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PROGRAM OVERVIEW

Galena FOL Cleanup Process

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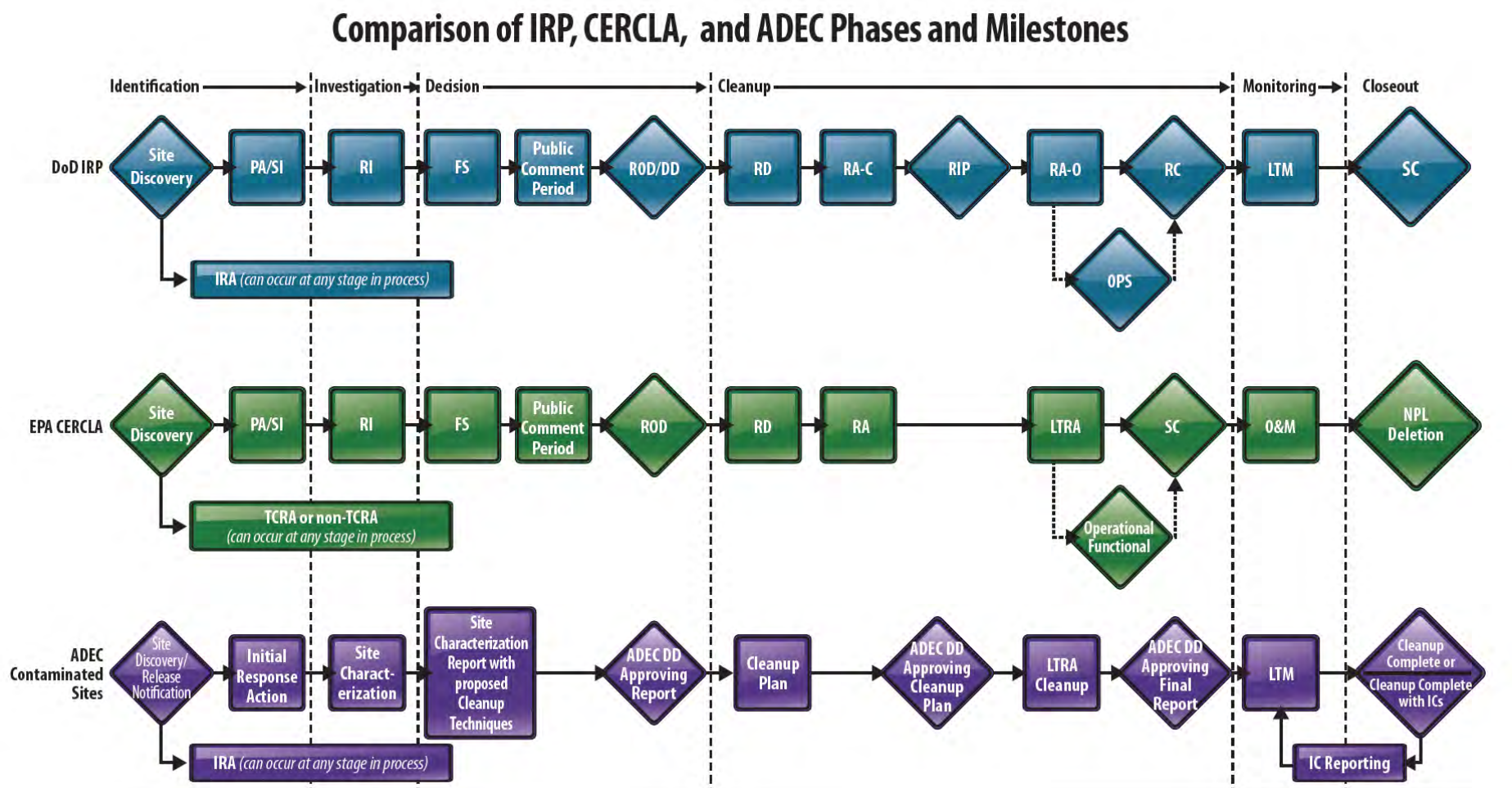

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2010 Overview

- **What was accomplished this summer?**
  - **Preliminary Assessment of entire base completed; resolving remaining comments with ADEC**
  - **Basewide Work Plan approved**
  - **40 Field Sampling Plans submitted for regulatory review (37 AOCs/sites, Background Study, Groundwater, and Vapor Intrusion)**
  - **Field investigations at 26 Areas of Concern and 6 ERP Sites**

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2010 Overview

- **What was accomplished this summer? (continued)**
  - **Remedial action (excavation) at OT099 (Parcel EE)**
  - **Bioreactor (pilot study) constructed at SS015 (TCE site)**
  - **Preliminary planning and identification of landfarm location**
  - **2 rounds of basewide groundwater sampling (approximately 130 wells)**
  - **Aquifer tests**

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2011 Plan

- **What is the Plan for next summer?**
  - **3rd (final) round of basewide groundwater sampling**
  - **Additional aquifer tests**
  - **Complete field investigations for nature and extent of contamination**
  - **Optimize current remediation systems (SVE and biovent)**

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2011 Plan

- What is the Plan for next summer? (continued)
  - Source removal at 4 Sites (SS017/SS014/SS021 and SS016)
  - Construct and operate 20 acre landfarm
  - Supplemental investigation to clear MMRP sites
  - Remove abandoned equipment
  - Monitor bioreactor

2010 FIELD WORK

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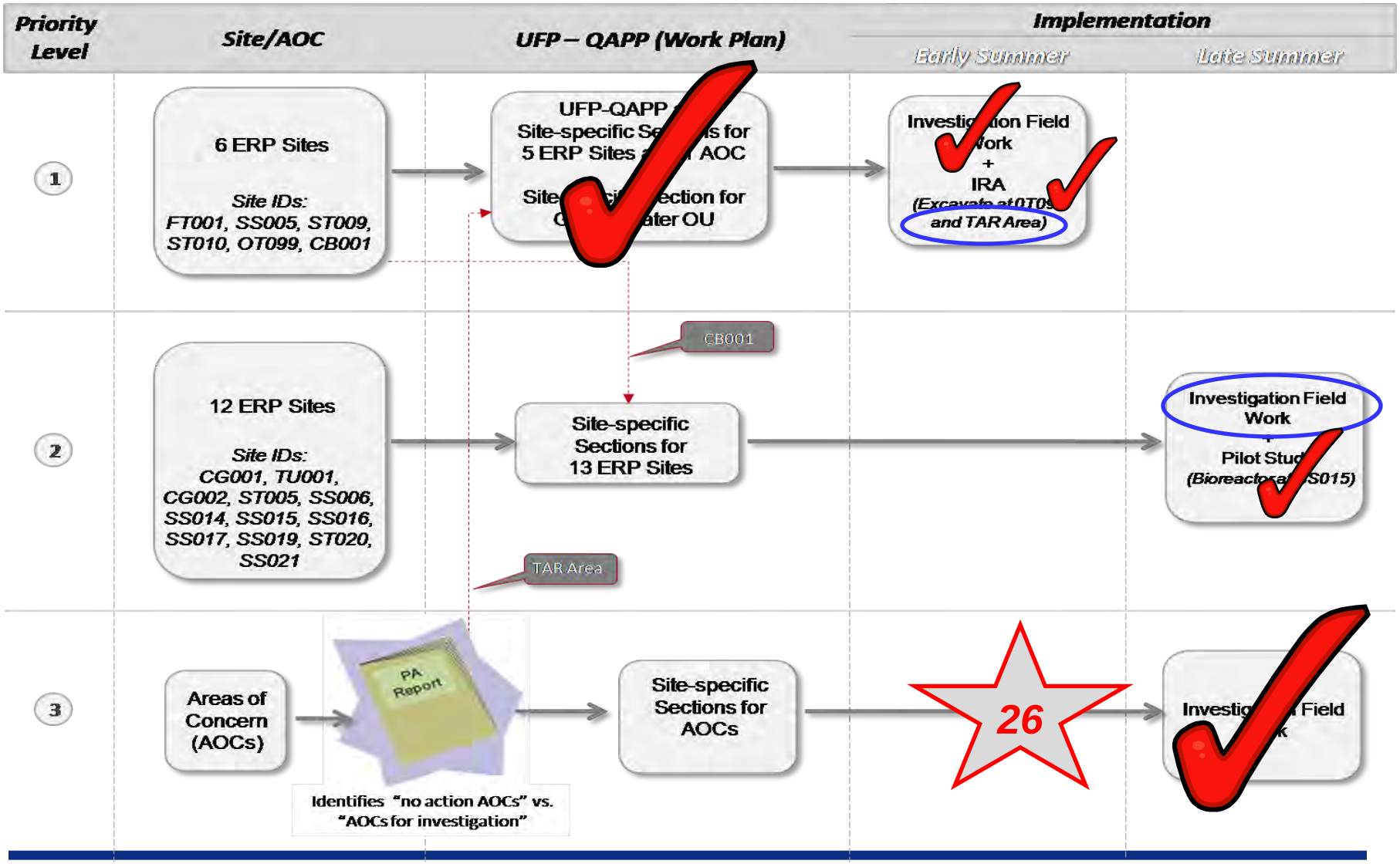
Former Galena FOL (FY10 Strategy)



SS015 BIOREACTOR INSTALLATION

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SS015 Bioreactor Pilot Study

- **Objective is to evaluate the effectiveness of in-situ bioremediation on TCE contaminated groundwater**
  - **Incorporates “Green” technologies**
  - **SS015 selected due to potential for off-site migration of groundwater contaminants**
  - **Contaminated soil is excavated during construction of the bioreactor**

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SS015 Bioreactor Pilot Study

- **Schedule:**
  - **2010 – Construct bioreactor**
  - **2011 – Startup operation and monitoring**
  - **2012 – Continue monitoring**
- **Results:**
  - **Study will be used to evaluate expanding the system at the current site if necessary**
  - **Study will be used to determine if this technology can be used at other similar sites**

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Bioreactor Location

Bioreactor As-Built

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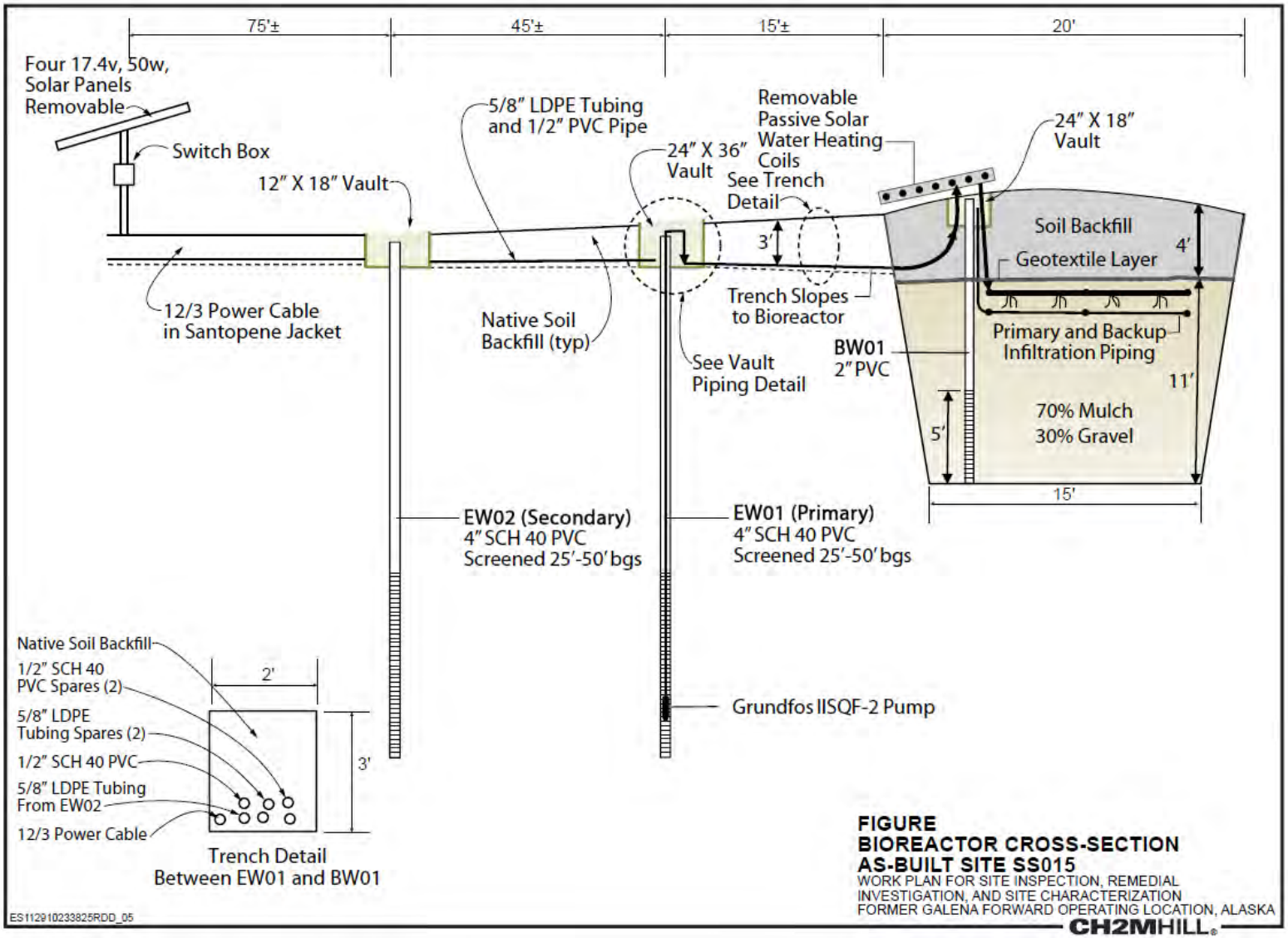

FIGURE
BIOREACTOR CROSS-SECTION
AS-BUILT SITE SS015
WORK PLAN FOR SITE INSPECTION, REMEDIAL INVESTIGATION, AND SITE CHARACTERIZATION
FORMER GALENA FORWARD OPERATING LOCATION, ALASKA
CH2MHILL

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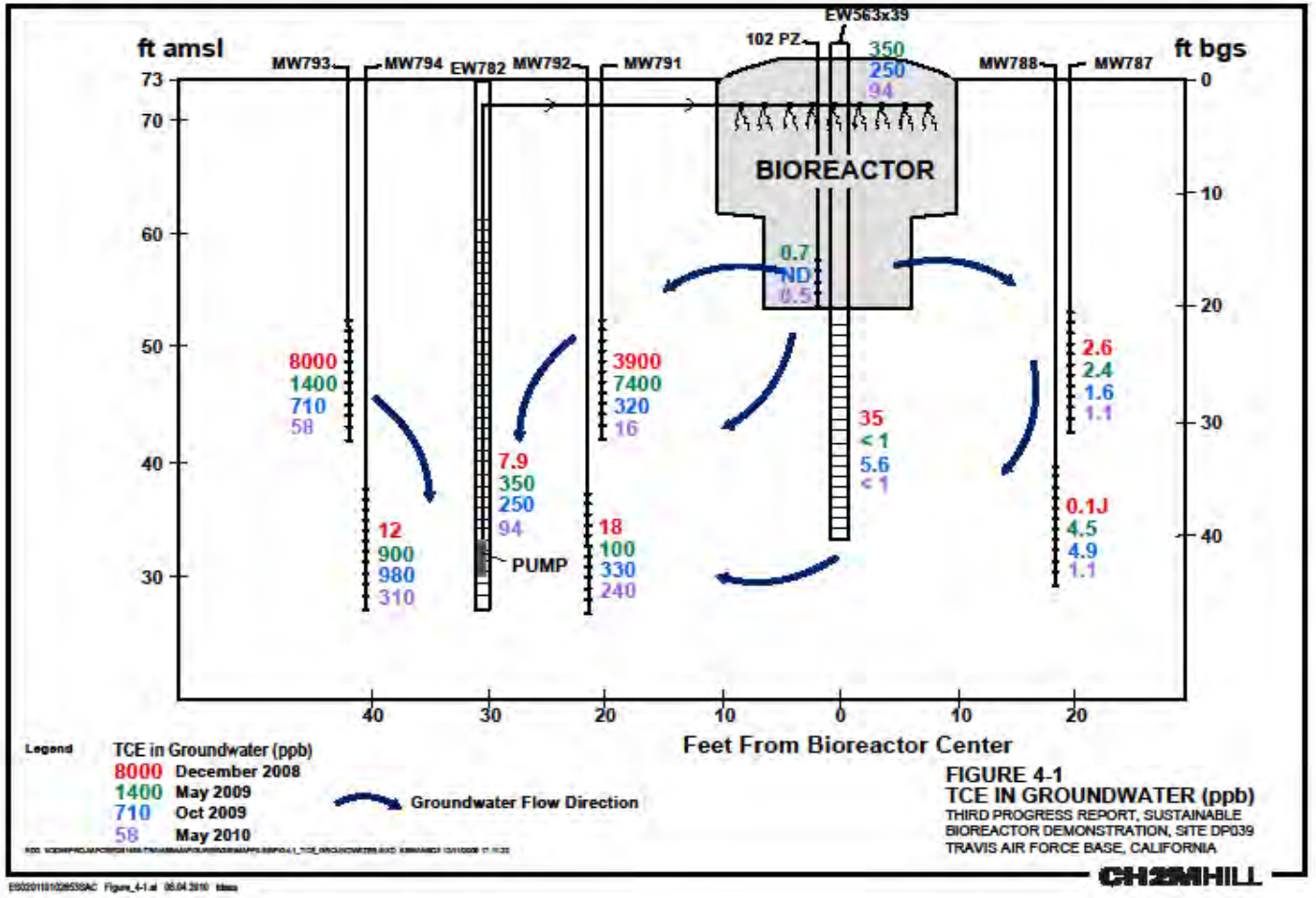
Bioreactor Anticipated TCE Treatment Example

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SS015 Bioreactor Site October 2010

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SS015 Bioreactor Highlights

- 180 CY of locally produced tree mulch
- 60 CY of locally produced washed gravel
- 50 gallons of locally produced cooking oil
- Excavated and backfilled in one day
- Soil excavation lesson - to 15 feet bgs was stable

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SS015 Bioreactor Start Up

- May 2011
  - Install solar powered pump and panels
  - Startup system
- June 2011 Performance Sampling
  - Install passive solar water heating
- September 2011 Performance Sampling
- October 2011 Winterization
  - Store solar pump and panels
  - Blow out water with compressed air

2010 GROUNDWATER SAMPLING UPDATE

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Groundwater Investigation Approach

- Groundwater sampling plan addresses three general areas of data collection:
  - Continuous groundwater elevation monitoring
  - Aquifer testing
  - Groundwater quality sampling focusing on plume wide delineation and monitoring

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Groundwater Investigation 2010

- **Wells installed to support the Groundwater Sampling Plan included:**
  - **4 pumping wells for aquifer testing**
  - **13 monitoring wells to support aquifer testing and groundwater elevation monitoring**
  - **14 monitoring wells specifically to augment the groundwater elevation monitoring network – primarily to collect vertical gradient information**
  - **All of the above wells will also augment our water quality monitoring network**

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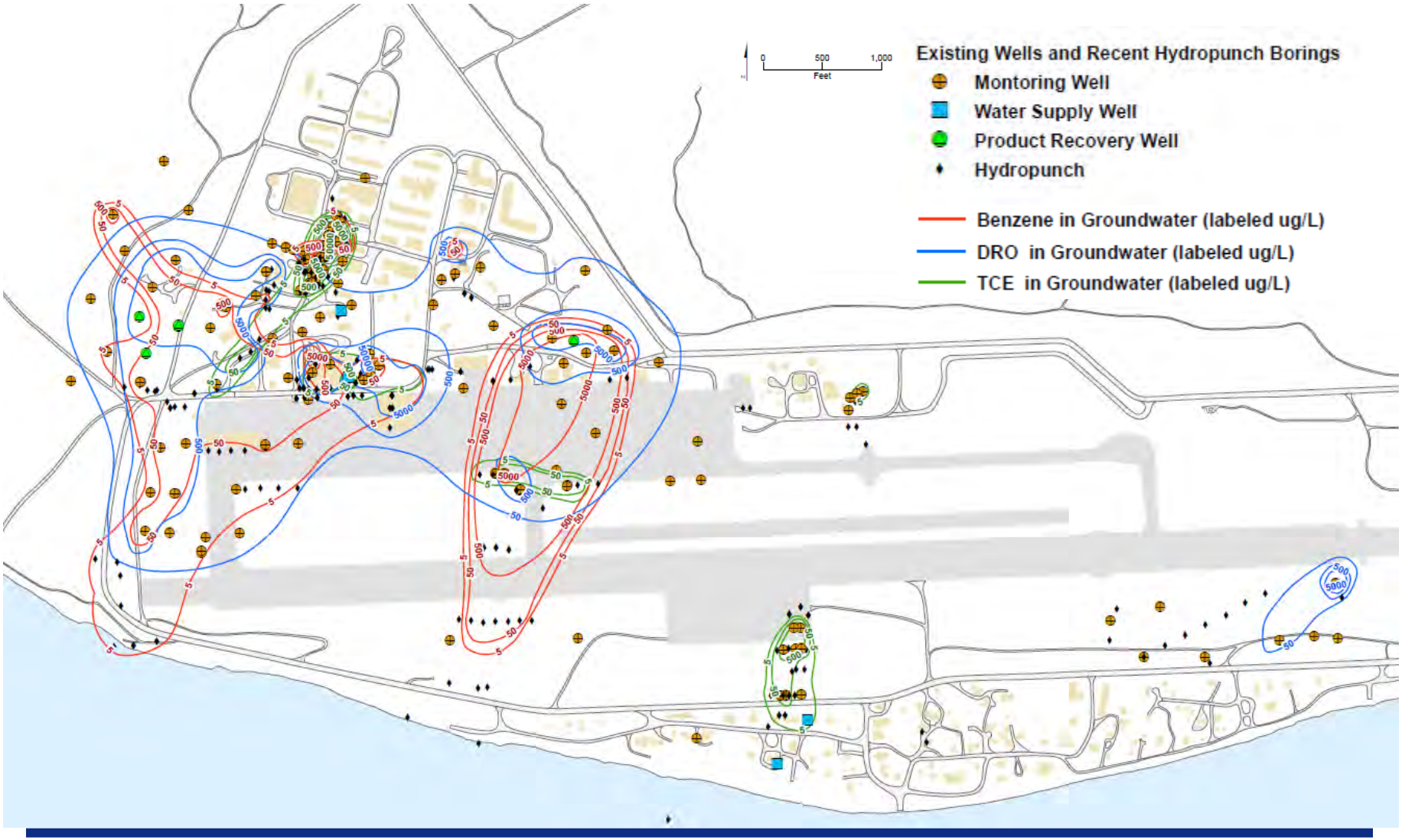
Pre-2010 Plume Extents



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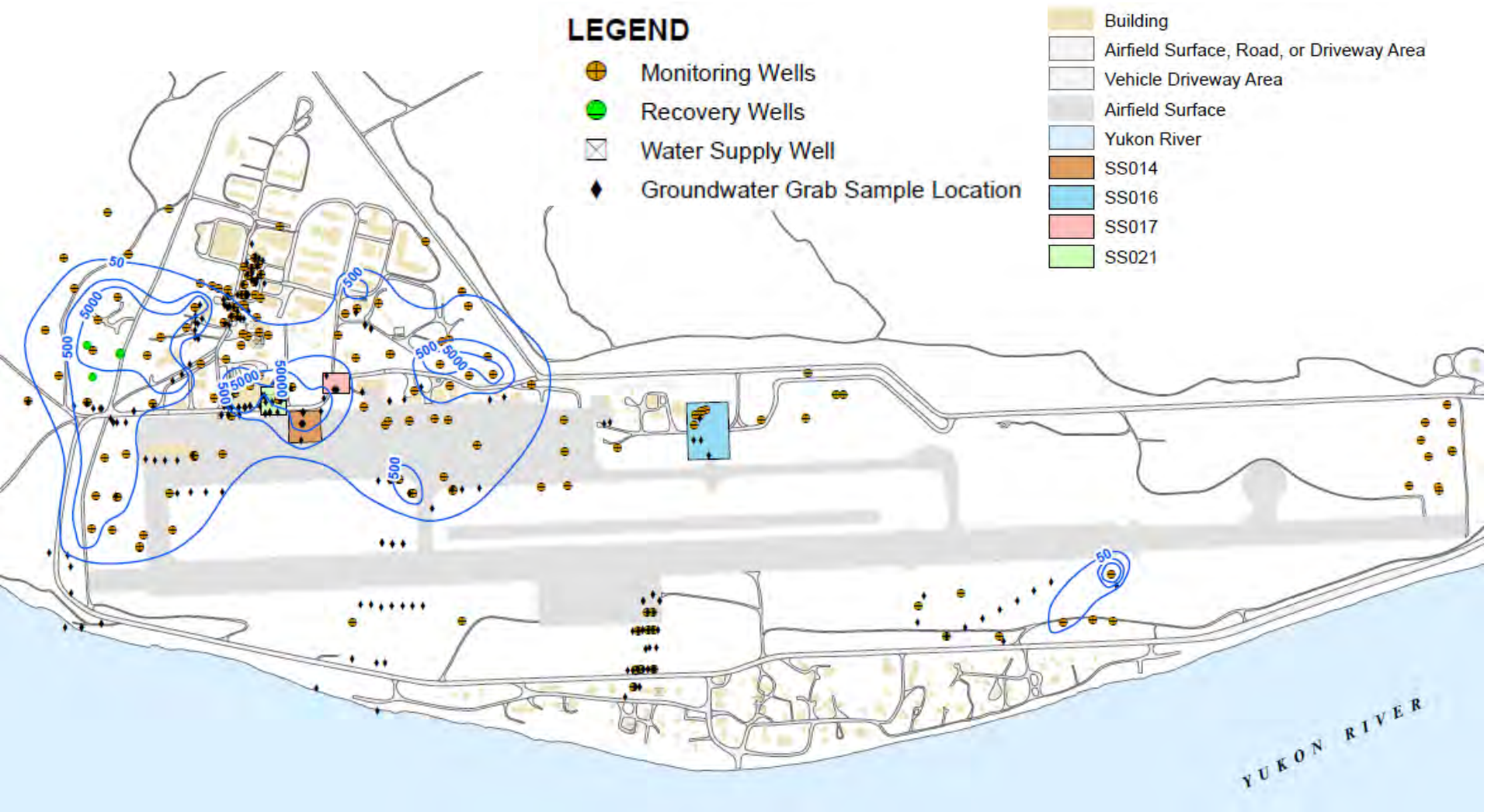
Maximum DRO 2004-2009



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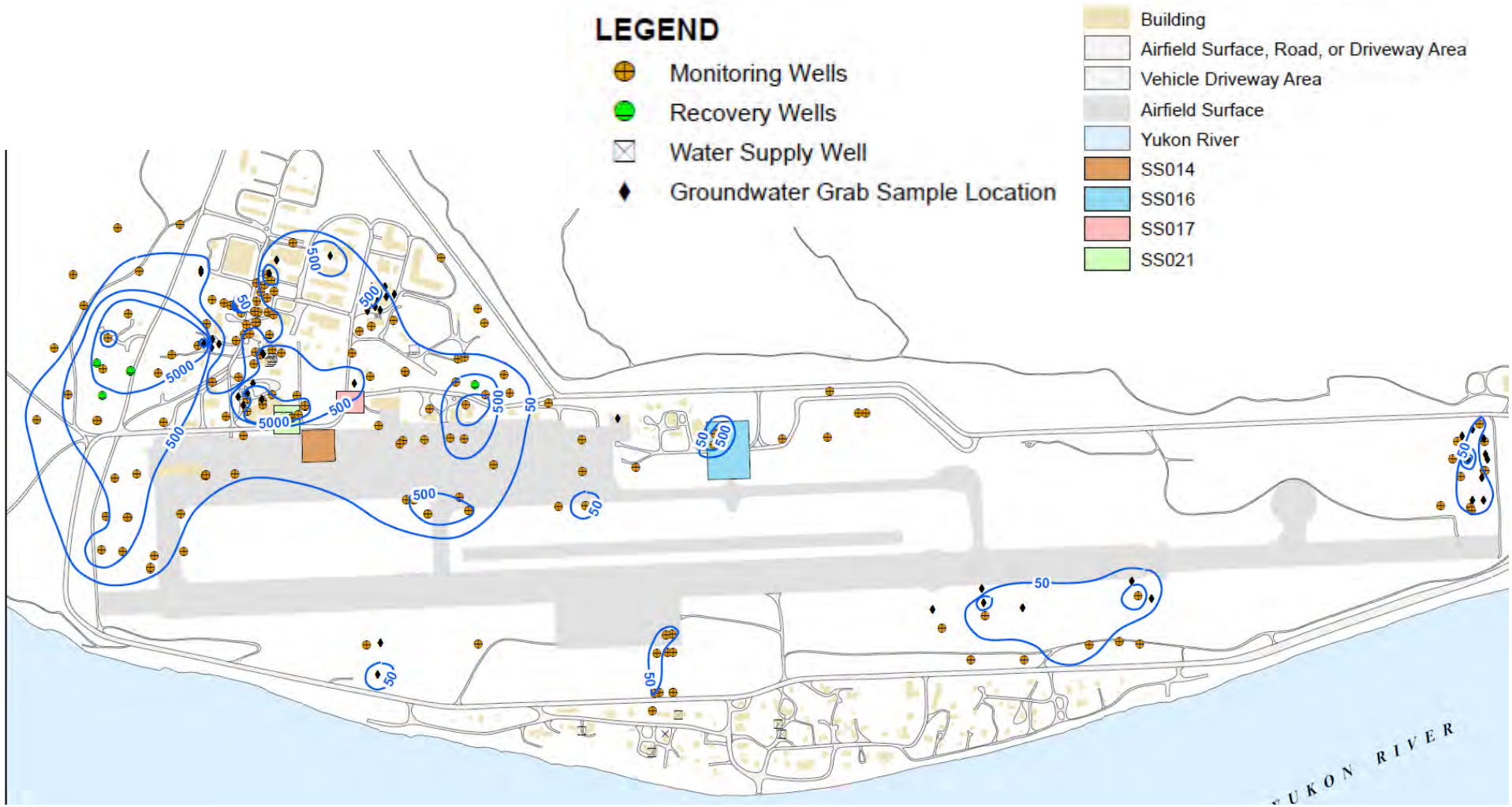
DRO July-August 2010



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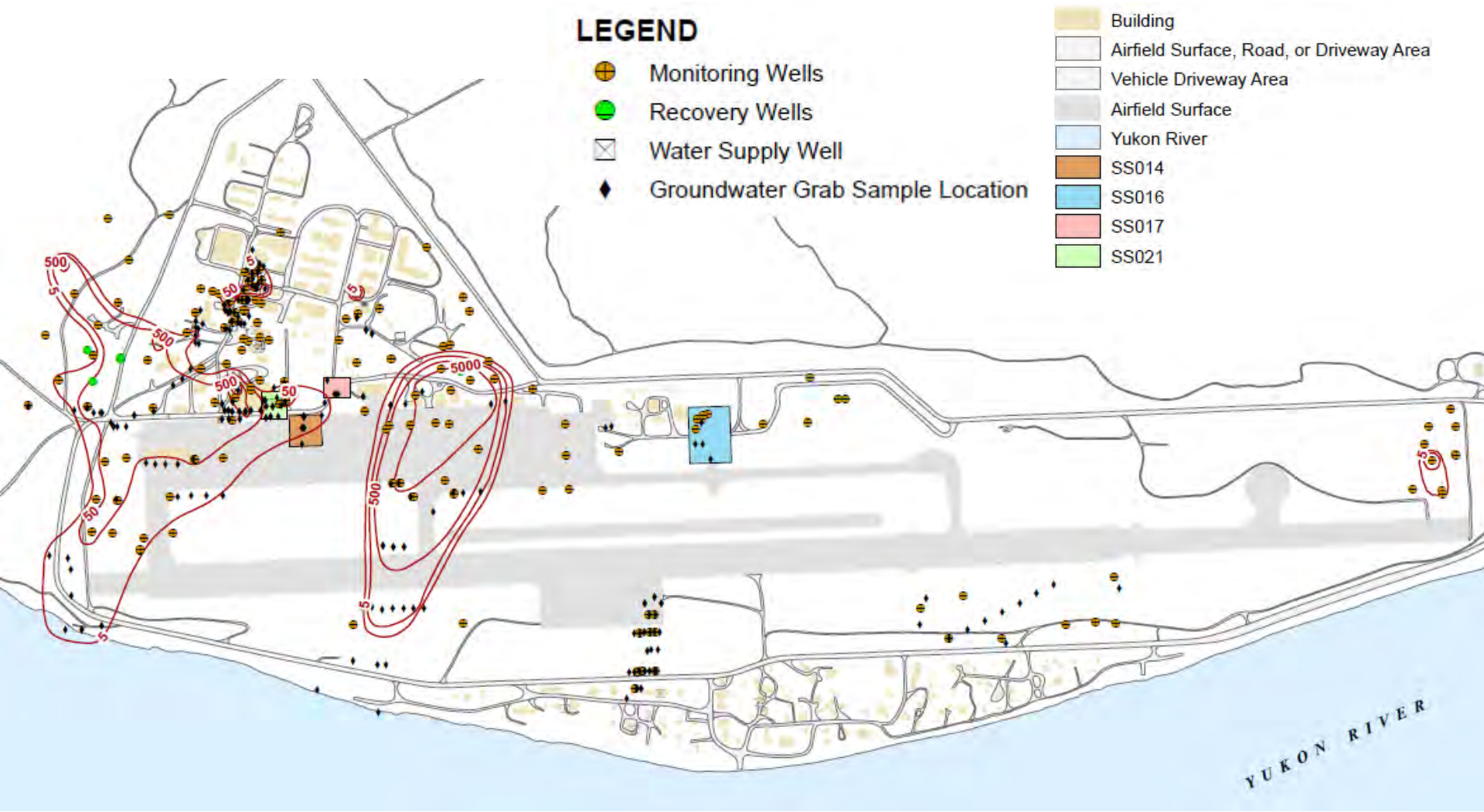
Maximum Benzene 2004-2009



Maximum Benzene July-August 2010

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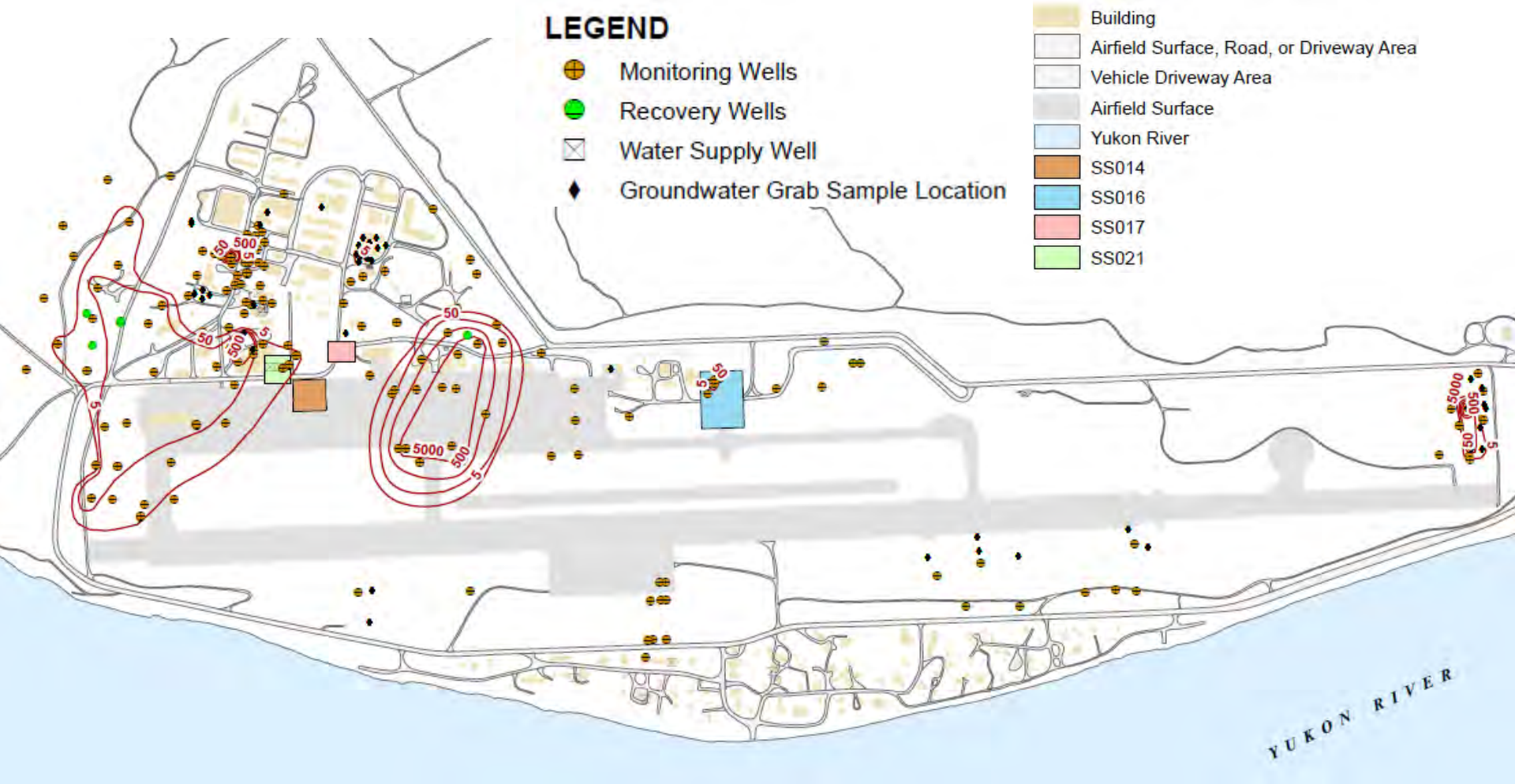

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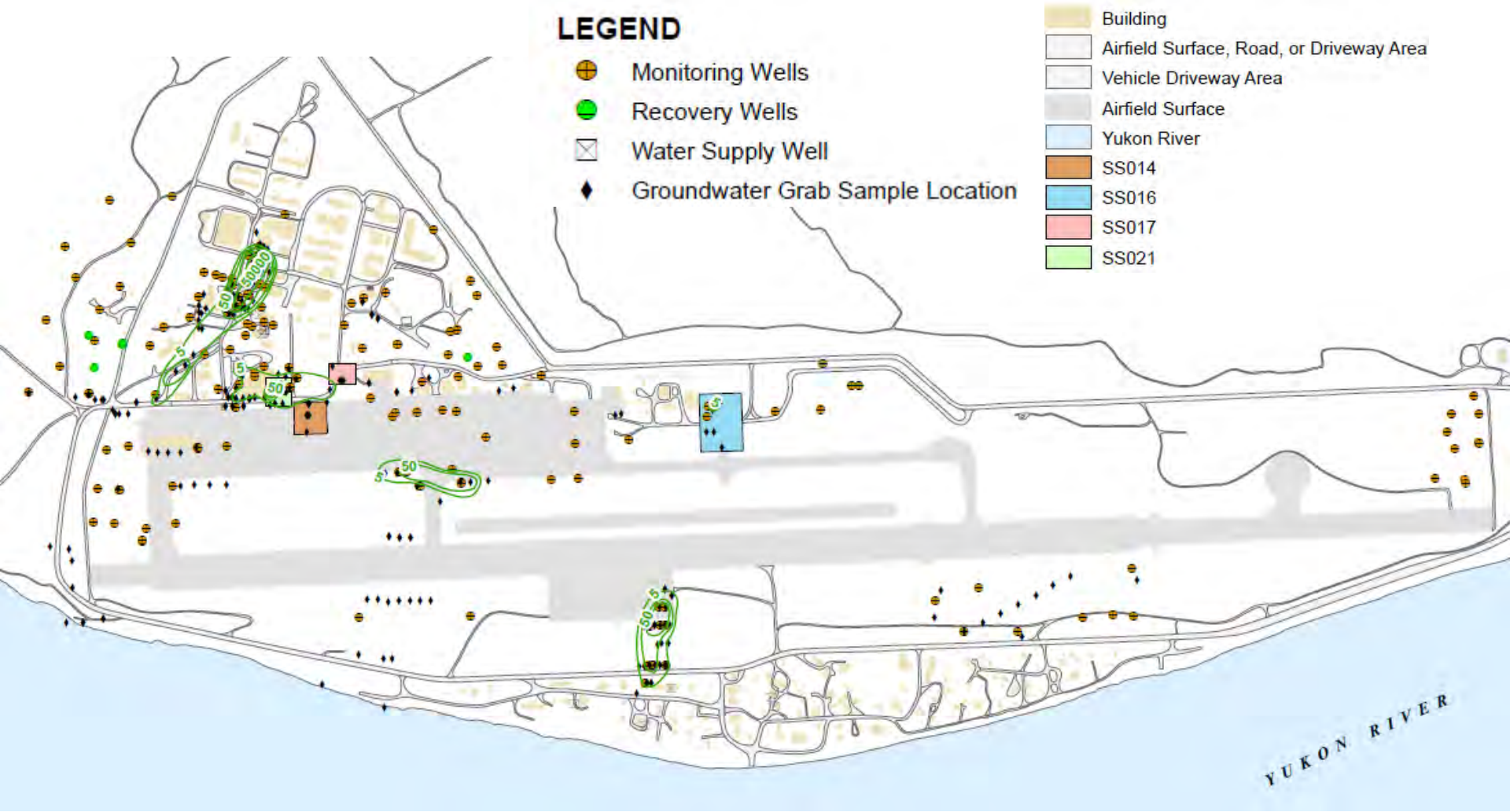
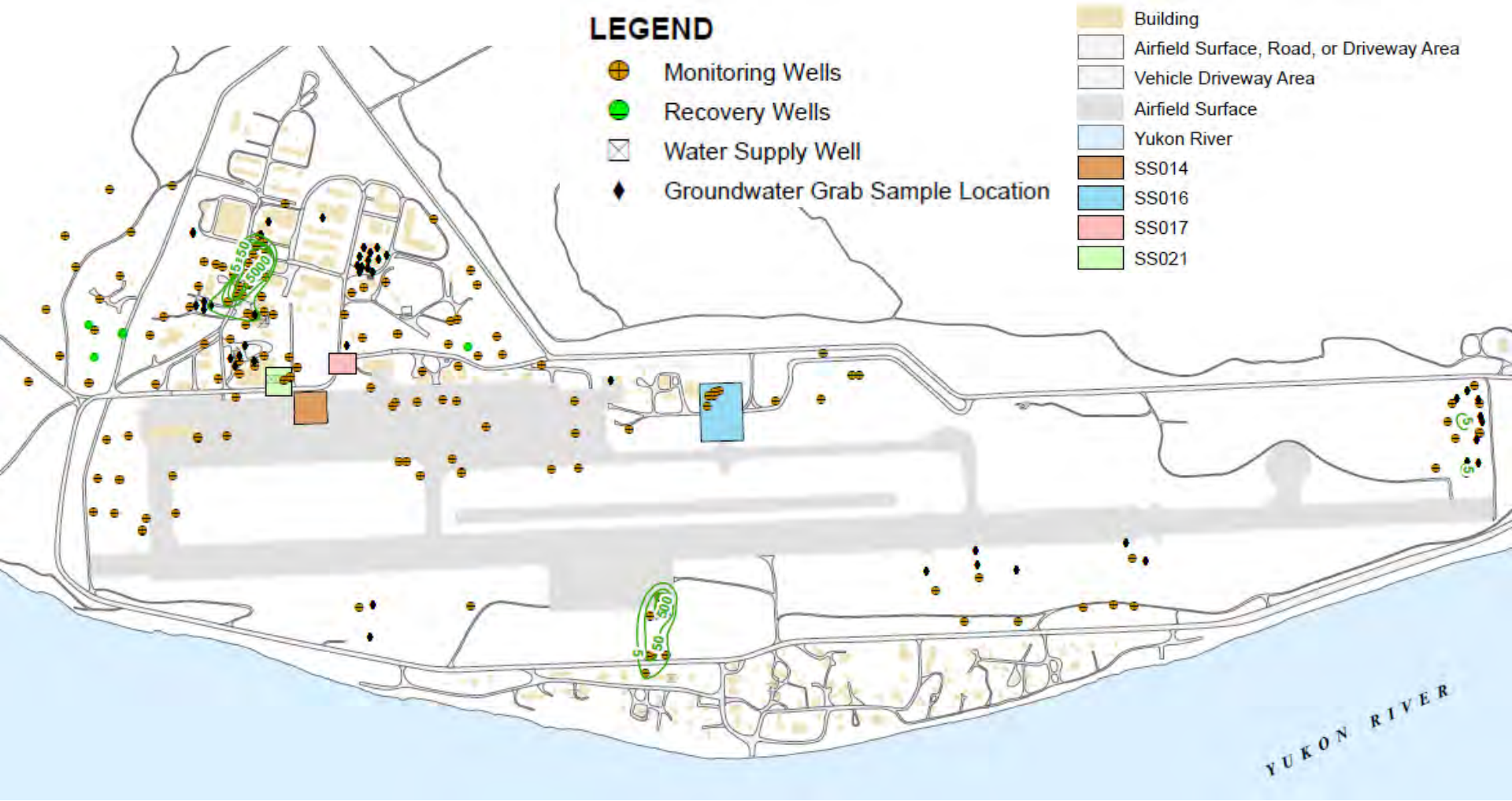
Maximum TCE 2004-2009



Maximum TCE July-August 2010



Groundwater Investigation 2010

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- **Preliminary Findings:**
  - **Comparison of old versus new results demonstrates that location of monitoring wells affects the interpreted shape of the plumes.**
  - **Additional data from fall 2010 and spring 2011 will be reviewed to determine where additional monitoring wells are needed to delineate the plume extents.**

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Groundwater Investigation

- **Next Steps:**
  - **Evaluate basewide well sampling data for seasonal fluctuations and data gaps**
  - **Evaluate aquifer test results to develop conceptual site model**
  - **Review groundwater data from site-specific investigations to identify locations for additional wells**
  - **Install additional wells to define and monitor the nature and extent of groundwater plumes**

2011 IRA AND LANDFARM CONSTRUCTION

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Galena FOL Source Removal Plan

- What is the source removal plan?
  - Initially target most contaminated sites with percent-level POL contamination (4 sites have been selected)
  - Excavate soil during seasonal low-water (late Summer) to maximize contaminated soil removal (unsaturated soil only)
  - Backfill with borrow soil purchased from community
  - Landfarm POL contaminated soil at location of City of Galena landfill
  - Identify additional petroleum-contaminated sites for source removal based on 2010/2011 investigations

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Proposed IRA Locations

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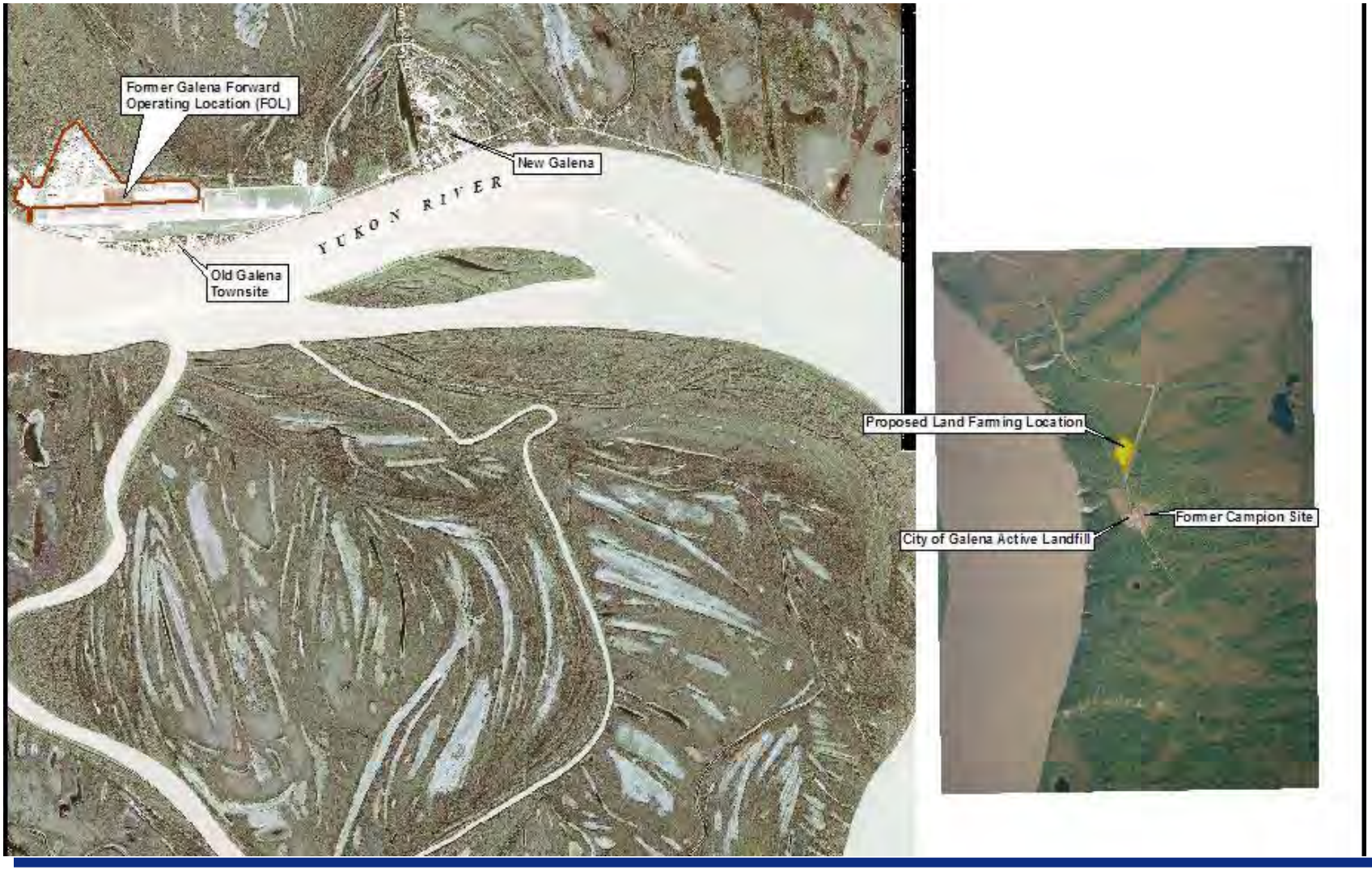
Proposed Landfarm Location



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Proposed Landfarm Location

30% Design Stage Drawing

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Proposed Landfarm Operation

- **Landfarm Operation**
  - **Initial soil blending**
  - **Ongoing operations**
    - **Tilling weekly for 1st month, then bi-weekly**
    - **Fertilizer application ratio per 100 lb carbon (TOC)**
      - **1 to 10 lbs nitrogen**
      - **0.5 to 1 lb phosphorous**
    - **Water as needed (moist, not saturated)**

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Proposed Landfarm Operation

- **Landfarm Operation (continued)**
  - **Progress sampling to determine effectiveness of bioremediation**
  - **Sampling to confirm treatment is complete**
  - **Reuse treated soil**