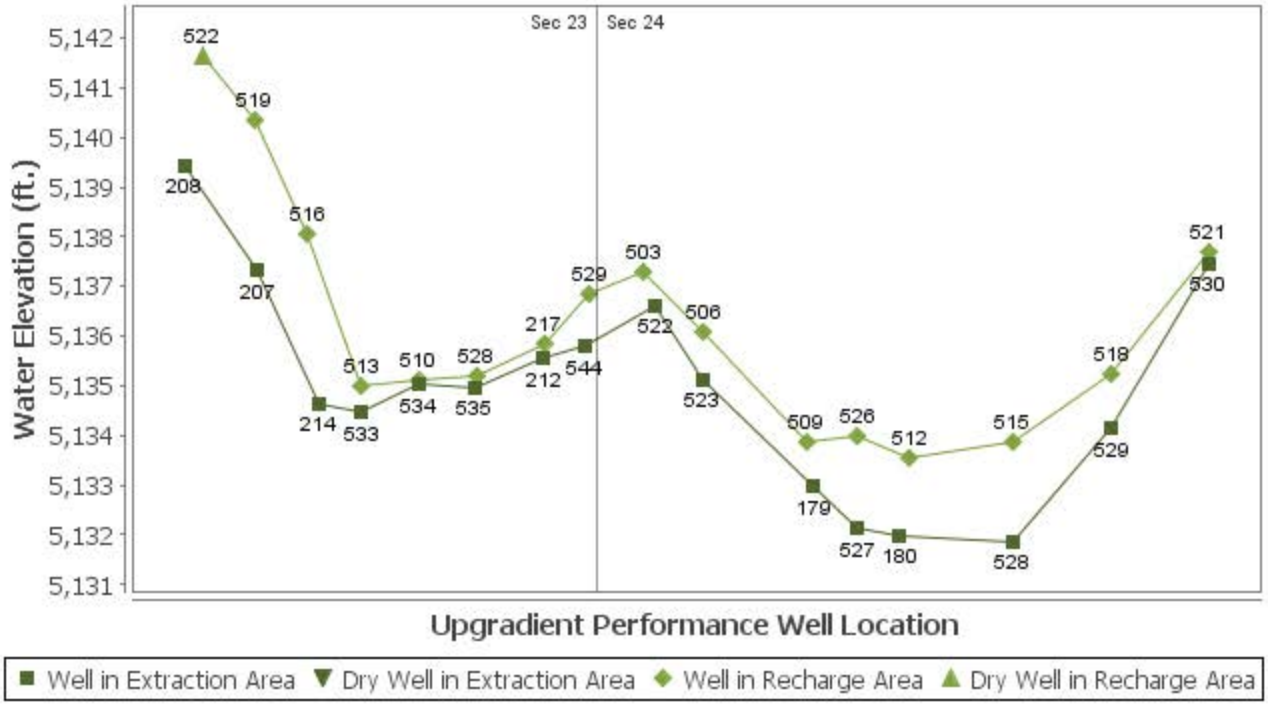
# Appendix B: North Boundary Containment System Figures

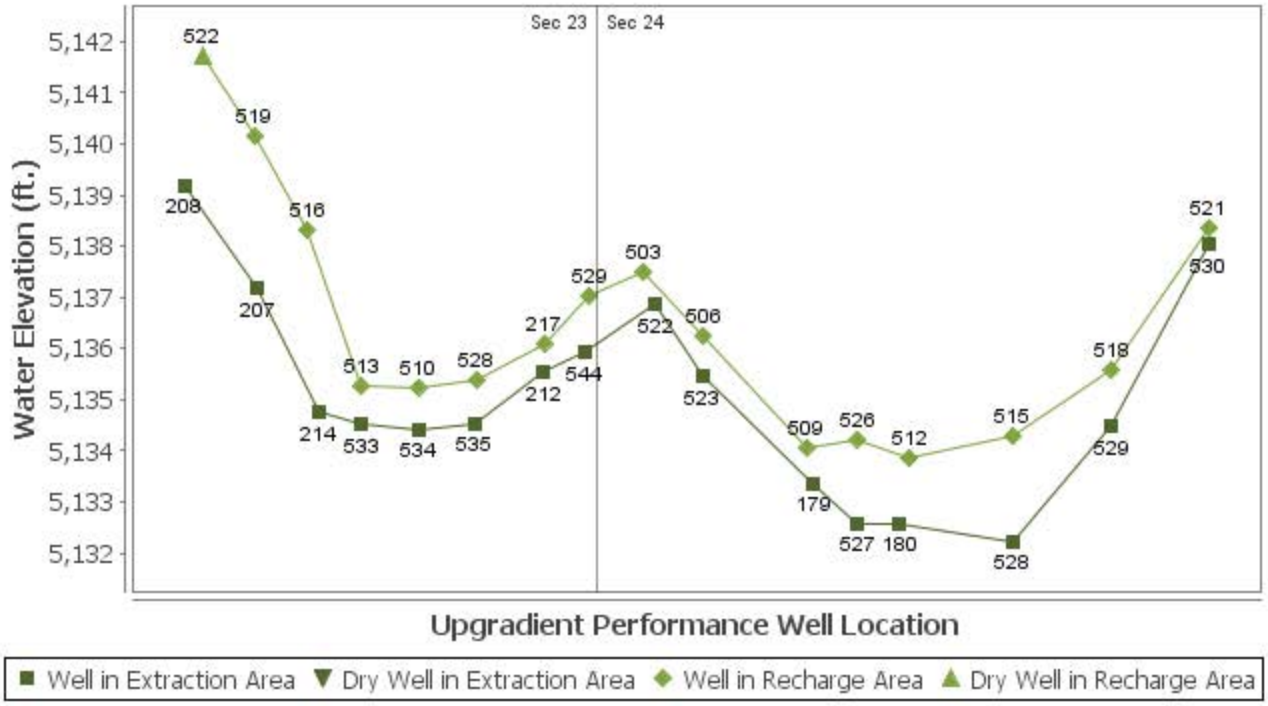
## North Boundary Water Levels (Alluvial)

**2013-10-01 to 2013-12-31**



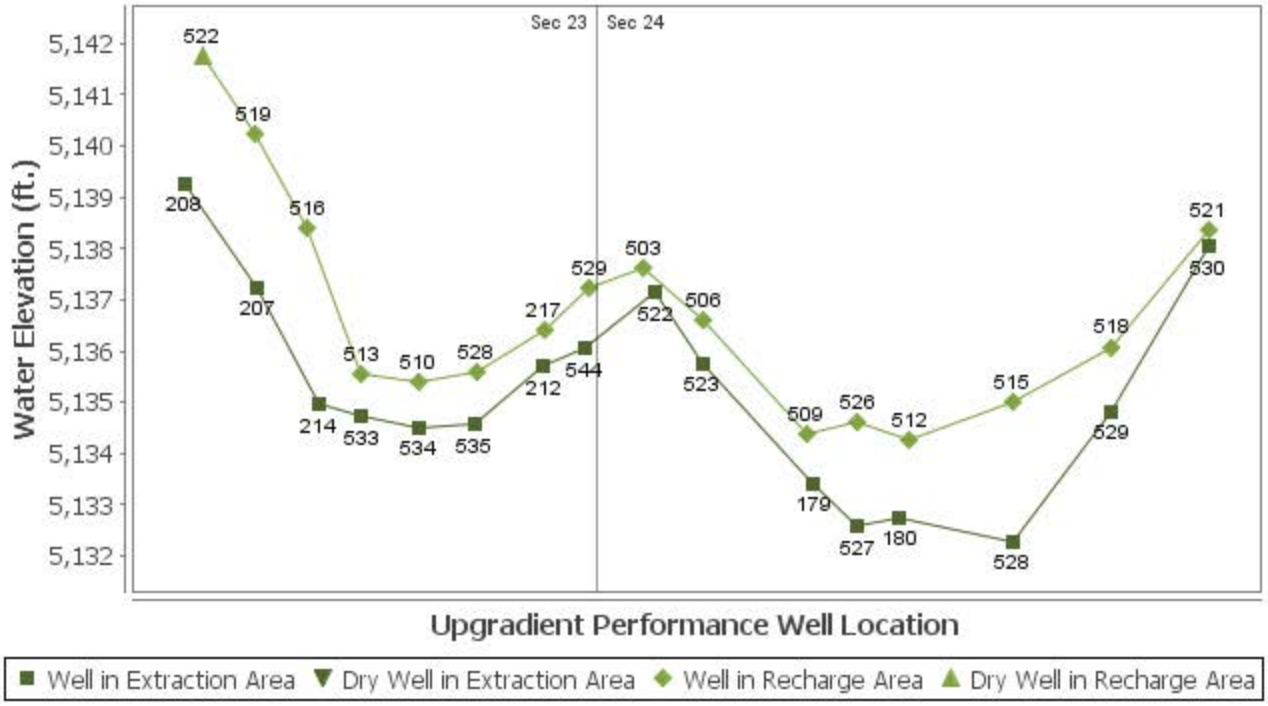

## North Boundary Water Levels (Alluvial)

**2014-01-01 to 2014-03-31**



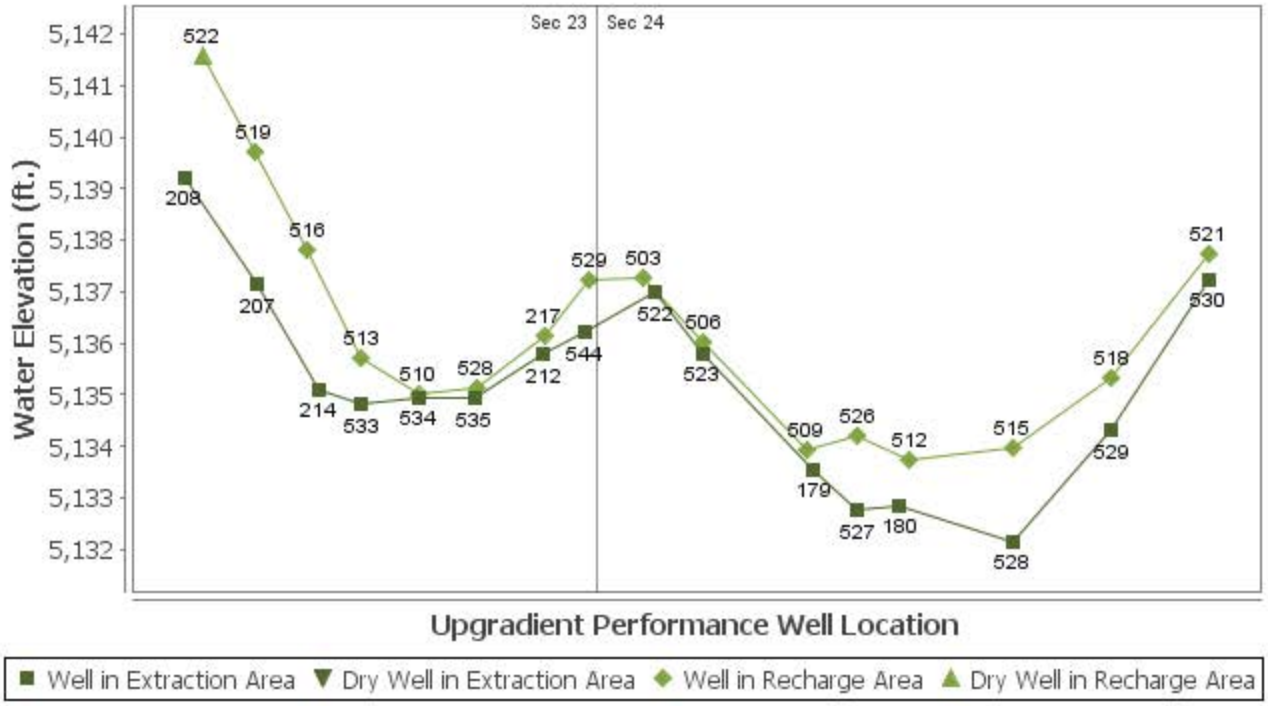
## North Boundary Water Levels (Alluvial)

**2014-04-01 to 2014-06-30**



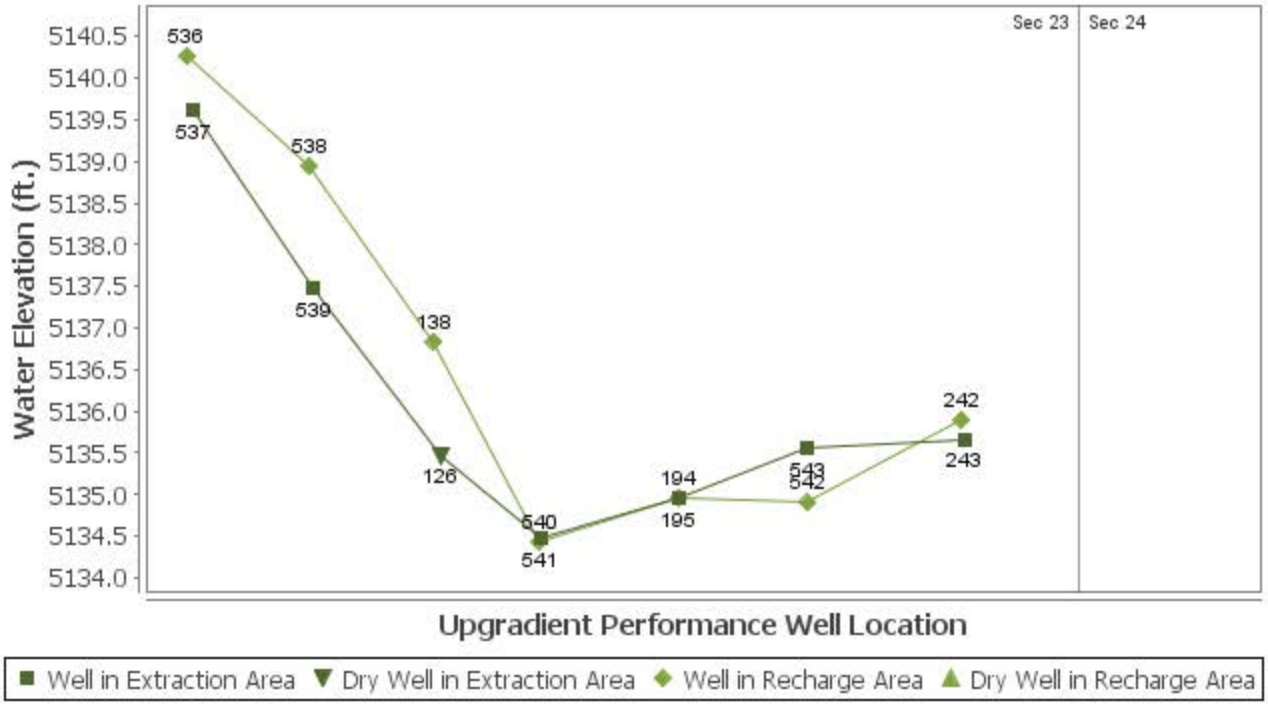

## North Boundary Water Levels (Alluvial)

**2014-07-01 to 2014-09-30**



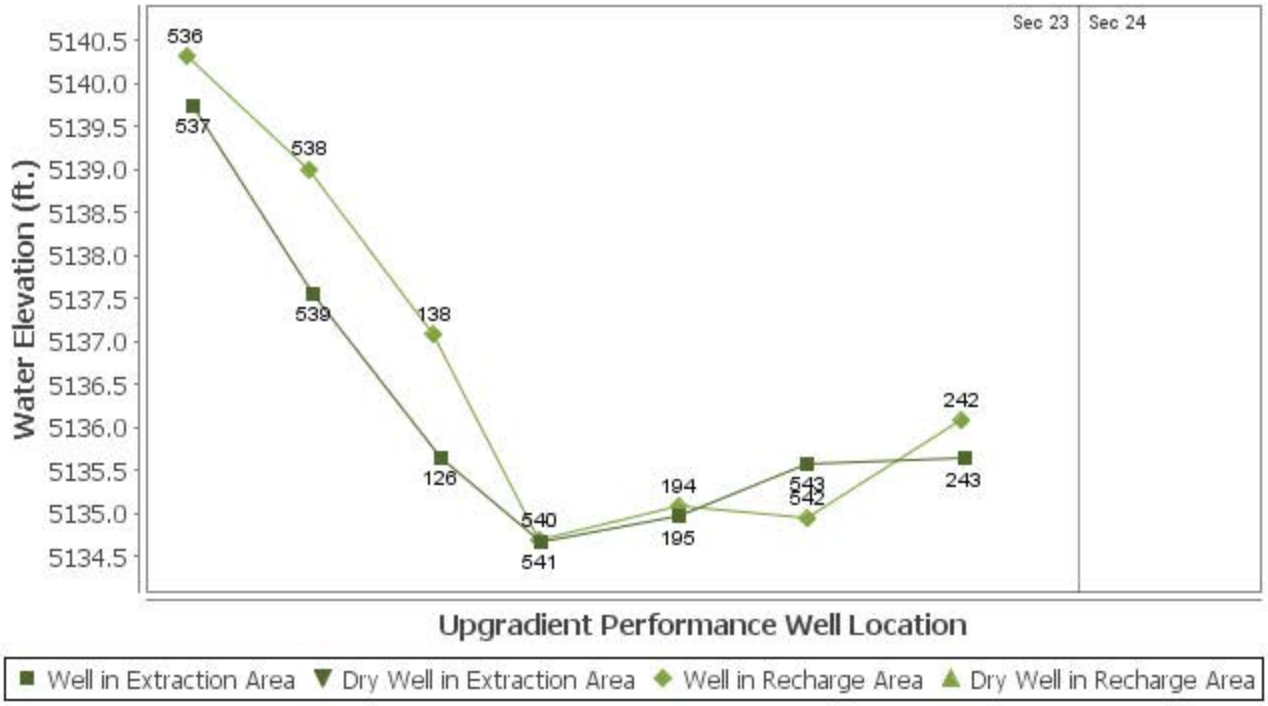
## North Boundary Water Levels (Denver)

**2013-10-01 to 2013-12-31**



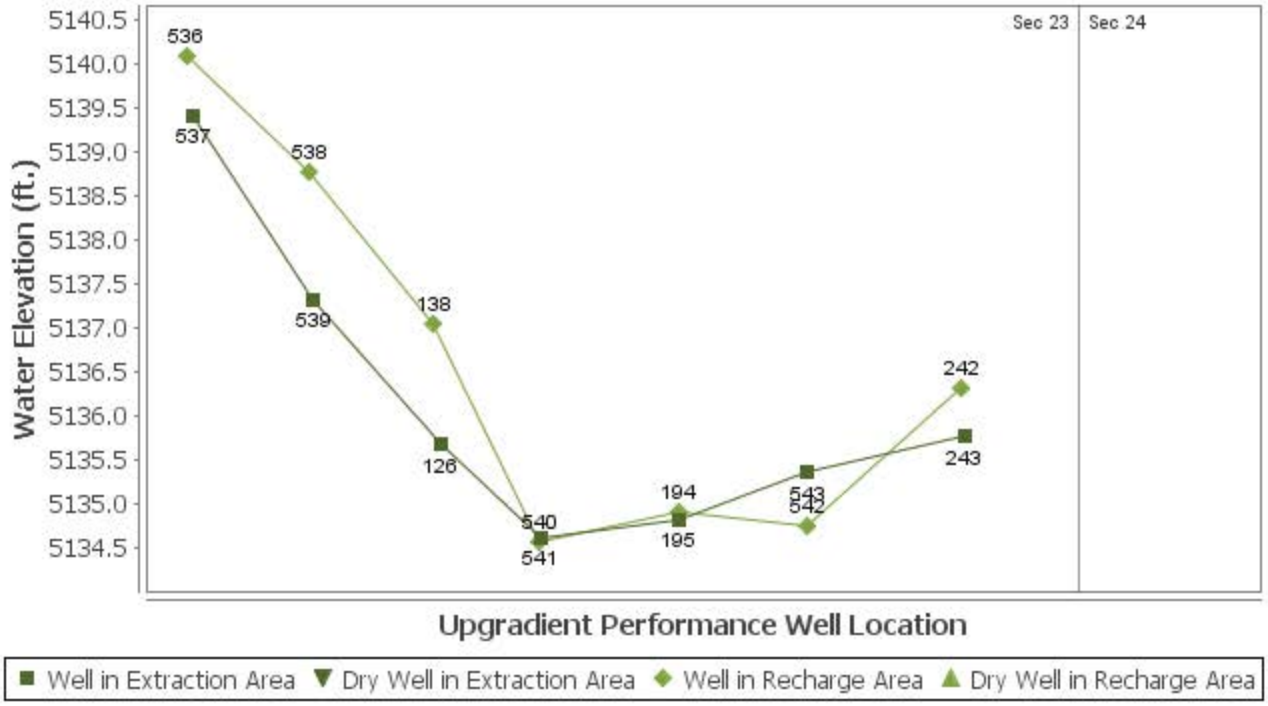

## North Boundary Water Levels (Denver)

**2014-01-01 to 2014-03-31**



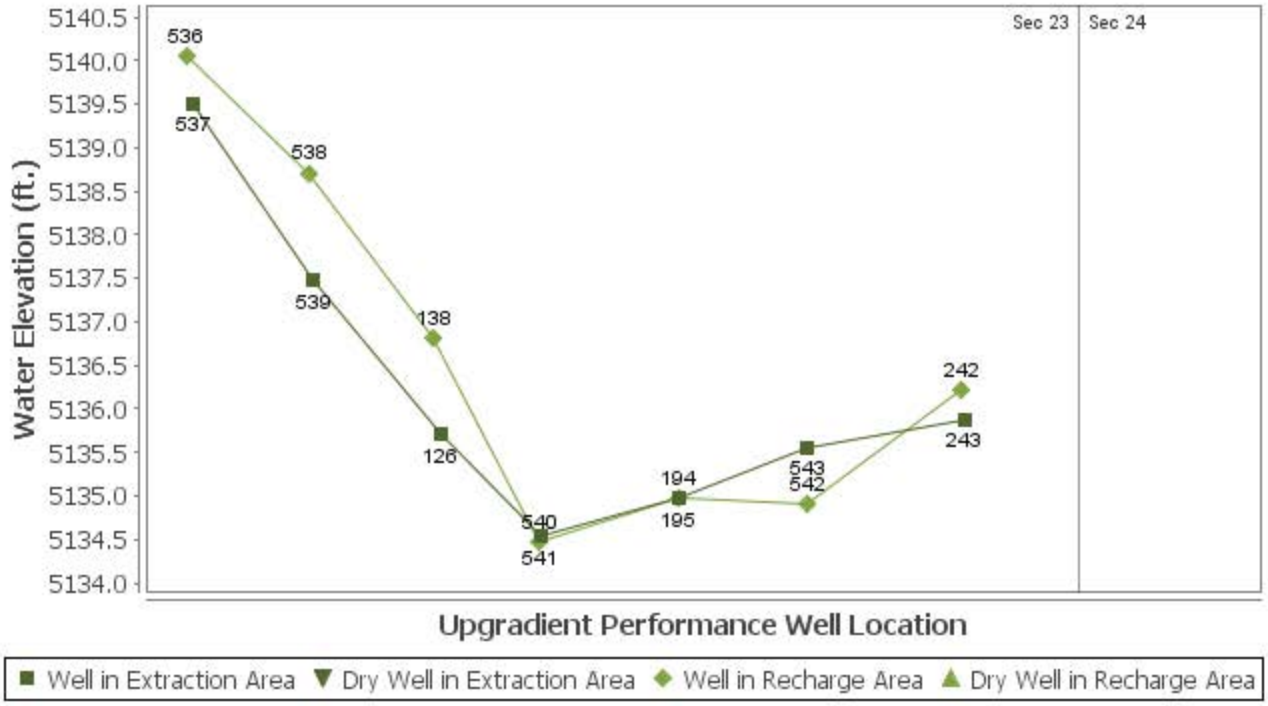
## North Boundary Water Levels (Denver)

**2014-04-01 to 2014-06-30**



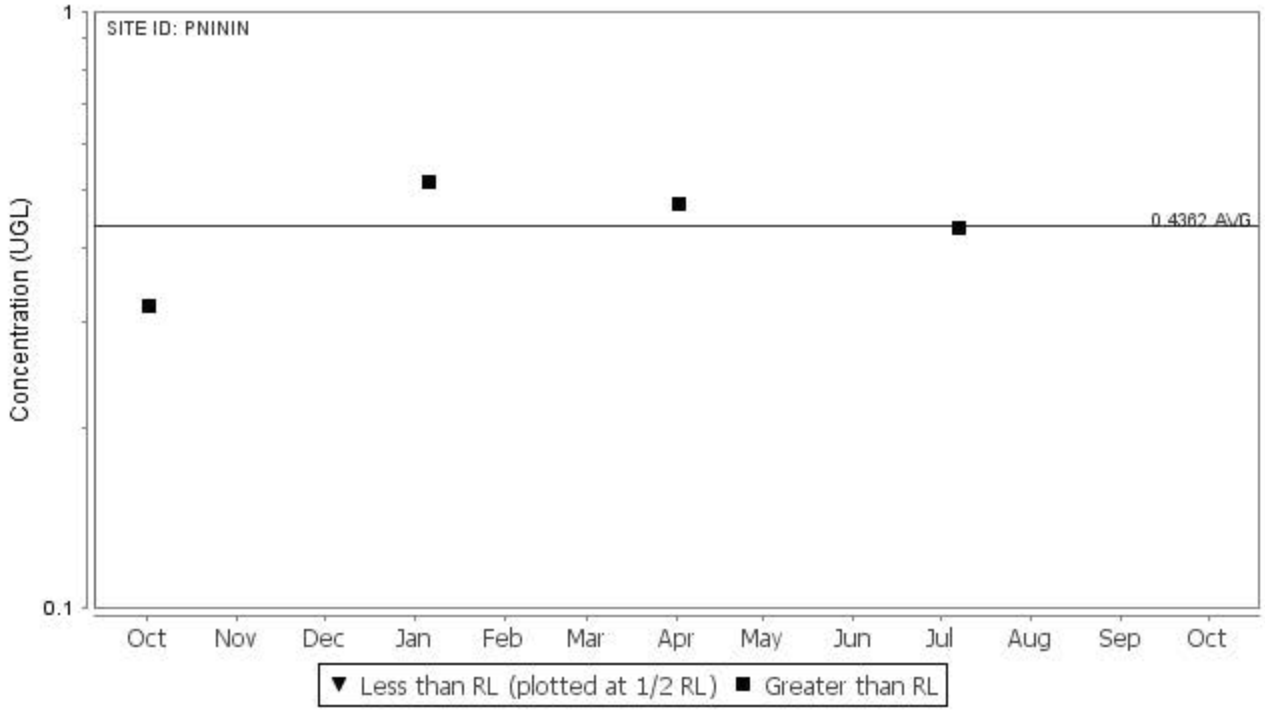

## North Boundary Water Levels (Denver)

**2014-07-01 to 2014-09-30**



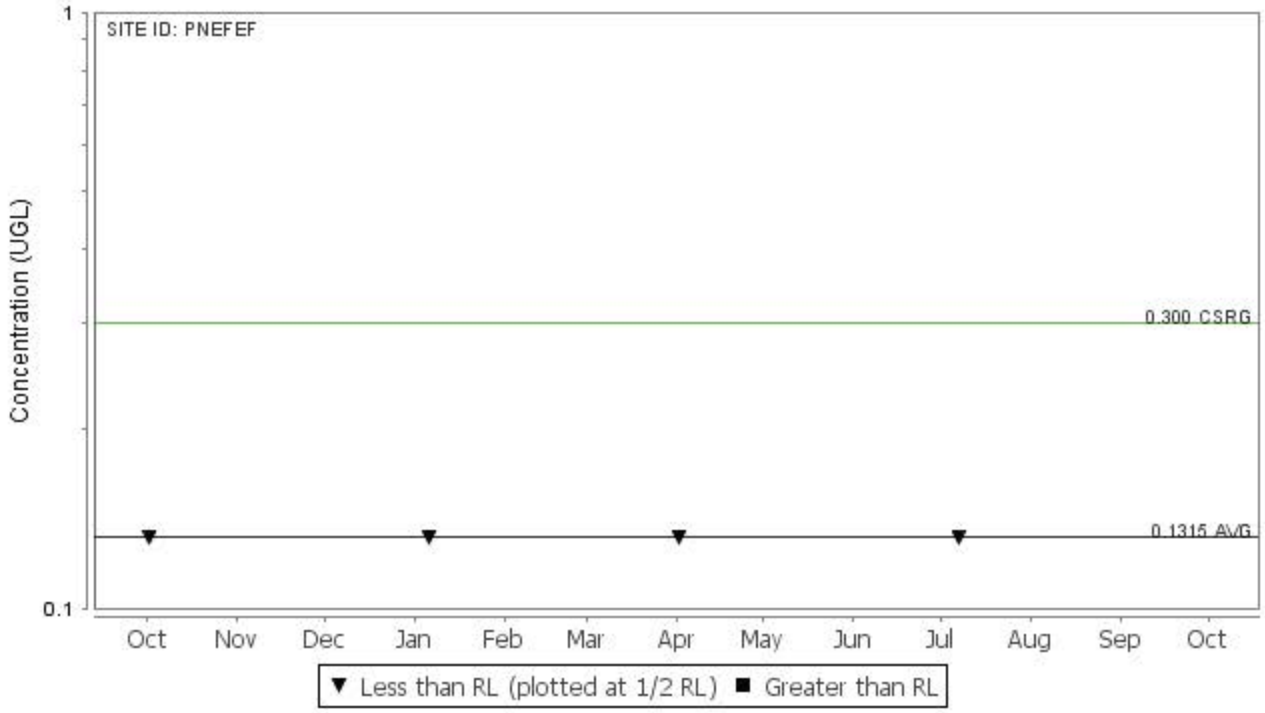
## North Boundary Treatment Plant Influent - CCL4

2013-10-01 to 2014-09-30



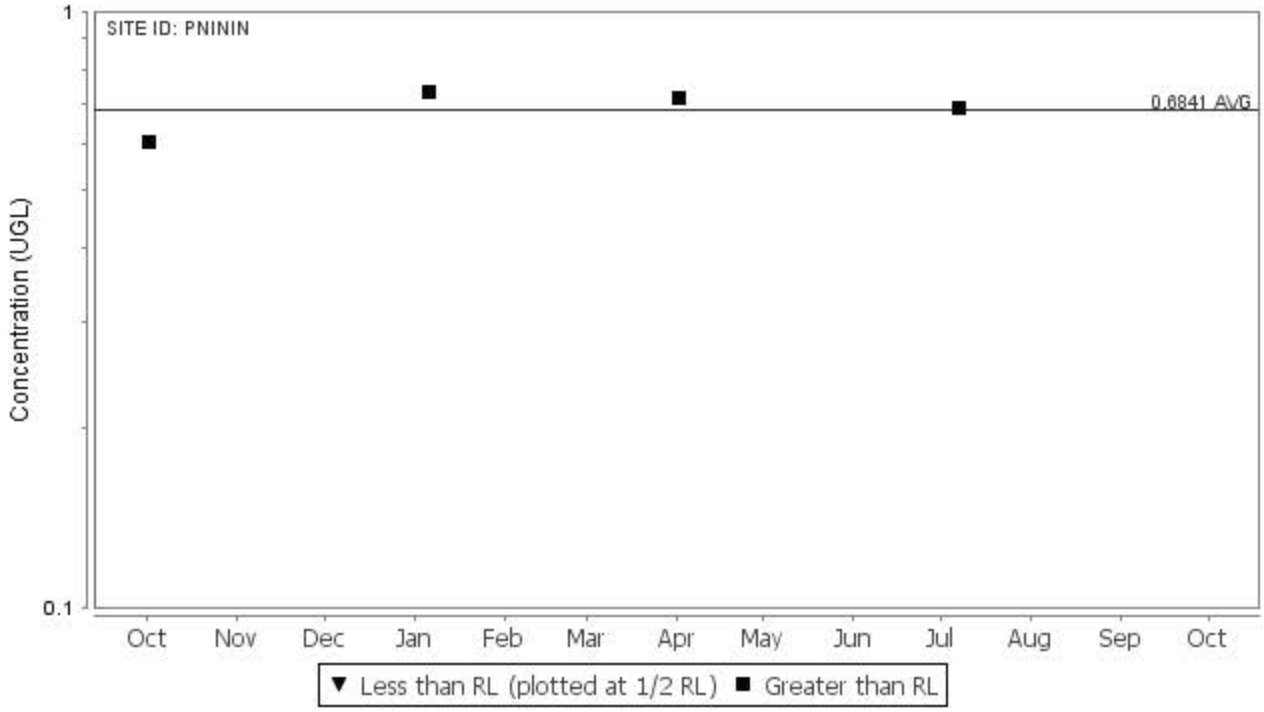

## North Boundary Treatment Plant Effluent - CCL4

2013-10-01 to 2014-09-30



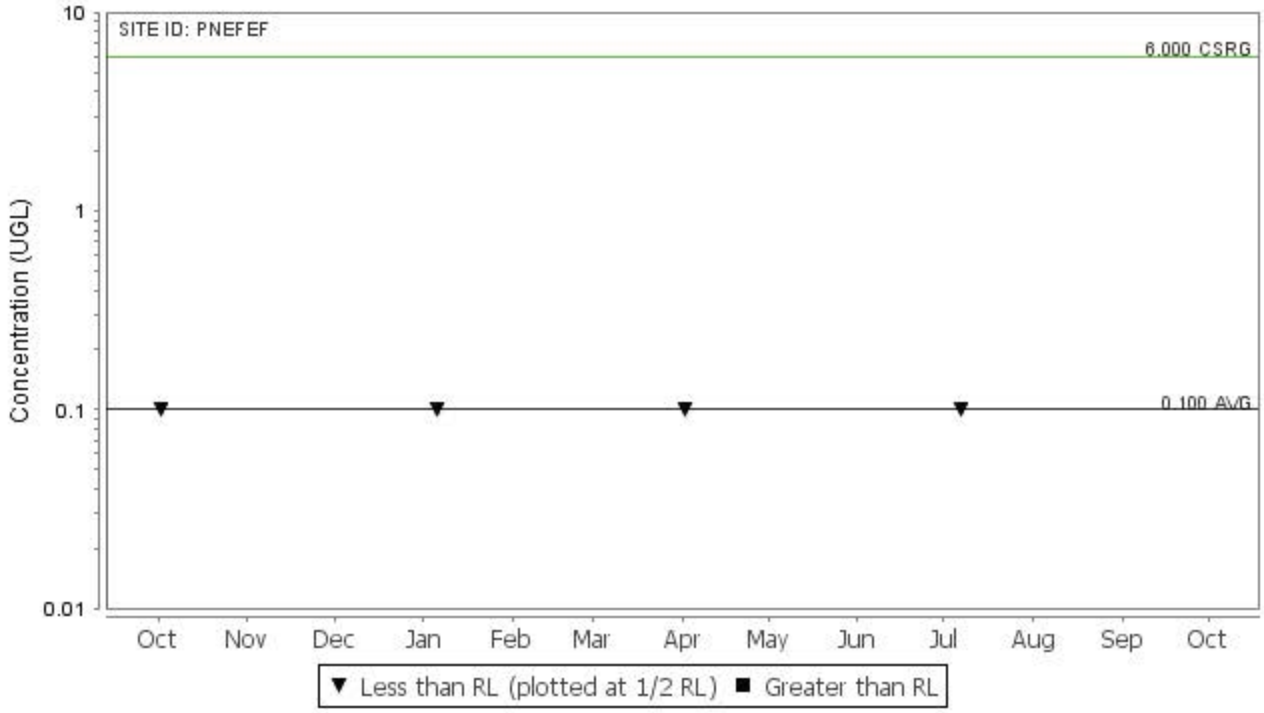
## North Boundary Treatment Plant Influent - CHCL3

2013-10-01 to 2014-09-30



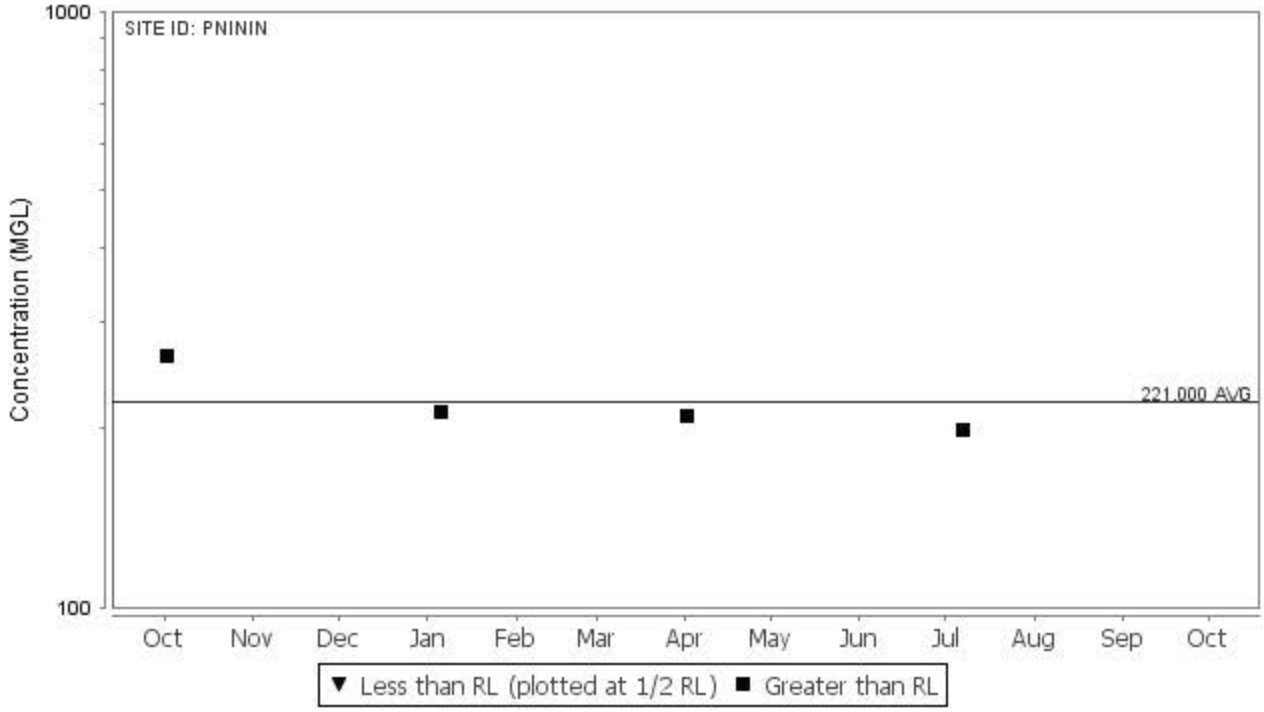

## North Boundary Treatment Plant Effluent - CHCL3

2013-10-01 to 2014-09-30



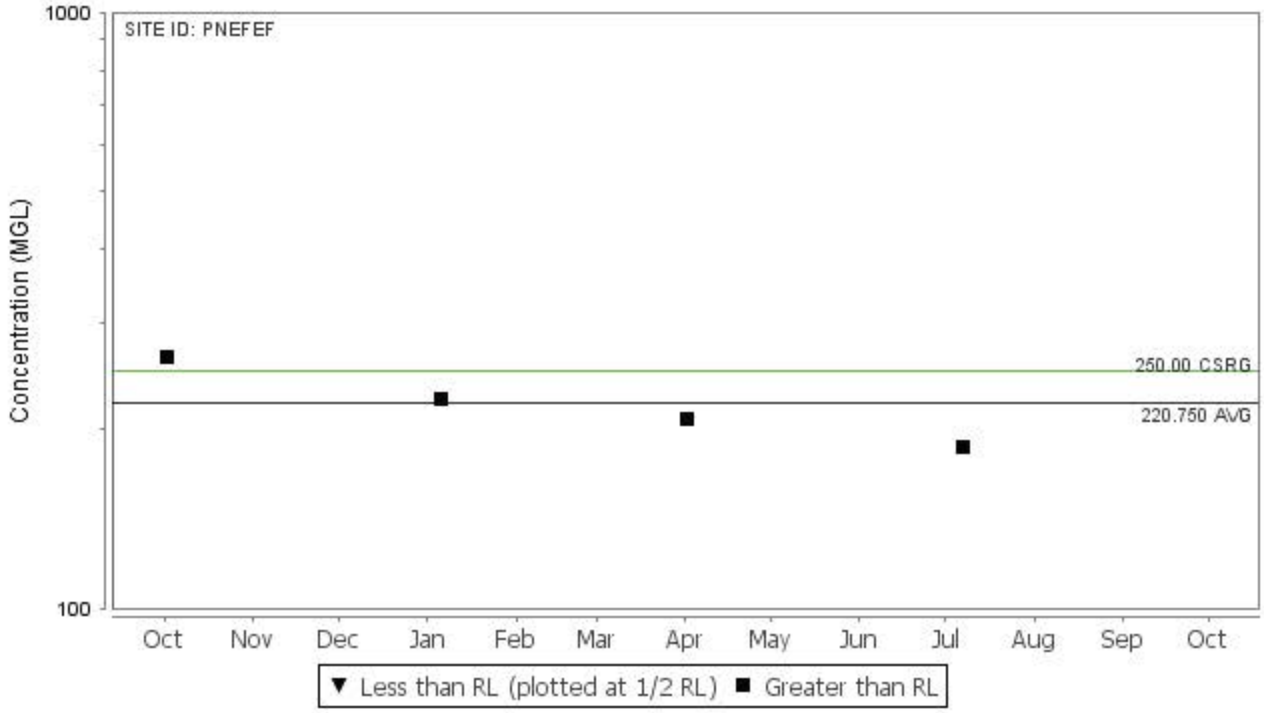
## North Boundary Treatment Plant Influent - CL

2013-10-01 to 2014-09-30



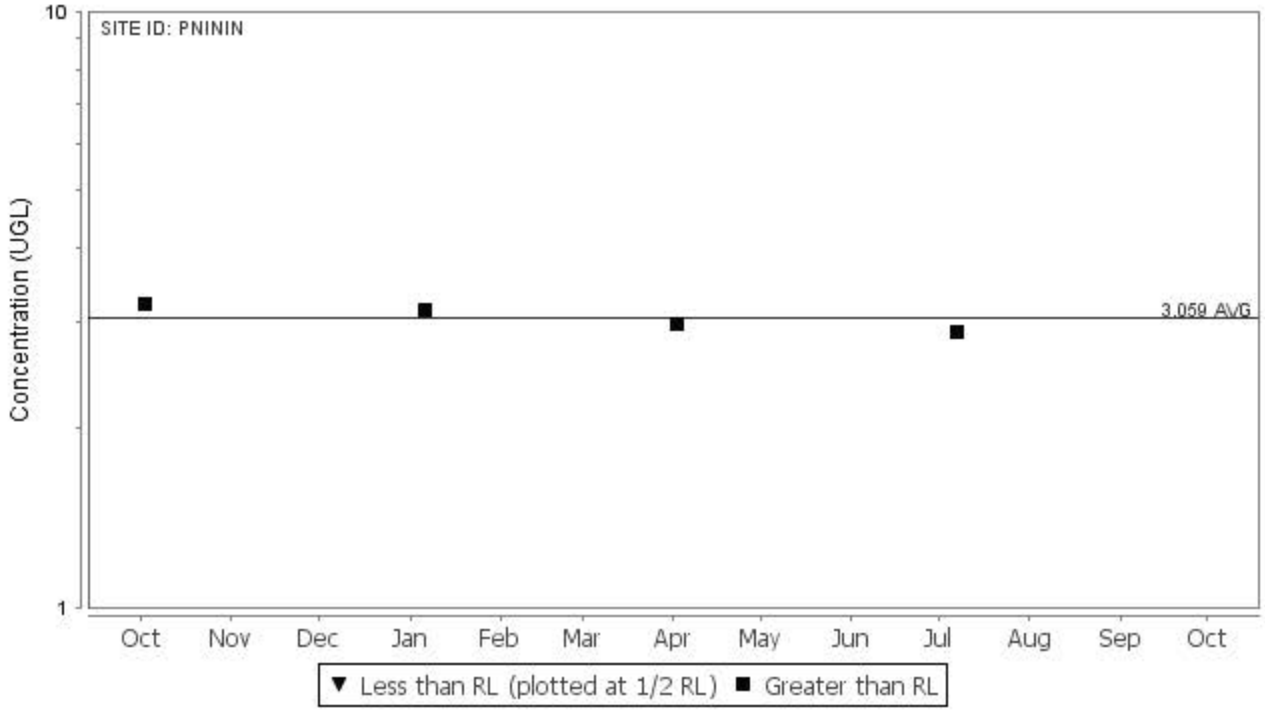

## North Boundary Treatment Plant Effluent - CL

2013-10-01 to 2014-09-30



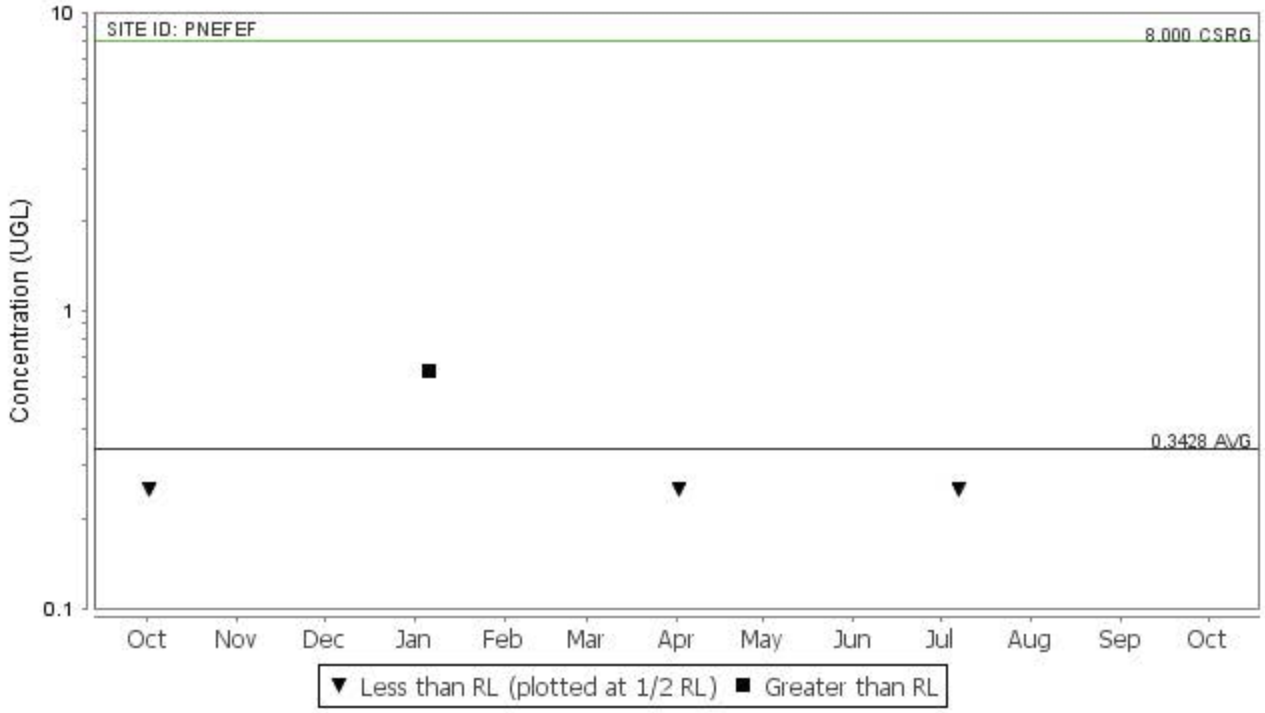
## North Boundary Treatment Plant Influent - DIMP

2013-10-01 to 2014-09-30



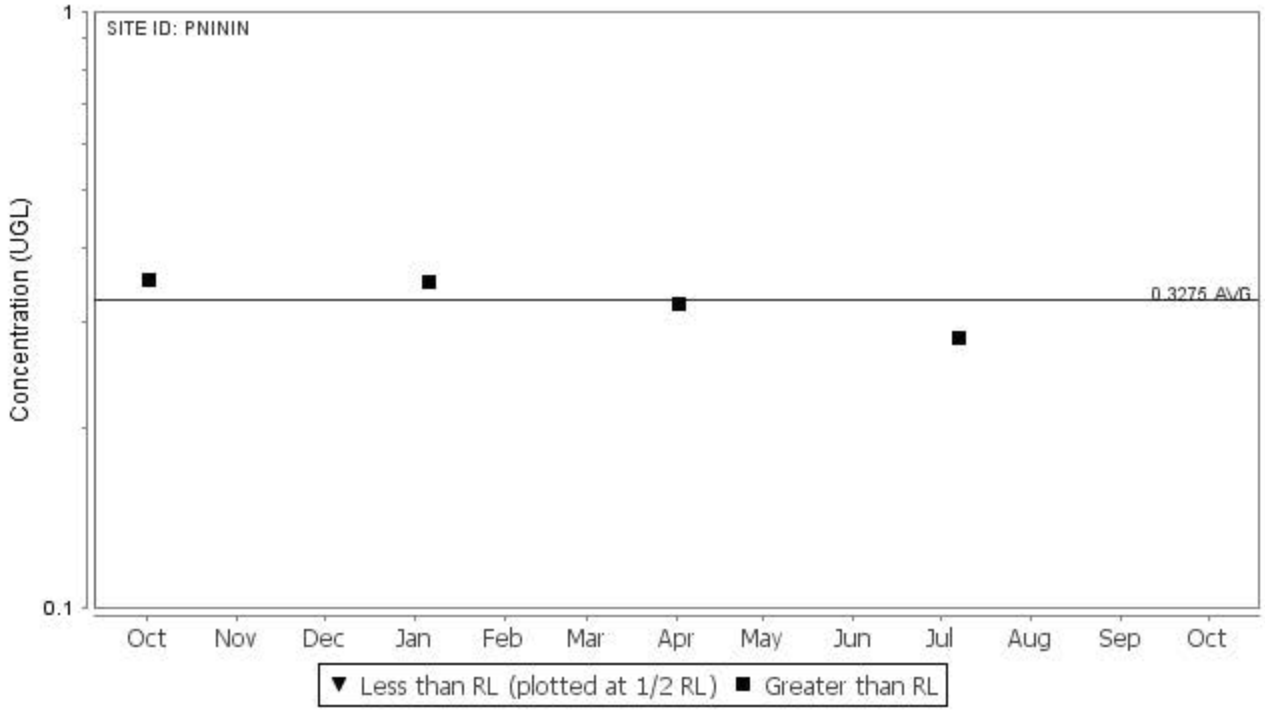

## North Boundary Treatment Plant Effluent - DIMP

2013-10-01 to 2014-09-30



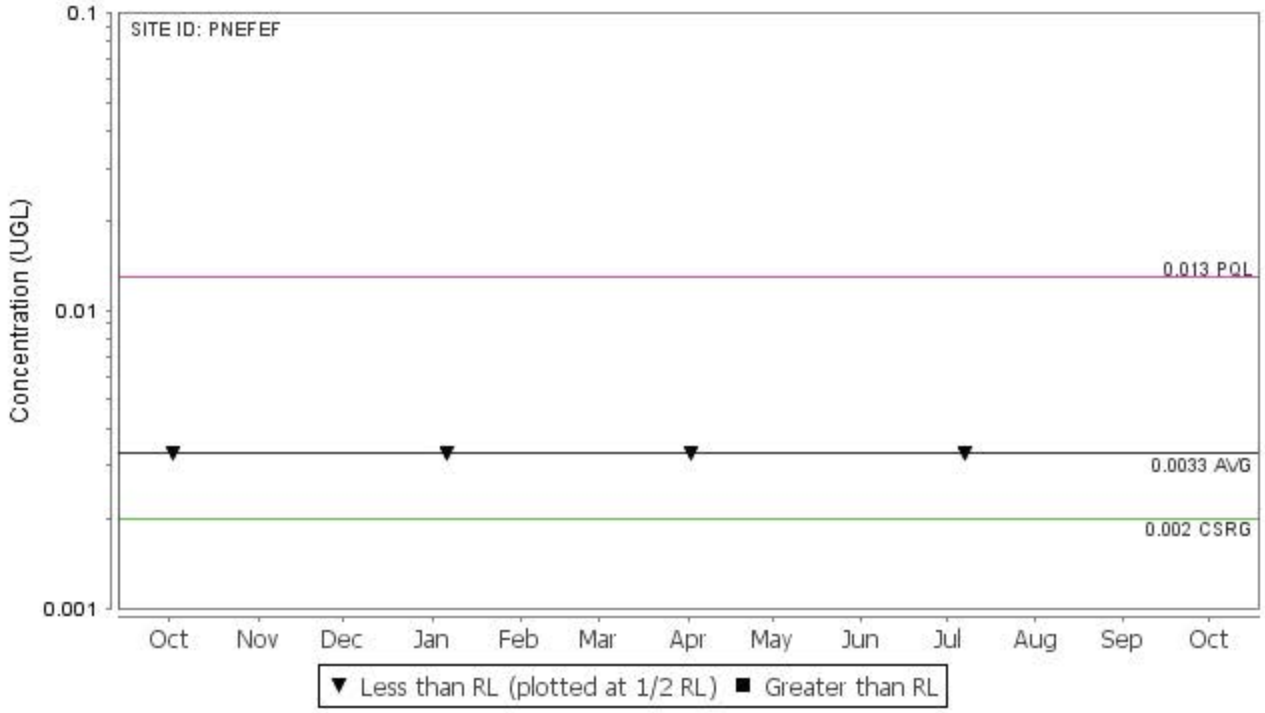
## North Boundary Treatment Plant Influent - DLDRN

2013-10-01 to 2014-09-30



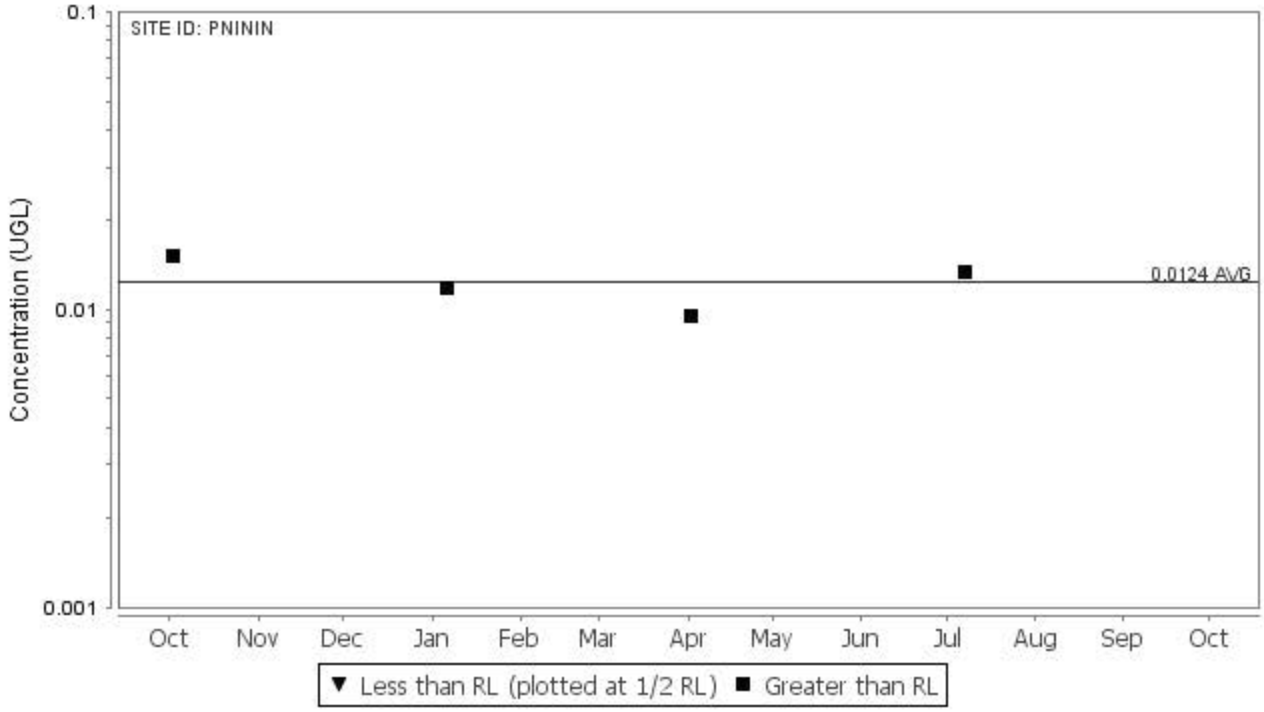

## North Boundary Treatment Plant Effluent - DLDRN

2013-10-01 to 2014-09-30



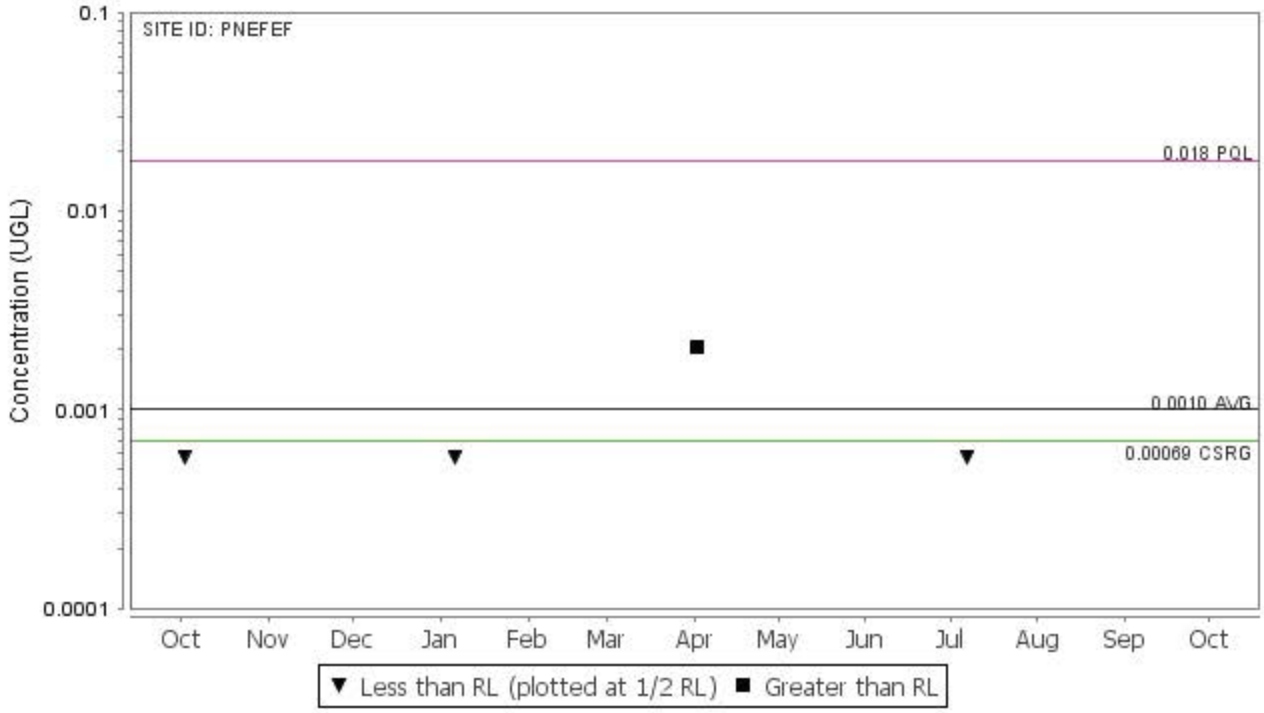
## North Boundary Treatment Plant Influent - NNDMEA

2013-10-01 to 2014-09-30



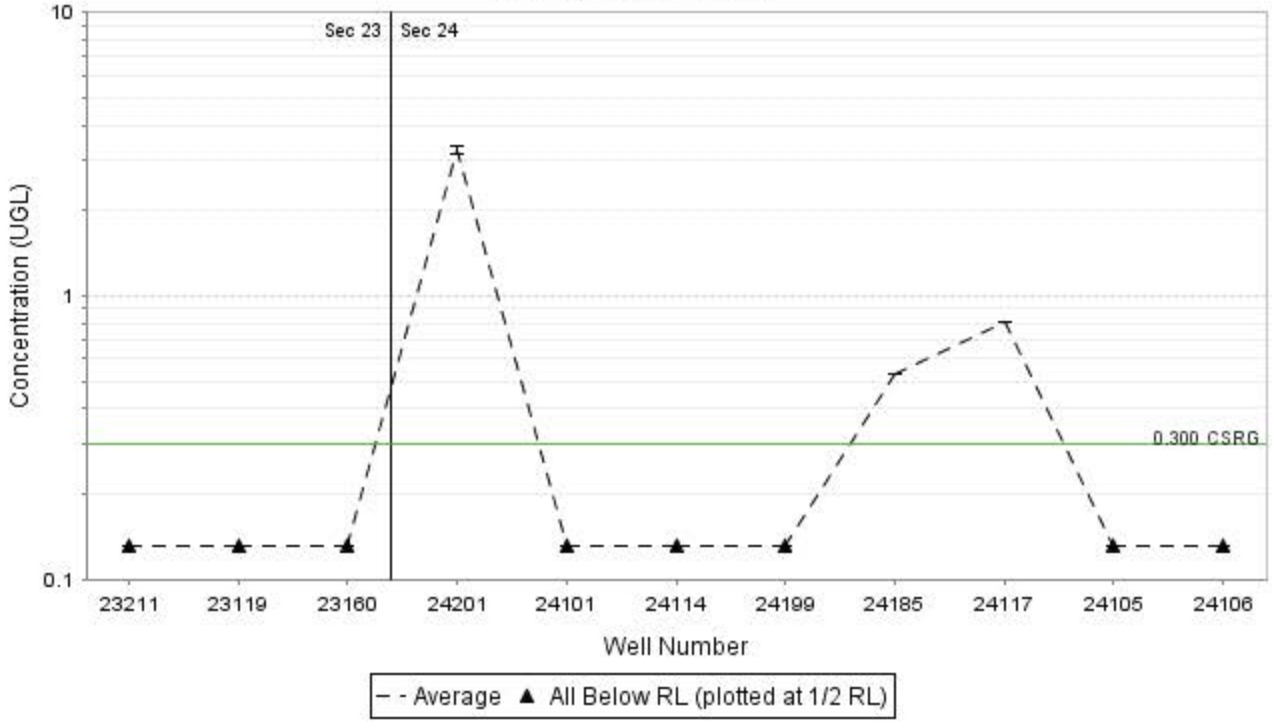

## North Boundary Treatment Plant Effluent - NNDMEA

2013-10-01 to 2014-09-30



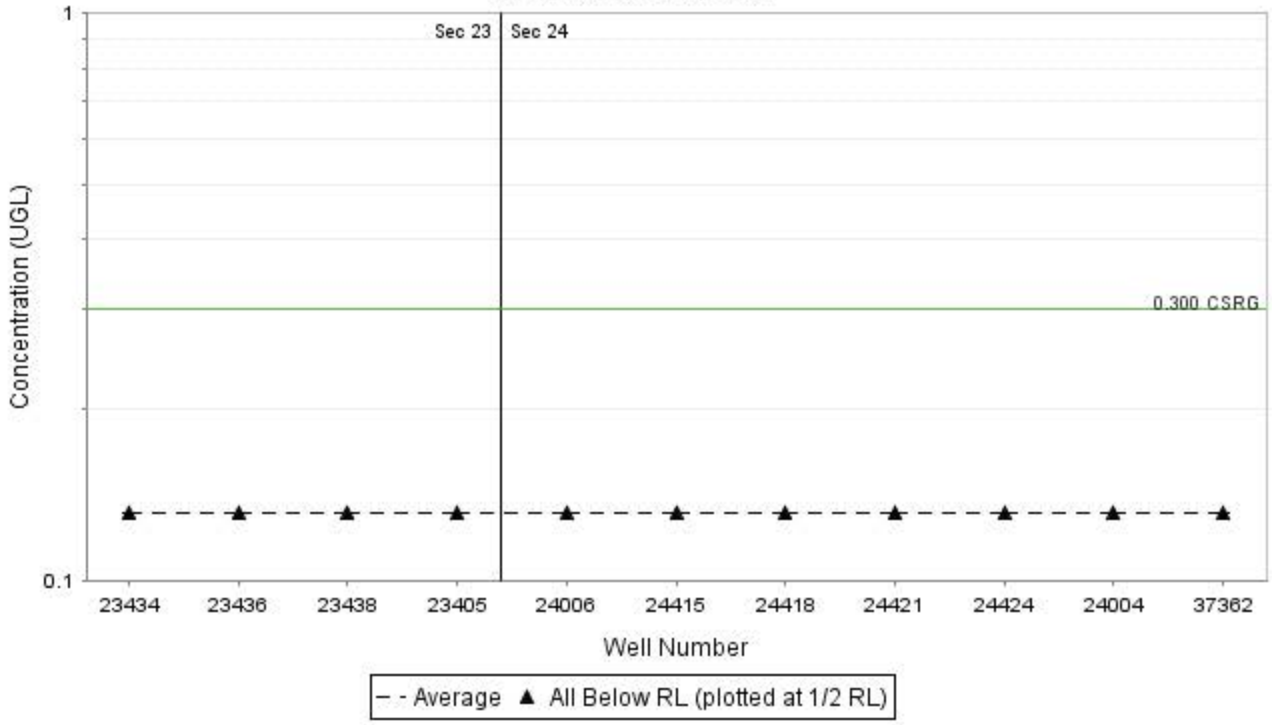
## North Boundary Upgradient Performance Wells - CCL4

2013-10-01 to 2014-09-30



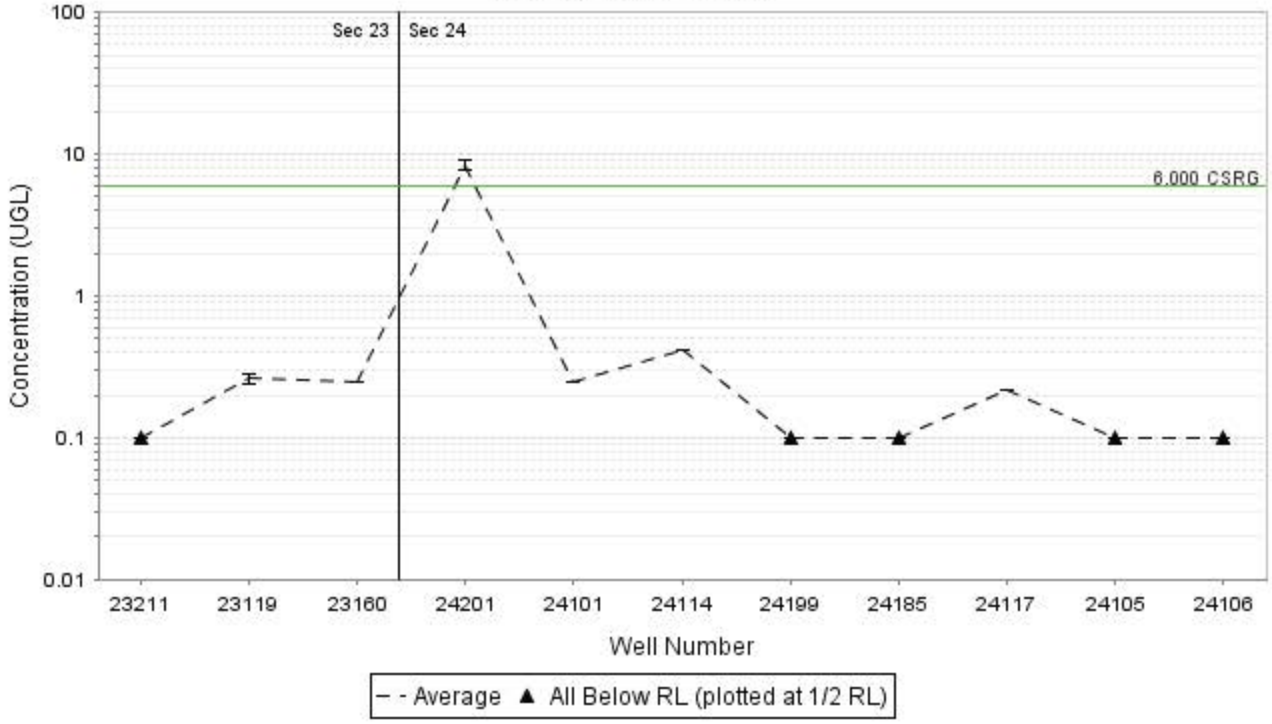

## North Boundary Downgradient Performance Wells - CCL4

2013-10-01 to 2014-09-30



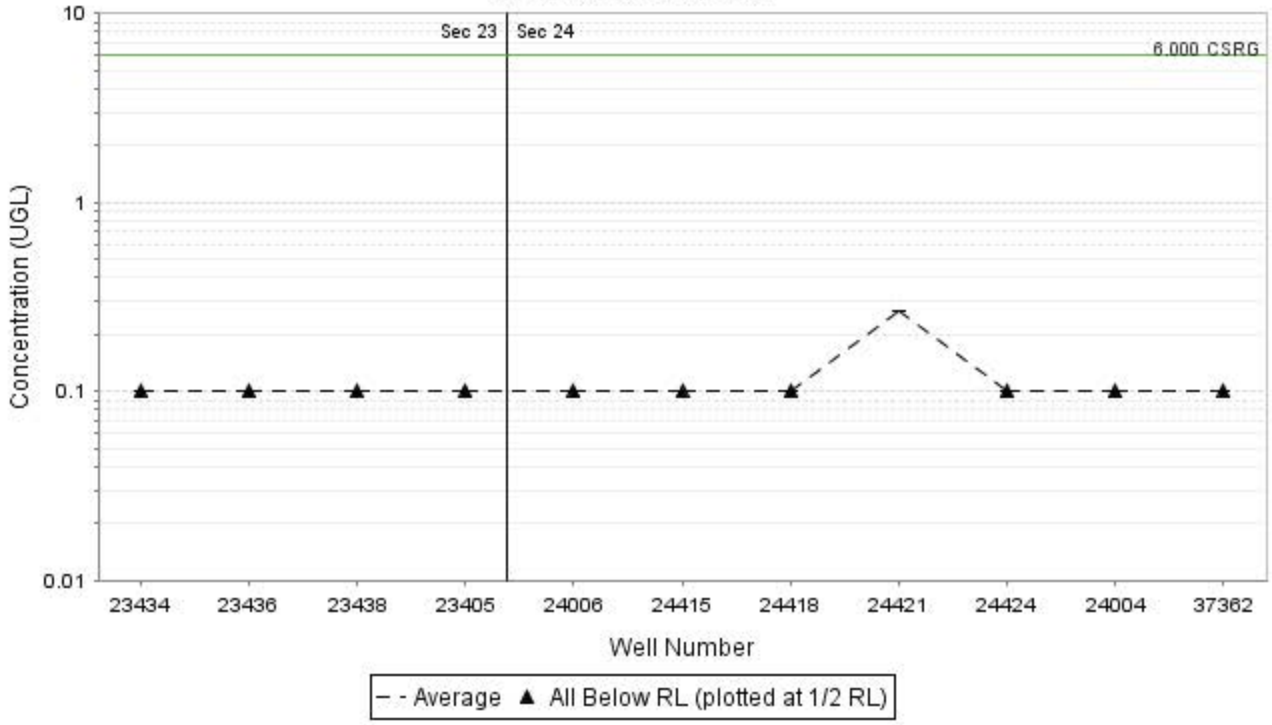
## North Boundary Upgradient Performance Wells - CHCL3

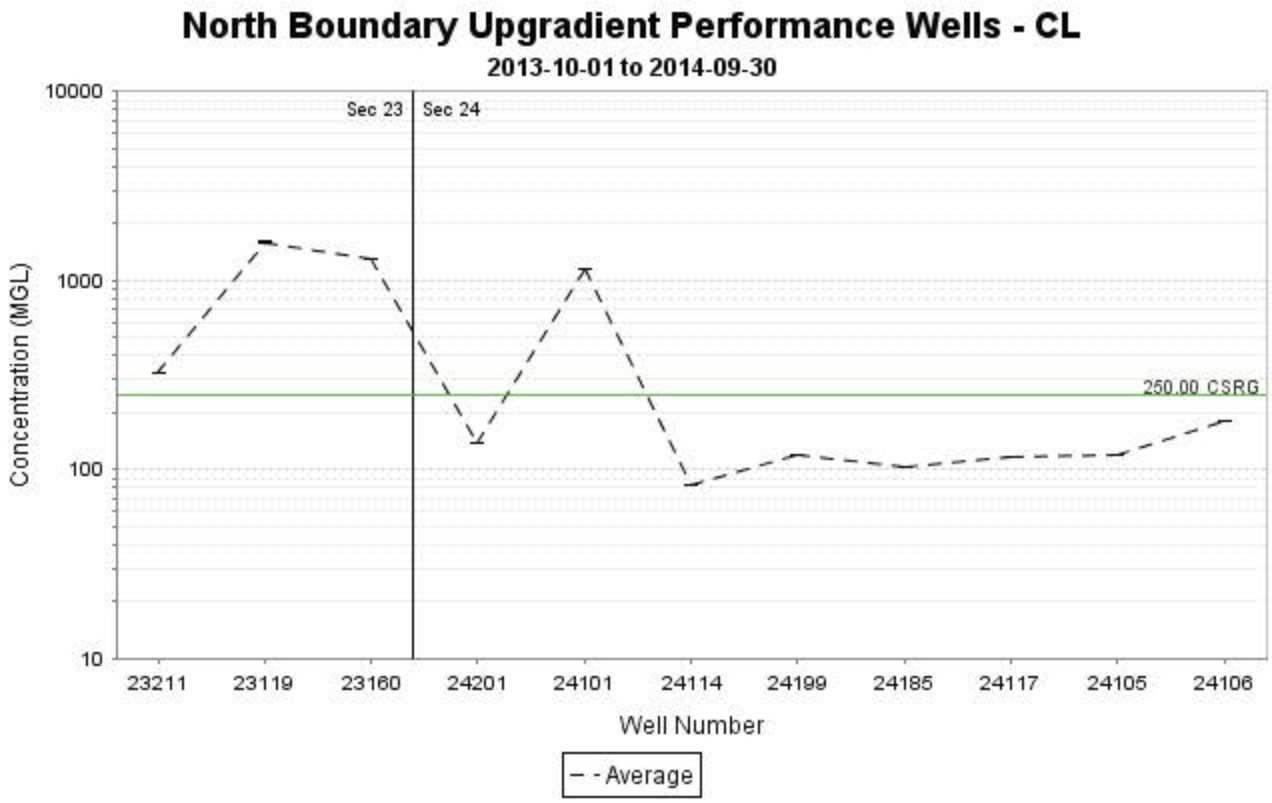
**2013-10-01 to 2014-09-30**

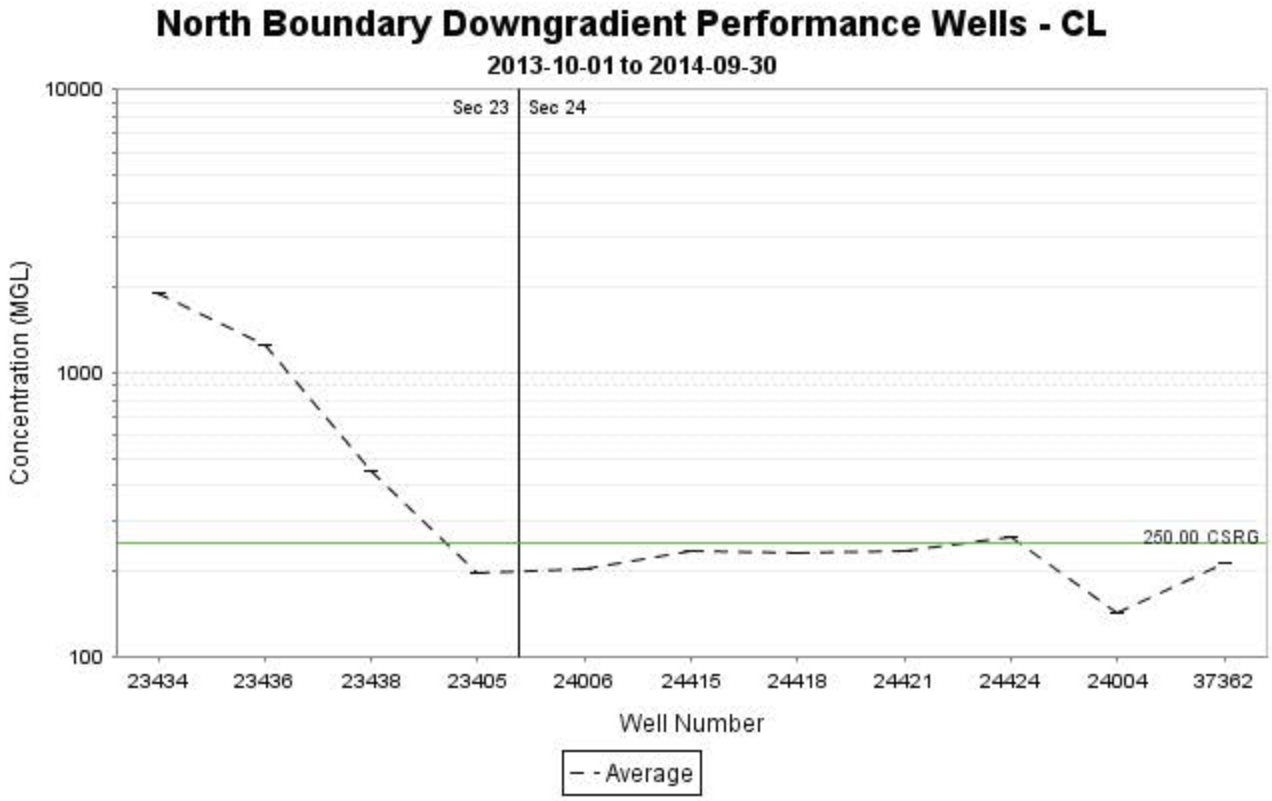


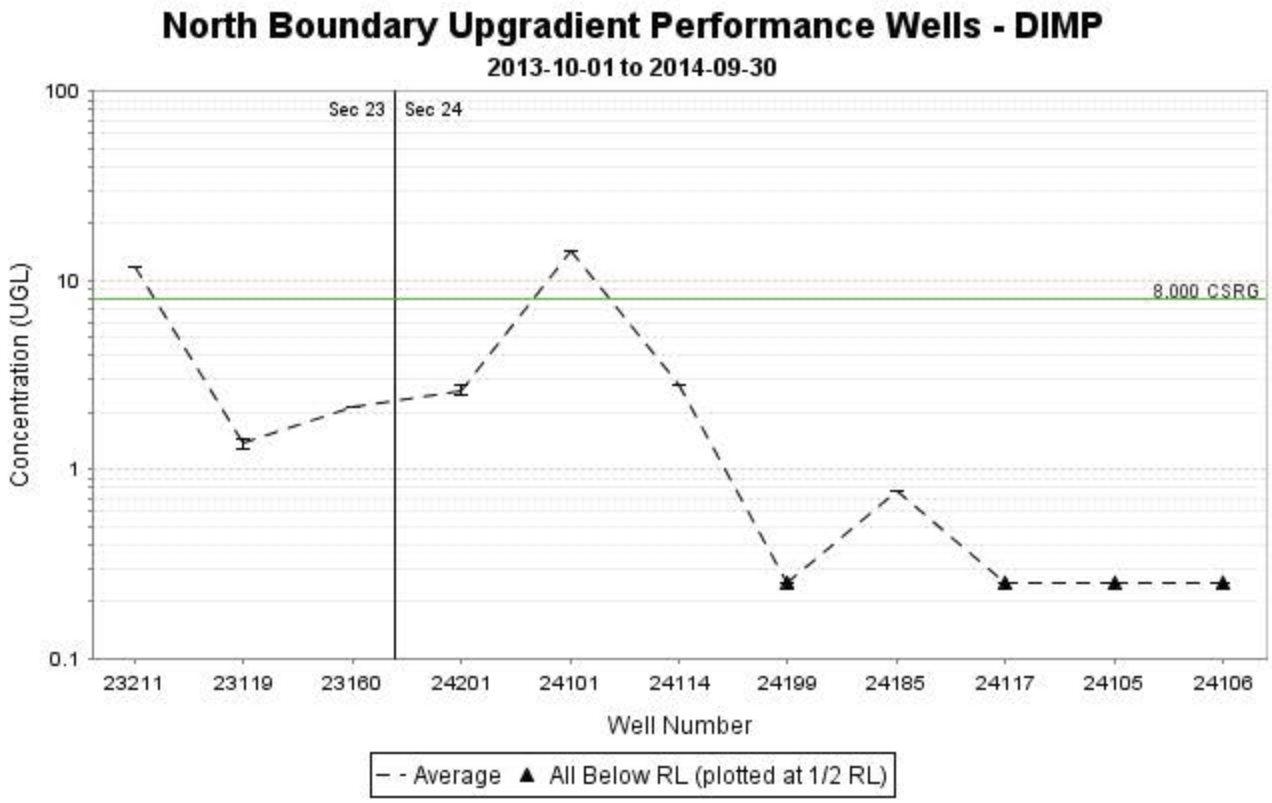

## North Boundary Downgradient Performance Wells - CHCL3

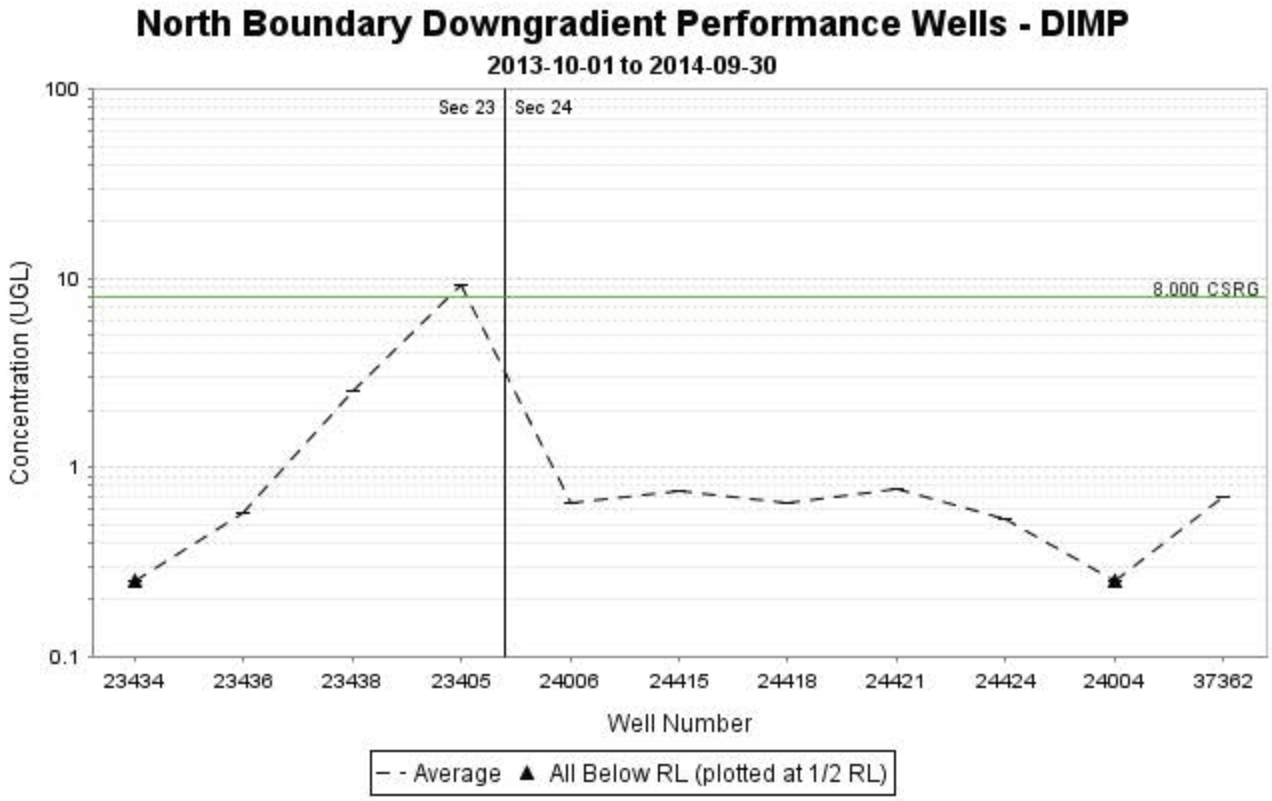
**2013-10-01 to 2014-09-30**




North Boundary Upgradient Performance Wells - CL
2013-10-01 to 2014-09-30
Sec 23
Sec 24
250.00 CSRG
Concentration (MGL)
10000
1000
100
10
23211
23119
23160
24201
24101
24114
24199
24185
24117
24105
24106
Well Number
Average

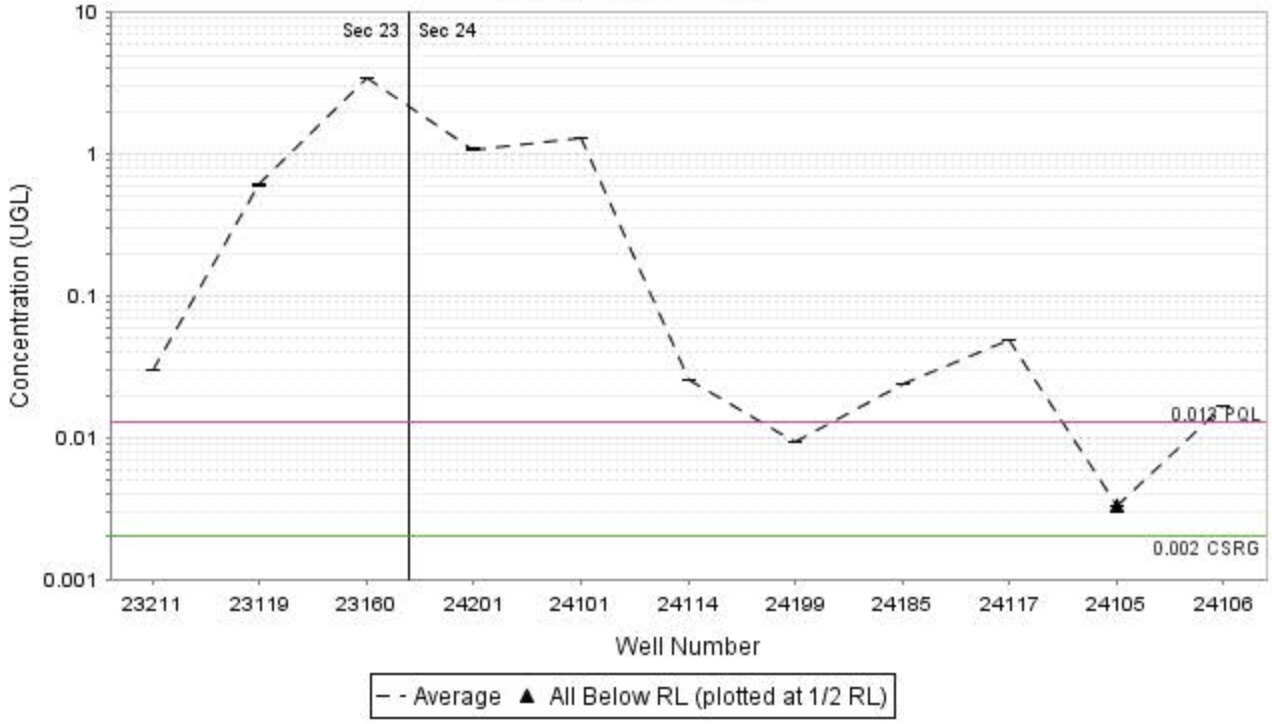

North Boundary Downgradient Performance Wells - CL
2013-10-01 to 2014-09-30
Sec 23
Sec 24
250.00 CSRG
Concentration (MGL)
10000
1000
100
23434
23436
23438
23405
24006
24415
24418
24421
24424
24004
37362
Well Number
Average


North Boundary Upgradient Performance Wells - DIMP
2013-10-01 to 2014-09-30
Sec 23
Sec 24
8.000 CSRG
Concentration (UGL)
100
10
1
0.1
23211
23119
23160
24201
24101
24114
24199
24185
24117
24105
24106
Well Number
- - Average
All Below RL (plotted at 1/2 RL)


North Boundary Downgradient Performance Wells - DIMP
2013-10-01 to 2014-09-30
Sec 23
Sec 24
8.000 CSRG
Concentration (UGL)
100
10
1
0.1
23434
23436
23438
23405
24006
24415
24418
24421
24424
24004
37362
Well Number
- - Average
All Below RL (plotted at 1/2 RL)

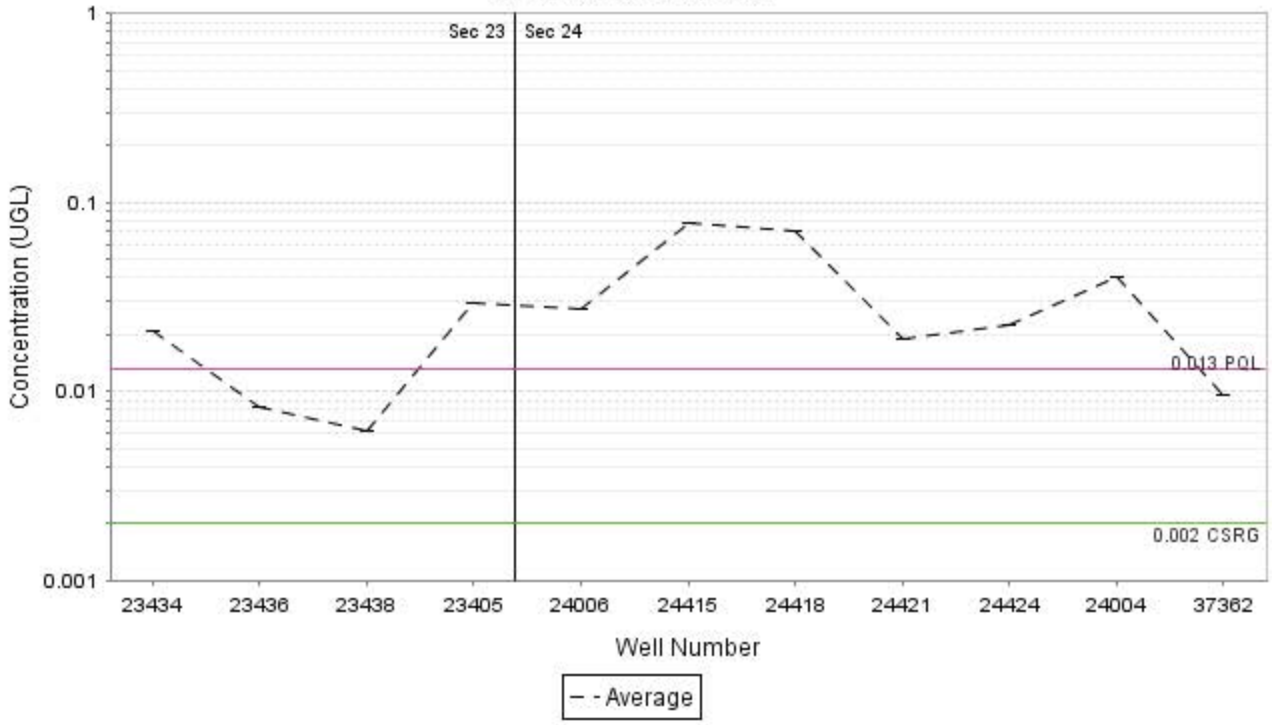
## North Boundary Upgradient Performance Wells - DLDRN

2013-10-01 to 2014-09-30



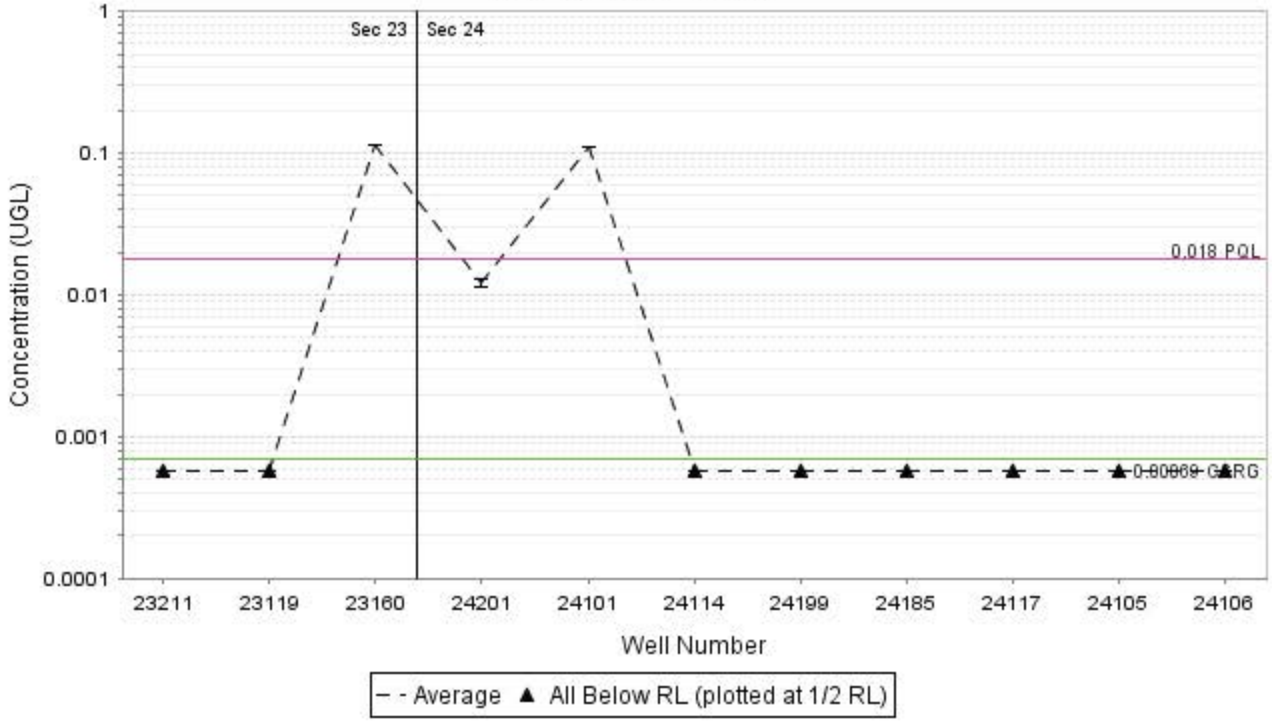

## North Boundary Downgradient Performance Wells - DLDRN

2013-10-01 to 2014-09-30



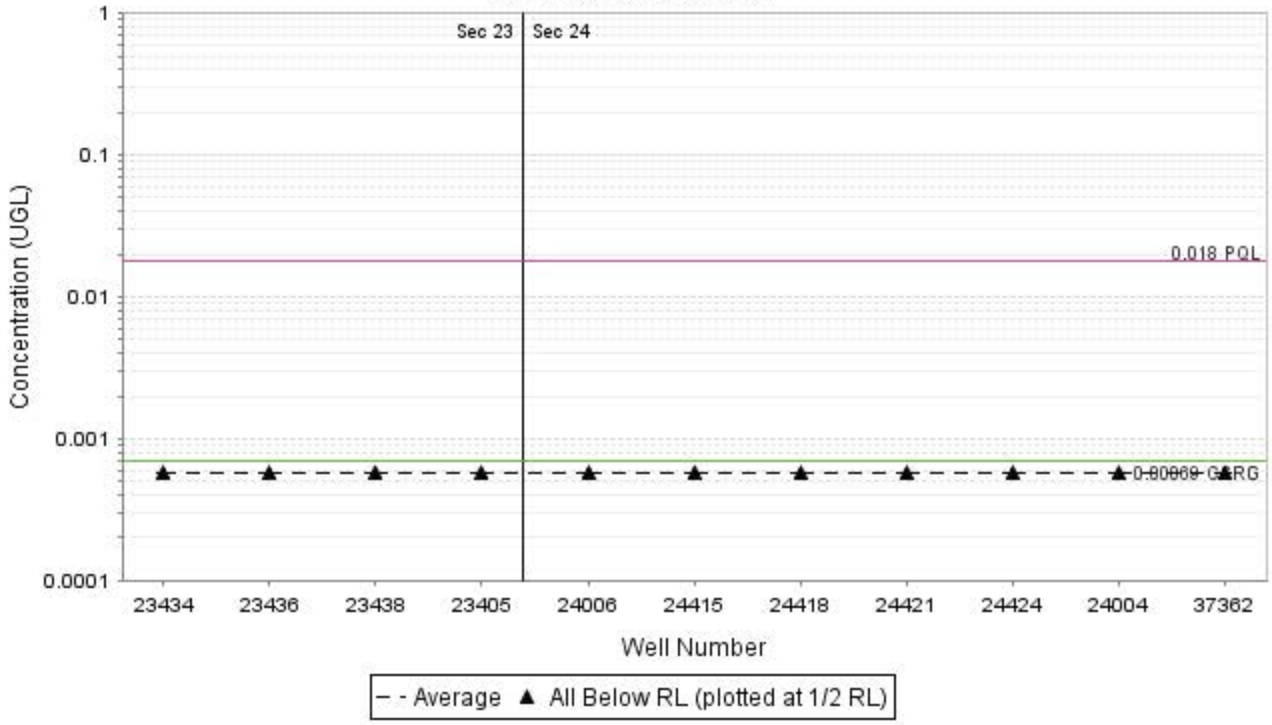
## North Boundary Upgradient Performance Wells - NNDMEA

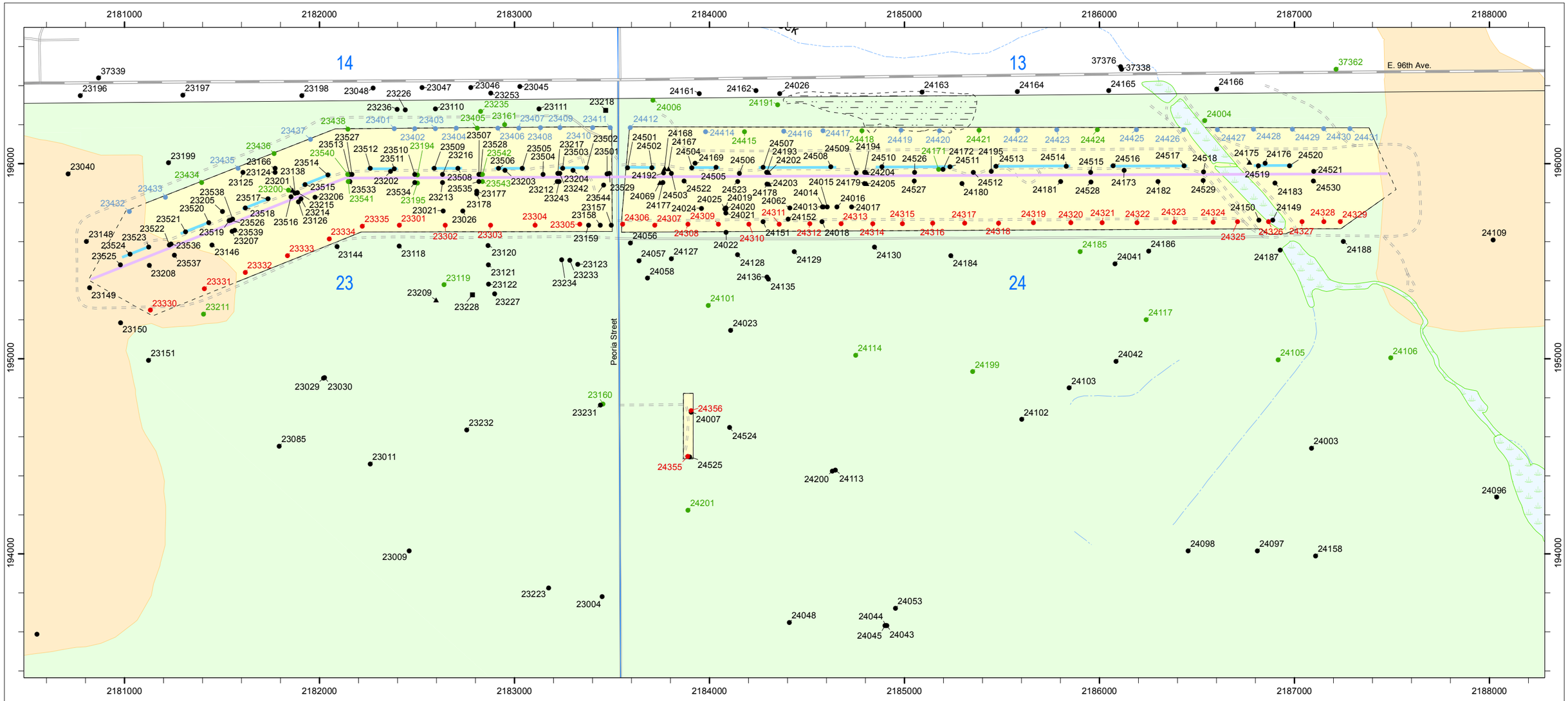
2013-10-01 to 2014-09-30




## North Boundary Downgradient Performance Wells - NNDMEA

2013-10-01 to 2014-09-30






# FY14 North Boundary Monitoring Well Network of the Unconfined Aquifer

## Legend

- Performance Water Quality Wells
- Extraction Wells
- Former Recharge Wells
- Monitoring Wells
  - Confined Flow System
  - Unconfined Flow System
  - Questionable Unconfined Flow System
- Slurry Walls
- Recharge Trenches
- Local Roads
- Secondary Roads
- Primary Roads
- Unimproved Roads
- Intermittent Streams
- Ditches
- Army Maintained Area
- USFWS Managed Area
- Section Lines
- Dry Lake Areas
- Wetlands
- Lakes and Ponds
- Unsaturated Alluvium (Developed using summer 2014 data)
- Army Maintained Area & USFWS Managed Area Border (shown under the Unsaturated Alluvium layer)

N

0 500 1,000
Feet

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

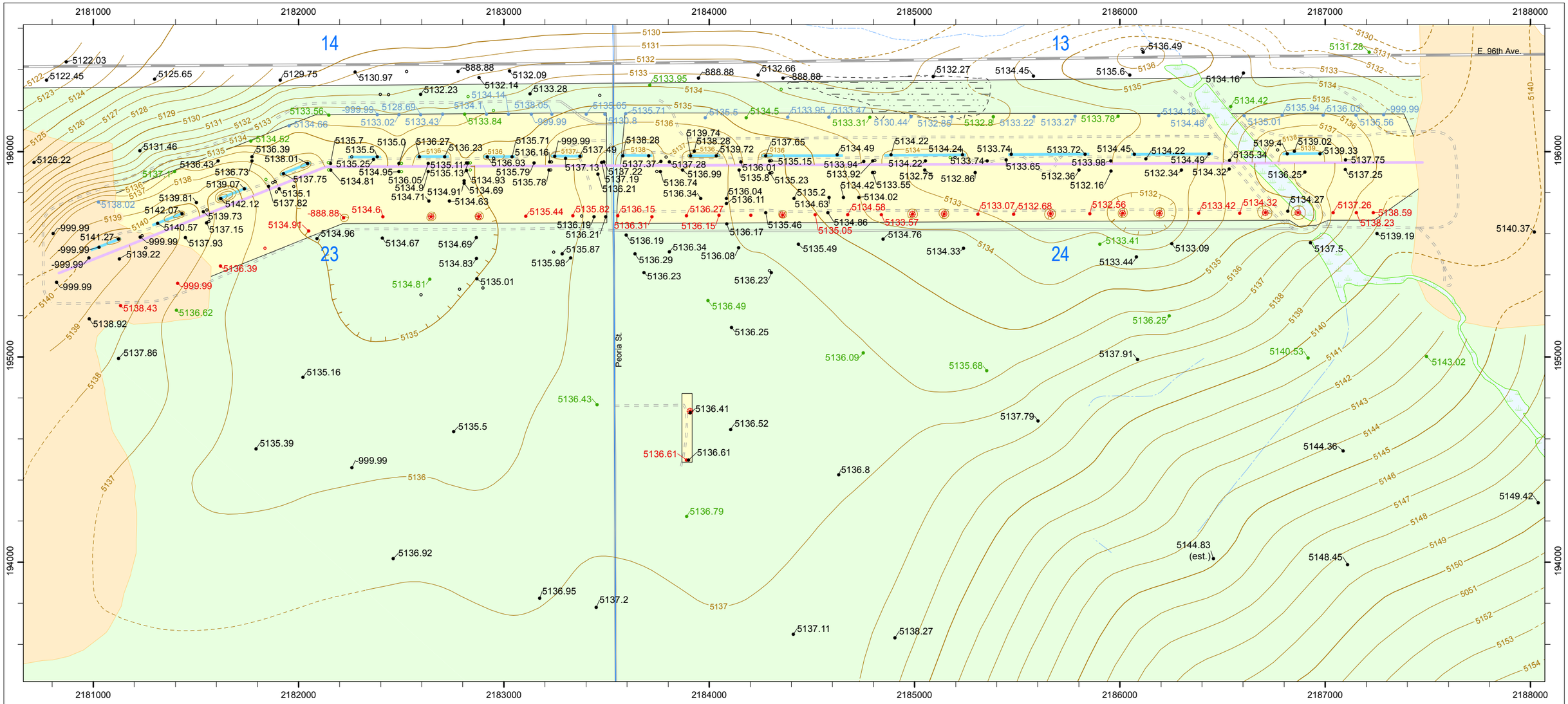
Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-17

Army/Shell GIS

8/27/2015 RMITS

M:\projects\oars\oar14\mxds\fy14nb_well_location.mxd




# FY14 4th Quarter Groundwater Elevation Contours of the Unconfined Aquifer North Boundary Containment System

## Legend

- Army Maintained Area
- USFWS Managed Area
- Dry Lake Areas
- Wetlands
- Lakes and Ponds
- Unsaturated Alluvium (Developed using summer 2014 data)
- Section Lines
- Intermittent Streams
- Ditches
- Slurry Walls
- Recharge Trenches
- Unimproved Roads
- Local Roads
- Secondary Roads
- Primary Roads
- Water elevation contour - 1 foot interval. Hachures indicate depression. Water elevations collected July 2014.
- Approximate water elevation contour

Measured Wells Used for Contouring with Water Elevations (-999.99 indicates dry well, -888.88 indicates unable to measure well - see remarks in water elevation listings included on CD)

- 5109.86 Monitoring Wells
- 5109.86 Extraction Wells
- 5109.86 Recharge Wells
- 5109.86 Performance Water Quality Wells

Wells Not Sampled or Not Used for Contouring

- Depression in water table due to extraction well. May not match actual areal extent of depression.
- Monitoring Wells
- Extraction Wells
- Recharge Wells
- Performance Water Quality Wells

N

0 250 500
Feet

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

# Figure B-18

Army/Shell GIS

8/27/2015 RMITS

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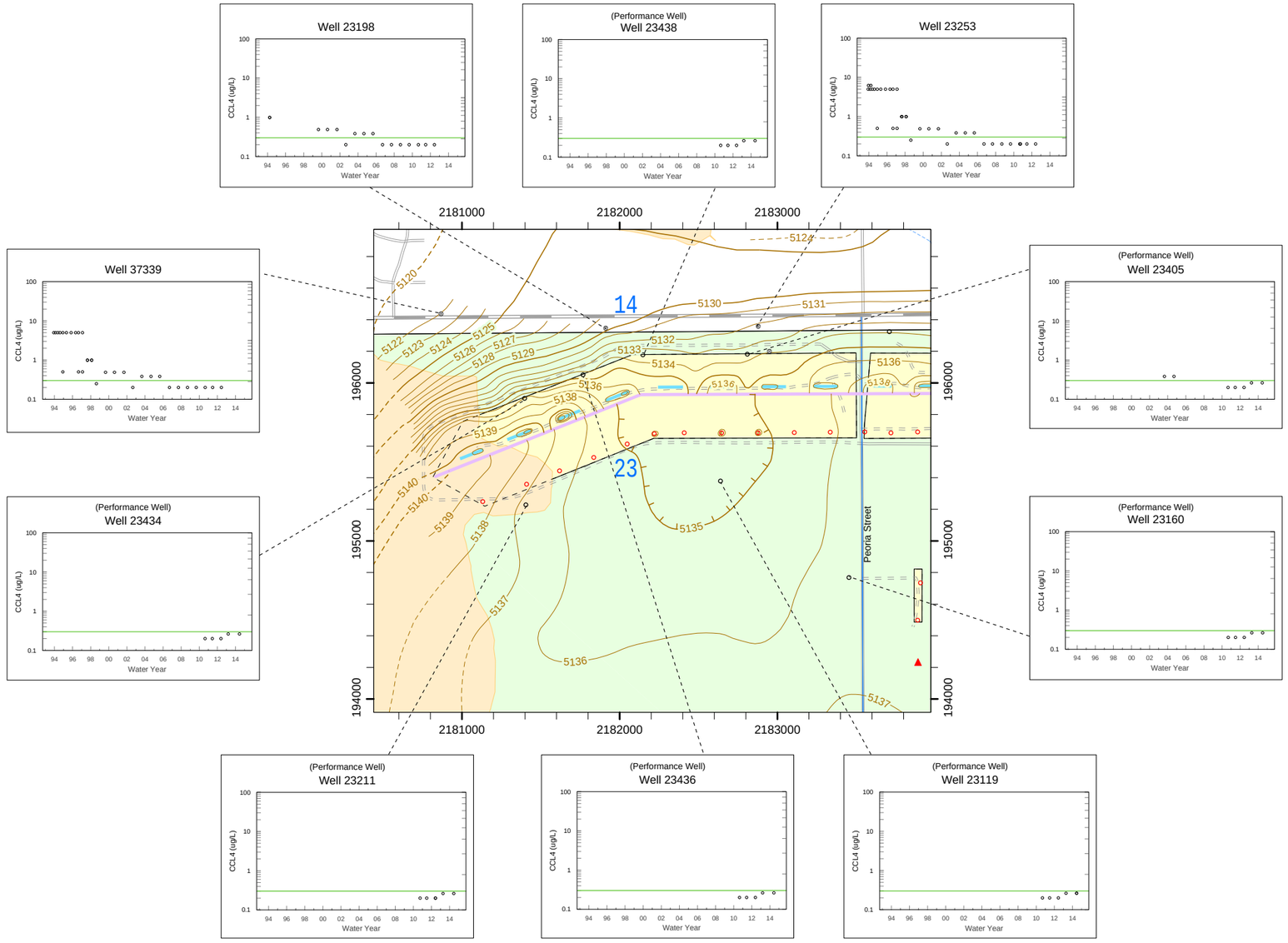


Army Maintained
USFWS Managed
Dry Lake Areas
Wetlands
Lakes and Ponds
Unsaturated Alluvium
(Developed using summer 2014 data)
Section Lines
Intermittent Streams
Ditches

Slurry Walls
Recharge Trenches
Water elevation contour - 1 foot interval.
Hachures indicate depression.
Water elevations collected July 2014.
Approximate water elevation contour
Paved
Local Roads
Secondary Roads
Primary Roads
Unimproved Roads

Treatment System Wells Not Used For Water Quality
Extraction Wells

Water Quality Wells
Chemical Detected At or Above Containment System Remediation Goal (CSRG)*
Chemical Detected Below CSRG*
Chemical Less Than Method Reporting Limit (MRL)*
Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for Carbon Tetrachloride, 0.30 micrograms per liter

# FY14 Carbon Tetrachloride Concentration for Selected Wells in Section 23 of the Unconfined Aquifer North Boundary Containment System

N

0 400 800
Feet

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-19.1

Army/Shell GIS

8/26/2015 RMITS

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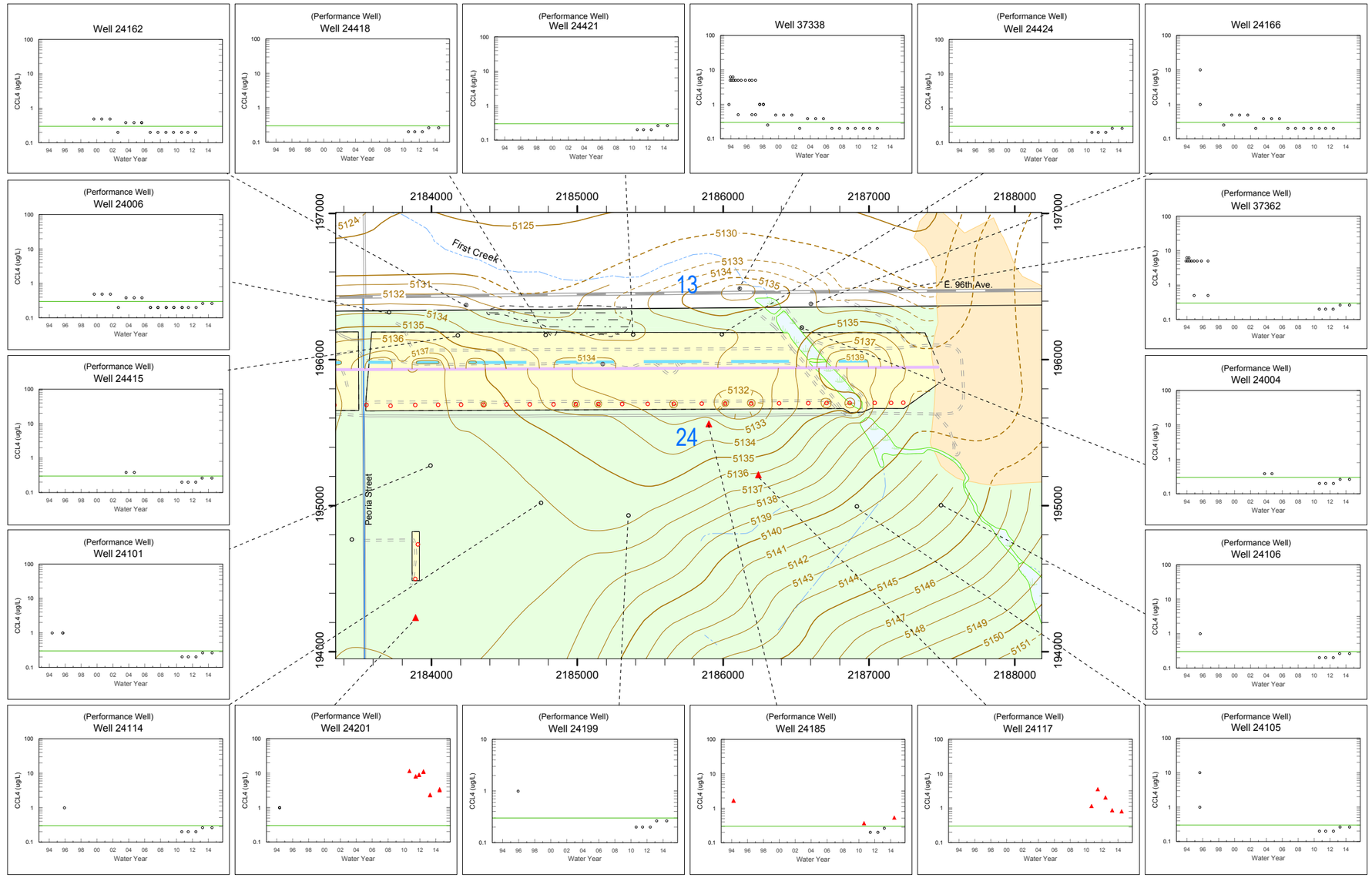


Army Maintained
USFWS Managed
Dry Lake Areas
Wetlands
Lakes and Ponds
Unsaturated Alluvium (Developed using summer 2014 data)
Section Lines
Intermittent Streams
Ditches

Slurry Walls
Recharge Trenches
Water elevation contour - 1 foot interval. Hachures indicate depression. Water elevations collected July 2014.
Approximate water elevation contour
Paved
Local Roads
Secondary Roads
Primary Roads
Unimproved Roads

Treatment System Wells Not Used For Water Quality
Extraction Wells

Water Quality Wells
Chemical Detected At or Above Containment System Remediation Goal (CSRG)*
Chemical Detected Below CSRG*
Chemical Less Than Method Reporting Limit (MRL)*
Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for Carbon Tetrachloride, 0.30 micrograms per liter

## FY14 Carbon Tetrachloride Concentration for Selected Wells in Section 24 of the Unconfined Aquifer North Boundary Containment System

N

0 400 800 Feet

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

# Figure B-19.2

## Army/Shell GIS

8/26/2015 RMITS

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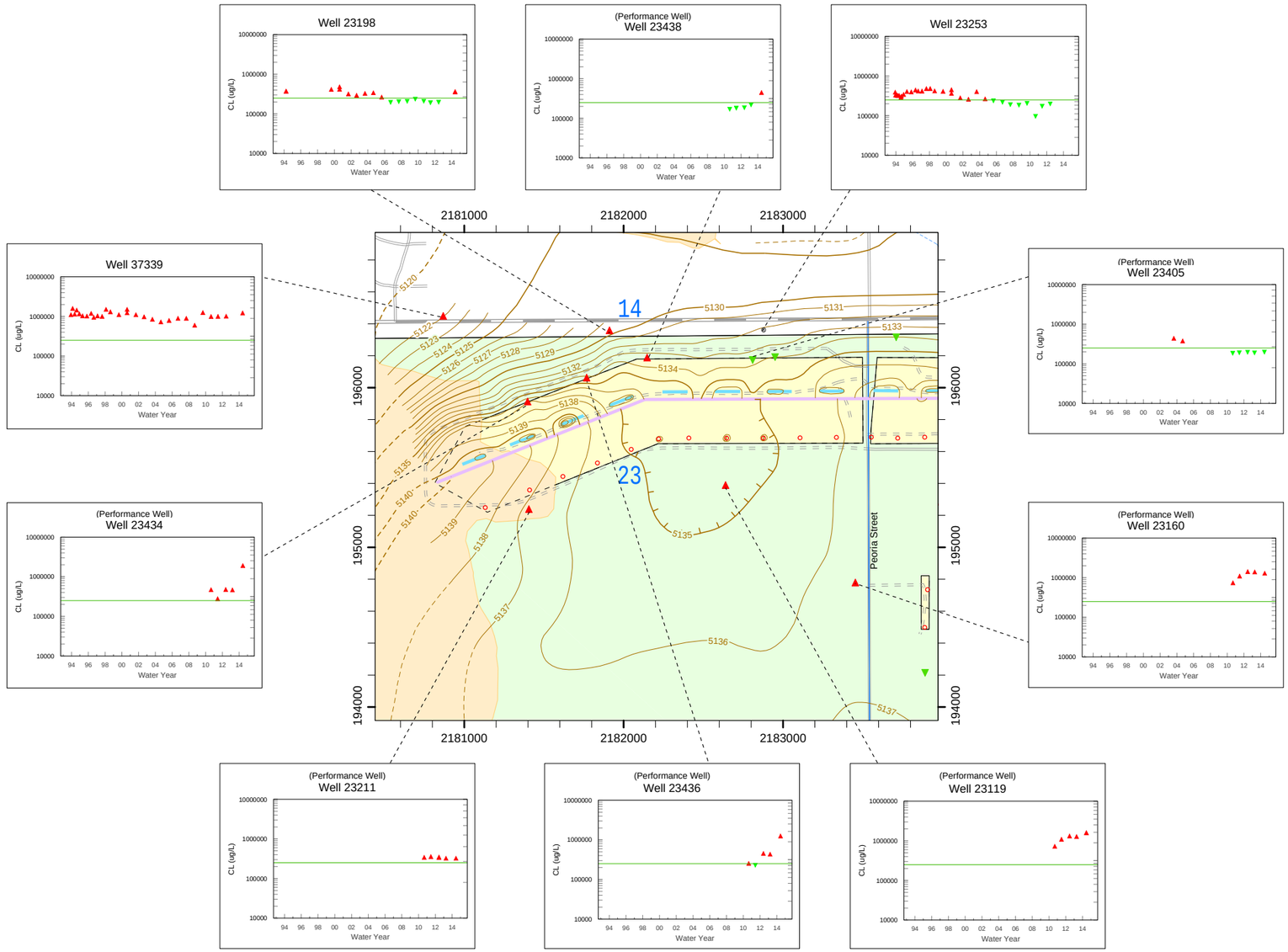


Army Maintained

USFWS Managed

Dry Lake Areas

Wetlands

Lakes and Ponds

Unsaturated Alluvium
(Developed using summer 2014 data)

Section Lines

Intermittent Streams

Ditches

Slurry Walls

Recharge Trenches

Water elevation contour - 1 foot interval.
Hachures indicate depression.
Water elevations collected July 2014.

Approximate water elevation contour

Paved

Local Roads

Secondary Roads

Primary Roads

Unimproved Roads

Treatment System Wells Not Used For Water Quality

Extraction Wells

Water Quality Wells

Chemical Detected At or Above Containment System Remediation Goal (CSRG)*

Chemical Detected Below CSRG*

Chemical Less Than Method Reporting Limit (MRL)*

Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for Chloride, 250 milligrams per liter

# FY14 Chloride Concentration for Selected Wells in Section 23 of the Unconfined Aquifer North Boundary Containment System

N

0 400 800 Feet

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-20.1

Army/Shell GIS

8/26/2015 RMITS

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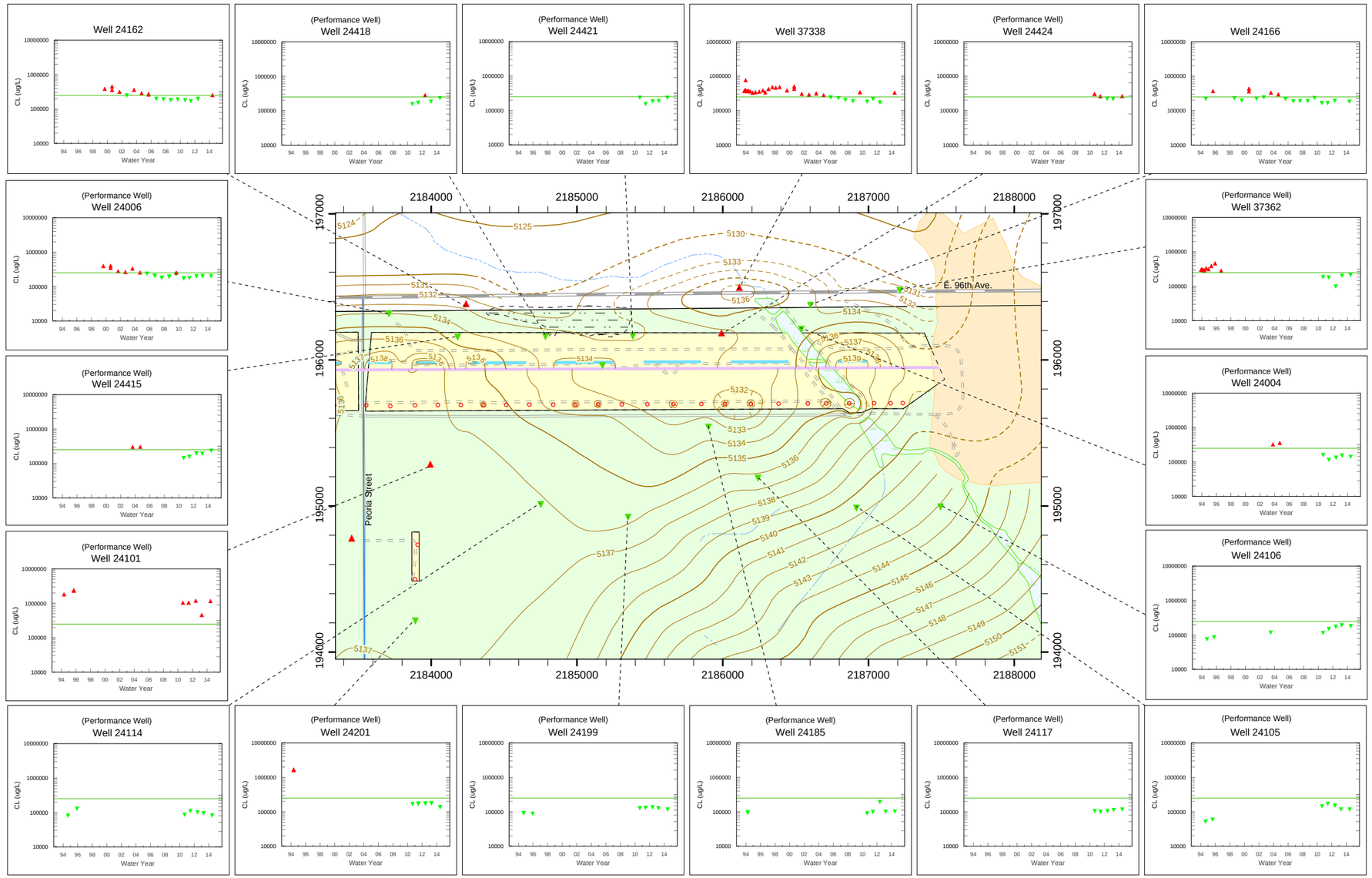


Army Maintained

USFWS Managed

Dry Lake Areas

Wetlands

Lakes and Ponds

Unsaturated Alluvium
(Developed using summer 2014 data)

Section Lines

Intermittent Streams

Ditches

Slurry Walls

Recharge Trenches

Water elevation contour - 1 foot interval.
Hachures indicate depression.
Water elevations collected July 2014.

Approximate water elevation contour

Paved

Local Roads

Secondary Roads

Primary Roads

Unimproved Roads

Treatment System Wells Not Used For Water Quality

Extraction Wells

Water Quality Wells

Chemical Detected At or Above Containment System Remediation Goal (CSRG)*

Chemical Detected Below CSRG*

Chemical Less Than Method Reporting Limit (MRL)*

Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for Chloride, 250 milligrams per liter

# FY14 Chloride Concentration for Selected Wells in Section 24 of the Unconfined Aquifer North Boundary Containment System

N

0 400 800 Feet

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-20.2

Army/Shell GIS

8/26/2015 RMITS

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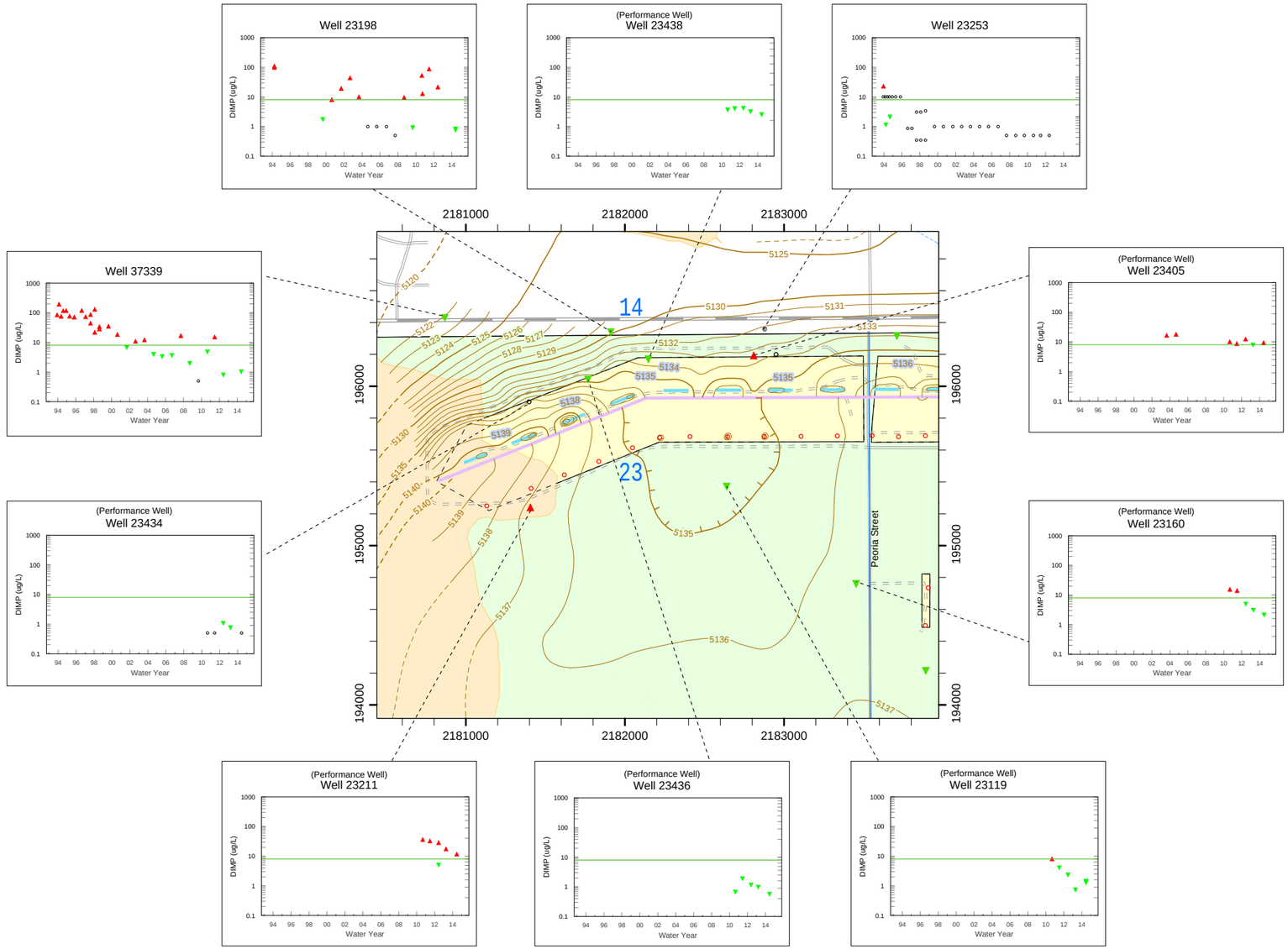


Army Maintained

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(Developed using summer 2014 data)

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Water elevation contour - 1 foot interval.
Hachures indicate depression.
Water elevations collected July 2014.

Approximate water elevation contour

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Treatment System Wells Not Used For Water Quality

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Water Quality Wells

Chemical Detected At or Above Containment System RemediationGoal (CSRG)*

Chemical Detected Below CSRG*

Chemical Less Than Method Reporting Limit (MRL)*

Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for Diisopropyl methylphosphonate, 8 micrograms per liter

FY14 Diisopropyl methylphosphonate Concentration
for Selected Wells in Section 23 of the
Unconfined Aquifer North Boundary Containment System

N

0 400 800
Feet

NAD27-NGVD29 Datum, US Survey Feet,
Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-21.1

Army/Shell GIS

8/26/2015 RMITS

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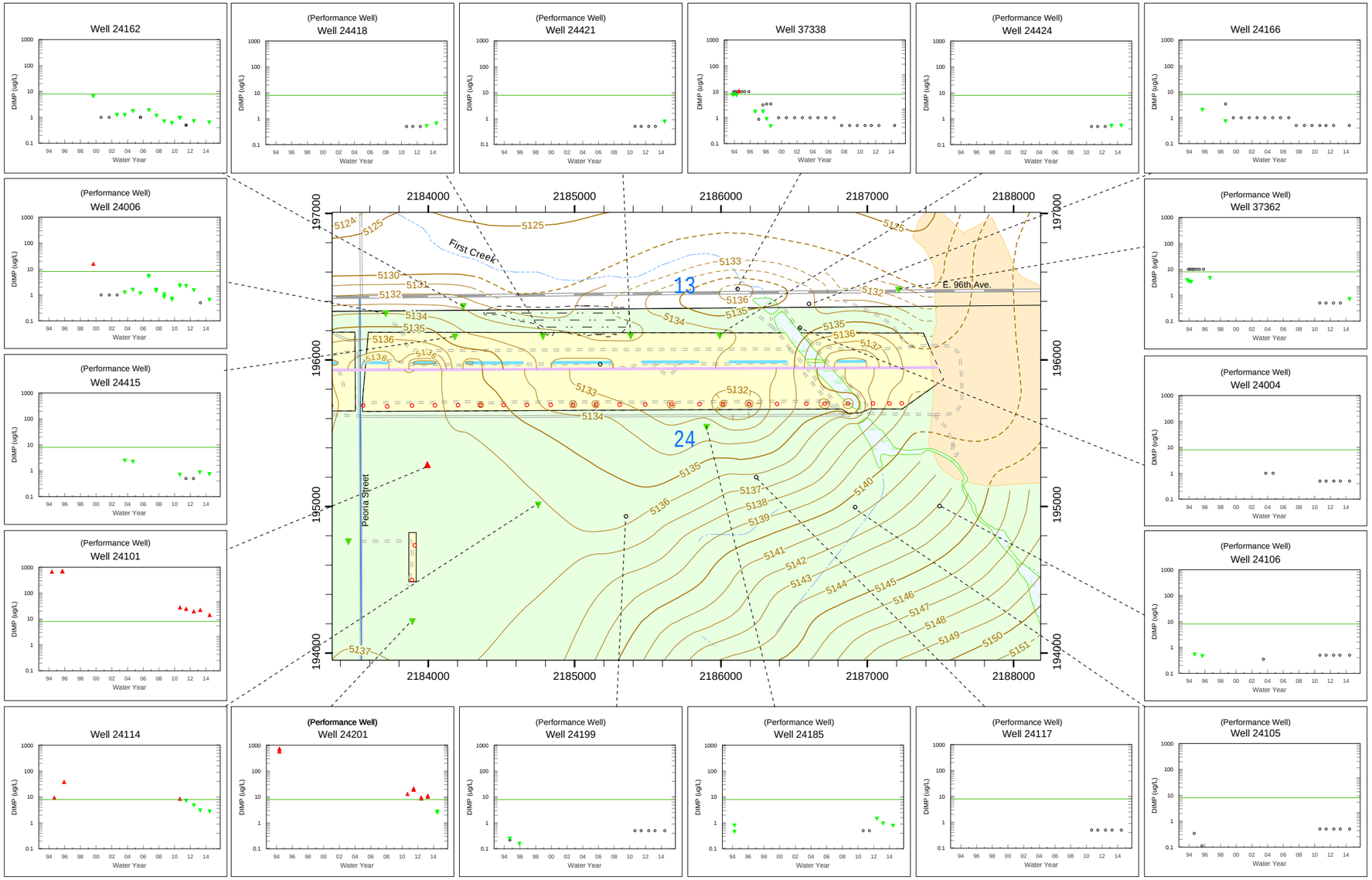


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Recharge Trenches
Water elevation contour - 1 foot interval. Hachures indicate depression. Water elevations collected July 2014.
Approximate water elevation contour
Paved
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Primary Roads
Unimproved Roads

Treatment System Wells Not Used For Water Quality
Extraction Wells

Water Quality Wells
Chemical Detected At or Above Containment System RemediationGoal (CSRG)*
Chemical Detected Below CSRG*
Chemical Less Than Method Reporting Limit (MRL)*
Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for Diisopropyl methylphosphonate, 8 micrograms per liter

FY14 Diisopropyl methylphosphonate Concentration
for Selected Wells in Section 24 of the
Unconfined Aquifer North Boundary Containment System

N

0 400 800 Feet

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-21.2

Army/Shell GIS

8/26/2015 RMITS

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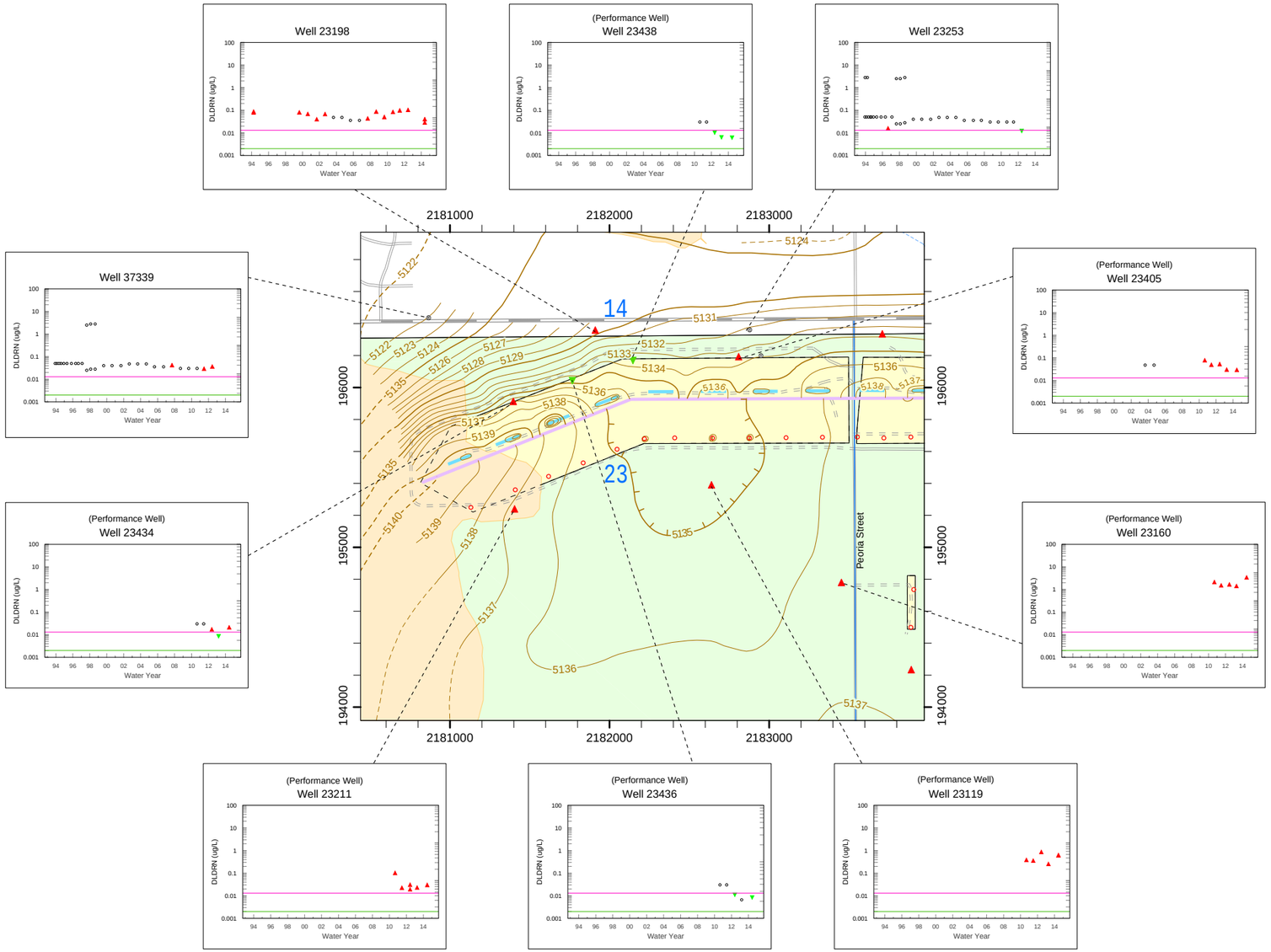


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Approximate water elevation contour

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Treatment System Wells Not Used For Water Quality

Extraction Wells

Water Quality Wells

Chemical Detected At or Above Practical Quantitation Limit (PQL)*

Chemical Detected Below Practical Quantitation Limit (PQL)*

Chemical Less Than Method Reporting Limit (MRL)*

Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for Dieldrin, 0.002 micrograms per liter

Graphed PQL indicator line for Dieldrin, 0.013 micrograms per liter

# FY14 Dieldrin Concentration for Selected Wells in Section 23 of the Unconfined Aquifer North Boundary Containment System

N

0 400 800 Feet

NAD27-NGVD29 Datum, US Survey Feet,
Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-22.1

Army/Shell GIS

8/26/2015 RMITS

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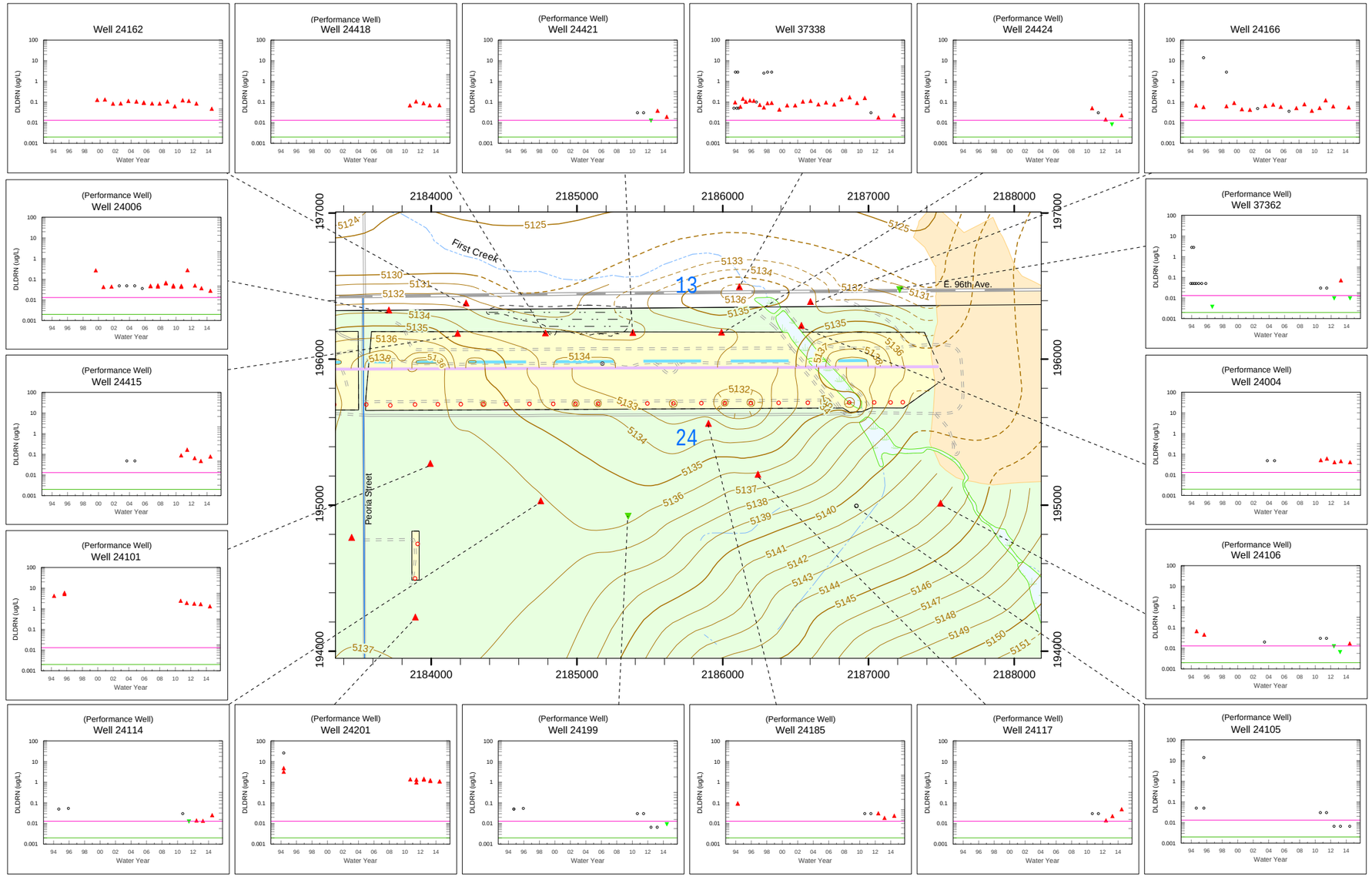


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Treatment System Wells Not Used For Water Quality

Extraction Wells

Water Quality Wells

Chemical Detected At or Above Practical Quantitation Limit (PQL)*

Chemical Detected Below Practical Quantitation Limit (PQL)*

Chemical Less Than Method Reporting Limit (MRL)*

Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for Dieldrin, 0.002 micrograms per liter

Graphed PQL indicator line for Dieldrin, 0.013 micrograms per liter

# FY14 Dieldrin Concentration for Selected Wells in Section 24 of the Unconfined Aquifer North Boundary Containment System

N

0 400 800 Feet

NAD27-NGVD29 Datum, US Survey Feet,
Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-22.2

Army/Shell GIS

8/26/2015 RMITS

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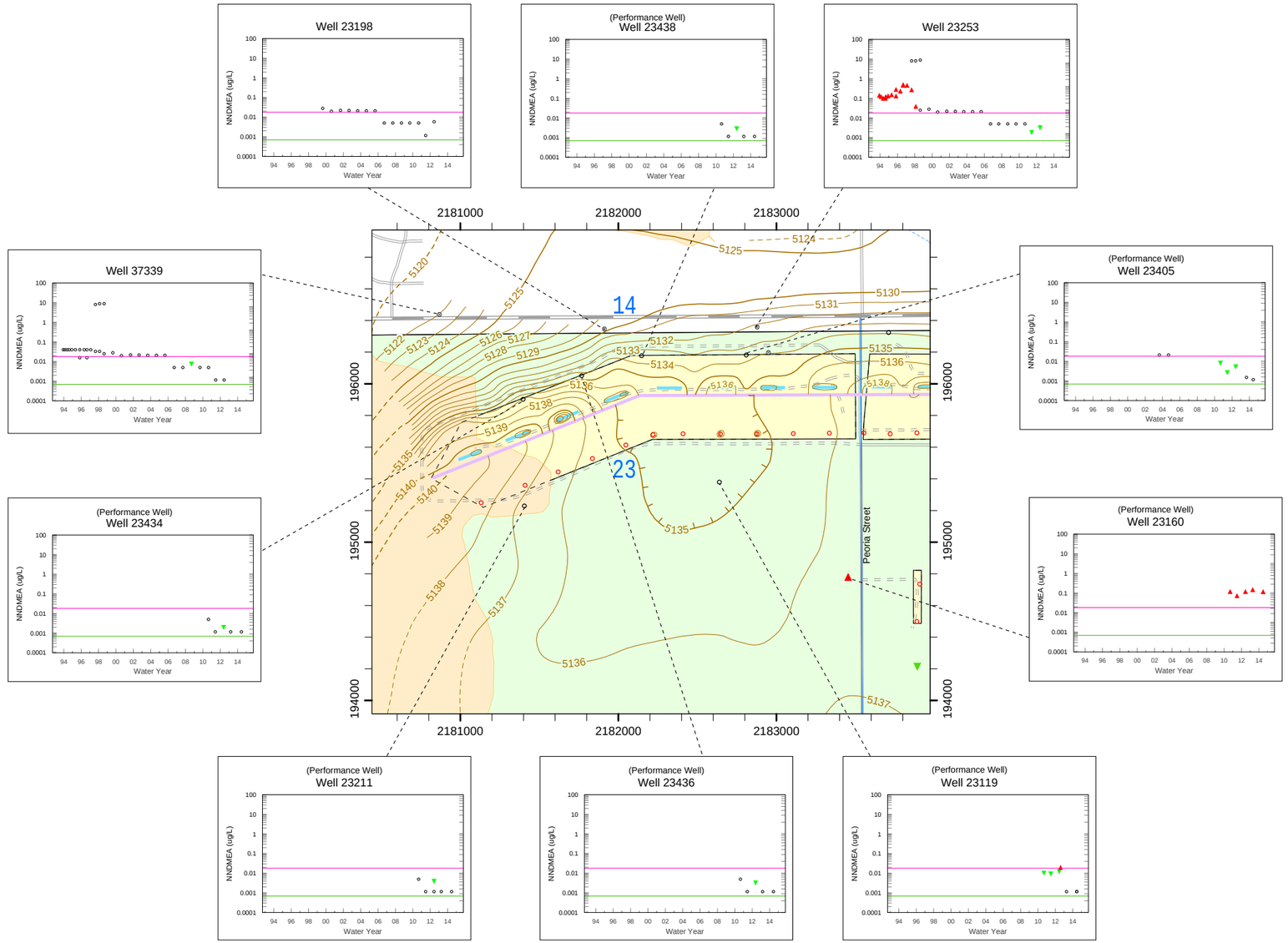


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Water elevations collected July 2014.
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Treatment System Wells Not Used For Water Quality

Extraction Wells

Water Quality Wells

Chemical Detected At or Above Practical Quantitation Limit (PQL)*

Chemical Detected Below Practical Quantitation Limit (PQL)*

Chemical Less Than Method Reporting Limit (MRL)*

Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for N-Nitrosodimethylamine, 0.00069 micrograms per liter

Graphed PQL indicator line for N-Nitrosodimethylamine, 0.018 micrograms per liter

# FY14 N-Nitrosodimethylamine Concentration for Selected Wells in Section 23 of the Unconfined Aquifer North Boundary Containment System

N

0 400 800 Feet

NAD27-NGVD29 Datum, US Survey Feet, Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-23.1

Army/Shell GIS

8/26/2015 RMITS

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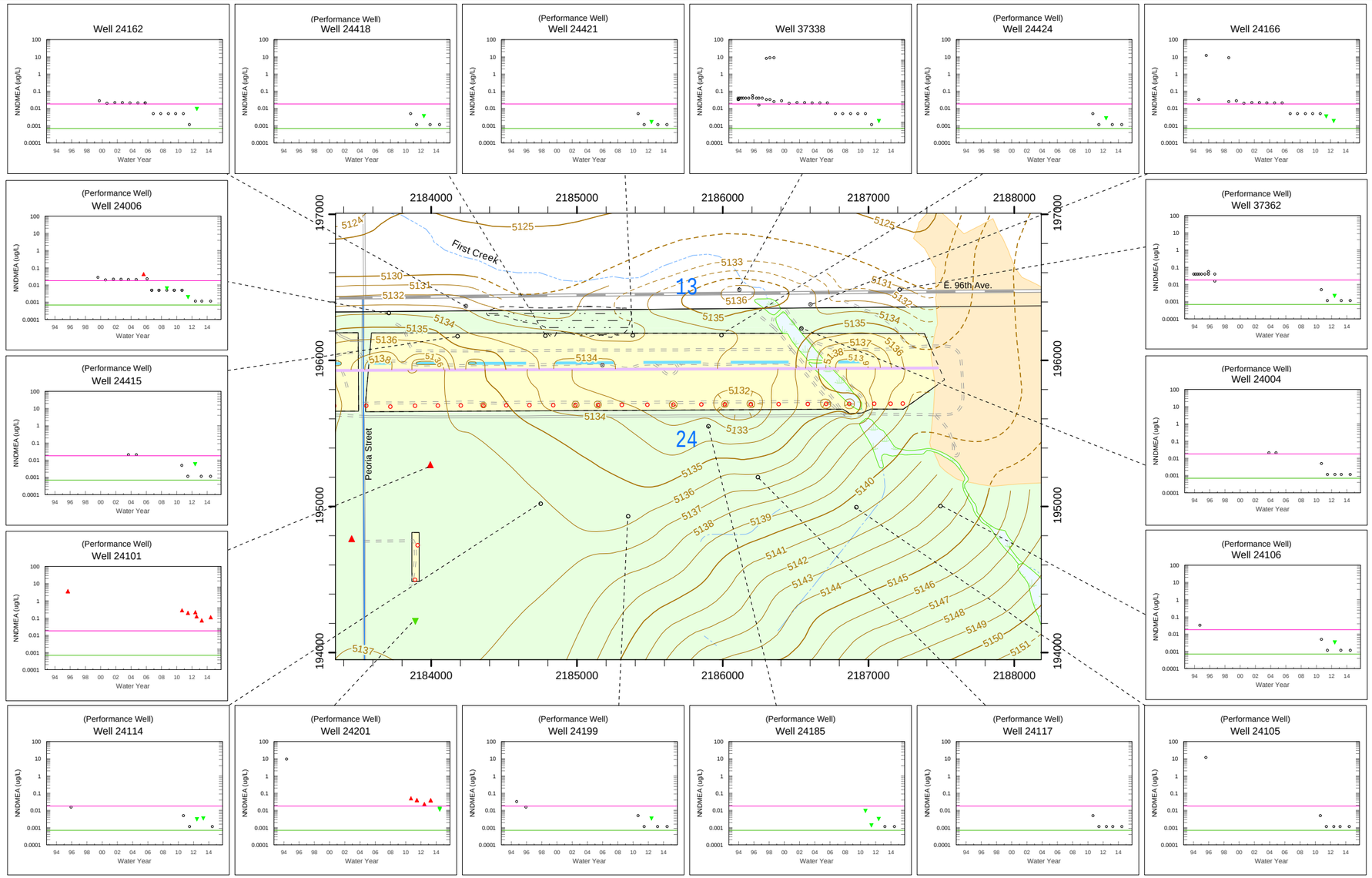


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Chemical Detected At or Above Practical Quantitation Limit (PQL)*

Chemical Detected Below Practical Quantitation Limit (PQL)*

Chemical Less Than Method Reporting Limit (MRL)*

Chemical Not Sampled In FY14

* Mapped symbols reflect FY14 chemical values only.

Graphed CSRG indicator line for N-Nitrosodimethylamine, 0.00069 micrograms per liter

Graphed PQL indicator line for N-Nitrosodimethylamine, 0.018 micrograms per liter

# FY14 N-Nitrosodimethylamine Concentration for Selected Wells in Section 24 of the Unconfined Aquifer North Boundary Containment System

N

0 400 800 Feet

NAD27-NGVD29 Datum, US Survey Feet,
Colorado North Zone

Sources: U.S. Army, RMA GIS, PMC, OMC, Shell/URS Corp.

Figure B-23.2

Army/Shell GIS

8/26/2015 RMITS

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