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ENVIRONMENTAL ASPECTS
BRINE USAGE FOR HIGHWAY PURPOSES

by

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FINAL REPORT
HIGHWAY RESEARCH PROJECT 44

Conducted for
The Arkansas State Highway Department
in cooperation with
The U.S. Department of Transportation
Federal Highway Administration

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Arkansas State Highway Department or the Federal Highway Administration.

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16. Abstract The need for effective, economical de-icing and dust palliation agents combined with availability of large quantities of waste brine in Arkansas led to the investigation of the feasibility of using the waste brine for these purposes on primary and/or secondary roads. The brine contains large concentrations of calcium (32,000 mg/l) and magnesium (3,000 mg/l) which are potentially advantageous for de-icing and dust palliation. The feasibility investigation included both laboratory and field studies were conducted. The effectiveness of the brine as a dust palliative was determined by application of the brine to a test road section. Laboratory studies were used for determining the effectiveness of the brine as a de-icing agent and for determining the effect of the brine on concrete, soil properties, run-off water quality and the corrosion rate of metal. The brine is an effective de-icing and dust palliation agent. Application of the brine in the dosages required for these purposes will have little, if any, observable adverse impact. As with any highly concentrated de-icing or dust palliation agent such as calcium chloride or sodium chloride, the avoidance of major spills or application at very large dosage rates is required to minimize or prevent adverse environmental impact.			
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SECTION I
INTRODUCTION

The increased emphasis on the maintenance and enhancement of our environmental resources in recent years has caused an evaluation of the effects of many of man's activities on the environment. One of these activities is the use of salt on the nation's highways.

From a total usage of less than one-half million tons in the United States in 1947, the total salt used increased to about 6.5 million tons in the winter of 1966-1967, to about 9 million tons in 1970-1971, and to an estimated 12 million tons in the winter of 1975-1976 (1,2).

Because of the large quantities of salt involved, a number of studies have been conducted to determine the environmental effects of salt usage for de-icing purposes. Similarly, any potential de-icing material must be evaluated to determine if adverse environmental effects would occur from its use. Additionally, suitable procedures and application rates to minimize potential adverse environmental effects must be determined for any material that has the potential for resulting in adverse environmental impact.

The availability of large quantities of brine in the El Dorado, Arkansas, area combined with the need for effective de-icing and dust palliation agents led to the investigation of the use of this brine for beneficial purposes on primary and secondary roads. The brine contains large concentrations of calcium, magnesium and sodium cations. Thus, the calcium and magnesium have potential for mitigating the adverse effects of the sodium on vegetative life. Addition-