

Title: Policy on Laboratory use of Explosive and High Energy Materials

Approved by: Environmental Health and Safety

Effective date: April 12, 2019

Responsible official: Environmental Health and Safety

Responsible University office: Environmental Health and Safety

Relates to: All of CWRU Community

Summary of this Policy.

This policy defines the protocol for the use of explosive or highly energetic materials (EoHE) as listed below in appendix A. Use of these chemicals require written consultation

between the primary investigator and the student or staff who performs work with EoHE. The written plan must include the procedures for protection and be included in the laboratories' Chemical Hygiene Plan (CHP).

The EoHE committee and the dean of the school where these chemicals are used

Definitions:

- a. CHP Chemical Hygiene Plan
- b. CWRU Case Western Reserve University
- c. DOE Department of Energy
- d. DOT Department of Transportation
- e. EHSA Environmental Health and Safety
- f. EoHE Explosive or highly energetic materials
- g. EPA Environmental Protection Agency
- h. Explosive substance is a solid or liquid substance (or mixture of substances) which

TRAINING REQUIRED

All faculty, staff and students working with EoHE shall be trained in accordance with the prepared work plan and the elements of this document before working with EoHE. Documentation of training shall include an outline of the training accompanied by a sign-in sheet. These documents will then be included in the CHP along with the work plan.

Procedure:

Good workmanship and laboratory practices shall be exercised in making and operating laboratory setups and configurations. Follow the guidelines as described in the Case Western Reserve Manuals and Prudent Practices. In particular, the following guidelines apply:

- a. Equipment and apparatus shall be clean, in good condition and in good working order.
- b. All glassware and apparatus shall be inspected for cracks, defects, etc., before use. Defective or damaged equipment shall be removed from service. Where appropriate, glassware should be wrapped or taped.
- c. Setup shall be

Table: Safety Shields for Explosive Laboratory Operations*

Shield	Minimum distance from explosive(cm)	
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- h. When explosive operations require personnel to reach around a shield to manipulate equipment, exposure shall be minimized and the use of distancing devices shall be employed whenever possible. For example, a stick or other device can be used to distance the worker from the potential hazard.

The EoHE Committee

- a. The EoHE committee approves use of EoHE materials above 100mg and shall be comprised at a minimum of: the principal investigator (PI), two additional peers and a representative from EHST. The committee will evaluate the work plan proposed by the PI and work to achieve a suitable process for carrying out the work.
- b. The EoHE committee and the dean of the school where the work will be done prior to submission must first approve any grant that will use EoHE materials at, or above 100mg, not exempt from this program. This requirement is necessary so that adequate engineering controls and work locations can be found prior to a grant commitment.
- c. A maximum of 100mg of EoHE materials may be prepared, stored or handled in a reaction at any one time unless an additional work plan has been established and presented to the EoHE committee for approval.
- d. Any approved use of materials above 100mg requires an authorized location for the work that contains the required engineering controls needed to contain a blast should it occur. This engineered space shall meet all the qualifications of local, state and federal regulations.
- e. Use of EoHE materials above 1g requires an emergency action plan be established. The emergency action plan must be comprehensive and sufficiently detailed to address the worst case scenario.

Note: Picric acid and sodium azide are utilized in biological research. Hydrated materials do not require additional protection and are exempt from the 100mg limit. In order to take advantage of this exemption, a log demonstrating a visual check of hydration must be kept. The materials should be checked no less than once every four months.

Appendix A: Substances defined as explosive

This list is defined by the ATF as of October 19, 2011 (Federal Register/Vol 76, No. 202)

*NOTE: This list should not be considered comprehensive.

A

Acetylides of heavy metals

Aluminum containing polymeric propellant

Aluminum perchlorate explosive

Amatex

Amatol

Ammonal

Ammonium nitrate explosive mixtures (capsensitive)

*Ammonium nitrate explosive mixtures (non capsensitive)

Ammonium perchlorate having particle size less than 15 microns

Ammonium perchlorate explosive mixtures (excluding ammonium perchlorate composite propellant (APCP))

Ammonium picrate [picrate of ammonia, Explosive D]

Ammonium salt lattice with isomorphous substituted inorganic salts

*ANFO [ammonium nitrate fuel oil]

Aromatic nitro compound explosive mixtures

Azide explosives

B

Baranol

Baratol

BEA [1,2-bis(2,2-difluoroethyl)nitroacetoxymethane]

Black powder

Black powder based explosive mixtures

*Blasting agents, nitro carbonates, including non capsensitive slurry and water gel explosives

Blasting caps

Blasting gelatin

Blasting powder

BTNEQ [bis(trinitroethyl) carbonate]

BTNEN [bis(trinitroethyl) nitramine]

BTTN [1,2,4-butanetriol trinitrate]

Bulk salutes

Butyl tetryl

C

Calcium nitrate explosive mixture

Cellulose hexanitrate explosive mixture

Chlorate explosive mixtures

Composition A and variations

C(continued)

CompositionB and variations

CompositionC and variations

Copper acetylide

Cyanurid triazide

Cyclonite [RDX]

Cyclotetramethylenetetranitramine

[HMX] Cyclotol

Cyclotrimethylenetrinitramine [RDX]

D

DATB

E (continued)

Explosive mixtures containing sensitized trimethane
Explosive mixtures containing tetranitromethane (nitroform)
Explosive nitro compounds of aromatic hydrocarbons
Explosive organic nitrate mixtures
Explosive powders

F

Flash powder
Fulminate of mercury
Fulminate of silver
Fulminating gold
Fulminating mercury
Fulminating platinum
Fulminating silver

G

Gelatinized nitrocellulose
Gem-dinitro aliphatic explosive mixtures
Guanyl nitrosaminoguanyl tetrazene
Guanyl nitrosaminoguanylidene hydrazine
Guncotton

H

Heavy metal azides
Hexanite
Hexanitrodiphenylamine
Hexanitrostilbene
Hexogen [RDX]
Hexogen or octogen and a nitrated N-methylaniline
Hexolites
HMTD [hexamethylene triperoxide diamine]
HMX [cyclo 1,3,5,7-tetramethylene 2,4,6,8-tetranitramine; Octogen]
Hydrazinium nitrate/hydrazine/aluminum explosive system
Hydrazoic acid

I

Igniter cord
Igniters
Initiating tube systems

K

KDNB [potassium dinitrobenzofuroxane]

N (continued)

Nitroparaffins Explosive Grade and ammonium nitrate mixtures

Nitro starch

Nitro substituted carboxylic acids

Nitro urea

O

Octogen [HMX]

Octol [75 percent HMX, 25 percent TNT]

Organic amines nitrates

Organic nitramines

P

PBX [plastic bonded explosives]

Pellet powder

Penthrinite composition

Pentolite

T (continued)

Trinitro meta cresol
Trinitronaphthalene
Trinitrophenetole
Trinitrophenol
Trinitroresorcinol
Tritonal

U

Ureanitate

W

Water bearing explosives having salts of oxidizing acids and nitrogen bases, sulfates or sulfamates (cap sensitive)
Water in oil emulsion explosive compositions

X

XanodTD -I