LEGISLATIVE ASSEMBLY OF THE NORTHWEST TERRITORIES

5TH COUNCIL, 27TH SESSION

SESSIONAL PAPER NO. 14-27.

TABLED ON JUNE 2, 1964

NORTHWEST TERRITORIES

SESSIONAL PAPER NO. 14, 1964 (First Session)

REPORT ON DUST CONTROL

Introduction

A program to control dust in settlements was commenced in 1960 and continued through 1963. The settlements involved were Hay River, Fort Simpson, Inuvik, Aklavik and Fort Smith with the most varied control program in Fort Smith. This paper is a report on the success of the program and it will deal principally with the experience in Fort Smith. At other settlements, the results with the systems of dust control tried were similar to those in Fort Smith.

Fort Smith Program

Four different methods of dust control were used in Fort Smith. All involved the use of some dust control agency on the streets of the Settlement. These are dealt with below:

(a) Sprayed Water

A water truck, complete with a 1,000 gallon tank, valves, spraybar and nozzles was used to apply water to the streets by gravity flow. In 1960, 240 truck hours were expended for a total cost of $1,308 for the year. In 1961, 150 truck hours were expended for a total expenditure of $817.50. During the period the water truck was in operation, the dust conditions diminished for a short period, but the road surface dried quickly and dust conditions reappeared. In order to control the dust by this process the spray truck would have to operate constantly on the heavily travelled streets.

(b) Local Salt Deposits

Natural salt deposits occur some 20 miles from Fort Smith in the area referred to locally as the Salt Flats. These deposits lie in the flat lands through which the Salt River flows. A sample of this salt was analyzed and was found to contain 94.9% Sodium Chloride and 4.9% moisture. Salt of this composition has been used quite effectively as a compacting and stabilizing agent with clay binders and graded aggregates. However, this salt is not hygroscopic, i.e., it will not absorb moisture from the air. For this reason the salt is not satisfactory for use as a dust-preventative agent.

(c) Calcium Chloride

An experiment was carried out in 1960 using calcium chloride as a stabilization and dust preventative agent. The calcium chloride was applied to the road surface at 1, 1 1/2 and 2 pounds per square yard. Observations were made on each test section. There was little or no effect from the 1 or the 1 1/2 pound per square yard applications. In the 2 pound treatment, a certain amount of stabilization and dust control resulted but, when the moisture content of the soil decreased the surface or treated layer cracked and crumbled. The treatment was applied on a sand layer to which had been added a wearing surface of gravel. This does not constitute

a dense soil. In soils having little or no cohesion or shear strength this type of stabilization is not satisfactory. Calcium chloride like salt, requires moisture to be effective, and through its chemical composition this moisture is obtained from the air. With the low humidity prevailing in that area the necessary moisture is not available unless it is provided by artificial means such as the use of a water spray truck.

(d) Calcium Lignosulphonate

Calcium Lignosulphonate treatment may be applied to streets in a solution of either water or oil. It is sold on the commercial market under the trade name of Lignosol B.D. The Lignosol B.D. treatment worked exceptionally well on all streets when used in an oil solution. After completion of the project, repairs could be made to any potholes and the treated material could be graded and relaid if desired. Some road surface deformation did occur at street intersections where vehicles stop and accelerate. From our experiments it has been definitely proven that Lignosol B.D. should be mixed with an oil emulsion in lieu of water to obtain the best results and that the improvement in results warrants the additional cost of the petroleum-based solution.

Conclusions

1. The sprayed water system is ineffective unless it is used almost constantly. If this is done the cost is prohibitive.

2. The low humidity of the air in the Mackenzie District renders the use of local salt impractical. To supply sufficient moisture by the use of the spray truck would drive costs to a very high level.

3. There are the same drawbacks to the use of calcium chloride as there are to the use of local salt.

4. Calcium Lignosulphonate gave much the best results. The apparent cost is about $1,250 per mile for a road with an eighteen foot surface but this figure if misleading. The application is not simply a matter of spraying over the finished road surface. The road is first scarified three to four inches deep so that the lignosulphonate can be well mixed with the surface material. This material is then compacted and graded. The road surface so achieved lasts much longer than an untreated surface and is capable of being satisfactorily patched. Therefore, much grading and maintenance work is eliminated. If these savings are applied to the apparent cost the net cost of dust control and road maintenance is much less than it appears. It is very difficult to estimate the actual net cost of the dust laying treatment but when one considers the total cost of road grading and maintenance with and without the treatment, the additional cost is well worthwhile. Not only is the dust nuisance abated but the road surface is in better condition at all times.