### Abstract
A demonstration of RejuvaSeal was offered to Alberta Infrastructure in order to assess the technical benefits of RejuvaSeal as a surface preservation treatment. Highway 16A:08 near Entwistle was chosen and 1357 metres of the west bound lane were treated. Two different application rates of RejuvaSeal were used and a “black” sand was applied to provide traction. The overall consensus, after one winter cycle, is that the product performs better than a traditional fog seal. The long term benefits and performance will vary and is dependent on the severity and extent of the damage already experienced by the asphalt concrete pavement. RejuvaSeal will be included as a proprietary surface treatment option for treating heavily oxidized asphalt concrete pavement. Additional monitoring is required to determine the service life of this treatment option.

### Key Words
- Asphalt pavement
- Surface treatment
- Fog seal

### Distribution
- Unlimited

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1.0 INTRODUCTION

RejuvaSeal has been primarily used on airports for jet fuel spill protection (contains coal tar) and on heavily oxidized airport pavements to prevent failure due to raveling (loss of fines) and minor surface cracking.

Echelon Industries Inc. is extending their efforts into promoting the product RejuvaSeal to preserve selected road projects, specifically asphalt shoulders of heavily traveled roads and chip seals on secondary roads.

A demonstration of RejuvaSeal was offered to Alberta Infrastructure in order to assess the technical benefits of RejuvaSeal as a surface preservation treatment.

2.0 OBJECTIVES

The objectives of this project are:

Determine the effectiveness of RejuvaSeal as a pavement preservation treatment.

3.0 BACKGROUND

On June 25, 1999, an alternative method of increasing pavement life and reducing life cycle cost of aged, oxidized, low use asphalt concrete pavement was made by Dr. Michael Lee and Bill Vandemark of Echelon Industries, Inc., San Antonio, TX, to members of Alberta Infrastructure.

The process is based upon the use of a proprietary coal tar rejuvenator, RejuvaSeal. The product uniquely penetrates into the surface, combines with the brittle asphalt cement, improving flexibility, lessening the loss of fines and crack formation.

Following a review of the literature and after discussions with knowledgeable third parties, Alberta Infrastructure agreed to an unpaid demonstration of the product. Echelon Industries arranged for the application equipment (photos, Appendix A (Equipment)) and personnel to be at the job site on September 29, 1999. Inland provided the sweeping and sand applicator equipment as well as traffic control.
Location:
Highway 16A:08 (Jct. Highway 16 to Jct. Highway 22) approximately (7km) seven kilometers west of the Inland Highway Maintenance yard. The Inland Highway Maintenance yard is at the Southwest corner of the intersection of Highway 16 and Reno Avenue and approximately 1 mile west of the town of Entwistle, Alberta, Canada.

Asphalt Surface Condition:
Highway 16A had been previously resurfaced with a chip seal surface that is starting to loose fines and large aggregate. Longitudinal cracks and some block cracking were observed. The asphalt concrete pavement is 44 years old and no recorded age of the chip seal. There are a few areas of delamination or spalling where the chip seal has come out in chunks. Flushing is evident in some areas of the surface. Some of the cracks had been filled with a crack sealing material but the material is now cracked and failing due to old age.

Test patches & Demonstration Area:
The westbound travel lane was swept to remove all loose dirt and debris from the surface. Test patches where applied in the right lane heading west on Highway 16A starting at about 300 meters West of Highway 22. The test patches were used to evaluate the product at the application rates of .18, .23 & .27 l per square metre. After observing those areas for approximately one hour .27 l per square metre was selected as an adequate application rate for this surface. As an experiment and for comparison, the first 287 metres were treated at an application rate of .23 l per square metre. A section was left untreated and the remaining 1357 metres were treated at the recommended application rate of .27 l per square metre (photos, Appendix A (Application Rates, 1999)). The width of the treatment was 3.2 metres, for a total treated surface area of 5,260 square metres.

The application rate was high enough to coat the inside surfaces of the existing cracks in the pavement (photos, Appendix A (Coverage, 1999)). Also, about three-quarters of the distance down the test area is an asphalt patch that received the .27 l per square metre application rate. It too cured quickly.

Weather:
The ambient air temperature was 5 degrees C at 12 noon, CMT when the work commenced. The crosswind was gusting at 40 to 80km. Conditions were cloudy with a light off and on drizzle, however, not enough moisture to stop the demonstration.

Sand Application:
For the demonstration a salt spreader unit was used to spread the sand. Initially, there were rate adjustment problems, in part because the sand is finer than salt, and the unit needed to be calibrated. This created a bit of an uneven sand application that was further exacerbated by the high winds. The plan was to attempt to apply 0.54 kg of sand per square metre. However, with the winds and the applicator performance the
sand application was approximately .48 kg per square metre. It is believed that .27 kg per square metre is adequate if applied evenly with the sand applicator. The goal is to create a sand paper appearance and at .27 kg per square metre with an even spread the desired appearance should be expected.

The work was completed at approximately 1:30 p.m. CMT and the traffic was kept off the surface until 3 p.m. CMT. The site was inspected at 4 p.m. CMT and the surface was somewhat tacky to the touch, deep in the deepest voids but was dry on the surface aggregate. There was no evidence that the RejuvaSeal would be splashed onto a vehicle travelling at highway speed.

4.0 FIELD OBSERVATIONS

Inspection April 27/2000
The treated areas are clearly visible with no distinctive difference noted between the two different application rates (photos, Appendix A (Application Rates, 2000)).

The rock surfaces of the old chip seal are well coated and the overall surface still has a sandpaper texture with some evidence of the snowplow removing some of the sand on the high areas (i.e., between wheel paths) (photos, Appendix A (Coverage, 2000)).

The surface of the treated lane is noticeable softer than the untreated lane and was easily scribed with a small spatula. The edge deterioration of the secondary cracking adjacent to the transverse crack is less pronounced when compared to those in the untreated lane. This would indicate that some softening of the aged crack sealant has occurred (photos, Appendix A (Surface Appearance, 2000)).

Field Comments
• Treated section appear to be standing up better than the traditional treatments using SS-1.
• Winter sanding and de-icing had no adverse effects on the product or surface appearance.
• No evidence of new cracking or crack propagation.
• Section to be inspected later this year to observe high temperature performance.
5.0 DISCUSSION OF RESULTS

All results are subjective in nature and will vary based on the experience of the evaluator. The overall consensus, after one winter cycle, is that the product is performing better than any traditional fog seal. The long term benefits and performance will also vary and is dependent on the severity and extent of the damage already experienced by the original pavement.

The initial field observations support the manufacturer’s claim that RejuvaSeal softens the asphalt, prevents further fine aggregate loss and improves the appearance of the road surface.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on this demonstration it is recommended that RejuvaSeal be included as a proprietary surface treatment option for treating heavily oxidized asphalt concrete pavement. The service life for life cycle costing is estimated to be between four and five years. The use of RejuvaSeal should be restricted to paved shoulders and travel lanes with low traffic volumes.

Monitoring of Highway 16A should be continued as part of the Surface Condition Rating in order to establish the service life of this treatment option.

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Mr. John Godden, Project Manager, Echelon Industries
APPENDIX A
EQUIPMENT

Sweeping provided by Inland

Distributor used to Apply RejuvaSeal
APPLICATION RATES
(1999)

0.23 litres/square metre

0.27 litres/square metre
APPLICATION RATE
(2000)

0.23 litres/square metre

0.27 litres/square metre
SURFACE APPEARANCE
(2000)

Surface Easily Scribed with Spatula

Secondary Cracking Adjacent to Transverse Crack

Secondary Cracking in Treated Lane

Secondary Cracking in Treated Lane