

High Performance Magazine Certification Test No. 3 Planning & Results

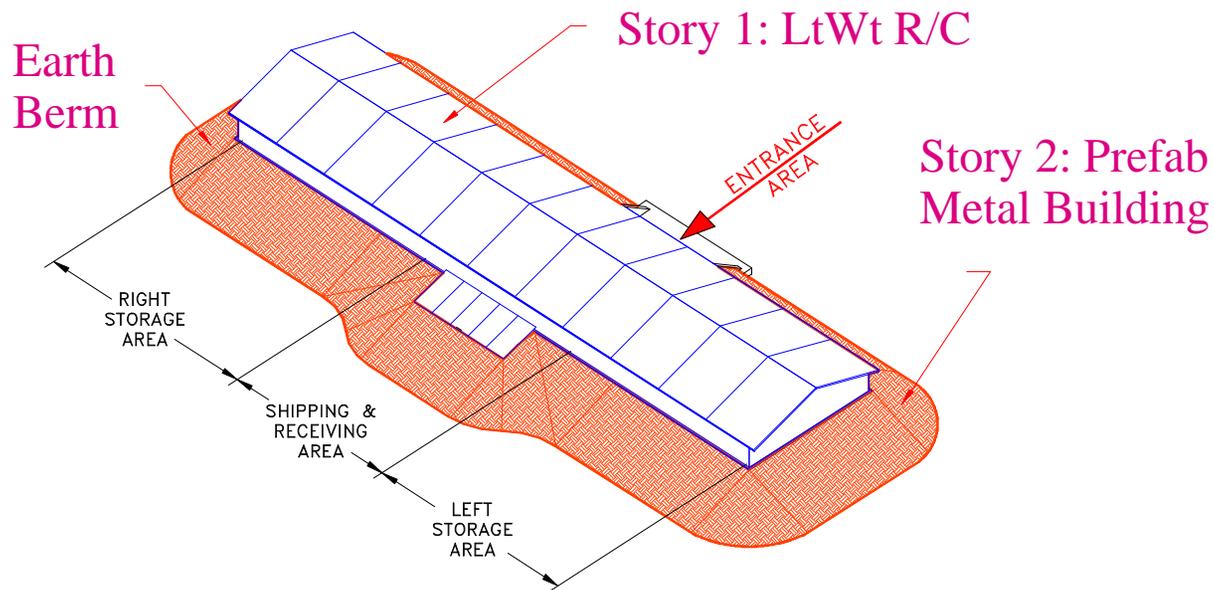


Presented to:
28th DDESB Seminar
Orlando, FL
18-20 August 1998



Robert Murtha
NFESC
Port Hueneme, CA

HPM Technical Objectives



- Limit Explosives Safety Distances
- Limit Maximum Credible Event (MCE)
- Modernize Handling System
- Develop Analytical Methods

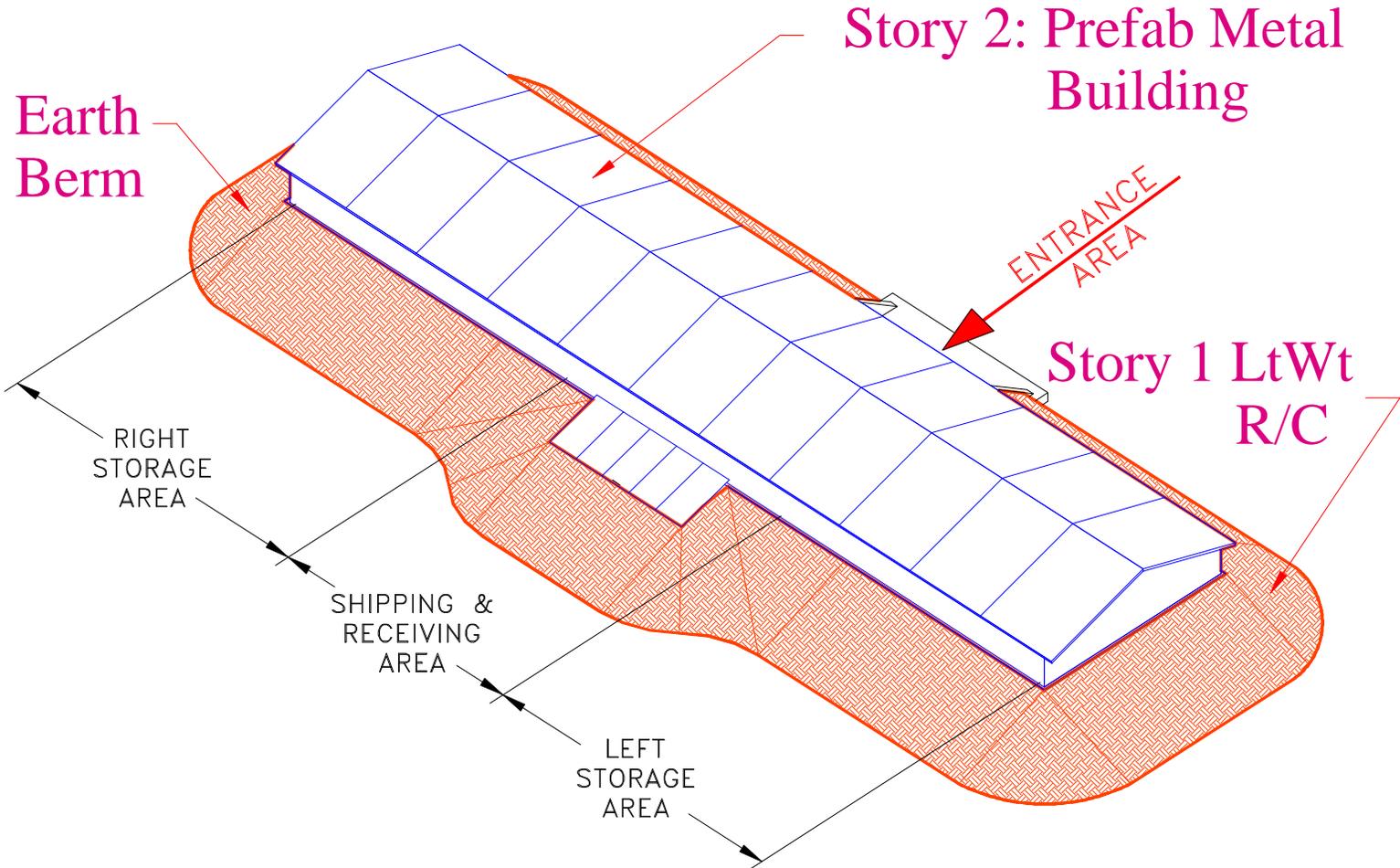
HPM Performance Goals

- 1250 ft ESQD
- 60,000 lb MCE
- 80% Reduction in Encumbered Land

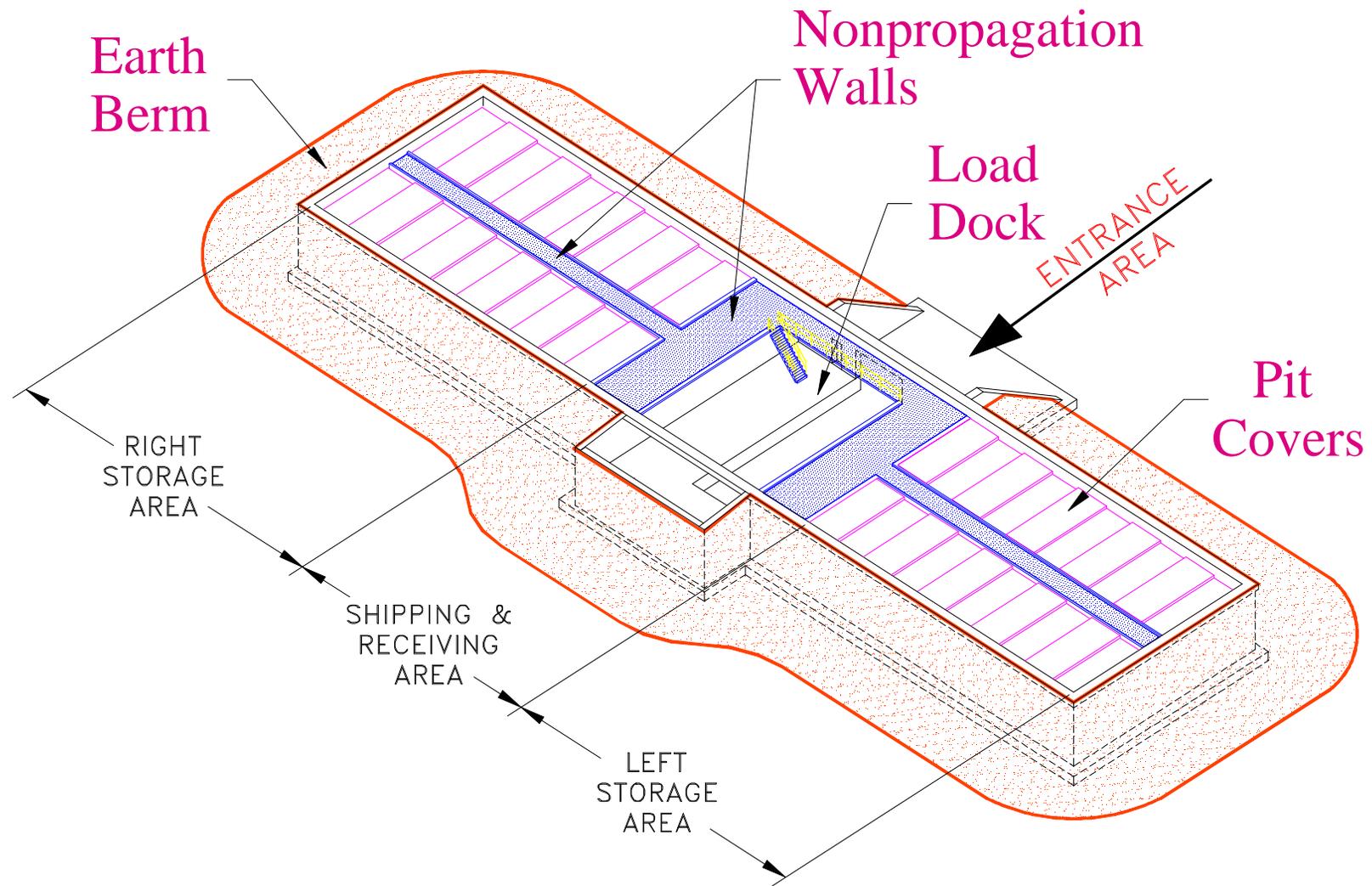
Magazine	NEW(lb)	MCE(lb)	IBD(ft)	Area(acres)
CONV	300,000	300,000	3350	809
HPM	300,000	60,000	1370	135

Magazine	NEW(lb)	MCE(lb)	IBD(ft)	Area(acres)
Missile	150,000	150,000	2175	341
HPM	150,000	45,000	1250	113

HPM Concept



HPM Story 1 - Storage Area



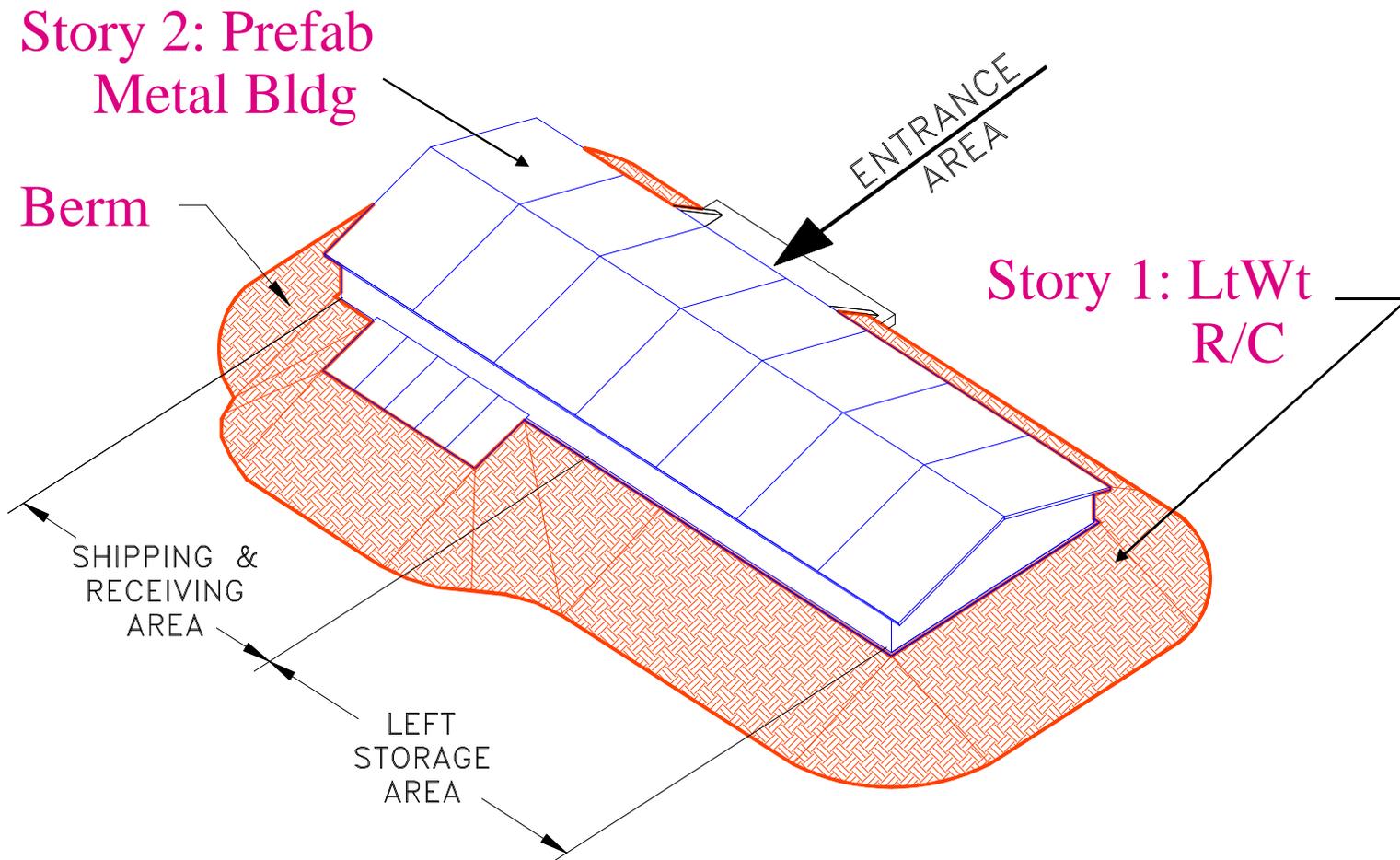
HPM CT3: Structure



NAVAL FACILITIES ENGINEERING SERVICE CENTER

HPM CT3: Isometric View

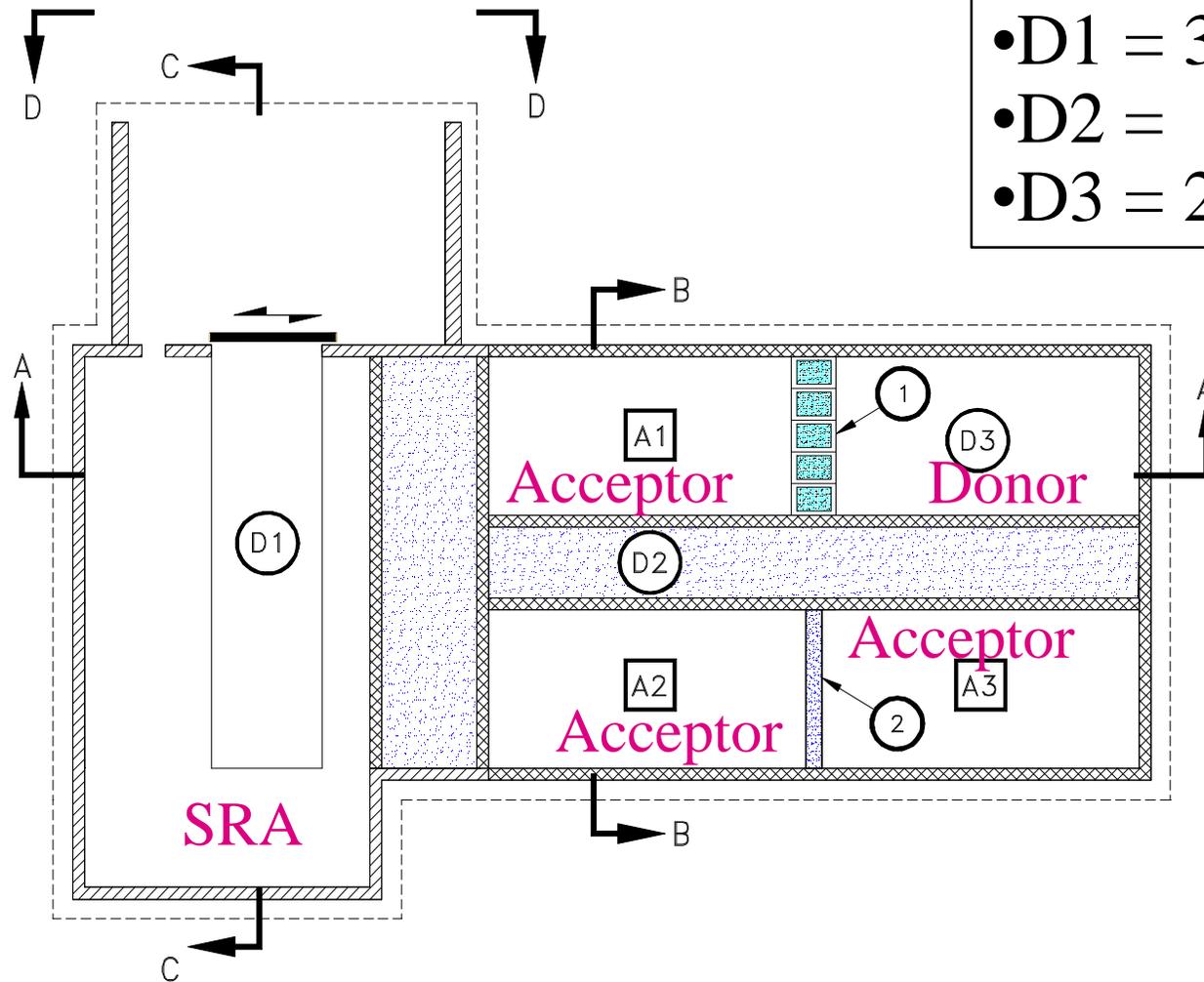
Objective: Certify Nonpropagation Walls for
60,000 lb Donor



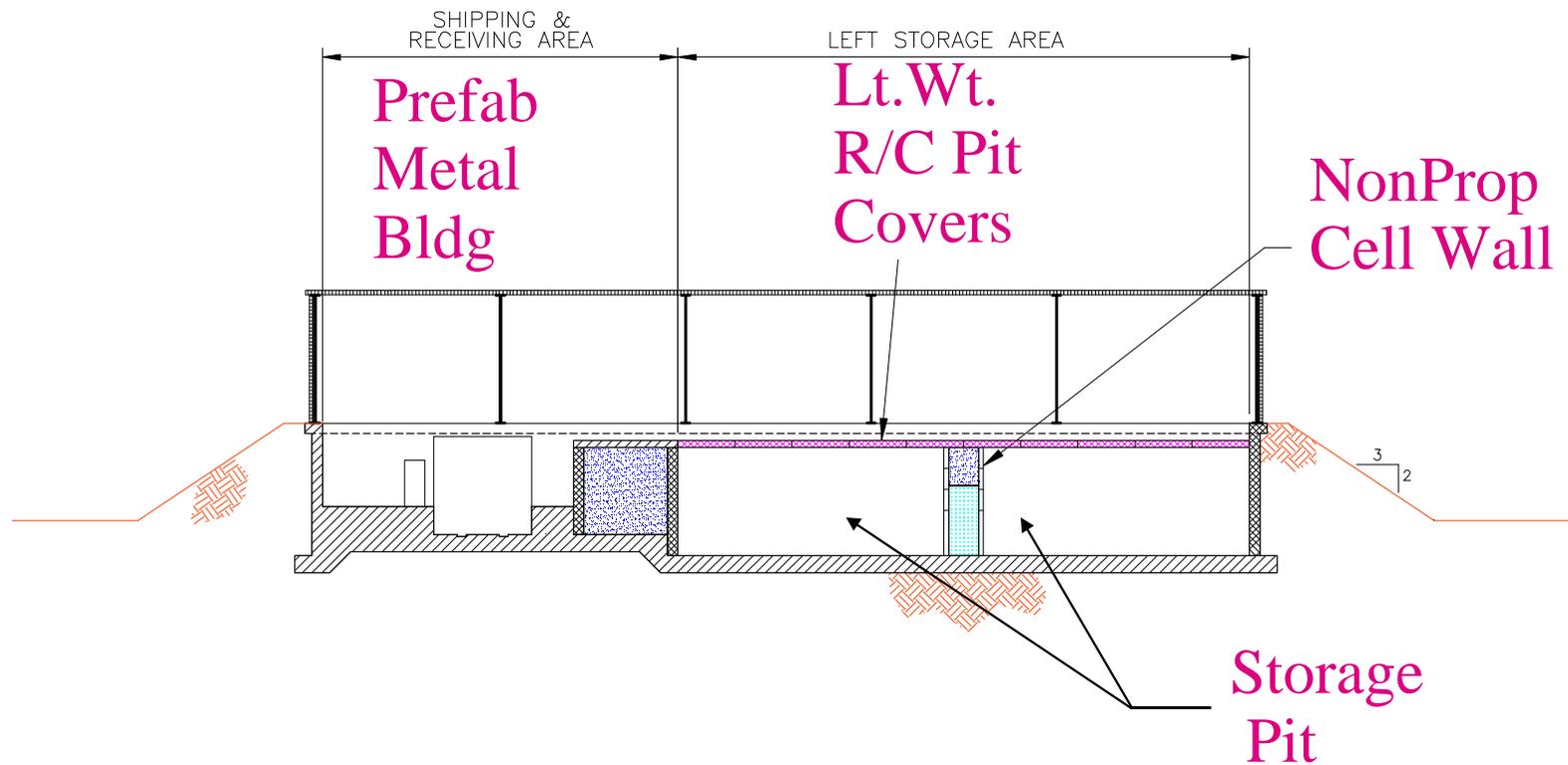
HPM CT3: Plan View

Hazard Scenario

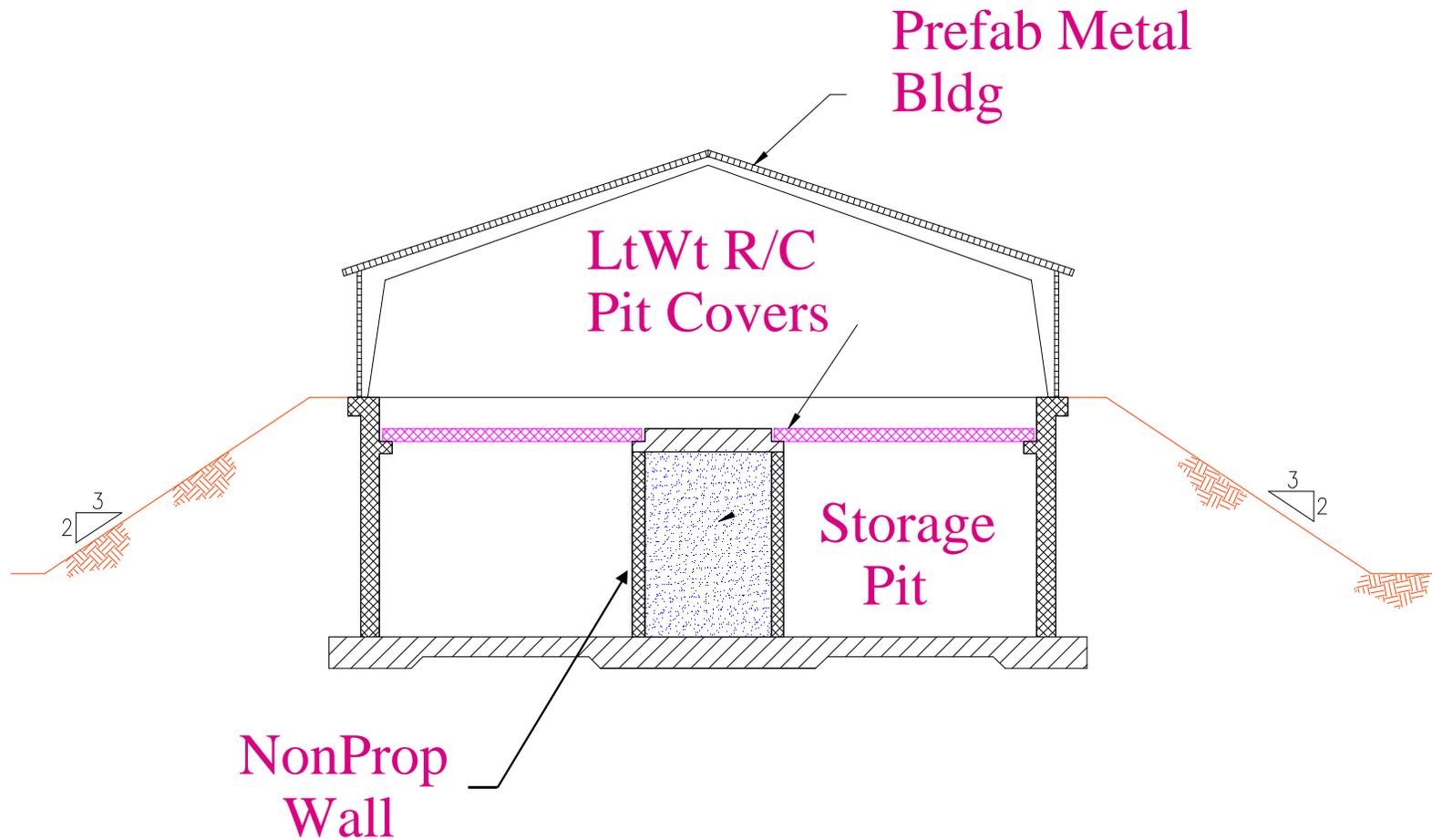
- D1 = 30,000 lb
- D2 = 4,000 lb
- D3 = 26,000 lb



HPM CT3: Section A-A



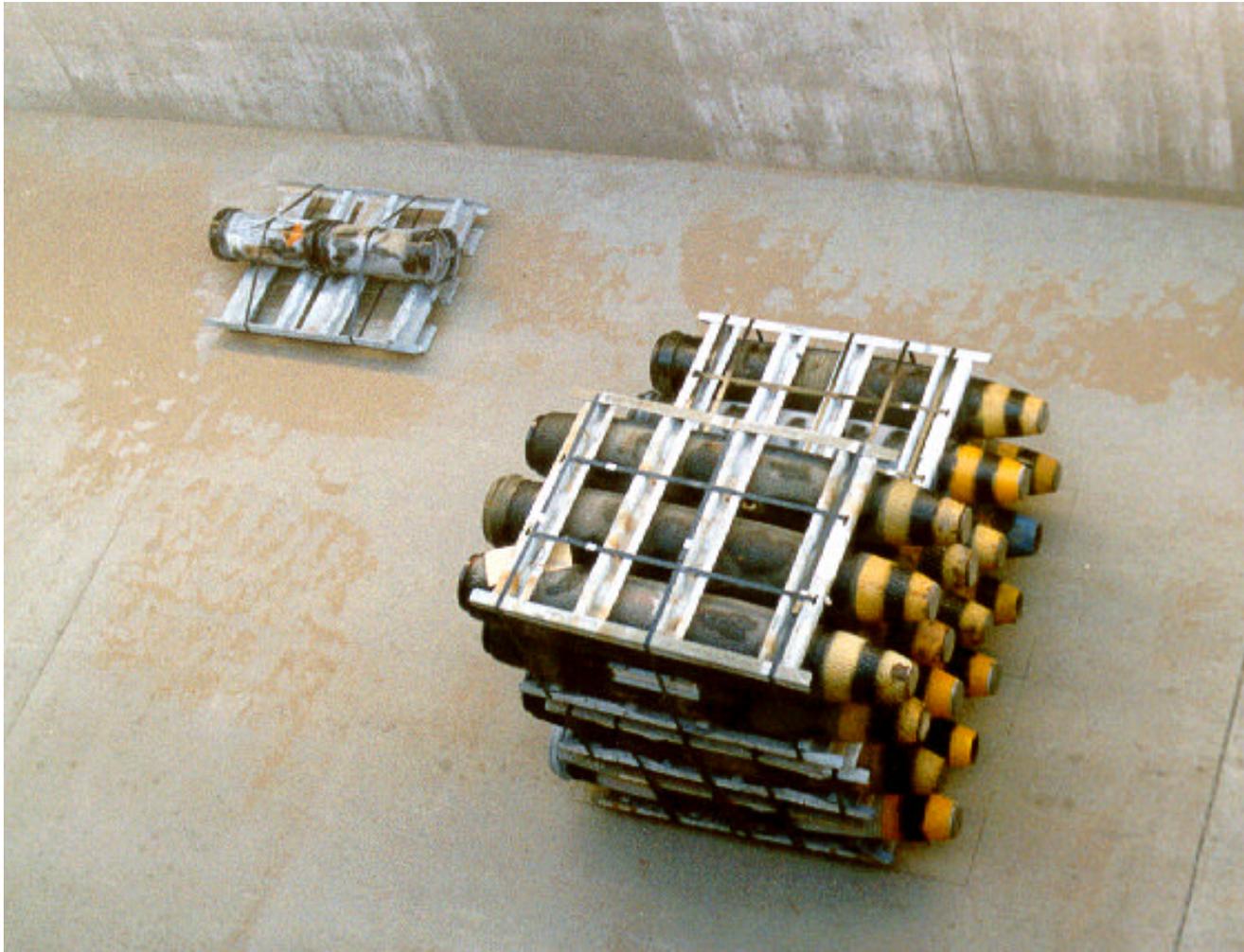
HPM CT3: Section B-B



HPM CT3: Acceptors

Cell	Item	Explosive Type	HPM SG
A1	Mk55 mine	HBX-1	8
	Mk103 torpedo WH	H6	8
	Mk107 torpedo WH	PBXN-103	8
	Mk82 bomb	H6	4
	M107 155mm proj	Comp B	4
A2	WAU-17 sparrow WH	PBXN-103	8
	Mk82 bomb	H6	4
A3	Mk55 mine	HBX-1	8
	Mk103 torpedo WH	H6	8
	Mk107 torpedo WH	PBXN-103	8
	WAU-17 sparrow WH	PBXN-103	8
	Mk82 bomb	H6	4
	Mk83 bomb	H6	4

HPM CT3: Cell A2 Acceptors



NAVAL FACILITIES ENGINEERING SERVICE CENTER

HPM CT3: Cell A3 Acceptors

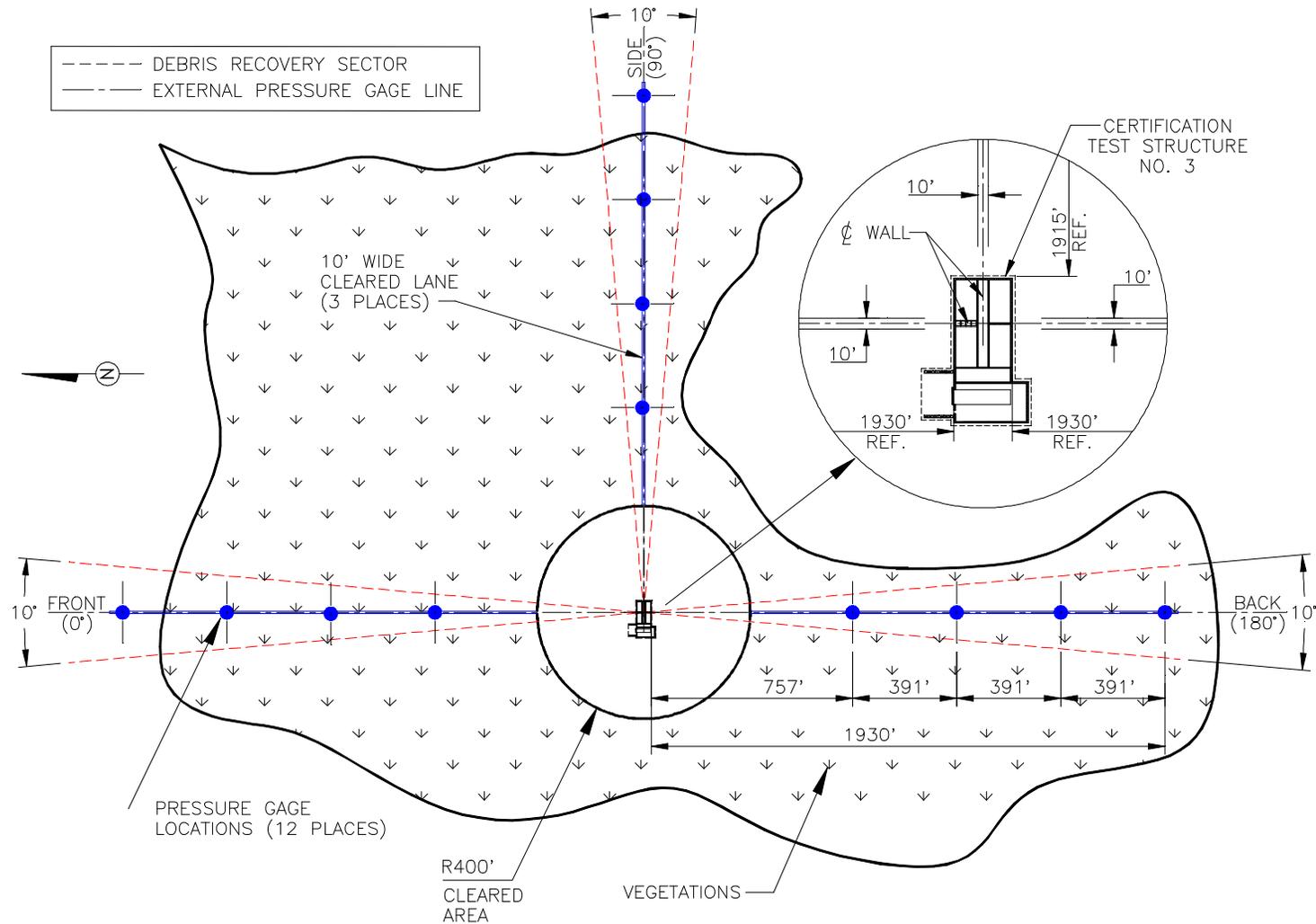


NAVAL FACILITIES ENGINEERING SERVICE CENTER

HPM CT3: Certification Test **Requirements**

- Relative deformation of thick-case acceptors shall not exceed 25%
- Explosive fill of thick-case acceptors shall not promptly react (ie., during initial MCE)
- Explosive fill of thin-case acceptors may burn but shall not detonate

HPM CT3: Test Site Layout



HPM CT3: Detonation Sequence

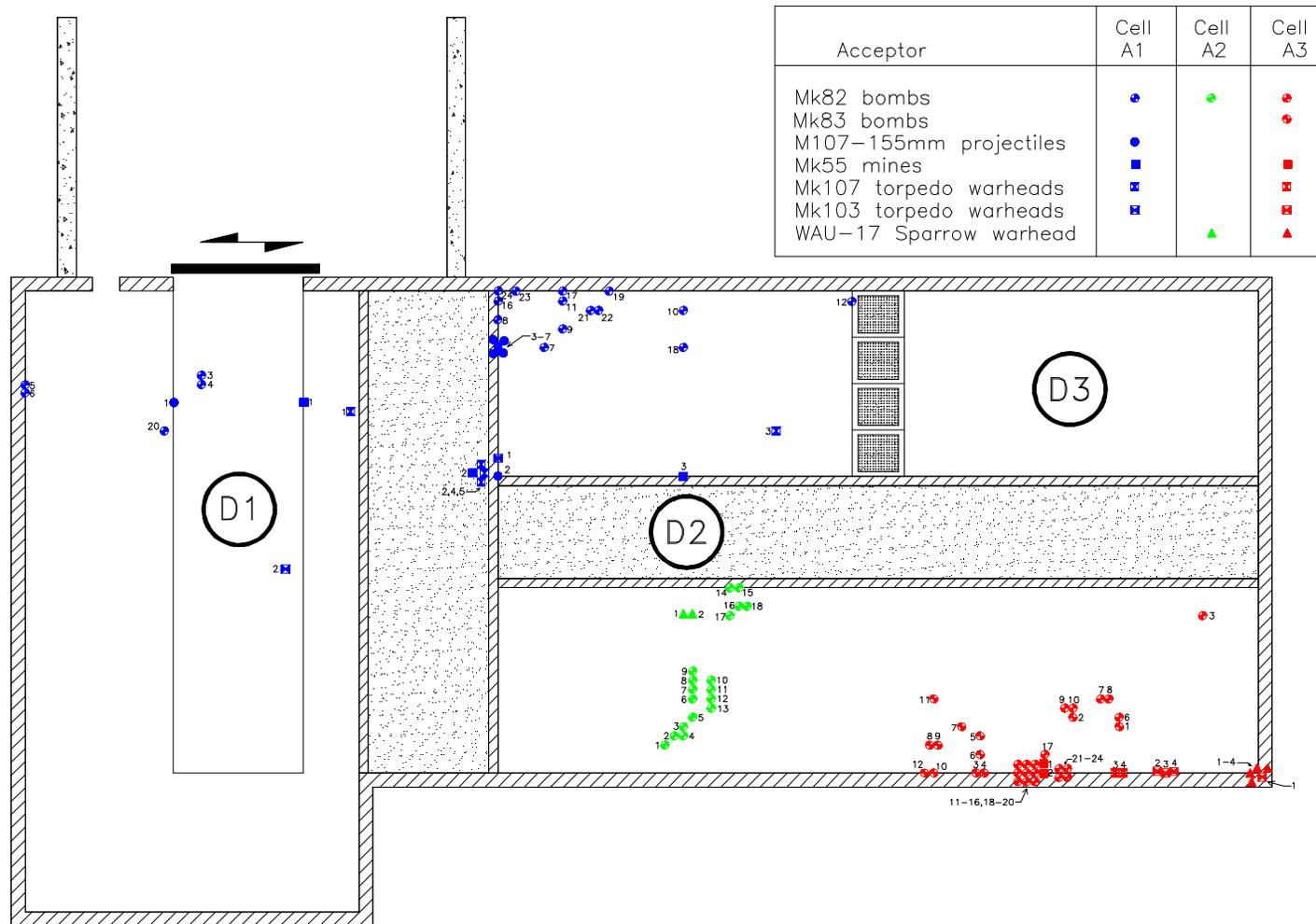


HPM CT3: Post-Test of Cells A1 & D3



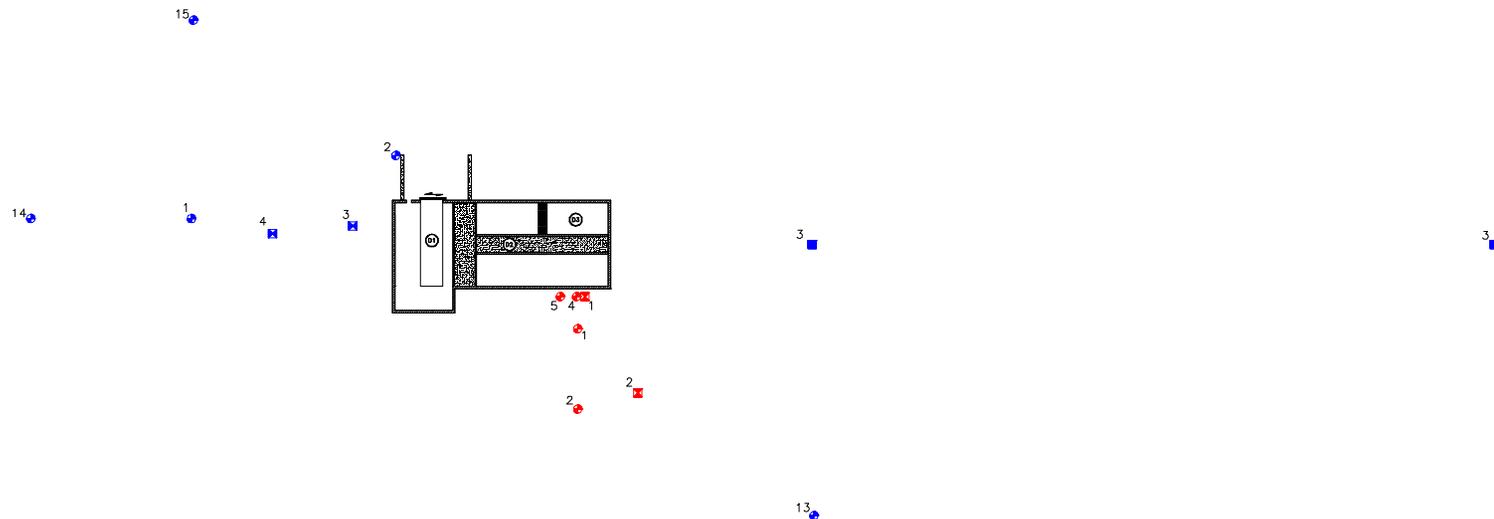
NAVAL FACILITIES ENGINEERING SERVICE CENTER

HPM CT3: Post-Test Acceptor Locations



HPM CT3: Post-Test Acceptor Locations

Acceptor	Cell A1	Cell A2	Cell A3
Mk82 bombs	●	●	●
Mk83 bombs			●
M107-155mm projectiles	●		
Mk55 mines	■		■
Mk107 torpedo warheads	■		■
Mk103 torpedo warheads	■		■
WAU-17 Sparrow warhead		▲	▲

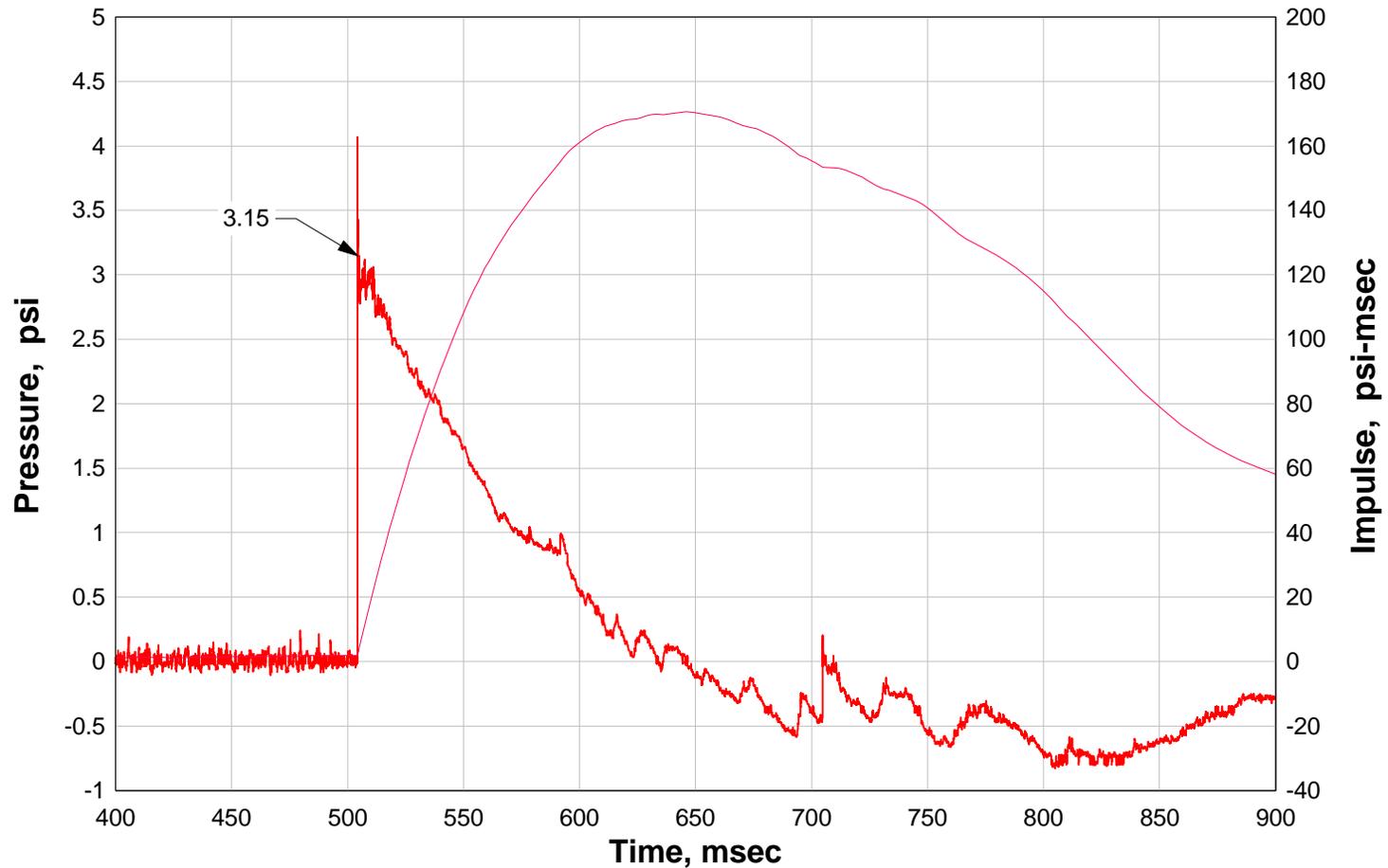


HPM CT3: Airblast Gage F-1

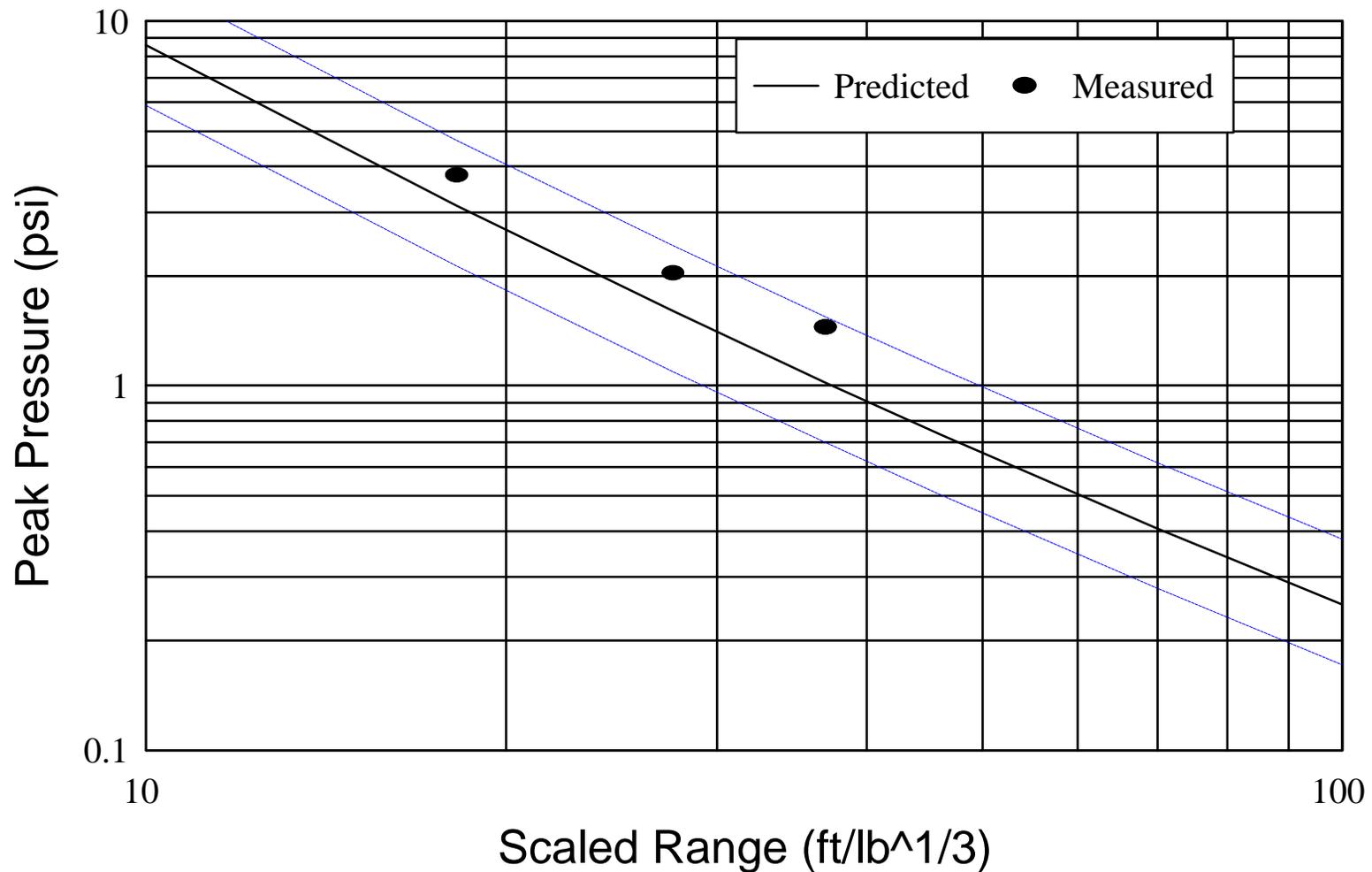
Measurement F-1

High Performance Magazine Certification Test Number 3

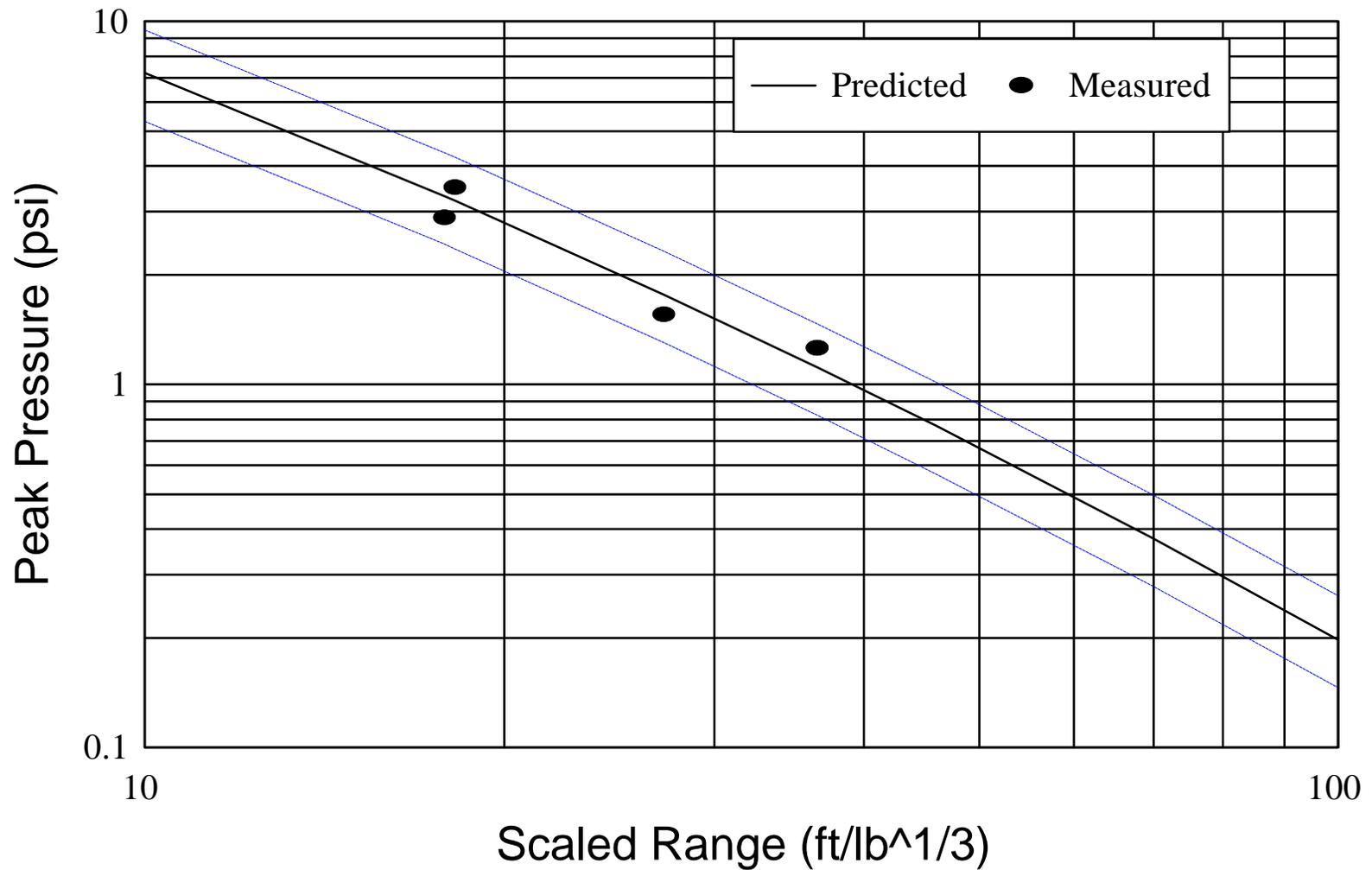
HPM CT3: 24 October 1996



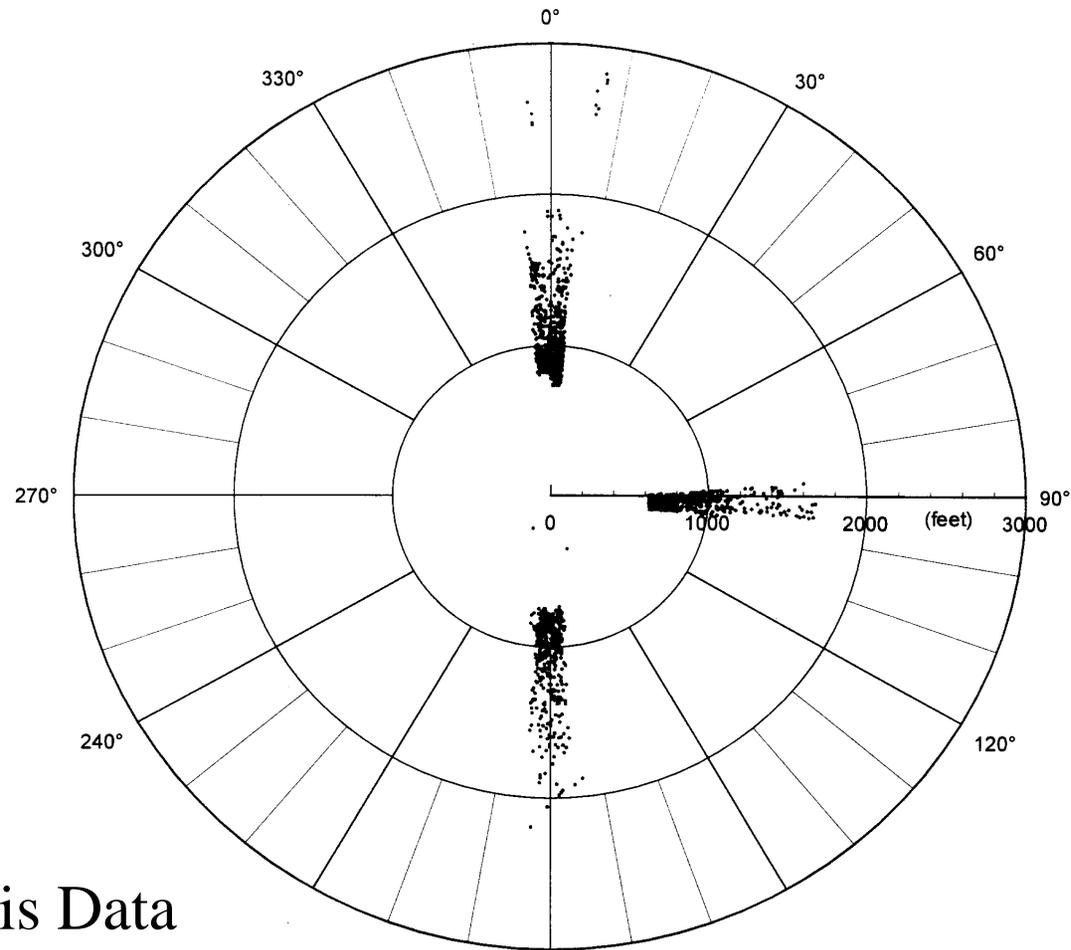
HPM CT3: External Pressures to Front



HPM CT3: External Pressures to Side & Back

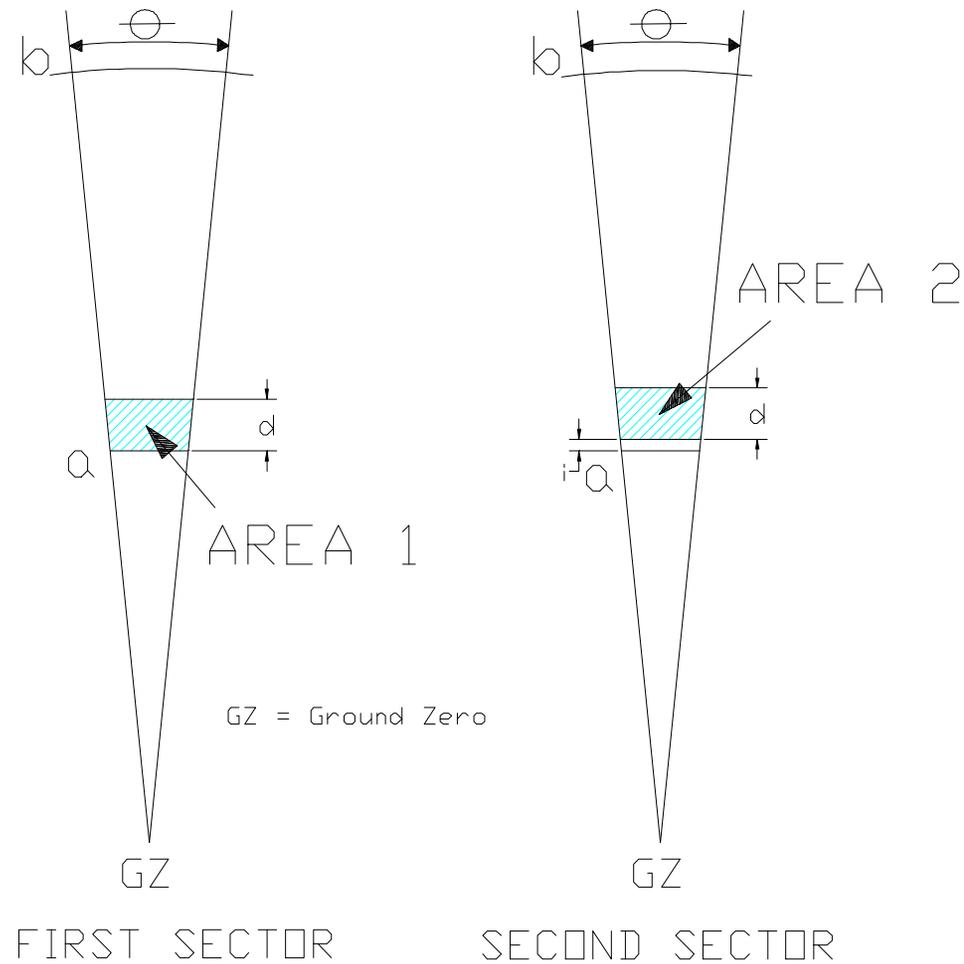


HPM CT3: Polar Plot of Hazardous Debris Locations

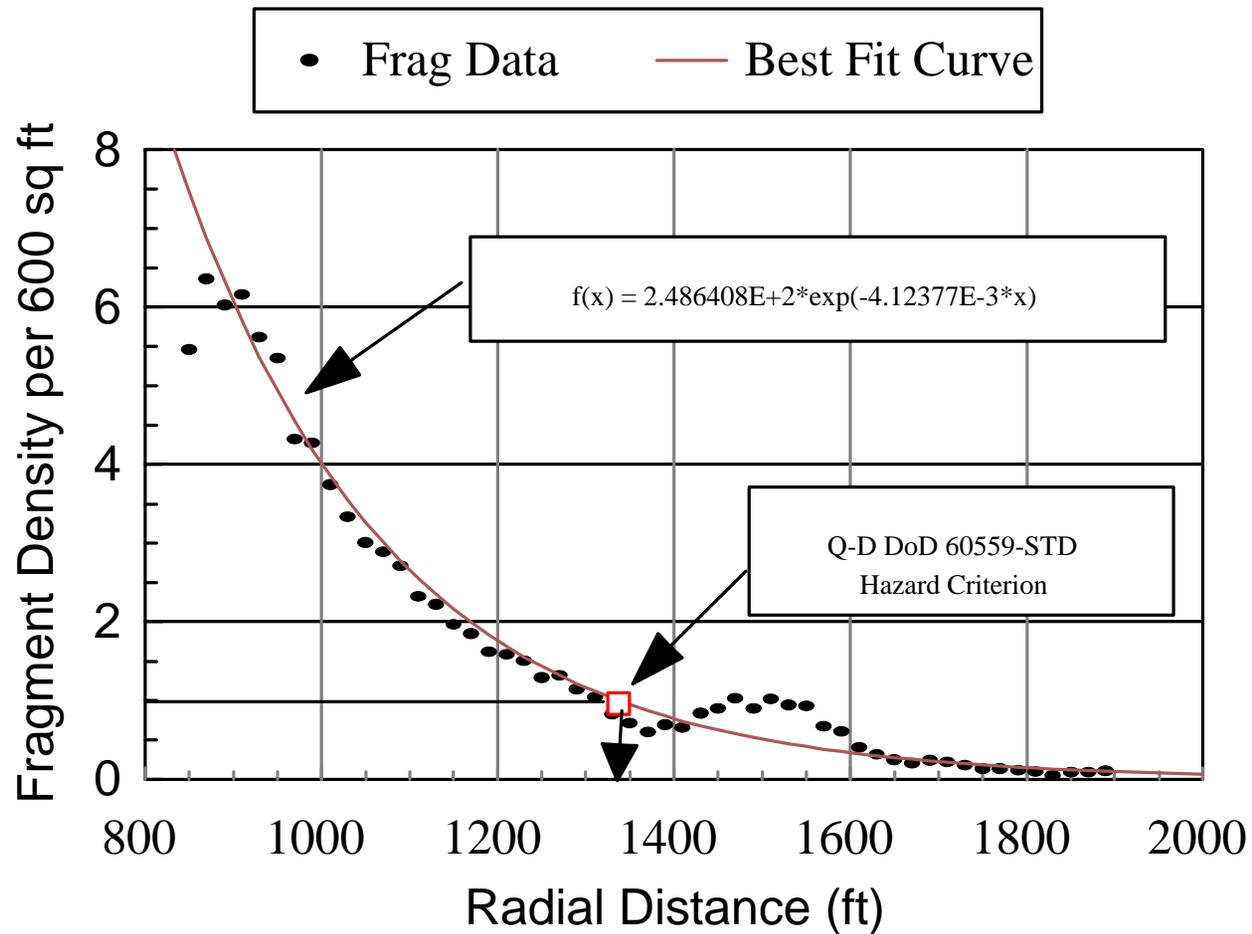


•Debris Data

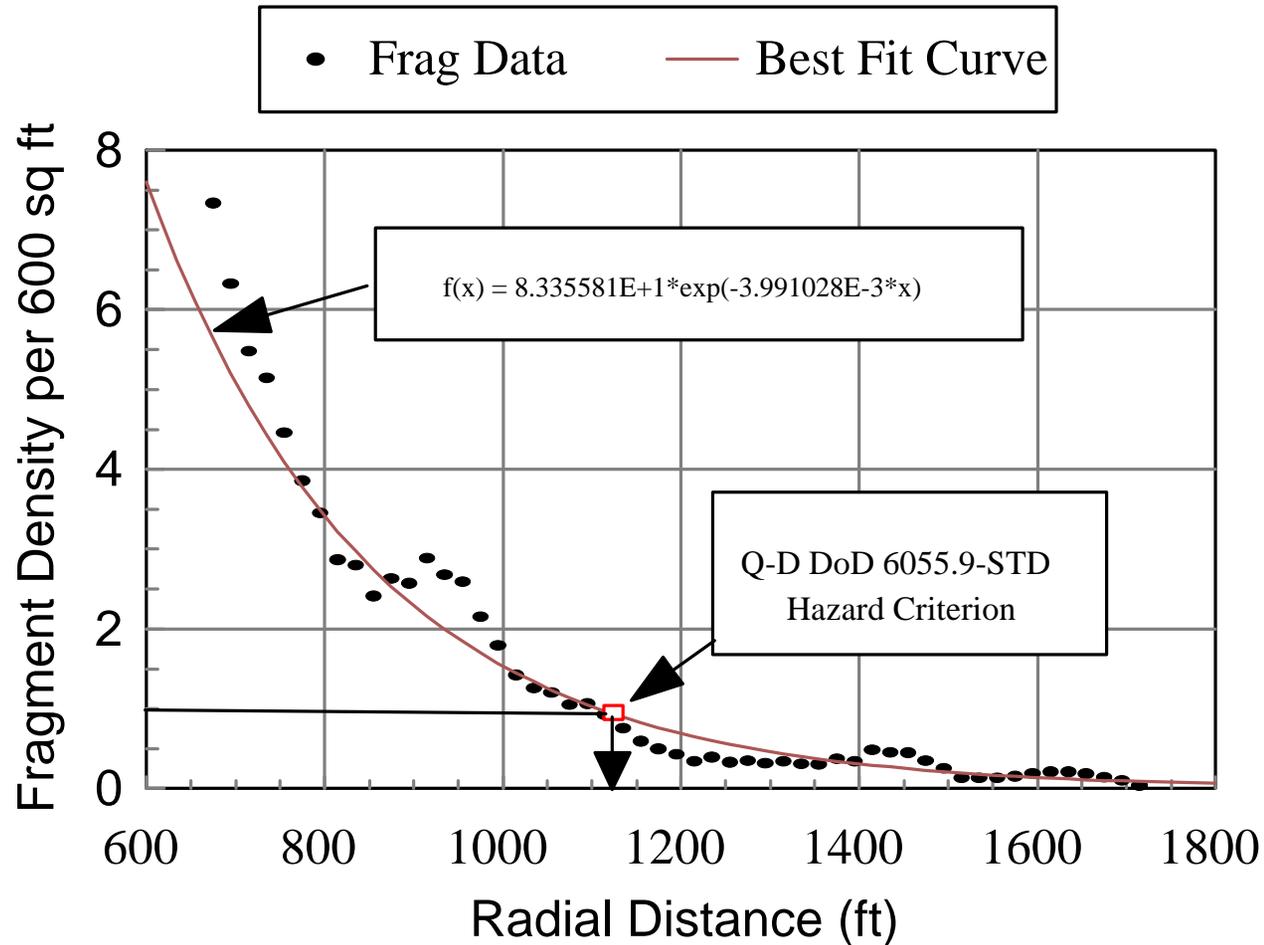
HPM CT3: Jacobs' Debris Method



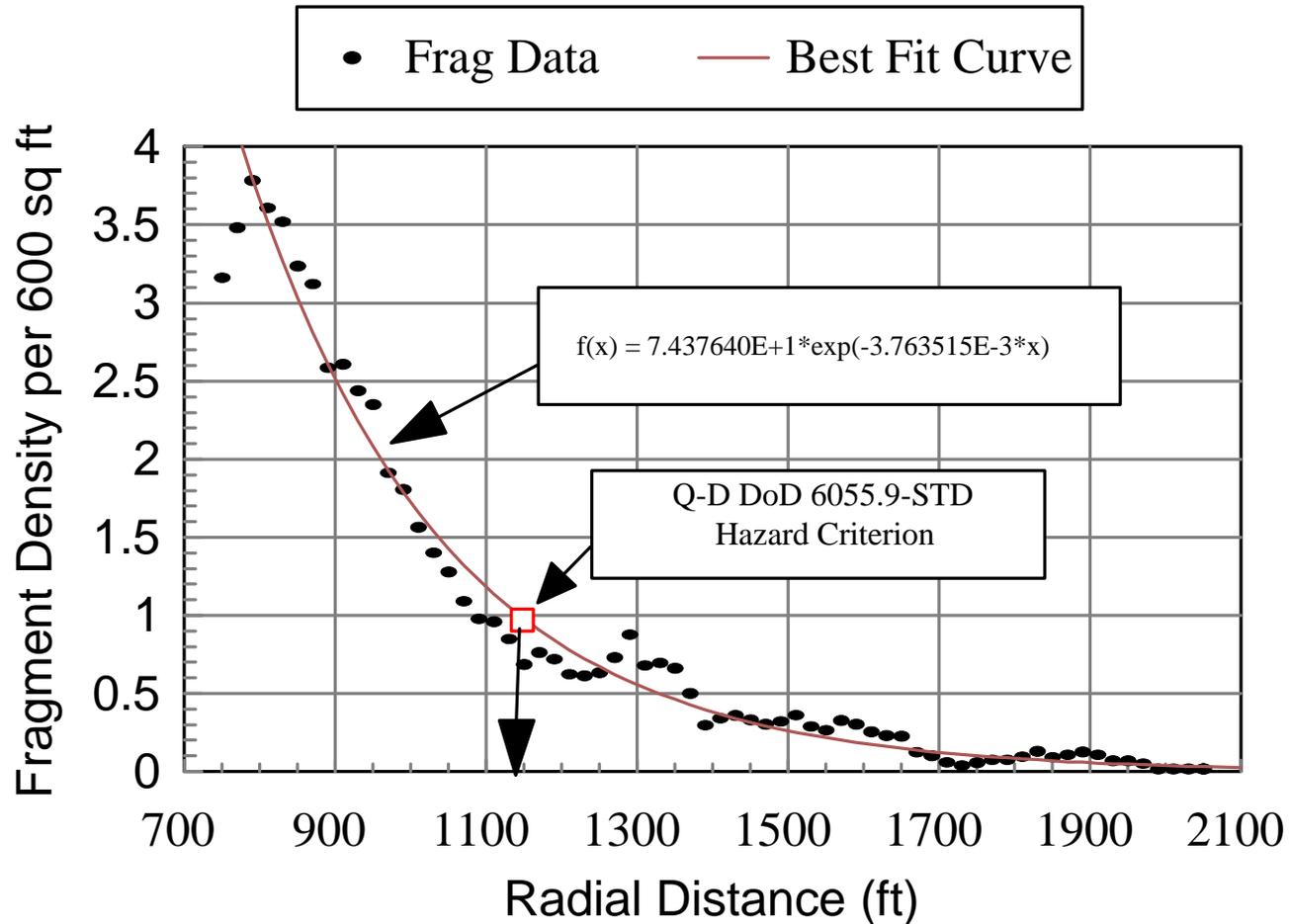
HPM CT3: Debris Areal Number Density Distribution - Front Direction



HPM CT3: Debris Areal Number Density Distribution - Side Direction



HPM CT3: Debris Areal Number Density Distribution - Back Direction



HPM CT3: Results

- No Sympathetic Detonation
- Minimal initial impact crushing of Thick-Case Acceptors (10% deformation in a few bombs vs. 25% threshold)
- Some Thin-Case Acceptors burned causing late-time reactions:
 - Deflagration of Mk55 mine
 - Deflagration of M107-155 projectile
 - Pressure rupture of Mk82 bomb

HPM CT3: Results

- Safe Debris Distance less than for Earth-Covered Magazine (Use 1250')
- Safe Pressure Distance at K35
 - 1370' for $W=60,000$ lb
 - 1250' for $W=45,000$ lb