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Title:	TA-16-260 Stormfilter Installation – Status & Issues
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TA-16-260 Stormfilter Installation – Status & Issues

Donald Hickmott - LANL

LAUR- 11-??

Abstract

TA-16-260 Stormfilter Installation – Status & Issues
Donald D. Hickmott

The Technical Area (TA)-16-260 Outfall and associated springs, seeps, surface water, and deep groundwater at Los Alamos National Laboratory's (LANL's) TA-16 are contaminated with high explosives (HE), particularly RDX, and barium at levels greater than regulatory standards. Hence, the TA-16-260 Outfall is and associated waters are being addressed in a corrective measures evaluation (CME) and corrective measures implementation (CMI) under the New Mexico Environment Department (NMED) Order on Consent. A key component of the CMI for the shallow groundwater system is the installation of Stormfilter systems for removal of HE in Burning Ground, SWSC, and Martin Springs at TA-16. The Stormfilter systems use granular activated carbon (GAC) to remove HE from the spring waters. Installation was completed in 2009; however, the filters were not able to be turned on due to regulatory concerns with background aluminum in the springs; which is present at levels above water standards. Aluminum and Al/Fe data from both the TA-16 springs and background springs located at TA-9 suggests that this aluminum is naturally occurring. Potential paths forward will be discussed.

Outline – 260 outfall

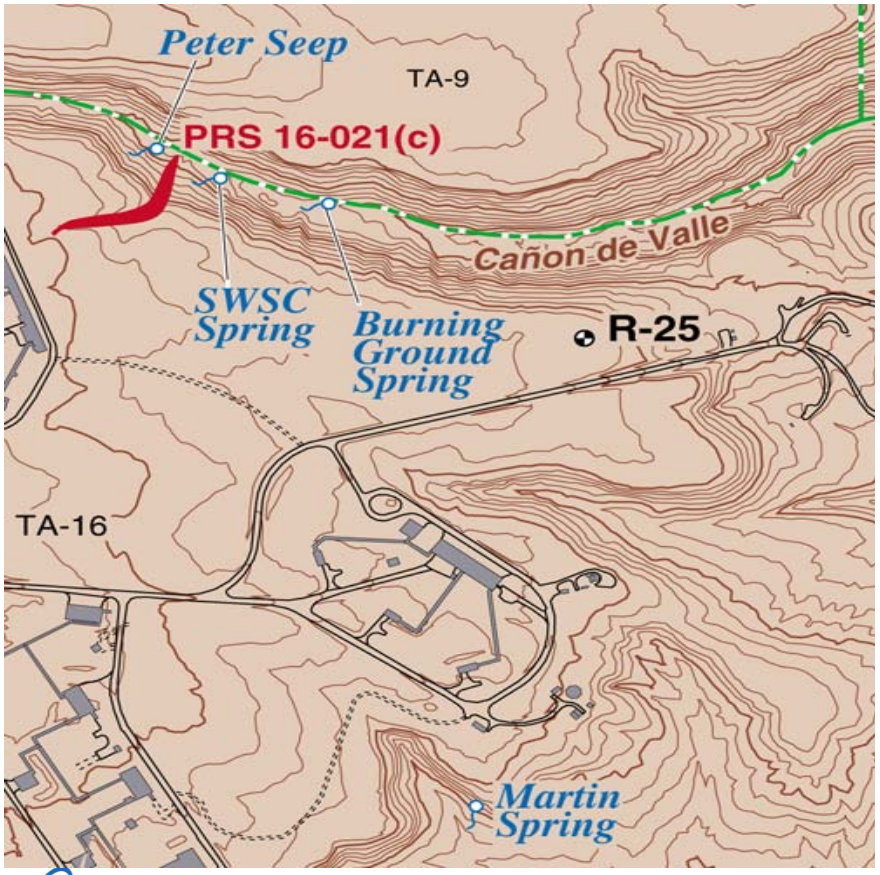
- Site Background
- Surface CME/CMI
  - Stormfilter in Springs Installation
- Discussion

Location of TA-16 at LANL

TA-16-260 Site Background

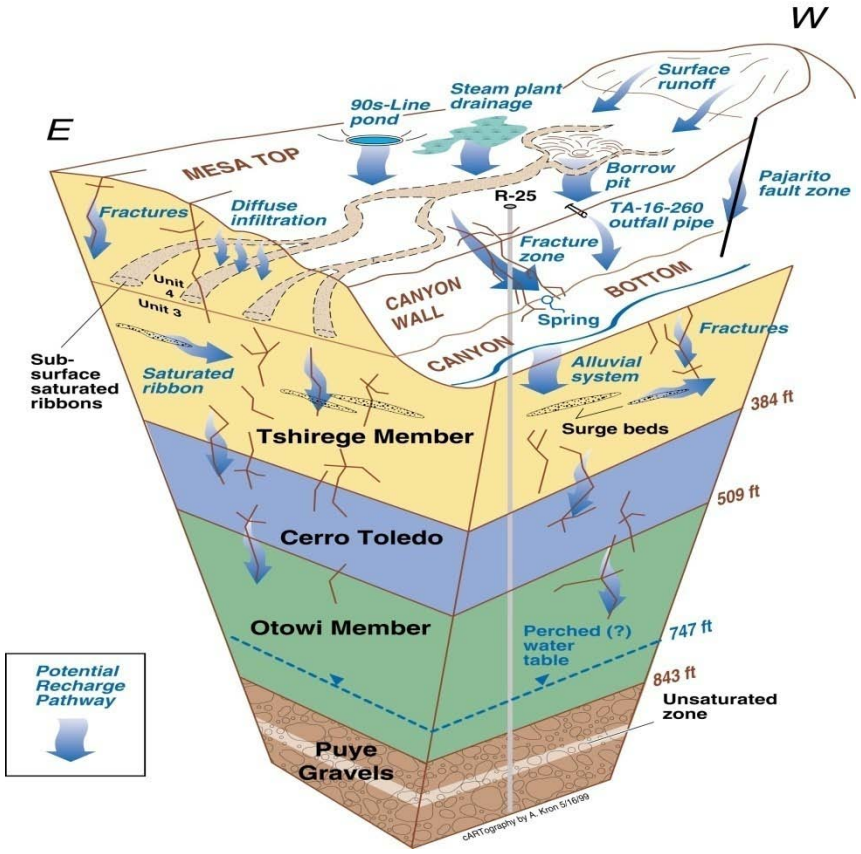
- The 260 outfall was highly contaminated with HE and barium.
- Site is undergoing LANL's first Corrective Measure Study/ Corrective Measures Implementation (CME/CMI).
- CME/CMI broken into surface and subsurface
- CMS/CMI was a focus of a LANL/NMED/ DOE 'high-performing team'

TA-16-260 Site Background (cont.)



- Nearby springs, seeps, surface and alluvial waters are contaminated with HE and barium.
- Perched groundwater at R-25 and nearby wells is contaminated with HE above NMWQCC standards
- Regional groundwater at the R-25 is contaminated with HE (currently below standards).
- This contamination probably from TA-16-260 outfall.
- Cañon de Valle is a nesting area for a T & E species.

TA-16-260 Background - Hydrogeologic Conceptual Model



- Conceptual model used to define pathways for risk assessments, to pick monitoring points
- Vadose zone transport characterized by ‘fast transport’ pathways, very heterogeneous conatmination
- Alluvial system impacted directly from both outfall and contaminated springs.
- Alluvial system is potential pathway to deep groundwater.
- Constraints on conceptual model from drilling, geophysics, sampling, geochemistry
- Conceptual model is key in formulation of CME/CMI remedies

Key Historic, Recent, & Ongoing TA-16-260 Activities

Historic

- 260 Outfall Interim Measure (IM) cleanup – (2001)
- Surface CMS Report – (2003)
- Groundwater CMS Report – (2007) NMED requested significant additional work

Recent

- Implementation of surface CMI remedies (2009-2010)
- Completed R-47(i) and R-48, two wells to help define nature and extent of groundwater contamination. (2009-2010)
- Drilling of CdV-16-4ip (pump test well) (2010)
- Drilling of R-63 (2011)

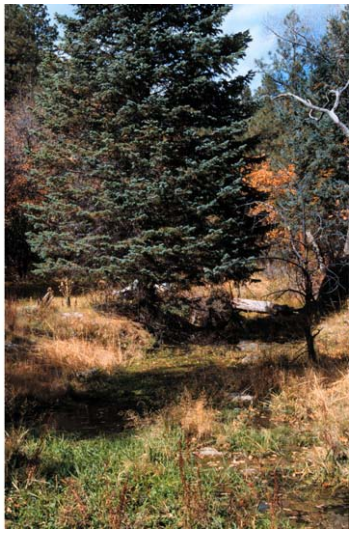
Ongoing (FY 11)

- PRB monitoring and optimization
- Pump test
- Drilling of R-47

Surface CMS/CMI

Key Activities

Phase III RFI - (2003)
CMS Report – (2003)
CMI Plan - (2007)
CMI Implementation – (2009-2010)



Surface CMS Report

- Issued November, 2003
- Discussed:
  1. CMS Constituents of Potential Concern (COPC)
  2. risk results, Media Cleanup Standards (MCSs), and ARARs
  3. reviewed technologies and pilot results
  4. recommended soil removal in source region
  5. evaluated 3 cleanup scenarios for Canon de Valle and Martin Canyon, recommended Permeable Reactive Barriers (PRBs), Stormfilters, monitoring
- NMED issued NOD in May 2005. LANL responded June 2005.

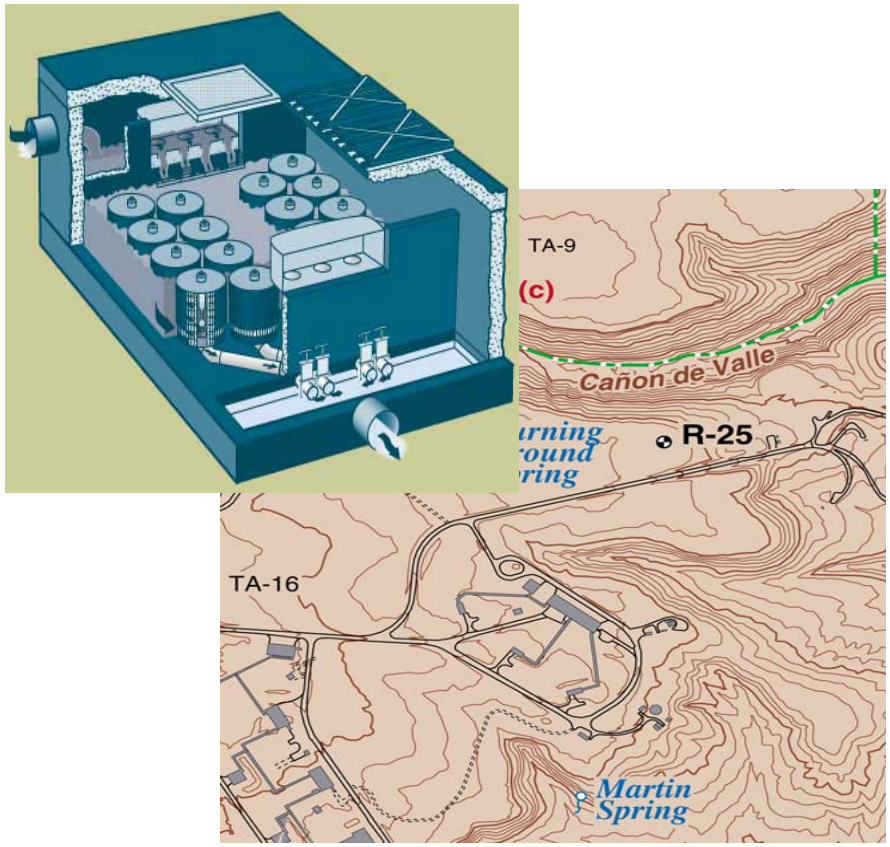
Surface CMS COPCs

- Risk assessments had carried numerous constituents into the risk assessment due to detections in water and soil
- Human heatlth risk was unacceptable (site-specific scenario) in outfall, acceptable in canyon. Ecorisk was largely acceptable (SWSC cut had uncertainties)
- Key risk drivers were RDX, TNT, other HE.
- Key WQCC/MCL constituent was Barium
- Key concern was migration to groundwater (RDX). Springs are all contaminated with RDX (but not Ba) above WQCC standard (~ 6 ppb)

Surface CMI

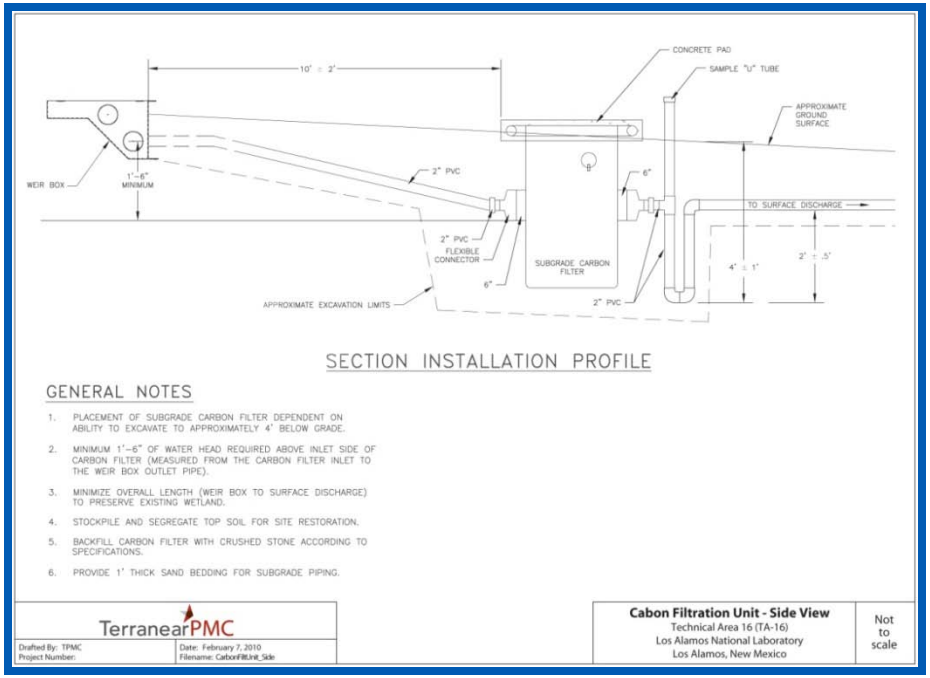
- CMI objectives – meet risk-based cleanup levels, minimize potential for migration of RDX and other constituents to groundwater
- CMI approved remedies
- **16-260 Outfall and Drainage Channel**
  - Concrete trough removal
  - Hotspot removals at former settling pond and drainage channel
- **Former Settling Pond at 16-260 Outfall**
  - Injection grouting of surge bed
  - Low-permeability cap installation
- **Martin Spring Canyon and Cañon de Valle Springs**
  - Installation of storm filters at SWSC and Burning Ground Springs
  - Modify existing carbon filter at Martin Spring
- **SWSC Cut**
  - Soil sampling and ecotoxicological testing
- **Cañon de Valle Alluvial System**
  - Pilot Permeable reactive barrier (PRB) design and installation
  - Alluvial monitoring well installation

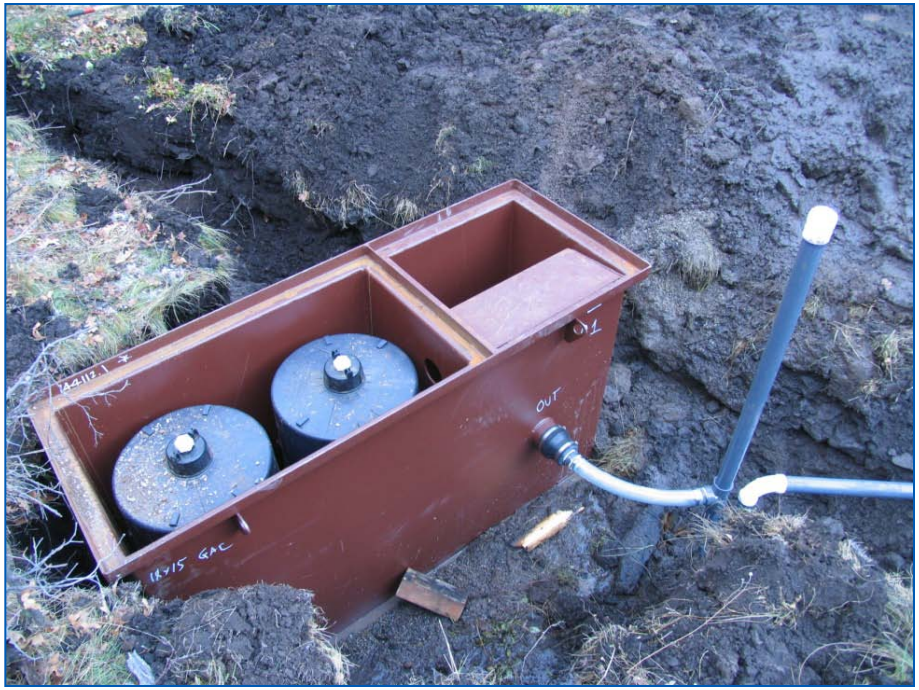
Stormwater Management System (SMS) - Stormfilter



- SMS designed to remove contaminants from runoff
- System is low profile - minimizes environmental impacts
- FY 2001 pilot-scale deployment of system in Martin spring to remove HE and Ba (installed as post Cerro Grande BMP)
- HE removed, minor breakthrough in late ’02
- Additional installed as part of CMI

Installation of Storm Filters at SWSC and Burning Ground Springs – Fall 2009





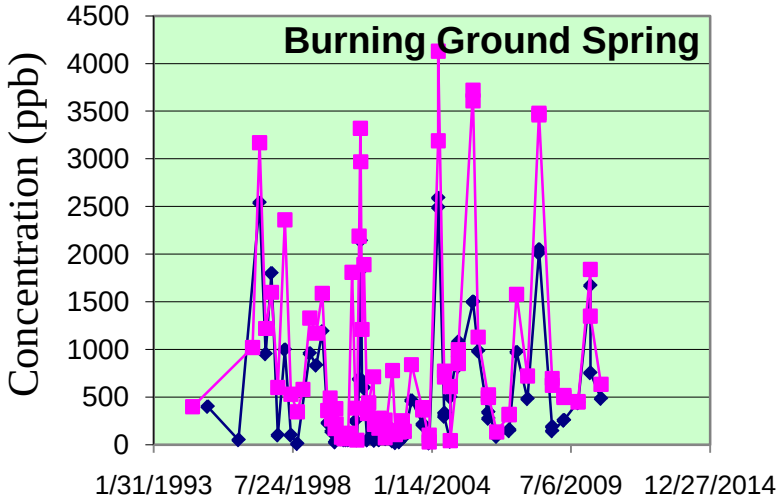
Key Issues - Stormfilters

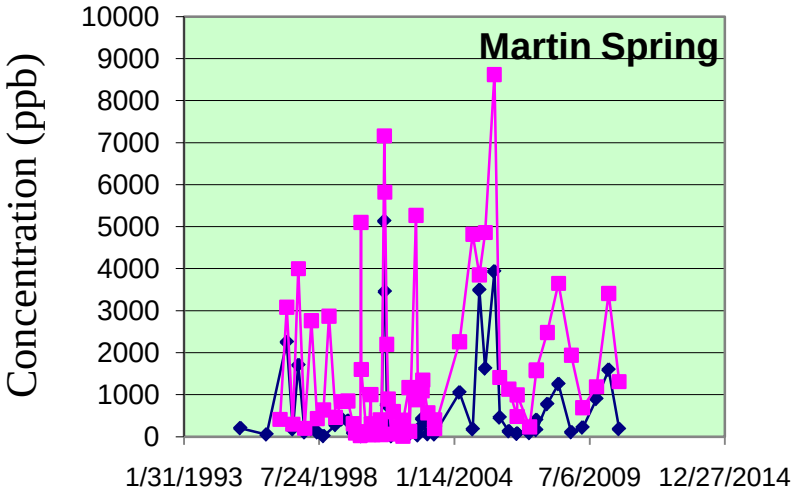
During 2010 LANL's ENV-RCRA NPDES permitting group engaged EPA in discussions on Stormfilters

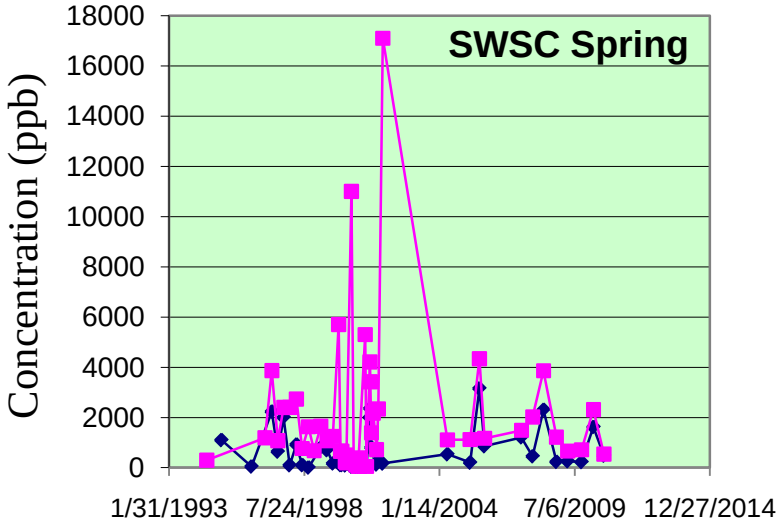
- EPA suggested NPDES Permitting of units
- EPA proposed to write NPDES permit to require meeting Aluminum standards for naturally occurring Al

- LANL ENV-RCRA has also inquired whether units could discharge to infiltration gallery to avoid NPDES issues

Aluminum in TA-16 springs data



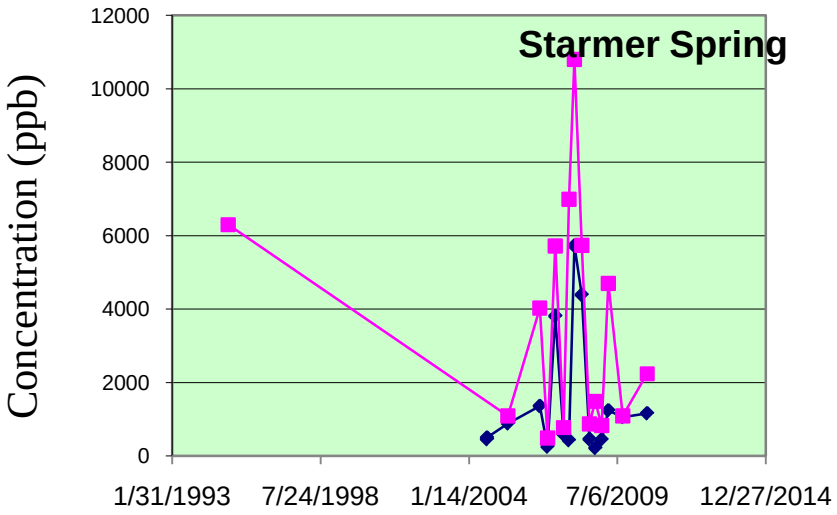


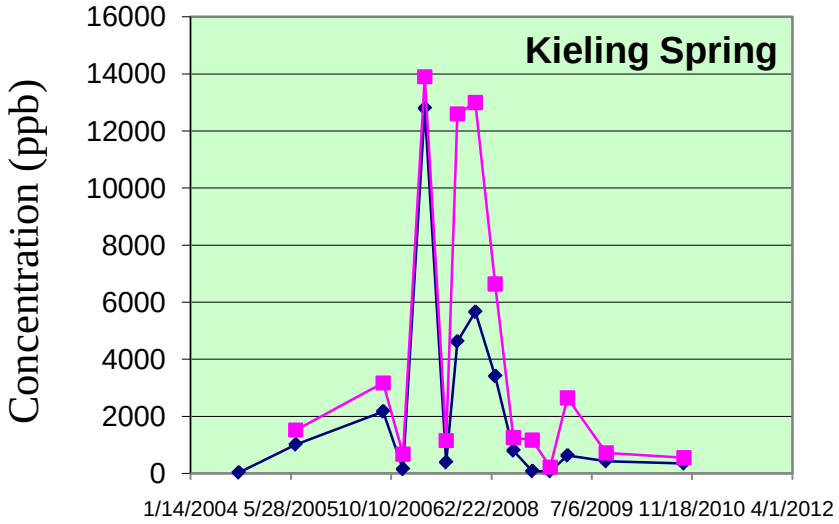


Filtered (blue) & unfiltered (pink)data

Al standard = 1000

Aluminum in TA-9 springs data

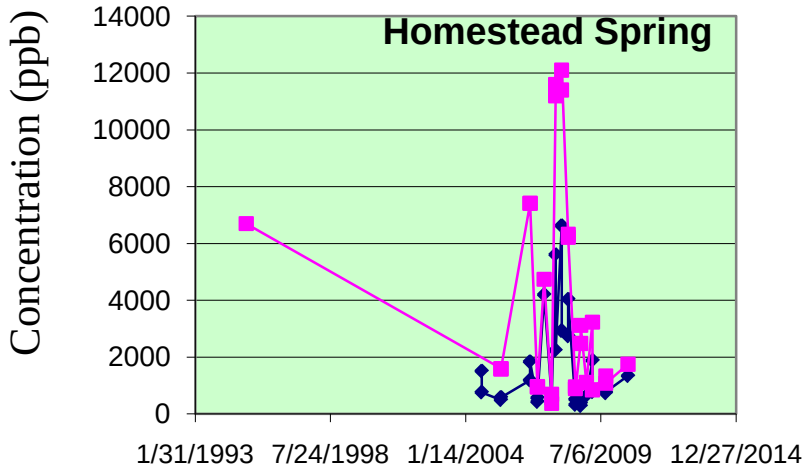




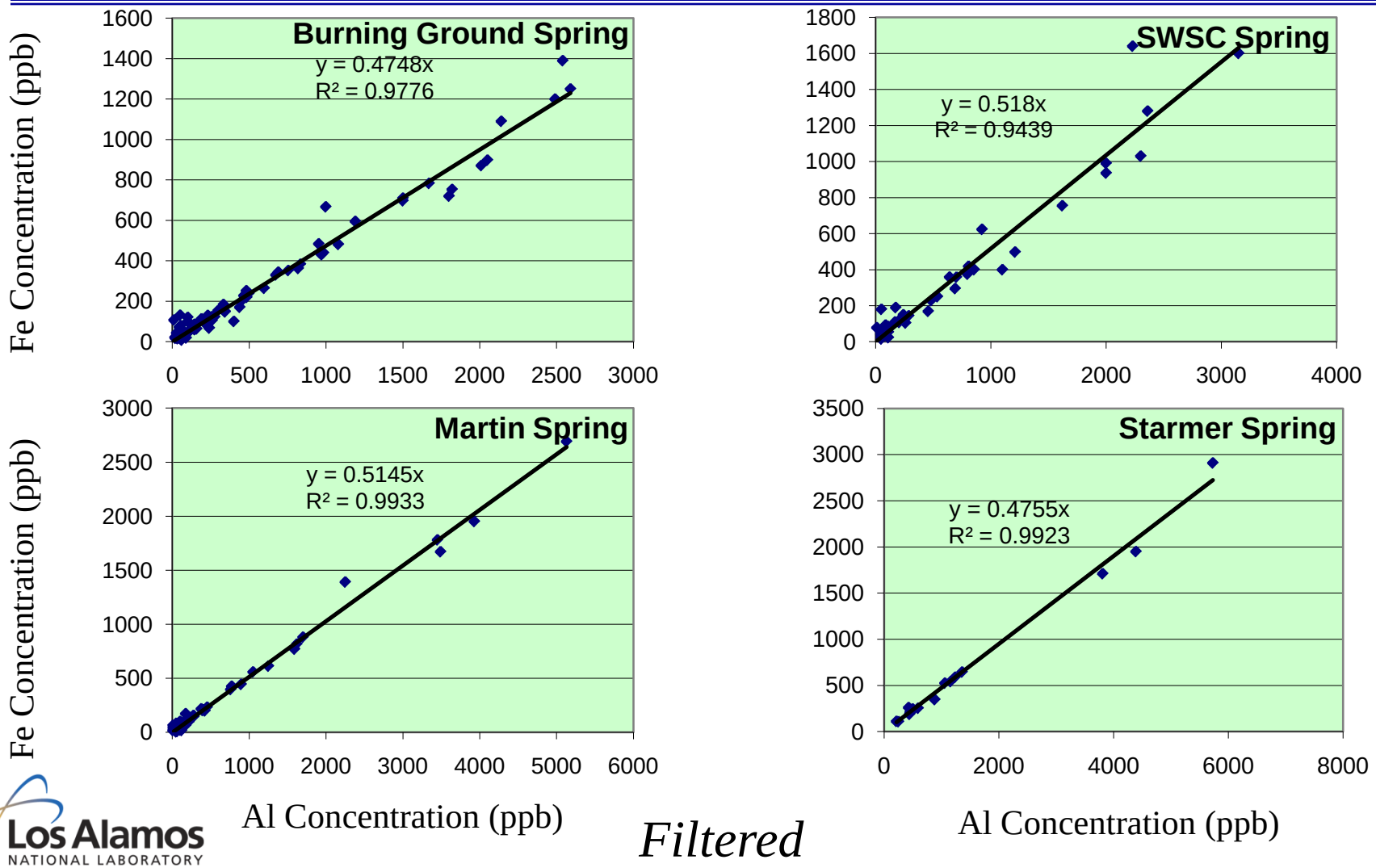
Filtered (blue) & unfiltered (pink) data

Same geologic units

Low (1) or no (2) HE in these springs

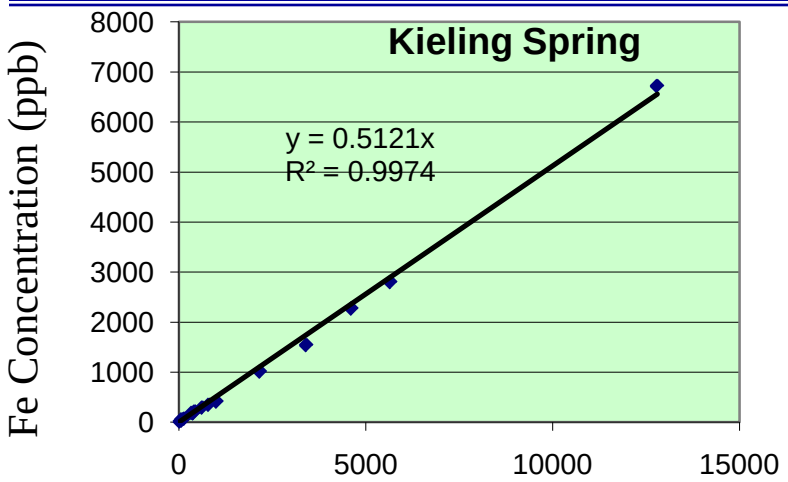


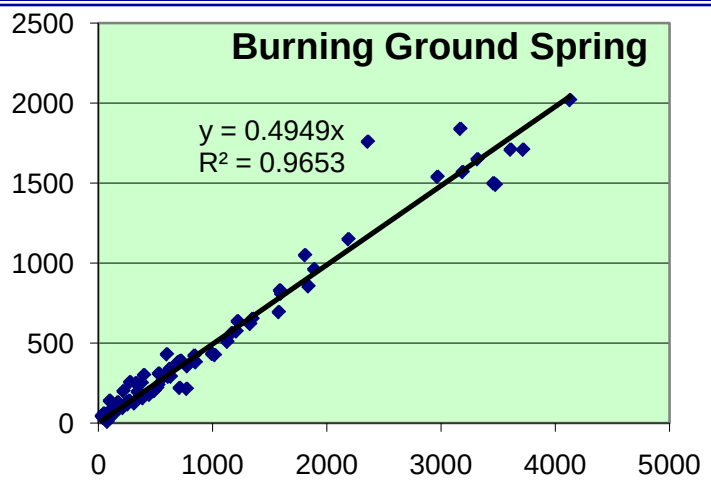
Additional Evidence for Natural Aluminum

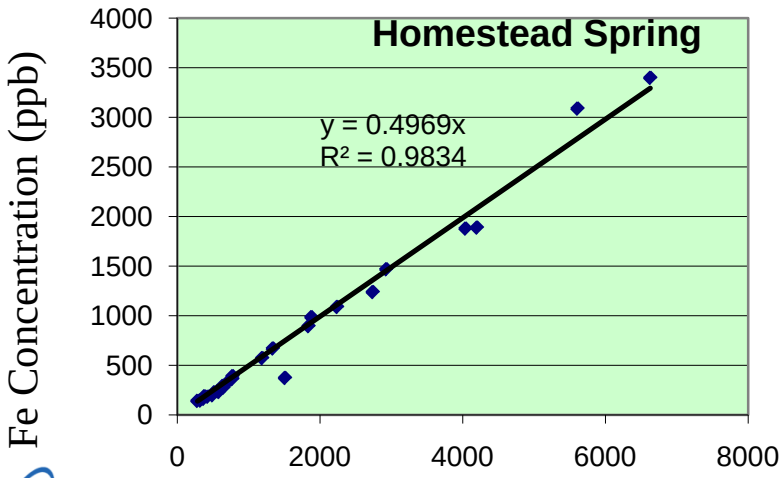


Filtered

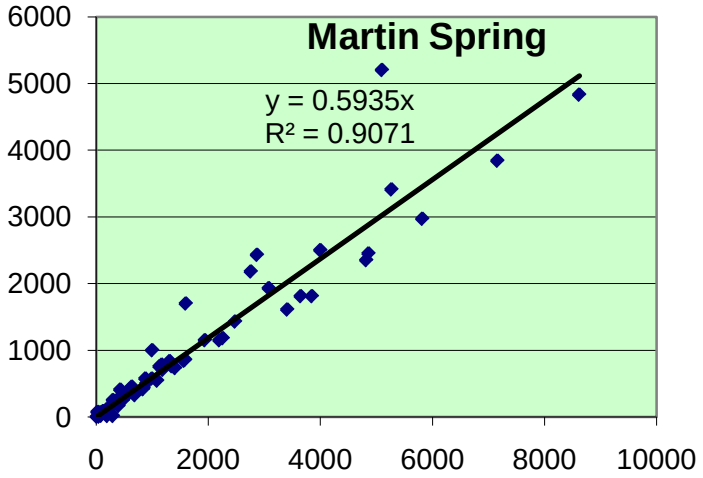
Additional Evidence for Natural Aluminum (cont)





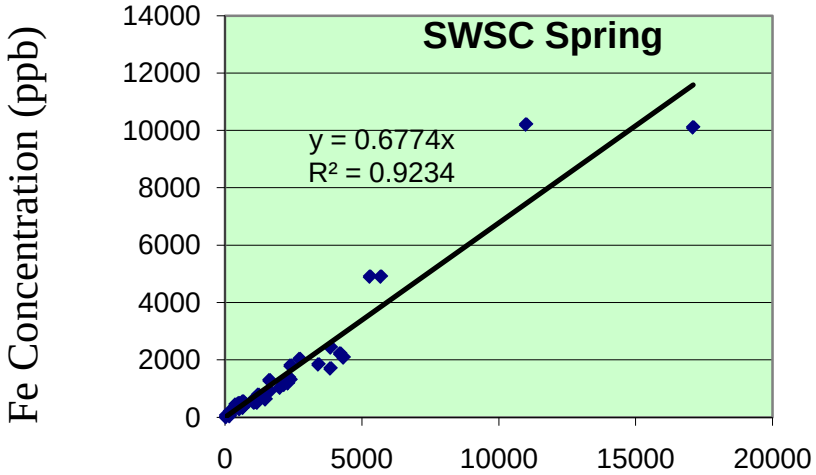


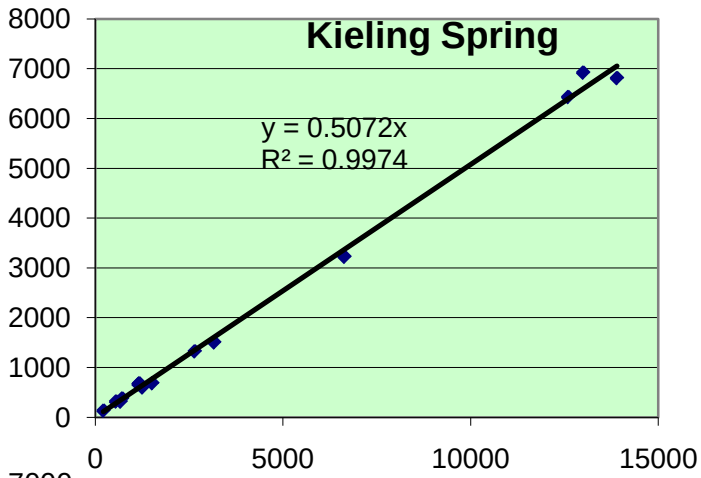
Filtered

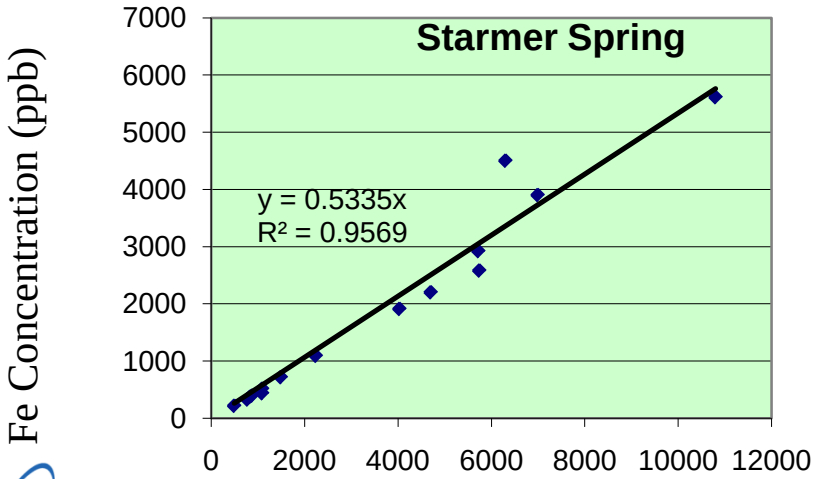


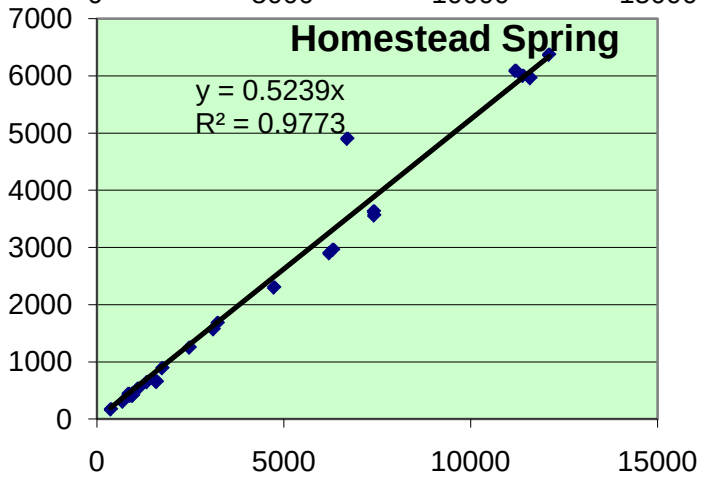
Unfiltered

Additional Evidence for Natural Aluminum (cont)









Al Concentration (ppb)

Al Concentration (ppb)

Unfiltered

Discussion Points

- Could NPDES Permit conditions be formulated to allow natural aluminum ‘in’ to equal natural aluminum ‘out’
- Could Stormfilters be redesigned to discharge to infiltration gallery rather than outfall, and hence be outside of the domain of NPDES
- LANL could research Aluminum colloid removal options (but even filtration unlikely to consistenly achieve standards