Figure 73
Arsenic Concentrations Versus Mean Values in Soil
North Pole Refinery
Flint HIlls Resources Alaska

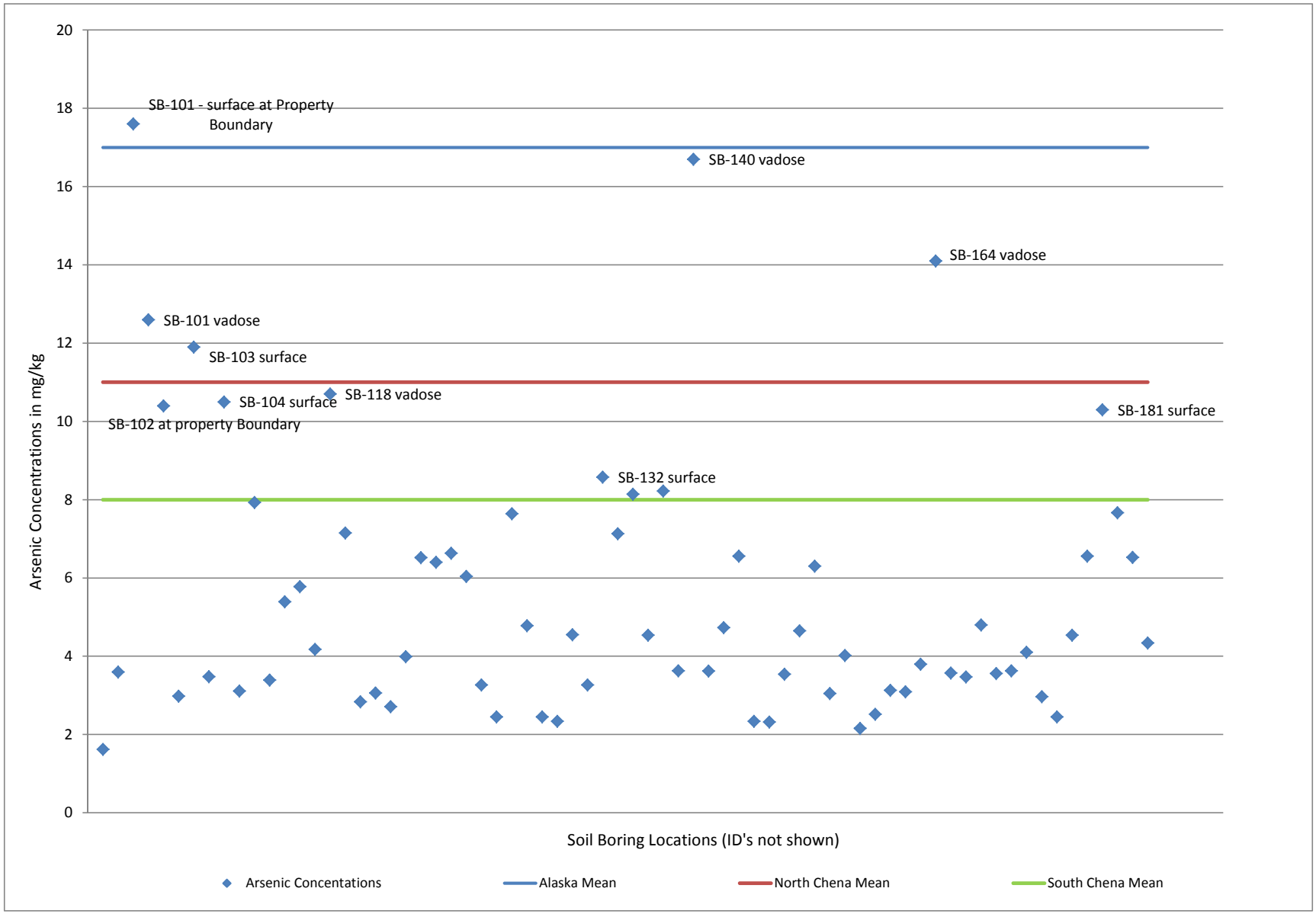
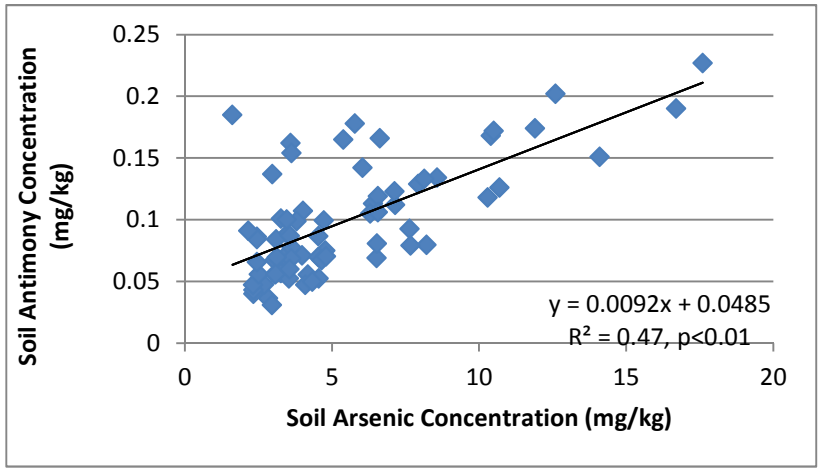
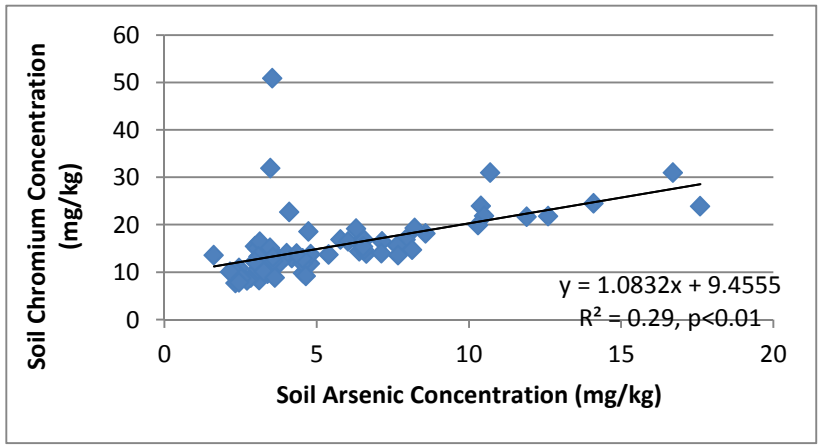


Figure 74
Arsenic Concentrations Versus Other Metals in Soil
North Pole Refinery
Flint Hills Resources Alaska





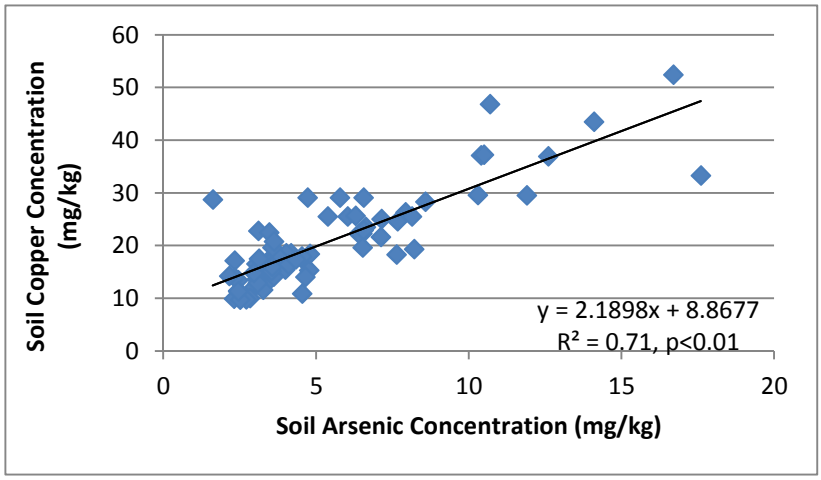
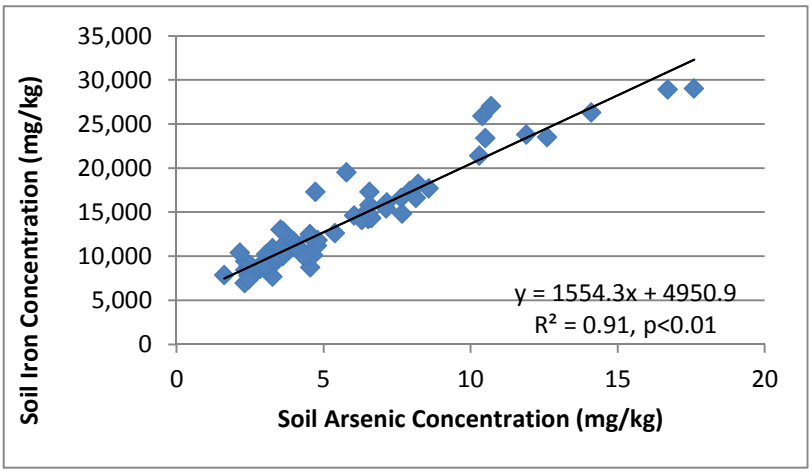
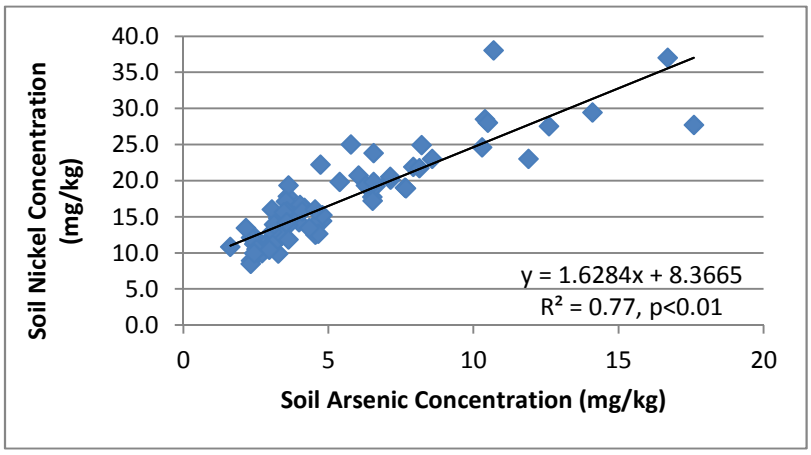


Figure 74
Arsenic Concentrations Versus Other Metals in Soil
North Pole Refinery
Flint Hills Resources Alaska





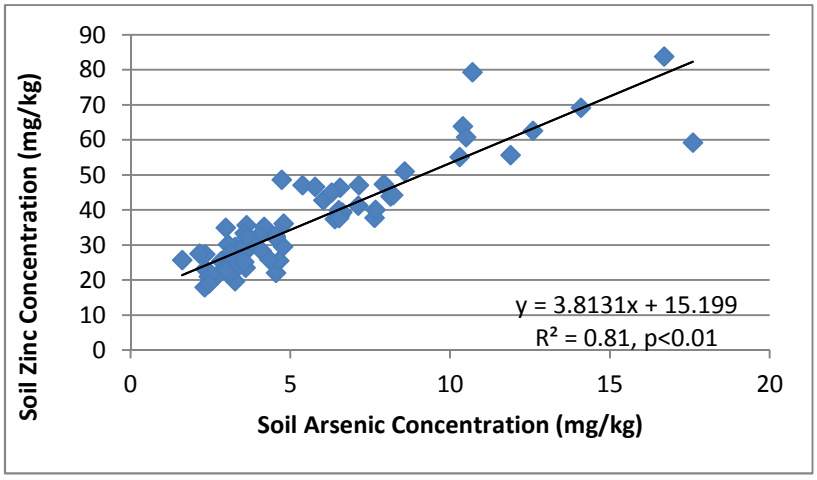


Figure 75
Benzene Concentrations Versus Arsenic Concentrations in Soil
North Pole Refinery
Flint HIlls Resources Alaska

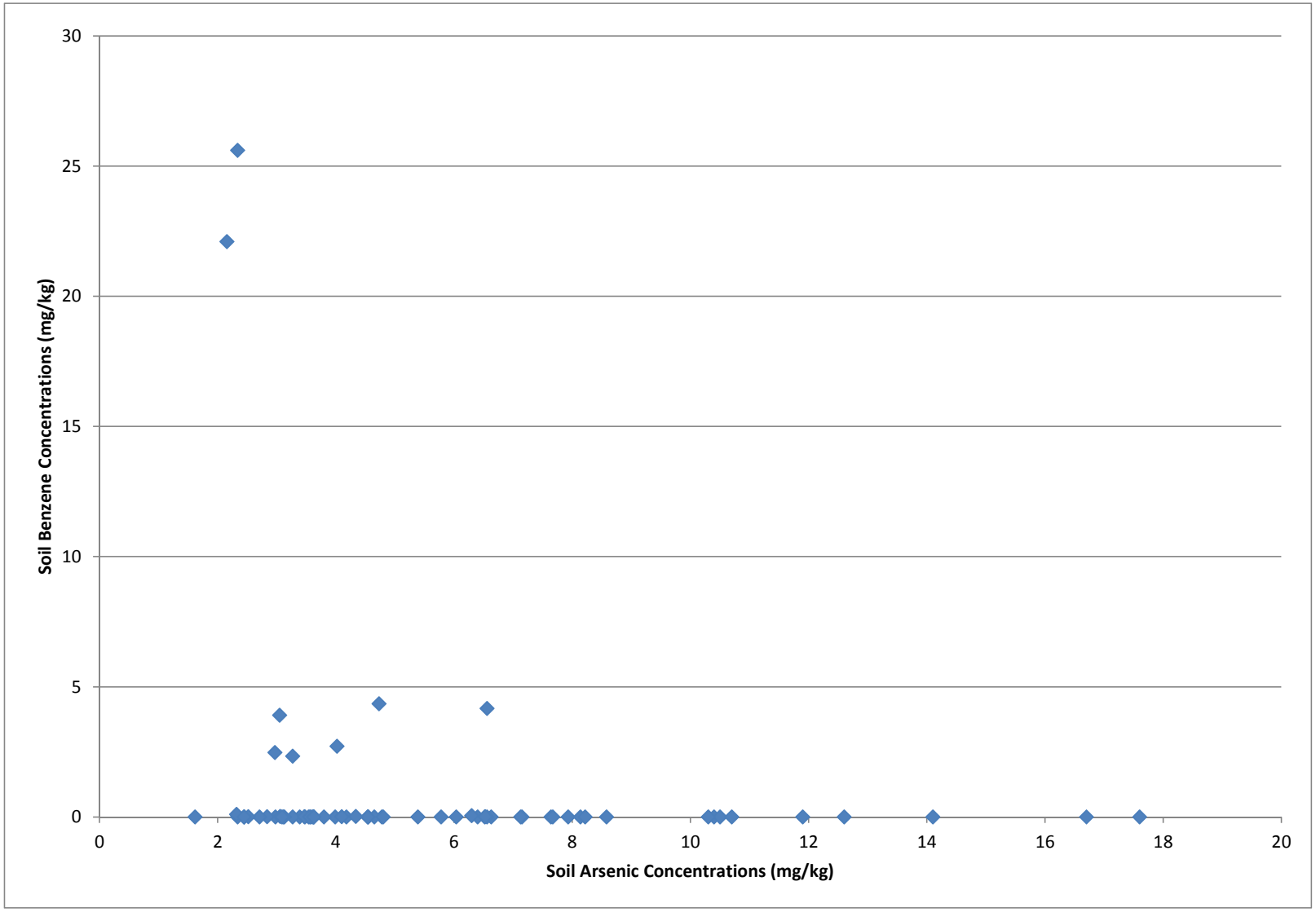
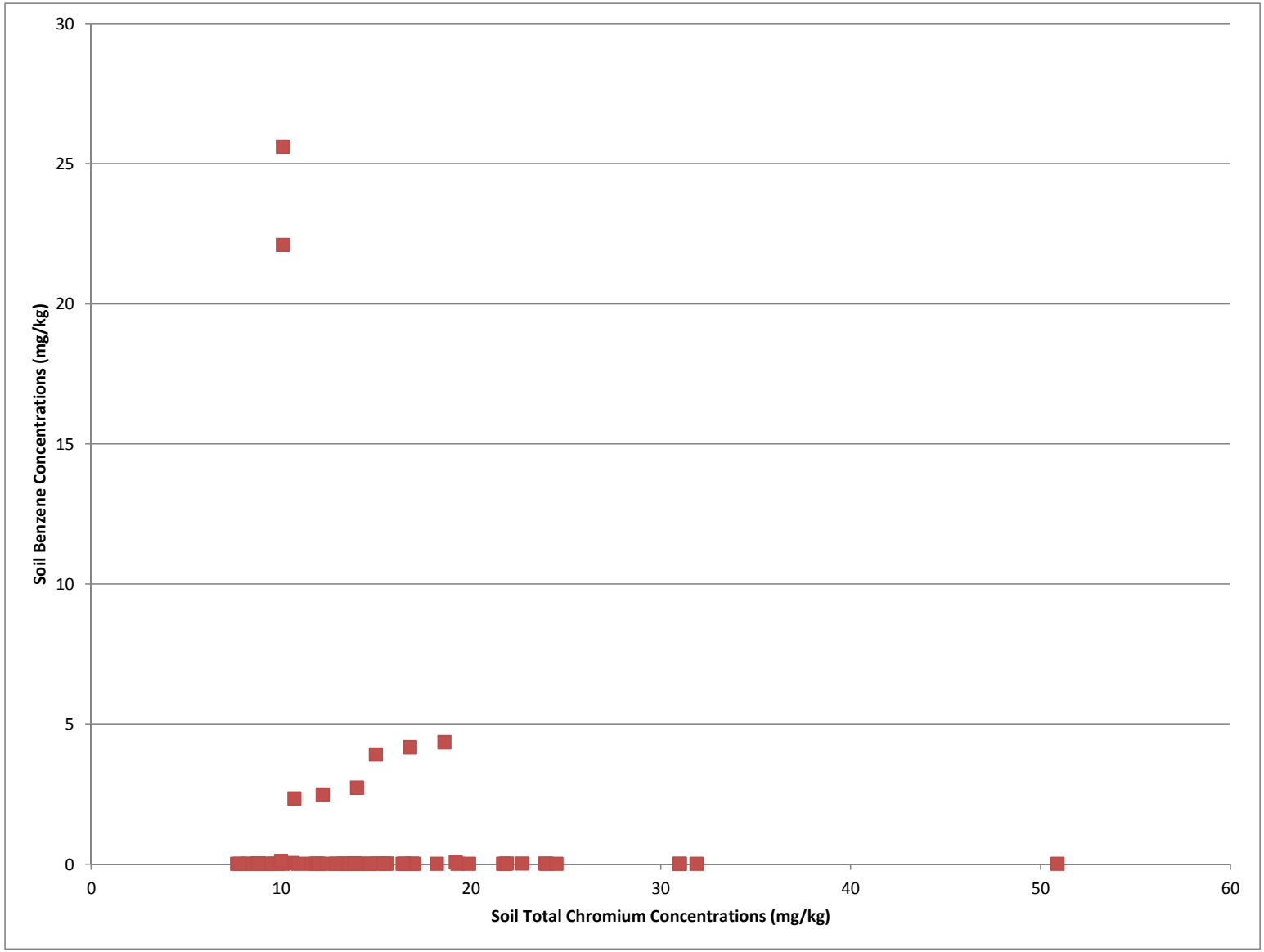
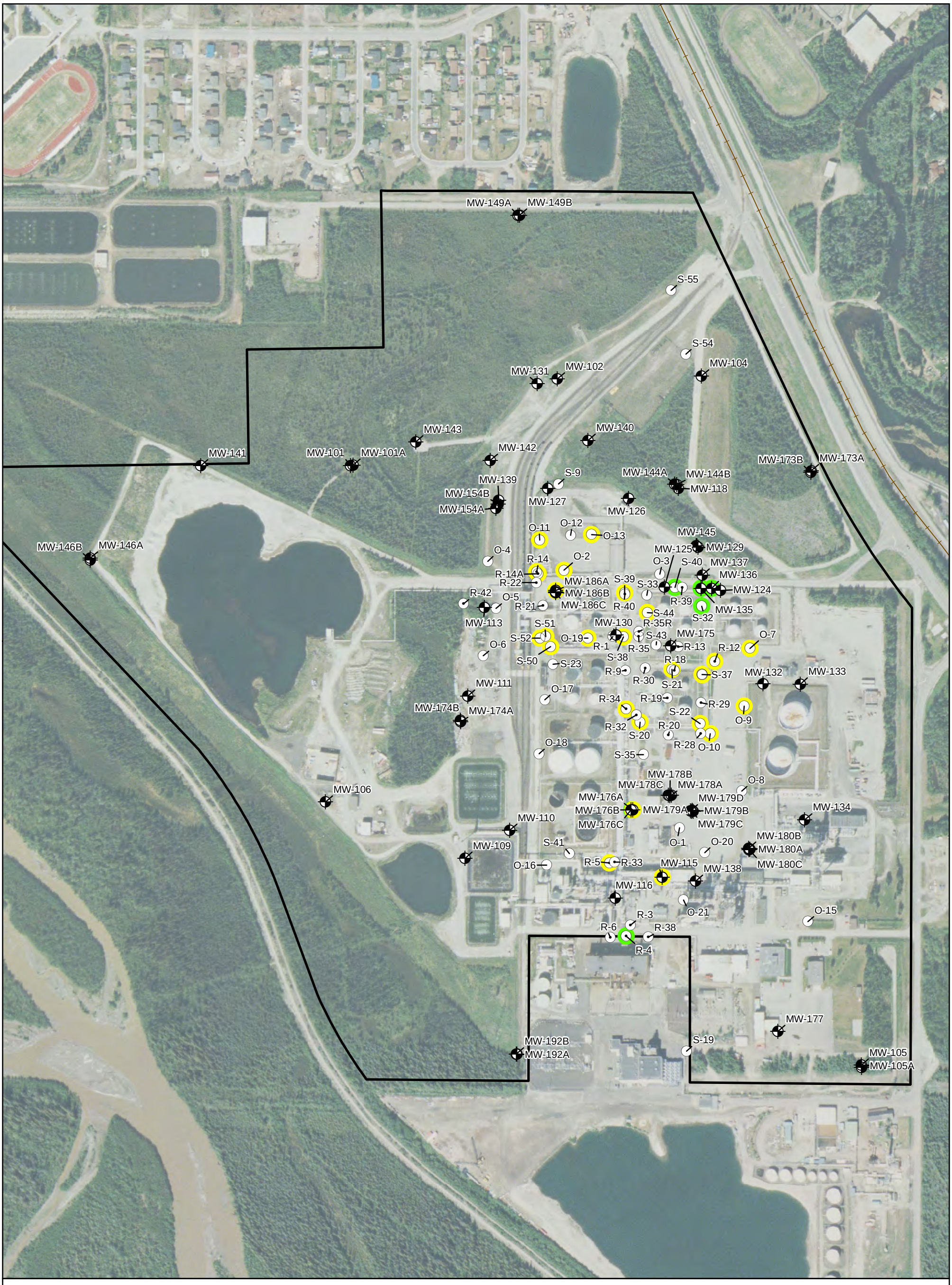


Figure 76
Benzene Concentrations Versus Chromium Concentrations in Soil
North Pole Refinery
Flint HIlls Resources Alaska





Monitoring Well

Observation Well

Recovery Well

Historical LNAPL Results

Measureable product

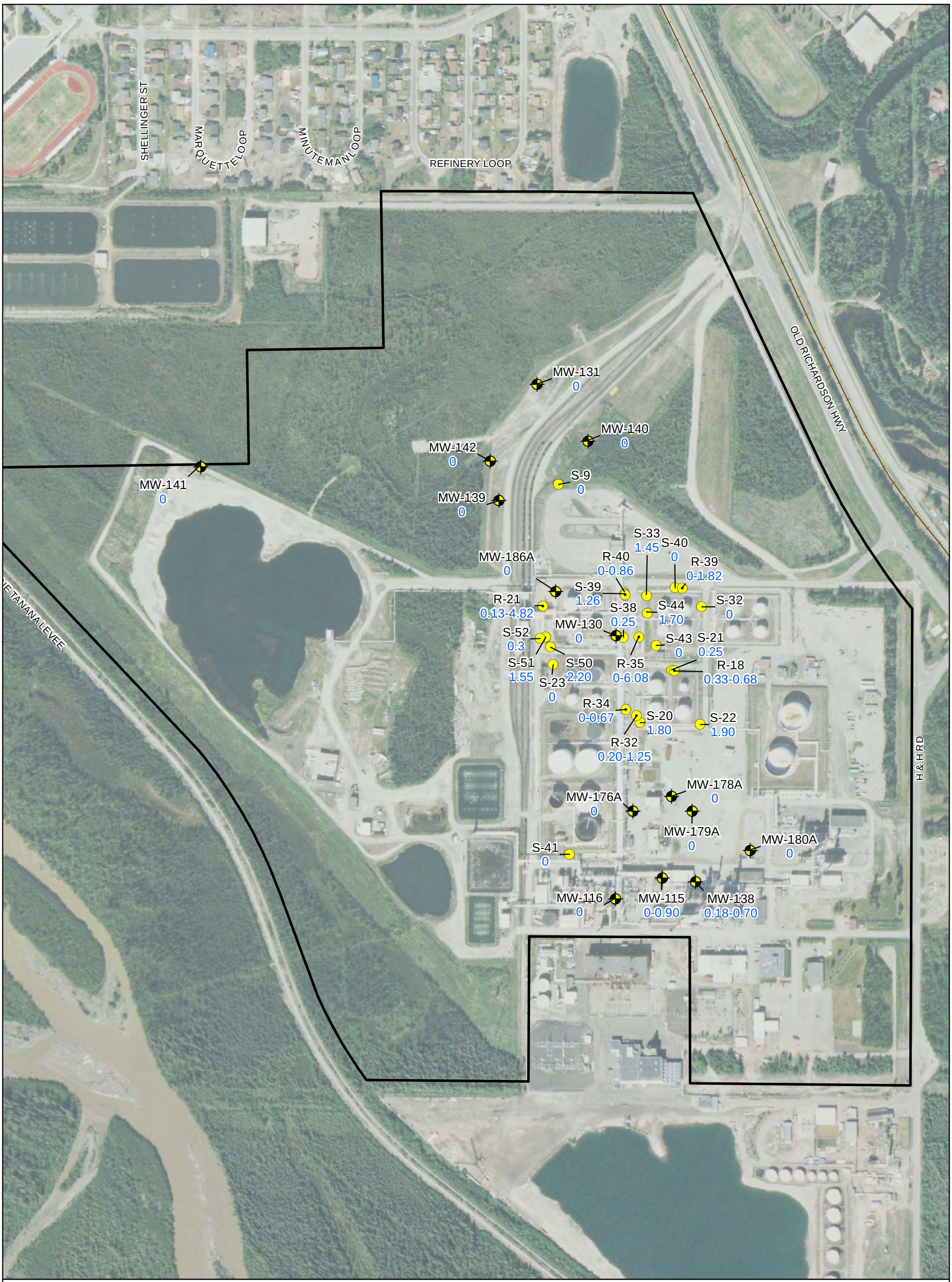
Sheen

FHRA Property Boundary

0 200 400 800

Feet

Figure 77
WELLS WITH HISTORICAL
LNAPL OCCURRENCE
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well

Observation Well

Recovery Well

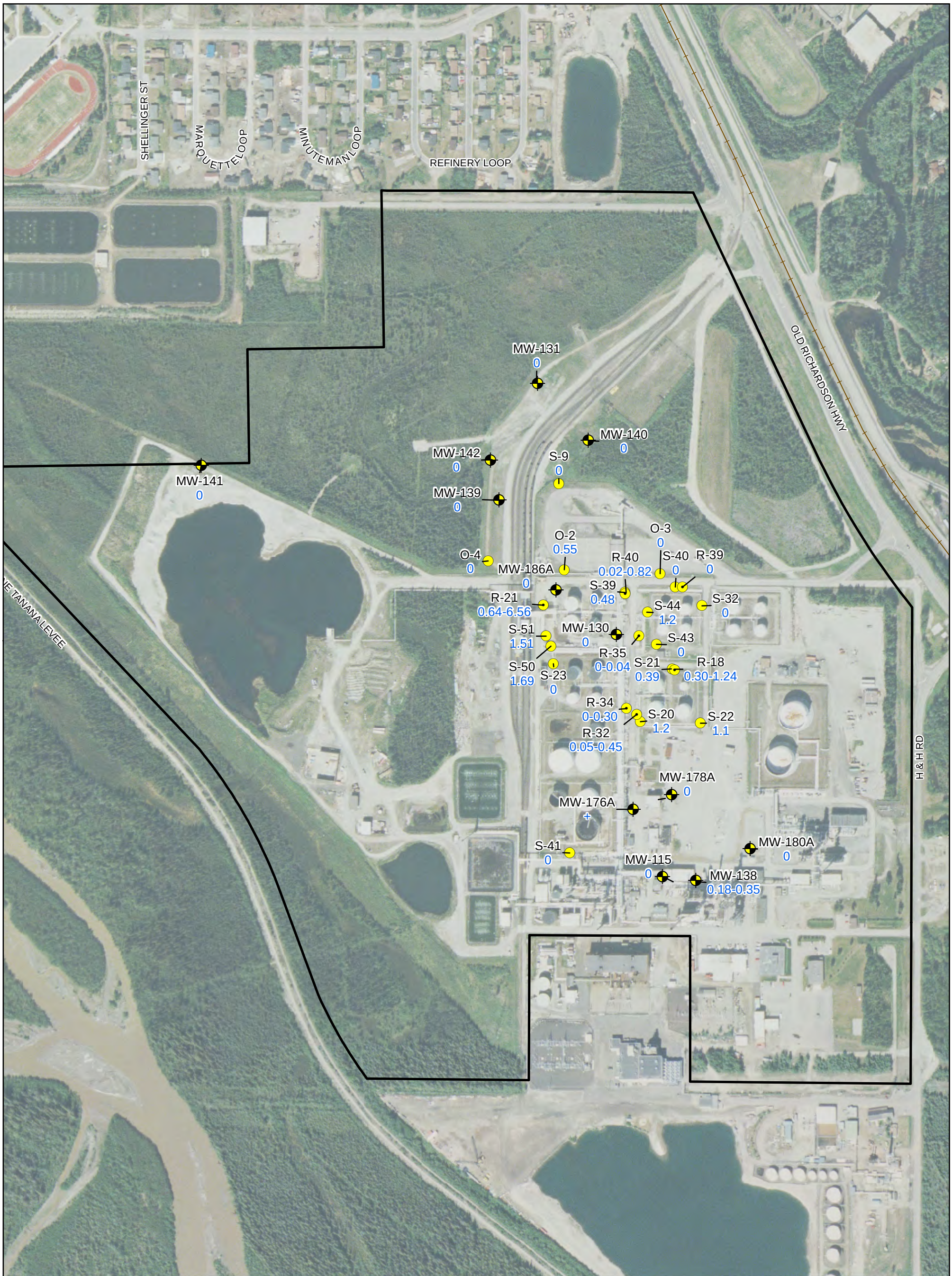
FHRA Property Boundary

1.0 LNAPL Thickness (ft)

0 200 400 800

Feet

Figure 78
LNAPL OCCURRENCE
FOURTH QUARTER 2010
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well

Observation Well

Recovery Well

FHRA Property Boundary

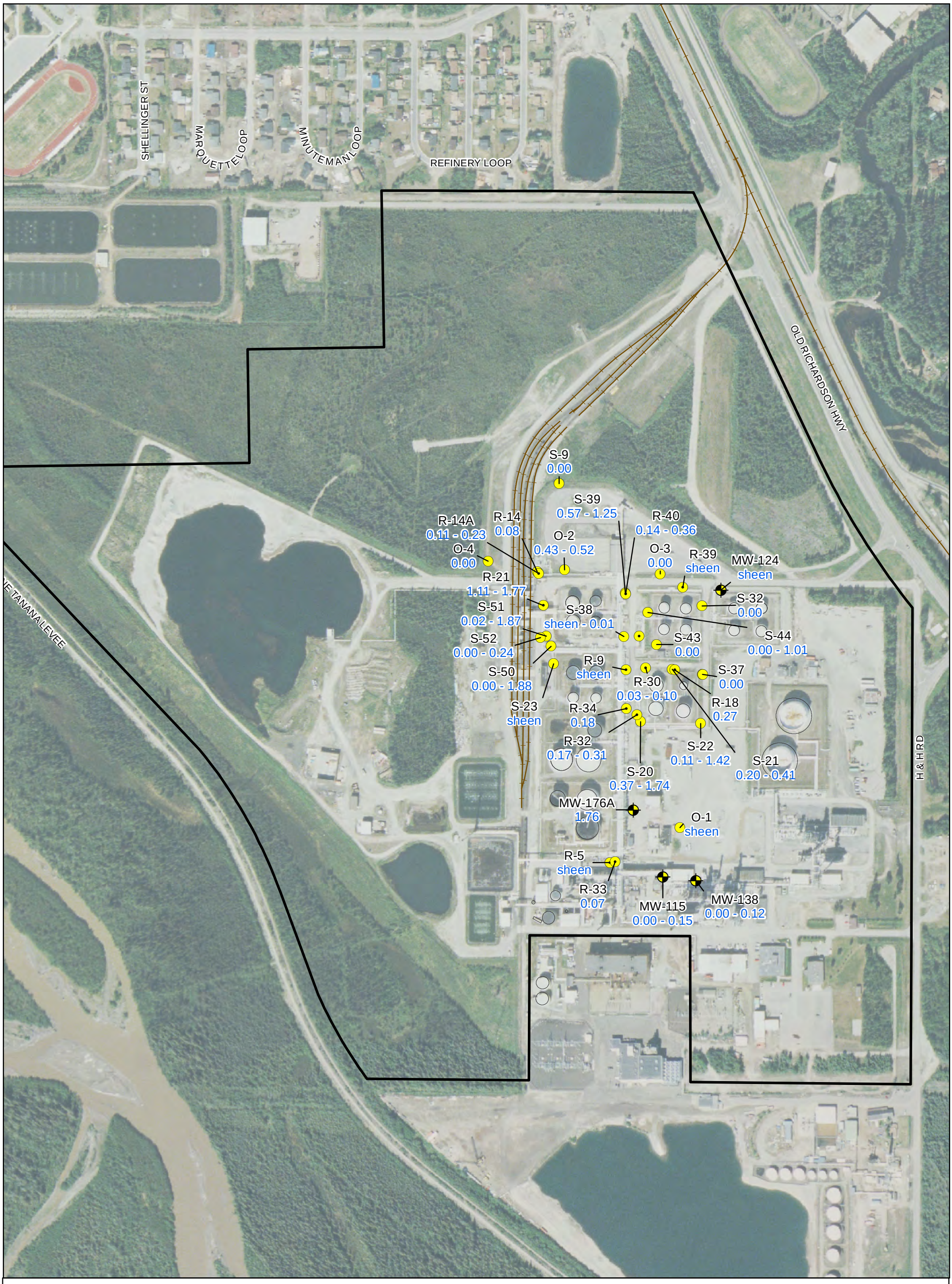
1.0 LNAPL Thickness (ft)

+ Product present, thickness not measured

0 200 400 800

Feet

Figure 79
LNAPL OCCURRENCE
FIRST QUARTER 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well

Observation Well

Recovery Well

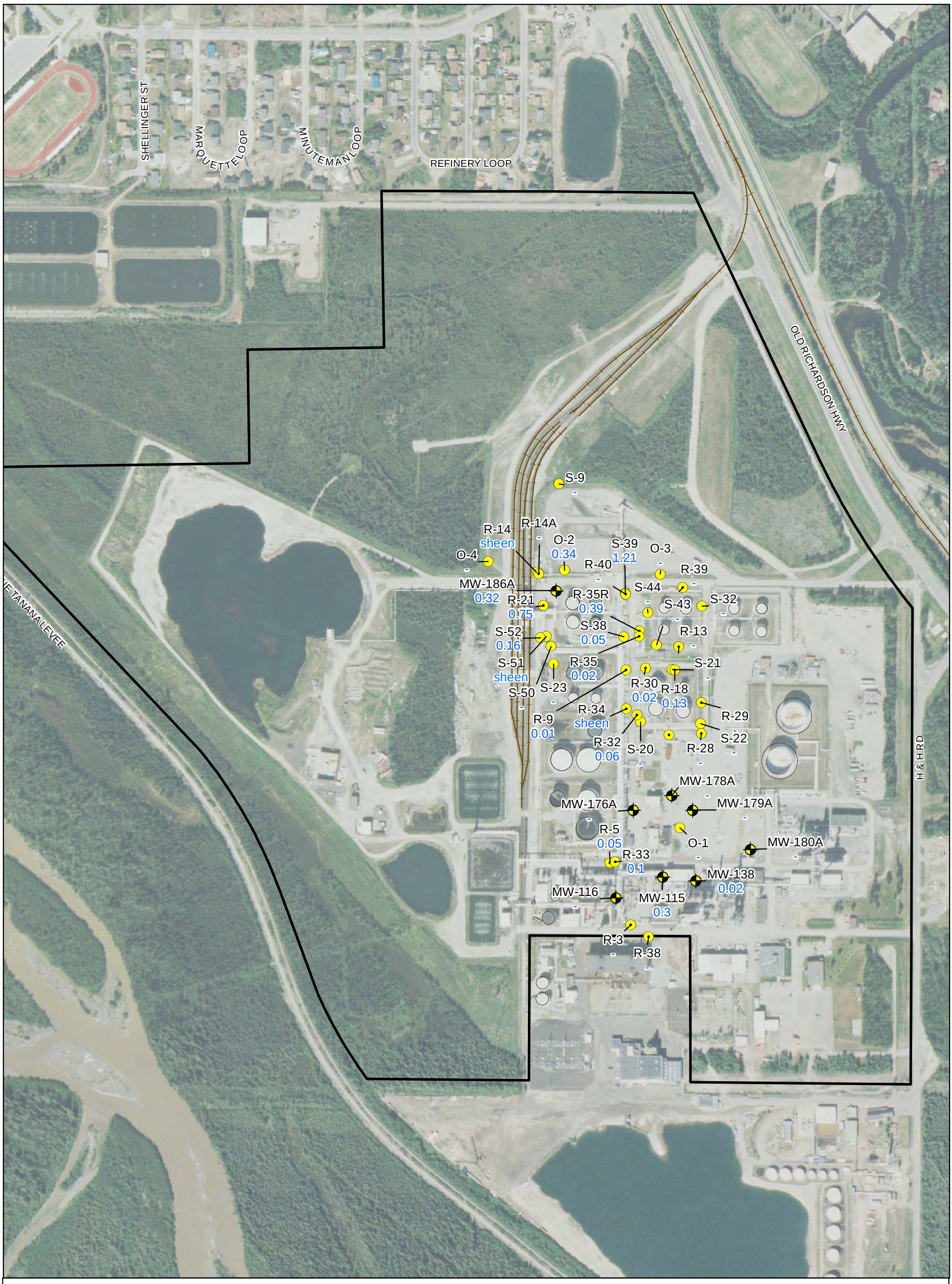
FHRA Property Boundary

1.0 LNAPL Thickness (ft)

0 200 400 800

Feet

Figure 80
LNAPL OCCURRENCE
SECOND QUARTER 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well

Observation Well

Recovery Well

FHRA Property Boundary

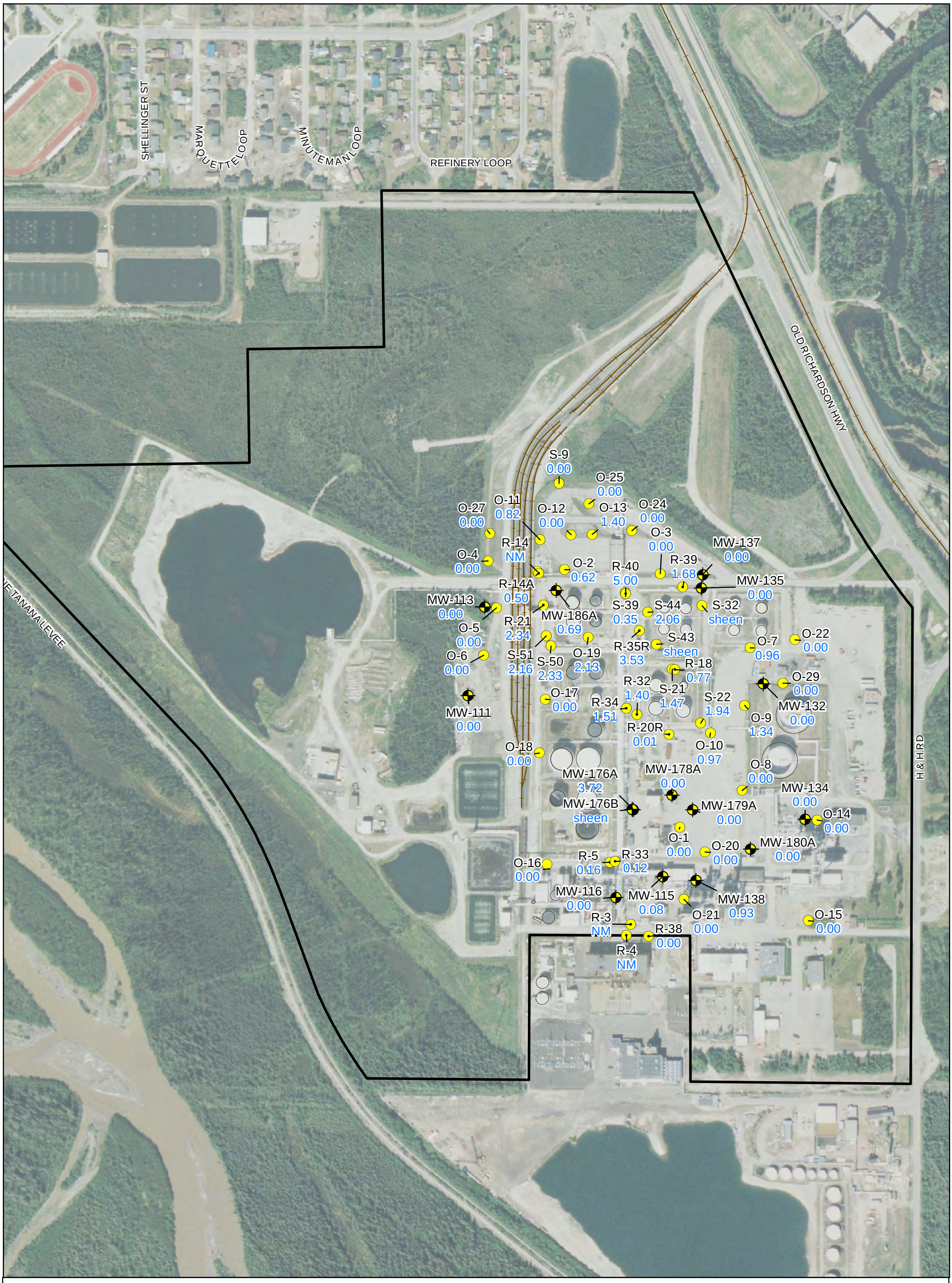
1.0 LNAPL Thickness (ft)

0 200 400 800

Feet

Figure 81
LNAPL OCCURRENCE
THIRD QUARTER 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Note: Wells where interface probe results did not indicate presence of LNAPL are denoted with '-'
Wells were guaged for LNAPL July 14 and 15, 2011.



Monitoring Well

Observation Well

Recovery Well

FHRA Property Boundary

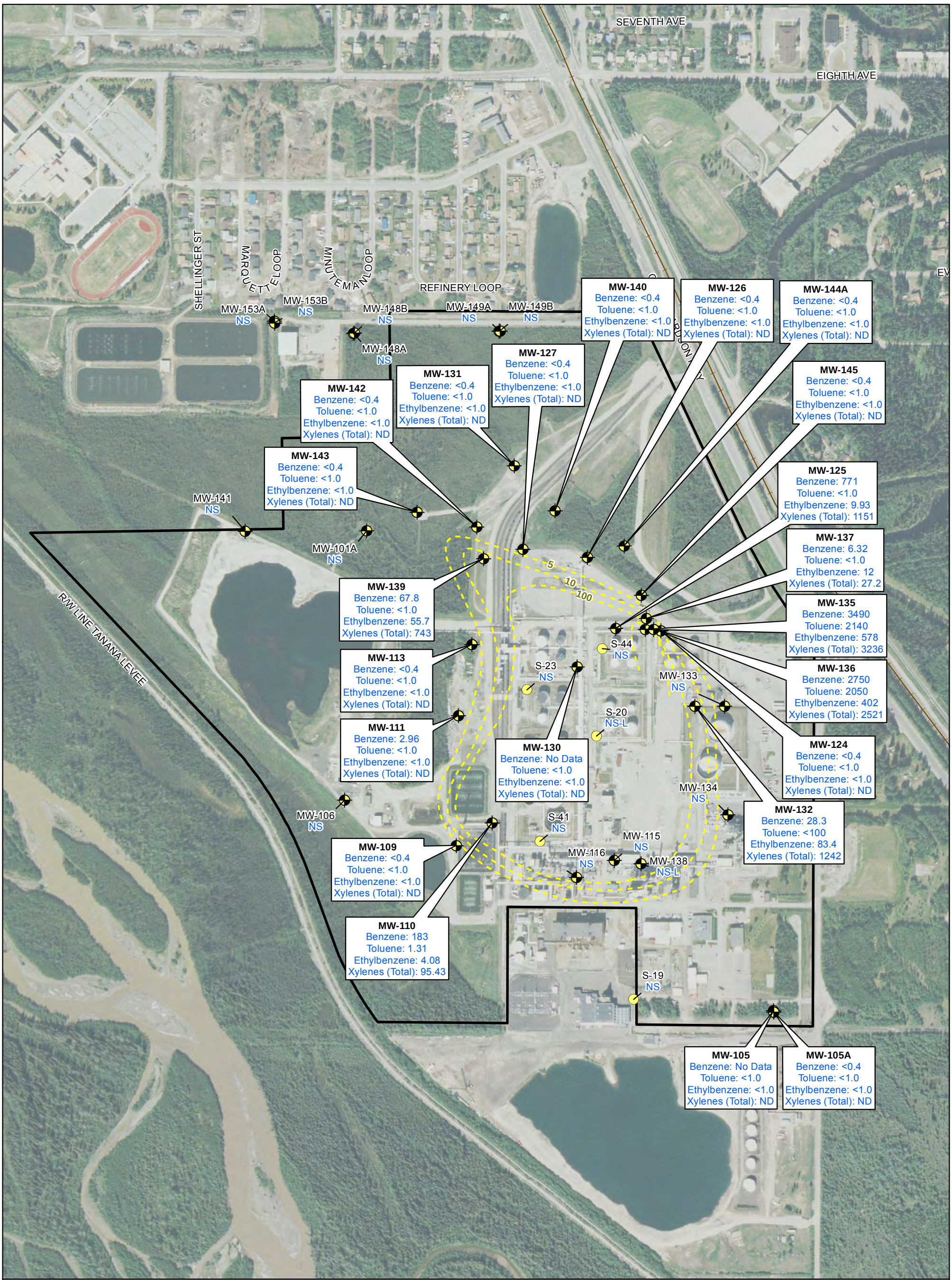
1.0 LNAPL Thickness (ft)

0 200 400 800

Feet

Figure 82
LNAPL OCCURRENCE
FOURTH QUARTER 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Note: Wells where interface probe results did not indicate presence of LNAPL are denoted with '-'
Wells were guaged for LNAPL October 21 and 22, 2011.



Monitoring Well

Observation Well

Approximate Benzene Isopleth in µg/L

FHRA Property Boundary

118 Concentration (µg/L)

NS-L Not sampled, LNAPL present

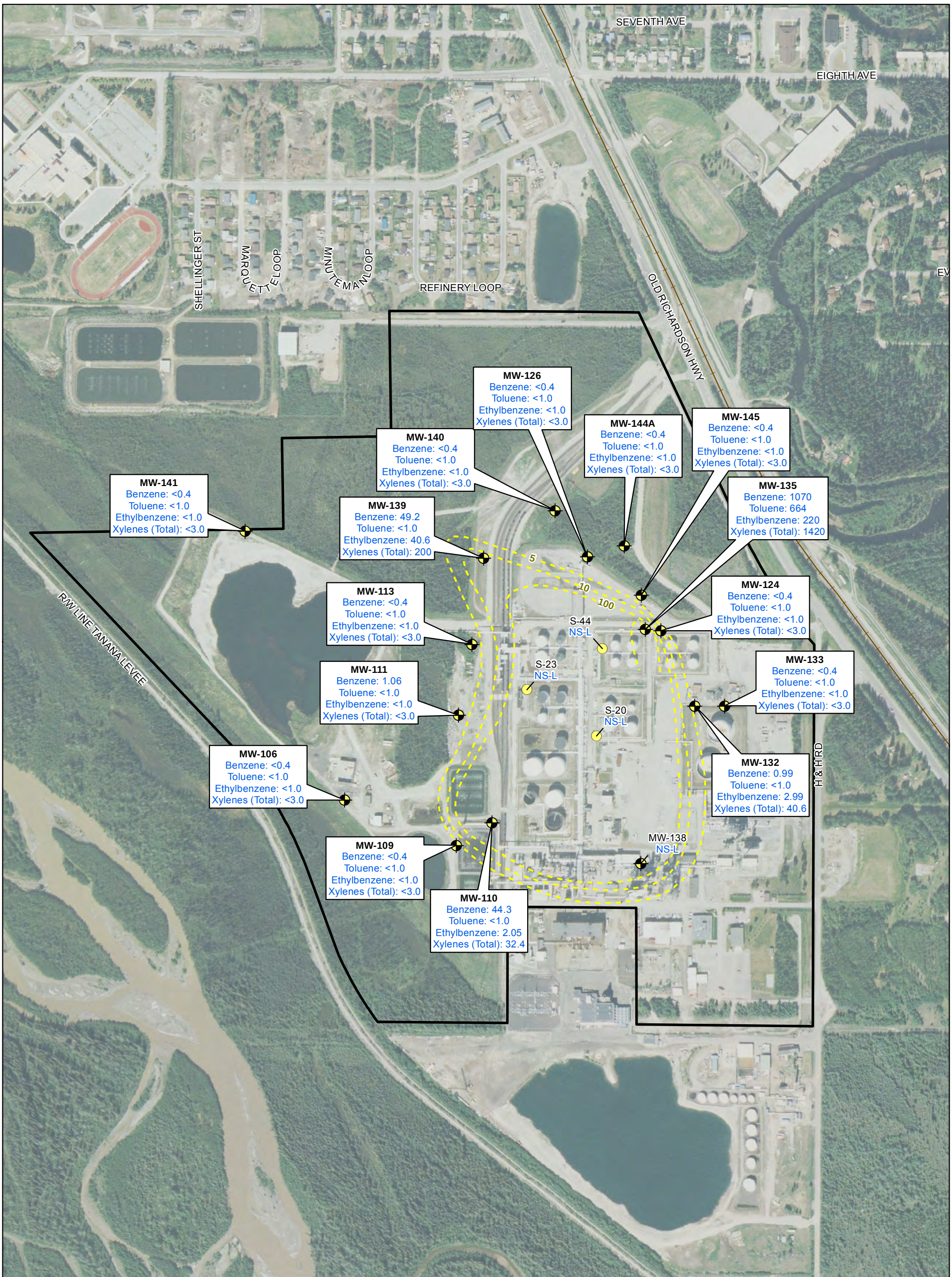
NS Not sampled

ND Non-Detect

0 250 500 1,000

Feet

Figure 83
BTEX CONCENTRATIONS
IN GROUNDWATER
FOURTH QUARTER 2010
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well

Observation Well

Approximate Benzene Isopleth in µg/L

FHRA Property Boundary

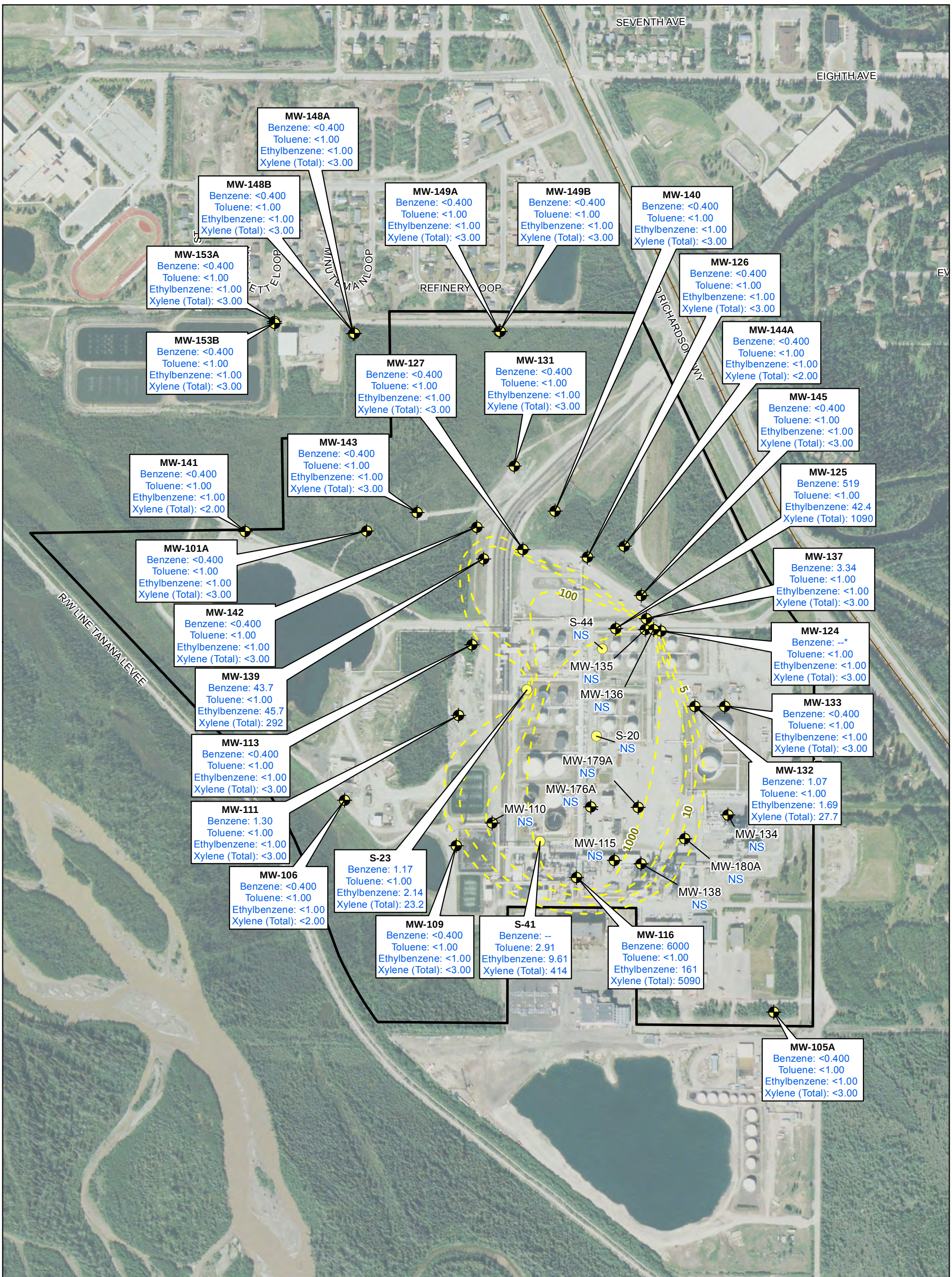
118 Concentration (µg/L)

NS-L Not sampled, LNAPL present

0 250 500 1,000

Feet

Figure 84
BTEX CONCENTRATIONS
IN GROUNDWATER
FIRST QUARTER 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well

Observation Well

Approximate Benzene Isopleth in µg/L

FHRA Property Boundary

118 Concentration (µg/L)

J Estimated Value

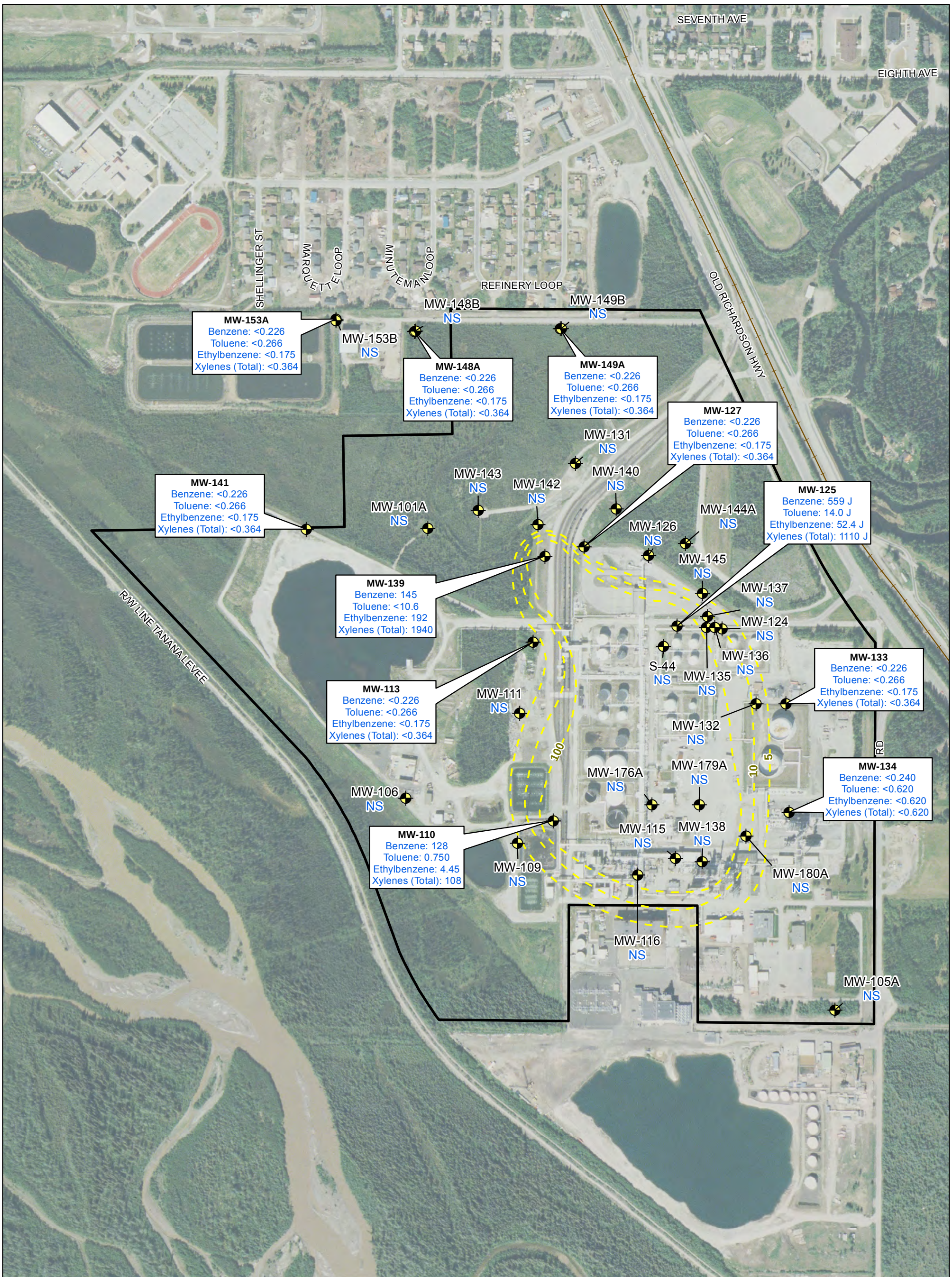
NS Not sampled

* Benzene result has been received but is still being validated

0 250 500 1,000

Feet

Figure 85
BTEX CONCENTRATIONS
IN GROUNDWATER
SECOND QUARTER 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well

Approximate Benzene Isopleth in µg/L

FHRA Property Boundary

118 Concentration (µg/L)

J Estimated Value

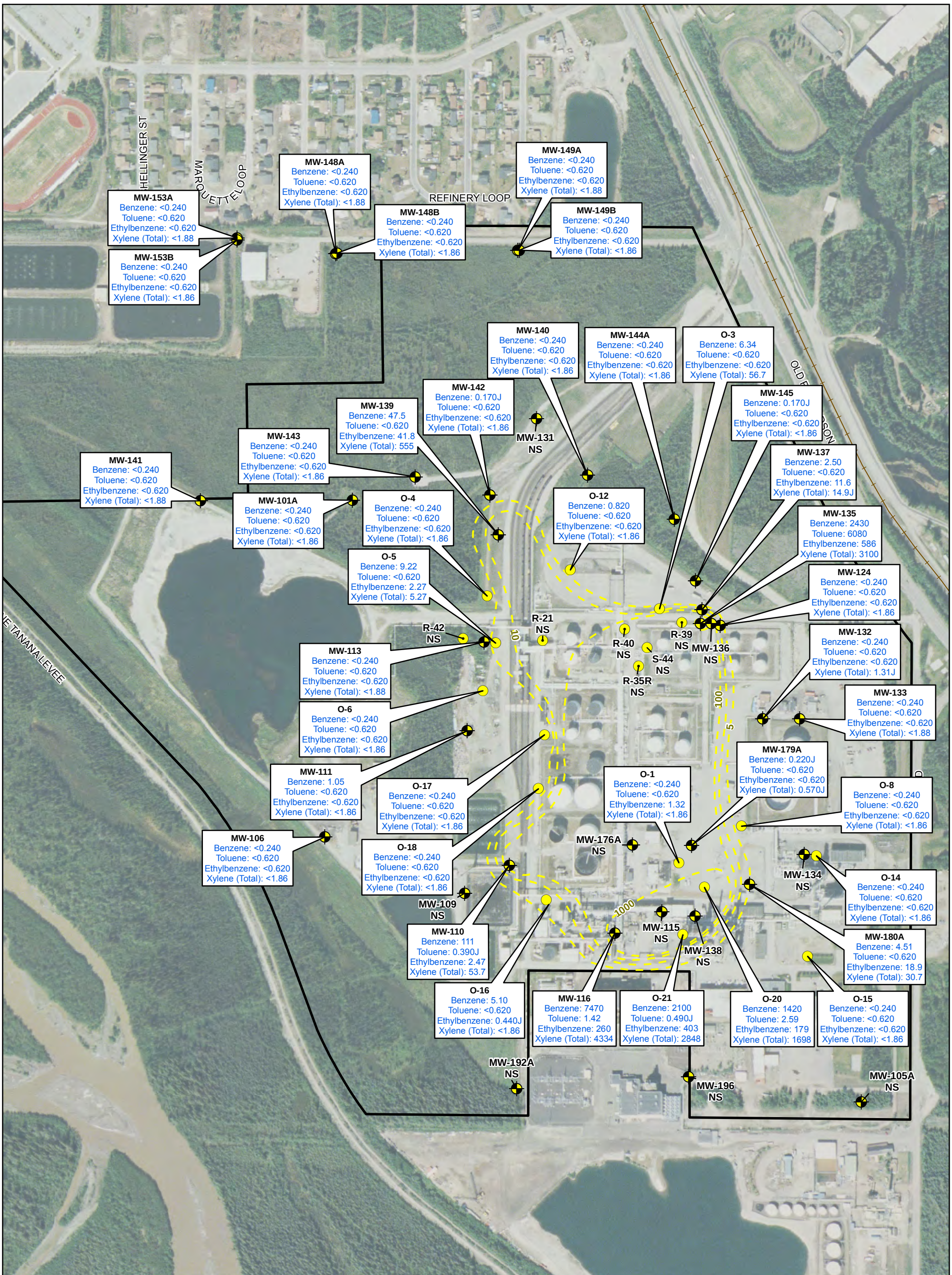
NS Not sampled

N

0 250 500 1,000

Feet

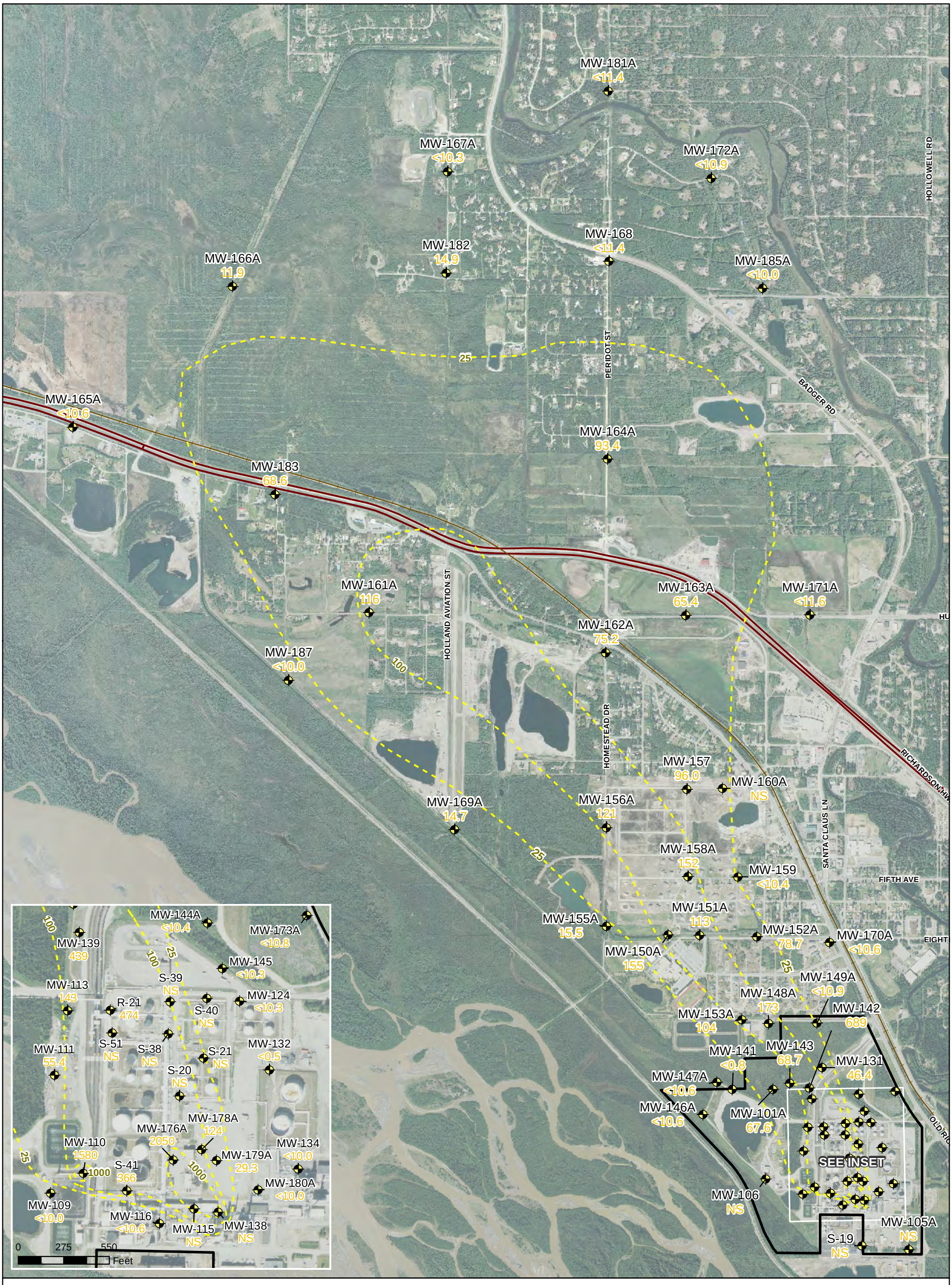
Figure 86
BTEX CONCENTRATIONS
IN GROUNDWATER
THIRD QUARTER 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well
Observation Well
Recovery Well
FHRA Property Boundary
118 Concentration (µg/L)
J Estimated Value
NS Not sampled

0 200 400 800
Feet

Figure 87
BTEX CONCENTRATIONS
IN GROUNDWATER
FOURTH QUARTER 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC



Monitoring Well

Approximate Sulfolane Isopleths in µg/L

FHRA Property Boundary

118 Sulfolane Concentration (µg/L)

NS Not Sampled

0 750 1,500 3,000

Feet

Figure 88
SULFOLANE CONCENTRATIONS
IN GROUNDWATER
AT THE WATER TABLE
FOURTH QUARTER 2010
North Pole Refinery
Flint Hills Resources Alaska, LLC

Monitoring Well

Approximate Sulfolane Isopleth in µg/L

FHRA Property Boundary

118 Sulfolane Concentration (µg/L)

NS Not Sampled

0 750 1,500 3,000

Feet

Figure 89
SULFOLANE CONCENTRATIONS
IN GROUNDWATER
10-55' BELOW THE WATER TABLE
FOURTH QUARTER 2010
North Pole Refinery
Flint Hills Resources Alaska, LLC