Investigation of PCC Pavement Sections on I-29 in Pottawattamie County

Final Report for MLR-06-01

March 2007

Highway Division



Iowa Department Of Transportation

Investigation of PCC Pavement Sections on I-29 in Pottawattamie County

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8. ABSTRACT

Early deterioration has shown up in a number of Iowa PCC pavements placed between 1986 and 1994. Research has shown that inadequate air content and spacing factors have contributed to the deterioration. Ettringite infilling of air voids is nearly always noted in cores obtained from pavements exhibiting deterioration. This research is to document the early deterioration on I-29 in Pottawattamie county from MP 59 to 72 in both directions.

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DISCLAIMER

The contents of this report reflect the views of the author(s) 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.

Introduction and Objective

Early deterioration has shown up in a number of Iowa PCC pavements placed between 1986 and 1994. Research^{1,2,7} has shown that inadequate air content and spacing factors have contributed to the deterioration. Infilling of the air voids with ettringite is typically noted on pavements exhibiting deterioration as indicated by previous research^{3,4}. This research is to document the early deterioration on I-29 in Pottawattamie County from MP 59 to 72 in both directions.

The northbound pavement placed in 1992 has exhibited staining at the joints since 1998 and some patching has occurred north of milepost 67. The southbound sections placed in 1994 exhibited staining at the joints in 2000 and spalling is now occurring across the joints. A one mile research test section was also placed in 1994 and is in excellent condition. The southbound sections placed in 1995 are also in excellent condition.

Hardened air analysis of cores revealed moderately low air content and borderline spacing factors for the pavement placed in 1992, very low air content and poor spacing factors for the pavement placed in 1994, and the one mile research test section placed in 1994 and the pavement placed in 1995 have excellent air content and spacing factors.

Project Location

The projects are located on I-29 in Pottawattamie county as shown in Figure 1. The northbound pavement was placed in 1992 and the south bound pavement was broken into four sections placed in 1994 and 1995 as shown in Table 1.



Figure 1 Project Location Map

Table 1 I-29	Pavement	Sections
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Year	Project No.	MP	Dir
1992	IM-29-4(39)56—13-78	57.70 to 72.45	NB
1994	IM-29-3(38)58—13-78	57.70 to 60.80 & 65.50 to 70.84	SB
1995	IM-29-3(52)61—13-78	60.80 to 65.50 & 70.84 to 72.45	SB

Materials

The general mix design and materials used can be found in Table 2. A summary of the plant reports for each project can also be found in the Appendix.

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Year	Mix	Cement	Fly Ash	Fine Aggregate	Coarse
					Aggregate
1992	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water
1994	C-6WR-C15	Ash Grove I/II	Council Bluffs #3	Hartford/Oreapolis	Weeping Water
	C-3WR	Ash Grove IP*	N/A	Hartford/Oreapolis	Weeping Water
1995	C-4-WR-C10	Ash Grove IP	North Omaha	All Spec	Weeping Water

Table 2 Project Material Sources

*Research test section placed Station 282+08 to 231+14 SB.

Pavement Conditions

1992 Pavement Northbound

The pavement placed in 1992 began to exhibit staining at the joints in 1998. Cores were obtained in 1999 to investigate the cause of the staining. In 1999, it was noted that the staining was more prevalent in the sections containing Council Bluffs fly ash from milepost 66 north (Honey Creek interchange). The area with the worst staining occurred at approximately milepost 67.43 and minimal staining was occurring at milepost 69.40. (See Figures 2 to 5) The sections containing Port Neal fly ash did not exhibit staining at that time.

In 1999, cores obtained from the project were subjected to freeze-thaw testing in accordance with ASTM C666 method B. Two of the cores failed at 180 cycles. Failure of cores in freezing and thawing has been noted in previous research¹. Results may be found in the Appendix.



Figure 2. 1992 NB – MP 67.43 Overall condition 1999



Figure 3. 1992 NB – MP 67.43 Joint close up 1999



Figure 4. 1992 NB – MP 69.40 Overall condition 1999



Figure 5. 1992 NB – MP 69.40 Joint close up condition 1999

In 2006, staining at the joints had progressed in the sections containing Council Bluffs fly ash north of milepost (Honey Creek Interchange). (See Figures 6-7) In the sections containing Port Neal fly ash staining at the joints was beginning to appear. (See Figure 8)



Figure 6. 1992 NB – MP 67.1 Council Bluffs Fly Ash Section Overall condition 2006



Figure 7 1992 NB – MP 67.1 Council Bluffs Fly Ash Section Joint Close-up 2006



Figure 8. 1992 NB – MP 62 Port Neal Fly Ash Section Overall condition 2006

1994 Pavement Southbound

The pavement placed in 1994 began to exhibit staining at the joints in 2000. Cores were obtained in 2002 to investigate the cause of the staining. In 2002, staining was noted throughout both sections placed in 1994. (See Figures 9-10) Some spalling of the joints was also noted in some areas. In 2006, the pavement had deteriorated significantly and many of the joints have had patch repairs. (See Figures 11-14)



Figure 9. 1994 SB – MP 59.4 Joint close up condition 2002



Figure 10. 1994 SB – MP 70.5 Joint close up condition 2002



Figure 11. 1994 SB – MP 70 Overall condition 2006



Figure 12. 1994 SB – MP 70 Joint close up condition 2006



Figure 13. 1994 SB – MP 66 Overall condition 2006



Figure 14. 1994 SB – MP 66 Joint close up condition 2006

1995 Pavement Southbound

The pavement sections placed in 1995 are all in excellent condition with no staining at the joints. (See Figures 15-17)



Figure 15. 1995 SB – MP 65 Joint close up condition 2002



Figure 16. 1995 SB – MP 65 Overall condition 2006



Figure 17. 1995 SB – MP 65 Joint close up condition 2006

Project Data – Plastic Air Content and w/c ratio

Plastic air content was determined on the projects before the paver using the pressure meter. The specification for plastic air content was $6\pm1\%$ until 1994 and $7\pm1\%$ from 1995 and later. The w/c ratio is an average for the day reported on the plant report. The w/c ratio specification was a maximum of 0.488 for the mixes used. The average air content and w/c ratio for each project are shown in Table 3.

Year	Project No.	Dir	Average Plastic Air Content	Average w/c ratio
1992	IM-29-4(39)56—13-78	NB	7.1%	0.384
1994	IM-29-3(38)58—13-78	SB	6.3%	0.425
1995	IM-29-3(52)61—13-78	SB	7.6%	0.471

Table 3. Project Testing Data

Hardened Air Analysis

Cores were obtained from the midpanel (MP) and joints (JT). For the 1992 and 1994 projects, areas exhibiting distress were targeted. Samples were obtained from the top (T) and bottom (B) of each core and hardened air analysis was performed by the MARL laboratory at ISU using the scanning electron microscope (SEM) (Figure 18) and image analysis. Infilling of air voids with ettringite was noted in the cores from the 1992 and 1994 pavements and was more prevalent in the top of the cores.



Figure 18. Scanning Electron Microscope (SEM)

Hardened air was measured on core slices obtained from each project. Using a method developed in previous research⁴, the SEM is used to sample 20 images at 40X from a polished sample. The images are then analyzed using image analysis software to determine bubble distribution. The hardened air results using the SEM and image analysis are shown in Table 4.

	Mortar	Mortar	Concrete	Concrete				
	Air T,	Air B,	Air T,	Air B,	Spacing	Factor T,	Spacing	Factor B,
Year/Location	%	%	%	%	mm	(in)	mm	(in)
NB 1992 MP 68 JT	6.2	9.3	4.30	6.50	0.194	0.0076	0.168	0.0066
NB 1992 MP 68 MP	8.1	10.4	5.70	7.30	0.184	0.0072	0.147	0.0058
SB 1994 MP 70 JT	1.4	3.8	1.01	2.77	0.383	0.0151	0.285	0.0112
SB 1994 MP 70 MP	5.9	7.5	4.33	5.53	0.198	0.0078	0.185	0.0073
SB 1995 MP 65 JT	11.3	12.7	8.44	9.53	0.133	0.0052	0.117	0.0046
SB 1995 MP 65 MP	8.7	10.2	6.44	7.59	0.099	0.0039	0.089	0.0035

Table 4. Air Content and Spacing Factor by Project

Discussion of Hardened Air Test Results

Concrete by nature is a porous material. In order to make a workable plastic concrete, the total mix water is normally much greater than that needed for hydration. When the original excess mix water not used in the hydration process is lost due to evaporation, voids, or capillary pores remain in the hardened concrete paste. Since the hardened cement paste is a porous solid, it will absorb water. Depending on the degree of saturation, water is typically present in the paste when the concrete is exposed to freezing temperatures. The resistance to freeze-thaw damage depends upon the size and distribution of entrained air bubbles in the paste. The entrained air bubbles act as a pressure relief for the nine percent expansion experienced when ice is formed. The severity is increased in the presence of deicing salts.

The American Concrete Institute (ACI) recommended concrete air content for severe freeze thaw environment is found in Table 5. ACI also recommends a maximum water cement ratio of 0.45 for freezing and thawing in a moist condition or the presence of deicing salts.

Nominal maximum aggregate size, inches.	Air content, as a percentage of total concrete volume.					
	Severe Exposure	Moderate Exposure				
3/8	7.5	6				
1/2	7	5.5				
3/4	6	5				
1	6	4.5				
1-1/2	5.5	4.5				
2	5	4				
3	4.5	3.5				

Table 5. ACI 318 Table 4.2.1 Total air content for frost resistant concrete

Typical aggregate size is 1 inch and thus, 6% in place air content is required in Iowa. Regardless of aggregate size, the air content in the mortar fraction should be a minimum of 9%. The concrete air content at the top of the cores obtained at the joint in the 1992 (4.3%) and 1994 (1.01%) pavements are lower than the requirement for freeze thaw durability. Concrete air content at the top of the cores obtained at the joint in the 1995 pavement is more than required at 8.44%. The mortar air content at the top of the cores obtained at the joint at the joint in the 1992 (6.2%) and 1994 (1.4%) pavements are higher than the requirement for freeze thaw durability. Mortar air content at the top of the cores obtained at the joint in the 1995 pavement is more than required at 11.3%.

Since the expanding water due to freezing cannot travel more than 0.01 inches (0.2mm) in the paste, the bubbles should be small and relatively close together. ASTM C457 recommends a maximum spacing factor of 0.1 to 0.2 mm (0.004 to 0.008 in) for a severe freeze thaw environment. The spacing factors in the top of the cores obtained at the joint in the 1992 pavement (0.194 mm (0.076 in)) is border line to provide freeze thaw durability. The spacing factors in the top of the cores obtained at the joint (0.0151 in)) is completely inadequate to provide freeze thaw durability. The spacing factor at the top of the cores obtained at the joint in the 1995 pavement is lower than required at 0.133 mm (0.0051 in).

Infilling of air voids with ettringite is often associated with these pavements exhibiting early deterioration. Performing hardened air analysis it is often difficult to distinguish infilled air voids from the paste. Thus, the initial air content (total) is often higher than it is after infilling (effective). Previous research⁹ has noted that up to 2% of the total air volume may be filled, reducing the effective air content and thus, increasing the spacing factor.

The air content in the top or bottom of 1994 pavement cores at the joint may not be at adequate levels even with a 2% increase in total volume. However, if the air content in the in the top of 1992 pavement cores would have been adequate initially with a 2% increase in total volume, then the air void system may have been compromised by increased saturation and freeze thaw damage, perhaps due to micro-cracking near the surface.

The concrete air contents, mortar air contents, and spacing factors are plotted on figures 19-21.

Figure 19 Hardened Air Content in Concrete - I-29



Iowa - Hardened Air Content - Concrete

Figure 20 Hardened Air Content in Mortar - I-29





Figure 21. Hardened Air - Spacing Factor I-29



Iowa - Spacing Factor

Type IP Research Test Section

A day's run research test section was placed in 1994 using Type IP cement for the first time in lowa. The Type IP test section is located from Station 282+08 to 231+14 southbound. Note in Figures 22 and 23, the test section is in excellent condition. This ASTM C 595 Type IP cement was produced with 17% calcined clay to eliminate expansion due to alkali silica reactivity (ASR) when Platte River gravels are used in Nebraska. Nebraska Department of Roads considers the Platte River sand-gravel aggregates to be alkali silica reactive. Use of these aggregates has exhibited a map cracking appearance.

Research⁷ has shown the plus #4 size aggregate to be somewhat reactive, but not the main cause of map cracking. This research also concluded the limestone sweetening, or use of 30% crushed limestone, was the most effective in eliminating the map cracking associated with the Platte River gravels. The Platte River aggregate used in this pavement was the sand portion with 100% passing the 3/8" sieve. In Iowa, limestone is typically used and the C-6WR mix design contains 40% coarse aggregate as limestone (55% coarse aggregate in the Type IP section with at C-3WR mix design). The sections were checked for evidence of ASR with X-ray mapping using the SEM-EDS.



Figure 22 – Type IP Test Section 1994 at Station 232/MP 59.5 (2006)



Figure 23 – Type IP Test Section 1994 Joint close up at Station 232/MP 59.5 (2006)

Cores were obtained at Station 238 southbound in the Type IP test section. Additional cores were also obtained at Station 195 and 212 in an area exhibiting deterioration for comparison. Hardened air analysis was performed on the cores as well as rapid chloride permeability testing AASHTO T 277.

The permeability of the cores tested using AASHTO T 277 indicated a very low rating in the Type IP test section with an average coulomb rating of 392. The permeability of the cores obtained in the area experiencing deterioration indicated a moderate rating with an average coulomb rating of 2610.

The hardened air results for the Type IP test section are shown in Table 6. The hardened air results in the area exhibiting deterioration are shown in Table 7.

 Table 6. Air Content and Spacing Factor – Type IP Test Section Station 282+08 to 231+14

 1994 Southbound

	Тор	Mortar	Total	Avg.	Specific	Spacing	Specific	Spacing
Location	or Bot	Air, %	Air, %	Dia.	Surface	Factor	Surface	Factor
				(microns)	(mm-1)	(mm)	(in-1)	(in)
238+47	Т	14.0	8.71	223	26.906	0.103	683.4	0.004
238+47	В	12.3	7.62	249	24.096	0.125	612.0	0.005
238+57	Т	13.2	8.20	223	26.906	0.107	683.4	0.004
238+57	В	13.2	8.20	216	27.778	0.104	705.6	0.004

Location	Top or Bot	Mortar Air, %	Total Air, %	Avg. Dia.	Specific Surface	Spacing Factor	Specific Surface	Spacing Factor
				(microns)	(mm-1)	(mm)	(in-1)	(in)
212+04	Т	4.0	2.87	172	34.884	0.154	886.0	0.006
212+04	В	6.9	5.00	342	17.544	0.223	445.6	0.009
195+98	Т	4.2	3.02	193	31.088	0.168	789.6	0.007
195+98	В	5.7	4.12	264	22.727	0.193	577.3	0.008

The hardened air results indicate the air content, mortar air content and spacing factor are more than adequate in the Type IP test section. The section experiencing early deterioration has low air content and mortar air content on the top of the cores and borderline spacing factors on the bottom of the cores.

A C-3WR mix with 55% coarse aggregate was used for the Type IP test section. This mix would not be as sandy and sticky as the C-6WR mix with 40% coarse aggregate that was used on the section experiencing deterioration.

Evidence of alkali silica reactivity was not found in either location. This may be due to the use of the sand portion of the Platte river gravel and the use of limestone sweetening. However, note the white spots of sulfur (S) on the Figure 24 (highlighted in red). This is typically noted on all the pavement sections that exhibit early deterioration. Research^{2,3} has noted this to be a form of ettringite. Other research⁶ has noted the ettringite infilling to be a consequence of cracking and saturation and frost damage. Note on Figure 26, the Type IP section that is in excellent condition, the air voids are free of sulfur (S).



 Figure 24. SEM X-RAY Map 100X- Core Obtained in Area Exhibiting Deterioration

 SE/BSE, 255
 ©Ka, 4

 OKa, 43
 NaKa, 14

Figure 25. SEM X-RAY Map 100X– Core Obtained in Area Type IP Test Section SE/BSE, 255 CKa, 5 CKa, 31 NaKa, 11 N



Discussion – Iowa DOT Specifications

lowa DOT specifications regarding air content and vibration changed between 1994 and 1995. The lowa DOT specifications regarding air and vibration are found in Table 8.

Specifications	Before 1995	1995 & Later					
Air Content	6±1%	7±1%					
Vibration	Minimum of 7000 vpm's	5000 to 8000 vpm's					
Supplementary	Required at Dowel Baskets	N/A					
Vibration							

Table 8. Iowa DOT Specifications

In 2000, the Iowa DOT began to require determining loss of air content through the paving machine. Typical values of air loss are 1.5 to 2.0%. Noting the old required air contents of 6% \pm 1% coupled with an air loss of up to 2%, it is not difficult to see how air contents could be below 4%.

It has been noted that prior to the mid 1980's, most paving machines were equipped with electric vibrators. These electric vibrators did not have a zone of influence as large as the hydraulic vibrators found on current paving machines. The electric vibrators required higher vibrations to achieve the same consolidation effort as the hydraulic vibrators. Vibration specification limits were not changed to reflect the greater degree of consolidation with hydraulic vibrators.

Research^{5,9} has shown that over vibration has been related to early pavement deterioration caused by segregation and excessive air loss in the vibrator trails. Since the air contents and spacing factors just below the surface in many pavements exhibiting early deterioration is typically inadequate, the map cracking may be attributed to frost damage caused by differential dimensional movement between concrete at the surface and the concrete in the area of vibrator depths.

Specifications also required supplemental vibration of dowel baskets from 1984 to 1994. The US 20 project placed in 1987 was the first project in Iowa to exhibit early deterioration due to over vibration and excessive air loss in the pavement. A reinforced pavement section was placed over an old coal mine. Since the section was reinforced, there were no dowel baskets. The person performing supplementary vibration apparently continued as they went through the reinforced section. Staining and cracking was evident on the normal skew of the joint where supplemental vibration had been performed. The section eventually received an overlay. (See Figure 26) It is evident that excess vibration is a contributing factor in the deterioration.



Figure 26 – US 20 Webster county reinforced section (1991) Note staining on skew where joint would be on standard pavement section.

During this time period, there were also problems noted with mix workability and placement problems. It was not unusual for a project to exhibit tearing of the surface which was difficult to close. Often the only alternatives were to add water, increase water reducer admixture dosage, and/or increase vibration. Increased vibration with poor workability and placement problems, whether from mix design or material incompatibilities, compromises the air void system and may cause an increase in micro-cracking. An increase in micro-cracking would allow for increased saturation near the surface.

Conclusions and Recommendations

On the pavements performing well, such as the 1995 pavement and the Type IP test section in the 1994 pavement, the air content and spacing factors were more than adequate. On the 1994 pavement, the air content and spacing factors are inadequate, even with a 2% increase in effective versus total air content. On the 1992 pavement cores, the air content and spacing factors are borderline. The original total air content may have been adequate in the 1992 pavement, but must have been compromised due to infilling of the air voids. Air content and spacing factor play a role in the deterioration of the pavements. This is in agreement with what has been noted in previous research^{1,3,5,7}.

On all pavements exhibiting deterioration, the presence of ettringite infilling the air voids is always noted. Research⁶ has noted this phenomenon to be a consequence of saturation and frost

damage. As the paste breaks up, ions go into solution more readily and recrystallize as ettringite in voids.

Micro-cracking in the paste will make the concrete more permeable and open to movement of water. This micro-cracking may be due to freeze thaw damage or perhaps some other mechanism, such as increased micro-cracking or shrinkage from poor workable mixes and over vibration, thereby increasing saturation and potential for freeze thaw damage. Excess vibration from the paver vibrators and supplementary vibration at the joints may compromise the air void system that is not well entrained, or may increase potential for micro-cracking in mixes with poor workability. In either case, it appears that saturation, coupled with inadequate or compromised air void system causes deterioration due to freeze thaw.

The permeability of cores obtained from the section of 1994 pavement experiencing deterioration is much higher than that of the Type IP research test section placed that same year, which is not experiencing deterioration. This increase in permeability may be due in part to micro-cracking.

The conclusions of this research are as follows:

- Poor placement of concrete coupled with excess vibration from paver vibrators compromises an already poorly entrained air void system. Poor placement may also increase micro-cracking, which increases potential for saturation. With increased saturation, freezing and thawing may cause excess infilling of the air voids, further compromising the air void system.
- 2. Increased saturation coupled with an entrained air void system that is either inadequate or has been compromised due to infilling causes freeze thaw deterioration. Typically, the first place the deterioration appears is at the joints where saturation is the highest. It also occurs early along the vibrator trails.
- 3. When a well entrained air void system is found in the concrete, with little infilling, the pavement is freeze thaw durable and experiences no deterioration. When the air void system is inadequate, the pavement experiences deterioration.

The recommendations of this research are as follows:

- 1. Continue with air checks behind the paver to ensure adequate in place air content.
- 2. Continue the use of vibration monitoring to prevent over vibration. Over vibrating the concrete leads to excessive air loss and/or increased micro-cracking.
- 3. Continue to monitor concrete placement to ensure workable mixes are being placed.
- 4. Continue to monitor hardened air contents.

Acknowledgement

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Appendix

Figure 1 – Plant Report Summary IM-29-4(39)56—13-78 1992 NB.

 1992
 IF Jensen
 IM-29-4(39)56--13-78 NB

 Oreapolis Fine (4110) Agg (ANE514), Weeping Water Coarse Agg (ANE002)
 WRDA-82 and DARAVAIR R

MP 57.70 to 72.50 Pott./Harrison Counties

TZ4/1902 644-00 to 546-00 CSWR-C15 Ah Grow III Council Bulfs #3 Oreapoils Weening Water 6555 1.0 7.2 0.401 1 7/21/102 644-00 to 566-15 CSWR-C15 Ah Grow III Council Bulfs #3 Oreapoils Weening Water 6865 1.7.5 7.4 0.381 2 8/1152 GSZ-16 DSZ-15 CSWR-C15 Ah Grow III Council Bulfs #3 Oreapoils Weening Water 7860 1.25 7.0 0.370 5 8/1192 GSZ-16 DSZ-16 CSWR-C15 Ah Grow III Council Bulfs #3 Oreapoils Weening Water 7860 1.25 7.0 0.370 5 8/1192 GSZ-16 DSZ-16 CAWR-C15 Ah Grow III Council Bulfs #3 Oreapoils Weening Water 7860 1.25 7.0 0.370 5 8/1192 GSZ-16 DSZ-16 CAWR-C15 Ah Grow III Council Bulfs #3 Oreapoils Weening Water 7867 1.5 7.6 0.401 111 <th>Date</th> <th>Station</th> <th>Mix</th> <th>Cement</th> <th>Fly Ash</th> <th>Fine</th> <th>Coarse</th> <th>Max./Min.</th> <th>Slump</th> <th>Air</th> <th>W/C</th> <th>Report</th>	Date	Station	Mix	Cement	Fly Ash	Fine	Coarse	Max./Min.	Slump	Air	W/C	Report		
T27471982 544+00 to 564+00 C-DWR-C15 Ash Grow III Council Bluffs #2 Oreanols Merring Water 8559 1.0 7.2 0.41 1 171271982 5543-10 to 564+15 C-SWR-C15 Ash Grow III Council Bluffs #2 Oreanols Werping Water 8855 1.7 7.4 0.361 2 0871982 6814-15 C-WR-C15 Ash Grow III Council Bluffs #2 Oreanols Werping Water 7860 1.2 7.0 0.377 5 841992 C344-0 to 264+00 C-WR-C15 Ash Grow III Council Bluffs #2 Oreanols Werping Water 7860 1.2 7.0 0.378 5 841992 C344-10 D 714-4 C-WR-C15 Ash Grow III Council Bluffs #3 Oreanols Werping Water 7965 1.5 6.3 0.333 9 881920 714-14 D 74R-15 Ash Grow III Council Bluffs #3 Oreanols Werping Water 7955 1.5 6.0 0.38 9 1770 1.5 6.8						Aggregate	Aggregate	Temp.			Ratio	#		
724/102 544-00 6-4WP-C15 And Grow III Councel Buffr #3 Orasolie Weeping Witter 8565 1.0 7.2 0.401 1 8/11582 583-32 to 600-44 C-WR-C15 And Grow III Councel Buffr #3 Orasolie Weeping Witter 8565 1.7 7.4 0.351 4 8/11582 COUNCE State Grow III Councel Buffr #3 Orasolie Weeping Witter 8565 1.7 0.337 5 8/11582 COUNCE And Grow III Councel Buffr #3 Orasolie Weeping Witter 8566 1.2 7.0 0.337 5 8/11922 E354-30 to 655-40 C-WR-C15 And Grow III Councel Buffr #3 Orasolie Weeping Witter 8576 1.5 7.1 0.388 9 8/11922 T314-7 T0734-5 C-WR-C15 And Grow III Councel Buff #3 Orasolie Weeping Witter 8572 1.5 7.2 0.388 9 8/11922 T314-7 T0734-7 C-WR-C15 And Grow III <td></td>														
State Dio Boscheis Convertis Abs Grow III Conunci Buffrag Oracolis Weeping Water BX058 1.76 7.4 0.381 2 W11982 S53.20 600-44 CoNVEC15 Abs Grow III Conunci Buffrag Oracolis Weeping Water BX058 1.26 7.0 0.357 1.5 W11982 S53.20 600-44 CoNVEC15 Abs Grow III Conunci Buffrag Oracolis Weeping Water 7800 1.25 7.0 0.377 5 S441902 S34.40 to 654-60 CoNVEC15 Abs Grow III Conunci Buffrag Oracolis Weeping Water 7800 1.5 7.0 0.378 6 0.333 9 S81192 Z14.17 T074.4 COWNEC15 Abs Grow III Conunci Buffrag Oracolis Weeping Water 7800 1.5 7.0 0.383 9 S81192 Z14.17 T074.4 COWNEC15 Abs Grow III Conunci Buffrag Oracolis Weeping Water 780.7 1.5 0.0 0.0 0.0 0.0	7/24/1992	544+00 to 549+00	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	65/59	1.0	7.2	0.401	1		
Mr.1982 SB3-32 to 601-44 C-SWR-515 Ash Grow III Cound Buffrs 3 Oreacols Weering Water B058 1.2 0 0.5 7 1 BX1182 B224433 B544-00 C-SWR-515 Ash Grow III Cound Buffrs 3 Oreacols Weering Water 7858 1.2 7 0.370 5 BX1182 B24430 B544-00 C-SWR-515 Ash Grow III Cound Buffrs 3 Oreacols Weering Water 7858 1.2 7 0.370 7 0.370 7 0.370 7 0.370 7 0.370 7 0.370 7 0.370 7 0.331 8 9 1.2 7.70 0.370 7 0.338 9 1.2 7.70 0.370 7 7 0.338 9 1.2 7.70 0.370 7 7 0.338 9 1.2 7.70 1.5 7.2 0.381 1.2 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1<	7/27/1992	549+00 to 566+15	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	88/65	1.75	7.4	0.361	2		
Writes Grandb Westing Water	8/1/1992	583+32 to 600+94	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	80/58	2.0	6.6	0.361	4		
82,419a2 column Bit and Strate Column Bit and Strate Weeping Water Weeping Water 7860 1.25 7.0 0.3708 5 88/19a2 column Bit and Strate	8/1/1992	602+05 to 605+12	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	80/58	1.25	7.6	0.367	4		
W31922 C24430 00 544400 C-3VM-C15 Ash Grov III Counce Buffs 37 Oreapoid Weeping Water PBoS 1.25 7.0 0.370 7 SK19122 S55-400 D0 720-15 C-SWR-C15 Ash Grov III Counce Buffs 37 Oreapoid Weeping Water PBoS 1.5 F.5 S.3 D.333 8 SK19122 T1-47 to 737-45 C-SWR-C15 Ash Grove III Counce Buffs 37 Oreapoid Weeping Water S277 1.5 F.5 B.3 D.333 9 SK19122 T74-65 C-SWR-C15 Ash Grove III Counce Buffs 37 Oreapoid Weeping Water S577 D.316 B.6 D.391 12 V11922 T26-68 D248-12 C-SWR-C15 Ash Grove III Counce Buffs 37 Oreapoid Weeping Water T856 2.25 T.7 D.318 13 V11922 T26-48 D632-412 C-SWR-C15 Ash Grove III Counce Buffs 37 Oreapoid Weeping Water T856 2.25 T.6 D.338	8/3/1992	608+41 to 629+23.4	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/60	1.25	7.2	0.367	5		
Bart Hold Columb Bit Hars 2 Oreacidi Muttar 2 O	8/3/1992	628+93 to 634+00	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/60	1.25	7.0	0.370	5		
926/1902 662/08 to 711+37 C-SWR-C15 Ach Grove III Councel Bluffs #3 Orespolie Weening Water 92/70 1.5 6.3 0.333 8 98/1902 711-47 to 737+46 C-SWR-C15 Ach Grove III Councel Bluffs #3 Orespolie Weening Water 92/70 1.5 6.4 0.333 8 98/1902 771-45 C-SWR-C15 Ach Grove III Councel Bluffs #3 Orespolie Weening Water 98/70 1.75 7.6 0.401 10.039 1.5 0.6 0.439 1.1 0.0391 1.2 0.4391 1.1 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391 1.2 0.0391	8/4/1992	655+90 to 682+08	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/58	1.5	7.1	0.368	р р		
28/1902 711-47 to 729-74 C-SWR-C15 Ach Grove III Councel Buirts #3 Oreapolis Weering Water 92/70 1.5 6.8 0.533 9 88/1902 711-47 0.7546 to F44-54 C-SWR-C15 Ach Grove III Councel Buirts #3 Oreapolis Weering Water 93/72 1.5 6.5 0.401 111 910192 724-65 to 764-54 C-SWR-C15 Ach Grove III Councel Buirts #3 Oreapolis Weering Water 83/70 1.75 6.6 0.601 111 910192 724-56 to 764-50 C-SWR-C15 Ach Grove III Councel Buirts #3 Oreapolis Weering Water 85/65 1.5 7.3 3.88 13 91192 827-420 to 565+87 C-SWR-C15 Ach Grove III Councel Buirts #3 Oreapolis Weering Water 78/60 1.25 6.9 0.388 14 91192 827-420 to 565+87 C-SWR-C15 Ach Grove III Councel Buirts #3 Oreapolis Weering Water 78/60 1.25 7.6 0.422	8/6/1992	682+08 to 711+37	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	79/65	1.25	63	0.370	8		
8/819182 771-417 to 737+65 C-SWR-C15 Ach Grove III Councel Bluffs #3 Oreapolis Weeping Water 9/70 1.5 7.2 0.388 9 8/101922 774-65 to 784-54 C-SWR-C15 Ach Grove III Councel Bluffs #3 Oreapolis Weeping Water 8/70 1.7.5 7.6 0.401 11 8/101922 774-65 It State III Councel Bluffs #3 Oreapolis Weeping Water 8/70 1.7.5 7.6 0.401 11 8/101922 C-SWR-C15 Ach Grove III Councel Bluffs #3 Oreapolis Weeping Water 78.65 1.2 6.9 3.88 14 8/13192 8/74-201 b658+92 C-SWR-C15 Ach Grove III Councel Bluffs #3 Oreapolis Weeping Water 78.60 1.25 7.5 0.428 14 8/141922 8/84-43 C-SWR-C15 Ach Grove III Councel Bluffs #3 Oreapolis Weeping Water 74.60 1.5 7.2 0.328 16 8/141922 8/84-43 C-SWR-C15 <t< td=""><td>8/8/1992</td><td>711+37 to 729+74</td><td>C-5WR-C15</td><td>Ash Grove I/II</td><td>Council Bluffs #3</td><td>Oreapolis</td><td>Weeping Water</td><td>92/70</td><td>1.5</td><td>6.8</td><td>0.383</td><td>9</td></t<>	8/8/1992	711+37 to 729+74	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	92/70	1.5	6.8	0.383	9		
Nig1902 737-65 to 764-54 C:SWR-C15 Ab Grove III Council Bluffs 20 Oreapolis Weeping Water 567/2 1.75 6.5 0.401 11 VI10192 74-64 to 768-67 C.SWR-C15 Ab Grove III Council Bluffs 20 Greapolis Weeping Water 567/2 1.75 6.8 0.386 11 VI10192 74-65 to 788-20 C.SWR-C15 Ab Grove III Council Bluffs 20 Greapolis Weeping Water 557/6 1.6 0.388 13 VI1192 282-821 to 388-20 C.SWR-C15 Ab Grove III Council Bluffs 20 Greapolis Weeping Water 7860 1.2 6.9 0.388 14 VI1192 287-521 to 858-42 C.SWR-C15 Ab Grove III Council Bluffs 20 Greapolis Weeping Water 7460 1.2 6.9 0.388 14 VI1192 287-51 to 827-20 C.SWR-C15 Ab Grove III Council Bluffs 20 Greapolis Weeping Water 7460 1.2 7.6 0.422 7.6 0.422 7.6 0.422<	8/8/1992	731+47 to 737+65	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	92/70	1.5	7.2	0.398	9		
White Teach To Frage C.SWR-C15 Ash Grove III Council Buff str Oreapolis Weeping Water B870 1.75 7.6 0.401 11 0.11192 77.045 10.2381.12 C.SWR-C15 Ash Grove III Council Buff str Oreapolis Weeping Water 7865 1.5 8.7 0.338 13 0.11192 77.04521 S2854.20 C.SWR-C15 Ash Grove III Council Buff str Oreapolis Weeping Water 7860 1.2 6.9 0.338 14 0.11192 S2854.20 LoSSF-47 C.SWR-C15 Ash Grove III Council Buff str Oreapolis Weeping Water 7860 1.2 7.2 0.4229 1 6 0.338 14 0.11192 S274.20 DSSF-42 C.SWR-C15 Ash Grove III Council Buff str Oreapolis Weeping Water 7860 1.2 7.6 0.322 16 0.11192 S274.10 DS74.41 C.SWR-C15 Ash Grove III Councii Buff str Oreapolis Weeping	8/9/1992	737+65 to 764+54	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	95/72	1.75	6.5	0.401	10		
Wind Mage Tries Case Abs Concol Builting 37 Weeping Water PMEPING Water	8/10/1992	764+54 to 768+97	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	88/70	1.75	7.6	0.401	11		
M11199 Zeb Common Section Ash Grove III Council Buffirs 30 Oreapoils Weeping Water ZebS 1.5 8.0 0.331 11 81/1398 51.258 10.235 51.258 10.235 51.258 51.2 51.3 51.4 51.3 51.4 51.3 51.4 51.3 51.3 51.3 51.3	8/10/1992	770+69 to 786+20	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	weeping water	88/70	1.75	6.8	0.396	11		
21/21/802 1/21/802 Convertion	8/11/1992	786+20 to 829+82	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/53	1.5	8.0	0.391	12		
213192 2532-20 to 855-87 C:SWR-C15 Ash Grove UII Council Buffs #3 Oreapolis Weeping Water 7860 1.20 6.30 0.388 1.4 8/13/192 857-20 to 858+22 C-SWR-C15 Ash Grove UII Council Buffs #3 Oreapolis Weeping Water 7860 1.25 7.5 0.429 16 8/14/192 857-470 to 854-43 C-SWR-C15 Ash Grove UII Council Buffs #3 Oreapolis Weeping Water 7460 1.25 7.6 0.429 16 8/14/192 857-470 to 854-43 C-SWR-C15 Ash Grove UII Council Buffs #3 Oreapolis Weeping Water 7460 1.5 7.6 0.429 16 8/11/192 885-413 to 884-85 C-SWR-C15 Ash Grove UII Council Buffs #3 Oreapolis Weeping Water 7460 1.5 7.6 0.429 16 8/16/192 224-23 to 916-18 C-SWR-C15 Ash Grove UII Council Buffs #3 Oreapolis Weeping Water 7460 1.5 7.6 0.429 1.6 1.6 <	8/12/1992	829+82 to 838+20	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	00/00 85/65	2.25	73	0.391	13		
Pri Ar 192 ST-20 to 558-92 C.SWR-C15 Ash Grove I/II Council Buffs 30 Orespolie Weeping Water 7860 1.25 F.5 0.429 164 8/14/1928 S58-92 M630-85 C-SWR-C15 Ash Grove I/II Council Buffs 30 Orespolie Weeping Water 7460 1.25 7.5 0.429 166 8/14/1928 S74-700 B684-43 0.5WR-C15 Ash Grove I/II Council Buffs 30 Orespolie Weeping Water 7460 1.25 7.6 0.392 16 8/17/1928 B684-43 0.888-43 0.688-430 0.888-43 0.6907 1.25 7.5 0.332 18 8/17/1928 B634-510 C-SWR-C15 Ash Grove I/II Council Buffs 30 Orespolie Weeping Water B067 1.5 7.5 0.332 18 8/16/1928 S324740 S44410 C-SWR-C15 Ash Grove I/II Council Buffs 30 Orespolie Weeping Water B460 1.0 7.6 0.330 21 1.1 5 0.0	8/13/1992	838+20 to 855+87	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/60	2.0	6.9	0.388	14		
8/13/1929 8/57+20 to 8/58+92 C-SWR-C15 Ash Grove I/II Council Bluff s/I Oregonis Weeping Water 7/8/60 1.5 7.5 0.429 16 8/14/1928 8/57+36 to 8/72+90 C-SWR-C15 Ash Grove I/II Council Bluff s/I Oregonis Weeping Water 7/4/60 1.25 7.6 0.429 16 8/1/1928 8/57+30 to 8/51+34 C-SWR-C15 Ash Grove I/II Council Bluff s/I Oregonis Weeping Water 7/4/60 1.25 7.6 0.392 18 8/1/1928 8/12+23 0.5-WR-C15 Ash Grove I/II Council Bluff s/I Oregonis Weeping Water 8/057 1.5 7.6 0.392 18 8/1/1928 12+23 to 5-WR-C15 Ash Grove I/II Council Bluff s/I Oregonis Weeping Water 7/8/59 1.5 7.6 0.403 19 8/1/1928 12+51 to 6-WR-C15 Ash Grove I/II Council Bluff s/I Oregonis Weeping Water 7/8/59 1.5 0.60 0.331 121 8/1/1928 12+51 to 6-WR-C15 Ash Grove I/II Port Neal 4/1 (O Oregon	8/13/1992	857+20 to 858+92	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/60	1.25	6.9	0.388	14		
Bit Al-1992 Bit Al-2 Bit Al-3 Council Buffs 3 Oreapoils Weeping Water 7.460 1.5 7.2 0.429 16 Bit Al-1992 Bit Al-30 R5-30k Bit S-20 C-SWR-C15 Ash Grove I/II Council Buffs 3 Oreapoils Weeping Water 7.460 1.25 7.6 0.329 16 Bit Al-3 Neeping Water 7.460 1.25 7.6 0.329 18 Bit Al-330 Neeping Water 7.460 1.25 7.6 0.332 18 Bit Al-7192 Bit Al-330 Neeping Water 7.460 1.5 7.5 0.332 18 Bit Al-7192 Bit Al-23 C-SWR-C15 Ash Grove I/II Council Buffs 3 Oreapoils Weeping Water 7.860 1.5 7.5 0.433 12 Bit Al-992 Bit Al-75 C-SWR-C15 Ash Grove I/II Port Neal 44 (0 Oreapoils Weeping Water 7.860 1.5 7.5 0.430 12 Bit Al-992 Bit Al-75 C-SWR-C15 Ash Grove I/II	8/13/1992	857+20 to 858+92	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/60	1.25	7.5	0.429	14		
8/14/1982 757-36 to 872-490 C-SWR-C15 Ash Grove I/II Council Buffs #3 Oreapolis Weeping Water 7/460 1.25 7.6 0.429 16 8/17/1982 888-43 to 888-45 C-SWR-C15 Ash Grove I/II Council Buffs #3 Oreapolis Weeping Water 70/57 1.25 7.5 0.392 18 8/17/1982 888-42 to 902-40 C-SWR-C15 Ash Grove I/II Council Buffs #3 Oreapolis Weeping Water 80/57 1.5 7.5 0.392 18 8/17/1982 884-73 to 884-75 C-SWR-C15 Ash Grove I/II Council Buffs #3 Oreapolis Weeping Water 78/50 1.5 7.6 0.430 13 8/19/1982 324-74 to 544-84 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 78/50 1.5 7.6 0.430 121 8/20/1982 544-84 to 884-75 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 78/59 1.0 7.0 0.400 224 <	8/14/1992	858+92 to 863+85	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	74/60	1.5	7.2	0.429	16		
8/14/1982 8/74/10 885+43 C.SWR-C15 Ash Grove /II Council Bluffs #3 Oreapolis Weeping Water 80/57 1.75 0.392 18 8/17/1982 888+43 to 888+43 C.SWR-C15 Ash Grove /II Council Bluffs #3 Oreapolis Weeping Water 80/57 1.5 7.5 0.392 18 8/17/1982 884-82 to 802+49 C.SWR-C15 Ash Grove /II Council Bluffs #3 Oreapolis Weeping Water 70/59 1.5 7.6 0.403 19 8/16/1982 221+03 to 321+42 C.SWR-C15 Ash Grove /II Pont Neal #4 (C) Oreapolis Weeping Water 70/59 1.5 6.0 0.393 12 1.5 6.0 0.393 12 1.5 7.6 0.403 19 8/1/1982 10/7+84 to 1034+74 C-SWR-C15 Ash Grove /II Pont Neal #4 (C) Oreapolis Weeping Water 80/62 1.5 7.2 0.390 24 8/20/1982 10/7+84 to 10/3+75 C-SWR-C15 Ash Grove /II Pont Neal #4 (C) Oreapolis	8/14/1992	867+36 to 872+90	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	74/60	1.25	7.6	0.429	16		
Bit //1.92 Bit //1.5 Council Builts #3 Oreapoid Weeping Water Bit //1.5 I.7.5 I.7.2 U.3.92 18 Bit //1922 Bit //1.5 Council Builts #3 Oreapoid Weeping Water Bit //1.5 7.5 0.332 18 Bit //1.92 Bit //1.5 Cown //1.5 A.sh Grove UII Council Builts #3 Oreapoid Weeping Water 8/0.57 1.25 7.5 0.303 19 Bit //1.92 Sit //2.23 to 9164-18 C-SWR-C15 A.sh Grove UII Council Builts #3 Oreapoid Weeping Water 8/0.60 1.0 7.5 0.403 19 Bit //1.92 Sit //1.60 L.5 Covn //1.5 A.sh Grove UII Port Neal #4 (C) Oreapoid Weeping Water 8/0.55 1.0 7.5 0.301 21 Bit //1.92 Sit //1.5 A.sh Grove UII Port Neal #4 (C) Oreapoid Weeping Water 8/0.55 1.0 0.6 0.322 25 Bit //1.92 L077+1.2 C.SWR-C15 A.sh Grove UII Port Neal #4 (C)	8/14/1992	873+70 to 885+43	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	74/60	1.25	7.6	0.392	16		
b) // 1/32 203+2.0 1.2.5 7.5 0.3.32 18 b) // 1/322 203+2.0 103+2.1 C-SWR-C15 A.S. Grove UII Council Bulfs #3 Oreabolis Weeping Water 78.69 1.5 7.5 0.433 13 b) // 1/392 201+2.3 10 81+4.5 C-SWR-C15 A.S. Grove UII Port Neal #4.10 Oreabolis Weeping Water 71.69 1.5 7.5 0.433 13 b) // 1/392 202+74 10 84+4.8 C-SWR-C15 A.S. Grove UII Port Neal #4.10 Oreabolis Weeping Water 81.60 1.5 7.5 0.331 21 b20/1982 944+75 1007+84 C-SWR-C15 A.S. Grove UII Port Neal #4.10 Oreabolis Weeping Water 81.66 1.5 6.9 0.382 25 b20/1982 944+75 1007+84 Oreabolis Weeping Water 70.66 1.5 6.9 0.382 25 b20/1982 944+75 C-SWR-C15 A.S. Grove UII Port Neal #4.10 Oreabolis Weeping Wa	8/17/1992	885+43 to 888+85	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	80/57	1.75	7.2	0.392	18		
b) (1) 320 012-223 (b) 314-L23 C_SWR-C15 Ash Grove III Council Blifts (7) Oreapoins Weeping Water 785 (b) 1.5 7.6 0.426 1 018 (18) 223 024-030 (821+02) C_SWR-C15 Ash Grove III Porn Neal #4 (C) Oreapoins Weeping Water 785 (b) 1.25 7.5 0.4331 11 018 (19) 023 024-030 (824+04) CSWR-C15 Ash Grove III Porn Neal #4 (C) Oreapoins Weeping Water 156(6) 1.0 7.0 0.400 22 020/1920 944-46 to 1036+40 CSWR-C15 Ash Grove III Port Neal #4 (C) Oreapoins Weeping Water 845(6) 1.5 7.0 0.400 22 028/01932 1054+40 to 1075+44 CSWR-C15 Ash Grove III Port Neal #4 (C) Oreapoins Weeping Water 7659 1.5 6.0 0.362 27 028/01932 1054+40 to 1075+75 CSWR-C15 Ash Grove III Port Neal #4 (C) Oreapoins Weeping Water 71659 1.5 7.4 0.385 28 <td>8/17/1992</td> <td>889+82 10 902+09</td> <td>C-5WR-C15</td> <td>Ash Grove I/II</td> <td>Council Bluffs #3</td> <td>Oreapolis</td> <td>Weeping Water</td> <td>80/57</td> <td>1.20</td> <td>7.5</td> <td>0.392</td> <td>18</td>	8/17/1992	889+82 10 902+09	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	80/57	1.20	7.5	0.392	18		
2014/510 2021+561 0522+57 C-SWR-C15 Ach Grove /II Council Buffs #3 Oreapoils Weeping Watter 78/59 1.25 7.5 0.403 19 8/191932 9524-74 0544-84 0984-75 C-SWR-C15 Ach Grove /II Port Neal #4 (C) Oreapoils Weeping Watter 81/60 1.0 7.5 0.301 21 8/201932 954+75 C-SWR-C15 Ach Grove /II Port Neal #4 (C) Oreapoils Weeping Watter 85/59 1.0 7.0 0.400 22 8/201932 1034+40 10164+60 C-SWR-C15 Ach Grove /II Port Neal #4 (C) Oreapoils Weeping Watter 70/59 1.5 6.9 0.382 27 8/201932 1034+60 to 1075+75 C-SWR-C15 Ach Grove /II Port Neal #4 (C) Oreapoils Weeping Watter 70/59 1.5 7.4 0.362 27 8/201932 1039+7 to 1102+00 C-SWR-C15 Ach Grove /II Port Neal #4 (C) Oreapoils Weeping Watter 71/55 7.5 0.317 <td>8/18/1992</td> <td>912+23 to 916+18</td> <td>C-5WR-C15</td> <td>Ash Grove I/II</td> <td>Council Bluffs #3</td> <td>Oreapolis</td> <td>Weeping Water</td> <td>78/59</td> <td>1.5</td> <td>7.5</td> <td>0.392</td> <td>19</td>	8/18/1992	912+23 to 916+18	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/59	1.5	7.5	0.392	19		
Bit /Bit /Bit Sign / Sign	8/18/1992	921+59 to 922+47	C-5WR-C15	Ash Grove I/II	Council Bluffs #3	Oreapolis	Weeping Water	78/59	1.25	7.5	0.403	19		
8/19/192 932-74 952-74 952-74 952-74 8/56 1.0 7.5 0.391 21 8/20/192 954-75 to 1007-84 C-SWR-C15 Ash Grove /II Port Neal #4 (C) Oreanolis<	8/19/1992	928+03 to 931+02	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	81/60	1.5	6.0	0.391	21		
8/20/1932 954+84 to 984+75 C-SWR-C15 Ash Grove /II Port Neal #4 (C) Oreapolis Weeping Water 85/59 1.0 7.0 0.400 22 8/20/1932 94+75 to 1007+84 C-SWR-C15 Ash Grove /II Port Neal #4 (C) Oreapolis Weeping Water 86/62 1.5 7.2 0.392 24 8/26/1932 1034+40 to 1036+40 C-SWR-C15 Ash Grove /II Port Neal #4 (C) Oreapolis Weeping Water 76/59 1.75 7.4 0.362 27 8/26/1932 1034+71 to 1102+90 C-SWR-C15 Ash Grove /II Port Neal #4 (C) Oreapolis Weeping Water 81/58 1.75 7.4 0.362 27 8/28/1932 1039+71 to 1107+02 C-SWR-C15 Ash Grove /II Port Neal #4 (C) Oreapolis Weeping Water 81/58 1.75 7.4 0.362 28 8/28/1932 1039+71 to 1107+02 C-SWR-C15 Ash Grove /II Port Neal #4 (C) Oreapolis Weeping Water 81/58 1.75 7.4 0.362 28 <td>8/19/1992</td> <td>932+74 to 954+84</td> <td>C-5WR-C15</td> <td>Ash Grove I/II</td> <td>Port Neal #4 (C)</td> <td>Oreapolis</td> <td>Weeping Water</td> <td>81/60</td> <td>1.0</td> <td>7.5</td> <td>0.391</td> <td>21</td>	8/19/1992	932+74 to 954+84	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	81/60	1.0	7.5	0.391	21		
8/20/1992 984/75 to 1007+84 C-5WR-C15 Ash Grove //I Port Neal #4 (C) Oreapolis Weeping Water 84/62 1.5 7.2 0.380 24 8/2/1992 1036+40 to 1054+60 C-5WR-C15 Ash Grove //I Port Neal #4 (C) Oreapolis Weeping Water 70/56 1.5 6.8 0.382 25 8/27/1992 1077+12 to 1056+10 C-5WR-C15 Ash Grove //I Port Neal #4 (C) Oreapolis Weeping Water 76/59 1.75 7.4 0.362 27 8/28/1992 1089+71 to 1102+90 C-5WR-C15 Ash Grove //I Port Neal #4 (C) Oreapolis Weeping Water 78/58 1.75 7.4 0.365 28 8/28/1992 1089+71 to 1102+90 C-5WR-C15 Ash Grove //I Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 109+88 to 1130+00 C-5WR-C15 Ash Grove //I Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 854+86 to 857+26 C-5WR-C15 Ash Grove	8/20/1992	954+84 to 984+75	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	85/59	1.0	7.0	0.400	22		
Big/241 Big/241 <t< td=""><td>8/20/1992</td><td>984+75 to 1007+84</td><td>C-5WR-C15</td><td>Ash Grove I/II</td><td>Port Neal #4 (C)</td><td>Oreapolis</td><td>Weeping Water</td><td>86/62</td><td>1.5</td><td>7.2</td><td>0.390</td><td>24</td></t<>	8/20/1992	984+75 to 1007+84	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	86/62	1.5	7.2	0.390	24		
Display Display <t< td=""><td>8/24/1992</td><td>1007+84 to 1036+40</td><td>C-5WR-C15</td><td>Ash Grove I/II</td><td>Port Neal #4 (C)</td><td>Oreapolis</td><td>Weeping Water</td><td>84/59</td><td>1.25</td><td>6.8</td><td>0.382</td><td>25</td></t<>	8/24/1992	1007+84 to 1036+40	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	84/59	1.25	6.8	0.382	25		
2027/11992 10077+12 to 1088+10 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 76/59 1.0 6.0 0.362 27 8/28/1992 1089+71 to 1102+90 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 81/58 1.75 7.4 0.365 28 8/28/1992 1089+71 to 1102+90 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 81/58 1.75 7.4 0.365 28 8/28/1992 1098+87 to 1102+90 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 109+88 to 1130+00 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/63 2.5 6.8 0.389 31 9/1/1992 854-86 to 857+26 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.5 6.8 0.387 38 9/12/1992 134+95 to 156+50 C-SWR-C15 Ash Grove I/II Po	8/27/1992	1054+60 to 1075+75	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	76/59	1.5	7.4	0.360	20		
28/2/1922 108+71 to 1102-90 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Orcapolis Weeping Water 81/58 1.25 6.6 0.365 28 8/28/1992 1103+97 to 1102-90 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Orcapolis Weeping Water 81/58 1.25 6.6 0.365 28 8/28/1992 1109+88 to 1130+00 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Orcapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 855-86 to 857+26 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Orcapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 855-86 to 857+26 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Orcapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/1/1992 964+80 to 959+90 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Orcapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/12/1992 156+50 to 182+55 C-SWR-C15 Ash Grove I/II Port Neal	8/27/1992	1077+12 to 1086+10	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	76/59	1.75	6.0	0.362	27		
8/28/1992 1103+97 to 1107+02 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 81/58 1.25 6.6 0.365 28 8/28/1992 1089+71 to 1102+00 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 81/58 1.75 7.4 0.365 28 8/28/1992 1109+88 to 1130+00 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 855-86 to 857+26 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 6.6 0.389 31 9/2/1992 964+80 to 959+90 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/2/1992 134+95 to 158-50 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.0 6.5 0.367 38 9/2/2/1992 226+90 to 253+12 C-SWR-C15 Ash Grove I/II Port Ne	8/28/1992	1089+71 to 1102+90	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	81/58	1.75	7.4	0.365	28		
8/28/1992 1089+71 to 1102+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 81/58 1.75 7.4 0.365 28 8/31/1992 1109+88 to 1130+00 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 855+86 to 857+26 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 6.8 0.394 30 9/2/1992 855+86 to 857+26 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/63 2.5 6.8 0.389 31 9/11/1992 134+95 to 156+50 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 79/55 2.25 7.5 0.371 37 9/12/1992 126+55 to 20+25 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/45 1.5 6.8 0.367 38 39 9/12/1992 226+90 to 253+12 C-5WR-C15 Ash Grove //II	8/28/1992	1103+97 to 1107+02	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	81/58	1.25	6.6	0.365	28		
2/3/1/1992 1109+88 to 1130+00 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 1109+88 to 1130+00 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 855+86 to 857+26 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/63 2.5 6.8 0.394 30 9/1/1992 964+80 to 959+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/11/1992 134+95 to 156+50 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/61 2.5 6.8 0.393 39 9/12/1992 126+50 to 182+55 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.376 45 9/21/1992 226+90 to 253+12 C-5WR-C15 Ash Grove //II Port Neal #	8/28/1992	1089+71 to 1102+90	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	81/58	1.75	7.4	0.365	28		
9/1/1992 1109+88 to 1130+00 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 74/56 1.5 7.1 0.373 29 9/1/1992 855+86 to 857+26 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/63 2.5 6.8 0.384 30 9/2/1992 964+80 to 959+90 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/11/1992 134+95 to 156+50 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 82/61 2.5 6.8 0.367 38 9/12/1992 182+55 to 209+25 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 86/62 1.5 6.8 0.367 38 9/12/1992 226+90 to 253+12 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.386 46 9/22/1992 287+13 to 312+79 C-5WR-C15 Ash Grove I/II Port Neal #4 (8/31/1992	1109+88 to 1130+00	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	74/56	1.5	7.1	0.373	29		
9/1/1992 855+86 to 857+26 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/63 2.5 6.8 0.394 30 9/2/1992 885+26 to 879+08 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/11/1992 134+95 to 156+50 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/11/1992 156+50 to 182+55 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/61 2.5 6.8 0.397 38 9/13/1992 129+25 to 226+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.386 46 9/21/1992 226+90 to 253+12 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/52 2.0 7.3 0.386 46 9/21/1992 287+12 to 282+45 C-5WR-C15 Ash Grove //II Port Neal #4 (C	9/1/1992	1109+88 to 1130+00	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	74/56	1.5	7.1	0.373	29		
9/2/1992 885+26 to 879+08 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.5 6.8 0.389 31 9/9/1992 964+80 to 959+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/12/1992 156+50 to 182+55 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/61 2.5 6.8 0.367 38 9/13/1992 182+55 to 209+25 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/55 1.5 6.8 0.393 39 9/12/1992 226+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/52 1.5 6.8 0.393 43 9/21/1992 237+12 to 282+45 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/62 1.5 6.8 0.393 47 9/22/1992 287+13 to 312+79 C-5WR-C15 Ash Grove //II Port Neal #4 (C)	9/1/1992	855+86 to 857+26	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	75/63	2.5	6.8	0.394	30		
9/9/1992 964+80 to 959+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/65 1.0 6.5 0.389 31 9/11/1992 134+95 to 156+50 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 72/55 2.25 7.5 0.371 37 9/13/1992 182+55 to 209+25 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/61 1.5 6.8 0.389 39 9/13/1992 129+25 to 209+25 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.386 46 9/20/1992 259+12 to 282+45 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/62 1.5 6.8 0.393 47 9/22/1992 287+13 to 312+79 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/52 2.0 6.4 0.391 50 9/23/1992 338+13 to 344+02 C-5WR-C15 Ash Grove //II Port Neal #4	9/2/1992	885+26 to 879+08	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	82/65	1.5	6.8	0.389	31		
9/11/1992 134+95 to 156+50 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 79/55 2.25 7.5 0.371 37 9/12/1992 156+50 to 182+55 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/61 2.5 6.8 0.367 38 9/19/1992 209+25 to 226+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/45 1.5 6.8 0.339 39 9/19/1992 209+25 to 226+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/65 1.5 6.8 0.393 39 9/21/1992 237+12 to 282+45 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.5 0.304 48 9/22/1992 312+79 to 338+13 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.8 0.377 51 9/25/1992 378+25 to 375+67 C-5WR-C15 Ash Grove //II Port Neal #4 (C) <t< td=""><td>9/9/1992</td><td>964+80 to 959+90</td><td>C-5WR-C15</td><td>Ash Grove I/II</td><td>Port Neal #4 (C)</td><td>Oreapolis</td><td>Weeping Water</td><td>82/65</td><td>1.0</td><td>6.5</td><td>0.389</td><td>31</td></t<>	9/9/1992	964+80 to 959+90	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	82/65	1.0	6.5	0.389	31		
9/12/1992 156+50 to 182+55 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 82/61 2.5 6.8 0.367 38 9/13/1992 182+55 to 209+25 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 86/62 1.5 6.8 0.393 39 9/13/1992 209+25 to 226+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.386 46 9/20/1992 226+90 to 253+12 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.386 46 9/22/1992 287+13 to 312+79 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/52 2.0 6.4 0.391 50 9/22/1992 338+13 to 344+02 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 2.0 6.4 0.391 50 9/25/1992 363+38 to 375+25 C-5WR-C15 Ash Grove //II Port Neal #4	9/11/1992	134+95 to 156+50	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	79/55	2.25	7.5	0.371	37		
9/13/1992 182+55 to 209+25 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 86/62 1.5 6.8 0.393 39 9/19/1992 209+25 to 226+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/45 1.5 6.3 0.379 45 9/20/1992 226+90 to 253+12 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/62 1.5 6.8 0.393 47 9/21/1992 253+12 to 282+45 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/62 1.5 6.8 0.393 47 9/22/1992 287+13 to 312+79 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/62 2.0 6.4 0.391 50 9/24/1992 338+13 to 344+02 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 2.0 6.4 0.389 52 9/25/1992 375+25 to 375+67 C-5WR-C15 Ash Grove //II Port Neal #4	9/12/1992	156+50 to 182+55	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	82/61	2.5	6.8	0.367	38		
9/19/1992 209+25 to 226+90 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.386 46 9/20/1992 226+90 to 253+12 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.386 46 9/20/1992 253+12 to 282+45 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/60 2.0 7.5 0.390 47 9/22/1992 287+13 to 312-79 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 6.4 0.391 50 9/23/1992 338+13 to 344+02 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.8 0.377 51 9/25/1992 375+75 to 402+18 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 9/25/1992 375+75 to 402+18 C-5WR-C15 Ash Grove //II Port Neal #	9/13/1992	182+55 to 209+25	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	86/62	1.5	6.8	0.393	39		
9/20/1992 226+09 to 253+12 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 7.3 0.386 46 9/21/1992 253+12 to 282+45 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/62 1.5 6.8 0.393 47 9/22/1992 312+79 to 338+13 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/52 2.0 6.4 0.391 50 9/24/1992 338+13 to 344+02 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.8 0.377 51 9/25/1992 375+25 to 375+67 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/6/1992 375+25 to 375+67 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/6/1992 375+75 to 402+18 C-5WR-C15 Ash Grove I/II Port Neal	9/19/1992	209+25 to 226+90	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	75/45	1.5	6.3	0.379	45		
9/21/1992 253+12 to 282+45 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/62 1.5 6.8 0.393 47 9/22/1992 287+13 to 312+79 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/60 2.0 7.5 0.390 48 9/22/1992 312+79 to 338+13 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 6.4 0.391 50 9/24/1992 338+13 to 344+02 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 78/50 1.75 6.8 0.377 51 9/25/1992 375+25 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 2.0 6.9 0.389 52 10/6/1992 375+75 to 402+18 C-SWR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/53 2.25 7.5 0.382 60 10/10/1992 406+92.4 to 406+92.4 C-SWR-C15 Ash Grove I/II P	9/20/1992	226+90 to 253+12	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	75/50	2.0	7.3	0.386	46		
9/22/1992 287+13 to 312+79 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/50 2.0 6.4 0.391 50 9/23/1992 312+79 to 338+13 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/52 2.0 6.4 0.391 50 9/23/1992 333+13 to 344+02 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 78/50 1.75 6.8 0.377 51 9/25/1992 363+38 to 375+25 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 9/25/1992 375+75 to 402+18 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/10/1992 406+92.4 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/42 1.5 7.2 0.375 62 10/10/1992 406+92.4 to 426+82 C-5WR-C15 Ash Grove I/II Port Neal #4 (9/21/1992	253+12 to 282+45	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	75/62	1.5	6.8	0.393	47		
9/23/1992 312+79 to 338+13 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 78/50 1.75 6.8 0.377 51 9/24/1992 338+13 to 344+02 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 78/50 1.75 6.8 0.377 51 9/25/1992 375+25 to 375+67 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 9/25/1992 375+25 to 375+67 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/16/1992 375+75 to 402+18 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/10/1992 406+92.4 to 406+92.4 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 59/42 1.5 7.2 0.375 62 10/11/1992 406+92.4 to 406+92.4 C-5WR-C15 <	9/22/1992	287+13 to 312+79	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	75/60	2.0	7.5	0.390	48		
9/24/1992 338+13 to 344+02 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 78/50 1.75 6.8 0.377 51 9/25/1992 363+38 to 375+25 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 2.0 6.9 0.389 52 10/6/1992 375+25 to 375+67 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/6/1992 375+25 to 375+67 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/10/1992 402+18 to 406+92.4 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 75/63 2.25 7.5 0.382 60 10/10/1992 406+92.4 to 426+82 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 65/38 1.25 7.8 0.375 62 10/12/1992 460+20 to 490+91 C-SWR-C15 Ash Grove //II </td <td>9/23/1992</td> <td>312+79 to 338+13</td> <td>C-5WR-C15</td> <td>Ash Grove I/II</td> <td>Port Neal #4 (C)</td> <td>Oreapolis</td> <td>Weeping Water</td> <td>75/52</td> <td>2.0</td> <td>6.4</td> <td>0.391</td> <td>50</td>	9/23/1992	312+79 to 338+13	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	75/52	2.0	6.4	0.391	50		
9/25/1992 363+38 to 375+25 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 2.0 6.9 0.389 52 0/6/1992 375+25 to 375+67 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/6/1992 375+75 to 402+18 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 76/53 2.25 7.5 0.389 52 10/10/1992 402+18 to 406+92.4 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 59/42 1.5 7.2 0.375 62 10/10/1992 402+2.4 to 426+82 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 59/42 5 0.375 62 10/11/1992 426+82 to 460+20 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 65/38 1.25 7.8 0.378 63 10/12/1992 460+20 to 490+91 C-5WR-C15 Ash Grove //II Port Neal	9/24/1992	338+13 to 344+02	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	78/50	1.75	6.8	0.377	51		
9/25/1992 3/3+25 to 3/3+67 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/6/1992 375+75 to 402+18 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 73/50 1.75 6.6 0.389 52 10/10/1992 402+18 to 406+92.4 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 59/42 1.5 7.2 0.375 62 10/10/1992 406+92.4 to 426+82 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 59/42 5 0.375 62 10/11/1992 426+82 to 460+20 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 65/38 1.25 7.8 0.378 63 10/12/1992 460+20 to 490+91 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 65/38 1.25 7.8 0.373 64 10/13/1992 522+76 to 544+00 C-5WR-C15 Ash Grove //II Port N	9/25/1992	363+38 to 375+25	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	73/50	2.0	6.9	0.389	52		
Olof/1992 375+75 to 402+18 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 76/53 2.25 7.5 0.382 60 10/10/1992 402+18 to 406+92.4 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 59/42 1.5 7.2 0.375 62 10/10/1992 406+92.4 to 426+82 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 59/42 5 0.375 62 10/11/1992 426+82 to 460+20 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 65/38 1.25 7.8 0.378 63 10/12/1992 460+20 to 490+91 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 65/38 1.25 7.8 0.373 64 10/13/1992 490+91 to 522+76 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 72/45 1.5 0.369 65 10/14/1992	9/25/1992	3/5+25 to 3/5+6/	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	weeping water	73/50	1.75	6.6	0.389	52		
10/10/1992 402+18 to 400+92.4 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 59/42 1.5 7.2 0.375 62 10/10/1992 406+92.4 to 426+82 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 59/42 5 0.375 62 10/11/1992 406+92.4 to 426+82 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 65/38 1.25 7.8 0.375 63 10/12/1992 460+20 to 490+91 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 65/38 1.25 7.8 0.373 64 10/13/1992 490+91 to 522+76 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 72/45 1.5 0.369 65 10/14/1992 522+76 to 544+00 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 55/46 0.5 7.0 0.367 66 10/16/1992 375+79 to 381+70 C-SWR-C15 Ash Grove //II Port Neal #4 (C) Oreapo	10/6/1992	3/5+/5 to 402+18	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	76/53	2.25	7.5	0.382	60		
I/01/10/1992 Port Neal #4 (C) Oreapolis Weeping Water 59/42 5 0.3/5 62 10/11/1992 426+82 to 460+20 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 59/42 5 0.3/5 62 10/11/1992 426+82 to 460+20 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 65/38 1.25 7.8 0.378 63 10/13/1992 490+91 to 522+76 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 72/45 1.5 0.369 65 10/14/1992 522+76 to 544+00 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 75/46 0.5 7.0 0.367 66 10/16/1992 375+79 to 381+70 C-5WR-C15 Ash Grove I/II Port Neal #4 (C) Oreapolis Weeping Water 55/46 0.5 7.0 0.367 66	10/10/1992	402+18 to 406+92.4	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapoils	weeping water	59/42 50/42	1.5	1.2	0.375	62		
Inv Inv <td>10/10/1992</td> <td>400+92.4 10 426+82</td> <td>C-5WR-C15</td> <td>Ash Grove I/II</td> <td>Port Neal #4 (C)</td> <td>Oreapoils</td> <td>weeping water</td> <td>09/4Z</td> <td>4 05</td> <td>7.0</td> <td>0.375</td> <td>62</td>	10/10/1992	400+92.4 10 426+82	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapoils	weeping water	09/4Z	4 05	7.0	0.375	62		
10/12/1992 400+20 0.430/FC15 Ash Grove //II Port Neal #4 (C) Ofeapolis weeping water b3/5 2.5 0.3/3 64 10/13/1992 490+91 to 522+76 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping water 72/45 1.5 0.369 65 10/14/1992 522+76 to 544+00 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 55/46 0.5 7.0 0.367 66 10/16/1992 375+79 to 381+70 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 55/46 0.5 7.0 0.367 66	10/11/1992	420+82 10 460+20	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapoils	vveeping water	05/38	1.25	7.8	0.378	64		
I/01/a)1992 I/02/a)1992 I/02/a)1992 <th 02="" a)1992<="" th=""> <th 02="" a)1992<="" th=""></th></th>	<th 02="" a)1992<="" th=""></th>		10/12/1992	400+20 to 490+91	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapoils	weeping water	00/45	2.5		0.373	04 65
10/14/1992 10/24/10/0 C-3V/R-C15 Ash Grove //II Port Neal #4 (C) Oreapoils Weeping water 53/46 0.5 7.0 0.367 66 10/16/1992 375+79 to 381+70 C-5WR-C15 Ash Grove //II Port Neal #4 (C) Oreapolis Weeping Water 44/37 1.5 8.0 0.361 68	10/13/1992	490+91 10 522+76	C-5WR-C15	Ash Grove I/II	Port Neal #4 (C)	Oreapolis	Weeping Water	12/40	1.5	7.0	0.309	60		
10/10/1992 3/3+79 to 301+10 U-30/R-013 ASh Grove I/II Port Neal #4 (C) Oreapoils weeping water 44/37 1.5 8.0 0.361 06	10/14/1992	322+10 10 344+00	C-5WR-C15	Ash Crove I/II	FUILINEAL#4 (C)	Oreapolis	Weeping Water	JJ/40	0.5	1.0	0.307	00 68		
162 71 0384	10/16/1992	3/3+/9 10 381+/0	C-3WK-C15	Asil Grove I/II	FUILINEAL#4 (C)	Oreapoils	weeping water	44/37	1.5	7.1	0.301	00		

IM-29-3(38)5813-78			SB	MP 57.70 to 60.80 & 65.50 to 70.84				Cedar Valley 1994				
Date	Station	Mix	Cement	Water Reducer	Fine Aggregate	Coarse Aggregate	Max./Min. Temp.	Slump	Air	W/C Ratio	Report #	
06/29/94	809+00 to 799+50	C-6WR-C15	AshGrove I	WRDA-82	Hartford	Weeping Water	88/85	2.5/1.5	6.7/5.8	0.410	3	
06/30/94	799+30 to 782+88	C-6WR-C15	AshGrove I	WRDA-82/Daratard	Hartford	Weeping Water	87/76	1.75/2.5	5.8/6.2	0.419	4	
07/01/94	782+88 to 766+86	C-6WR-C15	AshGrove I	WRDA-82/Daratard	Hartford	Weeping Water	86/73	1/2.25	5.8/6.2	0.407	5	
07/08/94	799+50 to 743+62	C-6WR-C15	AshGrove I	Daratard 17	Hartford	Weeping Water	72/64	1.25/2	6.6/7.4	0.379	8	
07/09/94	743+25 to 719+65	C-6WR-C15	AshGrove I	Daratard 17	Hartford	Weeping Water	87/64	2/1.75	6.4/5.6	0.414	9	
07/10/94	719+65 to 698+10	C-6WR-C15	AshGrove I	Daratard 17	Hartford	Weeping Water	88/56	1.5	5.5/5.9	0.411	10	
07/11/94	698+10 to 675+63	C-6WR-C15	AshGrove I	Daratard 17	Hartford	Weeping Water	90/62	1/1.5	5.5/5.8	0.421	11	
07/12/94	675+63 to 667+68	C-6WR-C15	AshGrove I	Daratard 17	Hartford	Weeping Water	90/70	1.5	5.9	0.446	12	
07/14/94	667+68 to 639+88	C-6WR-C15	AshGrove I	Daratard 17	Oreapolis	Weeping Water	82/72	1.75/1.25	6/6.5	0.405	14	
07/15/94	639+88 to 621+21	C-6WR-C15	AshGrove I	Daratard 17	Oreapolis	Weeping Water	80/60	2.0/1.0	7.1/5.6	0.428	15	
07/17/94	621+21 to 599+04	C-6WR-C15	AshGrove I	Daratard 17	Oreapolis	Weeping Water	85/65	1.25/1.5	5.5/6.1	0.436	16	
07/18/94	599+04 to 582+38	C-6WR-C15	AshGrove I	Daratard 17	Oreapolis	Weeping Water	89/70	1.5/1.0	6.8/6.2	0.394	17	
07/19/94	581+58 to 553+56	C-6WR-C15	AshGrove I	WRDA-82/Daratard	Oreapolis	Weeping Water	92/72	2/1.75	6.6/6.9	0.442	18	
07/20/94	553+56 to 544+05	C-6WR-C15	AshGrove I/IP	WRDA-82	Oreapolis	Weeping Water	82/70	1.5/1.25	6.7/6.6	0.451	19	
07/21/94	304+00 to 286+68	C-6WR-C15	AshGrove I/IP	WRDA-82	Oreapolis	Weeping Water	82/70	1/1.75	7.0/6.7	0.440	20	
07/22/94	282+08 to 256+50	C-3WR-C10	AshGrove IP	WRDA-82	Oreapolis	Weeping Water	70/64	2.0/1.25	5.0/6.6	0.478	21	
07/23/94	256+50 to 231+14	C-3WR	AshGrove I/IP	WRDA-82	Oreapolis	Weeping Water	91/60	1.5	6.0/7.0	0.459	22	
07/25/94	231+14 to 207+50	C-3WR-C15	AshGrove I	WRDA-82	Oreapolis	Weeping Water	82/65	1.0/1.5	6.8/7.2	0.415	23	
07/26/94	207+50 to 182+85	C-6WR-C15	AshGrove I	WRDA-82	Oreapolis	Weeping Water	78/62	0.75	5.5/7.0	0.429	25	
07/27/94	182+85 to 155+64	C-6WR-C15	AshGrove I	WRDA-82	Hartford	Weeping Water	78/56	1.75/1.25	6.3/6.0	0.424	26	
07/28/94	155+64 to 135+00	C-6WR-C15	AshGrove I	WRDA-82	Oreapolis	Weeping Water	83/54	1.75/1.5	7.0/7.3	0.426	27	

Figure 2 – Plant Report Summary IM-29-3(38)58—13-78 1994 SB.

0.425 6.3 Note: Southbound Lanes. Hartford Fine Aggregate (ANE506) Oreapolis Fine Aggregate (ANE514), & Weeping Water (ANE002) Coarse aggregate, Council Bluffs #3 Flyash (where flyash was used), and Daravair R air entraining agent.

IM-29-3(52)6	/l-29-3(52)6113-78 SB MP 60.80 to 65.50 & MP 70.84 to 72.45 1995 Fred C					95 Fred Carl	son					
Date	Dir.	Station	Mix	Cement	Fly ash	Fine	Coarse	Max./Min. Temperature	Slump	Air	W/C Ratio	Report #
07/03/95	SB	1130+00 to 1109+89	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	85/60	2/1.25	7.2/7.5	0.464	1
07/05/95	SB	1107+08 to 1078+12	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	65/57	1.5/1.75	8/7.8	0.433	2
07/06/95	SB	1076+78 to 1052+40	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	82/57	1.25/1.5	7.6/8	0.424	3
07/07/95	SB	1052+40 to 1026+70	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	89/62	1.50	8/7.8	0.435	4
07/08/95	SB	1026+70 to 999+65	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	95/65	1.87/.75	7.8/7.5	0.469	5
07/10/95	SB	999+65 to 972+50	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	93/69	1.5/1.25	7.5/7.8	0.448	6
07/11/95	SB	972+50 to 951+14	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	101/71	1.75/1.0	8.0/7.0	0.460	7
07/12/95	SB	951+14 to 928+02	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	109/72	1/1.25	7.5	0.478	8
07/14/95	SB	901+52 to 882+43	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	100/74	1.25/.75	7.8/6.0	0.458	10
07/15/95	SB	882+43 to 867+16	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	90/74	1.25	7.5/8.0	0.472	11
07/17/95	SB	1109+89 to 1106+99	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	86/65	1.8/1	7.5/7.2	0.478	12
07/18/95	SB	863+84 to 830+48	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	92/64	2.0	8.0/7.0	0.448	13
07/19/95	SB	828+02 to 809+00	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	88/63	1.25/1.5	7.4/7.8	0.448	14
07/20/95	SB	932+69 to 932+70	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	85/62	.75/1.25	7.5/7.8	0.489	15
07/22/95	SB	931+00 to 922+02	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	88/64	4/1.75	8.75/8	0.487	16
07/27/95	SB	917+84 to 828+02	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	96/70	2.5/3	8.0	0.480	19
07/28/95	SB	1109+95 to 863+48	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	97/65	4.00	8.0	0.476	20
07/31/95	SB	931+00 to 932+70	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	85/69	3.8	8.0	0.480	21A
07/31/95	SB	922+28 to 928+02	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	85/69	3.75	8.0	0.480	21B
08/01/95	SB	863+48 to 863+63	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	78/59	1.5/1.0	7.9/7.8	0.460	22
08/02/95	SB	828+46 to 916+12	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	84/64	3.75/1.5	7.8/8.0	0.472	23
08/03/95	SB	864+18 to 864+33	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	90/68	2.5	6.8	0.475	24
08/07/95	SB	644+06 to 621+38	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	93/68	1.0/1.5	7.4/7.6	0.485	25
08/08/95	SB	521+38 to 493+23	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	99/72	1.3	7.8/7.2	0.486	26
08/09/95	SB	493+23 to 462+15	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	90/70	1.25/1.5	8.0/7.0	0.488	27
08/10/95	SB	462+15 to 437+50	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	94/70	1.0/1.75	7.8/7.4	0.484	28
08/11/95	SB	437+50 to 409+42	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	97/72	1.5	7.4/7.6	0.488	29
08/12/95	SB	410+00 to 387+85	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	96/74	1.25/1.5	7.6/7.4	0.488	30
08/14/95	SB	387+85 to 366+46	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	83/71	2.0/1.0	6.9/8.5	0.468	31
08/16/95	SB	366+46 to 347+05	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	86/72	1.75/1.0	8.0/7.6	0.485	32
08/17/95	SB	345+67 to 315+97	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	96/70	2.0/1.25	7.4/7.9	0.485	33
08/19/95	SB	315+97 to 303+99	C-4WR-C10	Ash Grove IP	N. Omaha	All Spec	Weeping Water	86/65	1.5	7.7	0.486	35

Figure 3 – Plant Report Summary IM-29-3(52)61--13-78 1995SB.

SB Lanes. All Spec S&G (ANE540) fine aggregate, Weeping Water (ANE002) coarse aggregate, Plastocrete 161 water reducer, and Sika AEA air entraining agent. 7.61 0.471

Figure 4 – Freeze Thaw Durability of Cores from I-29 NB 1999.

Pavement Durability Cycling starts October 11, 1999 ends November 24, 1999

Freeze Thaw Test Cores I-29 NB Pott/Harrison Counties

Core #	29-1	29-5	29-9	29-13
Visual Pavement				
Cracking as of 9/1999	None	Moderate	Moderate	Moderate
F-T Cycles	Fraction of Pu	lse Velocity		
0	1.00	1.00	1.00	1.00
9	0.98	1.00	0.93	0.97
33	1.02	1.04	0.97	0.96
43	1.01	0.97	0.89	0.90
76	0.98	0.99	0.90	0.85
85	0.98	0.99	0.87	0.80
95	1.00	0.99	0.82	0.76
115	1.00	0.95	0.82	0.63
147	1.02	0.95	0.53	0.42
157	0.99	0.92	0.52	0.35
180	0.97	0.83	Failed	Failed
190	1.00	0.81		
221	1.01	0.80		
232	0.99	0.78		
242	1.00	0.76		
252	1.00	0.70		
262	1.00	0.76		
302	1.02	0.52		
312	0.99	0.48		
332	0.96	0.27		
364	1.01	Failed		
386	0.99			
406	0.99			
438	1.01			
458	0.99			
509	0.98			
530	0.97			
550	0.97			
585	0.97			
605	0.00			