

A Modernized IM Melt Pour Explosive Manufacturing Facility at Holston Army Ammunition Plant

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Acknowledgements



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- Modernization Funding
- Project Management



US ARMY PEO-AMMO
Project Manager Combat Ammunition Systems (PM-CAS)

- Stakeholder



US ARMY RDECOM-ARDEC
Munitions Engineering & Technology Center (METC)
Engineering & Technical Lead and Producibility Support
Project Integration Office (PIO)

- Program Support



BAE SYSTEMS

- Project Management
- Production / Design Teams / Facility Engineering

Briefing Outline

- Background
- Facts / Timeline
- Capabilities and Capacities
- Design
- Process Flow Diagram
- Summary



Background (1)

- Holston Army Ammunition Plant (HSAAP) had been manufacturing legacy melt-pour explosives (Comp B, Octol & others) since the 1940's.
- A new generation of melt-pour explosives has been developed and fielded recently to comply with DOD 5000.2-R, which requires munitions to withstand unplanned stimuli to improve the warfighter survivability.
- These insensitive melt-pour explosives, such as IMX-101, IMX-104 and PAX-48, have much tighter tolerances than their predecessors in order to maintain consistent IM quality.
- A Modernized IM Melt-Pour Explosive Manufacturing Facility was needed at HSAAP in order to manufacture IM explosives more effectively and efficiently.
- Additionally, this facility will provide HSAAP with the capability and capacity to meet future IM explosive production requirements.

Background (2)

Insensitive Melt-Pour Explosives manufactured at Holston Army Ammunition Plant

Product	Key Ingredients	Purpose	Qualification Status	Quantity (LB.)
IMX-101	DNAN + NTO + NQ	TNT replacement (for Artillery and other large caliber munitions)	Material qualified; Type qualified for 155mm M795, on-going for 155mm M1122 and 105mm projectiles	~ 2.2 M
IMX-104	DNAN + NTO + RDX	Comp B replacement (for mortar applications)	Material qualified; Type qualification on-going for 60mm & 81mm mortar, 120mm to follow	~ 782 k
PAX-48	DNAN + NTO + HMX	Comp B replacement (for mortar & tank ammunition)	Material qualified; Type qualification achieved for 120mm IM HE-T tracer round (NAMMO)	~ 180 k
PAX-21	DNAN + RDX + AP + MNA	Main fill for the 60mm M768 Mortar Rounds	Currently in-use in theater	~ 850 k
PAX-41	DNAN + RDX + MNA	Main fill for the Spider Grenade	Currently in-use in theater	~ 70 k

Facts / Timeline

- Modernization Project funded by US Army Project Director Joint Services (PD-JS)
- Refurbishment of legacy melt-pour facility (Bldg. M-4)
- Demolition/Construction began in March/May 2011
- Construction completed in Dec 2012
- Inert/Live Prove Out in March/September 2013
- First Article Manufacturing campaign in April 2014 (with IMX-101)
- IMX-101 manufacturing began in December 2014
- Over 300,000 lbs. of IMX-101 manufactured to date since it was commissioned
- IMX-104 manufacturing will follow suit (First Article Campaign planned in Q2, 2015)



Capabilities and Capacities

- Capable of manufacture up to 10,000 LBS of IM Melt-Pour Explosive per day
- Also capable of manufacture legacy Melt-Pour Explosive (e.g. Comp B)
- Reduce process cycle time significantly
 - New kettle configuration to separate melting from mixing
 - New kettle discharge valve allows better utilization of belt space during casting
 - Variable speed casting belt reduces general casting time
- Processing data logging capability will provide information for statistical data analysis in order to establish SPC
 - Improve process and product consistencies



Design (1)

- New melt and incorporation kettle configuration
 - Dedicated kettles for melting and mixing
 - Improve overall process efficiency
- Modified Kettle Discharge Valve
 - Pneumatic slide gate valve provides better flow control of molten product onto casting belt (improved consistency)
 - Steam jacketed to keep product molten during discharge
 - Utilize full width of the casting belt, shorten casting process
- State-of-the-Art Casting Belt System
 - Variable-speed belt controls cooling rate
 - Water and air cooling capability
 - Enclosed casting belt eliminates water exposure
 - Chiller system controls cooling water temperature



Design (2)

- New Flake Breaker
 - High rate flake breaking operation
 - Produce smaller flakes for quicker re-melt at LAP facility
- Improved Ventilation System
 - Reduce operators exposure
 - Consistent room temperature
- Plastic Sheeting
 - Cover walls and ceiling to prevent contamination
- LED Lighting
 - Energy savings and natural lighting environment
- New Loading Dock (Logistic Improvement)
 - Easier access to transport ingredients and products in and out of the building

Flake Breaker



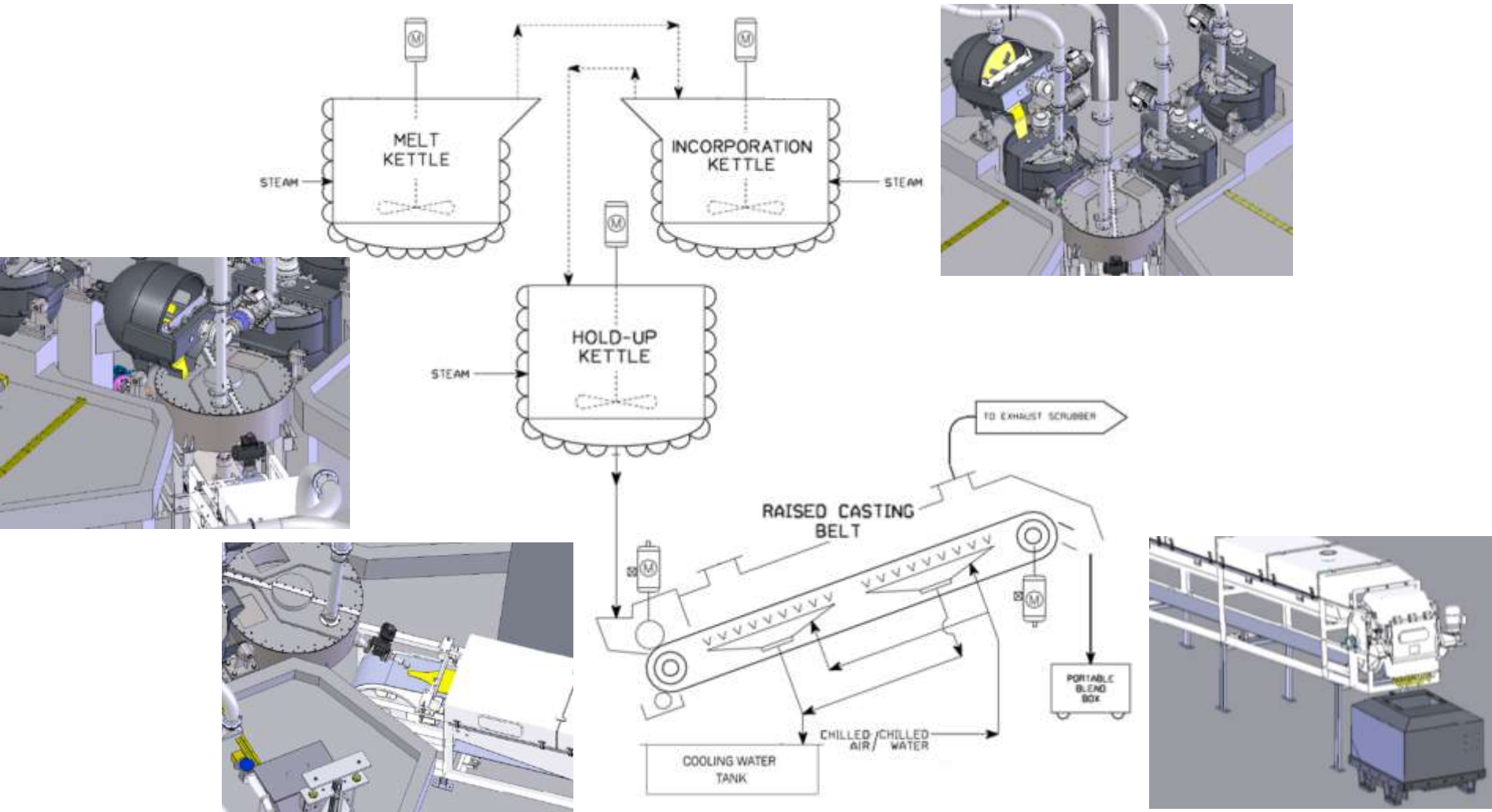
Air Handler & Chiller



Loading Dock

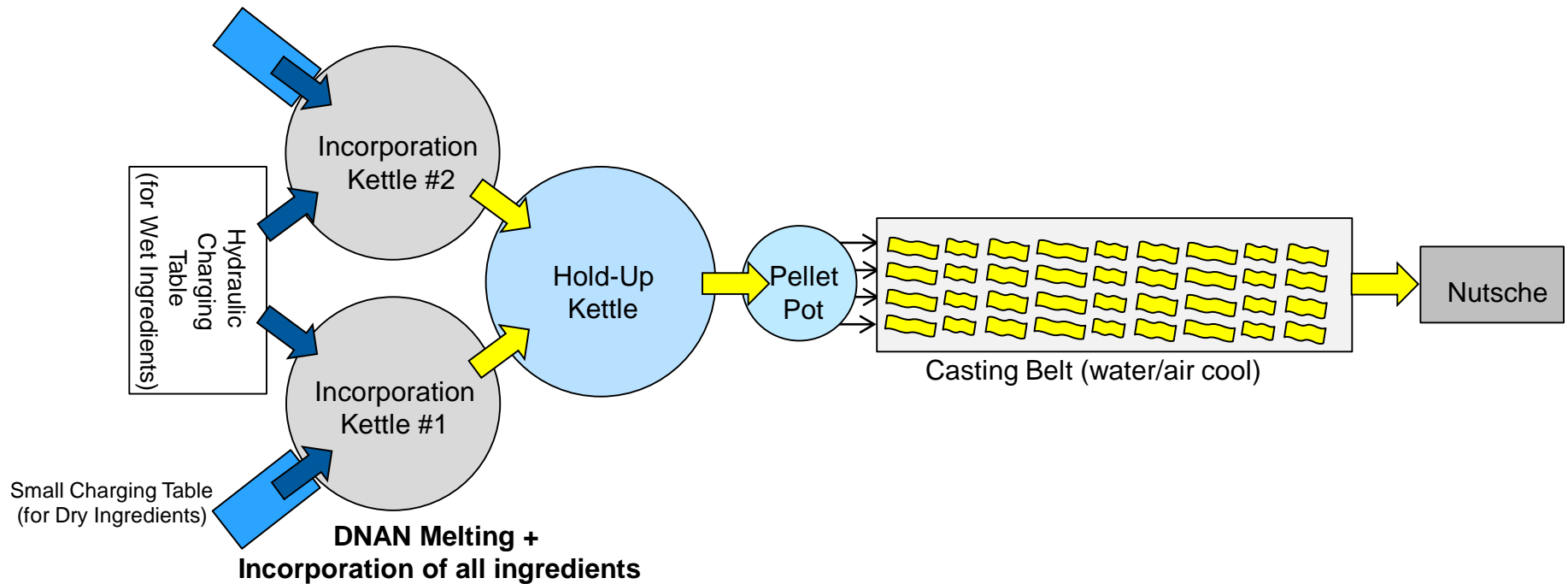


Process Flow Diagram (1)



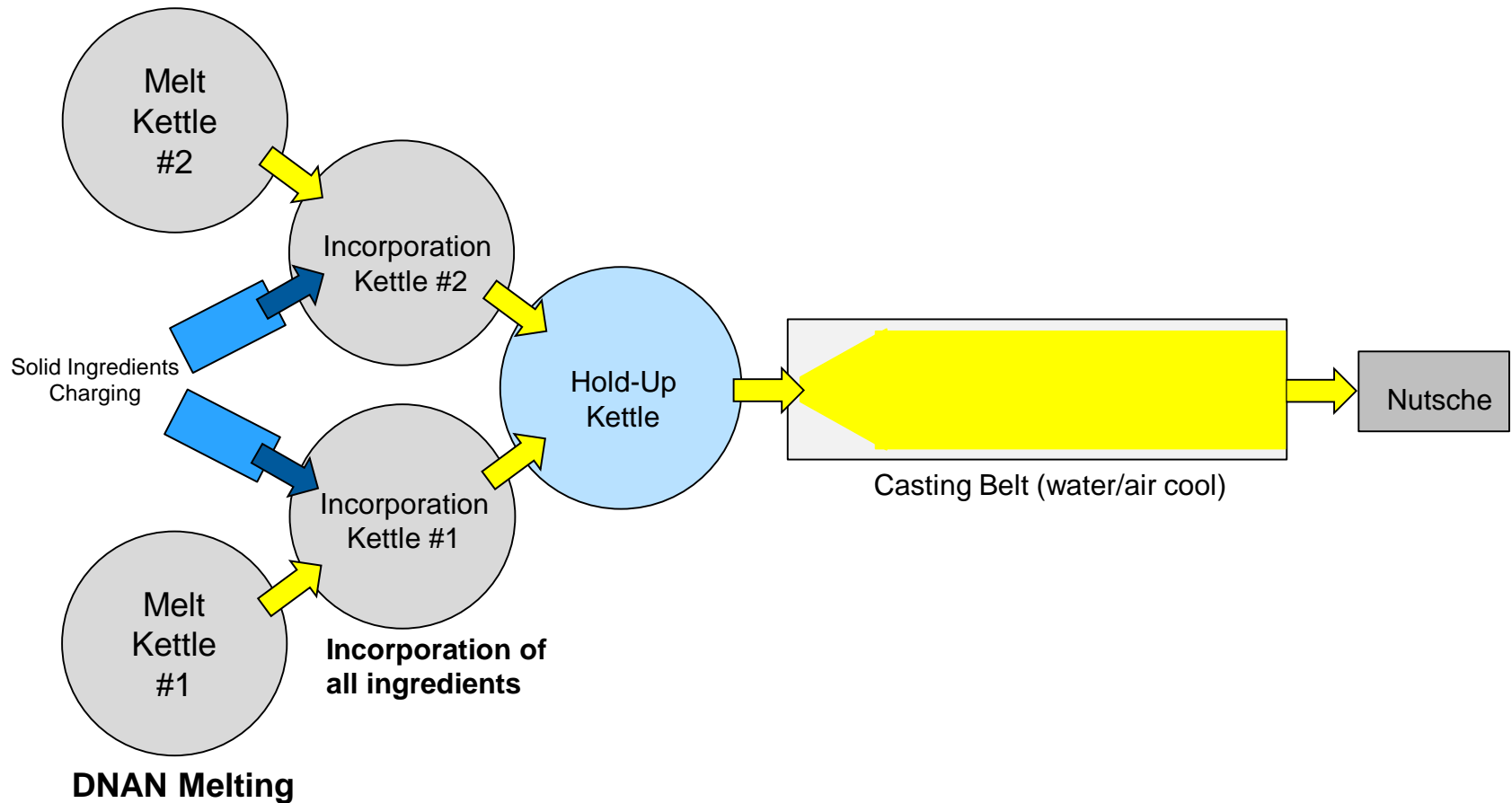
Process Flow Diagram (2)

- Equipment Layout (Legacy)



Process Flow Diagram (3)

- Equipment Layout (Modernized)



IMX-101 Manufacturing Process - Video



Summary

- A State-of-the-Art IM Melt-Pour Explosive Facility is now fully operational at HSAAP
- Computer controlled operation allows process parameters data collection
- Over 300,000 lbs. of IMX-101 had been manufactured successfully since the facility was commissioned
- The new facility combines with optimized processing parameters will provide additional throughput in IMX explosives (over 3 M lbs. a year)
- Reduced overall process cycle time achieved
- This new facility is vital to BAE Systems' ability to manufacture the next generation IM Melt-Pour Explosive, satisfying growing demands from the US DOD and Foreign Military Sales
- Successful collaboration and project execution between BAE Systems, ARDEC and PD-Joint Services



Questions??

