SAND2018-12417PE

Improvements at Sandia's High Energy Radiography Facility

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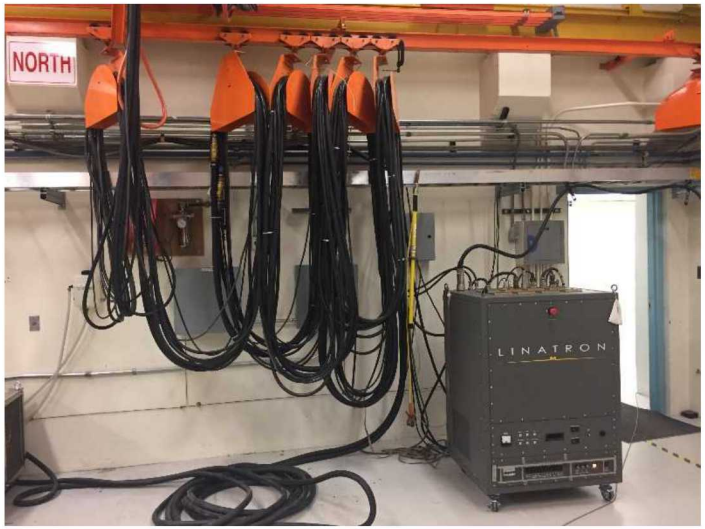
Outline

- Varex M9A X-ray System
- Varex 4343 flat panel detectors
- Refurbished Perkin Elmer 1621 & 1611 flat panel detectors.
- Additional Facility Shielding
- 3 meter DR staging system

Varex M9A


NORTH
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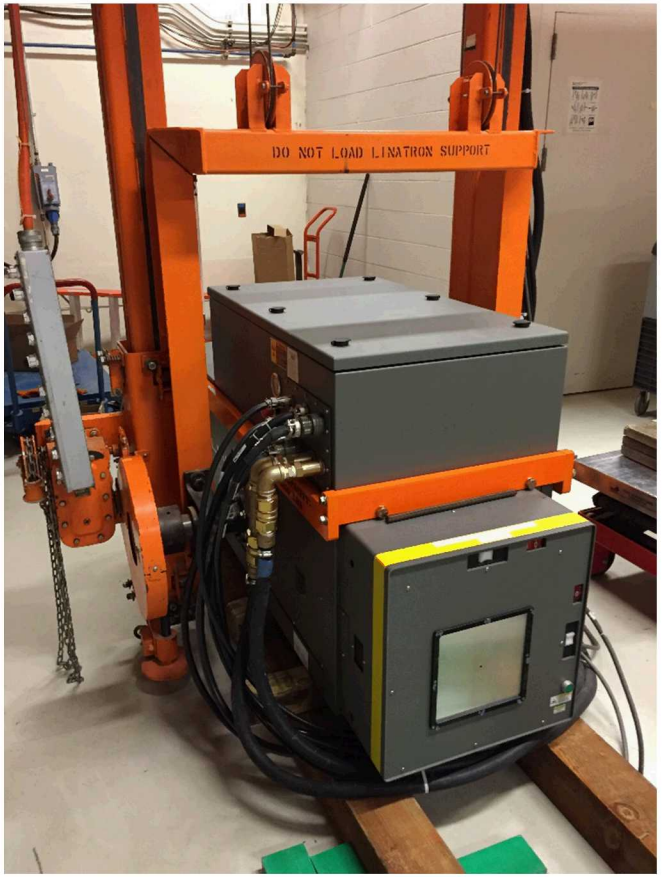
15 TONS
CAPACITY


DO NOT LOAD LINATRON SUPPORT

Varex M9A

Installed September 2017
Interfaced with HYTEC multi-collimator
CT/DR system

6 MeV max output ~1400 R/min @ 1 meter
9 MeV max output ~3700 R/min @ 1 meter
Focal spot: < 1.5 mm
Collimator: 0-24 degrees

Varex 4343HE

Two Varex 4343HE panels were purchased with M9A system

Technical Specifications

Receptor Type . . . . . Amorphous Silicon

Conversion Screen . . . . . DRZ+

Pixel Area - Total . . . . . 42.7cm (h) x 42.7cm (v) (16.8 x 16.8 in)

Pixel Matrix - Total . . . . . 3,072 (h) x 3,072 (v)

Pixel Pitch . . . . . 139 μm^2

Energy Range . . . . . 20 kV - 16 MV

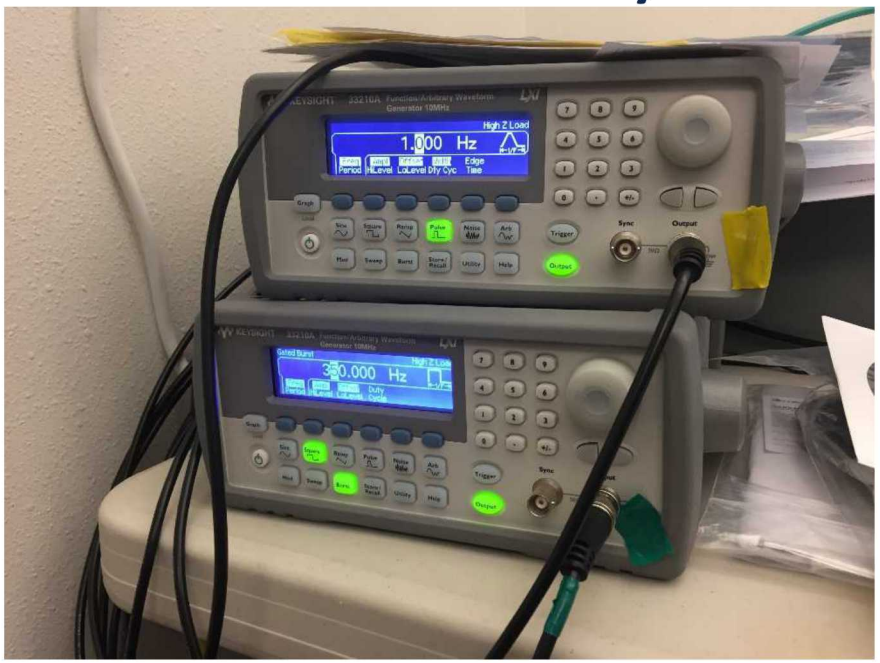
Fill Factor 64.3%

Data Output . . . . . Gigabit Ethernet

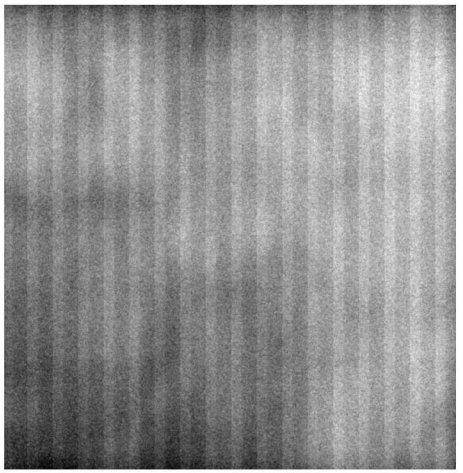
Scan Method

Varex 4343HE

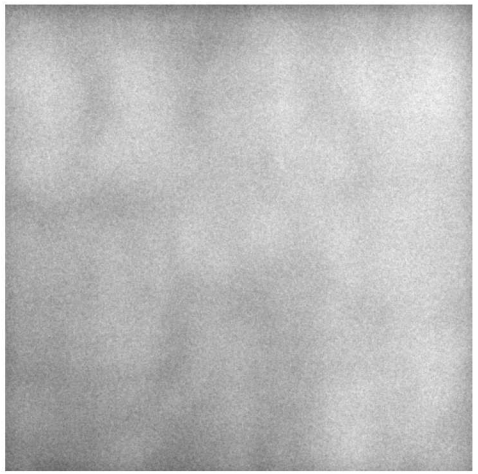
Varex 4343HE Synchronization



Unsynchronized



Synchronized



Refurbished Perkin Elmer Detectors

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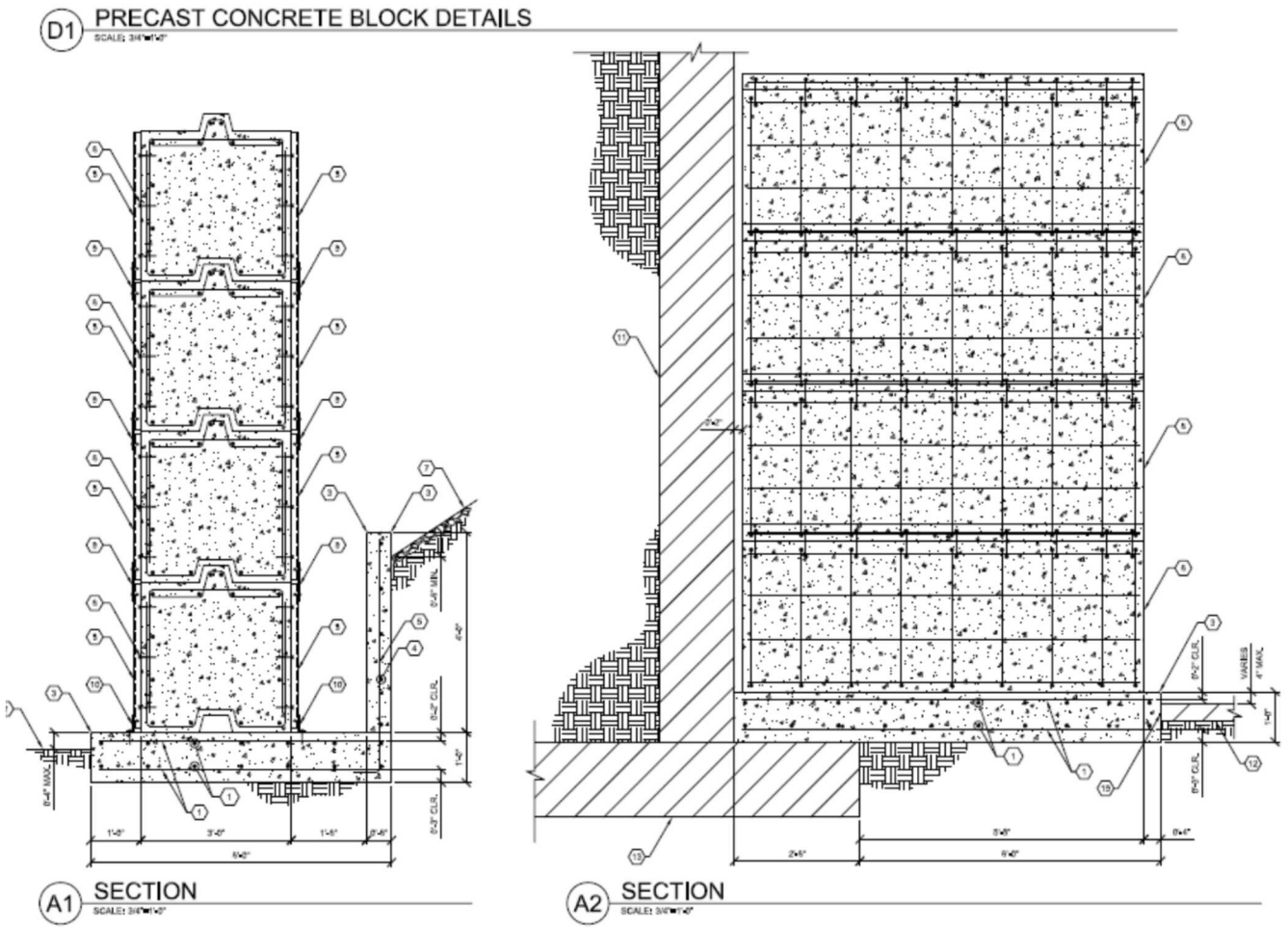
Perkin Elmer 1621 & 1611 flat panel detectors

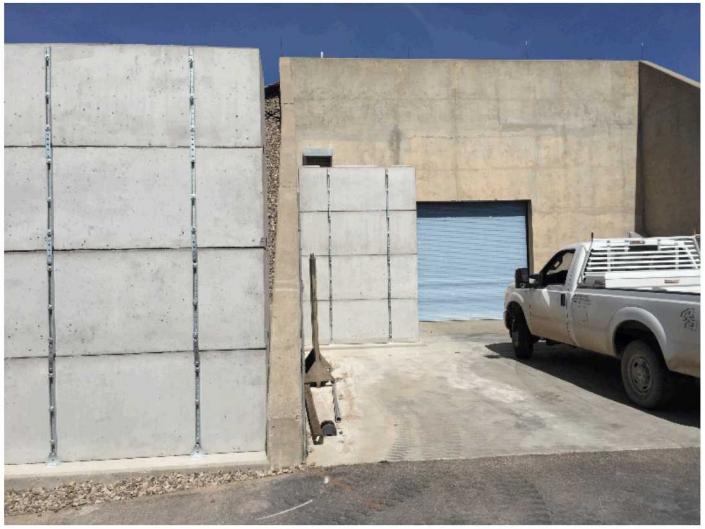
Replaced readout electronics

Lower Bad Pixels Count
More Tolerant to HE x-ray pulses
Better Image Quality

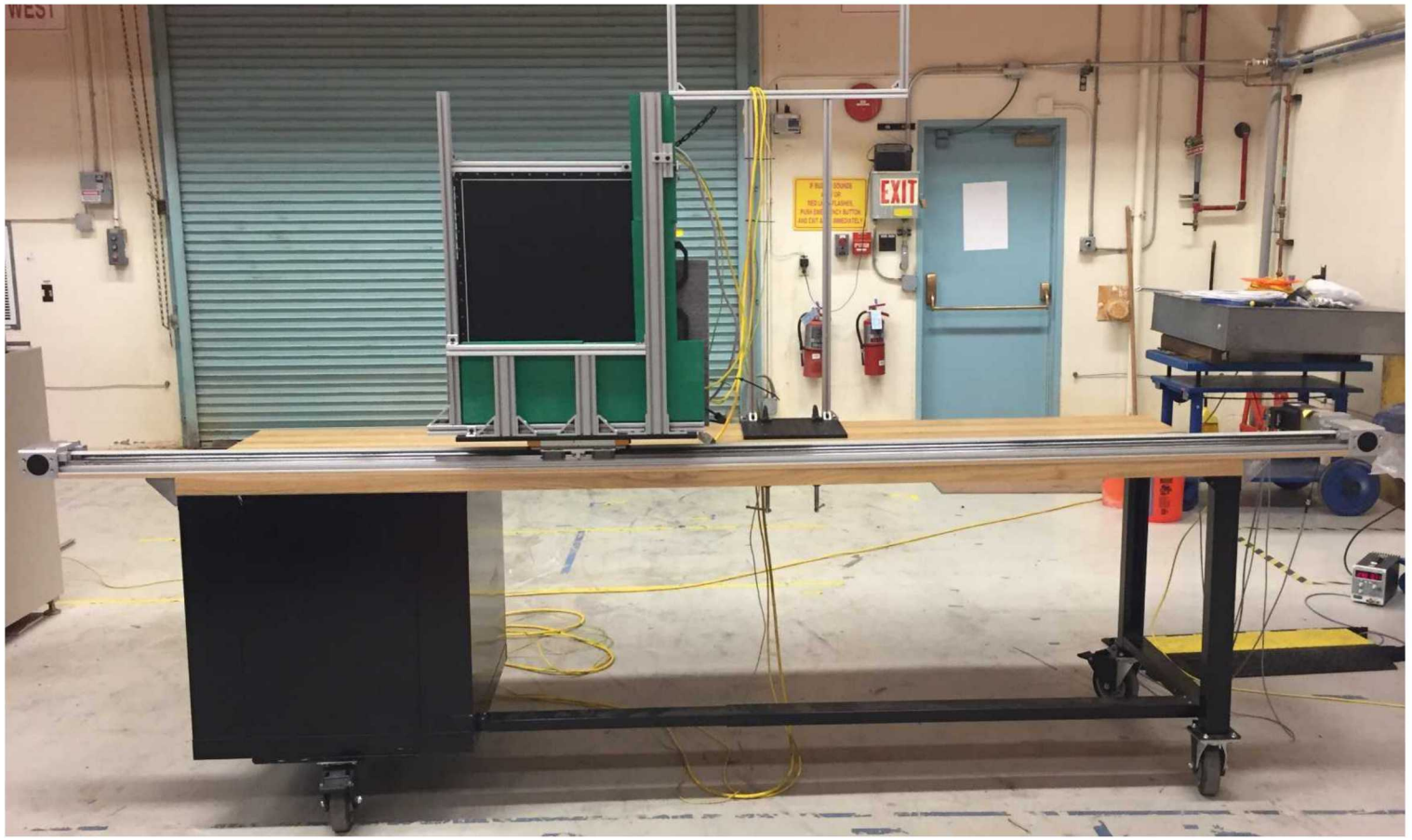
Shielding Additions



Shielding Additions



3 Meter Travel DR System



3 Meter Travel DR System

Schneider Electric stepper motor
- Built in ethernet motor controller
- Built in motor encoder
- 24 VDC operation

Transport Varex 4343 detector and shielding

Currently used for DR
- 9 detector images over length of travel

3.43 meter coverage

Future use in a horizontal rotation CT scanner

High Energy Usage

Over 100 6 MeV CT scans in last 7 months

Over 500 CR/DR Shots in September 2018

Currently characterizing of 9 MeV output

Marked improvement in DR/CT image quality with Varex M9A
- higher S/N
- faster CT scans

Currently use NSI data acquisition software for unsynchronized acquisition with Perkin Elmer detectors (1621 & 1611)
In-house and Marietta NDT software for data acquisition with Varex 4343 detector