

102460

To: Meena Sachdeva <sachdeva@lanl.gov>  
Subject: Fwd: June 17th e-mail

**From:** Tom Johnson [mailto:tmjohnsn@uiuc.edu]  
**Sent:** Tuesday, June 17, 2008 4:53 PM  
**To:** Jeff Heikoop  
**Cc:** Glessner\_Justin; 'Patrick Longmire'  
**Subject:** Re: R-35a

Jeff,  
See response below.

Hi Tom and Justin:

Pat Longmire has been plotting up d53Cr versus organic carbon and suspended iron (unfiltered minus 0.45 micron filtered) to demonstrate controls on Cr(VI) reduction in our groundwater. He found a nice relationship with iron as shown below. The point with the highest suspended iron and the highest d53Cr is R-35a. This well is one where in the first round you got a value of 3.93 ", but only recovered about 1/3rd as much Cr(VI) as we measured for total dissolved Cr (as a proxy for Cr(VI)). In the second round you didn't recover enough Cr(VI) for analysis for this well, even though we saw about 6 ppb total filtered Cr.

It's quite possible that our total filtered Cr values are actually colloidal Cr(III) in this well.

Or possibly Cr(III)-organic complexes that are soluble?

We are checking that for the May round and subsequent rounds. Another possibility that troubles me, however, is that given the high suspended iron content, some iron colloids are making it through our 0.45 micron filtering and causing reduction during storage.

Fe colloids would usually be ferric, so no reduction from them. If there's any ferrous iron around, it would stay dissolved and could go through a filter.

Has this ever been an issue for you?

Not that we know of. We have many, many samples that are stable in the fridge for years.



Furthermore, the kinetics of ferrous reduction of Cr(VI) are so fast that this would not happen for a simple water sample that is not a mixture. If the ferrous iron appeared there in the aquifer with the Cr(VI), it would be eaten up by Cr(VI) VERY quickly.

BUT...We DO worry about samples that, when pulled from a well, might be mixtures of water from oxidized, Cr(VI)-rich strata with water from Fe(II)-bearing reduced strata. So then there could be reduction in the bottle. I suppose the kinetics could give us reduction that took a few days- I have papers on the kinetics if you want to do the calcs.

We also worry about dissolved organic reductants. Slower kinetics.

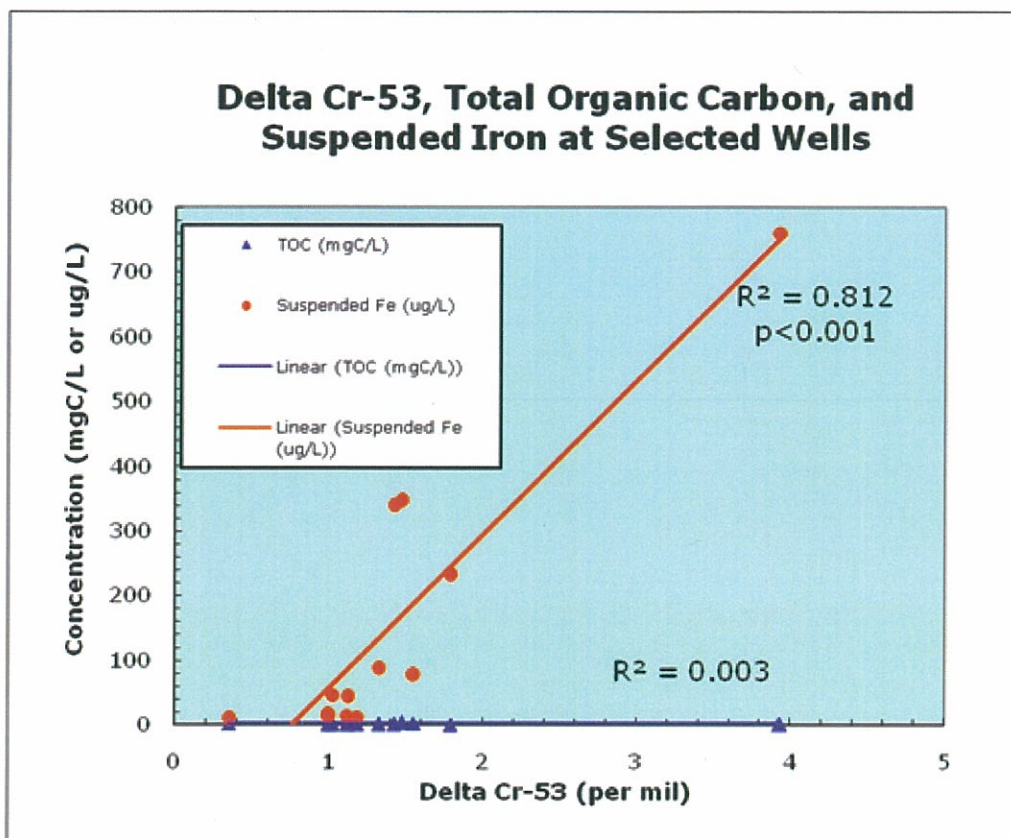
Would you be able to tell in any way if excess iron had resulted in Cr(VI) reduction during storage? We'll probably get you a sample of 0.02 micron filtered water from this well at some point in the future.

We should talk on the phone- sorry I haven't called yet.

-Tom

Take care.

Jeff




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