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TO: D. W. Pfeiffer
FROM: P. K. Amtower Sr. B. K. Amtower
SUBJECT: Materials Burned at Burning Grounds

Per your request a list of materials burned at the Burning Grounds has been assembled for your review. The different types of propellants have been identified showing their basic ingredients. The primary plant location usage is given. In addition the inert process materials are given which become contaminated in normal contact with explosives. The process solvents utilized as carriers or for cleaning during propellant manufacture are listed. Finally, the total quantity of explosive scrap burned in 1987, broken-out as inert contaminated material, propellant or liquid (nitrate ester) explosives has been defined.

(0887c)PKA:clh

Attachments

cc: L. D. West
D. A. McBride
A. T. Kucera
P. M. Horton
J. M. Brady

Double Base Propellant (DB)

Nitrocellulose (NC)
Nitroglycerin (NG)
Triacten (TA)
2-Nitrodiphenylamine (NDPA)
Lead Oxides or Salts/Carbon Black

Composite Modified Double-Base Propellant (CMDB)

Nitrocellulose (NC)
Nitroglycerin (NG)
Triacten (TA)
2-Nitrodiphenylamine (NDPA)
Lead Oxides or Salts/Carbon Black
RDX
HMX
Ammonium Perchlorate (AP)
Aluminum (Al)
Resorcinol

Crosslinked Double-Base (XLDB) Propellant

Polyglycol adipate (PGA)
Nitrocellulose (NC)
Nitroglycerin (NG)
Britanetrol Trinitrate (BTTN)
2-Methyl P-Nitroaniline (MNA)
2-Nitrodiphenylamine (NDPA)
Lead Oxides or Salts/Carbon Black
HMX or RDX
AP/AL
Isocyanates
Zirconium Carbide (Zrc)
Triphenyl Bismuth (TPB)
Dibutyltindiacetate (DBTDA)

Nitrate Ester Plasticized Polyether (NEPE) Propellant

Polyethylene Glycol (PEG)
all other ingredients same as XLDB

Composite Propellant (HTPB)

Diethyl Adipate (DOA)
Diethyl Sebacate (DOS)
Isodecyl Pelargonate (IDP)
HX 752
Tepanol
AO2246
Polygard
Ammonium Perchlorate (AP)
HMX, RDX
Aluminum
Fe₂O₃
Catocene
Isocyanates
Zirconium Carbides (Zrc)
Triphenyl Bismuth (TPB)
Di Butyltindiacetate (DBTDA)
R45M

Composite Propellant (CTPB)

- Butarey II
- PBNA
- Eastozone 33
- TDPA
- Cr Octoate
- Oxide
- MoO₃
- Ammonium Perchlorate (AP)
- Aluminum
- Fe₂O₃

The production composite formulations are made primarily in Plant 2 (Hercopel); however, all scale-up and proofing mixes 1-gallon or 5-gallon are made in Research. The SFW program has its composite formulations made in the 50-gallon mixers on Plant 1.

<u>Composite Mixes</u>	<u>Scrap</u>
600 gallon mixes	400 lbs.
150 gallon mixes	150 lbs.
50 gallon mixes	100 lbs.
5 gallon mixes	10 lbs.
1 gallon mixes	2 lbs.

XLDB propellant formulations are made in Plant 1 by Research and Manufacturing.

<u>XLDB Mixes</u>	<u>Scrap</u>
150 gallon	200
50 gallon	100
5 gallon	10
1 gallon	2

Double-base propellant are made in Plant 1.

	<u>Scrap*</u>
MK-74 castings	60
MK-75 castings	30
EM-27 castings	30
TP-1 castings	30

* - Scrap NG-TA-2NDPA is cut with 50% TA prior to scrapping and is placed in sawdust. A typical nominal formulation would be 74% NG 25% TA 1% 2NDPA.

All the above ingredients are processed in Grain Manufacturing Areas while according to Hercules Aerospace Standards once within these areas are considered contaminated and reactive. Therefore, it must be scrapped via burning at the Burning Grounds. The following materials are utilized to aid the processing of propellants at ABL and end-up being burned at the Burning Grounds.

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Sawdust	32,000 lbs./year
Rags	white cotton
Tongue depressors	wood
Hospital gloves	PVC
Cotton gloves	
Masking tape 3M	
Anti-static plastic bags 32" x 32"	6,000/year
Anti-static plastic bags 22" x 24"	2,000/year
Kerosene	600 gallon/year
Acetone	
Methylene chloride	
Filters - explosive air systems	
Cardboard	
Plastic liners	
Contaminated hi-fax mold parts	
Cotton string	
Polyethylene tape	
Cotton swabs	
Kay dry tissues	
Freezette container (plastic)	
Paper cups	
Nylon cord	
Alodine (rags contaminated)	
Casting hose	
Flash BTN drums	
Flash AP drums	
Powder level packs	
RDX/HMX level packs	
Wood from contaminated buildings	
Wood crates - contaminated	
RTV strip strap	
Polyethylene cone formers	
Polyethylene casting funnels	
Kraft paper	

In addition the following explosive scrap materials are also burned as required:

- Ground and unground scrap RDX/HMX
- Ground and unground scrap AP/A Nitrate
- Scrap lacquers (NC, NG, BTN, MNA, 2NDPA)
- Scrap propellant grain, all types (XLDB, composite, etc.)
- Tag nitrate
- Pyrotechnic powders
- Detonating fuze
- Squibs and initiators

The following process solvents are utilized and normally may be found on the scrap rags.

- Trichlorethylene
- Methylene Chloride
- Methylethyl Ketone
- Triacetin
- Ethyl Acetate
- Hexane
- Heptane
- Dioctyl Adipate (DOA)
- Water
- Alcohol
- Acetone

The total quantities of explosive scrap for 1987 was as follows:

	<u>Propellant</u>	<u>Liquid</u>	<u>Inert Contaminated</u>
Jan.	31,233	1,830	8,900
Feb.	35,185	3,890	9,700
Mar.	34,587	2,265	9,100
April	30,150	4,875	9,900
May	27,935	1,980	10,200
June	26,225	2,280	10,000
July	19,720	1,565	10,300
Aug.	27,653	2,030	11,800
Sept.	23,256	1,600	10,900
Oct.	32,330	1,995	11,200
Nov.	27,380	1,635	9,000
Dec.	<u>27,863</u>	<u>1,625</u>	<u>8,700</u>
TOTAL	<u>343,729</u> lbs.	<u>27,570</u> lbs.	<u>119,700</u> lbs.

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