Reliance, Wyoming Mine Subsidence Mitigation Project

Reliance No. 1 Mine Portal
Reliance Project Timeline

- 1868 – Rock Springs No. 1 Mine opens to supply the Union Pacific rail road.
- 1910 – Reliance No. 1 Mine opens.
- 1911 – Town is established with 75 houses reported.
- 1926 – Mine fire begins in No. 1 mine causing temporary closure. No. 7.5 mine opens.
- 1933 – No. 1 Mine closed.
- 1936 – No. 7 Mine opens. Reliance tipple built.
- 1954 – All underground mines are closed.
- 1980 - Wyoming Abandoned Mine Land Program begins 1980
- 2000 – Wyoming AML performs initial statewide abandoned mine inventory.
- 2002 – AML Project 17H begins to address surficial mine features.
- 2003 through 2005 – Detailed statewide mine inventory completed
- 2005 – Sweetwater County Report of Investigation submitted
- 2007 – First 17H closure project initiated
- 2015 – AML Project 17.6B begins addressing mine subsidence in developed areas
- 2015 – Investigation drilling and grouting of east Reliance Road
- 2016 – Grouting of East Reliance residences is initiated (2 Projects)
- 2017 - Grouting of East Reliance residences 4th Phase
- 2018 – 5th Phase of Construction NTP June 4
Figure 2-5. West-east geologic cross section, Wyoming Greater Green River Basin. Cross section by Fred McLaughlin and Yuri Ganshin, WSGS.
Ongoing Subsidence Projects
Reliance No. 1 Mine 2015
Ongoing Subsidence Projects
Reliance No. 1 Mine 2015
Reliance Proposed Drilling and Estimated Depth to No. 1 Coal Seam
Actual Depth to Mine Floor Isopach Map
Reliance County Road Grouting

Fire Venting Through Drill Hole
Reliance County Road Grouting

Elevated H2S Gas Requiring Use of Self Contained Breathing Apparatus / Compressed Air Breathing Apparatus (SCBA/CABA)
Reliance Drilling Results Cross Section
Reliance Drilling Results Cross Section
Drilling Results – Void Limited Support
Drilling Results – Rubble Zone
REMEDIATION

- **Goals** – Mitigate Mine Subsidence and Control or Extinguish Mine Fire
- **Method** – Void Fill Pressure Grouting
- **Approach** –
  - Begin Grouting Down Dip from Mine Fire
  - Push Grout into the Fire Zone
  - Create “Fire Line” along Strike
  - Gradually Continue Up Dip to Outcrop
RESULT

• Area Stabilized
• Mine Fire Extinguished
• No Safety Incidents
  – No Flash-Back
  – Eliminated Gasses
• Verification Drilling and Coring Completed
  – Grouting Placement and Strength Verified
  – No Fire or Mine Gasses
RELIANCE CORING 004 - 007

NOTE:
PROPERTY LINES SHOWN FOR CONCEPTUAL PURPOSES ONLY. LINES OBTAINED FROM THE COUNTY. NO SURVEY HAS BEEN DONE TO VERIFY ACCURACY.

004-RL-CR
MF: ~115'
TOP OF RUBBLE: ~65'

005-RL-CR
MF: ~105'
TOP OF RUBBLE: ~85

006-RL-CR
MF: ~105'
TOP OF RUBBLE: ~70'

007-RL-CR
MF: ~100'
TOP OF RUBBLE: ~65'

17.6A8-II-230-RL
VF GROUT: ~200 CY

17.6A8-II-346-RL
VF GROUT: ~710 CY

17.6A8-II-343-RL
VF GROUT: ~150 CY

17.6A8-II-345-RL
VF GROUT: ~360 CY

17.6A8-II-370-RL
VF GROUT: ~450 CY

17.6A8-II-372-RL
VF GROUT: ~180 CY

17.6A8-II-320-RL
VF GROUT: ~220 CY

17.6A8-II-321-RL
VF GROUT: ~520 CY

17.68-BRS-1A-129-RL
VF GROUT: ~280 CY
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<th>MIN</th>
<th>MAX</th>
<th>AVG</th>
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<td>780</td>
<td>1340</td>
<td>978</td>
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<tr>
<td>Sample</td>
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<tr>
<td>ADJACENT HOLE GROUT STRENGTH (PSI)</td>
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<td>1090</td>
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</table>

- **006-RL-CR-1**: 4580 PSI mudstone
- **006-RL-CR-2**: 1620 PSI grout
- **006-RL-CR-3**: 1940 PSI grout
<table>
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009-RL-CR
ADJACENT HOLE GROUT
STRENGTH (PSI)

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<th>MIN</th>
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<tr>
<td>1050</td>
<td>1200</td>
<td>1142.5</td>
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<tr>
<td>010-RL-CR</td>
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<td>ADJACENT HOLE GROUT STRENGTH (PSI)</td>
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**010-RL-CR-1**

- 3630 PSI sandstone

**010-RL-CR-2**

- 1770 PSI grout
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<td>ADJACENT HOLE GROUT STRENGTH (PSI)</td>
<td>1000</td>
<td>1590</td>
<td>1295</td>
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The table above lists the minimum, maximum, and average adjacent hole gROUT strength in PShe. The diagrams depict various core samples with labels indicating intervals and locations.
Reliance West Main Grouting

Grout Pumping Near Homes