

Assembled Chemical Weapons
Assessment Project
Task 5: Engineering Design Study



WHEAT Process Design Presentation
Parsons-Honeywell-IITRI-General Atomics
February, 2001



Summary Of WHEAT Design Presentation

- WHEAT Team Description
- WHEAT Design Pkg – Objective, Description and Background
- WHEAT Design Milestones and PUCDF Project Schedule
- Munitions Description and Munitions Processing
- WHEAT Process Description
 - WHEAT Video (16 minutes)
 - Simplified Block Flow Diagram
 - Summary Level Process Flow Diagram
 - Simple Process Flow Diagram
- WHEAT Site/Facility Description
- WHEAT Testing to Support WHEAT Design

Back-up slides for
WHEAT Design Presentation

- Design Highlights & Graphics for Key WHEAT Process Equipment
- Throughput Analysis
- Detailed Process Schematics



Description of WHEAT Team

**WHEAT Design Package
Objective, Description and
Background**



Overall EDS Objective

- The Engineering Design Studies will provide information for the following requirements:
 - Support the certification decision of the Undersecretary of Defense for Acquisition, Technology, and Logistics (AT&L) as directed in PL 105-261 with respect to Full-Scale Facility:
 - Total Life Cycle Cost
 - Safety
 - Schedule
 - Support NEPA documentation and RCRA Part B permit application
 - Support contract RFP for a pilot plant facility

Engineering Package Description

- Design Package Includes:
 - Design Documents that define the basic process design including equipment requirements, system integration and the quantity and quality of all raw materials, utilities, products and waste streams.
 - Life Cycle Costs/ Schedule including:
 - Capital cost estimate (+20%/ -20%);
 - Operating and maintenance (O&M) cost estimate;
 - Project schedule through commissioning that defines the critical path and delineates all major milestones and deliverables.
 - Preliminary Hazards Analysis (PHA); and

EDS Design Package Incorporate EDS Test Data From Following Tests:

- Incorporated Data from Completed Tests
 - Continuous Steam Treater (CST)
 - Metal Parts Treater (MPT) – Heat Transfer Tests
 - Immobilized Cell Bioreactor™ (ICBTM)
 - Catalytic Oxidizer (CatOx)
- Confirmatory Data from Planned Tests
 - Modified Continuous Steam Treater
 - Projectile Washer System (With Agent Reactor and Metal Parts Treater)

Attachment A:WHEAT Design Package Document List Was Prepared per the following Government Guidance

Lead Discipline	Drawing/Document	Status	Comments
Process & Mechanical	Process Design Basis	F	Defines performance reqts, raw material and utilities characteristics
	Process Flow Diagrams	C	Complete for all systems within the scope of supply (Rev 0)
	Material & Energy Balances	C	By campaign - sustained maximum and annual average conditions
	Water Balance Diagram	C	With flows for sustained maximum and average conditions
	Process Specifications	C	Preliminary description including overall operating and control philosophy
	Emissions and Effluents Lists	C	Characteristics & quantities of air emissions, water discharges & solid wastes
	Equipment Lists	C	Major equipment with dimensions, capacities, materials, & preliminary loads
	P & ID's	C	Shows line sizes and materials, primary instruments, control interconnects
	Major Equipment Specifications	P	Data sheets/equipment specifications to support PHA and costs
	General Arrangements	P	Basic plans and sections showing location of major equipment
	Tanks/Vessels Data Sheets	P	Dimensions, capacities, materials, internals, pressure and special reqts
	Line Lists/Piping Schedules	P	Not required if pipe sizes and materials are given on P&IDs for major lines
	Process Hazards Analysis	P	Preliminary for the core process plus adjustments as required to that prepared for the Baseline
	Fire Hazards Analysis	P	
	Site Development/Drainage Plans	P	
Civil	Site Plans	P	
	Structural	P	Only as required to support cost estimates (or PHAs), especially if new buildings are proposed or there are significant modifications to existing Baseline buildings
Architectural	Foundation Designs/Studies	P	
	Structural Steel Designs	P	
Electrical	Building HVAC Designs	P	
	Motor Lists	C	Complete
Instrumentation & Controls	Major Equipment Lists	C	Complete
	Electrical Area Classifications	P	Complete
	Loop Definitions/Functional Descriptions	C	In sufficient detail to support preliminary PHAs and operability analyses
	Instrument Lists	P	Functional instruments by type and number
	Control System Mini-Specifications	P	Basic requirements for central control panels & DDCS System to support costs

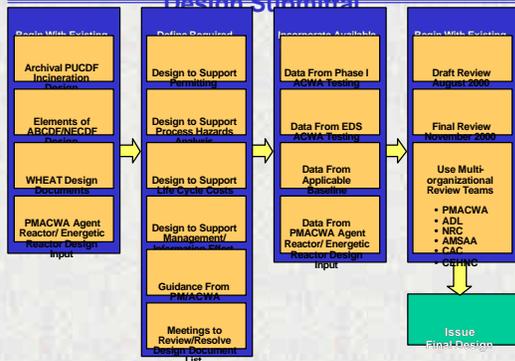
KEY: P - Preliminary (Sufficient to support PHA and cost estimate)
 C - Complete (Full set of drawings for major eq systems, but not yet fully detailed)
 F - Final

Description of the Design Approach/ Design Submittal

Navigating Design Document CD-ROM (View CD-ROM)

- Letter Of Transmittal
- Design Basis
- Technical Documentation – Documents
- Technical Documentation – Drawings
 - Architectural
 - Civil
 - Electrical
 - Instrumentation
 - Material Handling
 - Mechanical Process
 - Mechanical Utilities
 - Process
 - Structural

Description of the Design Approach/ Design Submittal



ACWA Design Milestones and Proposed PUCDF Project Schedule

Design Activity Completion Dates

WHEAT PUCDF Design/Life Cycle Cost Estimate/PHA Approach

- Began Design Effort 2/10/00
- Preliminary PHA approach 7/10/00
- Balance of Package – Preliminary 6/30/00
- Complete Design Review Meeting 8/3/00
- Provide Written Responses to Comments 8/17/00
- Begin Internal Review of Final Design 9/29/00
- Submit Final Design for Client Review 10/27/00
- Present Design to NRC 11/8/00
- Receive Design Comments 11/20/00
- Design Meeting to Resolve Comments 11/28/00
- Incorporate Comments and Issue Final Design 1/5/01

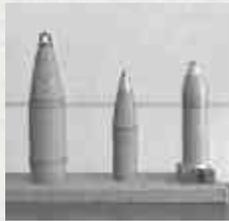
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Munitions Description and Munitions Processing

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Munitions at Pueblo Depot



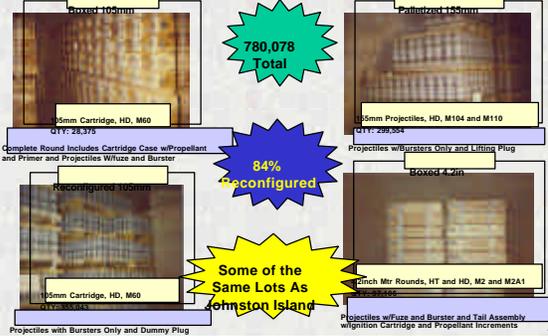
M110 Projectile 155mm HD Fill 299,554 each
 M60 Projectile 105mm HD Fill 383,418 each
 M2A1 Mortar 4.2 in HD Fill 97,106 each

M110 projectile	M60 Projectile	M2A1 Mortar
155mm	105 mm	4.2 inch
HD Fill (11.7 lbs)	HD Fill (3 lbs)	HD Fill (6 lbs)
Weight (94.6 lbs)	Weight (28.8 lbs)	Weight (25 lbs)
299,554 each	383,418 each	97,106 each
No reconfiguration required	23,375 to be reconfigured	97,106 to be reconfigured

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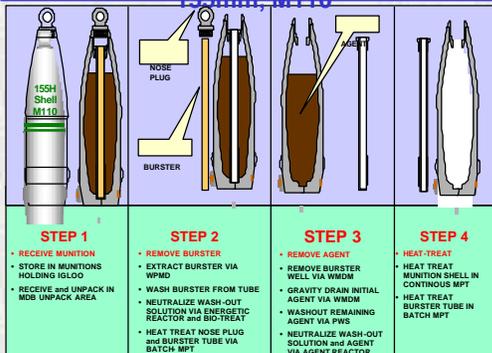
Status of Rounds in Storage

(All Munitions Are Blister Agent Filled Artillery Projectiles – No Rockets, Mines, or Ton Containers)



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WHEAT Processing of Projectile, 155mm, M110

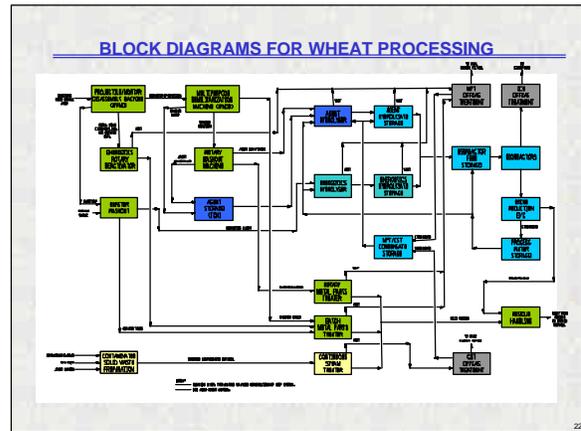
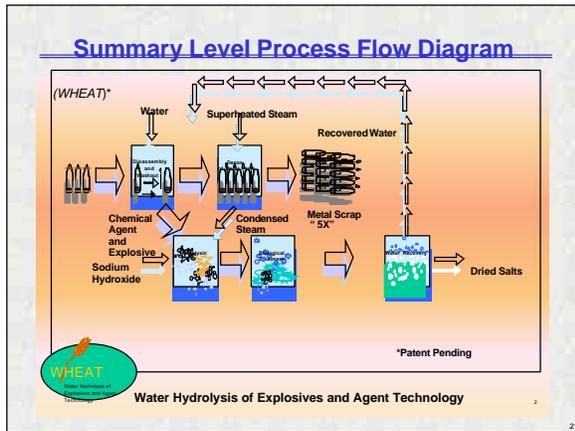
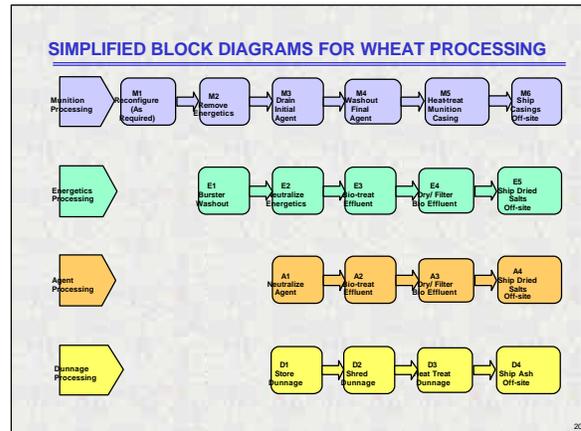
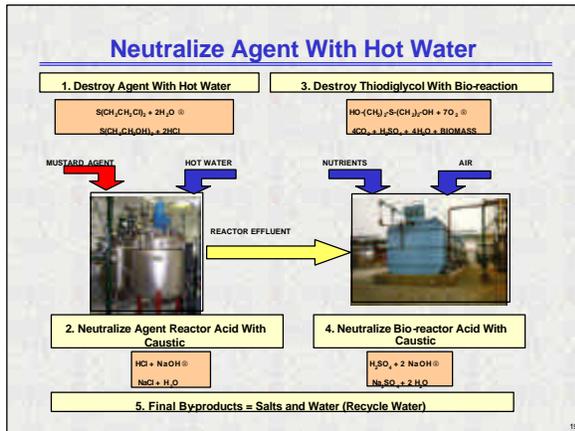


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ACWA WHEAT Process Description

- Basic Process – Neutralize Agent With Hot Water
- WHEAT Video (16 minutes)
- Simplified Block Flow Diagram
- Summary Level Process Flow Diagram
- Overall Wheat Process For Munitions Processing
- Overall WHEAT Process For Dunnage Processing



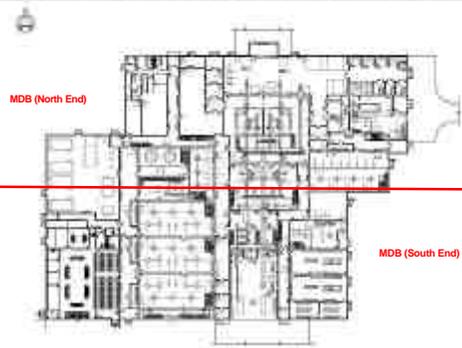
- ### Major Process Buildings and Areas
- Site Plan
 - Munitions Demilitarization Building (MDB)
 - Process Auxiliary Building (PAB)
 - Bio-Reactors Treatment Area (BTA)
 - Entry Control Facility (ECF)
 - Lab Building (Lab)
 - Personnel and Maintenance Building (PMB)
 - Utility Building (UB)
 - MDB Filter
 - Lab Filter

Site Plan (With Building Identifiers)



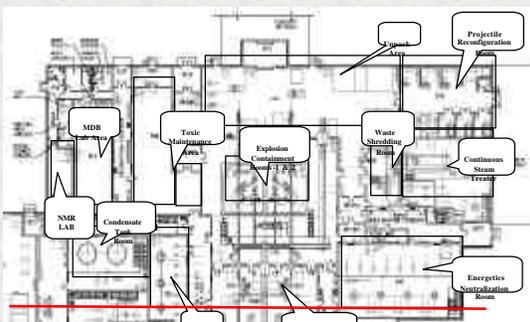
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Munitions Demilitarization Building



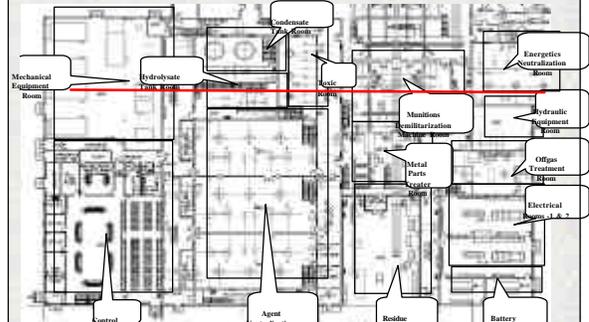
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MDB NORTH END



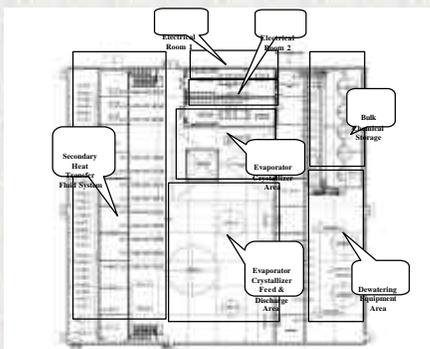
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MDB SOUTH END



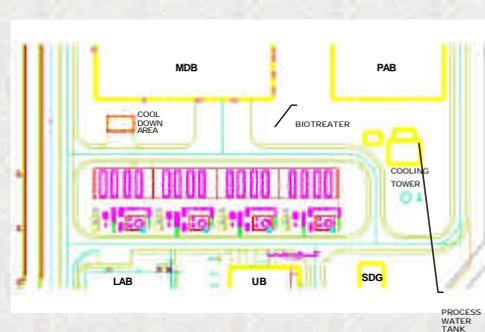
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PROCESS AUXILIARY BUILDING



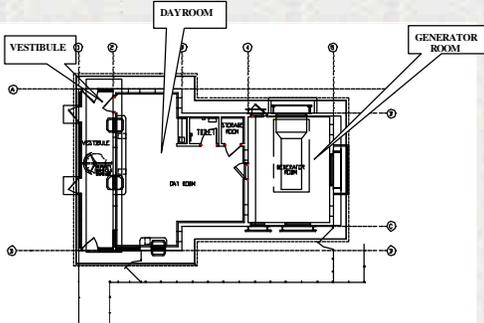
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BIOTREATMENT AREA



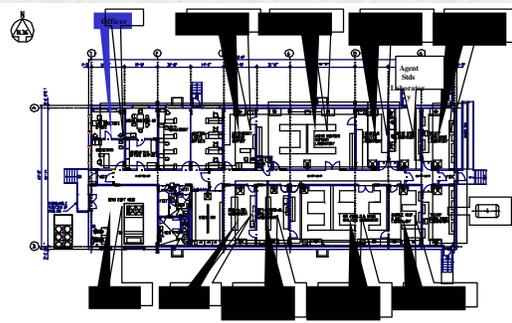
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ENTRY CONTROL FACILITY (ECF)



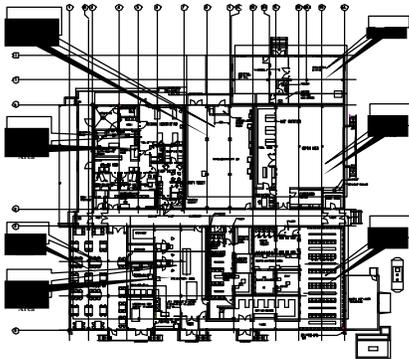
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LAB BUILDING



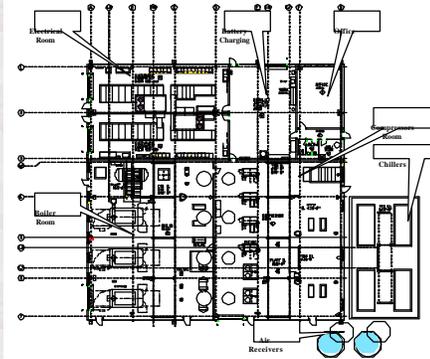
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PERSONNEL & MAINTENANCE BUILDING (PMB)



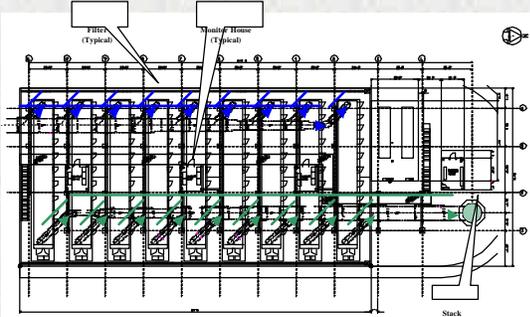
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UTILITY BUILDING



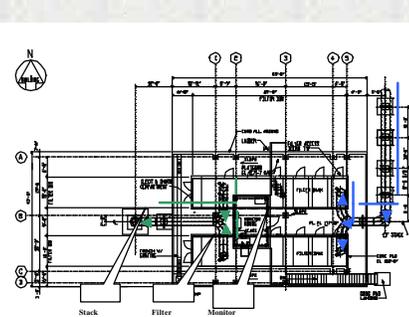
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MDB-FILTER



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LAB-FILTER



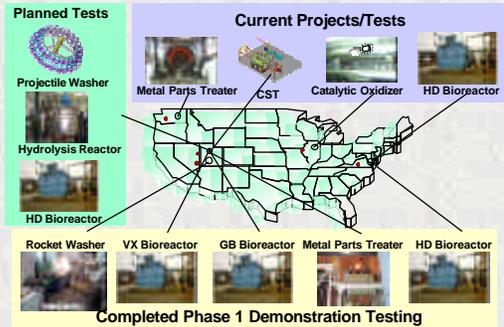
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Summary of WHEAT Testing to Support WHEAT Design

- Locations of Technology Evaluations to Date
- Summary Findings – EDS Testing
- Summary Findings – Phase 1 Testing

Locations of Technology Evaluations to Date



Summary Findings – EDS Testing

Current Projects/Tests



Metal Parts Treater



CST



Catalytic Oxidizer



HD Bioreactor

SUCCESSFUL
Demonstrated simulant M105 projectiles and Ton Container

IN-PROGRESS
Completed Test for Wood and Charcoal and DPE
Complete 270 hrs of 500 hr test for wood/ DPE/ charcoal mixture

SUCCESSFUL
Completed more than 600 hours of test with HD at 10 mg/m³

SUCCESSFUL
Operated 1000 gallon Unit for 4 months with Water Recycle

Summary Findings – Phase 1 Testing

SUCCESSFUL – Need to Demonstrate Propellant Shredding	PARTIALLY SUCCESSFUL – Need to Demonstrate IMPA/EMPA Destruction Current Bench Scale Test for Photocatalytic Bio_Reactor is in-Progress Initial Test Results are Successful	SUCCESSFUL – Processed Mortars with GB, VX, and HD Processed Dunn-age Wood, DPE, Carbon	SUCCESSFUL Operated Unit for 6 weeks
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Rocket Washer



VX Bioreactor



GB Bioreactor



Metal Parts Treater



HD Bioreactor

COMPLETED PHASE 1 DEMONSTRATION TESTING



Backup Slides
(Refer to Slides as required to address questions)



Design Highlights & Graphics for Key WHEAT Process Equipment

Design Highlights & Graphics are Attached for the Following Equipment. Additional Narrative, Block Flow Diagrams and P&IDs for Following Equipment are also available on Back-up Slides

- Munitions/Agent and Energetics Access
 - Projectile Disassembly/
 - Burster Washout/ERD
 - Agent Access/ Draining – MDM
 - Agent Wash-out - Projectile Washout System -PWS
- Hydrolysis/ Hydrolysate Treatment
 - Agent Collection/Toxic Storage/Spent Decon Agent Neutralization
 - Energetics Neutralization
 - Bio-Reactor
 - Evaporator/ Crystallizer
- Thermal Treatment
 - Continuous Metal Parts Treatment (Munition Body)
 - Batch Metal Parts Treatment (Miscellaneous Parts)
 - Continuous Steam Treatment (Dunnage)
 - Offgas Treatment
- Other Design Considerations
 - Overall Plant Throughput Considerations

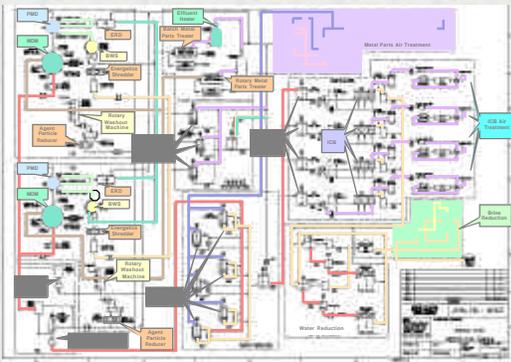
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Detailed Process Schematics

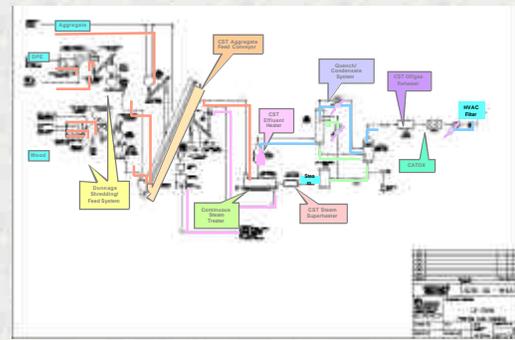
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Overall WHEAT Process for Munitions Processing



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Overall WHEAT Process for Dunnage Processing



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