Canyon Fuel Company, LLC
Dugout Canyon Mine

Refuse Pile Amendment
October 10, 2008

# RA ATTACHMENT 5-4
# WASTE ROCK ANALYSIS

File in:
❑ Confidential
❑ Shelf
❑ Expandable
Refer to Record No 0033 Date 09102008
In C/0070039, 2008, Incoming
For additional information

Canyon Fuel Company, LLC
Dugout Canyon Mine

Refuse Pile Amendment
October 10, 2008

# Soil Analysis Report

## Waste Rock Analysis

WS Feb = Feb 2008
WS April = April 2008
WS May = May 2008
WS June = June 2008
WS July = July 2008

WR Aug #1 & #2 = August 2007
WR Sept = Sept 2007
WR October = October 2007
WR Nov = Nov 2007
WR Client = Not relevant to Dugout sampling commitment
WS Dec = Dec 2007 - Acid Base Accounting for Dec 2007 sample Requested by Pricilla Burton

Inter-Mountain Laboratories, Inc.
1673 Terra Avenue, Sheridan, Wyoming 82801
(307) 672-8945

# Soil Analysis Report

**Canyon Fuel Company**

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0711471001

Project: Dugout Canyon Mine
Date Received: 11/28/2007

Date Reported: 1/11/2008
Work Order: S0711471

| Lab ID | Sample ID | pH | Saturation | Electrical Conductivity | Field Capacity | Wilt Point | Calcium | Magnesium | Sodium | Potassium | SAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | s.u. | % | dS/m | % | % | meq/L | meq/L | meq/L | meq/L | |
| S0711471-001 | WR Aug #1 | 8.0 | 28.2 | 1.47 | 10 | 4.8 | 2.90 | 3.48 | 8.04 | 0.86 | 4.50 |
| S0711471-002 | WR Aug #2 | 8.1 | 30.4 | 1.00 | 10 | 4.6 | 1.29 | 1.77 | 5.71 | 0.59 | 4.62 |
| S0711471-003 | WR Sept | 7.8 | 26.4 | 1.52 | 10 | 4.5 | 2.56 | 3.10 | 8.32 | 0.69 | 4.95 |
| S0711471-004 | WR October | 8.2 | 28.4 | 1.13 | 10 | 10 | 1.46 | 1.63 | 7.71 | 0.61 | 6.20 |
| S0711471-005 | WR Nov | 8.0 | 31.3 | 2.52 | 11 | 10 | 6.46 | 7.21 | 12.2 | 2.17 | 4.66 |
| S0711471-006 | WR-Client | 7.4 | 28.3 | 3.60 | 10 | 4.6 | 19.1 | 19.0 | 8.14 | 0.84 | 1.87 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

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# Soil Analysis Report

**Canyon Fuel Company**

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0711471001

Project: Dugout Canyon Mine
Date Received: 11/28/2007

Date Reported: 1/11/2008
Work Order: S0711471

| Lab ID | Sample ID | Sand % | Silt % | Clay % | Texture | Coarse Fragment % | Available Sodium meq/100g | Exchangeable Sodium meq/100g |
|---|---|---|---|---|---|---|---|---|
| S0711471-001 | WR Aug #1 | 76.0 | 14.0 | 10.0 | Sandy Loam | <0.01 | 0.82 | 0.59 |
| S0711471-002 | WR Aug #2 | 80.0 | 14.0 | 6.0 | Loamy Sand | <0.01 | 0.69 | 0.52 |
| S0711471-003 | WR Sept | 82.0 | 12.0 | 6.0 | Loamy Sand | <0.01 | 0.73 | 0.51 |
| S0711471-004 | WR October | 77.0 | 16.0 | 7.0 | Loamy Sand | <0.01 | 1.02 | 0.80 |
| S0711471-005 | WR Nov | 78.0 | 16.0 | 6.0 | Loamy Sand | <0.01 | 1.46 | 1.08 |
| S0711471-006 | WR-Client | 79.0 | 14.0 | 7.0 | Loamy Sand | 3.88 | 0.41 | 0.18 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

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Report ID: S0711471001

Project: Dugout Canyon Mine
Date Received: 11/28/2007

Date Reported: 1/11/2008
Work Order: S0711471

| Lab ID | Sample ID | TKN % | Nitrogen Nitrate ppm | Phosphorus ppm | Boron ppm | Selenium ppm |
|---|---|---|---|---|---|---|
| S0711471-001 | WR Aug #1 | <0.01 | 0.10 | 1.90 | 0.47 | <0.02 |
| S0711471-002 | WR Aug #2 | <0.01 | 0.18 | 2.17 | 0.44 | <0.02 |
| S0711471-003 | WR Sept | <0.01 | <0.02 | 1.80 | 0.46 | <0.02 |
| S0711471-004 | WR October | <0.01 | <0.02 | 2.03 | 0.31 | <0.02 |
| S0711471-005 | WR Nov | <0.01 | 0.05 | 2.30 | 0.17 | <0.02 |
| S0711471-006 | WR-Client | 0.04 | <0.02 | 1.97 | 0.29 | 0.44 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Dugout Canyon Mine
P.O. Box 1029
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Report ID: S0711471001

Project: Dugout Canyon Mine
Date Received: 11/28/2007

Date Reported: 1/11/2008
Work Order: S0711471

| Lab ID | Sample ID | Total Sulfur % | T.S. AB t/1000t | Neut. Pot. t/1000t | T.S. ABP t/1000t | Sulfate Sulfur % | Pyritic Sulfur % | Organic Sulfur % | PyriticS AB t/1000t | PyriticS ABP t/1000t | Total Carbon % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S0711471-001 | WR Aug #1 | 0.91 | 28.3 | 135 | 107 | 0.05 | 0.69 | 0.17 | 21.5 | 114 | 9.7 |
| S0711471-002 | WR Aug #2 | 0.39 | 12.3 | 124 | 111 | <0.01 | 0.25 | 0.15 | 7.75 | 116 | 10.9 |
| S0711471-003 | WR Sept | 0.78 | 24.2 | 80.2 | 56.0 | 0.10 | 0.46 | 0.22 | 14.4 | 65.8 | 9.2 |
| S0711471-004 | WR October | 0.35 | 11.1 | 175 | 164 | 0.03 | 0.11 | 0.22 | 3.27 | 172 | 14.6 |
| S0711471-005 | WR Nov | 0.45 | 13.9 | 198 | 184 | 0.06 | 0.22 | 0.17 | 6.85 | 191 | 19.2 |
| S0711471-006 | WR-Client | 1.14 | 35.5 | 125 | 89.3 | 0.14 | 0.80 | 0.19 | 25.0 | 99.9 | 13.9 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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Report ID: S0711471001

Project: Dugout Canyon Mine
Date Received: 11/28/2007

Date Reported: 1/11/2008
Work Order: S0711471

| Lab ID | Sample ID | TOC % |
|---|---|---|
| S0711471-001 | WR Aug #1 | 8.1 |
| S0711471-002 | WR Aug #2 | 9.4 |
| S0711471-003 | WR Sept | 8.3 |
| S0711471-004 | WR October | 12.5 |
| S0711471-005 | WR Nov | 16.8 |
| S0711471-006 | WR-Client | 12.4 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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# Soil Analysis Report

**Canyon Fuel Company**

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0804032001

Project: Dugout Canyon Mine
Date Received: 4/2/2008

Date Reported: 4/9/2008
Work Order: S0804032

| Lab ID | Sample ID | Total Sulfur % | T.S. AB t/1000t | Neut. Pot. t/1000t | T.S. ABP t/1000t | Sulfate Sulfur % | Pyritic Sulfur % | Organic Sulfur % | PyriticS AB t/1000t | PyriticS ABP t/1000t |
|---|---|---|---|---|---|---|---|---|---|---|
| S0804032-001 | WS Dec | 1.28 | 40.1 | 144 | 103 | 0.03 | 0.93 | 0.32 | 29.2 | 114 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

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# Soil Analysis Report

**Canyon Fuel Company**

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0805438001

Project: Dugout Canyon Mine
Date Received: 5/27/2008

Date Reported: 6/23/2008
Work Order: S0805438

| Lab ID | Sample ID | pH | Saturation | Electrical Conductivity | Field Capacity | Wilt Point | Calcium | Magnesium | Sodium | Potassium | SAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | s.u. | % | dS/m | % | % | meq/L | meq/L | meq/L | meq/L | |
| S0805438-001 | WS Feb | 8.3 | 25.3 | 0.81 | 16 | 5.9 | 1.12 | 0.84 | 5.42 | 0.48 | 5.48 |
| S0805438-002 | WS April | 8.2 | 25.2 | 0.84 | 16 | 6.1 | 1.02 | 0.84 | 5.59 | 0.50 | 5.80 |
| S0805438-003 | WS May | 8.6 | 29.6 | 0.61 | 16 | 4.0 | 0.36 | 0.23 | 5.22 | 0.23 | 9.63 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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# Soil Analysis Report

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Report ID: S0805438001

Project: Dugout Canyon Mine
Date Received: 5/27/2008

Date Reported: 6/23/2008
Work Order: S0805438

| Lab ID | Sample ID | Sand % | Silt % | Clay % | Texture | Available Sodium meq/100g | Exchangeable Sodium meq/100g |
|---|---|---|---|---|---|---|---|
| S0805438-001 | WS Feb | 73.0 | 19.0 | 8.0 | Sandy Loam | 1.28 | 1.15 |
| S0805438-002 | WS April | 73.0 | 20.0 | 7.0 | Sandy Loam | 0.76 | 0.62 |
| S0805438-003 | WS May | 83.0 | 12.0 | 5.0 | Loamy Sand | 0.99 | 0.83 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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Report ID: S0805438001

Project: Dugout Canyon Mine
Date Received: 5/27/2008

Date Reported: 6/23/2008
Work Order: S0805438

| Lab ID | Sample ID | TKN | Nitrogen Nitrate | Phosphorus | Boron | Selenium |
|---|---|---|---|---|---|---|
| | | % | ppm | ppm | ppm | ppm |
| S0805438-001 | WS Feb | 0.27 | 0.21 | <0.01 | 1.01 | <0.02 |
| S0805438-002 | WS April | 0.21 | 0.19 | 0.12 | 0.94 | <0.02 |
| S0805438-003 | WS May | 0.35 | 0.16 | 0.07 | 0.47 | <0.02 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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Report ID: S0805438001

Project: Dugout Canyon Mine
Date Received: 5/27/2008

Date Reported: 6/23/2008
Work Order: S0805438

| Lab ID | Sample ID | Total Sulfur % | T.S. AB t/1000t | Neut. Pot. t/1000t | T.S. ABP t/1000t | Sulfate Sulfur % | Pyritic Sulfur % | Organic Sulfur % | PyriticS AB t/1000t | PyriticS ABP t/1000t | Total Carbon % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S0805438-001 | WS Feb | 0.88 | 27.4 | 60.9 | 33.6 | 0.08 | 0.57 | 0.23 | 17.7 | 43.2 | 15.8 |
| S0805438-002 | WS April | 0.69 | 21.7 | 56.4 | 34.8 | <0.01 | 0.49 | 0.19 | 15.4 | 41.0 | 15.5 |
| S0805438-003 | WS May | 0.35 | 11.1 | 24.1 | 13.0 | 0.03 | 0.07 | 0.25 | 2.33 | 21.7 | 25.8 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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**Soil Analysis Report**

**Canyon Fuel Company**

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Report ID: S0805438001

Project: Dugout Canyon Mine
Date Received: 5/27/2008

Date Reported: 6/23/2008
Work Order: S0805438

| Lab ID | Sample ID | TOC % |
|---|---|---|
| S0805438-001 | WS Feb | 15.1 |
| S0805438-002 | WS April | 14.9 |
| S0805438-003 | WS May | 25.5 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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# Soil Analysis Report

**Canyon Fuel Company**

Dugout Canyon Mine
P.O. Box 1029
Wellington, UT 84542

Report ID: S0807229001

Project: Dugout Canyon Mine
Date Received: 7/10/2008

Date Reported: 8/18/2008
Work Order: S0807229

| Lab ID | Sample ID | pH | Saturation | Electrical Conductivity | Field Capacity | Wilt Point | Calcium | Magnesium | Sodium | Potassium | SAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | s.u. | % | dS/m | % | % | meq/L | meq/L | meq/L | meq/L | |
| S0807229-001 | WS June | 7.8 | 26.0 | 1.86 | 21 | 5.2 | 4.93 | 4.22 | 10.7 | 0.94 | 5.01 |
| S0807229-002 | WS July | 7.9 | 24.9 | 1.39 | 19 | 6.5 | 2.29 | 2.40 | 9.04 | 0.78 | 5.91 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
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# Soil Analysis Report

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Report ID: S0807229001

Project: Dugout Canyon Mine
Date Received: 7/10/2008

Date Reported: 8/18/2008
Work Order: S0807229

| Lab ID | Sample ID | Sand % | Silt % | Clay % | Texture | Available Sodium meq/100g | Exchangeable Sodium meq/100g |
|---|---|---|---|---|---|---|---|
| S0807229-001 | WS June | 76.0 | 16.0 | 8.0 | Sandy Loam | 0.62 | 0.34 |
| S0807229-002 | WS July | 73.0 | 20.0 | 7.0 | Sandy Loam | 0.53 | 0.31 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Report ID: S0807229001

Project: Dugout Canyon Mine
Date Received: 7/10/2008

Date Reported: 8/18/2008
Work Order: S0807229

| Lab ID | Sample ID | TKN % | Nitrogen Nitrate ppm | Phosphorus ppm | Boron ppm | Selenium ppm |
|---|---|---|---|---|---|---|
| S0807229-001 | WS June | 0.16 | 0.14 | 4.28 | 0.57 | <0.02 |
| S0807229-002 | WS July | 0.13 | 0.11 | 5.38 | 0.60 | <0.02 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Report ID: S0807229001

Project: Dugout Canyon Mine
Date Received: 7/10/2008

Date Reported: 8/18/2008
Work Order: S0807229

| Lab ID | Sample ID | Total Sulfur % | T.S. AB t/1000t | Neutral. Potential t/1000t | T.S. ABP t/1000t | Sulfate Sulfur % | Pyritic Sulfur % | Organic Sulfur % | PyriticS AB t/1000t | PyriticS ABP t/1000t | Total Carbon % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S0807229-001 | WS June | 0.61 | 19.0 | 84.2 | 65.2 | 0.01 | 0.45 | 0.14 | 14.2 | 70.0 | 9.9 |
| S0807229-002 | WS July | 0.82 | 25.5 | 115 | 89.9 | 0.02 | 0.64 | 0.16 | 19.9 | 95.4 | 9.4 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
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Report ID: S0807229001

Project: Dugout Canyon Mine
Date Received: 7/10/2008

Date Reported: 8/18/2008
Work Order: S0807229

| Lab ID | Sample ID | TOC % |
|---|---|---|
| S0807229-001 | WS June | 8.9 |
| S0807229-002 | WS July | 8.0 |

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H20Sol= water soluble,AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate
Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential
Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

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