



Directional Gravity Drainage Boreholes – Proven Effective to Drain Abandoned Mine Pools of Water to Mitigate Existing Environmental Hazards

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Pittsburgh, PA**

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**PRECISION DRILLING FOR YOUR SUCCESS APPLYING OIL, GAS
AND MINE DIRECTIONAL DRILLING EXPERIENCE**

TD'S COMPETITIVE EDGE



Mining
Turnkey
Underground
Directional
Drilling

Surface
Vertical-to-
Horizontal
Directional
Drilling

Surface
Directional
Horizontal
Slanthole

TARGET DRILLING, INC.

Rig and
Borehole
Navigation
Design and
Development

Directional
Drilling
Technology
And
Innovation


Directional
Drilling
Application
Consulting

**PRECISION DRILLING FOR YOUR SUCCESS APPLYING OIL, GAS AND
MINE DIRECTIONAL DRILLING EXPERIENCE**

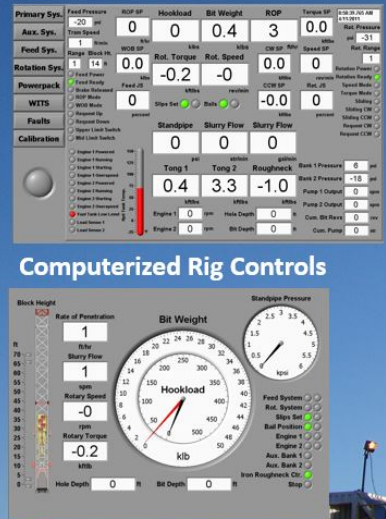
DIRECTIONAL DRILLING EQUIPMENT

480 RIG

- 480,000 pounds holdback
- 80,000 pounds pull-down



Computerized Rig Controls



REMOTE MONITORING CAPABILITIES VIA INTERNET

SELF-REPORTING DIAGNOSTICS

AUTOMATIC MITIGATION OF FAULT CONDITIONS WITH MINIMAL LOSS OF FUNCTIONALITY

FULL WITS COMMUNICATION

CAPABLE OF 12,000 FEET TVD OR TMD

TRAILER MOUNTED (DOES NOT REQUIRE

TARGET DRILLING

TD Designs Built-For-Purpose Rigs, Downhole Navigation and Wellhead Control For Their Specific Directional Drilling Applications

- Designed and developed both surface and in-mine drill rigs, well navigation and support equipment
- Current fleet includes:
 - (5) underground permissible rigs
 - (3) standard profile drills (42–48" Ht)
 - (2) low profile drills (32" Ht)
 - (2) surface tophead drive rigs
 - (1) capable of 16" boreholes to depth of 1,000 ft
 - (1) capable of 30" boreholes to depth of 1,500 ft
 - (2) diesel powered surface horizontal rigs

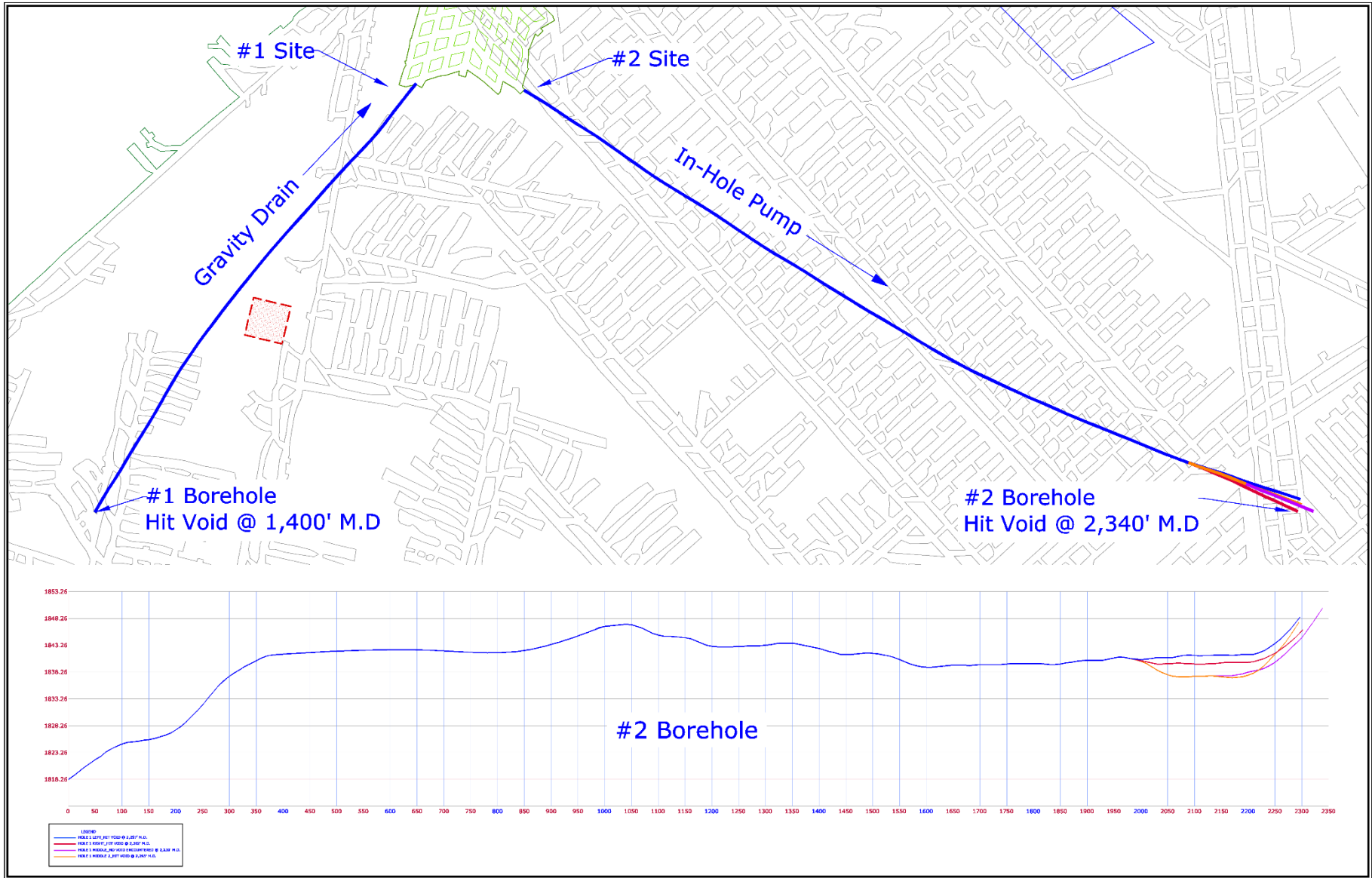
TD's Competitive Edge for AMD Directional

- ▶ Experienced and efficient directional driller serving coal and non-coal mining, oil, gas and civil industries since 1995
- ▶ Keenly familiar and experienced with Acid Mine Drainage horizontal directional drilling applications *including potential downhole hazards intercepting mine related water pools*
- ▶ Specialize in *MSHA permissible downhole navigation and wellhead control equipment* used during directional drilling
- ▶ Uniquely qualified with proven directional drilling experience including in-mine and surface horizontal, **AND**, vertical-to-horizontal applications pertaining to water drainage
- ▶ Recognized by Federal and State AML and Environmental Agencies as an experienced directional driller for AMD solutions
- ▶ Provides directional drilling AMD solutions as a turnkey operator

TD's Unique Diversity for AMD Directional Solutions

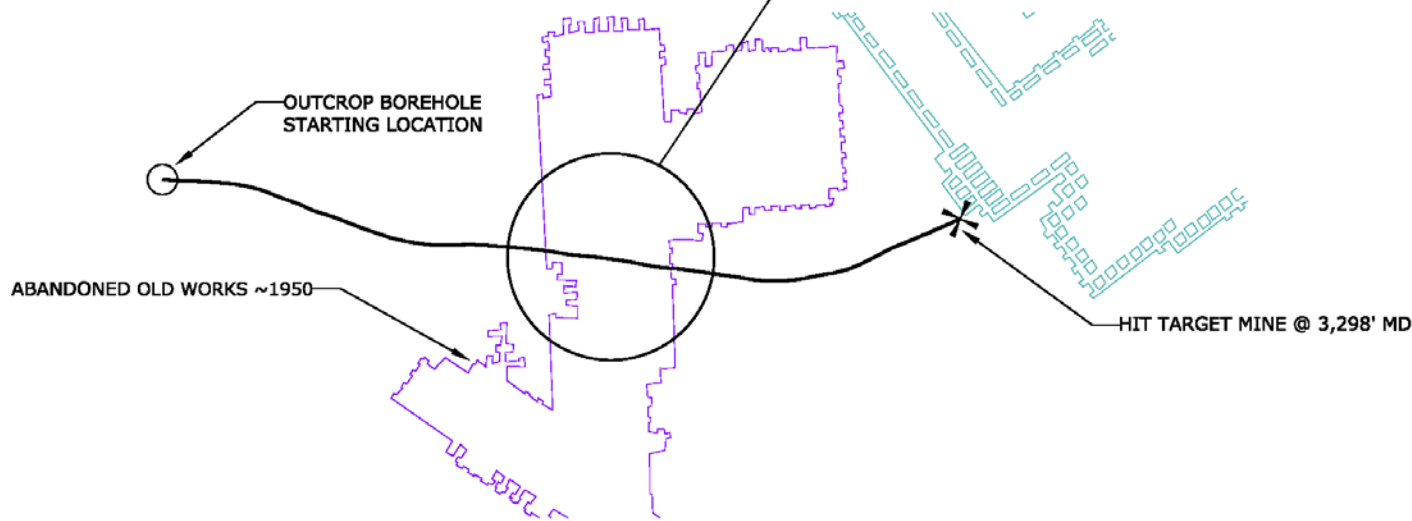
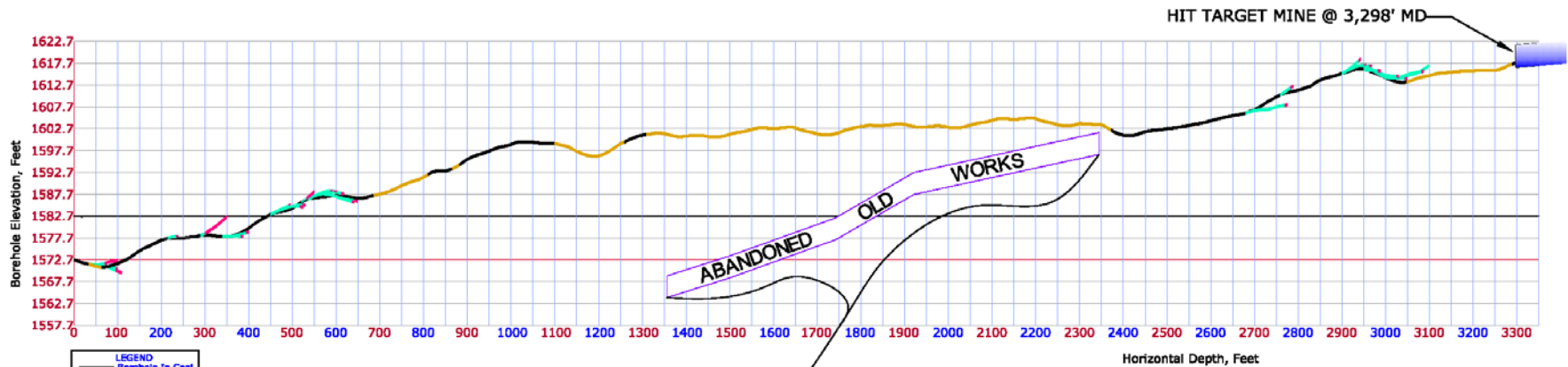
- ***In-Mine Water [where TD got it's start in AMD]***
- ***Acid Mine Gravity Drain Surface Horizontal Boreholes***
- ***Large Diameter Vertical Boreholes Intercept Mine***
- ***Dual Vertical and Horizontal Well System***
 - ***Surface Horizontal Wells to Drain Pools at Multiple Elevations***
 - ***Surface Horizontal Wells Used Connected to Horizontal Gravity Boreholes To Divert AMD to ONE Strategic Location***

TD In-Mine AMD Dewatering Boreholes [6 and 8"]



Outcrop Abandoned Mine AMD Drainhole - Rock & Coal

Gravity dewatering borehole successfully satisfied release of bond to seal mine



TARGET
DRILLING

PRECISION DRILLING FOR YOUR SUCCESS

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Smithton, Pa 15478

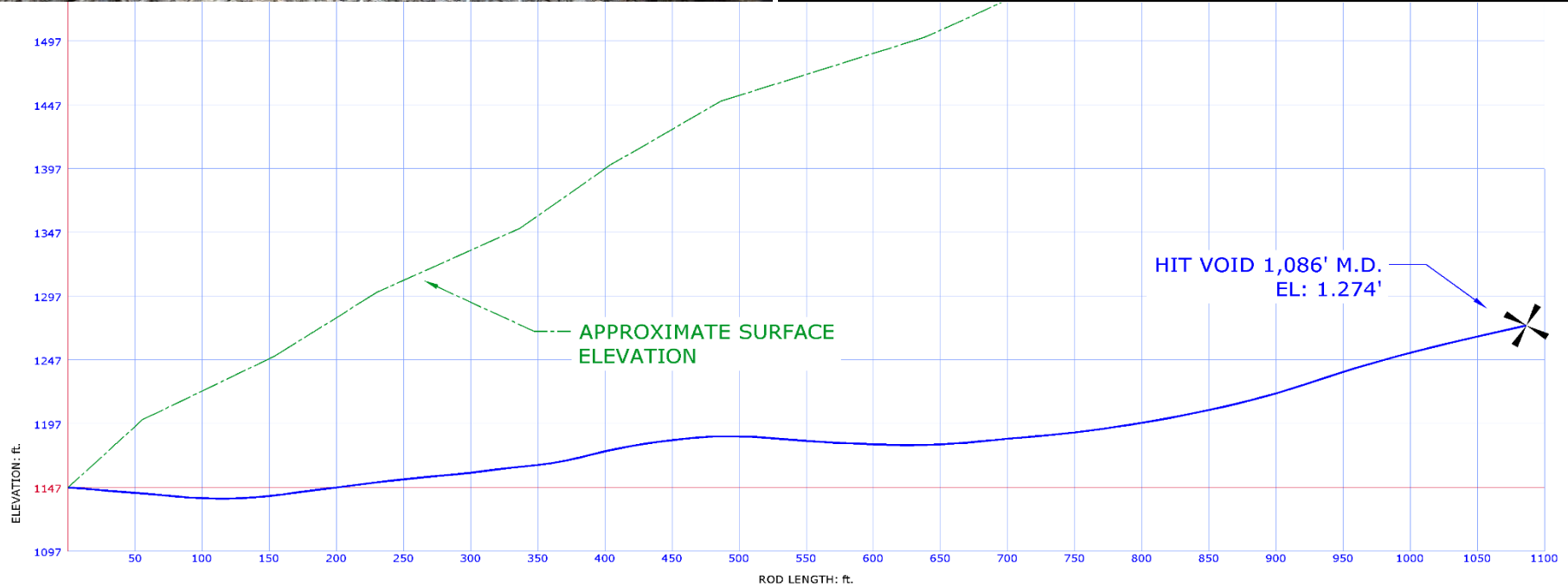
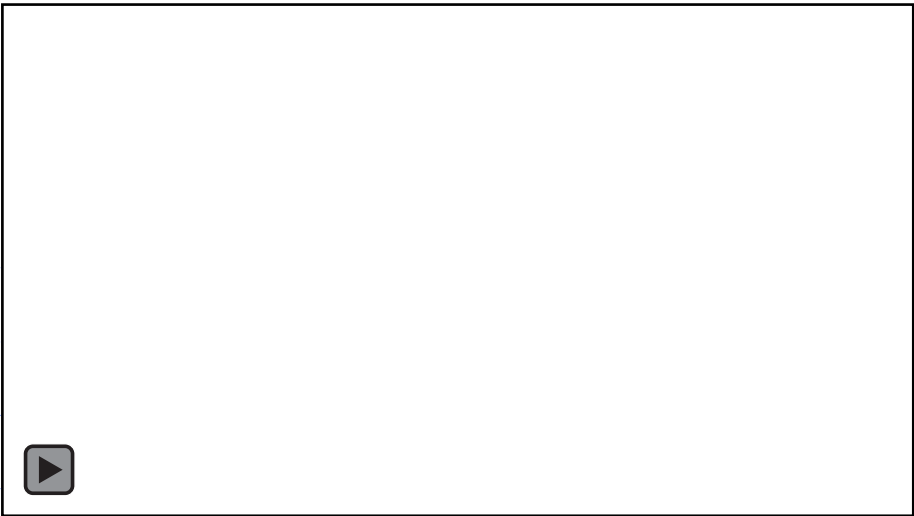
Phone: 724-833-9827
Fax: 724-872-1203

Large Diameter AMD Gravity Drain Borehole HDPE Cased

Hollywood AMD Project, Clearfield County PA



Charlie Hollow – AMD Horizontal Borehole



Charlie Hollow – AMD Horizontal Borehole

Initial Water Production ~ 1,000 GPM



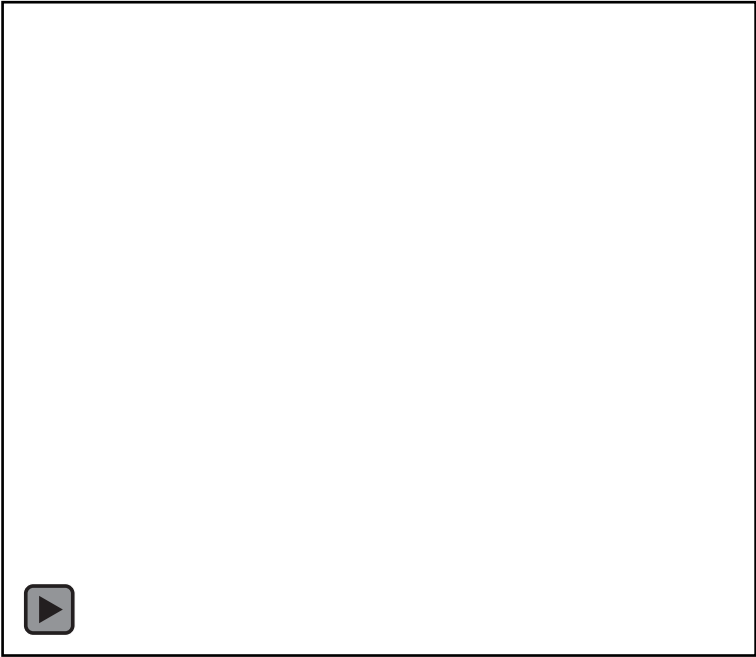
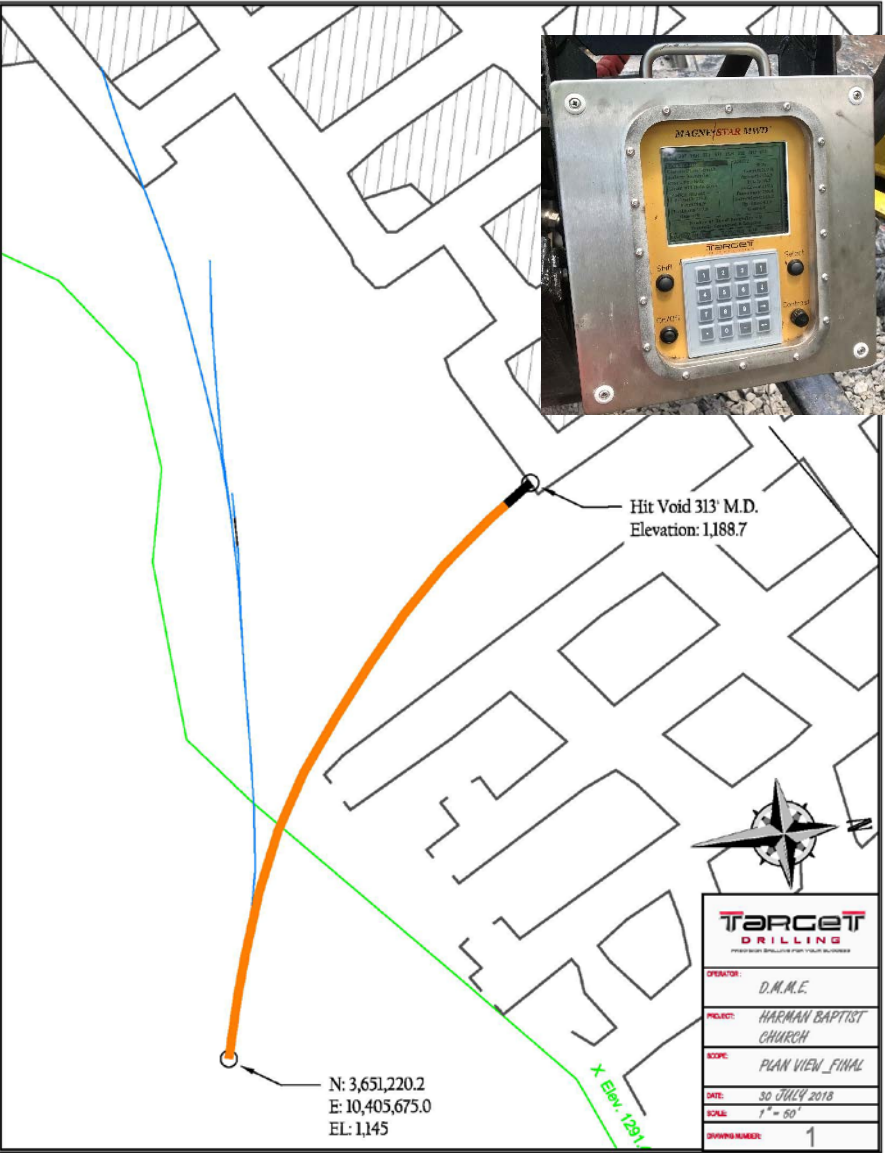
Water Production 18 Months Later 200 GPM
- > 4 Billion Gallons Gravity Drained to Date



Harmon Baptist – AMD Horizontal Borehole

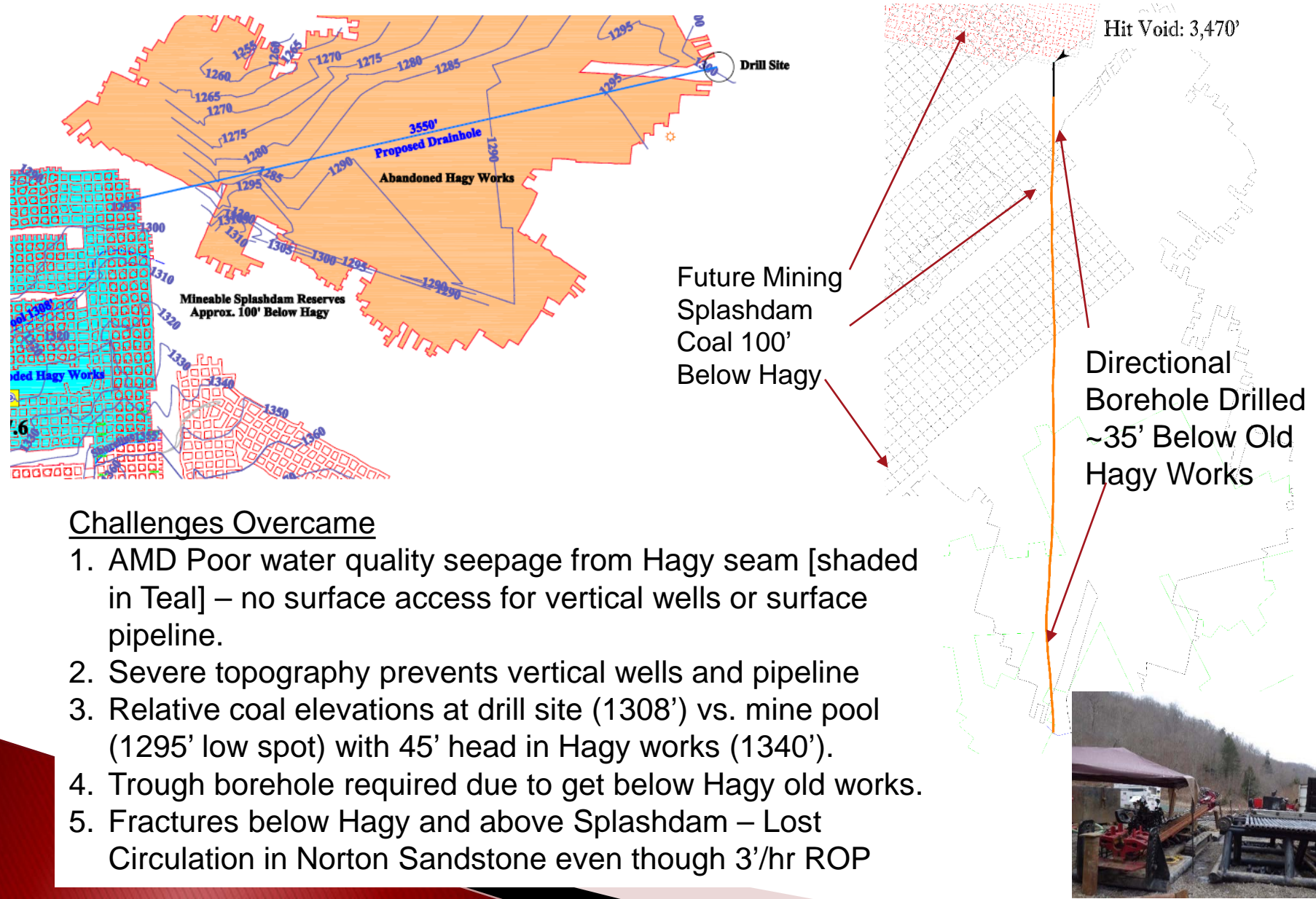


Harmon Baptist – AMD Horizontal Borehole



Outcrop Abandoned Mine Gravity AMD Borehole - Rock & Coal

Gravity dewatering borehole between below Hagy Mine and above Splashdam



Challenges Overcame

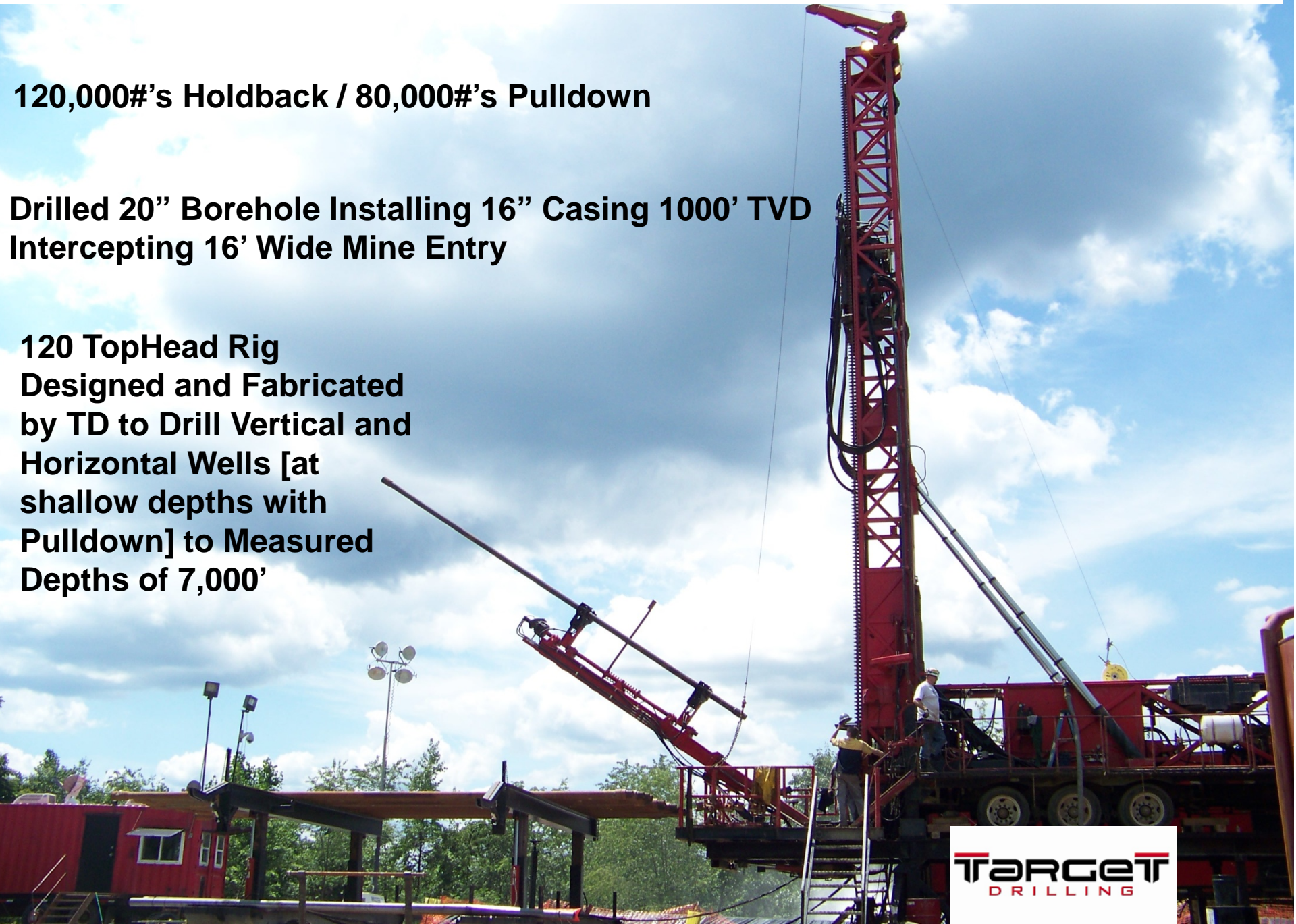
1. AMD Poor water quality seepage from Hagy seam [shaded in Teal] – no surface access for vertical wells or surface pipeline.
2. Severe topography prevents vertical wells and pipeline
3. Relative coal elevations at drill site (1308') vs. mine pool (1295' low spot) with 45' head in Hagy works (1340').
4. Trough borehole required due to get below Hagy old works.
5. Fractures below Hagy and above Splashdam – Lost Circulation in Norton Sandstone even though 3'/hr ROP

VERTICAL AND HORIZONTAL WELLS WITH TD-120 TOPHEAD PULL DOWN RIG

120,000#'s Holdback / 80,000#'s Pulldown

**Drilled 20" Borehole Installing 16" Casing 1000' TVD
Intercepting 16' Wide Mine Entry**

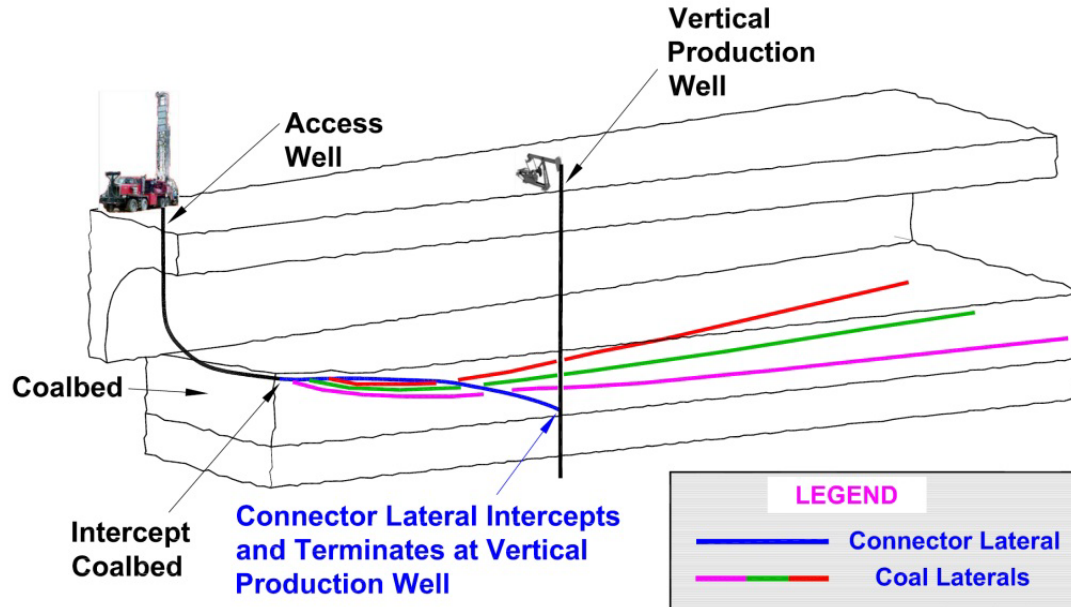
**120 TopHead Rig
Designed and Fabricated
by TD to Drill Vertical and
Horizontal Wells [at
shallow depths with
Pulldown] to Measured
Depths of 7,000'**



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TD's PATENTED SURFACE DUAL WELL SYSTEM

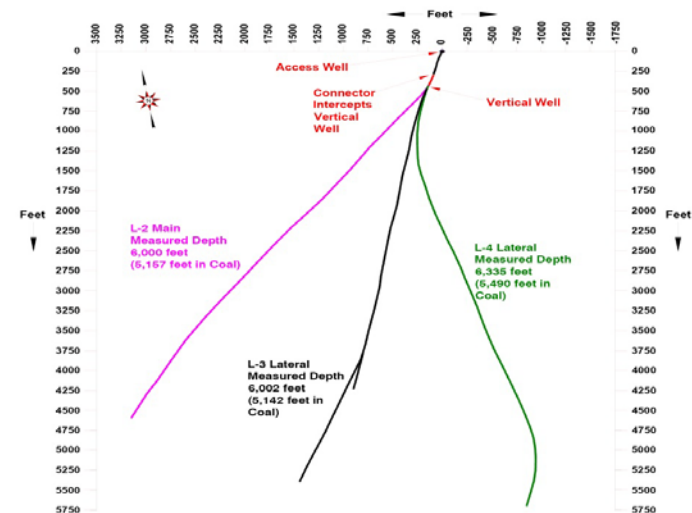
TD Patented CBM Dual Well Under-Balanced Drilling Technique



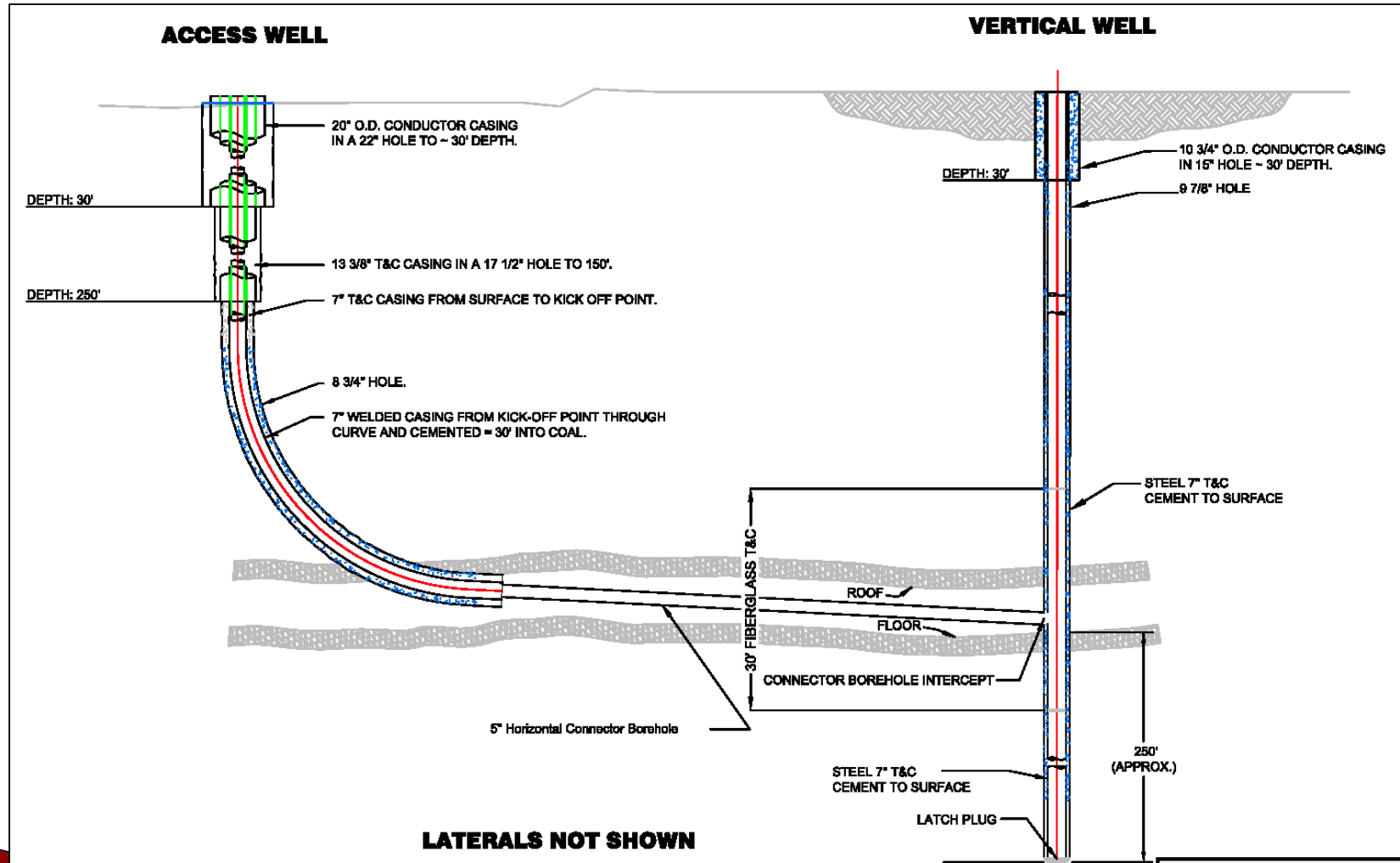
- Cased curve isolates water From other formations
- Reduces Torque and Drag To Drill Laterals >6,000'
- Connector Intercepts Vertical Well

Numerous Applications of TD's Dual Well System

- Gas Recovery with Multiple Laterals
- Vertical Production from Gravity Drain Laterals
- Provides Formation Geologic Information
- Large Footprint of >500 Acres

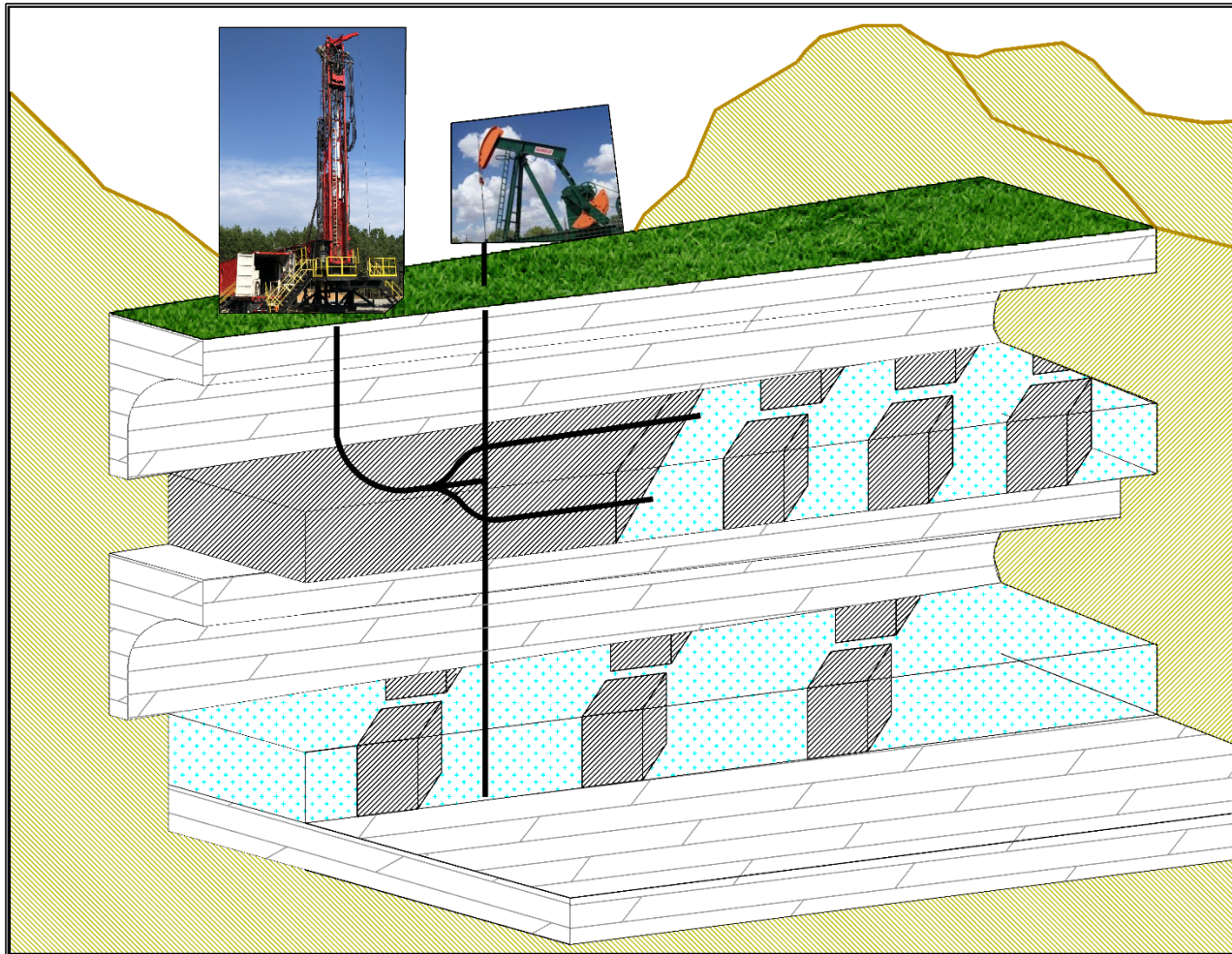


TD's Dual Well Collector System



AMD DIVERSION FROM DIFFERENT VERTICAL ELEVATIONS

SURFACE DIRECTIONAL HORIZONTAL LATERALS TARGET UPPER MINE POOL OF WATER WITH GRAVITY DRAIN INTO VERTICAL WELL FOR PUMPING

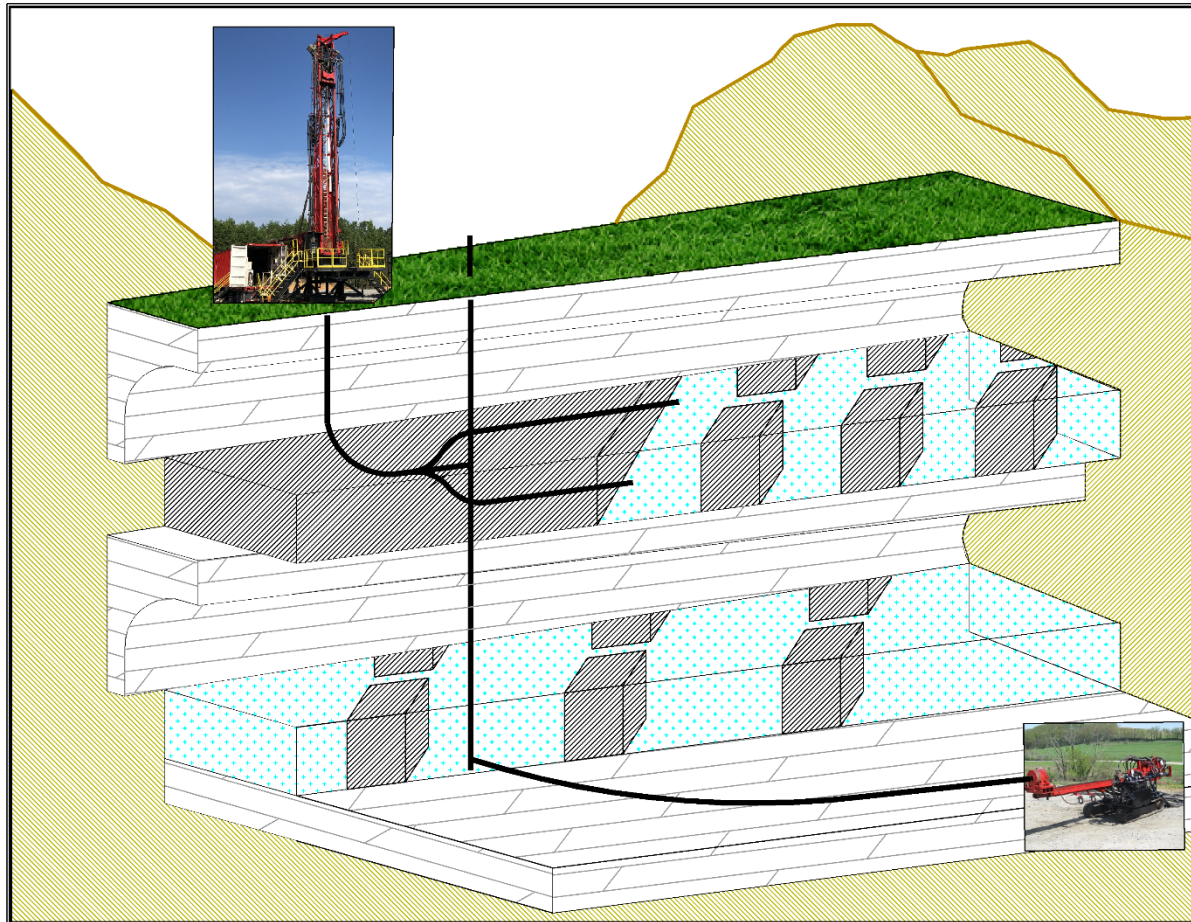


“Upper” Mine Pool

“Lower” Mine Pool

AMD DIVERSION FROM MULTIPLE VERTICAL HORIZONS

SURFACE DIRECTIONAL HORIZONTAL LATERALS DRILLED TARGETING UPPER MINE POOL WITH GRAVITY DRAIN INTO VERTICAL CONNECTED TO HORIZONTAL BOREHOLE TARGETING LOWER POOL. GRAVITY DRAINAGE TO ONE STRATEGIC LOCATION ON SURFACE

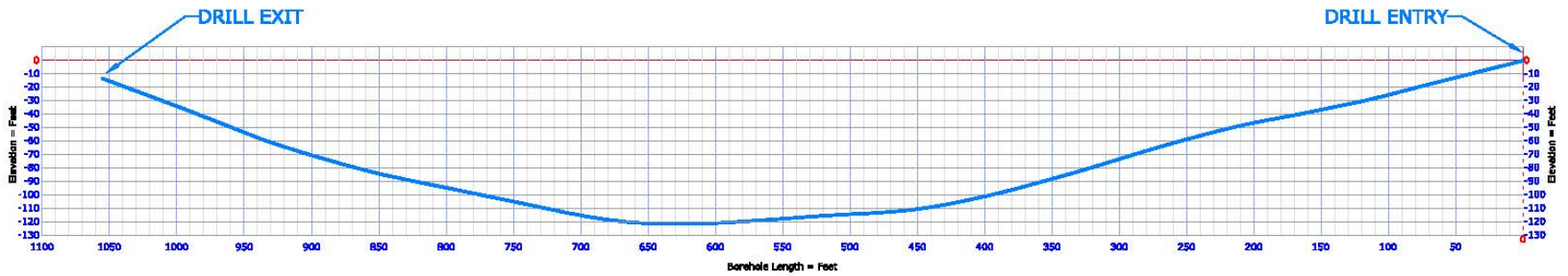


“Upper” Mine Pool

“Lower” Mine Pool

**AMD Gravity Drain
from TWO Pools to
ONE Strategic Location**

TD HDD Water Discharge 14" HDPE – 1000' Bore



SUMMARY TD'S AMD COMPETITIVE EDGE

- ▶ **Proven Successful AMD Results Mitigating Landslide Potential and Surface Leakage of AMD at Charlie Hollow, Harmon Baptist Church, Etc. Through TD's Safe Directional Drilling Procedures**
- ▶ **Specialize in MSHA permissible downhole navigation and wellhead control equipment used during directional drilling**
- ▶ **Keenly familiar and experienced with Acid Mine Drainage horizontal directional drilling applications including potential downhole hazards intercepting mine related water pools**
- ▶ **Proven directional drilling experience including in-mine and surface horizontal AMD Boreholes including design**
- ▶ **Uniquely qualified with patented vertical-to-horizontal dual well technology to use in combination with horizontal boreholes for AMD from pools of water at multiple elevations to ONE location**



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