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**Geothermal Energy: Problems and Shortcomings of Classification of a Unique Resource - A Look at Problems with Water Law, with Particular Emphasis on New Mexico**

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# COMMENT

## GEOHERMAL ENERGY: PROBLEMS AND SHORTCOMINGS OF CLASSIFICATION OF A UNIQUE RESOURCE—A LOOK AT PROBLEMS WITH WATER LAW, WITH PARTICULAR EMPHASIS ON NEW MEXICO\*

### INTRODUCTION

Geothermal energy is a unique natural resource, and developers have debated for quite some time over its legal classification as a "mineral," as "water," or as a resource impossible to classify into any one area or set of laws.<sup>1</sup> Courts and legislatures have struggled with the problem, and the results have been as varied as the nature of the resource itself.<sup>2</sup> Classification of geothermal resources by the courts, for example, has ranged from its characterization as "gas" for tax depletion allowance purposes,<sup>3</sup> to definition as a "mineral" in order to permit federal ownership of the resource through a federal reservation of the mineral estate.<sup>4</sup>

Although it now appears to be fairly well accepted that geothermal resources do not belong to the surface estate owner,<sup>5</sup> the questions of ownership of and jurisdiction over any *water* found in a geothermal formation are still wide open. For example, it is quite conceivable that the resource may belong to the mineral estate owner as a "mineral," yet the hot water or steam within the system may be recharged by seepage from natural tributary groundwater, thus may be subject to the water laws of the state and possibly to the ownership interest of the surface estate holder. In addition, geothermal resources appear in several different forms, ranging from hot dry rocks to superheated steam. The essence of the resource's value however boils down to pure heat energy.<sup>6</sup> Therefore, the categorizing of

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1. See generally, Bjorge, *The Development of Geothermal Resources and the 1970 Geothermal Steam Act—Law in Search of Definition*, 46 U. COLO. L. REV. 1 (1974); Aidlin, *Representing the Geothermal Resources Client*, 19 ROCKY MT. MIN. L. INST. 27 (1974); Schlauch and Worcester, *Geothermal Resources: A Primer for the Practitioner*, 9 LAND AND WATER L. REV. 327 (1974); Sato & Crocker, *Property Rights to Geothermal Resources*, 6 ECOLOGY L. Q. 247 (1977).

2. For a discussion of various state statutory provisions, see Aidlin, *supra* note 1, and Schlauch & Worcester, *supra* note 1, at 346. For discussion of cases, see *infra* at 8.

3. *Reich v. Commissioner of Internal Revenue*, 454 F.2d 1157 (9th Cir. 1972).

4. *U.S. v. Union Oil Co.*, 549 F.2d 1271 (9th Cir. 1977).

5. *Id.*; *Geothermal Kinetics, Inc. v. Union Oil Co.*, 75 C.A.3d 56, 141 Cal. Rptr. 879 (1977).

6. C. Stone, *The Federal Land Management Program* in ENERGY AND THE LAW (U.S.C. LAW CENTER, 1975); Bjorge *supra* note 1, at 2.

geothermal resources as either mineral or water alone may be impossible—and undesirable.

The legal issues involved with geothermal resources are many and complex, and they vary depending upon whether the resource is located on federal, state or private land. Relevant state or federal statutory provisions must be dealt with, as well as any case law defining the nature of the resource. Developers must be ready to grapple with possible adverse claims by the owner of the mineral estate, the surface estate, and any holders of water rights, who may claim that development of geothermal steam or brine causes an impairment of existing water rights. The following analysis is limited to a review of recent trends in the process of defining the resource, and to examination of treatment of the water that is such an integral part of geothermal resource occurrence in most of its forms. The statutory provisions in New Mexico dealing with geothermal resources are dealt with specifically as an example of the problems of interaction between geothermal resources and water law.

#### NATURE OF THE RESOURCE

In spite of the different definitions given to geothermal energy by courts and legislatures, it is generally accepted that geothermal energy is literally natural heat from the earth.<sup>7</sup> However, many statutes include byproducts of geothermal energy in the definition of the resource. For example, the Federal Geothermal Steam Act of 1970 defines geothermal steam and associated geothermal resources as:

- i. all products of geothermal processes, embracing indigenous steam, hot water and hot brines;
- ii. steam and other gases, hot water and brines resulting from water, gas, or other fluids artificially introduced into geothermal formations;
- iii. heat or other associated energy found in geothermal formations; and
- iv. any byproduct derived from them.<sup>8</sup>

Note that hot water and steam are included in this definition, thus creating potential conflicts with state water laws if the water is recharged by groundwater from the natural stream system of the state. Although federal problems of geothermal development are beyond

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7. Bjorge, *supra* note 1, at 21 citing CAL. PUB. RES. CODE §6903 (West 1956, Supp. 1974); see also N.M. STAT. ANN. §71-5-3A and §19-13-2A (1978).

8. Geothermal Steam Act of 1970, 30 U.S.C. §1001(c) (1970).

the scope of this article, the nature of the potential water law conflict will be explored in the context of New Mexico statutes.<sup>9</sup>

There are four primary forms of geothermal resource occurrence, and a cursory description of each of them serves to demonstrate that a blanket classification of the resource as "water" or "mineral" is impossible. First, the vapor dominated or "dry steam" system is found in the Geysers area of Sonoma County, California and is the subject of the landmark case of *U.S. v. Union Oil Co.*<sup>10</sup> In this system, water heated underground pushes to the surface and flashes into steam.<sup>11</sup> Second, the liquid-dominated or wet-steam field is a system "where pressure conditions are such that the water, though superheated far above ground-level boiling point, surfaces predominantly in liquid form."<sup>12</sup>

A third type of geothermal formation is the hot dry rock system which involves no water at all except that which is injected in order to transport the heat to the surface.<sup>13</sup> Fourth is the geopressured zone, in which superheated water and gas are trapped in sediment and heated by the high pressure.<sup>14</sup> Not all of the geothermal formation types include the occurrence of water or steam, so that an overall classification of geothermal resources as "water" would be "patently absurd."<sup>15</sup>

State statutes vary as to what is included in a definition of geothermal resources and reflect an attempt to deal with the problem of whether geothermal resources should be classified as water or mineral. Idaho defines geothermal resources as neither water or mineral, but as *sui generis*,<sup>16</sup> and Wyoming's definition of groundwater includes geothermal steam.<sup>17</sup> As seen in the New Mexico Geothermal Resources Act, some statutes define the resource as heat. But like the federal act, they include in the definition minerals that may be extracted as byproducts:

- A. Geothermal resources means the natural heat of the earth, or the energy, in whatever form, below the surface of the earth present in, resulting from, created by, or which may be extracted from,

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9. Sato & Crocker, *supra* note 1, at 270-282.

10. Stone, *supra* note 6, at 18; Bjorge *supra* note 1, at 2.

11. Stone, *supra* note 6, at 18.

12. *Id.*

13. *Id.*

14. *Id.*

15. Bjorge, *supra* note 1, at 22.

16. IDAHO CODE §42-4002(c) (Supp. 1973).

17. WYO. STAT. §41-121(b) (Supp. 1973). Wyoming's approach is an interesting one, one which we submit may be a useful model for the New Mexico legislature if used in conjunction with existing geothermal statutes, and modified to correct any inconsistencies.

this natural heat, and all minerals in solution or other products obtained from naturally heated fluids, brines, associated gases and steam, in whatever form, found below the surface of the earth, but excluding oil, hydrocarbon gas and other hydrocarbon substances.<sup>18</sup>

One should note that the New Mexico definition of geothermal resources does not appear to include extracted hot water or steam, but only the heat and byproducts that may be brought up in solution with the water. A discussion of the treatment of heated water or steam found within a geothermal system will be dealt with later in this article.

The classification of geothermal resources will have far-reaching effects on treatment of the resource and on its economic potential for development. If the resource is treated as water alone, it will be subject to state water laws which may fail to account for many of the commercially valuable elements involved in a geothermal formation, such as minerals in solution, gases, and the natural heat itself. If considered solely as a mineral, then ownership of most of the resource will be in the subsurface owner, with the resulting conflicts with water rights and state water law jurisdiction.

The ability of a geothermal developer to know exactly which laws must be complied with and how much water, if any, must be appropriated is crucial to determining the economic feasibility of a project.<sup>19</sup> It is suggested that states with the most lucid, explicit and comprehensive laws in the area of geothermal resources will benefit most from these resources and will encourage development of a relatively efficient and environmentally sound form of energy production.<sup>20</sup> Recent court decisions in the area have failed to provide the certainty necessary for optimum development of the resource, thus making clear statutory directives even more imperative.

#### RECENT CASE LAW

The most recent case law in the area of geothermal resources does not appear, in the long run, to shed much light on the issue of classification of the resource. In *U.S. v. Union Oil Co.*,<sup>21</sup> the ninth circuit reversed a lower federal court ruling that geothermal energy in

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18. N.M. Stat. Ann. §19-13-2A (1978).

19. See Aidlin, *supra* note 1, at 42 for a discussion of problems facing the geothermal industry.

20. See Sato & Crocker, *supra* note 1, at 268; see also 13 GONZ. L. REV. 240, 248 (1977), citing H.R. REP. NO. 91-1544, 91st Cong., 2d Sess. 4, reprinted in [1970] U.S. CODE CONG. & AD. NEWS 5113, 5130.

21. *U.S. v. Union Oil Co.*, *supra* note 4.

the Geysers area of Sonoma County, California is actually superheated steam, which is "water" and which thus belongs to the surface owner. The case arose under the Stock-Raising Homestead Act of 1916, which had reserved the mineral estate of certain federal homestead lands in the federal government.<sup>22</sup> The ninth circuit held, based upon a review of legislative history of the Act, that Congress intended to include all sources of energy in the government's mineral reservation, including geothermal steam.<sup>23</sup>

One should not read the holding of this case too liberally. Such a reading would imply that all geothermal resources are now to be considered as minerals. However, as noted above, some forms of geothermal resource occurrence do not involve steam or water at all. This case involved only the vapor-dominated system, and only in the context of a federally reserved mineral interest. It would be a mistake to extend the holding of this case to apply to all issues of geothermal resource ownership and classification without first gaining a working knowledge of the complexities and many elements involved in geothermal resources. A proper reading of *Union Oil* is one that limits the case fairly closely to its facts, and does not extend this classification of the resource to all forms in which it occurs.

The same holding was reached in a case between private parties in *Geothermal Kinetics, Inc. v. Union Oil Co.*<sup>24</sup> In this case the California Supreme Court held that a deed conveying the mineral estate to Geothermal Kinetics included geothermal resources. The court used the following reasoning: first, in this formation there was minimal interaction with replenishable groundwater; second, water is usually conveyed with the surface estate for domestic purposes, and the geothermal water involved here would be totally useless for that purpose; and finally, separation of geothermal resource ownership based upon whether the resource contained water or not would be impractical and confusing.

Although the court noted correctly the difficulties involved in meting out ownership interests in geothermal resources containing water, it failed to follow the necessary steps to reach that conclusion. When water is part of the resource, especially if it is recharged by the natural stream system, proper analysis of the possible effects and ramifications of a blanket "mineral" characterization must be made.

Another interesting case dealing indirectly with the subject is *Andrus v. Charlestone Stone Products, Inc.*<sup>25</sup> In this recent case the

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22. Stock-Raising Homestead Act of 1916, 43 U.S.C. §291 (1970).

23. *Supra* note 4; *see also* 18 NAT. RES. J. 213 (1978).

24. *Geothermal Kinetics, Inc. v. Union Oil Co.*, *supra* note 5.

25. *Andrus v. Charlestone Stone Products, Inc.*, 436 U.S. 604 (1978).

United States Supreme Court summarily rejected the ninth circuit's reasoning that water is a "locatable mineral." Without any suggestion from counsel or presentation of evidence, the ninth circuit had held *sua sponte* that Charlestone had the right to appropriate and use as a mineral the water found within placer claims, provided use of the water met the two-prong test of value and success in development.<sup>26</sup> The court had concluded upon "a rationale that had not been briefed or argued in either the District Court or the Court of Appeals"<sup>27</sup> that the term "mineral" has no specific definition, and that since early times water has been regarded as a mineral.<sup>28</sup>

As expected,<sup>29</sup> the Supreme Court of the United States reversed the lower court and held that water cannot be considered a valuable locatable mineral.<sup>30</sup> The Court noted the problems of allowing any such valuable substance to be treated as a mineral, and it outlined the practical consequences of overturning the entire separate system of water law:

Many problems would undoubtedly arise simply from the fact of having two overlapping systems for acquisition of private water rights. . . .

[Citing the differences between acquisition of water versus mineral interests:] One can readily imagine the legal conflicts that might arise from these differing approaches if ordinary water were treated as a federally cognizable "mineral." . . . We decline to effect so major an alteration in established legal relationships based on nothing more than an overly literal reading of a statute, without any regard for its context or history.<sup>31</sup>

At this point an interesting inconsistency seems to have arisen between the *Charlestone* and *Union Oil* cases. *Charlestone* holds unequivocally that water is not a mineral, while *Union Oil* and *Geothermal Kinetics* seem to hold in no uncertain terms that geothermal steam or water *is* to be classified as a mineral. Thus the following syllogism may develop:

Major premise: Geothermal steam is water.  
 Minor premise: Water is not a mineral.  
 Conclusion: Geothermal steam is not a mineral.  
 Inconsistency: But geothermal steam really is a mineral!

26. *Charlestone Stone Products, Inc. v. Andrus*, 553 F.2d 1209, 1214 (9th Cir. 1977), cert. granted, 434 U.S. 964 (Nov. 28, 1977).

27. *Andrus v. Charlestone Stone Products, Inc.*, *supra* note 25, at 609.

28. *Charlestone Stone Products, Inc. v. Andrus*, *supra* note 26, at 1215.

29. See especially Hill, *Water as a Locatable Mineral: The Heresy of the Charlestone Case*, N.D. L. REV. 364 (1978).

30. *Andrus v. Charlestone Stone Products, Inc.*, *supra* note 25.

31. *Id.* at 615.

The real effect of *Charlestone* on the classification of geothermal resources may be minimal. All of the holdings seem to be fairly narrow, clarifying the legal status of the resource in a particular fact situation. It is interesting to note, however, that the Supreme Court denied certiorari to *Union Oil* at about the same time it granted certiorari to *Charlestone*,<sup>32</sup> a case coming up from the same court. Perhaps the Court saw the ninth circuit's holding in *Union Oil* as satisfactory, and as limited to its facts. Or did it see geothermal steam as an element so different from "water" in its normal meaning that it did not consider its holding in *Charlestone* to have any effect on geothermal resources? Perhaps the simultaneous denial of certiorari to *Union Oil* implied that the two cases were not to be read as inconsistent. Or was the court merely shortsighted in its perception of the possible inconsistencies between the two cases?

It is interesting to note that in both of the ninth circuit decisions, water, geothermal or otherwise, was found to be a mineral. The fact that the Supreme Court reversed only *Charlestone* does give rise to the implication that geothermal steam and "water" in its normal sense are so different as to require totally different treatment. However, it would seem that an equally logical conclusion is that water, in whatever form it occurs—however potent or palatable—has always been treated legally as "water," and thus the two cases appear inconsistent. In any case, there has been no final resolution of the problem of classification of the resource.

The difficulties with classifying the legal nature of geothermal resources should now be painfully obvious. As many authorities in the field have suggested,<sup>33</sup> resolution of this problem will have to be undertaken largely by the state legislatures through inventive and comprehensive treatment of the resource.

Geothermal energy is neither water nor mineral because it is not a substance at all. But a technical or scientific definition may not be satisfactory for a legal classification. The most productive resolution of the problem would be to classify geothermal energy only after considering the consequences of such classification.<sup>34</sup>

All too often, it appears that the consequences of classification are not fully considered by legislatures, or as demonstrated, by the courts. Even if some type of classification is attempted, the questions of ownership by the mineral versus surface estate holders and juris-

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32. *Cert. denied*, 434 U.S. 930 (1977); *reh. denied* 435 U.S. 911; in *Charlestone* cert was granted Nov. 28, 1977, *supra* note 26.

33. *See especially* articles noted in 1.

34. Bjorge, *supra* note 1, at 23.

diction over the resource remain unclear. In addition, the many forms in which geothermal energy occur and the byproducts involved may, by their nature, cause gaps in the statutory treatment of the resource. This problem becomes most obvious when the legislature remains silent on the treatment of water within a geothermal formation. The following discussion advocates that whatever the final classification of the resource, any water involved must necessarily be treated separately.

#### NEW MEXICO STATUTES

The State of New Mexico, under the Geothermal Resources Act of 1967,<sup>35</sup> is given broad authority over the Commissioner of Public Lands to lease state lands for development of geothermal resources.<sup>36</sup> The Commissioner must classify all "known geothermal resources fields" that are determined to be capable of producing the resource in commercial quantities.<sup>37</sup> Lands with known resource fields are leased by the Commissioner through competitive bidding.<sup>38</sup> Thus the resource has been withdrawn from private acquisition in a manner similar to oil and gas resources.

The Act, however, "contains no determination of rights between surface, water rights and mineral owners."<sup>39</sup> Therefore questions about the nature of the resource and how it is classified for purposes of determining ownership on private lands, and for determining what state agencies and laws have jurisdiction over the resource, remain unanswered by the legislature.

The 1978 New Mexico Executive Reorganization Laws<sup>40</sup> did not clarify these problems. These laws established an Energy and Minerals Department, under whose jurisdiction falls the Geothermal Resources Conservation Act.<sup>41</sup> This act is similar to an earlier 1975 version which regulates geothermal production on private land.<sup>42</sup> Now, however, concurrent jurisdiction over geothermal resource conservation is given to the Oil Conservation Commission and the newly created Oil Conservation Division of the Energy and Minerals Department.<sup>43</sup>

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35. N.M. STAT. ANN. §19-13-1 (1978).

36. *Id.* at §19-13-5.

37. *Id.* at §19-13-6A.

38. *Id.* at §19-13-6B.

39. Schlauch & Worcester, *supra* note 1, at 356.

40. N.M. STAT. ANN. §71-5-1 *et seq.* (1978).

41. *Id.*

42. N.M. STAT. ANN. §65-11-1 *et seq.* (Supp. 1975).

43. N.M. STAT. ANN. §71-5-6 (1978).

The Act provides for regulation of drilling,<sup>44</sup> operation of wells,<sup>45</sup> and control of "disposition of geothermal resources or the residue thereof, and to direct the surface or subsurface disposal of such in a manner that will afford reasonable protection against contamination of all fresh waters and waters of present or probable future value . . ." <sup>46</sup>

Section 71-5-3(G) of the Act includes in the definition of geothermal resources "low temperature thermal reservoirs":

. . . defined as naturally heated water, the temperature of which is less than boiling at the altitude of occurrence, which has additional value by virtue of the heat contained therein, and is found below the surface of the earth, or in warm springs at the surface.

Inclusion of this type of resource may conflict with existing water law since the definition includes surface water that may be in the natural stream system. It should be noted, however, that surface water not included in the system and which seeps back into the ground is not subject to public appropriation but belongs exclusively to the surface owner.<sup>47</sup> Allocation of production may be undertaken "on a reasonable basis and recognizing correlative rights."<sup>48</sup> Pooling of resources is provided for in order to efficiently and economically develop resource areas, and spacing of wells is also provided for<sup>49</sup> in a manner similar to oil and gas resource allocation.<sup>50</sup>

Correlative rights are defined in § 71-5-3(C) as:

. . . the opportunity afforded, insofar as is practicable to do so, to the owner of each property in a geothermal reservoir to produce his just and equitable share of the geothermal resources within such reservoir, being an amount, so far as can be practicably determined, and so far as can be practicably obtained without waste, substantially in the proportion that the recoverable geothermal resources under such property bears to the total recoverable geothermal resources in the reservoir, and for such purposes to use his just and equitable share of the natural heat or energy in the reservoir.

This type of resource allocation is also bound to conflict with any

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44. *Id.* at § 71-5-2, 8F.

45. *Id.* at § 71-5-8C, 10, 11.

46. *Id.* at § 71-5-8M.

47. *Burgett v. Calentine*, 56 N.M. 194, 242 P.2d 276 (1951).

48. N.M. STAT. ANN. § 71-5-10A (1978).

49. *Id.* at § 71-5-11.

50. *See* N.M. STAT. ANN. § 70-2-15 through 18 (1978). These sections deal with oil and gas well pooling and spacing, and the statutory provisions are quite similar to the provisions for geothermal resources.

water rights involved, as those rights are based upon priority in time and beneficial use, not upon surface acreage covering the resource. Thus, once again the gaps and overlaps in statutory treatment of the resource are apparent.

New Mexico law has extensively covered geothermal resources in terms of leasing on state lands, and in terms of general conservation and production allocation. But it does not deal with the issues of resource ownership as between surface and mineral estates, or with water rights to geothermal waters. The first of these issues may be considered resolved if one implies from the statutory scheme that, since leasing of the resource and its allocation is done in a manner similar to oil and gas and other "mineral" resources, then it is also considered part of the mineral estate. In fact, reading the statutes and cases such as *Union Oil* together, it seems doubtful that one could still seriously contend that geothermal resources belong to the surface and not the mineral estate owner.<sup>51</sup>

Even if the question of ownership of the resource as between surface and mineral estate holders can be resolved by case law and statutory construction, serious questions still arise when considering the status of water that is found and used from a geothermal field. Of course, if the resource is of the "hot dry rock" variety, then water law questions will not arise. Any water used for transportation of the heat to the surface must naturally be appropriated. The problem arises with the more abundant forms of geothermal energy<sup>52</sup> involving hot water or steam found naturally within the system.

As mentioned, the New Mexico definition of geothermal resources does not expressly include water or steam found in a formation. The definition includes "natural heat of the earth, or the energy, *in whatever form*" resulting from or present in the natural heat.<sup>53</sup> It also includes "all minerals *in solution* or other products obtained from naturally heated *fluids, brines*, associated gases and *steam*, in whatever form . . ."<sup>54</sup> (emphasis added). Nowhere in the definition of the resource is water expressly included, except as the transmitting agent of the resource. The question of ownership of and jurisdiction over the water within the system is thus left open.

Other statutory provisions seem to imply that water is not in-

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51. The title of § 71-5-3: "Spacing Unit with Divided *Mineral Ownership*" (emphasis added) makes the implication even more clear, even though the statute itself does not refer again to "mineral ownership," but only to "lands" with geothermal wells.

52. Stone, *supra* note 6, at 18, stating that liquid-dominated systems comprise the vast majority of geothermal formations.

53. N.M. STAT. ANN. § 71-5-3A (1978).

54. *Id.*

cluded as part of "geothermal resources." For example, section 71-5-6 of the Conservation Act expressly provides: "[N]othing in this section shall be construed to supercede the authority which any state department or agency has with respect to the management, protection and utilization of the state lands or resources under its jurisdiction." This section may well be interpreted by the State Engineer to be an implied mandate to assume jurisdiction over all water within a geothermal system. The only specific statutory reference to water is found in section 71-5-8M, in which regulation of disposal is provided for in order to protect against "contamination of all fresh waters and waters of present or probable future value . . ." This section does not, however, relate in any way to the initial use and/or acquisition of the water.

### THE WATER TREATMENT PROBLEM

Assuming now that the definition of geothermal resources in New Mexico does not include water in any form, then several approaches to the problem of dealing with geothermal water are available. These approaches will, of course, depend upon whether water in a geothermal formation is depletable and nontributary, or whether it is connected to the natural tributary water system in the state.

#### *Nontributary Water*

If the water in a system is nontributary, that is, it is not connected in any way with the natural stream system of the state, then it appears that there are four possible ways to acquire and use the water in a geothermal formation without interference from state water law requirements. One approach would be to argue that the waters are "artificial" or "developed" waters; a second is that geothermal developers are merely using "dewatering" methods of mining which do not fall under the State Engineer's jurisdiction. Third, one may argue that the formation is not subject to permit requirements if the underground water is not a declared basin; and finally, that geothermal water is a substance so totally different than water in its normal meaning that it is not a resource that the state intended to regulate with water laws.

The first approach, that the waters are "developed," may be based upon *Hagerman Irrig. Co. v. East Grand Plains Drainage Dist.*<sup>55</sup> In this New Mexico case, the extra water usable as a result of installing

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55. *Hagerman Irr. Co. v. East Grand Plains Drainage Dist.*, 25 N.M. 649, 187 P. 555 (1920).

ceramic drain tiles was treated as "artificial water." The creator of these waters was held to be their absolute owner as long as they remained on the owner's property.<sup>56</sup> Artificial waters have since been defined by the New Mexico legislature as "... waters whose appearance or accumulation is due to escape, seepage, loss, waste, drainage, or percolation from constructed works, either directly or indirectly, and which depend for their continuance upon the acts of man."<sup>57</sup> Even with this specific statutory definition, however, artificial waters are often analogized to "developed" waters, which are more generally:

... those that have been added to a stream by man, generally from subterranean sources or from seepage that was previously prevented from reaching the stream. They are universally held to belong to the person who by his labors has made them available.<sup>58</sup>

Steam, brine or hot water extracted from the earth through the efforts of the geothermal developer can thus be seen as developed waters, owned and controlled exclusively by the developer.

This [developed] water is accorded special treatment under the appropriation doctrine and the appropriator is given a free rein as to the use of such water. That is, he may use, reuse, cease to use, or make any disposition he pleases of the water, on the theory that no other appropriator will be harmed thereby since, but for the efforts of the appropriator, this water would not have been available. On this theory, the water derived from a geothermal resource would not be subject to the same controls as would tributary water, but the producer of such water must be prepared to overcome the characteristic presumption that the water is tributary, and to prove the non-tributary nature of the water.<sup>59</sup>

Another approach available to the geothermal developer is to analogize the extraction of the hot water or steam to the mine dewatering process. This process is currently widely used by uranium mining operations in New Mexico, and the lack of state water law jurisdiction over it allows the extraction of enormous quantities of water without any restrictions or regulation. This unrestricted use of precious water by mining operations has been widely criticized, however, and it appears that the push to require regulation of mine dewatering has begun.<sup>60</sup> However, until dewatering is regulated by

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56. *Id.*

57. N.M. STAT. ANN. § 72-5-27 (1978).

58. F. TRELEASE, WATER LAW (2d ed. 1974).

59. Schlauch & Worcester, *supra* note 1, at 361.

60. Senate Bill 110, relating to dewatering, had been introduced by Senator Tito Chavez in the 34th New Mexico legislative session at the time of this article's printing. The bill states:

legislative mandate, geothermal developers have a strong argument that extraction of water from a geothermal formation is simply a form of dewatering and thus not subject to state laws.

A third approach, perhaps the most certain way to avoid state law jurisdiction, arises if the water within the geothermal system is not in a "declared basin" in the state. If the formation is not a declared basin (and chances are that it will not be so declared, at least for the State Engineer's purposes to date), then no permit to appropriate the water is required: "No permit and license to appropriate underground water shall be required except in basins declared by the State Engineer to have reasonably ascertainable boundaries."<sup>61</sup> N.M. Stat. Ann. § 72-12-25 further excludes all nonpotable aquifers with a "top" below 2,500 feet from the jurisdiction of the State Engineer's office. This relief from formal appropriation requirements may be temporary, however, since section 72-11-27 of the Water Code provides that once the State Engineer does declare a basin, the person drilling in that basin shall have ninety days from declaration in which to file plans of development for beneficial use. The issue may then become whether extraction of water simply to obtain the heat therein is a "beneficial use"—and whether use of the water to transmit heat, with subsequent reinjection into the formation is an "appropriation."

A final argument against state regulation of geothermal waters is that these waters are so different in nature from other waters that they should not be treated as water at all. A geothermal developer might "claim that the geothermal fluid is not the same 'water' whose use the State Engineer regulates, but a substance 'sui generis.'"<sup>62</sup> This may have been the reasoning underlying the holding of the *Union Oil* case, as the ninth circuit and the California Supreme Court seemed to disregard the possibility that the geothermal steam water involved may be separable from the other elements of the geothermal formation. This may indeed be a strong argument against state regulation of nontributary geothermal water, but it would not be at

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A diversion of underground waters in declared underground basins made for the purpose of de-watering a mine is not waste per se, but is subject to all of the administrative procedures and laws relating to the appropriation of underground waters, except that no water rights may be established by a diversion for the sole purpose of de-watering a mine. The provisions of this section shall not apply to or prevent the immediate de-watering of a mine in emergency flooding situations.

The bill allocates \$25,000 to the water resources division of the natural resources department in order to carry out the act provisions. As of mid-February, 1979, however, this bill had been tabled indefinitely.

61. N.M. STAT. ANN. § 72-12-20 (1978).

62. Stone, *supra* note 6, at 239.

all satisfactory if the formation is recharged by water from outside the formation.<sup>63</sup>

### *Tributary Water*

If the water in a geothermal formation interacts in any way with the natural underground or surface stream system, then regulation by the State Engineer is probably unavoidable. It is unclear at present how much, if any, interaction takes place between groundwater and water found in a geothermal system. "At present no one has been able to conclusively determine whether or not geothermal aquifers 'recharge' some or all conventional sources over long periods of time."<sup>64</sup> Some authorities believe that recharge or seepage of some form or another is almost always present in a geothermal system involving water or steam.

Water that interacts with the natural stream system becomes part of the public water that is subject to appropriation for beneficial use,<sup>65</sup> and a permit is required to appropriate such water, whether it be surface or groundwater.<sup>66</sup> In order to drill a well for appropriation of water from an underground source above 2,500 feet, a permit from the State Engineer is required,<sup>67</sup> but only "in basins declared by the state engineer to have reasonably ascertainable boundaries,"<sup>68</sup> as mentioned. Thus, unless the legislature expressly excludes geothermal water from the State Engineer's jurisdiction, it appears that he must necessarily have jurisdiction unless the water is in an area which has not been made a formally declared basin.

### CONCLUSION

Classification of geothermal resources may not be any easier after *Union Oil* and like cases. Courts consistently seem to ignore the fact that geothermal resources include several elements, among them heat, water and minerals. Each must be dealt with separately so that developers will be aware of what interests they are acquiring and with what laws they must comply. State statutes such as New Mexico's ameliorate the situation somewhat by defining and regulating production of the resource, but they leave unanswered major questions, especially in the treatment of water within a geothermal for-

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63. *Id.* at 246.

64. *Id.* at 242.

65. N.M. STAT. ANN. § 72-12-18 (1978); N.M. CONST. Art. XVI, § 2.

66. N.M. STAT. ANN. § 72-5-1 and § 72-12-3 (1978).

67. N.M. STAT. ANN. § 72-12-13 (1978).

68. *Id.* at § 72-12-20.

mation. Each element of the "geothermal resources" should be dealt with explicitly in order to clarify ownership of and jurisdiction over the resource. If this is not done, then confusion and litigation over development of the resource will continue.

The legal treatment of geothermal resources need not be dealt with in a vague and cursory manner. Classification of geothermal resources need not be an agonizing or even a necessary process, as long as each element of the multi-faceted resource is dealt with expressly by the legislatures. Although geothermal "energy" is really only natural heat, the water or minerals involved in the underground heating process are inextricably bound up in the extraction and use of the heat. Their presence and commercial value as heat transmitters or as commercially valuable resources in and of themselves cannot be ignored by courts and legislatures.

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