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OTIS BASIN DIATOMITE

Harney County, Oregon

Foreword: Of all the many occurrences of diatomite there are in eastern Oregon, those in the Otis Basin of Harney County have been long recognized as one of the leading candidates for commercial development because of the manifestly large amount of massively bedded material available for mining under circumstances involving good-overall quarrying conditions. Indeed, the nature of the Otis Basin occurrences in these respects is such that despite the distance from rail facilities (16 miles) the former Great Lakes Carbon Corporation (Dicalite Division) conducted an extensive explorations project in the area over a span of two years (1954-1955) before closing down their Terrebonne (Oregon) plant and committing their attention to the expansion of production from other company-owned diatomite holdings in the Lompoc area of California. This report represents a summation of the available data concerning the Great Lakes Carbon's Otis Basin explorations.

Location: The Otis Basin diatomite occurs in several places in the basin and throughout some of the surrounding terrain; however, the largest known deposits of the most massively bedded material are located in the basin proper in a belt of hilly terrain currently owned by the State of Oregon, by Joseph Altnow (Juntura address but Otis Basin residence) and by William Miller of the Central Oregon Pumice Company, Bend, Oregon. It is on this belt of deposits, and more specifically on those deposits exposed in the terrain owned by Mr. Altnow and the State that Great Lakes did most of their work. The area thus represented is situated in sections 9, 10, 15, 16 and 22, T. 20 S., R. 36 E. as is indicated on the attached map (Figure 1). Additionally, however, Great Lakes did sink some test holes at some outlying sites, particularly on deposits located in the northern portion of the basin to the north and northwest of the Altnow Ranch. The Miller holdings (Diatomite Products Company) are shown on Figure 1 because they and a State tract adjoining to the east in section 34 also serve to delineate the location of another occurrence of notably massive diatomite generally comparable to that explored by Great Lakes to the south. The Miller tract and the adjoining State land were not included in the Great Lakes option block which received the prospecting attention covered in this report, hence are called attention to here simply for the purpose of illustrating the enormity of potential reserves existent in the area as a whole.

Geology: Otis Basin is covered on a 1:250,000 scale by the Geologic Map of the Burns Quadrangle (USGS Misc. Geol. Investigations Map, 1-680 by Greene, Walker and Corcoran, 1972) and the only other published geology on a significantly larger scale (1" to the mile) is that on the reconnaissance map (Plate 11) included in USGS Bulletin 875 (Moore; Non-metallic Minerals of Eastern Oregon, 1937). Several unpublished theses have been completed in recent years relative to the overall geologic picture in neighboring parts of Harney and Malheur counties, however, and these include extensions of the same stratigraphic formations that exist in Otis Valley. Up-dated regional stratigraphy thus exists even though the Moore reconnaissance still rates as the most authoritative published reference available for the Otis Basin geology per se.

What this means is that the Otis Basin sediments are no longer correlated as belonging to the "Payette Formation" of "Miocene" age as is indicated by Moore. Instead, these sediments today correlate with what are now recognized as the Juntura and Drewsey formations of late Miocene-early Pliocene age, the net effect being a refinement involving only a relatively small decrease in assigned age. Otherwise the lithologic description and general structural setting of these formations is basically the same as described by Moore, subject only to the more precise contact placements when a base suitable for more precise re-mapping purposes (a topographic quadrangle) becomes available. As is, the map presented here (Figure 2) represents the original Moore geology transferred to a fairly recent (1961) BLM planimetric base; hence the discrepancies occasionally evident relative to some of the indicated rim rock margins in the instance of certain of the more prominent topographic features. Apart from distortions of this nature, Moore's mapped distribution of rock units can be taken as being a basically reliable overview of the prevailing conditions.

History: During the early days of interest in Oregon diatomites (1920's) the Otis Basin occurrences received prospect attention which, according to Moore, included some drilling. Nevertheless, no significant production is known to have been made either before, or since, Moore's time (1930-1931 field seasons). Accordingly, the sixty to seventy man-sized (about 40 inch diameter) test holes that the Great Lakes Company saw fit to drill to depths of 40 to 60 feet during the course of their 1954-1955 explorations rate as an unprecedented prospecting event of major proportions, especially so since most of the test sites were carefully selected so that the bottoms of the holes highest on the hillside co-incided with the collars of the next lower tier to reveal a virtually continuous section from the topmost layer of diatomite on the hilltop to the lowest horizon penetrated in the instance of each line of overlapping holes drilled one above the other up any given portion of the hillside in places where the strata exhibited uniformly moderate dips.

Project details: The Great Lakes work included comprehensive geologic mapping backed up by the afore-mentioned drilling program with the drill being a specially designed truck-mounted auger having a reported sinking capability of approximately 80 feet in the type of materials encountered in the basin. All holes (usual depth reportedly ranging from 40 to 60 feet) were logged and sampled from top to bottom by an examiner who was lowered for said purpose on a bosun's seat. After this each hole was back-filled and graded over for safety and reclamation reasons with the result that the location of many drill sites is today essentially non-discernable.

Findings: No report covering any phase of the geologic mapping, or of the logs that were compiled for the 3500, or thereabouts, feet of fabulous third-dimensional test-holing that was done, or concerning any shred of the laboratory data generated therefrom, is known to have been released to anyone, the lessor included, when Great Lakes terminated their option, nor does GREFCO, the successor company to Great Lakes, report having acquired any files relating to any Otis Basin project as a consequence of their subsequent take-over (1966) of the Great Lakes Carbon Corporation's Dicalite Division. Under the circumstances, the only commentary that can be offered here concerning the possible

tenor of the diatomite that was so intensively investigated consists of such inferences as can be drawn from (1) the writer's personal observations and experiences as acquired during the course of two on-site visitations with the project supervisors while the project was underway, and (2) the impressions gained by Mr. Altnow as a consequence of his almost daily contact with the project during all stages of project activity over the entire two-year period that Great Lakes's representatives were on the ground. This commentary is as follows:

That accessible-by-man-sized holes were augered to the general range of depths cited above, and that the total number of such tests drilled during the course of the project approximates the figures given above, is data which rates as an historical fact that is readily documentable common knowledge to residents in the Otis Basin, Drewsey and Juntura area. It is also data that the writer can attest to generally on the basis of having personally observed (1) holes in the process of being drilled, (2) completed holes in the process of being logged and sampled, and (3) assorted field notes for various test sites that had already been drilled, logged and reclaimed. Additionally, and on the basis of communications exchanged with the project supervisors during the course of his visitations to the project, the writer can state that on the occasion of his last visit the conversations were high-lighted at all times by unrestrained enthusiasm concerning the amount and quality of the diatomite that had been exposed and sampled up to that time and concerning the lay of it from a minability standpoint. For that matter the writer can state categorically that these conversations included a sufficient flow of references to processing plant considerations to make it seem abundantly clear that the erection of a processing facility was even then (mid-June, 1955) a programmed part of the Company's on-going planning.

Mr. Altnow's understandings concerning the Company's attitudes and intents during the last several months they were on the ground correspond with those just cited. Moreover, and owing to his special relationships with those in charge, he reports having been expressly advised regarding the specific sites that had been selected for the programmed camp and plant (section 16) and concerning the proposed plans for developing water supplies for said facilities --- a discussion rendered all the more remarkable because it took place, according to Mr. Altnow's recollection, not more than 24 hours prior to the time he was again contacted and told (last of Sept. or first of Oct.) that orders had been received to terminate the project and move out.

So abruptly was this reversal of announced plans carried out that all personnel and equipment were gone from the property in less than 24 hours after Altnow was told of the impending move and the only semblance of an explanation he can now recall getting to account for the change in plans was a vague and unconvincing reference about the diatomite being "too high in iron" to be satisfactory.

Comments: It is universal knowledge that the Great Lakes Carbon Company's Dicalite Division identified as one of the nation's leading developers and producers of some of the highest grade diatomaceous filtering products known to the industry at the time their examination of the Otis Basin diatomites took place. Due to this the company's relinquishment of their Otis Basin options can be exceedingly damaging in terms of the possible status of the diatomites comprising said

occurrence if this action is interpreted as an indication that the investigated diatomites failed to meet the company's raw material specifications for certain filtering products. Therefore, since the available record of the company's examination is so fraught with actions and utterances that are contradictory in this respect, a brief review of these inconsistencies is offered in order to establish (or to re-establish) a fresh and relatively objective perspective concerning the possible tenor of the subject diatomites.

The major inconsistency in the record is, of course, the official announcement of the programmed plant siting details one day followed by the pull-out of personnel and equipment the next. And how the hastily-given, last-minute reference to contaminants which accompanied this move could have been seriously tendered (or can be accepted) as a bona-fide explanation for this sudden reversal of announced development plans is neither clear nor comprehensible to anyone familiar with the history of the examination as it took place prior to this event. For example, if contaminants are actually present in the subject diatomite in amounts that are deleterious, then why is it that no hint of their presence was made prior to the last few hours that the lessee was on the ground? Or conversely, why is it that the quality of the drilled diatomite was consistently reported as being eminently satisfactory during the last several months that the investigation was underway?

The inconsistencies which these questions reflect lead logically to still other questions such as why the examination was continued in force as long as it was, and on the progressively accelerated tempo and degree of sophistication that took place, if the material encountered most abundantly throughout the course of the project was compositionally inferior? And above all, why was any time, effort or funding whatsoever spent in connection with plant engineering and other relating camp and water supply details if the occurrence had not first been deemed to contain minable reserves of industrially acceptable material?

Contradictions such as these make it difficult to accept the premise that inherent laboratory-level shortcomings in the diatomite constituted the prime explanation for the shut-down action which took place less than 24 hours after a company representative had officially reviewed the planned plant siting details with the principal lessor. Instead, they actually serve to suggest the possible (or probable) existence of some alternative explanation, such as, for example, the likelihood that the fantastic timing of the pull-out order comes closer to reflecting some top-level management decision based on policy considerations internal to the company than it does to a condemnation by the field examiners of the diatomite per se on minability grounds. After all, the company did own a going operation at Lompoc, concerning which a last-minute feasibility study could have shown that cost-wise it was more advantageous for the company to increase the output there rather than to undertake activating an entirely new operation at Otis Basin. Indeed, some such explanation as this appears to be the only explanation that can be made to fit all the variable aspects of the available record of this examination.

Conclusions: Although the lack of data concerning raw material acceptability findings means that no positive statements can be advanced here relative to said topic, two inferences do seem justified. The first is that since grounds exist for believing that the lessee's plant siting plans constituted a very real and

actual part of the company's on-going development commitment during the last two or three months that the investigation was underway, it seems logical to presume that they must have regarded the investigated diatomite as being generally satisfactory for most of the company's contemplated uses at the time they elected to expand their investigation to include the work expended on the plant siting level. The second is that if the investigated diatomite was deemed to have been specificationally acceptable enough to have warranted such action THEN, it certainly should be no less attractive, tenor-wise, TODAY.

When assessed from this standpoint the indicated follow-through in reasoning is that the investigated diatomite and its other neighboring Otis Basin occurrences still rate as logical targets for re-investigation by anyone interested in developing a new raw material source. Indeed, and in view of the plant siting aspect of the Great Lakes examination, there is ground for believing that these particular occurrences may even rate as especially prime targets for re-investigation.

Inferential though this may be, it is nonetheless the only conclusion which can be reconciled with all the devious and sometimes contradictory aspects of the available record of the company's examination of the subject property.

Report by N. S. Wagner
August 28, 1973