

APPENDIX S
CASE 10-T-0139
OVERLAND ROCK REMOVAL PLAN (C-159BB)

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Prepared For:

Kiewit Power Constructors Co.
Champlain Hudson Power Express
12 Metro Park Rd, Suite 201, Albany, NY 12205

Prepared By:

Maine Drilling & Blasting, Inc.
Western Construction
7190 State Route 40 Argyle, NY 12809
Telephone: 518 824-3309
Fax: 518 632 5716

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Technical Development

Joseph Happy
Cole Dube

Division Manager
Field Engineer

Name

Title

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1.0 INTRODUCTION

Champlain Hudson Power Express, Inc. (CHPE) is installing ±339 miles of high voltage direct current underground and underwater transmission line from Montreal, Quebec, to Queens, New York. It will bring 1,250 megawatts of renewable energy into New York to reduce the dependency on fossil fuels and carbon emissions. The proposed Project will provide enough power for more than 1 million homes, along with numerous environmental and economic benefits to millions of residents in New York State communities.

The least impactful rock removal methods will be used within Segment 7 – Package 4B that allow for construction of the Project. Further investigations in the project area of Segment 7 - Package 4B are currently being performed and potential rock removal locations are presented below in Table 1. While the least impactful rock removal methods will be used, this plan conservatively presents methods for removal by blasting. Information from the ongoing additional investigations will support the selection of the least impactful rock removal methodologies.

Maine Drilling & Blasting, LLC has prepared this rock removal plan on behalf of the CHPE project after reviewing the Segment 7 – Package 4B geotechnical data, report, project plans and profiles, and project specific certificate conditions, (2012), best management practices (2012) and guidelines (2012). This blasting plan only addresses land-based blasting as no near water, or in-water blasting is anticipated in the Segment 7 - Package 4B overland project.

Safety is the top priority during all phases of blasting operations. Our knowledgeable team will follow all local, state and federal regulations related to transportation and use of explosives. The locations of blasting are determined based on the bedrock depth and the rock type. The potential rock locations for Segment 7 - Package 4B are shown in Table 1.

Table 1 – Segment 7 – Package 4B Potential Rock Locations

Station		Bedrock Depth (ft)	Rock Type	Rock PSI
From	To			
Package 4B				
45050+00	45089+00	<5	Shale	11,960
45357+00	45381+00	5-10	Shale	8,750
45390+00	45393+00	<10	Shale	~
45395+50	45420+00	<5	Shale	~

2.0 PRE-BLAST SURVEYS AND NOTIFICATIONS

Pre-blast surveys of foundations, underground wells, and other susceptible in ground and above ground structures will be offered to all property owners within a 500-foot radius of the blast site. Appropriate notices will be given, and appointments arranged for those owners who desire a survey. Pre-blast surveys will be conducted, prior to developing the blast design, by the blasting team in coordination with the Environmental Monitor on site. Results of those surveys will be documented through video or still photographs, and the locations of all properties surveyed will be summarized, with any notable conditions generally described. A written report will be provided to CHPE for their records. In addition, the report will be submitted to the Secretary of the Department of Public Service (DPS). The Public Involvement Plan describes the process for complaint resolution and is Appendix I of the EM&CP.

Prior to the start of construction, contractor will conduct non-invasive rock investigation to validate the location of rock within the alignment. The rock location will be validated using two methods. These methods will be ground penetrating radar (GPR) and rock probing. GPR will be used first to get a general idea of the location of rock along the alignment. If the GPR results show that rock is at a depth greater than 8 feet, it will not be probed. If the GPR shows that rock is within 8 feet of the surface, the rock will be probed to determine the exact depth.

Rock probing will consist of drilling a hole 2.5 inches to 4 inches wide to a depth of eight (8) feet from surface to determine the subsurface conditions using drilling equipment. Based on the resistance on the drill apparatus during excavation and visual inspection of the drill cuttings, the contractor will be able to determine the presence and depth of rock. Investigation will occur along the entire alignment. In regions where GPR showed that rock was present within 8 feet, rock probing will occur every 50 feet along the alignment to accurately determine the depth of rock.

2.1 EAGLE NEST PRE-BLAST SURVEYS AND NOTIFICATION

Known eagle nest locations have been obtained from the DEC and mapped in relation to the potential blasting locations in the project area of Segment 7 - Package 4B and have been requested for future segments. For purposes of Segment 7 - Package 4B, the Certificate Holders have agreed to adhere to seasonal blasting restrictions for blasting locations within 1-mile of identified eagle nests as defined in the DEC's 2016 Conservation Plan for Bald Eagles in New York State (NYSDEC Bald Eagle Conservation Plan 2016). Prior to any blasting, the contractor will

coordinate with DPS and DEC in accordance with the EM&CP and provide confirmation of adherence to these seasonal restrictions for Segment 7 – Package 4B.

3.0 BLAST MONITORING

All blasts will be monitored by the Contractor who has been properly trained in the setup and use of seismic monitoring equipment. As described in the approved Best Management Practices (“BMPs”) included as Attachment F to the Certificate, the Safety Inspector and Construction Inspector will be present during all blast operations (2012 BMPs, Section 7.5.1). In addition, if blasting is performed near structures, an independent consultant shall be hired by the Certificate Holders to monitor blasting and the effects on structures (2012 BMPs, Section 7.5.1). At least one seismograph will be in use at all times. Placement of monitoring equipment will be at the nearest structure to the blast site. Typical monitoring equipment will consist of Instantel type seismographs. Results of blast monitoring will typically be available before the next blast, usually immediately following a blast, and will be provided to the Safety Inspector and Construction Inspector for their records. Blast contractor may use the seismograph data to modify blast design for future shots based on the results of previous detonations.

4.0 BLASTING PLANNING

If required, blasting operations in locations of known or suspected subsurface karst features will be performed under specific procedures recommended for those locations by a geotechnical engineer licensed to practice in the State of New York. Blasts will be developed to minimize ground vibrations and offer the greatest protection possible to the surrounding structures. Each specific blast design will be provided to CHPE for their record prior to the execution of the shot. Individual blasting design plans will also be submitted to the DPS prior to undertaking of any blast activities. The blast-specific plans and diagrammatic information to be provided to DPS at least two weeks before blasting and will document conformance with the measures outlined in the EM&CP, this plan, as well as the applicable Certificate Conditions and approved Best Management Practices. Additionally, information will be provided prior to blasting documenting how the work will be conducted in a manner consistent with provisions described in Certificate Condition 158 for a minor change, (e.g., avoid wetlands or cultural resources). Explosive products will be selected by the blasting subcontractor to meet the requirements of each specific blast and will be identified within the Blast Design. All blasting operations will be strictly coordinated with the contractor, engineers, towns, and Fire Department. Emphasis will be on the safe and efficient

removal of the rock without impact to surrounding structures.

5.0 BLASTING PROCEDURES

1. As described in the BMPs, blasting operations and explosive use will be limited to the hours of 9 am to 1 hour before sunset on non-holiday weekdays unless otherwise approved by DPS Staff (2012 BMPs, Section 7.5.2).
2. Blasting cannot be conducted at times different from those announced in the blasting schedule except in emergency situations, such as electrical storms or public safety. Weather forecasts are included in the planning process and NYSDOT blasting procedures will be followed at all times.
3. Warning and all-clear signals of different character that are audible within a range of one-quarter mile from the point of the blast shall be given, as outline in 7.0 of this document. In addition, all structures within 0.25 miles of the blast point will be notified at least 48 hours prior to the commencement of blast operations (2012 BMPs). Signal meaning information shall be posted and visible to all persons within the notification area. Additionally, DPS Staff, NYSDOT, and all applicable local and state public safety officials will be notified at least 48 hours prior to all blast operations.
4. As described in Certificate Condition (CC) 39, where blasting is occurring within 50 feet of the road/highway right of way (ROW), blast warning signs will be placed at a minimum of 1,000 feet from the blast point.
5. Access within the blasting area will be controlled by the blasting contractor once the explosive materials have entered the site. All access corridors will have a posted guard with redundant communications with the master blaster. The area will remain controlled until the master blaster has given the all clear.
6. Areas in which charged holes are awaiting firing shall be secured, barricaded and posted, or flagged against unauthorized entry.
7. All blasts shall be made in the direction of the stress relieved face previously marked out or previously blasted.
8. All stemming shall be minimum as specified using clean, dry 3/8" crushed stone.
9. Blasting mats shall be used as necessary to cover blasts in areas where flyrock could cause injury or damage property.
10. The Blasting Contractor shall insure that extra safety and judgment is exercised by his blaster to prevent the simultaneous blasting of numerous holes.

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11. As described in the BMPs, if blasting activities are necessary within 0.5 miles of active bald eagle nests, the United States Fish and Wildlife Service (USFWS) and New York Department of Conservation (NYSDEC) will be contacted for guidance to avoid and/or minimize the potential for noise-related disturbance.

6.0 BLASTING MATS

Blasting mats and backfill will be used to control excessive amounts of rock movement when blasting in close proximity to structures. Placement and number of mats are typically determined by the blasting subcontractor. Mats will be placed in accordance with the requirements of the specific blast and NYSDOT blasting procedures to protect all people and structures on or surrounding the blast site and property. Rubber tire type blasting mats will be utilized on this project and will be approximately 12' x 24' in size; Rubber mat @ 12' x 24' 38 lbs./s.f. = 10,944 lbs./ea.

7.0 BLAST SECURITY AND WARNING WHISTLES

Each blast will be preceded by a security check of the affected area and then a series of warning whistles. Communications will be made with job site supervisors and local officials as required to ensure the safest possible operation. The blasting subcontractor will have a redundant communication plan for the project, which will include misfire procedures and the specific communication architecture for each blast design. Guards will be utilized at every access point and will communicate with the blaster. All personnel in the vicinity closest to the blast area will be warned. The warning whistles will be as follows:

- 3 Audible Signal Pulses - 5 Minutes to Blast
- 2 Audible Signal Pulses - 1 Minute to Blast
- 1 Audible Signal Pulses - All Clear

No blast will be fired until the area has been secured and determined safe. All blasting materials will remain under the blasting subcontractor's control. The blast site will be examined by the blaster prior to the all-clear signal to determine that it is safe to resume work.

8.0 TRANSPORTATION AND HANDLING OF EXPLOSIVES

All explosives will be delivered to the job site on a daily basis. All vehicles transporting explosive

materials will comply with all state, federal and local regulations that pertain to the transport of explosives. All vehicles transporting explosives will display the placards, numbering and/or other signs required by law and will be driven only by personnel with the appropriate licenses/permits. Vehicles transporting explosives will not be left unattended. All explosives and blasting agent standards developed by the Occupational Safety and Health Administration (OSHA), will be followed.

Overnight storage will be a licensed secure magazine site to include only the amount of explosives required to perform the day's work will be brought to the site. All explosives will be stored in approved magazines when not in use, in accordance with applicable requirements of the United States Bureau of Alcohol, Tobacco, and Firearms and New York State Department of Labor. The storage area of all explosive materials shall be located on the site at a location approved by the blasting contractor. Caps or other detonating devices will not be stored with Class A explosives. The designated storage site, explosive transporting vehicles, and areas where explosives are being used shall be clearly marked and will display the required warning signs.

There shall be no smoking, open lights, or fire of any kind within 50 feet of any area where explosives are being handled. No source of ignition, except necessary means to light fuses or fire electric detonators, shall be permitted in an area containing loaded holes. Containers of explosive materials shall be opened only with non-sparking tools or instruments. Metal slitters may be used for opening fiberboard boxes, paper bags or plastic tubes. After loading of a blast is completed, all excess explosive materials and detonators shall be removed to a safe location or returned at once to the storage area, observing the same rules as when being conveyed to the blasting area. All empty boxes or bags used for containing explosives will be disposed of in accordance with the NYSDOT blasting procedures.

9.0 BLASTER QUALIFICATIONS

All blasters on this job will be licensed in the State of New York and have received required training in the safe use and handling of explosives. All blasters are familiar with all OSHA Regulations, State Regulations, and Federal Regulations regarding construction site safety, including transportation, use, and handling of explosive materials. The blasters will be responsible to ensure the area is clear and may use other personnel to assist with guarding the area to ensure there is no entry into the blast site during blasting. Weekly safety meetings are to be held on site by the blasting contractor job foreman, with a record of that meeting returned to the blasting

contractor office.

10.0 BLASTING PERSONNEL

All blasting operations shall be conducted by experienced, trained and competent persons who understand the hazards involved. Persons working with explosive materials shall:

1. Have demonstrated knowledge of, and a willingness to comply with, safety and security requirements.
2. Be capable of using mature judgment in all situations.
3. Be of good physical condition and not addicted to intoxicants, narcotics, or other similar type of drugs.
4. The person(s) responsible for the explosives shall possess current knowledge of the local, State and Federal laws and regulations applicable to his work.
5. The person(s) responsible for the explosives shall have obtained a Certificate of Competency or a license as required by State law.

11.0 LICENSES, PERMITS, AND REGULATIONS

The blasting contractor is fully licensed and insured for the transportation, use, and handling of explosives in accordance with all applicable local, State, and federal requirements. A copy of the blaster's license will be provided to CHPE and the DPS for their records prior to any blasting that might be necessary. Evidence of insurance is available upon request. Blasting permits will be applied for as required from the local authorities by the Blaster/Foreman when blasting is about to begin.

All blasting operations will adhere to applicable New York State statutes and regulations governing the use of explosives. The State regulations are contained in 12 NYCRR Part 39 and in Industrial Code Rule 53 (16 NYCRR Part 753) and include such requirements as licensing of operators; magazine (explosive storage) certification; and procedures for conducting operations in a safe manner. All pertinent safety regulations and standards shall be applied as required for safety, security and other related details for any blasting deemed necessary. Additional applicable safety regulations include:

- Code of Federal Regulations A.T.F. Title 27.
- Directive 495 standards of the National Fire Protection Association (NFPA).
- Occupation Safety and Health Administration (OSHA) standards, 29 CFR 1926.900 -

1926.914 and 1910.109.

- New York State Industrial Code Title 12- Part 39.
- Article 16 of the Labor Law of the State of New York.
- New York State Department of Transportation (NYSDOT) GEM-22, “Procedures for Blasting,” NYSDOL regulations (12 NYCRR 61), and NYSDOT Standard Specifications (§203-3.02.A.3 and any other applicable).

12.0 BLAST VIBRATION

Blast vibration will be monitored at the blast site, typically at the structure(s) closest to the blast site. Seismographs will be utilized to measure the ground vibrations before, during, and after each blast. All seismograph results will be provided to CHPE and DPS with the blast summary results. Vibration limits will closely follow industry limits and the State and Local Regulations. Blast designs will be modified as required to stay within the guidelines and meet project schedules as well. Blasting operations will be coordinated with the applicable Co-located infrastructure owners as necessary (2012 BMPs, Section 7.5).

Ground vibration peak particle velocity limits shall not exceed USBM Alternative Blasting Criteria

- US Bureau of Mines (USBM) RI 8507 Appendix B
- Standard, and applicable State Regulations (VOSHA related to blasting, N.F.P.A. No. 295)

Airblast overpressure level not to exceed 133 peak dB (linear) two Hertz high -pass system.

13.0 BLAST REPORTS

Enclosed is a sample of a Maine Drilling & Blasting, Inc Blast Report. A similar report will be filled out for each blast and copies supplied to CHPE for their records.

14.0 TYPICAL BLAST DESIGN

Enclosed are what would be considered typical blast designs forms for this project. Hole sizes, depths, spacing and loading information is based upon actual blasting location data obtained immediately prior to blasting. All blast related documentation will be provided to CHPE for review.

**TYPICAL BLAST REPORT &
TYPICAL BLAST DESIGN
ATTACHMENT**

Blast Report



Job # _____ Customer Name: _____ Customer Supt. : _____
 Date: _____ Job Address: _____ Pick Ticket(s) # : _____

Shot #: _____
 Shot Time: _____
 Operation: (Trench, Open)

Fire Detail Hours: _____
 Type of Rock: _____
 Type of Terrain: _____
 Weather Conditions: _____
 Wind Direction/Speed: _____
 Identify Hazards: _____

# Holes:				
Depth of Water:				
Hole Diameter:				
Burden:				
Spacing:				
Total Square Feet:				
Stemming:				
Sub Drill:				

Precautions Taken: _____

Avg. Drill Depth:				
Total Drill Footage:				
Total Pay Yards:				
Total Yards Shot:				

Calculations:

Bulk _____				
ANFO				
ANFO WR				
Exp. 1 _____				
Exp. 2 _____				
Exp. 3 _____				
Exp. 4 _____				
Cast Booster _____				
Cast Booster _____				

Total Pounds Shot:				
Powder Factor (Lbs / Cyd):				

Det 1 _____				
Det 2 _____				
Det 3 _____				
Det 4 _____				
Det 5 _____				
Det 6 _____				
Lead Line _____				

Notes:

Type of Cover (Dirt, Mats):				
# of Mats Used:				

Seis #:	PPV:				
Operator:	dB:				
Location:					

Seis #:	PPV:				
Operator:	dB:				
Location:					

Seis #:	PPV:				
Operator:	dB:				
Location:					

Seis #:	PPV:				
Operator:	dB:				
Location:					

Blaster Name: _____

Lic. # _____

Signature: _____

Blast Design Plan

Show Timing for Each Shot

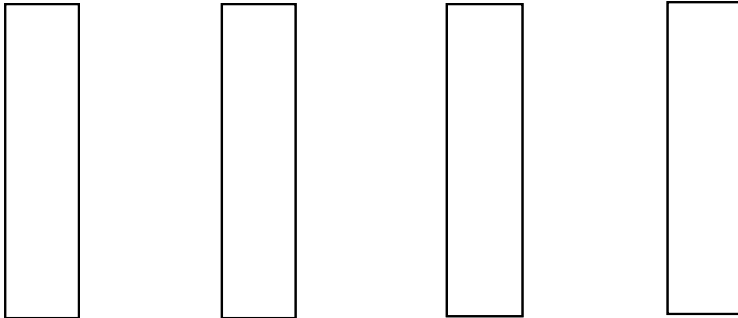


Job Number:

Date:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Typical Columns



FORMULAS:

$$SD = D / W ^{.5}$$

$$PPV = K \times (SD)^{1.6}$$

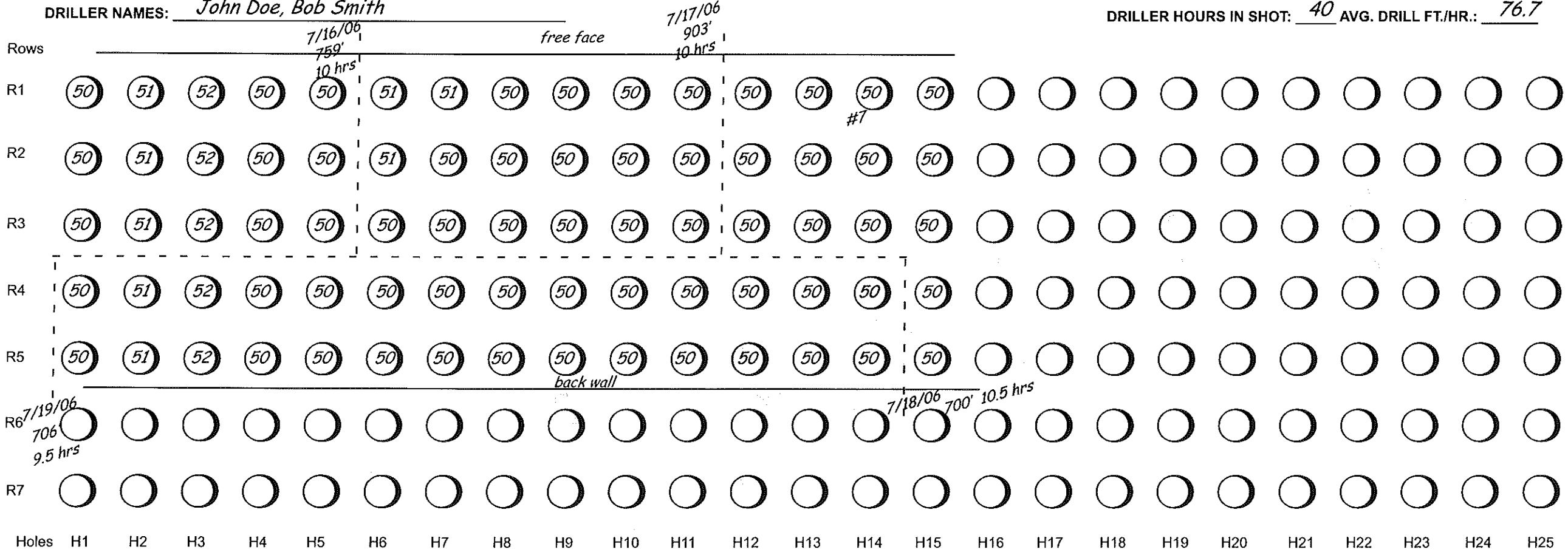
$$K = PPV \times SD ^{1.6}$$

Shot #:				
Distance to Closest Structure:				
Location of Structure:				
Max Holes Per Delay:				
Max Pounds Per Delay:				
Scale Distance:				
Predicted PPV: K Factor _____				

CUSTOMER: Best Customer
 LOCATION: City, State
 SHOT NO: 13 DATE: 7/20/06 TIME: 9:38 am
 BENCH ELEV.: 210 FLOOR ELEV.: 160
 BLAST LOCATION: Southeast Corner
 DRILLER NAMES: John Doe, Bob Smith

HOLE REPORT: SQUARE PATTERN

NUMBER OF HOLES: 75
 SPACING: 9 BURDEN: 10
 DEPTH: 50-52' DIAMETER: 4"
 TOTAL DRILL FEET IN SHOT: 3,068
 DRILL DAYS IN SHOT: 4 AVG. DRILL FT./DAY: 767
 DRILLER HOURS IN SHOT: 40 AVG. DRILL FT./HR.: 76.7



COMMENT CODE KEY:

- 1 = Mud Seam
- 2 = Overburden
- 3 = Soft Rock
- 4 = Deviation Detected
- 5 = Pressure Settings
- 6 = Accessories Lost or Broken in Shot
- 7 = Accessories Not Retrieved and Location
- 8 = Number of Holes Redrilled and Cause
- 9 = Method used to Collar Holes
- 10 = Angled-Document Degree/offset

HOLE AND DRILLING NOTES (Holes without comment are free from defect or overburden): _____

- 4. Losing light@ 30', should be boretracked
- 5. Reduced pressure to 120 bar helped with deviation, reduced drill production by 1 hour/day
- 6. Broke a steel and couldn't retrieve

All geological conditions are recorded above. Driller's signature: John Doe Date: 7/20/06

I have communicated with the driller(s) and understand all identified geological conditions:

B.I.C. Signature: Jim Barker Date: 7/20/06

HOLE REPORT: STAGGERED PATTERN

CUSTOMER: _____

LOCATION: _____

SHOT NO: _____ DATE: _____ TIME: _____

BENCH ELEV.: _____ FLOOR ELEV.: _____

BLAST LOCATION: _____

DRILLER NAMES: _____

NUMBER OF HOLES: _____

SPACING: _____ BURDEN: _____

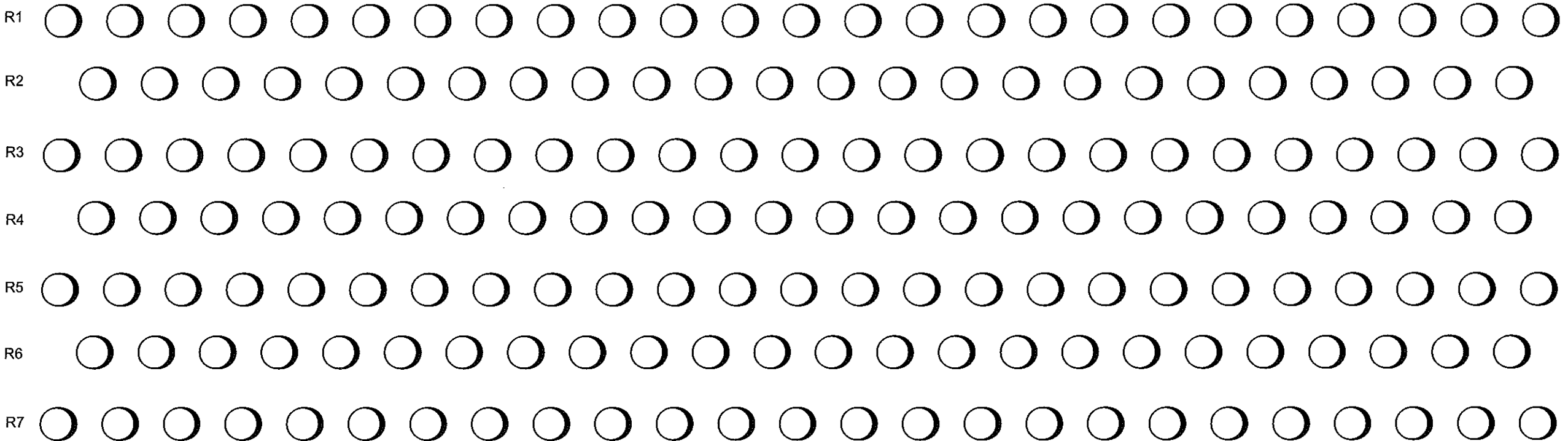
DEPTH: _____ DIAMETER: _____

TOTAL DRILL FEET IN SHOT: _____

DRILL DAYS IN SHOT: _____ AVG. DRILL FT./DAY: _____

DRILLER HOURS IN SHOT: _____ AVG. DRILL FT./HR.: _____

Rows



Holes H1 H2 H3 H4 H5 H6 H7 H8 H9 H10 H11 H12 H13 H14 H15 H16 H17 H18 H19 H20 H21 H22 H23 H24 H25

COMMENT CODE KEY:

- 1 = Mud Seam
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- 10 = Angled-Document Degree/offset

HOLE AND DRILLING NOTES (Holes without comment are free from defect or overburden) _____

All geological conditions are recorded above. Driller's signature: _____ Date: _____

I have communicated with the driller(s) and understand all identified geological conditions:

B.I.C. Signature: _____ Date: _____