

**From:** Benson, Michael  
**To:** Stevens, Gary; Kirk, Mark; Rudland, David  
**Subject:** RE: J-R curve data (ferritic material focus)  
**Date:** Tuesday, April 10, 2012 8:34:00 AM

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Get more funding, add 3 years to the App G schedule, and add vessels to xLPR. I want to make sure we're duplicating effort as much as possible.

**From:** Stevens, Gary  
**Sent:** Tuesday, April 10, 2012 8:32 AM  
**To:** Kirk, Mark; Rudland, David  
**Cc:** Benson, Michael  
**Subject:** RE: J-R curve data (ferritic material focus)

Then we have an addition to make to our Appendix G work, as originally instructed by WRC-175.

Get more funding and add another 3 years to the schedule.

Gary L. Stevens  
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**From:** Kirk, Mark  
**Sent:** Tuesday, April 10, 2012 8:30 AM  
**To:** Stevens, Gary; Rudland, David  
**Cc:** Benson, Michael  
**Subject:** Re: J-R curve data (ferritic material focus)

No

Piping has bigger cracks and so needs higher toughness.

Apparently even higher than it has (North Anna)

Nice try.

Mark Kirk, (b)(6) Cell (b)(6)

**From:** Stevens, Gary  
**To:** Kirk, Mark; Rudland, David  
**Cc:** Benson, Michael  
**Sent:** Tue Apr 10 07:52:56 2012  
**Subject:** RE: J-R curve data (ferritic material focus)

Is there easy proof in all of the available the crappy CVN data for piping that would prove RPV material is more limiting from a fracture point of view, thereby allowing us to dismiss all of those folks that have asked someone to demonstrate how RPV P-T curves bound the ferritic piping?

cl/19

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**From:** Kirk, Mark  
**Sent:** Monday, April 09, 2012 1:53 PM  
**To:** Rudland, David  
**Cc:** Stevens, Gary; Benson, Michael  
**Subject:** RE: J-R curve data (ferritic material focus)

Thanks for the info (about suckey CVN data).

You in the piping world are so blessed by high toughness materials (where CVN sucks and everything is limit load!). We in RPVs are not so encumbered. Our materials suck more, meaning CVN sucks less.

Best

mark

**From:** Rudland, David  
**Sent:** Monday, April 09, 2012 1:51 PM  
**To:** Kirk, Mark  
**Cc:** Stevens, Gary; Benson, Michael  
**Subject:** RE: J-R curve data (ferritic material focus)

Mark

I'm so not a fan of CVN-J relationships, especially for high toughness materials... I really think CVN becomes meaningless for really high toughness pipe.

Ok, now that I have stepped off my soapbox, here is some info that may be of some use.....

First of all, J-R round robins were done (Rahman, S., and others, "Summary of Results from the IPIRG-2 Round Robin Analyses," NUREGICR-6337, February 1996.) back in the IPIRG time frame. They did lots of good experiments.

The PIFRAC database is full of tensile and J-R curve data for a ton of nuclear grade piping materials... the database sits in database format, but Emc2 has a web-based copy here... <http://www.emc-so.com/MaterialDB/JRCurveData.php>. It's not all that user friendly, but everything is there. This database contains data from virtually all past NRC nuclear piping programs (Battelle, Argonne, MEA, and DTRC), EPRI-funded data by Westinghouse and GE, and data from Ontario Hydro. The problem here is that there is very little or no CVN data (since it sucks) for these materials.

The oil and gas industry still tries to use J-CVN relationships since much of their old pipe is only characterized by CVN. There has to be a database out there, so I've sent a few e-

mails to see if I get any nibbles. Will let you know

Thanks  
Dave

**From:** Kirk, Mark  
**Sent:** Monday, April 09, 2012 1:15 PM  
**To:** Rudland, David  
**Cc:** Stevens, Gary; Benson, Michael  
**Subject:** J-R curve data (ferritic material focus)

Dave -

We (Mike, Gary, and I) are embarking on an effort to put together a database of J-R curve data with the aim of updating the equations used to predict J-R curves of the kind that are now used in RG 1.161 (equivalent margins analysis for vessels with Charpy energy < 50 ft-lbs). I realize (of course) that piping and vessels are "different" ... but in the original work on the equations that are now in RG 1.161 piping data was used.

We are therefore wondering if you (and the Tsar of all things piping) might know of any existing data collections ... or data sources ... or citations ... that we should look to in our efforts. Or who we should contact (who will not charge us).

Thanks for the help,

mark

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