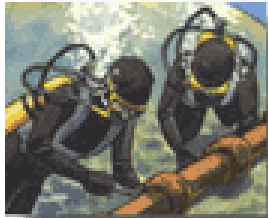


**ATTACHMENT 4**

**Lake Erie Connector - Blasting Plan**

**PRELIMINARY BLASTING PLAN  
FOR THE  
ITC LAKE ERIE  
+/- 320kV  
HVDC SUBMARINE CABLE SYSTEM**

**31 March 2015  
Issue 1, Rev 0**



SUBMITTED TO: Julian Pease  
Prysmian

SUBMITTED BY: Caldwell Marine International, LLC.  
1433 Highway 34, South  
Farmingdale, NJ 07727



**BLASTING PLAN**

Erie Trench Project – (March 31, 2015)

**Blast Plan 12/10/14**

Assumptions

- 4 ft. wide trench
- 6 ft. to grade in rock + mud & silt covering
- 4” dia. Blast holes drilled 4 ft. below planned excavation grade
- 11,000 ft. length to be drilled & blasted
- Long-arm backhoe excavator

Blast design – 1 charge per blast hole

- Drill blast holes at 4 ft. intervals alternating to each side of trench
- Explosive load per blast hole
  - 2 each 3” X 10 lb. Hydromite 860
  - 2 each 1-lb cast booster
  - 2 each 40 ft. non-electric dual delay detonator
- Initiate each blast with 2 each 500 ft. Lead-in-line

**“Measures to Avoid Causing Harm to Fish and Fish Habitat” 3-31-15**  
**Reduced Charge to 7 lbs. and Blast Hole Spacing to 2.5 ft.**

Assumptions

- 4 ft. wide trench at grade minimum
- 6 ft. to grade in rock
- 4” dia. blast holes drilled 4 ft. below planned excavation grade
- 10,600 ft. approximate length to be drilled & blasted
- Long-arm backhoe excavator

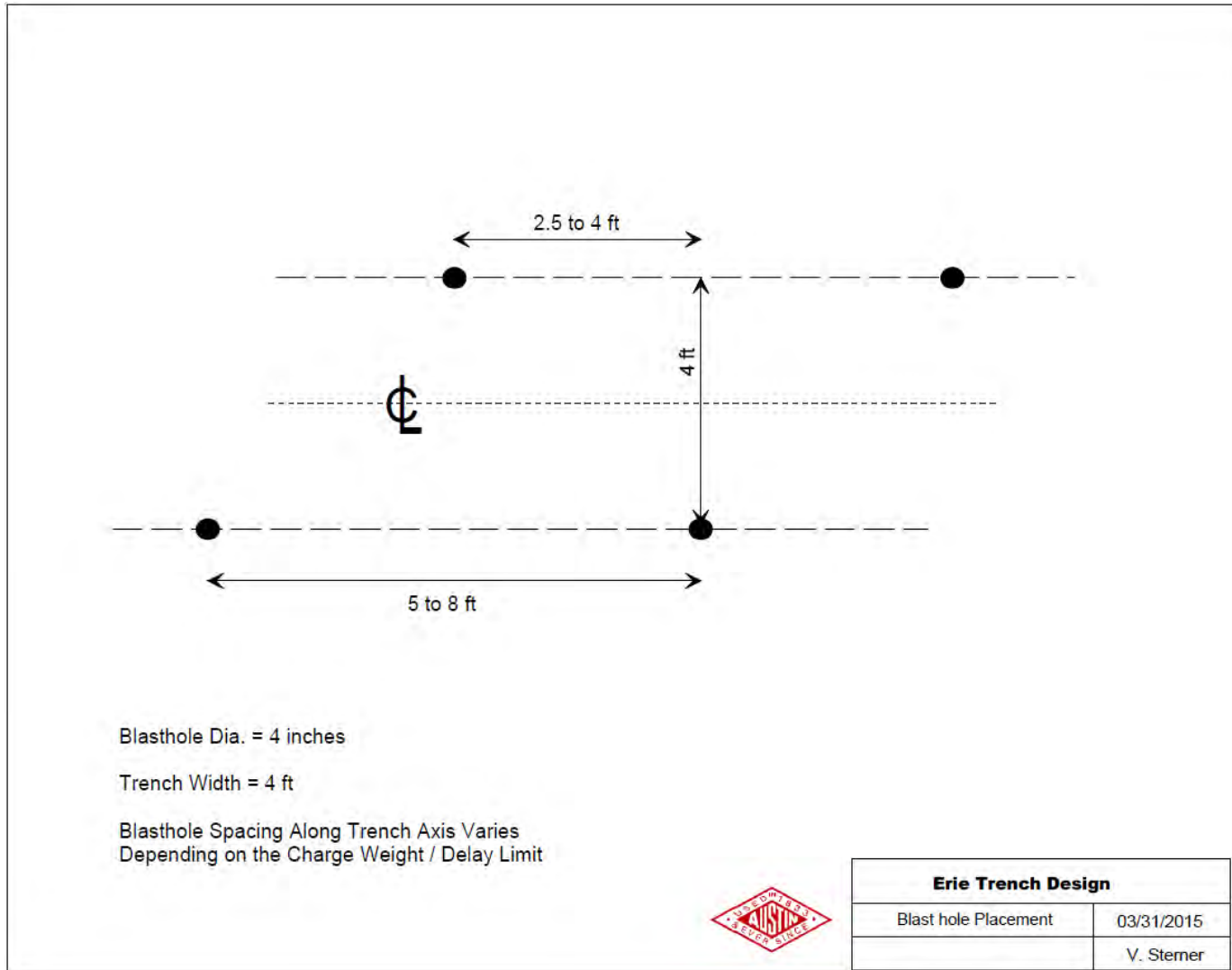
Blast design – 2 separated charges per blast hole

- Drill blast holes at 2.5 ft. intervals alternating to each side of trench
- Explosive load per blast hole
  - 2 each 3” X 7 lb. Hydromite 860
  - 2 each 1-lb cast booster
  - 2 each 40 ft. non-electric dual delay detonator
- Initiate each blast with 2 each 500 ft. lead-in-line

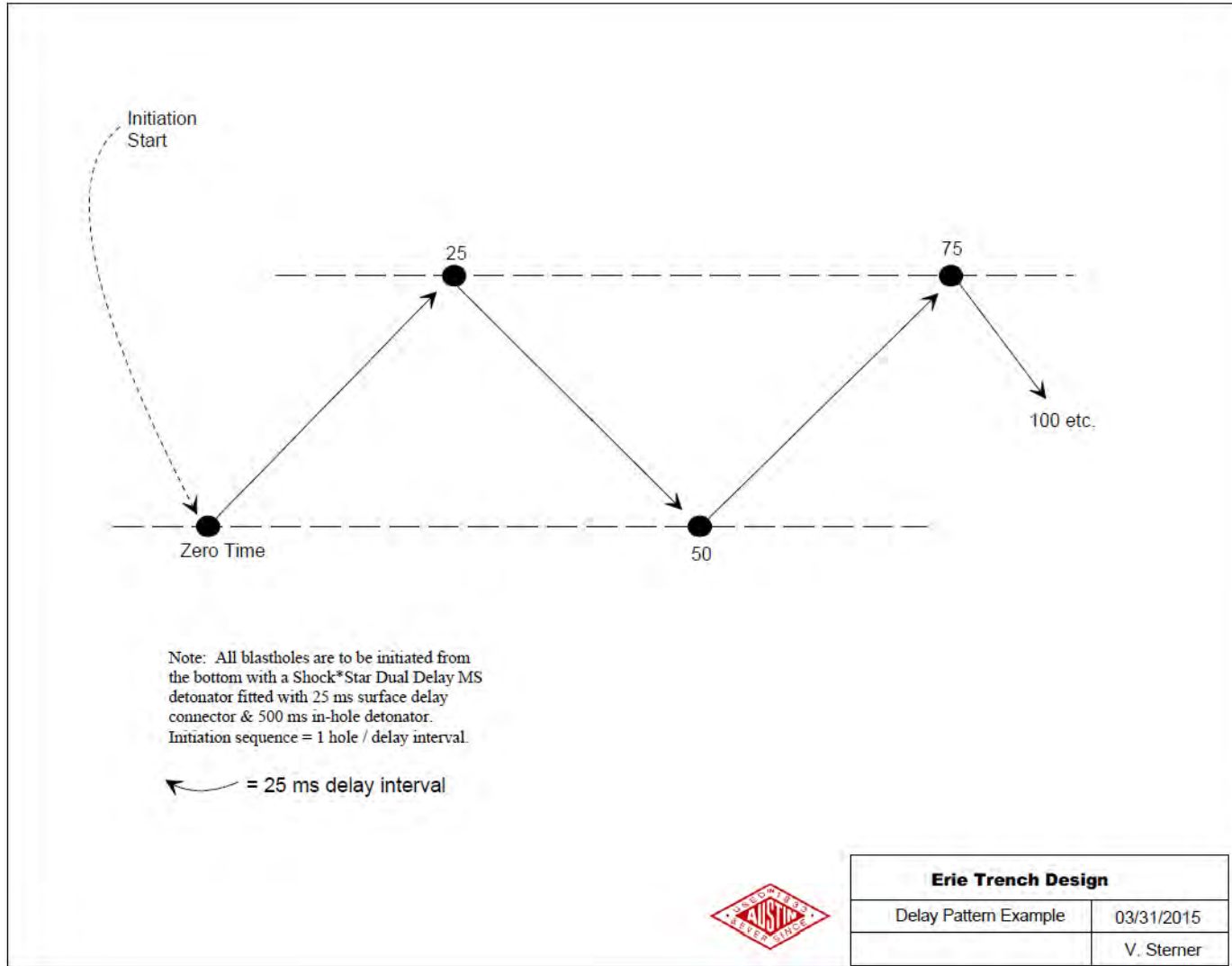
Notes:

1. In lieu of the bubble air curtain to keep fish from the blast area small detonating charges will be shot in the water column around the blast area 15 seconds prior to the trench blast to clear away fish. (Recommended practice by Austin Powder consultant).
2. Blasting mats to be used over the blast holes.
3. Smaller charges divided within the blast hole.
4. A 25 millisecond delay used between blast holes.

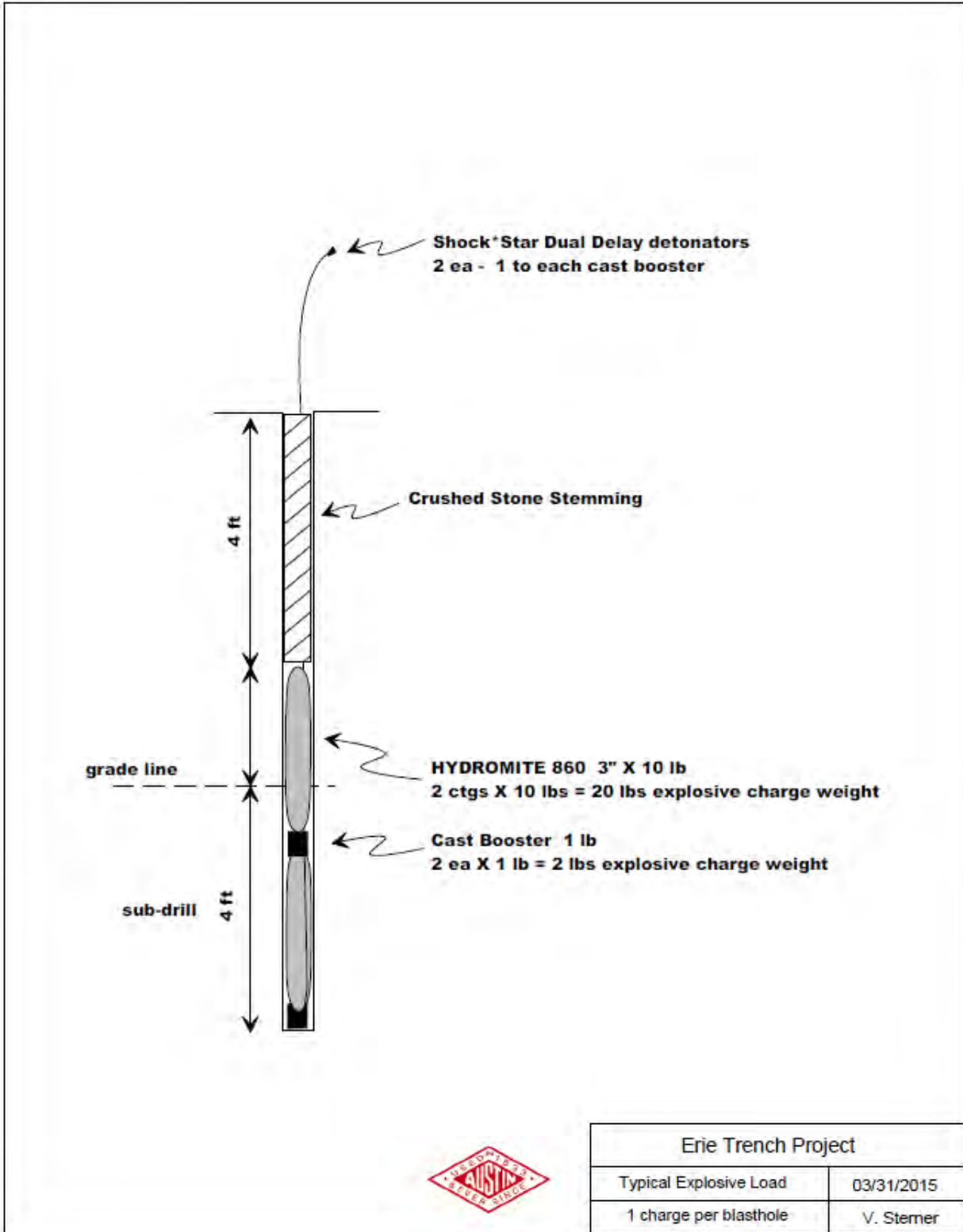
**TRENCH DRILL PATTERN**



**TRENCH DELAY PATTERN**

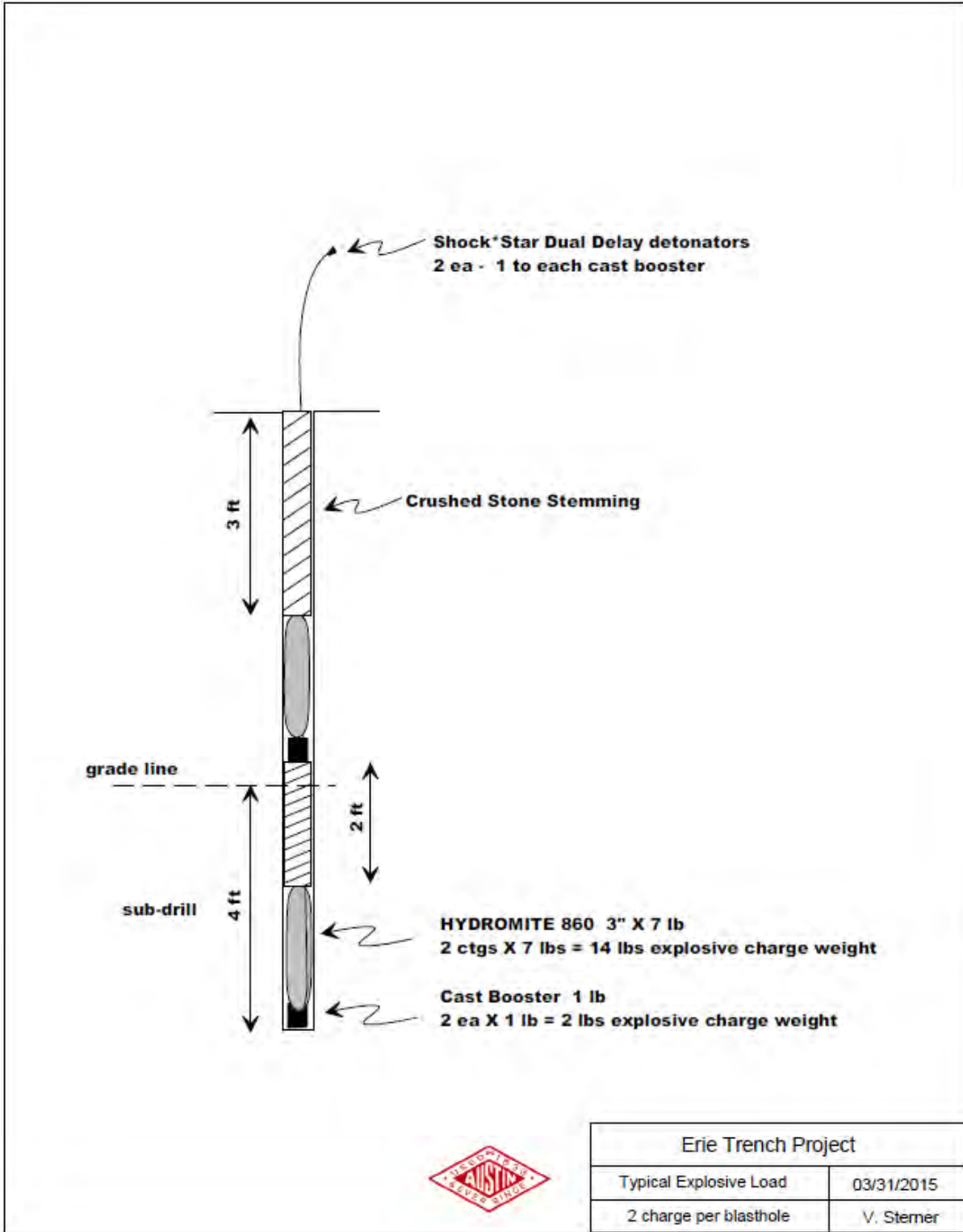


## TYPICAL EXPLOSIVE LOAD – 1 Charge per Hole





**TYPICAL EXPLOSIVE LOAD – 2 Charges per Hole**



## **SUBCONTRACTED BLASTING CONSULTANT RESUME** **AUSTIN POWDER COMPANY**

### **Consult-Austin Services**



Pg 1 of 2

#### **CORPORATE TECHICAL GROUP CONSULTANT:**

Victor A. Sterner  
Cell ph: 740-591-6043

#### **CONSTRUCTION PROJECT EXPERIENCE**

- Rondout Water Tunnel #2 Bypass, Newburgh, NY
- SAK 3 Channel Deepening, NY & NJ
- Mill Creek Effluent Tunnel, Shawnee, KS
- Columbus OARS - phase 1, Columbus, OH
- Lemay WWTP Expansion, St. Louis, MO
- 72<sup>nd</sup> Street Subway Cavern, New York City
- Rosslyn Subway Station, Arlington, VA
- 2<sup>nd</sup> Ave Subway, New York City
- Thornton Wet-Well, Chicago
- McCook MWRD Shaft, Chicago, IL
- Columbia River Deepening, St. Helens, OR
- Kill Van Kull, Port of NY & NJ
- East Side Access Subway (CM009, CM019, CM013), New York City
- Seven Line Subway Extension, New York City
- Harbor Siphon Relief Sewer, Milwaukee
- Water Tunnel #3, New York City
- Panama Canal Zone, Panama
- South Ferry Station, New Your City
- Fall River CSO, Fall River, MA
- TVA – Blue Ridge Reservoir Outlet, Blue Ridge, GA
- Narragansett Bay CSO, Providence, RI
- NW Side Relief Sewer, Milwaukee, WI
- NE Ohio Regional Sewer District, Cleveland, OH
- Little Calumet Leg Tunnels, S. Chicago, IL
- New Jersey Transit, Weehawken Tunnel
- Richmond CSO 4&5, Richmond, VA
- Metrowest Water Supply, Boston, MA
- Lake Mead Intake #2, Boulder City, NV
- South Florida Canal(s), Everglades, FL
- Cumberland Gap Tunnel(s), Middlesboro, KY
- Snake River Channel Deepening @ Ice Harbor Dam, Kahlotus, WA

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**AUSTIN POWDER COMPANY**

**Consult-Austin Services**



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EMPLOYMENT HISTORY

- Austin Powder Company 1997- present  
Corporate Tech. Group Consultant - Supervise development of products, equipment & services for mining and heavy construction blasting applications.
- Atlas Powder Co. / ICI Explosives 1979 - 97  
Technical Services Mgr. - Supervise blasting applications development, Mgr. of Regional Technical Reps. Establish & execute technical training of personnel.
- Ensign Bickford Co. 1973 - 79  
Technical Representative: - Implement initiation systems blasting applications.  
Perform blasting personnel training for customers
- Cleveland Cliffs Iron Co. 1972 - 73  
Mine Engineer: - Perform mine design, Supervise drill & blast design, Open pit supervisor 10,000 t/d iron mine.

PUBLICATIONS:

Co-author

- "Blaster's Handbook" 1998 & 2009 Int. Society Explo. Engineers
- "Heavy Construction Handbook" 1996 McGraw Hill Co.
- "Explosives & Rock Blasting" 1986 Atlas Powder Co.

EDUCATION

Colorado School of Mines 1967-72

- BS Mining Engineering

CERTIFICATES

- MSHA Instructor Surface & Underground

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