

**PRE-TREATMENT FOR REDUCTION  
OF ASPHALT ABSORPTION  
IN POROUS AGGREGATE**



Iowa Highway Research Board  
Project TR-422

April 2005  
Final Report

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## TECHNICAL REPORT TITLE PAGE

**1. REPORT NO.**

TR-422

**2. REPORT DATE**

May 2005

**3. TITLE AND SUBTITLE**

Pre-Treatment for Reduction  
of Asphalt Absorption in Porous Aggregate

**4. TYPE OF REPORT & PERIOD COVERED**

Final Report  
July 1998—May 2005

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**7. ACKNOWLEDGMENT OF COOPERATING ORGANIZATIONS/INDIVIDUALS**

The author would like to thank the Iowa Highway Research Board, the Louisa County Board of Supervisors and County Engineer, Norris Asphalt Paving Co., and Jebro Inc., for their support and participation in this project.

**8. ABSTRACT**

The objective of this research was to evaluate the performance of the product Ultracote<sup>®</sup> (a polymer based additive produced by Ultrapave, a division of Goodyear) as an aggregate pre-treatment for the reduction of asphalt binder absorption in hot mix asphalt (HMA). The product was tested with a paving project in Louisa county, Iowa with aggregate that had historically shown very high asphalt binder absorption.

Results of the testing did not provide any evidence of reduction in binder absorption.

**9. KEY WORDS**

HMA  
Asphalt Binder  
Absorption

**10. NO. OF PAGES**

23

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### Disclaimer

The contents of this report reflect the views of the author and do not necessarily reflect the official views or policy of the Iowa Department of Transportation. This report does not constitute a standard, specification or regulation.

## **Research Objective**

The objective of this research was to evaluate the performance and economics of using the product Ultracote<sup>®</sup> (a polymer based additive produced by Ultrapave, a division of Goodyear) as an aggregate pre-treatment for the reduction of asphalt binder absorption in hot mix asphalt (HMA).

## **Introduction**

HMA paving in Iowa is often hampered by the highly absorptive nature of some of the aggregates. It is possible to find HMA mixtures requiring as much as seven percent binder in some areas compared with a statewide average of approximately five percent. The manufacturer of this product wanted to determine if it would be effective in blocking some of the pores in the aggregate, thus reducing asphalt binder demand. Ultracote<sup>®</sup> is usually marketed as an anti-stripping agent for use in place of lime. This research focused on its possible use for reducing binder absorption.

## **Project Location and Description**

This project was performed in conjunction with another IHRB research project, TR-414 Superpave Mix Designs for Low Volume Roads. Both involved paving on the same road - county road X-17 in Louisa county from the junction with county road G-62 north to just inside the corporate limits of Columbus City (see map in Figure 1). The total project extended approximately 6 miles and consisted of a 3-inch HMA overlay placed in two lifts over cold-in-place recycled asphalt. The Ultracote<sup>®</sup>-treated aggregate was used in the far south end of the project.

HIGHWAY AND TRANSPORTATION MAP

# LOUISA COUNTY IOWA

Prepared by  
**Iowa Department  
of Transportation**  
Phone (515) 281-1000  
In Cooperation With

**United States  
Department of Transportation**

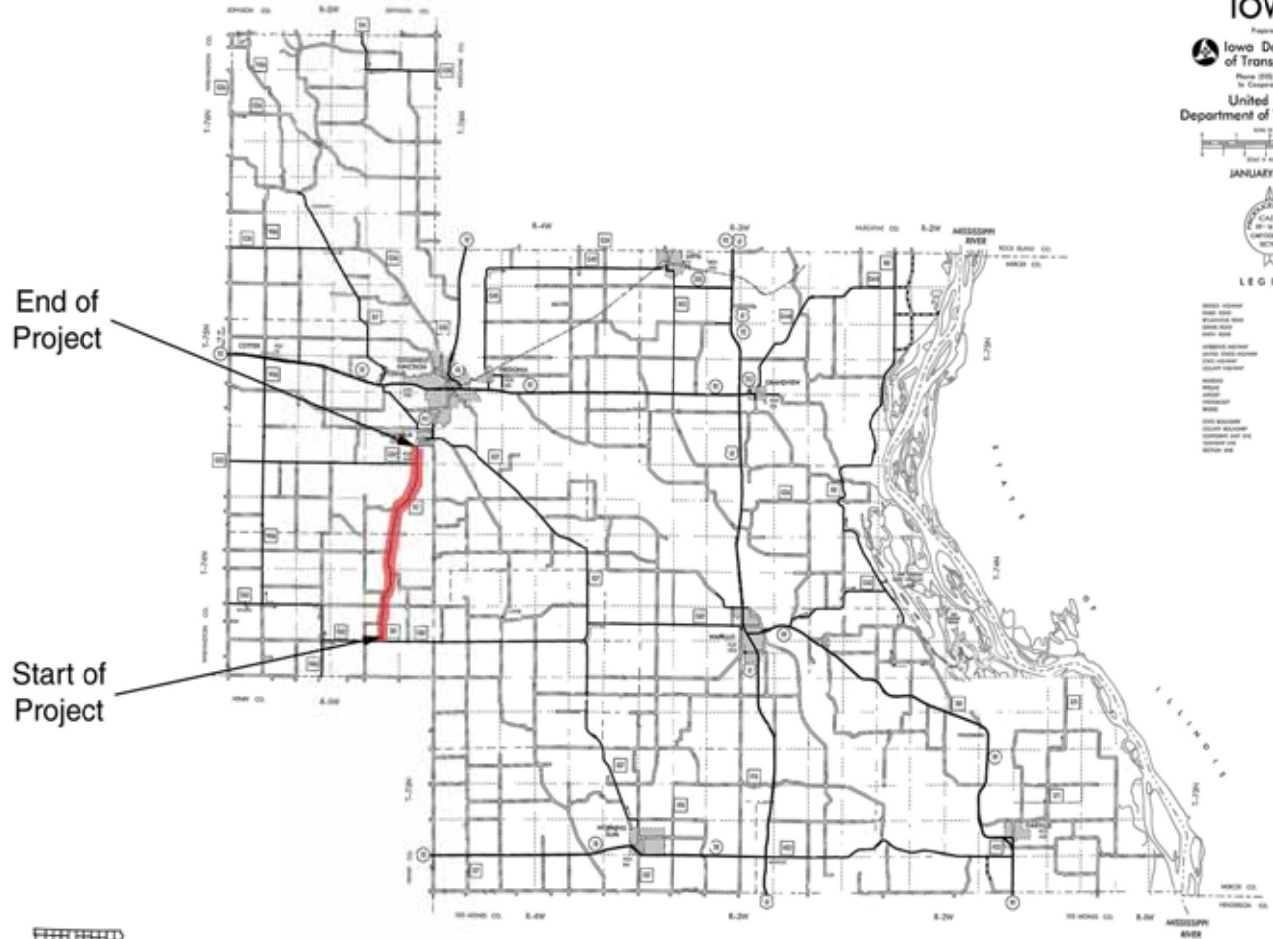


JANUARY 1, 1999



### LEGEND

- ROAD NUMBER
- ROAD TYPE
- UNPAVED ROAD
- ROAD WIDTH
- ROAD CLASS
- UNPAVED ROADWAY
- ROADWAY IMPROVEMENT
- ROADWAY CONDITION
- RAILROAD
- RAILROAD TYPE
- RAILROAD CLASS
- RAILROAD WIDTH
- RAILROAD CONDITION
- RAILROAD IMPROVEMENT
- RAILROAD CONDITION
- RAILROAD IMPROVEMENT
- RAILROAD CONDITION
- RAILROAD IMPROVEMENT



End of Project

Start of Project



26

Figure 1. Louisa County map showing project location.

## **Materials**

The HMA mix used in this project was designed under a gyratory mix design Special Provision. Mix design documentation is included in Appendix A.

Crushed aggregate and manufactured sand were from Columbus Junction (Iowa Aggregate Source Number A58002) and natural sand was from Fredonia (A58504). There was a problem initially with coarse aggregate originating from an incorrect bed, but this was corrected prior to the beginning of paving.

## **Construction**

The project consisted of cold-in-place recycling followed by a three-inch HMA overlay. In the last half mile or so of the north end of the project, inside the city limits, there was just an overlay over the existing pavement.

The plant was located at the Columbus Junction mine approximately one mile west of the project road on county highway G 52.

Locations were tracked by stationing. The project stretched from station 3000+90, at the junction with county highway G-62, north approximately six miles to station 3329+41.2 with a few minor equations along the way. Latex was applied to aggregate in both lifts of HMA from approximately station 3030+00 to 3100+00. That is, it started approximately 0.55 mile north of the junction with G-62 and extended approximately 1.33 miles. There are signs posted to show the beginning and ending points of the test area.

Construction was routine throughout the project. Several minor changes were made to the mix during the course of paving, mostly involving the target binder content of the HMA. At the north end of the project, a scratch coat was placed prior to the HMA lift to provide some additional strength to the non-recycled portion of the project.

The asphalt binder used was PG58-28 from Amoco, Davenport.

## **Latex Addition**

Latex was added to the aggregate under the control of a manufacturer representative at a rate of one pound per ton of aggregate. The aggregate pre-treatment did not noticeably change the behavior of the mix during paving.

Figures 2 to 6 show various aspects of addition of the latex to the mix at the plant.



Figure 2. Mixing unit for combining concentrated latex with water prior to dispensing.

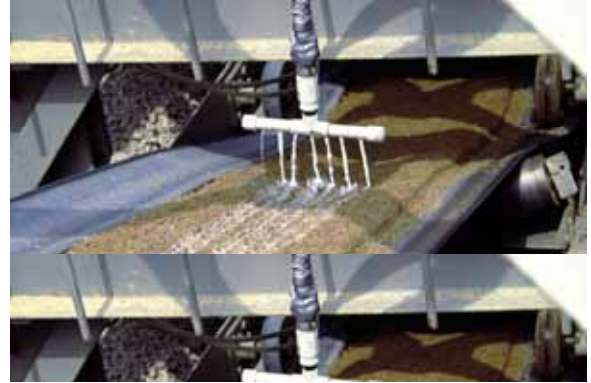


Figure 3. Dispensing the latex onto the aggregate stream on its way into the plant.



Figure 4. Coated aggregate moving up conveyor.

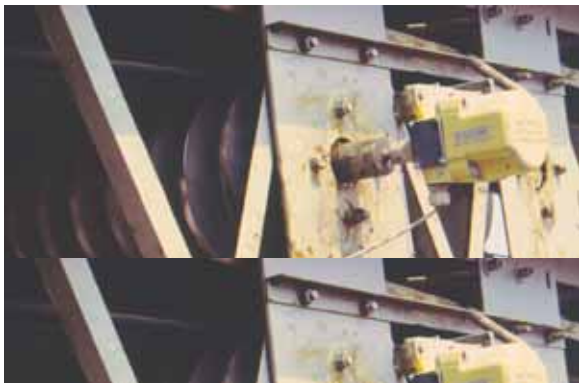


Figure 5. Conveyer scale used to meter latex mixture.



Figure 6. Aggregate and asphalt entering the plant.

## Evaluation

The difference between HMA that has had aggregate treated and untreated with latex was determined by calculating the percent binder absorbed. The data was obtained from the daily plant reports (provided in Appendix B). The calculation requires subtracting the *Effective percent binder* value from the *Actual Added percent binder* value. Calculation of the *Effective percent binder* value is described in detail in Iowa DOT Materials I.M. 501, *Asphaltic Terminology, Equations and Example Calculations*.

Results of these calculations are shown graphically in Figure 7. This is a small sample size and the absorbed binder value calculations introduce some significant variation. As a result, within experimental error, there is no indication that the latex coating has decreased the amount of absorbed binder.

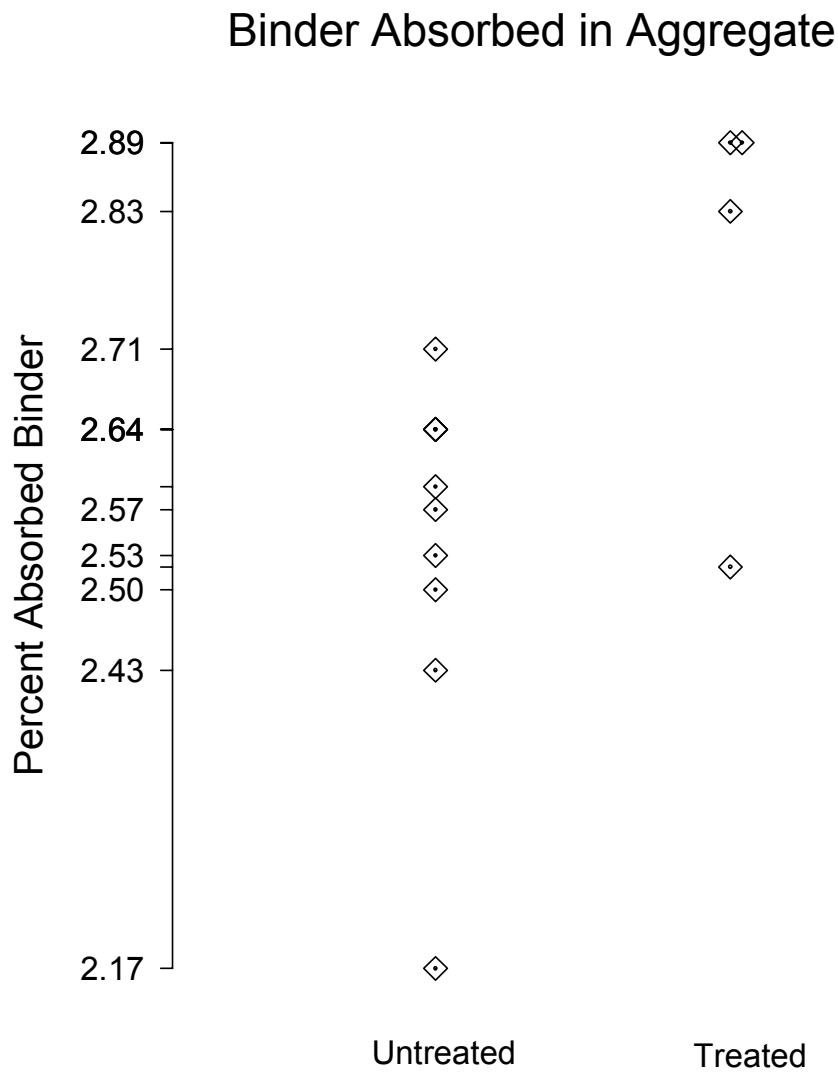


Figure 7



## **Acknowledgement**

The author would like to thank the Iowa Highway Research Board, the Louisa County Board of Supervisors and County Engineer, Norris Asphalt Paving Co., and Jebro Inc., for their support and participation in this project.

**Appendix A**  
**Mix Design Special Provision**

Louisa County  
Highway X-17

Form 956

Iowa Department of Transportation  
Project Development Division - Office of Materials  
ACC Superpave Mix Design

County : Louisa Project : FM-58(17)--55-58 Lab No. : ABD8-29  
Size : 12.5mm Contractor : Norris Asphalt Contract No. :  
Mix Type: B Design Life ESAL's :290,000 Date Reported :  
Intended Use : Surface Proj. Location : Louisa Co. X-17 N&E to IA 70

Agg. Sources :	1/2"	A58002	R.P. Col. Jct. W. Beds 16-19 5CJ8-001	@	30.0%
	3/8 Chip	A58002	R.P. Col. Jct. W. Beds 16-19 5CJ8-003	@	20.0%
	Man Sand	A58002	R.P. Col. Jct. W. Beds 16-19 5CJ8-002	@	30.0%
	Nat Sand	A58504	R.Prod. Fredonia 5FR8-001	@	20.0%

Job Mix Formula - Combined Gradation (Sieve Size mm)

25	19	12.5	9.5	4.75	2.36	1.18	600µ	300µ	150µ	75µ
Upper Tolerance										
100	100	100			58					10
100	100	95	88	63	43	32	22	9.2	6.2	4.8
100	100	90			39.1	31.6	23.1	15.5		2
Lower Tolerance										

Asphalt Source and Grade: Amoco Davenport PG58-28

	Gyratory Data			Interpolated		
% Asphalt			7.60			7.21
Corrected Density @ N-Design			2.310			2.298
Max. Sp.Gr. (Gmm)			2.382			2.393
% Gmm @ N- Initial			89.50			88.52
% Gmm @ N-Max			98.13			97.15
% Air Voids			3.02			4.00
% VMA			16.23			16.33
% VFA			81.39			75.35
Film Thickness			11.58			10.79
Filler Bit. Ratio			0.82			0.88
Gsb			2.548			2.548
Gse			2.671			2.671
Pbe			5.88			5.48
Pba			1.86			1.86
% New AC			100.00			100.00
AC Sp.Gr. @ 25c			1.029			1.029
% Water Abs			3.42			3.42
S.A. m <sup>2</sup> / Kg.			5.08			5.08
% +4.75mm Friction Agg.			0.0			0.0
Angularity-method A						
% Flat & Elongated						
Coarse Agg. Angularity			0			0
Sand Equivalent						

Avg. Design High Air Temp. C

<39

mm from Surface

0

Number of Gyration

N-Initial

7

N-Design

68

N-Max

104

Gsb for Angularity

Method A

2.638

Slope of Compaction

Curve

13.58

Minimum % AC for this aggregate combination is 6.15%

Disposition : An asphalt content of 7.21% is recommended to start this project.

Data shown in 7.21% column is interpolated from test data.

Comments : Verification of mix NAP8-022

Copies to : Norris Asphalt John Hinrichsen Cent. Lab. SEITC  
Jim Webb

Signed : \_\_\_\_\_

## Louisa County Highway X-17

Form 956

### Iowa Department of Transportation Project Development Division - Office of Materials ACC Superpave Mix Design

County :	Louisa	Project :	FM-58(17)-55-58	Lab No. :	ABD8-30
Size :	12.5mm	Contracter :	Norris Asphalt	Contract No. :	
Mix Type:	B	Design Life ESAL's :	290,000	Date Reported :	08/18/98
Intended Use :	Surface	Proj. Location :	Louisa Co. X-17 N&E to IA 70		

Agg. Sources :	1/2"	A58002	R.P. Col. Jct. W. Beds 16-19 5CJ8-001	@	30.0%
	3/8 Chip	A58002	R.P. Col. Jct. W. Beds 16-19 5CJ8-003	@	20.0%
	Man Sand	A58002	R.P. Col. Jct. W. Beds 16-19 5CJ8-002	@	30.0%
	Nat Sand	A58504	R.Prod. Fredonia 5FR8-001	@	20.0%

**Job Mix Formula - Combined Gradation (Sieve Size mm)**

	25	19	12.5	9.5	4.75	2.36	1.18	600 $\mu$	300 $\mu$	150 $\mu$	75 $\mu$
	Upper Tolerance										
100	100	100			58						10
100	100	95	88	63	43	32		22	9.2	6.2	4.8
100	100	90			39.1	31.6		23.1	15.5		2
	Lower Tolerance										

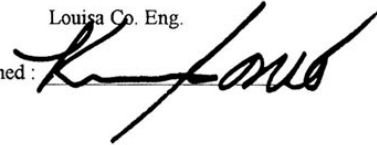
Asphalt Source and Grade:	Amoco Davenport PG58-28			Gyratory Data		Interpolated		
% Asphalt	6.60	7.10	7.60		6.66		6.66	<u>Avg. Design High Air Temp. C</u>
Corrected Density @ N-Design	2.314	2.339	2.326		2.317		2.317	<39
Max. Sp.Gr. (Gmm)	2.415	2.403	2.390		2.414		2.414	
% Gmm @ N- Initial	88.82	90.52	89.93		89.03		89.03	
% Gmm @ N-Max	96.87	98.38	98.43		97.05		97.05	<u>mm from Surface</u>
% Air Voids	4.18	2.66	2.68		4.00		4.00	0
% VMA	15.18	14.72	15.65		15.12		15.12	
% VFA	72.46	81.93	82.88		73.60		73.60	<u>Number of Gyration</u>
Film Thickness	9.63	10.44	11.29		9.72		9.72	N-Initial
Filler Bit. Ratio	0.98	0.90	0.84		0.97		0.97	7
Gsb	2.548	2.548	2.548		2.548		2.548	N-Design
Gse	2.669	2.676	2.682		2.676		2.676	68
Pbe	4.89	5.31	5.74		4.94		4.94	N-Max
Pba	1.83	1.93	2.02		1.93		1.93	104
% New AC	100.00	100.00	100.00		100.00		100.00	
AC Sp.Gr. @ 25c	1.029	1.029	1.029		1.029		1.029	<u>Gsb for Angularity</u>
% Water Abs	3.42	3.42	3.42		3.42		3.42	<u>Method A</u>
S.A. m <sup>2</sup> / Kg.	5.08	5.08	5.08		5.08		5.08	2.638
% +4.75mm Friction Agg.	0.0	0.0	0.0		0.0		0.0	
Angularity-method A	N/A	N/A	N/A		N/A		N/A	<u>Slope of Compaction</u>
% Flat & Elongated	N/A	N/A	N/A		N/A		N/A	<u>Curve</u>
Coarse Agg. Angularity	100/100	100/100	100/100		100/100		100/100	14.60
Sand Equivalent	85	85	85		85		85	

Minimum % AC for this aggregate combination is 6.21%  
Disposition : An asphalt content of 6.66% is recommended to start this project.  
Data shown in 6.66% column is interpolated from test data.

Comments : 1.0 lbs latex to 1 ton of aggregate

Copies to :   Norris Asphalt   John Hinrichsen   Cent. Lab.                   Louisa Co. Eng.

Signed :



**Appendix B**  
**Daily Plant Reports**

**DAILY ACC PLANT REPORT**

Project No.: FM-58(17)--55-58  
 Contract ID: \_\_\_\_\_  
 Mix Design No.: AKOS-2.9

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 1  
 Design Blows: \_\_\_\_\_  
 Design Gyration: 68

Hot Box I.D. No.:		HM-1A			
Date Sampled:		08/17/98			
Gradation ID:	Specs	CB-1A			
25mm Sieve	100	100			
19mm Sieve	98-100	100			
12.5mm Sieve	88-95-100	95			
9.5mm Sieve	81-88-95	89			
* 4.75mm Sieve	56-63-70	60			
* Moving Average					
* 2.36mm Sieve	37-43-49	41			
* Moving Average					
1.18mm Sieve		31			
* 600um Sieve	17-22-27	22			
* Moving Average					
300um Sieve		11			
150um Sieve		7.6			
* 75um Sieve	3.0-4.8-7.8	5.7			
* Moving Average					
Compliance ( Y/N )		Y			
Intended Added, % AC	7.46				
Actual Added, % AC		7.19			
Intended Total, % AC	7.46				
Actual Total, % AC		7.19			
Gmb:		2.362			
Gmm:		2.393			
Pa:		1.3			
Moving Average	4.0				
Time		9:50 AM			
Station		3001+00			
Side		RIGHT			
Sample Mg's		272.16	656.00	1,356.00	
Sublot Mg's		285.61			
Mg's to Date		285.61			
Fines / Bitumen Ratio	6-1.20	1.14			

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)	22						
A.C. Temp. (°C)	184						
Mix Temp. (°C)	146						

Date Placed: 08/17/98 Date Tested: 08/18/98  
 Course Placed: \_\_\_\_\_ Tested By: VICKI WILLIAMS

**Density Record**

Core No.:	1	2	3	4	5	6	7
Station	3004+12	3008+10	3012+81	3016+55	3020+37	3024+86	3028+39
CL Reference	8.0 RT	3.0 RT	8.5 RT	2.0 RT	5.0 RT	3.5 RT	8.5 RT
W 1 Dry	1,837.9	1,656.2	1,498.7	1,534.1	1,043.7	1,298.7	1,647.7
W 2 in H2O	1,048.9	927.6	841.1	864.5	585.9	721.0	928.3
W 3 Wet	1,838.5	1,656.5	1,499.1	1,534.8	1,044.3	1,299.2	1,648.6
Difference	789.6	728.9	658.0	670.3	458.4	578.2	720.3
Field Density	2.328	2.272	2.278	2.289	2.277	2.246	2.288
% Density	98.561	96.190	96.444	96.909	96.401	95.089	96.867
% Voids	2.7	5.1	4.8	4.3	4.8	6.1	4.4
Thickness (mm)	51	45	40	40	30	35	45

Gmb (Lot Avg.): 2.362 Avg. Field Density: 2.283  
 Gmm (Lot Avg.): 2.393 Avg. % Density: 96.637  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: 4.6  
 Target % RAP: \_\_\_\_\_ Specified % Density: 94

Q.I. =  $96.637 - \frac{1.042}{1.042} \times 94.000 = \underline{2.53}$

Low Outlier: \_\_\_\_\_ High Outlier: \_\_\_\_\_ New Q.I. = \_\_\_\_\_  
 Film Thickness ( FT ): 8.9 VMA: 12.8

Remarks: BEGINNING STATION: 3000+57 TO 3029+88 ON THE RIGHT LANE.  
285.61 MEGAGRAMS WERE LAID WITH NO ROAD WASTE.

C.P.I.: VICKI WILLIAMS SE 126 Cert. No. \_\_\_\_\_  
 QMA Tech: BARB DUNNUNG SE 145 Cert. No. \_\_\_\_\_

Gsb: 2.515 Gb: 1.0270 Effective % AC: 5.02

Mix Change Information: \_\_\_\_\_

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant \_\_\_\_\_

DAILY ACC PLANT REPORT

Project No.: FM-58(17)--55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-30

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 2  
 Design Blows: \_\_\_\_\_  
 Design Gyration: 68

Hot Box I.D. No.:	HM-2A	
Date Sampled:	08/18/98	
Gradation ID:	Specs	CB-2A
25mm Sieve	100	100
19mm Sieve	98-100	100
12.5mm Sieve	88-95-100	94
9.5mm Sieve	81-88-95	87
* 4.75mm Sieve	56-63-70	58
* Moving Average		
* 2.36mm Sieve	37-43-49	40
* Moving Average		
1.18mm Sieve		30
* 600um Sieve	17-22-27	22
* Moving Average		
300um Sieve		11
150um Sieve		7
* 75um Sieve	3.0-4.8-7.6	5.3
* Moving Average		
Compliance (Y/N)	Y	
Intended Added, % AC	6.80	
Actual Added, % AC		6.62
Intended Total, % AC	6.80	
Actual Total, % AC		6.62
Gmb:		2.319
Gmm:		2.453
Pa:		5.5
Moving Average	4.0	
Time	7:30 AM	
Station	3050+00	
Side	RIGHT	
Sample Mg's	127.00	856.00 1,487.00
Sublot Mg's	500.00	189.19
Mg's to Date		974.80
Fines / Bitumen Ratio	6-1.20	1.42

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)	21	23					
A.C. Temp. (°C)	149	149					
Mix Temp. (°C)	143	146					

Date Placed: 08/18/98 Date Tested: \_\_\_\_\_  
 Course Placed: BINDER Tested By: \_\_\_\_\_

Density Record

Core No.:	1	2	3	4	5	6	7
Station							
CL Reference							
W 1 Dry							
W 2 In H2O							
W 3 Wet							
Difference							
Field Density							
% Density							
% Voids							
Thickness (mm)							

Gmb (Lot Avg.): 2.319 Avg. Field Density: \_\_\_\_\_  
 Gmm (Lot Avg.): 2.453 Avg. % Density: \_\_\_\_\_  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: \_\_\_\_\_  
 Target % RAP: \_\_\_\_\_ Specified % Density: \_\_\_\_\_

Q.I. = \_\_\_\_\_ = \_\_\_\_\_

Low Outlier: ERR High Outlier: ERR New Q.I. = ERR

Film Thickness (FT): 6.9 VMA: 13.9

Remarks: WE RAN 689.19 MGS. OF THE LATEX MIX AND THEN SWITCHED TO THE REGULAR MIX. BEGINNING STATION 3029+86 ENDING STATION-3090+97

C.P.I.: VICKI WILLIAMS SE 126 Cert. No. \_\_\_\_\_  
 QMA Tech: BARB DUNNING SE 145 Cert. No. \_\_\_\_\_

Gsb: 2.515 Gb: 1.0270 Effective % AC: 3.73

Mix Change Information: WE ARE STARTING THE LATEX MIX AT 6.8% AC AND 1 LB OF LATEX PER TON.

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant \_\_\_\_\_

**DAILY ACC PLANT REPORT**

Project No.: FM-58(17)--55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-5029

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 2A  
 Design Blows: \_\_\_\_\_  
 Design Gyration: 68

Hot Box I.D. No.:	HM-2B	HM-2C	HM-2D
Date Sampled:	08/18/98	08/18/98	08/18/98
Gradation ID:	Specs CB-2A		
25mm Sieve	100		
19mm Sieve	98-100	100	
12.5mm Sieve	88-95-100	94	
9.5mm Sieve	81-88-95	87	
* 4.75mm Sieve	56-63-70	59	
* Moving Average			
* 2.36mm Sieve	37-43-49	41	
* Moving Average			
1.18mm Sieve		31	
* 600um Sieve	17-22-27	22	
* Moving Average			
300um Sieve		11	
150um Sieve		7.6	
* 75um Sieve	3.0-4.8-7.6	5.9	
* Moving Average			
Compliance (Y/N)			
Intended Added, % AC	7.26		
Actual Added, % AC		7.03	
Intended Total, % AC	7.26		
Actual Total, % AC		7.03	
Gmb:	2.346	2.344	2.352
Gmm:	2.420	2.419	2.407
Pa:		3.1	3.1
Moving Average	4.0		2.5
Time	10:15 AM	1:00 PM	3:50 PM
Station	3100+00	3160+00	3226+00
Side	RIGHT	RIGHT	RIGHT
Sample Mg's	776.00	1,142.00	2,008.00
Sublot Mg's	500.00	750.00	637.89
Mg's to Date			2,862.69
Fines / Bitumen Ratio	6-1.20	1.34	

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)			27	28	28	27	
A.C. Temp. (°C)			152	149	149	149	
Mix Temp. (°C)			143	143	143	143	

Date Placed: 08/18/98 Date Tested: 08/19/98  
 Course Placed: BINDER Tested By: VICKI WILLIAMS

**Density Record**

Core No.:	1	2	3	4	5	6	7
Station	3038+16	3064+49	3108+87	3144+79	3177+87	3227+48	3266+02
CL Reference	4' RT	8" RT	5" RT	6" RT	3" RT	7" RT	3.5" RT
W 1 Dry	1,731.1	1,786.4	2,307.6	1,406.6	1,452.5	1,521.3	1,458.0
W 2 in H2O	970.1	987.3	1,302.2	791.3	807.1	853.5	794.8
W 3 Wet	1,732.3	1,787.3	2,308.6	1,407.4	1,453.6	1,522.4	1,461.3
Difference	762.2	800.0	1,006.4	616.1	646.5	668.9	666.5
Field Density	2.271	2.233	2.293	2.283	2.247	2.274	2.188
% Density	97.051	95.427	97.991	97.564	96.026	97.179	93.504
% Voids	6.4	7.9	5.4	5.9	7.3	6.2	9.8
Thickness (mm)							

Gmb (Lot Avg.): 2.340 Avg. Field Density: 2.256  
 Gmm (Lot Avg.): 2.425 Avg. % Density: 96.392  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: 7.0  
 Target % RAP: \_\_\_\_\_ Specified % Density: 94

Q.I. = 96.392 -- 94.000 = 1.54  
 1.549

Low Outlier: \_\_\_\_\_ High Outlier: \_\_\_\_\_ New Q.I. = \_\_\_\_\_

Film Thickness (FT): 7.7 VMA: 13.5

Remarks: BEGINNING STATION-3090+97, ENDING STATION-3280+81, MEGATONS TO ROAD-1887.89 WITH NO ROAD WASTE.

C.P.I.: VICKI WILLIAMS SE 126 Cert. No. \_\_\_\_\_  
 QMA Tech: BARB DUNNING SE 145 Cert. No. \_\_\_\_\_

Gsb: 2.515 Gb: 1.0270 Effective % AC: 4.39

Mix Change Information: WE CHANGED THE TARGET AC TO 7.26.

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant \_\_\_\_\_



**DAILY ACC PLANT REPORT**

Project No.: FM-58(17)--55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-5029

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 3  
 Design Blows: \_\_\_\_\_  
 Design Gyration: 68

Hot Box I.D. No.:		HM-3A
Date Sampled:		08/19/98
Gradation ID:	Specs	CB-3A
25mm Sieve	100	100
19mm Sieve	98-100	100
12.5mm Sieve	88-95-100	94
9.5mm Sieve	81-88-95	87
* 4.75mm Sieve	56-63-70	60
* Moving Average		
* 2.36mm Sieve	37-43-49	42
* Moving Average		
1.18mm Sieve		31
* 600um Sieve	17-22-27	23
* Moving Average		
300um Sieve		11
150um Sieve		6.9
* 75um Sieve	3.0-4.8-7.8	5.3
* Moving Average		Y
Compliance ( Y/N )		
Intended Added, % AC	7.06	
Actual Added, % AC		7.01
Intended Total, % AC	7.06	
Actual Total, % AC		7.01
Gmb:		2.333
Gmm:		2.433
Pa:		4.1
Moving Average	4.0	3.2
Time		9:30 AM
Station		3020+00
Side		LEFT
Sample Mg's		163.00
Sublot Mg's		265.52
Mg's to Date		3,113.68
Fines / Bitumen Ratio	6-1.20	1.25

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)		28					
A.C. Temp. (°C)		149					
Mix Temp. (°C)		143					

Date Placed: 08/19/98 Date Tested: \_\_\_\_\_  
 Course Placed: Rindler Tested By: \_\_\_\_\_

**Density Record**

Core No.:	1	2	3	4	5	6	7
Station							
CL Reference							
W 1 Dry							
W 2 in H2O							
W 3 Wet							
Difference							
Field Density							
% Density							
% Voids							
Thickness (mm)							

Gmb (Lot Avg.): 2.333 Avg. Field Density: \_\_\_\_\_  
 Gmm (Lot Avg.): 2.433 Avg. % Density: \_\_\_\_\_  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: \_\_\_\_\_  
 Target % RAP: \_\_\_\_\_ Specified % Density: \_\_\_\_\_

Q.I. =      =     

Low Outlier: ERR High Outlier: ERR New Q.I. = ERR

Film Thickness ( FT ): 7.8 VMA: 13.7

Remarks: BEGINNING STATION-3000+57, ENDING STATION-3026+38  
250.99 MEGAGRAMS TO THE ROAD WITH NO ROAD WASTE.

Gsb: 2.515 Gb: 1.0270 Effective % AC: 4.24

Mix Change Information: AC TARGET CHANGE TO 7.06

C.P.I.: VICKI WILLIAMS SE 126 Cert. No. \_\_\_\_\_  
 QMA Tech: BARB DUNNING SE 145 Cert. No. \_\_\_\_\_

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant

DAILY ACC PLANT REPORT

Project No.: FM-58(17)-55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-30

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 3A  
 Design Blows: \_\_\_\_\_  
 Design Gyration: 68

Hot Box I.D. No.:		HM-3B	
Date Sampled:		08/19/98	
Gradation ID:	Specs	CB-3A	
25mm Sieve	100	100	
19mm Sieve	98-100	100	
12.5mm Sieve	88-95-100	94	
9.5mm Sieve	81-88-95	87	
* 4.75mm Sieve	56-63-70	60	
* Moving Average			
* 2.36mm Sieve	37-43-49	42	
* Moving Average			
1.18mm Sieve		31	
* 600um Sieve	17-22-27	23	
* Moving Average			
300um Sieve		11	
150um Sieve		6.9	
* 75um Sieve	3.0-4.8-7.8	5.3	
* Moving Average			
Compliance (Y/N)			
Intended Added, % AC	6.80		
Actual Added, % AC		6.54	
Intended Total, % AC	6.80		<i>1% LATEX</i>
Actual Total, % AC		6.54	
Gmb:		2.320	
Gmm:		2.456	
Pa:		5.5	
Moving Average	4.0		
Time		11:55 AM	
Station		3060+00	
Side		LEFT	
Sample Mg's		526.00	
Sublot Mg's		500.00	250.85
Mg's to Date			3,864.53
Fines / Bitumen Ratio	6-1.20	1.45	

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)			27	28			
A.C. Temp. (°C)			152	149			
Mix Temp. (°C)			143	143			

Date Placed: 08/19/98 Date Tested: \_\_\_\_\_  
 Course Placed: Binder Tested By: \_\_\_\_\_

Density Record

Core No.:	1	2	3	4	5	6	7
Station							
CL Reference							
W 1 Dry							
W 2 in H2O							
W 3 Wet							
Difference							
Field Density							
% Density							
% Voids							
Thickness (mm)							

Gmb (Lot Avg.): 2.320 Avg. Field Density: \_\_\_\_\_  
 Gmm (Lot Avg.): 2.456 Avg. % Density: \_\_\_\_\_  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: \_\_\_\_\_  
 Target % RAP: \_\_\_\_\_ Specified % Density: \_\_\_\_\_

Q.I. = \_\_\_\_\_ = \_\_\_\_\_

Low Outlier: ERR High Outlier: ERR New Q.I. = ERR

Film Thickness (FT): 6.7 VMA: 13.8

Remarks: BEGINNING STATION-3026+38, ENDING STATION-3101+90  
750.85 MEGAGRAMS TO THE ROAD WITH NO ROAD WASTE.  
with LATEX per TBX

C.P.I.: \_\_\_\_\_ Cert. No. \_\_\_\_\_  
 QMA Tech: \_\_\_\_\_ Cert. No. \_\_\_\_\_

Gsb: 2.515 Gb: 1.0270 Effective % AC: 3.65

Mix Change Information: \_\_\_\_\_

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant \_\_\_\_\_

DAILY ACC PLANT REPORT

Project No.: FM-58(17)--55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-5029

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 3B  
 Design Blows: \_\_\_\_\_  
 Design Gyration: 68

Hot Box I.D. No.:	HM-3C	HM-3D
Date Sampled:	08/19/98	08/19/98
Gradation ID:	Specs	CB-3A
25mm Sieve	100	100
19mm Sieve	98-100	100
12.5mm Sieve	88-95-100	94
9.5mm Sieve	81-88-95	87
* 4.75mm Sieve	56-63-70	60
* Moving Average		
* 2.36mm Sieve	37-43-49	42
* Moving Average		
1.18mm Sieve		31
* 600um Sieve	17-22-27	23
* Moving Average		
300um Sieve		11
150um Sieve		6.9
* 75um Sieve	3.0-4.8-7.8	5.3
* Moving Average		
Compliance (Y/N)	Y	
Intended Added, % AC	7.06	
Actual Added, % AC		6.88
Intended Total, % AC	7.06	
Actual Total, % AC		6.88
Gmb:	2.350	2.346
Gmm:	2.431	2.416
Pa:	3.3	2.9
Moving Average	4.0	3.2
Time	3:00 PM	5:45 PM
Station	3410+00	3200+00
Side	LEFT	LEFT
Sample Mg's	1,066.00	1,651.00
Sublot Mg's	500.00	750.00
Mg's to Date		5,119.74
Fines / Bitumen Ratio	6-1.20	1.27

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)					30	30	
A.C. Temp. (°C)					149	149	
Mix Temp. (°C)					143	143	

Date Placed: 08/19/98 Date Tested: 08/20/98  
 Course Placed: Binder Tested By: VICKI WILLIAMS

Density Record

Core No.:	1	2	3	4	5	6	7
Station	3004+75	3027+97	3066+69	3092+44	3143+56	3194+09	3238+38
CL Reference	4' LT	7.5' LT	3.5' LT	8' LT	3.5' LT	6' LT	9.5' LT
W 1 Dry	1,520.2	1,558.5	1,342.1	1,605.8	1,331.8	1,461.7	1,701.9
W 2 in H2O	852.2	863.6	752.0	902.1	739.1	815.5	931.5
W 3 Wet	1,520.9	1,560.1	1,342.9	1,606.4	1,332.6	1,462.3	1,705.2
Difference	668.7	696.5	590.9	704.3	593.5	646.8	773.7
Field Density	2.273	2.238	2.271	2.280	2.244	2.260	2.200
% Density	97.261	95.764	97.176	97.561	96.021	96.705	94.138
% Voids	6.6	8.1	6.7	6.3	7.8	7.1	9.6
Thickness (mm)	38	43	38	44	38	38	44

Gmb (Lot Avg.): 2.337 Avg. Field Density: 2.252  
 Gmm (Lot Avg.): 2.434 Avg. % Density: 96.375  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: 7.5  
 Target % RAP: \_\_\_\_\_ Specified % Density: 94

Q.I. =  $96.375 - 1.186 \times 94.000 = 2.00$

Low Outlier: \_\_\_\_\_ High Outlier: \_\_\_\_\_ New Q.I. = \_\_\_\_\_  
 Film Thickness (FT): 7.7 VMA: 13.5

Remarks: BEGINNING STATION 3101+90, ENDING STATION-3247+31  
1255.21 MEGAGRAMS TO THE ROAD WITH NO ROAD WASTE.

C.P.I.: VICKI WILLIAMS SE 126 Cert. No. \_\_\_\_\_  
 QMA Tech: BARB DUNNING SE 145 Cert. No. \_\_\_\_\_

Gsb: 2.515 Gb: 1.0270 Effective % AC: 4.17

Mix Change Information: \_\_\_\_\_

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant

800241M - 01/98

**DAILY ACC PLANT REPORT**

Project No.: FM-53(17)--55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-5029

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source:

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 4  
 Design Blows:  
 Design Gyration: 68

Hot Box I.D. No.:		HM-4A	HM-4B	HM-4C
Date Sampled:		08/20/98	08/20/98	08/20/98
Gradation ID:	Specs	CB-4A		
25mm Sieve	100	100		
19mm Sieve	98-100	100		
12.5mm Sieve	88-95-100	95		
9.5mm Sieve	81-88-95	88		
4.75mm Sieve	56-63-70	63		
* Moving Average		60		
* 2.36mm Sieve	37-43-49	45		
* Moving Average		42		
1.18mm Sieve		34		
* 600um Sieve	17-22-27	24		
* Moving Average		23		
300um Sieve		11		
150um Sieve		7.6		
* 75um Sieve	3.0 - 8-7.8	5.8		
* Moving Average		5.5		
Compliance (Y/N)		Y		
Intended Added, % AC	7.06			
Actual Added, % AC		6.81		
Intended Total, % AC	7.06			
Actual Total, % AC		6.81		
Gmb:		2.350	2.343	2.335
Gmm:		2.425	2.426	2.426
Pa:		3.1	3.4	3.8
Moving Average	4.0	3.4	3.2	3.3
Time		7:00 AM	9:40 AM	12:30 PM
Station		3290+00	3280+00	3200+00
Side		RIGHT	LEFT	RIGHT
Sample Mg's		126.00	646.00	1,275.00
Sublot Mg's		500.00	750.00	363.72
Mg's to Date				6,733.46
Fines / Bitumen Ratio	6-1.20	1.36		

Gsb: 2.515      Gb: 1.0270      Effective % AC: 4.28

Mix Change Information: AT 2:00 PM WE HAVE A NEW AC TARGET OF 6.7%.

Distribution    Central Materials    TC Materials    Proj. Engineer    Contractor    Plant

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)	22	29	31	33			
A.C. Temp. (°C)	149	149	149	149			
Mix Temp. (°C)	143	143	143	143			

Date Placed: 08/20/98

Date Tested: \_\_\_\_\_

Course Placed: SURFACE

Tested By: \_\_\_\_\_

**Density Record**

Core No.:	1	2	3	4	5	6	7
Station							
CL Reference							
W 1 Dry							
W 2 in H2O							
W 3 Wet							
Difference							
Field Density							
% Density							
% Voids							
Thickness (mm)							

Gmb (Lot Avg.): 2.343

Avg. Field Density: \_\_\_\_\_

Gmm (Lot Avg.): 2.426

Avg. % Density: \_\_\_\_\_

TC Labs Pa: \_\_\_\_\_

Avg. % Field Voids: \_\_\_\_\_

Target % RAP: \_\_\_\_\_

Specified % Density: \_\_\_\_\_

Q.I. =                      = \_\_\_\_\_

Low Outlier: ERR                      High Outlier: ERR                      New Q.I. = ERR

Film Thickness (FT): 7.4                      VMA: 13.2

Remarks: 1058.12 MGS. OF BINDER WERE LAID TODAY. JOB TOTAL FOR BINDER-6177.86 MGS. BEGINNING STATION FOR BINDER-3280+81 ENDING STATION-3307+95.

C.P.I.: VICKI WILLIAMS  
 QMA Tech: BARB DUNNING

SE 126    Cert. No.  
 SE 145    Cert. No.

800241M - 01/98

DAILY ACC PLANT REPORT

Project No.: FM-58(17)-55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-5029

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source:

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 5  
 Design Blows:  
 Design Gyration: 68

Hot Box I.D. No.:		HM-5A
Date Sampled:		08/21/98
Gradation ID:	Specs	CB-5A
25mm Sieve	100	100
19mm Sieve	98-100	100
12.5mm Sieve	88-95-100	94
9.5mm Sieve	81-88-95	85
* 4.75mm Sieve	56-63-70	62
* Moving Average		
* 2.36mm Sieve	37-43-49	44
* Moving Average		
1.18mm Sieve		33
* 800um Sieve	17-22-27	23
* Moving Average		
300um Sieve		11
150um Sieve		7.2
* 75um Sieve	3.0-4.8-7.8	5.4
* Moving Average		
Compliance (Y/N)		Y
Intended Added, % AC	6.70	
Actual Added, % AC		6.77
Intended Total, % AC	6.70	
Actual Total, % AC		6.77
Gmb:		2.333
Gmm:		2.426
Pa:		3.8
Moving Average	4.0	
Time		7:20 AM
Station		3020+00
Side		RIGHT
Sample Mg's		151.00
Sublot Mg's		286.34
Mg's to Date		7,868.34
Fines / Bitumen Ratio	.6-1.20	1.31

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)	22						
A.C. Temp. (°C)	157						
Mix Temp. (°C)	141						
Date Placed:	08/21/98			Date Tested:			
Course Placed:	SURFACE			Tested By:			
Density Record							
Core No.:	1	2	3	4	5	6	7
Station							
CL Reference							
W 1 Dry							
W 2 in H2O							
W 3 Wet							
Difference							
Field Density							
% Density							
% Voids							
Thickness (mm)							
Gmb (Lot Avg.):	2.333			Avg. Field Density:			
Gmm (Lot Avg.):	2.433			Avg. % Density:			
TC Labs Pa:				Avg. % Field Voids:			
Target % RAP:				Specified % Density:			
Q.I. =				=			
Low Outlier:	ERR		High Outlier:	ERR		New Q.I. =	ERR
Film Thickness (FT):	7.4			VMA: 13.5			

Remarks: BEGINNING STATION-3000+12, ENDING STATION-3030+00.  
 MGMS. TO ROAD-286.33 WITH NO ROAD WASTE

Gsb: 2.515      Gb: 1.0270      Effective % AC: 4.13

Mix Change Information:  
 Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant \_\_\_\_\_

C.P.I.: VICKI WILLIAMS      SE 126      Cert. No.  
 OMA Tech: BARB DUNNING      SE 145      Cert. No.

DAILY ACC PLANT REPORT

Project No.: FM-58(17)--55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-30

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source:

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 5A  
 Design Blows:  
 Design Gyration: 68

Hot Box I.D. No.:		HM-58
Date Sampled:		08/21/98
Gradation ID:	Specs	CB-5A
25mm Sieve	100	100
19mm Sieve	98-100	100
12.5mm Sieve	88-95-100	94
9.5mm Sieve	81-88-95	85
* 4.75mm Sieve	56-63-70	62
* Moving Average		
* 2.36mm Sieve	37-43-49	44
* Moving Average		
1.18mm Sieve		33
* 600um Sieve	17-22-27	23
* Moving Average		
300um Sieve		11
150um Sieve		7.2
* 75um Sieve	3.0-4.8-7.6	5.4
* Moving Average		
Compliance (Y/N)		
Intended Added, % AC	6.80	
Actual Added, % AC		6.84
Intended Total, % AC	6.80	
Actual Total, % AC		6.84
Gmb:		2.332
Gmm:		2.442
Pa:		4.5
Moving Average	4.0	
Time		9:50 AM
Station		3060+00
Side		RIGHT
Sample Mg's		539.00
Sublot Mg's		500.00 184.18
Mg's to Date		8,552.52
Fines / Bitumen Ratio	6-1.20	1.35

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)		27	31				
A.C. Temp. (°C)		152	152				
Mix Temp. (°C)		143	143				

Date Placed: 08/21/98  
 Date Tested:  
 Course Placed: SURFACE  
 Tested By:

Density Record

Core No.:	1	2	3	4	5	6	7
Station							
CL Reference							
W 1 Dry							
W 2 in H2O							
W 3 Wet							
Difference							
Field Density							
% Density							
% Voids							
Thickness (mm)							

Gmb (Lot Avg.): 2.332  
 Gmm (Lot Avg.): 2.442  
 TC Labs Pa:  
 Target % RAP:  
 Avg. Field Density:  
 Avg. % Density:  
 Avg. % Field Voids:  
 Specified % Density:

Q.I. = -- =

Low Outlier: ERR High Outlier: ERR New Q.I. = ERR

Film Thickness (FT): 7.2 VMA: 13.6

Remarks: BEGINNING STATION-3030+00. ENDING STATION-3269.62.  
 MGMS. TO ROAD-684.18 WITH NO ROAD WASTE.  
 WITH 1.1% LATEX FILLER

C.P.I: VICKI WILLIAMS SE 126 Cert. No.  
 QMA Tech: BARB DUNNING SE 145 Cert. No.

Gsb: 2.515 Gb: 1.0270 Effective % AC: 4.01

Mix Change Information:

Distribution Central Materials TC Materials Proj. Engineer Contractor Plant

**DAILY ACC PLANT REPORT**

Project No.: FM-58(17)--55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-5029

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 6  
 Design Blows: \_\_\_\_\_  
 Design Gyration: 68

Hot Box I.D. No.:	HM-6A	HM-6B		
Date Sampled:	08/24/98	08/24/98		
Gradation ID:	Specs	CB-6A		
25mm Sieve	100	100		
19mm Sieve	98-100	100		
12.5mm Sieve	88-95-100	95		
9.5mm Sieve	81-88-95	88		
* 4.75mm Sieve	56-63-70	56		
* Moving Average				
* 2.36mm Sieve	37-43-49	37		
* Moving Average				
1.18mm Sieve		28		
* 600um Sieve	17-22-27	20		
* Moving Average				
300um Sieve		9.8		
150um Sieve		6.7		
* 75um Sieve	3.0-4.8-7.8	5.2		
* Moving Average				
Compliance (Y/N)		Y		
Intended Added, % AC	6.70			
Actual Added, % AC		6.56		
Intended Total, % AC	6.70			
Actual Total, % AC		6.56		
Gmb:	2.330	2.339		
Gmm:	2.431	2.435		
Pa:	4.2	3.9		
Moving Average	4.0	4.0	4.0	
Time	7:20 AM	9:55 AM		
Station	3290+00	3190+00		
Side	LEFT	LEFT		
Sample Mg's	175.00	731.00	1,478.00	1,994.00
Sublot Mg's	500.00	707.82		
Mg's to Date		10,857.54		
Fines / Bitumen Ratio	6-1.20	1.28		

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)	25	27	30				
A.C. Temp. (°C)	156	156	157				
Mix Temp. (°C)	153	156	157				

Date Placed: 08/24/98 Date Tested: 08/25/98  
 Course Placed: SURFACE Tested By: VICKI WILLIAMS

**Density Record**

Core No.:	1	2	3	4	5	6	7
Station	3267+00	3248+48	3229+20	3199+50	3180+48	3172+33	3154.67
CL Reference	7.5' LT	4' LT	8.5' LT	3' LT	5' LT	3.5' LT	9' LT
W 1 Dry	1,168.0	1,246.1	1,427.3	1,194.3	1,541.7	1,447.2	1,716.0
W 2 in H2O	653.2	687.6	797.1	658.8	866.1	810.1	945.2
W 3 Wet	1,169.2	1,247.9	1,428.8	1,196.9	1,542.8	1,448.2	1,718.6
Difference	516.0	560.3	631.7	538.1	676.7	638.1	773.4
Field Density	2.264	2.224	2.259	2.219	2.278	2.268	2.219
% Density	96.959	95.246	96.745	95.032	97.559	97.131	95.032
% Voids	6.9	8.6	7.2	8.8	6.4	6.8	8.8
Thickness (mm)	32	32	38	32	40	38	45

Gmb (Lot Avg.): 2.335 Avg. Field Density: 2.247  
 Gmm (Lot Avg.): 2.433 Avg. % Density: 96.243  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: 7.6  
 Target % RAP: \_\_\_\_\_ Specified % Density: 94

Q.I. =  $96.243 - \frac{1096}{1.096} = 94.000 = \underline{2.05}$

Low Outlier: \_\_\_\_\_ High Outlier: \_\_\_\_\_ New Q.I. = \_\_\_\_\_

Film Thickness (FT): 8.0 VMA: 13.2

Remarks: Beginning station-3269+62, ending 3141+69. 1207.82 megagrams to road with no road waste.

Gsb: 2.515 Gb: 1.0270 Effective % AC: 4.06

Mix Change Information: \_\_\_\_\_

C.P.I.: VICKI WILLIAMS SE 126 Cert. No.  
 QMA Tech: BARB DUNNING SE 145 Cert. No.

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant

800241M - 01/98

**DAILY ACC PLANT REPORT**

Project No.: FM-58(17)-55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-5029

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 7  
 Design Blows: \_\_\_\_\_  
 Design Gyration: 68

Hot Box I.D. No.:		HM-7A		
Date Sampled:		08/25/98		
Gradation ID:	Specs	CB-7A		
25mm Sieve	100	100		
19mm Sieve	98-100	100		
12.5mm Sieve	88-95-100	92		
9.5mm Sieve	81-88-95	84		
* 4.75mm Sieve	56-63-70	61		
* Moving Average				
* 2.36mm Sieve	37-43-49	41		
* Moving Average				
1.18mm Sieve		31		
* 600um Sieve	17-22-27	22		
* Moving Average				
300um Sieve		11		
150um Sieve		7.2		
* 75um Sieve	3.0-4.8-7.6	5.6		
* Moving Average				
Compliance (Y/N)		Y		
Intended Added, % AC	6.70			
Actual Added, % AC		6.78		
Intended Total, % AC	6.70			
Actual Total, % AC		6.78		
Gmb:		2.329		
Gmm:		2.429		
Pa:		4.1		
Moving Average	4.0	3.9		
Time		7:25 AM		
Station		3132+00		
Side		LEFT		
Sample Mg's		127.00	711.00	
Sublot Mg's		370.91		
Mg's to Date		11,228.45		
Fines / Bitumen Ratio	6-1.20	1.33		

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)	22						
A.C. Temp. (°C)	154						
Mix Temp. (°C)	152						

Date Placed: 08/25/98 Date Tested: \_\_\_\_\_  
 Course Placed: SURFACE Tested By: \_\_\_\_\_

**Density Record**

Core No.:	1	2	3	4	5	6	7
Station							
CL Reference							
W 1 Dry							
W 2 in H2O							
W 3 Wet							
Difference							
Field Density							
% Density							
% Voids							
Thickness (mm)							

Gmb (Lot Avg.): 2.329 Avg. Field Density: \_\_\_\_\_  
 Gmm (Lot Avg.): 2.429 Avg. % Density: \_\_\_\_\_  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: \_\_\_\_\_  
 Target % RAP: \_\_\_\_\_ Specified % Density: \_\_\_\_\_

Q.I. = \_\_\_\_\_ = \_\_\_\_\_

Low Outlier: ERR High Outlier: ERR New Q.I. = ERR

Film Thickness (FT): 7.6 VMA: 13.7

Remarks: Stations-3141+69 to 3104+02, megagrams to road-370.91 with no road was

Gsb: 2.515 Gb: 1.0270 Effective % AC: 4.21

Mix Change Information: \_\_\_\_\_

C.P.I.: VICKI WILLIAMS SE 126 Cert. No. \_\_\_\_\_  
 QMA Tech: BARB DUNNING SE 145 Cert. No. \_\_\_\_\_

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant



**DAILY ACC PLANT REPORT**

Project No.: FM-58(17)-55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-30

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source: \_\_\_\_\_

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 7a  
 Design Blows: \_\_\_\_\_  
 Design Gyations: 68

Hot Box I.D. No.:		HM-7B	
Date Sampled:		08/25/98	
Gradation ID:	Specs	CB-7A	
25mm Sieve	100	100	
19mm Sieve	98-100	100	
12.5mm Sieve	88-95-100	92	
9.5mm Sieve	81-88-95	84	
* 4.75mm Sieve	56-63-70	61	
* Moving Average			
* 2.36mm Sieve	37-43-49	41	
* Moving Average			
1.18mm Sieve		31	
* 600um Sieve	17-22-27	22	
* Moving Average			
300um Sieve		11	
150um Sieve		7.2	
* 75um Sieve	3.0-4.8-7.8	5.6	
* Moving Average			
Compliance ( Y/N )			
Intended Added, % AC	6.80		
Actual Added, % AC		6.61	
Intended Total, % AC	6.80		
Actual Total, % AC		6.61	
Gmb:		2.327	
Gmm:		2.434	
Pa:		4.4	
Moving Average	4.0	5.0	
Time		10:30 AM	
Station		3086+00	
Side		LEFT	
Sample Mg's		607.00	
Sublot Mg's		500.00	183.71
Mg's to Date		11,912.16	
Fines / Bitumen Ratio	6-1.20	1.37	

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)			28				
A.C. Temp. (°C)			154				
Mix Temp. (°C)			152				

Date Placed: 08/25/98 Date Tested: 08/26/98  
 Course Placed: SURFACE Tested By: VICKI WILLIAMS

**Density Record**

Core No.:	1	2	3	4	5	6	7
Station	3126+58	3102+60	3085+23	3026+81	3024+93	3031+98	3015+89
CL Reference	8.5 LEFT	3.0 LEFT	5.5 LEFT	2.5 LEFT	4.0 LEFT	7.0 LEFT	6.0 LEFT
W 1 Dry	1,275.4	1,374.3	1,282.2	1,427.8	1,275.2	1,452.6	1,719.0
W 2 in H2O	716.2	773.1	718.2	797.5	712.8	803.1	939.4
W 3 Wet	1,276.6	1,375.2	1,283.6	1,429.3	1,276.1	1,454.6	1,725.5
Difference	560.4	602.1	565.4	631.8	563.3	651.5	786.1
Field Density	2.276	2.283	2.268	2.260	2.264	2.230	2.187
% Density	97.766	98.067	97.423	97.079	97.251	95.790	93.943
% Voids	6.4	6.1	6.7	7.1	6.9	8.3	10.1
Thickness (mm)	35	38	35	38	35	40	45

Gmb (Lot Avg.): 2.328 Avg. Field Density: 2.253  
 Gmm (Lot Avg.): 2.432 Avg. % Density: 96.760  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: 7.4  
 Target % RAP: \_\_\_\_\_ Specified % Density: 94

Q.I. =  $\frac{96.760 - 94.000}{1.436} = \underline{1.92}$

Low Outlier: \_\_\_\_\_ High Outlier: \_\_\_\_\_ New Q.I. = \_\_\_\_\_  
 Film Thickness ( FT ): 7.4 VMA: 13.6

Remarks: Stations-3104+02 to 3038+32, megagrams to road-683.71 with no road was  
 Last pg. of report represents sta.-3038+32 to 3000+12 with 475.25 megagrar  
 to road with no waste.

C.P.I.: VICKI WILLIAMS SE 126 Cert. No.  
 QMA Tech: BARB DUNNING SE 145 Cert. No.

Gsb: 2.515 Gb: 1.0270 Effective % AC: 4.09

Mix Change Information: \_\_\_\_\_

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant

800241M - 01/98

DAILY ACC PLANT REPORT

Project No.: FM-58(17)--55-58  
 Contract ID: 88471  
 Mix Design No.: ABD8-5029

Contractor: NORRIS ASPHALT PAVING CO.  
 County: LOUISA  
 Recycle Source:

Class: 1  
 Size: 1/2"  
 Mix Type: B

Report No.: 7B  
 Design Blows:  
 Design Gyration: 68

Hot Box I.D. No.:												
Date Sampled:		08/25/98										
Gradation ID:	Specs											
25mm Sieve	100											
19mm Sieve	98-100											
12.5mm Sieve	88-95-100											
9.5mm Sieve	81-88-95											
* 4.75mm Sieve	56-63-70											
* Moving Average												
* 2.36mm Sieve	37-43-49											
* Moving Average												
1.18mm Sieve												
* 600um Sieve	17-22-27											
* Moving Average												
300um Sieve												
150um Sieve												
* 75um Sieve	3.0-4.8-7.6											
* Moving Average												
Compliance (Y/N)												
Intended Added, % AC	6.80											
Actual Added, % AC		6.78										
Intended Total, % AC	6.80											
Actual Total, % AC		6.78										
Gmb:												
Gmm:												
Pa:												
Moving Average	4.0											
Time												
Station												
Side												
Sample Mg's												
Sublot Mg's		475.25										
Mg's to Date		12,387.41										
Fines / Bitumen Ratio	6-1.20											

Time	7:00	9:00	11:00	1:00	3:00	5:00	7:00
Air Temp. (°C)				30	32		
A.C. Temp. (°C)				152	152		
Mix Temp. (°C)				152	150		

Date Placed: 08/25/98 Date Tested: \_\_\_\_\_  
 Course Placed: SURFACE Tested By: \_\_\_\_\_

**Density Record**

Core No.:	1	2	3	4	5	6	7
Station							
CL Reference							
W 1 Dry							
W 2 in H2O							
W 3 Wet							
Difference							
Field Density							
% Density							
% Voids							
Thickness (mm)							

Gmb (Lot Avg.): \_\_\_\_\_ Avg. Field Density: \_\_\_\_\_  
 Gmm (Lot Avg.): \_\_\_\_\_ Avg. % Density: \_\_\_\_\_  
 TC Labs Pa: \_\_\_\_\_ Avg. % Field Voids: \_\_\_\_\_  
 Target % RAP: \_\_\_\_\_ Specified % Density: \_\_\_\_\_

Q.I. = \_\_\_\_\_ = \_\_\_\_\_

Low Outlier: ERR High Outlier: ERR New Q.I. = ERR

Film Thickness (FT): ERR VMA: \_\_\_\_\_

Remarks: This page is for the last 500 tons tank stick. The testing was done earlier in this subplot. There was a 400 ton over run from projected tons. Total binder tons-6809.93, total surface tons-6844.85, total job tons-13654.78

C.P.I.: VICKI WILLIAMS SE 126 Cert. No.  
 QMA Tech: BARB DUNNING SE 145 Cert. No.

Gsb: 2.515 Gb: 1.0270 Effective % AC: ERR

Mix Change Information: \_\_\_\_\_

Distribution: \_\_\_\_\_ Central Materials \_\_\_\_\_ TC Materials \_\_\_\_\_ Proj. Engineer \_\_\_\_\_ Contractor \_\_\_\_\_ Plant \_\_\_\_\_