



## ***Status of Cable Equivalency Work***

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# *Original Cable Equivalency Study*

- **Process**

- Data collection in accordance with ASME Sect XI App VIII Supp 1
- Acceptance criteria from ASME Sect. XI, App. VIII, Article 4000
- The equipment selected will provide a representative crosscut of PDI generic procedure T1 documents

- **Variables**

- Cable lengths tested were 6', 12', 18', and 24'
- Cable types were limited to RG-174/U and RG-58/U
- Four UT instruments with different electronic characteristics
- Search unit frequencies between 1MHz and 5MHz
- Dual and single element search units

- **Constants**

- Three intermediate connectors used in all measurements
- Data collection equipment and procedure

## ***Expanded Cable Equivalency Study***

Based on comments from PNNL we collected an expanded data set to include as many search units and instruments as possible

- **Process**

- Same process was used

- **Variables**

- Cable lengths tested were 6' and 24'
- Cable types were limited to RG-174/U
- 16 UT instruments were represented in the data
- 3 different 5Mhz single element search units

- **Constants**

- Three intermediate connectors used in all measurements
- Data collection equipment and procedure

# Expanded Cable Equivalency Study

Manufacture	Model	Used
Megasonic	MST	X
KBA	MSWS	
KBA	MSWQC	X
KBA	MSWQCA	
KBA	COMP-G	X
AUTO	RRW	
Qcorp	RRW	
Panametrics	V543-SM	
Panametrics	A543S	
Panametrics	C543-SM	
Panametrics	Centras	
SONA	PQC	
Staveley	F9L	
TKS	CAB5B	
Harasonic	ABT	
TECH	ABFQ	

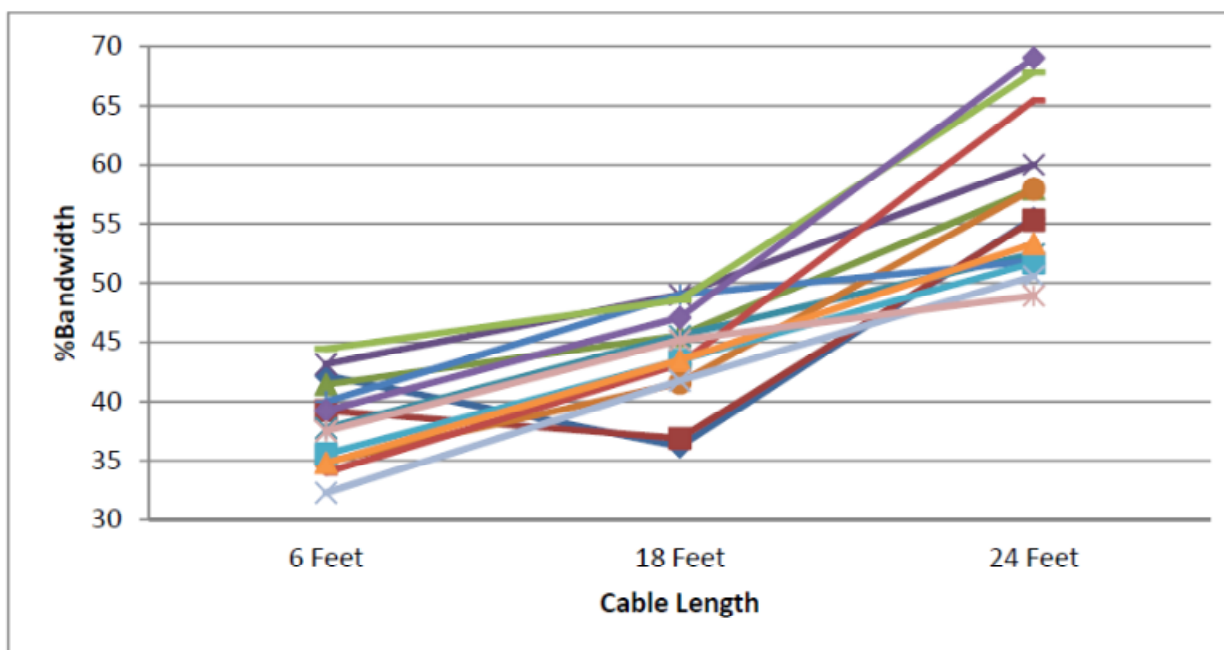
Instrument	Used
EPOCH 1000i	X
EPOCH 600	X
EPOCH 4	X
EPOCH II	X
EPOCH IIB	
EPOCH III	*
EPOCH XT	X
Masterscan 330	
Masterscan 335	X
Masterscan 340	
Sonic 1200s	
Sonic 136	X
Sonic 137	X
UI-25	
USK-7D	
USM Go	X
USM-25	
USM-35	
USN-60	X
USN 60sw	X
USN-50	X
USN-52	
USN-52L	
USN-52R	

- Tables show the search units and instruments represented in the expanded data set
  - EPOCH III stopped working prior to the end of data collection

## Results

- The original data set suggested cable lengths between 6' and 24' could be considered equivalent
- The expanded data set showed there were deviations that exceeded the criteria listed in Article 4000
  - Deviations were most evident when older transducers were matched with older instruments
  - In all cases the system bandwidth increased with the increase in cable length
- Due to the deviations noted in the expanded data set
  - A third data point (18' cable) was included
  - All deviations with 6'/18' cables met Article 4000 criteria
- Results of the original study with the expanded data set was published in EPRI Report 1025023

## Results (continued)



- Graph shows the increase in system bandwidth as it correlates with the cable length
  - This trend was not present in the original data set
  - Suggests that the search unit and instruments, included in this portion of the study, were better matched with longer cable lengths
  - Reason behind this trend is unknown and additional work would be needed to determine the cause

## ***Conclusions***

- The Cable Equivalency project ended in 2011
- Results looked similar to original set but unacceptable deviations were noted
- New data suggests cables less than 18' are equivalent
- Implementation plan
  - How do we handle this in regulatory space? (Action item from December 2011)
  - November 2010 a letter of acceptance was discussed
- Results published in EPRI Report 1025023