

Remedy Rescue at the Cleburn Street Well Site

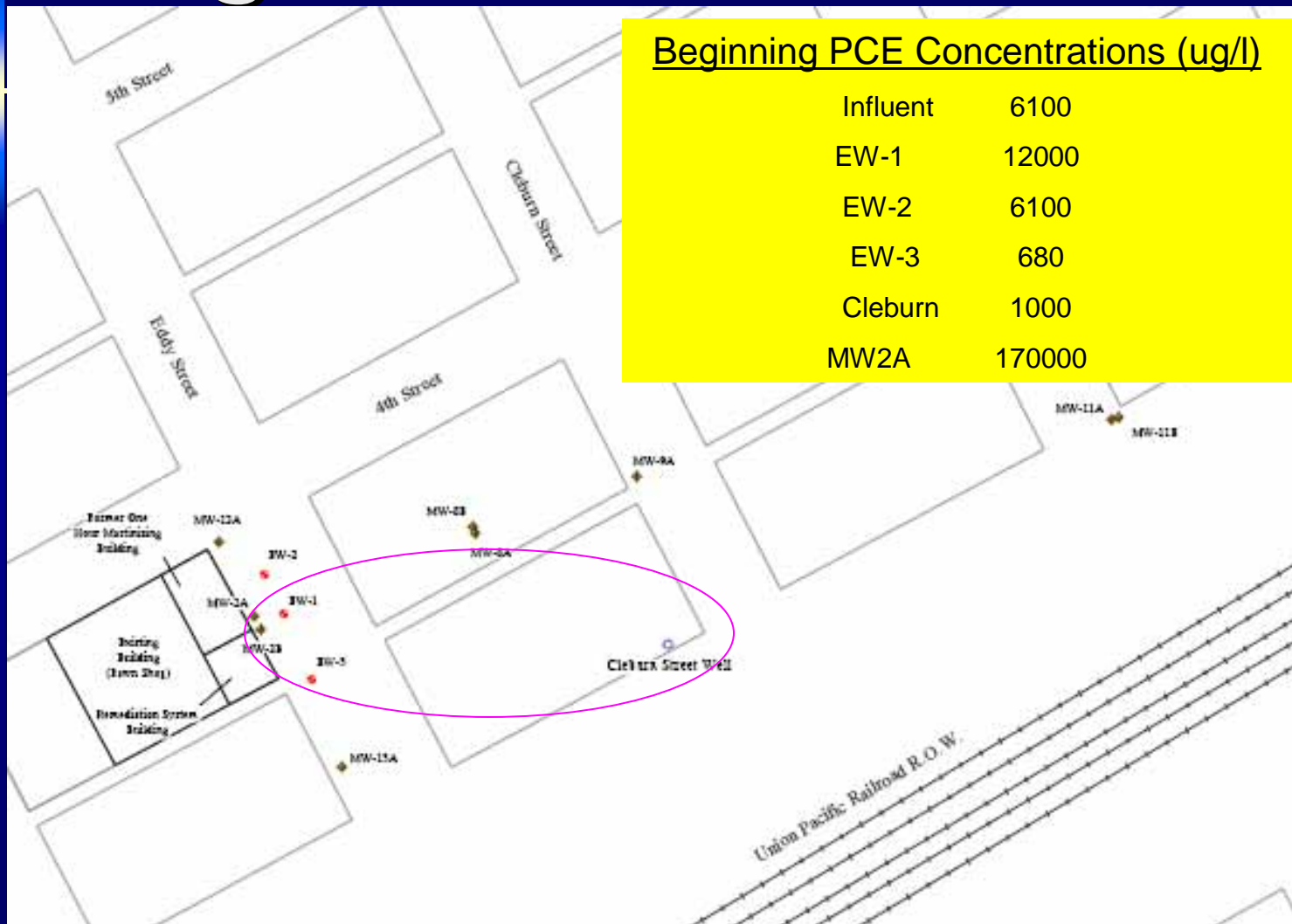
Grand Island, Nebraska

Mary Peterson, EPA Region 7

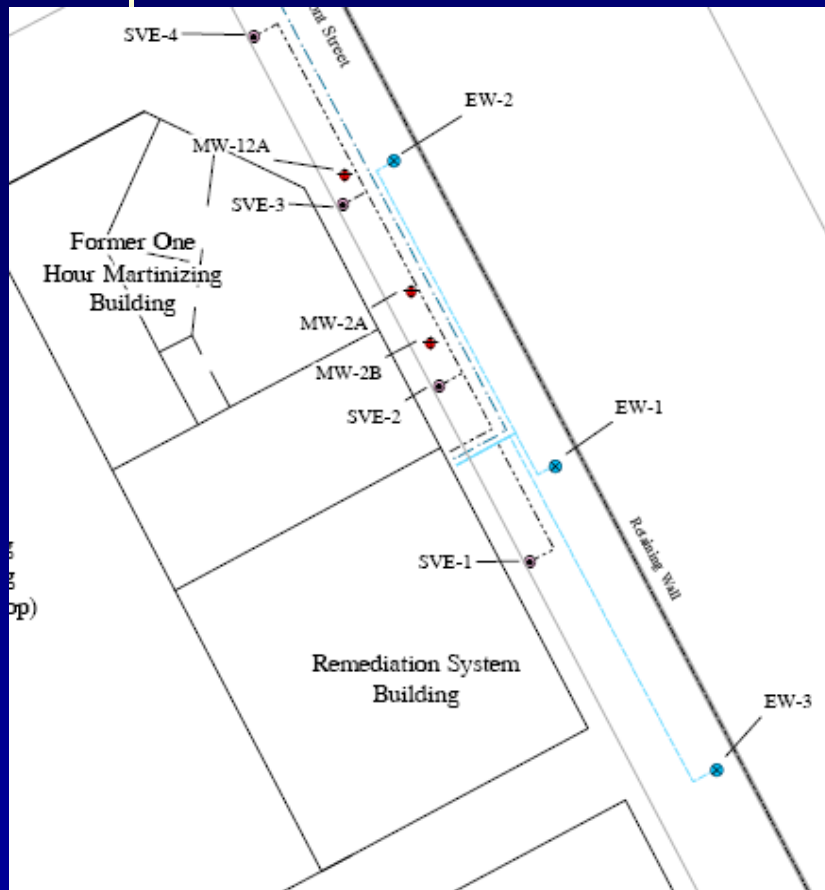
Original Problem

Beginning PCE Concentrations (ug/l)

Influent	6100
EW-1	12000
EW-2	6100
EW-3	680
Cleburn	1000
MW2A	170000



Remedy



Groundwater Extraction/Air Stripping

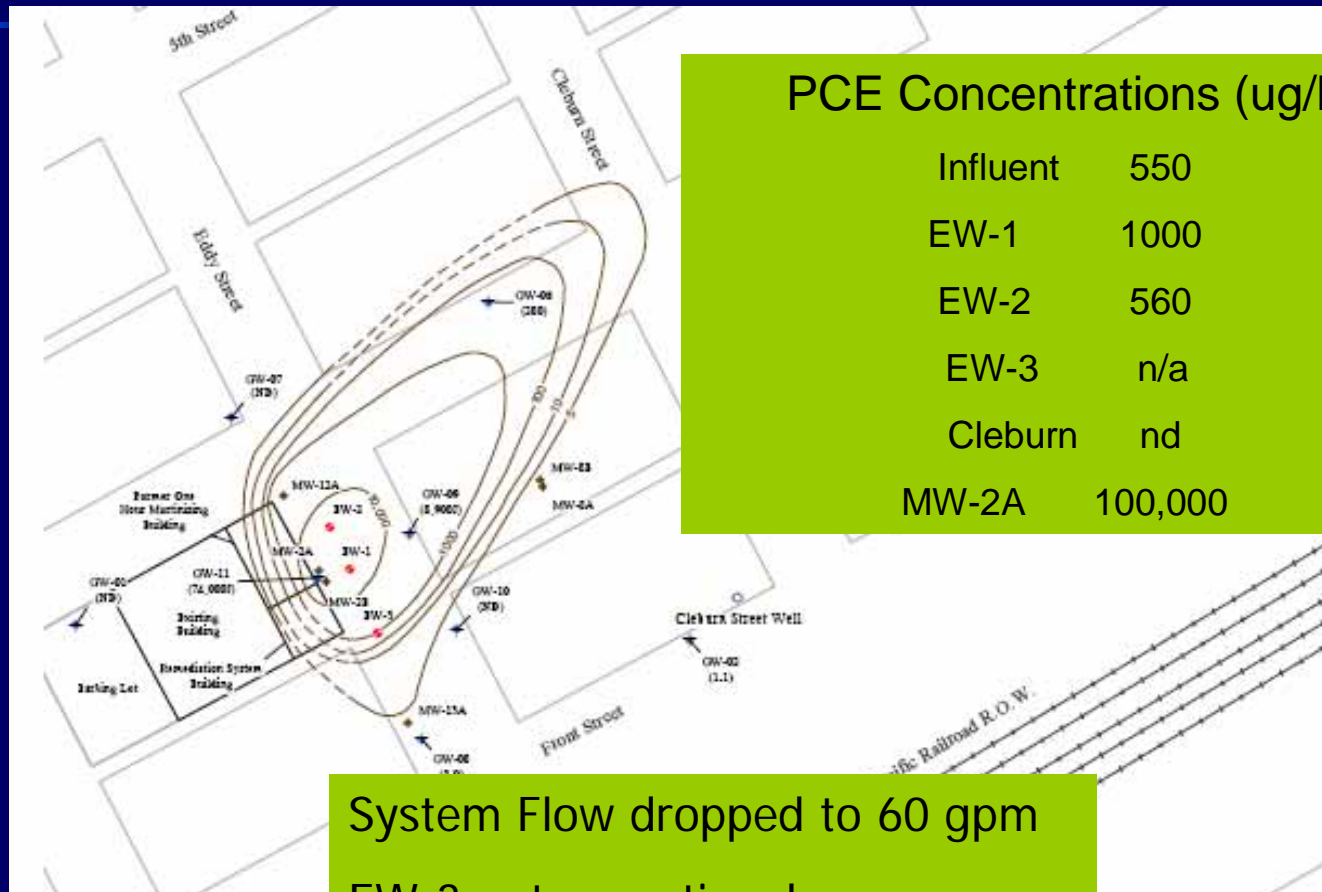
Design Flow 120 gpm

Soil Vapor Extraction/Carbon Treatment

Started up in 1999



GW Remedy Status January 2007

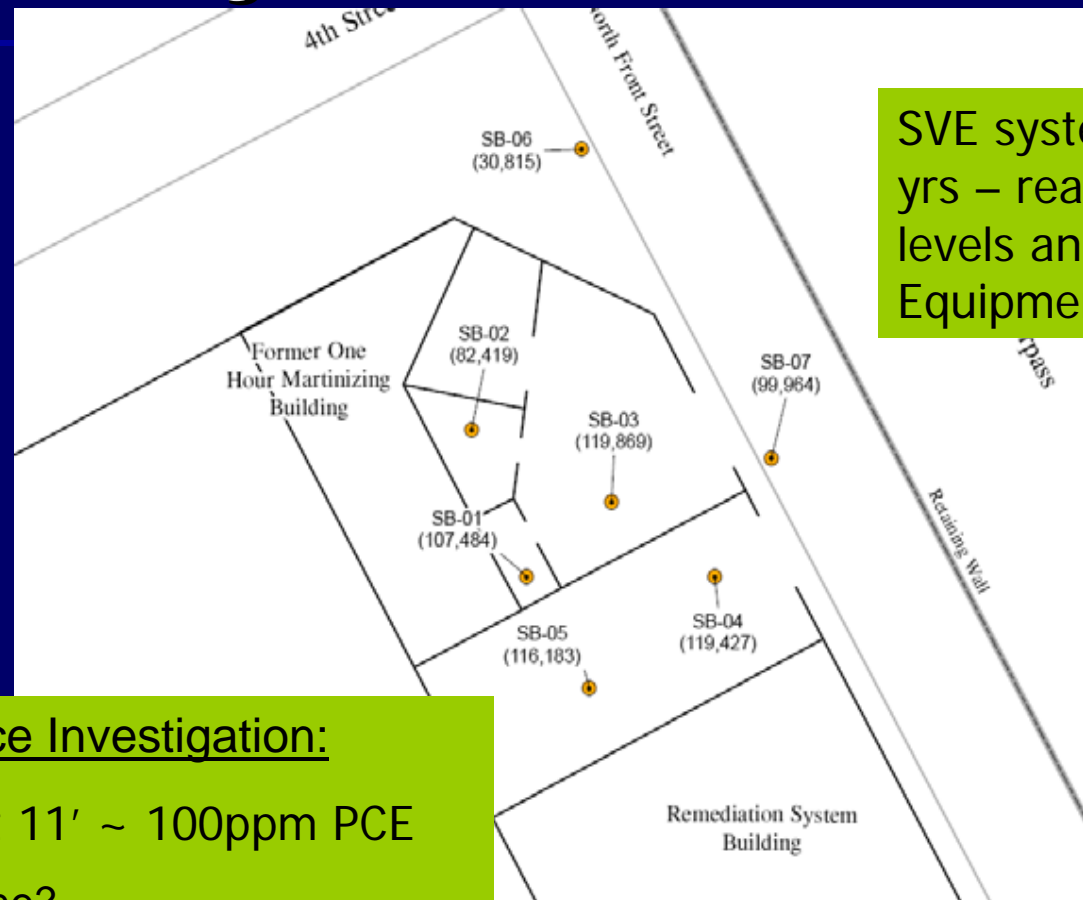


PCE Concentrations (ug/l)

Influent	550
EW-1	1000
EW-2	560
EW-3	n/a
Cleburn	nd
MW-2A	100,000

System Flow dropped to 60 gpm
EW-3 not operational
EW-2 flow < 10 gpm

SVE Status January 2007



SVE system operated 2+ yrs – reached asymptotic levels and turned off. Equipment still at site.

2006 Source Investigation:

- Soil gas at 11' ~ 100ppm PCE
- Vadose Zone?
- DNAPL source?

Optimization – Why do it?

- Increase Efficiency
- Identify Cost Saving Measures

This works when the remedy has been well maintained!

“Optimization” Activities for Pump and Treat System

Improve Extraction Efficiency:

- Evaluated/cleaned well screens and piping
- Replaced pumps and fouled equipment

RESULTS

Pre-Opt Flow = 56 gpm

Post-Opt Flow = 110 gpm



Additional Improvements to the Pump and Treat System

- Replaced acid pump
- Well vault modifications
- Relocated sampling ports
- Installed passive diffusion bag samplers in all MWs

“Optimization” Activities for the SVE System

- Evaluate source beneath building
 - soil or GW?
- Evaluate capabilities of SVE system
 - Mechanical inspection and rehab
 - Step tests
 - Start up

Source Evaluation

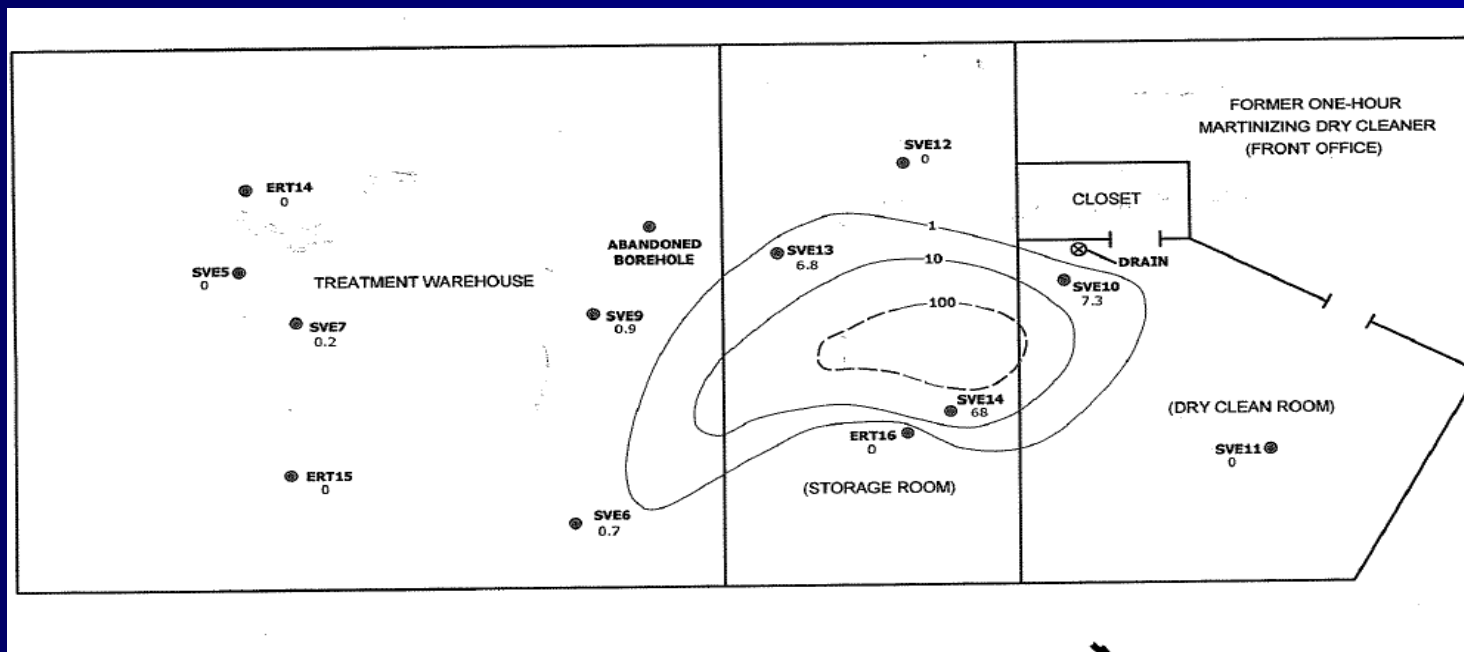
- **Geoprobe borings inside building– low PCE in soil; high PCE in soil gas (Oct '06, June '07)**
- **Installed 5 new SVE wells, 4 vapor monitoring points, and 3 MWs inside building – June 2007**
 - **Equipment rehab – August 2007**
- **Step tests and vapor sampling – October 2007**

Equipment Rehab

- New moisture separator installed
- Pressure gages replaced
- Electrical inspection/amp draw on blower
- Wellhead piping reconfigured
- Sample port installed on combined inlet
- New flow sensor and PID purchased
- Water "slug" removed from pipeline

Vapor Sampling/Step Test Results October 2007

- Existing SVE wells - high PCE conc.
- New SVE wells show moderate PCE levels
- Step tests show existing system exerts significant pull beneath building

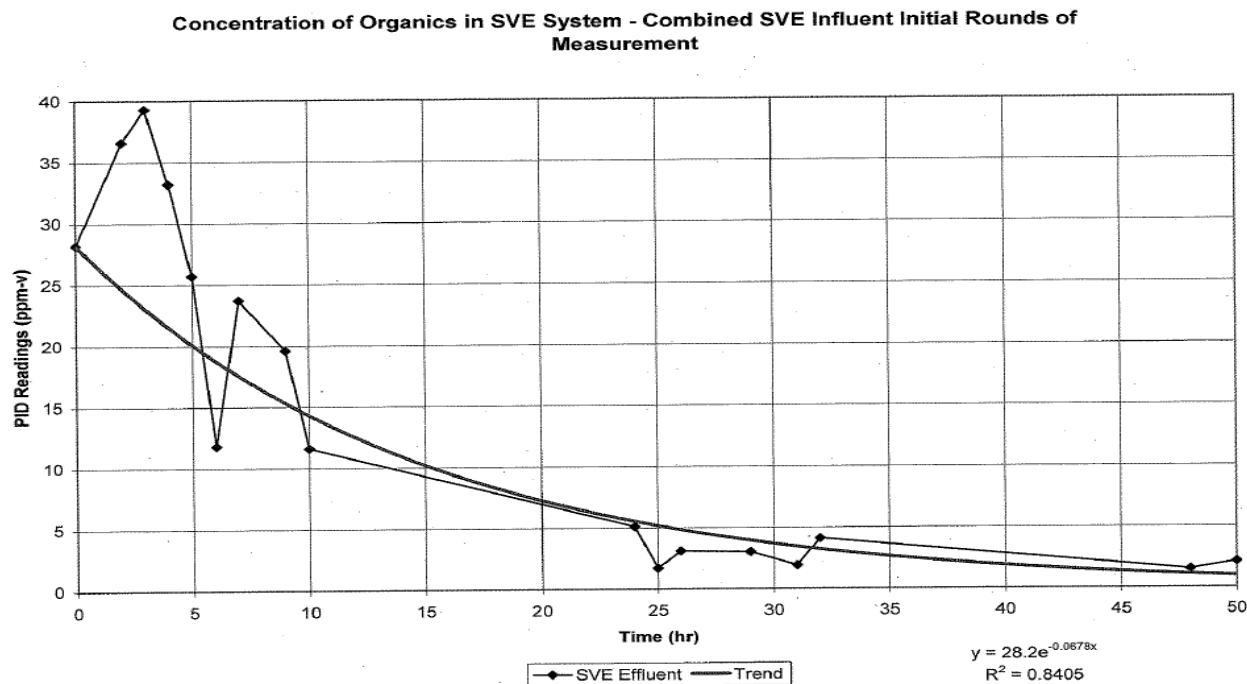


SVE Start-Up – Jan 2008

Use of a portable GC/MS allowed for quick data turn-around and multiple sampling rounds during first 48 hours.



SVE Start Up – Jan 2008



PCE levels dropped significantly in first 48 hours. Sustained concentration not great enough to justify full time operation.

The Prairie Dog Filter?



Removal of the filter doubled our air flow; from 300 cfm to 660 cfm at same vacuum!



Next Steps

- Evaluate GW contamination at depth - May 08
- Operate SVE system in pulsed mode
- Conduct pilot studies to enhance mass removal near hot spot – summer 08
- Implement remedy modifications
- TI waiver?
- ROD Amendment?
- State take-over?

How to Avoid a Remedy Rescue

- Need good O&M program – Are we making progress toward RAOs?
- Get out of your cube – need boots on the ground and good field engineers
- Get the support you need – hydro, engineering, construction
- Set achievable goals – know where you're going and how to get there