

**BEDFORD
13527**

January 27, 2011

SPECIAL PROVISION**AMENDMENT TO SECTION 203 -- EXCAVATION AND EMBANKMENT****Best Management Procedures for Blasting**

This special provision describes Best Management Procedures to be followed for blasting performed for rock excavation items under this and other sections.

Add to Description:

1.3 The Design-Builder shall follow the Best Management Procedures described herein to minimize the effects of nitrates in groundwater and surface water systems related to blasting.

Add to Construction Requirements

3.2.6 Best Management Procedures for Blasting. The Design-Builder shall follow Best Management Procedures (BMP's) to include preparing, reviewing and following an approved blasting plan; proper drilling, explosive handling and loading procedures; observing the entire blasting procedures; evaluating blasting performance; and handling and storage of blasted rock.

3.2.6.1 Loading practices. The Design-Builder shall utilize the following loading practices to minimize environmental effects:

- a) Blastholes shall be drilled within one foot of the intended blast pattern.
- b) Blastholes shall be within five (5) degrees of the intended orientation.
- c) Blasthole boring logs shall be maintained by the driller and communicated directly to the blaster. The logs shall indicate depths and lengths of voids, cavities, and fault zones or other weak zones encountered as well as groundwater conditions.
- d) Unpackaged/unsleeved ANFO and emulsions shall not be used if artesian or water flowing conditions are encountered.

- e) Loaded explosives shall be detonated as soon as possible and shall not be left in the blastholes overnight.

3.2.6.2 Ammonium Nitrate and Fuel Oil (ANFO). The following BMP's shall be followed to reduce nitrate impacts when ANFO is used:

- a) Identify blastholes containing water and remove water prior to loading with ANFO.
- b) Water resistant ANFO (ANFO-WR) shall be used in blastholes that recharge with groundwater and remain wet even after pumping.
- c) Spills of ANFO or other blasting agents, at the ground surface around the blasthole collars shall be cleaned up promptly and either reused or taken off site.
- d) Adequate unloaded collar lengths shall be established to reduce both "blowback" when loading pneumatically and blasthole proximity effects.
- e) Proper "standoff" distance and loading vessel pressure shall be maintained to reduce "blowback" during pneumatically loading ANFO.
- f) Partially used bags of ANFO shall be resealed and returned to the explosive magazine.
- g) Loading equipment shall be cleaned in an area where the water can be properly contained and handled in a manner that prevents releases.
- h) Explosives shall only be delivered to the site in approved magazine trucks and should not be stored overnight on-site.

3.2.6.3 Bulk emulsions and slurry/watergel explosives. The following BMP's shall be followed to reduce nitrate impacts when bulk emulsions or slurry/watergel explosives are used:

- a) Spills of the product shall be removed from the spillage area, and either reused or taken off site for disposal.
- b) Proper loading techniques shall be followed when loading a bulk product into a wet blasthole. The bulk liquid product should be extruded into itself from the bottom of the blasthole and not into the standing water above the product.
- c) If groundwater conditions are severe, e.g., artesian/flowing conditions, packaged explosives (emulsions, watergels, slurries, blends, cartridged, etc.) shall be used instead of bulk products or as required by the Engineer.

3.2.6.4 Blasthole stemming. The following BMP's shall be followed when placing stemming in blastholes:

- a) Blastholes shall be cleaned out thoroughly using the compressed air stream from the drill to remove the drill cuttings.
- b) Drill cuttings shall not be used as stemming.
- c) Stemming shall be placed to prevent bridging, and shall be appropriately sized for the blasthole diameter.
- d) Blastholes shall be completely stemmed to prevent incomplete detonation.

- e) Weak zones, voids, and cavities shall be stemmed as decks to prevent the loss of explosive products into the bedrock.

3.2.6.5 Misfires. One or more of the following BMP's shall be followed to help prevent misfires:

- a) Redundant surface delays to connect blastholes if shifting mats, uneven terrain or other conditions could cause cut-offs shall be used.
- b) Double or triple priming of the blastholes shall be done.
- c) Using electric detonating systems shall be considered.
- d) Using programmable electronic detonating systems shall be considered.

3.2.6.6 Fragmented Rock Storage, Handling, Processing, and Use. The following BMP's shall be followed when storing, handling or processing blasted rock on site.

- a) Remove the blasted rock (muckpile) from the blast area immediately after blasting.
- b) Distribute rock fragments and processed blasted rock widely throughout the project in fill areas as soon as possible.
- c) If the blasted rock will not be reused on site, remove the muckpile/processed rock from the project site as soon as possible.