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Explosives Safety & Security Branch (ESSB)

General Update

Meeting with CEAEC

Charlottetown – June 2017

Jean-Luc Arpin Director, CIE

Charles Montpetit A/National Manager

Canada

Agenda

ERD Personnel / On-going initiatives

J.L. Arpin

- Organization Charts / Personnel
- New Licence Management System (LMS) – Current Status
- Port surveys
- *Explosives Regulations, 2013* / Amendments
- Regulatory Cooperation Council
- Budget 2017
- NEEQ – TNT Equivalency

General Update

C. Montpetit

- Activity Statistics / Licences Breakdown
- Accidents / Incidents

CEAEC List of items (19)

Organization Charts / On-going initiatives

ESSB Organizational Chart

Explosives Safety Security Branch (ESSB)

Director General

Explosives Regulatory Division (ERD)

Director /
Chief Inspector of Explosives (CIE)

Program Policy and Administration Division (PPAD)

Chief

Canadian Explosives Research Lab (CanmetCERL)

Director

ERD Organizational Chart

Director / CIE

Authorization & Classification

Licensing & Inspections

Explosives Specialists

- Import / Export / In-transit
- Storage / QD
- Technical
- Transport
- Fireworks Program
- Security Screening
- Restricted Components

Operational Policies

Pacific Region
British Columbia / Yukon

Western Region
Alberta / Saskatchewan / Northwest Territories

Headquarters
Ontario / Manitoba

Eastern Region
Quebec / Nunavut / Atlantic Provinces

ERD Personnel

Director/CIE – Jean- Luc Arpin

A/National Manager – Charles Montpetit

Pacific Region

Manager –	Rod Boulay
Inspector –	David Murdoch
Assistant –	Kelp Watson

Western Region

Manager –	David Mohn
Inspectors –	Rebecca Holmberg
	Tushna Soonawalla
Assistant –	Wanda King

Central Region

Sr. Inspector –	Isabelle Gagné
Inspectors –	Greg Choryhanna
	Mike Farbod
	Meagan Martin
	Charles Montpetit
	Mark Wilansky

Eastern Region

Inspectors –	Jacques Beaupré
	Jean-Francois Viger

Specialists Manager – Serge Dionne

Security Screening and Restricted Components	Maurice Pinco
Fireworks	Rachel Robbins
Import, Export, In-Transit	Pavel Zraly
Magazines, Security, QD	Sebastian Towler
Specialist Support	Michael Lafleur

Authorization – Marie Vachon

New Licence Management System – Current Status

Questions?

Port Surveys

- Current regulatory requirements
  - S. 155 of *Cargo, Fumigation and Tackle Regulations* require:
    - Inspection to be conducted by an Inspector of Explosives as per Q-D manual as if a licence is issued under the *Explosives Act*
    - Issue: assessment of loading/unloading is done as if it were for fixed facilities
- Case Study of Port of Halifax, with IMESAFR completed in October – using an hourly risk approach to better address short-duration activity
- Regulatory initiative underway to amend ER, 2013 & CFTR – acceptance of risk based surveys

Explosives Regulations (ER) – new amendments

- Previous amendments in 2016
  - Updates to the references
    - Magazine Standards
    - Quantity-Distance Principles
  - Series of administrative amendments
- Amendments in 2017
  - Main objective is to amend Part 9 for Port Surveys
    - Allowance for using Risk Assessment techniques
    - CFTR will be amended in parallel
  - Series of minor amendments being considered
    - List of proposals made by CEAEC were reviewed
  - Regulatory drafting was completed – Gazette process underway

U.S. – Canada Regulatory Cooperation Council Regulatory Partnership

- Explosives Classification Initiative
  - Workplan was updated (PHMSA / ESSB)
    - http://www.nrcan.gc.ca/explosives/regulatory-partnership/17312
  - Recent focus:
    - Revision of Chapter 2.1 GHS / Explosives
    - Revision of UN MTC; amendments for GHS needs

Budget 2017

- Enhancing explosives safety (security) including stronger measures / restrictions on commercial explosives and precursor chemicals ($9M over 5 years)
- Primary focus:
  - New unit is being formed to address current shortfalls for precursors:
    - Inspections of sites enrolled
    - Specialists and scientists to monitor emerging threats, help support policies and provide assistance
    - Analysts to develop policies, address regulatory initiatives and conduct outreach activities

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NEEQ - TNT Equivalency

Canada

Background

- G05-05 – Guidelines for the Determination of Potential Effects for Explosives:
  - Was first issued in 2007
  - Includes a provision for Net Effective Explosive Quantity (NEEQ)
  - QD tables are based on TNT
  - NEEQ can be considered for explosives with a TNT equivalency (Q) that is outside ±20%, as measured by testing
- Issues
  - Q can be measured by peak overpressure or impulse
  - Measurements show dependence on scaled distance, of significance
  - High variability depending on test conditions

TNT Equivalency

- TNT Equivalency (Q) is the ratio of the mass of TNT to the mass of the explosive in question which has the same effect at the same range.
  - e.g.
    - if 50 kg of Explosive X produces 35 kPa at 25 m,
    - and 85 kg of TNT produces 35 kPa at 25 m
    - Q = 85/50 = 1.7
- Explosive X has a TNT equivalency of 1.7 based on overpressure

Determining TNT Equivalency

- The pressure and impulse (or other parameter) of an explosive are measured
- Pressure and impulse are usually measured in an arena test
- The output of TNT is not typically measured
  - It is usually calculated using the Kingery-Bulmash equations (idealized values)

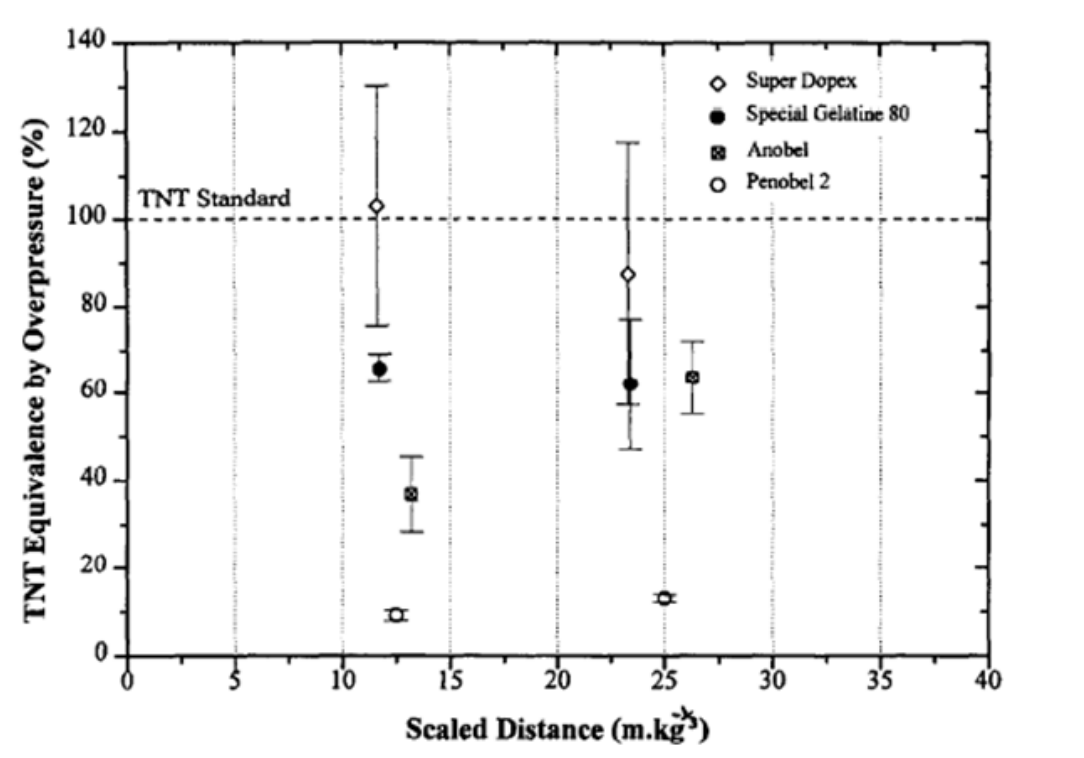
The Issues

- Q is very sensitive to small changes in pressure or impulse
  - e.g. If an explosive produces 65 kPa at 15 m then Q= 1.06
  - If it produces 70 kPa at 15 m then

    Q= 1.19
- However, it is very difficult to differentiate between 65 and 70 kPa in a pressure record
  - Variations in wind, ambient pressure, soil type, charge configuration, booster and detonator location all play a role
  - Shock fronts are inherently unstable and pressures will vary even when all other factors are held constant

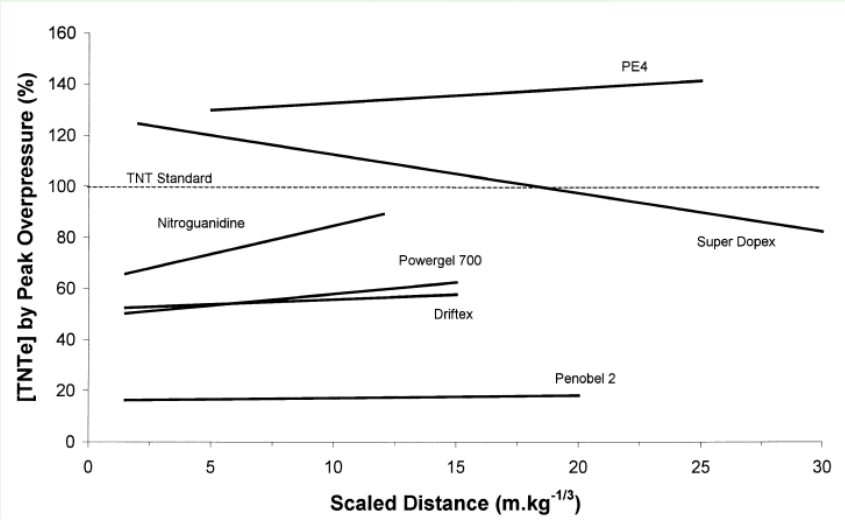
The Problems

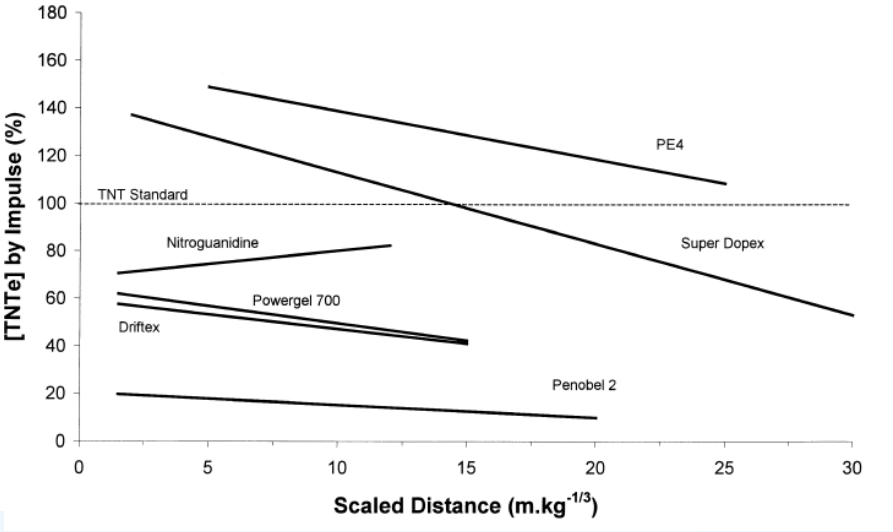
- Note the large error bars



TNT Equivalency is not a constant
(even when the measurements are perfect)

- Q varies depending with blast parameter, range, mass





- Which value do you choose?

Summary

- Q is very difficult to determine accurately
- Even when accurately determined, it is not a constant value
- So which value do you use?
  - Public safety would require worst case

Possible options?

- Treat all PE 1 material as Q = 1
- Create PE 1.5
- Set up a separate QD table or use Q = 0.8 for PE 1.5 ?

- Comments or suggestions ?

General Update

ERD Statistics Activity / Licences

Activity		FY 15-16	FY 16-17
Authorization	Applications received [indefinite period]	226	232
	Products tested	48	73
	Products approved	1830	5237
Import Permits	Annual	302	304
	Single Use	60	59
Restricted Components	Sites	2094	2085
	Sellers	1603	1591
Mobile Process Units	Active and in operation	224	234
Licences	F&S - Factory & Satellite, Bulk	162	160
	F&C - Factory & Certificate, Other	62	75
	F/PE - Factory, Perforators	59	60
	V - Magazine, Vendor	101	101
	U - Magazine, User	797	765
	U/Z - Magazine, User – Zone	222	283
	P - Magazine, Propellant	267	277
	X - Magazine, Fireworks	115	117
	TOTAL	**1,785**	**1838**

ERD Statistics Inspections

Inspections		FY 15-16	FY 16-17
Inspections by activity	F&S - Factory & Satellite, Bulk	73	68
	F&C - Factory & Certificate, Other	22	19
	F/PE - Factory, Perforators	15	44
	V - Magazine, Vendor	53	47
	U - Magazine, User	272	234
	U/Z - Magazine, User – Zone	50	52
	P - Magazine, Propellant	91	134
	X - Magazine, Fireworks	47	48
	Restricted Component sites	30	38
	Mobile Process Units (MPU)	25	47
	Unlicensed [provincial magazines, trucks, fireworks events, port surveys, technical inspections, importation or expired licences]	21	24
	TOTAL	**699**	**755**

ERD Statistics Inspection Ratings

Activity		FY 15-16	FY 16-17
Average Inspection Rating	F&S - Factory & Satellite, Bulk	2.0	2.0
	F&C - Factory & Certificate, Other	2.5	2.6
	F/PE - Factory, Perforators	2.8	2.5
	V - Magazine, Vendor	2.7	2.5
	U - Magazine, User	2.7	3.1
	U/Z - Magazine, User – Zone	2.2	2.4
	P - Magazine, Propellant	2.9	2.9
	X - Magazine, Fireworks	2.7	3.2

Inspection Deficiencies

Operations / Housekeeping:

- AN prill Auger stand-off clogged
- Presence of tetra-ammine copper nitrate
- Mixed storage of contaminated / non-contaminated equipment parts
- Combustible material in vicinity of explosives / AN hopper
- Electrical components, non-conforming (non-CEMA 4X, electrical box weatherproof seals)
- Pumps, requiring maintenance (seals)
- Containment dyke, requiring maintenance/repair
- MPU hydraulic leaks
- Door, requiring panic hardware

Support Plans / Administration:

- Plans not up to date / not available at site (fire safety, site security, emergency response)
- Procedures not up to date (maintenance, operating)
- Electronic security system does not provide detection
  (does not transmit or significant delay in transmitting notification)
- Fire extinguisher monthly checks not conducted/recorded

ERD Statistics Accident and Incidents

Activity		FY 15-16	FY 16-17 Apr - Sep
Accidents / Incidents	Manufacture	27	21
	Transport	17	23
	Thefts / Break and Entry	14	6
	Fireworks	9	12
	Restricted Components	4	3

Reported Accidents / Incidents

Manufacture (Bulk)

- Inadvertent initiation during manufacturing [procedural / equipment failure]

Transport

- Road accidents [collision]
- Breakdowns [mechanical / electrical]

Mischief / Criminal Intent

- High explosives used for criminal purposes [ON, AB]

CEAEC - List of Items

CAN/BNQ Quantity Distance Std

Item 1 - Table C.3 / Can this Table be expanded from 136,000 up to 300,000 kg ?

Yes, with the next revision of the Standard.

Item 4 - With the release of both CAN/BNQ Standards, what Directives remain as in-force?

None, requirements of former Directives are being addressed in the Regulations.

CAN/BNQ Magazine Std

Item 2 - Calculation of magazine capacities / Can ERD issue a new guidance table ?

Previous Table was understood as not being very useful. Perhaps a clarification is needed.

Item 3 - Physical inspection frequency in Ts & Cs

Being addressed with eLMS.

Part 5 – Manufacturing licences

Item 5 – Considerations for a "Zone" temporary factory licence

Explanation being provided: this would be for short periods of time to load remote shots that cannot be completed in one day.

Item 10 – T &C of a Division 1 factory licence

Latest change were of cosmetic nature and done in order to reflect the new CAN/BNQ QD standard.

Item 12 – Unattended site access without direct supervision

Q. Provision in ER, 2013 ?

A. Yes.

Q. Apply to trained 3rd party carrier ?

A. Yes. Onus is placed on the holder of the licence to still ensure safety and security.

…Part 5 – Manufacturing licences

Item 18 – Status of Guidelines for Bulk Explosives Facilities rev. 6

Q. Will CEAEC have the opportunity to review/comment ?

A. Yes. The revision process will be undertaken this Fall.

Part 6 – Magazine licences

Item 8 – Only “one case” may be open at any time within a magazine

Q. What is the logic behind “one case” only regulation s. 150 (4) ?

A. Only storage is permitted in a magazine; the opening of a single package is to allow the taking of a sample.

Q. Can this Regulation be revised to “two cases” ?

A. Would need to discuss and develop safety conditions.

Item 9 – Grandfathering of older magazines

Policy was communicated to CEAEC in May.

Grandfathered magazines are captured in the “door Tag database”.

…Part 6 – Magazine licences

Item 17 – Spare key located inside a magazine

Q. Is this a requirement ? It is not mentioned in ER, 2013 nor in CAN/BNQ Std for Magazines.

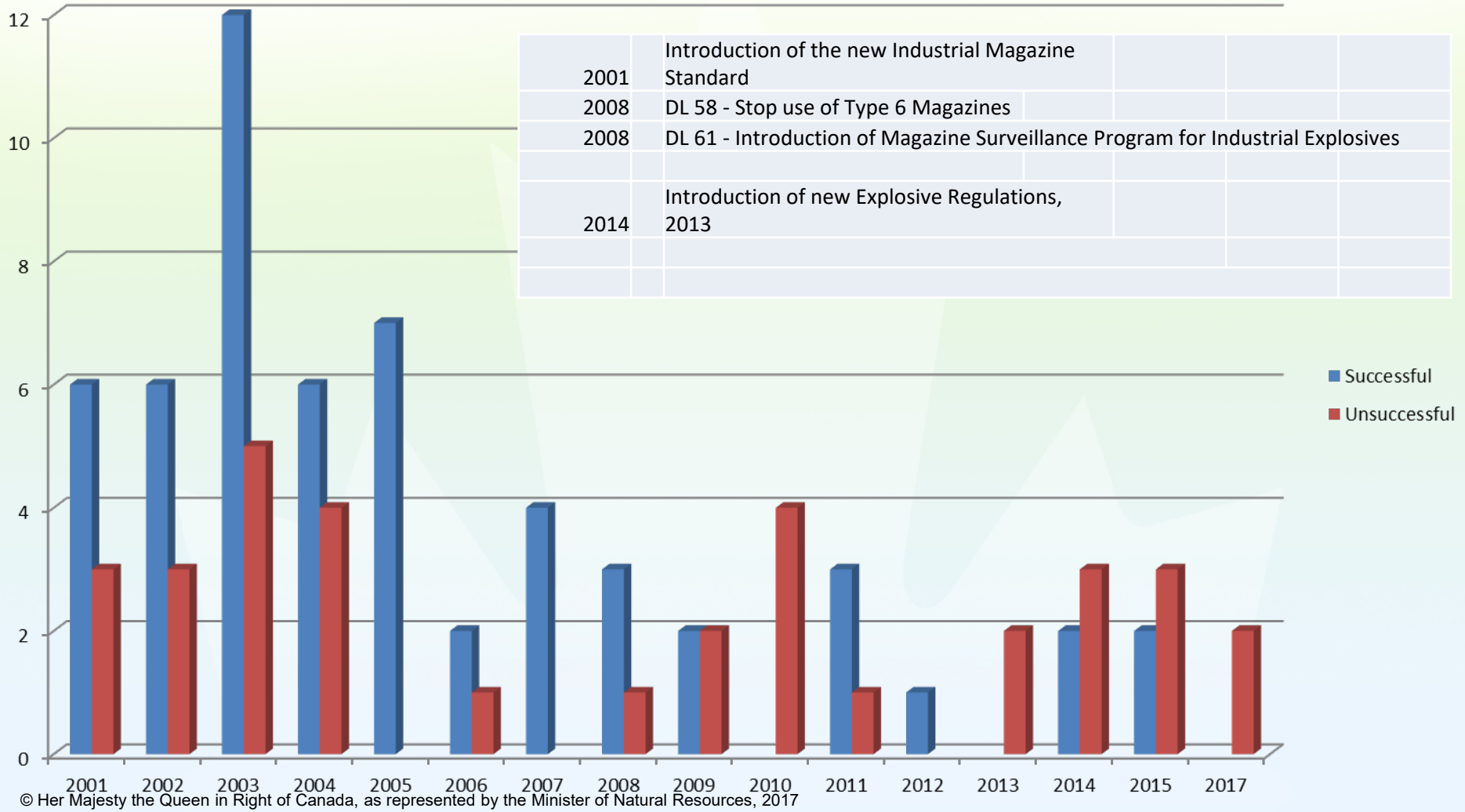
A. It is not a requirement, but a good safety practice.

Item 19 – Magazine surveillance program

Q. Can ERD detail the benefits of the surveillance program ?

A. A review/analysis of incidents since 2001 was conducted.

…Part 6 – Magazine licences



2001	Introduction of the new Industrial Magazine Standard
2008	DL 58 - Stop use of Type 6 Magazines
2008	DL 61 - Introduction of Magazine Surveillance Program for Industrial Explosives
2014	Introduction of new Explosive Regulations, 2013

Part 8 – Screening

Item 11 – A person who was denied or is waiting to obtain an approval letter can work under direct supervision

Q. Why is the exemption specific to approval letter applications ?

A. Policy intent is to not delay employment of a person due to an NRCan process.

Q. Can this exemption be expanded to include equivalency documents ?

A. Discuss.

Part 9 – Transport

Item 14 – Fire resistant materials s. 191 (1)

Q. What is ERD's position on the wooden floors of van bodies ?

A. Even if wooden floors are not fire resistant, it would offer some fire resistance for several minutes and allow time for people to evacuate.

Item 15 – Vehicle is to be fueled prior to loading explosives s. 194 (3)

Q. How are carriers to adhere to this rule when travelling distances that require refueling ?

A. Once explosives have been loaded, refueling is not forbidden but it must be avoided as much as possible.

Item 16 – BG s. 4.6.1.1 fueling facilities

Q. Type of approval required to use of mine fuel facilities?

A. No special approval. MPU must be fuelled before explosives are loaded and ERP for explosive incident must be available

Part 11 – Industrial explosives

Item 6 – Who can purchase industrial explosives s. 217 (1)

Q. Which P/T licences meet the intent of s. 271 (1) ?

A. All P/T except AB, NS and NB.

Q. Under what conditions can sales be made to the Canadian Armed Forces ?

A. No condition; pursuant s. 3 of the Act, this Act does not apply to or in respect of any explosives under the direction or control of the Minister of National Defence.

Q. Can a sale be made to a P/T licence holder but with no storage ?

A. Yes if it complies with the exception found in the definition of a “magazine” in s. 2 of the Act.

Q. Is a licence required for a customer that obtains the “shot service” or “rock on ground” service ?

A. No, since the customer does not come to possess the explosives.

Part 11 – Industrial explosives

Item 7 – A seller must not sell more explosives to a buyer than the buyer is authorized by their licence s. 217 (2) to store

Q. Is this Regulation applicable to shot service ?

A. No, since in the case of a shot service, the possession of the explosives remains with the user; even if the customer pays for the explosives as part of the service being rendered.

Q. How does this apply to quarry operators with a provincial permit to use ?

A. Pursuant s. 2 of the Act and the definition of a “magazine” including ss (a), explosives that are kept or stored at a quarry for use at that location, a federal licence is not required if a provincial law is in place; provincial requirements are to be applied.

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Explosives Safety and Security Branch (ESSB)
Explosives Regulatory Division (ERD)

Questions?

Headquarters (Ottawa)
Authorization - Import - Export - In-transit
(613) 948-5200
ERDmms@NRCan.gc.ca

Pacific Region (Vancouver)
British Columbia / Yukon
Magazine Licences - Inspections
(604) 666-0366
ERDpacific@NRCan.gc.ca

Western Region (Calgary)
Alberta / Saskatchewan / Northwest Territories
GLF & Magazine Licences - Inspections
(403) 292-4766
ERDwestern@NRCan.gc.ca

Central Region (Ottawa)
Ontario / Manitoba
Factory & Magazine Licences - Inspections
(613) 948-5187
ERDcentral@NRCan.gc.ca

Eastern Region (Varennes)
Quebec / Nunavut / Atlantic Provinces
Magazine Licences - Inspections
(450) 652-0703
ERDeastern@NRCan.gc.ca

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