



**Louisa**

<b><u>DATE</u></b>	<b><u>LOI%</u></b>	<b><u>325 SIEVE %</u></b>	<b><u>MOISTURE %</u></b>
12/03/15	0.37	12.51	0.03
12/04/15	0.44	10.86	0.03
12/07/15	0.33	12.90	0.02
12/08/15	0.41	14.02	0.03
12/09/15	0.46	13.13	0.03
12/10/15	0.20	9.69	0.02
12/11/15	0.20	12.20	0.03
Offline			

**Analytical Testing Service Laboratories, Inc.**  
**P.O. Box 1118, Joplin, Missouri 64802**  
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Headwaters Resources  
 4319 S. # 127  
 Springfield, MO 65810-2607  
 (417)882-0965

January 07, 2016

Attn: Kristy Rotramel

Re: 55774 - Louisa Fly Ash Sample Weekly Composite - 11/ 30-12/04 /2015

	AASHTO-M295 Class "C" <u>Requirements</u>	ASTM C-618 Class "C" <u>Requirements</u>	<u>Actual</u>
Fineness (+325 Mesh)	34% Max	34% Max	12.60%
Moisture Content	3% Max	3% Max	0.06%
Density g/cm <sup>3</sup> C188	****	****	2.66
Density Variation	5% Max	5% Max	1.02%
Loss on Ignition	5% Max	6% Max	0.17%
Soundness	0.8% Max	0.8% Max	0.03%
S.A.I., 7 Days	75% Min	75% Min	97.40%
S.A.I., 28 Days	75% Min	75% Min	103.60%
Water Req. % Control	105% Max	105% Max	94.20%
Silica SiO <sub>2</sub>	****	****	37.93%
Aluminum Oxide Al <sub>2</sub> O <sub>3</sub>	****	****	20.13%
Ferric Oxide Fe <sub>2</sub> O <sub>3</sub>	****	****	5.72%
Total	50% Min	50% Min	63.78%
Sulfur Trioxide SO <sub>3</sub>	5% Max	5.0% Max	1.82%
Calcium Oxide CaO	****	****	26.17%
Magnesium Oxide MgO	****	****	4.64%
Sodium Oxide Na <sub>2</sub> O	****	****	1.46%
Potassium Oxide K <sub>2</sub> O	****	****	0.47%
Available Alkalies as Na <sub>2</sub> O	1.50% Max	****	1.11%

We certify the above was tested in accordance with ASTM C-618 & AASHTO M295.

Analytical Testing Service Laboratories, Inc.



John K. Cupp, Manager

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**P.O. Box 1118, Joplin, Missouri 64802**  
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Headwaters Resources  
 4319 S. # 127  
 Springfield, MO 65810-2607  
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January 15, 2016

Attn: Kristy Rotramel

Re: 55846 - Louisa Fly Ash Sample Weekly Composite - 12/ 07-11 /2015

	<u>AASHTO-M295</u> Class "C" <u>Requirements</u>	<u>ASTM C-618</u> Class "C" <u>Requirements</u>	<u>Actual</u>
Fineness (+325 Mesh)	34% Max	34% Max	12.00%
Moisture Content	3% Max	3% Max	0.04%
Density g/cm <sup>3</sup> C188	****	****	2.67
Density Variation	5% Max	5% Max	1.35%
Loss on Ignition	5% Max	6% Max	0.17%
Soundness	0.8% Max	0.8% Max	0.04%
S.A.I., 7 Days	75% Min	75% Min	100.40%
S.A.I., 28 Days	75% Min	75% Min	104.20%
Water Req. % Control	105% Max	105% Max	94.20%
Silica SiO <sub>2</sub>	****	****	37.24%
Aluminum Oxide Al <sub>2</sub> O <sub>3</sub>	****	****	21.29%
Ferric Oxide Fe <sub>2</sub> O <sub>3</sub>	****	****	5.86%
Total	50% Min	50% Min	64.39%
Sulfur Trioxide SO <sub>3</sub>	5% Max	5.0% Max	1.92%
Calcium Oxide CaO	****	****	25.45%
Magnesium Oxide MgO	****	****	5.14%
Sodium Oxide Na <sub>2</sub> O	****	****	1.51%
Potassium Oxide K <sub>2</sub> O	****	****	0.48%
Available Alkalies as Na <sub>2</sub> O	1.50% Max	****	1.14%

We certify the above was tested in accordance with ASTM C-618 & AASHTO M295.

Analytical Testing Service Laboratories, Inc.



John K. Cupp, Manager