Fundamentals of royalty rate determination in the crushed stone industry with a special reference to northeast Illinois

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Background

The Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) intends to sign contractual agreements with a mining/quarrying company to have it extract and sell limestone/dolomite from an MWRDGC property and subsequently use the open pit for temporary storage of storm water. In order to be able to negotiate the terms of agreement based on the best objective market information, the MWRDGC approached the Illinois State Geological Survey (ISGS) and the authors for a written report. The charge of the investigation was to study the following three questions:

1) How does the stone quality and geology in the area concerned compare with the currently mined stone?

2) What is the range of royalties paid by mining companies to the owners of the stone resources, nationally, in Illinois and, in northern Illinois?

3) What are the pros and cons of considering the involvement of a third party mining company instead of Vulcan?

This report elaborates the answers to the above questions.

1) How does the stone quality and geology in the area concerned compare with the currently mined stone?

Geology

Several areas of northeastern Illinois (Elgin, Plainfield, Joliet) were identified as containing quarries operating under royalty agreements. The geology of the rock units quarried in these areas was examined to determine the presence of geological differences that might have a significant impact on royalty rate comparisons between these sites and the McCook Quarry /MWRDGC Reservoir area.

McCook

The Vulcan McCook Quarry and boring logs from the MWRDGC site all exhibit the same general Silurian rock succession from bedrock surface to the underlying Ordovician shales: Racine Dolomite, Sugar Run Dolomite, Joliet Dolomite, Kankakee Dolomite, Elwood Dolomite, and the Wilhelmi Formation (most of the Elwood and Wilhelmi have not been quarried). Throughout the McCook area these units are

very consistent in character with the exception of the Racine as described in Mikulic et.al.,1985. Specifically the Racine in the northern part of the Vulcan property locally contains reefs which are a higher purity dolomite than the surrounding non-reef rock and might have a higher value for rock products in which chemical purity is needed. There is no evidence of reef deposits on the MWRDGC property or along the east wall of the Vulcan pit and the Racine is likely to have the same characteristics through this area as that currently being quarried in the main (south) Vulcan pit.

Kane and Will Counties

Quarries in Kane and Will Counties, which might be operating with royalty agreements, were examined to establish which Silurian rock units were being quarried and to determine if there were any significant differences in the geological characteristics of those units compared to those quarried in the McCook area. Near Elgin two operations were found to quarry the basal Joliet, the Kankakee, and possibly the upper Elwood. The Wilhelmi is absent at both sites. At Plainfield four quarries operate in the basal Joliet, Kankakee, and upper Elwood formations with a unquarried Wilhelmi interval similar to that in the McCook area. Near Joliet two quarries currently operate in the Joliet and Kankakee although other units have been locally used in the past. In all three areas the Joliet and Kankakee are very similar in geologic character to that exhibited in the McCook area and specifically to the McCook Quarry. The major difference among the sites, of course, is the presence of the entire Joliet, Sugar Run, and Racine formations at McCook which are not presence in the operating quarries of the Elgin, Plainfield, and Joliet areas. One other site which is possibly operating under a royalty agreement (the Conco-Western mine at North Aurora) was also considered but is only operating in the underlying Ordovician dolomites of the Galena Group which are not a mining target at the MWRDGC.

Conclusion

In conclusion the rock units quarried near Elgin, Plainfield, and Joliet are similar in geologic character to that quarried in Vulcan's McCook quarry and that described in the MWRDGC Reservoir site cores that were previously examined. Therefore the rock of these units is not likely to be of a significantly

higher or lower quality at than that occurring at the MWRDGC site.

2) What is the range of royalties paid by mining companies to the owners of the stone resources, nationally, in Illinois and, in northern Illinois?

Payments to landowners or to owners of mineral rights can be made in various forms. Royalty per ton of material mined is one form of payment. Another form of payment is reflected in the price of land per acre when the mining company purchases the land instead of leasing it for mining purposes. Royalty payment agreements are fundamentally the result of negotiations between the parties involved. A number of market related factors influence the strength of negotiating positions as discussed below.

Stone quality: Crushed stone quality best suited for the construction industry improves construction quality and ultimately saves money. In northern Illinois, most desirable stone is of the dolomitic variety. Dolomite is also in demand in other parts of the State. Chicago area dolomite such as the deposits mined at Vulcan's McCook quarry is of highly desirable quality.

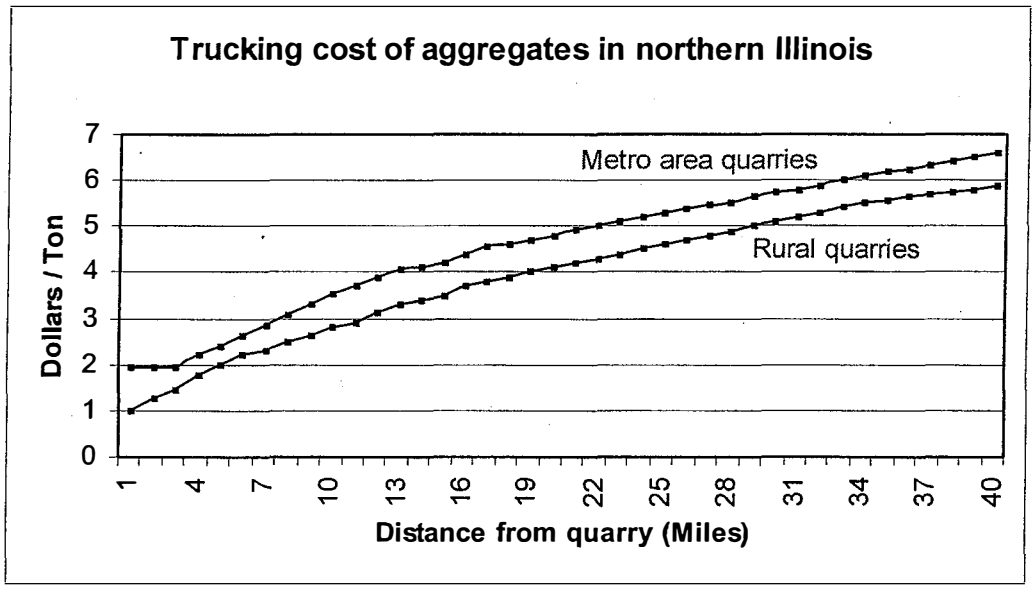
Land value: The alternative uses of land bearing the stone resource deposits affect the royalty payment in a significant way because the land owner (lessor) attempts to capture the opportunity costs in the transaction. The higher the price of land for uses other than mining, the higher the royalty expected by the lessor. Therefore, rural land primarily used for agricultural purposes may be priced lower than urban land that can be used for industrial, suburban or infra-structural development.

Quantity of reserves: Land value is directly influenced by the quantity of stone reserves in every acre of land or , in other words, by the thickness of mineable deposits. Another reason for quantity affecting the land value is the life expectancy of the mining operation. Larger quantity per acre extends the life-span of the mining operations at the site and makes investments economically more feasible.

Market conditions: Proximity of stone markets for construction and the demand size have a major influence on royalty payments. This factor may increase or decrease the ability of the lessor to demand greater royalty payment depending upon where the demand is and how large it is. An important market parameter is the timing of royalty agreement. If the agreement is signed in a year of exceedingly

high market demand the royalty rate could be much higher than if the agreement is signed in a recessionary year. A revision clause is often included in the royalty agreement by mutual consent in order to account for changing market conditions. Such a clause can be in either party 's interest under appropriate circumstances.

Location: All real estate value depends on location. In case of mining the location is predetermined by nature. Also, unlike housing, quarry locations in relation to the markets determine how much transportation cost will have to be paid by the customer. Transportation costs can double the delivered price of stone within 20 miles from the quarry. (See chart below). Quarry locations closer to the market thus have a competitive advantage that could affect the producer's willingness to pay a higher rate of royalty.



Contractual conditions: Leasing agreements between a landowner and a mining company some times include conditions other than mineral royalty payments that can have an impact on how much royalty is paid. For example, the landowner may offer to pay fully or in part for the preparation of the property for mining, removing the overburden, storing the removed overburden on adjacent property of the same

owner and reclaiming the land according to the prev ailing laws after mining is completed. Another modification to the contractual conditions som etimes takes the form of a follow-up contract between the landowner and the m ining company to prepare the mined out area for a different subsequent use. The profit potential of such contracts and the financial participation of the land owner in pre-m ining preparatory work could be reasons for higher than norm al royalty payments to the landowner.

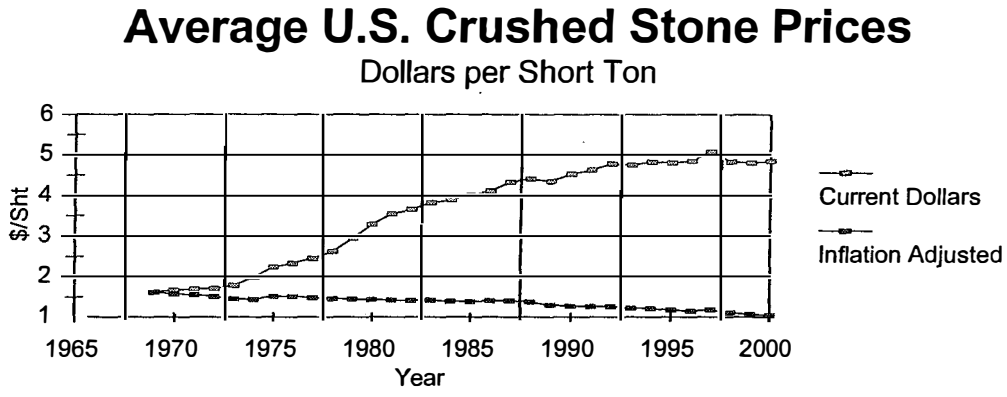
What do we know about royalty rates in the crushed stone industry?

The table below sum marizes information available from publications and personal communications regarding roy alty agreements in the United States crushed stone industry . The data must be seen in relation to tim e and the prevailing stone prices. Therefore, the average prices of crushed stone in the U.S. are listed in the right colum n. Details of royalty agreements are not available. As a result, it is not known whether the agreem ents were open to re-negotiations as m arket conditions changed. Royalty agreements are often renegotiable. Most agreements listed here are roy alty agreements, as against purchase agreem ents sometimes interpreted as payments per ton.

Renegotiation of royalty agreements can have a different significance to the landowner and the mine operator. W hile the value of land may depend upon factors such as urban growth and thus af fect the landowner's ex pectations of the royalty income he/she expects from the mineral leasing, the m ine operator works in the environment of the stone markets and his/her willingness to pay royalty is influenced by the "real" price (inflation adjusted) of stone. For example: Some of the royalty rates from 1969 or 1970 listed below indicate v ery high rates in terms of percent of market price at the time of signing. Decades later, howev er, the same royalty payment constitutes a much smaller percentage of the market price while suburban land prices m ay have increased substantially . As a result, the landowner may want to renegotiate the agreem ent and increase the roy alty payment. However, as the chart below indicates, the m ine operator may disagree because in inf lation adjusted term s the price of stone has actually declined significantly in the past three decades. O nly negotiations can lead to a meeting of the minds in such cases.

Roughly two-thirds of the agreements in the table are for payments in dollars per ton. O ne-third

of the agreements are for payments in percent of sales price. The implication of a dollars per ton agreement is that the payment so made declines in percent of price as the price increases. For example: The 1969 agreement from Michigan amounted to a royalty rate of 37% of the then average



price of stone. If it remained unchanged, the same payment would constitute a 12% payment in year 2000. Similarly, the 1972 agreement in the Midwest region for the payment of $0.50 per ton was equivalent to a 30% royalty rate at the price of stone prevailing in 1972 but would be equivalent to about a 10% rate today. In general, the outright purchase agreements seem to pay a higher royalty rate than the per ton agreement.

Royalty agreements in the U.S. crushed stone industry.

Year	State	Royalty	Rate	Average price of stone in US
		$/t	%	$/sht
1969	MI	0.60		1.62
1970				1.67
1971	KY		3.5	1.70
1972	Midwest	0.50		1.71
1973				1.78
1974				1.99
1975				2.23
1976				2.33
1977	MO	0.10		2.45
1978				2.62
1979	NC	0.25		2.95
1980	PA	0.18		3.29
	WV	0.15		
	Midwest		11.25	

1981	IN		5	3.56
1982	CO	0.35		3.66
	NV	0.40		
	NJ	0.40		
	SC		3	
	Northeast		4.5	
1983	MI		3	3.83
	MO	0.25		
	NM	0.60		
1984				3.90
1985	AR	0.08		4.01
	GA	0.20		
	IL	0.40		
	IN		5.5	
	MI		5	
	MI	0.80		
	SCentral		3.25	
1986	AL	0.15		4.12
	AL		5	
	GA	0.18		
	NC		4.25	
	TN	0.09		
	VA		5	
1987	MI	0.55		4.34
	MI	0.50		
	MI	0.50		
1988	IL	0.15		4.42
	SC		5	
1989				4.36
1990	GA	0.14		4.54
	UT	0.30		
1991	CA	0.35		4.64
	AZ	0.22		
	MI	0.23		
	NV	0.28		
	NM	0.24		
	NC		4.5	
	OK	0.38		
	VA		5	
	WY	0.13		
1992	CO	1.00		4.79
	ME	0.40		
	MA	0.48		
	NH	0.25		
	NY	0.60		
	OK	0.30		
	OK	0.11		
	VT	0.25		
1993	FL	0.37		4.76
	FL		6	
	TX	0.24		
	WA		4	

1994				4.84
1995	VA		3	4.82
1996				4.86
1997				5.09
1998		0.40		4.84
1999				4.82
2000	NE-Illinois	0.45		4.86
	NE-Illinois	0.37		
	NE-Illinois		10	

Sources: 1) Bourne, H. Lyn 1996. What it's worth: A review of mineral royalty information. Mining Engineering, July 1996, pages 35-38. 2) Personal communications from Art Pincombe (Consultant),Lyndon Dean (Retired Geologist) and MWRDGC.

The data in the table above seem to indicate that a majority of percent payment agreements were signed in the 1980s. Later agreements are primarily on dollars per ton basis. The range of agreements varies from $0.08 to $1.00per ton, and from 3% to 11.25% of market price. No uniform conclusion can be drawn from these data regarding a single "prevailing" rate because of the conditions surrounding the contracts and the specific situation of each contract. We recommend that the influencing factors discussed in the previous section be carefully considered and weighed in determining the specific royalty rate to be accepted through negotiations.

3) What are the pros and cons of considering the involvement of a third party mining company instead of Vulcan?

Vulcan's McCook quarry is adjacent to the MWRDGC's concerned property. It offers additional stone reserves equivalent to some 15 years of current annual production at McCook, extending the life of current operations at a location close to the Chicago metropolitan markets. It would be detrimental from Vulcan's point of view to have a competing stone producer next door.

The intended time plan foresees mining on MWRDGC land at an annual rate equal to the current McCook quarry's production, in effect replacing McCook production. A third party mining operation would add a large quantity to the total market, increasing the supply significantly and possibly depressing the price of stone. The magnitude of price decline will depend on how and where total demand will increase in the future. As a consequence of the additional stone on the market other stone

producers may lose business and possibly close quarries. In view of the already difficult situation in obtaining new quarry permits a reduction in the number of quarries in the area could pose a supply problem in the future when mining on MWRDGC land must be completed and the space utilized for storm water storage. For the same reason any positive impact on employment would be small and limited to the 15 year duration of the operation.

A new mining company would have to use parts of MWRDGC land for surface facilities and access roads, thereby reducing total extraction and limiting the size of reservoir available for water storage. On the other hand there would be no need to pay for the access tunnels, crushers etc. currently under consideration from the existing McCook quarry. Up-front payments of this nature considerably reduce the value of future royalties received. The net result of the two features is the real royalty received. Not having to pay up-front for the tunnels and crushers would be a considerable reduction in financial burden for MWRDGC and would have the effect of normalizing royalty negotiations with a new operator.

The search for and negotiations with an alternate mining company would require much time. MWRDGC would need to consider whether such time is available and affordable. The opportunity cost of taking care of the storm water problem for a longer period of time due to negotiating time consumed in the process.

Reference:

Mikulic, Donald G., Sargent, Michael L., Norby, Rodney D. and Kolata, Dennis, R. 1985. Silurian Geology of the Des Plaines River Valley, Northeastern Illinois ,Nineteenth Annual Meeting, North-Central Section of the Geological Society of America, Northern Illinois University, April 25-27, De Kalb, Illinois. 56 p., 22 figs. (ISGS Guidebook 17, 1985.)