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Delineating property rights in unconventional hydrocarbon resources: Concepts from the United States and Germany

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ABSTRACT

The use of hydraulic fracturing (fracking) and horizontal drilling technologies for recovering unconventional hydrocarbons (oil and gas) has created issues concerning the rights of property owners, energy companies, and others involved with the development and distribution of these resources. Constitutional provisions, legislative statutes, and jurisprudence on liability in the United States and Germany affect rights to oil and gas resources and the profitability of developing these resources. Legal rules for trespass, the rule of capture, pooling, unitization, and municipal fracturing bans circumscribe property rights associated with shale gas development in the United States. Germany, until setting up a specific, long-term legal regime on hydraulic fracturing, will rely on existing mining, water, and environmental legislation (as most recently modified). The evaluation of the law and jurisprudence governing unconventional hydrocarbon development in the U.S. and Germany discloses perceptions and expectations that contribute to widespread extraction in the U.S. while Germany contemplates the safety of allowing hydraulic fracturing.

1. Introduction

In the past decade, the United States and Canada have proceeded to develop significant quantities of unconventional hydrocarbons, especially shale gas. More than 487,000 wells are producing gas in the United States [77]. In Germany and other European countries, concerns about negative externalities to people and the environment have precluded commercial development of shale gas resources even though the consumer price of natural gas is double that of the United States [37]. While considerable opposition to hydraulic fracturing exists in both North America and Europe, the different approaches have been influenced by constitutional and statutory provisions governing property rights and liabilities associated with shale gas resources.

Under the U.S. Constitution, property owners have rights that are enforceable against non-owners. For example, lessees are liable under trespass law for leaving contaminants on leased properties [47]. Private property rights in the U.S. extend to mineral resources underneath one's property. Owners of rights to oil and gas resources in the U.S. enter contracts with companies desiring to develop these resources. This often is the surface property owner, but in some areas ownership rights may be divided between surface owners and owners of the underground mineral resources. Over the past century, individual U.S. states adopted statutes concerning underground drainage of oil and gas from neighboring properties, drilling too many wells, and removing oil and gas too quickly to the detriment of maximizing total production over time. Well spacing and polling statutes are two examples [52,75]. These statutes act to reconcile the rights of individuals with those of neighboring property owners within the parameters of trespass law and the protection of private property rights by the "Takings Clauses" of the U.S. and state constitutions. For situations in which pollutants cause damages, injured plaintiffs may establish liability under causes of action in negligence, nuisance, or a pollution statute [33].

In Germany, section 905 of the Civil Code states that private property, as a matter of principle, extends to areas below the surface [5]. However, the Federal Mining Act *(Bundesberggesetz – BBergG)* [4] exempts certain natural resources such as oil and gas from that property by labeling them as *bergfrei*, essentially stipulating a rule of capture, albeit subject to tight governmental regulation. This is considered to be in line with Article 14 of the German Basic law guaranteeing private property as defined through legislation [2]. Within this framework, the German government may collect royalty payments from companies licensed to extract oil and gas (so-called *Feldes- und Förderabgabe*) while owners of private prop-

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erty above the respective mining sites may receive no payments. Ambitious rules for pollution control are in place which are based on a high level of environmental and health protection and a precautionary approach [38]. Property adds a subjective dimension to this protection by conferring rights on neighboring landowners adversely affected by mining activities [3] pp. 255 et seq.,[49] pp. 202 et seq. Hence, from a business perspective, German property law appears to inhibit rather than incentivize hydraulic fracturing. One might add that property law makes landowners more likely to act as environmental advocates, as their neighbors' rights may often correspond to general environmental or health concerns.

An evaluation of legal institutions in the United States and Germany discloses that constitutional and statutory provisions governing property rights can affect the development of unconventional hydrocarbon resources. Assignments of property rights and safeguards concerning environmental and health risks posed by extraction technologies have led to the commercial development of shale gas resources in the United States while Germany is still deciding whether development should proceed. The emphasis of this paper should not distract from other important aspects such as the dominant public idea of the right energy mix (as expressed in the German "Energiewende") and the assessment of environmental risks, which may differ considerably between the U.S. and Germany. However, this analysis suggests that the allocation of property rights also matters and intends to show and compare options in reconciling competing property rights and environmental quality that other countries might consider in discerning whether and how to develop their shale gas resources.

Because the U.S. has developed significant unconventional hydrocarbon resources, the first part of the paper examines the U.S. state institutions that have contributed to the regulation of risks and property rights of persons connected to and affected by these resources. Over the past century, U.S. state jurisprudence has fostered the development of oil and gas resources. The economic benefits associated with this development supported rules that defined property rights to augment production. The second part of the paper discloses a very different situation in Germany where potential development of unconventional hydrocarbons would have to occur within the context of the *Energiewende*. An accounting of pertinent law and jurisprudence governing development as well as the most recent temporary reform legislation explain whether this appears realistic at all. While examining the frameworks overseeing development of oil and gas resources in the U.S. and Germany, public perceptions and expectations help explain why countries adopt different approaches.

2. The U.S. institutions

Under U.S. property law, boundaries on the surface often are used to demarcate ownership rights to the mineral rights underneath. Reserves of shale gas deep underground do not follow these recognized property boundaries and U.S. state governments have developed legal institutions to respond to issues regarding trespasses, property rights, and the conservation of gas resources. These institutions reconcile competing property rights in a manner that support the development of shale gas resources. Four issues affecting property rights may be discussed to delineate ownership rights and liability. First, property rights concerning the migration of fugitive oil and gas resources underground are delineated. Second, legislative provisions enhancing the recovery of oil and gas resources without effecting an unconstitutional "taking" of private property under the Fifth Amendment of the U.S. Constitution or a state constitution are identified. This is followed by an analysis of jurisdictive bans of hydraulic fracturing that preclude persons from developing their oil and gas resources. The last section evaluates liability rules for health and pollution damages to identify how they affect the economic viability of shale gas production.

2.1. Oil and gas flows and the rule of capture

The extraction of hydrocarbons from underground reservoirs often causes oil or gas resources from neighboring properties to migrate across property boundaries to the wellbore. To respond to the argument that this flow from neighboring properties constitutes a trespass, U.S. state governments adopted the rule of capture. Possession of the land may include possession of the hydrocarbons underneath, but fugitive oil or gas resources belong to the owner of the land only if they are on (within) it and subject to the owner's control. Persons drilling wells acquire title to the oil or gas produced from the well, including hydrocarbons that flow underground from adjoining lands to the wellbore [40]. Thereby, the rule of capture fosters the development of oil and gas resources by allowing all of the oil or gas at a well site to become the property of the owner or lessee of the property. Underground oil and gas resources on neighboring properties may be diminished if a well is developed nearby.

A more difficult question is presented when a wellbore or proppants extend under a neighbor's property. The Texas Supreme Court noted that permission to drill a well is not accompanied by blanket immunity from trespass liability [21]. A West Virginia court suggests that if hydraulic fracturing extended underneath property of a neighbor without permission, it would constitute an actionable trespass [72]. However, a North Dakota court noted that a horizontal wellbore under a neighboring property within a designated pool would not constitute a trespass as the pooling agreement contemplated such an intrusion [16].

While the rule of capture encourages the development and production of oil and gas resources, it is accompanied by two major problems. First, it encourages overdrilling [40]. Neighbors are encouraged to drill wells to extract hydrocarbon resources and garner profits. This may result in unnecessary well-drilling expenses if property owners drill more wells than are needed to effectively extract hydrocarbon resources. Governments respond to this problem by enacting well spacing requirements that delineate the size of an area that can be effectively drained by a well (i.e., [52] tit. 52, § 87.1).

Second, the rule of capture encourages extraction at too rapid a rate. A well owner may attempt to capture migrating underground oil and gas resources from neighboring properties by producing as much oil or gas as possible. This can result in a failure to maintain proper pressure levels in the reservoir that can lead to the dissipation of a reservoir's natural energy and reductions in total quantities of hydrocarbons recovered [40]. U.S. state governments have enacted unitization statutes to address this problem [75] ch. 52.

Overdrilling and too rapid extraction under the rule of capture result in inefficiencies that adversely affect total revenue to property owners and energy companies. Moreover, since many state governments impose severance taxes on extracted oil and gas resources, the rule of capture may also reduce state revenues [59]. U.S. state governments have responded to the problems associated with the rule of capture with conservation statutes enumerating correlative rights [40]. Correlative rights recognize the opportunity of each owner of oil and gas resources in a pool to produce a just and equitable share without waste [31]. This operates to preclude pumping too much from a well to the detriment of total overall production and may lead to uniform spacing requirements for wells throughout a given well field [58]. Moreover, each owner has rights and duties with regard to other owners in an oil and gas reservoir. An owner cannot unreasonably interfere with the use of surrounding lands [58]. While the rule of capture serves as a start-