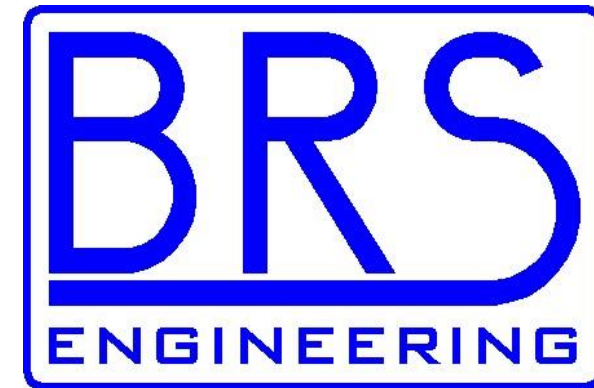


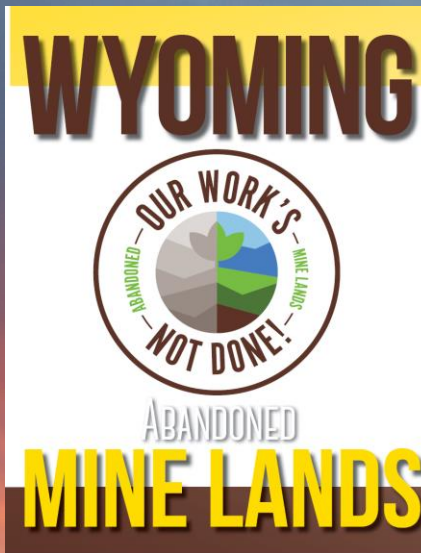
Mitigation of the Union Pacific Coal Company Rock Springs No. 9 Mine Fire



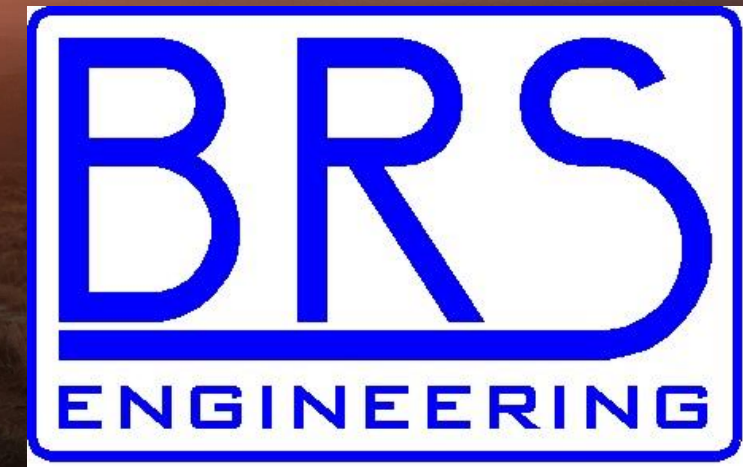
WYOMING DEPARTMENT OF
ENVIRONMENTAL
QUALITY



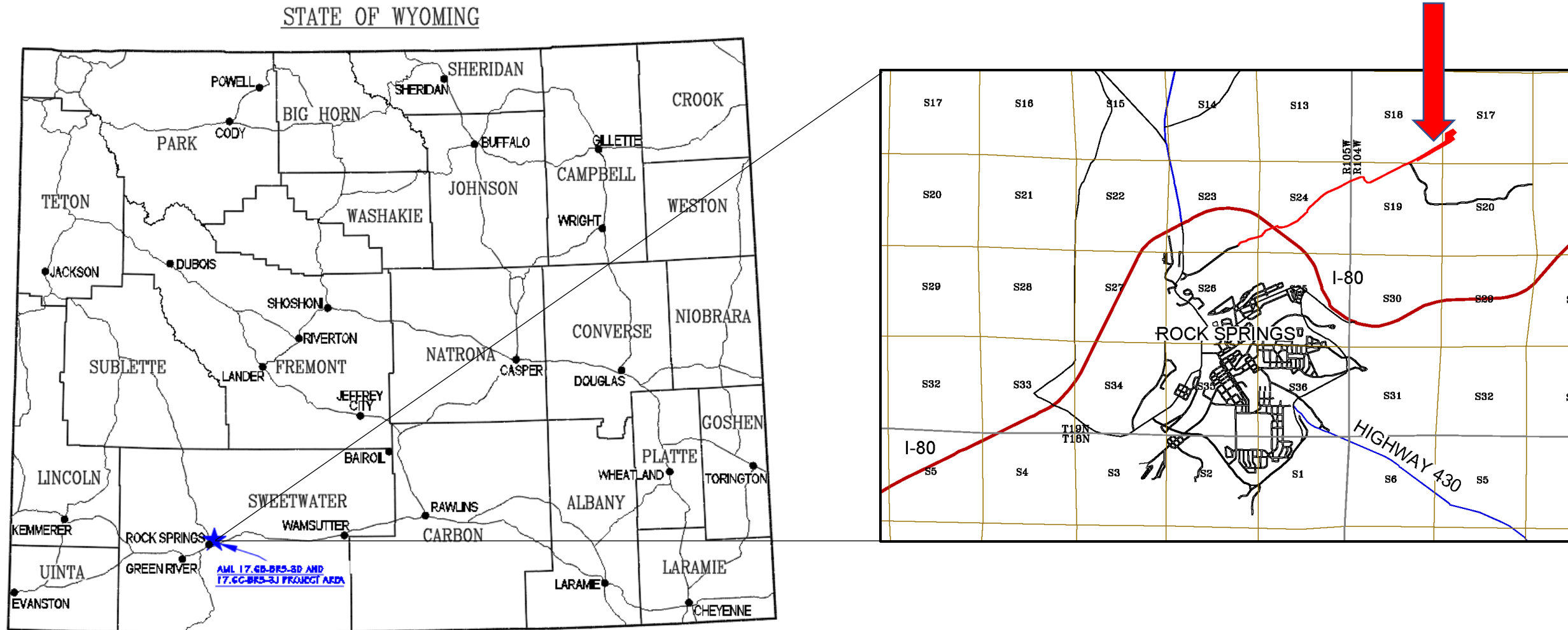
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ROCK SPRINGS NO. 9 MINE FIRE PROJECT LOCATION



SITE LOCATION: AML PROJECT 17.6B-BRS-3D & 17.6C-BRS-3J IS LOCATED IN ROCK SPRINGS, WYOMING.

ROCK SPRINGS HISTORIC COAL MINING DISTRICT

•Historic Coal Mining Camps/Towns

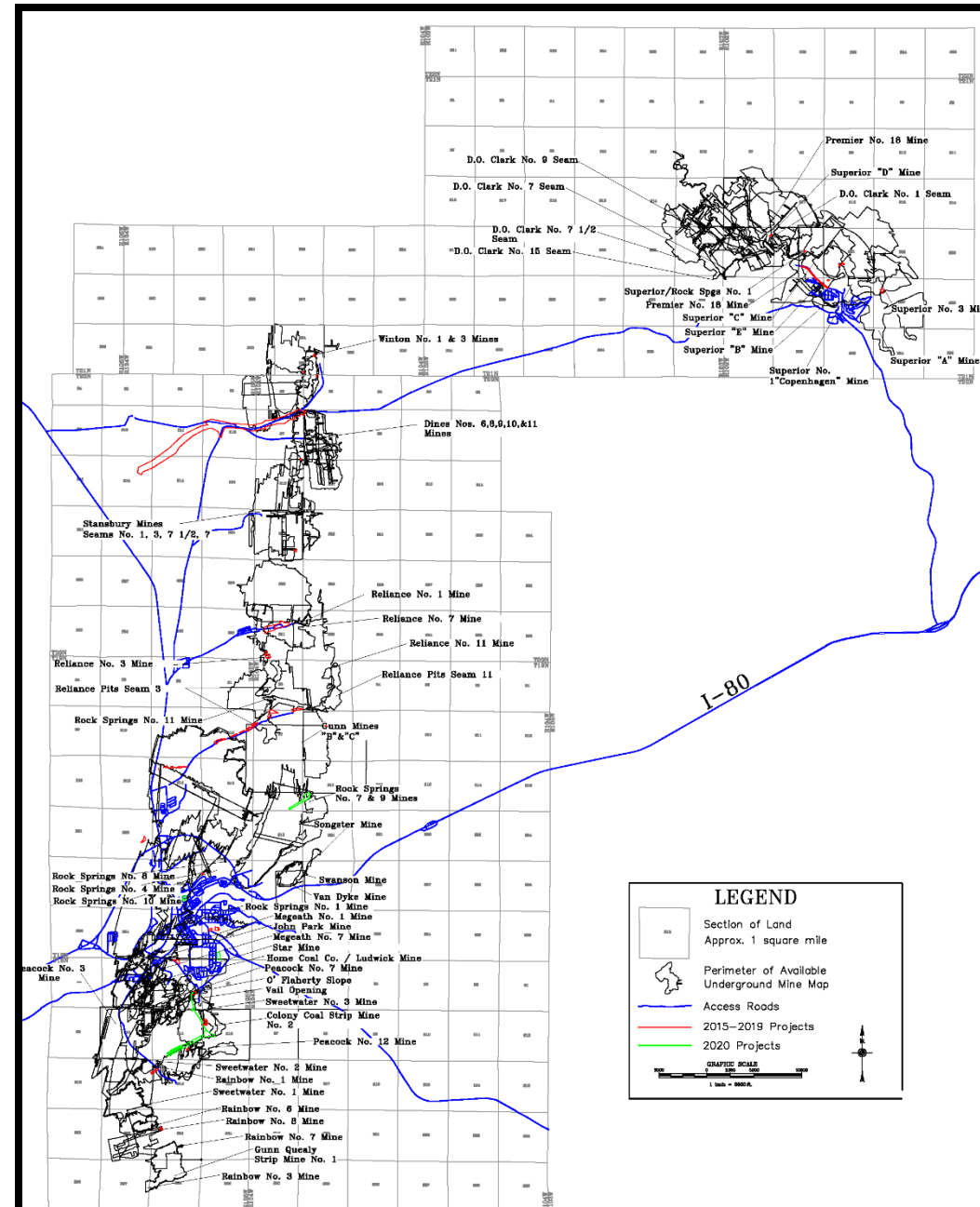
- Rock Springs
- Superior
- Reliance
- Winton
- Dines
- Sweetwater
- Quealy
- Stansbury
- Blairtown
- Megeath
- Van Dyke
- Lionkol
- Gunn

•120+ Known Historic Mine Sites with 20,000 acres undermined

•640 Acres Undermined Inside the City Limits of Rock Springs in One or More Coal Seams

•Historic Coal Mining Companies

- Union Pacific Coal Company
- Central Coal and Coke Company
- Gunn-Quealy Coal Company
- Colony Coal Company
- Lion Coal Company
- Wyoming Coal Company
- Megeath Coal Company
- Rocky Mountain Associated Coal Corporation

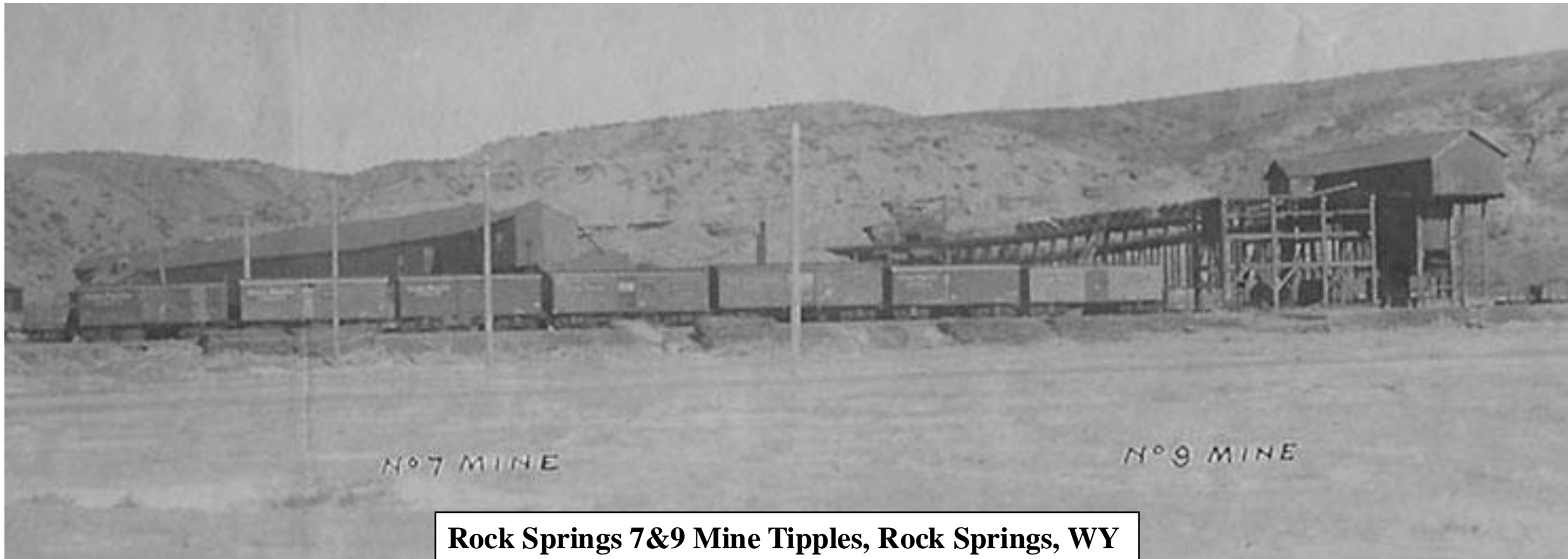


MULTIPLE CONTRACTS AND MITIGATION METHODS

AML 17.6B-BRS-3D, Rock Springs No. 7 & 9 Mine Pipeline Corridor – Drilling and Grouting

AML 17.6C-BRS-3J, Reliance, Rainbow, & Mine Fires – Drilling and Grouting

AML 17G-2, Task Order 1-23, Rock Springs No. 7 & 9 Firewall – Excavation and Bulkheading



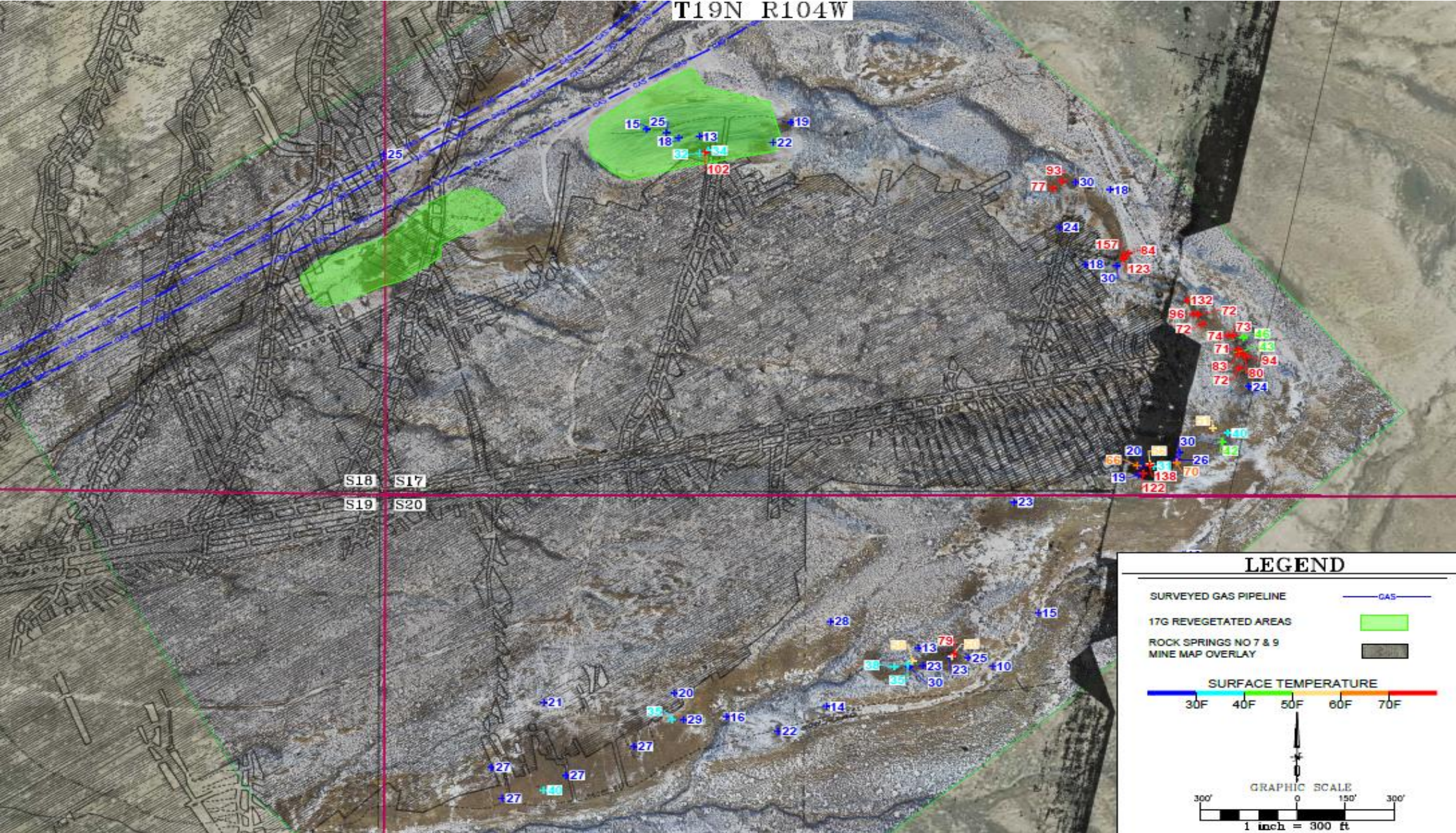
UNION PACIFIC COAL CO. ROCK SPRINGS No. 9 MINE COAL FIRE



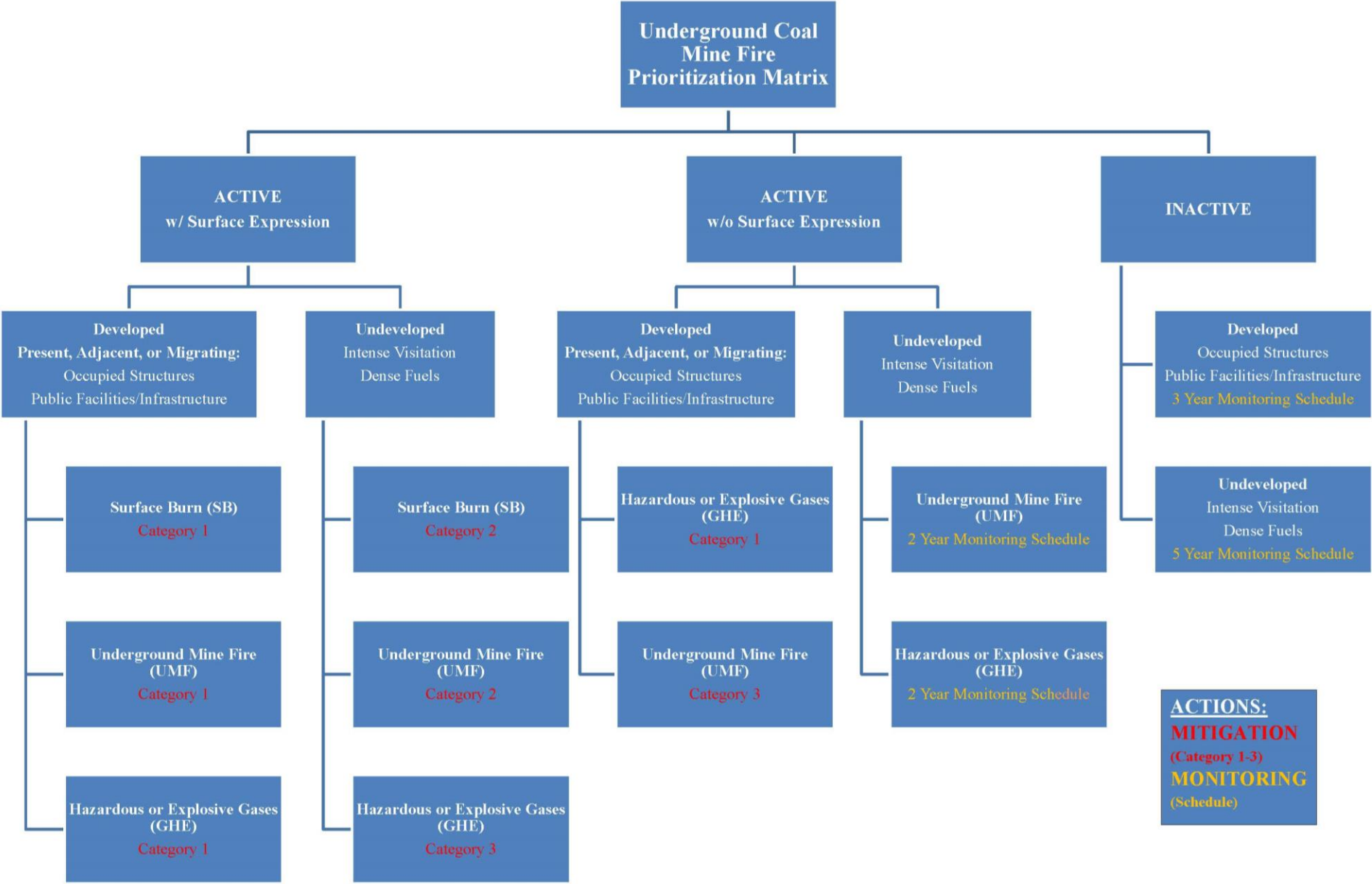
VIDEO-ROCK SPRINGS NO. 9 MINE LOCATION FLYOVER



SURFACE TEMPERATURES-2024 ANNUAL FIRE MONITORING SURVEY



MINE FIRE PRIORITIZATION MATRIX



MINE FIRE PRIORITY CATEGORIZATION

MINE FIRE PRIORITY CATEGORIZATION

FIRE SITE	ACTIVITY	SURFACE EXPRESSION	SITE DESCRIPTION	SITE TYPE	CATEGORY	RECOMMENDATION	Surface Ownership	Current Monitoring Freq
Rock Springs No 7 & 9 Mine	Active	Yes	Developed,	UMF	1	Mitigation	AGGIE GRAZING	1 year
Blairtown Fire	Active	Yes	Developed,	UMF	1	Mitigation	AGGIE GRAZING	1 year
Reliance No. 1 Mine	Active	Yes	Undeveloped,	UMF	1	Mitigation	AGGIE GRAZING	1 year
Rainbow No 5 Fire	Active	Yes	Developed, Private	UMF	1	Mitigation	P4 Production LLC	1 year
RS North Fire	Active	Yes	Developed,	UMF	1	Mitigation	Anselmi Trust, Union Pacific	2 years
Gebo Mine area	Active	Yes	Developed, Public	SB, UMF	1	Mitigation	BLM	4 years
Acme-Welch Mine	Active	Yes	Undeveloped,	UMF	2	Mitigation	BLM	1 year
Acme No 1 - Big Horn Mine	Active	Yes	Undeveloped,	UMF	2	Mitigation	Black Gold Land Company	1 year
Hotchkiss	Active	Yes	Undeveloped,	UMF	2	Mitigation	Padlock Ranch	1 year
Winton Mine	Active	Yes	Undeveloped,	UMF	2	Mitigation	AGGIE GRAZING	1 year
Dines Mine	Active	Yes	Undeveloped,	UMF	2	Mitigation	Wildcat Coal Company LLC	2 years
Burnell Fire	Active	Yes	Undeveloped,	UMF	2	Mitigation	BLM	2 years
Kemmerer No. 1 and 2 Mine	Active	Yes	Undeveloped,	UMF	2	Mitigation	Kemmerer Operations	2 years
Kemmerer Mine	Active	Yes	Undeveloped,	UMF	2	Mitigation	Kemmerer Operations	2 years
Kemmerer No. 3 Mine	Active	Yes	Undeveloped,	UMF	2	Mitigation	Kemmerer Operations	2 years
Gunn-Quealy Swtr No 1 Fire	Active	Yes	Undeveloped,	UMF	2	Mitigation	AGGIE GRAZING	2 years
Creighton	Active	Yes	Undeveloped,	UMF	2	Mitigation	BLM	3 years
Diamond No 1	Active	Yes	Undeveloped,	UMF	2	Mitigation	Kemmerer Operations	2 years
Rocky Mountain 1 & 2 Mine	Active	No	Developed,	UMF	3	Mitigation	Patrick Towing & Recovery	3 years
Cumberland Gap area fire	Low Active	No	Undeveloped	UMF-2 Year	2-Year	Monitoring	Union Pacific	2 years
Grass Creek Mine Fire	Low Active	No	Undeveloped	UMF-2 Year	2-Year	Monitoring	Spring Gulch Coal Company	2 years
Almy No. 4 Mine	Inactive	No	Undeveloped	5-Year	5-Year	Monitoring	Heritage Properties of Wyoming	3 years
Almy No. 6 Coal Waste Pile	Inactive	No	Undeveloped	5-Year	5-Year	Monitoring	Brady and Alayna Stokes	3 years
Cumberland 2/Brilliant No 8 mine	Inactive	No	Undeveloped	5-Year	5-Year	Monitoring	Kemmerer Operations	4 years
Buyok-Monarch mine	Inactive	No	Undeveloped	5-Year	5-Year	Monitoring	John and Vanessa Buyok	5 years
Interstate Camp Mine	Inactive	N/A	Undeveloped	5-Year	5-Year	Monitoring	Sweetwater County	None
Superior C Mine	Inactive	N/A	Undeveloped	5-Year	5-Year	Monitoring	Willam McIntosh	None
Echeta Fire area	N/A	N/A	N/A	N/A	N/A	N/A		Unknown

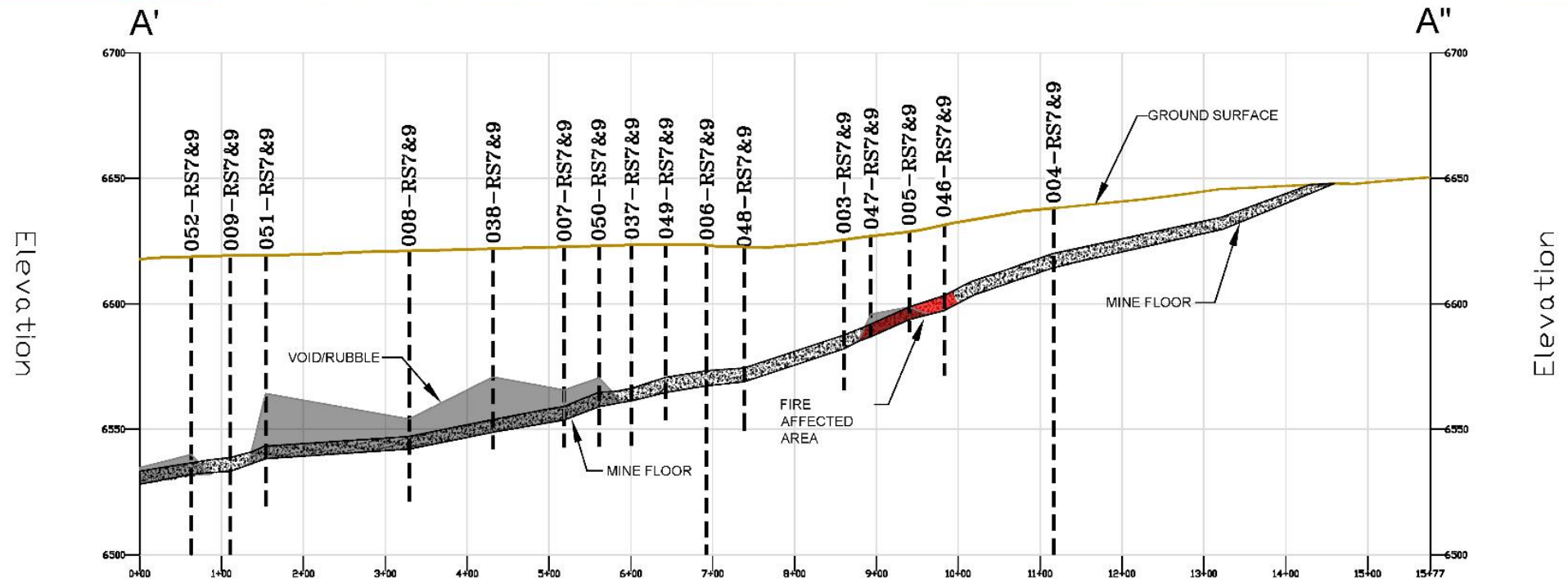
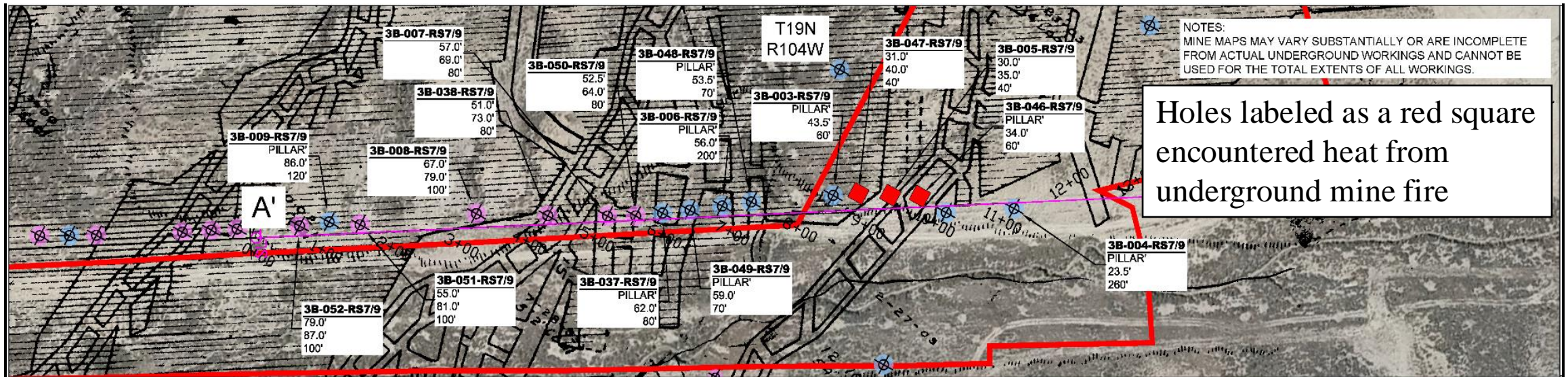
GLOSSARY

UMF-UNDERGROUND MINE FIRE

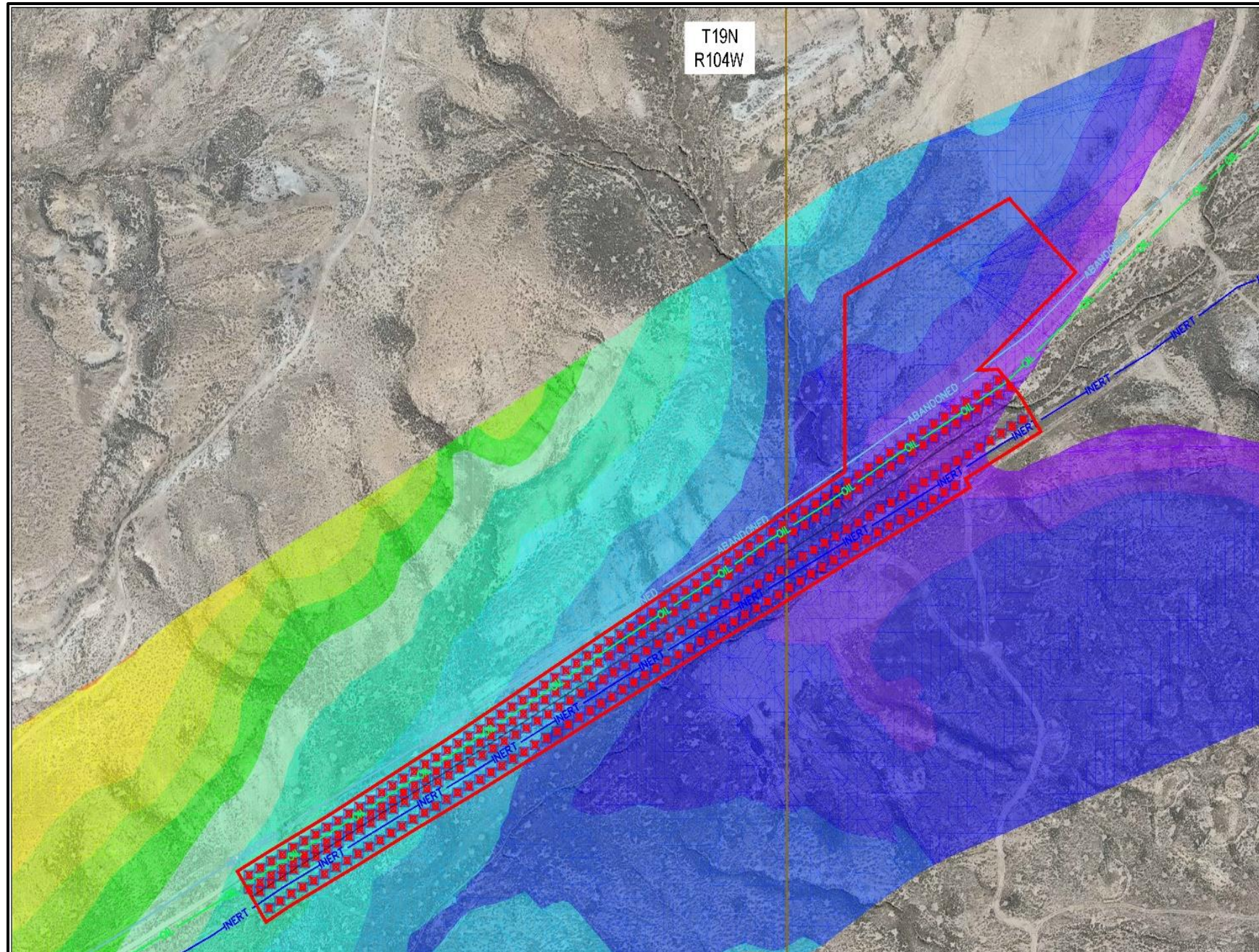
SB-SURFACE BURN

GHE-HAZARDOUS OR EXPLOSIVE GASES

17.6B-3D & 17.6C-3J CROSS SECTION A' – A''



17.6B-3D DRILL/GROUT HOLE LAYOUT AND DEPTH ISOPACH



LEGEND

SECTION LINE	
PIPELINE (ABANDONED)	ABANDONED
PIPELINE (MARATHON)	OIL
PIPELINE (PHILLIPS 66)	INERT
PROJECT BOUNDARY	
PROPOSED DRILL / GROUT HOLES	

ROCK SPRINGSS # 7 COAL SEAM DEPTH TABLE

Minimum Elevation	Maximum Elevation	Color
400+	300	
300	280	
280	260	
260	240	
240	220	
220	200	
200	180	
180	160	
160	140	
140	120	
120	100	
100	80	
80	60	
60	40	
40	20	
20	0	

PIPELINE ALIGNMENT AND SPACING



DRILLING OPERATIONS

Drilling under 17.6B-3D



Drilling under 17.6C-3J



INSTALLING TREMMIE PIPE



GROUT INJECTION EQUIPMENT

Grouting under 17.6B-3D

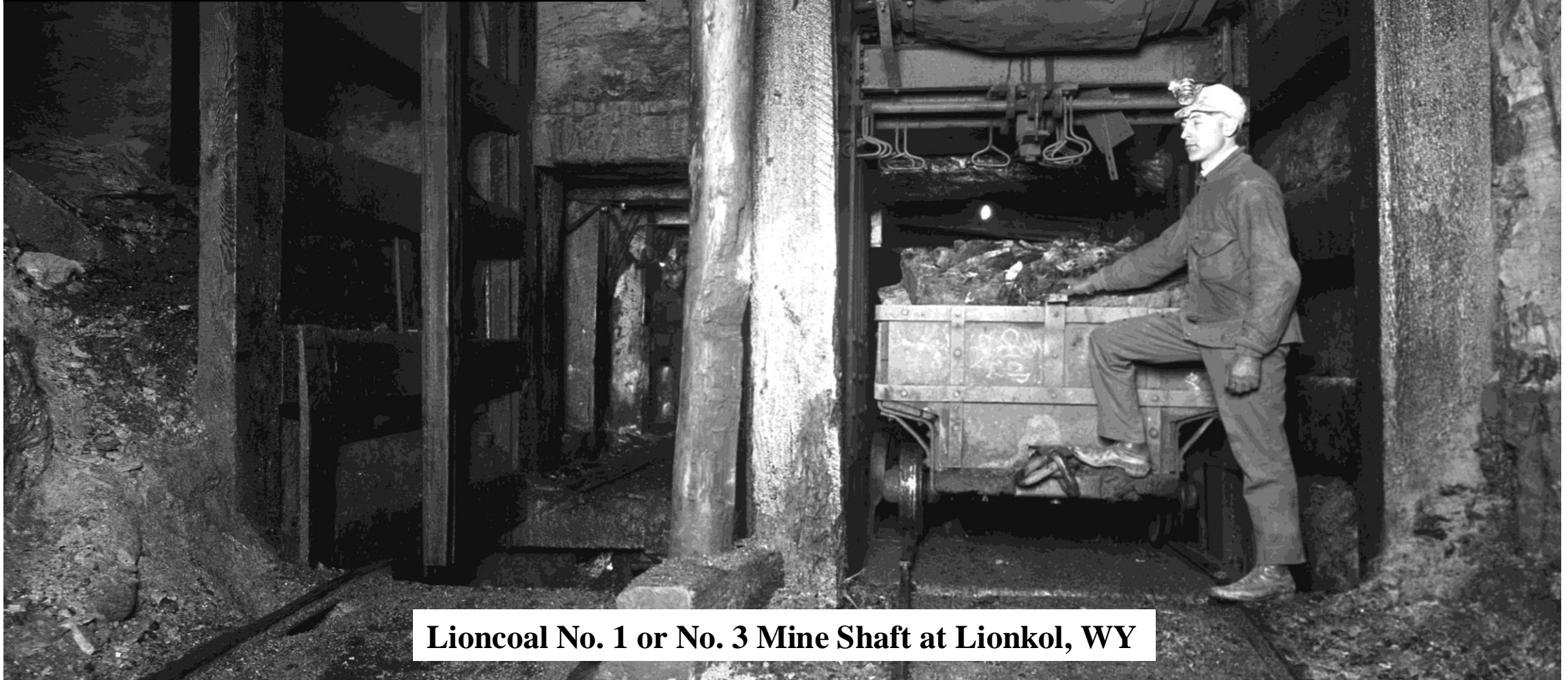


VIDEO-PRESSURE GROUTING OF ABANDONED MINE WORKINGS



COMPLETION OF THE 17.6B-3D PROJECT

300 Drill Hole Completed
55% of Drill Holes Encountered Rubble/Voids
30,000 CY of Grout Installed
Mitigated up to a Depth of ~100 ft. of Cover
\$7,400,000 Total Project Cost











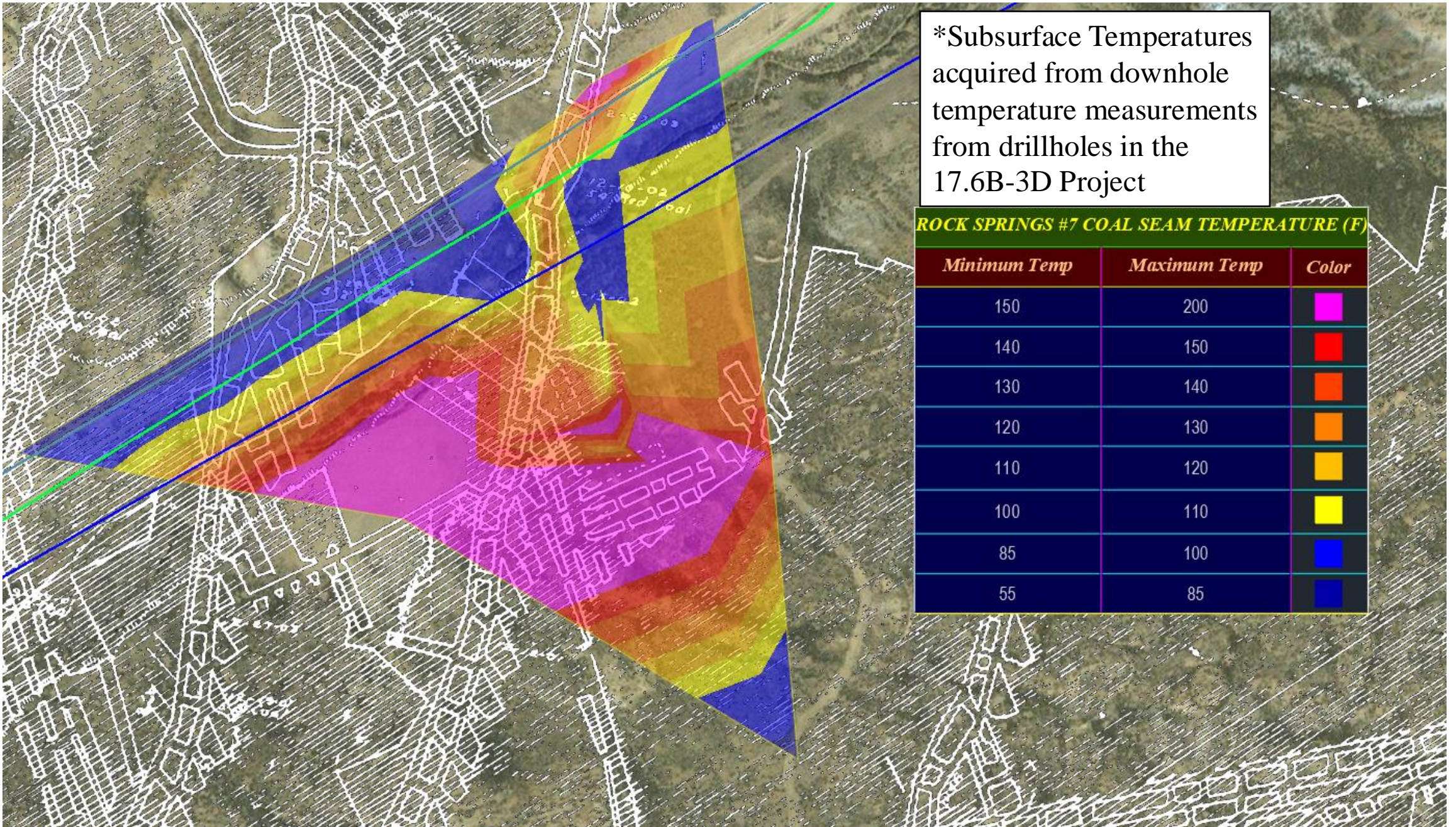
Lioncoal No. 1 or No. 3 Mine Shaft at Lionkol, WY

SUBSURFACE TEMPERATURES FROM COAL FIRE

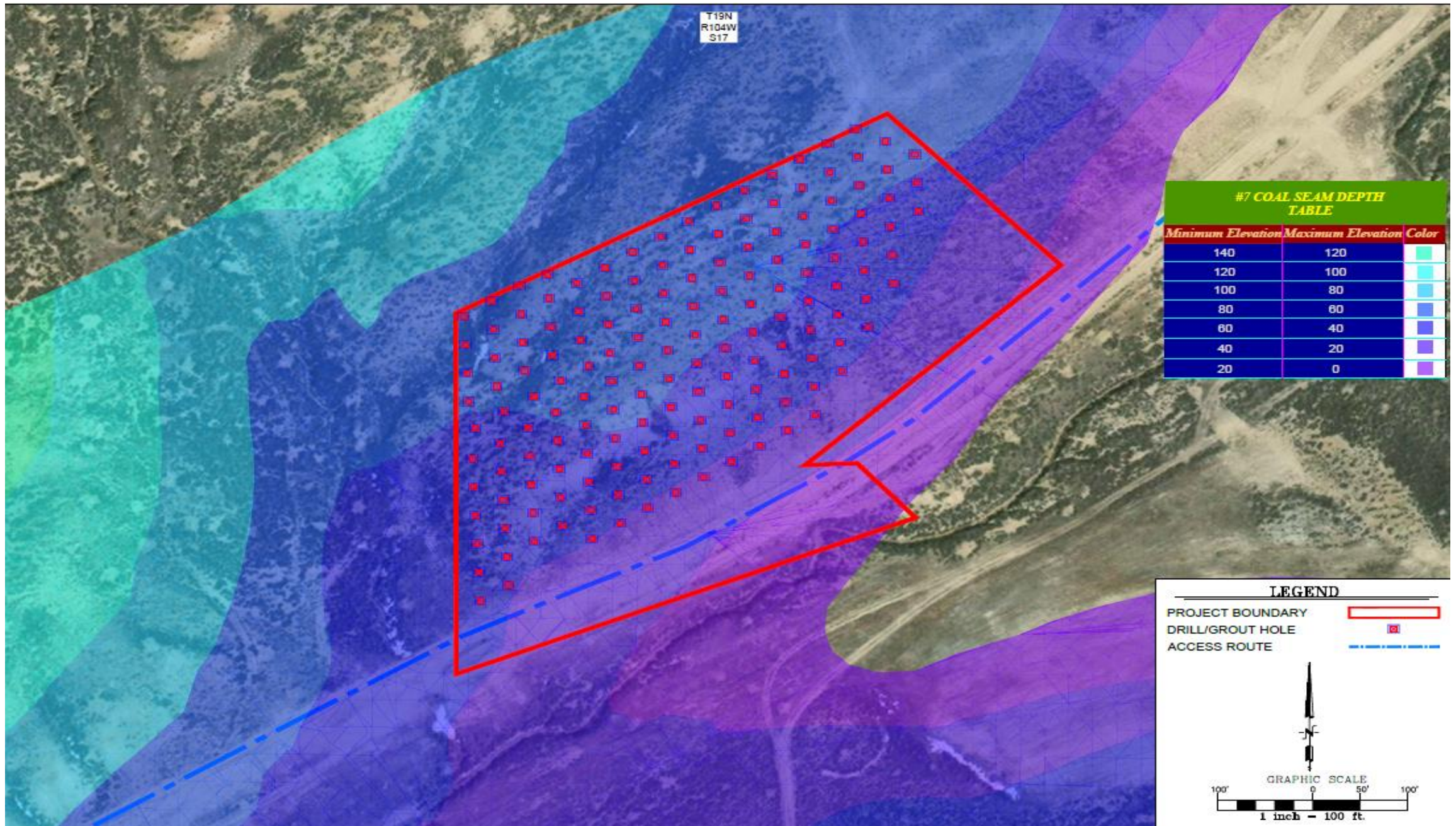
*Subsurface Temperatures acquired from downhole temperature measurements from drillholes in the 17.6B-3D Project

ROCK SPRINGS #7 COAL SEAM TEMPERATURE (F)

<i>Minimum Temp</i>	<i>Maximum Temp</i>	<i>Color</i>
150	200	
140	150	
130	140	
120	130	
110	120	
100	110	
85	100	
55	85	

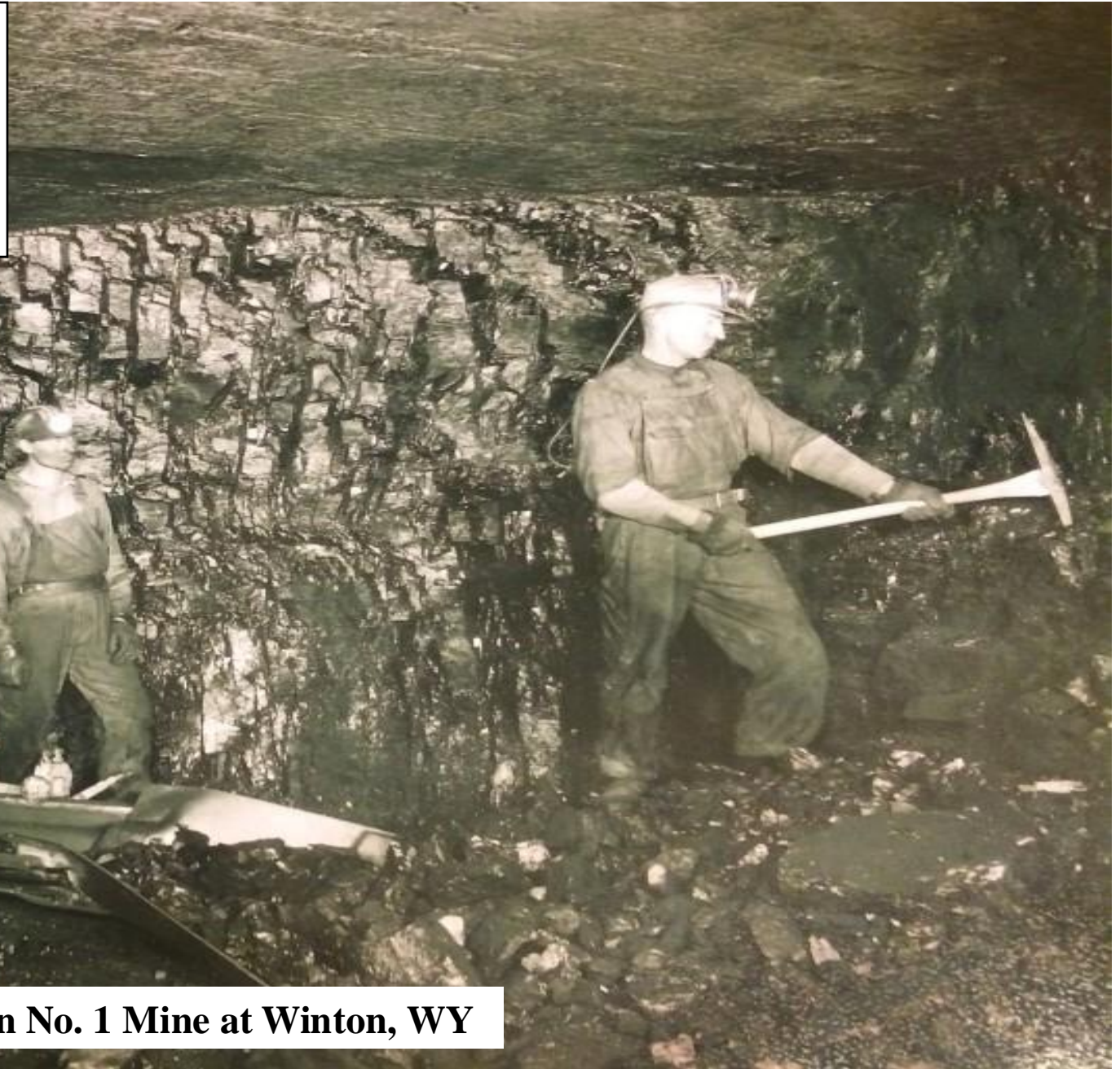


17.6C-3J DRILL/GROUT HOLE LAYOUT AND DEPTH ISOPACH



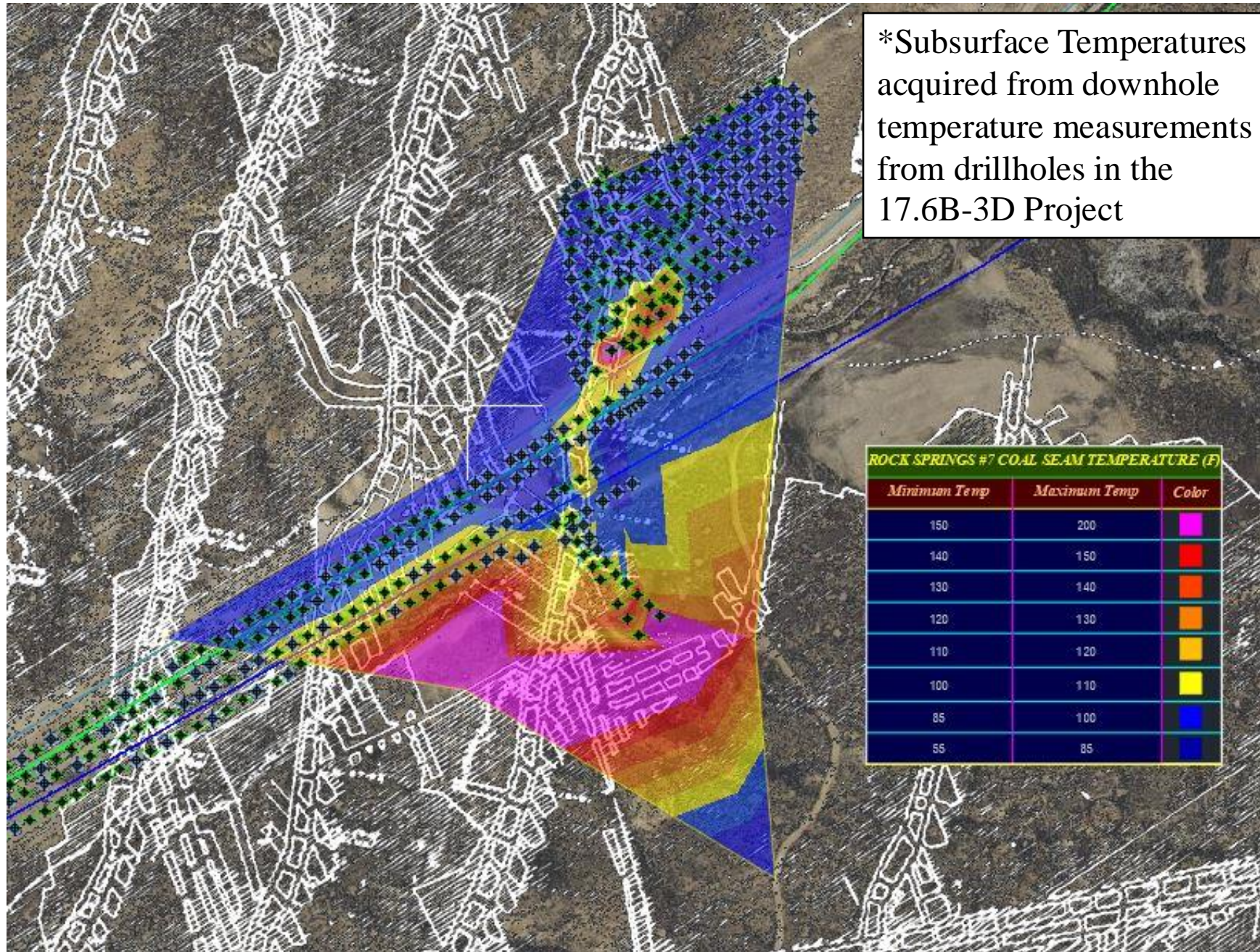
COMPLETION OF THE 17.6C-3J PROJECT

159 Drill Hole Completed
50% of Drill Holes Encountered Rubble/Voids
11,800 CY of Grout Installed
Mitigated up to a Depth of ~80 ft. of Cover
\$4,500,000 Total Project Cost



Winton No. 1 Mine at Winton, WY

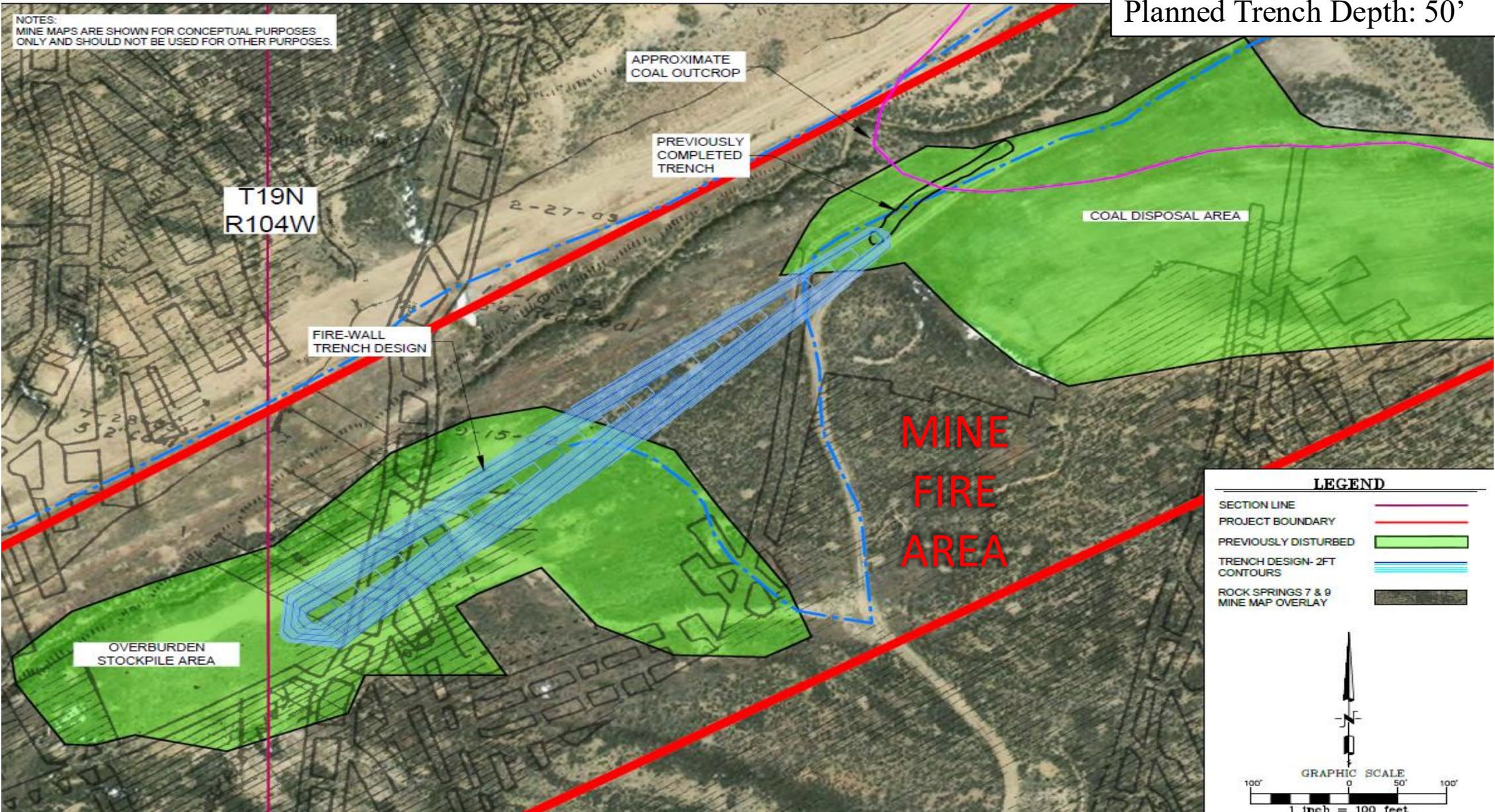
SUBSURFACE TEMPERATURES FROM COAL FIRE



AML PROJECT 17G-2, TASK ORDER 1-23 ROCK SPRINGS NO. 7 & 9 FIREWALL

EXCAVATION PLAN

Planned Trench Length: 800'
Planned Trench Depth: 50'



EXCAVATION



EXCAVATION



BURNING COAL SEAM IN SOUTH BANK OF EXCAVATION



MIXING AND QUENCHING BURNING MATERIAL FROM COAL FIRE



CONCRETE RIP RAP INSTALLATION



FLOWFILL GROUT INSTALLATION



GROUT INSTALLED FROM 17.6B-3D PROJECT ENCOUNTERED IN EXCAVATION



GROUT INSTALLED FROM 17.6B-3D PROJECT REMOVED FROM EXCAVATION

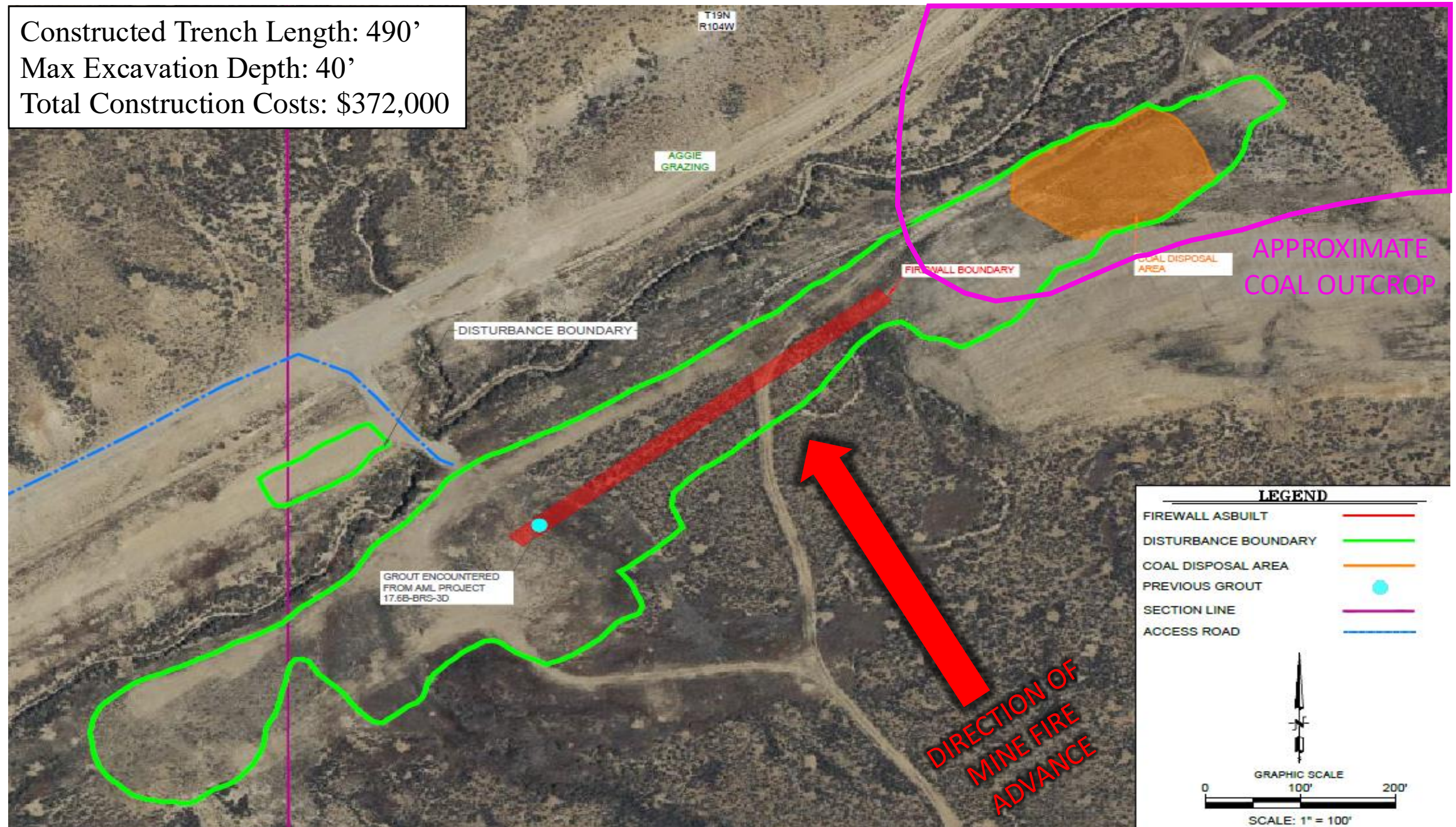


TRENCH BACKFILL

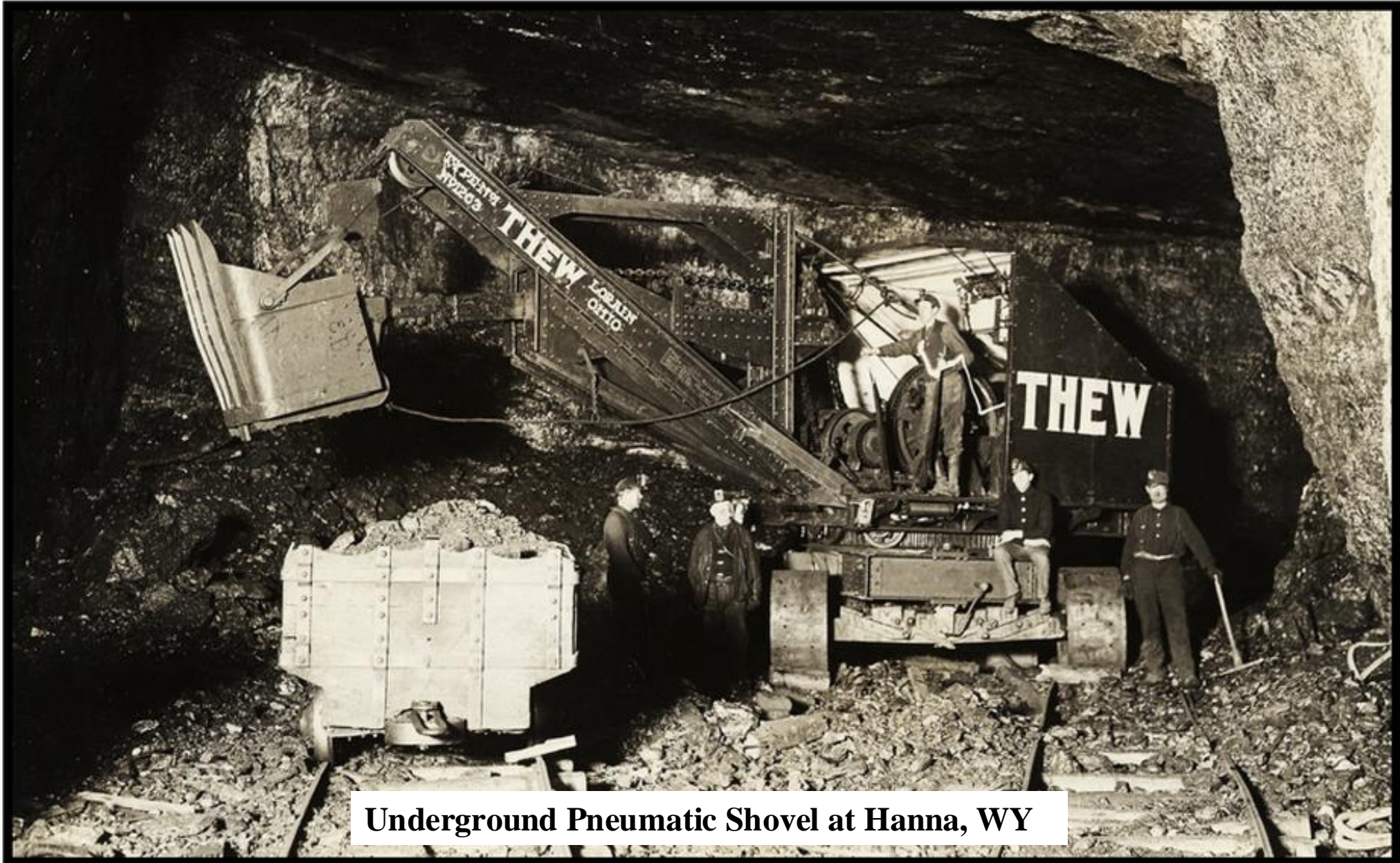


FINAL ASBUILT AND COMPLETION OF AML 17G-2 TASK ORDER 1-23

Constructed Trench Length: 490'
Max Excavation Depth: 40'
Total Construction Costs: \$372,000



THANK YOU! QUESTIONS?



Underground Pneumatic Shovel at Hanna, WY