submitted to them and reported—it is worth while to note this—that 22 per cent by volume would be recovered as aviation gasoline of 100 octane rating, and 17 per cent by volume would be recovered as motor fuel of from 73 to 74 octane rating, which is about the quality of the gasoline we use in our motor cars.

Mr. JOHNSTON (Bow River): What was the percentage of motor car gasoline?

Mr. CRERAR: They reported that 17 per cent by volume would be recovered as motor fuel from 73 to 74 octane rating. Also 16½ per cent by volume of fuel oil would be available for sale; that is the cheaper fuel oil that might be used, for instance, in diesel tractors. The total saleable products in high grade gasoline, lower grade gasoline and fuel oil would be 55·5 per cent. Some use might also be found for the residue. The percentages I have given and the qualities of these percentages give some indication of what could be recovered from the bitumen on a large scale operation.

Mr. JOHNSTON (Bow River): Would it be a commercial success?

Mr. CRERAR: I shall deal with that in a moment. Assuming that our pilot or experimental plant works out, that you can get the sands from their present beds transported to the plant, get them through the plant and make the separation, and then in the refinery make the breakdown on the basis, let us say, of the report presented by Universal Oil Products, you would then have a large-scale operation, and of course the larger the scale of operation the better the chance there is of reducing the costs.

Universal Oil Products estimate the cost of constructing a refinery to treat 5,000 barrels of bitumen per calendar day at $8,700,000 in United States funds, which, if you include sales tax, duty and exchange, would be approximately $12,000,000 in Canadian funds. Those figures do not include the cost of mining or the cost of a separation plant. The cost of a separation plant is not nearly so large as the cost of a refinery, because it simply provides the vats into which the sand and hot water is poured and an agitation carried on, much as hon. members have seen in gold mining using the cyanide process. Once you get the bitumen off, the real job starts. It is very difficult to give any estimate of cost. In fact I would hesitate to give any estimates of cost because they are really little more than guesses. I do not believe in guessing in a matter of this kind. I have always in my experience wanted the facts before me and then analysed and weighed them, and on such an analysis reached a conclusion as to the wise action to be taken.

That is the story up to the present time. A great deal of information has yet to be secured before any definite conclusion can be reached that the project is capable of successful commercial development. I might mention two or three factors. There is first of all the sands. Drilling is going on, and we propose to carry on that drilling this year under the Department of Mines and Resources, separate wholly from the Abasand company. That drilling is being carried on to determine, first, the amount of overburden on the sands; second, the richness of the sands; third, their quality. Some sands are very coarse; some are fine. As a matter of fact, in a commercial operation the fine sand which may be coated with these oil particles is much more expensive and difficult to treat than is the coarse sand. But the drilling has revealed that frequently when, starting at the top, going down through 40, 50 or 100 feet of overburden, you reach the sands, you may have a layer of coarse sands with oil; then you may have a layer of thin sands. In a good many of the drill holes they have run across layers of sand interspersed with clay seams.

Mr. JOHNSTON (Bow River): That is not the difficulty in their pilot plant now, because they are not even attempting to do that.

Mr. CRERAR: No, but what I am getting at is this, that if you clear off fifty feet of overburden, and you find five feet of sand, and then two feet of clay, and then some lean sand under that, and again below that some coarse sand, you have certain problems in mining the sands and getting them out. I do not know, and as yet, so far as I am aware, no one knows, what effect clay particles in these sands may have on the separation of the oil from the sands. It may not present any problem at all, but that is something which must be and can be worked out in a pilot plant, in the experimental plant which we shall soon have in operation.

Beyond that, there are the tests to be made of whether you can reach the same results as were attained, for instance, by the Universal Oil Products in their laboratory tests in Chicago and in the tests which in a smaller way have been made in our own laboratories in the mines branch. There is the problem of disposing of the overburden. You go out on a level area of sands; you have to scoop off say forty or fifty feet of overburden, where are you going to put it? There is the problem of the disposal of the sands once they are separated from the bitumen in the plant. You