

UPDATE for USEPA
HOOKER/RUCO FACILITY

HICKSVILLE, NEW YORK

November 4, 2009

AGENDA

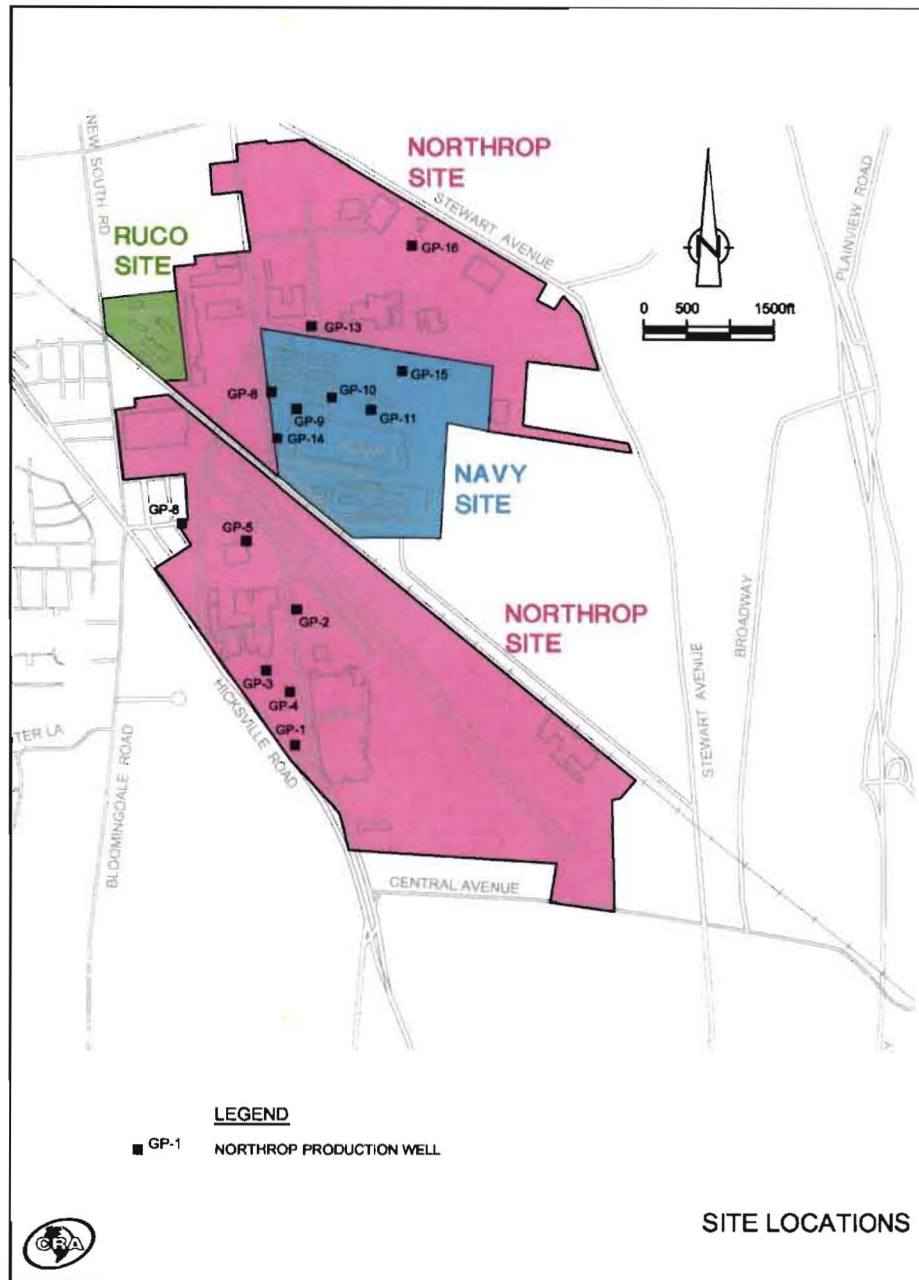
A - Site History / Background

B - Overview of Operable Units

C - Biosparge Remedy

A

Site History / Background



Hooker/Ruco Site History

Site operated 1945 through 2002

OxyChem (and predecessors) operated 1945 through 1982

- Three subsequent facility owners

Produced PVC (until 1975), polyesters, polyurethanes, and plasticizers

Major chemical of concern = Vinyl Chloride

Storm water and some process water

historically discharged to on-Site sumps

Site Regulatory History

Superfund Site under USEPA lead

NYSDEC & Nassau County receive updates

Site studies performed throughout 1990s

Site Regulatory History

All studies complete both on-Site and off-Site

All On-Site remedies complete

- Bayer working with NYSDEC to close Site under RCRA Program

Off-Site remedy in implementation phase

- GSHI working with EPA to finalize groundwater remedy
- Cooperative effort with Northrop, Navy & GSHI

B

Operable Units

Operable Units

Three Operable Units for Site

- OU1 for on-Site soil / groundwater
 - Complete
- OU2 for Therminol spill
 - Complete
- OU3 for off-Site groundwater
 - Ongoing

OU-1

On-Site Soils/Groundwater

ROD Issued 1994

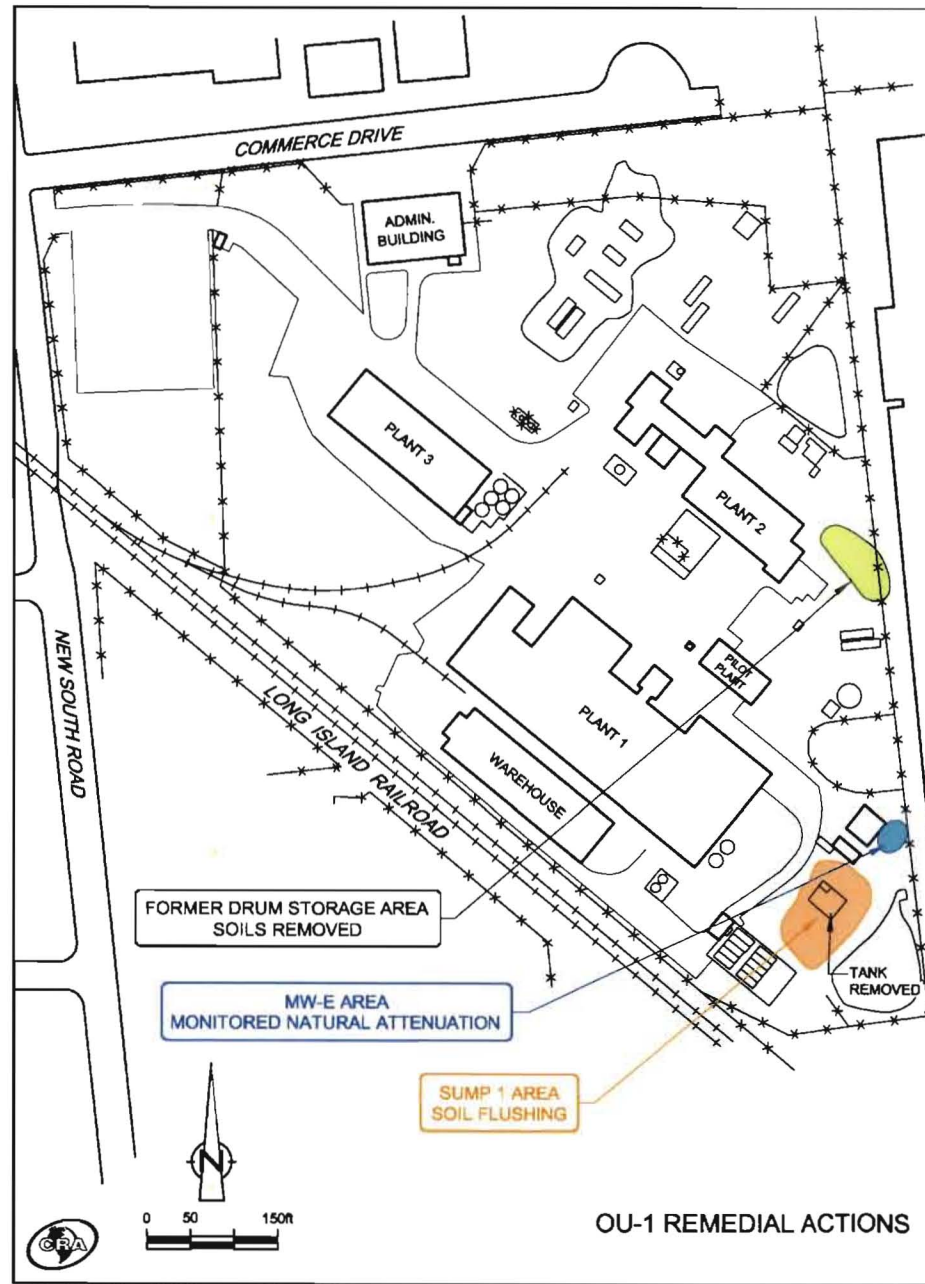
- Former storage areas and sumps (6)
- Received discharges from Plant including Vinyl Chloride
- Work completed in 2006
- USEPA approval issued Sept 28, 2007

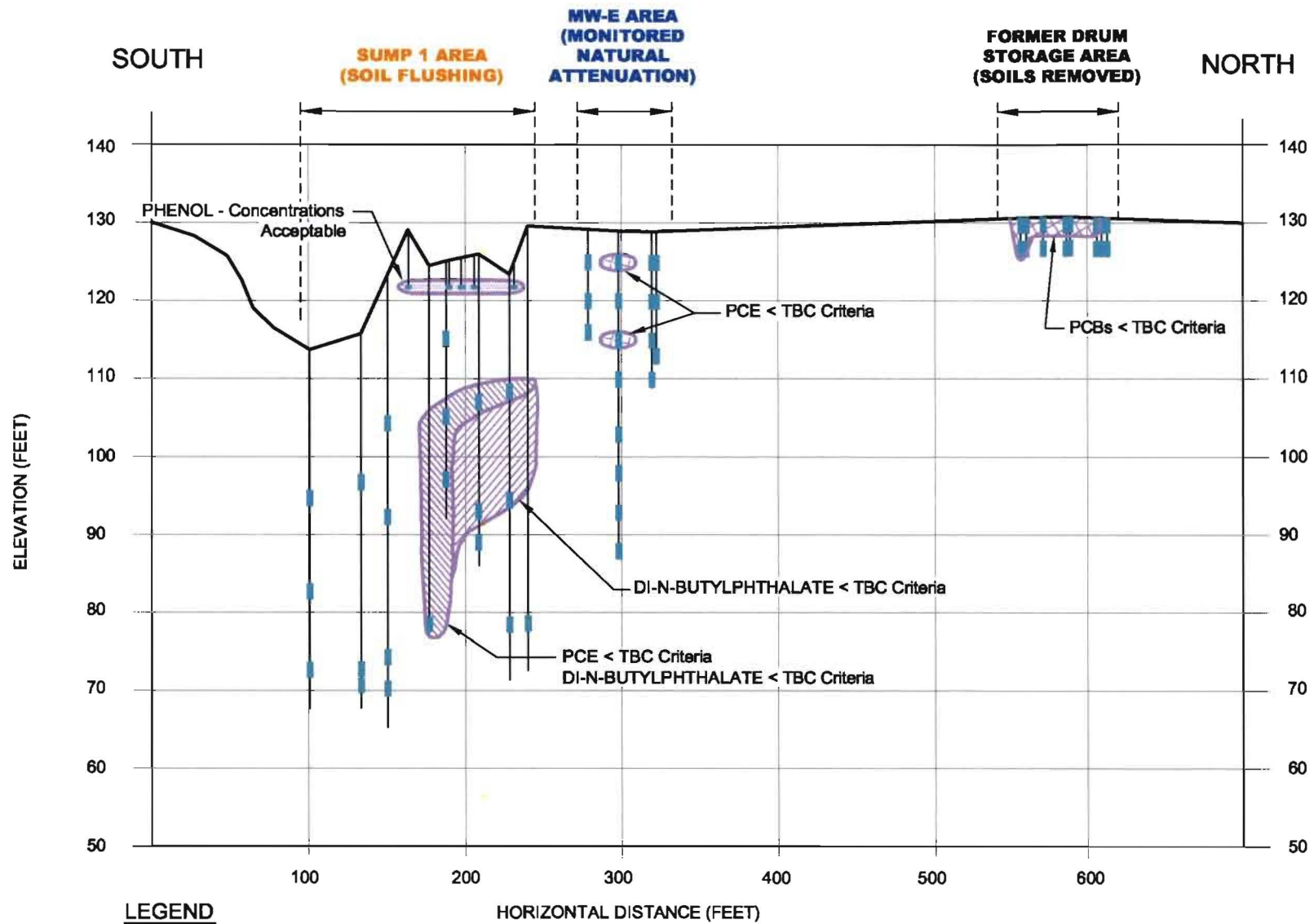
OU-1

On-Site Soils/Groundwater

Remedy

- Sump 1
 - Removed Concrete Tank (2000)
 - Soil Flushing
- Former Drum Storage Area
 - Excavated PCBs > 10 ppm
 - 220 cy
- MW-E Area
 - Monitored Natural Attenuation





LEGEND

- EXISTING GROUND
- BOREHOLE
- SAMPLED INTERVAL (ft bgs)

SCALE: HORZ. 1"=100'
VERT. 1"=20'



OU-1 POST-REMEDY SOIL DATA

OU-1

On-Site Soils/Groundwater

EPA concurs that the minimal on-Site chemical presence in groundwater can be addressed by OU-3 off-Site remedy

OU-1

On-Site Soils/Groundwater

Bayer demolishing plant

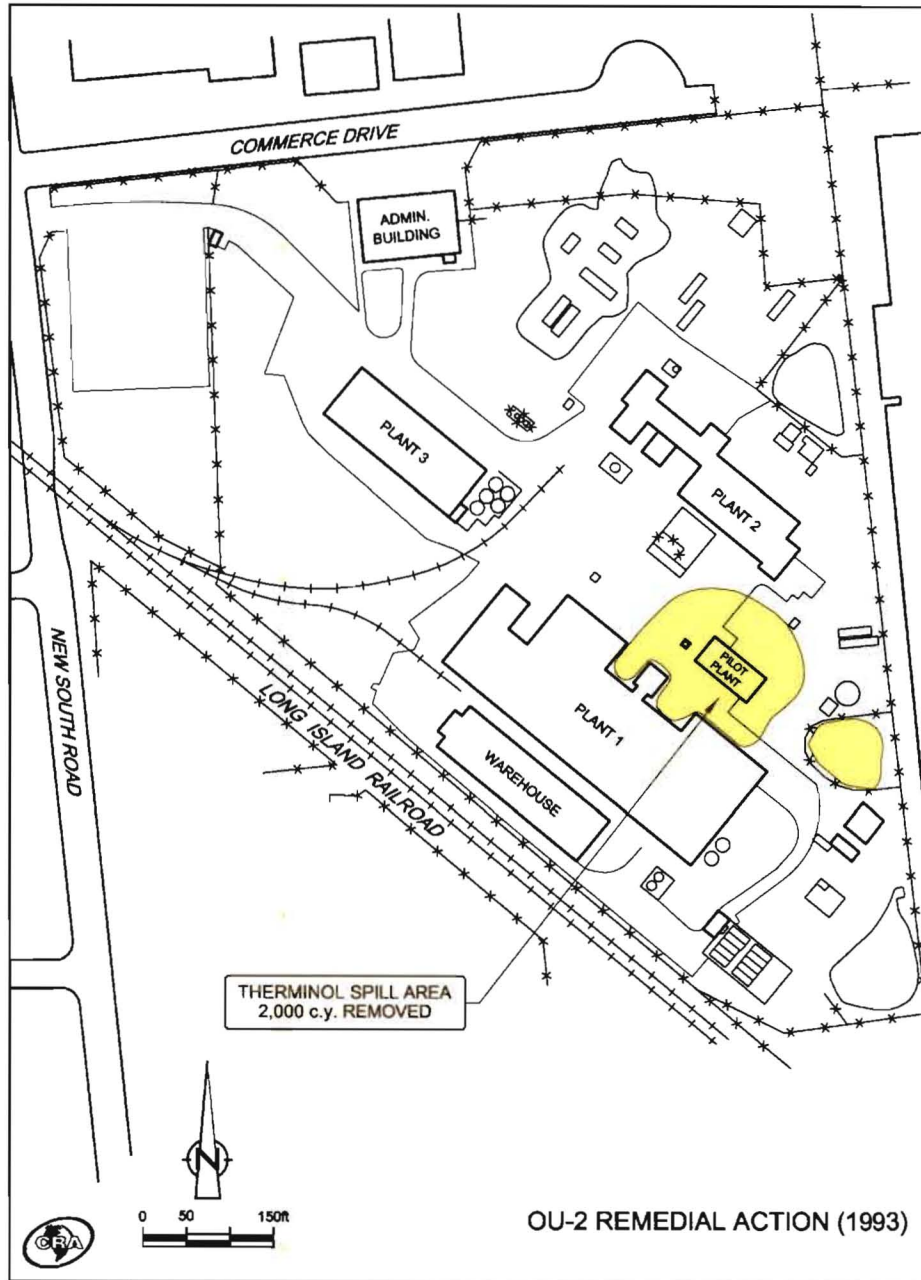
NYSDEC and Bayer following RCRA closure
procedures

OU-2

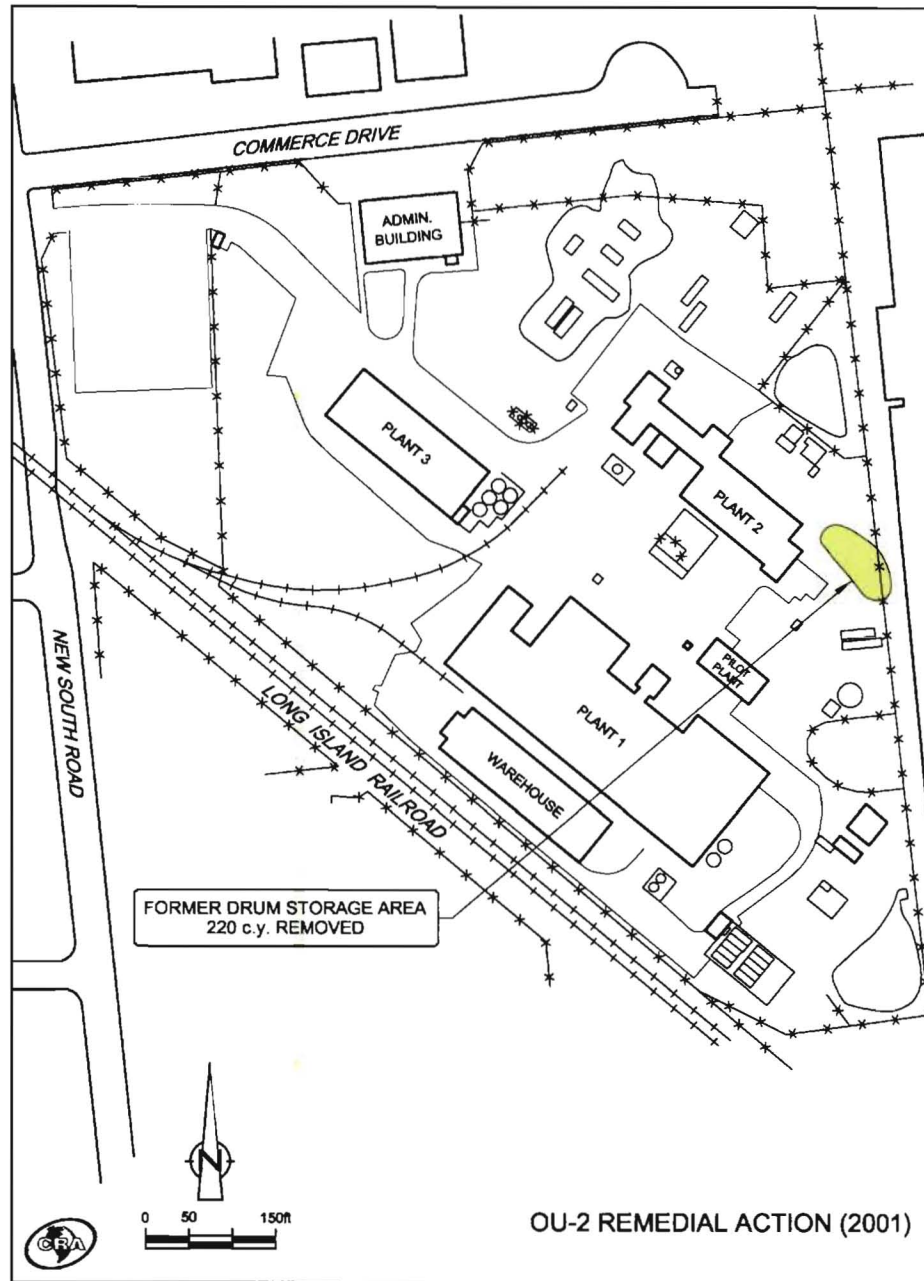
Therminol Area

ROD issued 1991

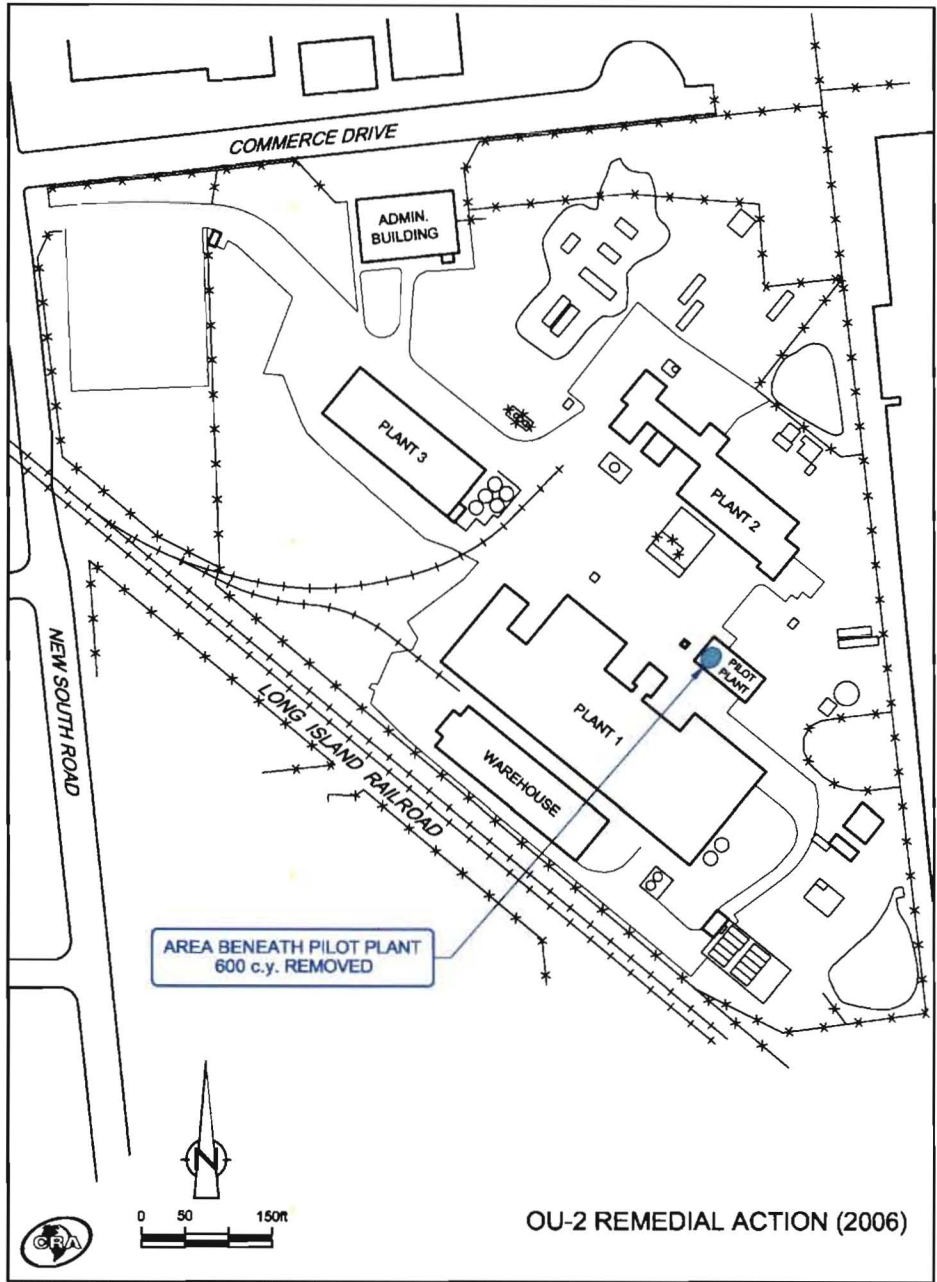
- Soil excavation & removal completed in 1993
 - 2000 cy removed
- Additional area identified & removed in 2001 under OU1
 - 220 cy removed
- Area under building became accessible in 2006
 - 600 cy removed
- All PCBs >10 ppm removed



OU-2 REMEDIAL ACTION (1993)



OU-2 REMEDIAL ACTION (2001)



OU-2 REMEDIAL ACTION (2006)

OU-3

Off-Site Groundwater

ROD Issued September 2000

Remedy Selected

- Oxygen Injection (Biosparge) into the impacted groundwater layers
- Vinyl Chloride => Water, CO₂, chloride, ethenes, ethanes
- Pump & treat stipulated fall back

Studies have refined plume location, aerobic conditions, injection capabilities

OU-3

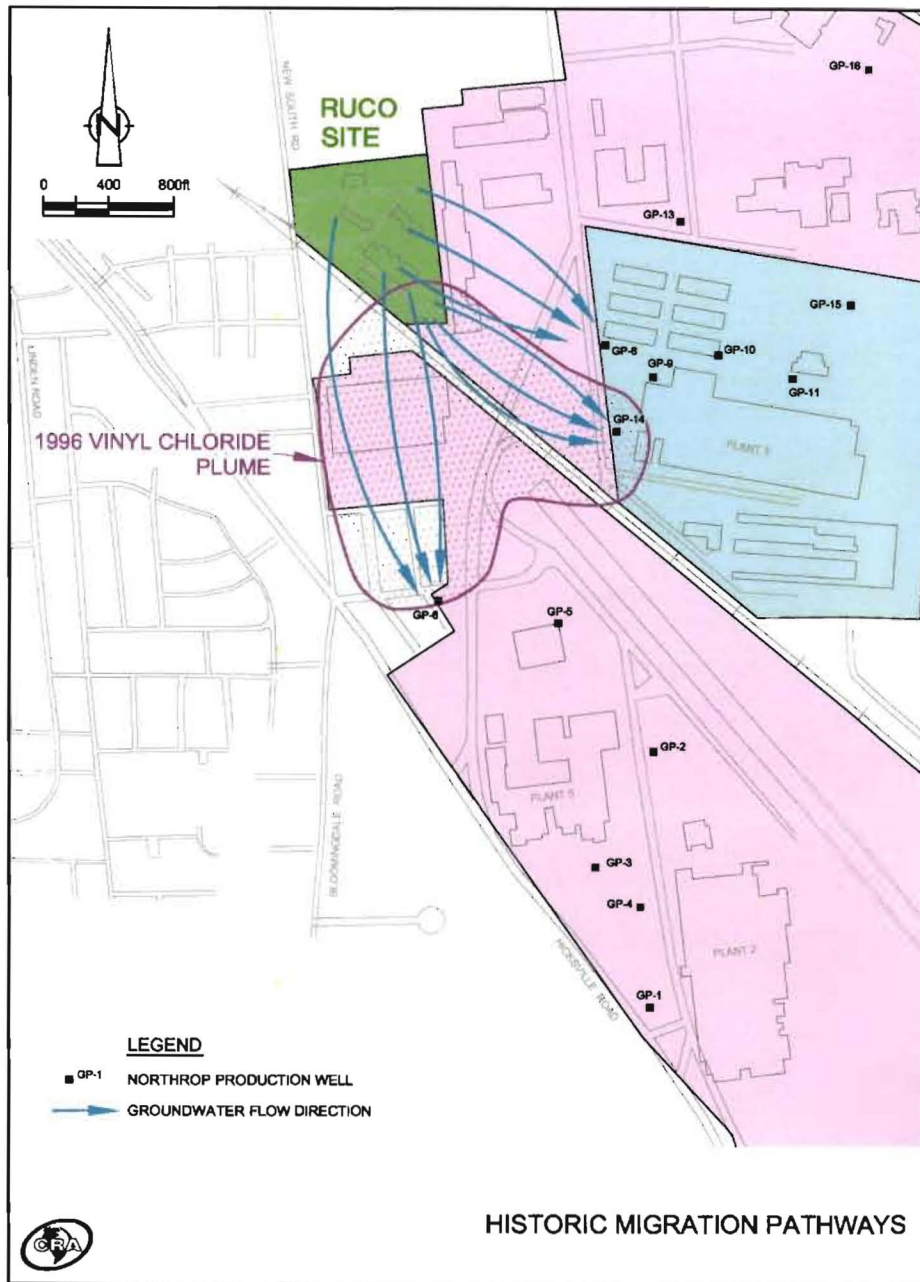
Off-Site Groundwater

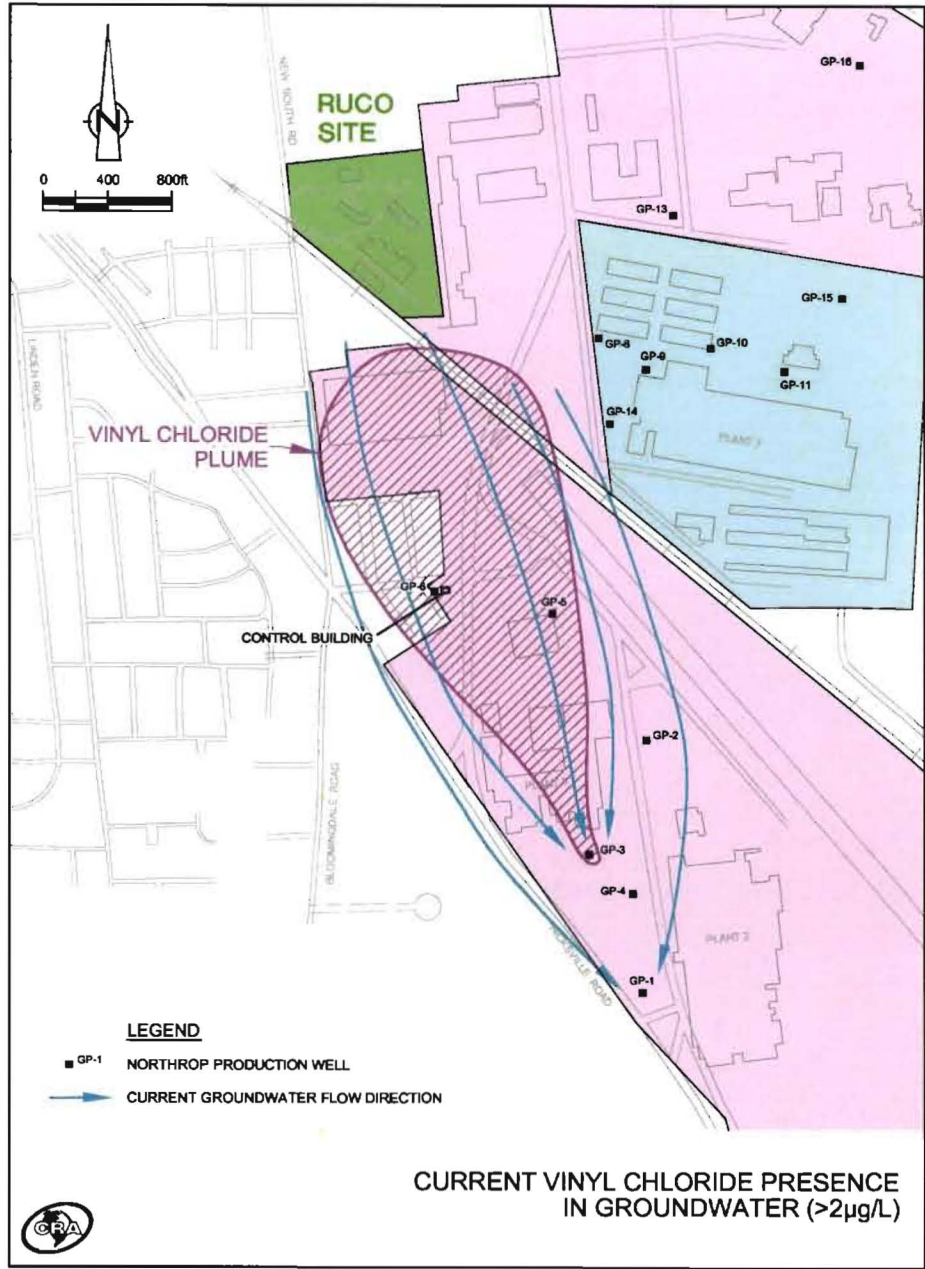
Flow is to the south but can be influenced by pumping

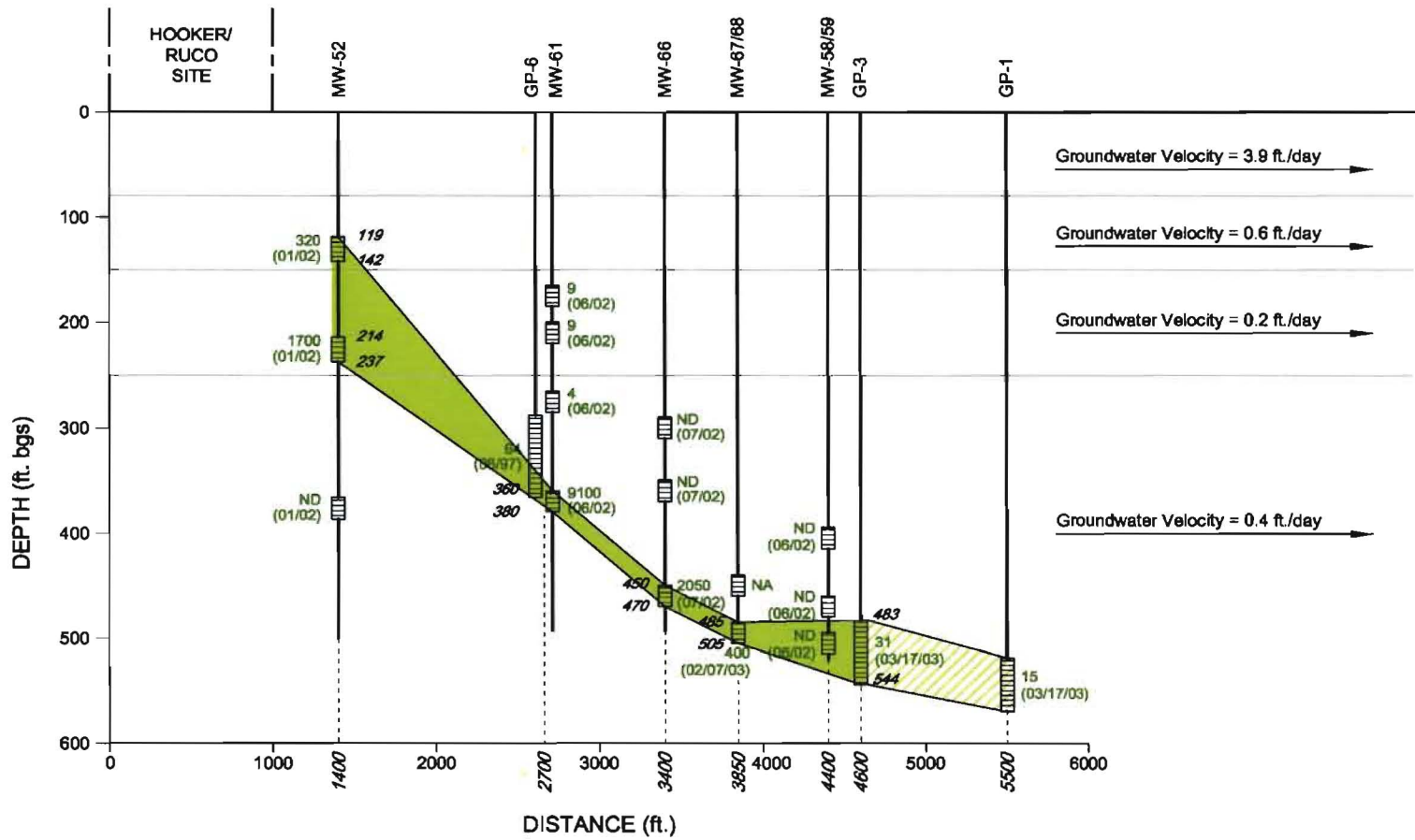
Entire vinyl chloride plume is hydraulically contained by Northrop pumping system (GP-1 and GP-3)

Historical rate of vinyl chloride migration
150 feet / year






Vinyl chloride has been drawn to a depth of 550 feet due to pumping







LEGEND

-  WELL SCREEN
-  2000 VINYL CHLORIDE CONCENTRATION (µg/L)
-  (09/00) MONTH/YEAR
-  VINYL CHLORIDE PLUME
-  380 DEPTH (ft. bgs)

VINYL CHLORIDE PLUME
CROSS-SECTION SCHEMATIC
Hicksville, New York



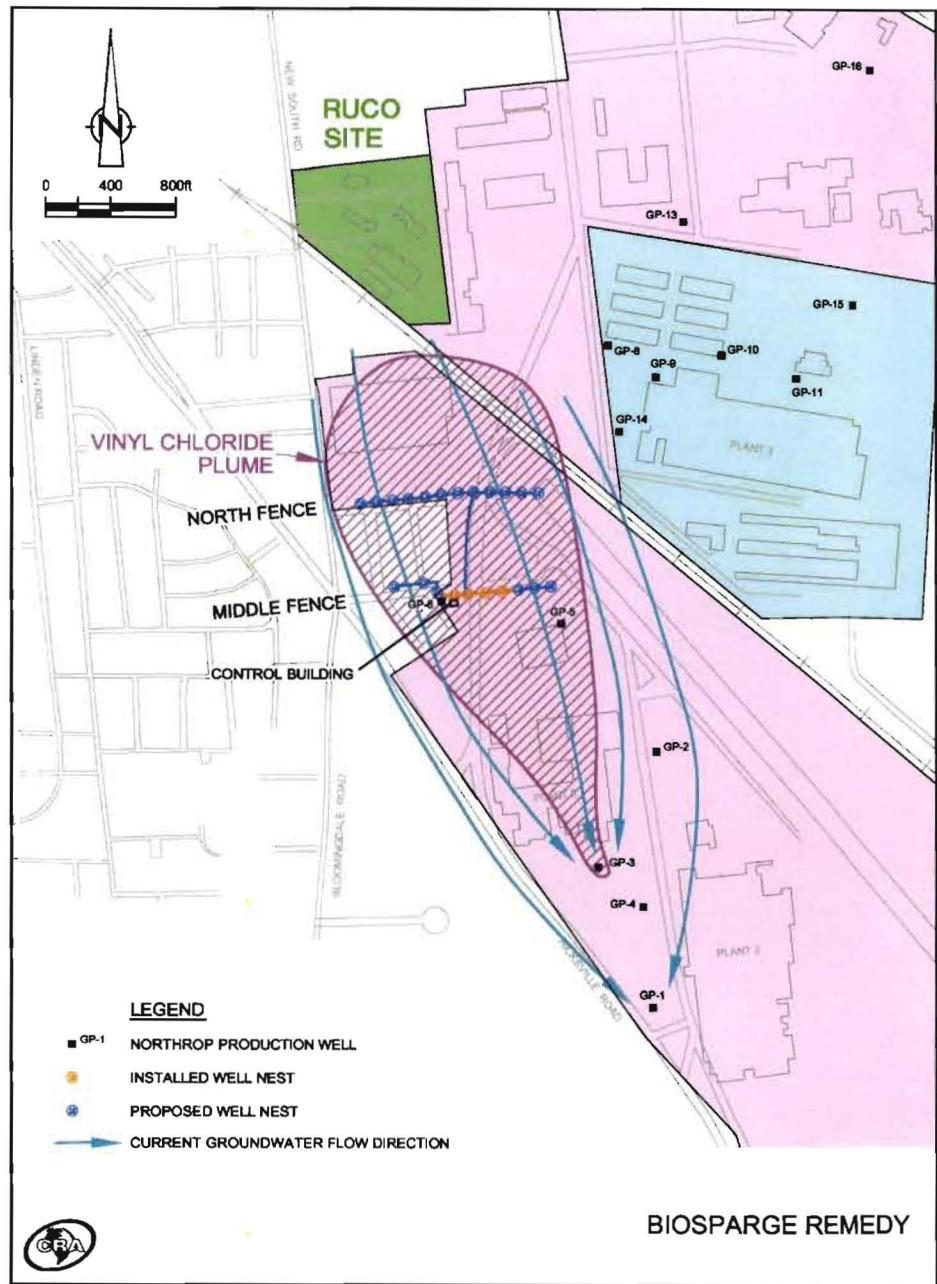
OU-3

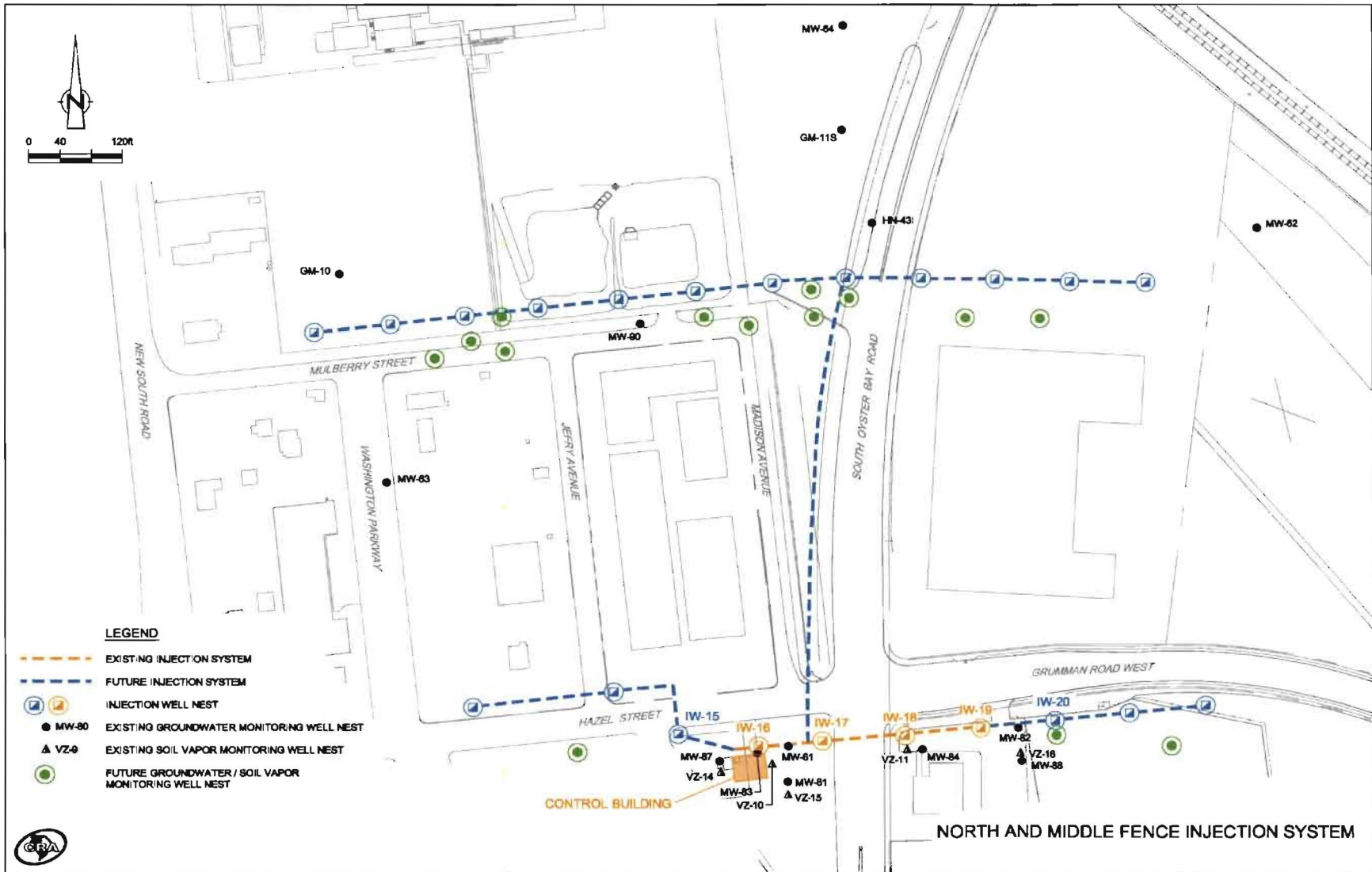
Off-Site Groundwater

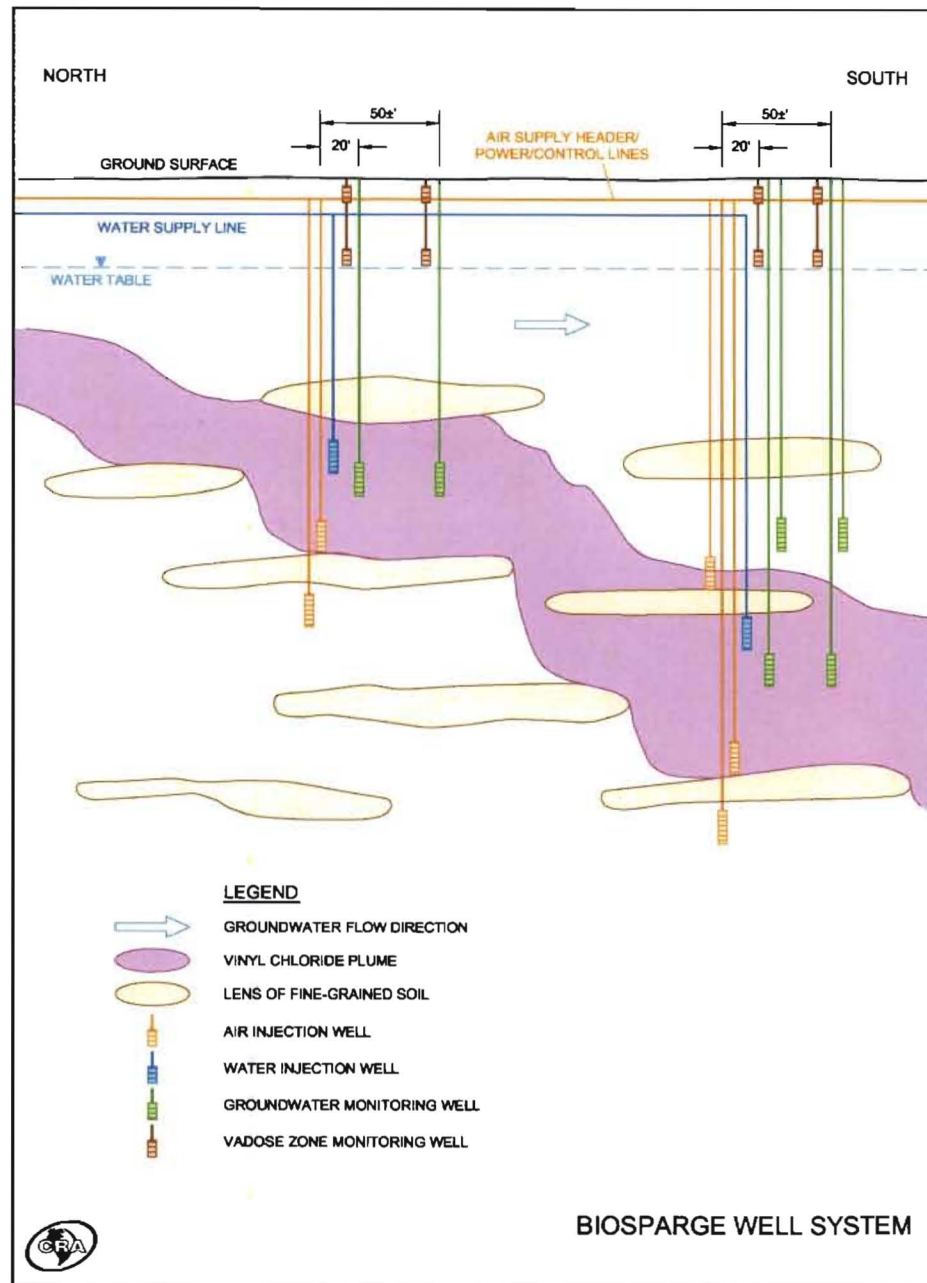
FINAL 100% Design Report - May 27 2005

Remedy Under Construction

- Phase 1 Injection and Monitoring System
Constructed and Operating since October 2006
- Operating Parameters have been defined







C

Biosparge Remedy

EPA Comments

Effectiveness of Biodegradation

- Is oxygen being distributed ?
- Is biodegradation occurring ?
- Are chemicals being lifted to shallower depths ?

1 Oxygen Distribution

Goal for oxygen concentration to support biodegradation

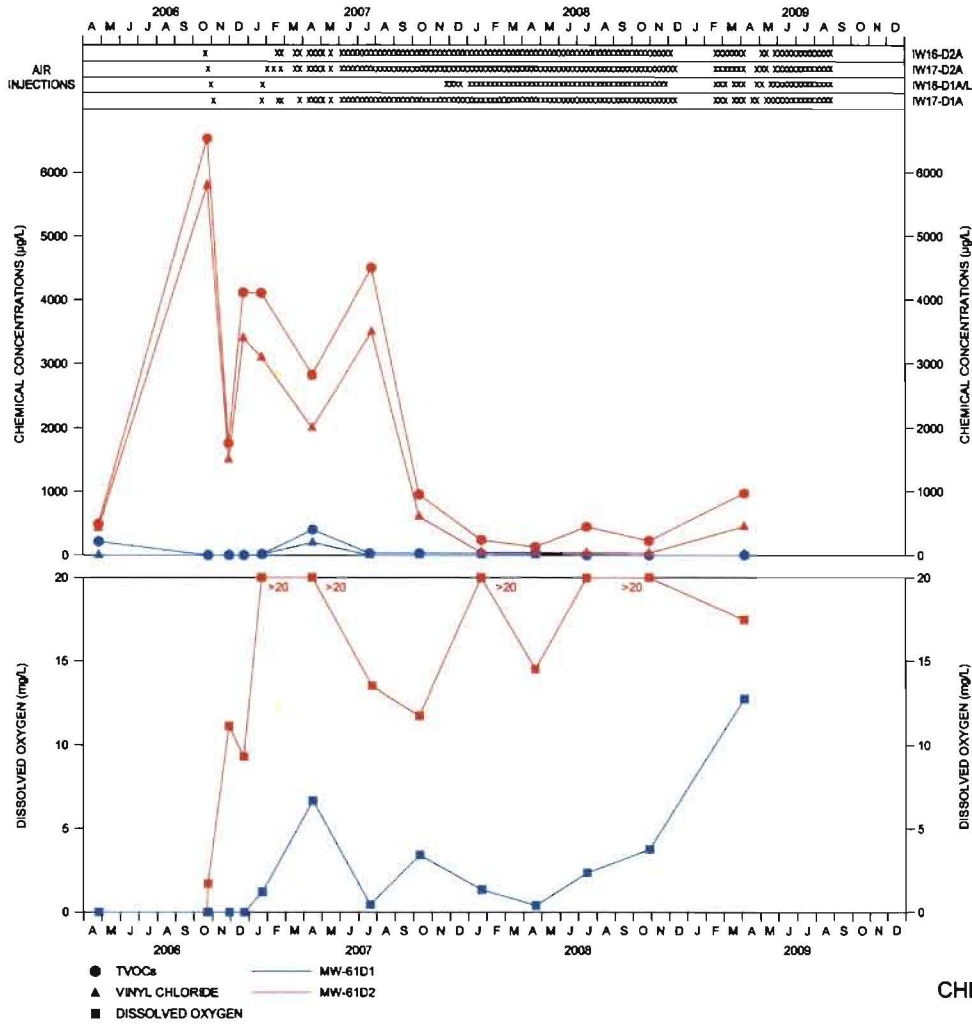
- 2 to 5 ppm
- >5 ppm ideal

Oxygen Concentrations in wells

- prior to injections - average = 0.7 ppm
- current concentration - average = 11.2 ppm

Oxygen Concentrations (ppm)

Well	Initial	Current	Well	Initial	Current
MW-61 D1	0.0	12.8	MW-83 D2	2.0	20
MW-61 D2	0.0	17.5	MW-84 D1	0.0	13.3
MW-81 D1	0.0	0.0	MW-84 D2	2.7	10.2
MW-81 D2	0.0	10.6	MW-87 D1	0.0	8.6
MW-82 D1	0.0	5.4	MW-87 D2	1.6	9.9
MW-82 D2	0.0	>20	MW-88 D1	3.1	16.7
MW-83 D1	0.0	1.4	MW-88 D2	0.0	9.9



WELL NEST MW-61
 CHEMICAL CONCENTRATION PLOTS
 MIDDLE INJECTION FENCELINE



1 Oxygen Distribution

Oxygen delivery

- air injection
- water injection (from Northrop's treatment system)

Conclusions

- oxygen delivery is effective
- 100' spacing of injection wells is sufficient
- oxygen concentrations suitable for biodegradation

2 Chemical Reductions

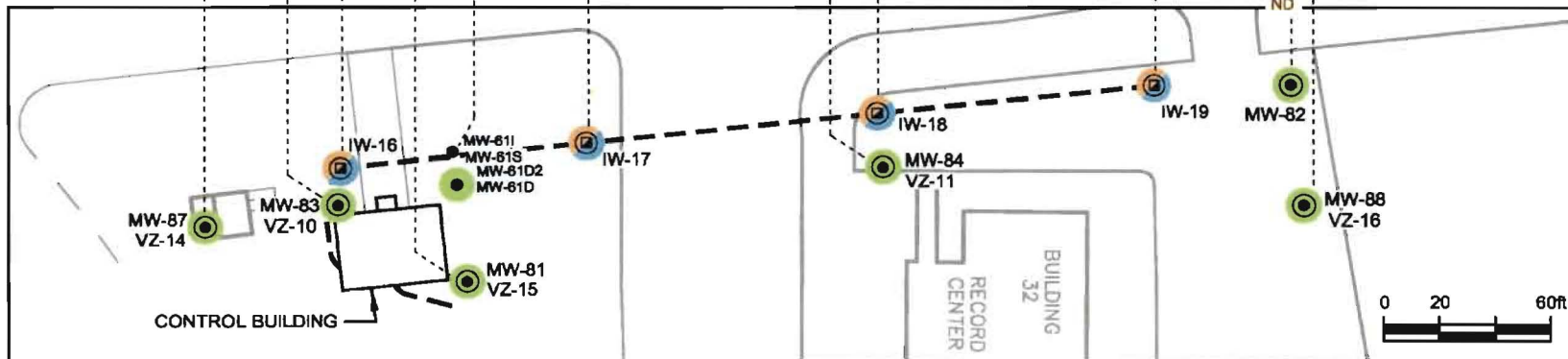
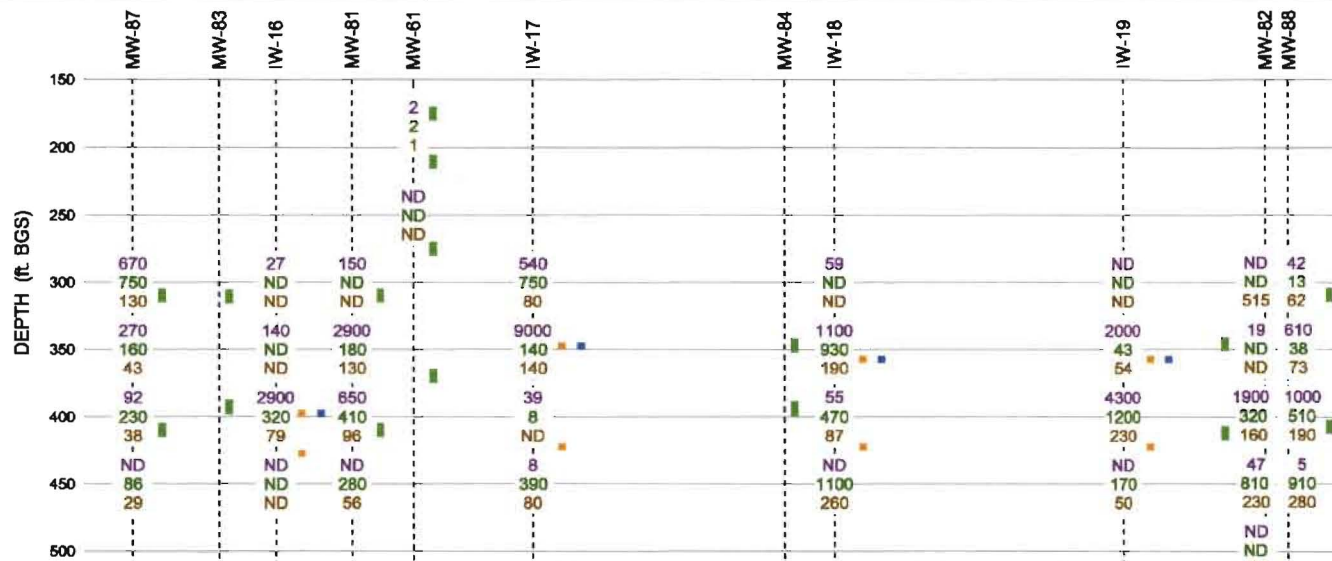
Initially some mixing effect following startup of oxygen / water injections

Vinyl Chloride concentrations reducing

- Initial Concentration - Average = 1,845 ppb
- Current Concentration - Average = 72 ppb
- Average reduction = 95%

Vinyl Chloride Concentrations (ppb)

Well	Initial Current		Well	Initial Current	
MW-61 D1	200	ND	MW-83 D2	74	2.4
MW-61 D2	5,800	450	MW-84 D1	2,600	ND
MW-81 D1	430	4.3	MW-84 D2	265	ND
MW-81 D2	1,400	ND	MW-87 D1	630	ND
MW-82 D1	5,500	1.7	MW-87 D2	ND	ND
MW-82 D2	3,600	3.5	MW-88 D1	1,500	410
MW-83 D1	330	71	MW-88 D2	3,500	59



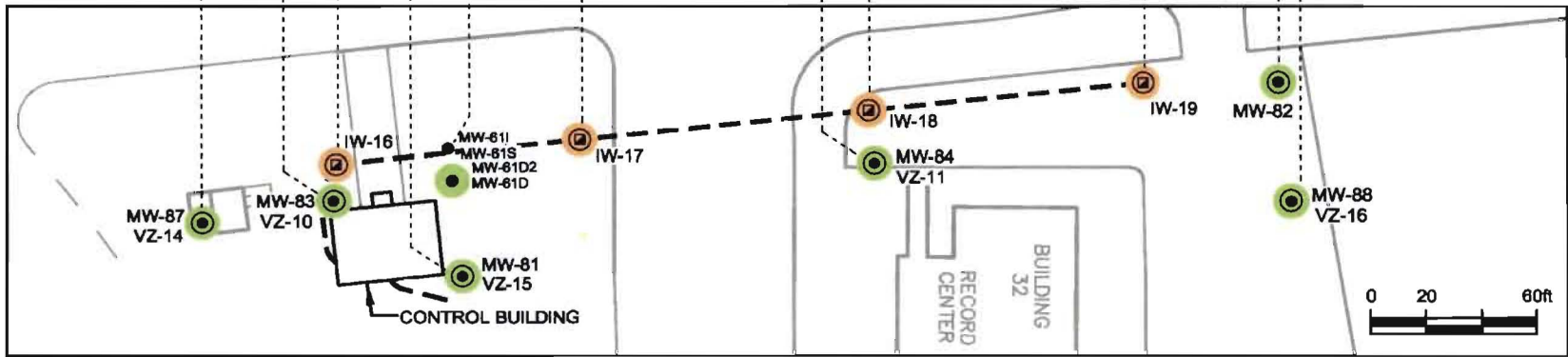
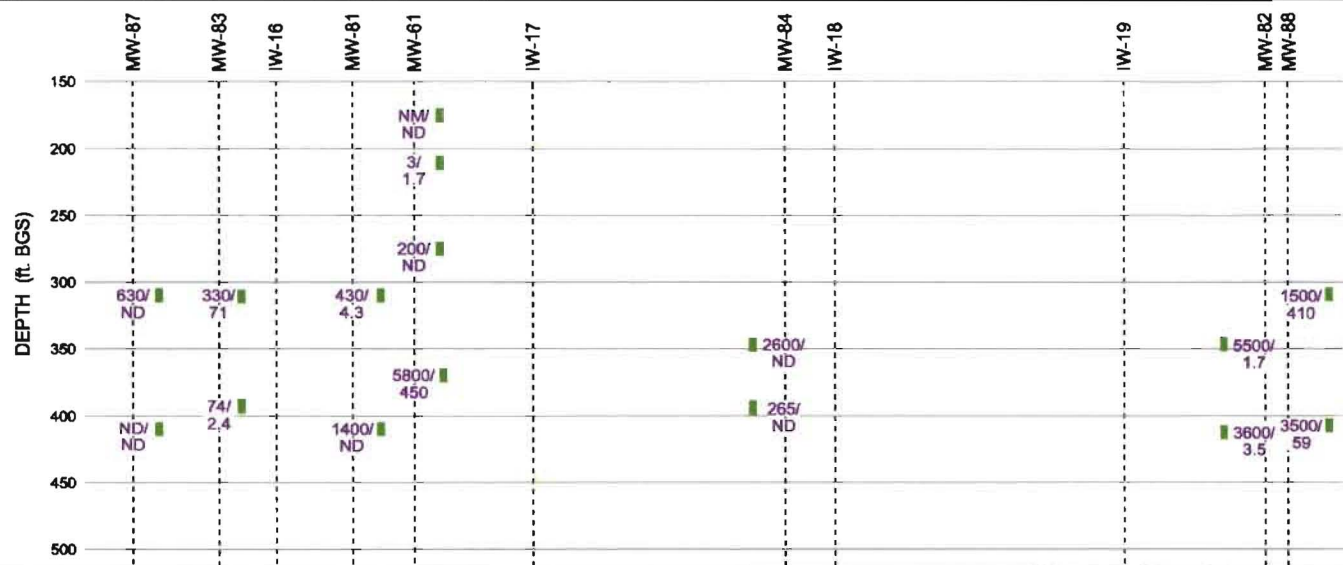
LEGEND

- FORCEMAIN ALIGNMENT
- MONITORING WELL LOCATION
- AIR INJECTION WELL LOCATION
- WATER INJECTION WELL LOCATION
- 670 HYDRPUNCH VINYL CHLORIDE CONCENTRATION (ppb)
- 750 HYDRPUNCH TCE CONCENTRATION (ppb)
- 130 HYDRPUNCH PCE CONCENTRATION (ppb)



INJECTION AND MONITORING LOCATIONS





LEGEND

- FORCEMAIN ALIGNMENT
- MONITORING WELL LOCATION
- AIR INJECTION WELL LOCATION
- VINYL CHLORIDE CONCENTRATION (ppb) INITIAL/2009



VINYL CHLORIDE CONCENTRATIONS

3 Vinyl Chloride Uplifting

Not into Vadose Zone

- Vinyl Chloride most prominent chemical in groundwater
- Only sporadically detected in vadose zone
 - highest current concentration 15 ppbv

Conclusion

- Vinyl Chloride is not being lifted into vadose zone

3 Vinyl Chloride Uplifting

Not being lifted into Shallower Groundwater Zones

- All 14 monitoring wells have lower vinyl chloride concentrations than prior to injections
- Confirmed at MW-61 which has three shallow wells

Conclusion

- Vinyl chloride is not being lifted into the shallower groundwater intervals

4 Microbial Populations

Aerobic microbial populations remain healthy

Increase of aerobic microorganisms specific to cis-1,2-dichloroethene

- same family of degraders as needed for vinyl chloride

5 Conclusions

Conditions needed for aerobic biodegradation are present

- oxygen and microorganisms

Literature and lab studies confirm it will happen

No increase in shallow well concentrations

No increase in vadose zone concentrations

Conclusion - biodegradation is occurring