

Enclosure 1



Environmental Challenges
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EarthCon Plume Analytics™ Services

Westinghouse Columbia Fuel Fabrication Facility

Hopkins, SC

Westinghouse Electric Company, LLC

29 August 2017

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www.earthcon.com

Groundwater Plume Analytics



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Inorganics

Fluoride

Nitrate

Ammonia

Chloroethenes

PCE

TCE

cis-1,2-DCE

Vinyl Chloride

Total Chloroethenes

Radionuclides

Gross Alpha

Gross Beta

Black Mingo

Inorganics

Chloroethenes

Radionuclides

Radionuclides

Gross Alpha

Gross Beta

Black Mingo

Radionuclides

Inorganics

Fluoride

Nitrate

Ammonia

Chloroethenes

PCE

TCE

cis-1,2-DCE

Vinyl Chloride

Total Chloroethenes

Radionuclides

Gross Alpha

Base Contour ☒

15 pCi/L

5 pCi/L

Radionuclides

Gross Alpha

Base Contour **x**

15 pCi/L

5 pCi/L

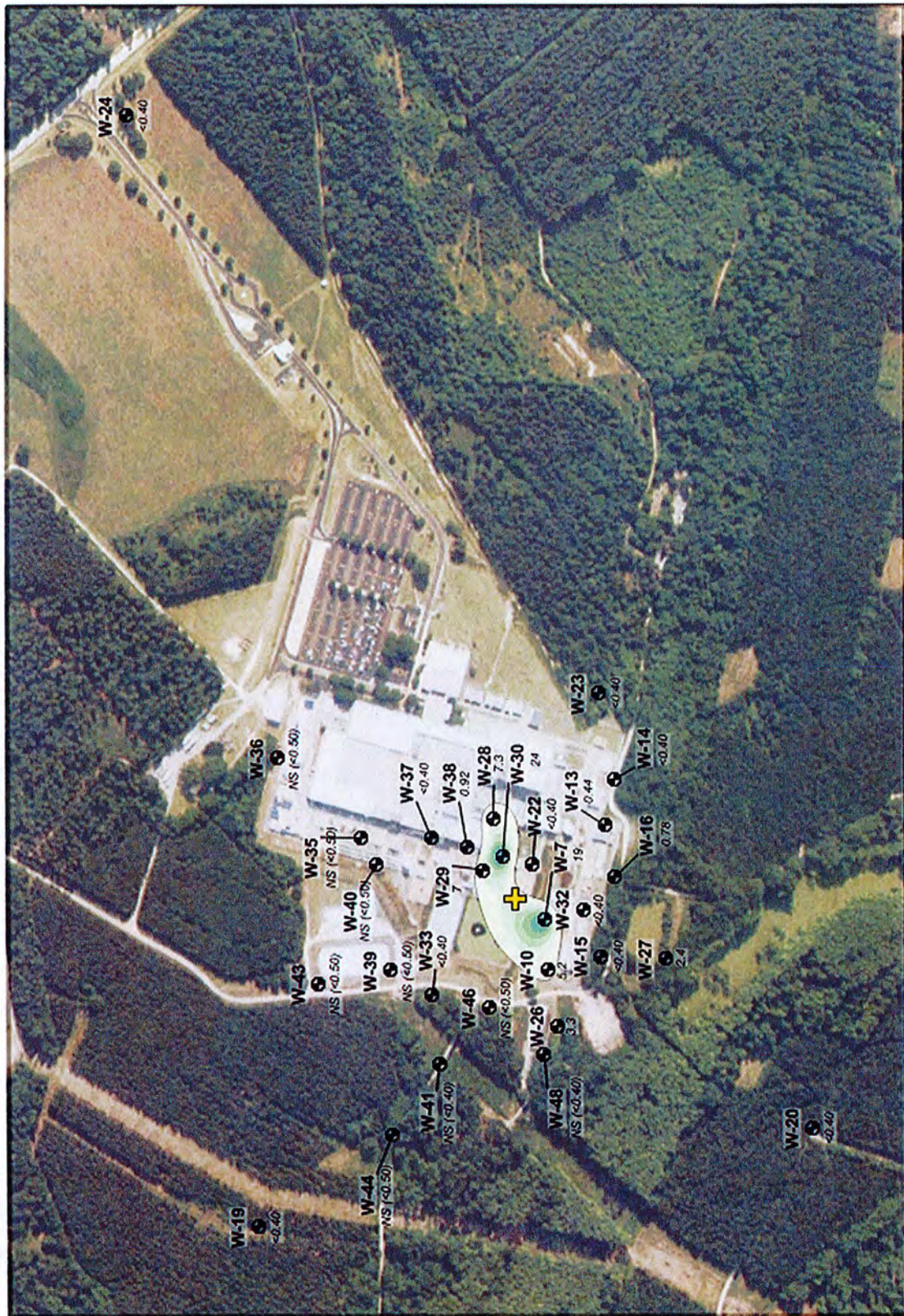
Black Mingo

Radionuclides

Fluoride

Fluoride Jun-2004

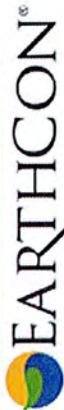
Concentration (mg/L)



Plume Characteristics

Plume Area: 3.6 acres
Plume Average Concentration: 7.0 mg/L
Plume Mass Indicator: 305 lbs

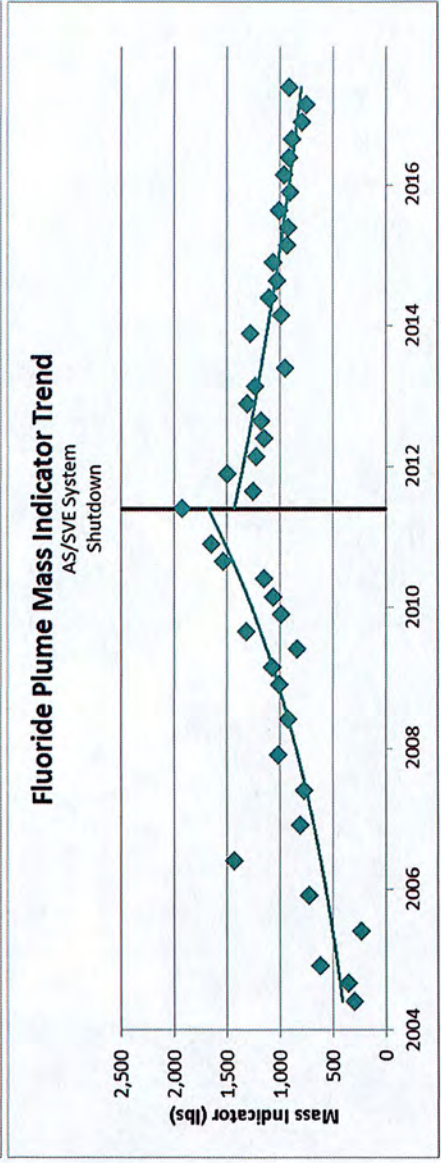
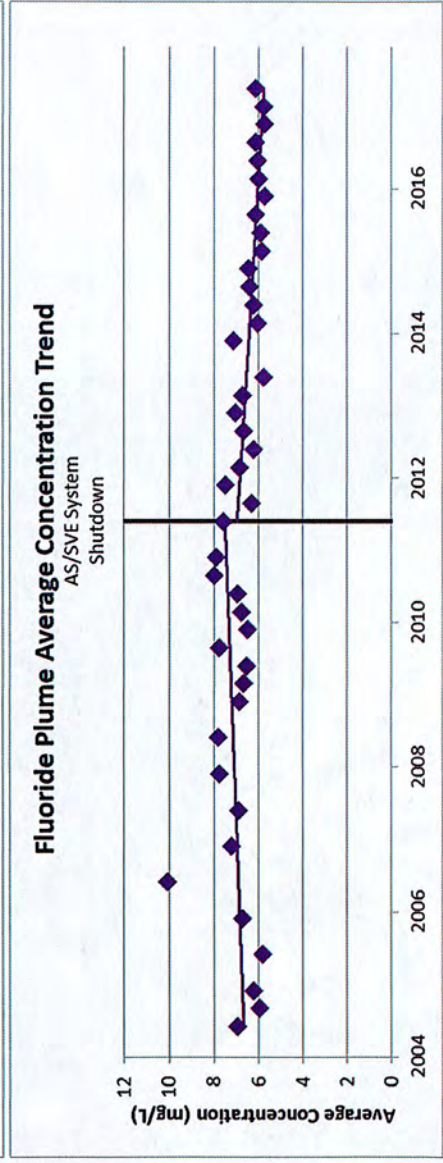
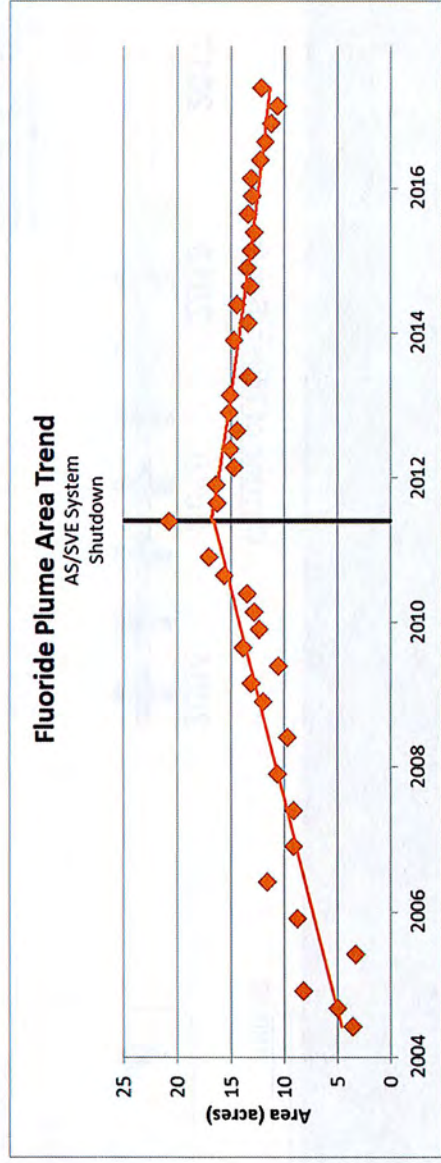
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



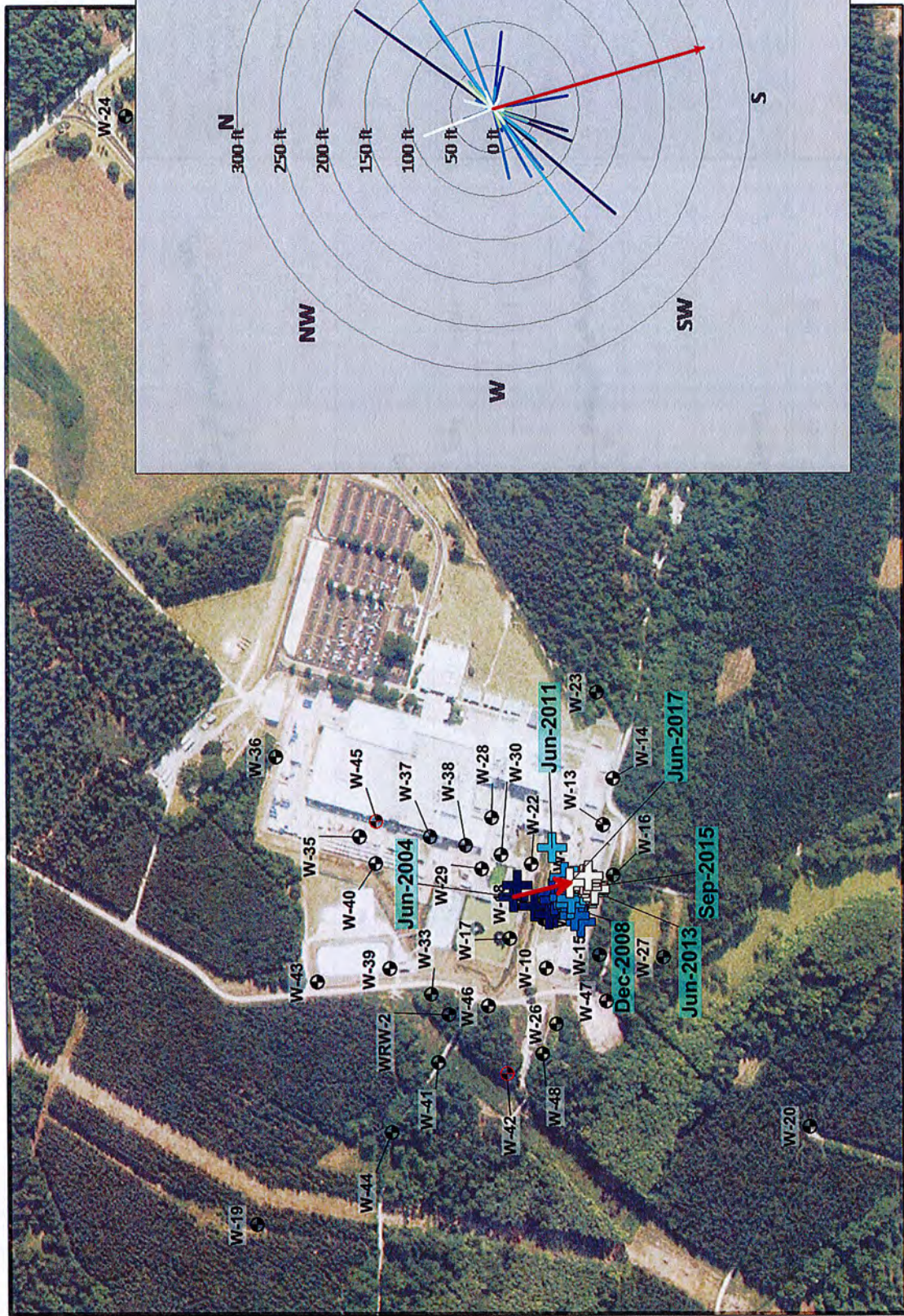
Environmental Challenges
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LEGEND

- Monitoring Well
- Concentration (mg/L)
- Hanging Well - No Longer Sampled
- Well Not Sampled (Assigned Value Shown)
- Plume Center of Mass



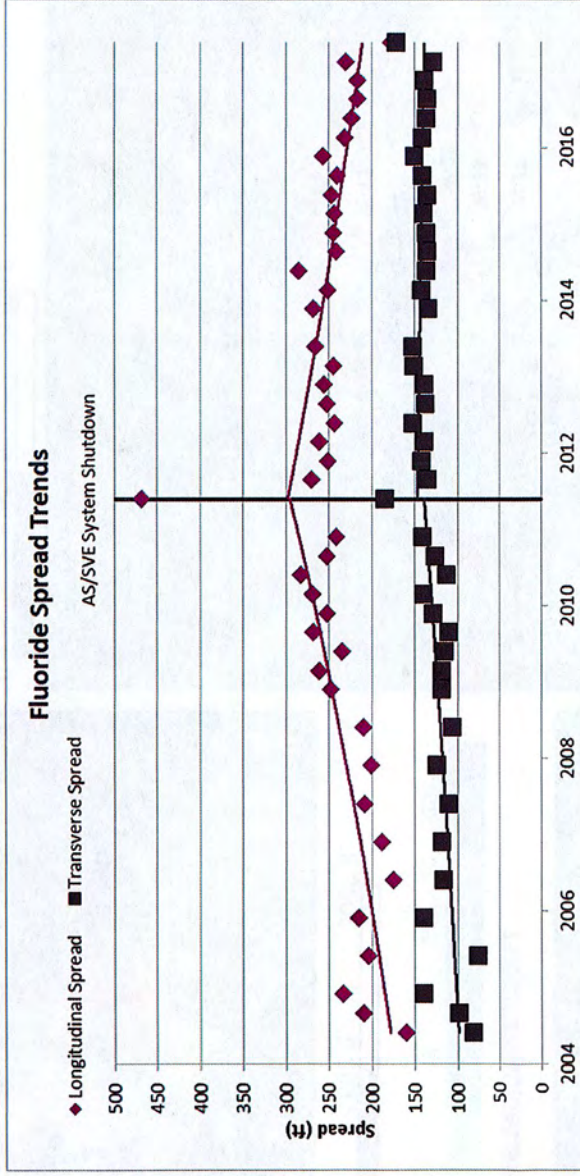
Fluoride Center of Mass



Center of Mass Scale

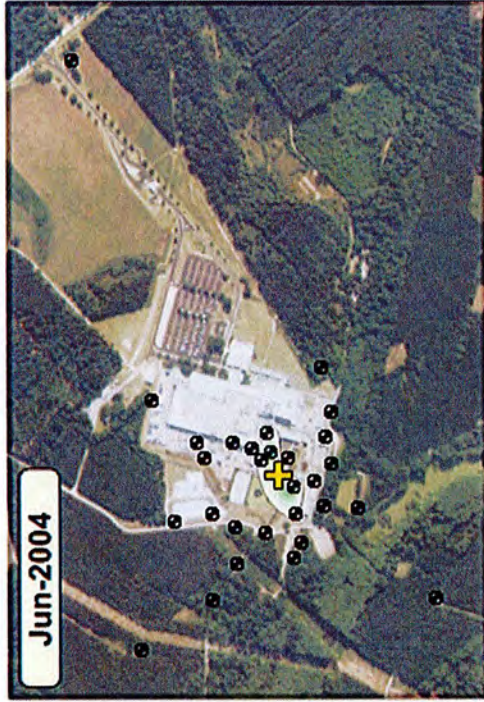


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<p><u>Longitudinal Spread</u> <u>Jun-2004 to Jun-2011</u> Increasing Trend Mann-Kendall: >99% Confidence Regression: >99% Confidence</p>	<p><u>Longitudinal Spread</u> <u>Jun-2011 to Jun-2017</u> Decreasing Trend Mann-Kendall: >99% Confidence Regression: >99% Confidence</p>
<p><u>Transverse Spread</u> <u>Jun-2004 to Jun-2011</u> Increasing Trend Mann-Kendall: 99% Confidence Regression: 99% Confidence</p>	<p><u>Transverse Spread</u> <u>Jun-2011 to Jun-2017</u> No Trend Mann-Kendall: 87% Confidence Regression: 70% Confidence</p>

Jun-2004

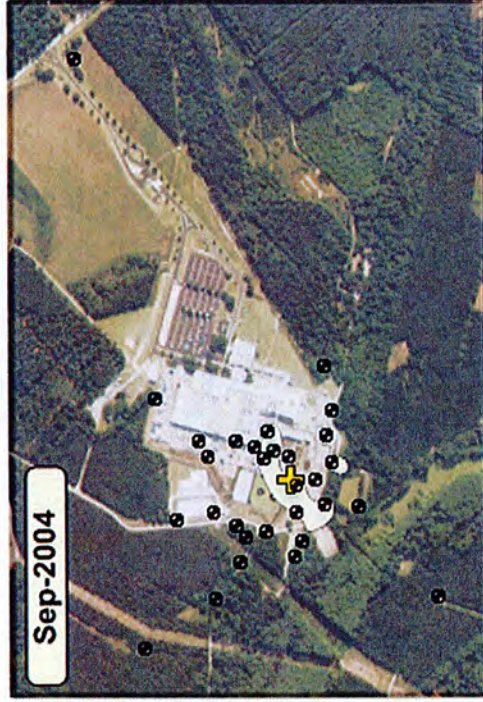


Concentration (mg/L)

4 6 8 10 12 15 20 25 30 35

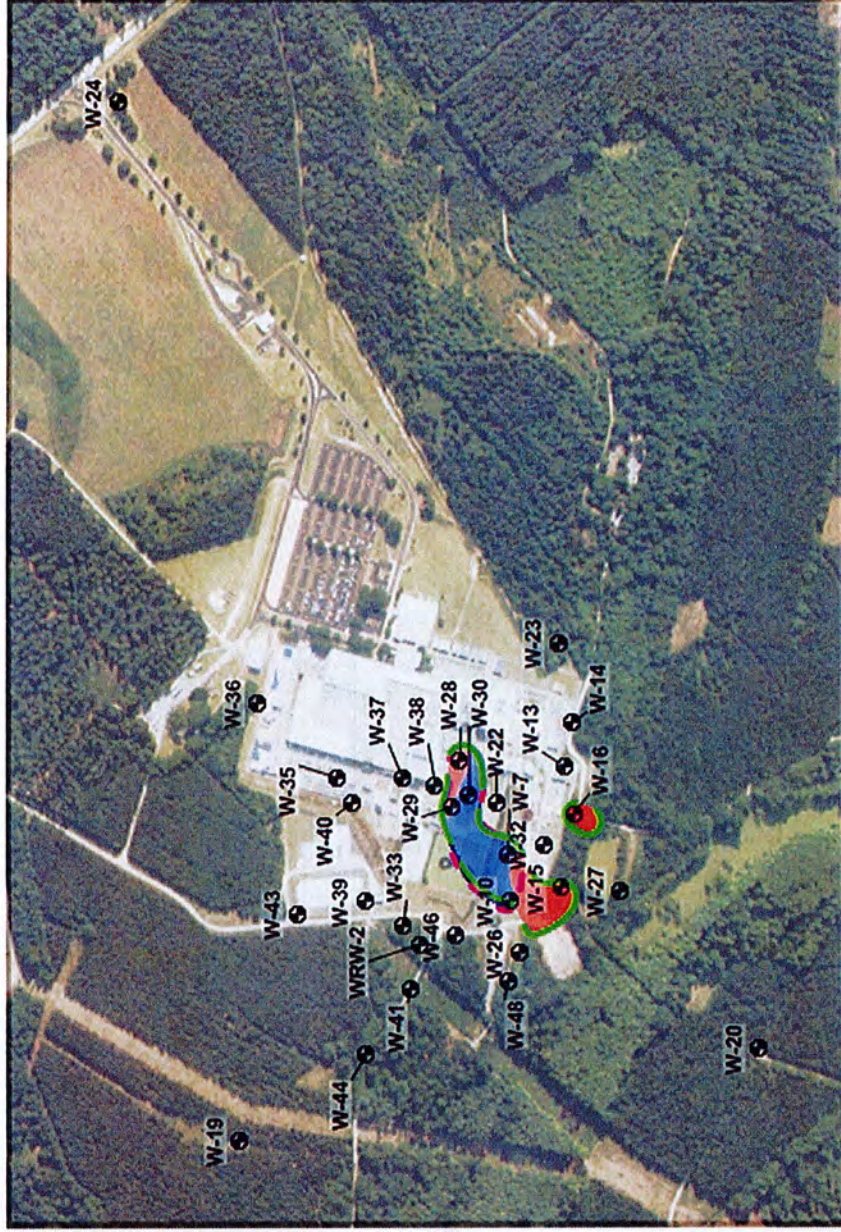
0 ft. 1500 ft. 3000 ft.

Sep-2004



Fluoride

Plume Differences Jun-2004 vs Sep-2004



Spatial Change Indicator



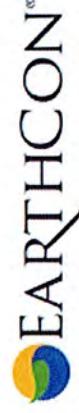
LEGEND

- W-4 Monitoring Well
- W-4 Hanging Well - No Longer Sampled
- + Plume Center of Mass
- Jun-2004 Plume Boundary
- Sep-2004 Plume Boundary

Plume Characteristics

Area: 39% Increase
 Average Concentration: 14% Decrease
 Mass Indicator: 19% Increase
 Mass Increase: 68.8 lbs Increase
 Mass Decrease: 28.2 lbs Decrease

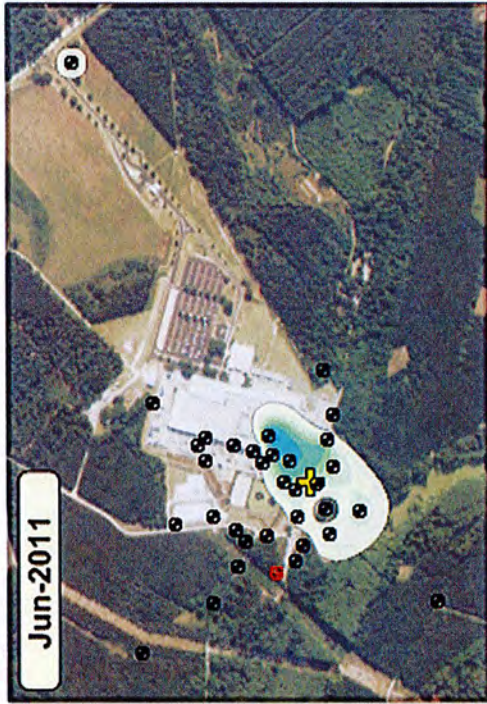
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Jun-2011

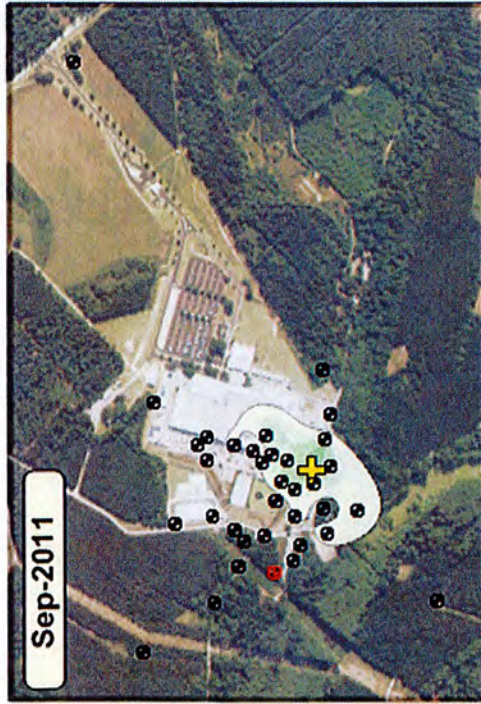


Concentration (mg/L)

4 6 8 10 12 15 20 25 30 35

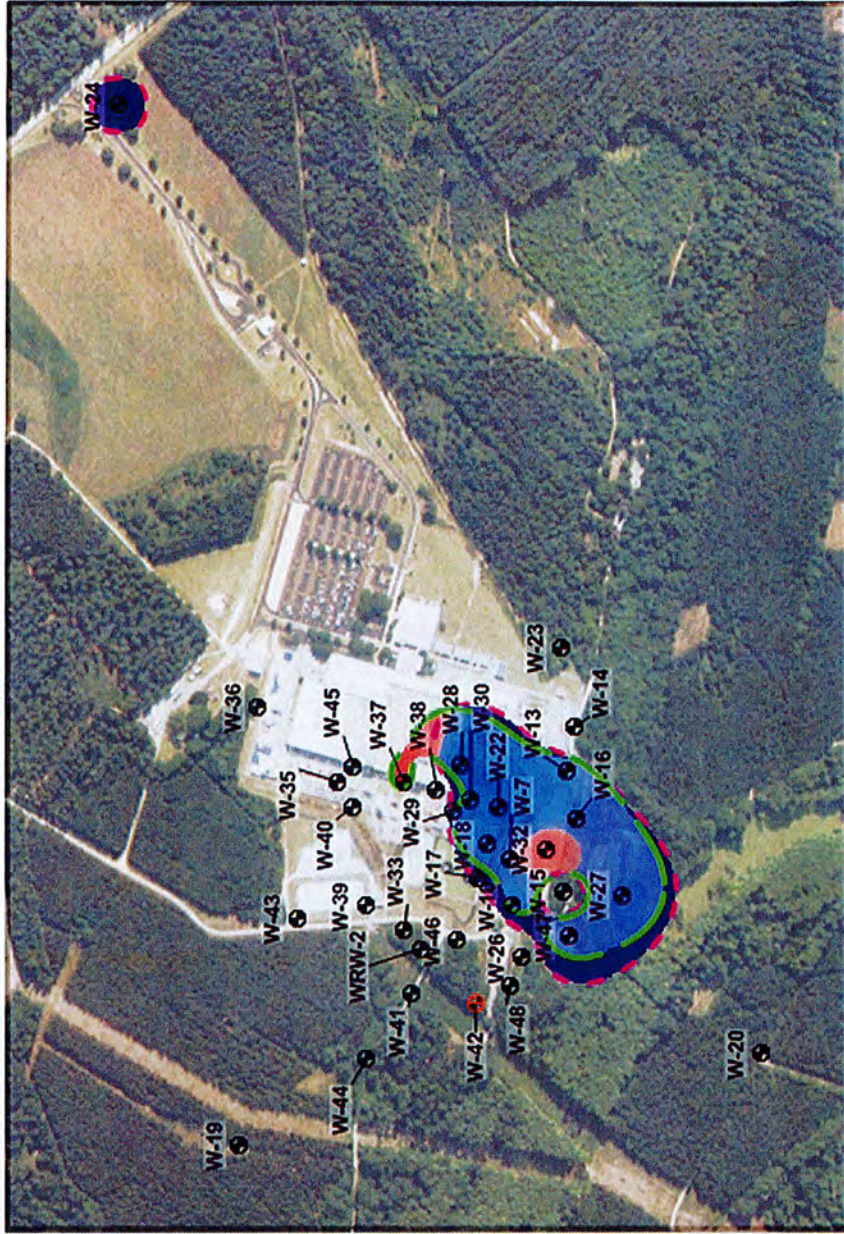
0 ft. 1500 ft. 3000 ft.

Sep-2011



Fluoride

Plume Differences Jun-2011 vs Sep-2011



Spatial Change Indicator

-1 0 1

0 ft. 850 ft. 1700 ft.

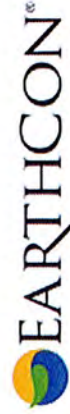
LEGEND

- W-4 Monitoring Well
- W-4 Hanging Well - No Longer Sampled
- Plume Center of Mass
- Jun-2011 Plume Boundary
- Sep-2011 Plume Boundary

Plume Characteristics

Area: 21% Decrease
Average Concentration: 17% Decrease
Mass Indicator: 35% Decrease
Mass Increase: 32.2 lbs Increase
Mass Decrease: 529 lbs Decrease

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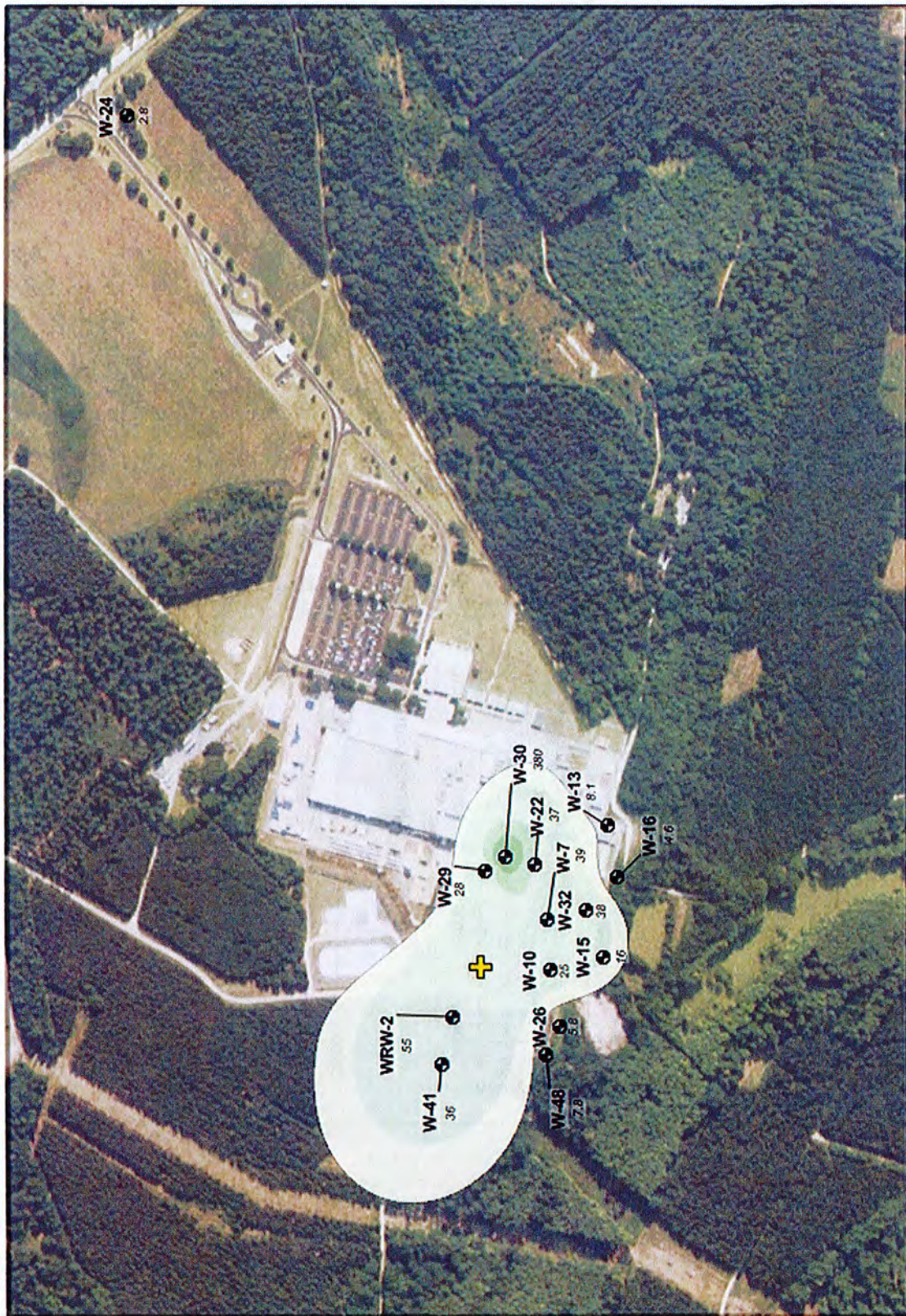
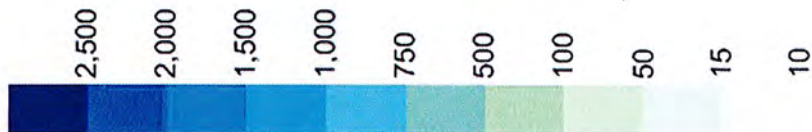
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Nitrate

Nitrate
Dec-2004

Concentration (mg/L)



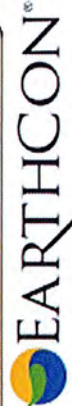
Plume Characteristics

Plume Area: 33.4 acres

Plume Average Concentration: 24.3 mg/L

Plume Mass Indicator: 9,928 lbs

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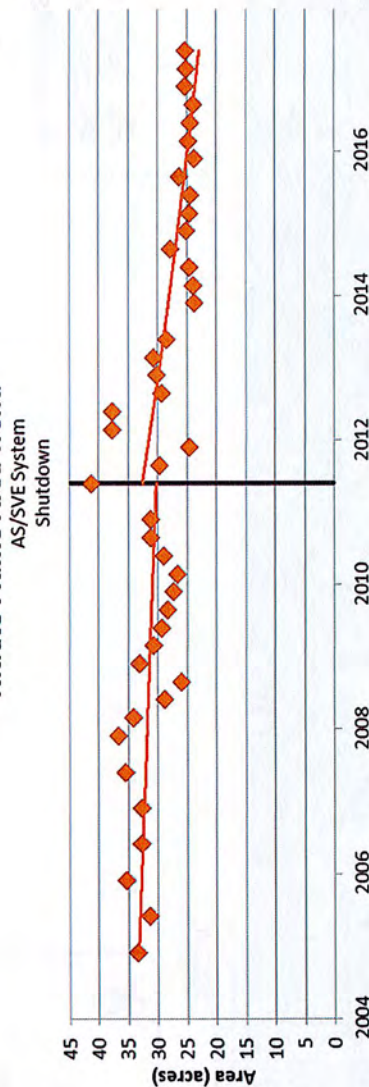


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LEGEND

- W-4 Monitoring Well
- 112 Concentration (mg/L)
- W-4 Hanging Well -
- NS (146) No Longer Sampled
- Well Not Sampled (Assigned Value Shown)
- Plume Center of Mass

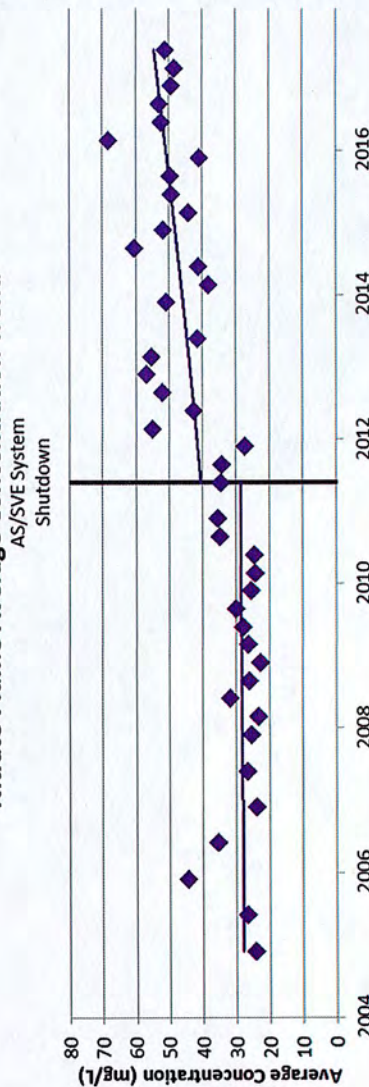
Nitrate Plume Area Trend



Dec-2004 to Jun-2011
No Trend/Decreasing Trend
Mann-Kendall: 92% Confidence
Regression: 69% Confidence

Jun-2011 to Jun-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

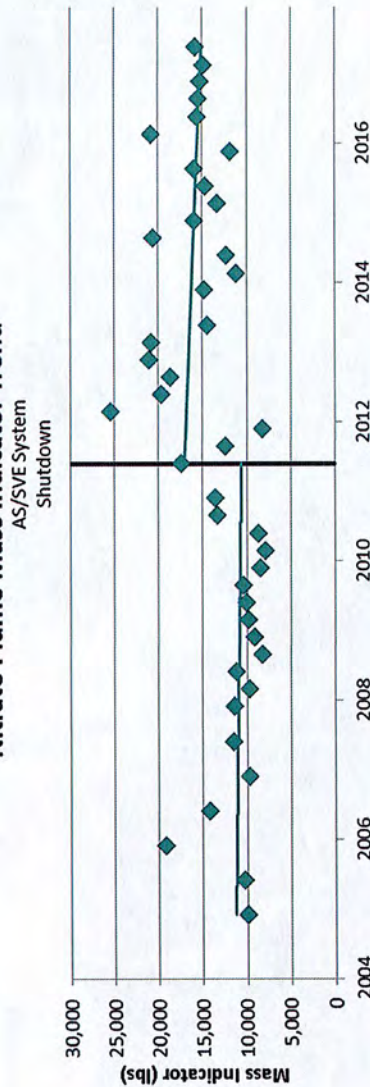
Nitrate Plume Average Concentration Trend



Dec-2004 to Jun-2011
No Trend
Mann-Kendall: 66% Confidence
Regression: 16% Confidence

Jun-2011 to Jun-2017
Increasing Trend
Mann-Kendall: 91% Confidence
Regression: 97% Confidence

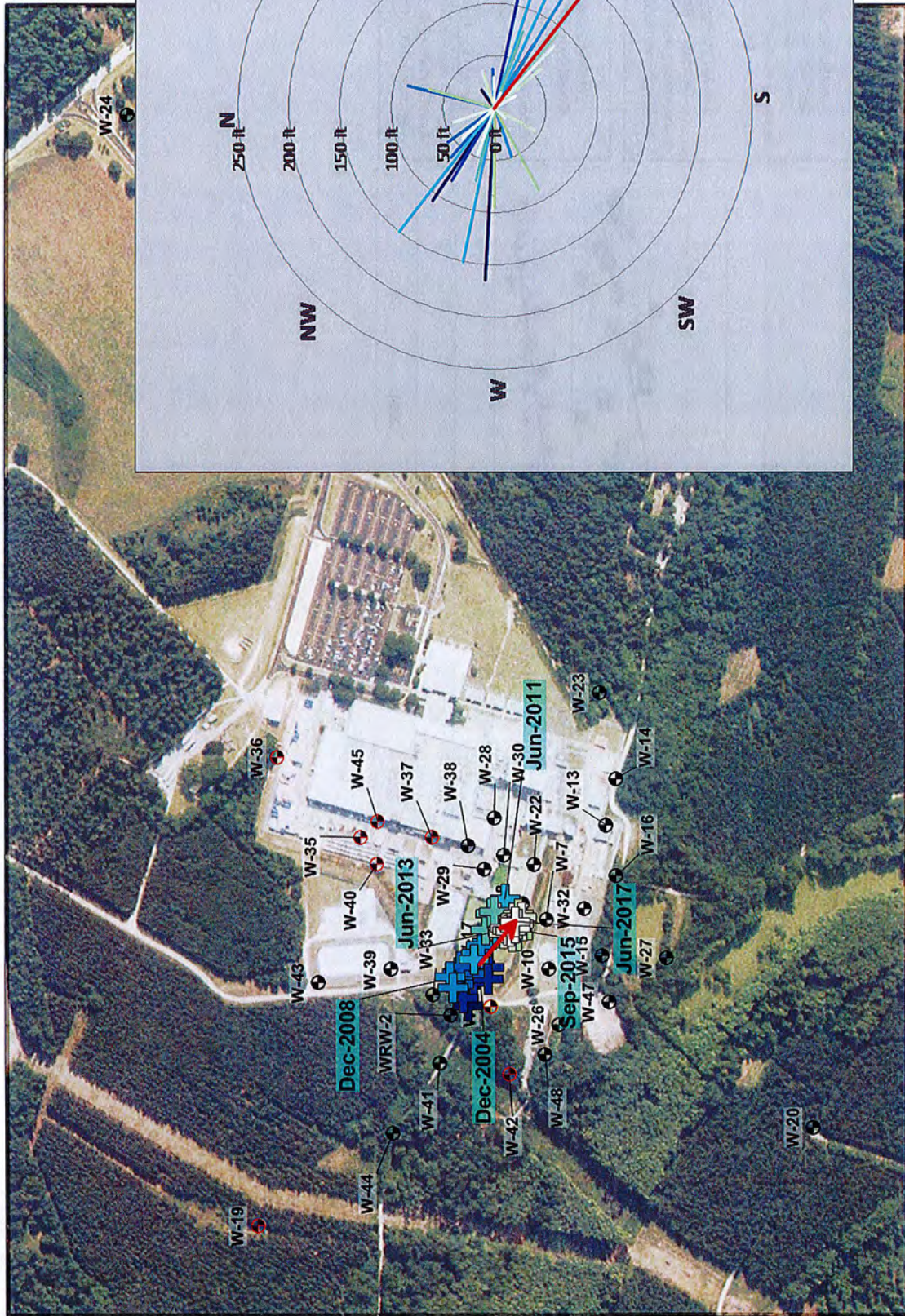
Nitrate Plume Mass Indicator Trend



Dec-2004 to Jun-2011
No Trend
Mann-Kendall: 66% Confidence
Regression: 26% Confidence

Jun-2011 to Jun-2017
No Trend
Mann-Kendall: 70% Confidence
Regression: 53% Confidence

Nitrate Center of Mass



0 ft. 650 ft. 1300 ft.

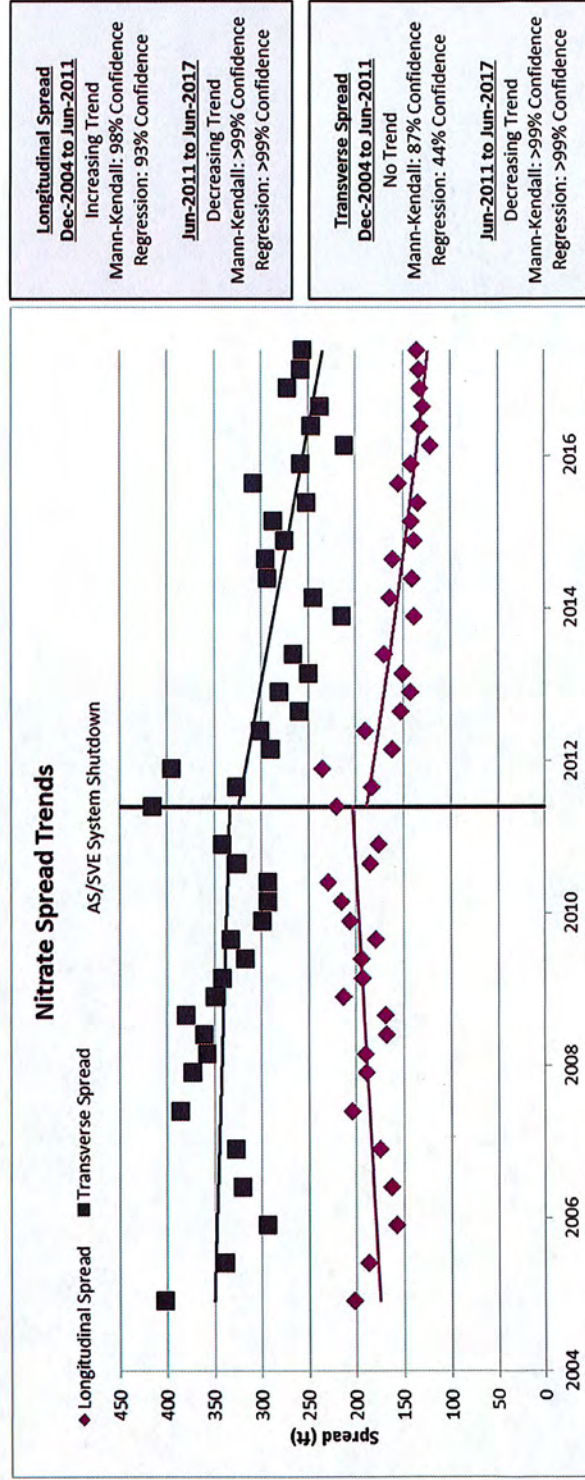
Center of Mass Scale



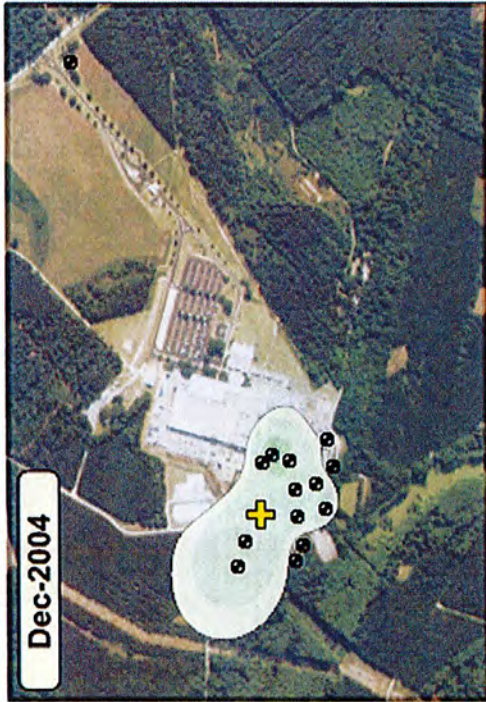
LEGEND

- Monitoring Well
- Hanging Well - No Longer Sampled
- Center of Mass Movement
- Net Movement

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



Dec-2004

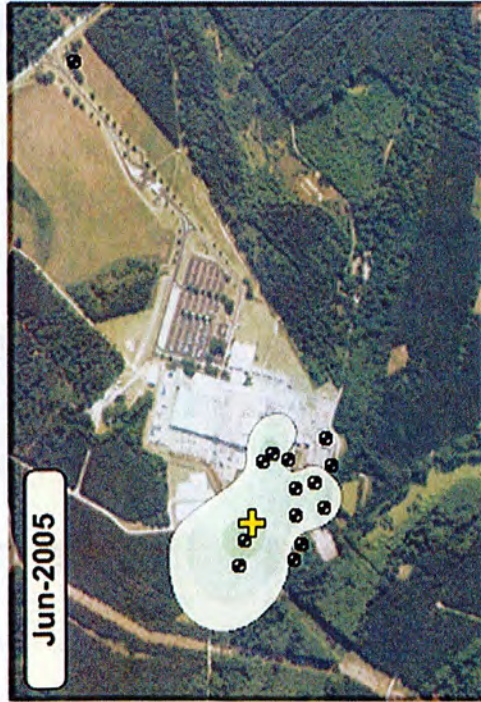


Concentration (mg/L)

10 15 50 100 500 750 1,000 1,500 2,000 2,500

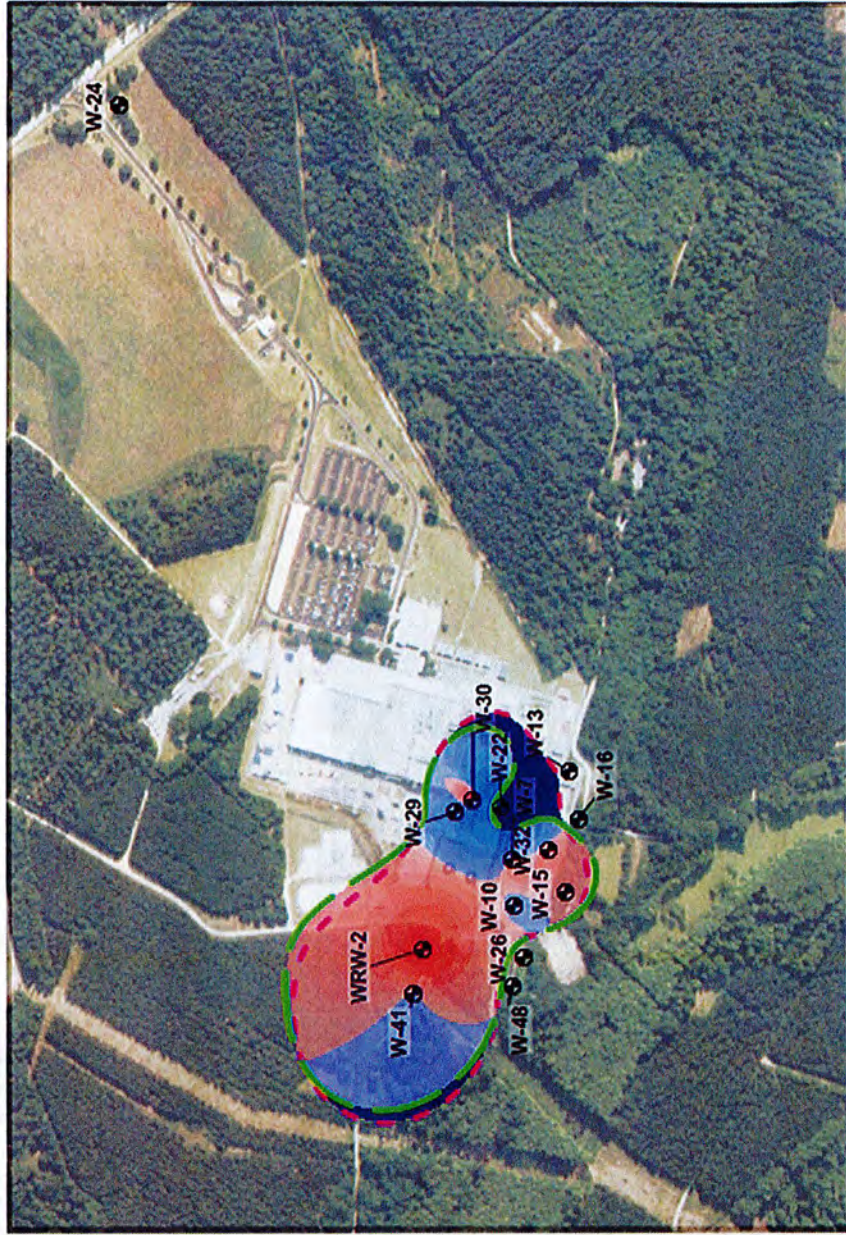
0 ft. 1500 ft. 3000 ft.

Jun-2005



Nitrate

Plume Differences Dec-2004 vs Jun-2005



Spatial Change Indicator

-1 0 1

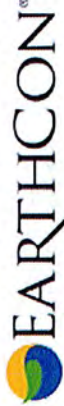
LEGEND

- W-4 Monitoring Well
- W-4 Hanging Well - No Longer Sampled
- Plume Center of Mass
- Dec-2004 Plume Boundary
- Jun-2005 Plume Boundary

Plume Characteristics

Area: 6% Decrease
Average Concentration: 10% Increase
Mass Indicator: 4% Increase
Mass Increase: 1,930 lbs Increase
Mass Decrease: 1,407 lbs Decrease

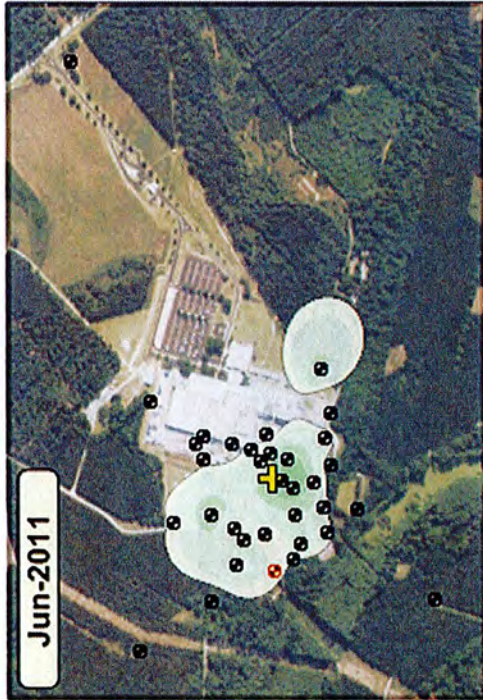
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Jun-2011

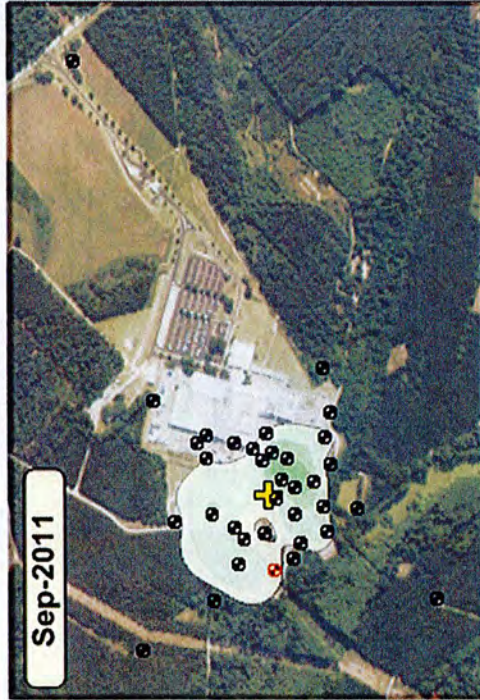


Concentration (mg/L)

10 15 50 100 500 750 1,000 1,500 2,000 2,500

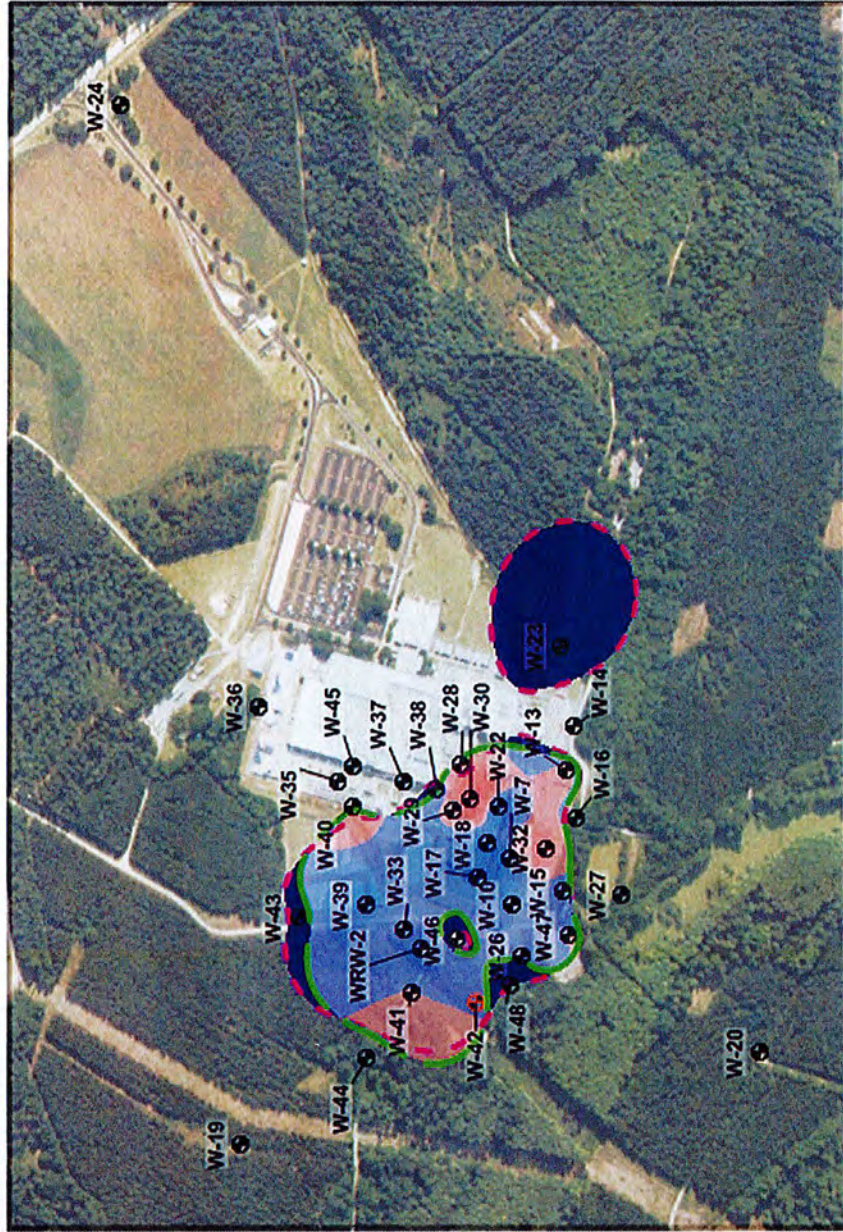
0 ft. 1500 ft. 3000 ft.

Sep-2011



Nitrate

Plume Differences Jun-2011 vs Sep-2011



Spatial Change Indicator



Plume Characteristics

Area: 28% Decrease
Average Concentration: 1% Decrease
Mass Indicator: 29% Decrease
Mass Increase: 679 lbs Increase
Mass Decrease: 5,437 lbs Decrease

LEGEND

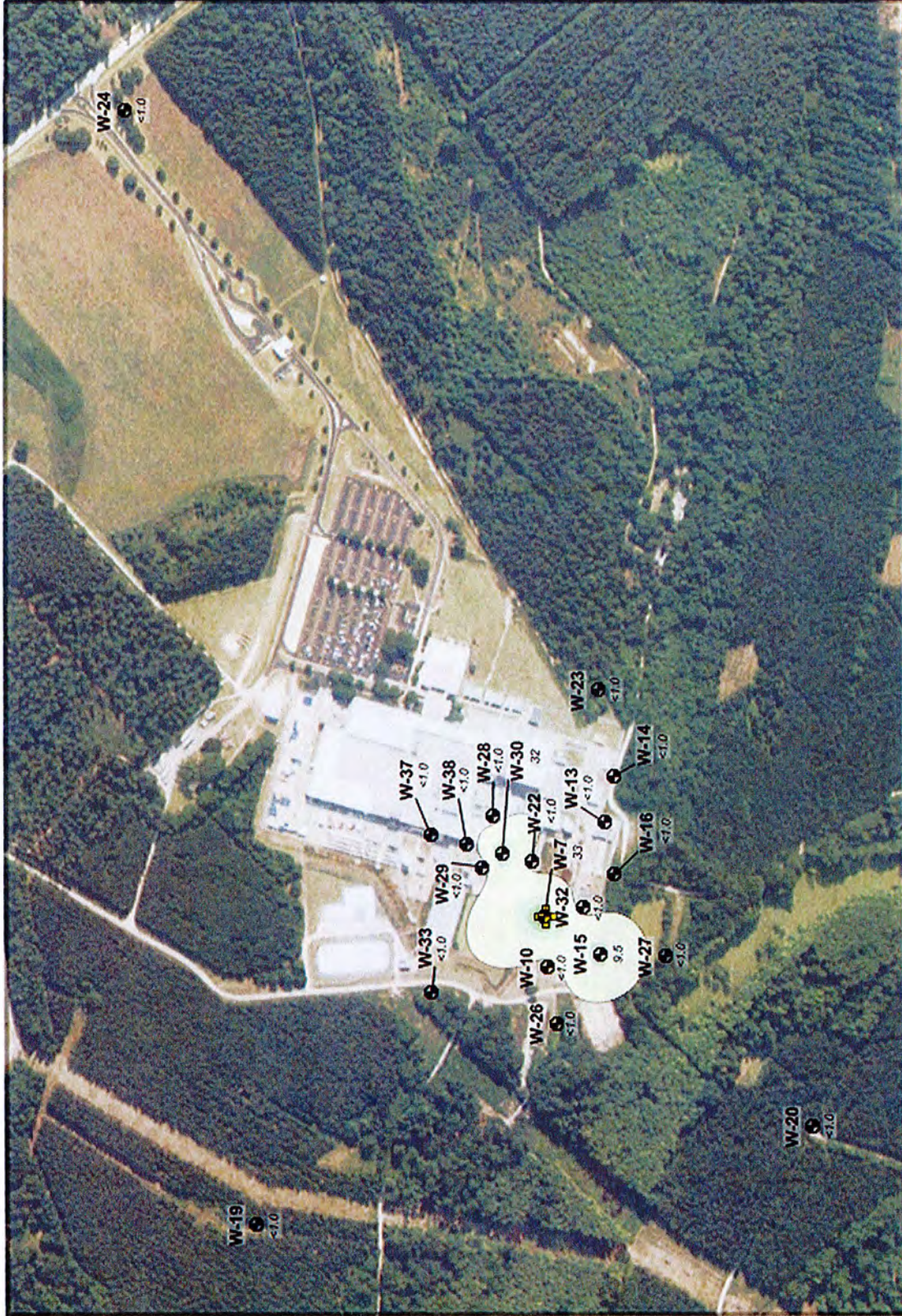
- W-4 Monitoring Well
- W-4 Hanging Well - No Longer Sampled
- Plume Center of Mass
- Jun-2011 Plume Boundary
- Sep-2011 Plume Boundary

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Ammonia

Ammonia Jun-2004

Concentration (mg/L)



0 ft. 650 ft. 1300 ft.



LEGEND

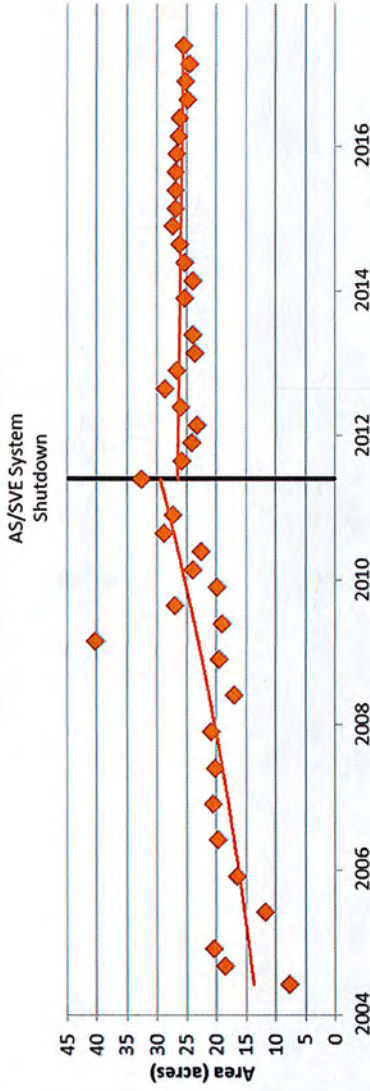
- W-4 Monitoring Well
- 112 Concentration (mg/L)
- W-4 Hanging Well -
- NS (146) No Longer Sampled
- Well Not Sampled (Assigned Value Shown)
- Plume Center of Mass

Plume Characteristics

Plume Area: 7.6 acres
Plume Average Concentration: 3.3 mg/L
Plume Mass Indicator: 310 lbs

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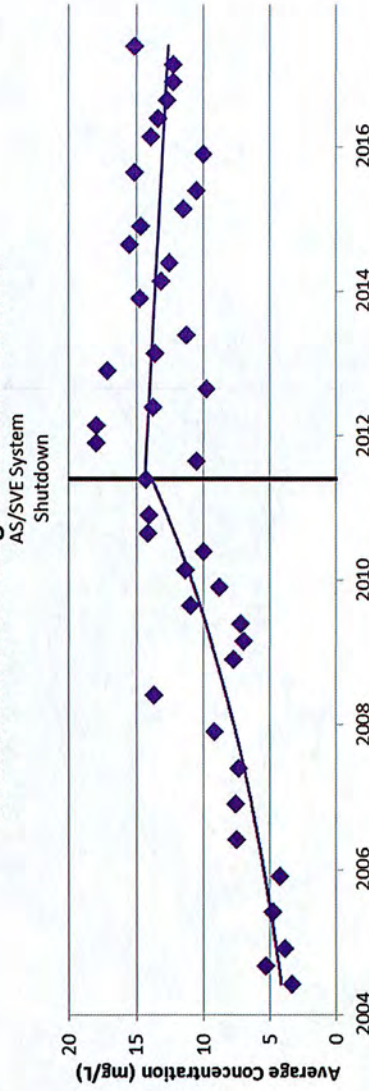
Ammonia Plume Area Trend



Jun-2004 to Jun-2011
Increasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Jun-2011 to Jun-2017
No Trend
Mann-Kendall: 51% Confidence
Regression: 55% Confidence

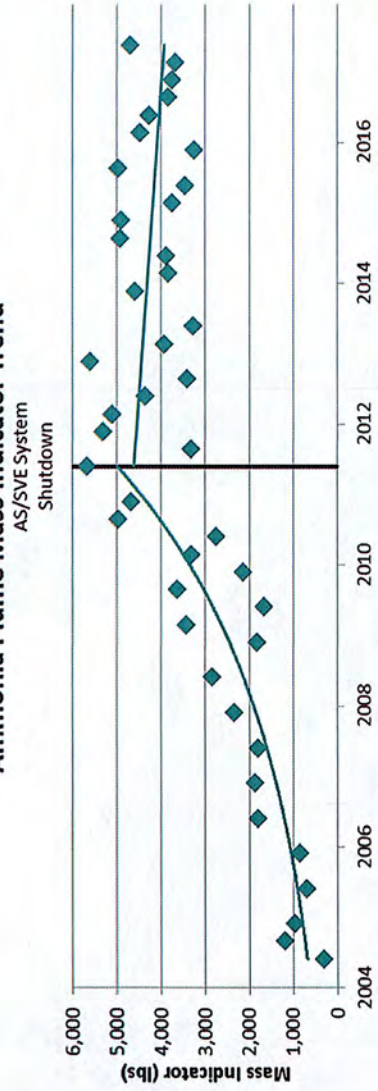
Ammonia Plume Average Concentration Trend



Jun-2004 to Jun-2011
Increasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Jun-2011 to Jun-2017
No Trend
Mann-Kendall: 85% Confidence
Regression: 72% Confidence

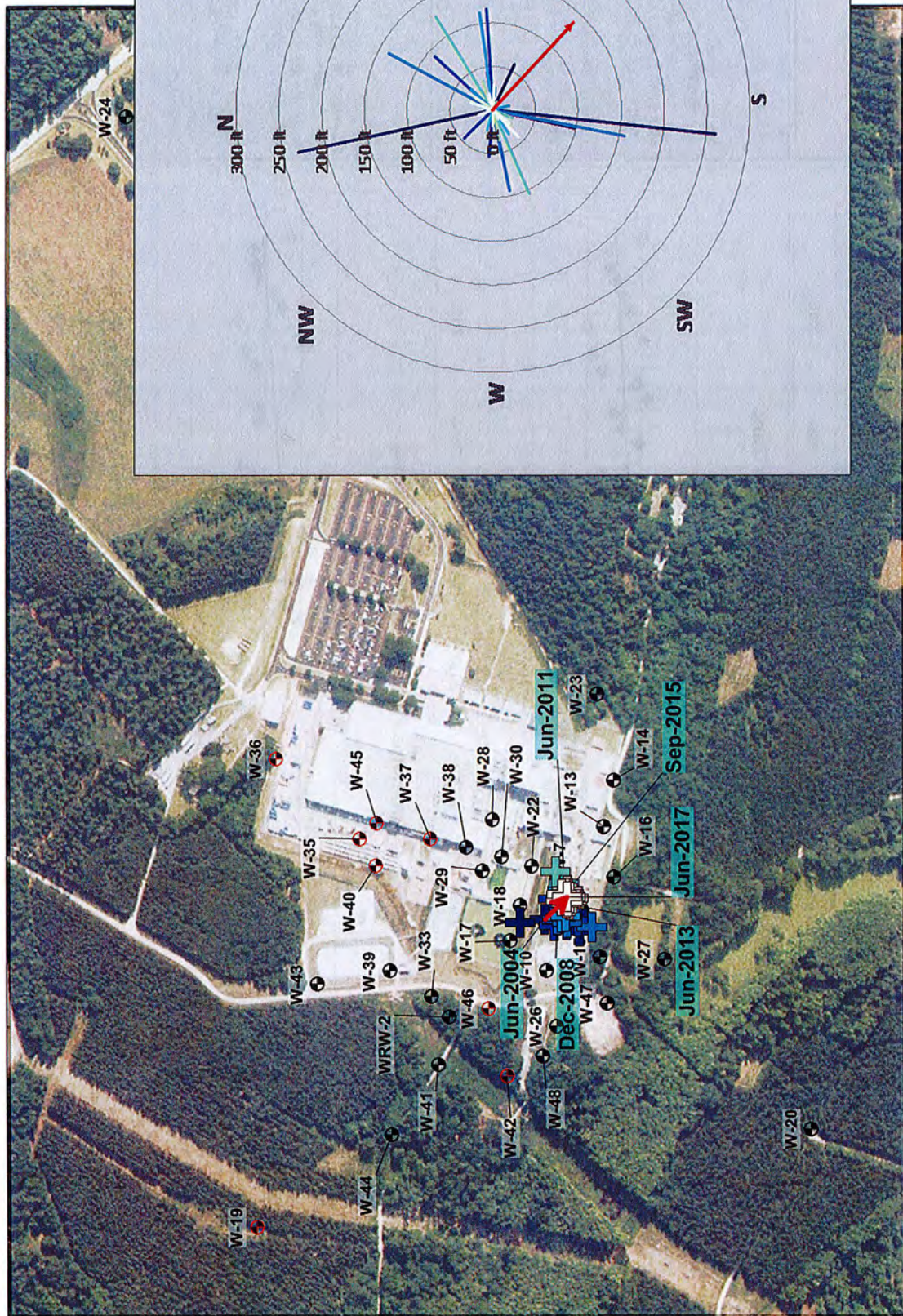
Ammonia Plume Mass Indicator Trend



Jun-2004 to Jun-2011
Increasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Jun-2011 to Jun-2017
No Trend/Decreasing Trend
Mann-Kendall: 93% Confidence
Regression: 81% Confidence

Ammonia Center of Mass



0 ft. 650 ft. 1300 ft.

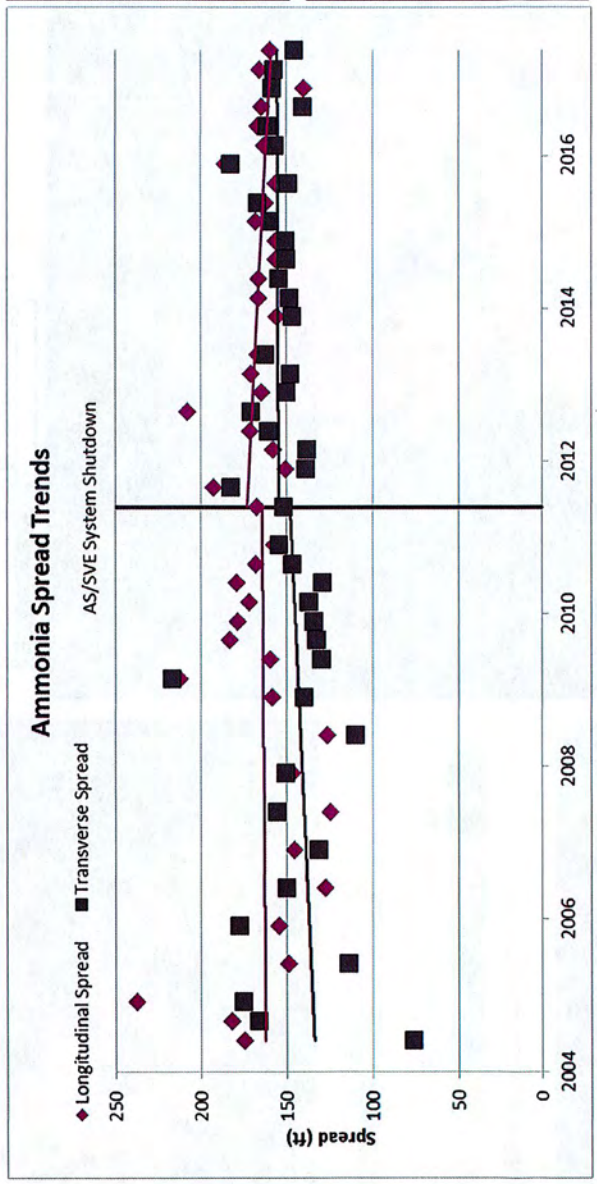
Center of Mass Scale



LEGEND

- Monitoring Well
- Hanging Well - No Longer Sampled
- Center of Mass Movement
- Net Movement

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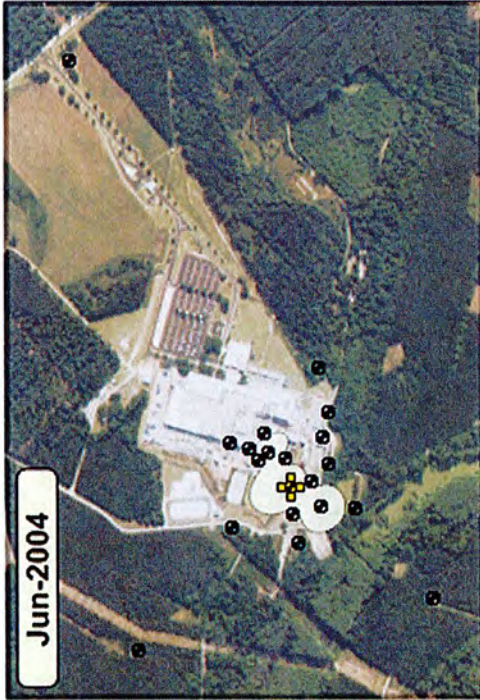
Longitudinal Spread
Jun-2004 to Jun-2011
 No Trend
 Mann-Kendall: 66% Confidence
 Regression: 8% Confidence

Longitudinal Spread
Jun-2011 to Jun-2017
 No Trend/Decreasing Trend
 Mann-Kendall: 91% Confidence
 Regression: 87% Confidence

Transverse Spread
Jun-2004 to Jun-2011
 No Trend
 Mann-Kendall: 51% Confidence
 Regression: 47% Confidence

Transverse Spread
Jun-2011 to Jun-2017
 No Trend
 Mann-Kendall: 61% Confidence
 Regression: 8% Confidence

Jun-2004

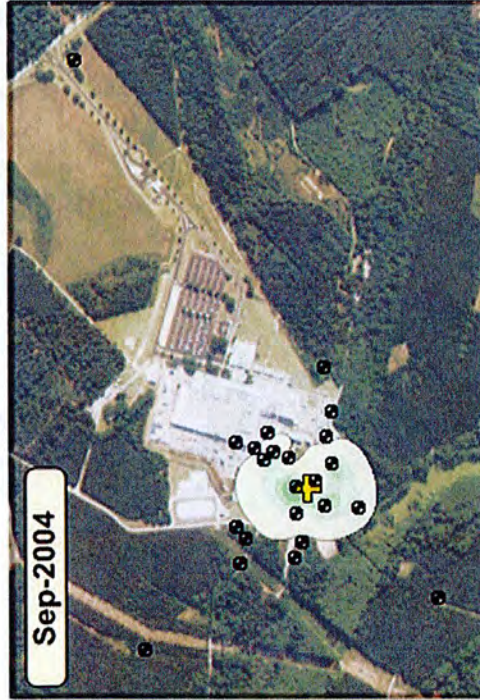


Concentration (mg/L)



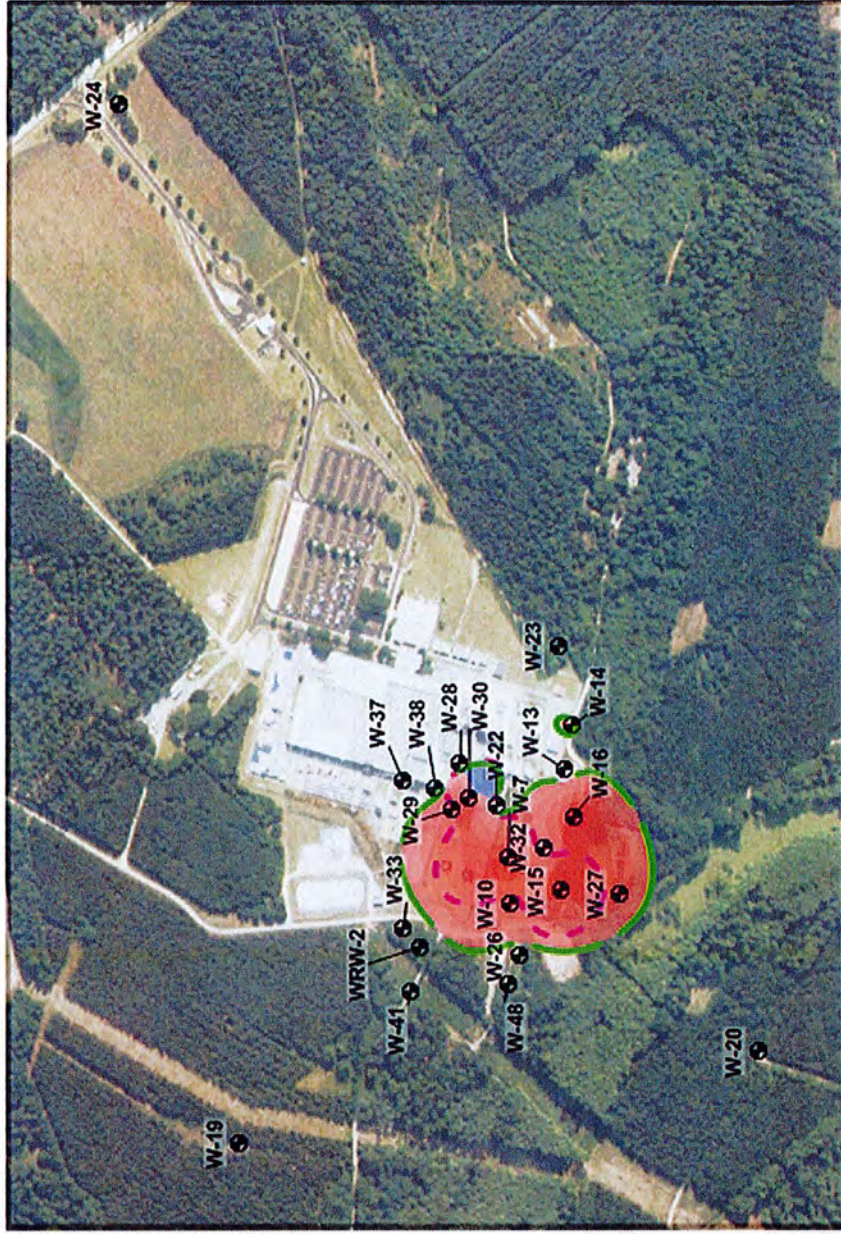
0 ft. 1500 ft. 3000 ft.

Sep-2004



Ammonia

Plume Differences Jun-2004 vs Sep-2004



0 ft. 850 ft. 1700 ft.

Spatial Change Indicator



LEGEND

- W-4 Monitoring Well
- W-4 Hanging Well - No Longer Sampled
- Center of Mass
- Jun-2004 Plume Boundary
- Sep-2004 Plume Boundary

Plume Characteristics

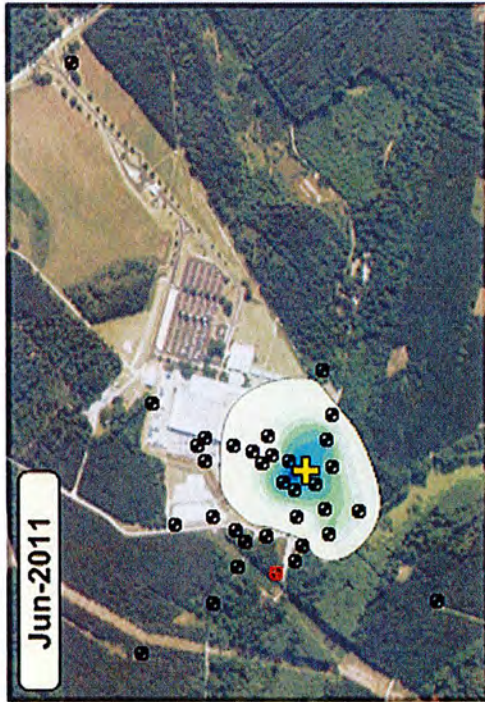
Area: >99% Increase
Average Concentration: 59% Increase
Mass Indicator: >99% Increase
Mass Increase: 819 lbs Increase
Mass Decrease: 0.80 lbs Decrease

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Jun-2011

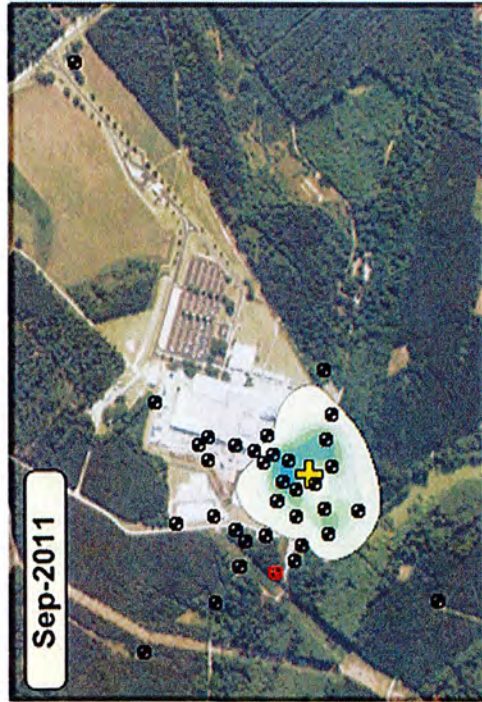


Concentration (mg/L)

1 5 10 15 25 50 75 100 125 150

0 ft. 1500 ft. 3000 ft.

Sep-2011



LEGEND

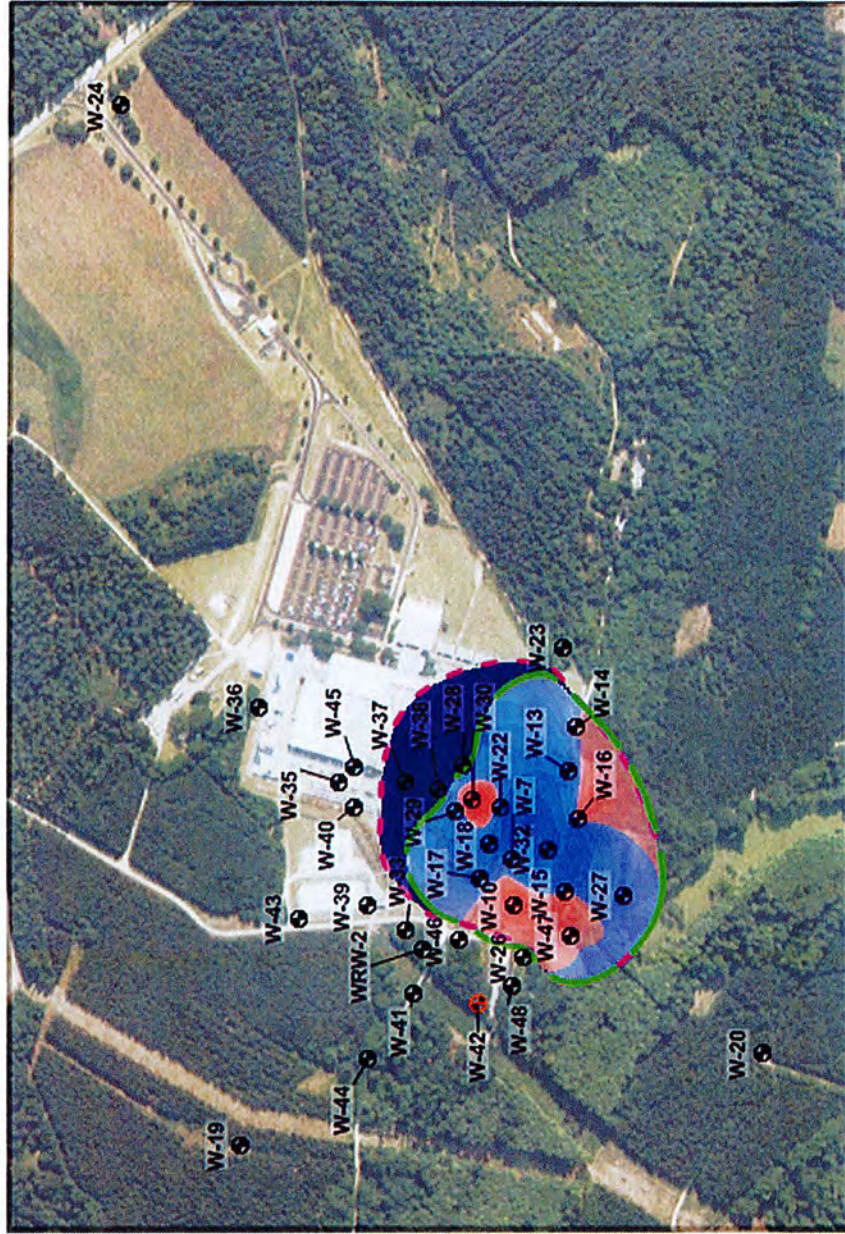
- W-4 Monitoring Well
- W-4 Hanging Well - No Longer Sampled
- ⊕ Plume Center of Mass
- Jun-2011 Plume Boundary
- Sep-2011 Plume Boundary

Plume Characteristics

Area: 21% Decrease
Average Concentration: 26% Decrease
Mass Indicator: 42% Decrease
Mass Increase: 220 lbs Increase
Mass Decrease: 2,543 lbs Decrease

Plume Differences Jun-2011 vs Sep-2011

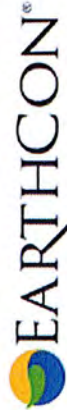
Ammonia



Spatial Change Indicator

-1 0 1

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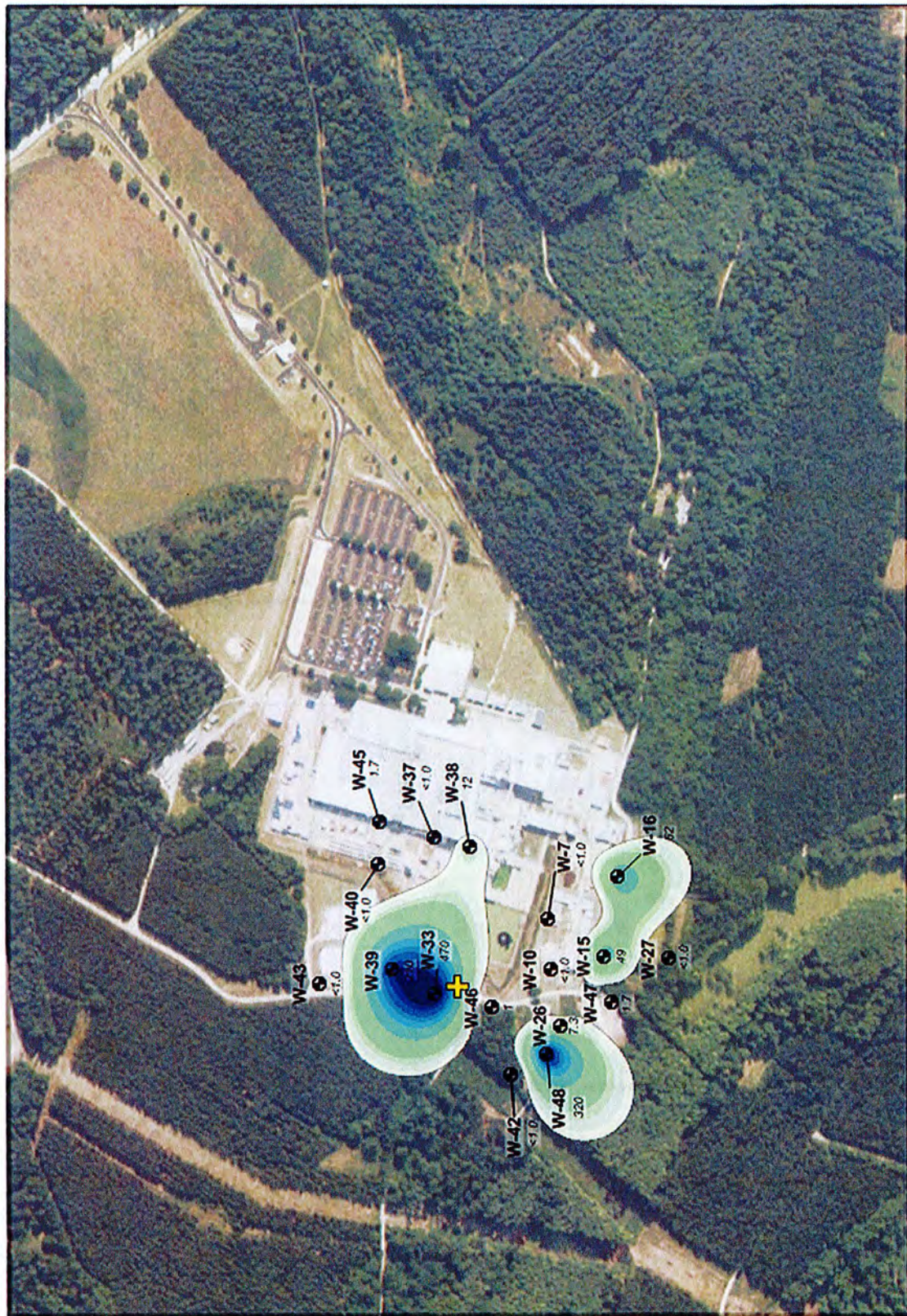
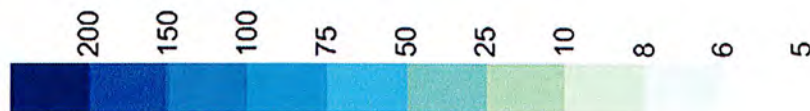
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PCE

PCE
Mar-2004

Concentration (µg/L)



0 ft. 650 ft. 1300 ft.



LEGEND

- W-4 Monitoring Well
- 172 Concentration (µg/L)
- W-4 Hanging Well - No Longer Sampled
- NS (146) Well Not Sampled (Assigned Value Shown)
- ✚ Plume Center of Mass

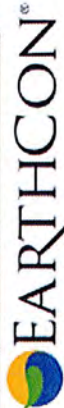
Plume Characteristics

Plume Area: 20.2 acres

Plume Average Concentration: 31.5 µg/L

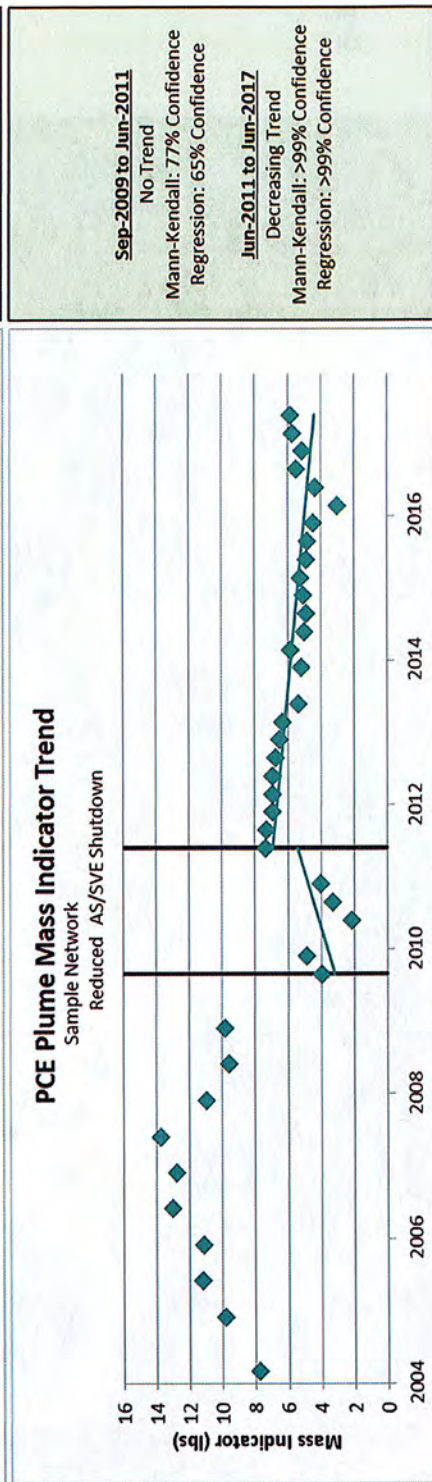
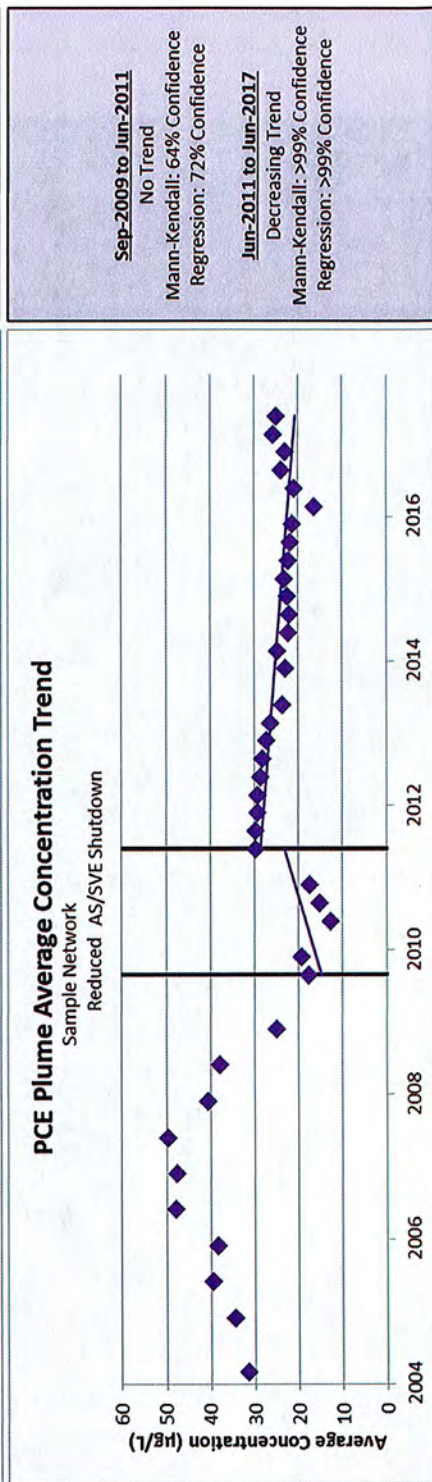
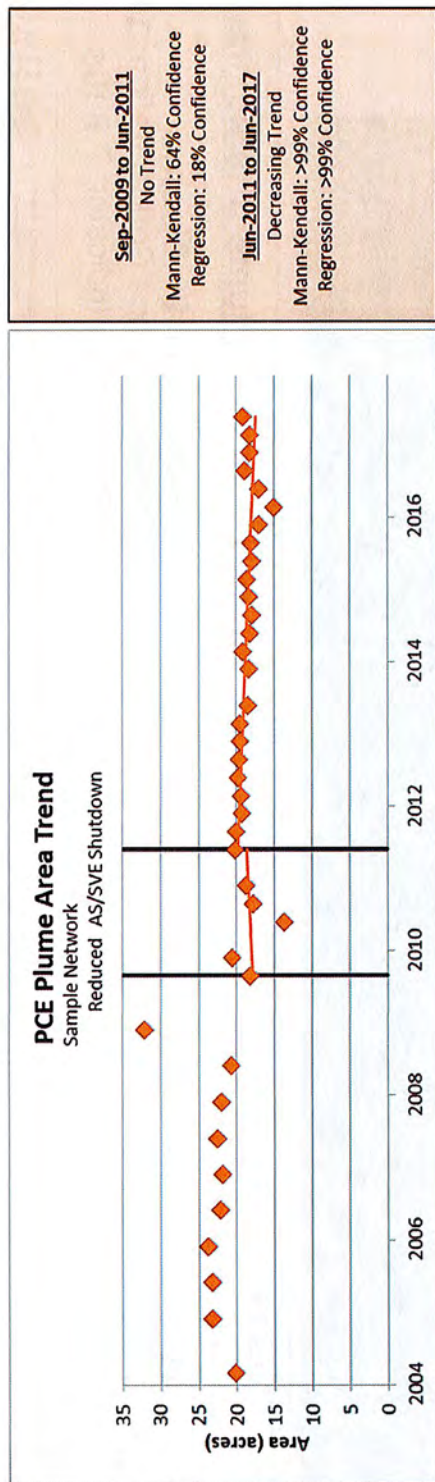
Plume Mass Indicator: 7.8 lbs

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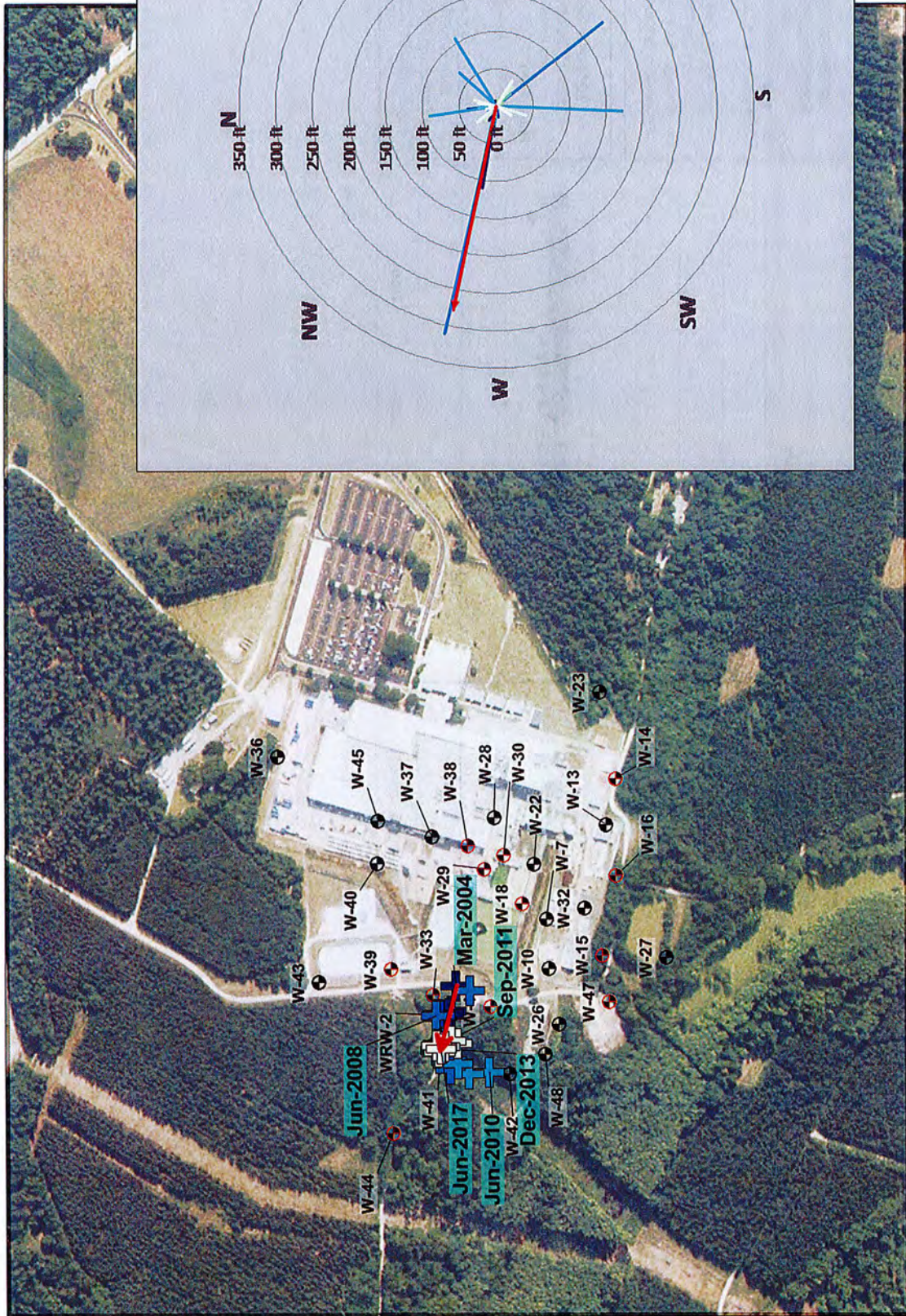


Environmental Challenges
BUSINESS SOLUTIONS

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PCE
Center of Mass



0 ft. 650 ft. 1300 ft.

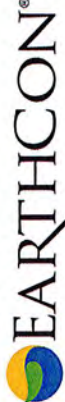
Center of Mass Scale



LEGEND

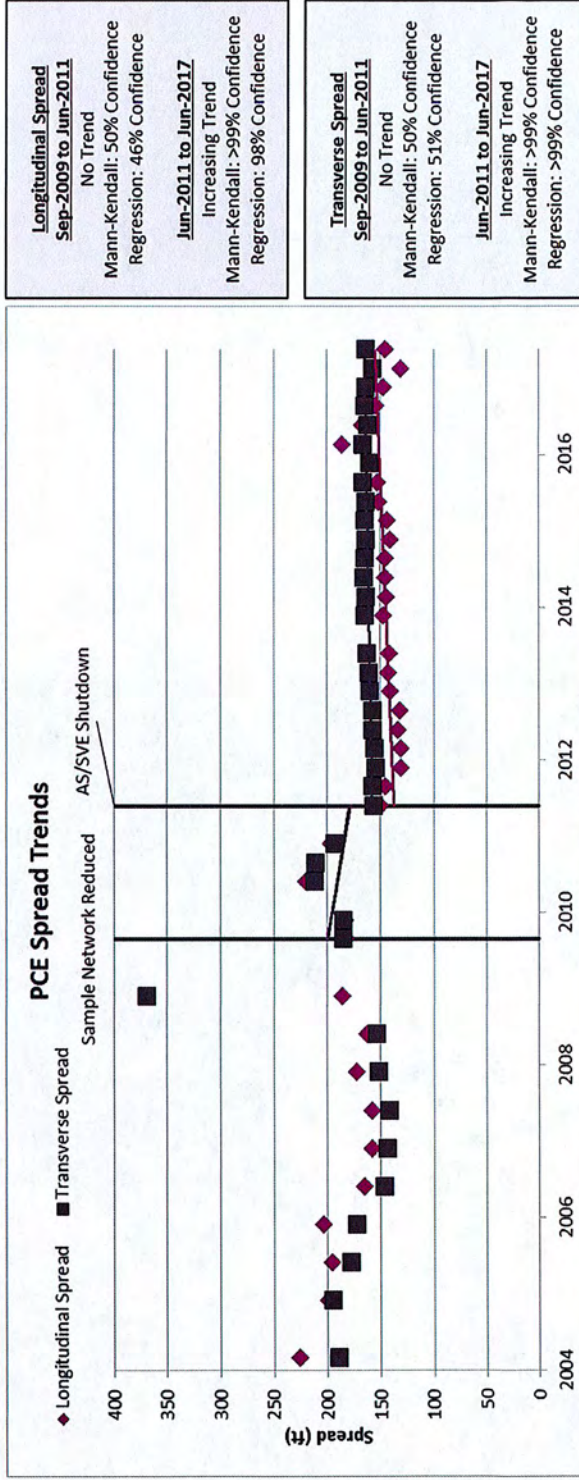
- W-4
- Monitoring Well
- W-4
- Hanging Well - No Longer Sampled
-
- Center of Mass Movement
-
- Net Movement

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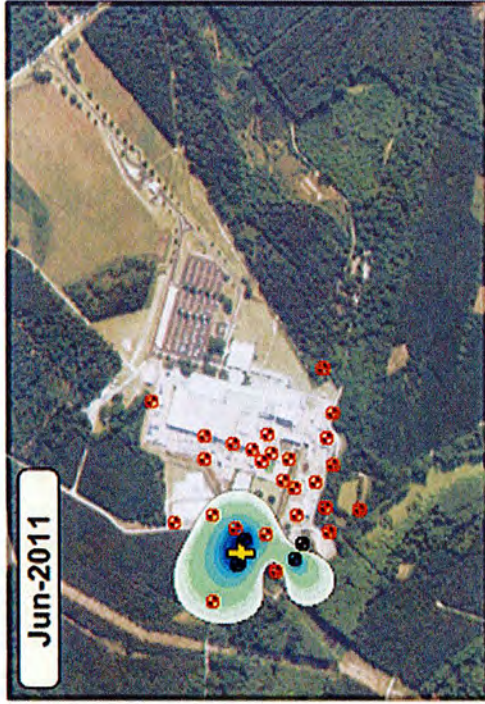


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Jun-2011

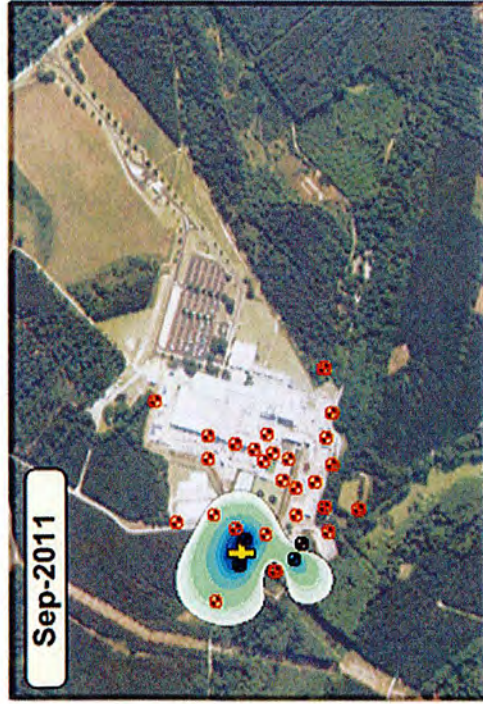


Concentration ($\mu\text{g/L}$)

5 6 8 10 25 50 75 100 150 200

0 ft. 1500 ft. 3000 ft.

Sep-2011

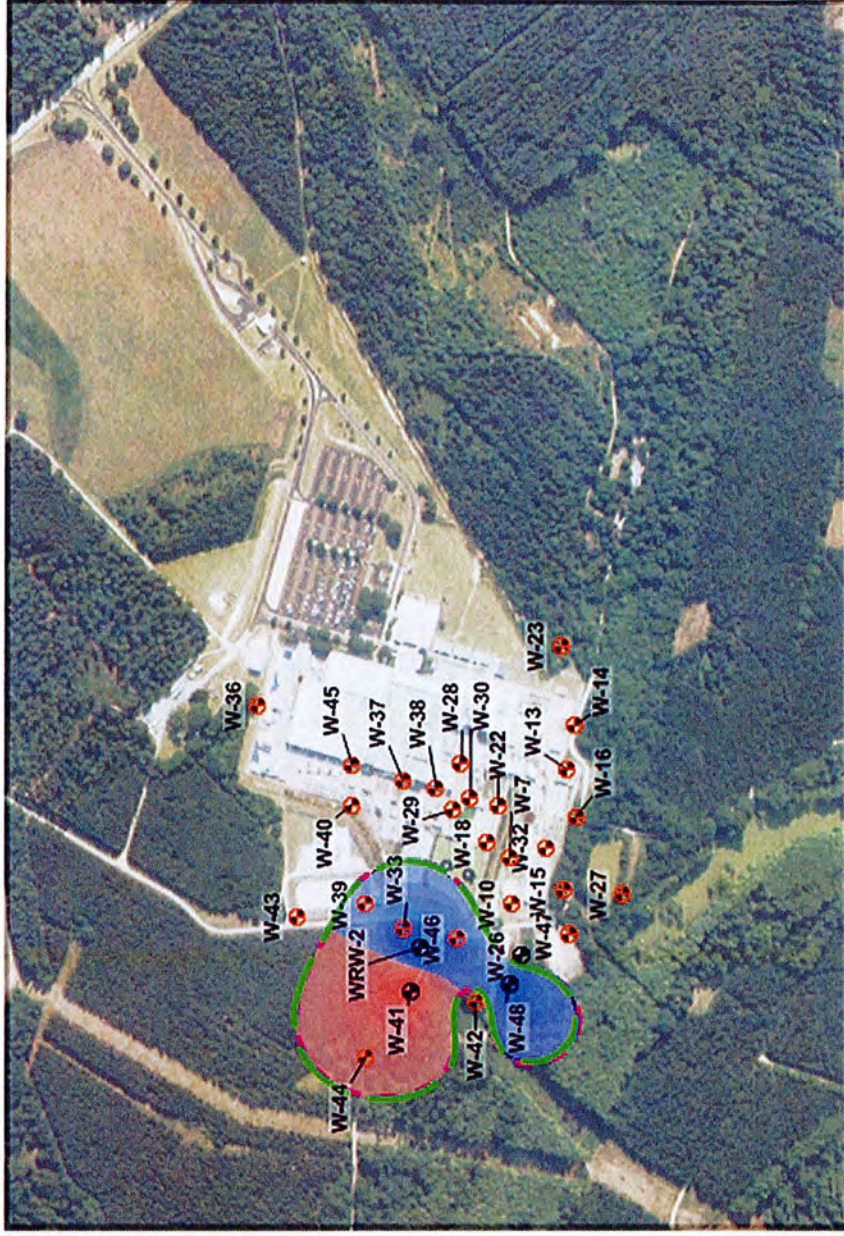


LEGEND

- Monitoring Well
- Hanging Well -
- No Longer Sampled
- Plume Center of Mass
- Jun-2011 Plume Boundary
- Sep-2011 Plume Boundary

PCE

Plume Differences Jun-2011 vs Sep-2011



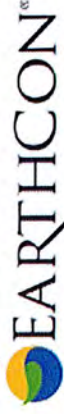
Spatial Change Indicator

-1 0 1

Plume Characteristics

Area: 0% Decrease
Average Concentration: 1% Decrease
Mass Indicator: 1% Decrease
Mass Increase: 0.18 lbs Increase
Mass Decrease: 0.23 lbs Decrease

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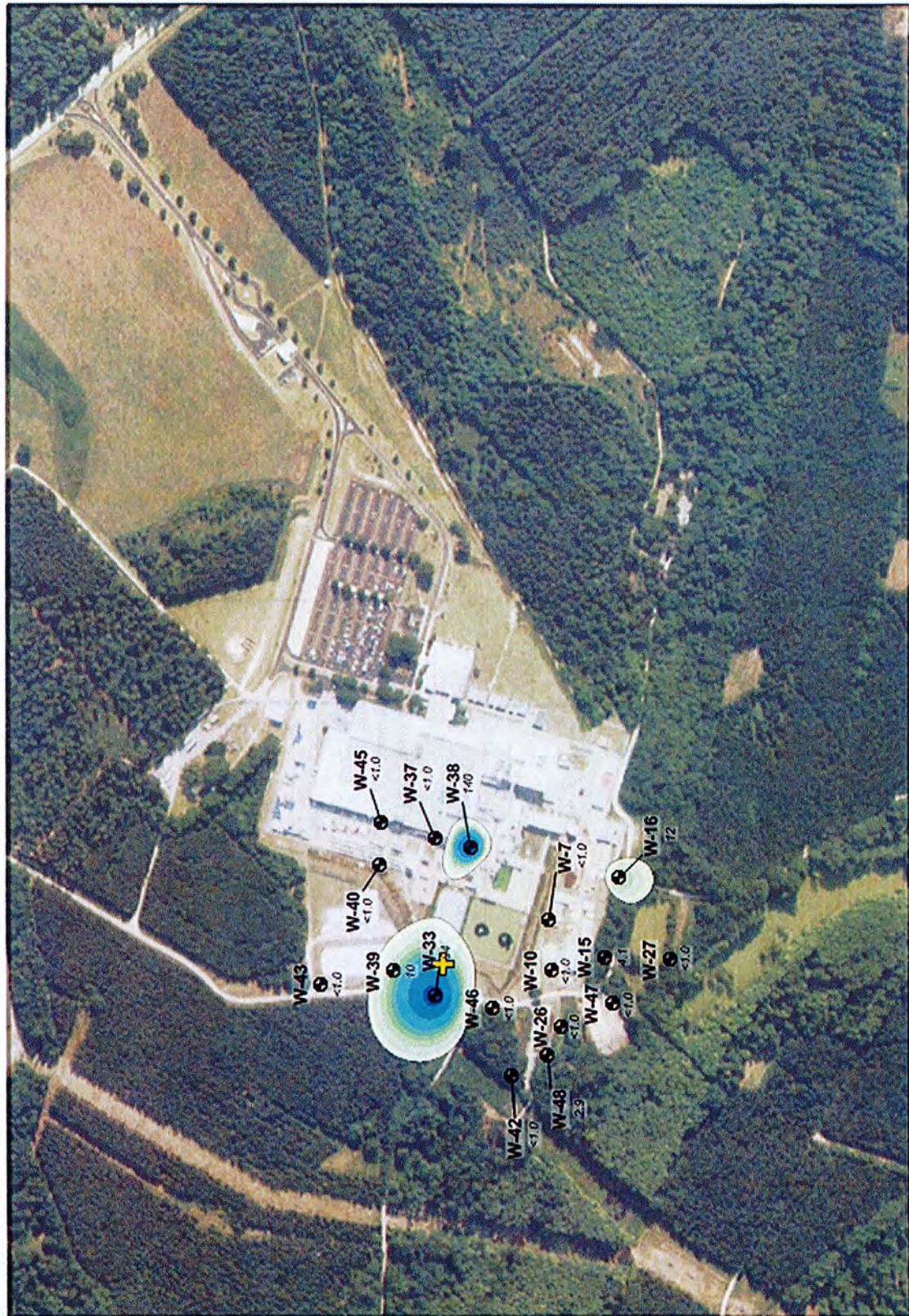
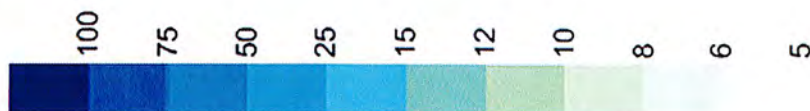
Environmental Challenges
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TCE

TCE
Mar-2004

Concentration (µg/L)



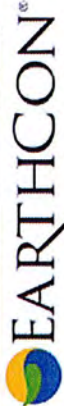
Plume Characteristics

Plume Area: 6.9 acres

Plume Average Concentration: 14.0 µg/L

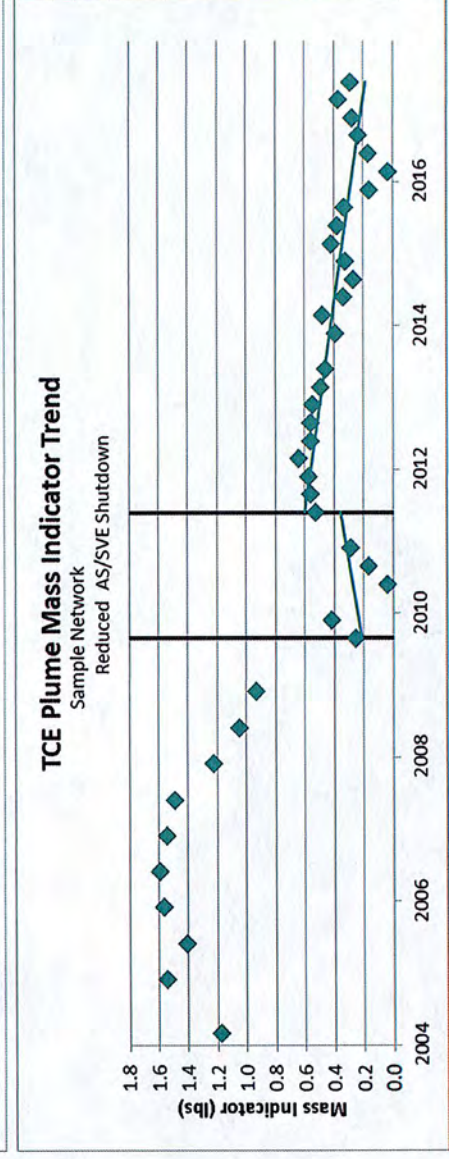
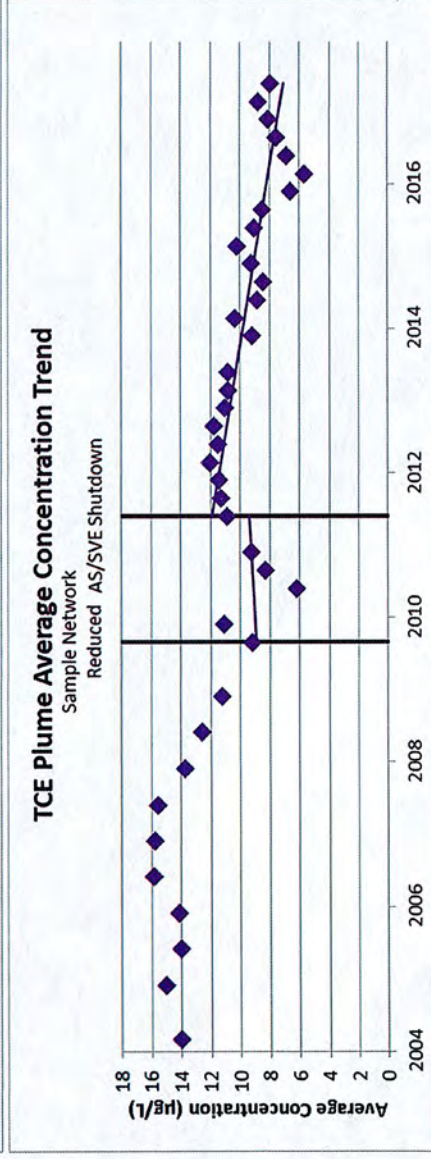
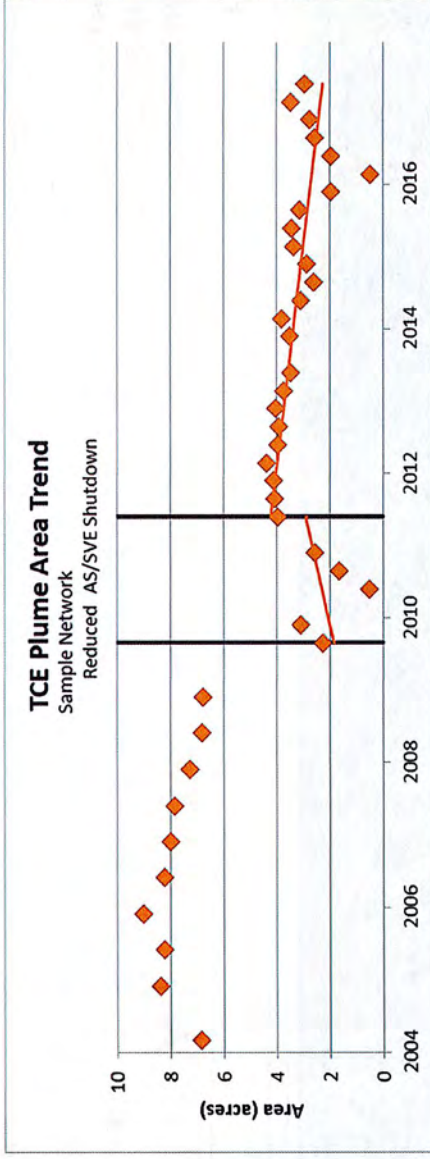
Plume Mass Indicator: 1.2 lbs

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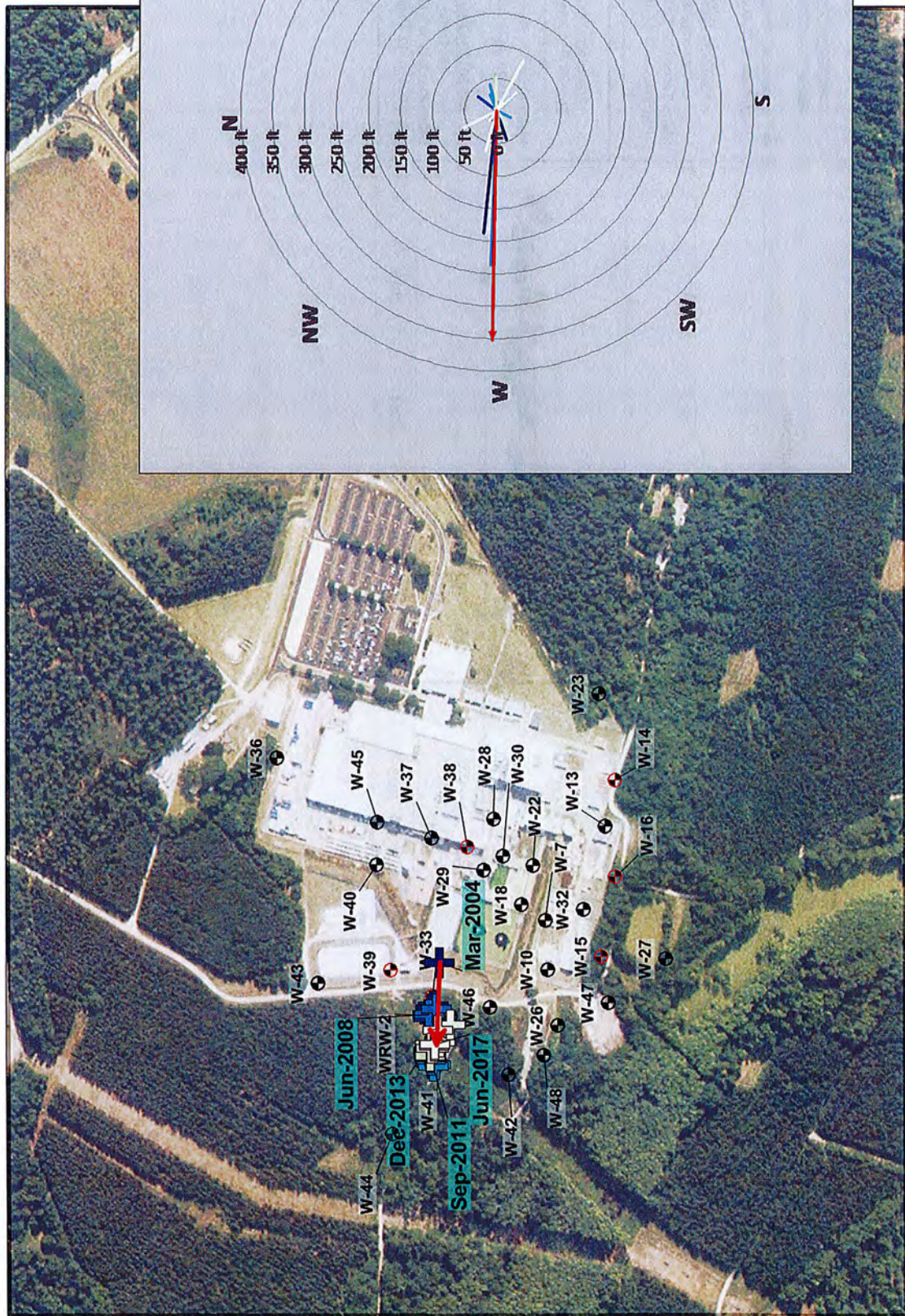


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TCE
Center of Mass



0 ft. 650 ft. 1300 ft.



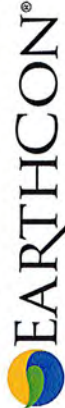
LEGEND

- W-4 Monitoring Well
- W-4 Hanging Well - No Longer Sampled
- Center of Mass Movement
- Net Movement

Center of Mass Scale

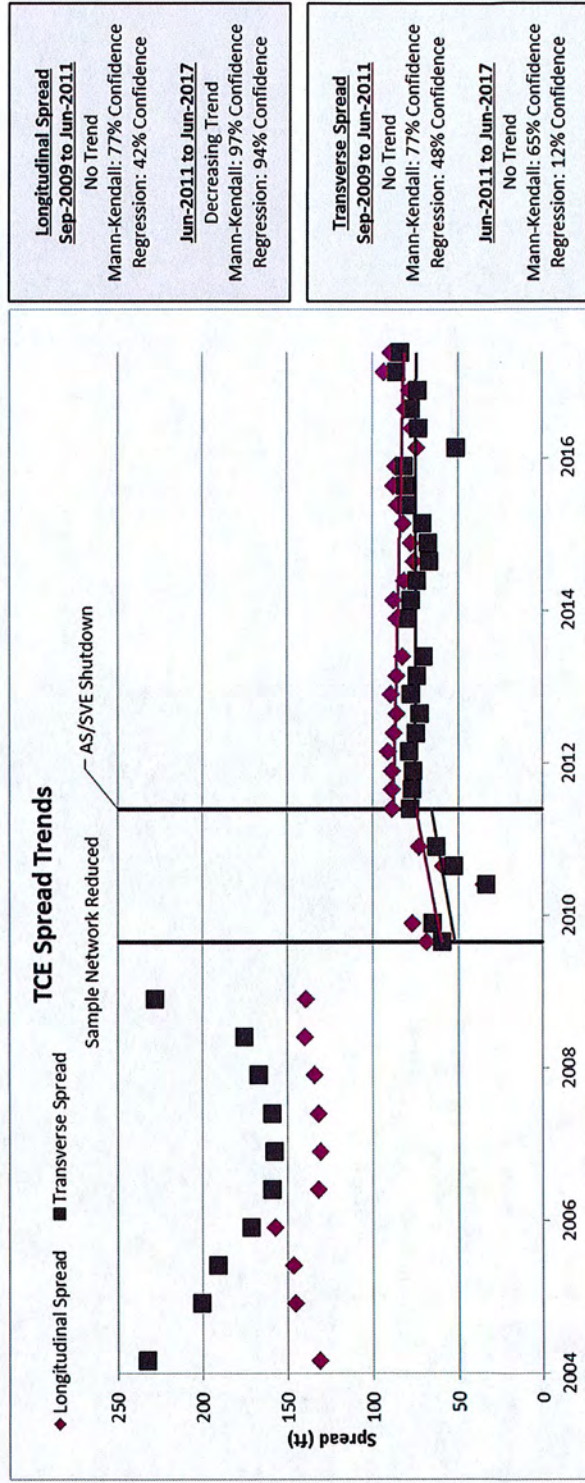


This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.

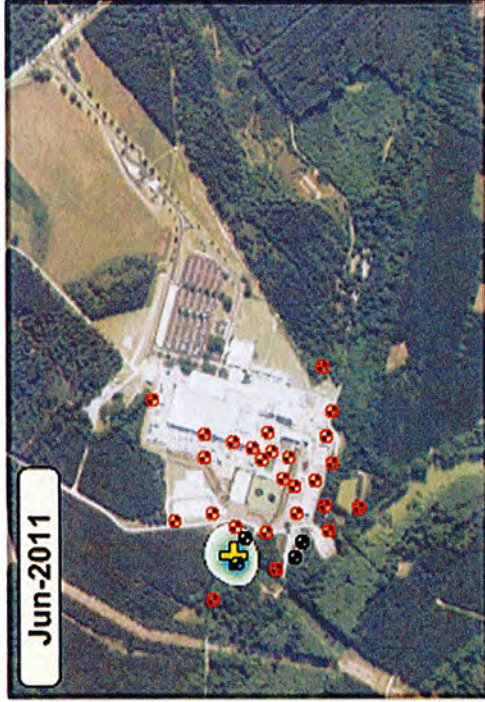


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Jun-2011

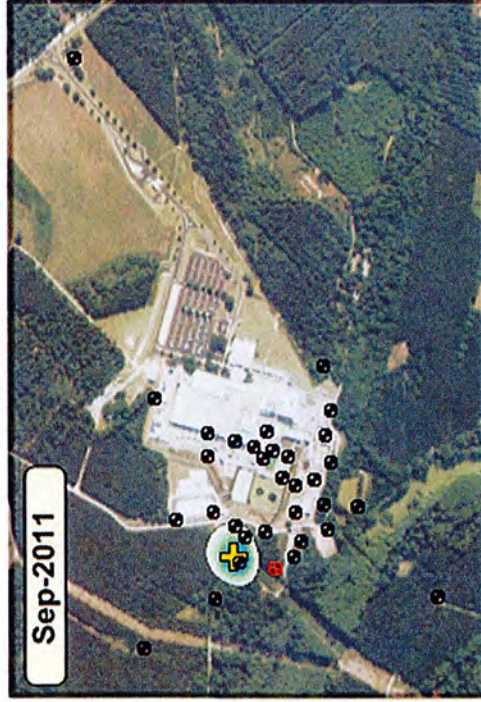


Concentration (µg/L)

5 6 8 10 12 15 25 50 75 100

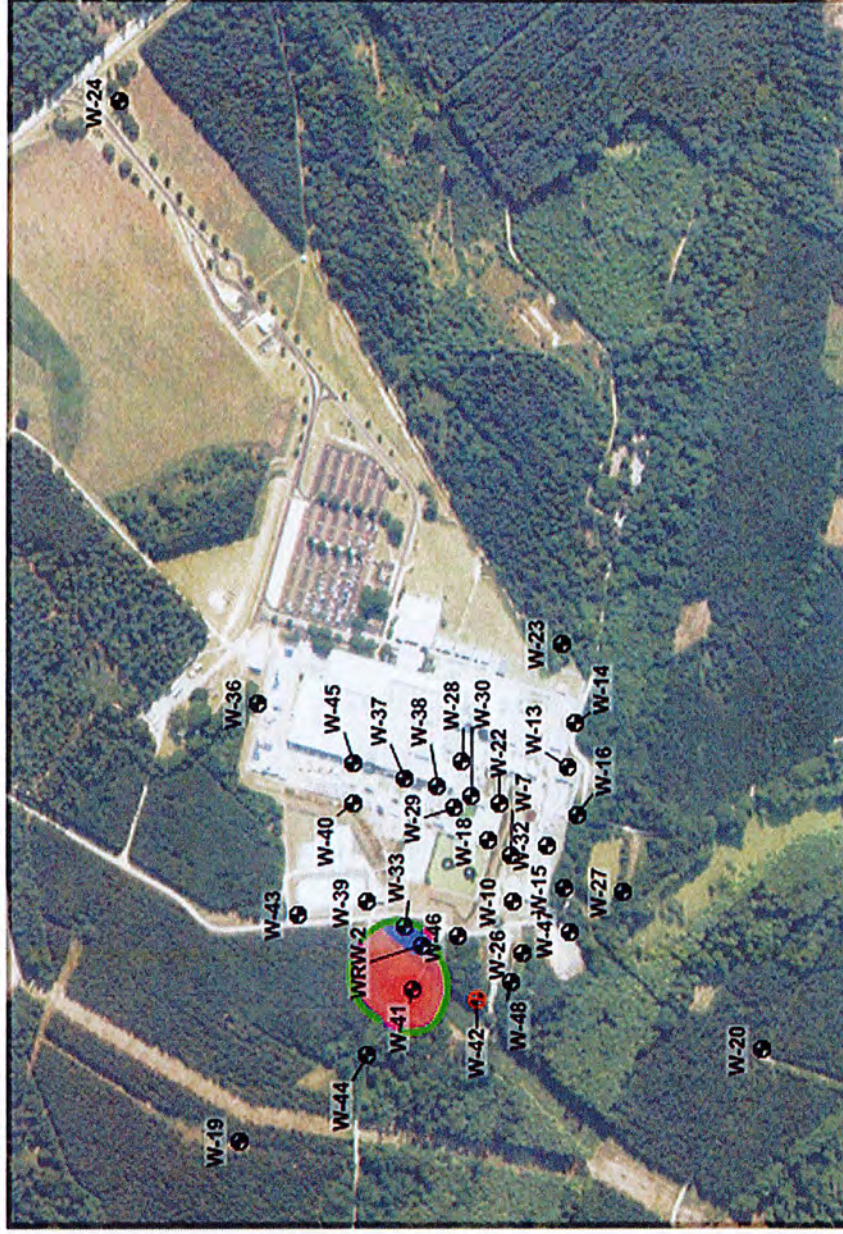
0 ft. 1500 ft. 3000 ft.

Sep-2011



TCE

Plume Differences Jun-2011 vs Sep-2011



Spatial Change Indicator

-1 0 1

LEGEND

- Monitoring Well
- Hanging Well -
- No Longer Sampled
- Plume Center of Mass
- Jun-2011 Plume Boundary
- Sep-2011 Plume Boundary

Plume Characteristics

Area: 2% Increase
Average Concentration: 4% Increase
Mass Indicator: 7% Increase
Mass Increase: 0.03 lbs Increase
Mass Decrease: 0.00 lbs Decrease

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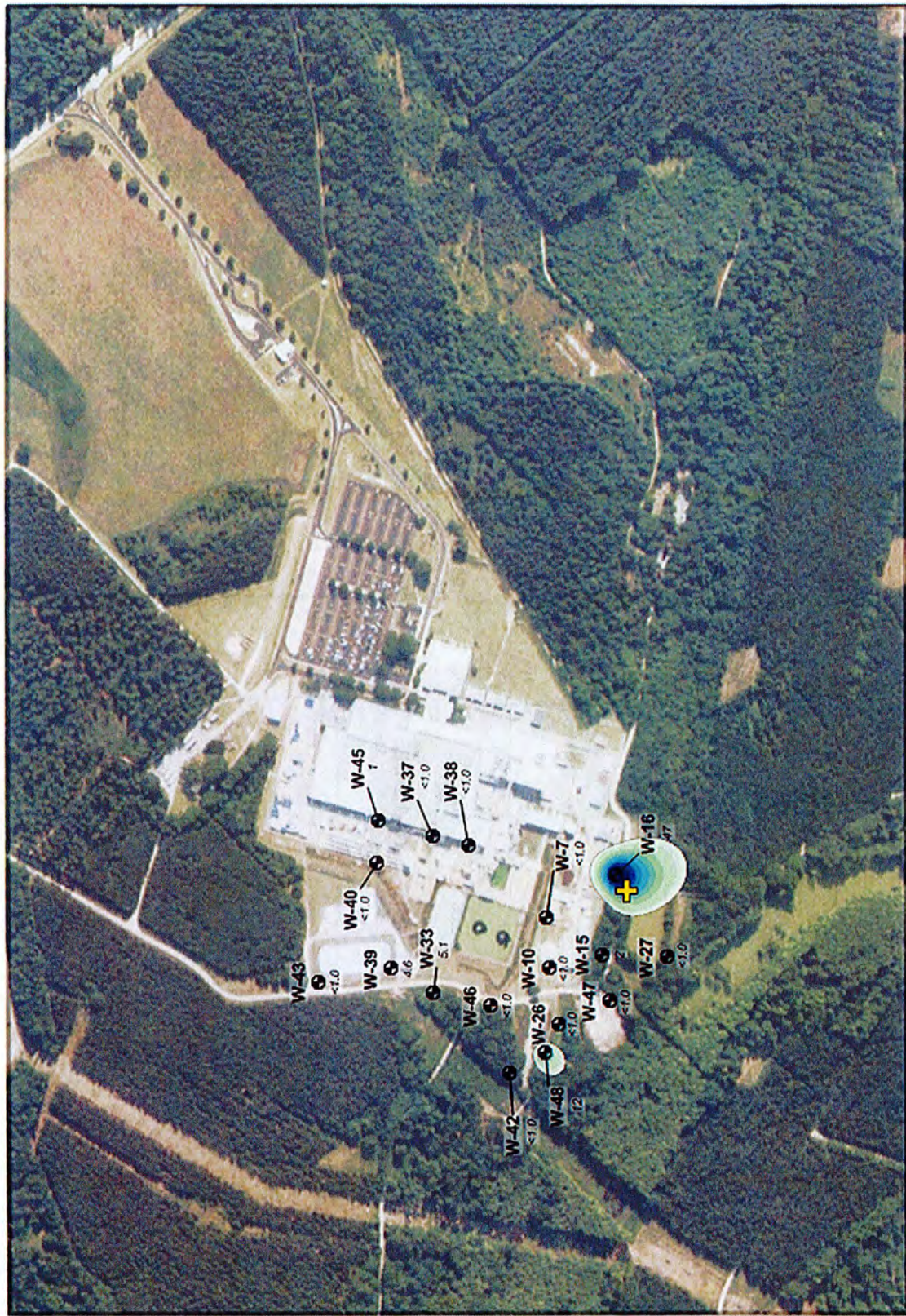
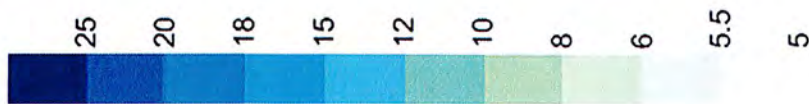
Environmental Challenges
BUSINESS SOLUTIONS

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cis-1,2-DCE

cis-1,2-DCE
Mar-2004

Concentration (µg/L)



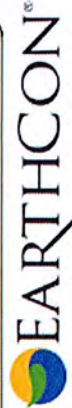
Plume Characteristics

Plume Area: 2.9 acres

Plume Average Concentration: 10.0 µg/L

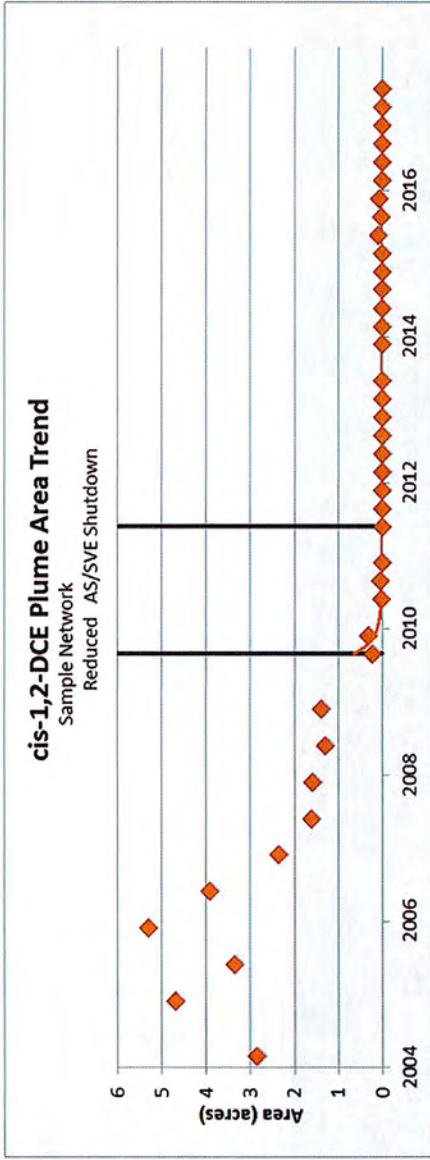
Plume Mass Indicator: 0.35 lbs

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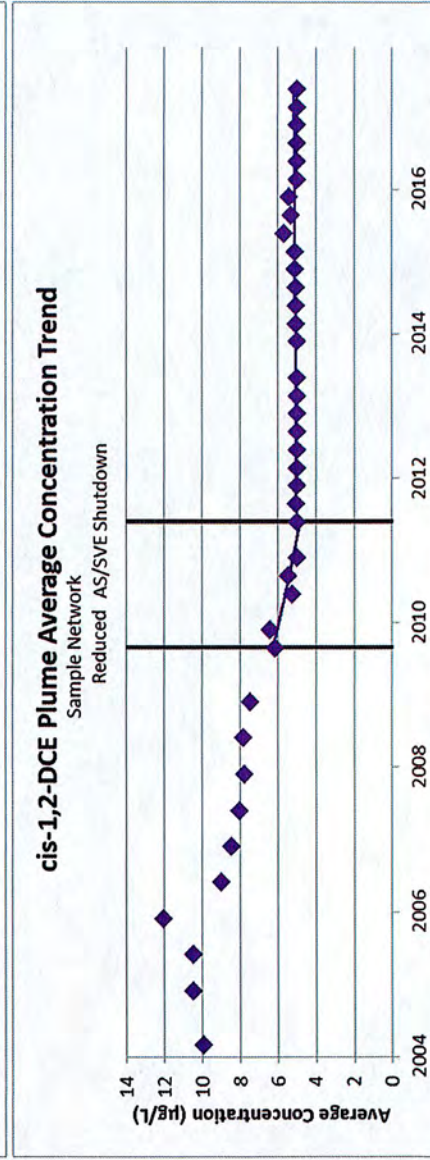
Environmental Challenges
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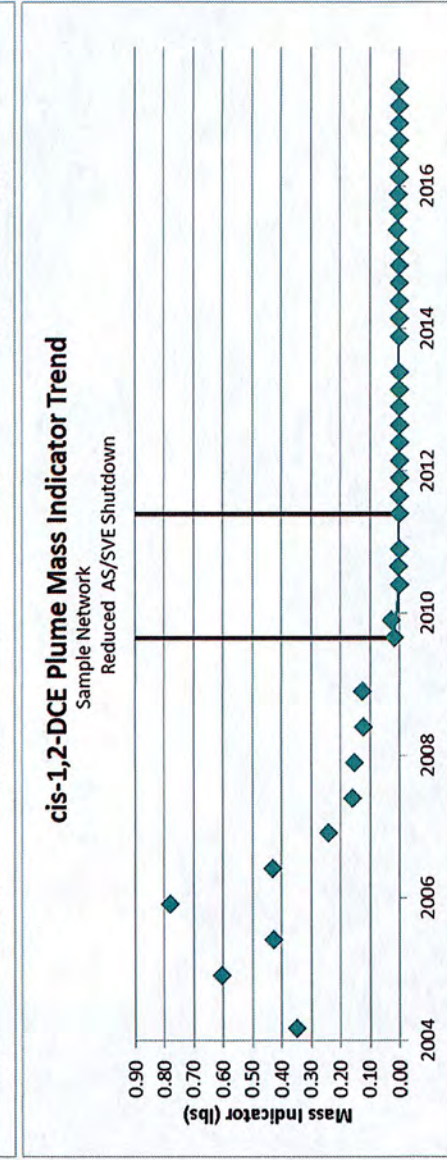
Sep-2009 to Jun-2011
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: 98% Confidence

Jun-2011 to Jun-2017
No Trend
Mann-Kendall: 81% Confidence
Regression: 76% Confidence



Sep-2009 to Jun-2011
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: 98% Confidence

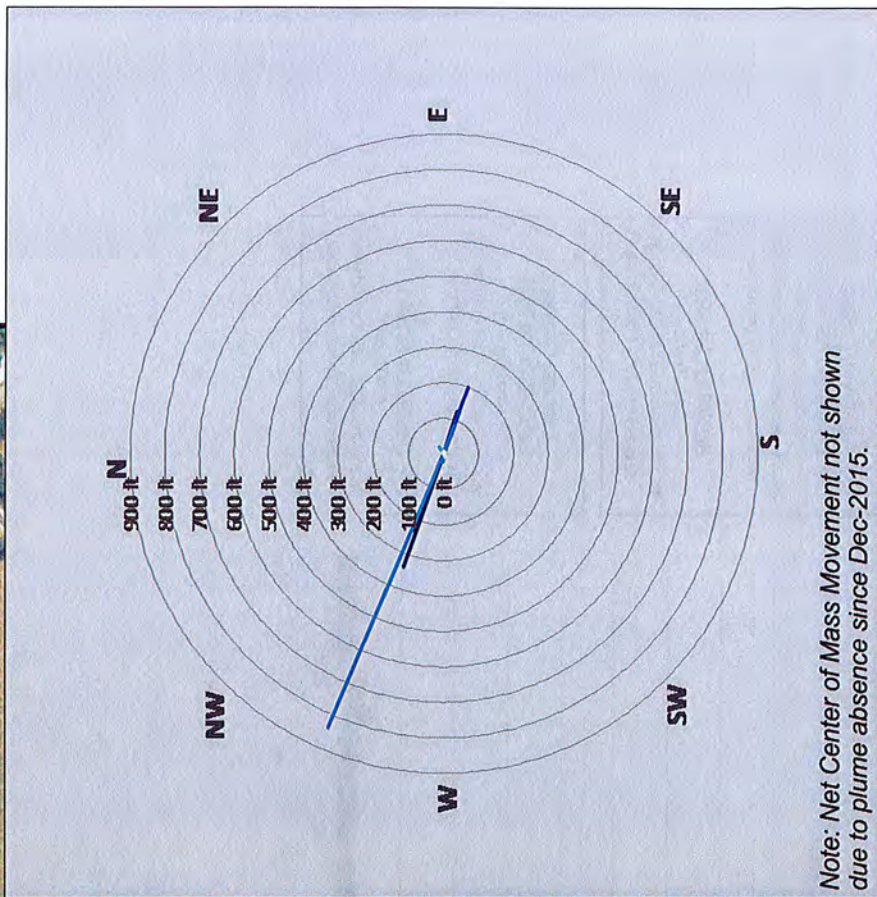
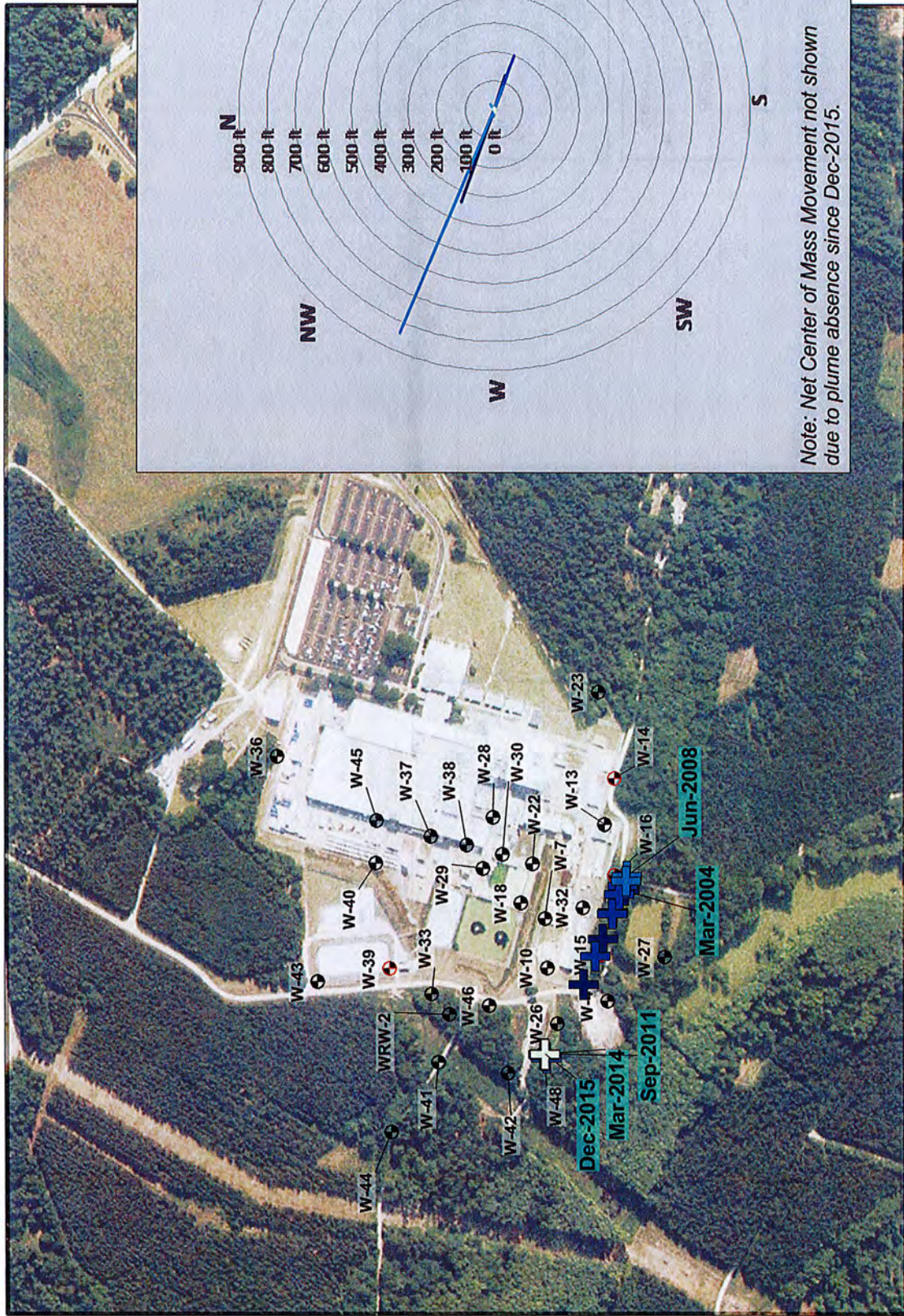
Jun-2011 to Jun-2017
No Trend
Mann-Kendall: 81% Confidence
Regression: 74% Confidence



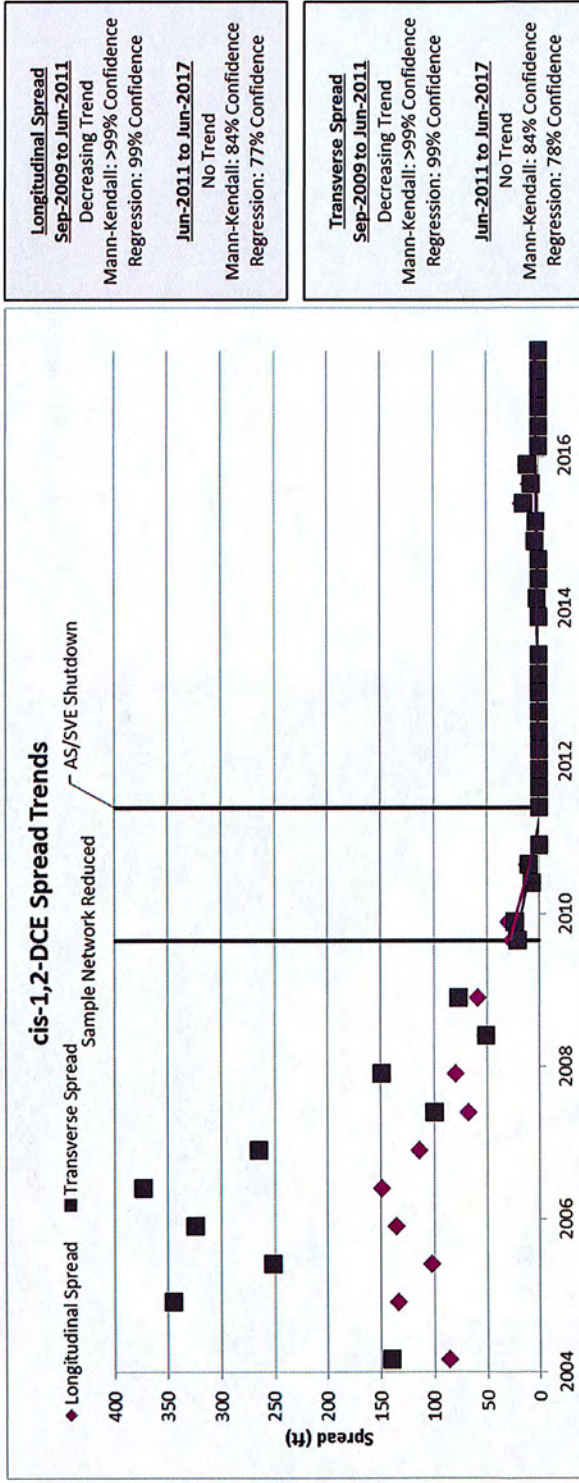
Sep-2009 to Jun-2011
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: 99% Confidence

Jun-2011 to Jun-2017
No Trend
Mann-Kendall: 86% Confidence
Regression: 85% Confidence

**cis-1,2-DCE
Center of Mass**



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[CONSTITUENT AND ZONE] 3PDM VID

Vinyl Chloride

[CONSTITUENT AND ZONE] VID

Vinyl Chloride Input Data

	May 2004	June 2004	July 2004	Aug 2004	Sept 2004	Oct 2004	Nov 2004	Dec 2004	Jan 2005	Feb 2005	Mar 2005	Apr 2005	May 2005	Jun 2005	Jul 2005	Aug 2005	Sept 2005	Oct 2005	Nov 2005	Dec 2005	Jan 2006	Feb 2006	Mar 2006	Apr 2006	May 2006	Jun 2006	Jul 2006	Aug 2006	Sept 2006	Oct 2006	Nov 2006	Dec 2006	Jan 2007	Feb 2007	Mar 2007	Apr 2007	May 2007	Jun 2007	Jul 2007	Aug 2007	Sept 2007	Oct 2007	Nov 2007	Dec 2007	Jan 2008	Feb 2008	Mar 2008	Apr 2008	May 2008	Jun 2008	Jul 2008	Aug 2008	Sept 2008	Oct 2008	Nov 2008	Dec 2008	Jan 2009	Feb 2009	Mar 2009	Apr 2009	May 2009	Jun 2009	Jul 2009	Aug 2009	Sept 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010	Jul 2010	Aug 2010	Sept 2010	Oct 2010	Nov 2010	Dec 2010	Jan 2011	Feb 2011	Mar 2011	Apr 2011	May 2011	Jun 2011	Jul 2011	Aug 2011	Sept 2011	Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012	Sept 2012	Oct 2012	Nov 2012	Dec 2012	Jan 2013	Feb 2013	Mar 2013	Apr 2013	May 2013	Jun 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2077	Sept 2077	Oct 2077	Nov 2077	Dec 2077	Jan 2078	Feb 2078	Mar 2078	Apr 2078	May 2078	Jun 2078	Jul 2078	Aug 2078	Sept 2078	Oct 2078	Nov 2078	Dec 2078	Jan 2079	Feb 2079	Mar 2079	Apr 2079	May 2079	Jun 2079	Jul 2079	Aug 2079	Sept 2079	Oct 2079	Nov 2079	Dec 2079	Jan 2080	Feb 2080	Mar 2080	Apr 2080	May 2080	Jun 2080	Jul 2080	Aug 2080	Sept 2080	Oct 2080	Nov 2080	Dec 2080	Jan 2081	Feb 2081	Mar 2081	Apr 2081	May 2081	Jun 2081	Jul 2081	Aug 2081	Sept 2081	Oct 2081	Nov 2081	Dec 2081	Jan 2082	Feb 2082	Mar 2082	Apr 2082	May 2082	Jun 2082	Jul 2082	Aug 2082	Sept 2082	Oct 2082	Nov 2082	Dec 2082	Jan 2083	Feb 2083	Mar 2083	Apr 2083	May 2083	Jun 2083	Jul 2083	Aug 2083	Sept 2083	Oct 2083	Nov 2083	Dec 2083	Jan 2084	Feb 2084	Mar 2084	Apr 2084	May 2084	Jun 2084	Jul 2084	Aug 2084	Sept 2084	Oct 2084	Nov 2084	Dec 2084	Jan 2085	Feb 2085	Mar 2085	Apr 2085	May 2085	Jun 2085	Jul 2085	Aug 2085	Sept 2085	Oct 2085	Nov 2085	Dec 2085	Jan 2086	Feb 2086	Mar 2086	Apr 2086	May 2086	Jun 2086	Jul 2086	Aug 2086	Sept 2086	Oct 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2095	Jan 2096	Feb 2096	Mar 2096	Apr 2096	May 2096	Jun 2096	Jul 2096	Aug 2096	Sept 2096	Oct 2096	Nov 2096	Dec 2096	Jan 2097	Feb 2097	Mar 2097	Apr 2097	May 2097	Jun 2097	Jul 2097	Aug 2097	Sept 2097	Oct 2097	Nov 2097	Dec 2097	Jan 2098
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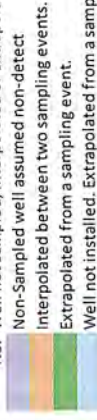
Notes:

All concentrations in $\mu\text{g/l}$

NA: Well not installed, abandoned or otherwise not utilized.

<5.00: Analyte not detected. (In general, non-detect values were used in the analysis at one-half the reported detection limit.)

NS: Well not sampled, interpolated or extrapolated value shown - refer to shading for more specific explanation.



Non-Sampled Well

Earthcon Consultants Inc.

8700 Trail Lake Drive 'P: 901-850-5404

Suite 101
F-901.950.5144

Suite 101
Memphis TN 38120 www.earthtron.com
1-801-690-6144

[COM Figure]

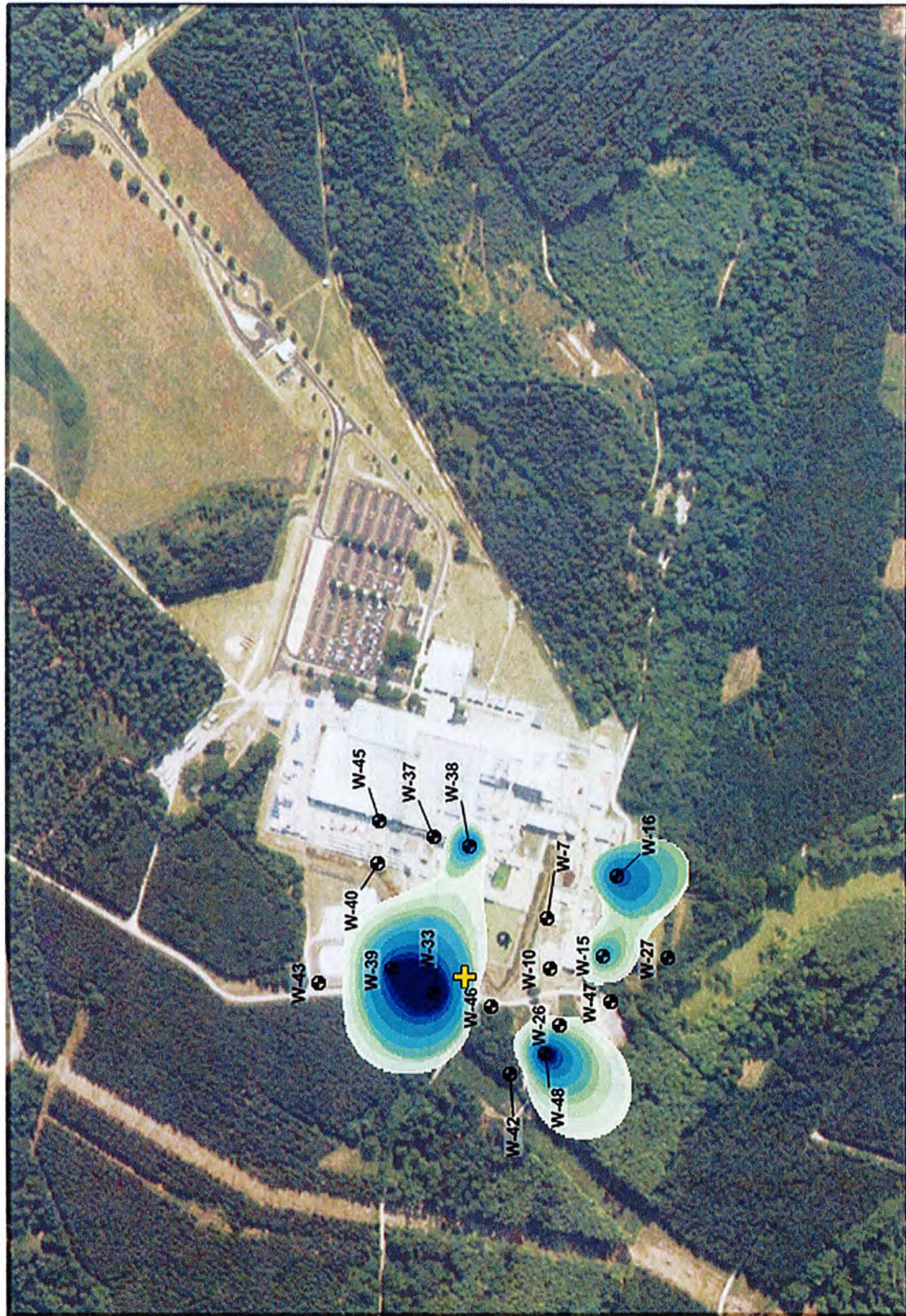
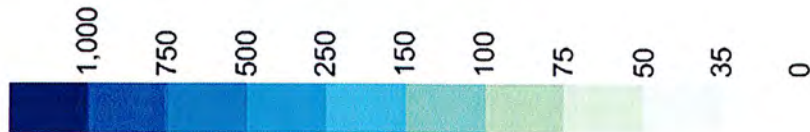
[charts go here]

[CONSTITUENT AND ZONE] 3PDM VID

Chloroethenes

Chloroethenes
Mar-2004

Concentration (nmol/L)



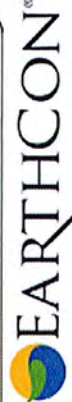
Plume Characteristics

Plume Area: 20 acres

Plume Average Concentration: 243 nmol/L

Plume Mass Indicator: 27.1 moles

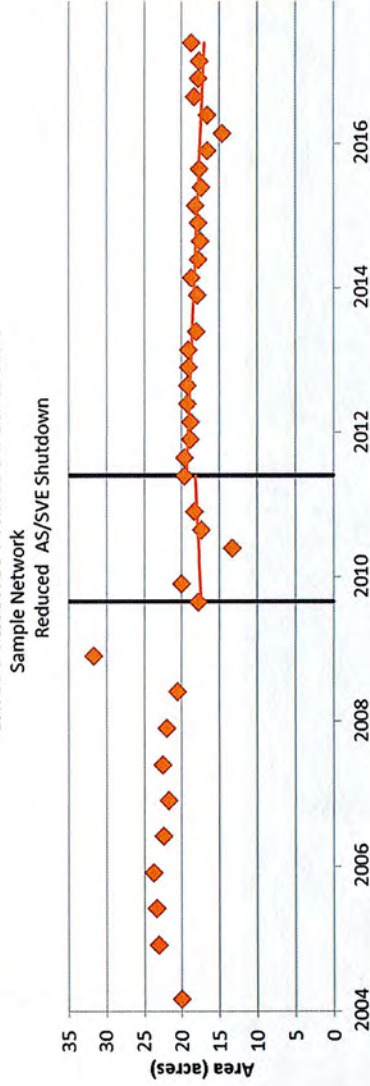
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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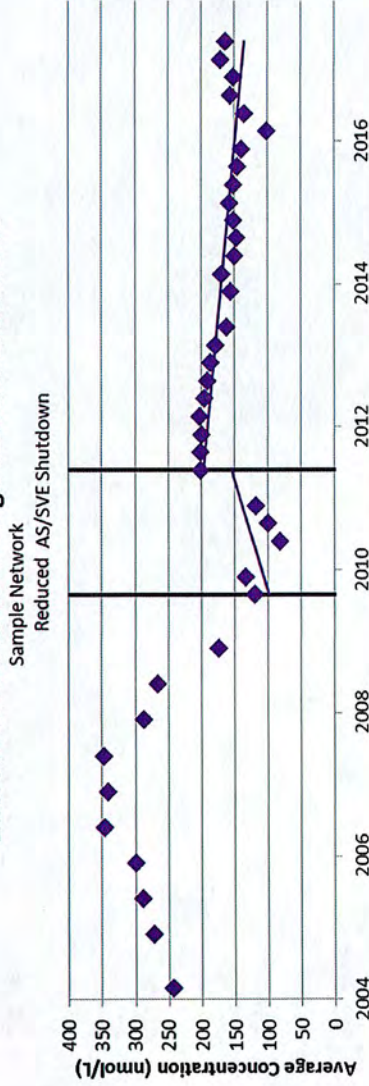
Chloroethenes Plume Area Trend



Sep-2009 to Jun-2011
No Trend
Mann-Kendall: 64% Confidence
Regression: 18% Confidence

Jun-2011 to Jun-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

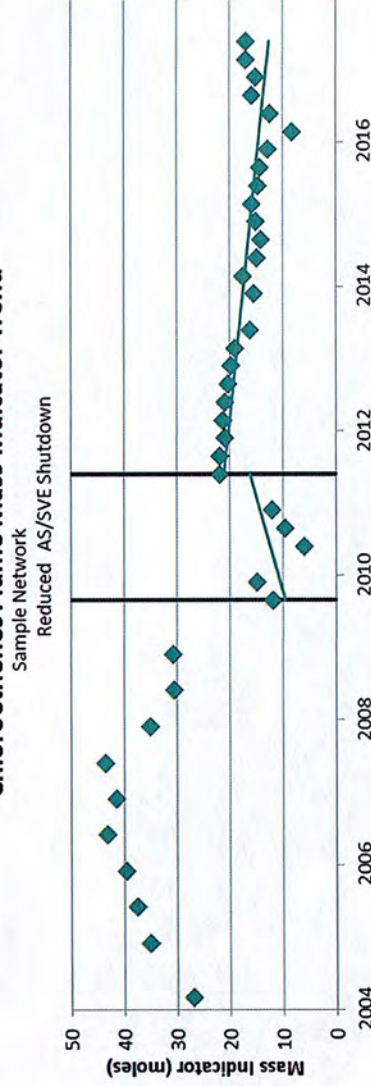
Chloroethenes Plume Average Concentration Trend



Sep-2009 to Jun-2011
No Trend
Mann-Kendall: 64% Confidence
Regression: 69% Confidence

Jun-2011 to Jun-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

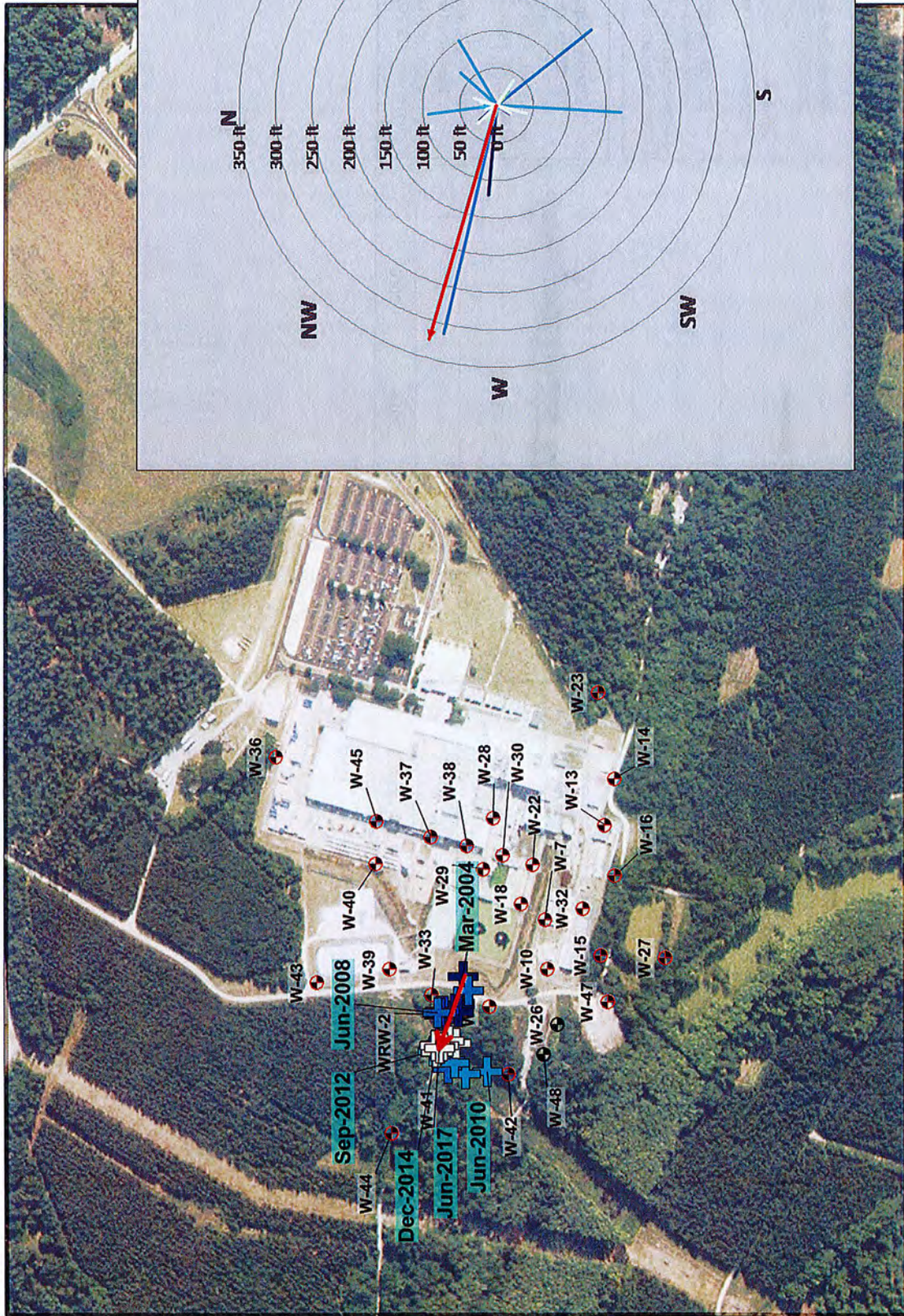
Chloroethenes Plume Mass Indicator Trend



Sep-2009 to Jun-2011
No Trend
Mann-Kendall: 77% Confidence
Regression: 62% Confidence

Jun-2011 to Jun-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Chloroethenes Center of Mass

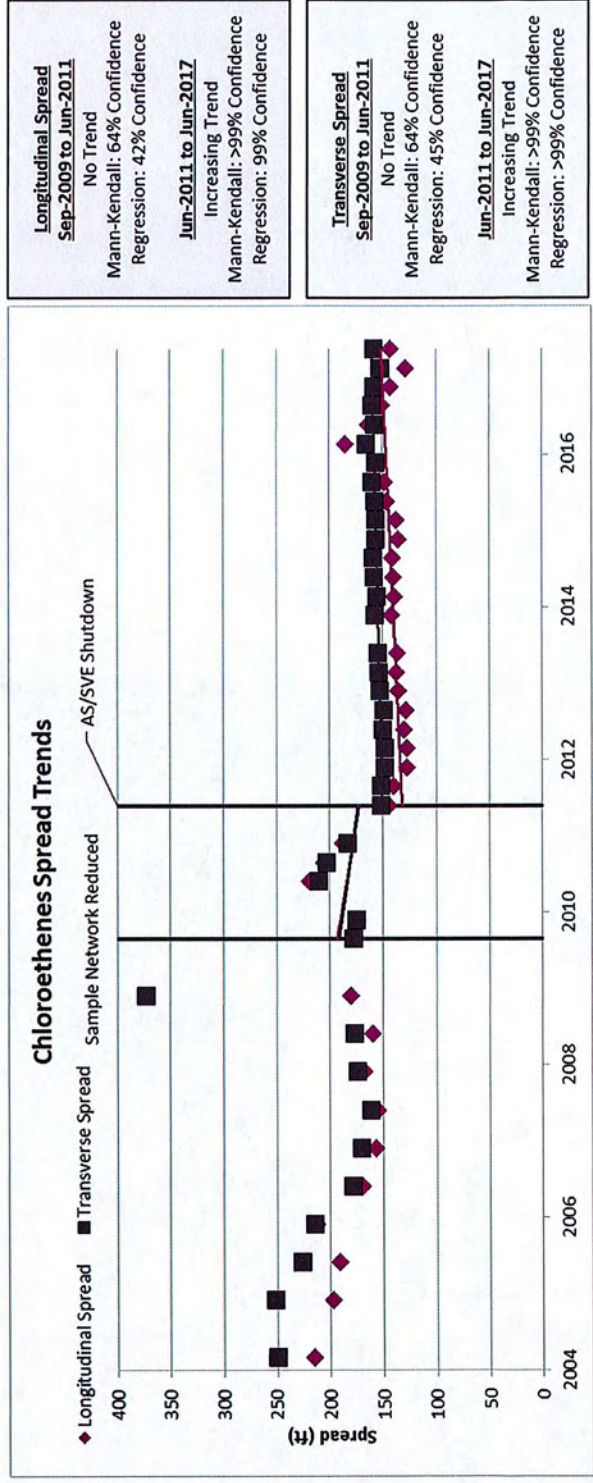


0 ft. 650 ft. 1300 ft.

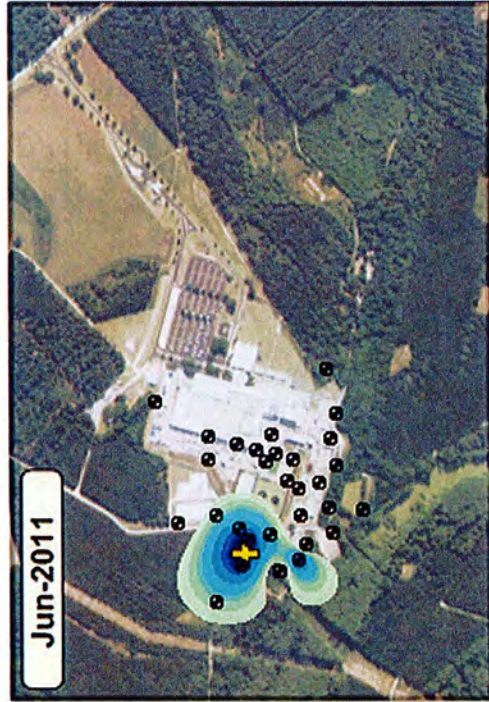
Center of Mass Scale



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Jun-2011

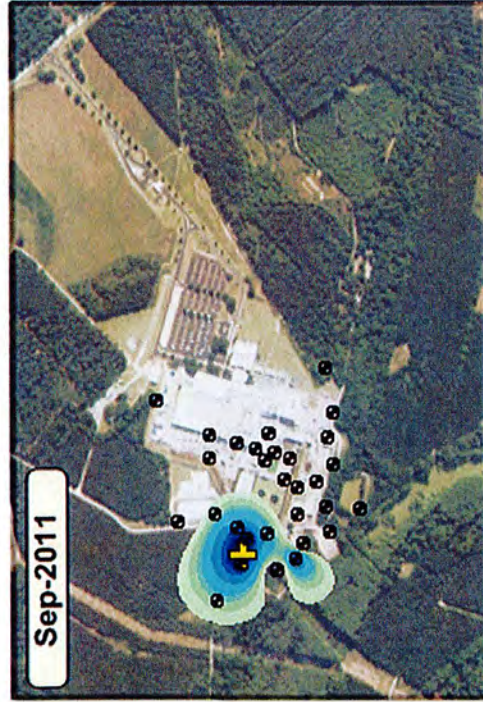


Concentration (nmol/L)

0 10 25 50 75 100 250 500 750 1,000

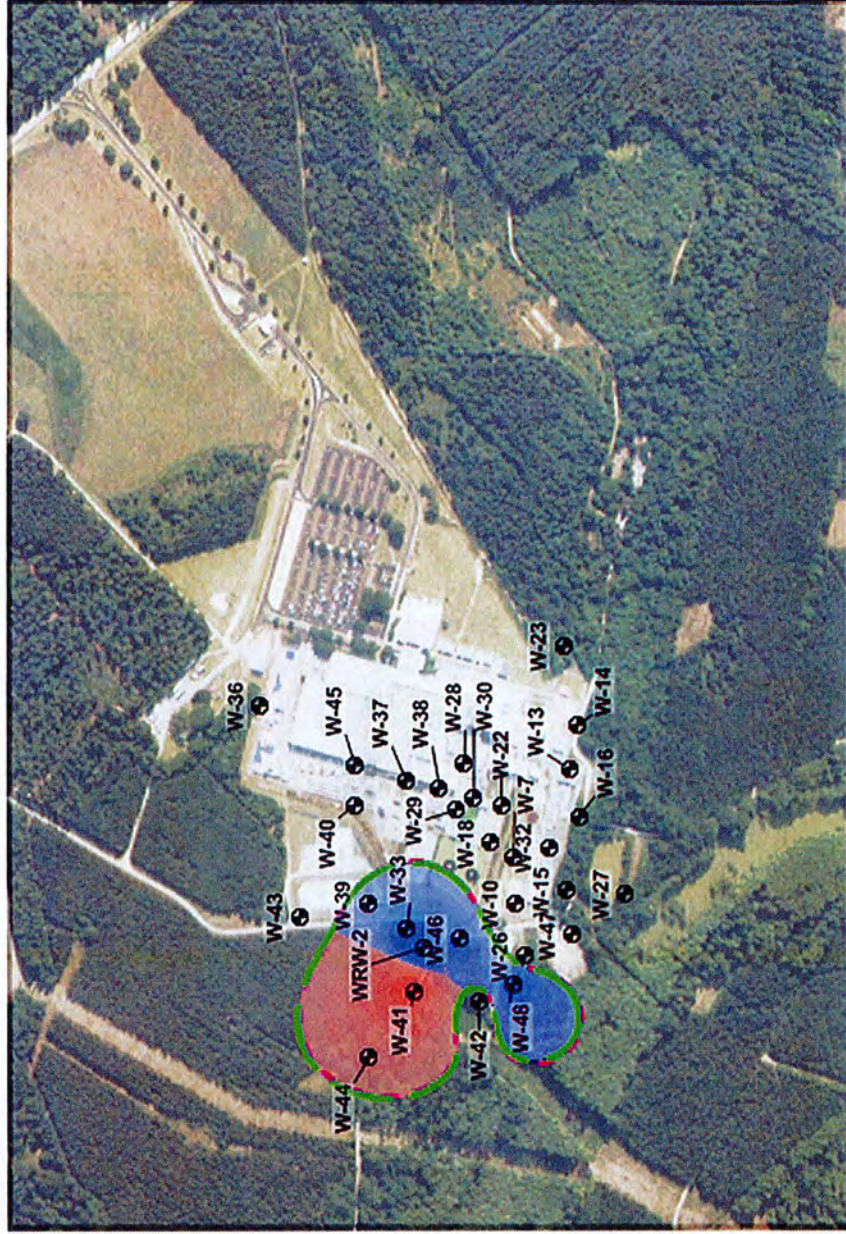
0 ft. 1500 ft. 3000 ft.

Sep-2011



Chloroethenes

Plume Differences Jun-2011 vs Sep-2011



Spatial Change Indicator

-1 0 1

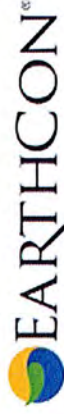
LEGEND

- W-4 Monitoring Well
- W-4 Hanging Well - No Longer Sampled
- ⊕ Plume Center of Mass
- - - Jun-2011 Plume Boundary
- Sep-2011 Plume Boundary

Plume Characteristics

Area: <0.1% Decrease
Average Concentration: <0.1% Increase
Mass Indicator: <0.1% Decrease
Mass Increase: 0.62 moles Increase
Mass Decrease: 0.63 moles Decrease

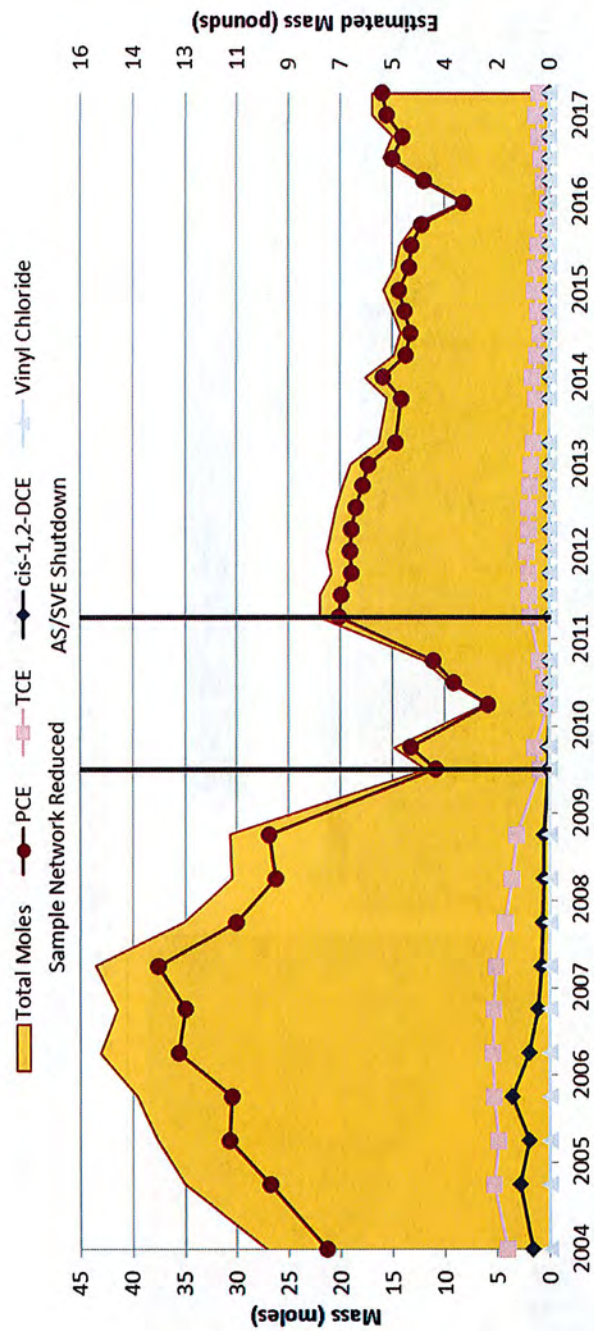
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



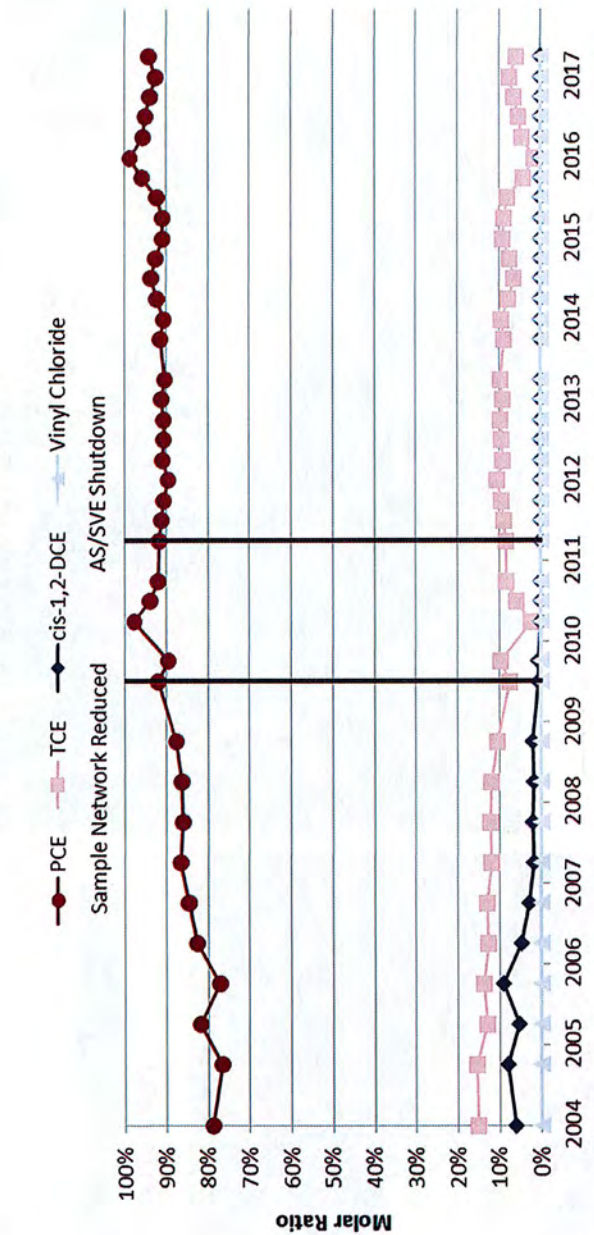
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Total Chloroethenes Molar Mass

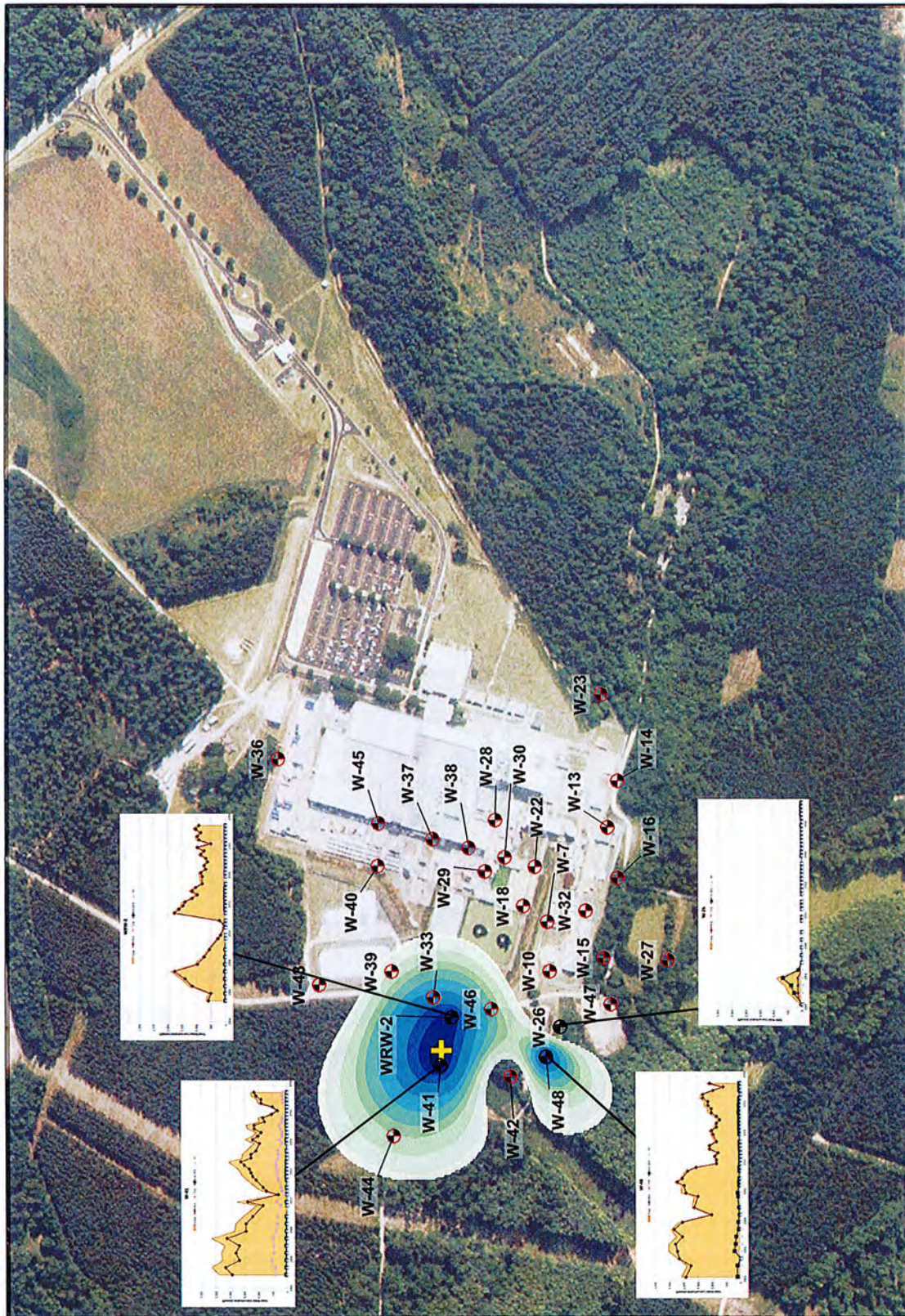
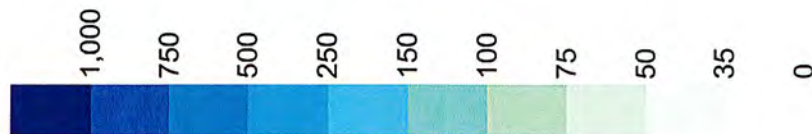


Total Chloroethenes Molar Ratio



Chloroethenes Jun-2017

Concentration (nmol/L)



Plume Characteristics

Plume Area: **19 acres**

Plume Average Concentration: **163 nmol/L**

Plume Mass Indicator: **17.0 moles**

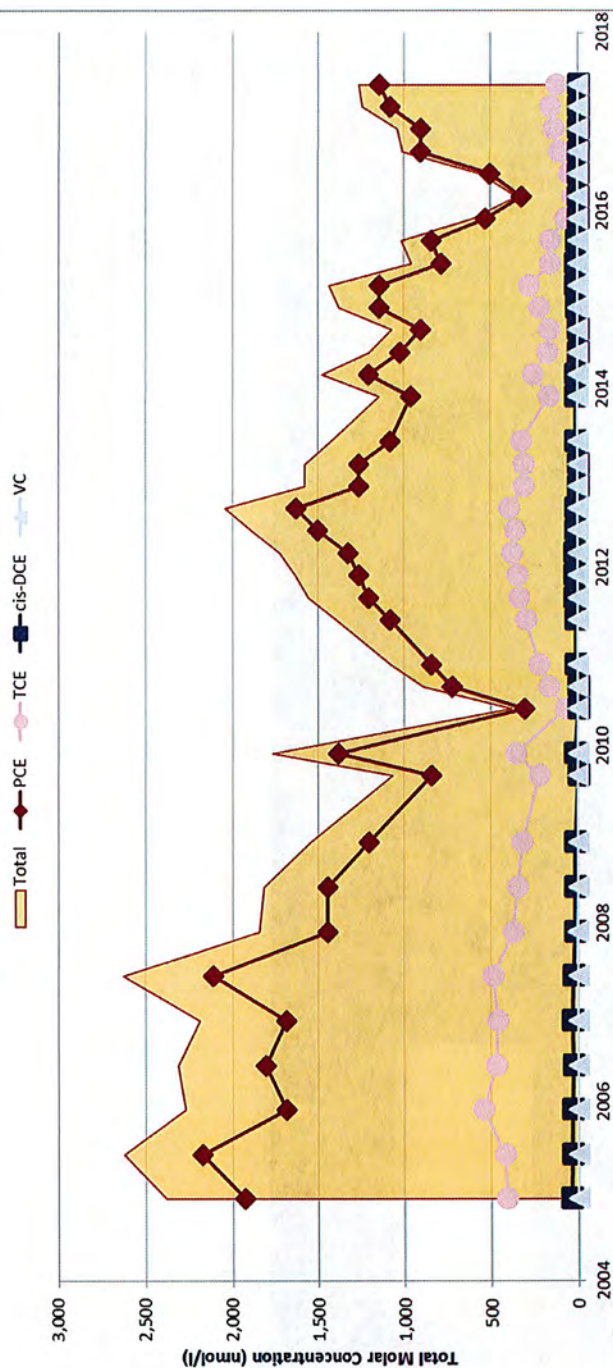
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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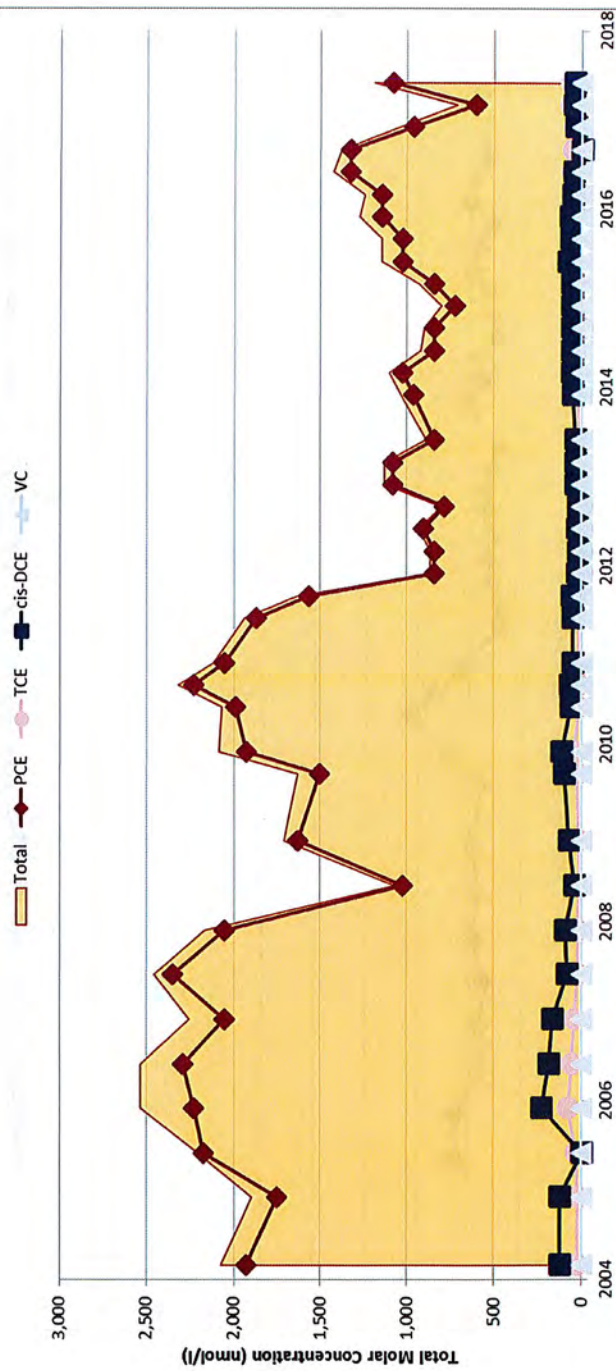
W-41



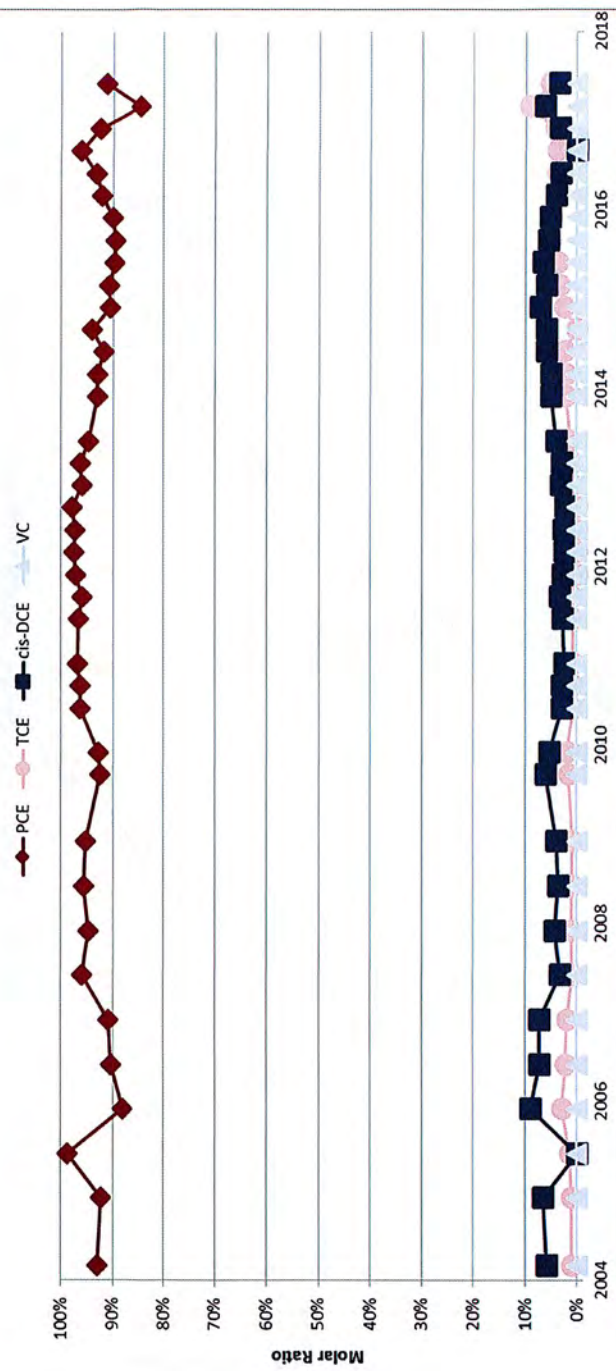
W-41



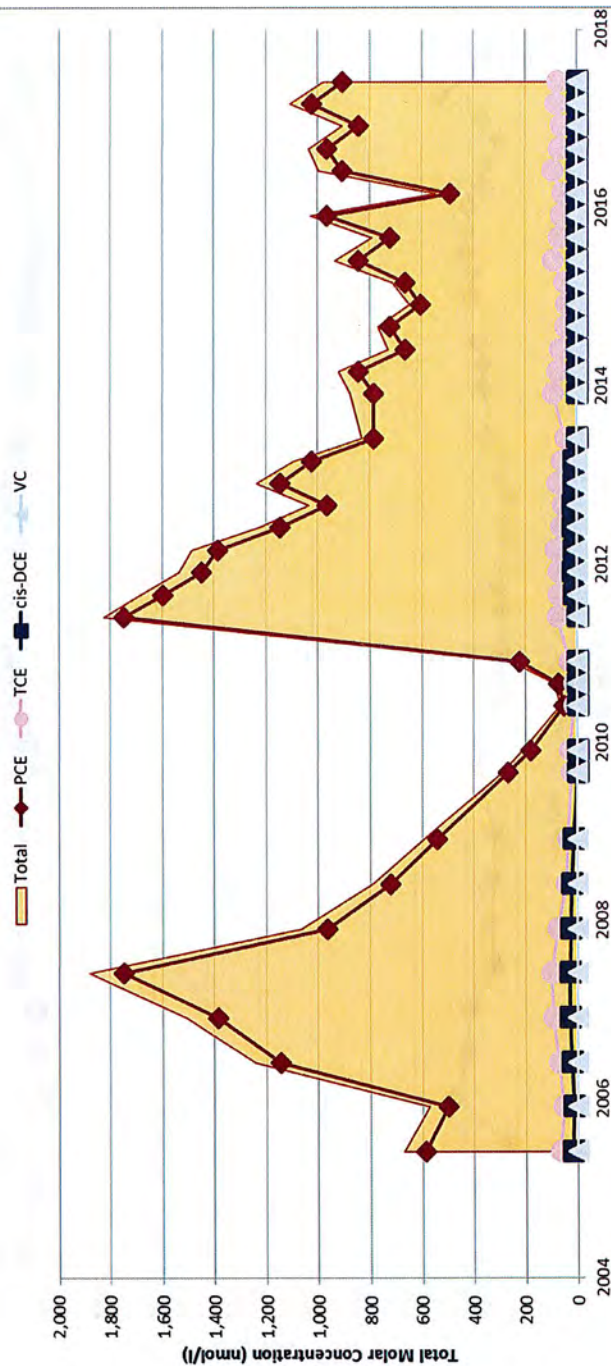
W-48



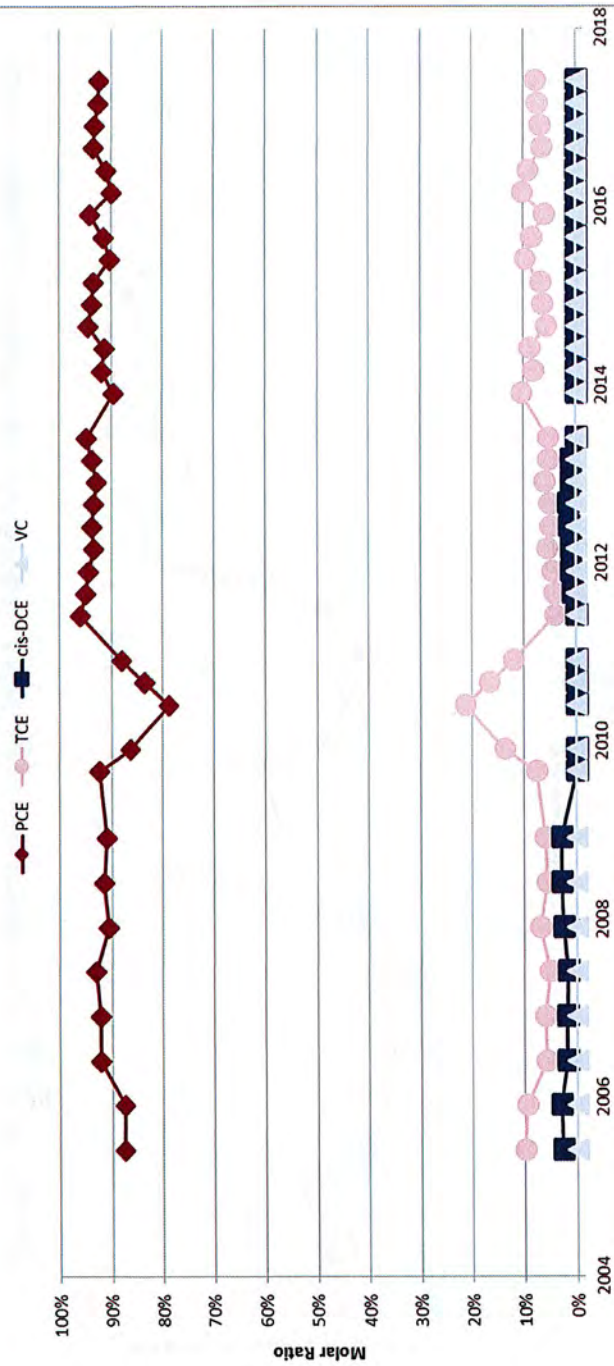
W-48



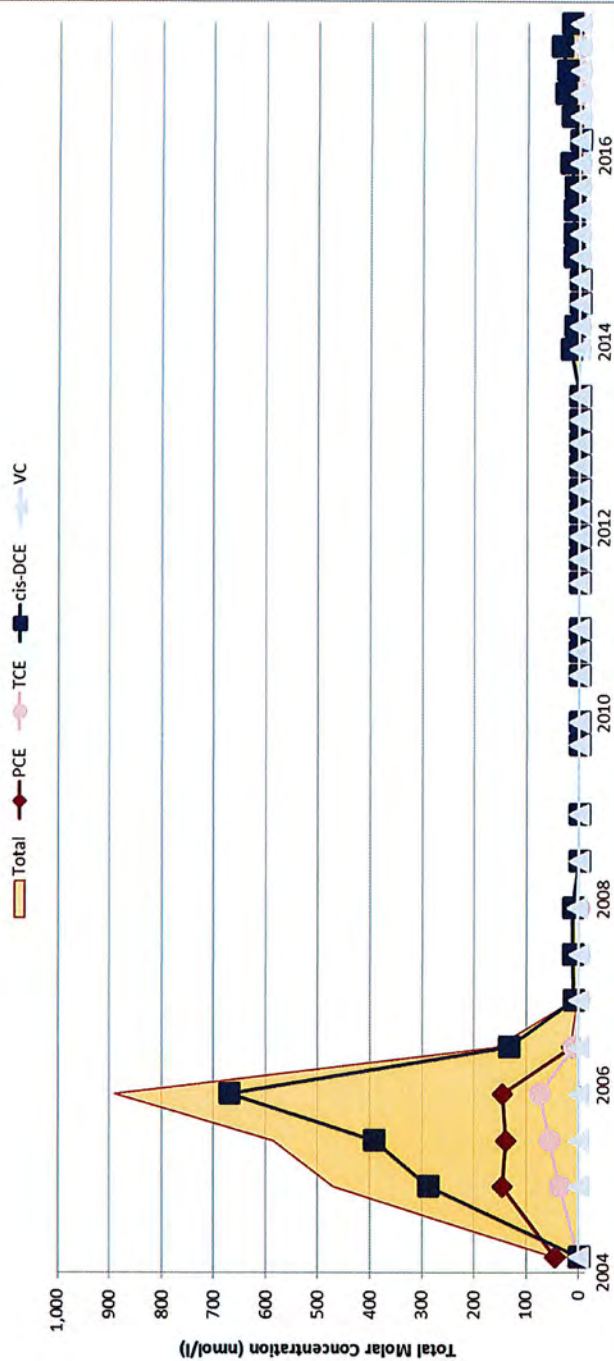
WRW-2



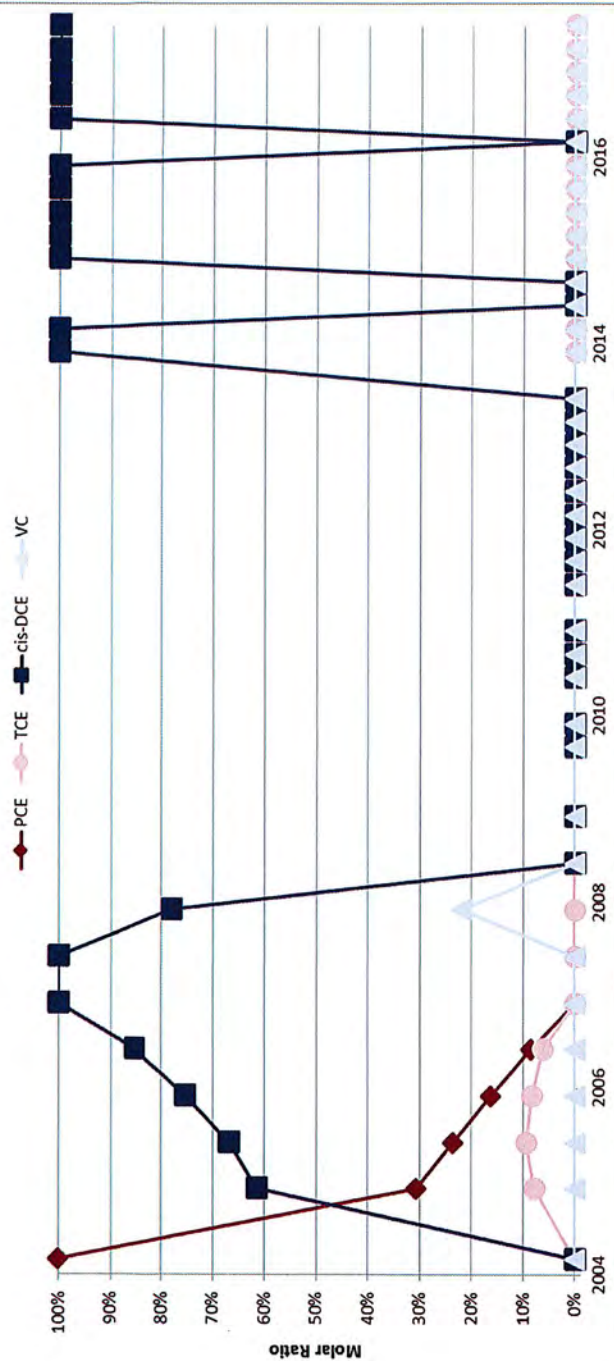
WRW-2



W-26



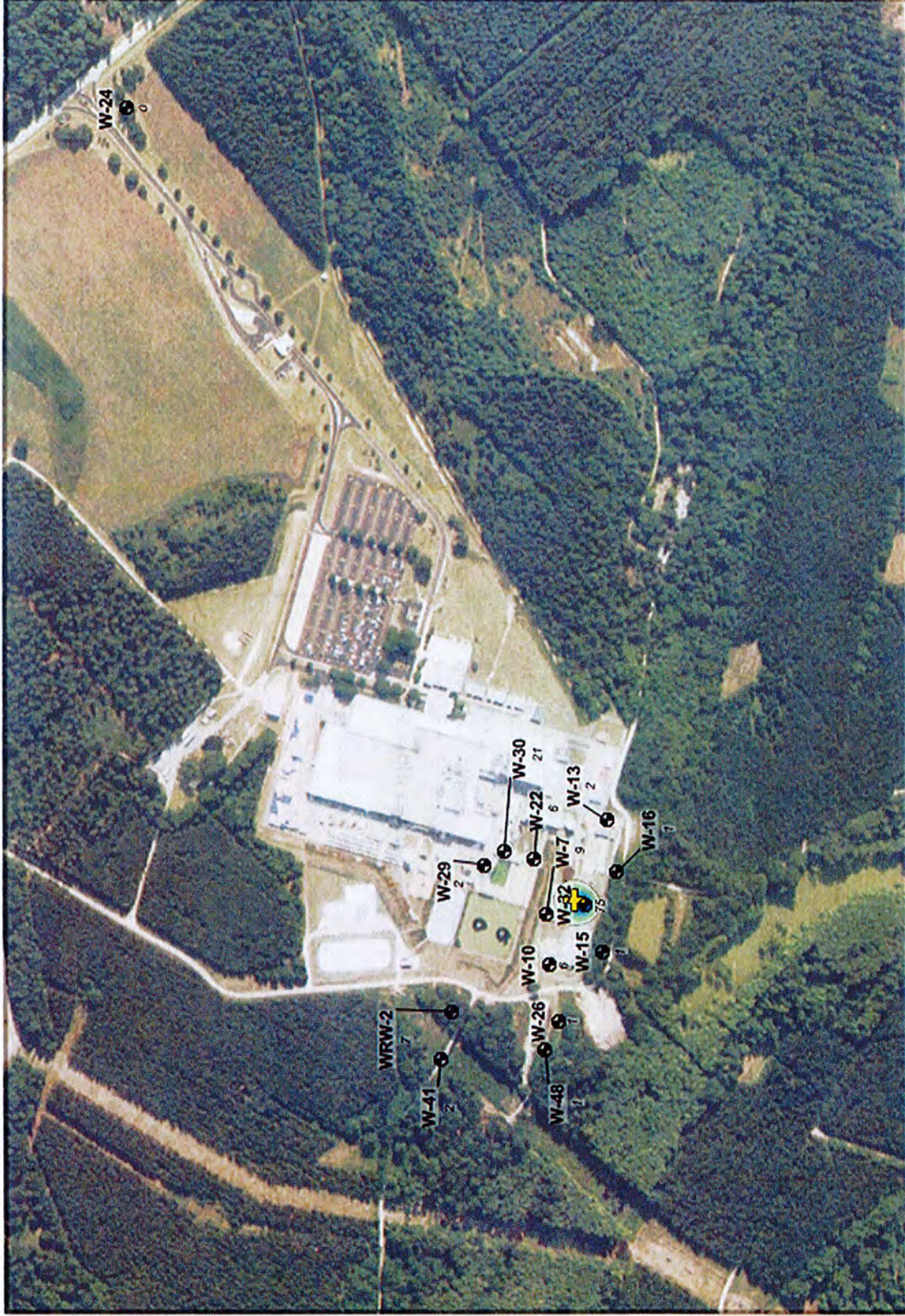
W-26



Gross Alpha

Gross Alpha
Dec-2004

Concentration (pCi/L)



Plume Characteristics

Plume Area: **0.74 acres**

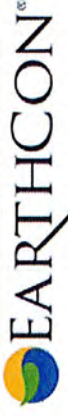
Plume Average Concentration: **25.4 pCi/L**

Plume Mass Indicator: **0.082 lbs**

LEGEND

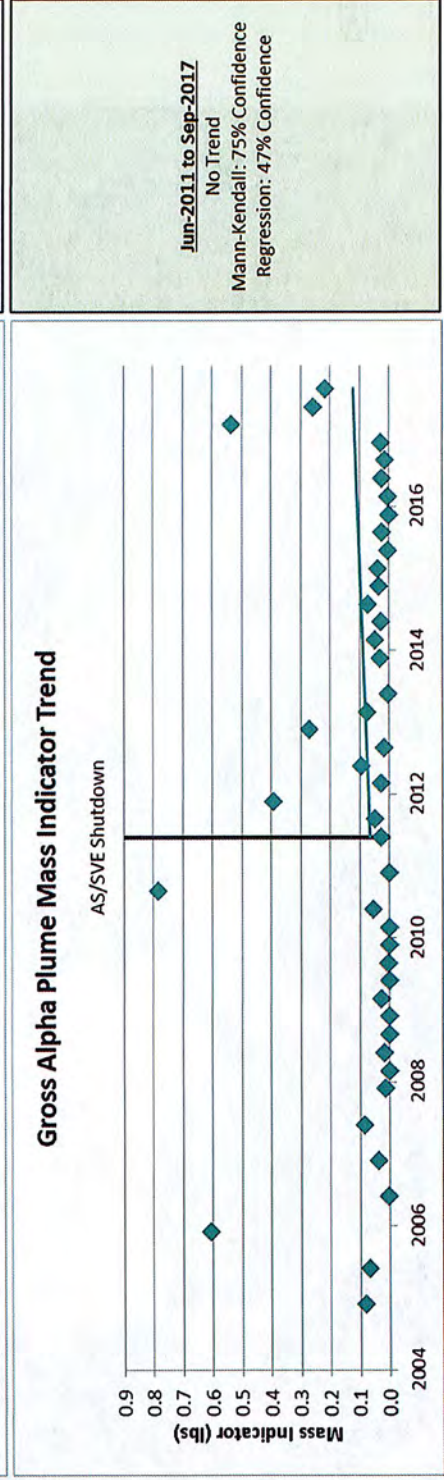
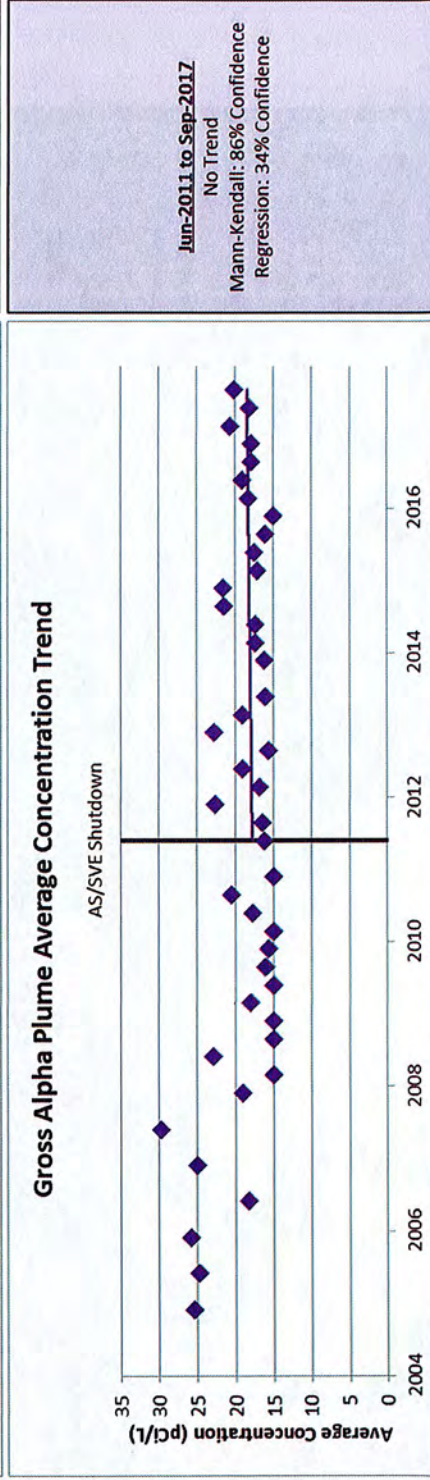
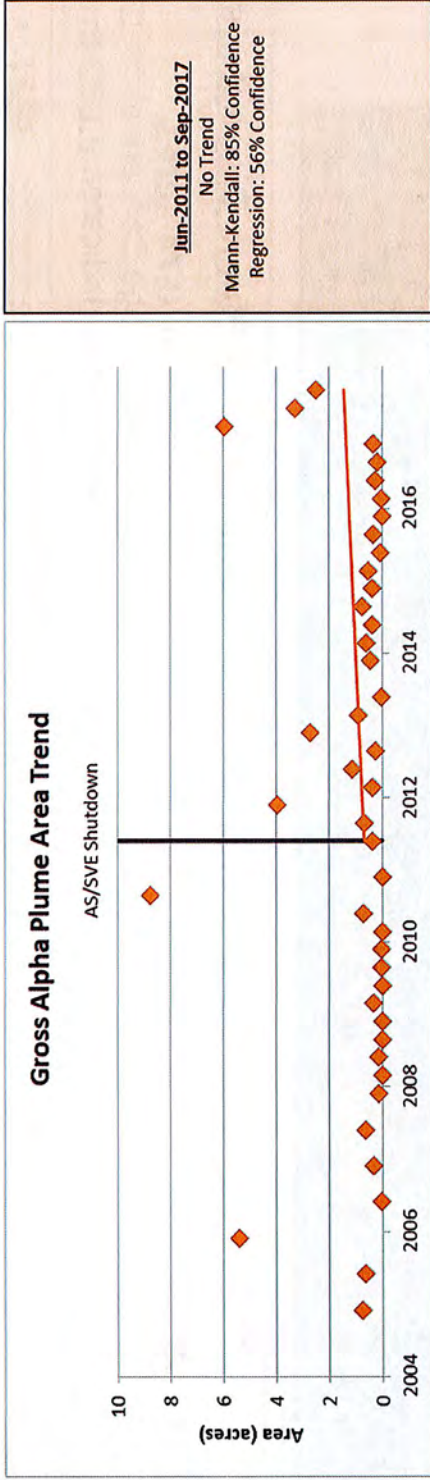
- W-4 Monitoring Well
- 112 Concentration (pCi/L)
- W-4 Well No Longer Sampled (No Value Assigned)
- NS (146) Well Not Sampled (Assigned Value Shown)
- Plume Center of Mass

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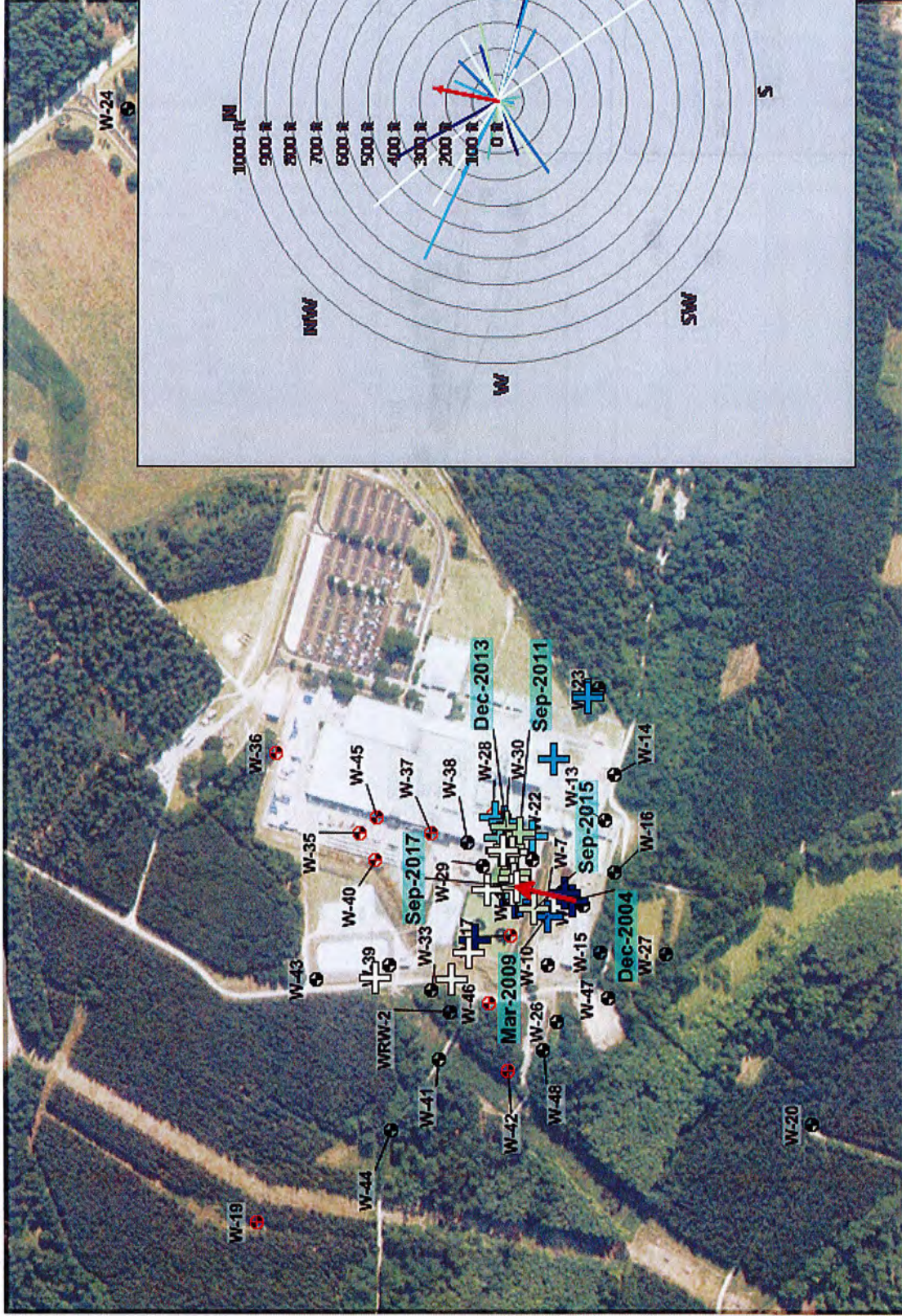
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Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

Gross Alpha Center of Mass

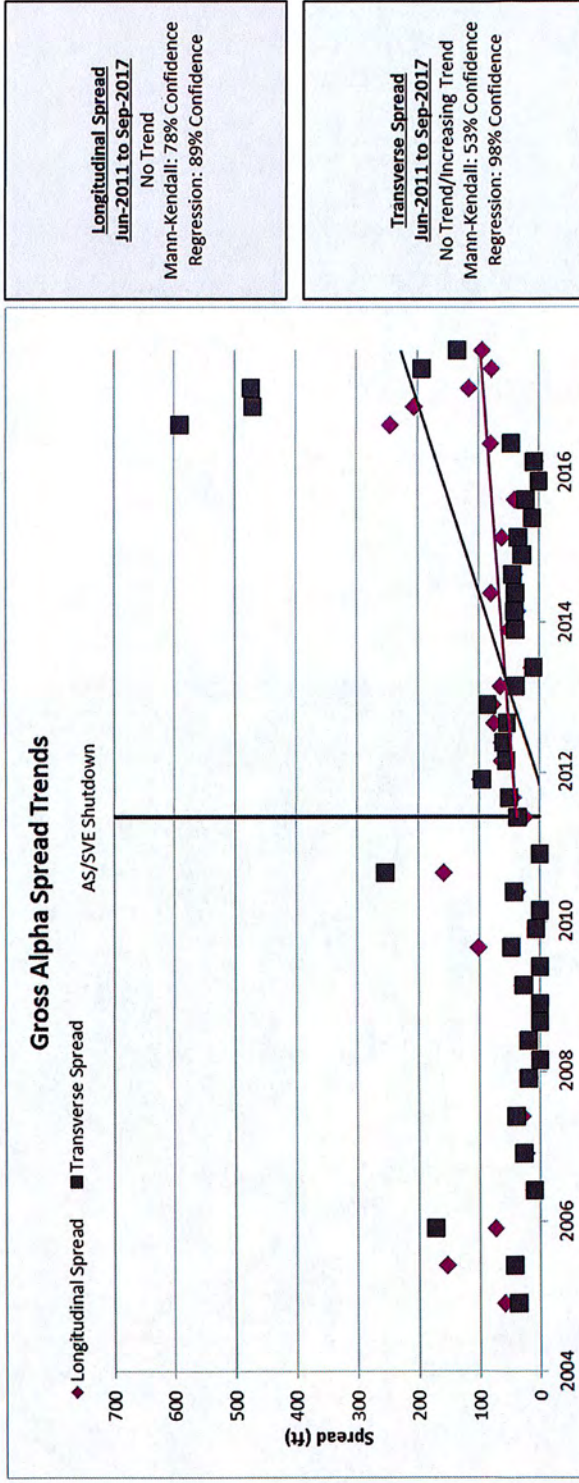


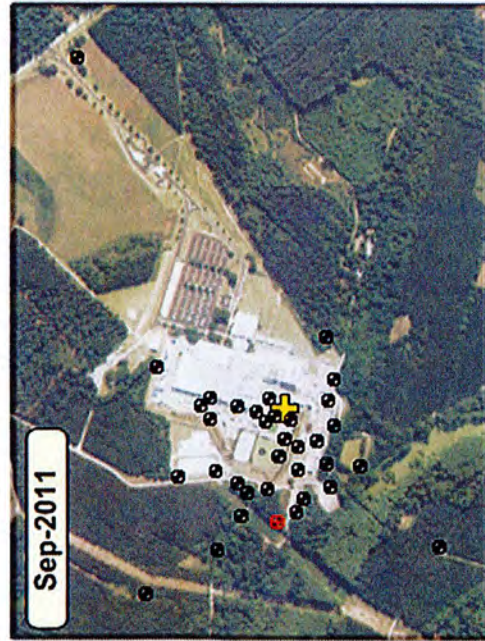
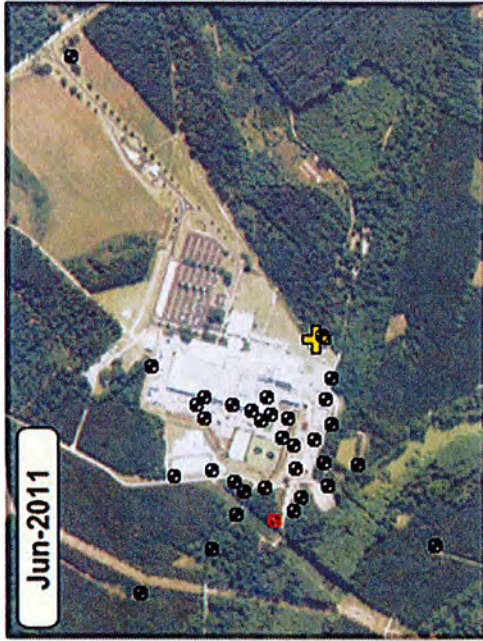
0 ft. 650 ft. 1300 ft.

Center of Mass Scale



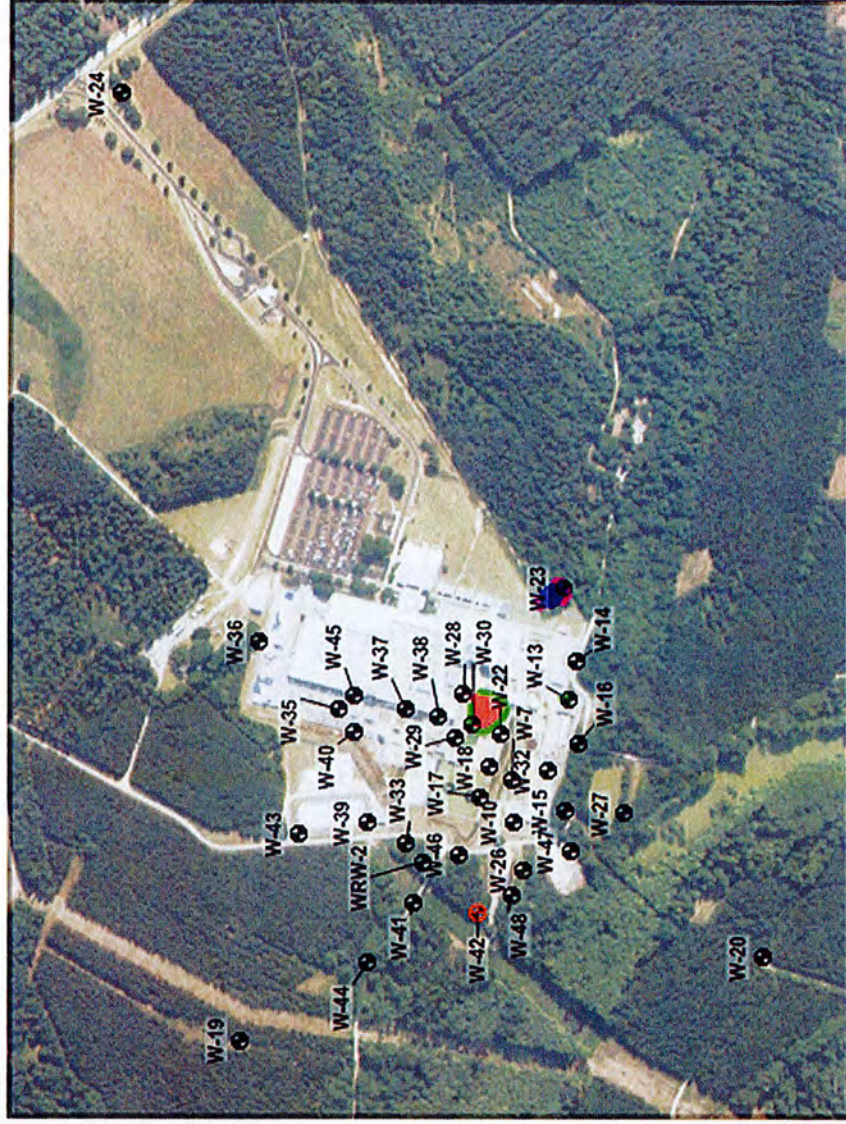
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned methods over time.





Gross Alpha

Plume Differences Jun-2011 vs Sep-2011



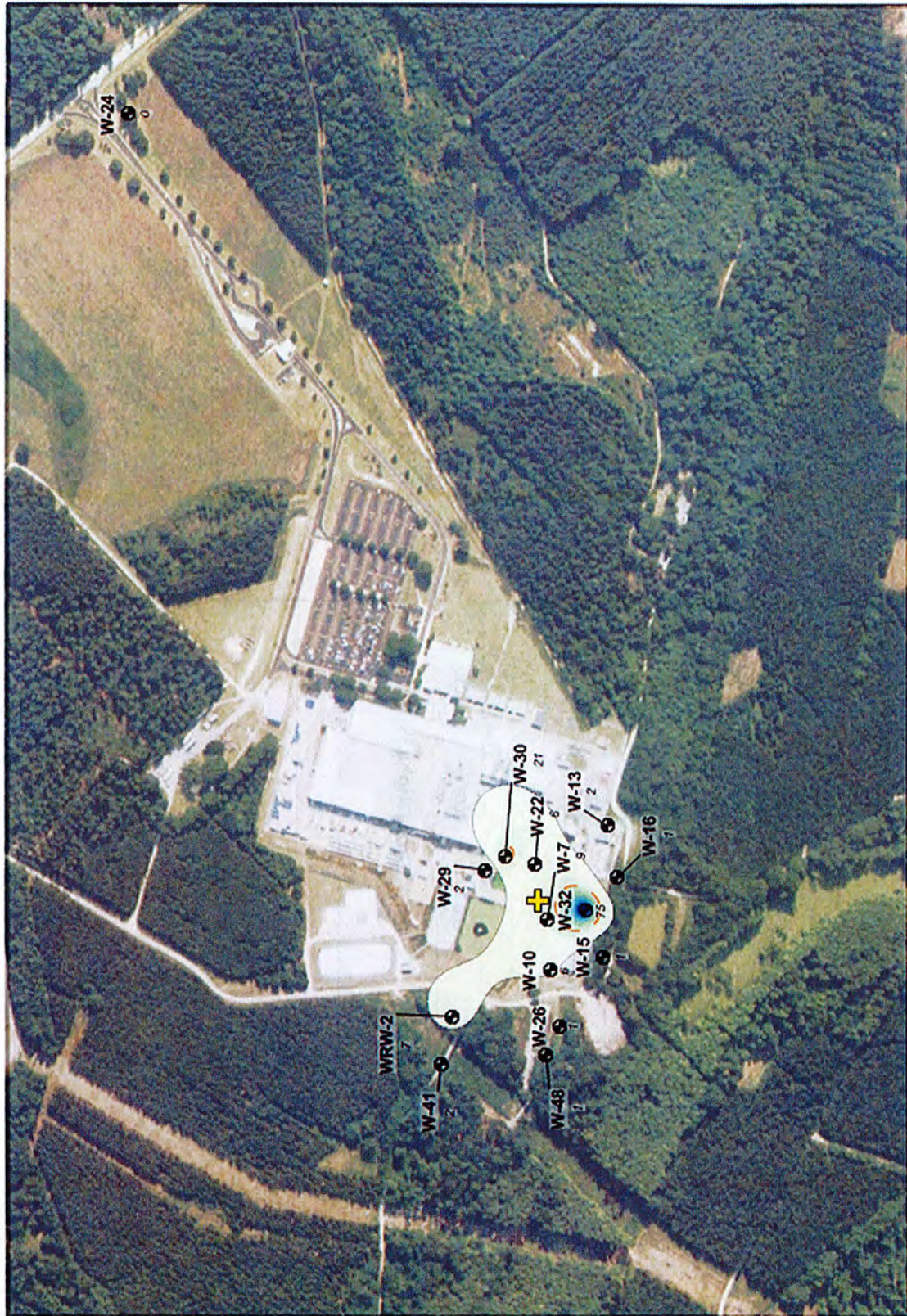
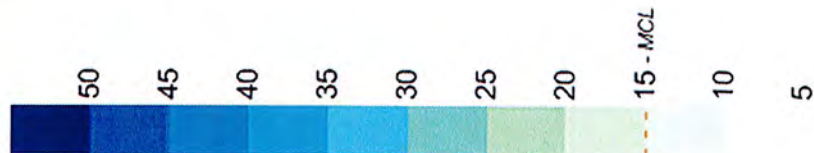
Plume Characteristics

Area: 80% Increase
 Average Concentration: 2% Increase
 Mass Indicator: 82% Increase
 Mass Increase: 0.01 lbs Increase
 Mass Decrease: 0.03 lbs Decrease

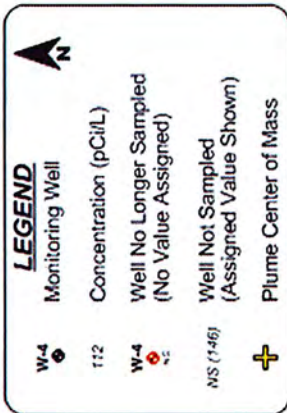
Gross Alpha (5)

Gross Alpha
Dec-2004

Concentration (pCi/L)



0 ft. 650 ft. 1300 ft.



Plume Characteristics

Plume Area: 8.7 acres

Plume Average Concentration: 8.7 pCi/L

Plume Mass Indicator: 0.33 lbs

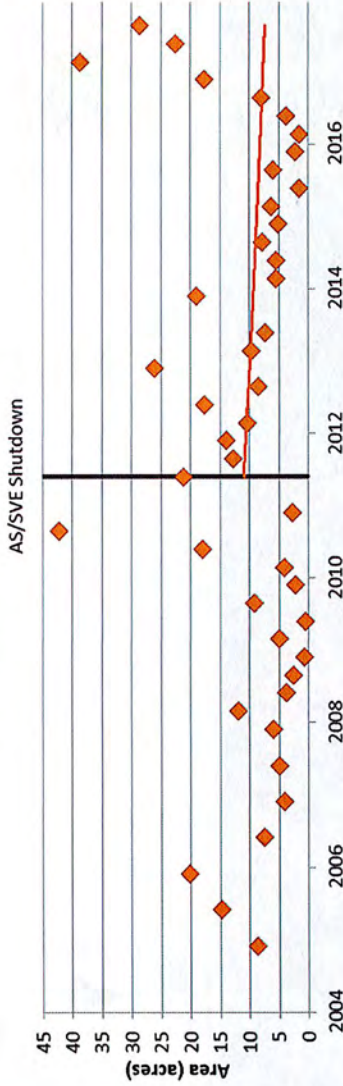
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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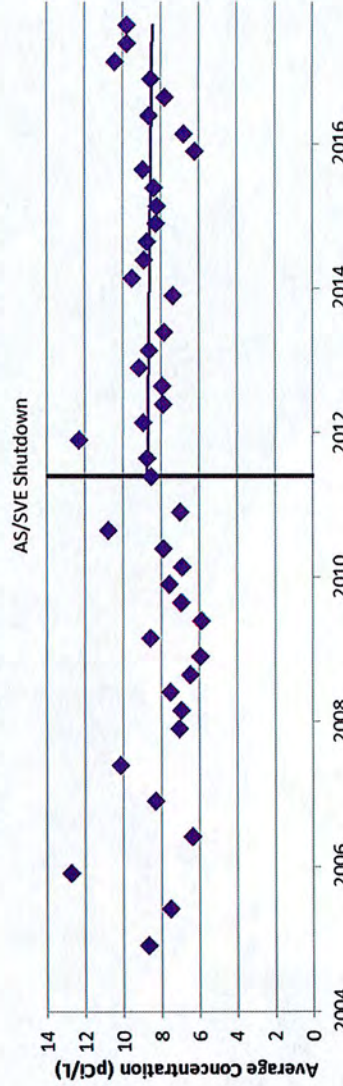
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Gross Alpha (5) Plume Area Trend



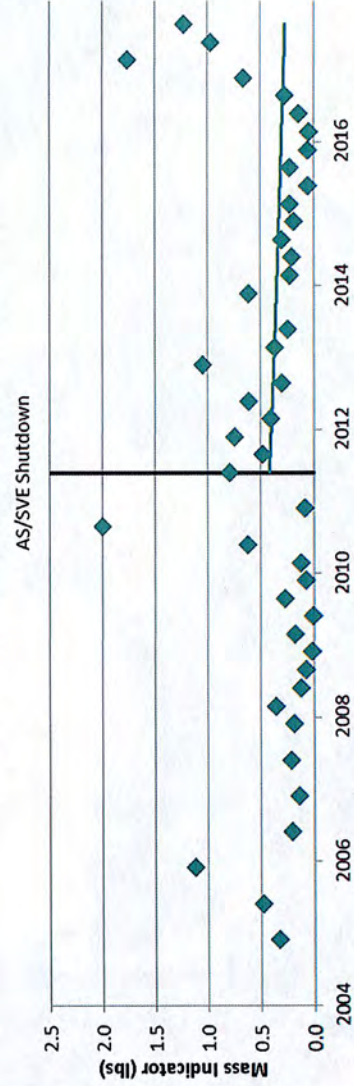
Jun-2011 to Sep-2017
No Trend
Mann-Kendall: 86% Confidence
Regression: 50% Confidence

Gross Alpha (5) Plume Average Concentration Trend



Jun-2011 to Sep-2017
No Trend
Mann-Kendall: 53% Confidence
Regression: 28% Confidence

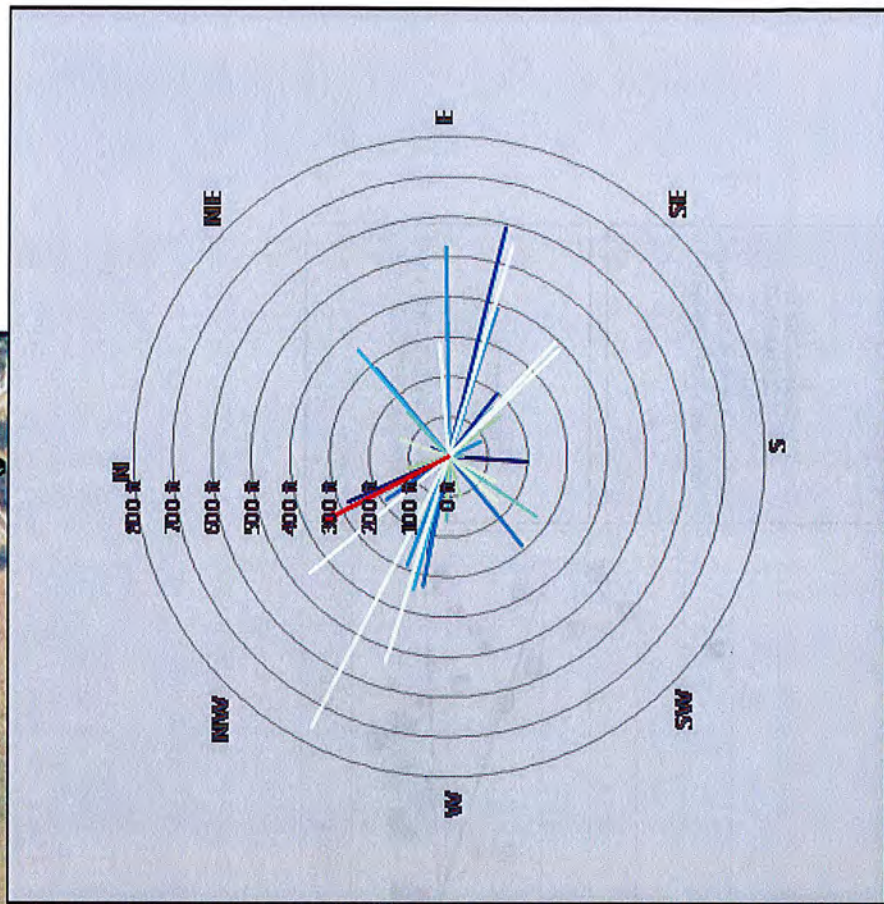
Gross Alpha (5) Plume Mass Indicator Trend



Jun-2011 to Sep-2017
No Trend
Mann-Kendall: 88% Confidence
Regression: 50% Confidence

Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

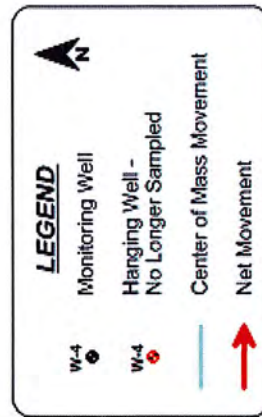
The figure consists of two parts. The main part is an aerial photograph of a study area, likely a coastal or estuarine region, showing a large body of water, a road, and various land parcels. Numerous wells are marked with symbols and labels: W-19, W-24, W-36, W-35, W-40, W-45, W-43, W-39, W-37, W-29, W-38, W-28, W-30, W-15, W-7, W-16, W-14, W-27, W-20, W-48, W-42, W-26, W-10, W-47, W-15, W-62, W-46, W-41, W-44, and WRW-2. Some wells are marked with red dots, while others are marked with black dots. Several wells are also marked with blue crosses, indicating specific data points or events. The labels for these wells are color-coded: red for W-19, W-36, W-40, W-45, W-46, W-42, W-26, W-48, W-47, W-15, W-62, W-41, W-44, and WRW-2; black for W-24, W-35, W-37, W-29, W-38, W-28, W-30, W-16, W-14, W-27, W-20, W-10, W-43, W-39, W-43, W-46, W-41, W-44, and WRW-2; and blue for W-33, W-34, W-35, W-36, W-37, W-38, W-39, W-40, W-41, W-42, W-43, W-44, W-45, W-46, W-47, W-48, W-49, W-50, W-51, W-52, W-53, W-54, W-55, W-56, W-57, W-58, W-59, W-60, W-61, W-62, W-63, W-64, W-65, W-66, W-67, W-68, W-69, W-70, W-71, W-72, W-73, W-74, W-75, W-76, W-77, W-78, W-79, W-80, W-81, W-82, W-83, W-84, W-85, W-86, W-87, W-88, W-89, W-90, W-91, W-92, W-93, W-94, W-95, W-96, W-97, W-98, W-99, W-100, W-101, W-102, W-103, W-104, W-105, W-106, W-107, W-108, W-109, W-110, W-111, W-112, W-113, W-114, W-115, W-116, W-117, W-118, W-119, W-120, W-121, W-122, W-123, W-124, W-125, W-126, W-127, W-128, W-129, W-130, W-131, W-132, W-133, W-134, W-135, W-136, W-137, W-138, W-139, W-140, W-141, W-142, W-143, W-144, W-145, W-146, W-147, W-148, W-149, W-150, W-151, W-152, W-153, W-154, W-155, W-156, W-157, W-158, W-159, W-160, W-161, W-162, W-163, W-164, W-165, W-166, W-167, W-168, W-169, W-170, W-171, W-172, W-173, W-174, W-175, W-176, W-177, W-178, W-179, W-180, W-181, W-182, W-183, W-184, W-185, W-186, W-187, W-188, W-189, W-190, W-191, W-192, W-193, W-194, W-195, W-196, W-197, W-198, W-199, W-200, W-201, W-202, W-203, W-204, W-205, W-206, W-207, W-208, W-209, W-210, W-211, W-212, W-213, W-214, W-215, W-216, W-217, W-218, W-219, W-220, W-221, W-222, W-223, W-224, W-225, W-226, W-227, W-228, W-229, W-230, W-231, W-232, W-233, W-234, W-235, W-236, W-237, W-238, W-239, W-240, W-241, W-242, W-243, W-244, W-245, W-246, W-247, W-248, W-249, W-250, W-251, W-252, W-253, W-254, W-255, W-256, W-257, W-258, W-259, W-260, W-261, W-262, W-263, W-264, W-265, W-266, W-267, W-268, W-269, W-270, W-271, W-272, W-273, W-274, W-275, W-276, W-277, W-278, W-279, W-280, W-281, W-282, W-283, W-284, W-285, W-286, W-287, W-288, W-289, W-290, W-291, W-292, W-293, W-294, W-295, W-296, W-297, W-298, W-299, W-300, W-301, W-302, W-303, W-304, W-305, W-306, W-307, W-308, W-309, W-310, W-311, W-312, W-313, W-314, W-315, W-316, W-317, W-318, W-319, W-320, W-321, W-322, W-323, W-324, W-325, W-326, W-327, W-328, W-329, W-330, W-331, W-332, W-333, W-334, W-335, W-336, W-337, W-338, W-339, W-340, W-341, W-342, W-343, W-344, W-345, W-346, W-347, W-348, W-349, W-350, W-351, W-352, W-353, W-354, W-355, W-356, W-357, W-358, W-359, W-360, W-361, W-362, W-363, W-364, W-365, W-366, W-367, W-368, W-369, W-370, W-371, W-372, W-373, W-374, W-375, W-376, W-377, W-378, W-379, W-380, W-381, W-382, W-383, W-384, W-385, W-386, W-387, W-388, W-389, W-390, W-391, W-392, W-393, W-394, W-395, W-396, W-397, W-398, W-399, W-400, W-401, W-402, W-403, W-404, W-405, W-406, W-407, W-408, W-409, W-410, W-411, W-412, W-413, W-414, W-415, W-416, W-417, W-418, W-419, W-420, W-421, W-422, W-423, W-424, W-425, W-426, W-427, W-428, W-429, W-430, W-431, W-432, W-433, W-434, W-435, W-436, W-437, W-438, W-439, W-440, W-441, W-442, W-443, W-444, W-445, W-446, W-447, W-448, W-449, W-450, W-451, W-452, W-453, W-454, W-455, W-456, W-457, W-458, W-459, W-460, W-461, W-462, W-463, W-464, W-465, W-466, W-467, W-468, W-469, W-470, W-471, W-472, W-473, W-474, W-475, W-476, W-477, W-478, W-479, W-480, W-481, W-482, W-483, W-484, W-485, W-486, W-487, W-488, W-489, W-490, W-491, W-492, W-493, W-494, W-495, W-496, W-497, W-498, W-499, W-500, W-501, W-502, W-503, W-504, W-505, W-506, W-507, W-508, W-509, W-510, W-511, W-512, W-513, W-514, W-515, W-516, W-517, W-518, W-519, W-520, W-521, W-522, W-523, W-524, W-525, W-526, W-527, W-528, W-529, W-530, W-531, W-532, W-533, W-534, W-535, W-536, W-537, W-538, W-539, W-540, W-541, W-542, W-543, W-544, W-545, W-546, W-547, W-548, W-549, W-550, W-551, W-552, W-553, W-554, W-555, W-556, W-557, W-558, W-559, W-560, W-561, W-562, W-563, W-564, W-565, W-566, W-567, W-568, W-569, W-570, W-571, W-572, W-573, W-574, W-575, W-576, W-577, W-578, W-579, W-580, W-581, W-582, W-583, W-584, W-585, W-586, W-587, W-588, W-589, W-590, W-591, W-592, W-593, W-594, W-595, W-596, W-597, W-598, W-599, W-600, W-601, W-602, W-603, W-604, W-605, W-606, W-607, W-608, W-609, W-610, W-611, W-612, W-613, W-614, W-615, W-616, W-617, W-618, W-619, W-620, W-621, W-622, W-623, W-624, W-625, W-626, W-627, W-628, W-629, W-630, W-631, W-632, W-633, W-634, W-635, W-636, W-637, W-638, W-639, W-640, W-641, W-642, W-643, W-644, W-645, W-646, W-647, W-648, W-649, W-650, W-651, W-652, W-65



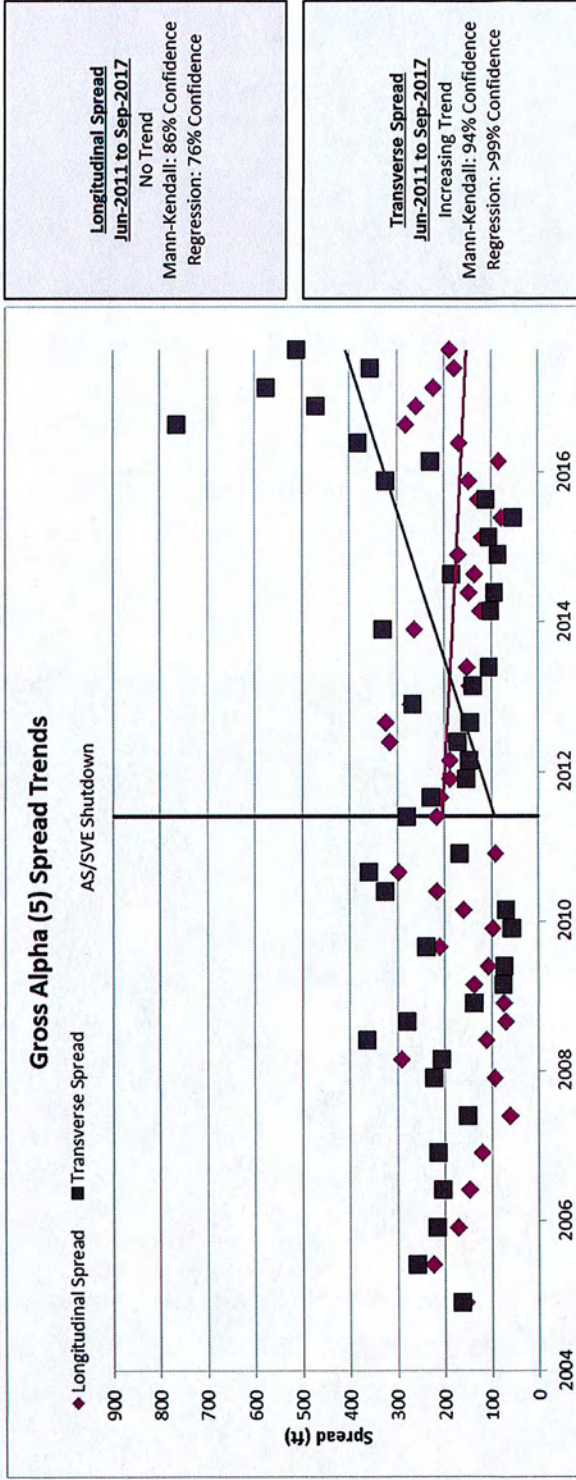
0 ft. 650 ft. 1300 ft.

Center of Mass Scale

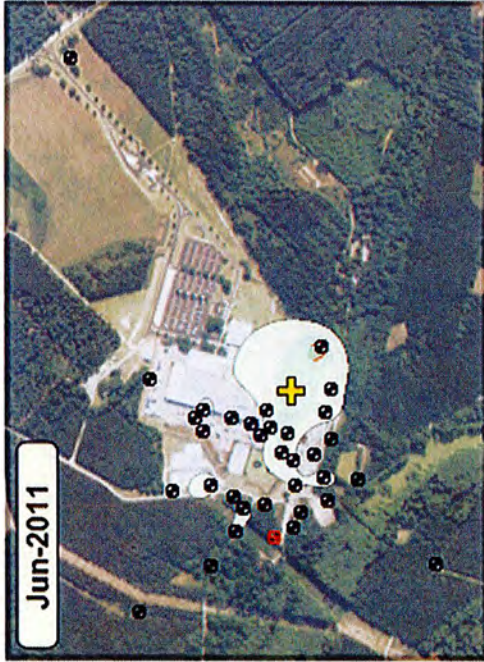
A horizontal timeline bar representing the period from 2004 to 2017. The bar is divided into segments by plus signs (+). The years 2004, 2010, 2013, and 2017 are labeled at the top of the bar. The segments are colored in a gradient: dark blue for 2004-2007, light blue for 2007-2010, green for 2010-2013, and light green for 2013-2017.



This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicators over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned plume over time.



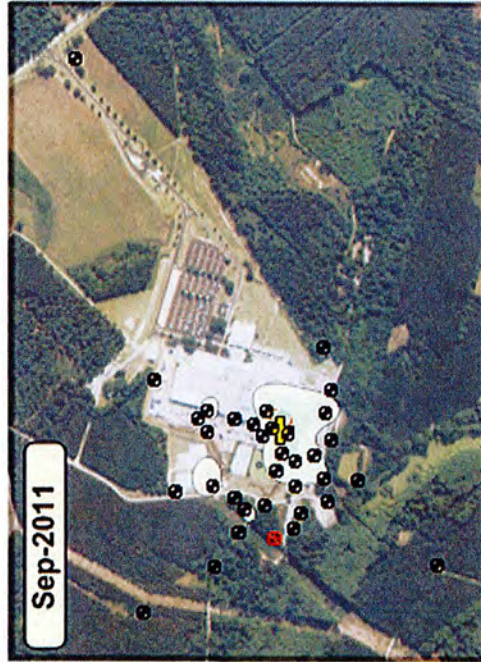
Jun-2011



Concentration (pCi/L)

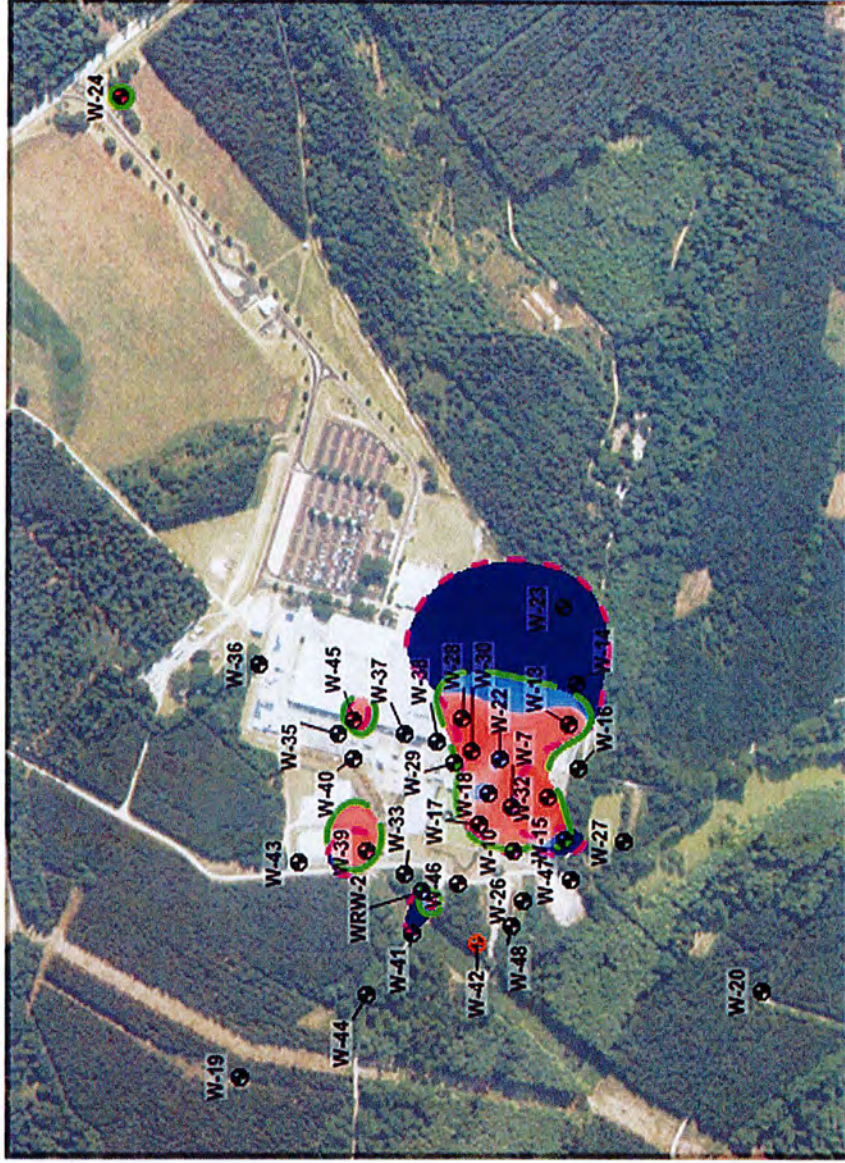


Sep-2011



Gross Alpha

Plume Differences Jun-2011 vs Sep-2011



Spatial Change Indicator



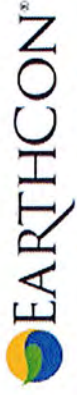
LEGEND

- W-4 Monitoring Well
- W-4 Well No Longer Sampled (No Value Assigned)
- Center of Mass
- Jun-2011 Plume Boundary
- Sep-2011 Plume Boundary

Plume Characteristics

Area: 40% Decrease
Average Concentration: 2% Increase
Mass Indicator: 39% Decrease
Mass Increase: 0.11 lbs Increase
Mass Decrease: 0.37 lbs Decrease

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather a means to show conceptual behavior of the aforementioned metrics over time.



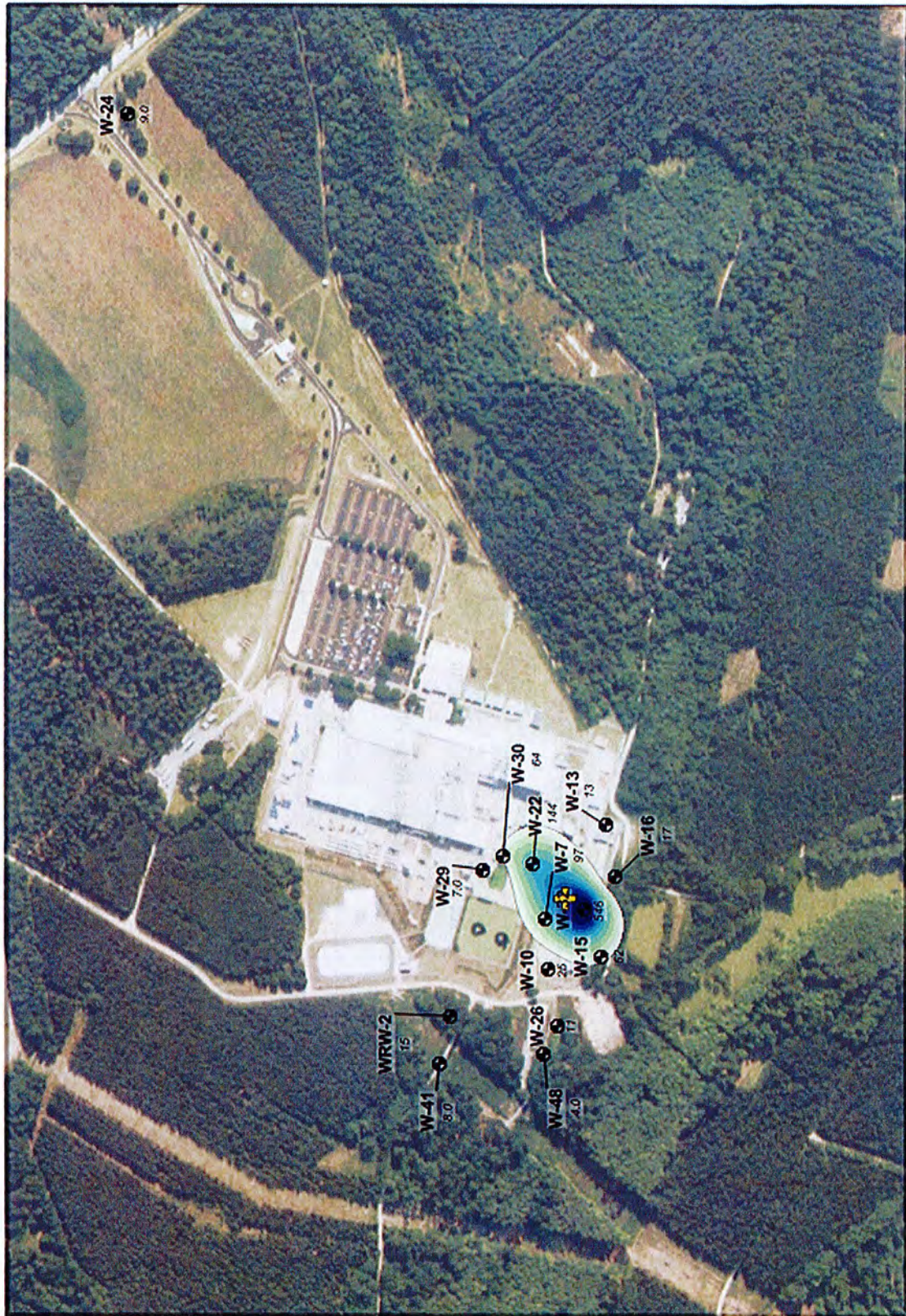
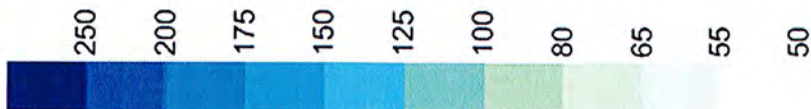
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Gross Beta

Gross Beta
Dec-2004

Concentration (pCi/L)



0 ft. 650 ft. 1300 ft.



LEGEND

- W-4 Monitoring Well
- 112 Concentration (pCi/L)
- W-4 Well No Longer Sampled (No Value Assigned)
- NS (146) Well Not Sampled (Assigned Value Shown)
- + Plume Center of Mass

Plume Characteristics

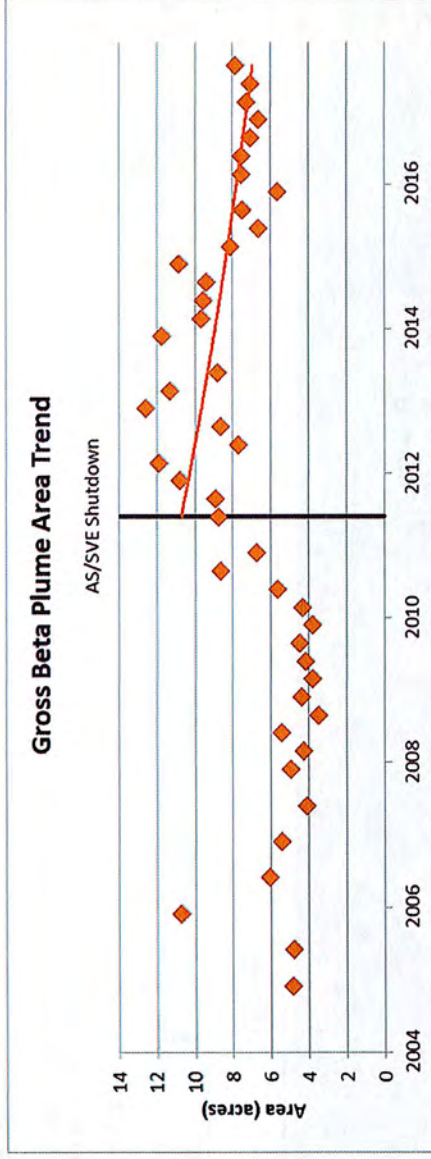
Plume Area: 4.8 acres
Plume Average Concentration: 119 pCi/L
Plume Mass Indicator: 4.1E-4 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.

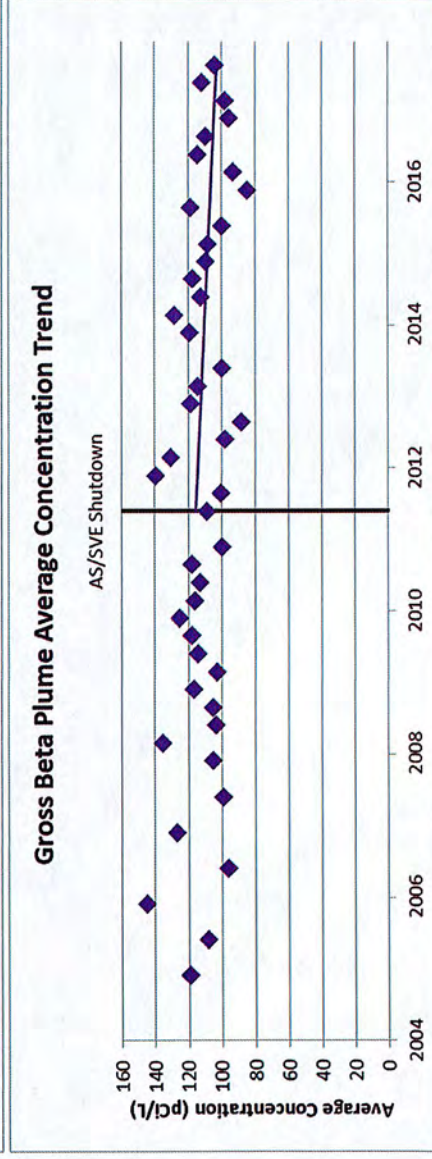


Environmental Challenges
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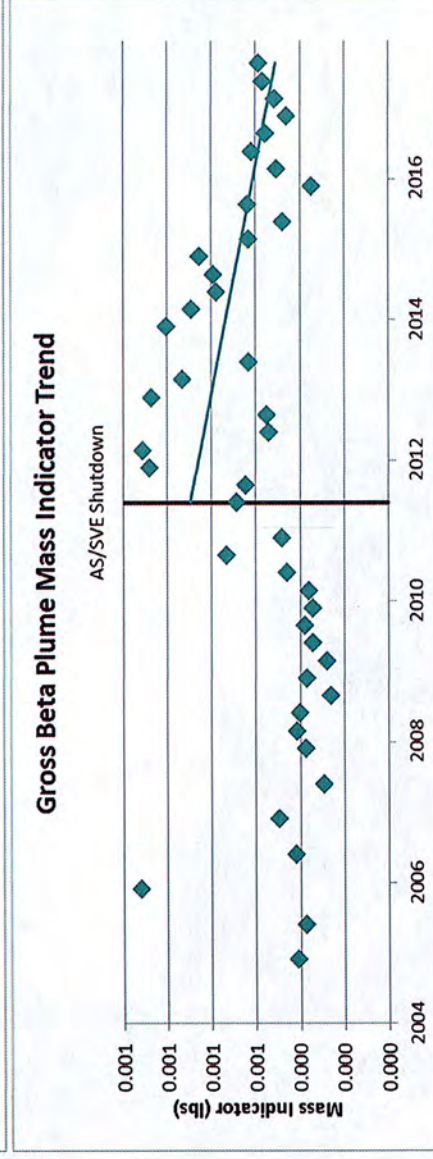
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Jun-2011 to Sep-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence



Jun-2011 to Sep-2017
No Trend/Decreasing Trend
Mann-Kendall: 94% Confidence
Regression: 85% Confidence



Jun-2011 to Sep-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

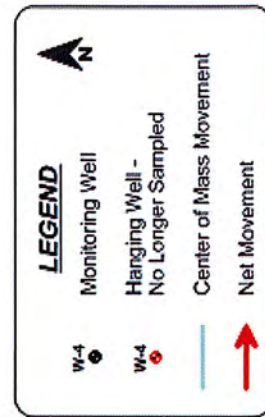
Note: Conversion to mass indicator assumes gross beta result is entirely Tc-99.

[illegible]

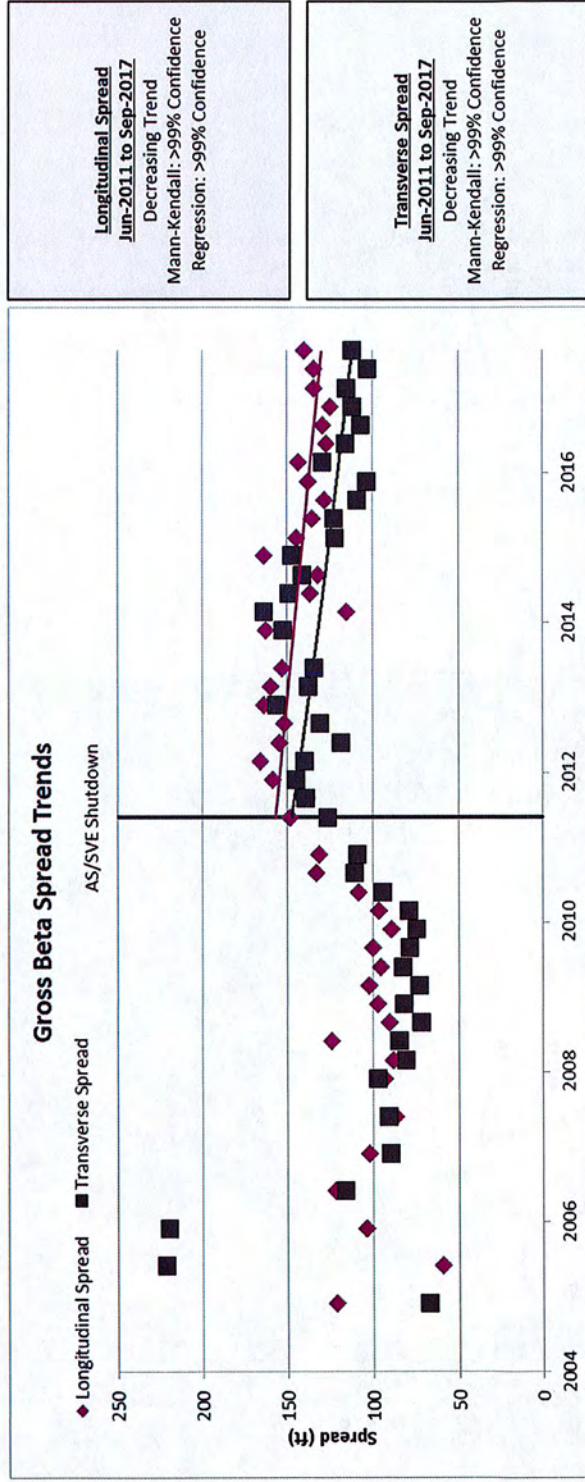
0 ft. 650 ft. 1300 ft.

Center of Mass Scale

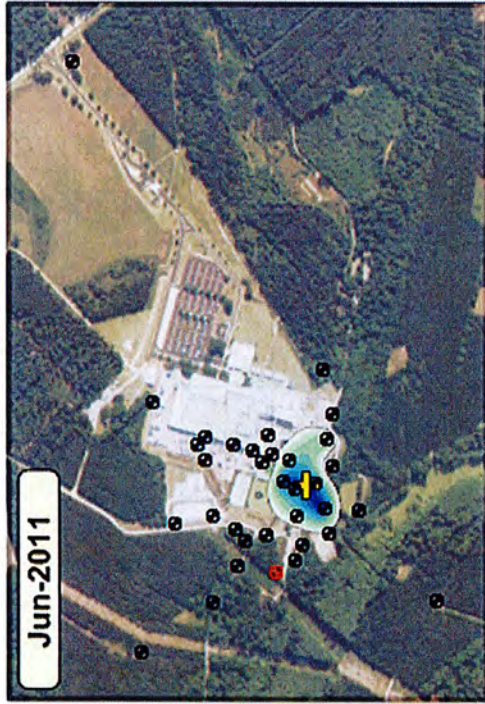
A horizontal timeline bar representing the period from 2004 to 2017. The bar is divided into segments by plus signs (+). The years 2004, 2010, 2013, and 2017 are labeled at the top of the bar. The segments are colored in a gradient: dark blue for 2004-2007, light blue for 2007-2010, green for 2010-2013, and light green for 2013-2017.



This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicators over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



Jun-2011

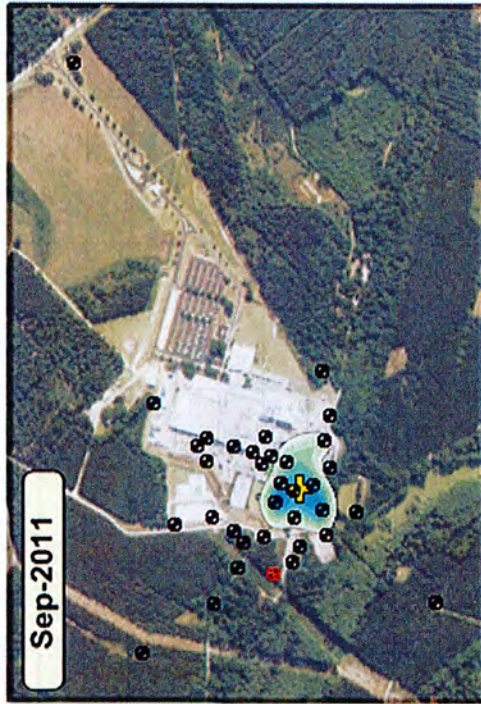


Concentration (pCi/L)

50 55 65 80 100 125 150 175 200 250

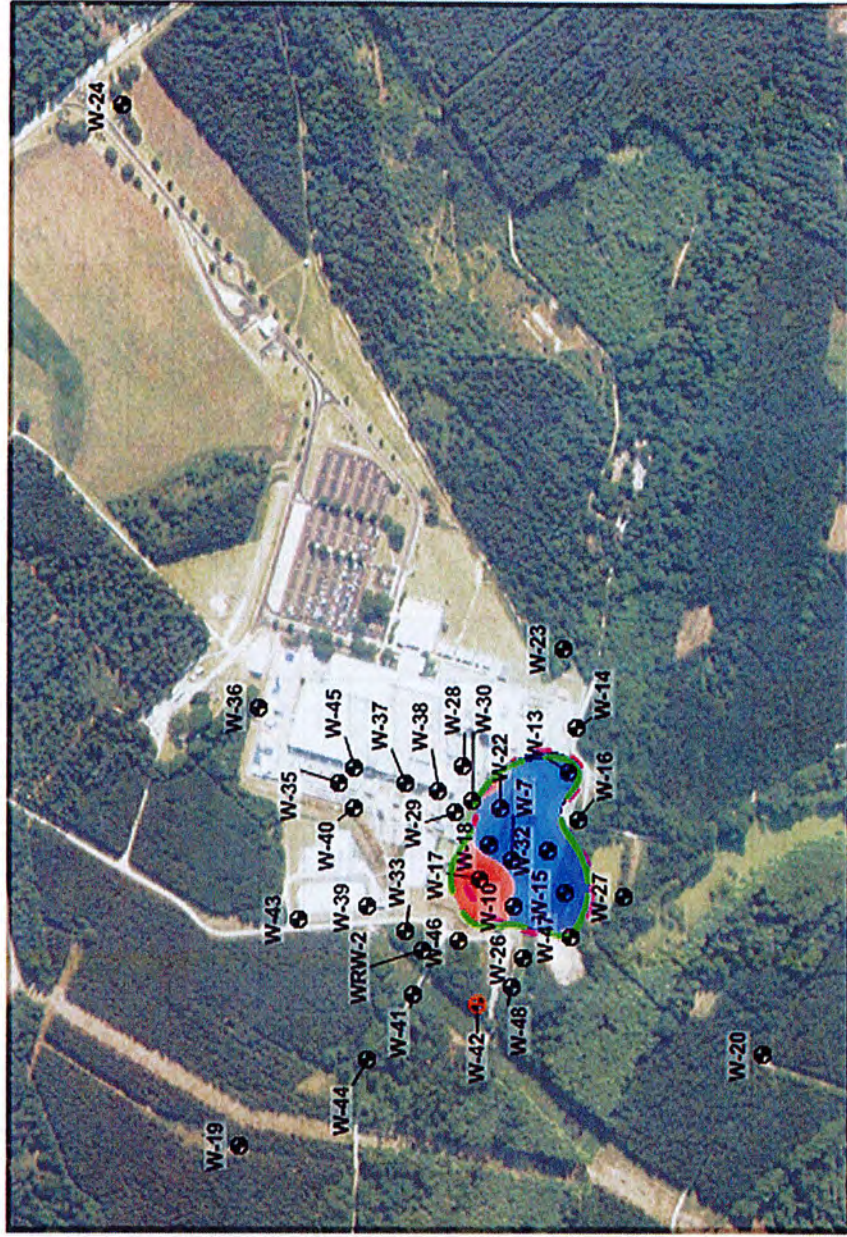
0 ft. 1500 ft. 3000 ft.

Sep-2011



Gross Beta

Plume Differences Jun-2011 vs Sep-2011



Spatial Change Indicator

-1 0 1

LEGEND

- Monitoring Well
- Well No Longer Sampled (No Value Assigned)
- Plume Center of Mass
- Jun-2011 Plume Boundary
- Sep-2011 Plume Boundary

Plume Characteristics

Area: 2% Increase
Average Concentration: 8% Decrease
Mass Indicator: 6% Decrease
Mass Increase: 4.9E-5 lbs Increase
Mass Decrease: 9.3E-5 lbs Decrease

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.

Fluoride (mg/l)			
Date	W-3A	W-49	W-50
Jun. 2004	<0.40	--	--
Sep. 2004	<0.40	--	--
Dec. 2004	<0.40	--	--
Dec. 2008	<0.50	<0.50	<0.50
Mar. 2009	<0.50	--	--
Jun. 2009	<0.50	--	--
Sep. 2009	<0.50	--	--
Dec. 2009	<0.50	--	--
Mar. 2010	<0.50	--	--
Jun. 2010	<0.50	--	--
Sep. 2010	<0.50	--	--
Dec. 2010	<0.50	--	--
Jun. 2011	<0.50	--	<0.50
Sep. 2011	<0.50	--	<0.50
Dec. 2011	<0.50	--	<0.50
Mar. 2012	<0.50	--	<0.50
Jun. 2012	<0.50	--	--
Sep. 2012	<0.50	--	--
Dec. 2012	<0.50	--	--
Mar. 2013	<0.50	--	--
Jun. 2013	<0.50	--	--
Dec. 2013	<0.50	--	--
Mar. 2014	<0.50	--	--
Jun. 2014	<0.50	--	--
Sep. 2014	<0.50	--	--
Dec. 2014	<0.50	--	--
Jun. 2017	<0.50	--	--

Nitrate (mg/l)			
	W-3A	W-49	W-50
Mar. 2008	0.11	--	--
Jun. 2008	0.15	--	--
Sep. 2008	0.14	--	--
Dec. 2008	0.030	<0.020	<0.020
Mar. 2009	0.22	--	--
Jun. 2009	0.11	--	--
Sep. 2009	0.13	--	--
Mar. 2010	49	--	--
Jun. 2010	0.12	--	--
Sep. 2010	0.075	--	--
Dec. 2010	<0.020	--	--
Jun. 2011	<0.020	--	0.056
Sep. 2011	<0.020	--	0.030
Dec. 2011	<0.020	--	<0.020
Mar. 2012	0.044	--	<0.020
Jun. 2012	<0.020	--	--
Dec. 2012	<0.020	--	--
Mar. 2013	<0.020	--	--
Jun. 2013	<0.020	--	--
Dec. 2013	<0.020	--	--
Mar. 2014	<0.020	--	--
Jun. 2014	<0.020	--	--
Sep. 2014	<0.020	--	--
Dec. 2014	<0.020	--	--
Dec. 2016	0.039	--	--
Mar. 2017	<0.020	--	--
Jun. 2017	<0.020	--	--

Ammonia mg/l			
	W-3A	W-49	W-50
Jun. 2004	<1.0	--	--
Sep. 2004	<1.0	--	--
Dec. 2004	<1.0	--	--
Dec. 2008	<1.0	<1.0	<1.0
Mar. 2009	4.9	--	--
Jun. 2009	<1.0	--	--
Sep. 2009	<1.0	--	--
Dec. 2009	<1.0	--	--
Mar. 2010	<1.0	--	--
Jun. 2010	<1.0	--	--
Sep. 2010	<1.0	--	--
Dec. 2010	<1.0	--	--
Jun. 2011	<1.0	--	<1.0
Sep. 2011	<1.0	--	<1.0
Dec. 2011	<1.0	--	<1.0
Mar. 2012	0.046	--	<1.0
Jun. 2012	<1.0	--	--
Sep. 2012	<1.0	--	--
Dec. 2012	<1.0	--	--
Mar. 2013	<1.0	--	--
Jun. 2013	<1.0	--	--
Dec. 2013	<1.0	--	--
Mar. 2014	<1.0	--	--
Jun. 2014	<1.0	--	--
Sep. 2014	<1.0	--	--
Dec. 2014	<1.0	--	--
Dec. 2016	<1.0	--	--
Mar. 2017	<1.0	--	--
Jun. 2017	<1.0	--	--

Gross Alpha (pCi/l)			
	W-3A	W-49	W-50
Mar. 2008	2.1	--	--
Jun. 2008	3	--	--
Sep. 2008	2.5	--	--
Dec. 2008	0.3	0.06	--
Mar. 2009	0.9	--	--
Jun. 2009	0.76	--	--
Sep. 2009	2.8	--	--
Dec. 2009	0.65	--	--
Mar. 2010	1.3	--	--
Jun. 2010	2.7	--	--
Sep. 2010	2.9	--	--
Dec. 2010	2	--	--
Jun. 2011	0.86	--	1.7
Sep. 2011	2.3	--	2.1
Dec. 2011	1.8	--	3.5
Mar. 2012	2.9	--	1.4
Jun. 2012	1.3	--	--
Sep. 2012	1.4	--	--
Dec. 2012	<0.11	--	--
Mar. 2013	0.46	--	--
Jun. 2013	2.7	--	--
Dec. 2013	<0.77	--	--
Mar. 2014	<0.11	--	--
Jun. 2014	2.3	--	--
Sep. 2014	1.2	--	--
Dec. 2014	1.9	--	--
Dec. 2016	1.2	--	--
Mar. 2017	4.6	--	--

Gross Beta (pCi/l)			
	W-3A	W-49	W-50
Mar. 2008	1.5	--	--
Jun. 2008	2.4	--	--
Sep. 2008	<0.0010	--	--
Dec. 2008	2.5	<0.0010	--
Mar. 2009	0.024	--	--
Jun. 2009	<0.0010	--	--
Sep. 2009	6.2	--	--
Dec. 2009	<0.0010	--	--
Mar. 2010	<0.0010	--	--
Jun. 2010	11	--	--
Sep. 2010	1.2	--	--
Dec. 2010	3.2	--	--
Jun. 2011	2.1	--	<0.0010
Sep. 2011	1.3	--	3.6
Dec. 2011	0.17	--	<0.0010
Mar. 2012	1	--	0.49
Jun. 2012	1.5	--	--
Sep. 2012	<0.0010	--	--
Dec. 2012	0.73	--	--
Mar. 2013	4.9	--	--
Jun. 2013	1.3	--	--
Dec. 2013	<0.31	--	--
Mar. 2014	<0.0010	--	--
Jun. 2014	0.9	--	--
Sep. 2014	1.2	--	--
Dec. 2014	3.3	--	--
Sep. 2016	--	--	--
Dec. 2016	7.3	--	--
Mar. 2017	4.3	--	--
Jun. 2017	4	--	--

Tetrachloroethene (µg/l)			
	W-3A	W-49	W-50
Dec. 2008	<1.0	<1.0	<1.0
Jun. 2010	<1.0	--	--

Trichloroethene (µg/l)			
	W-3A	W-49	W-50
Dec. 2008	<1.0	<1.0	<1.0
Jun. 2010	<1.0	--	--

Cis-1,2-Dichloroethene (µg/l)			
	W-3A	W-49	W-50
Dec. 2008	<1.0	<1.0	<1.0
Jun. 2010	<1.0	--	--

Vinyl Chloride (µg/l)			
	W-3A	W-49	W-50
Dec. 2008	<2.0	<2.0	<2.0
Jun. 2010	<2.0	--	--



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EarthCon Plume Analytics™ Services

Ricker Method® Well Sufficiency Analysis

Westinghouse Columbia Fuel Fabrication Facility
Hopkins, SC

Westinghouse Electric Company, LLC

29 August 2017

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Groundwater Plume Analytics™ Services



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Inorganics

Fluoride

Nitrate

Ammonia

Chloroethenes

Total Chloroethenes

Radionuclides

Gross Alpha

Gross Beta

Well Sufficiency

WSA Matrix

WSA Summary

Ricker Method®

Well Sufficiency Analysis



Inorganics

Fluoride

Nitrate

Ammonia

Radionuclides

Gross Alpha

Gross Beta

WSA Matrix

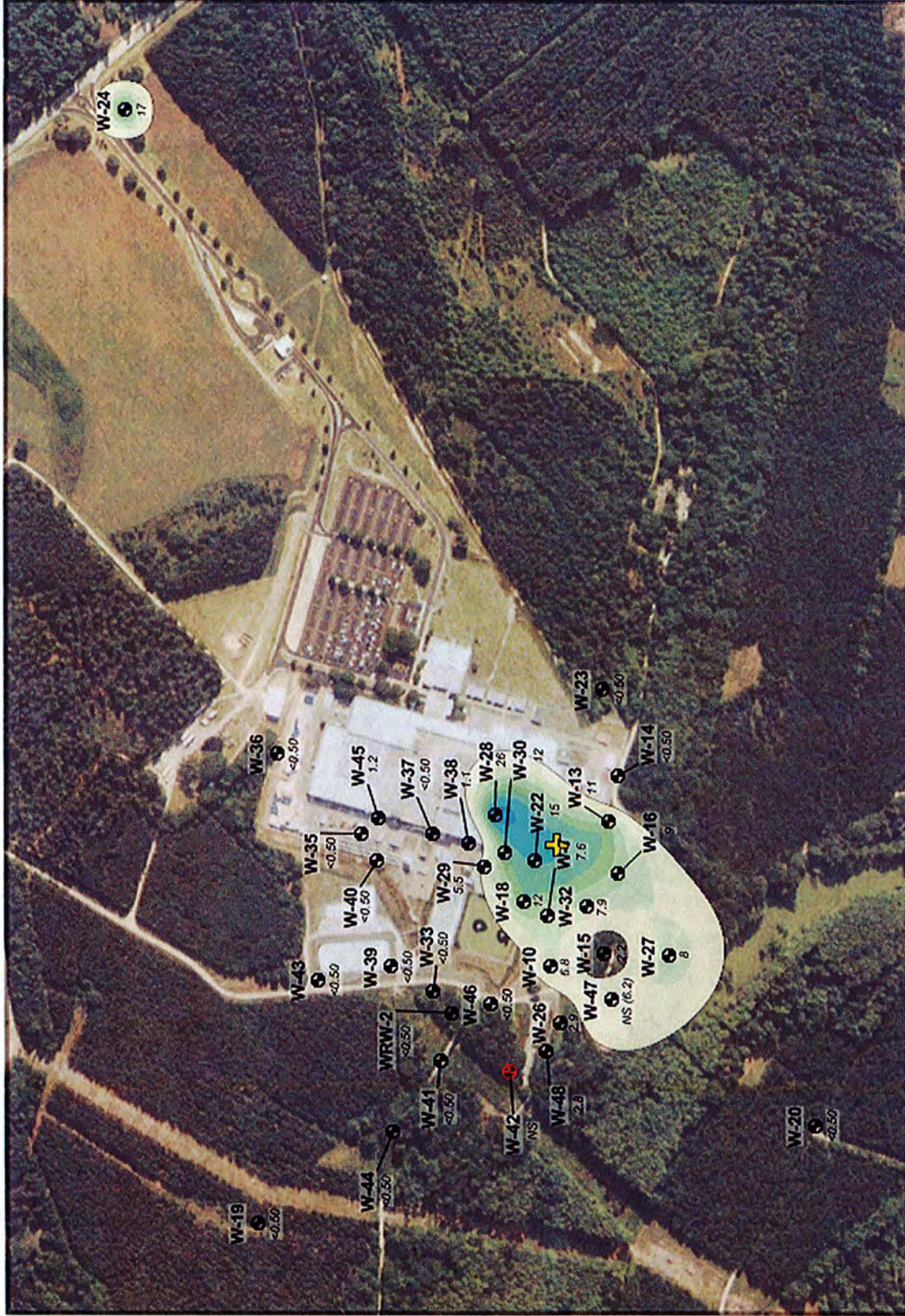
WSA Summary

Ricker Method® Well Sufficiency Argument				
Strength of Argument	Comparison of Original Network to Reduced Network			
	Primary Line of Evidence		Secondary Line of Evidence	
	Trend via Mann-Kendall	Trend via Linear Regression	Relative Percent Difference	Correlation Coefficient
Very Strong	Same	Same	<10%	≥0.9
Strong	Same	Same	<20%	≥0.8
Marginal	Increasing/Stable or Decreasing/Stable	Increasing/Stable or Decreasing/Stable	<30%	≥0.7
Poor	Increasing/Decreasing	Increasing/Decreasing	>30%	<0.7

Fluoride

Fluoride
Jun-2011

Concentration (mg/L)



Plume Characteristics

Plume Area: 20.7 acres
Plume Average Concentration: 7.6 mg/L
Plume Mass Indicator: 1,919 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.

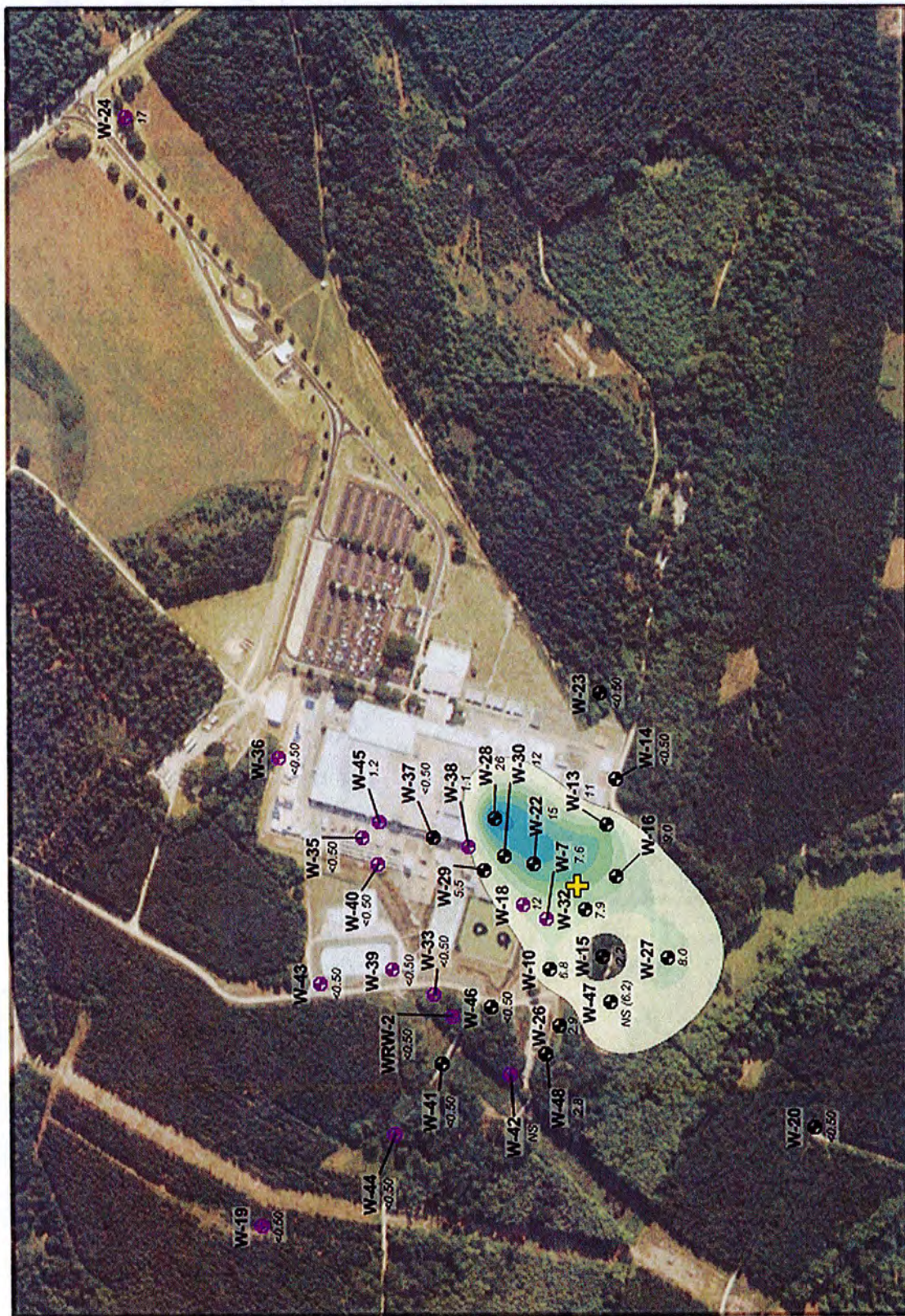


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LEGEND

- Monitoring Well
- Concentration (mg/L)
- Hanging Well - No Longer Sampled
- Well Not Sampled (Assigned Value Shown)
- Plume Center of Mass

Concentration (mg/L)



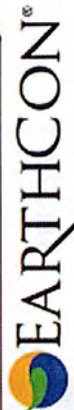
0 ft. 650 ft. 1300 ft.

Plume Area: 19.5 acres

Plume Average Concentration: 7.5 mg/L

Plume Mass Indicator: 1,789 lbs

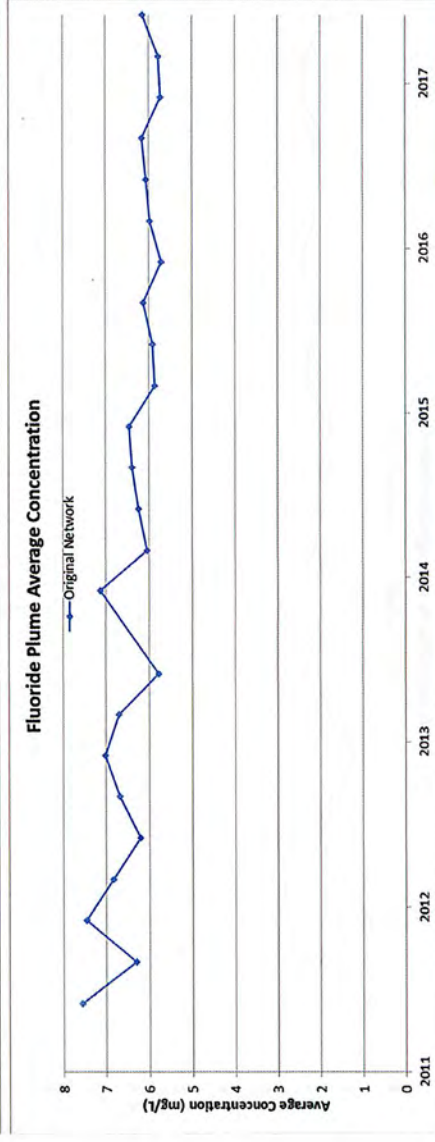
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes in area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behaviour of the aforementioned metrics over time.



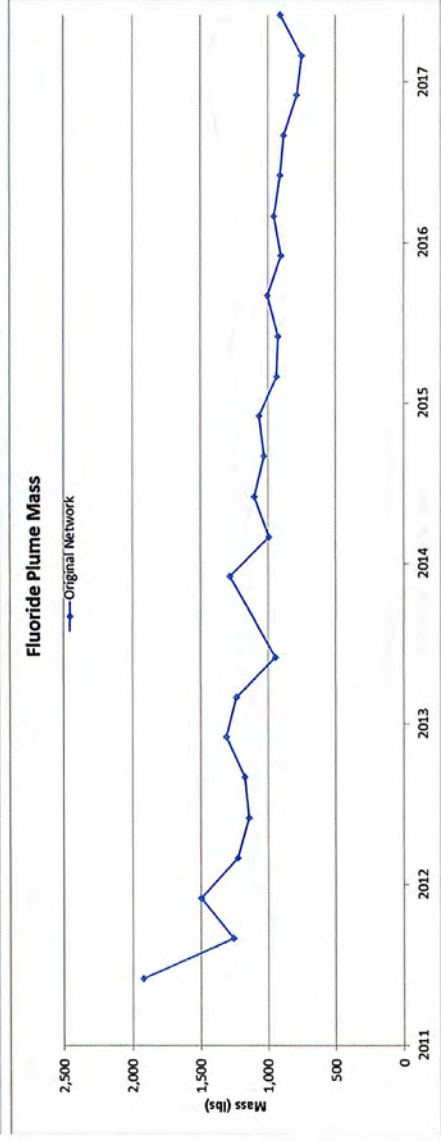
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Original Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

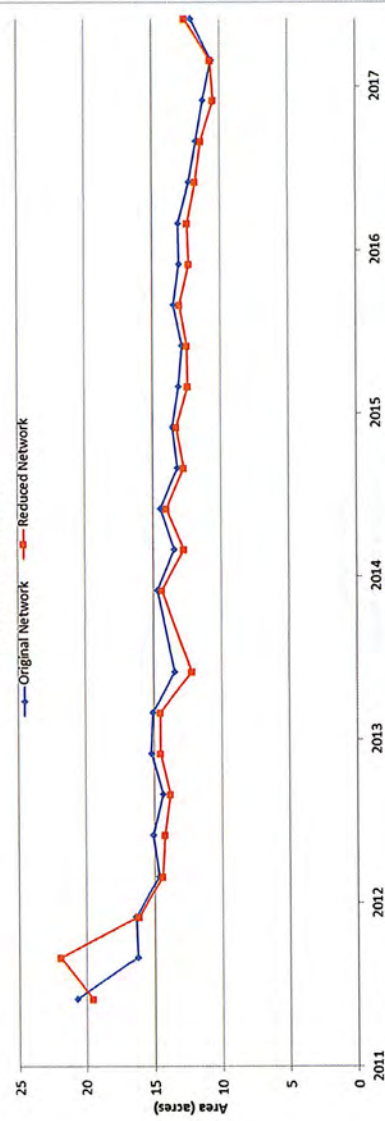


Original Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence



Original Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Fluoride Plume Area



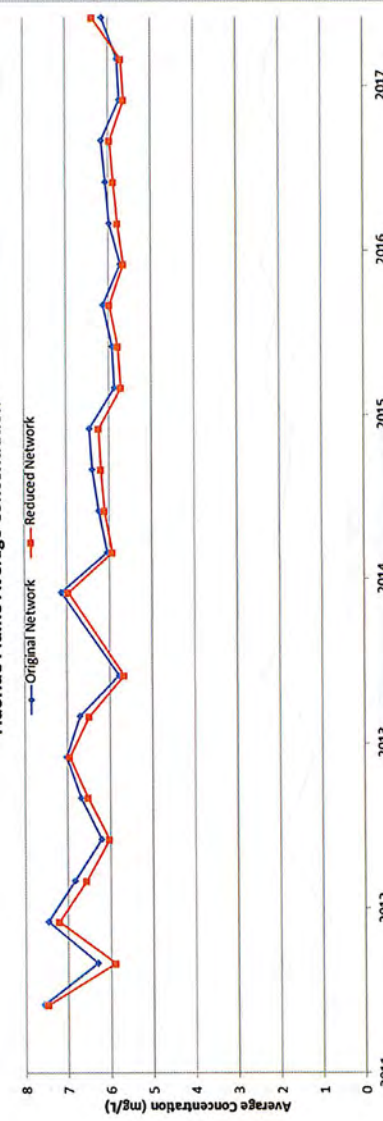
15 of 35 Wells Removed
42% Reduction

Original Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Reduced Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Average RPD: 5.21%
Correlation: 0.86

Fluoride Plume Average Concentration



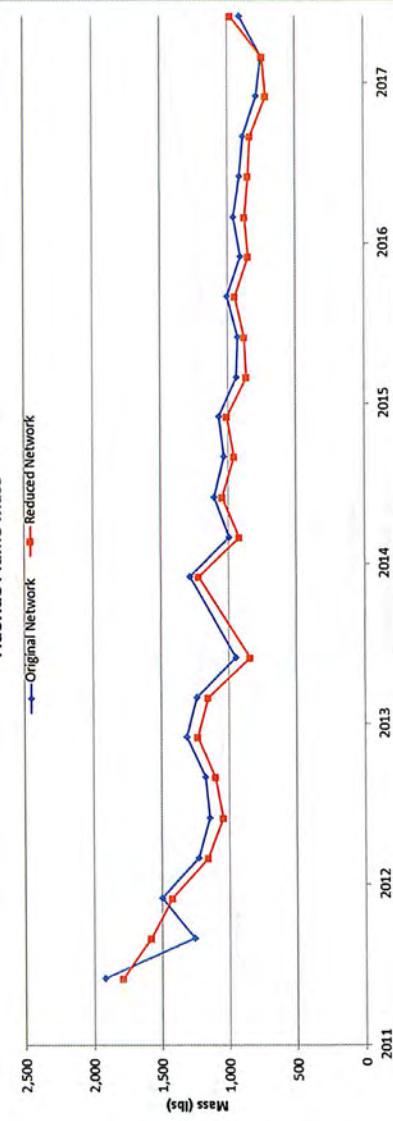
15 of 35 Wells Removed
42% Reduction

Original Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Reduced Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Average RPD: 2.72%
Correlation: 0.98

Fluoride Plume Mass



15 of 35 Wells Removed
42% Reduction

Original Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Reduced Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Average RPD: 7.35%
Correlation: 0.94

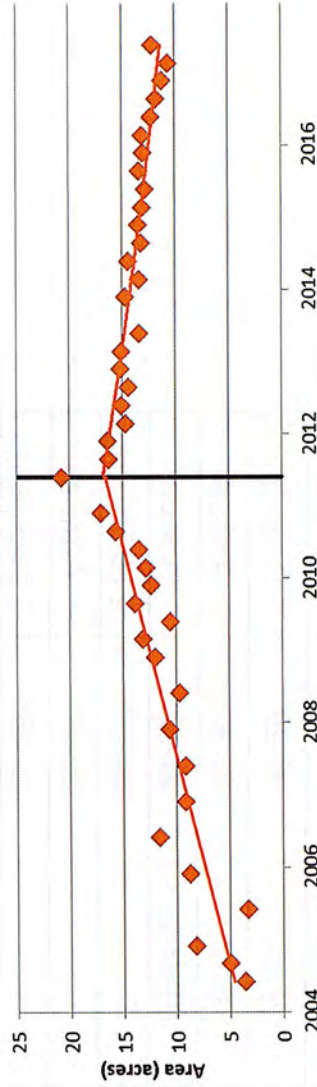
Well Sufficiency Summary (15 of 35 Wells Removed)

Constituent	RPD			Correlation			Trend Conclusion			Strength of Argument
	Area	Conc	Mass	Area	Conc	Mass	Area	Conc	Mass	
Fluoride	5.21%	2.72%	7.35%	0.86	0.98	0.94	Same	Same	Same	Strong/Very Strong

Fluoride - Well Sufficiency Analysis Summary										
Removed	Recommended Sampling			Comments						
	Well	Frequency								
W-18	W-10	Annual		<p>- Annual sampling frequency recommended based on Frequency Analysis.</p> <p>- * Denotes necessary boundary well not currently sampled.</p> <p>- † Denotes Hanging Well</p>						
W-19 [†]	W-13	Annual								
W-24	W-14	Annual								
W-33	W-15	Annual								
W-35 [†]	W-16	Annual								
W-36 [†]	W-17	Annual								
W-38	W-20	Annual								
W-39	W-22	Annual								
W-40 [†]	W-23	Annual								
W-42 [†]	W-26	Annual								
W-43	W-27	Annual								
W-44	W-28	Annual								
W-45 [†]	W-29	Annual								
W-7	W-30	Annual								
WRW-2	W-32	Annual								
	W-37*	2 to 5 Years								
	W-41	Annual								
	W-46*	2 to 5 Years								
	W-47	Annual								
	W-48	Annual								

Fluoride Plume Area Trend

AS/SVE System
Shutdown



Jun-2004 to Jun-2011

Increasing Trend

Mann-Kendall: >99% Confidence
Regression: >99% Confidence

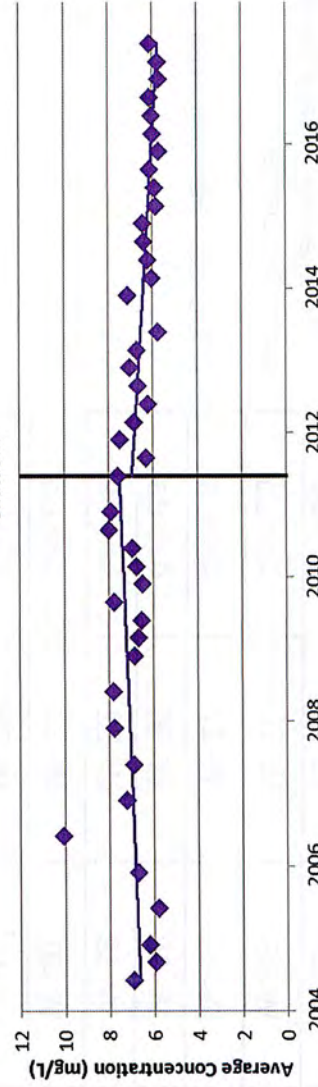
Jun-2011 to Jun-2017

Decreasing Trend

Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Fluoride Plume Average Concentration Trend

AS/SVE System
Shutdown



Jun-2004 to Jun-2011

No Trend/Increasing Trend

Mann-Kendall: 94% Confidence
Regression: 82% Confidence

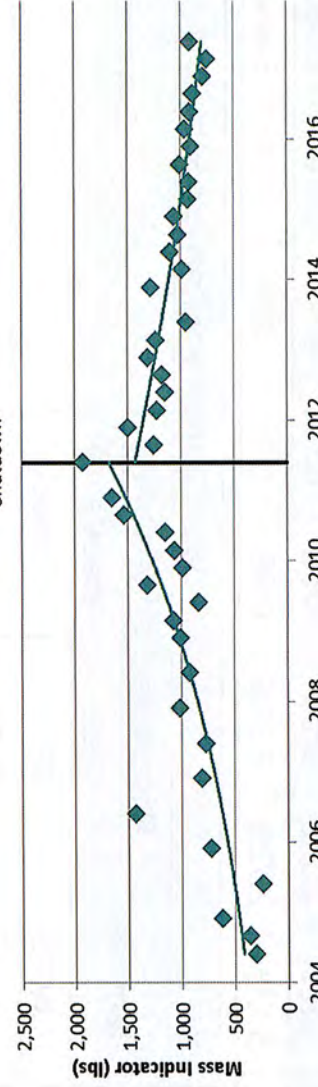
Jun-2011 to Jun-2017

Decreasing Trend

Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Fluoride Plume Mass Indicator Trend

AS/SVE System
Shutdown



Jun-2004 to Jun-2011

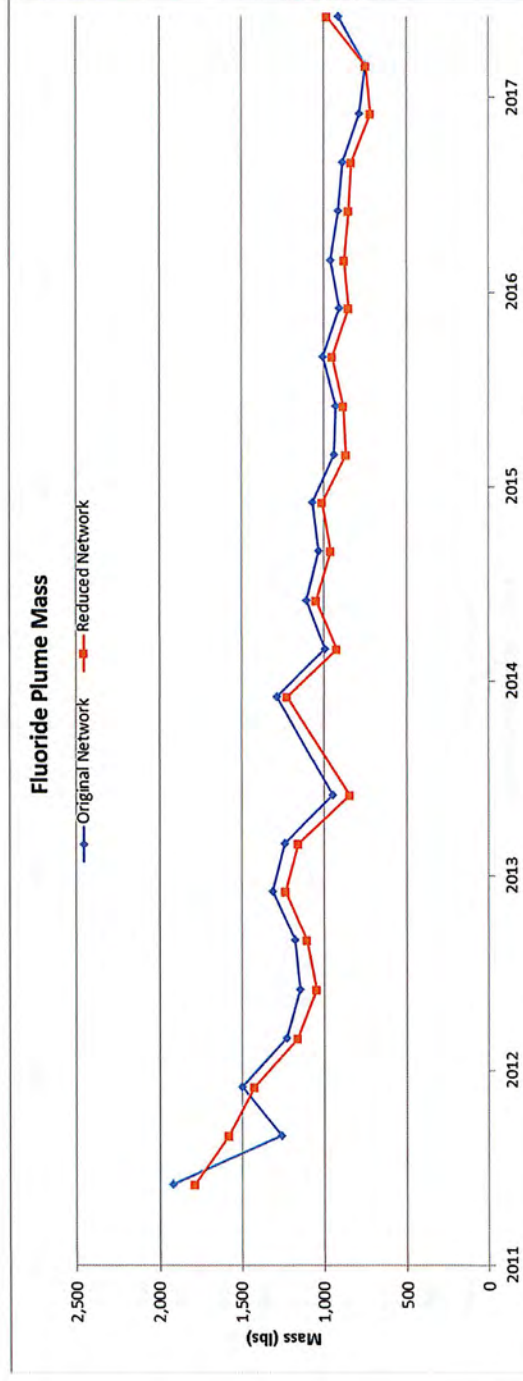
Increasing Trend

Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Jun-2011 to Jun-2017

Decreasing Trend

Mann-Kendall: >99% Confidence
Regression: >99% Confidence



15 of 35 Wells Removed
42% Reduction

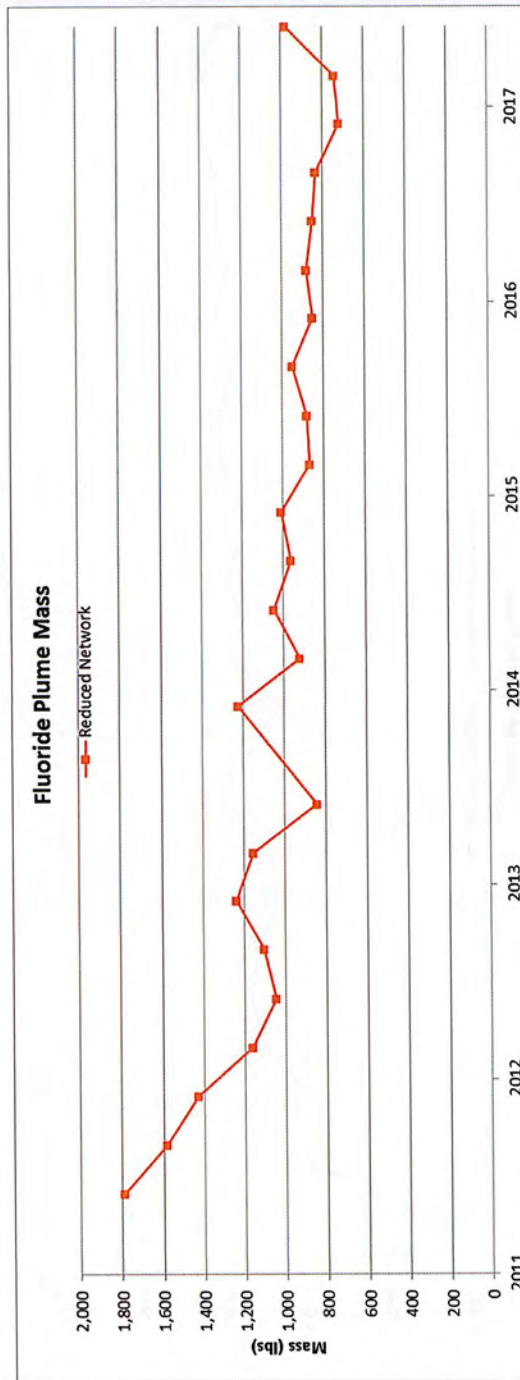
Original Network Trends
 Mann-Kendall: Decreasing Trend >99% Confidence
 Regression: Decreasing Trend >99% Confidence

Reduced Network Trends
 Mann-Kendall: Decreasing Trend >99% Confidence
 Regression: Decreasing Trend >99% Confidence

Average RPD: 7.35%
Correlation: 0.94

15 of 35 Wells Removed
42% Reduction

Reduced Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence





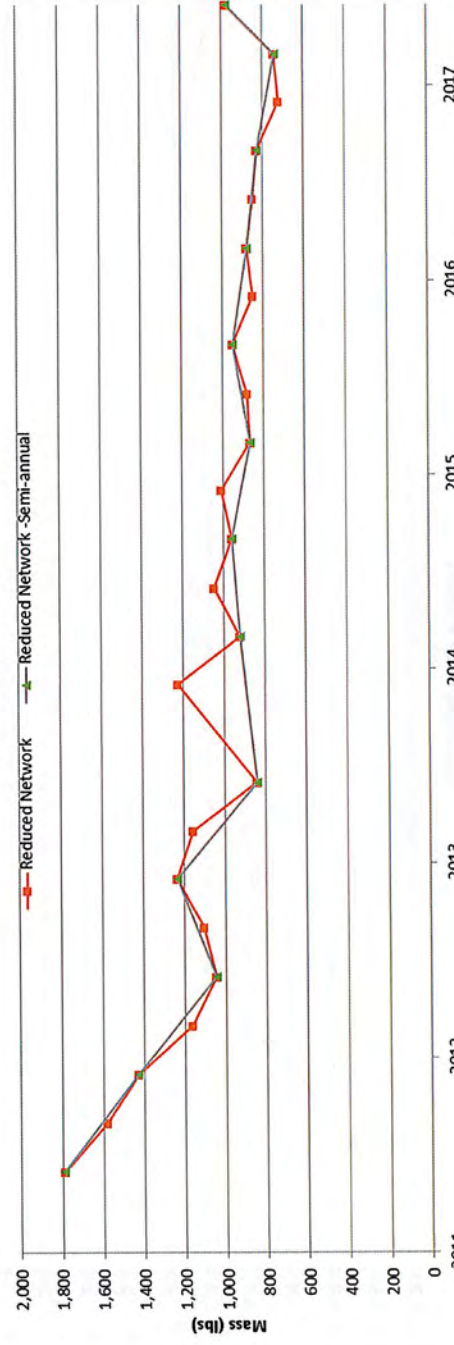
15 of 35 Wells Removed
42% Reduction

Reduced Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Reduced Network - Annual Trends
Mann-Kendall: No Trend 88% Confidence
Regression: No Trend 88% Confidence

PSA Trends

Fluoride Plume Mass



15 of 35 Wells Removed
42% Reduction

Reduced Network Trends

Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Reduced Network - Semi annual Trends

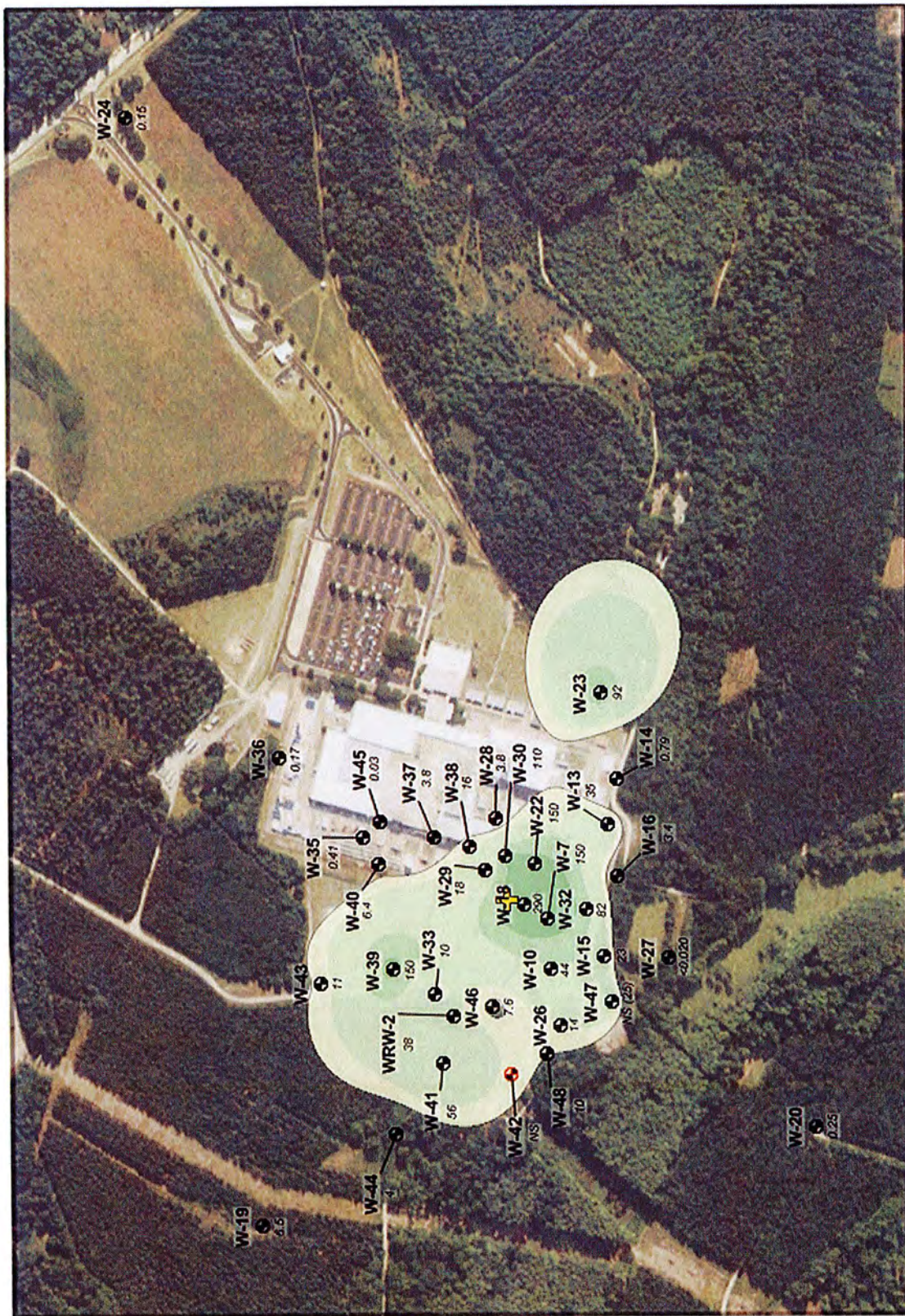
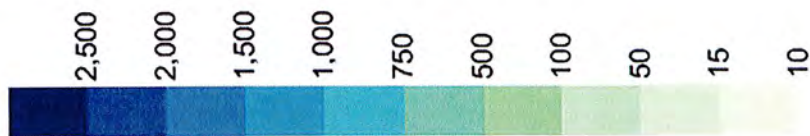
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

PSA Trends

Nitrate

Nitrate
Jun-2011

Concentration (mg/L)



Plume Characteristics

Plume Area: 41.2 acres
Plume Average Concentration: 34.6 mg/L
Plume Mass Indicator: 17,443 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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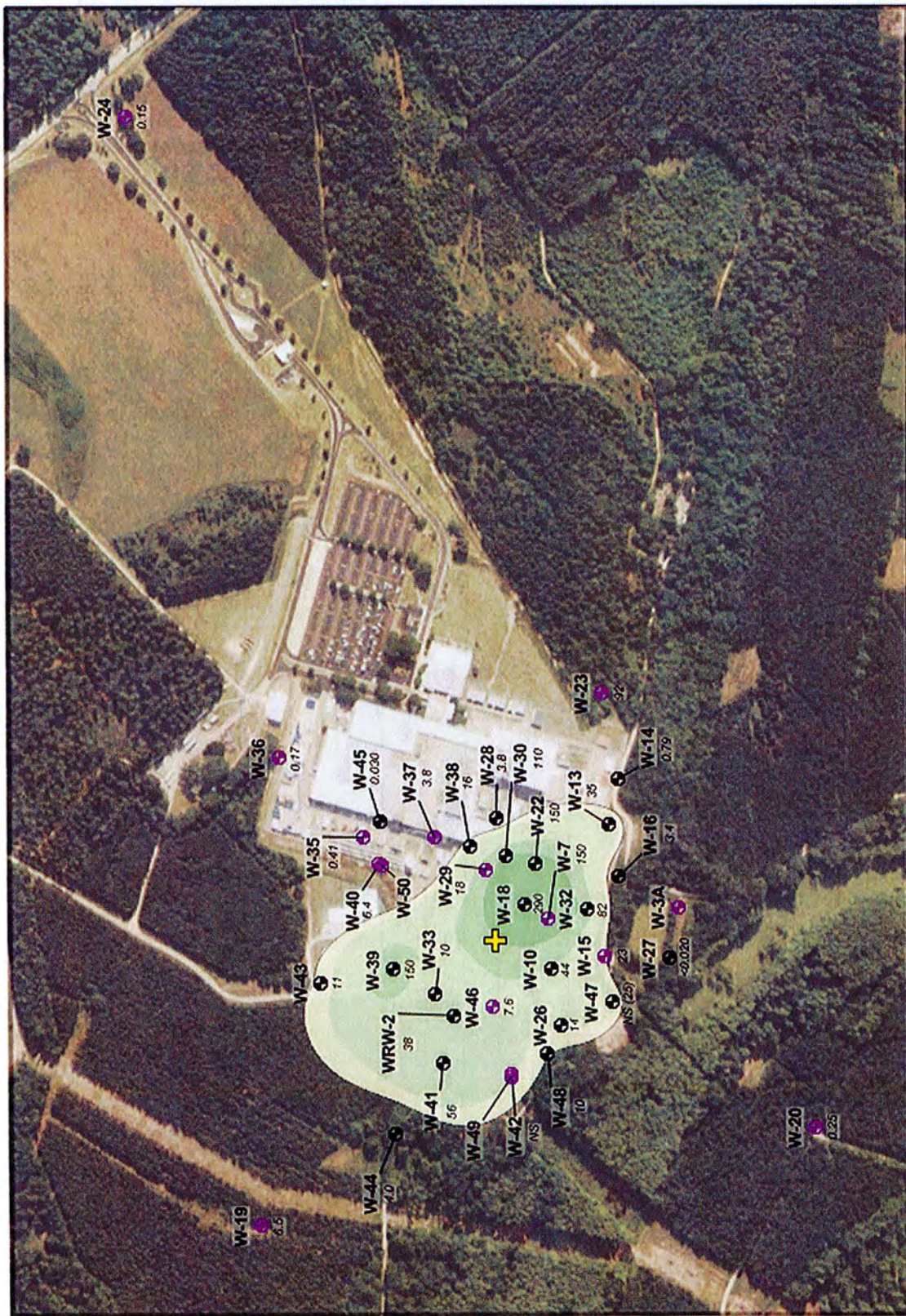
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LEGEND

- W-4 Monitoring Well
- 112 Concentration (mg/L)
- W-4 Hanging Well - No Longer Sampled
- NS (146) Well Not Sampled (Assigned Value Shown)
- ✚ Plume Center of Mass

Concentration (mg/L)



0 ft. 650 ft. 1300 ft.

Plume Area: 29.4 acres

Plume Average Concentration: **45.5 mg/L**

Plume Mass Indicator: 16,382 lbs

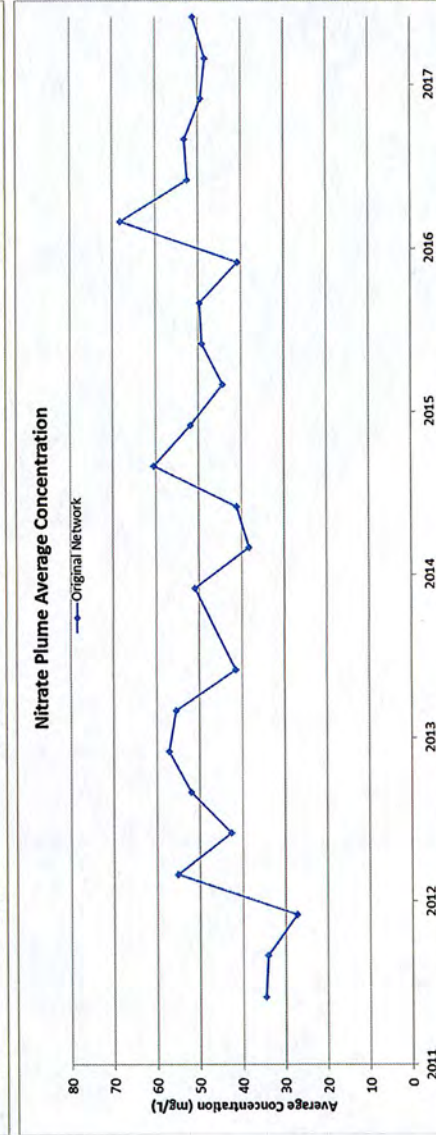
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes in area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual volume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



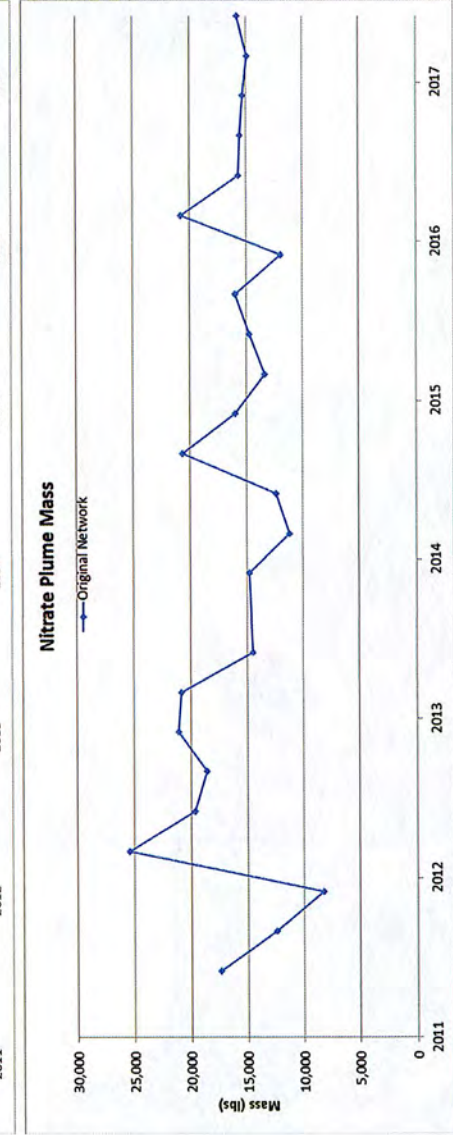
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Original Network Trends
 Mann-Kendall: Decreasing Trend >99% Confidence
 Regression: Decreasing Trend >99% Confidence

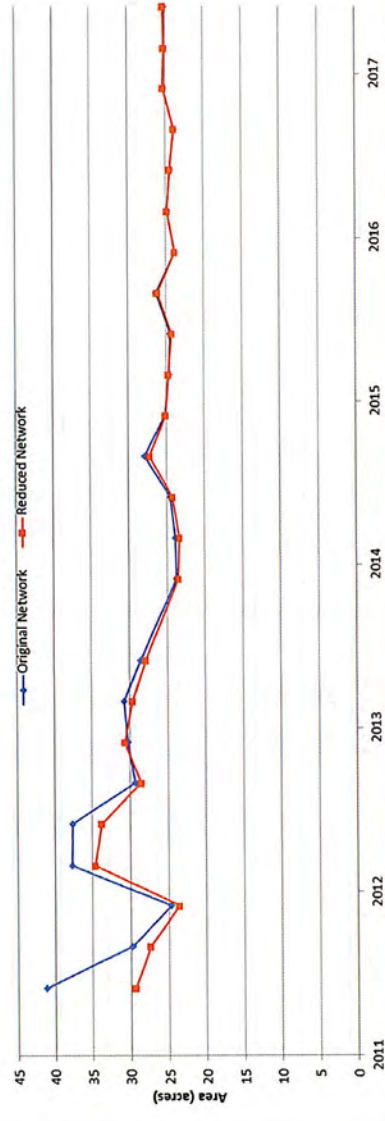


Original Network Trends
 Mann-Kendall: Increasing Trend 90.57% Confidence
 Regression: Increasing Trend 97.49% Confidence



Original Network Trends
 Mann-Kendall: No Trend 69.88% Confidence
 Regression: No Trend 53.38% Confidence

Nitrate Plume Area



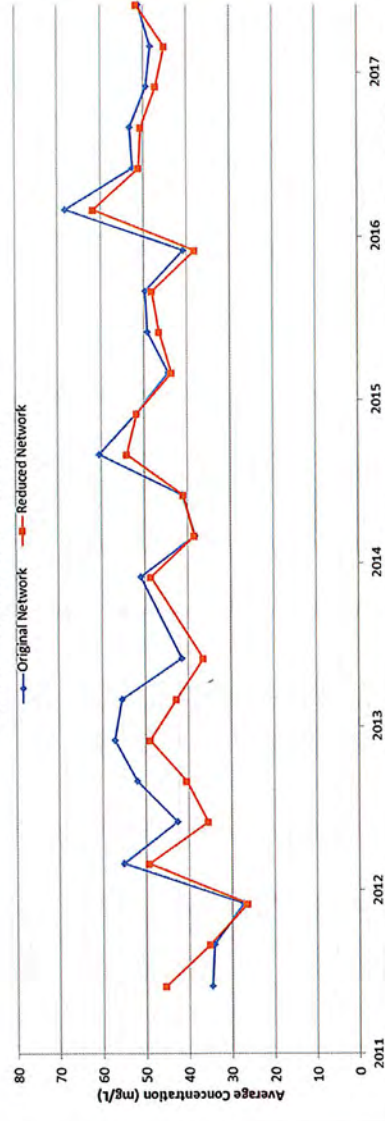
13 of 35 Wells Removed
42% Reduction

Original Network Trends
Mann-Kendall: Decreasing Trend >99% Confidence
Regression: Decreasing Trend >99% Confidence

Reduced Network Trends
Mann-Kendall: Decreasing Trend 97.50% Confidence
Regression: Decreasing Trend >99% Confidence

Average RPD: 3.54%
Correlation: 0.89

Nitrate Plume Average Concentration



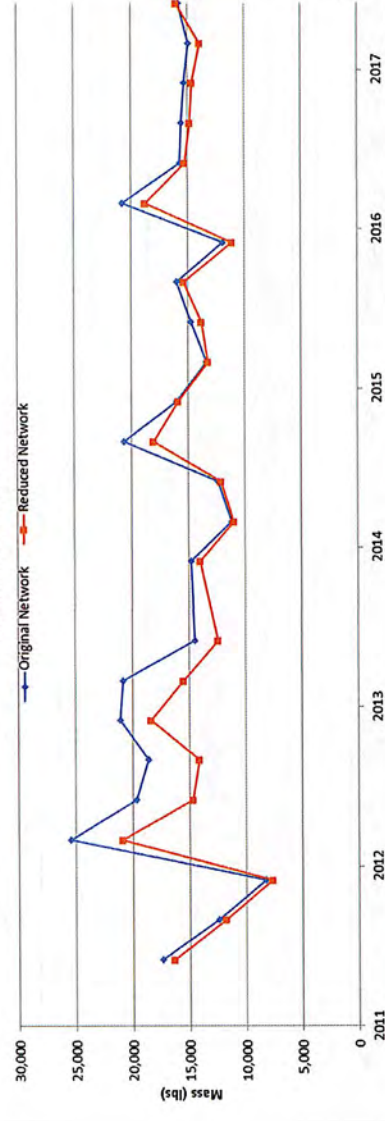
13 of 35 Wells Removed
42% Reduction

Original Network Trends
Mann-Kendall: Increasing Trend 90.57% Confidence
Regression: Increasing Trend 97.45% Confidence

Reduced Network Trends
Mann-Kendall: Increasing Trend 99.08% Confidence
Regression: Increasing Trend 99.30% Confidence

Average RPD: 8.59%
Correlation: 0.86

Nitrate Plume Mass



13 of 35 Wells Removed
42% Reduction

Original Network Trends
Mann-Kendall: No Trend 69.88% Confidence
Regression: No Trend 53.38% Confidence

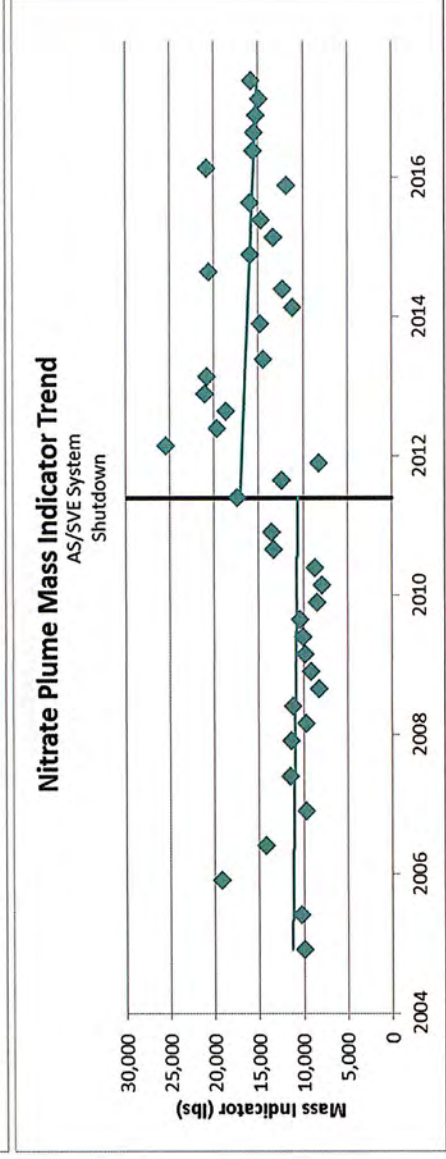
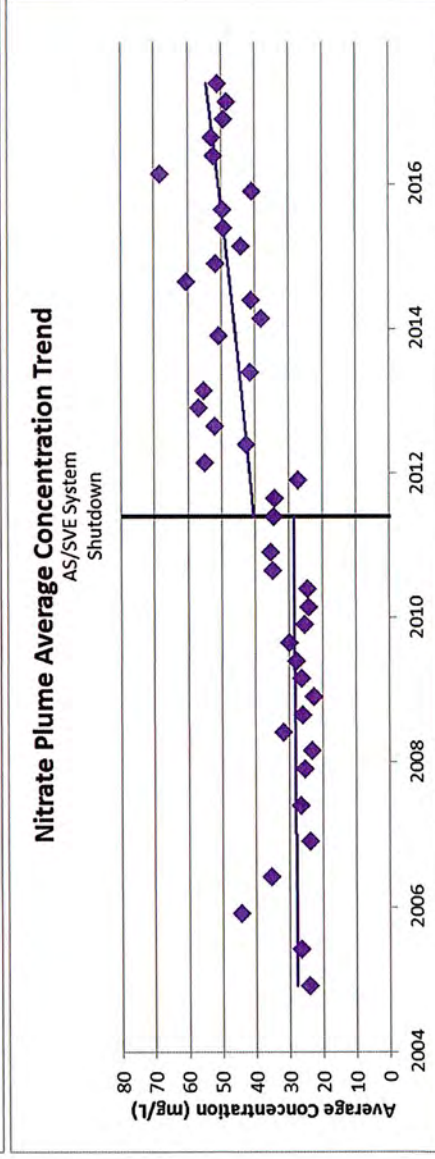
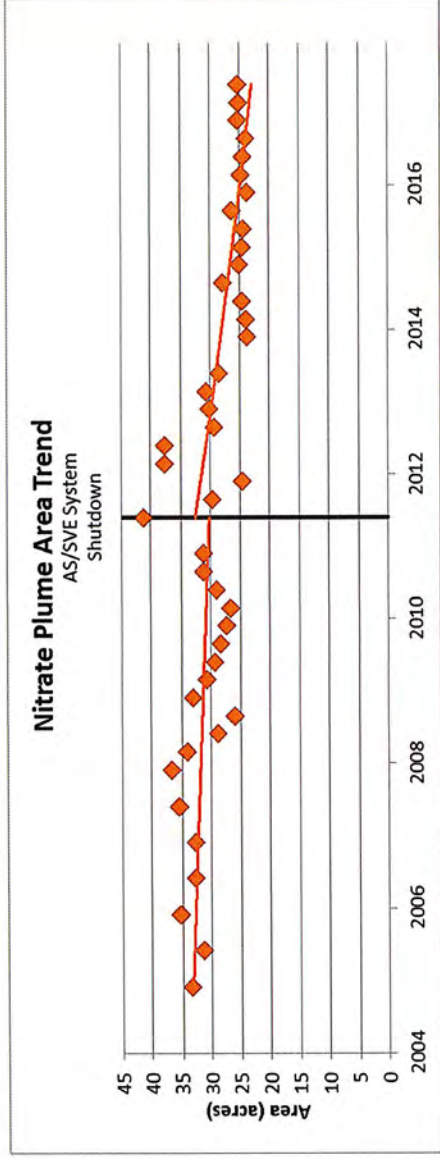
Reduced Network Trends
Mann-Kendall: No Trend 56.89% Confidence
Regression: No Trend 48.51% Confidence

Average RPD: 9.43%
Correlation: 0.92

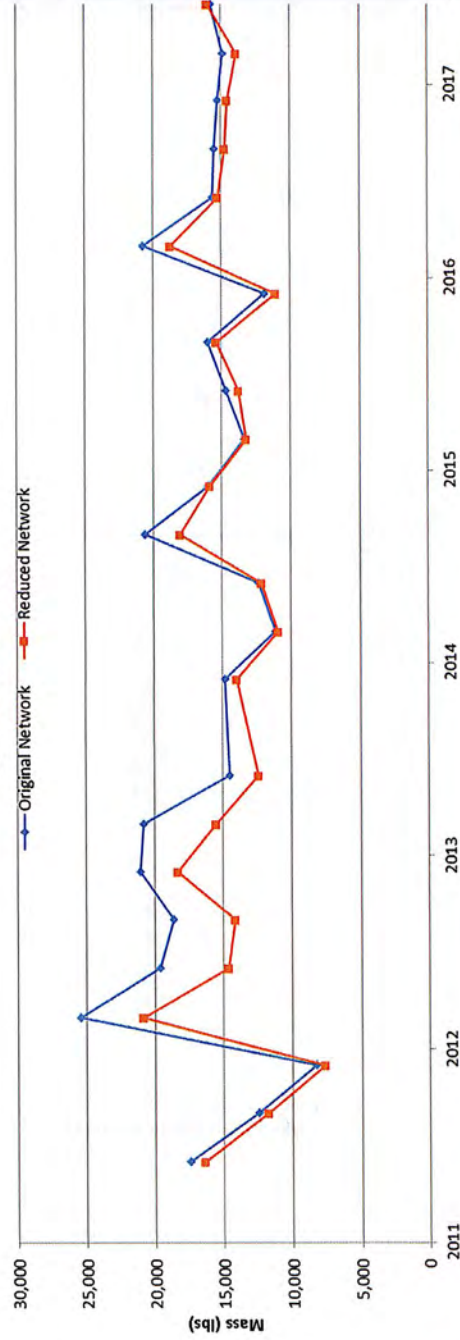
Well Sufficiency Summary (13 of 35 Wells Removed)

Constituent	RPD			Correlation			Trend Conclusion			Strength of Argument
	Area	Conc	Mass	Area	Conc	Mass	Area	Conc	Mass	
Nitrate	3.54%	8.59%	9.43%	0.89	0.86	0.92	Same	Same	Same	Very Strong

Nitrate - Well Sufficiency Analysis Summary									
Removed	Recommended Sampling			Comments					
	Well	Frequency							
W-15	W-10	Annual		<p>- Annual sampling frequency recommended based on Frequency Analysis.</p> <p>- * Denotes necessary boundary well not currently sampled.</p> <p>- † Denotes Hanging Well</p>					
W-19 [†]	W-13	Annual							
W-20	W-14	Annual							
W-23	W-16	Annual							
W-24	W-17	Annual							
W-29	W-18	Annual							
W-35 [†]	W-22	Annual							
W-36 [†]	W-26	Annual							
W-37 [†]	W-27	Annual							
W-40 [†]	W-28	Annual							
W-42 [†]	W-30	Annual							
W-46 [†]	W-32	Annual							
W-7	W-33	Annual							
	W-38	Annual							
	W-39	Annual							
	W-41	Annual							
	W-43	Annual							
	W-44	Annual							
	W-45*	2 to 5 Years							
	W-47	Annual							
	W-48	Annual							
	WRW-2	Annual							



Nitrate Plume Mass



13 of 35 Wells Removed
42% Reduction

Original Network Trends
Mann-Kendall: No Trend 69.88% Confidence
Regression: No Trend 53.38% Confidence

Reduced Network Trends
Mann-Kendall: No Trend 56.89% Confidence
Regression: No Trend 48.51% Confidence

Average RPD: 9.43%

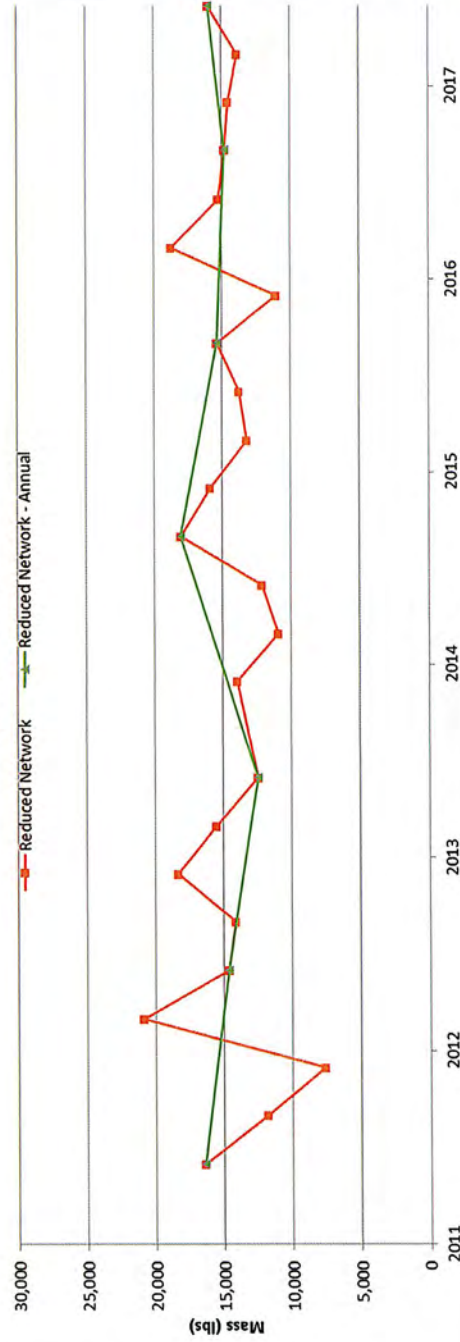
Correlation: 0.92



13 of 35 Wells Removed
42% Reduction

Reduced Network Trends
 Mann-Kendall: No Trend 56.89% Confidence
 Regression: No Trend 48.51% Confidence

Nitrate Plume Mass



13 of 35 Wells Removed
42% Reduction

Reduced Network Trends

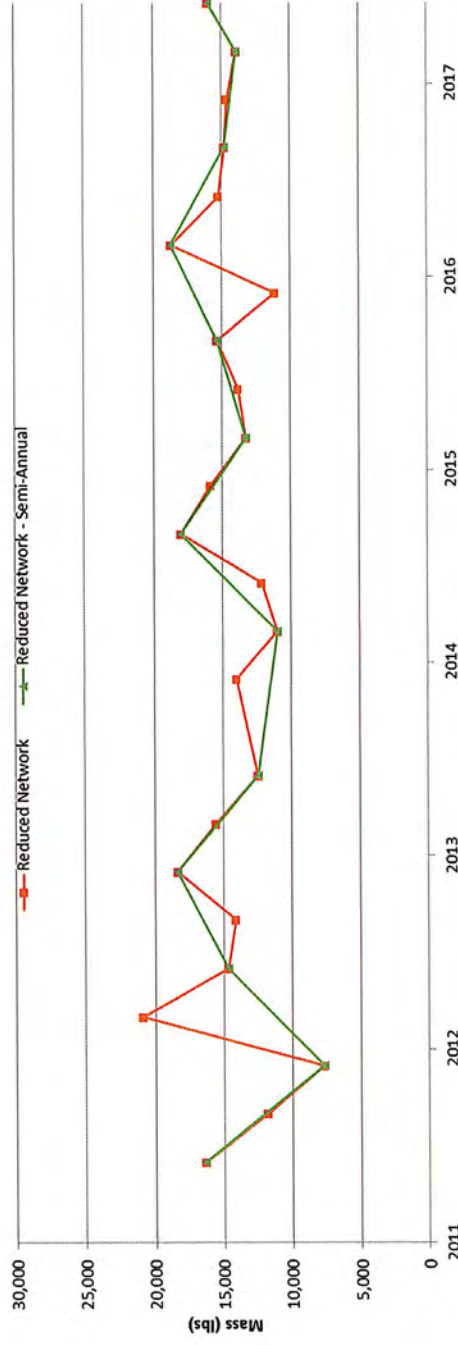
Mann-Kendall: No Trend 56.89% Confidence
Regression: No Trend 48.51% Confidence

Reduced Frequency - Annual Trends

Mann-Kendall: No Trend 50% Confidence
Regression: No Trend 20% Confidence

PSA Trends

Nitrate Plume Mass



13 of 35 Wells Removed
42% Reduction

Reduced Network Trends

Mann-Kendall: No Trend 56.89% Confidence
Regression: No Trend 48.51% Confidence

Reduced Frequency - Semi-Annual Trends

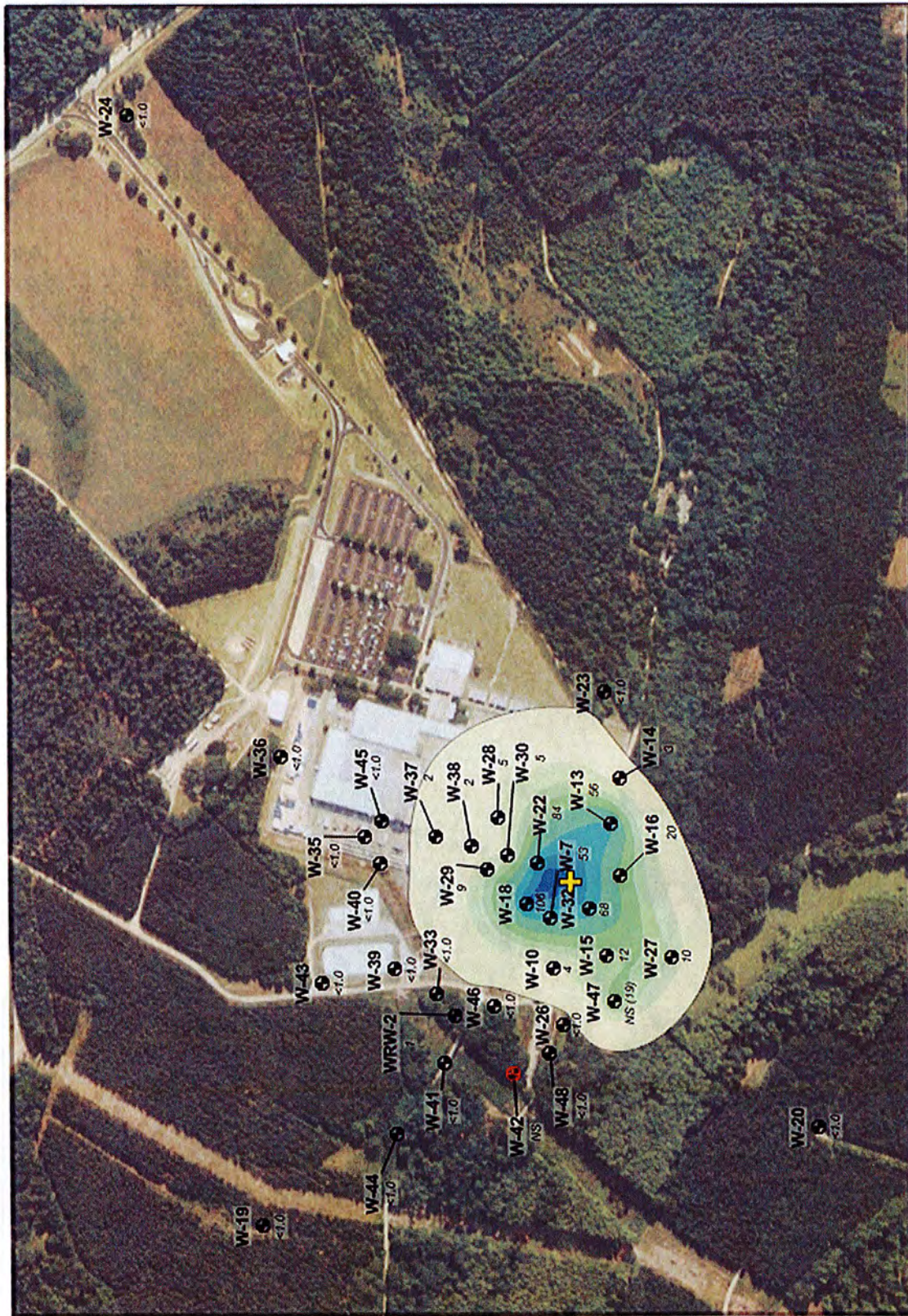
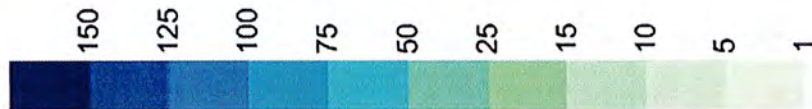
Mann-Kendall: No Trend 75% Confidence
Regression: No Trend 62% Confidence

PSA Trends

Ammonia

Ammonia
Jun-2011

Concentration (mg/L)



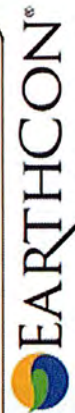
Plume Characteristics

Plume Area: 32.5 acres

Plume Average Concentration: 14.3 mg/L

Plume Mass Indicator: 5,685 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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LEGEND

Monitoring Well

Concentration (mg/L)

Hanging Well -

No Longer Sampled

Well Not Sampled

(Assigned Value Shown)

Plume Center of Mass



W-4

112

W-4

NS

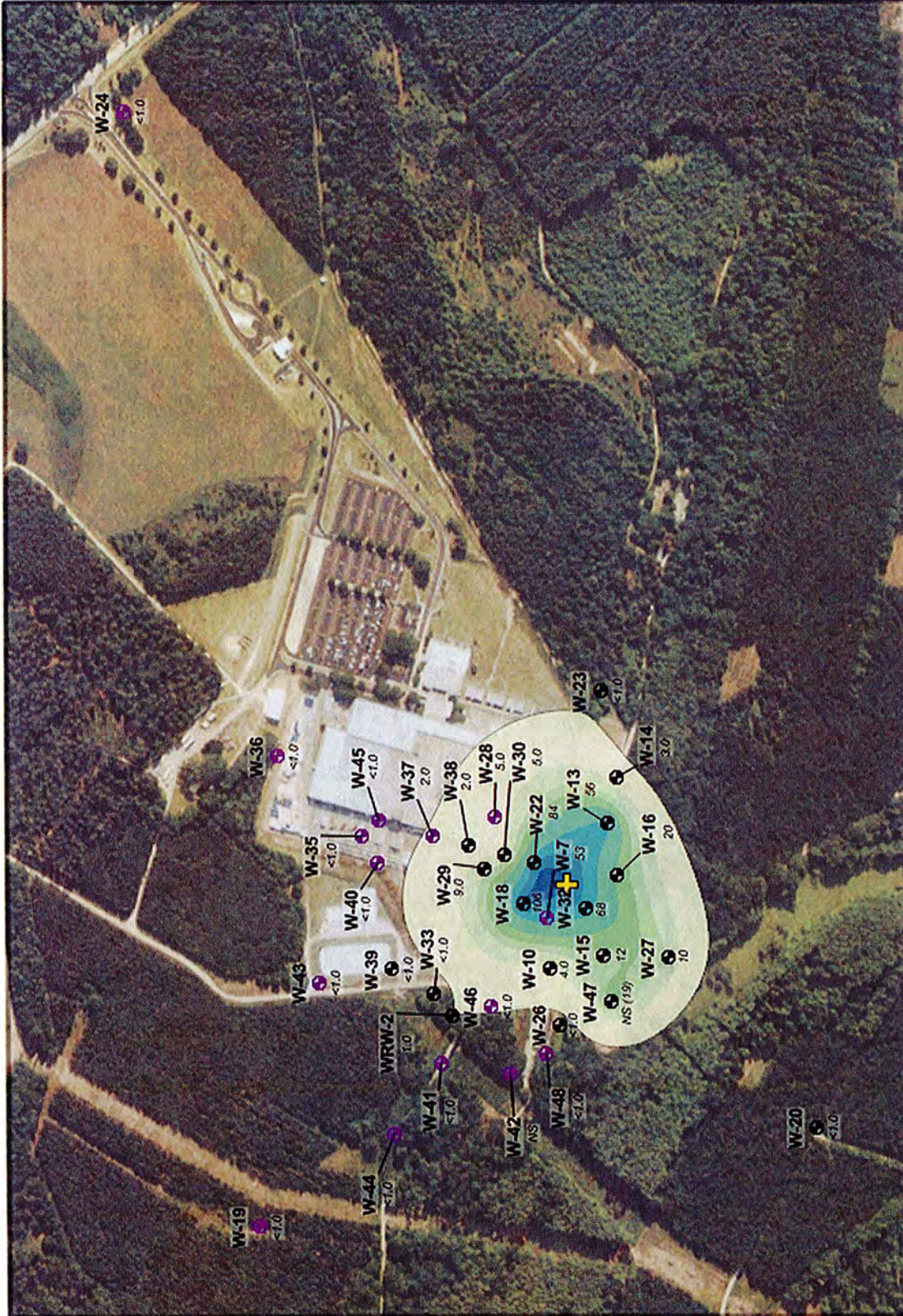
NS

NS

NS

Ammonia
Jun-2011

Concentration (mg/L)



Plume Characteristics

Plume Area: 31.6 acres

Plume Average Concentration: 14.6 mg/L

Plume Mass Indicator: 5,661 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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LEGEND

W-4 Monitoring Well

1:2 Concentration (mg/L)

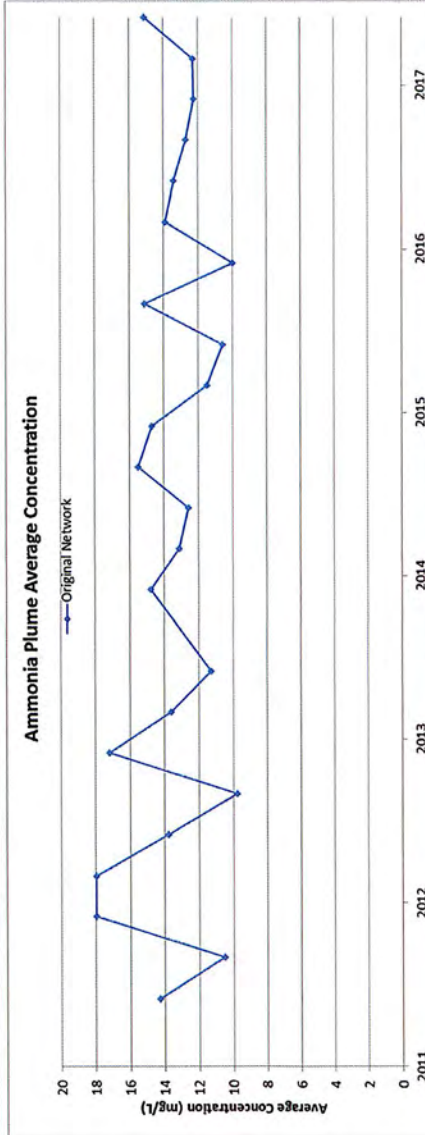
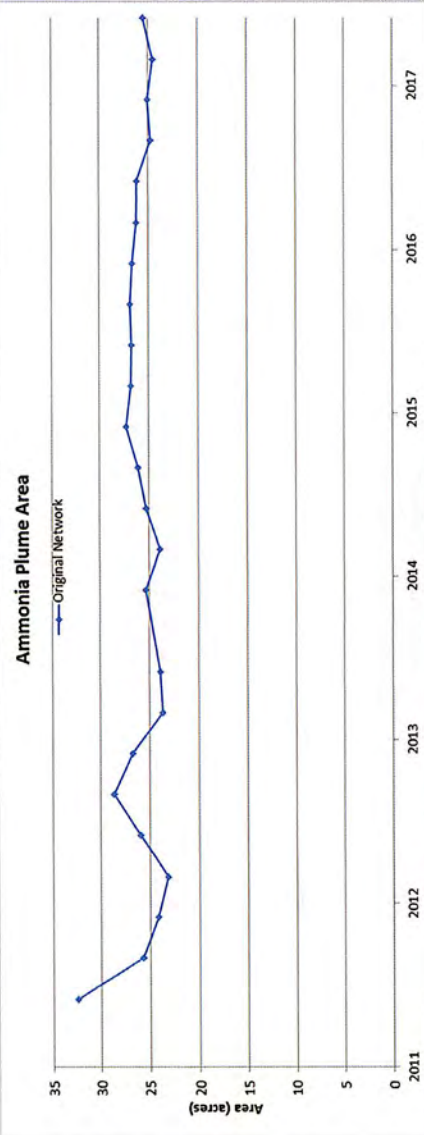
W-4 Removed Well

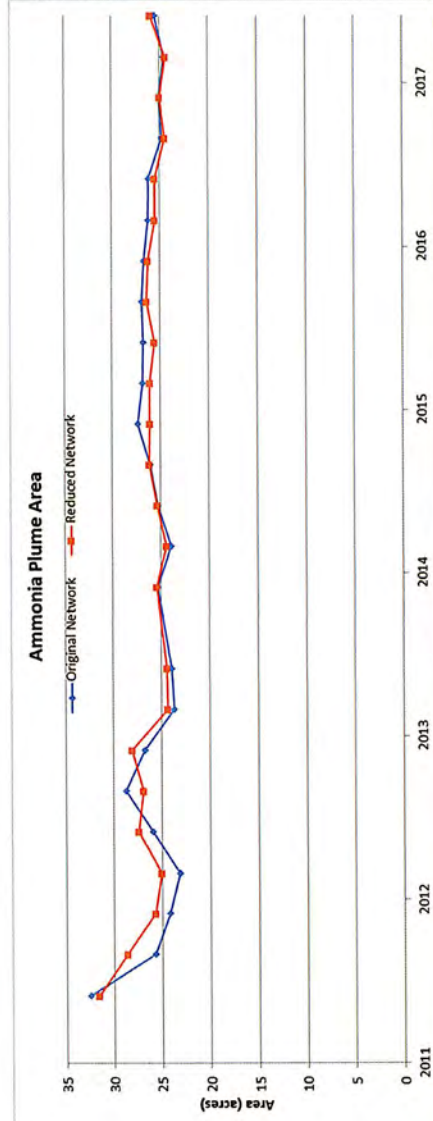
NS (146) Well Not Sampled (Assigned Value Shown)

+ Plume Center of Mass



0 ft. 650 ft. 1300 ft.



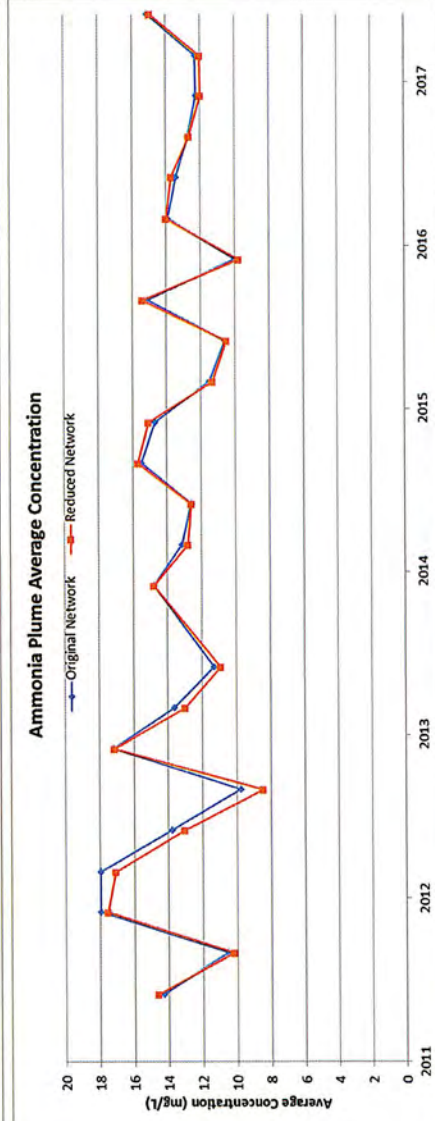


15 of 35 Wells Removed
43% Reduction

Original Network Trends
Mann-Kendall: No Trend 50.99% Confidence
Regression: No Trend 55.47% Confidence

Reduced Network Trends
Mann-Kendall: Decreasing Trend 96.49% Confidence
Regression: Decreasing Trend 98.91% Confidence

Average RPD: 3.17%
Correlation: 0.82

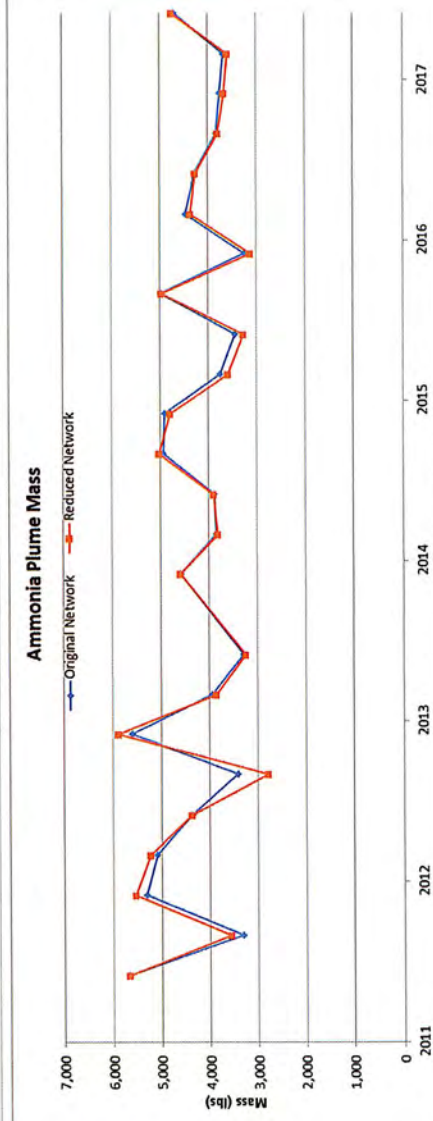


15 of 35 Wells Removed
43% Reduction

Original Network Trends
Mann-Kendall: No Trend 84.54% Confidence
Regression: No Trend 72.01% Confidence

Reduced Network Trends
Mann-Kendall: No Trend 82.06% Confidence
Regression: No Trend 52.27% Confidence

Average RPD: 2.56%
Correlation: 0.99



15 of 35 Wells Removed
43% Reduction

Original Network Trends
Mann-Kendall: Decreasing Trend 92.83% Confidence
Regression: No Trend 81.17% Confidence

Reduced Network Trends
Mann-Kendall: Decreasing Trend 92.13% Confidence
Regression: No Trend 83.61% Confidence

Average RPD: 2.97%
Correlation: 0.98

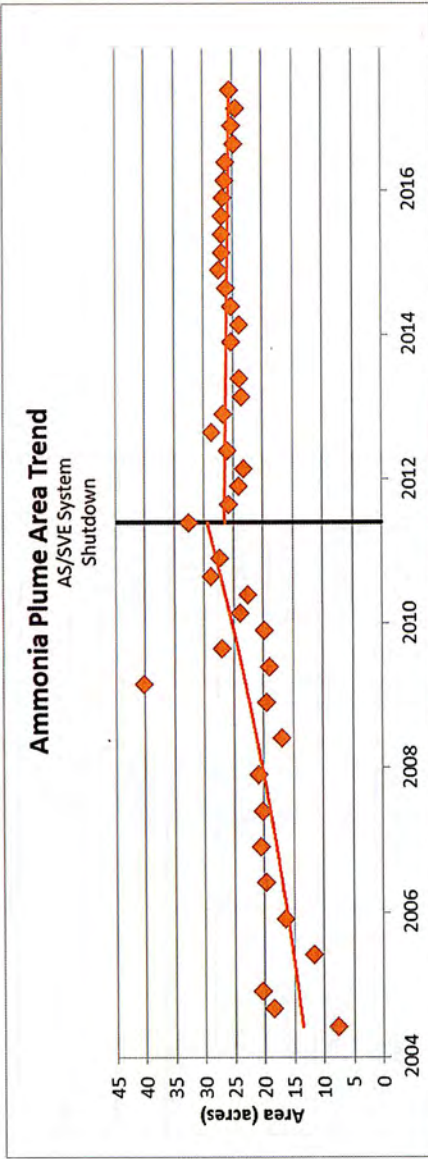
Well Sufficiency Summary (15 of 35 Wells Removed)									
Constituent	RPD			Correlation			Trend Conclusion		
	Area	Conc	Mass	Area	Conc	Mass	Area	Conc	Mass
Ammonia	3.17%	2.56%	2.97%	0.82	0.99	0.98	No Trend - Decreasing Trend	Same	Same
									Strong/Very Strong

Ammonia - Well Sufficiency Analysis Summary			
Removed	Recommended Sampling		Comments
	Well	Frequency	
W-19 [†]	W-10	Annual	- Annual sampling frequency recommended based on Frequency Analysis . - [†] Denotes Hanging Well
W-24	W-13	Annual	
W-28	W-14	Annual	
W-35 [†]	W-15	Annual	
W-36 [†]	W-16	Annual	
W-37 [†]	W-17	Annual	
W-40 [†]	W-18	Annual	
W-41	W-20	Annual	
W-42 [†]	W-22	Annual	
W-43	W-23	Annual	
W-44	W-26	Annual	
W-45 [†]	W-27	Annual	
W-46 [†]	W-29	Annual	
W-48	W-30	Annual	
W-7	W-32	Annual	
	W-33	Annual	
	W-38	Annual	
	W-39	Annual	
	W-47	Annual	
	WRW-2	Annual	

Ammonia Plume Area Trend
AS/SVE System
Shutdown

Jun-2004 to Jun-2011
Increasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

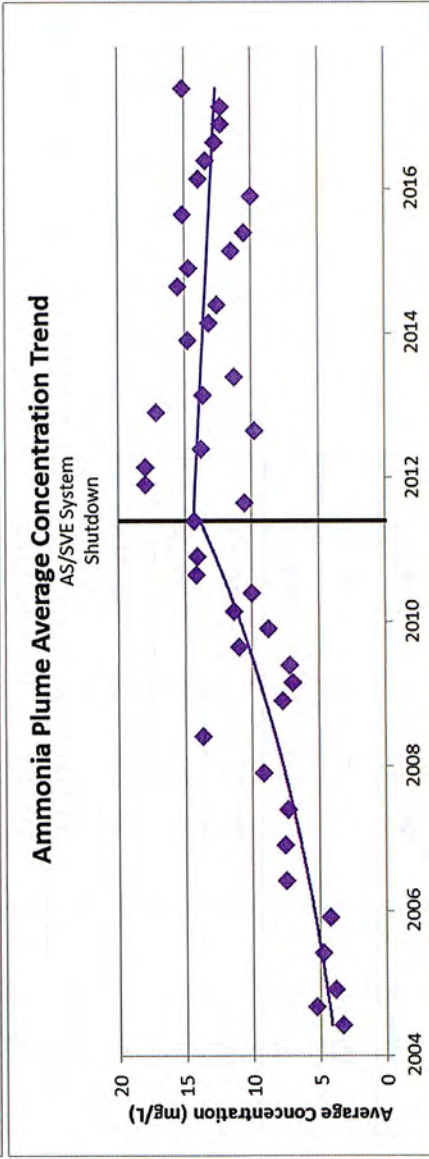
Jun-2011 to Jun-2017
No Trend
Mann-Kendall: 51% Confidence
Regression: 55% Confidence



Ammonia Plume Average Concentration Trend
AS/SVE System
Shutdown

Jun-2004 to Jun-2011
Increasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

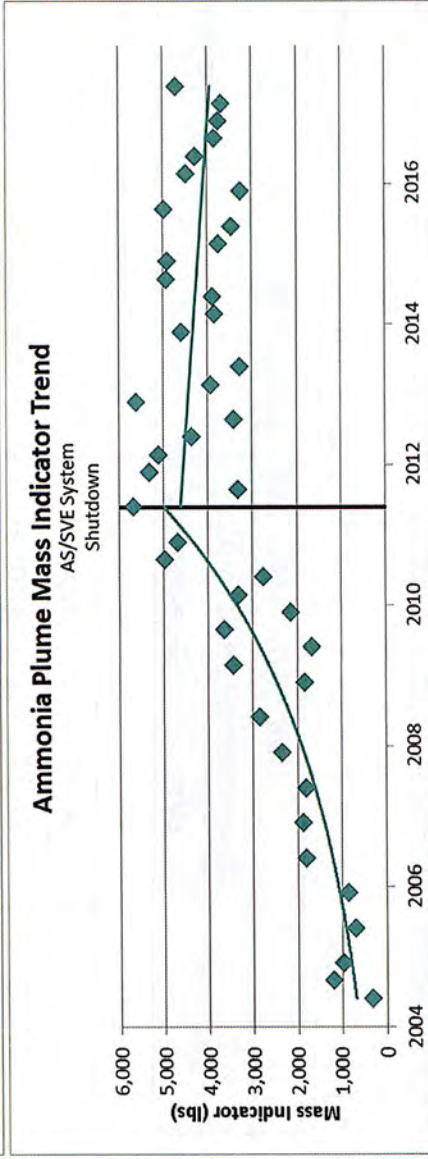
Jun-2011 to Jun-2017
No Trend
Mann-Kendall: 85% Confidence
Regression: 72% Confidence

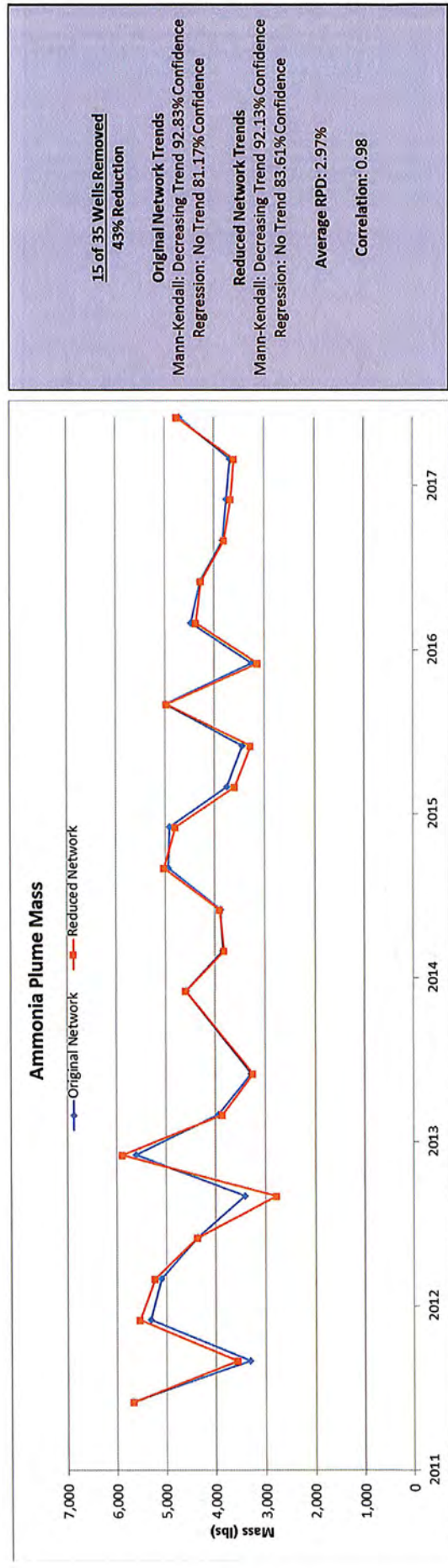


Ammonia Plume Mass Indicator Trend
AS/SVE System
Shutdown

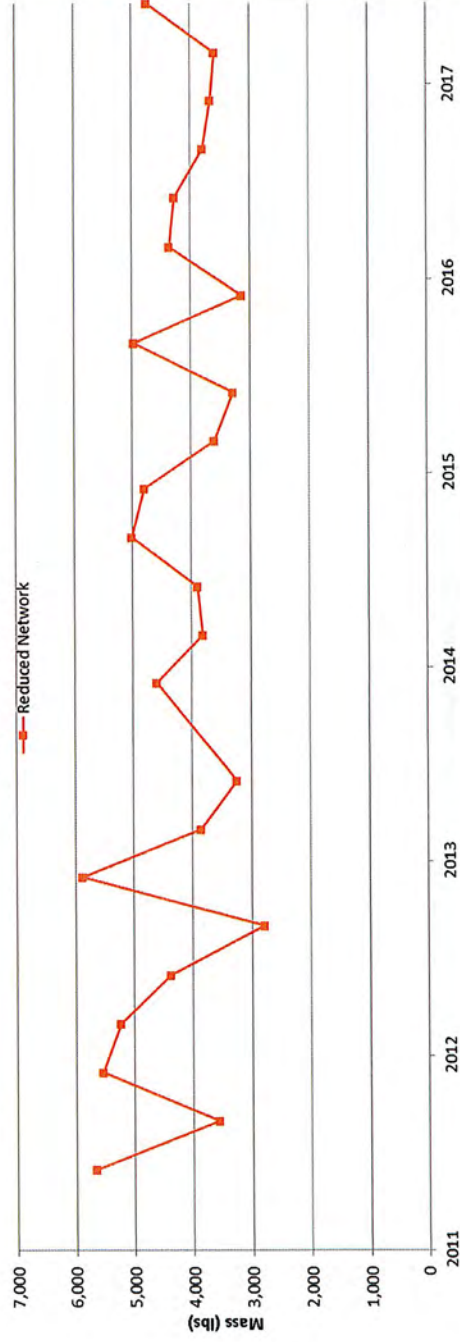
Jun-2004 to Jun-2011
Increasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Jun-2011 to Jun-2017
No Trend/Decreasing Trend
Mann-Kendall: 93% Confidence
Regression: 81% Confidence





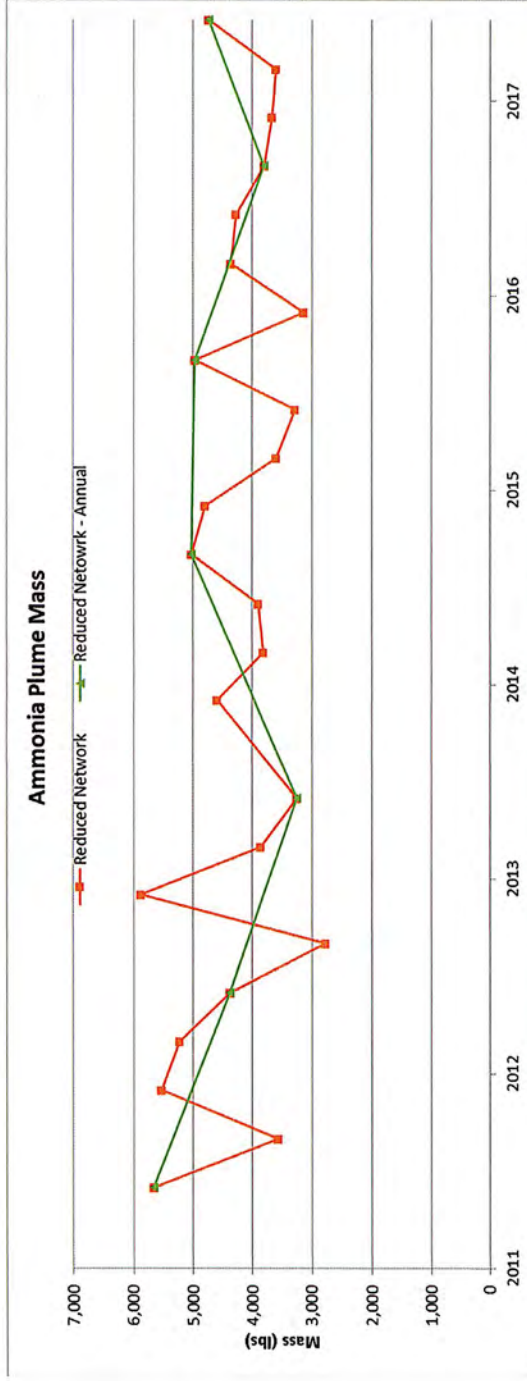
Ammonia Plume Mass



15 of 35 Wells Removed
43% Reduction

Reduced Network Trends

Mann-Kendall: Decreasing Trend 92.13% Confidence
Regression: No Trend 83.61% Confidence

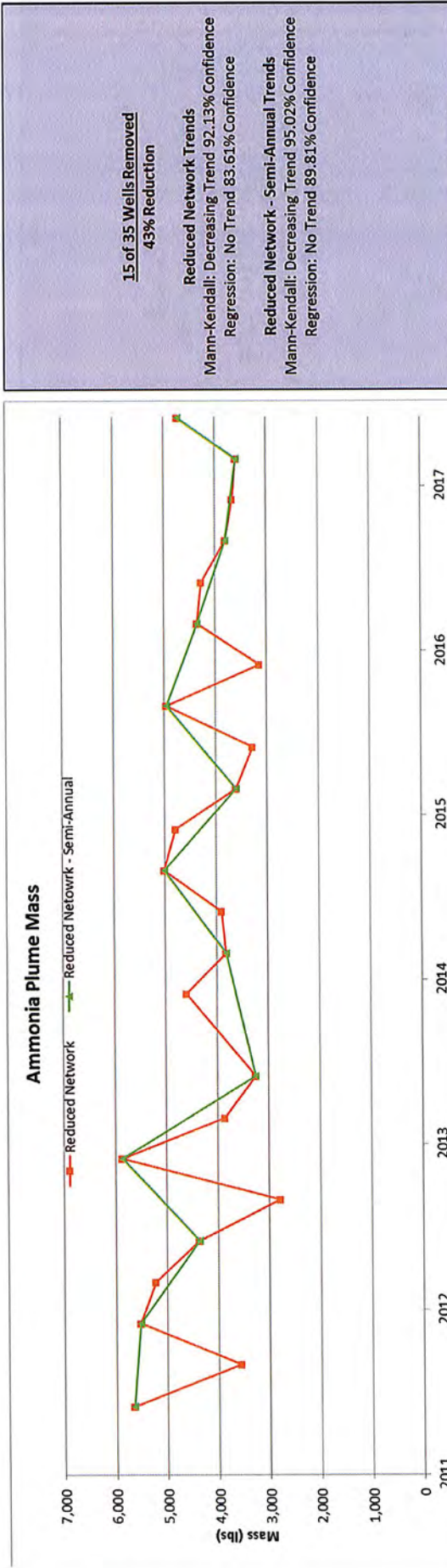


15 of 35 Wells Removed
43% Reduction

Reduced Network Trends
Mann-Kendall: Decreasing Trend 92.13% Confidence
Regression: No Trend 83.61% Confidence

Reduced Network - Annual Trends
Mann-Kendall: No Trend 71.90% Confidence
Regression: No Trend 33.03% Confidence

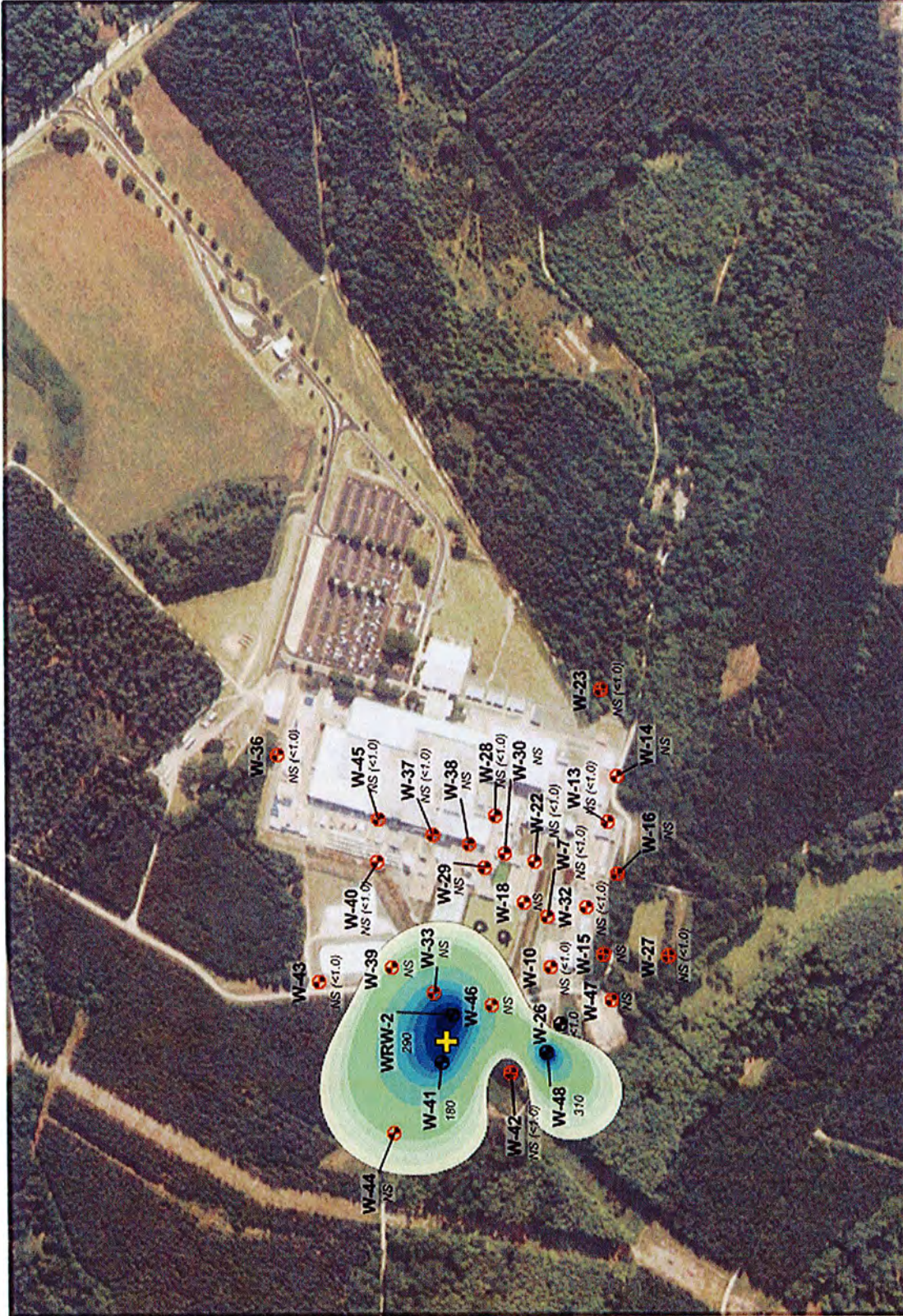
PSA Trends



Chloroethenes

PCE
Jun-2011

Concentration (µg/L)



0 ft. 650 ft. 1300 ft.



Plume Characteristics

Plume Area: 20.1 acres

Plume Average Concentration: 29.8 µg/L

Plume Mass Indicator: 7.4 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.

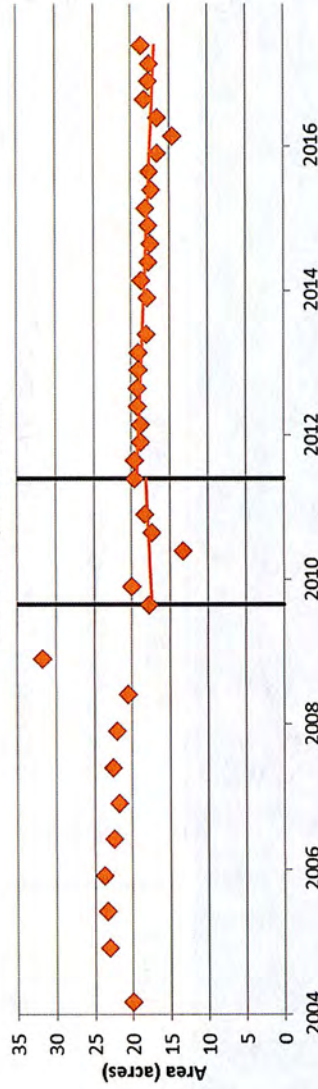


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Chloroethenes Plume Area Trend

Sample Network
Reduced AS/SVE Shutdown



Sep-2009 to Jun-2011
No Trend
Mann-Kendall: 64% Confidence
Regression: 18% Confidence

Jun-2011 to Jun-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Chloroethenes Plume Average Concentration Trend

Sample Network
Reduced AS/SVE Shutdown

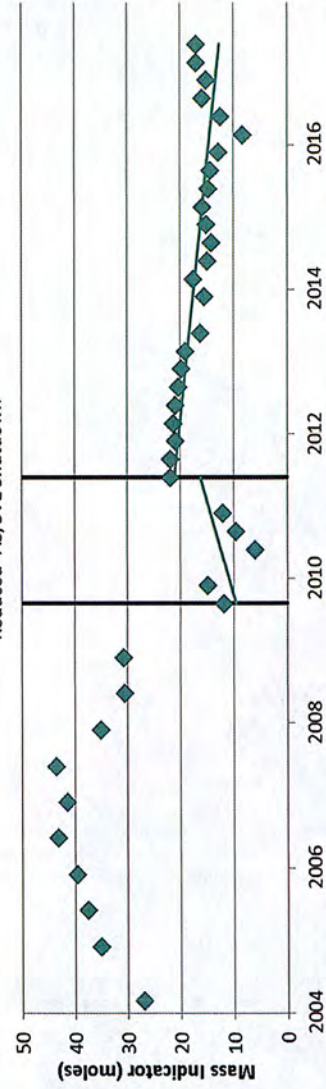


Sep-2009 to Jun-2011
No Trend
Mann-Kendall: 64% Confidence
Regression: 69% Confidence

Jun-2011 to Jun-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

Chloroethenes Plume Mass Indicator Trend

Sample Network
Reduced AS/SVE Shutdown

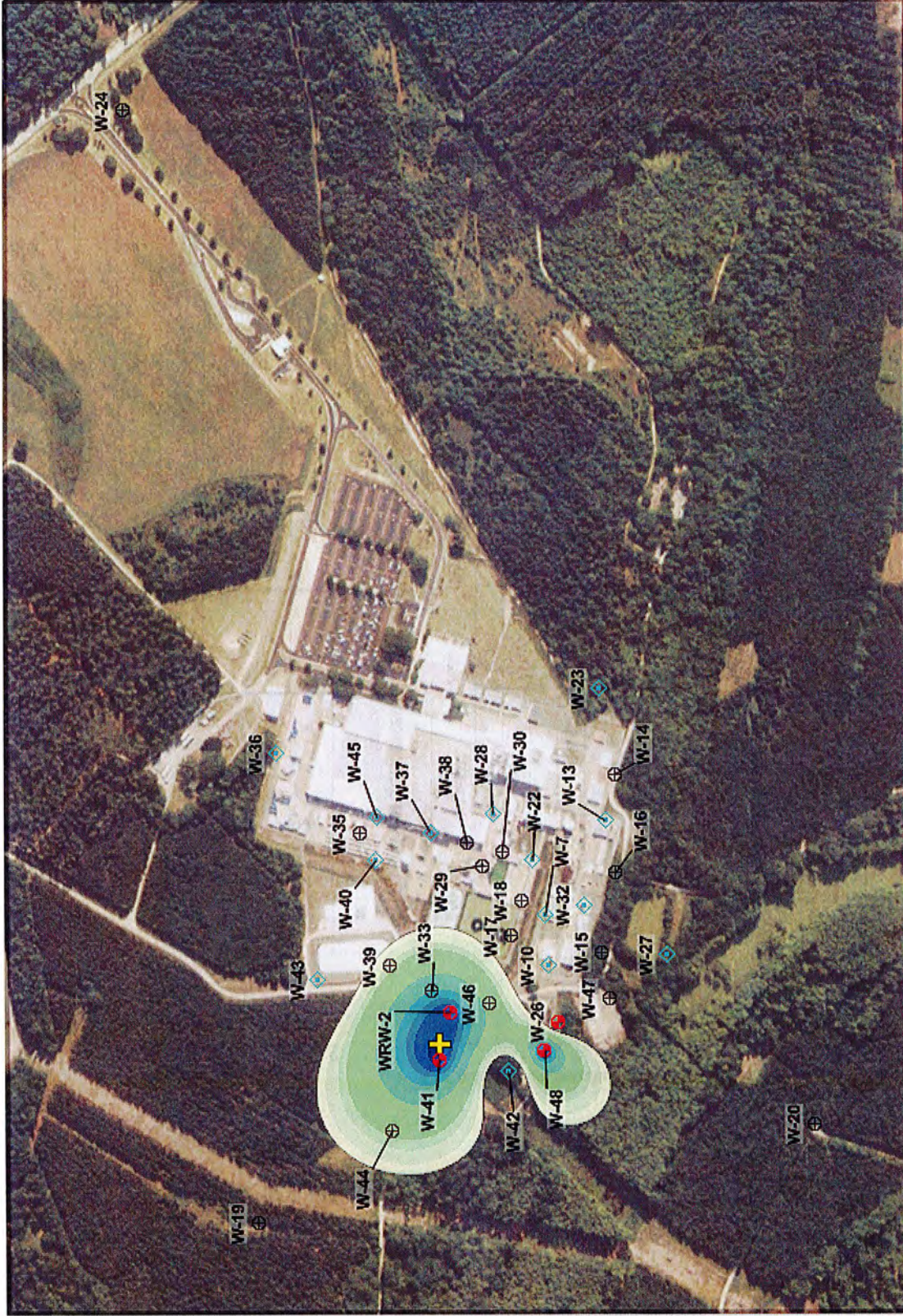


Sep-2009 to Jun-2011
No Trend
Mann-Kendall: 77% Confidence
Regression: 62% Confidence

Jun-2011 to Jun-2017
Decreasing Trend
Mann-Kendall: >99% Confidence
Regression: >99% Confidence

PCE
Jun-2017

Concentration (µg/L)



Well Sufficiency Legend

Currently Sampled



Currently Used as Non-Detect Point



Not Sampled



Recommend to be Sampled



LEGEND

Monitoring Well



Concentration (µg/L)



Well Not Sampled
(Assigned Value Shown)



Plume Center of Mass



Plume Characteristics

Plume Area: 18.6 acres

Plume Average Concentration: 25.2 µg/L

Plume Mass Indicator: 5.8 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.

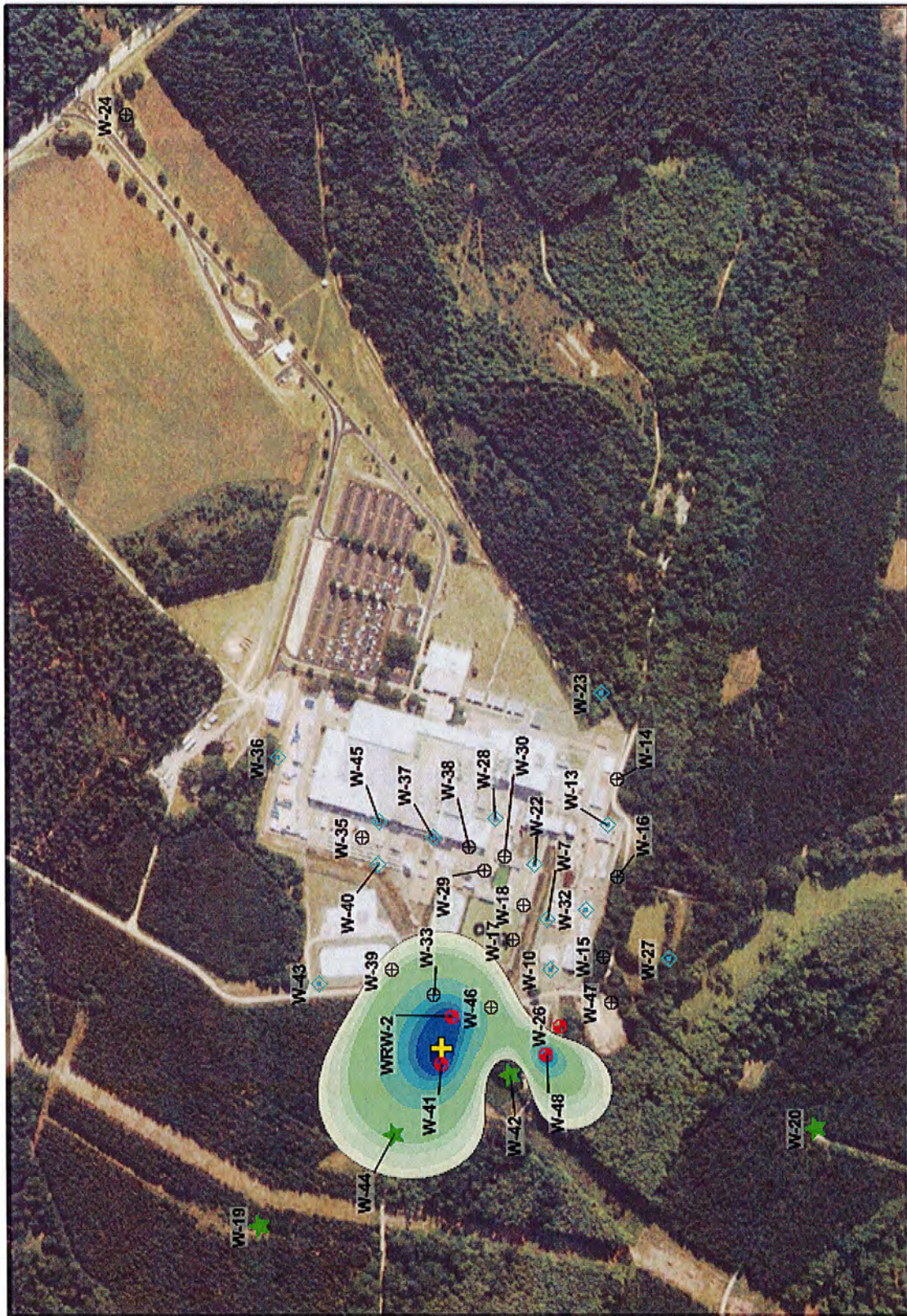


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PCE
Jun-2017

Concentration (µg/L)



Plume Characteristics

Plume Area: 18.6 acres

Plume Average Concentration: 25.2 µg/L

Plume Mass Indicator: 5.8 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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Well Sufficiency Legend

- ⊕ Currently Sampled
- ⊕ Currently Used as Non-Detect Point
- ⊕ Not Sampled
- ★ Recommend to be Sampled

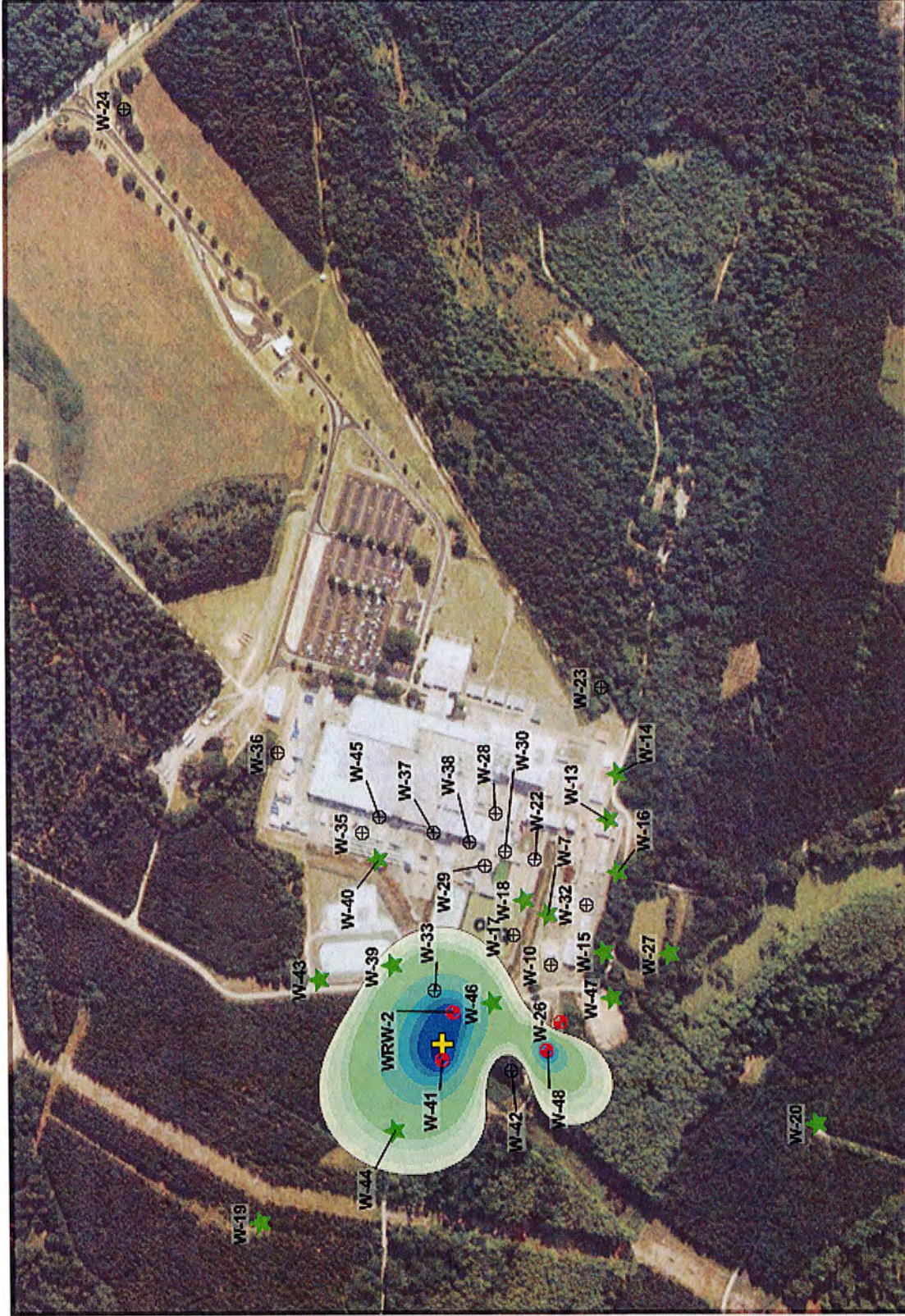
LEGEND

- Monitoring Well
- 112 Concentration (µg/L)
- NS (146) Well Not Sampled (Assigned Value Shown)
- + Plume Center of Mass

0 ft. 650 ft. 1300 ft.

PCE
Jun-2017

Concentration (µg/L)



Well Sufficiency Legend

- ⊕ Currently Sampled
- ⊖ Currently Used as Non-Detect Point
- ⊕ Not Sampled
- ★ Recommend to be Sampled

0 ft. 650 ft. 1300 ft.



LEGEND

- W-4 Monitoring Well
- 112 Concentration (µg/L)
- NS (146) Well Not Sampled (Assigned Value Shown)
- ⊕ Plume Center of Mass

Plume Characteristics

Plume Area: 18.6 acres
Plume Average Concentration: 25.2 µg/L
Plume Mass Indicator: 5.8 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.

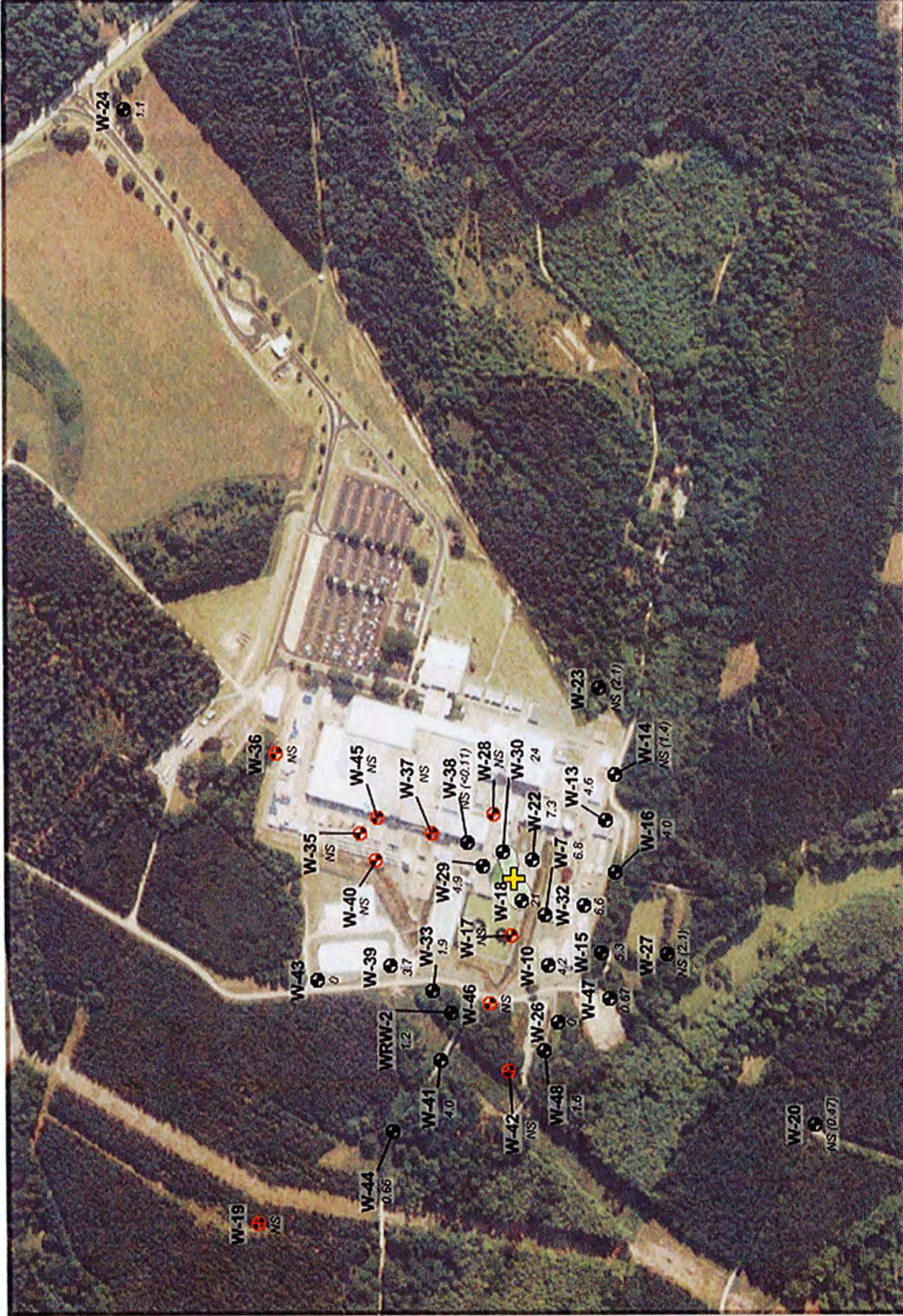


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Gross Alpha

Gross Alpha
Mar-2015

Concentration (pCi/L)



0 ft. 650 ft. 1300 ft.

Plume Characteristics

Plume Area: **0.52 acres**
Plume Average Concentration: **17.1 pCi/L**
Plume Mass Indicator: **0.039 lbs**

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



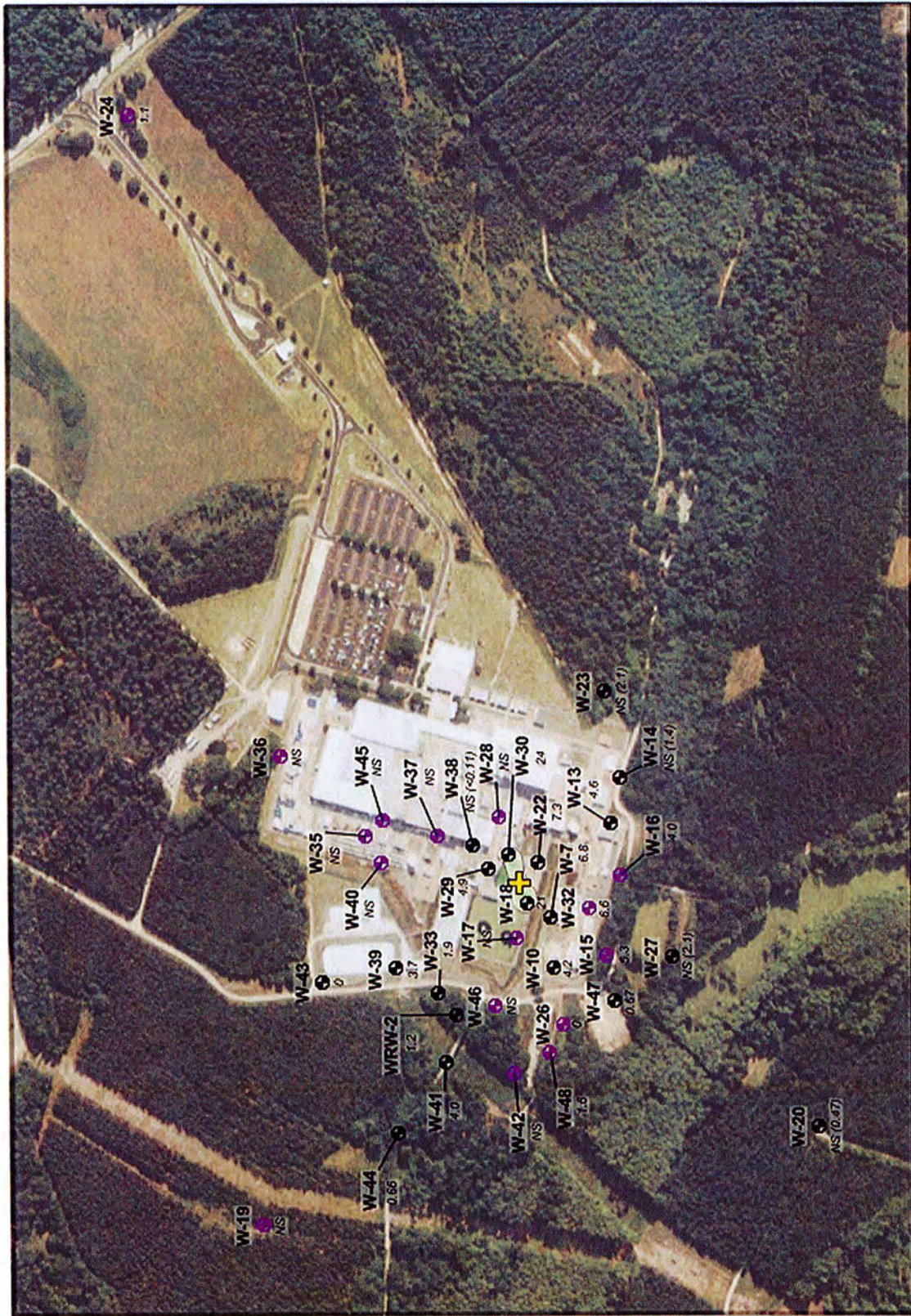
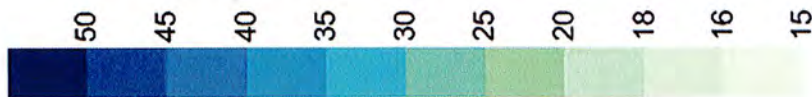
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LEGEND

- W-4 Monitoring Well
- 112 Concentration (pCi/L)
- W-4 Well No Longer Sampled (No Value Assigned)
- NS (146) Well Not Sampled (Assigned Value Shown)
- Plume Center of Mass

Gross Alpha
Mar-2015

Concentration (pCi/L)



Plume Characteristics

Plume Area: **0.53 acres**
 Plume Average Concentration: **17.1 pCi/L**
 Plume Mass Indicator: **0.039 lbs**

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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LEGEND

- Monitoring Well
- Removed Well
- Concentration (pCi/L)
- Well Not Sampled (Assigned Value Shown)
- Plume Center of Mass

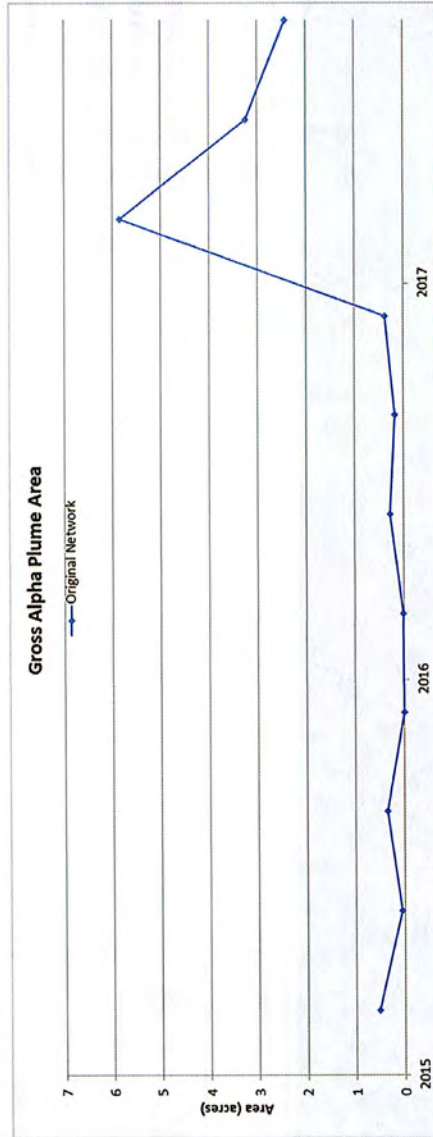
W-4

W-4

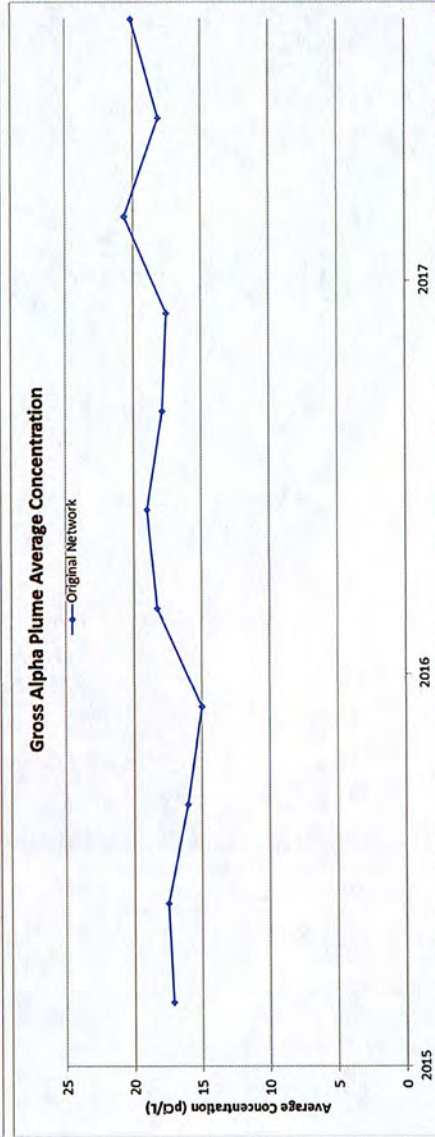
112

NS (146)

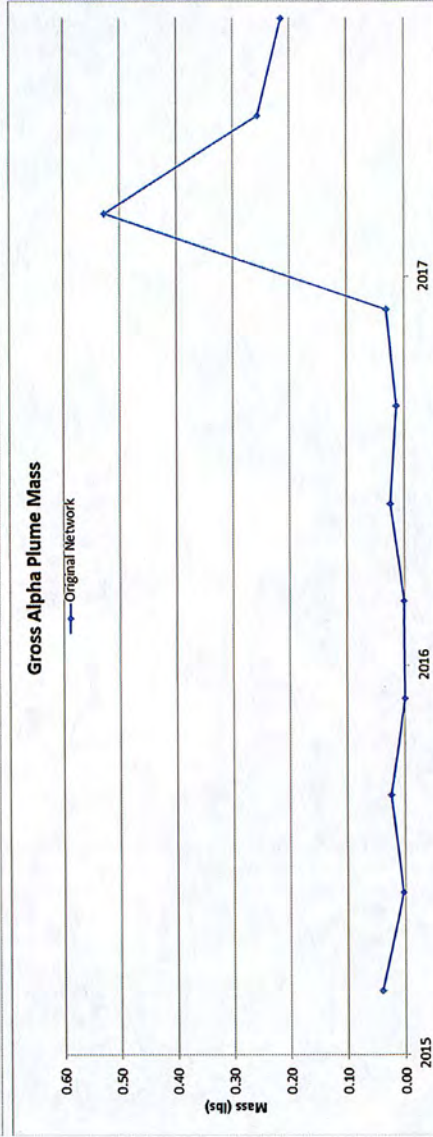
+



Original Network Trends
 Mann-Kendall: Increasing Trend 94.03% Confidence
 Regression: Increasing Trend 96.52% Confidence



Original Network Trends
 Mann-Kendall: Increasing Trend 97.85% Confidence
 Regression: Increasing Trend 97.46% Confidence



Original Network Trends
 Mann-Kendall: Increasing Trend 94.03% Confidence
 Regression: Increasing Trend 96.10% Confidence

Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

16 of 35 Wells Removed
46% Reduction

Original Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 96.52% Confidence

Reduced Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 98.44% Confidence

Average RPD: 8.95%
Correlation: 0.97

16 of 35 Wells Removed
46% Reduction

Original Network Trends
Mann-Kendall: Increasing Trend 97.85% Confidence
Regression: Increasing Trend 97.46% Confidence

Reduced Network Trends
Mann-Kendall: Increasing Trend 98.54% Confidence
Regression: Increasing Trend 95.60% Confidence

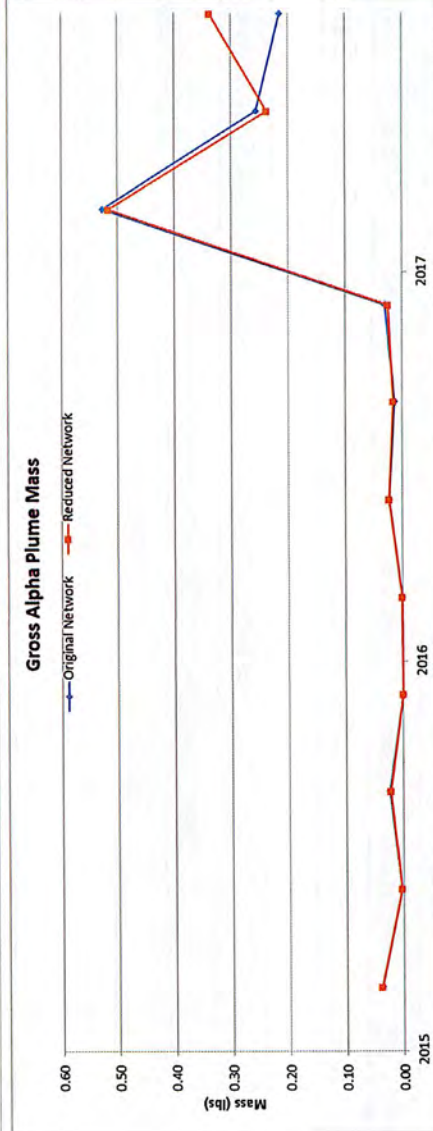
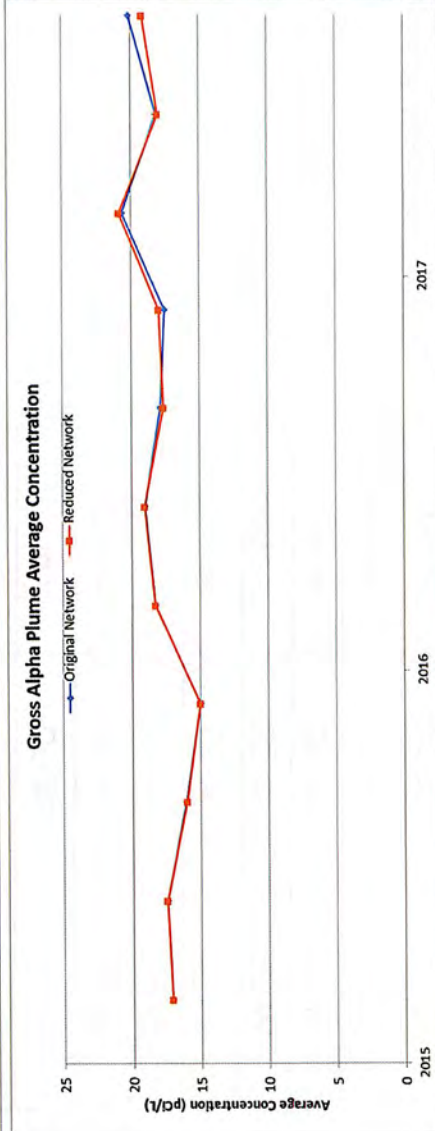
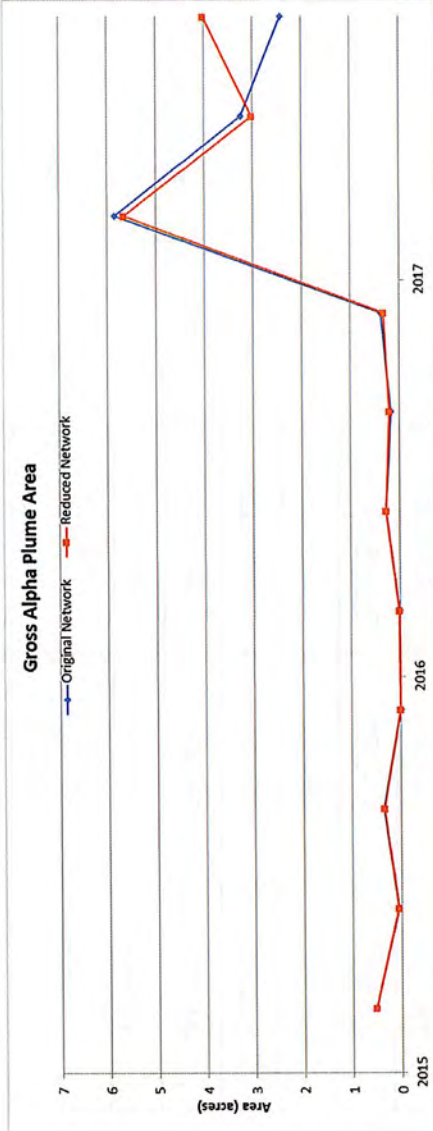
Average RPD: 0.98%
Correlation: 0.98

16 of 35 Wells Removed
46% Reduction

Original Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 96.10% Confidence

Reduced Network Trends
Mann-Kendall: Increasing Trend 96.91% Confidence
Regression: Increasing Trend 97.99% Confidence

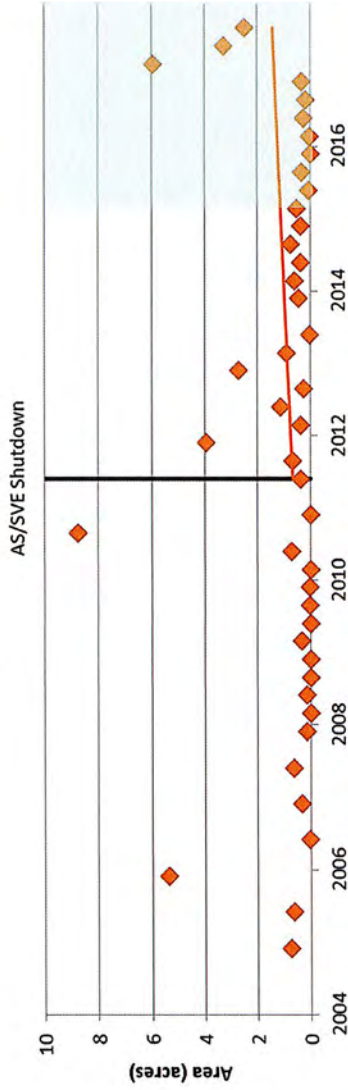
Average RPD: 8.14%
Correlation: 0.98



Well Sufficiency Summary (16 of 35 Wells Removed)									
Constituent	RPD			Correlation			Trend Conclusion		
	Area	Conc	Mass	Area	Conc	Mass	Area	Conc	Mass
Gross Alpha	8.95%	0.98%	8.14%	0.97	0.98	0.98	Same	Same	Same
									Very Strong

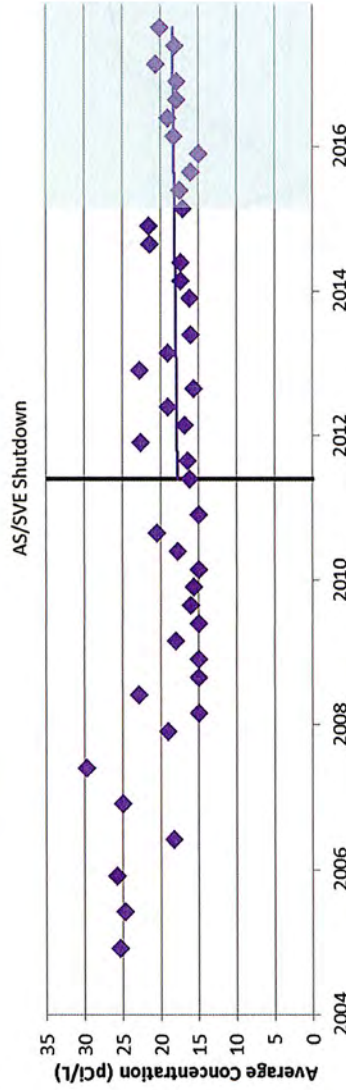
Gross Alpha - Well Sufficiency Analysis Summary			
Removed	Recommended Sampling		Comments
	Well	Frequency	
W-15	W-10	Annual	<ul style="list-style-type: none"> - Quarterly sampling frequency recommended based on Frequency Analysis. - * Denotes necessary boundary well not currently sampled. - † Denotes Hanging Well
W-16	W-13	Annual	
W-17 [†]	W-14	Annual	
W-19 [†]	W-18	Annual	
W-24	W-20	Annual	
W-26	W-22	Annual	
W-28 [†]	W-23	Annual	
W-32	W-27	Annual	
W-35 [†]	W-29	Annual	
W-36 [†]	W-30	Annual	
W-37 [†]	W-33	Annual	
W-40 [†]	W-38*	2 to 5 Years	
W-42 [†]	W-39	Annual	
W-45 [†]	W-41	Annual	
W-46 [†]	W-43	Annual	
W-48	W-44	Annual	
	W-47	Annual	
	W-7	Annual	
	WRW-2	Annual	

Gross Alpha Plume Area Trend



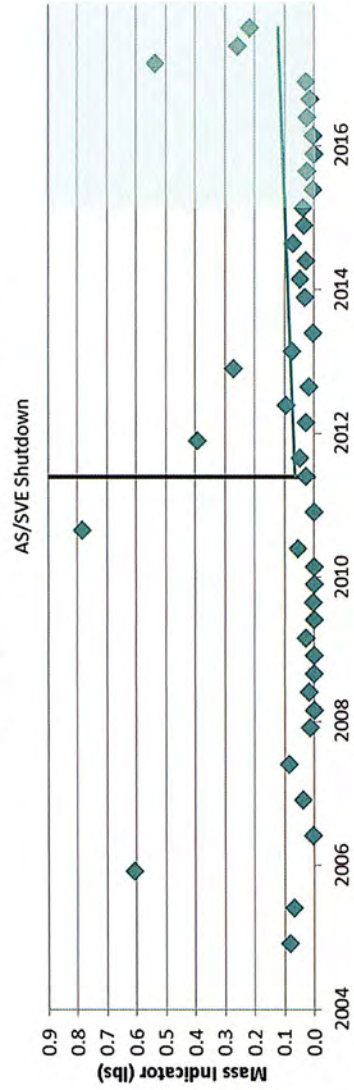
Jun-2011 to Sep-2017
 No Trend
 Mann-Kendall: 85% Confidence
 Regression: 56% Confidence

Gross Alpha Plume Average Concentration Trend



Jun-2011 to Sep-2017
 No Trend
 Mann-Kendall: 86% Confidence
 Regression: 34% Confidence

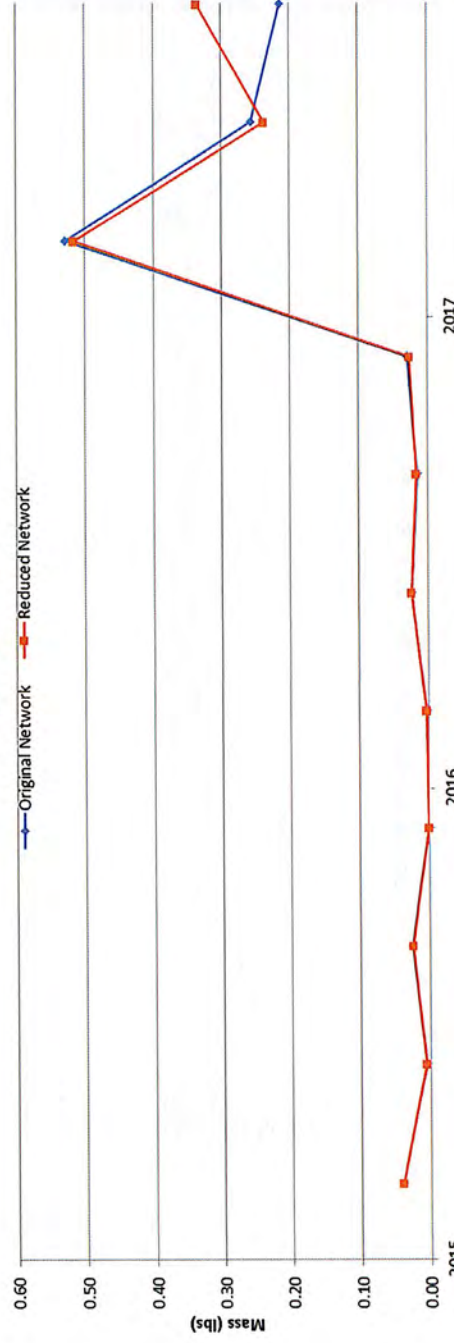
Gross Alpha Plume Mass Indicator Trend



Jun-2011 to Sep-2017
 No Trend
 Mann-Kendall: 75% Confidence
 Regression: 47% Confidence

Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

Gross Alpha Plume Mass



16 of 35 Wells Removed
46% Reduction

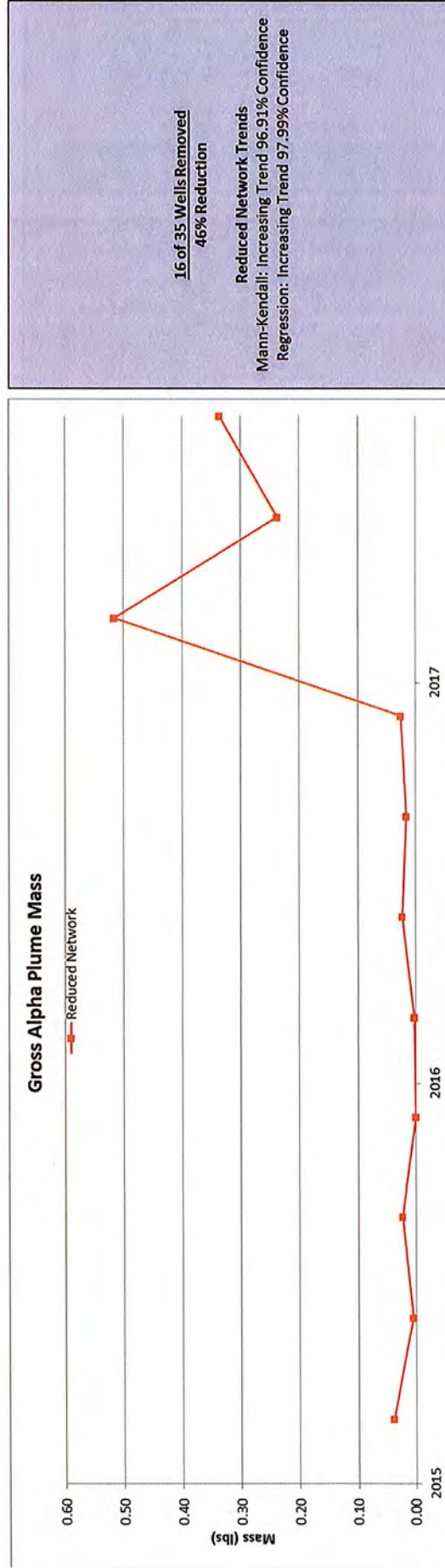
Original Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 96.10% Confidence

Reduced Network Trends
Mann-Kendall: Increasing Trend 96.91% Confidence
Regression: Increasing Trend 97.99% Confidence

Average RPD: 8.14%

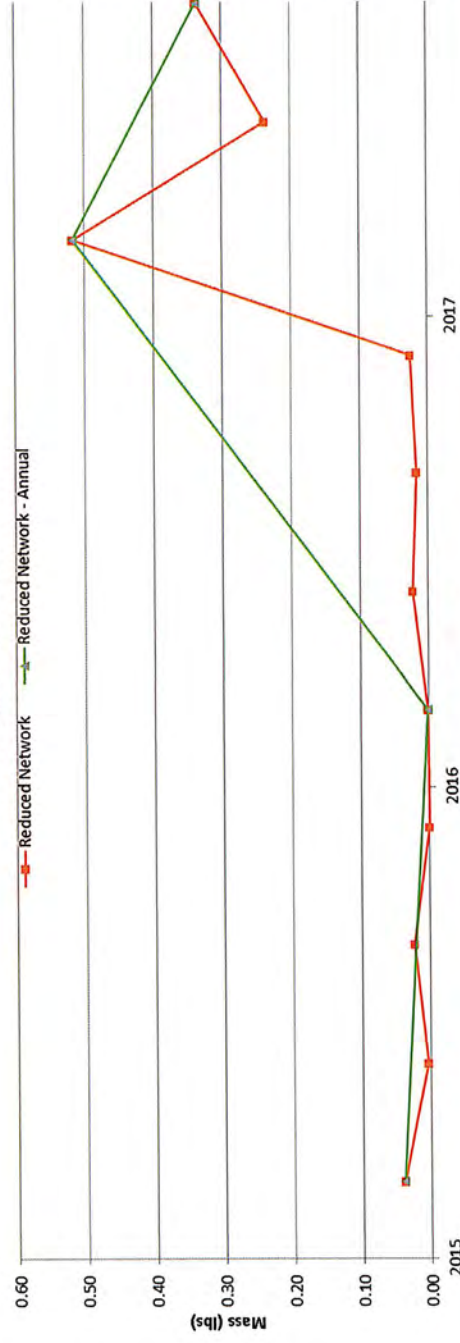
Correlation: 0.98

Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.



Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

Gross Alpha Plume Mass



16 of 35 Wells Removed
46% Reduction

Reduced Network Trends

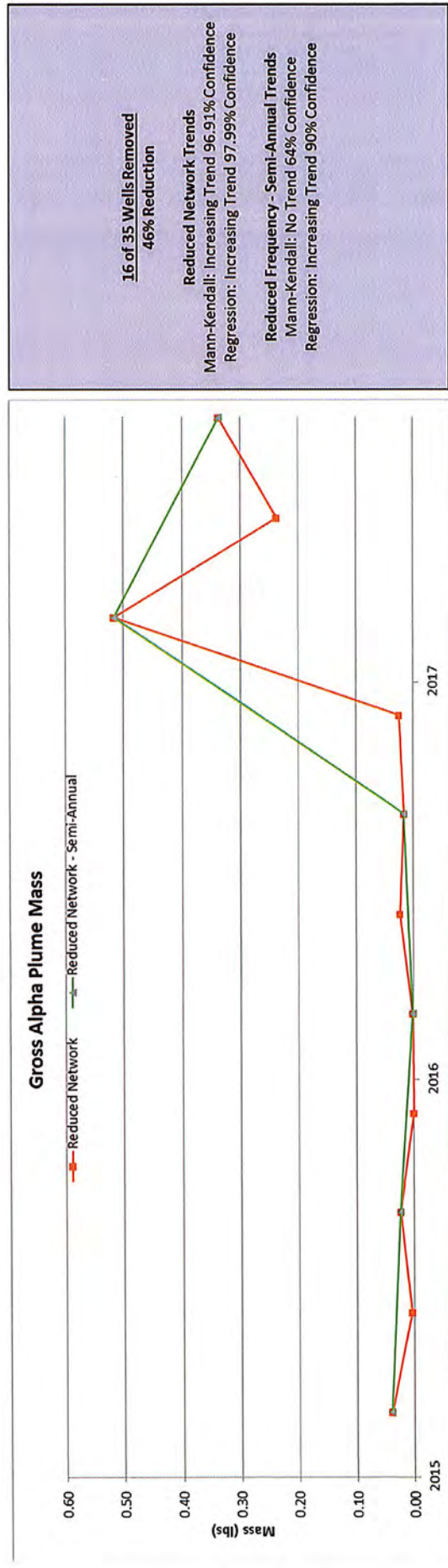
Mann-Kendall: Increasing Trend 96.91% Confidence
Regression: Increasing Trend 97.99% Confidence

Reduced Frequency - Annual Trends

Mann-Kendall: No Trend 63% Confidence
Regression: No Trend 79% Confidence

PSA Trends

Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

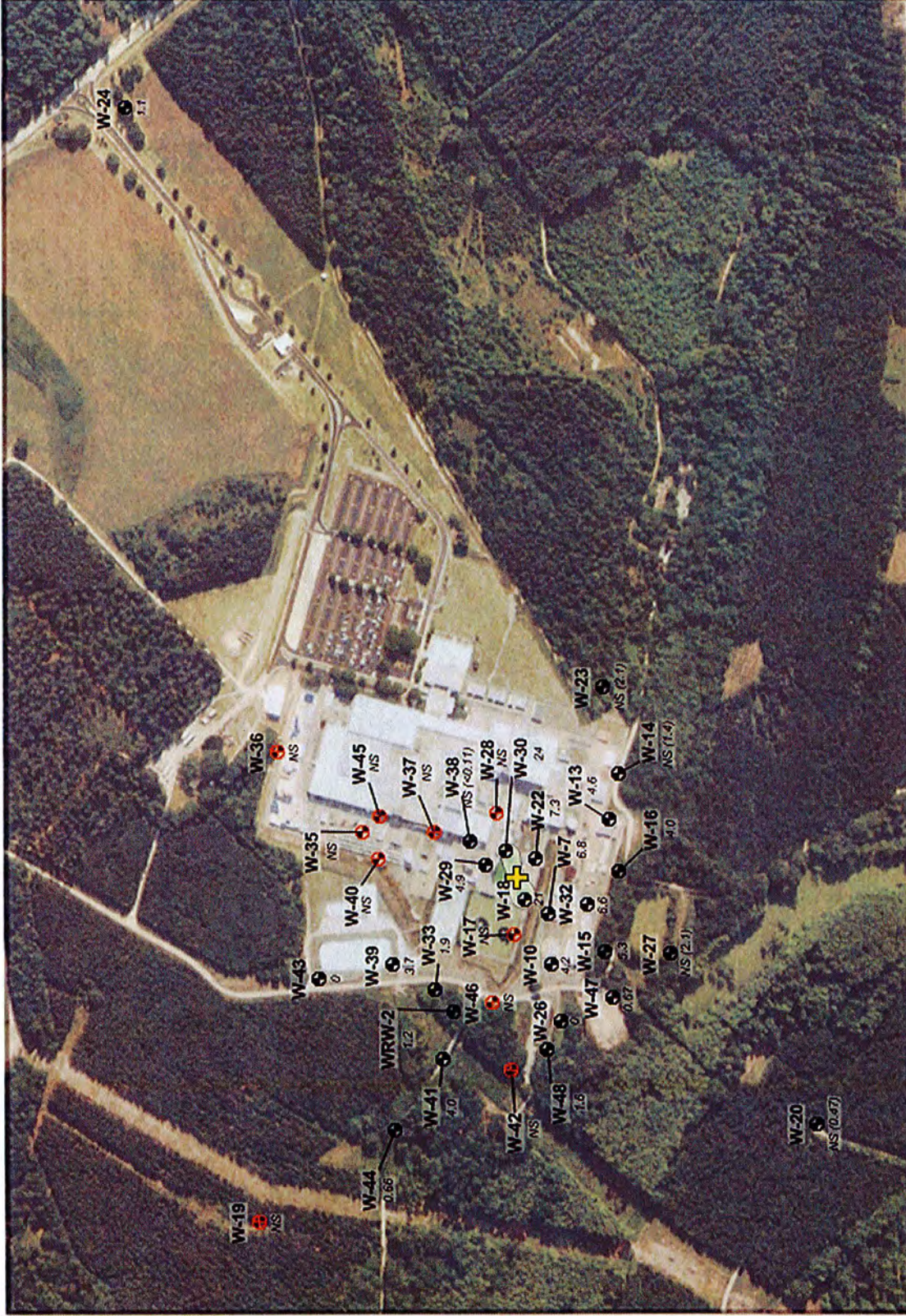
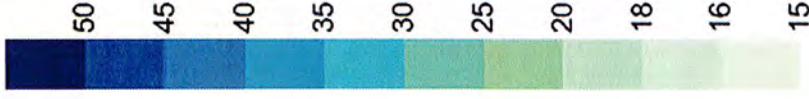


Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

Gross Alpha 2

Gross Alpha
Mar-2015

Concentration (pCi/L)



Plume Characteristics

Plume Area: 0.52 acres
Plume Average Concentration: 17.1 pCi/L
Plume Mass Indicator: 0.039 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



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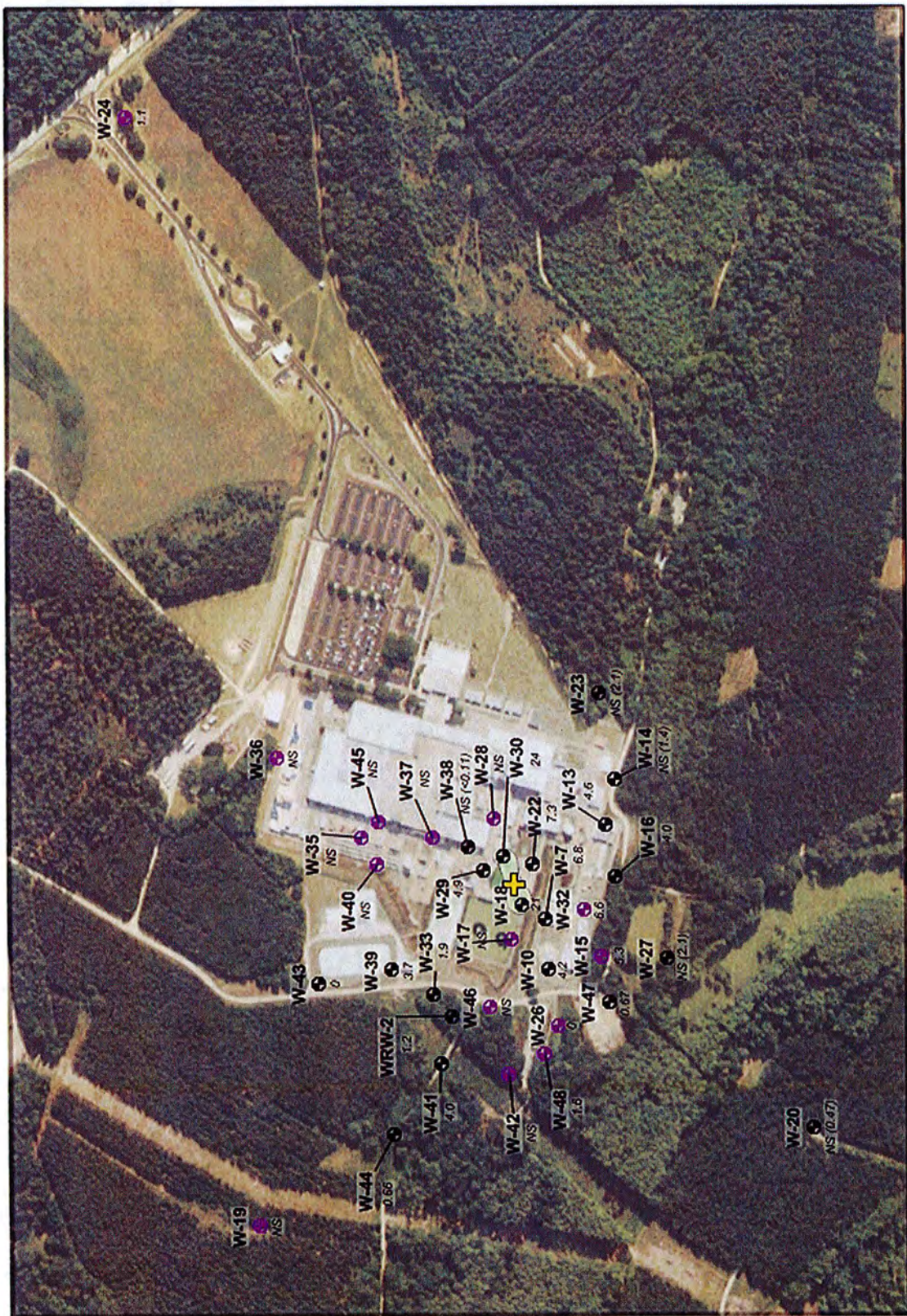
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LEGEND

- W-4 Monitoring Well
- 1:2 Concentration (pCi/L)
- W-4 Well No Longer Sampled (No Value Assigned)
- NS (146) Well Not Sampled (Assigned Value Shown)
- + Plume Center of Mass

Concentration (pCi/L)



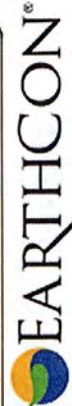
0 ft. 650 ft. 1300 ft.

Plume Area: 0.53 acres

Plume Average Concentration: 17.1 pCi/L

Plume Mass Indicator: 0.039 lbs

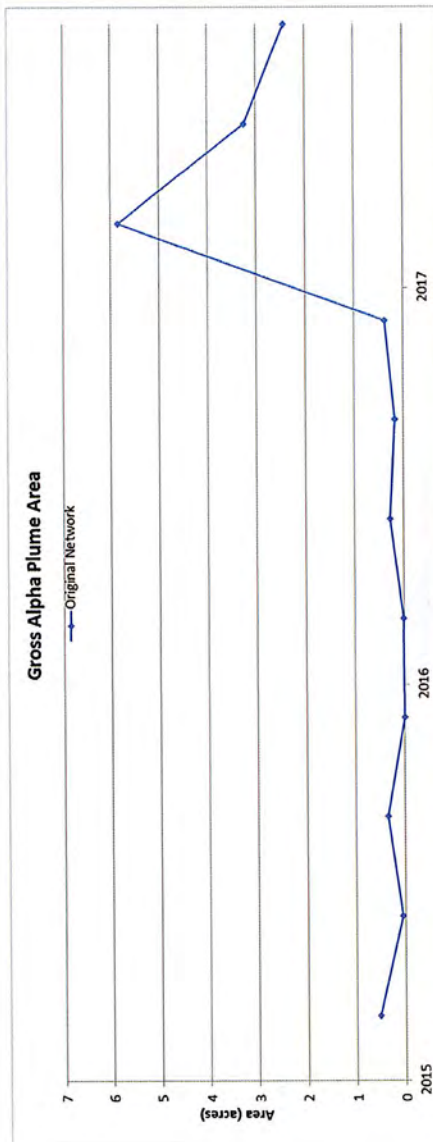
This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behaviour of the aforementioned metrics over time.



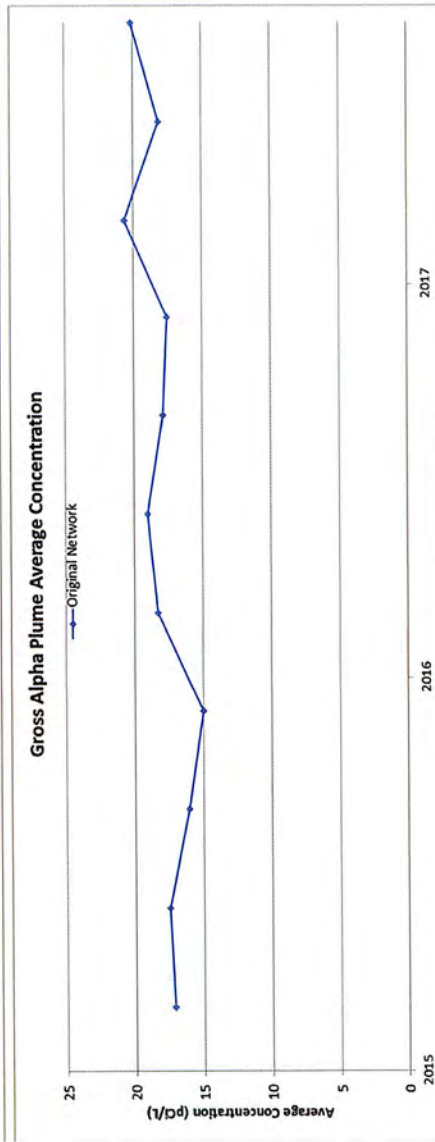
© EarthCon 2017 Environmental Challenges **BUSINESS SOLUTIONS**

Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

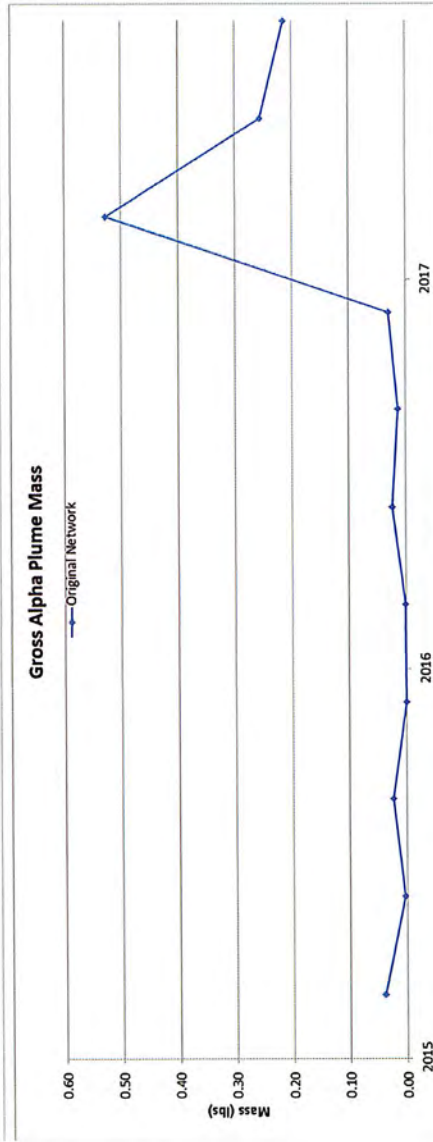
Original Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 96.52% Confidence

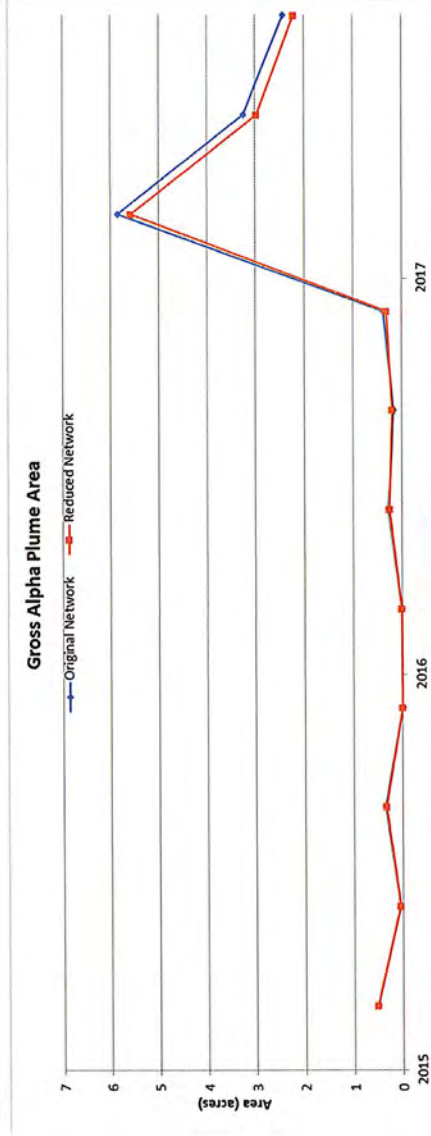


Original Network Trends
Mann-Kendall: Increasing Trend 97.85% Confidence
Regression: Increasing Trend 97.46% Confidence



Original Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 96.10% Confidence



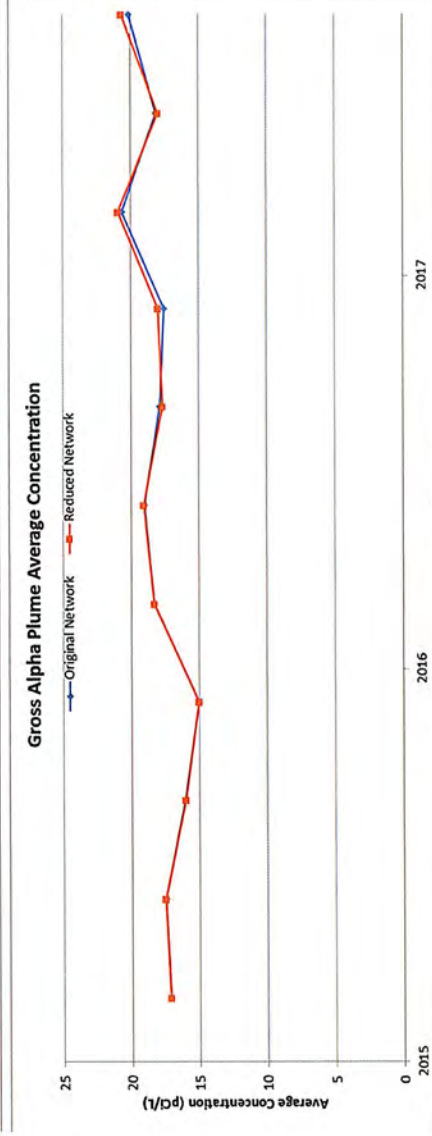


15 of 35 Wells Removed
43% Reduction

Original Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 96.52% Confidence

Reduced Network Trends
Mann-Kendall: Increasing Trend 91.94% Confidence
Regression: Increasing Trend 96.01% Confidence

Average RPD: 5.84%
Correlation: 1.00

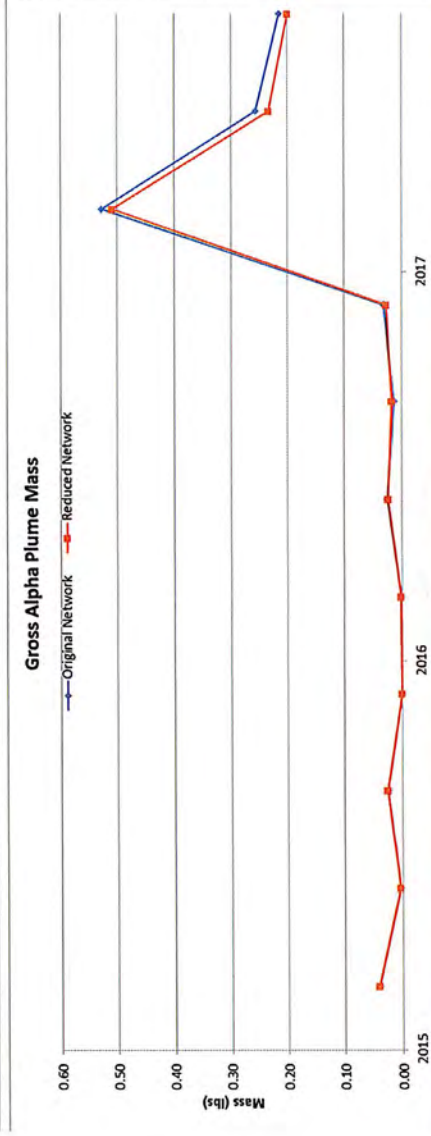


15 of 35 Wells Removed
43% Reduction

Original Network Trends
Mann-Kendall: Increasing Trend 97.85% Confidence
Regression: Increasing Trend 97.46% Confidence

Reduced Network Trends
Mann-Kendall: Increasing Trend 98.54% Confidence
Regression: Increasing Trend 97.79% Confidence

Average RPD: 0.74%
Correlation: 0.99



15 of 35 Wells Removed
43% Reduction

Original Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 96.10% Confidence

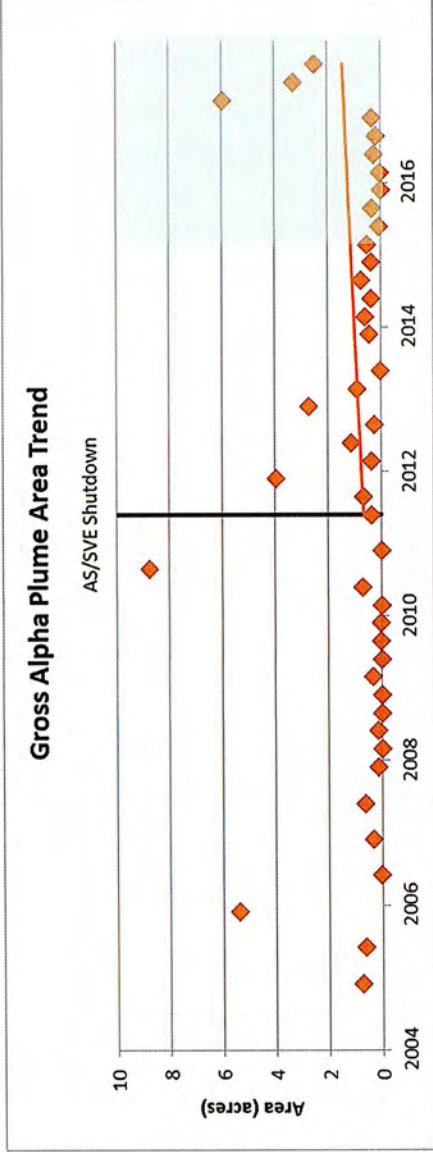
Reduced Network Trends
Mann-Kendall: Increasing Trend 94.03% Confidence
Regression: Increasing Trend 95.57% Confidence

Average RPD: 5.27%
Correlation: 1.00

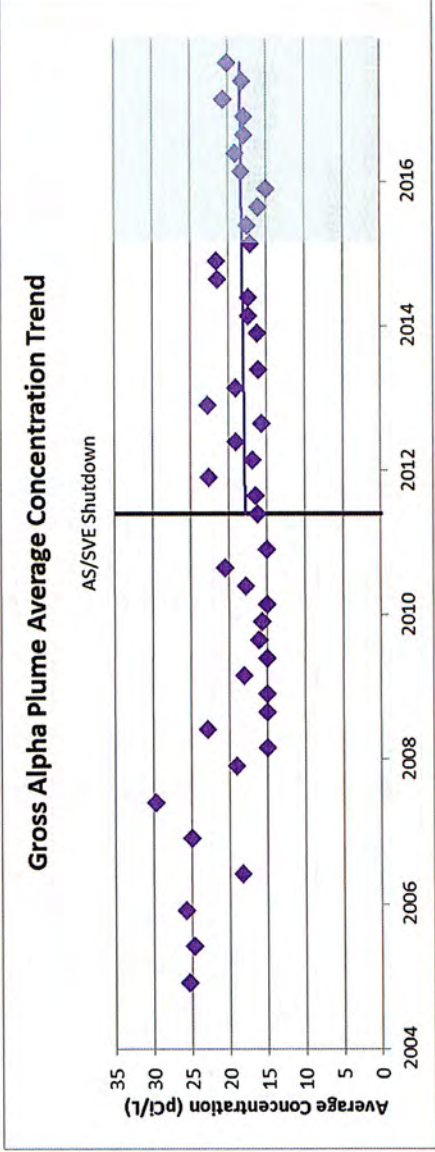
Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

Well Sufficiency Summary (15 of 35 Wells Removed)									
Constituent	RPD			Correlation			Trend Conclusion		
	Area	Conc	Mass	Area	Conc	Mass	Area	Conc	Mass
Gross Alpha	5.84%	0.74%	5.27%	1	0.99	1	Same	Same	Same
Strength of Argument									Very Strong

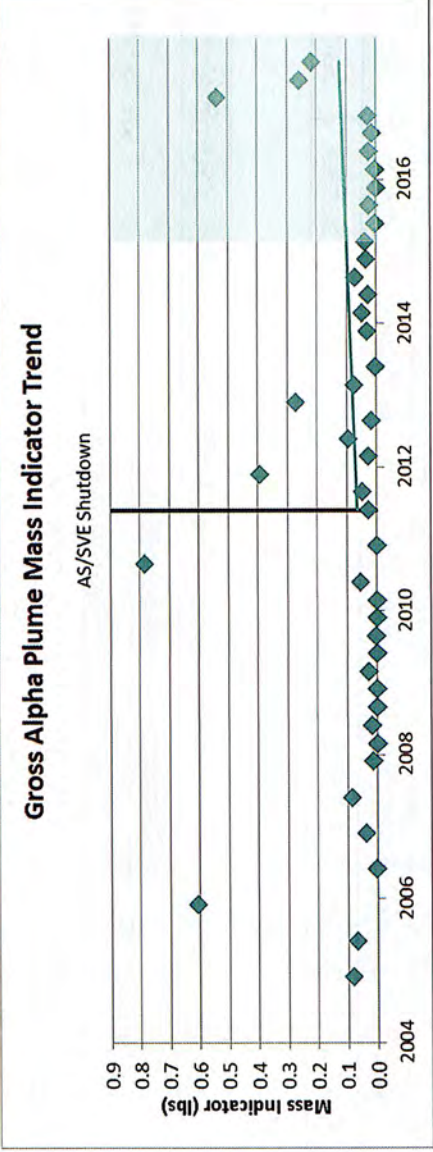
Gross Alpha - Well Sufficiency Analysis Summary			
Removed	Recommended Sampling		Comments
	Well	Frequency	
W-15	W-10	Quarterly	<ul style="list-style-type: none"> - Quarterly sampling frequency recommended based on Frequency Analysis. - * Denotes necessary boundary well not currently sampled. - † Denotes Hanging Well
W-17 [†]	W-13	Quarterly	
W-19 [†]	W-14	Quarterly	
W-24	W-16	Quarterly	
W-26	W-18	Quarterly	
W-28 [†]	W-20	Quarterly	
W-32	W-22	Quarterly	
W-35 [†]	W-23	Quarterly	
W-36 [†]	W-27	Quarterly	
W-37 [†]	W-29	Quarterly	
W-40 [†]	W-30	Quarterly	
W-42 [†]	W-33	Quarterly	
W-45 [†]	W-38*	2 to 5 Years	
W-46 [†]	W-39	Quarterly	
W-48	W-41	Quarterly	
	W-43	Quarterly	
	W-44	Quarterly	
	W-47	Quarterly	
	W-7	Quarterly	
	WRW-2	Quarterly	



Jun-2011 to Sep-2017
 No Trend
 Mann-Kendall: 85% Confidence
 Regression: 56% Confidence

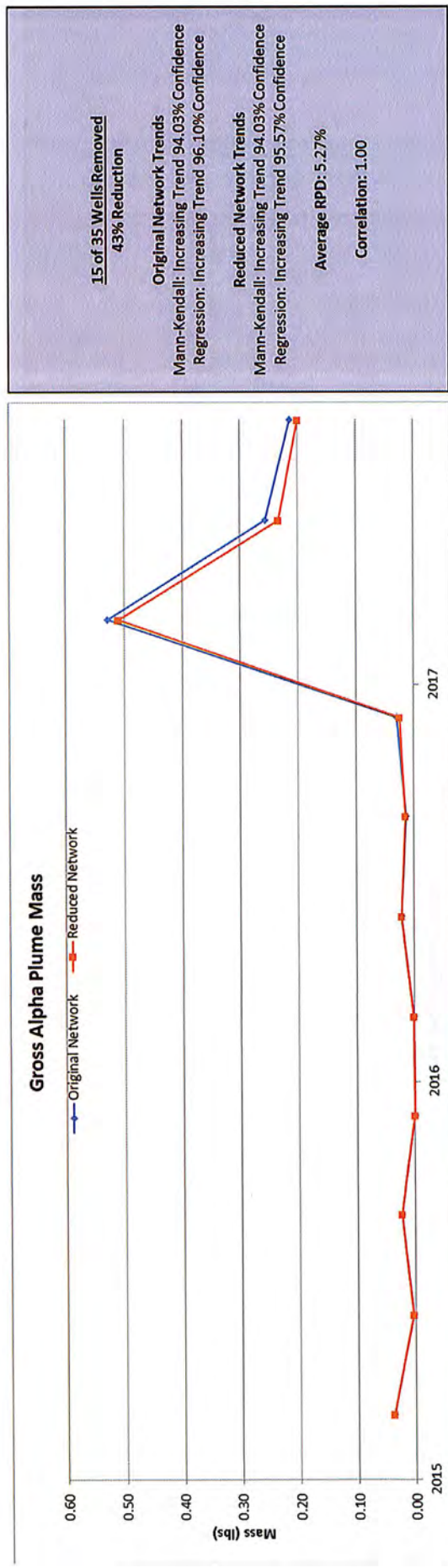


Jun-2011 to Sep-2017
 No Trend
 Mann-Kendall: 86% Confidence
 Regression: 34% Confidence

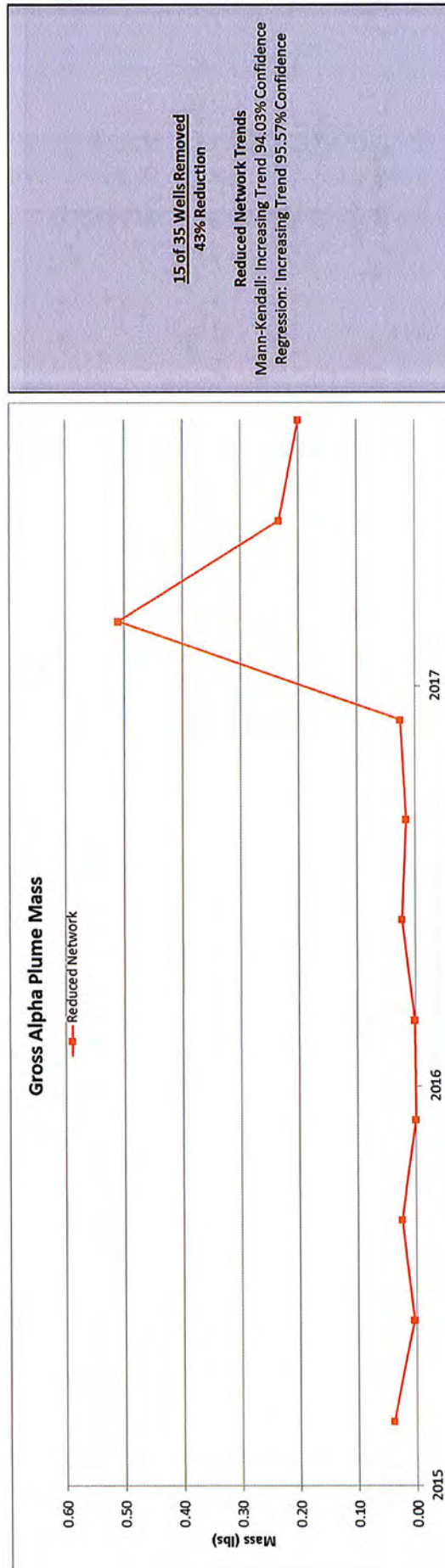


Jun-2011 to Sep-2017
 No Trend
 Mann-Kendall: 75% Confidence
 Regression: 47% Confidence

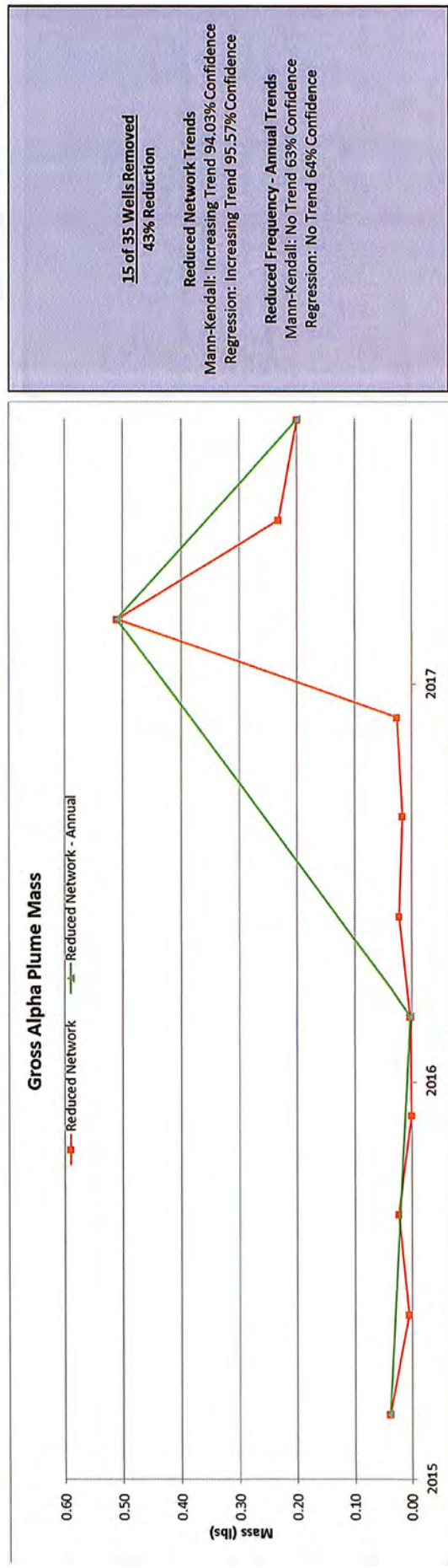
Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.



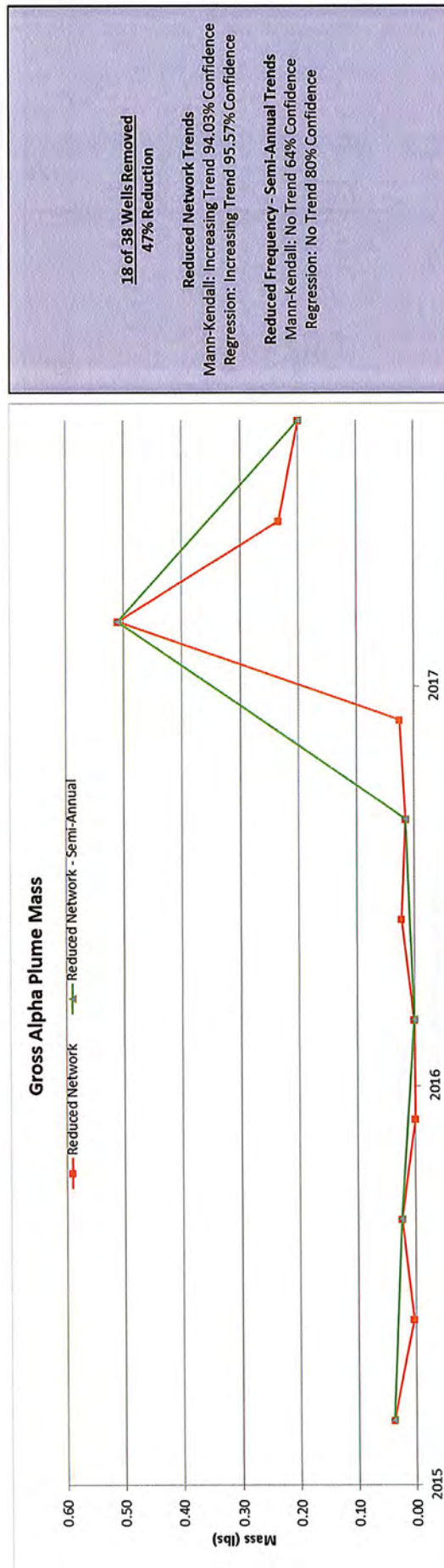
Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.



Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.



Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.



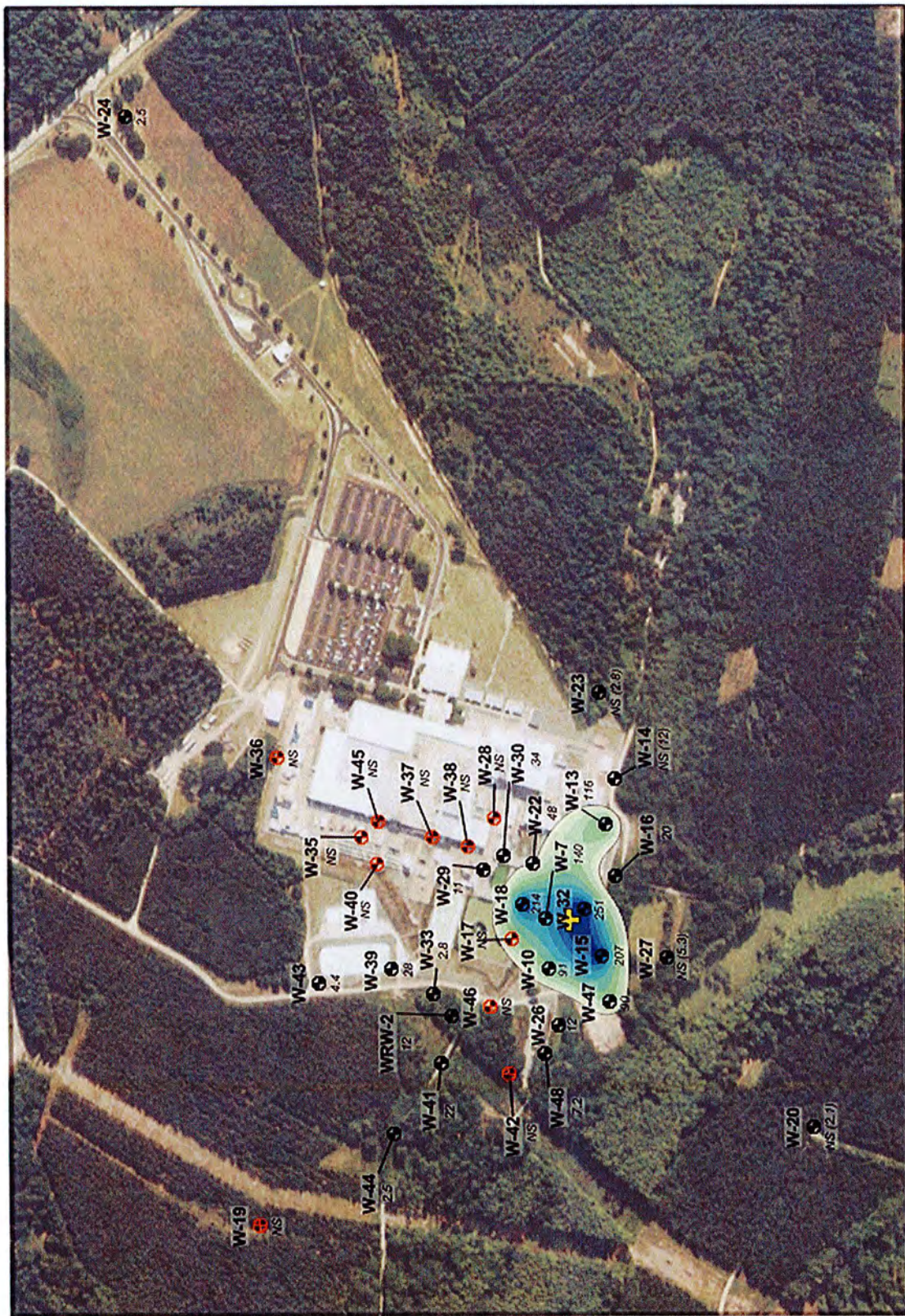
PSA Trends

Note: Conversion to mass indicator assumes gross alpha result is entirely Uranium.

Gross Beta

Gross Beta
Mar-2015

Concentration (pCi/L)



0 ft. 650 ft. 1300 ft.

LEGEND

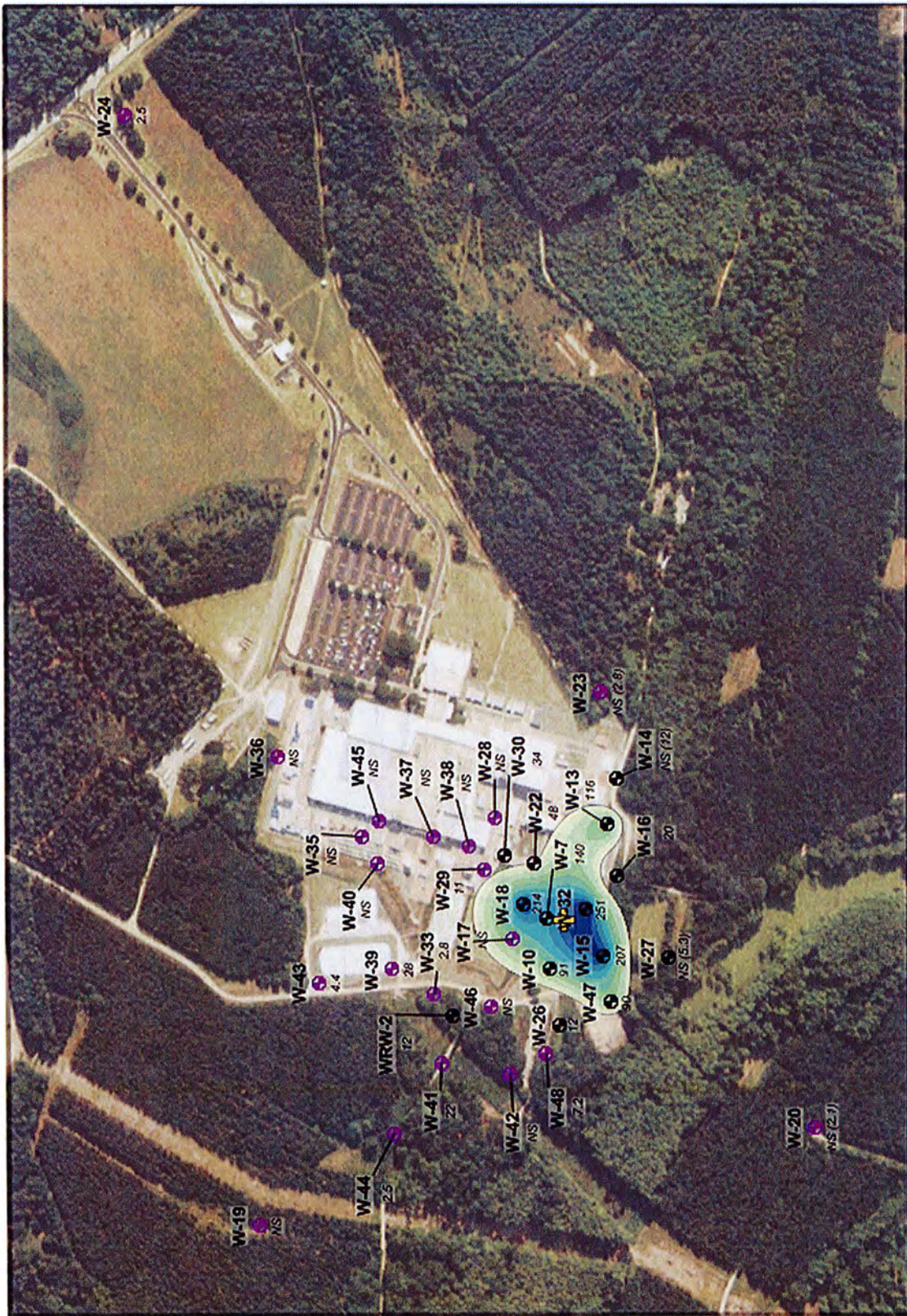
- Monitoring Well
- Concentration (pCi/L)
- Well No Longer Sampled (No Value Assigned)
- Well Not Sampled (Assigned Value Shown)
- Plume Center of Mass

Plume Characteristics

Plume Area: 8.1 acres
Plume Average Concentration: 109 pCi/L
Plume Mass Indicator: 6.3E-4 lbs

Gross Beta
Mar-2015

Concentration (pCi/L)



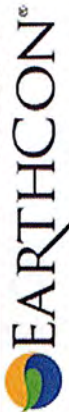
Plume Characteristics

Plume Area: 9.0 acres

Plume Average Concentration: 106 pCi/L

Plume Mass Indicator: 6.9E-4 lbs

This analysis requires fixed data points within a fixed area for the purposes of assessing relative changes of area, average concentration, and mass indicator over time. Therefore, any created isopleth maps are not intended to be a depiction or model of the actual plume but rather is meant to show conceptual behavior of the aforementioned metrics over time.



Environmental Challenges
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0 ft. 650 ft. 1300 ft.



LEGEND

Monitoring Well

Removed Well

Concentration (mg/L)

Well Not Sampled
(Assigned Value Shown)

Plume Center of Mass

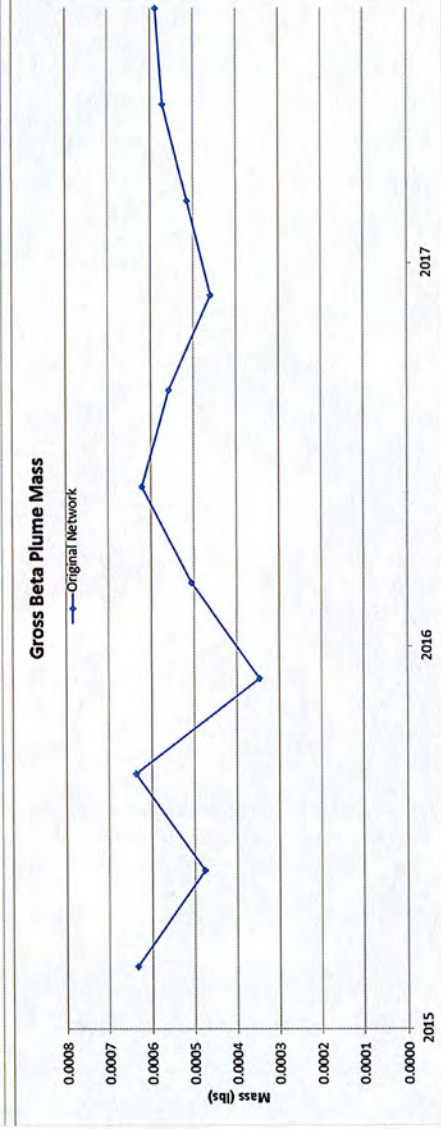
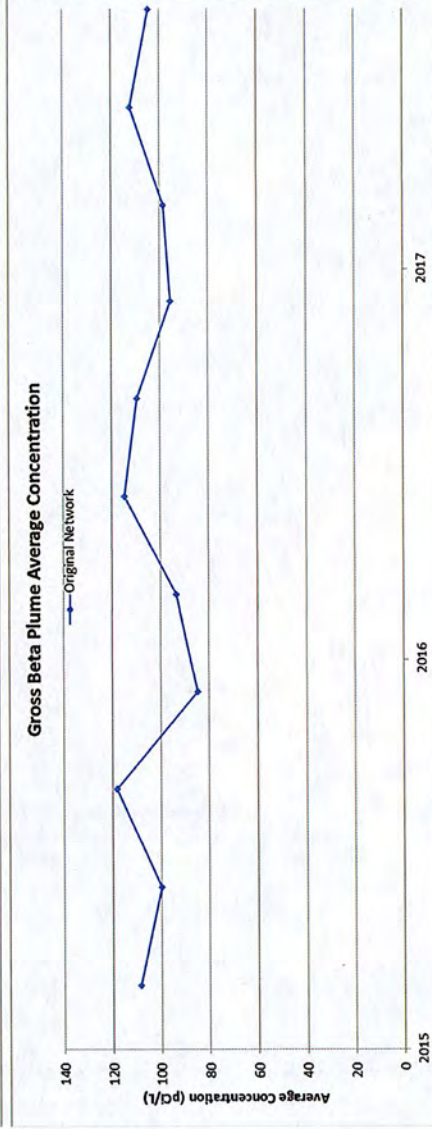
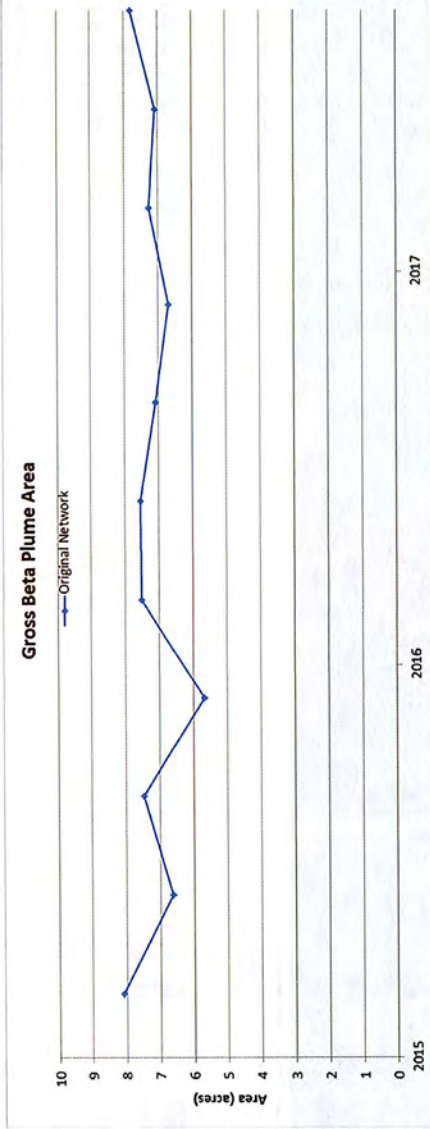
W-4

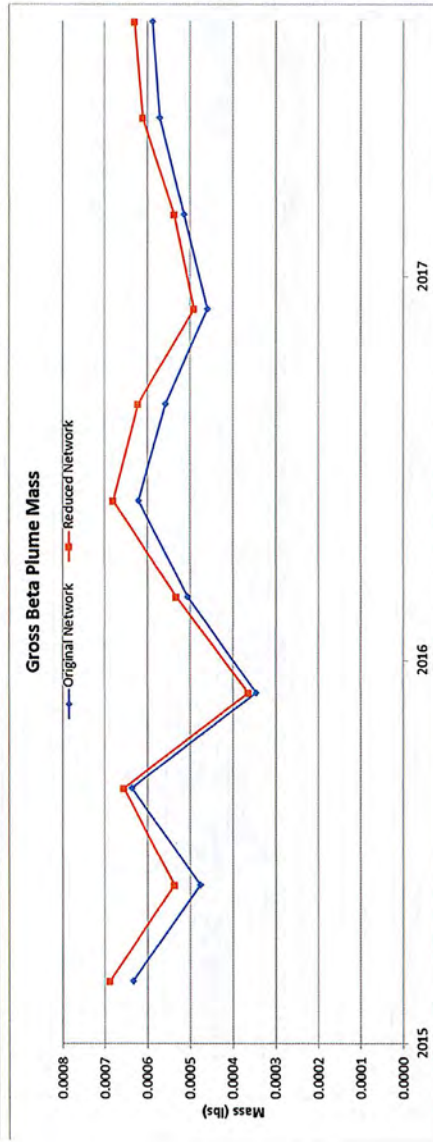
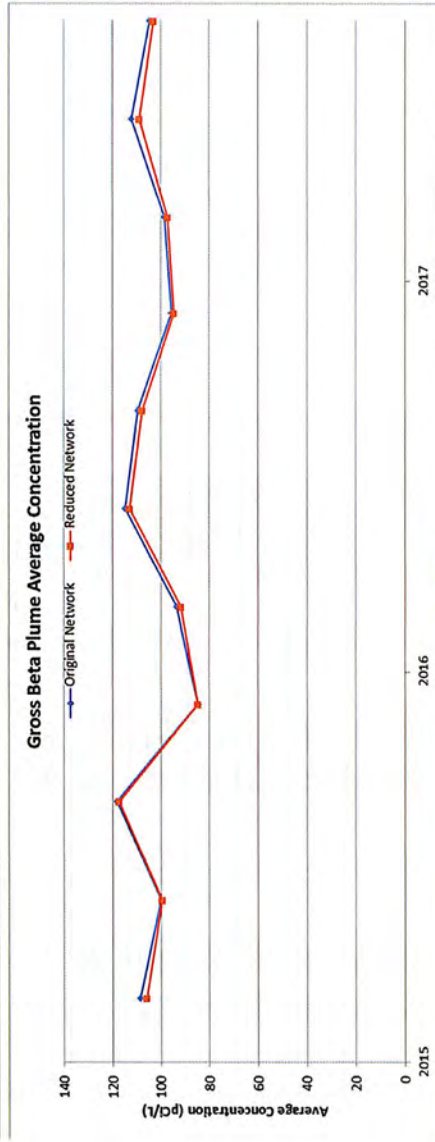
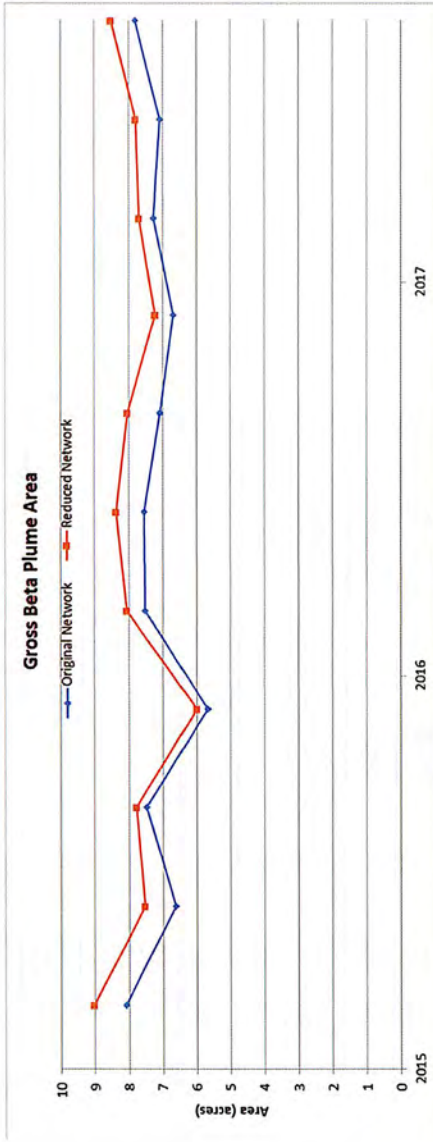
W-4

112

NS (146)



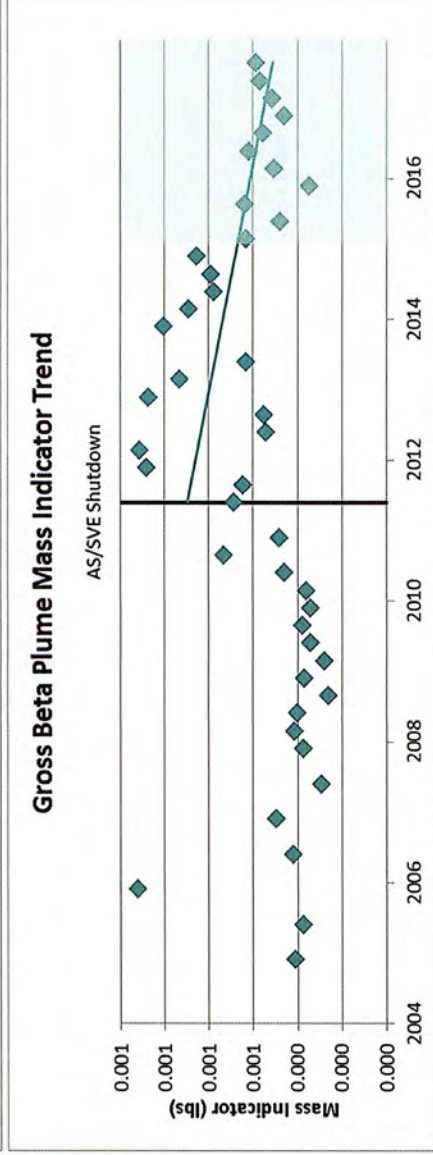
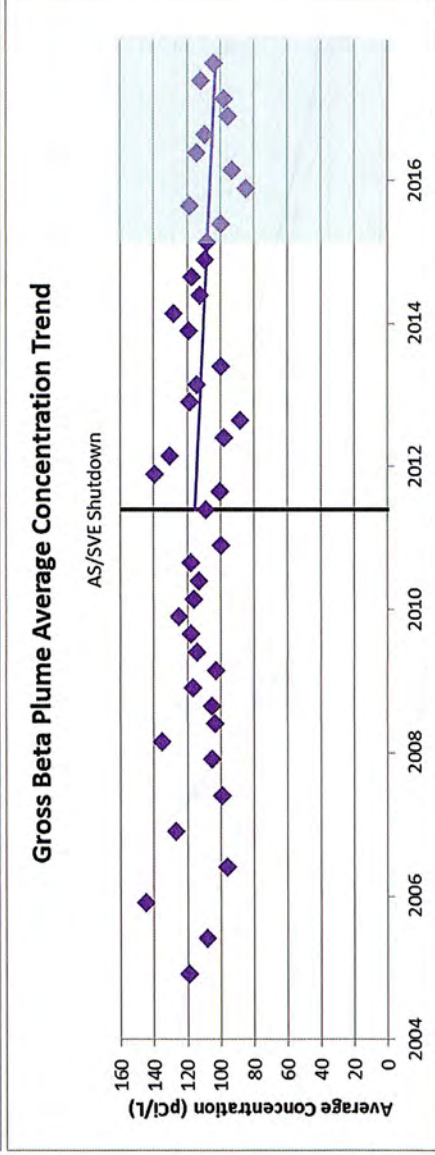
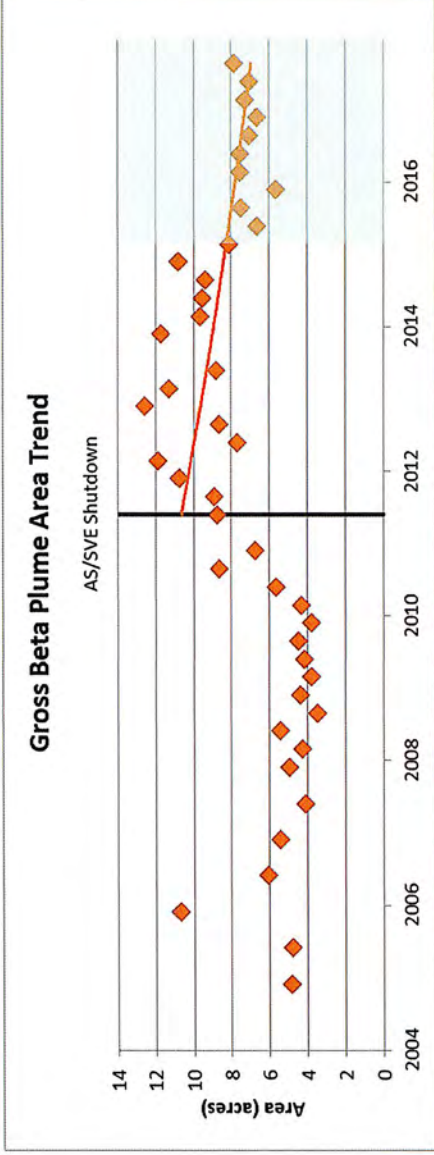




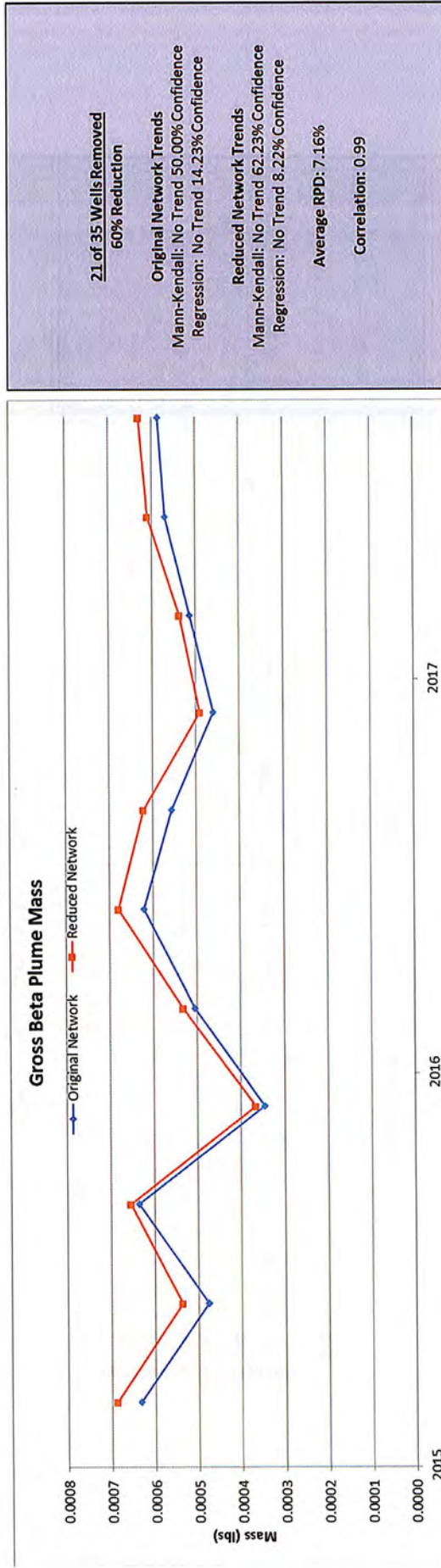
Well Sufficiency Summary (21 of 35 Wells Removed)

	RPD			Correlation			Trend Conclusion			Strength of Argument
	Area	Conc	Mass	Area	Conc	Mass	Area	Conc	Mass	
Constituent										
Gross Beta	8.53%	1.36%	7.16%	0.96	1	0.99	Same	Same	Same	Very Strong

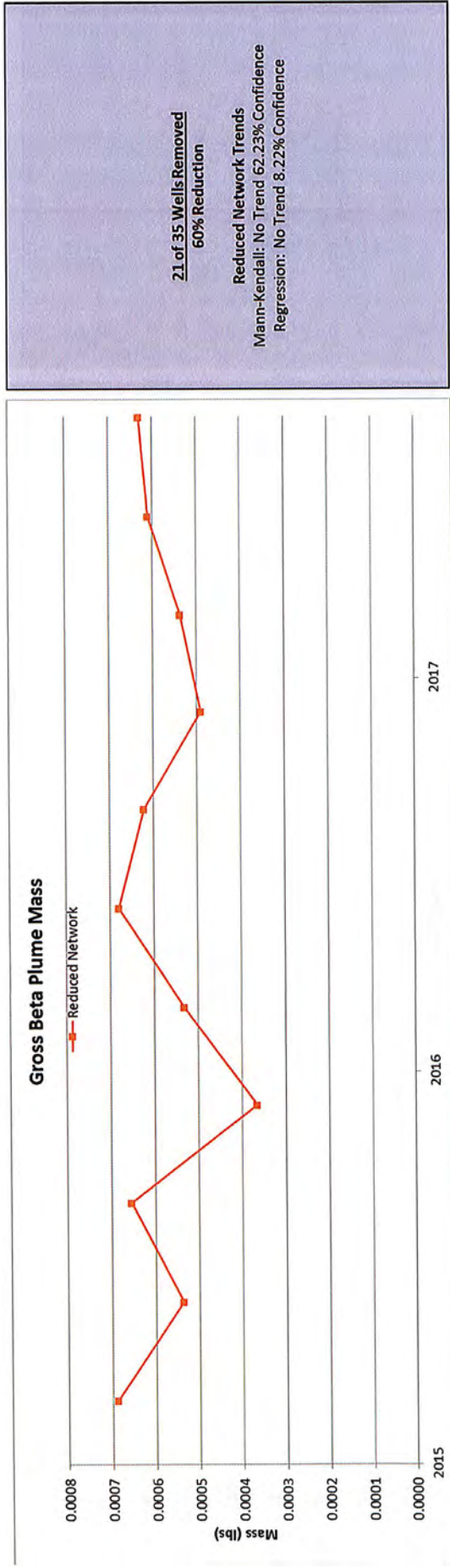
Gross Beta - Well Sufficiency Analysis Summary									
Removed	Recommended Sampling			Comments					
	Well	Frequency							
W-17 [†]	W-10	Annual		<p>- Annual sampling frequency recommended based on Frequency Analysis.</p> <p>- [†] Denotes Hanging Well.</p>					
W-19 [†]	W-13	Annual							
W-20	W-14	Annual							
W-23	W-15	Annual							
W-24	W-16	Annual							
W-28 [†]	W-18	Annual							
W-29	W-22	Annual							
W-33	W-26	Annual							
W-35 [†]	W-27	Annual							
W-36 [†]	W-30	Annual							
W-37 [†]	W-32	Annual							
W-38 [†]	W-47	Annual							
W-39	W-7	Annual							
W-40 [†]	WRW-2	Annual							
W-41									
W-42 [†]									
W-43									
W-44									
W-45 [†]									
W-46 [†]									
W-48									



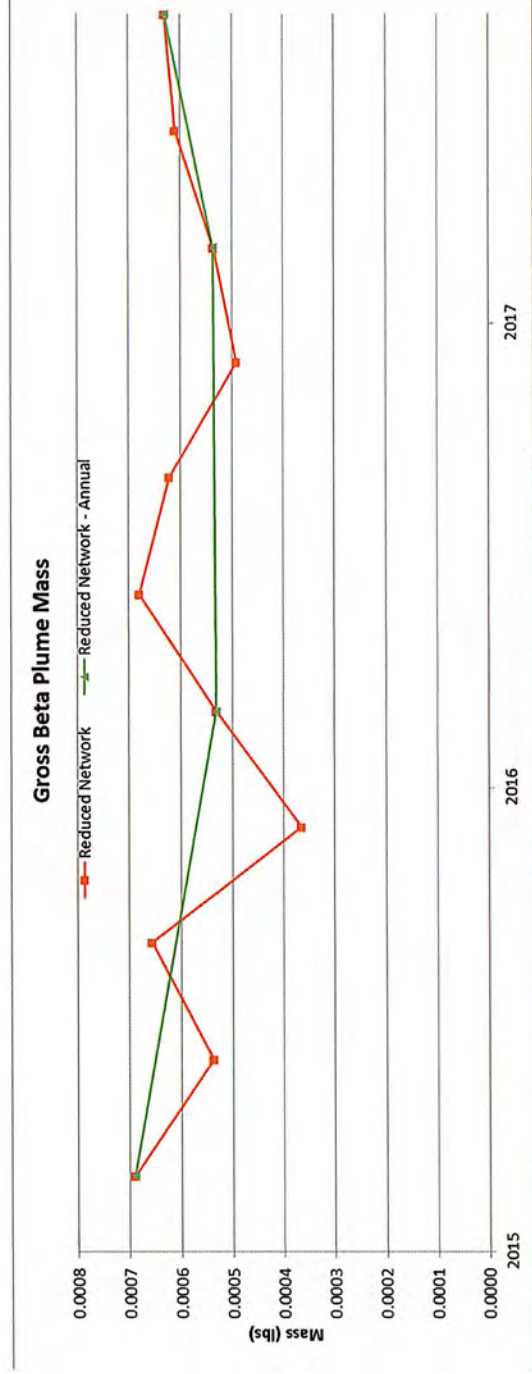
Note: Conversion to mass indicator assumes gross beta result is entirely Tc-99.



Note: Conversion to mass indicator assumes gross beta result is entirely Tc-99.



Note: Conversion to mass indicator assumes gross beta result is entirely Tc-99.



21 of 35 Wells Removed
60% Reduction

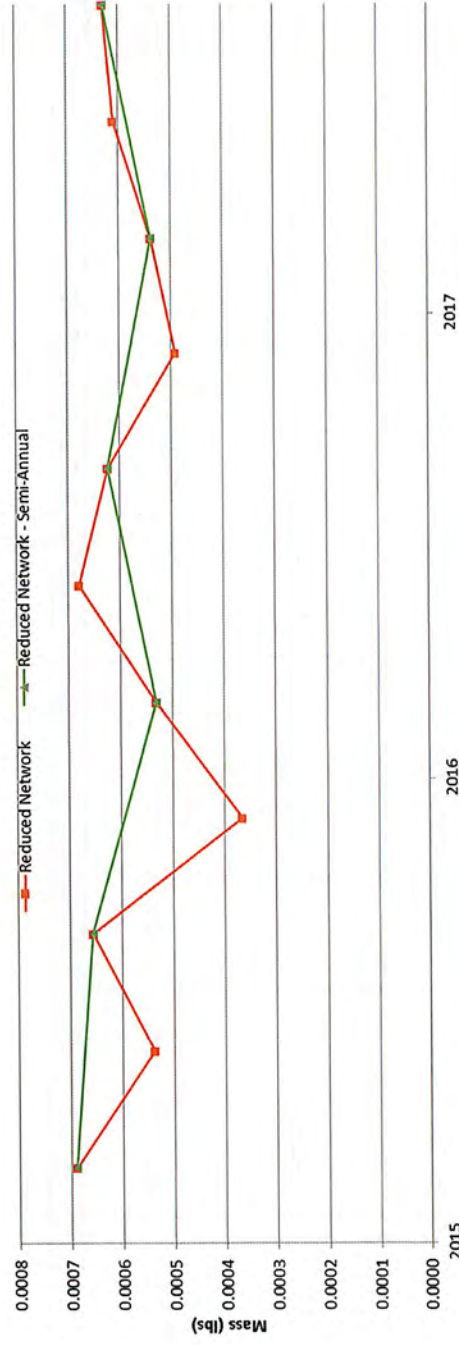
Reduced Network Trends
Mann-Kendall: No Trend 62.23% Confidence
Regression: No Trend 8.22% Confidence

Reduced Frequency - Annual Trends
Mann-Kendall: No Trend 38% Confidence
Regression: No Trend 40% Confidence

PSA Trends

Note: Conversion to mass indicator assumes gross beta result is entirely Tc-99.

Gross Beta Plume Mass



21 of 35 Wells Removed
60% Reduction

Reduced Network Trends

Mann-Kendall: No Trend 62.23% Confidence
Regression: No Trend 8.22% Confidence

Reduced Frequency - Semi-Annual Trends

Mann-Kendall: No Trend 77% Confidence
Regression: No Trend 65% Confidence

PSA Trends

Note: Conversion to mass indicator assumes gross beta result is entirely Tc-99.

Westinghouse - Hopkins, SC Well Sufficiency Analysis Summary											
Constituent	RPD			Correlation			Trend Conclusion			Strength of Argument	Wells Removed from Analysis
	Area	Conc	Mass	Area	Conc	Mass	Area	Conc	Mass		
Jun. 2011 - Jun. 2017											
Fluoride	5.21%	2.72%	7.35%	0.86	0.98	0.94	Same	Same	Same	Strong/ Very Strong	15
Nitrate	3.54%	8.59%	9.43%	0.89	0.86	0.92	Same	Same	Same	Very Strong	13
Ammonia	3.17%	2.56%	2.97%	0.82	0.99	0.98	No Trend - Decreasing Trend	Same	Same	Strong/ Very Strong	15
Mar. 2015 - Jun. 2017											
Gross Alpha	8.95%	0.98%	8.14%	0.97	0.98	0.98	Same	Same	Same	Very Strong	16
Gross Beta	8.53%	1.36%	7.16%	0.96	1	0.99	Same	Same	Same	Very Strong	21

Westinghouse - Hopkins, SC Well Sufficiency Analysis Summary												
Constituent	RPD			Correlation			Trend Conclusion			Strength of Argument	Wells Removed from Analysis	
	Area	Conc	Mass	Area	Conc	Mass	Area	Conc	Mass			
Jun. 2011 - Jun. 2017												
<u>Fluoride</u>	5.21%	2.72%	7.35%	0.86	0.98	0.94	Same	Same	Same	Strong	15	
<u>Nitrate</u>	3.54%	8.59%	9.43%	0.89	0.86	0.92	Same	Same	Same	Very Strong	13	
<u>Ammonia</u>	3.17%	2.56%	2.97%	0.82	0.99	0.94	No Trend - Increasing Trend	Same	Same	Strong/Very Strong	15	
Mar. 2015 - Jun. 2017												
<u>Gross Alpha</u>	5.84%	0.74%	5.27%	0.96	0.99	1	Same	Same	Same	Very Strong	15	
<u>Gross Beta</u>	8.53%	1.36%	1.36%	0.96	1	0.99	Same	Same	Same	Very Strong	21	

Westinghouse - Hopkins, SC Recommended Monitoring Network						
Well	Fluoride	Nitrate	Ammonia	Gross Alpha	Gross Beta	
W-10	✓	✓	✓	✓	✓	✓
W-13	✓	✓	✓	✓	✓	✓
W-14	✓	✓	✓	✓	✓	✓
W-15	✓	--	✓	--	✓	✓
W-16	✓	✓	✓	--	✓	✓
W-17	✓	✓	✓	--	--	--
W-18	--	✓	✓	✓	✓	✓
W-19	--	--	--	--	--	--
W-20	✓	--	✓	✓	--	--
W-22	✓	✓	✓	✓	✓	✓
W-23	✓	--	✓	✓	--	--
W-24	--	--	--	--	--	--
W-26	✓	✓	✓	--	✓	✓
W-27	✓	✓	✓	✓	✓	✓
W-28	✓	✓	--	--	--	--
W-29	✓	--	✓	✓	--	--
W-30	✓	✓	✓	✓	✓	✓
W-32	✓	✓	✓	--	✓	✓
W-33	--	✓	✓	✓	--	--
W-35	--	--	--	--	--	--
W-36	--	--	--	--	--	--
W-37	--	--	--	--	--	--
W-38	--	✓	✓	✓	--	--
W-39	--	✓	✓	✓	--	--
W-40	--	--	--	--	--	--
W-41	✓	✓	--	✓	--	--
W-42	--	--	--	--	--	--
W-43	--	✓	--	✓	--	--
W-44	--	✓	--	✓	--	--
W-45	--	✓	--	--	--	--
W-46	--	--	--	--	--	--
W-47	✓	✓	✓	✓	✓	✓
W-48	✓	✓	--	--	--	--
W-7	--	--	--	✓	✓	✓
WRW-2	--	✓	✓	✓	✓	✓

Westinghouse - Hopkins, SC Recommended Monitoring Network						
Well	Fluoride	Nitrate	Ammonia	Gross Alpha	Gross Beta	
W-10	✓	✓	✓	✓	✓	✓
W-13	✓	✓	✓	✓	✓	✓
W-14	✓	✓	✓	✓	✓	✓
W-15	✓	--	✓	--	--	✓
W-16	✓	✓	✓	✓	✓	✓
W-17	✓	✓	✓	--	--	✓
W-18	--	✓	✓	✓	✓	✓
W-19	--	--	--	--	--	✓
W-20	✓	--	✓	--	--	✓
W-22	✓	✓	✓	✓	✓	✓
W-23	✓	--	✓	--	--	✓
W-24	--	--	--	--	--	✓
W-26	✓	✓	✓	--	✓	✓
W-27	✓	✓	✓	✓	✓	✓
W-28	✓	✓	--	--	--	✓
W-29	✓	--	✓	✓	--	✓
W-30	✓	✓	✓	✓	✓	✓
W-32	✓	✓	✓	--	✓	✓
W-33	--	✓	✓	✓	--	✓
W-35	--	--	--	--	--	✓
W-36	--	--	--	--	--	✓
W-37	--	--	--	--	--	✓
W-38	--	✓	✓	✓	--	✓
W-39	--	✓	✓	✓	--	✓
W-40	--	--	--	--	--	✓
W-41	✓	✓	--	✓	--	✓
W-42	--	--	--	--	--	✓
W-43	--	✓	--	✓	--	✓
W-44	--	✓	--	✓	--	✓
W-45	--	✓	--	--	--	✓
W-46	--	--	--	--	--	✓
W-47	✓	✓	✓	✓	✓	✓
W-48	✓	✓	--	--	--	✓
W-7	--	--	--	✓	✓	✓
WRW-2	--	✓	✓	✓	✓	✓

