 858 F.2d at 172.

161. *Id.* at n. 27 (emphasis added) (citing RESTATEMENT (SECOND) OF TORTS, § 433A cmt. d, illus.4, 5 (1965)).

162. *Bell Petroleum*, 3 F.3d at 900 (emphasis added).

163. *Id.* at 904.

> chromium-contaminated water each discharged into the environment.[164]

Note also that these facts demonstrate qualitative uniformity in both cause and harm: all defendants disposed of the same waste at approximately the same rate, and the harm could be measured in terms of "degree" because there was only one contaminant, chromium.

In the same vein, a volumetric divisibility defense was successful in *Coeur D'Alene Tribe v. Asarco Inc.*, since the defendant showed that the volume of waste disposed of, *taken alone*, could be measured to a reasonable degree.[165] The Coeur D'Alene basin had become contaminated over the past century by waste discharged to local waterways from a number of mining operations, leaving much of the basin contaminated with commingled mine tailings, including pollution from cadmium, lead, and zinc.[166] Although the harm would appear, therefore, to be singular, the various mining company defendants claimed that it could be apportioned based on the volume of tailings produced by each defendant or its predecessors.[167] Evidence presented showed that all tailings from the area contained *relatively similar levels* of cadmium, zinc, and lead, with differences from mine to mine being insignificant.[168] The district court of Idaho therefore found a "reasonable relationship" existed between the volume of mine tailings produced *alone* and the harm done at the site.[169] The court distinguished *U.S. v. Monsanto*, stating:

> [t]he [c]ourt finds the present case distinguishable from United States v. Monsanto Company. In Monsanto there was no evidence that each generator was contributing the same type and quantity of hazardous substance. In the case at bar, sufficient evidence was presented by the Plaintiffs that establishes each generator was contributing tailings

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164. *Id.*, at 903.

165. Coeur d'Alene Tribe v. Asarco, Inc., 280 F. Supp. 2d 1094, 1120 (D. Idaho 2003).

166. *Id.* at 1100-01, 1120.

167. *Id.* at 1119.

168. *Id.* at 1105-06.

169. *Id.* at 1120.

> and all of the tailings released contained lead, cadmium and zinc. Even though the exact percentages of lead, cadmium and zinc in the tailings from each mill is unknown and differed slightly based on the type of metal being extracted in the milling process, the [c]ourt finds the milling methodologies used in the Basin did not differ significantly from mill to mill to preclude divisibility based on the volume of tailings generated.[170]

The court concluded that there is a reasonable relationship between the waste volume, the release of hazardous substances, and the harm at the site.[171] This conclusion was due to the absence of independent factors as well as qualitative uniformity across both the causes and the harm. The court found that volume alone was sufficient to establish divisibility because the site waste was fairly uniform in composition, the hazardous substances were substantially the same, and all the defendants disposed of similar waste.[172]

In *United States v. Broderick Investment. Co.*, defendant Burlington Northern Railroad Company ("BN") argued that the harm was divisible both *temporally* and by *geographic* apportionment.[173] The site consisted of two separate lots, owned or leased by Broderick and BN at different times, which contributed to two separate groundwater plumes contaminated primarily by pentachlorophenol.[174] Furthermore, the record showed that the two plumes, emanating from each lot,[175] *had not merged* underground.[176] The United States District Court for the District of Colorado found that "the environmental harm at the Site is not reasonably capable of apportionment on a chronological basis," but that the harm was

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170. *Id.* at 1120. *See* United States v. Monsanto, 858 F.2d 160, 172, n. 27 (4th Cir. 1988) ("[V]olumetric contributions provide a reasonable basis for apportioning liability only if it can be reasonably assumed, or it has been demonstrated, that *independent factors had no substantial effect on the harm* to the environment.") (emphasis added).

171. *Id.*

172. *Id.* at 1120-21.

173. United States v. Broderick Inv. Co., 862 F. Supp. 272, 276 (D. Colo. 1994).

174. *Id.* at 275.

175. *Id.* at 277.

176. *Id.*

divisible geographically.[177] The court summarized the defendant's argument as follows: BN "presented two arguments to support divisibility: first, that the harm was divisible by chronology or time period; and second, that there were *separate and distinct* geographic areas of contamination."[178] The defendant BN was held liable only for contamination of soil and groundwater emanating from its own lot. The court declined "to adopt any specific percentages at this time" and reserved "for a later phase of the case application of these findings to the response costs that may be proved by the United States."[179]

Although the district court in *Broderick* merely concluded that the harm was "divisible geographically," it appears that it based its decision on the conclusion that the two contaminant plumes constituted separate, *distinct* harms. It is significant, however, that in addition to the complete separation of the two groundwater plumes geographically, both contained the *same contaminant*, pentachlorophenol, which the court acknowledged "drives the groundwater remedy selection by the EPA."[180] Consequently, the court was not faced with the obstacle that might otherwise have been present if each plume had contained different contaminants with varying environmental effects, thus requiring different response actions.

Therefore, in CERCLA cases prior to *Burlington Northern* where a single harm was found to be capable of apportionment among two or more independent causes, the reasonableness of that determination depended largely upon the reliability of a single theory of apportionment.[181] This is because, where complex interrelated facts are necessary for a divisibility determination, the more difficult it becomes to establish a reliable and quantifiable correspondence between a defendant's actions and the resulting harm. As the United States District Court for the District of Idaho stated in *Coeur D'Alene*, "evidence supporting divisibility must be concrete and

177. *Id.*

178. *Id.* (emphasis added).

179. *Id.*

180. *Id.*

181. *See id.; In re* Bell Petroleum Servs., Inc., 3 F.3d 889, 894 (5th Cir. 1993); Coeur d'Alene Tribe v. Asarco, Inc., 280 F. Supp. 2d 1094, 1120 (D. Idaho 2003); United States v. Broderick Inv. Co., 862 F. Supp. 272, 276 (D. Colo. 1994); Hatco Corp. v. W.R. Grace & Co., 836 F. Supp. 1049, 1087-88 (D.N.J. 1993).

specific. . . .Where causation is unclear, divisibility is not an opportunity for courts to 'split the difference' in an attempt to achieve equity."[182] Without a "concrete and specific" correspondence between cause and harm, any attempt at apportionment is likely to be what the Restatement calls an "arbitrary" exercise:

> [w]here two or more causes combine to produce such a single result, incapable of division on any logical or reasonable basis, and each is a substantial factor in bringing about the harm, *the courts have refused to make an arbitrary apportionment for its own sake*, and each of the causes is charged with responsibility for the entire harm.[183]

### *C. The Sorcerer's Apprentice: Multiplication*

It is important to recognize that in attempting to resolve competing theories of divisibility by straight multiplication of the fractions or percentages derived from each, the district court in *Burlington Northern* used a flawed method. The district court's methodology recalls the dilemma of the sorcerer's apprentice beset by multiplying brooms in the famous tale adapted by Goethe in *Der Zauberlehrling*,[184] except that a court's multiplication of fractions, instead of an overabundance, can create an equally dramatic diminution in liability. In so doing, a court using multiplication may call up another disturbing apparition: an unapportioned share for the plaintiff to absorb.

The district court in *Burlington Northern* multiplied fractions or percentages assigned to *all three* theories of divisibility together to arrive at an apportioned share for the Railroads. Since multiplication of fractions can only give incrementally smaller fractions, the district court's method may not account for all the harm and can work a

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182. *Coeur d'Alene Tribe*, 280 F. Supp. 2d 1094, 1120.

183. RESTATEMENT (SECOND) OF TORTS, §. 433A, subsection 2, cmt. i, (1965) (emphasis added). *See* Burlington Northern & Santa Fe Ry. v. United States, 129 S.Ct. 1870, 1881 ("When two or more causes produce a single, indivisible harm, 'courts have refused to make an arbitrary apportionment for its own sake, and each of the causes is charged with responsibility for the entire harm.'").

184. *The Sorcerer's Apprentice*, WIKIPEDIA, http://en.wikipedia.org/wiki/The_Sorcerer's_Apprentice. (September 19, 2010). The tale was later depicted in the 1940 animated Disney film, Fantasia. *See id.*

serious inequity by leaving the plaintiff with an artificially-created unapportioned share. An exception might be multiplication of area by time, which can be viewed as a single theory of apportionment based on a function of two *independent* space-time variables. This might be appropriate under certain factual scenarios; however, such multiplication was inappropriate under the facts presented in *Burlington Northern* because multiplication of space-time factors only makes sense where the factors to be multiplied are proportional to the harm. As the Ninth Circuit pointed out in its *Burlington* opinion, that condition was not present at the Arvin site.[185] Furthermore, even if it had been reasonable to rely on multiplication of area by time in apportioning harm, *further* multiplication by a percentage representing waste disposal would not be reasonable since waste disposal, as a variable dependent on both area and time, constitutes a separate and distinct theory of divisibility.

1.Accounting For 100% Of The Harm

As should be self-evident, in multiplying fractions representing separate theories of apportionment, the result is always a *smaller* fraction than *any* of the original fractions. As a result, a significant portion of the harm can remain *entirely unaccounted for*: no one can know its cause, yet the innocent plaintiff will be forced to accept responsibility for it. As an example, consider a hypothetical where there are only two responsible parties, both site "owner/operators" of separate parcels of equal size comprising a Superfund site and each party operating for half the total period of site operation. Let's say further that each defendant while in operation disposed of an equal volume of the same waste at the same rate, that the contaminants are evenly distributed across the site, and that together these two volumes account for all the waste at the site. Assuming that a court finds the harm is theoretically divisible *and* that it is capable of reasonable apportionment based on these facts, using the district court's approach in *Burlington Northern*, each of the two owners could be found to have divisible liability for 50% of the site area, 50% of the time in operation, and 50% of the waste volume.[186] Common sense

185. 502 F.3d 781, 802-4 (9th Cir. 2007).

186. This assumes that the court declines to hold both defendants liable for the *entire* harm at the site by virtue of their statutory liability as current site owners under Section 107(a)(1) of CERCLA.

tells us that each defendant therefore should be liable for 50% of the harm, yet if these three fractions are *multiplied*, each would be found liable for only 12.5%. Clearly under these facts multiplication of the three factors alone would not achieve a satisfactory result since the plaintiff would be left to absorb a huge 75% unapportioned share; a share that cannot be attributed to any cause.[187]

That the *Burlington Northern* district court might have failed to account for all the harm through straight multiplication of all three factors is demonstrated by Table 1 which shows, with regard to the Railroads *as against all other causes*, the relative percentages of divisible liability for the three theories the district court used, along with the totals arrived at through multiplication. When the products for both the Railroads and all other causes *excluding* the Railroads (i.e., B&B and Shell) are added together, only 20.5% of the total liability appears to be accounted for. That seems to leave 79.5% of the harm unapportioned: seemingly due to no cause whatever.[188]

Table 1

***Burlington Northern* Multiplication**

| **Factors** | **Railroads** | **All *Other* Causes** | **Totals** |
|---|---|---|---|
| *Area* | *19%* | *81%* | 100% |
| *Time* | *45%* | *55%* | 100% |
| *Waste (volume/toxicity)* | *66.6%* | *33.3%* | 100% |
| ***Multiplied*** | ***5.7%*** | ***14.8%*** | **20.5%** |

187. *See* Walter Mugdan, *The Burlington Court's Flawed Arithmetic*, 40 ENVTL. L. REP.: NEWS & ANALYSIS 10637, 10638 (2010).

188. Of course, this would only result if the liability of all the *other* defendants is *limited* to 80.9% of the area, 55% of the time of operation, and 33.3% of the waste disposed. Whether correctly or not under the principles of *Chem-Dyne* and the Restatement, B&B's share alone would probably have been found much larger than that. *See* 572 F. Supp. 802 (S.D. Ohio 1983); RESTATEMENT (SECOND) OF TORTS § 433A (1965).

To leave an unapportioned share for the plaintiff is contrary to the intent of § 433A, comment h of the Restatement, which states that divisibility should not be applied where it would work an injustice by, for example, leaving the plaintiff to recover from an insolvent or deceased defendant.[189] In the case of an *unapportioned* share, that inequity is even more pronounced. § 433A, comment d states that divisibility should not be applied if injustice to *any* of the parties—in this case the plaintiff government—would result.[190] Such a method goes against the entire rationale for divisibility: that a single harm may be apportioned if its component causes are capable of division in such a way as to reflect the proportion of harm caused, since an unapportioned share is attributable to *no cause whatsoever.* Therefore, in apportioning harm, as emphasized above, 100% of the harm must be accounted for.

The question then becomes: if straight multiplication of all three percentages was flawed, what is the *right* method? In order to answer that question, we must first ask: is it possible to apportion harm *at all* by mathematically resolving more than one competing theory of divisibility? It is tempting based on the analysis above to assert that no such thing is possible—consistent with the principles of the Restatement and the judicial precedent endorsed by the Supreme

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189. Note, however, that the district court appears to have rejected the argument that apportionment cannot leave an "orphan" share. *See* United States v. Atchison, Topeka & Santa Fe Ry. Co., No. CV-F-92-5068 OWW, No. CV-F-96-6226 OWW, No. CV-F-96-6228 OWW, 2003 U.S. Dist. LEXIS 23130 at *242-51 (E.D. Cal. July, 14, 2003); *see also* RESTATEMENT (SECOND) OF TORTS § 433A cmt. h (1965) (*Exceptional cases*) ( which reads in its entirety as follows: The rule stated in Clause (b) of Subsection (1) [divisibility] is one normally applicable to cases in which a reasonable basis can be found for the division of a single harm according to the contribution of each cause. Exceptional cases may, however, arise in which injustice to the plaintiff may result from an application of the rule. It may, for example, appear that one of two tortfeasors is so hopelessly insolvent that the plaintiff will never be able to collect from him the share of the damages allocated to him; or, in a jurisdiction in which actions for the particular tort do not survive the death of the defendant, he may have died after the infliction of the harm, but before suit has been instituted. In such cases the application of the rule stated in Clause (b) would mean that the innocent plaintiff would be forced to bear the share of the loss due to the defendant from whom he could not collect the damages, and the liability of the other tortfeasor would be reduced accordingly.).

190. RESTATEMENT (SECOND) OF TORTS at cmt. d. (emphasis added) (stating in part, with regard to divisibility: "Where such apportionment can be made *without injustice to any of the parties*, the court may require it to be made.").

Court in *Burlington Northern*—particularly where the results are significantly divergent. Where competing theories *of equal weight* give widely differing results, the harm simply may be said not to be capable of reasonable apportionment. Therefore, in most fact scenarios, divisibility arguments with any hope of success will continue to be based on one theory alone. Yet the Supreme Court did not rule that the *Burlington Northern* district court abused its discretion when it attempted to resolve competing theories.[191] One must assume that, in an appropriate case, another court may accept, first, that a harm *is* divisible based on more than one factor or hypothesis of divisibility, and second, that a reasonable basis for apportionment exists through resolution of those competing theories. In that event, what should the court do?

Whatever approach a court may take, it should be obvious from the preceding discussion that it must, at the very least, accomplish one thing: account for 100% of the harm. A court cannot leave an unapportioned share even though there may be apportioned shares which are *uncollectible* due to "innocent" causes or contributory negligence in the tort context or insolvency of a CERCLA responsible party as in *Burlington Northern*. Furthermore, a court should not reach a result which falls outside the range of the component theories: where multiple theories of equal importance or "weight" give a lower and upper bound, to adopt a method of integration of those theories that gives a result falling *outside* that range would not appear justified.

One method which *would* account for 100% of the harm and stay within the range of the component theories would be to find the *arithmetic mean* of the percentages assigned to each theory. In other words, straight averaging of the three percentages was one approach the district court might have taken in *Burlington Northern*. This appeals to common sense since averaging evenly balances the three competing theories (all of which are assumed to be of equal significance or weight); it falls within their range, and the total of the

191. Burlington Northern & Santa Fe Ry. v. United States, 129 S. Ct. 1870, 1883 (2009) ("[W]e are persuaded that it was reasonable for the court to use the size of the leased parcel and the duration of the lease as a starting point for its analysis," quoting from the Ninth Circuit's observation that "divisibility may be established by 'volumetric, chronological, or other types of evidence,' including geographic considerations." (quoting United States v. Burlington & Santa Fe Ry. Co., 520 F.3d 918, at 936, n.18. (9th Cir. 2008))).

averages would be 100%—ensuring that all the harm is accounted for and there is no unapportioned share. This last point can be demonstrated mathematically as follows: if one individual defendant's liability is $x$ percent (as a fraction of one), then that portion of the harm "caused" by all *other* defendants or causes can be written $(1 - x)$, and the two percentages will always add up to 100% or (if written as fractions) one:

$$x + (1 - x) = 1$$

If the number of divisibility theories or "factors" is **n**, the average of percentages $x, y, z \ldots n$ (one for each factor) attributable to a defendant alleging divisibility,

$$\frac{(x + y + z + \ldots + n)}{n}$$

when added to the average of the remainder percentages for each factor attributable to all *other* causes—

$$\frac{(1 - x) + (1 - y) + (1 - z) + \ldots + (1 - n)}{n}$$

will still always equal one because the positive and negative values for $x, y, z \ldots n$ will cancel each other out. Thus, straight averaging will always account for 100% of the harm.

Note that straight averaging assumes that all of the theories are of equal "weight" or significance. If that were *not* the case, one might expect a defendant to rely exclusively on the best or most significant of the competing theories—presumably the one proportional, or more nearly proportional, to the harm. However, should a multiple-factor averaging approach be used where the factors are considered unequal in significance, a *weighted average* could be taken whereby arbitrary (that is, elective) "weights" or multipliers, $[w_1, w_2, \ldots w_n]$, could be applied to one or more factors. If for example a single weight $w$ were applied to $x$ factor, where there are $n$ factors, $x, y, z, \ldots n$, the numerator would become $[w(x) + y + z + \ldots + n]$, and the denominator, instead of $n$, would be $[(n - 1) + w]$; with two multipliers, the denominator would be $[(n - 2) + w_1 + w_2]$, and so on. This is similar to finding the *weighted mean* of a set of data $[x_1,$

$x_2, \ldots, x_n$] to which are applied non-negative weights [$w_1, w_2, \ldots, w_n$], the formula for which is:[192]

$$\bar{x} = \frac{\sum_{i=1}^{n} w_i x_i}{\sum_{i=1}^{n} w_i}$$

or, written another way:

$$\bar{x} = \frac{w_1 x_1 + w_2 x_2 + \cdots + w_n x_n}{w_1 + w_2 + \cdots + w_n}$$

Note further that if the same weights or multipliers are also applied to the *remainder* percentages for $x, y, z \ldots n$, as in [$w(1 - x)$], thus giving a weighted average of the remainder percentages, both weighted averages will always equal one—indicating that even if a *weighted* average is taken, all the harm will still be accounted for.

Averaging, therefore, seems to be one way to integrate competing theories of apportionment that will account for all the harm. But are there other methods that would also do so? Is multiplication always wrong? It is important to recognize that whatever method a defendant may attempt to use must be fact-specific and tailored to the exigencies of a particular case. There may, for example, be circumstances in which multiplication of certain independent variables related in *space and time* are appropriate as a means of apportionment, provided that the facts establish reasonable proportionality of such variables to the harm. In such cases, multiplication may provide an alternative means of apportioning harm, as long as it accounts for *all* the harm.

What does it mean to say that multiplication must be "appropriate?" It means that the factors or variables to be multiplied must be both (1) *independent* of one another and (2) *proportional* to the harm. For example, where a theory of apportionment is based on

192. *See Weighted Mean,* Wikipedia, http://en.wikipedia.org/wiki/Weighted_mean (last visited September 19, 2010).

area and time alone, the two factors, area, ***a***, and time, ***t***, may exist in such a relationship. In such circumstances, a rule of thumb for determining whether or not multiplication is appropriate as a tool for apportionment is to find out whether the two variables—area, ***a***, and time, ***t***—are *independent* of one another (that is, changing one will have no effect on the other), and whether the harm or liability, ***L***, is *directly proportional* to each of ***a*** and ***t*** and, by logical extension, their product. In that event, the relationship between the two independent variables, which could be described as $L = at$, liability (or harm) equals area by time, is written as:

$$L = k(at)$$

where, if ***a*** and ***t*** are proportional to the harm, then ***k*** is a *constant of proportionality*.[193] Where such a relationship exists between ***a*** and ***t***, their multiplication may be appropriate for apportionment purposes. However, without such a constant, that is, without direct proportionality of each of ***a*** and ***t*** to the harm, no reasonable apportionment can be made by multiplying area by time. Put another way, without uniformity of the harm across space and time, their measurement would have no bearing upon a party's responsibility for site contamination. Furthermore, it should be stressed that both variables must be *independent* of one another: no interdependent relationship can exist between them. This would be the case, for example, if area was not multiplied by time, but by a waste disposal percentage which might be expected to vary according to the extent of the area used for disposal. In that case, the waste disposal variable

193. The term "constant of proportionality" or "proportionality constant" can be defined mathematically as follows. Given two independent variables $x$ and $y$, $y$ is said to be *directly proportional* to $x$, that is, the *ratio* of $y$ to $x$ is always the same, if there is a non-zero constant $k$ such that $k = y : x$, or $k = y/x$, which can also be written $y = k(x)$. In that case, $k$ is called the ***constant of proportionality***. Given *three* independent variables, $x$, $y$ and $z$, $y$ may be said to be *directly proportional* to the product of $x$ and $z$, that is, the *ratio* of $y$ to $(xz)$ is always the same, if $k = y : (xz)$, or $k = y/(xz)$, which can also be written $y = k(xz)$. That $y$ is *also* directly proportional to *each* of $x$ and $z$ can be demonstrated by holding either $x$ or $z$ constant. For example, if $x$ is a constant, $k(x)$ in the formula above can be written as a single constant, $k_x$, and $y = k(xz)$ becomes $y = k_x(z)$, showing $y$ is proportional to $z$. Note, however, that for this to hold true, $x$ and $z$ must be *independent* variables. *See Proportionality, Wikipedia,* http://en.wikipedia.org/wiki/Proportionality_(mathematics) (last visited September 19, 2010).

would not be *independent* of the area or time variables, as they are with respect to each other, but would be dependent upon each of them. Finally, it should be recognized that the logic of multiplying area by time only applies to site "owner/operators." It would appear to have little or no relevance to "generator/transporter" liability in most CERCLA cases. Thus, the factual circumstances under which such multiplication can be used are limited.

It might be objected that uniformity of harm across space and time are not relevant to "owner" liability under CERCLA § 107(a)(1), which premises strict liability upon ownership or operation alone.[194] Thus, the argument would go, multiplying time by area would provide an adequate measure of an "owner" defendant's divisible liability regardless of the distribution of contamination across the site or over time. This argument overlooks the difficultly of apportioning harm among *all* defendants in the event that "transporter/generator" defendants also exist. But its reasoning is further strained because it also overlooks the purpose of apportionment, which is to reasonably divide the *harm*.

Since the harm does not necessarily respect title boundaries, ownership alone, though conferring *liability*, has been consistently held insufficient as a means of *apportionment*.[195] In rejecting a geographical divisibility argument, the district court for the Western District of Michigan cited the Seventh Circuit's opinion in *United States v. Capital Tax Corporation* for the principle that the following factors tend to preclude a finding of geographic divisibility: (1) where the facility functioned as a "dynamic, unitary operation" in which materials were moved from location to location during the production process; (2) where there was "migratory potential" and "actual migration" of the toxic substances; and (3) where there was commingling and cross-contamination.[196] All of these conditions

194. 14 U.S.C. § 9607(a) (2010) ("[n]otwithstanding any other provision or rule of law, and subject only to the defenses set forth in subsection (b) of this section . . . the owner and operator of a . . . facility . . . shall be liable for . . . . all costs of removal or remedial action . . . not inconsistent with the national contingency plan.").

195. *See, e.g.*, ITT Corp. v. Borgwarner, Inc., 700 F. Supp. 2d 848 (W.D. Mich. 2010).

196. *Id.* at 878 (citing United States v. Capital Tax Corp., 545 F.3d 525, 535-6 (7th Cir. 2008)).

were supported by the record with respect to the Arvin site.[197] The Seventh Circuit rejected a geographic divisibility claim based on ownership of a discrete parcel in *Capital Tax*, stating that "the EPA has broad discretion in defining the boundaries of a particular facility, and the boundaries are normally based on the extent of the contamination. The boundaries of the facility do not necessarily reflect property boundaries . . .and liability can extend beyond what the defendants actually own."[198]

However, although an "owner/operator" defendant may be held liable for contamination that extends *beyond* the parcel owned or operated, *divisible* liability based on the percentage of ownership or operation of a site arguably may not be further divided as a matter of law.[199] Finding an owner or operator liable for *less* than a percentage of overall site liability premised on its ownership or lease interest, because, for example, its past ownership was only a portion of the period of overall site operation, could be said to conflict with CERCLA's purpose in holding current site "owner/operators" strictly liable.[200] Also, as a matter of public policy, dividing a site owner/operator's liability geographically could be seen as relieving site owners or operators of responsibility for mitigating contamination on their own property which they might argue did not

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197. Burlington Northern and Santa Fe Ry. Co. v. United States, 129 S. Ct. 1870, 1875-76 (2009).

198. 545 F.3d 525, 535 (7th Cir. 2008) (citing United States v. Rohm & Haas Co., 2 F.3d 1265, 1280-81 (3d Cir. 1993) (holding responsible party jointly and severally liable although owned only 10% of site)).

199. *See* United States v. Newmont USA Limited, No. CV-05-020-JLQ, 2008 U.S. Dist. LEXIS 82922 at *157-8 (E.D. Wash. Oct. 17, 2008) (Newmont's divisibility claim based on its limited "footprint" of operations at the "Midnite Mine" in the early "exploration" period of operation was rejected. Notwithstanding its claim that its historic mining operations were limited in scope geographically, the court found Newmont strictly liable as an "operator" of the entire site under a *Bestfoods* analysis, at 136-150).

200. *See* Gelber, *supra* note 47, at 6 ("Subject to the limited defenses in Section 107(b) and the liability exclusion in Section 107(r), CERCLA makes current owners strictly liable even if they have had no connection to the contamination-causing activities. *See also* 42 U.S.C. § 9607(a)(1) (2010) A divisibility defense for current owners arguably nullifies the additional proof requirements imposed by Section 107(b)(3), such as due care and reasonable precautions, and the conditions in Section 101(40)." Section 101(40) sets forth requirements for establishing "bona fide prospective purchaser" status to qualify for the liability exclusion of Section 107(r) of CERCLA).

originate with their operations. The Sixth Circuit addressed a geographic divisibility defense raised by Brighton Township in *United States v. Township of Brighton* and noted:

> [a]llowing Brighton Township to assert a geographical basis for apportionment would completely undermine our earlier analysis that Brighton Township was an operator of the *entire* facility. Moreover, allowing a geographically based divisibility defense would seriously weaken CERCLA's remedial scheme. An operator who can escape liability when its operational activities were limited to a discrete portion of the facility has no incentive to engage in the voluntary cleanup of the contamination caused by hazardous waste disposed of on the remaining portion of the facility.[201]

The Ninth Circuit in *Burlington Northern* similarly criticized the lower court's "meat-axe" approach "premised on percentages of land ownership," because "[s]uch an approach would be tantamount to a disagreement with the imposition of no-fault land ownership liability."[202] Therefore, even where factors such as area and time *can* be multiplied, for an "owner" or "operator" defendant, such multiplication may conflict with CERCLA's purpose in holding such defendants strictly liable.

### 2. *Burlington Northern*

If we now apply these concepts to the facts in *Burlington Northern*, we may be able to suggest what the Supreme Court might have done to resolve conflicting theories of apportionment based variously on (a) time of ownership/operation (b) area controlled and (c) waste disposal, assuming adequate factual development to support such a multi-factor approach. First, the *Burlington Northern* district court might have simply averaged the three percentages, assuming each factor or theory of divisibility is considered to have equal weight. Had a straight average of the three factors been taken, the result

201. U.S. v. Brighton, 153 F.3d 307, 331 (6th Cir. 1998) (Moore, J., concurring separately).

202. United States v. Burlington Northern and Santa Fe Ry. Co., 502 F.3d 781, 803 (9th Cir. 2007).

would have been 43.6% for the Railroads and 56.4% for B&B and Shell. Furthermore, had any one of the three factors been considered more important than the others, or had their importance been ranked in some way, a *weighted* average could have been taken. Either approach would have accounted for all the harm, ensuring that no unapportioned share resulted.

However, based on the above discussion, it should be apparent that the *Burlington Northern* district court's multiplication of at least those two factors related in space and time might have been appropriate, provided both were proportional to the harm. In that case, the court might have been correct in ascribing 9%, the approximate product of time by area, to the Railroads based on their "owner" liability, *and* that calculation could have accounted for all the harm. The reason is that, with respect to both time *and* area, while the Railroads are liable for 19% of the area only 45% of the time, B&B is assumed to be responsible for 100% of the area *all* the time (these two factors are inapplicable to Shell). While the site area is divided between the two owner-operators 19% to 81%, that only holds true for the 45% of the time of the Railroads' operations. The balance of the time, 55%, the Railroads would have had zero liability while B&B would have had 100%, as illustrated in Table 2. The result is that while the Railroads would have been liable for approximately 9%, B&B (as the only other viable PRP) would have been liable for 91%, thus accounting for 100% of the harm.

Such a result appears statistically sound; however, aside from the initial difficulties that it falls outside the range of the two factors taken together and compromises "owner" strict liability, it has two other major flaws: (1) it necessarily assumes proportionality to the harm, that is, both qualitative and quantitative uniformity of the contamination across space and time—which was not supported by the facts at the Arvin site; and (2) it completely ignores the district court's findings regarding site-wide operations by B&B, commingling and migration of hazardous substances at the Site, and the potential for groundwater infiltration from both parcels. Significantly, it ignores substantial evidence in the record of the responsibility of both site owner/operators for site-wide contamination, particularly B&B.

Table 2

**BURLINGTON NORTHERN SPACE-TIME THEORY**

| FACTOR | Railroads | B & B |
|---|---|---|
| AREA | 19% | 81% |
| TIME 1 | 45% x 19% | 45% x 81% |
| TIME 2 | 55% x 0% | 55% x 100% |
| TOTAL | 9% (8.55%) | 91% (91.45%) |

In effect, the district court's approach in *Burlington Northern* could be viewed as an attempt to meld two theories of divisibility: one based on area and time and the other based on waste disposal alone. The logic of the first is that if one defendant owns ***a*** % of a site for ***t*** % of the time, then the product, ***at***, is one way to determine its divisible liability. This would make sense if the only defendants were the two owner/operators, the contamination were distributed evenly over the entire site, and disposal practices of both defendants were proportional to the area controlled by each and constant for their respective periods of ownership or operation. In other words, the proportional constant, ***k***, would need to be part of the formula: both factors would have had to be directly proportional to the harm.

However, in its opinion, the Ninth Circuit emphasized that the record did not indicate this was the case at the Arvin site.[203] The Ninth Circuit stressed that the "land area" theory of apportionment was problematic since "the mere percentage of land owned by one PRP relative to the entire facility cannot alone be a basis for

203. *Id.* at 802-04.

apportionment, as it does not provide a minimally reliable basis for tracing the *proportion* of leakage, contamination, *or* cleanup costs associated with the entire parcel."[204] The Ninth Circuit further stated that, "[n]othing in the record supports a conclusion that the leakage of contaminants that ended up on the B&B parcel occurred on each parcel *in proportion to its size*."[205] Similarly, the Ninth Circuit also criticized the second theory based on time period of ownership, because the "simple fraction based on the time that the Railroads owned the land. . .assumes *constant* leakage on the facility as a whole or *constant* contamination traceable to the facility as a whole *for each time period* [and] no evidence suggests that to be the case."[206] The Ninth Circuit further noted that excluding the Railroads' liability for the period of time preceding B&B's lease was inappropriate given the "evidentiary vacuum concerning the amount of contamination traceable to the pre-lease period."[207] Where uniformity of the contamination across space and time is not present, multiplication of space-time factors makes no sense. This exercise would be like attempting to determine the two-dimensional area of a room by measuring its length and width with a tape measure containing kinks and knots, or over obstacles such as chairs and desks requiring vertical as well as horizontal measurement.

As demonstrated in Table 2, if the *Burlington Northern* district court had only considered two factors, area and time, the Railroads might have been found liable for 9% on that basis, assuming proportionality to the harm. In fact, the Supreme Court cited the multiplication of time by area as one way of justifying the district court's conclusion that the Railroads' liability was 9%.[208] But even had that been appropriate, it would have completely ignored the district court's findings regarding the integration of operations at the Site, migration of contaminants, and the responsibility of *both* owner-operators for site-wide contamination of both soil and

204. *Id.* at 802 (emphasis added).

205. *Id.* at 803 (emphasis added).

206. *Id.* at 803-04 (emphasis added).

207. *Id.* at 804.

208. Burlington Northern and Santa Fe Ry. Co. v. United States, 129 S. Ct. 1870, 1883 (2009).

groundwater.[209] As shown above, there is ample evidence in the record and in the district court's findings that the liability of the Railroads was not limited to their own parcel, but included responsibility for migratory site-wide contamination.[210] Besides their liability as "owners," "operator" liability for direct disposal could also have been imputed to the Railroads themselves by knowledge of spills and/or failure to mitigate the harm: both were found by the district court.[211] Therefore, limiting the Railroads' liability to a function of area and time would have completely ignored the district court's extensive findings regarding site-wide disposal.[212]

In any event, multiplying area by time alone was *not* the court's method: the district court reached the conclusion that the Railroads' share was 6% (before application of the 150% multiplier), because it *further* multiplied that 9% by a *third* factor, 66.6%, the percentage of waste disposal attributed to the Railroads.[213] If that factor had been intended as the Railroads' contribution to *site-wide* contamination, such multiplication was erroneous despite the use of the court's corrective 150% multiplier, because by doing so the court failed to account for 100% of the harm. That is because had B&B been viable, its share would have been 91% as indicated in Table 2. But that 91% would further have been reduced by multiplying it by 33.3% to factor in the site-wide waste disposal factor (assuming Shell was not liable), giving about 30% to B&B and accounting for only 36% of the total harm.[214]

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209. *See* U.S. v. Atchison, Topeka and Santa Fe Ry. Co., No. CV-F-92-5068, 2003 U.S. Dist. LEXIS 23130 at *12-61 (¶¶ 15-152), *72 (¶ 187), *250-61 (¶¶ 472-89), *268-71 (¶¶ 501-505), (E.D. Cal. July 14, 2003).

210. *Atchison, Topeka and Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *251-58 (¶¶ 472-487).

211. *Id.* at *268-69 (¶¶ 501-505).

212. *See infra* n. 215.

213. *Atchison, Topeka and Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *258-61 (¶¶ 488-9).

214. Note that the district court originally apportioned 6% to Shell, as a generator, based on *waste disposal alone. Id.* at *271-72. This means any space-time analysis relied on by the court to determine the Railroads' liability would have had no relevance whatsoever to Shell's liability, which was based exclusively on waste disposal, not area or time, thus further calling the space-time theory into question. Furthermore, the district court calculated Shell's 6% based on the percentage of total *D-D spills* attributable to Shell, not Shell's percentage of total releases of *all* chemicals at the Site. *See id.* at *267, ¶498, which reads in its

On the other hand, had the district court intended its two-thirds multiplier to apply *only* to the Railroad parcel, multiplication of that factor times the area-time product might be rationalized based on an argument that the *other* third of contamination requiring remediation found on or in groundwater below that parcel, presumably attributable to D-D, was caused not by releases on the Railroad parcel but by migratory releases from the B&B parcel. In this view, the Supreme Court's statement that the two chemicals, Nemagon and dinoseb, "contributed to 2/3 of overall site contamination" only means that two-thirds of the entire Site was contaminated with Nemagon and dinoseb (the other third by D-D) and that, although all three chemicals were *found* on both parcels, only spills of Nemagon and dinoseb in quantities sufficient to require remediation occurred on the Railroad parcel.[215] This would mean that the district court might have concluded that the Railroads were only liable for two-thirds of the contamination on *their* parcel, while B&B was liable for 100% of the contamination on its own parcel as well as the remaining

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entirety as follows: "The percentage of D-D spills resulting from Shell deliveries is calculated by dividing 1,863 gallons (the D-D spilled through Shell controlled deliveries) by 31,212 gallons (the total amount of D-D spills) to equal approximately 6%."

215. Burlington Northern and Santa Fe Ry. Co. v. United States, 129 S. Ct. 1870, 1883 (2009) ("[t]he fact that no D-D spills on the Railroad parcel required remediation lends strength to the district court's conclusion that the Railroad parcel contributed only Nemagon and dinoseb in quantities requiring remediation") However, since the district court found the Site was graded so that surface runoff "drained to the waste pond on the southeast corner of the B&B parcel," that is, away from the Railroad parcel. *See Atchison, Topeka and Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *255, ¶ 479. Further, there was testimony that a pipe under the railroad spur tracks "allowed the water on the Railroad parcel to drain to the pond." There was also testimony that the purpose of the pond "prior to 1980 was...to collect rainwater from the *entire* plant." *Id.* at *22-3, ¶ 52-3 (emphasis added). The lease term of the Railroad parcel began in 1975. *Id.* at *5-6. It appears likely that the district court simply concluded based on conflicting expert testimony that, although D-D spills occurred on the Railroad parcel, they did not contribute significantly to the incurrence of response costs compared to releases of D-D on the B&B parcel, which were more likely to have affected the groundwater. *See id.* at *22-37 (¶ 52-85). However, releases of D-D on the Railroad parcel, had they migrated to the B&B pond through surface run-off, could have entered the groundwater from that location. ("It is undisputed that the pond, the sump, and the dinoseb spill area, all of which are located on the B&B parcel, were and are the primary sources of the groundwater contamination at the Site.") *Id.* at *35, ¶ 81.

one-third of the contamination on the Railroad parcel. That would give B&B, in addition to 100% of the contamination on its 91% of the area/time continuum (see Table 2), one-third of the Railroads' 9%, or 3%, for a total of 94%; while the Railroads' liability would be two-thirds of its 9% of area/time, or 6%. These two percentages add up to 100% and appear to have the virtue of accounting for all the harm.

The problem with this calculation, however, besides the reality that it is purely speculative and cannot be found *per se* in the district court's opinion, is that it has no basis in *fact*: it would ignore the district court's finding that releases of *all three* chemicals regularly occurred on *both* parcels, the entire site was one continuous "sloppy" B&B operation, and there was evidence of migration of contaminants *from* the Railroad parcel *to* a pond and sump on the B&B parcel.[216] Both the pond and sump, in addition to contributing to soil contamination on that parcel, were found to be two of three primary sources of groundwater infiltration from surface contamination at the Site.[217] To limit the Railroads' liability to two-thirds of the contamination on their *own* property would disregard evidence of site-wide operations by B&B and site-wide migration of those contaminants.

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216. *Atchison, Topeka and Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *72 (§ Y, ¶ 187), and *250-58 (¶¶ 472–87).

217. *Id.* Spills of all three chemicals, D-D, dinoseb and Nemagon, regularly occurred on the Railroad parcel. As the Ninth Circuit pointed out, "[a]ll three chemicals were on the Railroad parcel at some time." United States v. Burlington Northern and Santa Fe Ry. Co., 502 F.3d 781, 804 (9th Cir. 2007). However, the district court discounted the government's expert testimony that surface spills on the Railroad parcel reached the groundwater through flaws or cracks in the soil surface, which had been contested by the Railroads' experts. Balancing these competing views, the court concluded that: "The Government's evidence does not establish by a preponderance that the chemical releases contaminated the groundwater under the Railroad parcel *through focused infiltration*." *Atchison, Topeka and Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *255, ¶ 479 (emphasis added). However, the court did find that "[d]inoseb and DCP (a major D-D constituent) were transported to the groundwater by water...[and] there was sufficient water at the Site to dissolve organic liquid spills." *Id.* at *27-8, ¶ 66. The court also found that "it is plausible some surface spills of chemicals on the Railroad parcel reached the waste pond by down-gradient surface water flow." *Id.* at *255, ¶ 479. The pond was a primary source of groundwater infiltration. *Id.* at *35, ¶ 81.

Furthermore, the district court found that: "[t]he evidence establishes by more than a preponderance that *throughout its operations*, B&B personnel spilled chemicals, allowed chemical leakage, and rinsed down equipment, causing hazardous agricultural chemicals to be released to the environment, which *directly caused* the present need for CERCLA remediation."[218] B&B's "operations" included the Railroad parcel.[219] Therefore, B&B is not liable just as an "owner," but as "operator" of the entire Site: its liability for *site-wide* waste disposal would not have been limited to its own parcel but must be presumed to be 100% of the entire Site. Since B&B's percentage of both time and area as an "operator" of the entire site would also be 100%, *further* assigning 100% to B&B for site-wide waste disposal would leave B&B with 100% of the liability, a result in conflict with the Restatement's prohibition against apportionment of a single harm where any one defendant is 100% liable for all of it.[220]

Moreover, the third factor, the waste disposal percentage, is dependent on each of the two space-time factors: it can be expected to vary according to both area of disposal and time period of disposal. Therefore, it is not an *independent* variable appropriate for multiplication; it is really an entirely separate theory of divisibility. The whole purpose of multiplying area by time is to divide the *harm*: to determine how much of the contamination each defendant is responsible for. If on the other hand, waste-disposal evidence *were* available which provided a more accurate and proportional measure of the harm, there would be no purpose to the space-time calculation and the waste evidence would speak for itself.

In effect, the district court in *Burlington Northern* was really grappling with one theory based on space-time parameters and an alternative theory based on waste disposal evidence alone.[221] Given

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218. *Id.* at *72, ¶187 (emphasis added).

219. *Id.* at *8-10, ¶¶ 1-7.

220. *See* RESTATEMENT (SECOND) TORTS § 433A(2) cmt. i (1965) (harms which are normally incapable of any logical, reasonable , or practical division include *where either cause would have been sufficient in itself to bring about the result*) (emphasis added).

221. *See, e.g., Atchison, Topeka and Santa Fe Ry.*, 2003 U.S. Dist. LEXIS at *260, ¶ 489 (court alternatively finds that "the Railroad parcel could not have contributed to more than 10% of the volume or mass of the overall site contamination . . . ." In other words, the court is using a strictly volumetric theory

that the space-time theory requires constants which were not found at the Arvin Site (even distribution of similar waste across the site, uniform disposal of that waste over time), the better theory, if it could be proved, would have been to simply rely on the waste disposal evidence itself, as long as it could be shown it represented a proportional division of the harm. It seems unlikely, however, that in the vast majority of CERCLA cases, the *Burlington Northern* district court's *sua sponte* rough estimate of waste contribution would pass muster for that purpose, since in most cases the parties would have an opportunity to develop the record and advance their arguments concerning the issue of divisibility apportionment—an opportunity which was denied the parties in *Burlington Northern*.[222]

## IV. CONCLUSION

What does the future hold for defendants attempting to establish divisibility of a single harm under *Burlington Northern*? In its *Burlington Northern* opinion, the Supreme Court did not state it was changing the law but rather only affirmed the *existing* standard for divisibility based on longstanding case law and the *Second Restatement of Torts*, Sec. 433A. That standard places the burden on a defendant raising the defense, who must still prove by a preponderance of the evidence that the prerequisites for theoretical apportionment of a single harm are met: that is, at a minimum, that both the harm and its causes are sufficiently proportional to one another, and all the harm is attributable to some cause. At most Superfund sites, simply meeting these threshold criteria will remain difficult due to the commingling of multiple site contaminants with varying toxicity, migratory potential, and synergistic capacities, as well as the possible incompleteness or unreliability of disposal evidence.

The only unusual feature of the opinion regarding divisibility is the Supreme Court's holding that the record supported the district court's

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of apportionment, which gives 10% to the Railroads, to support its area-time theory, which (whether adjusted for waste percentage and uncertainty or not) would have given 9% of site liability to the Railroads.

222. *See* Burlington Northern and Santa Fe Ry. Co. v. United States, 129 S. Ct. 1870, 1883 (2009) (Ginsburg, J., dissenting) ("I would return these cases to the [d]istrict [c]ourt to give all parties a fair opportunity to address that court's endeavor to allocate costs").

method of apportionment, an approach based on resolving the differences among multiple factors, each of which can be viewed as a separate theory of divisibility, through multiplication alone. That method is so foreign to the existing standard of divisibility as articulated by the federal courts, which appear to require an election of such theories as opposed to their integration, as to render its possible future application extremely limited. One could, for example, imagine a factual scenario in which more than one theory of apportionment of a single harm gave close results, requiring only minor adjustments in resolving their differences. Similarly, a space-time theory, *i.e.,* area owned, which by itself is inadequate to apportion liability, may bear a multiplicative relationship to another space-time theory, such as time of operation, which by itself is equally inadequate; but where multiplication of the two, assuming proportionality of both to the harm, would achieve a satisfactory result. However, in most cases multiple theories of divisibility are more likely to give incompatible and divergent results because they may entail incompatible measures, different classes of defendants, and different kinds of harm. In such cases, relying on competing multiple theories may make it impossible for a defendant to make even a threshold theoretical divisibility showing consistent with the principles of *Chem-Dyne* and the Restatement.

Furthermore, should a district court find itself with the need to resolve competing theories of divisibility in a future CERCLA case, unless the factors the court uses are independent, related in space and time *and* proportional to the harm, it cannot use the *Burlington Northern* district court's method without straying from the principles of the Restatement and the *Chem-Dyne* dynasty of federal case law affirmed by the Supreme Court in its opinion. That is because multiplication of *dependent* factors can leave the plaintiff with an unapportioned share, an inherent contradiction since apportionment must account for *all* sources contributing to a single harm. While in most future cases attempting to establish that a divisible harm is capable of apportionment should not entail more than one theory of divisibility, if it becomes necessary to resolve the results of competing theories in an appropriate case, a method should be found that is tailored to the facts and mathematically sound. In that regard, the district court's *Burlington Northern* methodology should be regarded as more cautionary tale than prescription.