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Revision 0

Description of Modeling Analyses in Support of the 200-ZP-1 Remedial Design/Remedial Action Work Plan

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

U.S. DEPARTMENT OF ENERGY | Richland Operations Office

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Terms

COC	contaminant of concern
FS	feasibility study
FY	fiscal year
gpm	gallons per minute
HEIS	Hanford Environmental Information System
HWIS	Hanford Well Information System
IRM	interim remedial measure
K_d	distribution coefficient
MCL	maximum contaminant level
N/A	not applicable
OU	operable unit
PNNL	Pacific Northwest National Laboratory
RAO	remedial action objective
RD/RA	remedial design/remedial action
ROD	Record of Decision
SSP&A	S.S. Papadopulos and Associates, Inc.
TCE	trichloroethene

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1 Introduction

1.1 Background and Objectives

The *Feasibility Study for the 200-ZP-1 Groundwater Operable Unit* (DOE/RL-2007-28) and the *Proposed Plan for Remediation of the 200-ZP-1 Groundwater Operable Unit* (DOE/RL-2007-33) describe the use of groundwater pump-and-treat technology for the 200-ZP-1 Groundwater Operable Unit (OU) as part of an expanded groundwater remedy. During fiscal year 2008 (FY08), a groundwater flow and contaminant transport (flow and transport) model was developed to support remedy design decisions at the 200-ZP-1 OU. This model was developed because the size and influence of the proposed 200-ZP-1 groundwater pump-and-treat remedy will have a larger areal extent than the current interim remedy, and modeling is required to provide estimates of influent concentrations and contaminant mass removal rates to support the design of the aboveground treatment train. The *200 West Area Pre-Conceptual Design for Final Extraction/Injection Well Network: Modeling Analyses* (DOE/RL-2008-56) documents the development of the first version of the MODFLOW[1]/MT3DMS[2] model of the Hanford Site's Central Plateau, as well as the initial application of that model to simulate a potential well field for the 200-ZP-1 remedy (considering only the contaminants carbon tetrachloride and technetium-99).

This document focuses on the use of the flow and transport model to identify suitable extraction and injection well locations as part of the *200 West Area 200-ZP-1 Pump-and-Treat Remedial Design/Remedial Action Work Plan* (DOE/RL-2008-78). Currently, the model has been developed to the extent necessary to provide approximate results and to lay a foundation for the design basis concentrations that are required in support of the remedial design/remediation action (RD/RA) work plan.

The discussion in this document includes the following:

- Assignment of flow and transport parameters for the model
- Definition of initial conditions for the transport model for each simulated contaminant of concern (COC) (i.e., carbon tetrachloride, technetium-99, iodine-129, nitrate [as NO_3], trichloroethene [TCE], total chromium, tritium), plus uranium
- Assumptions underlying the predictive simulations, including the phased implementation of the final full remedy
- Approximate number, locations, and rates of extraction and injection wells
- Predicted amounts of contaminant mass extracted and influent concentrations at individual extraction wells for each COC and for uranium

This document is a companion report to pre-conceptual design document (DOE/RL-2008-56). Together these documents describe the sequential, progressive development of the modeling analyses and design basis for the 200-ZP-1 OU remedy.

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[1] MODFLOW is the U.S. Geological Survey modular, finite-difference flow model, which is a computer code that solves the groundwater flow equation. The program is used by hydrogeologists to simulate the flow of groundwater through aquifers.

[2] MT3DMS (Modular 3-D Transport Multi-Species) is a modular, three-dimensional transport model for the simulation of advection, dispersion, and chemical reactions of dissolved constituents in groundwater systems (*A Modular Three-Dimensional Multi-Species Transport Model for Simulation of Advection, Dispersion and Chemical Reactions of Contaminants in Groundwater Systems; Documentation and User's Guide* [Zheng and Wang 1999]; *MT3DMS V5.2 Supplemental User's Guide* [Zheng 2006]). MT3DMS uses a modular structure similar to the structure used by MODFLOW, and MT3DMS is used in conjunction with MODFLOW in a two-step flow and transport simulation.

1.2 Role of Modeling in Phased Remedy Implementation

The design, evaluation, and optimization of groundwater pump-and-treat remedies should be viewed as a long-term project in which the system design and operation are modified in response to improved understanding of the site (*Alternatives for Ground Water Cleanup* [U.S. Nuclear Regulatory Commission 1994]). The methods and tools used to assist in this understanding also develop over time and with increasing knowledge. The program to drill and construct extraction and injection wells at the 200-ZP-1 OU will be implemented in a phased manner, and the pump-and-treat remedy will be expanded in distinct phases. These phases are described in detail in the RD/RA work plan. The role of modeling in support of each phase is briefly described below. This document describes calculations made in support of the first phase, which is the RD/RA work plan design:

- Phase 0 – RD/RA Work Plan Design:
  1. Develop initial conditions (i.e., COC distributions) for use in predictive simulations of remedy design.
  2. Model groundwater flow and particle paths:
     - Particle starting locations defined on the basis of COC distributions and Record of Decision (ROD) remedial action objectives (RAOs)/cleanup levels
     - Simulations used to identify initial well locations and rates that will accomplish the RAOs, assuming advective transport.
  3. Model groundwater flow and advective/dispersive/reactive contaminant transport to provide initial estimates of the following:
     - Concentration versus time for each COC at each recovery well
     - Total system mass recovery versus time
     - Design basis concentrations for the design of the aboveground treatment train.
- Phase I – System Construction (through December 2011):
  1. Assume current interim remedial measure (IRM) is operational at 350 gallons per minute (gpm).
  2. Incorporate new field characterization data (e.g., aquifer tests, etc.) into model.
  3. Recalibrate flow and transport model to 350-gpm operational data, including measured heads, drawdowns, influent concentrations, and mass recovery rates.
  4. Repeat steps (1) through (3) from Phase 0, as appropriate.
  5. Update well locations and rates required to achieve ROD RAOs. These simulations will constitute the "FYxx Model Run xx" series of simulation/optimization analyses.
  6. Support the identification of suitable monitoring well locations and data quality objectives for monitoring the performance of the remedy operating at the following:
     - 1,000 gpm (i.e., Phase II)
     - 2,000 gpm, or ultimate full operating capacity (i.e., Phase III).

- Phase II – System Upgrade and Optimization (assumed duration 3 years):
  1. Assume remedy is operational at 1,000 gpm.
  2. Incorporate new field characterization data (e.g., aquifer tests, etc.) into model.
  3. Recalibrate flow and transport model to 1,000-gpm operational data, including measured heads, drawdowns, influent concentrations, and mass recovery rates.
  4. Repeat steps (1) through (3) from Phase 0, as appropriate.
  5. Update well locations and rates required to achieve ROD RAOs; these simulations will constitute the "FYxx Model Run xx" series of simulation/optimization analyses.
  6. Re-evaluate suitable monitoring well locations for monitoring performance of the final remedy operating at full operating capacity.
- Phase III – Long-Term Operations (assumed duration 22 years):
  1. Assume remedy is operational at 2,000 gpm or final full capacity.
  2. Incorporate new field characterization data (e.g., aquifer tests, etc.) into model.
  3. Calibrate flow and transport model to full operational data, including heads, drawdowns, influent concentrations, and mass recovery rates.
  4. Repeat steps (1) through (3) from Phase 0, as appropriate.
  5. Update well rates required to achieve ROD RAOs; these simulations will constitute the "FYxx Model Run xx" series of simulation/optimization analyses.
  6. Re-evaluate suitable monitoring well locations for monitoring performance of final remedy operating at full operating capacity.

Finally, modeling will also likely be used in support of regular evaluations of remedy performance, such as part of statutory *Comprehensive Environmental Response, Compensation, and Recovery Act of 1980* 5-year reviews.

This document describes the results of simulations conducted under Phase 0 for the RD/RA work plan. These simulations constitute the "FY09 Model Run 2" series of baseline predictive model runs.

1.3 Assumptions and Limitations

Groundwater flow and contaminant transport modeling provides approximate predictions of groundwater flow, migration of contaminants, and potential effectiveness of a proposed pump-and-treat remedy. Throughout this document, the principal assumptions of this modeling effort are described, and actions are currently being taken to address or evaluate each of these.

The principal assumptions are summarized in Section 5.3. Recommendations are provided in Chapter 6 for additional work that can improve the model and also evaluate (or mitigate) the impact of the assumptions on predictions made using the model.

As described in DOE/RL-2008-56, the design, evaluation, and optimization of groundwater pump-and-treat remedies should be viewed as a long-term project in which the system design and operation is modified in response to improved understanding of the site (U.S. Nuclear Regulatory Commission 1994). The methods and tools used to assist in this understanding also develop over time and with increasing

knowledge. DOE/RL-2008-56 discusses the development of the first version of the MODFLOW/ MT3DMS model of the Central Plateau, as well as initial application of that model to simulate a possible well field for the 200-ZP-1 remedy (considering only carbon tetrachloride and technetium-99). The simulations described in the current document represent further development and application of the flow and transport model (DOE/RL-2008-56). Development of the flow and transport model will continue by incorporating new information as this becomes available. In this regard, the model can complement other methods of analysis throughout the design, implementation, and optimization of the final 200-ZP-1 remedy.

2 Groundwater Flow Model Development

The pre-conceptual design document (DOE/RL-2008-56) describes the development of the first version of the MODFLOW/MT3DMS model of the Central Plateau. The development of the model is summarized in this chapter; DOE/RL-2008-56 provides more detailed information.

The groundwater model was constructed to simulate an area encompassing the Central Plateau (Figure 2-1). The model comprises 134 rows, 256 columns, and 5 layers, totaling 171,520 model cells. Of these, 113,540 model cells are active and the remainder is inactive. All layers of the model were simulated as convertible type. If the head calculated in the layer exceeds the top of the layer, the layer is simulated as confined (specific storage applies); if the head calculated in the layer is above the bottom of the layer but below the top of the layer (i.e., within the model cell), then the layer is simulated as unconfined (specific yield applies).

2.1 Simulation Codes

The groundwater flow model is constructed using the U.S. Geological Survey three-dimensional modular groundwater flow model (MODFLOW), which is discussed in the following documents:

- *A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model* (McDonald and Harbaugh 1988)
- *User's Documentation for MODFLOW-96, An Update to the U.S. Geological Survey Modular Finite-Difference Ground-Water Flow Model* (Harbaugh and McDonald 1996)
- *MODFLOW-2000, The U.S. Geological Survey Modular Ground-Water Model – User Guide to Modularization Concepts and the Ground-Water Flow Process* (Harbaugh et al. 2000)
- *MODFLOW-2005, The U.S. Geological Survey Modular Ground-Water Model – The Ground-Water Flow Process* (Harbaugh 2005).

The MODFLOW-2000 release of the MODFLOW code was selected because it possesses the necessary simulation capabilities, yet it is relatively simple to use, is public domain software, has been extensively used and thoroughly reviewed, and can be executed on a variety of computers and operating systems.

2.2 Boundary Conditions

Boundary conditions are defined on all sides of the model, vertically and horizontally. The vertical boundaries are the bottom of the model (which corresponds with the top of basalt) and the top of the model (which corresponds with the water table). The basalt is considered a no-flow lower boundary to the model, while the water table is a recharge boundary. Figure 2-1 illustrates the groundwater flow model domain and lateral boundary conditions, which are assigned as follows:

- Basalt forms the western boundary of the model, as well as part of the northern and southern boundaries. In all cases, the basalt is considered a no-flow boundary.

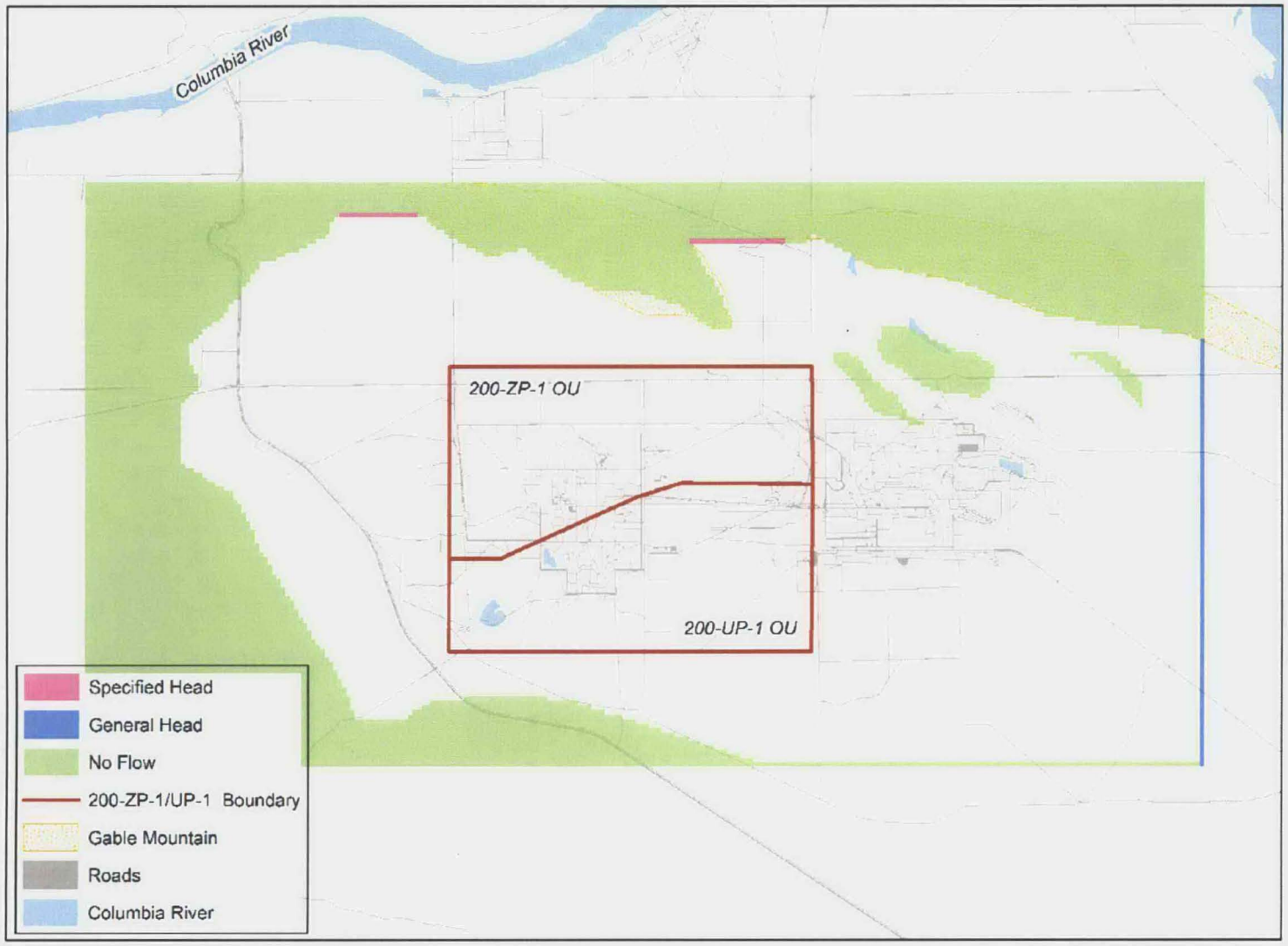

Figure 2-1. Groundwater Flow Model Domain and Lateral Boundary Conditions

- The northern boundary of the model includes two gaps in the basalt subcrop/outcrop:
  - A northwest gap is located between Gable Butte and Umtanum Ridge. This gap was represented as a time-invariant specified head boundary using water levels measured at well 699-63-90.
  - An eastern gap along the northern model boundary lies between Gable Mountain and Gable Butte. This boundary was defined as a time-varying specified head boundary using the water levels measured in well 699-60-60.
- A basalt subcrop crosses the southern model boundary, creating a shallow gap between the subcrop and Yakima Ridge. The southern gap is specified as a no-flow boundary.
- The southeastern model boundary extending from the southern basalt subcrop to the eastern end of the model domain is potentially an open boundary. However, this was specified as a no-flow boundary based on low and/or ambiguous gradients.
- The eastern model boundary is open, with groundwater flowing toward the Columbia River. This boundary is treated as a general head boundary. The Columbia River stage is applied as the boundary head, and the conductance is computed using the properties of each eastern boundary cell together with the distance to the Columbia River. The general head boundary was not specified in model layer 4, which is the Ringold Lower Mud Unit.

The sensitivity of the model results presented in the following subsections to these assumed boundary conditions is expected to be low; however, sensitivity analyses should be conducted to confirm this.

2.3 Stratigraphy

The model stratigraphy essentially follows the stratigraphy described in *Groundwater Data Package for Hanford Assessments* (PNNL-14753), including the elevation of the top of basalt and the top and bottom elevations of the geologic units at the Hanford Site. A data table containing the top and bottom elevations of the principal stratigraphic units based on PNNL-14753 was used to define the six hydrostratigraphic units listed in Table 2-1. Data obtained from PNNL-14753 were used directly in mapping the presence, top, bottom, and thickness of each unit. Unit top and bottom elevation and the unit thickness were interpolated onto the model grid using kriging. The calculated unit thickness was used to identify areas where a unit pinches out. In these areas, a minimum thickness of 1 m was defined. The presence or absence of a unit was mapped onto the model grid using a nearest-neighbor interpolation of the data in PNNL-14753. The top of basalt is used as the bottom of the model throughout the model domain.

The following revisions were made to the elevation of the top of basalt based on data collected since the publication of PNNL-14753. First, the top of basalt elevation was taken from Figure 5.13 of PNNL-14753 by digitizing and geo-referencing the contours shown in that figure. Second, the top of basalt was modified in the area of Gable Gap based on (1) top-of-basalt contours, and (2) top-of-basalt elevations at recent borings. The new top-of-basalt contours were geo-referenced and digitized, and replaced top of basalt elevation points digitized from PNNL-14753. The new boring data were used directly as data points and supplemented the top of basalt data set for interpolation. The top of basalt was incorporated into the model by kriging the top of basalt data set onto the model grid.

Table 2-1. Stratigraphic Units Represented in the Groundwater Flow Model

Model Zone	Statigraphic Unit	Description
1	1	Hanford formation gravel, sand and silt (dominated by gravel and sand within the aquifer)
5	5	Ringold gravel Units E and C (BHI-00184); also includes sand facies of the Upper Ringold Unit where it directly overlies the other E and C units
6	6	Fine-grained overbank and paleosol deposits that vertically separate unit B from overlying unit C in the eastern part of the Hanford Site
7	7	Ringold Units B and D (BHI-00184)
8	8	Ringold Lower Mud Unit (BHI-00184)
9	9	Ringold Unit A (BHI-00184), a gravel and sand facies that is dominated by sand in the western part of the Pasco Basin

NOTES:

1. Stratigraphic unit and model zone do not correspond with model layer. A stratigraphic unit or model zone may occur in one or more model layers.
2. Units 2 through 4 are defined, but do not occur in the 200-ZP-1 model domain.
3. BHI-00184, *Miocene- to Pliocene-Aged Suprabasalt Sediments of the Hanford Site, South-Central Washington.*

2.4 Recharge

The top model boundary is set as a recharge boundary. Groundwater recharge (net infiltration rate at the water table) specified in the flow model comprises the following three components:

1. Recharge from net precipitation that reaches the water table (i.e., areal recharge): Estimates of long-term groundwater recharge rates from precipitation throughout the Central Plateau range widely (PNNL-16688, *Recharge Data Package for Hanford Single-Shell Tank Waste Management Areas*; PNNL-17841, *Compendium of Data for the Hanford Site [Fiscal Years 2004 to 2008] Application to Estimation of Recharge Rates*). As a result, at the present time the areal recharge is specified as a calibration parameter in the flow model, with an allowable range from 0 in./yr as a lower bound up to 2 in./yr as an upper bound (which is equivalent to 30% of the average annual precipitation of 7.1 in./yr recorded for Richland, Washington). This upper-bound number is consistent with the upper-bound estimates provided in PNNL-16688 and PNNL-17841.

2. Recharge arising from historic wastewater discharge activities: The correspondence of historic wastewater disposal activities with changes in groundwater levels throughout the 200-ZP-1 OU indicates that disposal at various ponds and drains led to increases in groundwater elevations of over 15 m in some locations. The wastewater disposal constituted a primary driving force in the historic migration (and the current disposition) of contaminants. Approximate water-loss-rate data were obtained for the period from 1944 through 1993 from (a) the Hanford Virtual Library's effluent volumes and discharges database for the 200 West Area (dated November 2006); and (b) the

memorandum, *Soil Inventory Model Rev. 1 Enhancement Scoping Test Results*[3]. These sources of infiltration, plus B Pond and Gable Mountain Pond (which are the most substantial historic sources of water within the 200 East Area), were incorporated into the flow model by defining polygons for each infiltrating body so each polygon contains at least one flow model cell center, and then calculating the recharge rate in each encompassed cell by dividing the total infiltration rate by the number of model cells multiplied by the model cell area. Additional anthropogenic sources of infiltration within the 200 East Area not included in the current model will be incorporated prior to recalibration for the 30% design simulations.

3. Mountain-front recharge arises from infiltration of snowmelt and run-off from elevated areas: Recharge associated with basalt outcrops is not well understood (PNNL-17841); however, it may comprise a significant contributor to groundwater recharge in the vicinity (upgradient) of the Central Plateau. Zones depicting possible areas of focused recharge were defined along Umtanum Ridge mountain front, Gable Mountain/Gable Butte mountain front, and the area of bedrock high along the southern model boundary. Since unique determination of recharge rates within each of these zones is difficult, sensitivity analyses will be used (as described in Section 1.3) to evaluate the effect of uncertainties in these parameters on the 200-ZP-1 pump-and-treat remedy design.

For the predictive simulations that form the basis of the 200-ZP-1 pump-and-treat remedy well field design, the primary source of recharge to groundwater is net-deep percolation from aerial precipitation. However, previous work (e.g., PNNL-14717, *Natural Recharge to the Unconfined Aquifer System on the Hanford Site from the Greater Cold Creek Watershed: Progress Report 2004*; and PNNL-15534, *FY 1999 Progress Report on Potential Groundwater Recharge from the Infiltration of Surface Runoff in Cold and Dry Creeks*) suggests that recharge from Cold Creek and Dry Creek comprises a significant source of water to the Central Plateau. The flow model will be revised to incorporate these sources of water through lateral boundary conditions (mountain front recharge), aerial recharge, or some combination of these, prior to recalibration for the 30% design simulations.

2.5 Flow Model Temporal Discretization (Stress Periods)

The groundwater flow model comprises two distinct periods: (1) a period representing historic conditions simulating from pre-development through to the approximate current timeframe; and (2) a period representing predictive (future) conditions simulating from about the current timeframe through the phased implementation of the 200-ZP-1 pump-and-treat remedy. For historic conditions, the transient flow model simulates 64 stress periods; for predictive (future) conditions, the transient flow model simulates 3 stress periods. Details are provided in Table 2-2.

Although the predictive (future) model simulates the migration and fate of the COCs for 54 years following implementation of the final full-scale remedy, calculations of mass recovery are made using model outputs at t = 28 years from present. This corresponds with 25 years from the implementation of Phase I of the remedy in accordance with the *Record of Decision, Hanford 200 Area, 200-ZP-1 Superfund Site, Benton County, Washington* (U.S. Environmental Protection Agency et al. 2008).

[3] *Soil Inventory Model Rev. 1 Enhancement Scoping Test Results*, memorandum from B. C. Simpson (Nuvotec) to G. V. Last (Pacific Northwest National Laboratory), dated November 23, 2005.

Table 2-2. Temporal Discretization of the Groundwater Flow Model

Model	Stress Period(s)	Duration	Description
Historic	1	Approx. 550 years	The initial transient stress period is specified prior to the calibration period to establish an initial pre-development groundwater condition.
Historic	2 to 63	62 years	The 62 transient annual stress periods span the calibration period from 1944 through 2005.
Historic	64	5 years	This stress period simulates current conditions under the assumption that predictive simulations of the 200-ZP-1 remedy should commence no earlier than 2010.
Predictive (future)	1	3 years	Phase I; current interim remedial measure, operating at approximately 350 gpm total extraction/injection rate.
Predictive (future)	2	3 years	Phase II of final 200-ZP-1 pump-and-treat remedy operating at 1,000 gpm.
Predictive (future)	3	54 years	Phase III of final 200-ZP-1 pump-and-treat remedy operating at 2,000 gpm.

gpm = gallons per minute

2.6 Flow Model Calibration

Calibration of the groundwater flow model is described in the pre-conceptual design document (DOE/RL-2008-56). The flow model was calibrated to historic groundwater elevations recorded at monitoring wells throughout the 200-ZP-1 OU, which document large changes in groundwater elevation in response to infiltration of wastewater discharged to the various disposal facilities. Calibration of the flow model focused on obtaining relatively good correspondence between simulated and measured changes in groundwater elevations at monitoring wells; contoured, simulated, and measured groundwater elevations; and corresponding hydraulic gradients. Manual and automated parameter estimation techniques were used to adjust model parameter values during calibration; however, no formal statistical methods were used to assess the calibration results. Rather, the calibration was interpreted qualitatively by reviewing hydrographs illustrating the measured and simulated groundwater levels throughout the 200-ZP-1 OU, and then comparing the estimated parameter values with independent sources of information (e.g., aquifer tests and previous publications).

The flow model parameters estimated through the calibration process were the net recharge accrued from precipitation, specific yield, and hydraulic conductivity in the principal water-bearing units, which was a total of eight parameters (Table 2-3). The ratio of horizontal to vertical hydraulic conductivity (i.e., vertical anisotropy) was held constant at 10:1 throughout the calibration.

Table 2-3. Flow Model Parameters Used in Predictive Simulations

Parameter/ Units	Parameter Name	Formation	Initial Value	Estimated Value
R (m/day)	Recharge from precipitation	N/A	1.39E-04	1.35E-04
S_Y (-)	Specific yield (unconfined storage)	All	1.50E-01	2.07E-01
HK1 (m/day)	Hydraulic conductivity	Hanford	500.00	577.50
HK5 (m/day)	Hydraulic conductivity	Ringold Units C and E	10.00	10.14
HK6 (m/day)	Hydraulic conductivity	Ringold Unit B/C fines	10.00	14.40
HK7 (m/day)	Hydraulic conductivity	Ringold Units B and D	10.00	20.92
HK8 (m/day)	Hydraulic conductivity	Ringold Lower Mud	1.00E-03	4.36E-03
HK9 (m/day)	Hydraulic conductivity	Ringold Unit A	10.00	10.53

NOTES:

1. The ratio of horizontal to vertical hydraulic conductivity (i.e., vertical anisotropy) was held constant at 10:1 throughout the calibration.
2. The specific yield is constant for all formations, and as such during calculations applies to the formation within which the water table lies.

N/A = not applicable

Calculations performed to allocate rates at extraction and injection wells suggest that the total aquifer transmissivity above the basalt near the 200-ZP-1 OU ranges from about 370 to 950 m^2/day at the completion of the calibration. These values are comparable with values reported from aquifer test analyses and other modeling efforts as summarized in Appendix D of the feasibility study (FS) (DOE/RL-2007-28) and estimated from model calculations.

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3 Contaminant Transport Modeling

Contaminant transport modeling conducted in support of the RD/RA work plan (DOE/RL-2008-78) considered the migration of contaminants mapped as being present at the current time within the saturated aquifer. As such, the simulations assume that there are no continuing sources of contaminants to groundwater, and also that the dissolved and sorbed contaminants are in equilibrium.

3.1 Simulation Codes

The code MT3DMS (Modular 3-D Transport Multi-Species) (*A Modular Three-Dimensional Multi-Species Transport Model for Simulation of Advection, Dispersion and Chemical Reactions of Contaminants in Groundwater Systems; Documentation and User's Guide* [Zheng and Wang 1999]; *MT3DMS V5.2 Supplemental User's Guide* [Zheng 2006]) is a three-dimensional, multi-species transport model for the simulation of advection, dispersion, and chemical reactions in groundwater developed specifically for use with MODFLOW. It was used to evaluate the approximate directions and rates of migration of the contaminants and the approximate time-varying influent concentration of these contaminants at the extraction wells.

3.2 Transport Properties for Contaminants of Concern

Contaminant transport simulations were completed for carbon tetrachloride, technetium-99, iodine-129, nitrate, TCE, chromium, tritium, and uranium. Transport terms simulated in the analyses include advection, dispersion, and simple reactions. MT3DMS can solve the advection terms using either explicit or implicit solution schemes. In these initial analyses, all transport terms (including advection) were solved using an implicit solution scheme. Parameters defined for the transport of carbon tetrachloride are primarily based on values provided in the FS (DOE/RL-2007-28). The parameters defined for the remaining contaminants are based on values provided in the FS and in the *Hanford Contaminant Distribution Coefficient Database and Users Guide* (PNNL-13895) and *Geochemical Data Package for the Hanford Immobilized Low-Activity Tank Waste Performance Assessment (ILAW PA)* (PNNL-13307).

3.2.1 Base Case Parameters

The following parameters applied to all transport simulations and all contaminants described in this document, with the exception of sensitivity analyses completed for carbon tetrachloride, which are described in the following section:

- Longitudinal dispersivity = 50 m, transverse dispersivity = 10 m, and vertical dispersivity is assumed to be zero
- Bulk density = 1.72 kg/L
- Mobile porosity = 0.18.

Instantaneous, reversible sorption was simulated for only two COCs (carbon tetrachloride and iodine-129). A distribution coefficient (K_d) of 0.200 L/kg and corresponding retardation rate (R) of 2.911 were used for iodine-129. The radioactive decay of radionuclides was not simulated in the series of model runs described here.

3.2.2 Alternate Parameter Values for Carbon Tetrachloride

Since carbon tetrachloride is the primary COC at the 200-ZP-1 OU and the initial transport simulations focused on a well configuration designed to achieve the RAOs for carbon tetrachloride, several simulations of carbon tetrachloride were completed using the following parameters (note that bulk density = 1.72 kg/L for all three parameter sets):

- Base case parameter set:
  - K_d = 0.0110 L/kg
  - Mobile porosity = 0.180
  - R = 1.105
- Alternate parameter set #1:
  - K_d = 0.0110 L/kg
  - Mobile porosity = 0.130
  - R = 1.146
- Alternate parameter set #2:
  - K_d = 0.060 L/kg
  - Mobile porosity = 0.180
  - R = 1.573.

As described in the following chapter, these three parameter sets were used together with two alternate initial conditions for carbon tetrachloride, resulting in six simulations of the likely fate of carbon tetrachloride under the assumed extraction and injection well configuration.

4 Mapping of Contaminants of Concern

The initial conditions for contaminant transport modeling were mapped in three dimensions using concentration data measured in wells throughout the area. A wide variety of methods can be used to map point data to create initial conditions for transport modeling. The remedy design modeling described in this document used initial conditions that were constructed using two methods:

- An ordinary kriging method that produces a single depiction of the likely extent of a contaminant. This method was used to prepare initial conditions for all contaminants.
- A multi-Gaussian (stochastic) sequential simulation approach that produces multiple realizations of the likely extent of a contaminant, each consistent with the spatial statistics of that contaminant. This method was used to prepare initial conditions for the most widespread contaminants (i.e., carbon tetrachloride, technetium-99, and nitrate).

Two alternate mapping methods were used to provide an indication of the potential impact of uncertainties in the distribution of the contaminants. Within the convex hull of the data domain (and for the purposes of developing design basis concentrations for the 200-ZP-1 remedy), the contaminant depictions prepared using the ordinary kriging method are considered to be the "best estimate" of the contaminant distribution, leading to the corresponding "best estimate" of the likely influent concentration at each extraction well. The contaminant depictions prepared using the stochastic sequential simulation approach are considered to present an alternate (and typically considerably higher) "potential" contaminant distribution, leading to a corresponding "potential" influent concentration at each extraction well.

Common data sets were used to prepare these three-dimensional depictions of the extent of contamination. The methods used to compile the sample data in readiness for interpolation are described in this chapter.

4.1 Compilation of Depth-Discrete Concentration Database

A database of depth-discrete concentration data was compiled for use in spatial analysis and geostatistical mapping tasks. The database was compiled as part of a collective effort by personnel from Pacific Northwest National Laboratory (PNNL); S.S. Papadopulos and Associates, Inc. (SSP&A); Fluor Hanford, Inc.; and Vista Engineering Technologies, LLC. The data compilation effort is described further in *Spatial Analysis of Contaminants in 200 West Area Groundwater in Support of the 200-ZP-1 Operable Unit Pre-Conceptual Remedy Design* (PNNL-18100). A summary is provided in this section.

The database includes well sample data, well construction information, water table elevations, fields describing the sources of the concentration data, and data quality flags. The data were drawn from several sources that can be traced back to standard Hanford data sources, including the Hanford Environmental Information System (HEIS) database and the Hanford Well Information System (HWIS) database:

- 200-ZP-1 OU RI data set (DOE/RL-2006-24, *Remedial Investigation Report for the 200-ZP-1 Groundwater Operable Unit*)
- 200-ZP-1 FS data set (DOE/RL-2007-28)
- Depth-discrete carbon tetrachloride data

- Depth-discrete technetium-99 data
- The most recent data available in the HEIS database.

In addition to the three-dimensional, depth-discrete concentration data, the database was supplemented by two-dimensional data sets used to map contaminants in *Hanford Site Groundwater Monitoring for Fiscal Year 2007* (DOE/RL-2008-01). The use of the supplemental two-dimensional data sets follows the approach used in *Geostatistical Analyses of the Persistence and Inventory of Carbon Tetrachloride in the 200 West Area of the Hanford Site* (PNNL-16509), where the two-dimensional data constrain the concentrations present near the water table and supplement data used for variogram analysis. This effort provides a comprehensive compilation of sample data in the 200 West Area. The final point data used to develop the contaminant initial conditions using the ordinary kriging method are listed in Appendix A. A corresponding data set was employed to prepare the three-dimensional depictions using the sequential simulation approach, as detailed in PNNL-18100.

4.1.1 Treatment of Non-Detects and Duplicates

In many cases, contaminant concentrations were less than the detection limit, which is noted in the "laboratory qualifier" field in the database. These concentrations were flagged as "non-detect." Non-detect concentrations were replaced by one-half of their stated value, which is a common practice in environmental analysis (*Statistical Methods for Environmental Pollution Monitoring* [Gilbert 1987]). There were occasions when more than a single observation of the concentration was made at a given location (i.e., duplicate samples from a single depth in a well, or multiple sample dates). When this occurred, the maximum concentration value that was above detection was used to represent the concentration at that location. If all data from a given location were less than the detection limit, then the minimum value was used.

4.1.2 Sample Elevations

Representative elevations for the sample data were assumed the midpoint of the well screen or sampled interval. Because of the falling water table in the 200 West Area and the prevalence of monitor wells screened at the water table, many monitoring wells have mid-screen elevations above the water table. In these cases, the mid-screen elevation was adjusted toward the screen bottom elevation to put the sample point below the current water table elevation.

4.1.3 Treatment of Nitrogen

Sample data for nitrogen species included nitrate, nitrite, ammonia, and the ammonium ion. These nitrogen species were converted to nitrogen in nitrate (NO_3-N), nitrogen in nitrite (NO_2-N), nitrogen in ammonia (NH_3-N), and nitrogen in ammonium ion (NH_{4+}-N), respectively. These results were then summed to obtain the total nitrogen concentration, and then converted back to nitrate as NO_3 by multiplying the total nitrogen concentration by 4.4268.

4.1.4 Final Selection of Data for Interpolation

Several criteria were used in the final selection of the contaminant data used in the spatial analysis and in mapping: sampling date, location relative to the water table, geographic area, and well type. The data were restricted so only sample data collected from 1999 or later were included in the final data used for analysis and mapping. This follows the approach used in PNNL-16509. The majority of the data incorporated in the final data set used for mapping represent samples obtained during 2003 or later.

4.2 Interpolation

Three-dimensional maps were prepared by CH2M Hill Plateau Remediation Company, PNNL, and SSP&A, with SSP&A involved in each stage of data compilation and mapping to provide continuity in the analyses.

4.2.1 Ordinary Kriging

The point concentration data tabulated in Appendix A were interpolated to a relatively fine, regular, three-dimensional grid using ordinary kriging. Each plume was divided into one or more kriging zones. Within each kriging zone, the prevailing groundwater flow direction was used as a basis for local kriging parameters. Each zone was kriged separately, and the results were combined to produce the resulting plume shell. In each case, the variogram assumed no nugget effect, and the interpolated results were truncated to the minimum and maximum values of the point sample data. The interpolated contaminant concentrations were contoured and visualized using wire-net isosurfaces. The kriging process was adjusted until the resulting plume shells fit the known data as closely as possible and were hydrologically plausible.

4.2.1.1 Control Points

Control points were used to supplement the point sample data listed in Appendix A to control the horizontal and vertical plume boundaries. The control points included water table elevations from March 2007 to prevent the interpolation from extending above the current water table, and basalt elevations to prevent the interpolation from extending below the base of the model. Control points were also used to bridge spatial gaps between widely spaced sampling points in the interior of each plume. In these cases, the control point concentrations were the average of the closest upgradient and downgradient data points along the prevailing groundwater flow direction.

4.2.1.2 Plume Shell Masking

Each plume shell was masked to mitigate artifacts of the kriging process that can produce hydraulically unreasonable extrapolation into areas with no data coverage. The mask is the plan view of the maximum lateral extent of contamination present at a boundary concentration. Outside the mask boundary, interpolated concentrations were set to 0. Masking boundaries were established at the following concentrations/activities:

- Carbon tetrachloride = 5 μg/L
- Total chromium = 10 μg/L
- Iodine-129 = 1.0 pCi/L
- NO_3 as NO_3 = 10 mg/L
- Technteium-99 = 90 pCi/L
- TCE = 5 μg/L
- Tritium = 1,000 pCi/L
- Uranium = 3 μg/L.

4.2.1.3 Interpolation of Plume Shell Concentrations to Model Grid

To transfer the mapped plume shells described above from the three-dimensional plume shell development grid into the model, each plume shell array was translated onto the model grid using linear interpolation of a concentration at the center (node) of each model grid cell from the concentrations at the surrounding plume shell grid nodes. Any model grid cells that are outside of the plume shell grid are assigned a concentration/activity of zero. Since the transport model has a coarser grid than the plume

shell development grids, the volume of contaminated groundwater and the dissolved-phase contaminant mass/activity statistics for each contaminant differ slightly between the plume shell grid and the model grid. A comparison of these masses/volumes is provided in Table 4-1.

Table 4-1. Mapped Approximate Volumes and Masses of Contaminants

COC	Mapping Method	Volume (Plume Shell) (million m^3)	Volume (Model Grid) (million m^3)	Dissolved Mass/Activity (Plume Shell)	Dissolved Mass/Activity (Model Grid)
Carbon tetrachloride	1	115.8	115.7	43,121.8 kg	47,150.3 kg
	2	N/C	N/C	89,705 kg	93,553 kg
Nitrate (as NO_3)	1	122.2	125.0	1.4E+7 kg	1.5E+7 kg
	2	N/C	N/C	5.1E+7 kg	4.2E+7 kg
Technetium-99	1	14.8	14.2	23.9 Ci	26.7 Ci
	2	N/C	N/C	213.9 Ci	232.3 Ci
Total chromium	1	52.5	49.4	2,036.7 kg	1,749.9 kg
Iodine-129	1	4.3	4.6	0.04 Ci	0.03 Ci
TCE	1	19.7	23.0	151.8 kg	227.8 kg
Tritium	1	53.3	58.5	2,159.7 Ci	1,885.8 Ci
Uranium	1	17.3	12.9	503.4 kg	501.7 kg

COC = contaminant of concern
N/C = not calculated
TCE = trichloroethene

4.2.2 Multi-Gaussian Simulation

4.2.2.1 Carbon Tetrachloride and Technetium-99

Multi-Gaussian mapping analyses for carbon tetrachloride and technetium-99 were completed by PNNL. Details of the process to obtain the data for mapping, data analyses prior to mapping, and mapping completed by PNNL are detailed in PNNL-18100 and *Revised Geostatistical Analysis of the Inventory of Carbon Tetrachloride in the Unconfined Aquifer in the 200 West Area of the Hanford Site* (PNNL-18118). A summary is provided below.

Stochastic realizations prepared by PNNL were constructed on a regular grid using the Geostatistical Software Library (GSLIB) protocols (*GSLIB: Geostatistical Software Library and User's Guide* [Deutsch and Journel 1998]). The lateral extents of the COC mapping used to define initial concentrations for the contaminant transport modeling extended slightly beyond the lateral extents of the available sample data in each direction (i.e., to the north, east, south, and west). As for the ordinary kriging approach, stochastic mapping can extrapolate into areas where the presence of contamination is hydraulically unlikely (e.g., considerably upgradient of postulated source areas) due to the absence of available well data to directly constrain extrapolation into these areas. It may be appropriate to consider the western boundary of the mapping to be defined along the line of proposed upgradient (westerly)

injection wells (illustrated later in this discussion); however, the simulations described here incorporated the full mapped extent of the carbon tetrachloride and technetium-99.

The mapping analyses completed by PNNL produced 500 realizations of the distribution of carbon tetrachloride and technetium-99 throughout the 200 West Area. From these realizations, PNNL provided several realizations for use as inputs in the remedy simulations. The following depictions of the contaminant distribution were used as initial conditions for the modeling described in this document (PNNL-18118):

- Carbon tetrachloride: E-type estimate (EAvg) of the 500 realizations produced using a three-dimensional variogram model.
- Technetium-99: E-type estimate (EAvg) of the 500 realizations produced using a two-dimensional variogram model.

In each case, the E-type estimate represents the average of the 500 simulated values for the contaminant at each simulation grid node (*Geostatistics for Natural Resources Evaluation* [Goovaerts 1997]). These relatively fine-resolution, regular, three-dimensional grids were interpolated to the coarser model grid using a locally weighted average approach similar to that used for the ordinary kriging plume shells.

4.2.2.2 Nitrate

To supplement the ordinary kriging method for defining initial conditions for the remaining COC that shows a wide spatial extent throughout the 200 West Area (i.e., nitrate), a stochastic simulation approach similar to that described for carbon tetrachloride and technetium-99 was used by incorporating definition (parameter) files provided by PNNL (PNNL-18118). A rigorous variogram analysis was not completed for nitrate. The same three-dimensional variogram parameters were used for nitrate as used by PNNL (PNNL-18118) for carbon tetrachloride, however, with the nugget set to zero. This approach was taken under the assumption that nitrate has a similar spatial coverage, and it shows a similar range (variability) in concentrations (i.e., from single-digit concentrations to several thousands, although in different units) as does carbon tetrachloride. A compound-specific variogram analysis should be completed for the nitrate data set prior to conducting further simulations.

4.3 Contaminant Masses and Volumes

Table 4-1 compares the estimated volumes of contaminated groundwater and dissolved-phase masses/activities for each contaminant, for each mapping method, calculated assuming an aquifer porosity of 18% (0.18). Differences between the mass/activity calculated on the fine, regular grids and those reported for the coarse, irregular model grid are typically on the order of (or less than) 10%, with the exception of TCE and technetium-99. With regard to TCE, this is a minor COC that is fully encompassed within the spatial footprint of the carbon tetrachloride, and uncertainty in the mass or volume of TCE is of limited concern. In regard to technetium-99, PNNL-18100 indicates the following:

> *Tc-99 occurs as isolated small plumes and that the concentration decreases substantially with depth" and "The Tc-99 realizations show greater variability than the realizations generated for the 3D CTET [three dimensional carbon tetrachloride] model..."* and *"The greater variability for the Tc-99 realizations, which should lead to higher uncertainty for Tc-99 flow and transport predictions, is probably due to several factors, including 1) the presence of 17% more depth-discrete data for CTET [carbon tetrachloride] than there is for Tc-99 ...; 2) the apparent patchiness of the Tc-99 plumes relative to the CTET [carbon tetrachloride] plumes, ... and 3) the presence of a greater degree of variability in*

the univariate distributions of the two variables, with the Tc-99 data ranging over more than five orders of magnitude... (PNNL-18100).

4.4 Sources of Uncertainty and Recommendations

4.4.1 Sources of Uncertainty

As is often the case when mapping large sample data sets over wide areas, there is uncertainty associated with defining the current extent of contaminants. This comprises uncertainty regarding the point sample data, as well as uncertainties regarding the distribution of contaminants between the point sample data and in locations where there are no sample data. Despite these uncertainties, the sample data sets represent the information currently available, upon which the current three-dimensional contaminant distributions are based.

Uncertainties regarding the point sample data include the following:

- Contrasting monitoring well designs, sample collection, and analytical methods (i.e., sampling variability)
- The occurrence of analytical method reporting limits that exceed the applicable maximum contaminant levels (MCLs) (this is particularly evident for iodine-129)
- Contrasting and sometimes relatively low-density spatial coverage of sample data for each contaminant (the most comprehensive coverage is associated with carbon tetrachloride and nitrate)
- Some sampled wells have relatively long screen lengths (e.g., 45 ft or longer); samples collected from such a well integrate conditions throughout the intercepted interval.

Uncertainties regarding the spatial distribution of the contaminants between the point sample data, and in locations where there are no sample data, include the following:

- The groundwater flow direction has varied over time, primarily due to the changes in wastewater discharges. The changing flow direction can make it difficult to correlate sample data points spatially.
- There are multiple source areas for most contaminants. Ideally, sample data could be connected in the direction of groundwater flow. However, the possibility of multiple sources for many contaminants makes it difficult to determine the source origin of the sampled water and contaminants.

Often, the distribution of sampling locations, particularly vertically (i.e., with depth), is a primary source of uncertainty in the characterization of a plume. Where there are closely spaced sampling locations (e.g., those screened close to the water table in the vicinity of the tank farms), the uncertainty may be less than where there are fewer, more widely spaced sampling locations. Near the carbon tetrachloride source areas beneath the 216-Z-12 and 216-Z-18 Cribs and further south toward the U Pond and 216-S-25 Crib, there are few deep sample locations to define the plume shell lower boundaries for any contaminants. Uncertainty generally increases toward the northeast, east, and southeast for most contaminants, and it increases with increasing depth within the aquifer for most contaminants.

5 200-ZP-1 Pump-and-Treat Remedy Simulations

The 200-ZP-1 FS (DOE/RL-2007-28) and proposed plan (DOE/RL-2007-33) provide relatively simple, comparative evaluations of alternate pump-and-treat well configurations on the basis of semi-analytical groundwater flow modeling and particle-tracking calculations. The analyses were used to identify the approximate number and potentially suitable locations for extraction and injection wells. These calculations provided a starting point for the flow and transport simulations described here. The initial locations and rates for the extraction and injection wells simulated in this analysis were based upon the alternatives presented in the FS.

5.1 Procedures

5.1.1 Simulation of Carbon Tetrachloride and Other Contaminants of Concern

A series of flow and transport simulations were completed to identify the approximate locations and rates for extraction and injection wells that could meet the primary RAO for carbon tetrachloride (i.e., maximizing mass recovery in order to remediate 95% of the initial carbon tetrachloride mass within 25 operational years).

Initial flow and transport simulations suggested that the larger extraction and injection rates described in the FS (DOE/RL-2007-28) and proposed plan (DOE/RL-2007-33) were most likely to achieve the specified RAO within a reasonable timeframe (further details are provided in the pre-conceptual design document [DOE/RL-2008-56]). Once this was established, the advective/ dispersive/reactive transport simulations focused on well configurations that would recover groundwater contaminated above 100 μg/L carbon tetrachloride while providing a hydraulic barrier to further eastward migration of these contaminants. A concentration of 100 μg/L was selected based on calculations performed as part of the FS (DOE/RL-2007-28) and based on PNNL-18118, which suggest that about 95% of the mass of carbon tetrachloride lies above a concentration of about 100 μg/L.

Numerical optimization techniques were not employed in identifying the well locations and rates, which were instead identified manually by reviewing the results of previously completed simulations. After these simulations were completed, additional simulations were completed to model likely influent concentrations for the remaining COCs.

5.1.2 Allocation of Extraction and Injection Across Model Layers

The groundwater model includes five layers that represent the principal water-bearing units. For the predictive transport simulations, recovery and injection wells were assumed to intercept the entire saturated thickness of the aquifer. While this is unrealistic in terms of practical implementation, (1) it is expected that given the vertical distribution of carbon tetrachloride, several of the recovery wells, in particular, will be constructed with relatively long (>20 m) screened intervals; and (2) the simulated mass recovery at each well will be relatively accurate, regardless of screen length, under the assumption that most mass is mobile within transmissive units that a shorter well would be designed to intercept. However, the simulated influent concentrations may be under-estimated and should be reviewed accordingly. Additionally, further simulations should be conducted using wells with open-screened intervals focused on the vertical extent of the COCs when sufficient data are available to accomplish this goal.

In some areas throughout the model at the end of the calibration period, the calculated water table falls below the bottom elevation of the cell. When using MODFLOW (a saturated groundwater flow simulator), the cell is treated as "dry" (i.e., no flow is simulated in that cell). Based on this, and the intent that in the current simulation the extraction wells draw water throughout the saturated thickness, the

following approach was adopted to specify groundwater pumping in each saturated ("wet") layer intercepted by a well:

- Identify the row and column of the model in which the proposed well lies
- Identify the uppermost "wet" model layer and the elevation of the water table in that layer, at that row, column location
- Identify the bottom elevation of the model at that row, column location
- Calculate the fraction of the total extraction (or injection) at the well that occurs in each saturated layer that the well penetrates as a function of the transmissivity of each layer divided by the total transmissivity of all "wet" layers that the well penetrates.

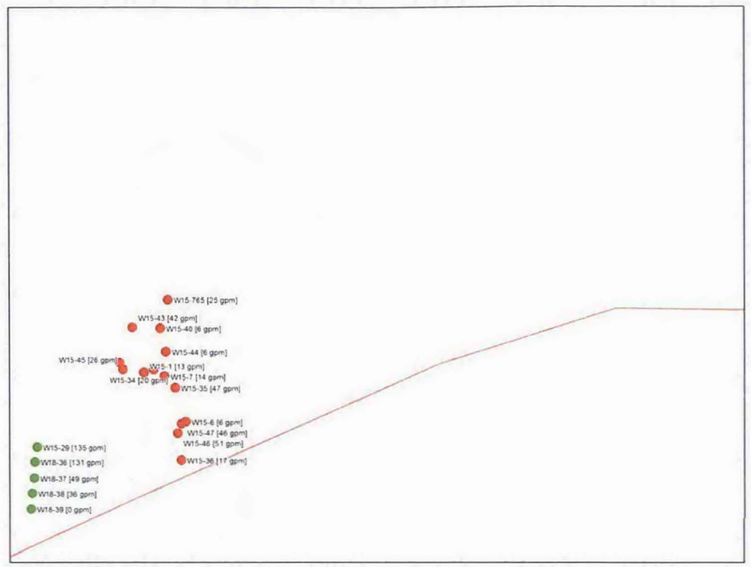
This approach to allocating extraction or injection at each well is an effective way to use specified flux boundary conditions. However, at the conclusion of the model run, the volumetric balance mass must be reviewed to ensure that the total extraction approximately (ideally, exactly) matches the total injection. During testing, no extraction/injection volumetric balance errors exceeded 0.5%.

5.2 Results

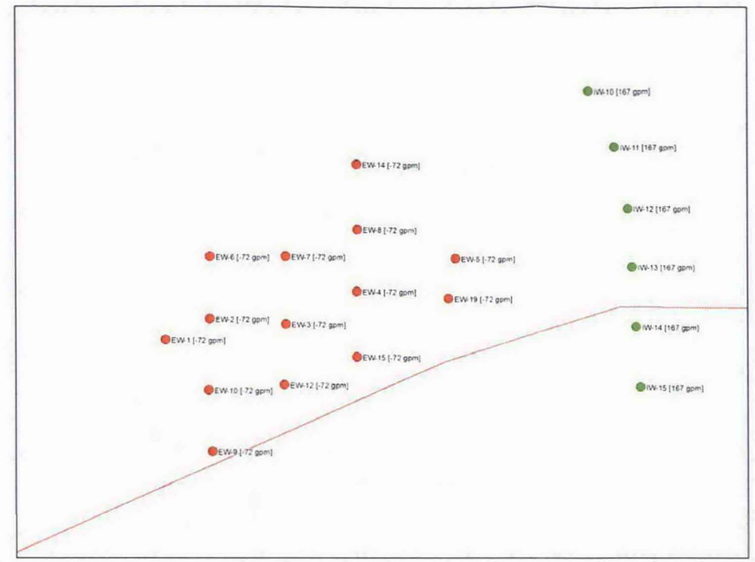
5.2.1 Fiscal Year 2009 Run 2N Well Locations and Rates

Figure 5-1 depicts the configuration of extraction and injection wells simulated for the "Fiscal Year 2009 Model Run 2N" (hereinafter referred to as "FY09 Run 2N") for each of the three phases of implementation, identified following the simulation of several alternate configurations. The well locations and rates are also listed in Table 5-1. The "FY09 Run 2N" well configuration comprises the following:

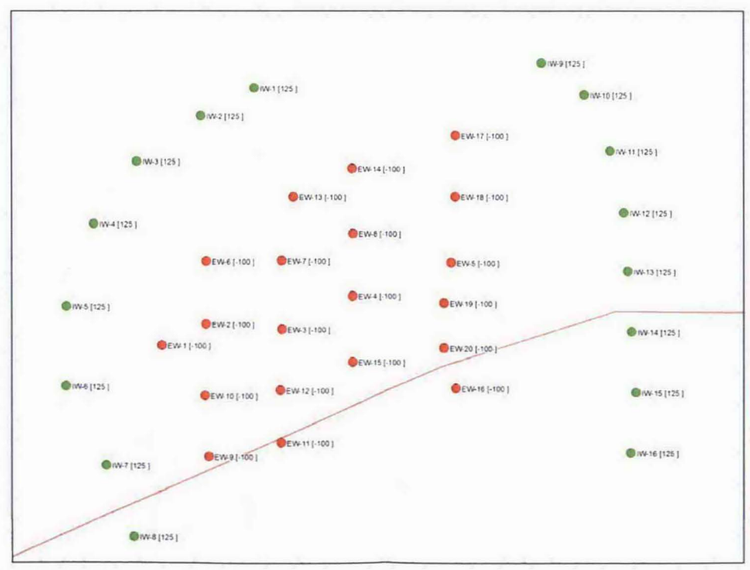
- Phase I at current conditions: Fourteen extraction wells and five injection wells, and a total extraction/injection rate of about 352 gpm.
- Phase II: Fourteen extraction wells and six injection wells, and a total extraction/injection rate of about 1,000 gpm, equating to about 72 gpm at each extraction well and 167 gpm at each injection well.
- Phase III: Twenty extraction wells and 16 injection wells, and a total extraction/injection rate of about 2,000 gpm, equating to about 100 gpm at each extraction well and 125 gpm at each injection well.



(A)



(B)



(C)

Figure (a) Current conditions
Figure (b) Phase 1 (Q = 1,000 gpm)
Figure (c) Phase 2 (Q = 2,000 gpm)

FY = fiscal year
gpm = gallons per minute

Figure 5-1. Configuration of Extraction and Injection Wells, FY09 Run 2N

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Table 5-1. Well Locations and Rates: Model Run 2N

			Phase I Rate		Phase II Rate		Phase III Rate	
Name	Easting	Northing	m^3/day	gpm	m^3/day	gpm	m^3/day	gpm
W15-1	566554	135943	-70.3	12.9	N/A	N/A	N/A	N/A
W15-11	566412	136001	-179.9	33.0	N/A	N/A	N/A	N/A
W15-34	566612	135960	-109.0	20.0	N/A	N/A	N/A	N/A
W15-35	566738	135853	-255.1	46.8	N/A	N/A	N/A	N/A
W15-36	566773	135429	-93.8	17.2	N/A	N/A	N/A	N/A
W15-40	566651	136205	-33.3	6.1	N/A	N/A	N/A	N/A
W15-43	566489	136210	-229.5	42.1	N/A	N/A	N/A	N/A
W15-44	566684	136066	-33.8	6.2	N/A	N/A	N/A	N/A
W15-45	566432	135961	-140.1	25.7	N/A	N/A	N/A	N/A
W15-46	566752	135587	-276.9	50.8	N/A	N/A	N/A	N/A
W15-47	566775	135642	-251.3	46.1	N/A	N/A	N/A	N/A
W15-6	566800	135654	-31.6	5.8	N/A	N/A	N/A	N/A
W15-7	566676	135920	-76.9	14.1	N/A	N/A	N/A	N/A
W15-765	566696	136373	-135.7	24.9	N/A	N/A	N/A	N/A
W15-29	565920	135506	734.4	134.7	N/A	N/A	N/A	N/A
W18-36	565907	135419	712.8	130.8	N/A	N/A	N/A	N/A
W18-37	565903	135323	269.1	49.4	N/A	N/A	N/A	N/A
W18-38	565891	135233	198.8	36.5	N/A	N/A	N/A	N/A
W18-39	565884	135141	1.9	0.4	N/A	N/A	N/A	N/A
EW-1	566634	136122	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-2	566892	136247	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-3	567337	136215	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-4	567753	136411	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-5	568331	136607	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-6	566893	136616	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-7	567336	136619	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-8	567756	136779	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-9	566907	135463	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-10	566885	135825	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-11	567332	135545	N/A	N/A	0.0	0.0	-545.1	-100.0

Table 5-1. Well Locations and Rates: Model Run 2N

			Phase I Rate		Phase II Rate		Phase III Rate	
Name	**Easting**	**Northing**	**m^3/day**	**gpm**	**m^3/day**	**gpm**	**m^3/day**	**gpm**
EW-12	567328	135855	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-13	567406	136996	N/A	N/A	0.0	0.0	-545.1	-100.0
EW-14	567752	137164	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-15	567753	136020	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-16	568360	135866	N/A	N/A	0.0	0.0	-545.1	-100.0
EW-17	568356	137358	N/A	N/A	0.0	0.0	-545.1	-100.0
EW-18	568355	136997	N/A	N/A	0.0	0.0	-545.1	-100.0
EW-19	568290	136370	N/A	N/A	-390.0	-71.5	-545.1	-100.0
EW-20	568289	136104	N/A	N/A	0.0	0.0	-545.1	-100.0
IW-1	567178	137639	N/A	N/A	0.0	0.0	681.4	125.0
IW-2	566864	137477	N/A	N/A	0.0	0.0	681.4	125.0
IW-3	566490	137208	N/A	N/A	0.0	0.0	681.4	125.0
IW-4	566236	136838	N/A	N/A	0.0	0.0	681.4	125.0
IW-5	566078	136351	N/A	N/A	0.0	0.0	681.4	125.0
IW-6	566075	135878	N/A	N/A	0.0	0.0	681.4	125.0
IW-7	566311	135410	N/A	N/A	0.0	0.0	681.4	125.0
IW-8	566471	134987	N/A	N/A	0.0	0.0	681.4	125.0
IW-9	568862	137789	N/A	N/A	0.0	0.0	681.4	125.0
IW-10	569112	137600	N/A	N/A	910.0	166.9	681.4	125.0
IW-11	569265	137266	N/A	N/A	910.0	166.9	681.4	125.0
IW-12	569344	136902	N/A	N/A	910.0	166.9	681.4	125.0
IW-13	569368	136557	N/A	N/A	910.0	166.9	681.4	125.0
IW-14	569392	136200	N/A	N/A	910.0	166.9	681.4	125.0
IW-15	569416	135842	N/A	N/A	910.0	166.9	681.4	125.0
IW-16	569386	135483	N/A	N/A	0.0	0.0	681.4	125.0
		Total out	**-1,917**	**-352**	**-5,460**	**-1,002**	**-10,902**	**-2,000**
		Total in	**1,917**	**352**	**5,460**	**1,002**	**10,902**	**2,000**

gpm = gallons per minute
N/A = not applicable

Consistent with the planned, phased implementation of the remedy, the 14 extraction wells and 6 injection wells simulated during Phase II are at equivalent locations to 14 of the 20 extraction wells and 6 of the 16 injection wells simulated during Phase III (i.e., these represent the same wells, operating at different rates during Phases II and III). With regard to the proposed Phase II and III well locations, it is expected that the model results will be relatively insensitive to well relocations on the order of tens of meters. If, however, following field surveys and revisions for accessibility, any well moves on the order of 100 m or greater, the well may move into a different model cell, and it may be necessary to repeat the simulations described above using the revised well locations.

The extraction and injection rates prescribed for simulating current conditions are based on actual FY08 extraction and injection rates at the existing 200-ZP-1 IRM. The extraction and injection rates prescribed for simulating the Phase II and Phase III periods are based on analyses presented in the FS (DOE/RL-2007-28), current extraction rates at the existing IRM wells, and recent analyses of injection well-specific capacities in the current IRM injection wells.

5.2.2 Influent Concentrations and Mass Recovery of Carbon Tetrachloride

Figure 5-2 depicts the flow-weighted influent concentration of carbon tetrachloride at each extraction well over time, calculated using the base-case transport parameters and the ordinary kriging initial conditions (i.e., "FY9 Run 2N[i]"). Figure 5-3 depicts the flow-weighted influent concentration of carbon tetrachloride at each extraction well over time, calculated using base-case transport parameters and the sequential simulation initial conditions (i.e., "FY9 Run 2N[ii]"). A comparison of Figures 5-2 and 5-3 illustrates the effect of using differing depictions of the current extent of carbon tetrachloride when projecting likely future influent concentrations at the extraction wells. As previously described, the contaminant depictions prepared using the ordinary kriging method are considered to be the "best estimate" of the contaminant distribution, within the extents of the sample data, leading to the corresponding "best estimate" of the likely influent concentration at each extraction well. The contaminant depictions prepared using the stochastic simulation approach present an alternate (typically higher) potential contaminant distribution, leading to a corresponding potential influent concentration at each extraction well.

Projected influent concentrations are not shown for all six cases that were simulated (three parameter sets, and two sets of initial conditions); however, Figure 5-4 depicts the predicted rates of mass recovery of carbon tetrachloride over time calculated for all six cases, as well as the corresponding cumulative mass recovery. Figure 5-4 suggests that the rate and relative timing of contaminant mass recovery may vary significantly over time, depending on the actual transport parameters that may apply and the actual conditions that are encountered when the remedy is implemented. Figures 5-5 and 5-6 illustrate the likely impact of this potential uncertainty in terms of the likelihood of attaining the principal RAO for carbon tetrachloride as described in the 200-ZP-1 OU ROD (U.S. Environmental Protection Agency et al. 2008) (i.e., recovery of 95% of the mass).

Figure 5-5 depicts the maximum and minimum percentages of the initial dissolved mass of carbon tetrachloride that is recovered (i.e., extracted and treated) by the remedy over time, calculated using the results of all six simulated cases. Figure 5-5 suggests that under suitable conditions, it is possible that the remedy could recover a mass of carbon tetrachloride equivalent to over 95% of the corresponding initial (i.e., current) estimate of the dissolved mass. Figure 5-6 depicts the maximum and minimum percentages of the initial total (i.e., dissolved and sorbed) carbon tetrachloride mass that is remediated (i.e., extracted and treated by the remedy, and decays) over time, calculated using the results of all six simulated cases. Figure 5-6 suggests that under suitable conditions, it is possible that the remedy could recover a mass of carbon tetrachloride equivalent to over 95% of the corresponding initial (i.e., current) estimate of the dissolved mass of carbon tetrachloride.

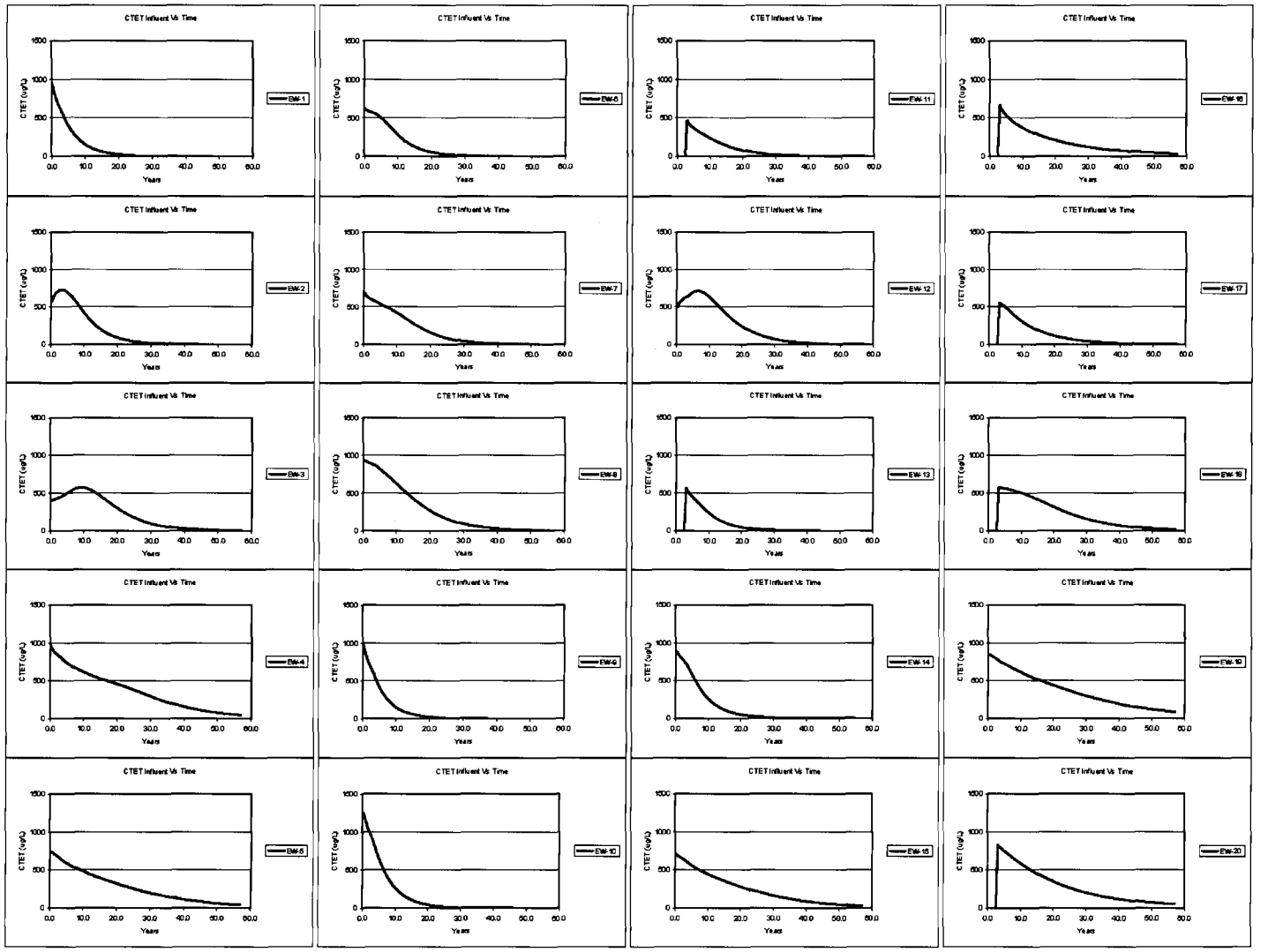

Figure 5-2. Flow-Weighted Influent Concentrations: Carbon Tetrachloride (Ordinary Kriging Initial Condition)

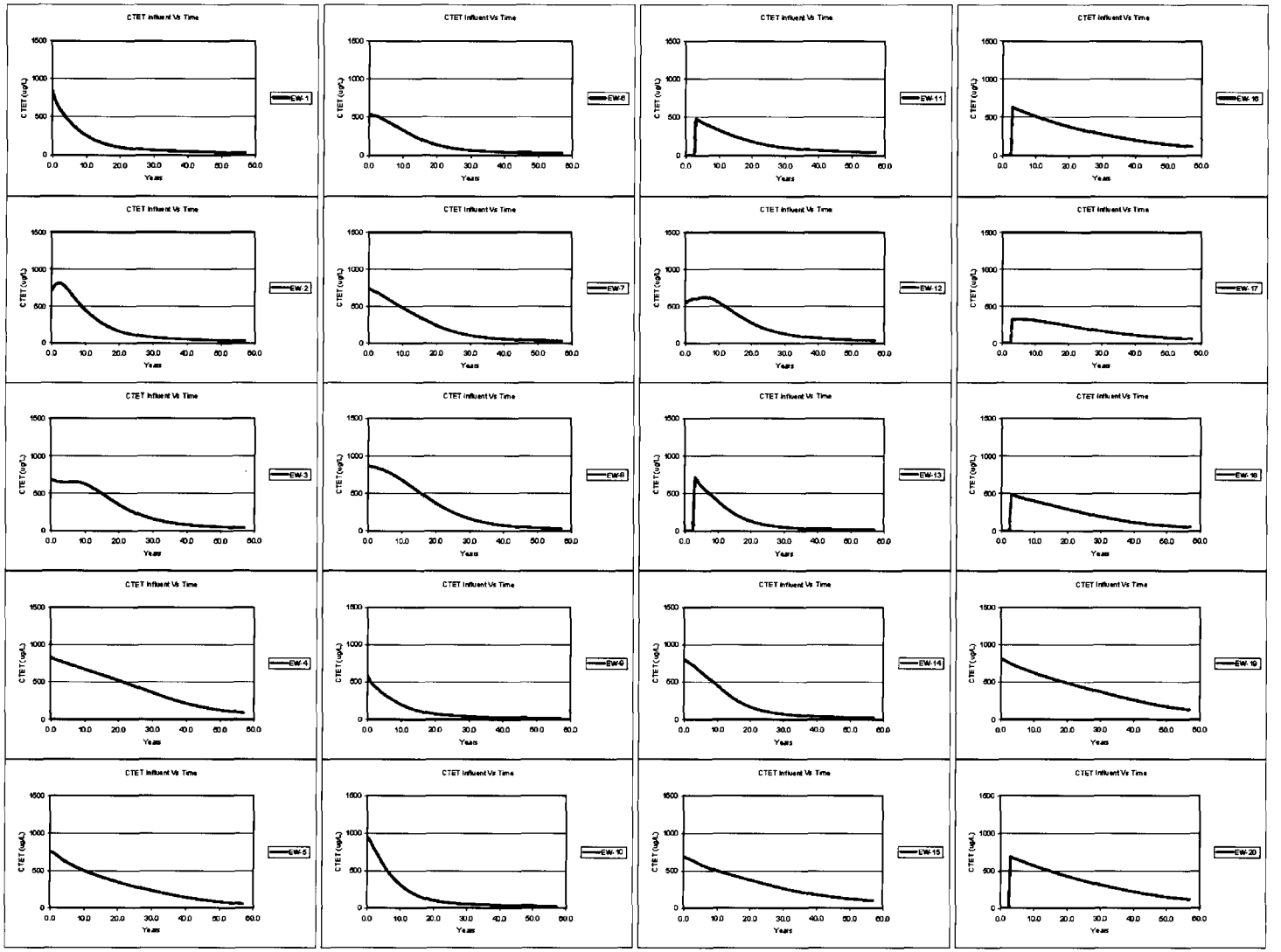

Figure 5-3. Flow-Weighted Influent Concentrations: Carbon Tetrachloride (Sequential Simulation Initial Condition)

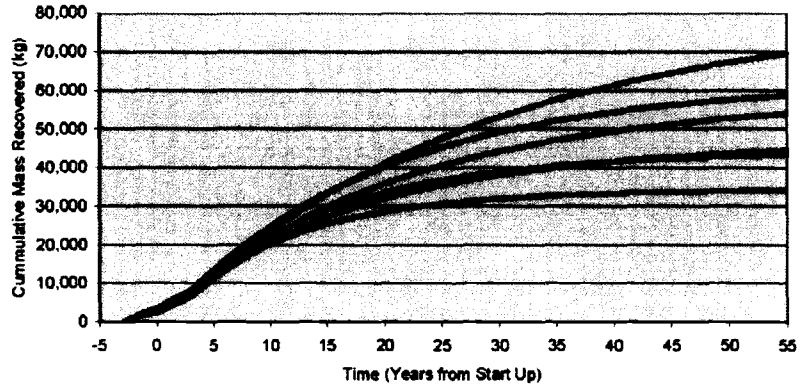

Figure 5-4. Cumulative Carbon Tetrachloride Mass Recovery (Extracted and Treated): All Six Simulated Cases

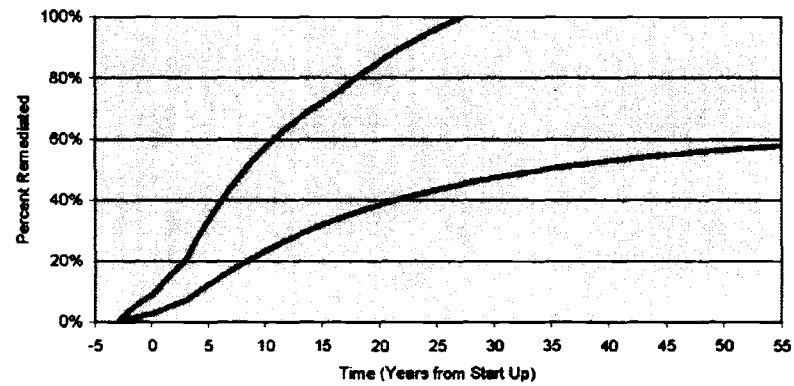

Figure 5-5. Percent of Dissolved Carbon Tetrachloride Mass Recovered (Extracted and Treated): Maximum and Minimum Calculated

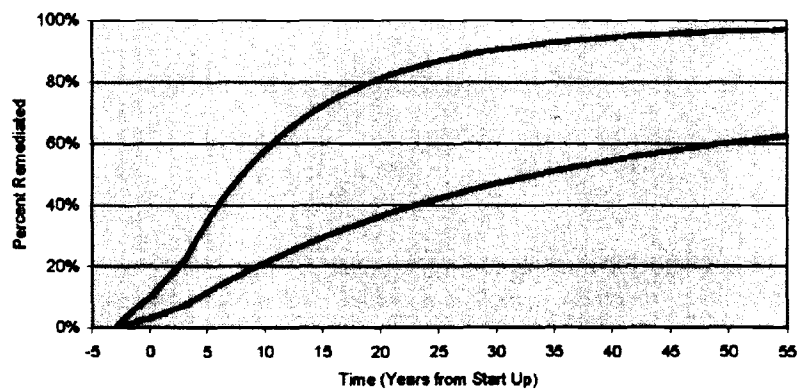

Figure 5-6. Percent of Total Carbon Tetrachloride Mass Remediated (Recovered + Decayed): Maximum and Minimum Calculated

Table 5-2 compares the simulated carbon tetrachloride mass recovery calculated using the proposed well configuration when using the alternate transport parameters and initial conditions described below:

- Alternative 1: Ordinary kriging initial condition, $K_d = 0.011$, porosity = 0.180 (R = 1.105).
- Alternative 2: Sequential simulation initial condition, $K_d = 0.011$, porosity = 0.180 (R = 1.105).
- Alternative 3: Ordinary kriging initial condition, $K_d = 0.011$, porosity = 0.130 (R = 1.146).
- Alternative 4: Sequential simulation initial condition, $K_d = 0.011$, porosity = 0.130 (R = 1.146).
- Alternative 5: Ordinary kriging initial condition, $K_d = 0.060$, porosity = 0.180 (R = 1.573).
- Alternative 6: Sequential simulation initial condition, $K_d = 0.060$, porosity = 0.180 (R = 1.573).

Table 5-2. Carbon Tetrachloride Mass Recovery Using Proposed Well Configuration and Alternate Transport Parameters

Model Run		Initial Mass (kg)						Mass Remediated After 25 Years	
Run #	Alternative	Dissolved	Sorbed	Total	Mass Extracted (kg)	Mass Decayed (kg)	Mass Remediated (kg)	% of Initial Dissolved Mass	% of Total Initial Mass
2N(i)	1	47,100	5,000	52,100	36,800	4,900	41,700	**89.0%**	**80.0%**
2N(ii)	2	93,600	9,800	103,400	40,700	13,000	53,700	**57.0%**	**52.0%**
2N(iii)	3	35,300	3,700	39,000	30,700	3,200	33,900	**96.0%**	**87.0%**
2N(iv)	4	67,600	9,800	77,400	35,600	8,900	44,500	**66.0%**	**57.0%**
2N(v)	5	47,100	27,000	74,100	45,500	5,600	51,100	**108.0%**	**69.0%**
2N(vi)	6	93,600	53,600	147,200	47,900	14,100	62,000	**66.0%**	**42.0%**

5.2.3 Influent Concentrations for Nitrate

Figure 5-7 depicts the flow-weighted influent concentration of nitrate (as NO_3) at each extraction well over time, calculated using the base-case transport parameters and the ordinary kriging initial conditions. Figure 5-8 depicts the flow-weighted influent concentration of nitrate (as NO_3) at each extraction well over time, calculated using the base-case transport parameters and the sequential simulation initial conditions. A comparison of Figures 5-7 and 5-8 illustrates the effect of using differing depictions of the current extent of nitrate when projecting likely future influent concentrations at the extraction wells.

5.2.4 Influent Concentrations for Technetium-99

Figure 5-9 depicts the flow-weighted influent concentration of technetium-99 at each extraction well over time, calculated using the base-case transport parameters and the ordinary kriging initial conditions. Figure 5-10 depicts the flow-weighted influent concentration of technetium-99 at each extraction well over time, calculated using the base-case transport parameters and the sequential simulation initial conditions (i.e., "FY9 Run 2N"). A comparison of Figures 5-9 and 5-10 illustrates the effect of using differing depictions of the current extent of technetium-99 when projecting likely future influent concentrations at the extraction wells.

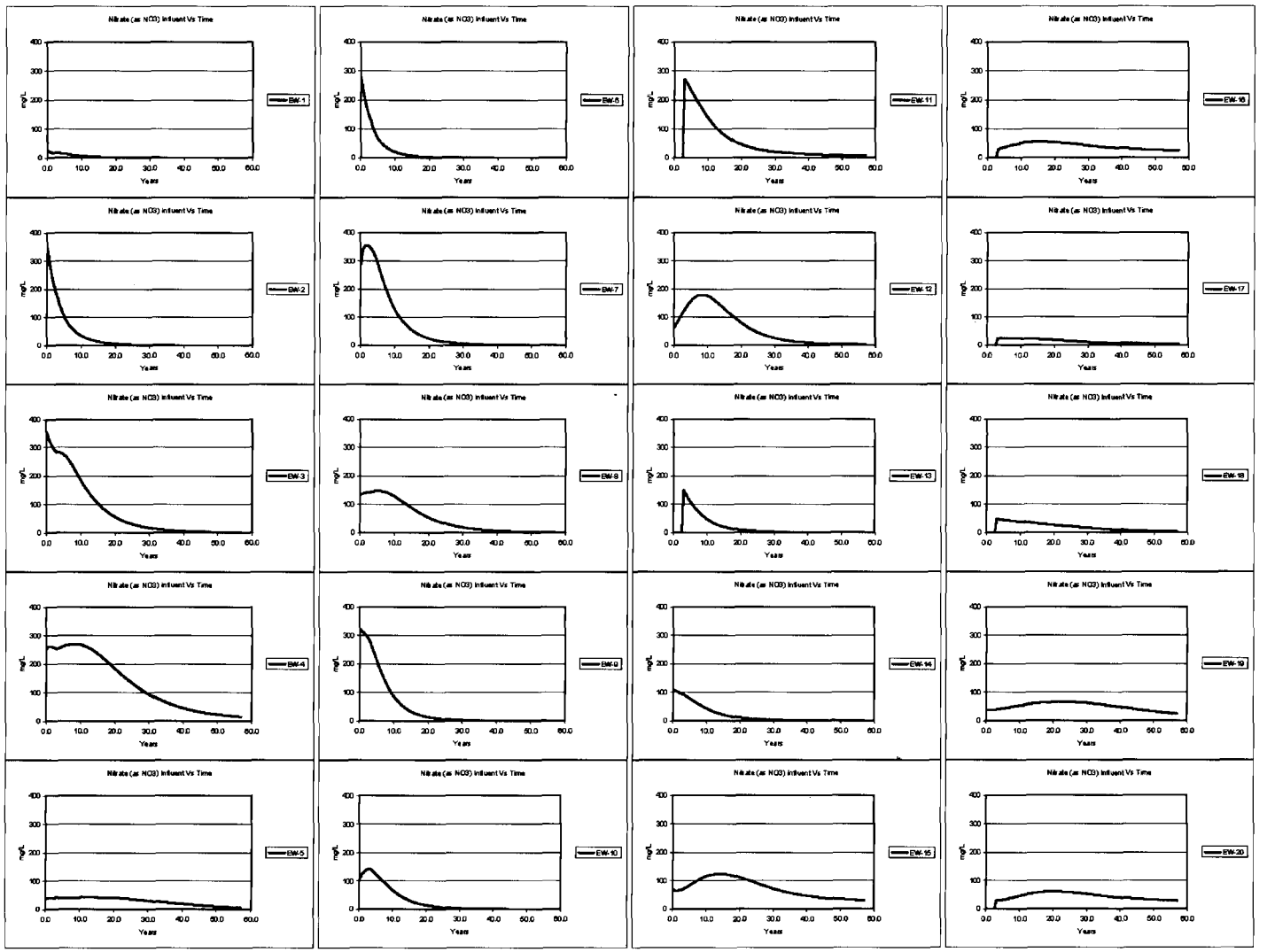

Figure 5-7. Flow-Weighted Concentrations: Nitrate as NO_3 (Ordinary Kriging Initial Conditions)

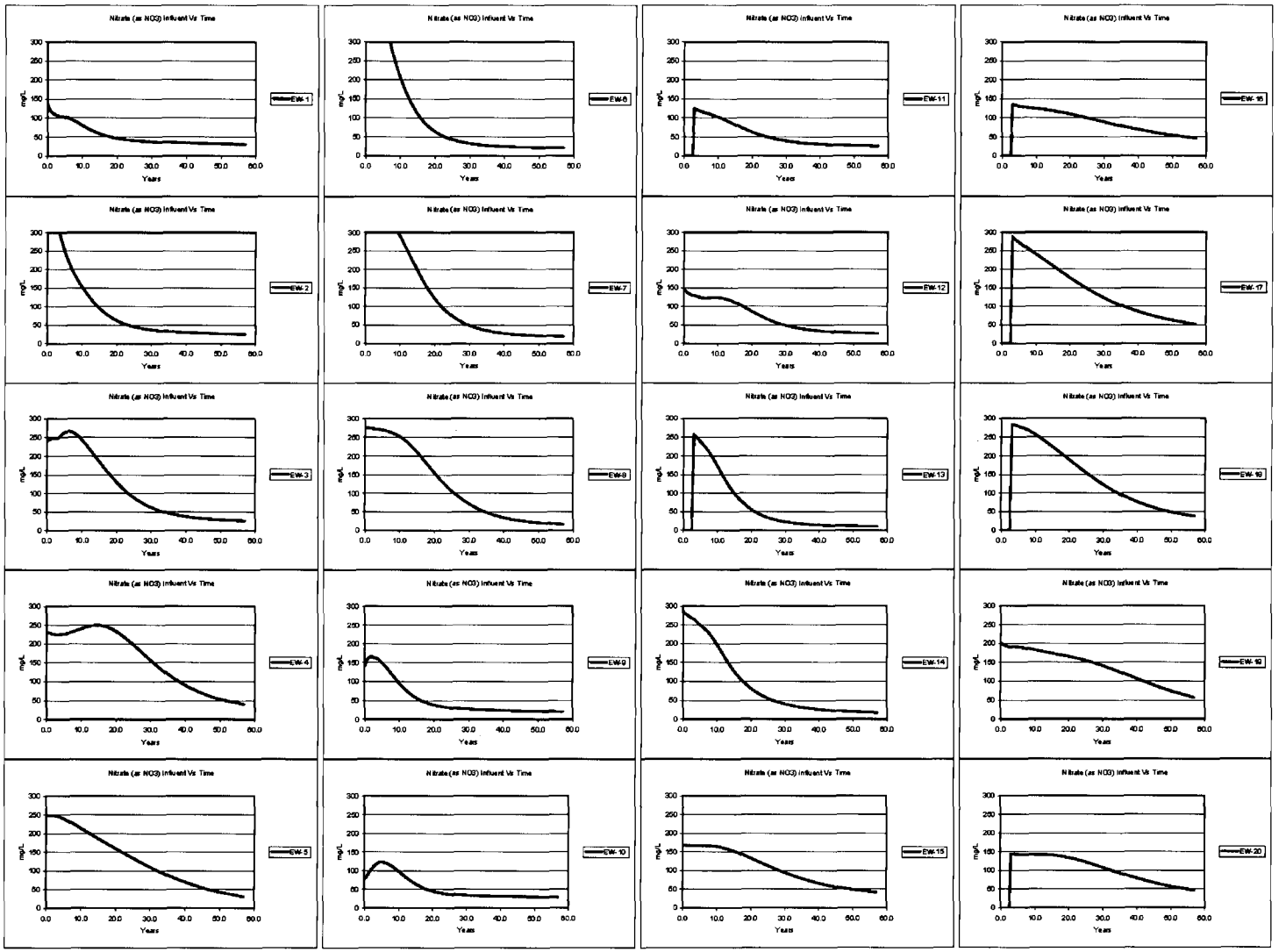

Figure 5-8. Flow-Weighted Influent Concentrations: Nitrate as NO_3 (Sequential Simulation Initial Conditions)

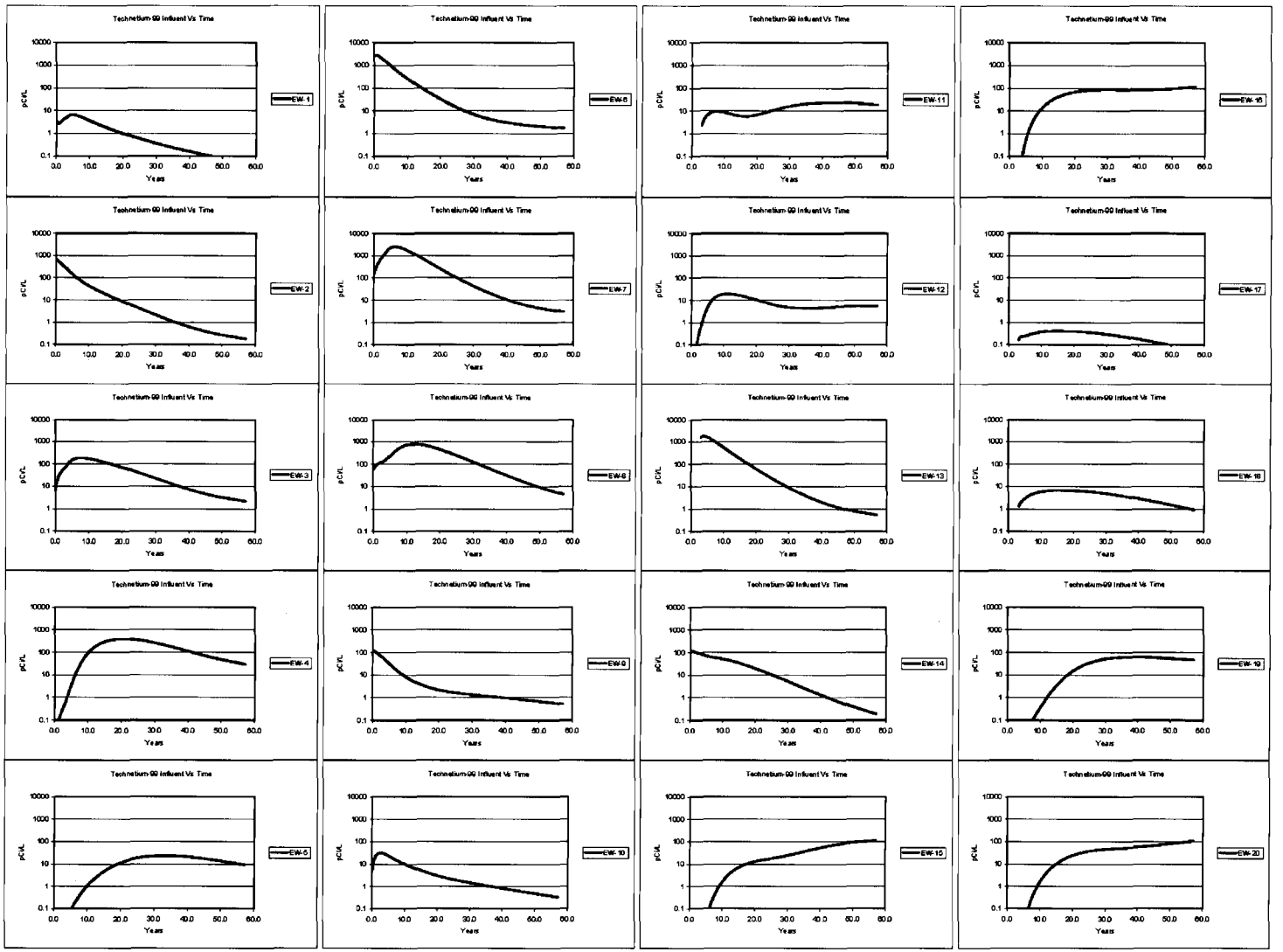

Figure 5-9. Flow-Weighted Influent Activities: Technetium-99 (Ordinary Kriging Initial Conditions)

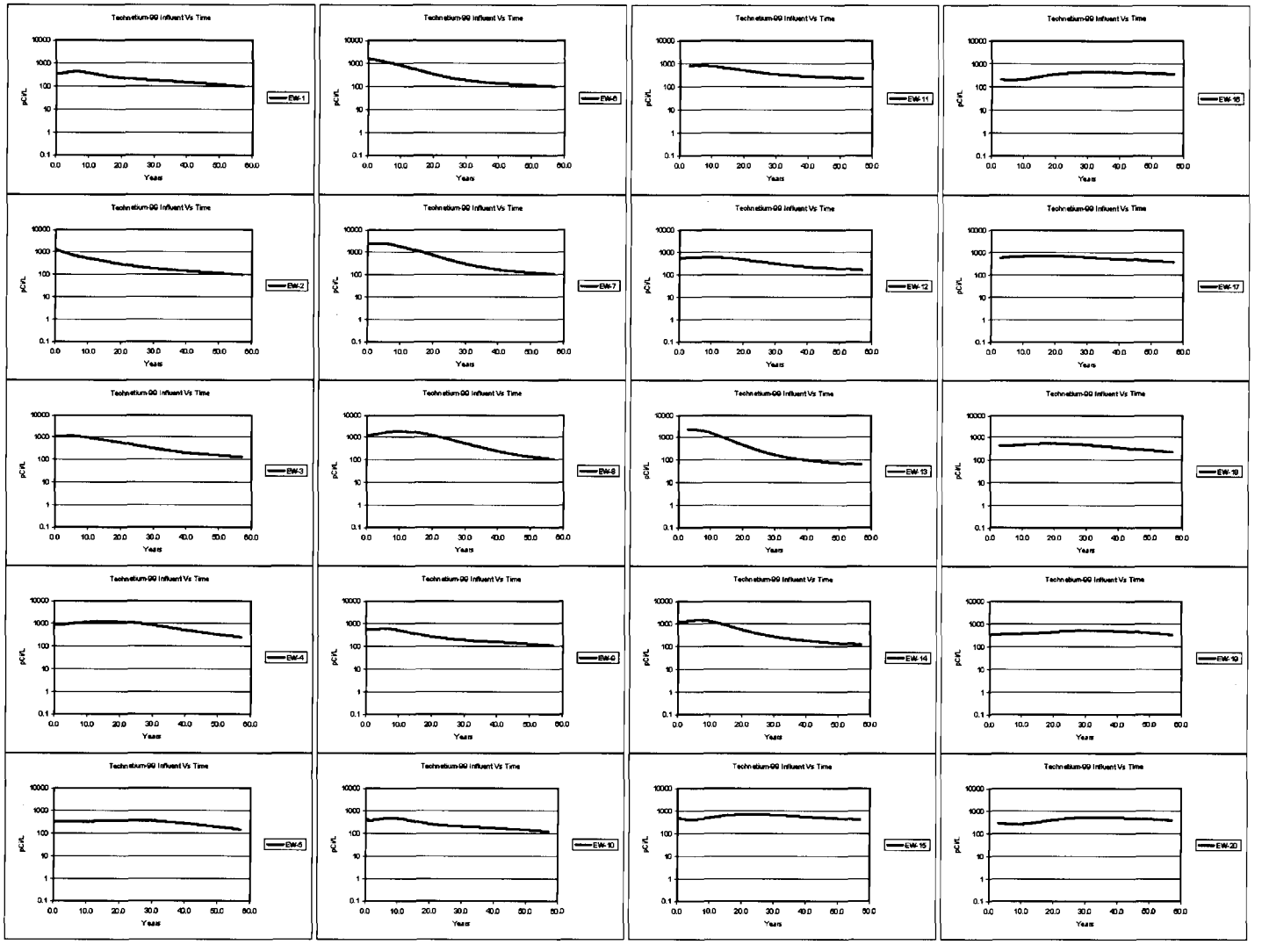

Figure 5-10. Flow-Weighted Influent Activities: Technetium-99 (Sequential Simulation Initial Conditions)

5.2.5 Influent Concentrations for the Remaining Contaminants of Concern

Figures 5-11 through 5-15 depict the flow-weighted influent concentration or activity at each extraction well over time, calculated using the base-case transport parameters and the ordinary kriging initial conditions (i.e., "FY9 Run 2N"), for the remaining COCs:

- Figure 5-11 shows total chromium
- Figure 5-12 shows iodine-129
- Figure 5-13 shows TCE
- Figure 5-14 shows tritium
- Figure 5-15 shows uranium.

5.2.6 Summary

Table 5-3 summarizes the results of the modeling analyses in terms of the predicted long-term average and the peak (highest) influent concentration/activity for each contaminant at each recovery well. This information can be used to help size the treatment facility to ensure that the combined effluent can be successfully treated to concentrations necessary for reinjection.

Table 5-4 summarizes the results of the modeling in terms of the cumulative recovery of carbon tetrachloride at each of the extraction wells. Table 5-4 also ranks the recovery wells in terms of their predicted cumulative mass recovery after 25 years of operations (i.e., at the end of Phase III). Table 5-4 illustrates that some extraction wells are predicted to ultimately recover considerably more mass than other wells. This information can be used to help prioritize the order of installation and operation of the extraction wells to accelerate progress to achieving the RAOs.

5.2.7 Final Screened Intervals for Wells

The simulations presented in this analysis assume that the recovery and injection wells intercept the entire saturated thickness of the aquifer, which is unrealistic in terms of practical implementation. However, this approach was taken because it provides reasonable estimates of likely total contaminant mass recoveries. Final screened intervals for the extraction wells will be determined based on the following criteria:

- Depth-discrete groundwater samples collected during ongoing site characterization and during the installation of each extraction and injection well
- The results of ongoing contaminant transport analyses using methods similar to those presented in this document, but that simulate the discrete vertical screened intervals based upon analyses previously described.

Consistent with the objectives outlined in the FS, the extraction well screened intervals will encompass the vertical extent of the highly concentrated target contaminants. The final screened intervals for most of the injection wells may straddle (i.e., lie above and below) the water table. However, some injection wells located downgradient of the mapped distribution of contaminants may be screened deeper in the aquifer to provide further hydraulic control of contaminants identified at those depths.

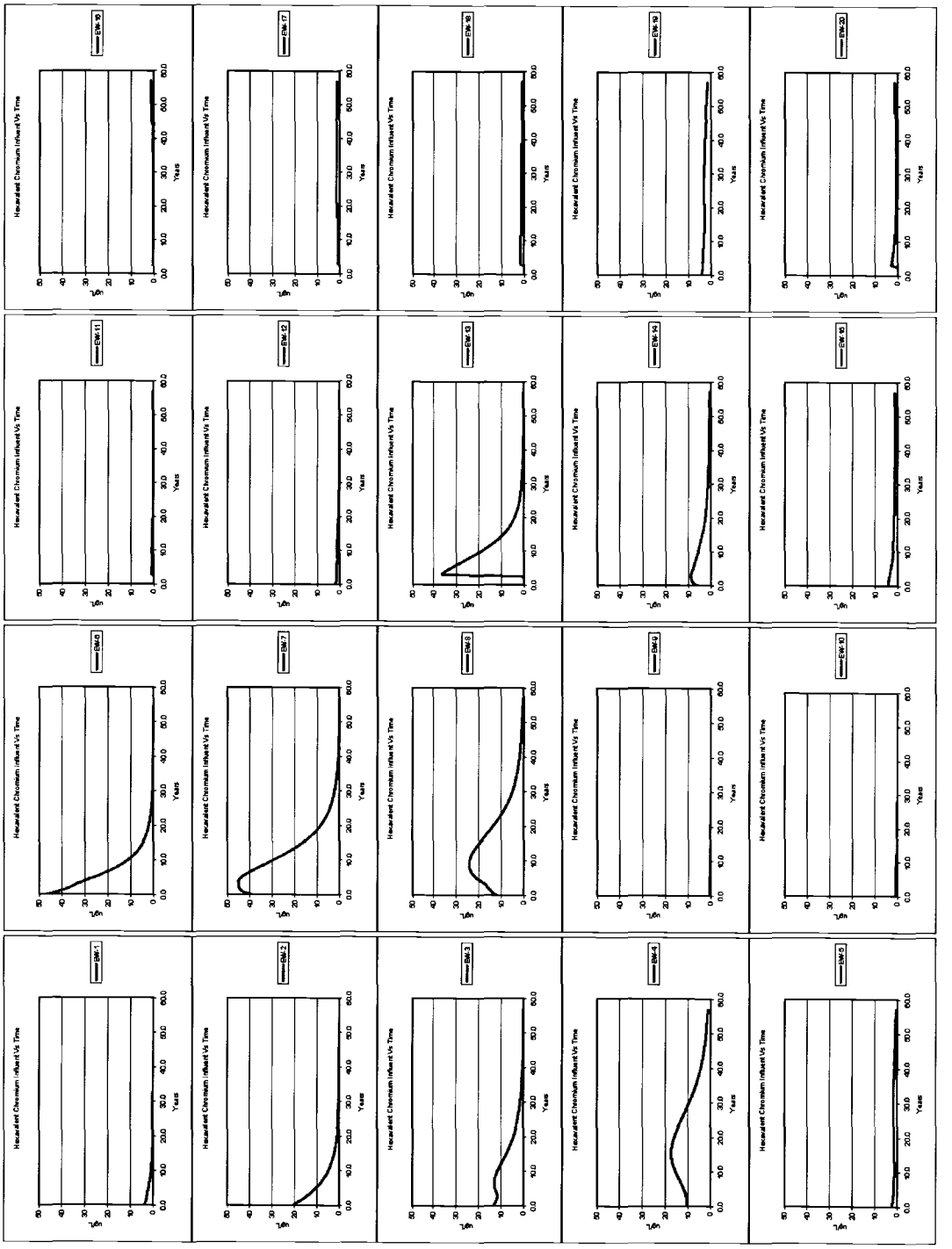

Figure 5-11. Flow-Weighted Influent Concentrations: Total Chromium (Ordinary Kriging Initial Conditions)

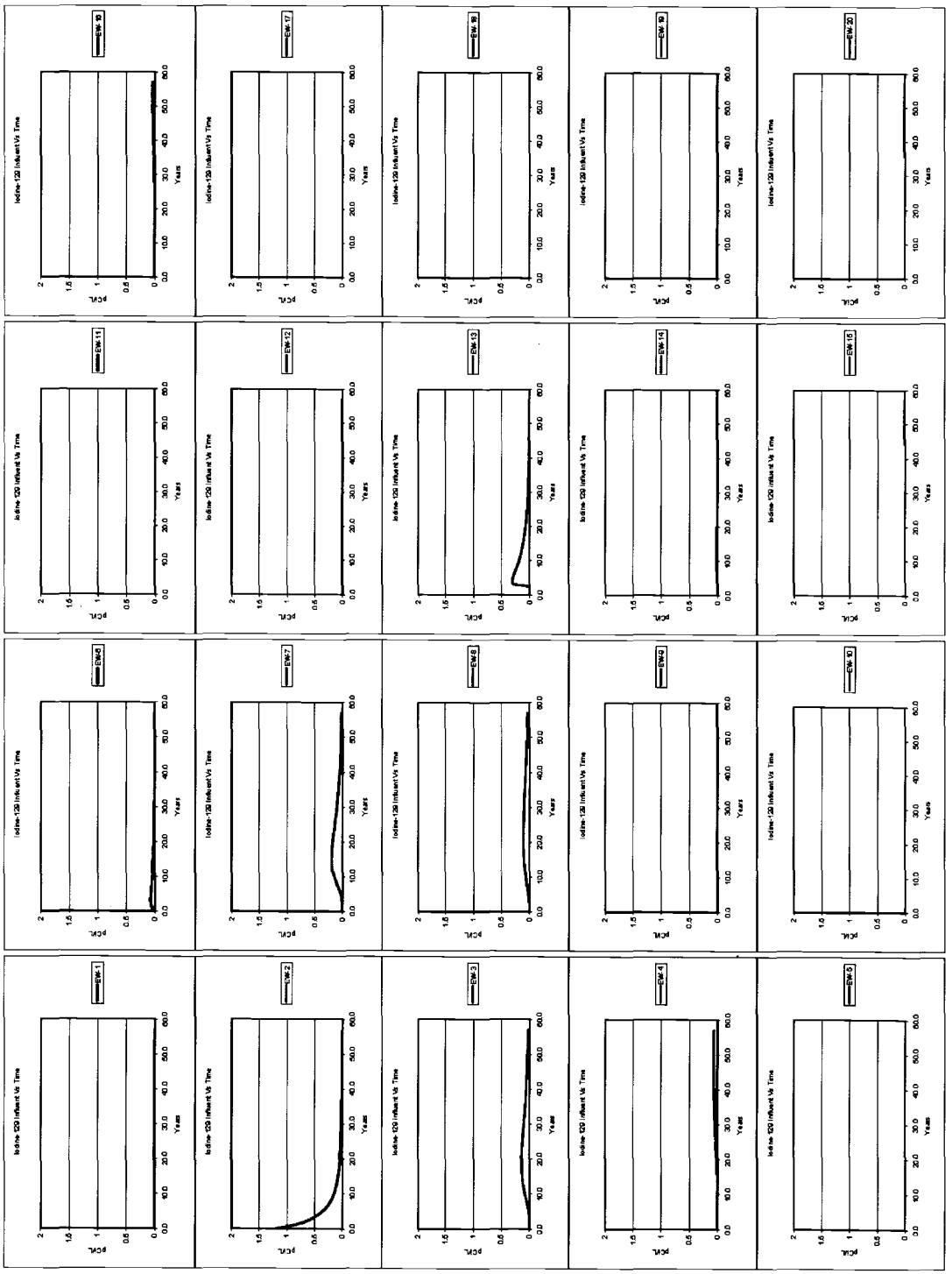

Figure 5-12. Flow-Weighted Influent Activities: Iodine-129 (Ordinary Kriging Initial Conditions)

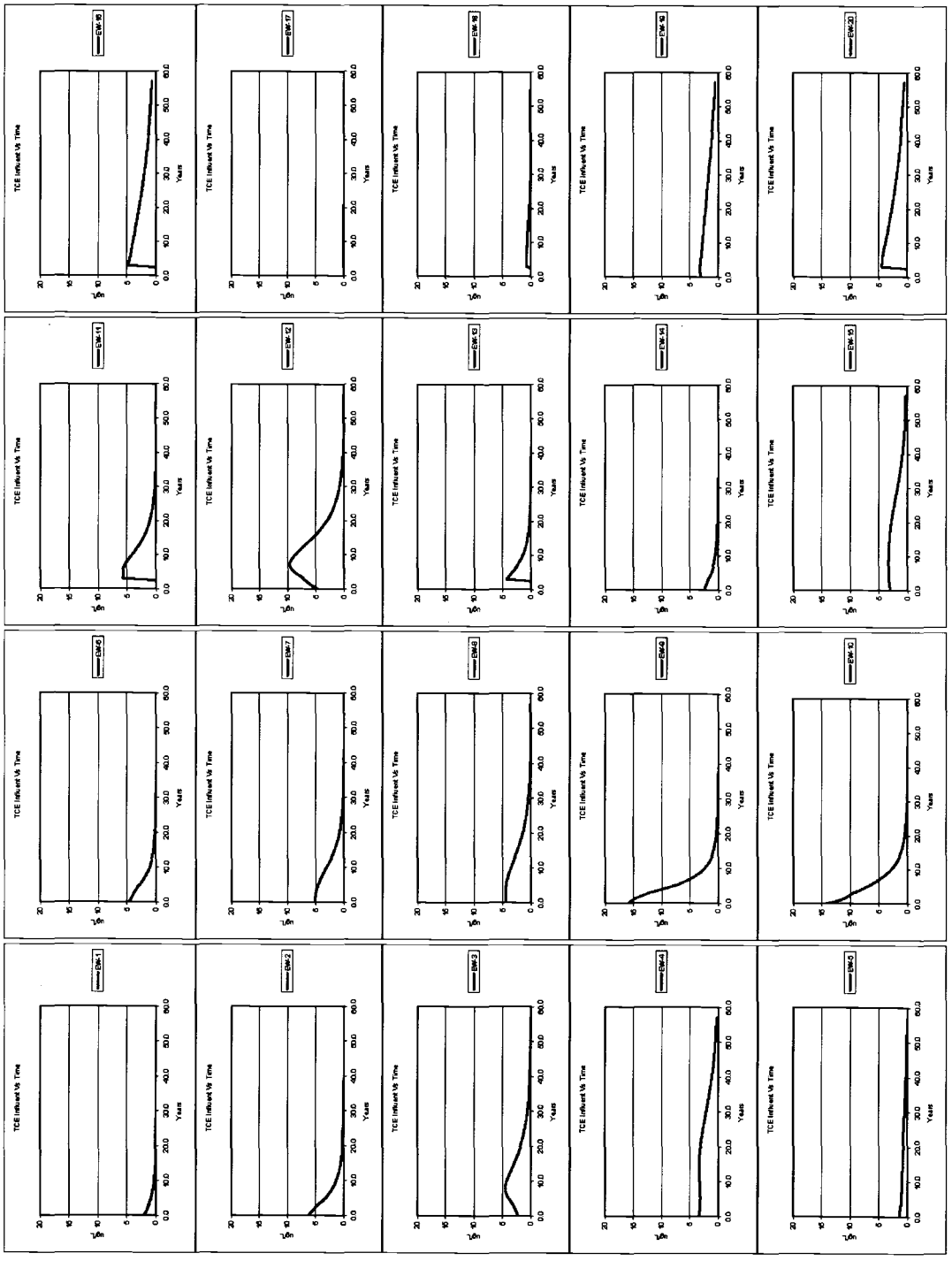

Figure 5-13. Flow-Weighted Influent Concentrations: Trichloroethene (Ordinary Kriging Initial Conditions)

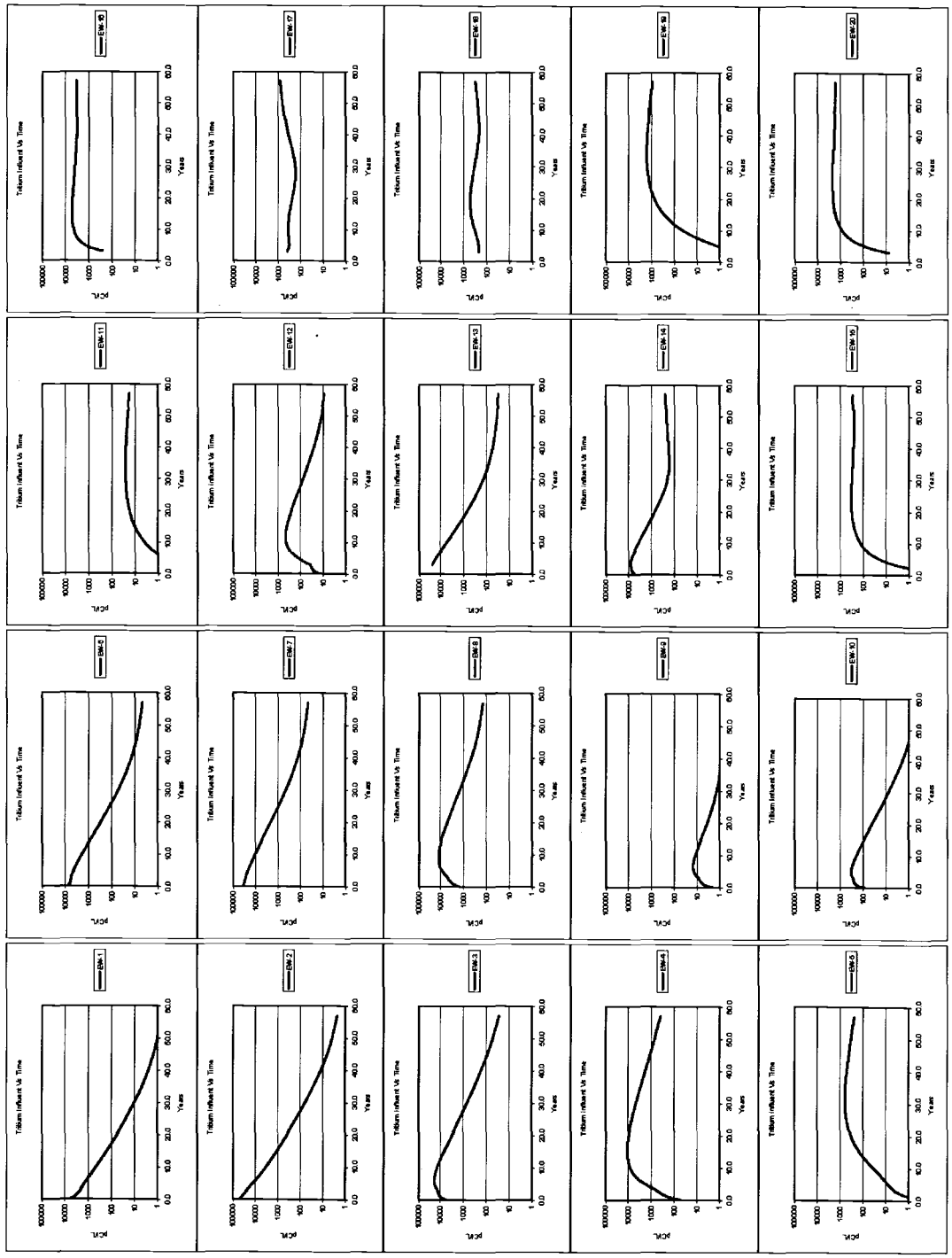

Figure 5-14. Flow-Weighted Influent Activities: Tritium (Ordinary Kriging Initial Conditions)

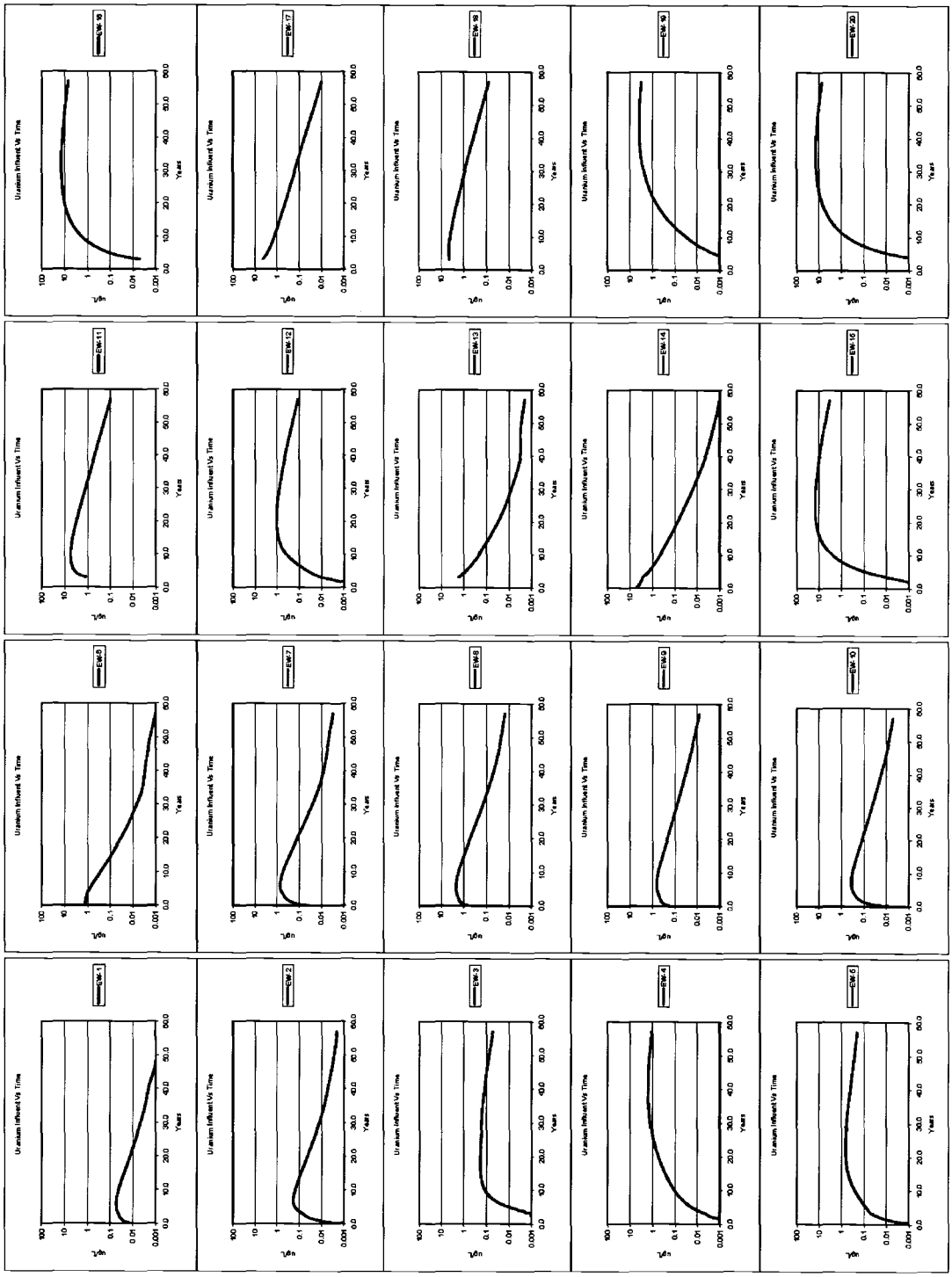

Figure 5-15. Flow-Weighted Influent Concentrations: Uranium (Ordinary Kriging Initial Conditions)

Table 5-3. Average and Peak Influent Concentrations/Activities at Recovery Wells

Method	COC	Initial Condition	Statistic	EW-1	EW-2	EW-3	EW-4	EW-5	EW-6	EW-7	EW-8	EW-9	EW-10
A	Carbon tetrachloride	1	MAX	951	732	570	971	734	616	688	929	973	1,260
A	Carbon tetrachloride	1	AVG	421	501	402	678	534	401	455	674	436	632
B	Carbon tetrachloride	2	MAX	840	812	685	831	752	531	747	873	589	954
B	Carbon tetrachloride	2	AVG	429	573	552	669	557	383	533	676	316	542
C	Chromium (total)	1	MAX	3.8	20.4	13.2	17.4	2.0	47.0	45.2	24.3	0.7	0.8
C	Chromium (total)	1	AVG	1.9	10.3	10.0	11.3	1.6	24.1	32.9	15.6	0.4	0.6
C	I-129	1	MAX	0.0	1.2	0.1	0.1	0.0	0.1	0.2	0.1	0.0	0.0
C	I-129	1	AVG	0.0	0.4	0.0	0.0	0.0	0.0	0.1	0.0	N/A	N/A
C	NO_3	1	MAX	26	346	356	269	42	279	355	147	323	142
C	NO_3	1	AVG	12	133	223	226	38	100	228	115	188	93
C	NO_3	2	MAX	137	463	266	249	249	513	338	276	165	123
C	NO_3	2	AVG	91	246	212	213	211	329	265	229	120	90
C	Tc-99	1	MAX	7	667	186	393	23	2,876	2,548	742	126	32
C	Tc-99	1	AVG	4	226	79	68	4	1,219	995	235	46	17
C	Tc-99	2	MAX	443	1,252	1,164	1276	375	1,601	2,631	1,852	602	494
C	Tc-99	2	AVG	344	740	946	944	337	1,059	2,004	1,289	488	384
C	TCE	1	MAX	2.1	6.2	4.5	3.5	1.4	4.7	5.2	4.5	15.8	14.3
C	TCE	1	AVG	0.9	3.3	2.8	3.0	1.0	2.5	3.6	3.5	8.1	6.9
C	Tritium	1	MAX	6,006	48,618	18,978	11,341	600	7,204	34,430	12,292	15	336
C	Tritium	1	AVG	1,811	17,917	10,717	2,910	99	3,856	19,765	5,614	8	196
C	Uranium	1	MAX	0.1	0.2	0.2	1.6	0.7	1.3	0.7	2.3	0.7	0.4
C	Uranium	1	AVG	0.0	0.1	0.1	0.2	0.2	0.7	0.4	1.4	0.4	0.2

Table 5-3. Average and Peak Influent Concentrations/Activities at Recovery Wells

Method	COC	Initial Condition	Statistic	EW-11	EW-12	EW-13	EW-14	EW-15	EW-16	EW-17	EW-18	EW-19	EW-20
A	Carbon tetrachloride	1	MAX	467	713	567	899	722	669	555	580	845	827
A	Carbon tetrachloride	1	AVG	193	506	221	512	503	297	246	317	647	415
B	Carbon tetrachloride	2	MAX	481	626	719	805	695	634	324	493	813	688
B	Carbon tetrachloride	2	AVG	238	494	310	544	536	356	198	270	648	392
C	Chromium (total)	1	MAX	1.2	1.8	36.5	9.0	4.2	1.3	1.6	1.7	4.1	2.8
C	Chromium (total)	1	AVG	0.6	1.2	15.6	6.4	2.8	0.2	0.7	1.0	3.4	1.2
C	I-129	1	MAX	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C	I-129	1	AVG	N/A	0.0	0.1	0.0	0.0	0.0	N/A	N/A	0.0	0.0
C	NO_3	1	MAX	271	180	149	107	123	55	26	49	66	61
C	NO_3	1	AVG	117	107	55	67	79	28	15	26	45	28
C	NO_3	2	MAX	125	148	258	287	168	135	289	285	201	145
C	NO_3	2	AVG	68	115	121	209	151	85	163	166	178	95
C	Tc-99	1	MAX	23	19	1,689	121	112	112	0	7	63	106
C	Tc-99	1	AVG	6	5	649	68	9	20	0	3	9	11
C	Tc-99	2	MAX	859	615	2,428	1,468	713	451	702	523	524	534
C	Tc-99	2	AVG	496	535	1,136	1,107	491	193	443	313	374	243
C	TCE	1	MAX	5.8	9.5	4.3	2.4	3.3	4.9	0.1	0.8	3.2	4.4
C	TCE	1	AVG	2.7	6.0	1.6	1.3	2.9	2.7	0.0	0.4	2.7	2.6
C	Tritium	1	MAX	26	450	24,345	8,144	332	5,327	808	512	1,674	2,267
C	Tritium	1	AVG	5	127	8,216	5,332	88	1,924	252	205	256	583
C	Uranium	1	MAX	5.5	1.0	1.8	5.1	15.2	14.0	4.2	4.4	3.9	14.0
C	Uranium	1	AVG	2.1	0.2	0.5	2.0	2.8	2.7	1.5	2.4	0.5	2.2

Table 5-3. Average and Peak Influent Concentrations/Activities at Recovery Wells

NOTE: All units in mg/L, except Tc-99, I-129, and tritium (in pCi/L).

Model run:

A = FY09 Run 2N with corresponding base model parameters and ordinary kriging initial condition.

B = FY09 Run 2N with corresponding base model parameters and sequential simulation initial condition.

C = FY09 Run 2N with corresponding base model parameters and ordinary kriging initial conditions.

Initial condition:

1 = Ordinary kriging.

2 = Sequential simulation.

Statistics:

MAX = Maximum concentration calculated at the well over the simulation period.

AVG = Average concentration calculated at the well over the simulation period.

COC = contaminant of concern

FY = fiscal yea

N/A = calculation not applicable

TCE = trichloroethene

Table 5-4. Tabulation of Extraction Wells by Approximate Cumulative Carbon Tetrachloride Mass Recovery at 25 Years

	Model Run 2Ni		Model Run 2Nii		
	Mass (kg)	Rank	Mass (kg)	Rank	Avg. Rank
EW-1	870	18	1,189	19	18.5
EW-2	1,529	11	1,832	11	11
EW-3	1,953	7	2,356	4	5.5
EW-4	2,730	1	2,934	1	1
EW-5	2,072	6	2,211	7	6.5
EW-6	1,110	15	1,302	16	15.5
EW-7	1,554	10	1,941	10	10
EW-8	2,387	3	2,669	3	3
EW-9	886	17	891	20	18.5
EW-10	1,383	13	1,452	14	13.5
EW-11	807	20	1,200	18	19
EW-12	2,103	5	2,048	8	6.5
EW-13	808	19	1,314	15	17
EW-14	1,239	14	1,767	12	13
EW-15	1,904	8	2,225	6	7
EW-16	1,409	12	2,017	9	10.5
EW-17	1,057	16	1,206	17	16.5
EW-18	1,814	9	1,549	13	11
EW-19	2,643	2	2,771	2	2
EW-20	2,158	4	2,255	5	4.5

5.3 Assumptions Underlying the Modeling Analysis

Some of the assumptions that underlie the modeling analysis described in this document are listed below. These assumptions are listed in order of the likely magnitude of potential impact on the results presented. This list is not all-inclusive but should provide direction for analyses and actions to refine and update the estimates presented in this document:

1. Contaminant distribution: The simulations described address the current mapped extent of contaminants in the groundwater and, using an instantaneous reversible linear sorption isotherm, their current extent sorbed on the aquifer materials:

   a. There is/are assumed to be no continuing source(s) to groundwater for any of the COCs.

   b. Contamination that may lie outside of the current mapped extent is not explicitly addressed, although hydraulic capture extends beyond the current mapped extent of the COCs in some areas.

c. Contaminants that may be sorbed to materials that express a higher effective K_d than the model-wide value used in the simulations are not represented.

2. Aquifer properties: Although all principal water-bearing units documented in PNNL-14753 that lie within the model domain are explicitly simulated, the representation of the hydrostratigraphy in the model is relatively simplistic (i.e., homogeneity is assumed within each water-bearing unit). The dual-domain approach for simulating solute transport in heterogeneous media ("A Dual-Domain Mass Transfer Approach for Modeling Solute Transport in Heterogeneous Porous Media, Application to the MADE Site" [Feehley et al. 1999]) is being reviewed for its suitability in future applications of the transport model.

3. Recharge: The model described in this report incorporates anthropogenic sources of infiltration within the 200 West Area, as well as B Pond and Gable Mountain Pond (the most substantial historic sources of water within the 200 East Area), during the model calibration period. Other historic sources of water within the 200 East Area are not included. The model is currently being revised to incorporate (a) spatially variable net recharge from aerial precipitation (PNNL-14753); (b) historic wastewater discharges in the 200 West Area, (c) historic wastewater discharges in the 200 East Area, and (d) mountain front recharge via the ephemeral Dry Creek and Cold Creek (PNNL-14753) prior to recalibration for the 30% design simulations

4. Well screen intervals: The recovery wells are considered to be fully penetrating from the water table to the top of the basalt, which forms the base of the model. This assumption is not a limitation of the model but instead was made to obtain reasonable estimates of likely mass recovery rates. Mass recovery estimates may be relatively insensitive to this assumption; however, the model may under-estimate influent concentrations. Final screened intervals for the wells will be determined based on depth-discrete groundwater sampling and the results of ongoing contaminant transport analyses that simulate alternate vertical screened intervals.

5. Boundary conditions: The model described in this report assumes that the southeastern boundary is a no-flow boundary, which does not allow for flow into or out of the domain, forcing flow to be parallel (directly east) to this boundary. The model is currently being revised to treat this boundary as a general head boundary that is defined on the basis of two controlling head conditions: the first of these comprising the Columbia River, and the second comprising a relatively static head condition between the Rattlesnake Mountain and Yakima Ridge anticlines.

Finally, sensitivity analyses of the predicted remedy performance have been performed with respect to the distributions of carbon tetrachloride and technetium-99, and the transport parameters for carbon tetrachloride. Additional sensitivity analyses are recommended for the following, to guide further calibration of flow and transport model parameters:

- Rates and distribution of recharge between spatially distributed and mountain-front sources of water
- Flow rates across the active model's lateral boundary conditions, particularly the proposed revised southeastern boundary described above
- Hydraulic (flow) properties of the principal water-bearing units
- Transport properties of the remaining COCs in addition to carbon tetrachloride.

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6 Conclusions

A groundwater flow and contaminant transport model has been used to simulate the approximate fate of the COCs listed in the 200-ZP-1 OU ROD (U.S. Environmental Protection Agency et al. 2008), as well as uranium. For the principal COC (carbon tetrachloride), six simulations were made to consider the potential effect of alternate depictions of the extent of contamination and of alternate transport parameters on the likely effectiveness of the proposed pump-and-treat remedy. This approach was taken acknowledging that uncertainty exists regarding the actual conditions that will be encountered in the field as the remedy is implemented. For two further COCs (nitrate and technetium-99), two simulations were made to consider the potential effects of alternate depictions of the extent of contamination on likely remedy performance.

The simulations suggest that under suitable conditions, the remedy could recover a mass of carbon tetrachloride equivalent to or exceeding 95% of the corresponding initial (i.e., current) estimate of the dissolved mass of carbon tetrachloride, thus demonstrating that the RAO can potentially be achieved. The simulations also suggest that the further that conditions encountered in the field differ from these suitable conditions, the less likely the RAO can be achieved with the proposed well configuration. The use of the alternate parameter sets and alternate initial conditions also predicts different system-wide (i.e., combined) mass recovery rates, which can present difficulties for designing a cost-effective treatment system for the extracted water.

The simulations suggest that significant variables that might affect both the mass recovery rates and the attainment of RAOs are likely to be the following:

- Initial distribution of contaminants
- Spatially varying aquifer properties (principally hydraulic conductivity)
- K_d and retardation rate for certain contaminants.

Although not explicitly considered in these simulations, the presence of continuing sources of contaminants would significantly impact the attainment of RAOs.

The simulations suggest that characterization, sampling, and monitoring efforts should focus on improving the understanding of the variables listed above, which will in turn help improve and refine model predictions of likely remedy performance. Information obtained through each phase described in Section 1.2 will, therefore, inform the implementation of the subsequent phase(s). For example, during Phase 0 and Phase I, it is important that the following data are collected to refine model predictions, optimize implementation of the later phases, and re-evaluate the likelihood of attaining the RAOs on an ongoing basis:

- As-built well capacities and performance
- Sample data enabling updated depictions of the extents of contamination
- Aquifer properties obtained through pumping tests and other methods
- Transport parameters for key COCs, primarily carbon tetrachloride
- Mass recovery rates for all COCs, enabling a correspondence between this source of information on contaminant extents to be combined with point sample data.

The implemented monitoring program must collect information that enables the actual conditions in the field to be identified as early as possible so the likelihood of attaining the RAOs can be assessed early during implementation. Information gathered regarding as-built well capacities will identify whether the well spacing is likely to be suitable for attaining the RAOs.

A comprehensive sampling round should be completed to refine the contaminant distributions and, as each new well is drilled, profile sampling should be performed to update the depictions of the contaminant distribution. It should be expected that a number of shallow (water table) monitoring wells will go dry when the system is started up because many of the wells already straddle the water table. Stratigraphic data should be collated, and/or aquifer testing performed, at each newly installed well.

With regard to contaminant transport properties, despite the variety of methods available for estimating K_d, it is difficult to obtain a direct estimate of K_d that is applicable at the site scale throughout the longevity of the site. Estimates for this parameter may ultimately be obtained indirectly through model calibration, by refining the understanding of aquifer properties and the contaminant distribution, and by comparing the model-predicted mass recovery with the measured mass recovery. Given the time required for a groundwater system to stabilize following implementation of a large pump-and-treat remedy (and for monitoring data to elucidate patterns and trends enabling inference of the remedy performance), information regarding the large-scale K_d and/or the presence of any continuing sources may require several years to obtain.

If an improved understanding of any of these variables deviates substantially from the assumptions made during the design (e.g., significantly higher transmissivity, substantially poorer well performance, and/or a much wider spatial distribution of contaminants), this would indicate that the subsequent phases will require substantial revision. It may also indicate that the likelihood of achieving the RAOs is sufficiently undermined by the new information and understanding that further remedy implementation should be reconsidered. If the model predictions are based on assumptions that are contradicted by new data, it may become evident that the remedy may be either over-designed (i.e., more wells may be installed than required to meet the RAOs) or under-designed (i.e., fewer wells may be installed than required to meet the RAOs).

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Appendix A

Sample Data Used to Map Initial Conditions for Transport Simulations

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Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W10-1	566663.13	136734.56	134.60	800	8/20/2007
299-W10-13	565998.65	136599.87	136.40	1.00	3/12/2002
299-W10-14	566017.19	136608.89	78.63	0.015	3/28/2007
299-W10-19	566317.42	137030.18	135.20	6.20	9/8/2003
299-W10-20	566249.69	136866.61	135.20	13.00	3/16/2006
299-W10-21	566584.00	137154.72	134.60	350	9/19/2005
299-W10-22	566803.82	136876.10	134.60	800.00	10/29/2007
299-W10-23	566823.75	136815.34	132.28	0.5	8/20/2007
299-W10-24	566885.44	136798.78	132.28	54	9/20/2005
299-W10-29	566055.36	136822.06	80.01	79.00	3/27/2007
299-W10-30	566055.15	136732.65	131.65	16.00	3/27/2007
299-W10-31	566266.44	136968.34	130.75	170.00	4/13/2007
299-W10-33	566772.75	136610.18	131.72	1300	7/6/2007
299-W10-33	566772.75	136610.18	130.04	1700	7/10/2007
299-W10-33	566772.75	136610.18	124.71	1500	7/11/2007
299-W10-33	566772.75	136610.18	122.18	1200	7/12/2007
299-W10-33	566772.75	136610.18	119.83	1600	7/16/2007
299-W10-33	566772.75	136610.18	116.78	600	7/17/2007
299-W10-33	566772.75	136610.18	113.74	2.7	7/24/2007
299-W10-33	566772.75	136610.18	109.77	230	7/27/2007
299-W10-33	566772.75	136610.18	107.64	280	7/31/2007
299-W10-33	566772.75	136610.18	104.59	1100	8/1/2007
299-W10-33	566772.75	136610.18	101.24	1200	8/2/2007
299-W10-33	566772.75	136610.18	99.41	110	8/3/2007
299-W10-33	566772.75	136610.18	95.45	65	8/6/2007
299-W10-33	566772.75	136610.18	92.40	14	8/8/2007
299-W10-33	566772.75	136610.18	89.05	8.1	8/13/2007
299-W10-33	566772.75	136610.18	86.00	0.5	8/15/2007
299-W10-33	566772.75	136610.18	83.10	6.3	8/21/2007
299-W10-33	566772.75	136610.18	80.21	2.5	8/24/2007
299-W10-33	566772.75	136610.18	77.16	0.5	8/29/2007
299-W10-4	566734.63	136578.08	134.60	1100.00	8/29/2007
299-W10-5	566578.63	136474.83	134.60	1300.00	12/28/2007
299-W10-8	566848.81	136811.22	134.60	320	8/25/2005
299-W11-10	568147.50	136610.03	131.40	110	8/30/2007
299-W11-12	566927.13	136604.02	132.90	83	1/24/2005
299-W11-13	567070.56	136417.10	106.67	270.00	12/8/2007
299-W11-14	567457.94	136913.97	132.89	240	6/21/2006
299-W11-18	567153.10	137154.52	133.10	230.00	8/29/2007
299-W11-25B	566912.31	136774.77	130.19	890	2/8/2005
299-W11-25B	566912.31	136774.77	124.10	1400	2/8/2005
299-W11-25B	566912.31	136774.77	118.00	1146	2/16/2005
299-W11-25B	566912.31	136774.77	111.91	1500	2/17/2005
299-W11-25B	566912.31	136774.77	105.81	1200	2/23/2005
299-W11-25B	566912.31	136774.77	99.71	1341	2/24/2005
299-W11-25B	566912.31	136774.77	93.92	998	3/4/2005
299-W11-25B	566912.31	136774.77	87.83	1050	3/7/2005
299-W11-25B	566912.31	136774.77	84.93	884	3/8/2005
299-W11-3	567641.69	136663.89	132.28	200.00	10/25/2007
299-W11-37	567635.19	137018.00	133.10	200	9/27/2005

Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W11-40	566926.81	136709.67	135.48	3	11/23/2005
299-W11-41	566935.50	136677.78	134.60	99	9/26/2005
299-W11-42	566920.44	136745.67	132.28	1181.00	11/16/2005
299-W11-43	567269.75	136971.05	125.90	900	6/1/2005
299-W11-43	567269.75	136971.05	116.76	980	6/7/2005
299-W11-43	567269.75	136971.05	105.79	450	6/9/2005
299-W11-43	567269.75	136971.05	89.33	310	6/16/2005
299-W11-43	567269.75	136971.05	79.88	1100	6/21/2005
299-W11-45	566992.84	136775.64	129.46	790	10/4/2005
299-W11-45	566992.84	136775.64	123.27	1200	10/11/2005
299-W11-45	566992.84	136775.64	117.18	1370	10/17/2005
299-W11-45	566992.84	136775.64	111.39	1175	10/20/2005
299-W11-45	566992.84	136775.64	105.44	891	10/26/2005
299-W11-45	566992.84	136775.64	99.35	63	10/28/2005
299-W11-45	566992.84	136775.64	93.10	363	11/1/2005
299-W11-45	566992.84	136775.64	87.00	2.4	11/7/2005
299-W11-45	566992.84	136775.64	80.91	77	11/10/2005
299-W11-46	566886.06	136766.32	126.77	1100.00	1/8/2008
299-W11-47	566933.82	136680.70	122.48	1347.560976	2/21/2006
299-W11-47	566933.82	136680.70	119.43	341.2757974	2/28/2006
299-W11-47	566933.82	136680.70	116.69	1700	3/3/2006
299-W11-47	566933.82	136680.70	110.60	1389.02439	3/6/2006
299-W11-47	566933.82	136680.70	104.50	701.6885553	3/8/2006
299-W11-47	566933.82	136680.70	98.40	606.0037523	3/10/2006
299-W11-47	566933.82	136680.70	92.31	35.08442777	3/14/2006
299-W11-47	566933.82	136680.70	86.21	10.52532833	3/16/2006
299-W11-48	566881.97	136846.18	132.09	850	4/10/2007
299-W11-48	566881.97	136846.18	127.52	1200	4/11/2007
299-W11-48	566881.97	136846.18	122.94	650	4/13/2007
299-W11-48	566881.97	136846.18	119.59	1100	4/17/2007
299-W11-48	566881.97	136846.18	116.85	1300	4/25/2007
299-W11-48	566881.97	136846.18	113.49	12	5/16/2007
299-W11-48	566881.97	136846.18	109.53	1200	5/17/2007
299-W11-48	566881.97	136846.18	107.40	190	5/21/2007
299-W11-48	566881.97	136846.18	104.35	780	5/22/2007
299-W11-48	566881.97	136846.18	101.30	58	5/23/2007
299-W11-48	566881.97	136846.18	99.57	140	5/25/2007
299-W11-48	566881.97	136846.18	95.21	77	5/25/2007
299-W11-48	566881.97	136846.18	92.46	6.2	5/29/2007
299-W11-48	566881.97	136846.18	89.72	6.2	6/1/2007
299-W11-48	566881.97	136846.18	87.28	0.5	6/5/2007
299-W11-6	567452.79	136485.91	132.29	250.00	12/8/2007
299-W11-7	567260.88	136675.33	133.10	1100.00	5/8/2007
299-W11-86	568143.53	136610.04	126.97	1433	6/30/2006
299-W11-86	568143.53	136610.04	119.96	1200	7/7/2006
299-W11-86	568143.53	136610.04	111.43	780	7/10/2006
299-W11-86	568143.53	136610.04	106.25	2300	7/12/2006
299-W11-86	568143.53	136610.04	97.10	1292	7/17/2006
299-W11-86	568143.53	136610.04	89.48	260	7/25/2006
299-W11-86	568143.53	136610.04	81.56	160	7/31/2006

Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W11-86	568143.53	136610.04	73.63	68	8/4/2006
299-W11-87	568113.36	136602.03	104.16	2100.00	11/20/2007
299-W11-88	567874.67	137113.09	124.80	1100	11/29/2007
299-W11-88	567874.67	137113.09	115.04	1100	11/29/2007
299-W11-88	567874.67	137113.09	109.56	1600	12/3/2007
299-W11-88	567874.67	137113.09	103.46	1700	12/5/2007
299-W11-88	567874.67	137113.09	94.32	850	12/6/2007
299-W11-88	567874.67	137113.09	88.22	23	12/11/2007
299-W11-88	567874.67	137113.09	84.56	570	2/6/2008
299-W11-88	567874.67	137113.09	74.23	450	2/13/2008
299-W12-1	568302.38	137199.15	128.26	0.5	9/4/2007
299-W13-1	568148.75	136048.59	128.63	119.4668821	12/3/2003
299-W13-1	568148.75	136048.59	116.44	344.3457189	12/4/2003
299-W13-1	568148.75	136048.59	110.95	557.5121163	12/5/2003
299-W13-1	568148.75	136048.59	99.98	2717.285945	12/6/2003
299-W13-1	568148.75	136048.59	92.05	2900	12/12/2003
299-W13-1	568148.75	136048.59	83.21	1506.219709	12/19/2003
299-W13-1	568148.75	136048.59	74.07	1194.668821	12/20/2003
299-W13-1	568148.75	136048.59	62.18	309.2084006	12/22/2003
299-W14-11	566901.69	136287.63	129.10	26	4/18/2005
299-W14-11	566901.69	136287.63	123.00	410	4/20/2005
299-W14-11	566901.69	136287.63	116.91	920	4/20/2005
299-W14-11	566901.69	136287.63	110.81	690	4/25/2005
299-W14-11	566901.69	136287.63	104.71	1200	4/26/2005
299-W14-11	566901.69	136287.63	98.62	530	4/27/2005
299-W14-13	566872.92	136275.45	132.96	110.00	8/2/2006
299-W14-14	566898.38	136181.05	132.89	1100.00	8/23/2007
299-W14-16	566972.53	136311.55	132.08	320.00	5/9/2007
299-W14-6	566899.19	136100.83	133.70	164.00	1/21/2005
299-W14-71	567733.43	135567.81	128.72	230.023753	9/19/2006
299-W14-71	567733.43	135567.81	120.49	222.0427553	9/22/2006
299-W14-71	567733.43	135567.81	112.75	310.6888361	9/27/2006
299-W14-71	567733.43	135567.81	106.78	259.3824228	10/5/2006
299-W14-71	567733.43	135567.81	97.94	877.9097387	10/9/2006
299-W14-71	567733.43	135567.81	90.32	1200	10/12/2006
299-W14-71	567733.43	135567.81	85.93	863.6579572	10/13/2006
299-W14-71	567733.43	135567.81	76.30	533.0166271	11/29/2006
299-W14-72	567328.44	135941.28	126.06	86.7	10/2/2006
299-W14-72	567328.44	135941.28	121.18	71	10/4/2006
299-W14-72	567328.44	135941.28	113.25	52.8	10/9/2006
299-W14-72	567328.44	135941.28	107.46	628	10/11/2006
299-W14-72	567328.44	135941.28	98.32	731	10/12/2006
299-W14-72	567328.44	135941.28	90.39	280	10/17/2006
299-W14-72	567328.44	135941.28	82.47	988	10/24/2006
299-W14-9	567031.75	135650.69	79.46	258	2/14/2005
299-W15-1	566554.31	135942.94	133.23	1042	2/4/2005
299-W15-1	566554.31	135942.94	131.71	1350	2/7/2005
299-W15-1	566554.31	135942.94	129.88	1947	2/7/2005
299-W15-1	566554.31	135942.94	127.75	3321	2/8/2005
299-W15-1	566554.31	135942.94	123.48	4152	2/8/2005

Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W15-11	566412.31	136000.72	133.28	2600	1/25/2005
299-W15-11	566412.31	136000.72	131.15	2100	1/26/2005
299-W15-11	566412.31	136000.72	127.79	2600	1/27/2005
299-W15-11	566412.31	136000.72	124.44	2700	1/27/2005
299-W15-11	566412.31	136000.72	121.70	3100	2/1/2005
299-W15-15	566088.81	135751.50	135.20	1.2	7/11/2007
299-W15-152	566309.38	135550.00	130.78	12	9/16/2005
299-W15-152	566309.38	135550.00	121.94	95	9/19/2005
299-W15-152	566309.38	135550.00	110.05	190	9/19/2005
299-W15-152	566309.38	135550.00	100.30	390	9/20/2005
299-W15-16	566278.24	135726.73	135.20	610.00	1/13/2004
299-W15-17	566306.88	135718.95	78.63	7.40	7/26/2007
299-W15-2	566093.75	136336.23	135.20	40.00	9/21/2007
299-W15-224	566280.25	135919.45	131.19	120.00	1/22/2007
299-W15-30	566304.63	135748.94	134.40	370	7/17/2007
299-W15-31A	566377.13	135856.11	135.20	260.00	10/1/2007
299-W15-32	566744.64	135628.11	131.29	1400.00	6/21/2005
299-W15-33	566404.52	135959.80	135.15	2700.00	2/23/2004
299-W15-34	566613.44	135960.44	132.89	4000.00	12/12/2007
299-W15-35	566739.25	135853.06	131.97	3300.00	12/12/2007
299-W15-36	566773.88	135429.59	131.97	600.00	12/12/2007
299-W15-37	566716.44	135248.31	132.58	110.00	8/28/2007
299-W15-38	566784.13	135666.01	134.25	1700.00	10/18/2007
299-W15-39	566790.38	135546.08	134.31	220.00	8/31/2007
299-W15-40	566652.50	136204.97	132.89	3500.00	12/12/2007
299-W15-41	566728.80	136024.77	134.60	960.00	8/31/2007
299-W15-42	566581.81	135627.02	129.23	540	8/30/2007
299-W15-43	566490.13	136210.03	132.28	1000.00	1/8/2008
299-W15-44	566685.00	136066.47	132.58	3500.00	12/20/2007
299-W15-45	566432.94	135961.16	128.01	1300.00	12/12/2007
299-W15-46	566752.25	135586.67	133.22	330	9/14/2004
299-W15-46	566752.25	135586.67	132.00	1600	9/28/2004
299-W15-46	566752.25	135586.67	126.97	0.5	10/6/2004
299-W15-46	566752.25	135586.67	125.14	120	10/11/2004
299-W15-46	566752.25	135586.67	122.09	4400	2/1/2006
299-W15-46	566752.25	135586.67	121.79	825	10/12/2004
299-W15-46	566752.25	135586.67	119.04	3800	10/14/2004
299-W15-46	566752.25	135586.67	114.47	2918	10/19/2004
299-W15-46	566752.25	135586.67	113.86	2200	10/19/2004
299-W15-46	566752.25	135586.67	112.79	286	10/25/2004
299-W15-46	566752.25	135586.67	112.18	270	10/25/2004
299-W15-46	566752.25	135586.67	106.09	110	10/28/2004
299-W15-46	566752.25	135586.67	100.14	32	11/2/2004
299-W15-46	566752.25	135586.67	99.99	29	11/2/2004
299-W15-46	566752.25	135586.67	94.66	258	11/8/2004
299-W15-46	566752.25	135586.67	91.73	1300	11/10/2004
299-W15-46	566752.25	135586.67	88.56	472	11/15/2004
299-W15-46	566752.25	135586.67	87.80	470	11/15/2004
299-W15-46	566752.25	135586.67	81.55	8.7	11/23/2004
299-W15-46	566752.25	135586.67	75.76	206	11/30/2004

Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W15-46	566752.25	135586.67	75.15	190	11/30/2004
299-W15-47	566776.44	135642.38	126.79	1300.00	12/12/2007
299-W15-49	566307.19	135972.91	130.75	220.00	11/9/2007
299-W15-50	566793.50	135790.72	127.82	1724.137931	1/25/2005
299-W15-50	566793.50	135790.72	120.81	2000	1/31/2005
299-W15-50	566793.50	135790.72	115.63	1659.482759	2/2/2005
299-W15-50	566793.50	135790.72	105.57	1576.508621	2/7/2005
299-W15-50	566793.50	135790.72	99.78	887.9310345	2/9/2005
299-W15-6	566801.50	135654.39	133.80	550	5/19/2005
299-W15-6	566801.50	135654.39	131.97	1000	5/19/2005
299-W15-6	566801.50	135654.39	124.05	1100	5/23/2005
299-W15-6	566801.50	135654.39	115.82	1000	5/23/2005
299-W15-6	566801.50	135654.39	107.90	1700	5/23/2005
299-W15-6	566801.50	135654.39	99.67	2300	5/24/2005
299-W15-6	566801.50	135654.39	95.09	1700	5/25/2005
299-W15-6	566801.50	135654.39	89.88	834	11/14/2005
299-W15-6	566801.50	135654.39	89.30	1478	11/19/2005
299-W15-6	566801.50	135654.39	83.79	1028	11/14/2005
299-W15-6	566801.50	135654.39	83.21	1389	11/14/2005
299-W15-6	566801.50	135654.39	78.30	1003	11/14/2005
299-W15-6	566801.50	135654.39	77.72	1266	11/14/2005
299-W15-7	566675.88	135920.20	132.62	2358	2/21/2005
299-W15-7	566675.88	135920.20	130.79	2601	2/21/2005
299-W15-7	566675.88	135920.20	127.13	2665	2/21/2005
299-W15-7	566675.88	135920.20	122.56	2688	2/22/2005
299-W15-7	566675.88	135920.20	117.69	2639	2/22/2005
299-W15-7	566675.88	135920.20	112.81	2564	2/22/2005
299-W15-763	566780.41	136021.85	132.28	680.00	12/6/2007
299-W15-765	566697.00	136373.06	131.67	3400.00	12/20/2007
299-W15-83	566275.75	135819.34	131.98	390.00	7/24/2006
299-W15-94	566278.81	135633.45	132.11	830.00	1/29/2007
299-W17-1	565310.69	135038.73	135.01	1	11/17/2003
299-W17-1	565310.69	135038.73	120.19	1	11/17/2003
299-W17-1	565310.69	135038.73	112.33	1	11/18/2003
299-W17-1	565310.69	135038.73	106.05	1	11/19/2003
299-W18-1	566421.50	135465.20	134.80	160	5/16/2005
299-W18-1	566421.50	135465.20	132.36	250	5/17/2005
299-W18-1	566421.50	135465.20	125.04	84	5/17/2005
299-W18-1	566421.50	135465.20	117.12	89	5/17/2005
299-W18-1	566421.50	135465.20	108.89	57	5/18/2005
299-W18-1	566421.50	135465.20	100.96	57	5/18/2005
299-W18-1	566421.50	135465.20	97.30	56	5/18/2005
299-W18-15	566380.06	134733.48	130.45	100.00	9/21/2007
299-W18-16	566605.06	135425.69	131.69	670	11/22/2004
299-W18-16	566605.06	135425.69	119.49	222	12/1/2004
299-W18-16	566605.06	135425.69	108.83	137	12/9/2004
299-W18-16	566605.06	135425.69	108.52	850	12/9/2004
299-W18-16	566605.06	135425.69	104.25	2.6	12/15/2004
299-W18-21	566068.94	134971.83	135.20	2.80	7/16/2007
299-W18-22	566059.88	134983.30	69.36	0.5	7/16/2007

Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W18-23	566055.78	135335.56	135.20	0.42	7/31/2007
299-W18-24	566342.07	135339.44	135.20	6.60	8/22/2002
299-W18-27	566061.43	135219.67	135.20	4.60	1/15/2003
299-W18-30	566841.96	135186.75	133.84	140.00	8/30/2007
299-W18-31	566692.75	135068.31	134.60	97.00	2/13/2003
299-W18-33	566694.53	134804.27	134.37	78.00	9/2/2005
299-W18-4	566276.80	135408.91	132.67	11.00	8/21/2002
299-W18-40	566694.50	134989.55	130.86	160.00	2/26/2003
299-W19-101	567939.14	135014.07	106.70	69	8/22/2005
299-W19-101	567939.14	135014.07	97.56	120	8/23/2005
299-W19-104	568007.74	135206.88	129.02	118	3/28/2006
299-W19-104	568007.74	135206.88	125.06	156	3/29/2006
299-W19-105	567565.13	134745.44	129.53	98.00	12/10/2007
299-W19-105	567565.13	134745.44	127.61	88	1/11/2006
299-W19-105	567565.13	134745.44	118.47	24	1/12/2006
299-W19-105	567565.13	134745.44	109.32	19	1/13/2006
299-W19-105	567565.13	134745.44	97.13	1	1/16/2006
299-W19-107	567997.89	135205.66	119.48	210	8/31/2007
299-W19-107	567997.89	135205.66	106.94	212	4/5/2006
299-W19-107	567997.89	135205.66	94.75	115	4/7/2006
299-W19-107	567997.89	135205.66	86.52	20.6	4/10/2006
299-W19-12	566868.33	135052.59	129.49	120.00	2/13/2003
299-W19-20	567873.94	134901.08	133.10	39	8/22/2002
299-W19-30	567665.88	134924.47	133.10	1	1/17/2001
299-W19-34A	567644.80	135005.39	113.34	150.00	8/30/2007
299-W19-35	567963.25	135008.30	133.10	71.00	12/28/2007
299-W19-36	567605.90	135010.19	129.62	240.00	1/8/2008
299-W19-37	567695.00	134943.49	133.10	47.00	9/4/2007
299-W19-39	567872.89	134879.89	131.52	68.00	2/22/2007
299-W19-40	567945.01	134840.53	133.10	9.00	1/25/2006
299-W19-41	566867.73	134997.65	133.35	77.00	2/19/2003
299-W19-42	566868.01	135116.03	133.00	180.00	3/12/2003
299-W19-43	567670.31	134997.16	130.54	100.00	1/8/2008
299-W19-44	566868.15	135035.11	131.11	55.00	2/19/2003
299-W19-45	566868.85	135080.79	132.02	550.00	2/18/2003
299-W19-46	567782.69	134842.45	130.14	65	9/4/2007
299-W19-46	567782.69	134842.45	121.95	98	11/20/2002
299-W19-46	567782.69	134842.45	109.76	46	11/20/2002
299-W19-46	567782.69	134842.45	103.66	0.075	11/21/2002
299-W19-46	567782.69	134842.45	98.17	75	11/21/2002
299-W19-48	567822.94	134925.98	126.49	130.00	12/7/2007
299-W19-48	567822.94	134925.98	123.74	37	11/30/2004
299-W19-48	567822.94	134925.98	120.69	72	12/9/2004
299-W19-48	567822.94	134925.98	106.98	87	12/9/2004
299-W19-48	567822.94	134925.98	89.60	100	12/14/2004
299-W19-48	567822.94	134925.98	82.90	40	12/16/2004
299-W19-49	567568.06	134894.38	128.62	190	8/31/2007
299-W19-49	567568.06	134894.38	116.50	130	9/1/2005
299-W19-49	567568.06	134894.38	106.75	120	9/2/2005
299-W19-49	567568.06	134894.38	97.60	100	9/6/2005

Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W19-50	567939.25	135011.84	128.40	35	8/8/2005
299-W19-50	567939.25	135011.84	122.30	89	8/9/2005
299-W19-50	567939.25	135011.84	115.59	120	8/11/2005
299-W21-2	568124.38	134573.80	129.23	11.00	12/28/2007
299-W21-2	568124.38	134573.80	127.33	16	11/29/2004
299-W21-2	568124.38	134573.80	119.86	6.5	11/29/2004
299-W21-2	568124.38	134573.80	112.33	6.4	12/1/2004
299-W21-2	568124.38	134573.80	107.76	13	12/2/2004
299-W21-2	568124.38	134573.80	101.66	16	12/6/2004
299-W21-2	568124.38	134573.80	98.01	13	12/7/2004
299-W22-20	567564.26	133872.45	130.28	0.5	9/18/2007
299-W22-26	567176.37	134458.40	132.48	14.00	8/30/2006
299-W22-45	566916.36	134285.69	130.77	62	9/14/2007
299-W22-46	566875.05	134121.02	134.60	13.00	3/18/2003
299-W22-47	566908.75	134076.28	130.14	62.00	12/14/2005
299-W22-47	566908.75	134076.28	123.54	145	1/12/2005
299-W22-47	566908.75	134076.28	117.75	90	1/13/2005
299-W22-47	566908.75	134076.28	111.65	3.4	1/19/2005
299-W22-47	566908.75	134076.28	105.56	5.2	1/20/2005
299-W22-47	566908.75	134076.28	99.46	3.9	1/21/2005
299-W22-48	566967.84	134418.27	133.59	19.00	9/17/2007
299-W22-49	566875.58	134194.81	133.69	67.00	9/11/2007
299-W22-50	566904.25	134139.75	133.70	20.00	10/9/2000
299-W22-50	566904.25	134139.75	130.69	5.6	11/29/1999
299-W22-50	566904.25	134139.75	125.50	0.94	12/14/1999
299-W22-50	566904.25	134139.75	108.74	1.5	12/15/1999
299-W22-50	566904.25	134139.75	84.36	5.6	12/17/1999
299-W22-50	566904.25	134139.75	69.73	0.89	12/22/1999
299-W22-50	566904.25	134139.75	38.03	0.23	1/1/1999
299-W22-69	567179.60	134347.83	128.92	6.10	1/4/2008
299-W22-69	567179.60	134347.83	118.88	1	2/1/2006
299-W22-69	567179.60	134347.83	110.80	1	2/2/2006
299-W22-69	567179.60	134347.83	92.42	11	2/8/2006
299-W22-72	567237.37	134207.08	129.53	7.10	9/26/2007
299-W22-72	567237.37	134207.08	125.05	1	2/23/2006
299-W22-72	567237.37	134207.08	118.95	1	2/24/2006
299-W22-72	567237.37	134207.08	112.85	1	2/27/2006
299-W22-72	567237.37	134207.08	109.81	4.4	2/28/2006
299-W22-72	567237.37	134207.08	98.30	7.1	2/28/2006
299-W22-83	566980.28	134085.73	131.67	56.00	9/17/2007
299-W22-86	567186.74	134041.31	129.53	36.00	9/25/2007
299-W22-86	567186.74	134041.31	124.32	15	3/14/2006
299-W22-86	567186.74	134041.31	117.31	1	3/14/2006
299-W22-86	567186.74	134041.31	115.78	1	3/15/2006
299-W22-86	567186.74	134041.31	111.21	1	3/14/2006
299-W22-86	567186.74	134041.31	108.16	1	3/15/2006
299-W22-86	567186.74	134041.31	99.02	2.5	3/16/2006
299-W22-87	567541.75	134539.88	129.23	5.30	12/28/2007
299-W22-87	567541.75	134539.88	119.83	6.4	12/21/2005
299-W22-87	567541.75	134539.88	110.69	1	12/22/2005

Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W22-87	567541.75	134539.88	95.45	1	12/27/2005
299-W22-88	568046.08	134390.40	127.66	3.6	2/13/2008
299-W22-88	568046.08	134390.40	118.21	9.8	2/15/2008
299-W22-88	568046.08	134390.40	106.02	14	2/20/2008
299-W22-88	568046.08	134390.40	95.96	22	2/27/2008
299-W22-88	568046.08	134390.40	78.28	8.8	2/28/2008
299-W23-10	566570.38	134256.33	134.60	41.00	2/27/2006
299-W23-15	566794.00	134127.23	134.60	140.00	9/11/2007
299-W23-21	566678.95	134287.17	132.11	130.00	9/11/2007
299-W23-4	566628.19	134391.88	134.60	23	6/21/2006
299-W23-4	566628.19	134391.88	133.81	211	11/12/2005
299-W23-4	566628.19	134391.88	130.76	222	11/17/2005
299-W23-4	566628.19	134391.88	127.71	232	11/21/2005
299-W23-9	566613.20	134267.80	132.64	12.00	9/18/2007
299-W26-13	566395.61	133286.82	132.04	1.40	6/20/2007
299-W26-14	566653.90	133532.43	131.25	2.8	6/20/2007
299-W26-7	566296.68	133235.65	135.20	0.075	6/12/2003
299-W27-2	566879.47	133663.56	81.14	6.9	1/29/2007
299-W6-10	567384.51	137446.07	133.10	200.00	9/1/2005
299-W6-3	567089.37	137292.15	85.88	1.10	7/17/2002
299-W6-6	567289.92	137631.73	86.21	0.68	1/22/2002
299-W6-7	567282.48	137631.81	133.10	33.00	4/16/2002
299-W7-12	566012.05	137629.31	135.60	0.045	9/23/2005
299-W7-3	566263.26	137631.65	66.39	0.015	3/28/2007
299-W7-4	566380.00	137301.27	133.99	81.00	9/24/2007
299-W7-5	566447.25	137628.70	135.20	0.53	3/17/2005
299-W7-7	566537.97	137629.08	134.60	0.075	9/9/2003
299-W7-8	566732.60	137629.67	134.60	0.165	3/13/2002
299-W8-1	565720.68	137639.65	134.31	2.10	5/3/2007
699-32-72A	567913.83	133355.84	98.74	0.5	9/30/2007
699-32-76	566683.01	133138.74	128.01	0.5	12/6/2007
699-32-76	566683.01	133138.74	118.72	0.5	12/11/2007
699-32-76	566683.01	133138.74	110.64	0.5	12/12/2007
699-32-76	566683.01	133138.74	97.53	0.5	12/14/2007
699-33-75	566901.62	133663.81	130.71	13	1/16/2008
699-33-75	566901.62	133663.81	121.87	43	1/17/2008
699-33-75	566901.62	133663.81	112.12	35	1/18/2008
699-33-75	566901.62	133663.81	100.23	12	1/22/2008
699-33-76	566621.48	133600.48	127.92	3.3	3/3/2008
699-33-76	566621.48	133600.48	118.78	3.6	3/4/2008
699-33-76	566621.48	133600.48	97.62	6.8	3/6/2008
699-34-72	567859.97	133785.33	126.50	0.5	2/28/2008
699-34-72	567859.97	133785.33	117.54	0.5	2/29/2008
699-34-72	567859.97	133785.33	112.82	3.5	3/5/2008
699-34-72	567859.97	133785.33	105.02	1.4	3/4/2008
699-34-72	567859.97	133785.33	92.73	3.4	3/5/2008
699-35-70	568537.60	133980.77	131.40	1.80	9/30/2007
699-35-78A	566034.83	134264.45	132.02	12	6/26/2007
699-36-67	569250.58	134418.18	131.01	6	9/6/2007
699-36-70A	568437.80	134302.02	131.40	5.00	9/16/2007

Table A-1. 2007 Carbon Tetrachloride Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
699-36-70B	568427.81	134625.98	128.31	8.00	12/7/2007
699-36-70B	568427.81	134625.98	121.53	1.1	9/1/2004
699-36-70B	568427.81	134625.98	110.89	0.5	9/9/2004
699-36-70B	568427.81	134625.98	100.19	8.5	9/14/2004
699-36-70B	568427.81	134625.98	86.49	0.5	9/23/2004
699-37-68	569244.75	134622.65	128.24	8	9/6/2007
699-38-65	570061.23	135032.99	117.93	0.49	3/21/2002
699-38-70	568472.06	135082.34	120.93	20.00	7/2/2007
699-38-70B	568469.13	135331.05	126.11	64	2/4/2004
699-38-70B	568469.13	135331.05	115.75	309	2/5/2004
699-38-70B	568469.13	135331.05	107.83	311	2/6/2004
699-38-70B	568469.13	135331.05	97.16	470	2/6/2004
699-38-70B	568469.13	135331.05	88.01	428	2/11/2004
699-38-70B	568469.13	135331.05	75.97	14	2/27/2004
699-38-70C	569084.13	135325.58	125.65	25	2/18/2004
699-38-70C	569084.13	135325.58	114.68	28	2/19/2004
699-38-70C	569084.13	135325.58	104.32	32	2/20/2004
699-38-70C	569084.13	135325.58	98.53	31	2/20/2004
699-39-79	565862.15	135404.99	131.77	0.075	1/16/2003
699-40-65	570057.50	135881.16	120.91	1	12/18/2003
699-40-65	570057.50	135881.16	90.13	1	12/31/2003
699-43-69	568967.03	136488.48	123.82	5	3/12/2008
699-43-69	568967.03	136488.48	117.72	0.5	3/14/2008
699-43-69	568967.03	136488.48	115.59	0.5	3/18/2008
699-43-69	568967.03	136488.48	101.57	240	3/26/2008
699-43-69	568967.03	136488.48	94.25	150	4/1/2008
699-43-69	568967.03	136488.48	87.85	140	4/2/2008
699-44-64	570361.68	136890.48	106.37	2.30	3/6/2000
699-45-69A	568700.41	137175.71	124.60	4.20	9/30/2007
699-45-69C	568947.12	137233.81	124.75	2.4	8/10/2007
699-45-69C	568947.12	137233.81	122.31	1.6	8/15/2007
699-45-69C	568947.12	137233.81	110.12	22	8/31/2007
699-45-69C	568947.12	137233.81	102.80	15	9/6/2007
699-45-69C	568947.12	137233.81	90.91	0.5	9/12/2007
699-45-69C	568947.12	137233.81	83.60	1	10/1/2007
699-48-71	568359.04	138049.93	128.42	62.00	1/3/2008
699-48-77A	566384.45	137961.85	135.08	0.5	10/15/2007
699-48-77C	566440.18	138079.79	114.42	0.5	10/15/2007
699-49-79	565742.38	138264.08	129.98	0.23	4/19/2006
699-50-74	567359.50	138646.73	132.07	0.5	7/14/2005
699-50-74	567359.50	138646.73	122.01	0.5	7/15/2005
699-50-74	567359.50	138646.73	115.61	0.5	7/18/2005
699-50-74	567359.50	138646.73	106.77	0.5	7/19/2005
699-50-74	567359.50	138646.73	97.32	0.5	7/21/2005
699-51-75	566949.27	138899.23	111.22	0.075	1/20/2006

Table A-2. 2007 Total Chromium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W10-1	566663.13	136734.56	134.00	21.9	08/20/07
299-W10-14	566017.19	136608.89	78.63	32.3	09/11/07
299-W10-22	566803.82	136876.10	134.60	84.8	11/16/06
299-W10-23	566823.75	136815.34	132.28	50	11/16/06
299-W10-24	566885.44	136798.78	132.28	54.8	05/07/07
299-W10-26	566814.60	136393.66	133.16	10.2	08/21/07
299-W10-27	566815.17	136434.85	132.19	80.9	08/21/07
299-W10-28	566672.76	136702.98	132.12	98.8	05/08/07
299-W10-29	566055.36	136822.06	80.01	15.5	09/12/07
299-W10-30	566055.15	136732.65	131.65	23.6	09/12/07
299-W10-31	566266.44	136968.34	130.75	7.2	09/12/07
299-W10-33	566772.75	136610.18	131.72	147	07/06/07
299-W10-33	566772.75	136610.18	130.04	262	07/10/07
299-W10-33	566772.75	136610.18	124.71	84.1	07/11/07
299-W10-33	566772.75	136610.18	122.18	118	07/12/07
299-W10-33	566772.75	136610.18	119.83	86.7	07/16/07
299-W10-33	566772.75	136610.18	116.78	35.1	07/17/07
299-W10-33	566772.75	136610.18	113.74	1.16	07/24/07
299-W10-33	566772.75	136610.18	109.77	3.19	07/27/07
299-W10-33	566772.75	136610.18	107.64	9.24	07/31/07
299-W10-33	566772.75	136610.18	104.59	14.8	08/01/07
299-W10-33	566772.75	136610.18	101.24	18.8	08/02/07
299-W10-33	566772.75	136610.18	99.41	13.8	08/03/07
299-W10-33	566772.75	136610.18	95.45	11.6	08/06/07
299-W10-33	566772.75	136610.18	92.40	6.88	08/08/07
299-W10-33	566772.75	136610.18	89.05	12.3	08/13/07
299-W10-33	566772.75	136610.18	86.00	0.25	08/15/07
299-W10-33	566772.75	136610.18	83.10	0.25	08/21/07
299-W10-33	566772.75	136610.18	80.21	0.25	08/24/07
299-W10-33	566772.75	136610.18	77.16	0.25	08/29/07
299-W10-4	566734.63	136578.08	134.00	507	02/08/07
299-W10-5	566578.63	136474.83	134.60	6.7	06/15/07
299-W10-8	566848.81	136811.22	134.60	53.6	12/04/06
299-W11-12	566927.13	136604.02	132.90	21.7	02/08/07
299-W11-13	567070.56	136417.10	106.67	12.5	06/25/07
299-W11-18	567153.10	137154.52	133.10	26.5	08/29/07
299-W11-39	566879.58	136772.97	131.81	157	05/08/07
299-W11-40	566926.81	136709.67	134.00	59.8	11/21/06
299-W11-41	566935.50	136677.78	134.00	148	08/16/07
299-W11-42	566920.44	136745.67	132.28	149	11/21/06
299-W11-43	567240.92	136964.08	84.99	150	10/24/06
299-W11-45	566965.17	136768.96	124.92	143	02/09/07
299-W11-46	566886.06	136766.32	126.77	708	05/08/07
299-W11-47	566906.15	136674.03	121.40	103	08/16/07
299-W11-47	566933.82	136680.70	116.70	87	03/03/06
299-W11-47	566933.82	136680.70	110.60	27.4	03/06/06
299-W11-47	566933.82	136680.70	104.46	121	03/08/06
299-W11-47	566933.82	136680.70	98.36	71.2	03/10/06
299-W11-47	566933.82	136680.70	92.36	9.8	03/14/06
299-W11-48	566854.31	136839.50	110.61	19	04/06/07

Table A-2. 2007 Total Chromium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W11-48	566881.97	136846.18	132.09	28.1	04/10/07
299-W11-48	566881.97	136846.18	127.52	63	04/11/07
299-W11-48	566881.97	136846.18	122.94	0.25	04/13/07
299-W11-48	566881.97	136846.18	119.59	93.1	04/17/07
299-W11-48	566881.97	136846.18	116.85	81.5	04/25/07
299-W11-48	566881.97	136846.18	113.49	0.799	05/16/07
299-W11-48	566881.97	136846.18	109.53	23.8	05/17/07
299-W11-48	566881.97	136846.18	107.40	2	05/21/07
299-W11-48	566881.97	136846.18	104.35	131	05/22/07
299-W11-48	566881.97	136846.18	101.30	0.773	05/23/07
299-W11-48	566881.97	136846.18	95.21	126	05/25/07
299-W11-48	566881.97	136846.18	92.46	21.6	05/29/07
299-W11-48	566881.97	136846.18	89.72	0.25	06/01/07
299-W11-48	566881.97	136846.18	87.28	8.2	06/05/07
299-W11-7	567260.88	136675.33	133.10	17.4	05/08/07
299-W13-1	568119.88	136041.69	98.32	12	05/24/07
299-W14-11	566872.89	136280.70	123.10	110	08/16/07
299-W14-13	566872.92	136275.45	132.96	715	11/17/06
299-W14-14	566898.38	136181.05	132.89	10.5	08/23/07
299-W14-15	566870.89	136223.73	132.28	121	08/20/07
299-W14-16	566972.53	136311.55	132.08	4	05/09/07
299-W14-17	566977.97	136211.43	132.08	4.6	05/09/07
299-W14-18	566868.67	136337.22	132.46	7.1	05/09/07
299-W14-19	566869.80	136128.14	131.43	7.3	08/20/07
299-W14-19	566898.63	136135.06	124.13	1.5	10/28/02
299-W14-19	566898.63	136135.06	118.03	1.5	10/29/02
299-W14-19	566898.63	136135.06	111.94	1.5	10/29/02
299-W14-19	566898.63	136135.06	105.84	1.5	10/29/02
299-W14-19	566898.63	136135.06	100.05	1.5	10/29/02
299-W14-6	566899.19	136100.83	133.70	3.3	12/06/06
299-W14-71	567705.73	135561.19	91.18	2	08/29/07
299-W14-72	567300.76	135934.65	87.19	2	08/28/07
299-W15-15	566088.81	135751.50	135.20	19.9	01/22/07
299-W15-152	566280.63	135543.11	131.85	11.1	07/17/07
299-W15-17	566306.88	135718.95	78.63	13	07/26/07
299-W15-224	566280.25	135919.45	131.19	12.2	07/26/07
299-W15-30	566304.63	135748.94	134.40	10.4	07/17/07
299-W15-31A	566377.13	135856.11	135.20	6.8	11/28/06
299-W15-34	566613.44	135960.44	132.89	11.8	05/24/07
299-W15-35	566739.25	135853.06	131.97	18.2	09/25/07
299-W15-36	566773.88	135429.59	131.97	9.8	06/04/07
299-W15-37	566716.44	135248.31	132.58	7.3	08/28/07
299-W15-38	566784.13	135666.01	134.25	10.4	08/29/07
299-W15-40	566652.50	136204.97	132.89	20	06/04/07
299-W15-41	566728.80	136024.77	134.60	13.7	08/31/07
299-W15-42	566581.81	135627.02	129.23	10.1	07/17/07
299-W15-42	566581.81	135627.02	136.12	2.5	01/18/02
299-W15-42	566581.81	135627.02	119.36	0.5	01/24/02
299-W15-43	566490.13	136210.03	132.28	12.3	05/24/07
299-W15-43	566490.13	136210.03	121.43	8	11/11/02

Table A-2. 2007 Total Chromium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W15-43	566490.13	136210.03	115.34	1.5	11/12/02
299-W15-43	566490.13	136210.03	109.24	1.5	11/12/02
299-W15-43	566490.13	136210.03	101.01	1.5	11/12/02
299-W15-44	566685.00	136066.47	132.58	11.2	11/28/06
299-W15-44	566685.00	136066.47	123.40	1.5	10/17/02
299-W15-44	566685.00	136066.47	117.30	1.5	10/17/02
299-W15-44	566685.00	136066.47	111.20	1.5	10/17/02
299-W15-44	566685.00	136066.47	105.11	1.5	10/18/02
299-W15-44	566685.00	136066.47	99.93	1.5	10/18/02
299-W15-45	566432.94	135961.16	128.01	20.8	06/05/07
299-W15-46	566723.44	135579.78	127.42	11	06/01/07
299-W15-46	566752.25	135586.67	133.37	45	09/14/04
299-W15-46	566752.25	135586.67	112.95	0.5	10/19/04
299-W15-46	566752.25	135586.67	90.85	0.5	11/10/04
299-W15-46	566752.25	135586.67	42.08	1.5	01/26/05
299-W15-47	566776.44	135642.38	126.79	8	05/24/07
299-W15-49	566307.19	135972.91	130.75	10.7	05/24/07
299-W15-49	566307.19	135972.91	126.09	1.5	12/07/04
299-W15-49	566307.19	135972.91	115.42	1.5	12/09/04
299-W15-49	566307.19	135972.91	107.80	1.5	12/10/04
299-W15-49	566307.19	135972.91	86.16	1.5	12/14/04
299-W15-49	566307.19	135972.91	74.27	0	12/15/04
299-W15-50	566764.68	135783.82	128.29	10.1	08/24/07
299-W15-50	566793.50	135790.72	120.81	1.5	01/31/05
299-W15-50	566793.50	135790.72	115.63	1.5	02/02/05
299-W15-50	566793.50	135790.72	105.57	1	02/07/05
299-W15-50	566793.50	135790.72	99.78	0	02/09/05
299-W15-763	566780.41	136021.85	132.28	7.1	06/05/07
299-W15-765	566697.00	136373.06	131.67	72.3	11/30/06
299-W15-83	566275.75	135819.34	131.98	10.6	07/16/07
299-W15-94	566278.81	135633.45	132.11	14.9	09/12/07
299-W17-1	565281.96	135031.88	134.08	13.4	08/31/07
299-W18-16	566605.06	135425.69	131.69	1.5	11/22/04
299-W18-16	566605.06	135425.69	119.49	1.5	12/01/04
299-W18-16	566605.06	135425.69	108.83	1.5	12/09/04
299-W18-21	566068.94	134971.83	135.20	17.5	07/16/07
299-W18-22	566059.88	134983.30	69.36	9	07/16/07
299-W18-23	566055.78	135335.56	135.20	17.9	07/31/07
299-W18-30	566841.96	135186.75	133.84	7.2	08/30/07
299-W18-31	566692.75	135068.31	134.60	9.3	01/10/07
299-W18-40	566694.50	134989.55	130.86	3.3	05/09/07
299-W19-105	567536.32	134738.60	129.80	6	07/12/07
299-W19-107	567970.17	135199.06	119.71	2.45	08/31/07
299-W19-12	566868.33	135052.59	129.49	4.8	05/15/07
299-W19-35	567963.25	135008.30	132.00	5.4	12/28/06
299-W19-37	567695.00	134943.49	133.10	15.9	09/04/07
299-W19-41	566867.73	134997.65	133.35	10.6	11/10/06
299-W19-42	566868.01	135116.03	133.00	4.5	05/15/07
299-W19-44	566868.15	135035.11	131.11	5	05/15/07
299-W19-45	566868.85	135080.79	132.02	9.4	08/31/07

Table A-2. 2007 Total Chromium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W19-46	567753.83	134835.61	130.32	4.8	02/22/07
299-W19-46	567782.69	134842.45	115.85	3.4	11/20/02
299-W19-46	567782.69	134842.45	109.79	1.7	11/20/02
299-W19-46	567782.69	134842.45	103.69	1.2	11/21/02
299-W19-46	567782.69	134842.45	98.19	1.7	11/21/02
299-W19-47	566866.51	135154.99	131.01	3.4	05/15/07
299-W19-48	567822.94	134925.98	123.74	1.65	11/30/04
299-W19-48	567822.94	134925.98	106.93	1.65	12/09/04
299-W19-48	567822.94	134925.98	89.63	1.65	12/14/04
299-W19-48	567822.94	134925.98	82.93	1.28	12/16/04
299-W21-2	568095.53	134566.95	129.49	1.55	01/04/07
299-W22-26	567176.37	134458.40	132.48	17.3	10/25/06
299-W22-44	566927.19	134477.59	134.00	352	09/09/07
299-W22-45	566916.36	134285.69	130.77	18.6	09/14/07
299-W22-47	566879.94	134069.47	130.49	302	10/25/06
299-W22-48	566967.84	134418.27	133.59	24.3	09/17/07
299-W22-49	566875.58	134194.81	133.69	22.6	09/11/07
299-W22-50	566875.46	134132.94	133.70	94	09/14/07
299-W22-69	567151.92	134341.27	129.37	17.9	09/24/07
299-W22-72	567209.69	134200.53	129.77	11.9	09/26/07
299-W22-79	567600.70	134458.01	131.66	3.2	12/28/06
299-W22-80	566814.06	134118.84	132.13	6.6	09/09/07
299-W22-81	566971.46	134347.36	131.45	27.9	09/09/07
299-W22-82	566975.93	134160.25	131.85	15.8	09/09/07
299-W22-83	566980.28	134085.73	131.67	189	09/17/07
299-W22-84	566949.96	134540.78	131.74	13.7	09/09/07
299-W22-85	566874.10	134253.76	132.18	8.2	09/09/07
299-W22-86	567159.06	134034.77	129.80	43.5	09/25/07
299-W22-87	567512.92	134533.04	129.65	2.45	09/26/07
299-W22-9	567710.85	134035.92	128.42	2	09/18/07
299-W23-15	566794.00	134127.23	134.60	16.5	09/11/07
299-W23-19	566730.33	134159.84	133.70	798	03/30/07
299-W23-20	566688.88	134439.36	132.07	29.1	09/11/07
299-W23-21	566678.95	134287.17	132.11	8.8	09/11/07
299-W26-13	566395.61	133286.82	132.04	21.4	01/29/07
299-W26-14	566653.90	133532.43	131.25	2	06/20/07
299-W27-2	566879.47	133663.56	81.14	4.3	01/29/07
299-W7-3	566263.26	137631.65	66.39	21.9	09/11/07
299-W7-4	566380.00	137301.27	133.99	22.6	09/24/07
299-W8-1	565720.68	137639.65	134.31	38.1	09/28/07
699-32-62	570980.56	133209.16	98.46	152	09/26/07
699-35-66A	569828.91	134092.43	131.00	17.6	03/29/07
699-36-61A	571366.45	134550.27	119.46	17.2	10/05/06
699-36-70A	568437.80	134302.02	131.40	23.5	03/29/07
699-36-70B	568427.81	134625.98	130.67	0.36	08/18/04
699-36-70B	568427.81	134625.98	121.53	10.3	08/31/04
699-36-70B	568427.81	134625.98	110.89	1.65	09/09/04
699-36-70B	568427.81	134625.98	100.19	17.8	09/14/04
699-36-70B	568427.81	134625.98	86.49	0.89	09/23/04
699-47-60	571445.35	137961.72	118.50	2.45	09/28/07
699-48-77A	566384.45	137961.85	135.08	173	02/07/07
699-48-77C	566440.18	138079.79	114.42	8.21	07/23/07
699-48-77D	566404.53	138112.25	136.15	19.6	04/03/07

Table A-3. 2007 I-129 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W10-14	565988.44	136601.95	78.84	0.0491	03/28/07
299-W10-22	566803.82	136876.10	134.60	0.1725	05/07/07
299-W10-23	566794.93	136808.39	132.52	0.0855	08/20/07
299-W10-29	566055.36	136822.06	80.01	0.0565	10/03/06
299-W10-30	566055.15	136732.65	131.65	0.058	10/03/06
299-W10-31	566238.81	136961.65	131.18	0.02665	04/13/07
299-W10-4	566705.85	136571.14	134.60	0.456	08/29/07
299-W11-13	567070.56	136417.10	106.93	0.0525	01/19/07
299-W11-18	567153.10	137154.52	133.10	0.472	08/29/07
299-W11-25B	566912.31	136774.77	134.46	0.5	02/07/05
299-W11-25B	566912.31	136774.77	125.93	7	02/08/05
299-W11-25B	566912.31	136774.77	122.88	2.5	02/09/05
299-W11-3	567612.88	136656.95	132.54	0.525	10/24/06
299-W11-37	567606.35	137011.04	133.10	2.08	05/03/07
299-W11-41	566906.71	136670.84	132.17	0.252	11/30/06
299-W11-43	567269.75	136971.05	125.90	1.5	06/01/05
299-W11-43	567269.75	136971.05	116.76	0	06/07/05
299-W11-43	567269.75	136971.05	105.79	1	06/09/05
299-W11-43	567269.75	136971.05	89.33	0	06/16/05
299-W11-43	567269.75	136971.05	79.88	1	06/21/05
299-W11-45	566965.17	136768.96	124.92	3.65	02/09/07
299-W11-46	566886.06	136766.32	126.77	13.6	08/29/07
299-W11-47	566933.82	136680.70	125.23	0.1425	02/21/06
299-W11-47	566933.82	136680.70	122.79	0.147	02/23/06
299-W11-47	566933.82	136680.70	119.44	0.181	02/28/06
299-W11-47	566933.82	136680.70	116.70	0.1425	03/03/06
299-W11-47	566933.82	136680.70	110.60	0.1635	03/06/06
299-W11-47	566933.82	136680.70	104.46	0.0905	03/08/06
299-W11-47	566933.82	136680.70	98.36	0	03/10/06
299-W11-47	566933.82	136680.70	92.36	0.0325	03/14/06
299-W11-6	567452.79	136485.91	132.29	0.3065	10/03/06
299-W11-7	567232.07	136668.39	133.10	0.56	05/08/07
299-W11-86	568143.53	136610.04	126.97	1.18	06/30/06
299-W11-86	568143.53	136610.04	119.98	0	07/07/06
299-W11-86	568143.53	136610.04	106.28	0	07/12/06
299-W11-86	568143.53	136610.04	89.48	0	07/25/06
299-W11-86	568143.53	136610.04	73.68	0	08/04/06
299-W11-87	568113.36	136602.03	104.16	0.04055	06/20/07
299-W12-1	568302.38	137199.15	133.59	0.3845	09/04/07
299-W13-1	568119.88	136041.69	98.32	0.0224	08/16/07
299-W14-11	566901.69	136287.63	135.19	72	04/15/05
299-W14-11	566901.69	136287.63	129.10	24	04/18/05
299-W14-11	566901.69	136287.63	123.00	9	04/20/05
299-W14-11	566901.69	136287.63	116.91	5	04/20/05
299-W14-11	566901.69	136287.63	110.81	3	04/25/05
299-W14-11	566901.69	136287.63	104.71	0.5	04/26/05
299-W14-11	566901.69	136287.63	98.62	0.5	04/27/05
299-W14-13	566872.92	136275.45	132.96	45.4	08/16/07
299-W14-14	566869.59	136174.13	133.14	0	08/23/07
299-W14-15	566870.89	136223.73	132.28	6.89	08/20/07

Table A-3. 2007 I-129 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W14-16	566972.53	136311.55	132.08	0.1305	05/09/07
299-W14-17	566977.97	136211.43	132.08	0.0685	08/20/07
299-W14-18	566868.67	136337.22	132.46	0.2805	05/09/07
299-W14-71	567705.73	135561.19	91.18	0.054	06/12/07
299-W14-72	567300.76	135934.65	87.19	0	10/17/06
299-W15-15	566060.05	135744.60	135.20	0.03385	07/11/07
299-W15-152	566280.63	135543.11	131.85	0.0494	01/29/07
299-W15-17	566278.12	135712.06	78.92	0	01/31/07
299-W15-224	566280.25	135919.45	131.19	0	01/22/07
299-W15-30	566275.85	135742.04	134.40	0.00162	01/31/07
299-W15-31A	566348.33	135849.20	135.20	0.076	02/27/07
299-W15-34	566584.63	135953.53	133.15	0.0271	05/24/07
299-W15-35	566710.47	135846.17	132.02	0.054	05/24/07
299-W15-36	566745.11	135422.71	132.02	0.0655	02/26/07
299-W15-40	566623.72	136198.05	133.27	0.118	06/04/07
299-W15-41	566728.80	136024.77	134.60	0	11/28/06
299-W15-43	566461.35	136203.11	132.43	0.2455	06/20/07
299-W15-44	566656.23	136059.56	132.91	0.04825	11/28/06
299-W15-45	566404.17	135954.25	128.08	0.00855	12/05/06
299-W15-46	566752.25	135586.67	133.37	0	09/13/04
299-W15-46	566752.25	135586.67	132.15	0	09/28/04
299-W15-46	566752.25	135586.67	112.95	0	10/19/04
299-W15-46	566752.25	135586.67	90.85	0	11/10/04
299-W15-46	566752.25	135586.67	42.08	0	01/26/05
299-W15-47	566747.66	135635.48	126.97	0.0473	05/24/07
299-W15-49	566278.43	135966.00	131.18	0.058	11/28/06
299-W15-49	566307.19	135972.91	126.09	0	12/07/04
299-W15-49	566307.19	135972.91	115.42	0	12/09/04
299-W15-49	566307.19	135972.91	107.80	0	12/10/04
299-W15-49	566307.19	135972.91	86.16	0.5	12/14/04
299-W15-49	566307.19	135972.91	74.27	0	12/15/04
299-W15-50	566793.50	135790.72	127.82	0	01/25/05
299-W15-50	566793.50	135790.72	120.81	0.5	01/31/05
299-W15-50	566793.50	135790.72	115.63	0.5	02/02/05
299-W15-50	566793.50	135790.72	105.57	0	02/07/05
299-W15-50	566793.50	135790.72	99.78	0	02/09/05
299-W15-763	566780.41	136021.85	132.28	0.07	06/05/07
299-W15-765	566668.23	136366.13	132.10	0.1595	11/30/06
299-W15-83	566275.75	135819.34	131.98	0.056	01/22/07
299-W15-94	566278.81	135633.45	132.11	0.03115	09/12/07
299-W17-1	565281.96	135031.88	134.08	0.052	08/31/07
299-W18-16	566605.06	135425.69	131.69	0	11/22/04
299-W18-16	566605.06	135425.69	119.49	0	12/01/04
299-W18-16	566605.06	135425.69	108.83	0.5	12/09/04
299-W18-21	566068.94	134971.83	135.20	0.04035	07/16/07
299-W18-22	566059.88	134983.30	69.36	0	07/16/07
299-W18-23	566055.78	135335.56	135.20	0.0415	02/12/07
299-W18-30	566841.96	135186.75	133.84	0.001155	08/30/07
299-W19-101	567910.29	135007.21	128.75	0.575	06/01/07
299-W19-105	567536.32	134738.60	129.80	0.356	08/24/07

Table A-3. 2007 I-129 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W19-107	567970.17	135199.06	119.71	0.1185	12/21/06
299-W19-18	567331.83	135005.50	125.90	0.835	02/26/07
299-W19-34A	567644.80	135005.39	113.34	0.227	08/30/07
299-W19-34B	567634.04	135003.80	87.57	0	01/18/07
299-W19-35	567963.25	135008.30	133.10	0.615	06/19/07
299-W19-36	567605.90	135010.19	129.62	0.362	09/14/07
299-W19-37	567695.00	134943.49	133.10	0.69	09/04/07
299-W19-39	567872.89	134879.89	131.52	0.814	02/22/07
299-W19-4	567921.08	135343.92	98.30	0.0366	08/31/07
299-W19-43	567670.31	134997.16	130.54	0.4495	09/11/07
299-W19-46	567753.83	134835.61	130.32	0.56	09/04/07
299-W19-46	567782.69	134842.45	121.95	0.58	11/20/02
299-W19-46	567782.69	134842.45	109.79	0.2445	11/20/02
299-W19-46	567782.69	134842.45	103.69	0.067	11/21/02
299-W19-46	567782.69	134842.45	98.19	0.155	11/21/02
299-W19-48	567794.08	134919.13	126.89	0.585	06/01/07
299-W19-48	567822.94	134925.98	123.74	0.81	11/30/04
299-W19-48	567822.94	134925.98	106.93	0.33	12/09/04
299-W19-48	567822.94	134925.98	89.63	0.0265	12/14/04
299-W19-48	567822.94	134925.98	82.93	0	12/16/04
299-W19-49	567539.21	134887.53	129.00	3	08/31/07
299-W21-2	568095.53	134566.95	129.49	3.08	06/20/07
299-W22-20	567564.26	133872.45	130.28	0.0735	09/18/07
299-W22-45	566916.36	134285.69	130.77	0.01835	11/17/06
299-W22-48	566967.84	134418.27	133.59	0.0785	03/23/07
299-W22-49	566875.58	134194.81	133.69	0.1105	03/26/07
299-W22-69	567151.92	134341.27	129.37	0.0332	10/04/06
299-W22-72	567209.69	134200.53	129.77	1.88	06/14/07
299-W22-83	566980.28	134085.73	132.01	0.25	12/15/06
299-W22-86	567159.06	134034.77	129.80	0.069	09/25/07
299-W22-87	567512.92	134533.04	129.65	0	06/05/07
299-W26-13	566395.61	133286.82	132.04	0	06/20/07
299-W26-14	566653.90	133532.43	131.25	0.02495	06/20/07
299-W7-3	566263.26	137631.65	62.17	0.0348	10/26/06
299-W7-4	566380.00	137301.27	133.99	0.03205	09/24/07
299-W8-1	565720.68	137639.65	134.31	0.0555	09/28/07
699-30-66	569962.02	132732.44	90.82	0.0076	06/01/07
699-32-62	570980.56	133209.16	98.46	0	09/26/07
699-32-72A	567913.83	133355.84	66.74	0.067	09/30/07
699-35-66A	569828.91	134092.43	133.76	5.59	09/27/07
699-35-70	568537.60	133980.77	131.40	38.7	09/30/07
699-36-61A	571366.45	134550.27	119.46	0.185	10/05/06
699-36-70A	568437.80	134302.02	131.40	14.3	03/29/07
699-36-70B	568398.91	134619.14	128.64	3.76	06/01/07
699-36-70B	568427.81	134625.98	121.53	0	08/31/04
699-36-70B	568427.81	134625.98	110.89	0.002	09/09/04
699-36-70B	568427.81	134625.98	100.19	0	09/14/04
699-38-65	570061.23	135032.99	117.93	0.4025	11/02/06
699-38-68A	569151.39	134924.75	132.05	1.61	09/24/07
699-38-70	568472.06	135082.34	120.93	2.61	11/02/06
699-38-70B	568440.22	135324.16	95.56	0	12/27/06
699-38-70C	569055.20	135318.70	103.03	0.483	06/01/07
699-40-65	570028.52	135874.26	124.14	0.21	02/07/07
699-45-69A	568700.41	137175.71	124.60	0.03105	09/30/07
699-47-60	571445.35	137961.72	118.50	0	09/28/07
699-48-71	568359.04	138049.93	128.42	0.1855	06/30/07

Table A-4. 2007 Nitrate Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (mg/L)
299-W10-13	566027.44	136606.81	139.6	0.0
299-W10-14	566017.19	136608.89	80.5	21.6
299-W10-15	566770.38	136808.05	141.6	0.0
299-W10-16	566780.88	136606.61	141.6	0.0
299-W10-17	566775.44	136491.25	140.1	0.0
299-W10-18	566846.88	136396.28	140.5	0.0
299-W10-19	566346.19	137037.14	139.0	0.0
299-W10-20	566249.69	136866.61	133.0	70.6
299-W10-21	566584.00	137154.72	131.0	123.3
299-W10-22	566832.63	136883.05	133.0	345.2
299-W10-23	566823.75	136815.34	132.4	303.0
299-W10-24	566885.44	136798.78	81.6	0.0
299-W10-24	566885.44	136798.78	87.5	0.0
299-W10-24	566885.44	136798.78	95.7	0.0
299-W10-24	566885.44	136798.78	110.5	0.0
299-W10-24	566885.44	136798.78	125.3	0.0
299-W10-24	566885.44	136798.78	132.7	347.8
299-W10-26	566843.38	136400.59	133.0	170.4
299-W10-27	566844.00	136441.78	132.1	718.0
299-W10-28	566701.56	136709.94	132.1	2282.8
299-W10-3	566731.88	136673.41	142.0	0.0
299-W10-4	566734.63	136578.08	132.0	4040.0
299-W10-8	566848.81	136811.22	132.0	204.0
299-W10-9	566748.19	136798.84	142.6	0.0
299-W11-24	566912.94	136744.53	137.5	0.0
299-W11-27	566885.00	136796.56	139.9	0.0
299-W11-28	566934.88	136743.73	139.0	0.0
299-W11-30	567193.38	136858.86	135.6	0.0
299-W11-30	567193.38	136858.86	136.9	0.0
299-W11-31	567221.56	137235.28	138.1	0.0
299-W11-37	567635.19	137018.00	131.0	208.2
299-W11-39	566908.38	136779.92	131.8	323.7
299-W11-40	566926.81	136709.67	131.8	559.8
299-W11-41	566935.50	136677.78	132.1	740.3
299-W11-42	566920.44	136745.67	132.7	1032.7
299-W11-43	567269.75	136971.05	81.1	309.7
299-W11-43	567269.75	136971.05	84.9	417.5
299-W11-43	567269.75	136971.05	90.6	340.3
299-W11-43	567269.75	136971.05	107.1	284.8
299-W11-43	567269.75	136971.05	118.0	299.0
299-W11-43	567269.75	136971.05	127.2	309.6
299-W11-46	566914.88	136773.27	126.8	518.2
299-W13-1	568148.75	136048.59	98.3	43.0
299-W14-10	567981.06	135898.31	130.3	0.0
299-W14-11	566901.69	136287.63	98.6	1045.0
299-W14-11	566901.69	136287.63	99.2	1080.0
299-W14-11	566901.69	136287.63	100.8	1110.0
299-W14-11	566901.69	136287.63	102.3	1020.0
299-W14-11	566901.69	136287.63	103.8	885.0
299-W14-11	566901.69	136287.63	104.7	770.5

Table A-4. 2007 Nitrate Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (mg/L)
299-W14-11	566901.69	136287.63	105.3	879.0
299-W14-11	566901.69	136287.63	106.8	810.5
299-W14-11	566901.69	136287.63	108.4	710.5
299-W14-11	566901.69	136287.63	109.9	615.0
299-W14-11	566901.69	136287.63	110.8	540.0
299-W14-11	566901.69	136287.63	111.4	615.0
299-W14-11	566901.69	136287.63	112.9	664.0
299-W14-11	566901.69	136287.63	114.5	748.0
299-W14-11	566901.69	136287.63	116.0	651.0
299-W14-11	566901.69	136287.63	116.9	546.5
299-W14-11	566901.69	136287.63	117.5	478.0
299-W14-11	566901.69	136287.63	119.0	783.5
299-W14-11	566901.69	136287.63	120.6	679.5
299-W14-11	566901.69	136287.63	122.1	713.0
299-W14-11	566901.69	136287.63	123.0	834.5
299-W14-11	566901.69	136287.63	123.1	255.4
299-W14-11	566901.69	136287.63	123.6	901.0
299-W14-11	566901.69	136287.63	125.1	1185.0
299-W14-11	566901.69	136287.63	126.7	1490.0
299-W14-11	566901.69	136287.63	128.2	1910.0
299-W14-11	566901.69	136287.63	129.1	1545.0
299-W14-11	566901.69	136287.63	129.7	2125.0
299-W14-11	566901.69	136287.63	131.2	2190.0
299-W14-11	566901.69	136287.63	132.8	3630.0
299-W14-11	566901.69	136287.63	135.2	2560.0
299-W14-12	566905.69	136284.17	139.9	0.0
299-W14-13	566901.69	136282.38	131.1	0.0
299-W14-13	566901.69	136282.38	132.6	0.0
299-W14-13	566901.69	136282.38	133.0	490.6
299-W14-13	566901.69	136282.38	134.1	0.0
299-W14-13	566901.69	136282.38	135.6	0.0
299-W14-13	566901.69	136282.38	137.1	0.0
299-W14-13	566901.69	136282.38	138.6	0.0
299-W14-14	566898.38	136181.05	70.6	0.0
299-W14-14	566898.38	136181.05	84.3	0.0
299-W14-14	566898.38	136181.05	102.0	0.0
299-W14-14	566898.38	136181.05	111.0	0.0
299-W14-14	566898.38	136181.05	124.8	0.0
299-W14-14	566898.38	136181.05	133.0	91.5
299-W14-15	566899.69	136230.66	132.3	190.9
299-W14-16	567001.31	136318.48	132.1	67.6
299-W14-17	567006.75	136218.34	132.1	134.7
299-W14-18	566897.50	136344.16	132.4	161.9
299-W14-19	566898.63	136135.06	101.1	0.0
299-W14-19	566898.63	136135.06	106.9	0.0
299-W14-19	566898.63	136135.06	113.0	0.0
299-W14-19	566898.63	136135.06	119.1	0.0
299-W14-19	566898.63	136135.06	125.2	0.0
299-W14-19	566898.63	136135.06	131.5	111.8
299-W14-19	566898.63	136135.06	135.9	0.0

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Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (mg/L)
299-W14-9	567031.75	135650.69	62.5	0.0
299-W15-15	566088.81	135751.50	134.0	128.3
299-W15-152	566309.38	135550.00	132.1	136.5
299-W15-16	566307.00	135733.63	134.0	61.1
299-W15-17	566306.88	135718.95	78.9	26.8
299-W15-18	566308.69	135561.77	141.4	0.0
299-W15-19	566189.06	135968.69	142.5	0.0
299-W15-20	566082.88	135964.19	142.8	0.0
299-W15-22	566683.06	136110.92	140.8	0.0
299-W15-23	566083.63	135858.13	143.4	0.0
299-W15-24	566091.13	135605.73	143.1	0.0
299-W15-3	566729.19	136371.47	137.4	0.0
299-W15-3	566729.19	136371.47	138.8	0.0
299-W15-30	566304.63	135748.94	134.0	97.2
299-W15-31A	566377.13	135856.11	133.0	107.1
299-W15-32	566773.44	135635.00	133.0	298.0
299-W15-37	566716.44	135248.31	132.7	17.8
299-W15-38	566812.94	135672.91	133.0	170.1
299-W15-39	566819.19	135552.97	132.0	31.5
299-W15-40	566652.50	136204.97	133.3	157.5
299-W15-41	566757.56	136031.69	132.0	127.8
299-W15-42	566581.81	135627.02	121.2	0.0
299-W15-42	566581.81	135627.02	121.8	0.0
299-W15-42	566581.81	135627.02	129.5	191.5
299-W15-42	566581.81	135627.02	136.7	0.0
299-W15-43	566490.13	136210.03	101.2	0.0
299-W15-43	566490.13	136210.03	109.5	0.0
299-W15-43	566490.13	136210.03	115.6	0.0
299-W15-43	566490.13	136210.03	121.7	0.0
299-W15-43	566490.13	136210.03	132.4	58.0
299-W15-44	566685.00	136066.47	100.8	0.0
299-W15-44	566685.00	136066.47	105.9	0.0
299-W15-44	566685.00	136066.47	112.0	0.0
299-W15-44	566685.00	136066.47	118.1	0.0
299-W15-44	566685.00	136066.47	124.2	0.0
299-W15-44	566685.00	136066.47	130.3	0.0
299-W15-44	566685.00	136066.47	133.0	144.3
299-W15-44	566685.00	136066.47	136.4	0.0
299-W15-46	566752.25	135586.67	45.9	38.9
299-W15-46	566752.25	135586.67	56.7	0.0
299-W15-46	566752.25	135586.67	76.5	62.4
299-W15-46	566752.25	135586.67	83.0	77.0
299-W15-46	566752.25	135586.67	88.7	121.3
299-W15-46	566752.25	135586.67	91.7	161.5
299-W15-46	566752.25	135586.67	95.2	167.3
299-W15-46	566752.25	135586.67	100.9	389.1
299-W15-46	566752.25	135586.67	107.0	575.5
299-W15-46	566752.25	135586.67	113.1	801.3
299-W15-46	566752.25	135586.67	114.6	1002.0
299-W15-46	566752.25	135586.67	119.2	849.9

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Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (mg/L)
299-W15-46	566752.25	135586.67	122.6	93.8
299-W15-46	566752.25	135586.67	125.3	74.8
299-W15-46	566752.25	135586.67	127.4	330.0
299-W15-46	566752.25	135586.67	127.5	89.4
299-W15-46	566752.25	135586.67	132.9	397.3
299-W15-46	566752.25	135586.67	134.1	415.9
299-W15-49	566307.19	135972.91	74.9	28.9
299-W15-49	566307.19	135972.91	75.7	0.6
299-W15-49	566307.19	135972.91	86.8	45.1
299-W15-49	566307.19	135972.91	108.4	50.1
299-W15-49	566307.19	135972.91	116.0	17.9
299-W15-49	566307.19	135972.91	126.7	70.1
299-W15-49	566307.19	135972.91	131.2	106.4
299-W15-50	566793.50	135790.72	100.3	11.4
299-W15-50	566793.50	135790.72	106.1	36.2
299-W15-50	566793.50	135790.72	116.1	94.3
299-W15-50	566793.50	135790.72	121.3	74.8
299-W15-50	566793.50	135790.72	123.0	112.4
299-W15-50	566793.50	135790.72	128.3	56.9
299-W15-6	566801.50	135654.39	93.1	82.3
299-W15-763	566809.19	136028.77	132.3	310.0
299-W15-765	566697.00	136373.06	132.1	400.2
299-W15-83	566304.50	135826.23	132.1	123.0
299-W15-94	566307.56	135640.34	132.1	124.7
299-W17-1	565310.69	135038.73	134.1	24.3
299-W18-1	566421.50	135465.20	113.8	117.0
299-W18-16	566605.06	135425.69	109.6	631.4
299-W18-16	566605.06	135425.69	109.9	617.7
299-W18-16	566605.06	135425.69	120.6	802.3
299-W18-16	566605.06	135425.69	131.2	912.6
299-W18-16	566605.06	135425.69	132.8	943.1
299-W18-17	566702.75	135425.23	143.9	0.0
299-W18-2	566380.19	135383.59	139.3	0.0
299-W18-20	566590.06	135081.77	133.2	0.0
299-W18-21	566097.69	134978.69	135.0	133.5
299-W18-22	566088.63	134990.16	69.5	19.1
299-W18-23	566084.56	135342.44	135.0	141.3
299-W18-24	566370.81	135346.31	137.5	0.0
299-W18-25	566721.50	134978.22	139.9	0.0
299-W18-26	566091.25	135491.70	142.2	0.0
299-W18-27	566090.19	135226.55	141.1	0.0
299-W18-28	566092.56	135106.78	140.7	0.0
299-W18-30	566870.75	135193.63	132.0	30.5
299-W18-31	566721.56	135075.17	132.0	41.8
299-W18-32	566515.56	134975.64	141.7	0.0
299-W18-33	566723.31	134811.13	132.0	14.6
299-W18-4	566305.56	135415.78	141.3	0.0
299-W18-40	566723.31	134996.41	130.9	37.4
299-W19-1	566886.94	134925.63	133.2	0.0
299-W19-105	567565.13	134745.44	129.7	21.4

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Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (mg/L)
299-W19-12	566897.13	135059.45	132.0	54.3
299-W19-13	567288.88	134897.27	142.6	0.0
299-W19-14	567268.00	134831.14	141.9	0.0
299-W19-15	567254.25	134975.78	128.8	0.0
299-W19-16	567270.69	135029.20	129.4	0.0
299-W19-16	567270.69	135029.20	138.5	0.0
299-W19-16	567270.69	135029.20	143.1	0.0
299-W19-19	567826.88	134914.45	139.0	0.0
299-W19-2	567646.63	134694.66	135.8	0.0
299-W19-23	567771.63	134893.05	139.0	0.0
299-W19-24	567771.56	134927.75	139.9	0.0
299-W19-25	567874.69	134916.36	139.3	0.0
299-W19-26	567845.50	134894.72	139.3	0.0
299-W19-27	567014.38	134930.58	142.0	0.0
299-W19-28	567589.81	134991.19	140.1	0.0
299-W19-29	567664.13	134999.52	140.5	0.0
299-W19-30	567665.88	134924.47	139.0	0.0
299-W19-31	566897.00	135127.48	140.1	0.0
299-W19-32	566896.56	135009.30	140.1	0.0
299-W19-36	567634.75	135017.05	129.5	275.8
299-W19-37	567723.88	134950.34	131.0	450.6
299-W19-40	567973.88	134847.39	132.0	41.2
299-W19-41	566896.56	135004.52	133.3	85.1
299-W19-42	566896.81	135122.91	133.0	36.0
299-W19-43	567699.13	135004.02	130.6	1626.7
299-W19-44	566896.94	135041.97	131.2	87.1
299-W19-45	566897.63	135087.66	132.1	49.5
299-W19-46	567782.69	134842.45	98.8	0.0
299-W19-46	567782.69	134842.45	104.3	0.0
299-W19-46	567782.69	134842.45	110.4	0.0
299-W19-46	567782.69	134842.45	116.5	0.0
299-W19-46	567782.69	134842.45	122.6	0.0
299-W19-46	567782.69	134842.45	128.7	0.0
299-W19-46	567782.69	134842.45	130.3	44.6
299-W19-46	567782.69	134842.45	132.0	0.0
299-W19-47	566895.31	135161.86	130.9	38.6
299-W19-48	567822.94	134925.98	83.8	15.4
299-W19-48	567822.94	134925.98	90.5	15.9
299-W19-48	567822.94	134925.98	107.8	21.2
299-W19-48	567822.94	134925.98	124.6	332.0
299-W19-48	567822.94	134925.98	126.9	56.7
299-W19-49	567568.06	134894.38	129.1	19.4
299-W21-2	568124.38	134573.80	129.4	68.5
299-W22-39	566903.88	134213.67	138.5	0.0
299-W22-40	567634.56	134509.98	138.7	0.0
299-W22-41	567637.06	134479.45	138.5	0.0
299-W22-42	567623.19	134452.20	138.7	0.0
299-W22-43	567532.50	134539.23	138.7	0.0
299-W22-44	566956.00	134484.42	132.0	194.5
299-W22-45	566945.19	134292.52	132.0	85.3

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Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (mg/L)
299-W22-46	566903.88	134127.84	133.0	72.2
299-W22-47	566908.75	134076.28	99.9	6.5
299-W22-47	566908.75	134076.28	101.5	6.0
299-W22-47	566908.75	134076.28	103.0	7.8
299-W22-47	566908.75	134076.28	104.5	9.7
299-W22-47	566908.75	134076.28	106.0	36.9
299-W22-47	566908.75	134076.28	107.6	10.7
299-W22-47	566908.75	134076.28	109.1	19.6
299-W22-47	566908.75	134076.28	110.6	29.5
299-W22-47	566908.75	134076.28	112.1	17.8
299-W22-47	566908.75	134076.28	113.7	63.3
299-W22-47	566908.75	134076.28	115.2	338.0
299-W22-47	566908.75	134076.28	116.7	216.0
299-W22-47	566908.75	134076.28	118.2	362.0
299-W22-47	566908.75	134076.28	119.7	400.0
299-W22-47	566908.75	134076.28	121.3	352.0
299-W22-47	566908.75	134076.28	122.8	327.0
299-W22-47	566908.75	134076.28	124.0	483.0
299-W22-47	566908.75	134076.28	125.8	478.0
299-W22-47	566908.75	134076.28	127.4	487.0
299-W22-47	566908.75	134076.28	128.9	491.0
299-W22-47	566908.75	134076.28	130.4	478.0
299-W22-47	566908.75	134076.28	130.6	116.8
299-W22-47	566908.75	134076.28	131.9	536.0
299-W22-47	566908.75	134076.28	132.9	469.0
299-W22-47	566908.75	134076.28	134.4	456.0
299-W22-47	566908.75	134076.28	135.6	176.0
299-W22-48	566996.63	134425.09	132.0	50.7
299-W22-49	566904.38	134201.63	133.7	78.8
299-W22-50	566904.25	134139.75	38.9	0.0
299-W22-50	566904.25	134139.75	70.6	0.0
299-W22-50	566904.25	134139.75	85.2	0.0
299-W22-50	566904.25	134139.75	109.6	0.0
299-W22-50	566904.25	134139.75	126.4	0.0
299-W22-50	566904.25	134139.75	131.5	0.0
299-W22-50	566904.25	134139.75	133.0	81.0
299-W22-50	566904.25	134139.75	137.9	0.0
299-W22-79	567629.56	134464.84	131.7	41.8
299-W22-80	566842.88	134125.66	132.1	7.5
299-W22-81	567000.25	134354.19	131.5	28.5
299-W22-82	567004.75	134167.06	131.8	49.5
299-W22-83	567009.06	134092.55	132.1	106.9
299-W22-84	566978.75	134547.63	131.8	31.3
299-W22-85	566902.88	134260.58	132.1	62.1
299-W22-87	567541.75	134539.88	129.7	3.4
299-W23-13	566712.81	134445.94	139.1	0.0
299-W23-14	566708.69	134290.17	139.1	0.0
299-W23-15	566794.00	134127.23	136.6	6.6
299-W23-17	566532.13	134630.75	139.3	0.0
299-W23-20	566717.69	134446.19	132.1	9.7

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Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (mg/L)
299-W23-21	566707.75	134294.00	132.1	110.4
299-W26-10	566683.25	133499.11	139.0	0.0
299-W26-12	566901.00	133689.86	138.5	0.0
299-W26-13	566424.38	133293.59	132.1	12.2
299-W26-14	566682.69	133539.20	131.2	3.4
299-W26-6	566463.38	133406.00	137.2	0.0
299-W26-7	566325.44	133242.42	138.4	0.0
299-W26-8	566645.69	133663.48	140.7	0.0
299-W27-2	566908.25	133670.34	81.1	9.6
299-W6-10	567413.31	137453.05	131.0	114.0
299-W6-11	567162.50	137634.83	134.7	0.0
299-W6-12	566915.56	137635.16	135.2	0.0
299-W6-2	566938.38	137351.00	140.1	0.0
299-W6-3	567118.19	137299.13	86.0	0.0
299-W6-4	567132.25	137290.48	137.9	0.0
299-W6-5	567493.31	137638.63	133.0	0.0
299-W6-6	567318.75	137638.72	86.1	0.0
299-W6-7	567311.31	137638.80	137.2	0.0
299-W6-8	567028.81	137638.80	137.5	0.0
299-W6-9	567031.63	137363.13	137.8	0.0
299-W7-1	565932.06	137647.13	138.4	0.0
299-W7-10	566858.19	137457.53	140.1	0.0
299-W7-11	566186.19	137636.00	139.1	0.0
299-W7-12	566040.81	137636.30	138.7	35.6
299-W7-2	566302.81	137638.50	141.7	0.0
299-W7-3	566292.00	137638.64	66.3	16.0
299-W7-4	566408.75	137308.25	135.6	55.6
299-W7-5	566476.00	137635.69	136.5	46.5
299-W7-6	566658.06	137636.31	135.3	0.0
299-W7-7	566566.75	137636.08	139.6	0.0
299-W7-8	566761.38	137636.67	139.4	0.0
299-W7-9	565844.44	137646.41	140.8	0.0
299-W8-1	565749.44	137646.64	139.3	40.5
299-W9-1	565657.63	137023.77	137.8	0.0
699-29-78	566211.56	132413.61	127.4	0.0
699-30-66	569991.00	132739.19	90.8	21.6
699-30-66	569991.00	132739.19	91.1	17.3
699-30-66	569991.00	132739.19	104.8	22.4
699-30-66	569991.00	132739.19	115.2	21.8
699-30-66	569991.00	132739.19	126.2	15.9
699-32-62	571009.56	133215.92	120.6	21.3
699-32-72B	567935.00	133362.09	133.2	0.0
699-32-77	566416.81	133152.48	138.4	0.0
699-34-61	571395.88	133809.86	125.6	0.0
699-35-66A	569857.88	134099.25	127.0	23.8
699-35-70	568566.50	133987.58	130.0	23.0
699-35-78A	566063.56	134271.27	133.0	9.6
699-36-61A	571395.50	134557.11	121.9	26.8
699-36-67	569279.50	134425.02	129.0	66.0
699-36-70B	568427.81	134625.98	87.0	5.6

Table A-4. 2007 Nitrate Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (mg/L)
699-36-70B	568427.81	134625.98	100.7	23.5
699-36-70B	568427.81	134625.98	111.4	0.0
699-36-70B	568427.81	134625.98	122.0	20.5
699-36-70B	568427.81	134625.98	128.8	101.9
699-36-70B	568427.81	134625.98	131.2	103.7
699-37-68	569273.69	134629.48	128.0	124.0
699-37-82A	564906.94	134739.81	143.0	0.0
699-38-61	571219.13	134997.28	122.5	0.0
699-38-65	570090.19	135039.84	126.0	194.0
699-38-70	568500.94	135089.20	129.0	101.0
699-38-70B	568469.13	135331.05	95.6	19.9
699-38-70C	569084.13	135325.58	103.2	187.7
699-39-79	565890.88	135411.88	138.3	0.0
699-40-62	571164.31	135764.44	117.5	112.0
699-44-64	570390.63	136897.44	117.5	83.7
699-47-60	571474.38	137968.73	119.8	39.3
699-48-71	568387.94	138056.94	128.4	270.4
699-48-77A	566413.25	137968.86	138.1	0.7
699-49-79	565771.13	138271.11	135.1	58.4
699-50-59	571946.88	138741.72	121.5	110.9
699-50-74	567359.50	138646.73	127.3	12.3
699-50-85	564130.19	138669.33	130.4	23.0
699-51-75	566978.06	138906.28	130.1	1.0

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W10-1	566663.13	136734.56	134.60	64.7	08/20/07
299-W10-14	566017.19	136608.89	78.63	0	09/11/07
299-W10-22	566803.82	136876.10	134.60	140	05/07/07
299-W10-23	566823.75	136815.34	132.28	86	08/20/07
299-W10-24	566885.44	136798.78	132.28	815	08/24/07
299-W10-26	566814.60	136393.66	133.16	289	08/21/07
299-W10-27	566815.17	136434.85	132.19	260	08/21/07
299-W10-28	566672.76	136702.98	132.12	107	09/04/07
299-W10-29	566055.36	136822.06	80.01	0.4	09/12/07
299-W10-30	566055.15	136732.65	131.65	1.9	09/12/07
299-W10-31	566266.44	136968.34	130.75	5.5	09/12/07
299-W10-33	566772.75	136610.18	119.83	458	07/16/07
299-W10-33	566772.75	136610.18	122.18	376	07/12/07
299-W10-33	566772.75	136610.18	130.04	373	07/10/07
299-W10-33	566772.75	136610.18	124.71	335	07/11/07
299-W10-33	566772.75	136610.18	131.72	291	07/06/07
299-W10-33	566772.75	136610.18	116.78	120	07/17/07
299-W10-33	566772.75	136610.18	104.59	65	08/01/07
299-W10-33	566772.75	136610.18	101.24	58	08/02/07
299-W10-33	566772.75	136610.18	109.77	54	07/27/07
299-W10-33	566772.75	136610.18	107.64	53	07/31/07
299-W10-33	566772.75	136610.18	99.41	31	08/03/07
299-W10-33	566772.75	136610.18	95.45	26	08/06/07
299-W10-33	566772.75	136610.18	83.10	18	08/21/07
299-W10-33	566772.75	136610.18	92.40	4.3	08/08/07
299-W10-33	566772.75	136610.18	89.05	0.9	08/13/07
299-W10-33	566772.75	136610.18	113.74	0.2	07/24/07
299-W10-33	566772.75	136610.18	86.00	0	08/15/07
299-W10-33	566772.75	136610.18	80.21	0	08/24/07
299-W10-33	566772.75	136610.18	77.16	0	08/29/07
299-W10-4	566734.63	136578.08	134.60	876	08/29/07
299-W10-5	566578.63	136474.83	134.60	10	06/15/07
299-W10-8	566848.81	136811.22	134.60	111	09/04/07
299-W11-12	566927.13	136604.02	132.90	123	08/21/07
299-W11-13	567070.56	136417.10	106.67	220	06/25/07
299-W11-18	567153.10	137154.52	133.10	247	08/29/07
299-W11-25B	566912.31	136774.77	125.93	185000	02/08/05
299-W11-25B	566912.31	136774.77	124.71	153000	02/08/05
299-W11-25B	566912.31	136774.77	127.45	141000	02/08/05
299-W11-25B	566912.31	136774.77	128.97	82800	02/08/05
299-W11-25B	566912.31	136774.77	130.50	78900	02/08/05
299-W11-25B	566912.31	136774.77	118.00	55800	02/16/05
299-W11-25B	566912.31	136774.77	111.91	50600	02/17/05
299-W11-25B	566912.31	136774.77	118.31	50000	02/14/05
299-W11-25B	566912.31	136774.77	113.73	44100	02/17/05
299-W11-25B	566912.31	136774.77	106.11	42800	02/23/05
299-W11-25B	566912.31	136774.77	110.69	40700	02/18/05
299-W11-25B	566912.31	136774.77	109.16	40000	02/22/05
299-W11-25B	566912.31	136774.77	100.02	39500	03/03/05
299-W11-25B	566912.31	136774.77	116.78	38300	02/17/05

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W11-25B	566912.31	136774.77	119.83	37300	02/14/05
299-W11-25B	566912.31	136774.77	121.35	32300	02/14/05
299-W11-25B	566912.31	136774.77	115.26	31500	02/17/05
299-W11-25B	566912.31	136774.77	87.83	31100	03/07/05
299-W11-25B	566912.31	136774.77	98.49	30600	03/03/05
299-W11-25B	566912.31	136774.77	104.59	30100	02/23/05
299-W11-25B	566912.31	136774.77	107.64	29800	02/22/05
299-W11-25B	566912.31	136774.77	96.97	27200	03/04/05
299-W11-25B	566912.31	136774.77	89.35	27000	03/07/05
299-W11-25B	566912.31	136774.77	103.07	26700	02/23/05
299-W11-25B	566912.31	136774.77	93.92	26000	03/04/05
299-W11-25B	566912.31	136774.77	85.08	21600	03/08/05
299-W11-25B	566912.31	136774.77	101.54	18300	02/23/05
299-W11-25B	566912.31	136774.77	95.45	16300	03/04/05
299-W11-25B	566912.31	136774.77	92.40	15600	03/04/05
299-W11-25B	566912.31	136774.77	90.87	15400	03/04/05
299-W11-25B	566912.31	136774.77	112.21	13700	02/18/05
299-W11-25B	566912.31	136774.77	133.55	13400	02/07/05
299-W11-25B	566912.31	136774.77	86.30	13300	03/08/05
299-W11-25B	566912.31	136774.77	132.02	13100	02/07/05
299-W11-25B	566912.31	136774.77	122.88	8620	02/09/05
299-W11-25B	566912.31	136774.77	134.46	243	02/07/05
299-W11-39	566879.58	136772.97	131.81	23500	08/29/07
299-W11-40	566926.81	136709.67	135.48	1920	08/16/07
299-W11-41	566935.50	136677.78	134.60	8280	08/16/07
299-W11-42	566920.44	136745.67	132.28	1580	08/16/07
299-W11-43	567269.75	136971.05	116.76	640	06/07/05
299-W11-43	567269.75	136971.05	125.90	600	06/01/05
299-W11-43	567269.75	136971.05	79.88	120	06/21/05
299-W11-43	567269.75	136971.05	105.79	111	06/09/05
299-W11-43	567269.75	136971.05	89.33	68.5	06/16/05
299-W11-45	566992.84	136775.64	126.63	16200	10/07/05
299-W11-45	566992.84	136775.64	123.58	2870	10/11/05
299-W11-45	566992.84	136775.64	123.27	2630	10/11/05
299-W11-45	566992.84	136775.64	120.53	1880	10/13/05
299-W11-45	566992.84	136775.64	128.15	992	10/06/05
299-W11-45	566992.84	136775.64	114.43	710	10/18/05
299-W11-45	566992.84	136775.64	117.18	599	10/17/05
299-W11-45	566992.84	136775.64	109.86	427.5	10/20/05
299-W11-45	566992.84	136775.64	108.34	427.5	10/21/05
299-W11-45	566992.84	136775.64	106.81	427.5	10/25/05
299-W11-45	566992.84	136775.64	105.59	427.5	10/26/05
299-W11-45	566992.84	136775.64	103.77	427.5	10/26/05
299-W11-45	566992.84	136775.64	102.24	427.5	10/27/05
299-W11-45	566992.84	136775.64	133.79	214	09/26/05
299-W11-45	566992.84	136775.64	132.72	214	09/29/05
299-W11-45	566992.84	136775.64	131.20	214	09/29/05
299-W11-45	566992.84	136775.64	129.37	214	10/04/05
299-W11-45	566992.84	136775.64	125.10	214	10/11/05
299-W11-45	566992.84	136775.64	122.05	214	10/12/05

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W11-45	566992.84	136775.64	118.70	214	10/17/05
299-W11-45	566992.84	136775.64	115.96	214	10/18/05
299-W11-45	566992.84	136775.64	112.91	214	10/19/05
299-W11-45	566992.84	136775.64	111.39	214	10/20/05
299-W11-45	566992.84	136775.64	93.10	125	11/01/05
299-W11-45	566992.84	136775.64	100.72	85.5	10/27/05
299-W11-45	566992.84	136775.64	99.19	85.5	10/28/05
299-W11-45	566992.84	136775.64	97.67	85.5	10/31/05
299-W11-45	566992.84	136775.64	96.15	85.5	10/31/05
299-W11-45	566992.84	136775.64	94.62	85.5	11/01/05
299-W11-45	566992.84	136775.64	90.05	85.5	11/03/05
299-W11-45	566992.84	136775.64	88.53	85.5	11/03/05
299-W11-45	566992.84	136775.64	85.48	43.6	11/08/05
299-W11-45	566992.84	136775.64	91.57	17.1	11/02/05
299-W11-45	566992.84	136775.64	87.00	17.1	11/07/05
299-W11-45	566992.84	136775.64	83.95	15.9	11/09/05
299-W11-46	566886.06	136766.32	126.77	113000	08/29/07
299-W11-47	566933.82	136680.70	119.43	3880	02/28/06
299-W11-47	566933.82	136680.70	125.23	3150	02/21/06
299-W11-47	566933.82	136680.70	122.79	1020	02/23/06
299-W11-47	566933.82	136680.70	110.60	296	03/06/06
299-W11-47	566933.82	136680.70	120.96	236	02/27/06
299-W11-47	566933.82	136680.70	116.69	202	03/03/06
299-W11-47	566933.82	136680.70	104.50	197	03/08/06
299-W11-47	566933.82	136680.70	118.22	174	03/02/06
299-W11-47	566933.82	136680.70	134.52	171	02/10/06
299-W11-47	566933.82	136680.70	131.63	171	02/10/06
299-W11-47	566933.82	136680.70	131.02	171	02/13/06
299-W11-47	566933.82	136680.70	128.88	171	02/13/06
299-W11-47	566933.82	136680.70	126.44	171	02/14/06
299-W11-47	566933.82	136680.70	109.07	111	03/07/06
299-W11-47	566933.82	136680.70	124.01	109.5	02/22/06
299-W11-47	566933.82	136680.70	101.45	100	03/09/06
299-W11-47	566933.82	136680.70	98.40	87.6	03/10/06
299-W11-47	566933.82	136680.70	107.55	84.9	03/07/06
299-W11-47	566933.82	136680.70	106.02	69.5	03/07/06
299-W11-47	566933.82	136680.70	99.93	68.1	03/09/06
299-W11-47	566933.82	136680.70	113.64	48.4	03/06/06
299-W11-47	566933.82	136680.70	115.17	46.5	03/03/06
299-W11-47	566933.82	136680.70	102.98	46.2	03/08/06
299-W11-47	566933.82	136680.70	112.12	44.3	03/06/06
299-W11-47	566933.82	136680.70	96.57	44.1	03/10/06
299-W11-47	566933.82	136680.70	93.83	41.2	03/13/06
299-W11-47	566933.82	136680.70	95.36	37.3	03/13/06
299-W11-47	566933.82	136680.70	92.31	17.1	03/14/06
299-W11-47	566933.82	136680.70	90.78	17.1	03/15/06
299-W11-47	566933.82	136680.70	89.26	17.1	03/15/06
299-W11-47	566933.82	136680.70	87.74	17.1	03/16/06
299-W11-48	566881.97	136846.18	109.53	246	05/17/07
299-W11-48	566881.97	136846.18	132.09	243	04/17/07

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W11-48	566881.97	136846.18	119.59	230	04/17/07
299-W11-48	566881.97	136846.18	116.85	220	04/25/07
299-W11-48	566881.97	136846.18	104.35	216	05/22/07
299-W11-48	566881.97	136846.18	99.57	181	05/25/07
299-W11-48	566881.97	136846.18	127.52	150	04/11/07
299-W11-48	566881.97	136846.18	122.94	85.5	04/13/07
299-W11-48	566881.97	136846.18	92.46	11	05/29/07
299-W11-48	566881.97	136846.18	107.40	8.5	05/21/07
299-W11-48	566881.97	136846.18	101.30	7.3	05/23/07
299-W11-48	566881.97	136846.18	95.21	4.6	05/25/07
299-W11-48	566881.97	136846.18	87.28	3.7	06/05/07
299-W11-48	566881.97	136846.18	113.49	0.15	05/16/07
299-W11-48	566881.97	136846.18	89.72	0	06/01/07
299-W11-7	567260.88	136675.33	133.10	392	05/08/07
299-W11-86	568143.53	136610.04	126.97	51.2	06/30/06
299-W11-86	568143.53	136610.04	119.96	26	07/07/06
299-W11-86	568143.53	136610.04	106.25	22	07/12/06
299-W11-86	568143.53	136610.04	89.48	8.55	07/25/06
299-W11-86	568143.53	136610.04	73.63	0	08/04/06
299-W11-87	568113.36	136602.03	104.16	28	06/20/07
299-W11-88	567874.67	137113.09	109.56	150	12/03/07
299-W11-88	567874.67	137113.09	103.46	140	12/05/07
299-W11-88	567874.67	137113.09	84.56	0	02/06/08
299-W13-1	568119.88	136041.69	98.32	13.1	08/16/07
299-W14-11	566901.69	136287.63	131.23	7780	04/15/05
299-W14-11	566901.69	136287.63	129.71	4500	04/15/05
299-W14-11	566901.69	136287.63	125.14	3870	04/19/05
299-W14-11	566901.69	136287.63	126.66	3750	04/18/05
299-W14-11	566901.69	136287.63	128.18	3560	04/18/05
299-W14-11	566901.69	136287.63	123.00	3340	04/20/05
299-W14-11	566901.69	136287.63	129.10	2910	04/18/05
299-W14-11	566901.69	136287.63	123.61	2860	04/19/05
299-W14-11	566901.69	136287.63	120.56	2480	04/20/05
299-W14-11	566901.69	136287.63	119.04	2430	04/20/05
299-W14-11	566901.69	136287.63	122.09	2120	04/20/05
299-W14-11	566901.69	136287.63	135.19	1850	04/15/05
299-W14-11	566901.69	136287.63	109.90	1270	04/25/05
299-W14-11	566901.69	136287.63	108.37	1130	04/25/05
299-W14-11	566901.69	136287.63	132.76	855	04/15/05
299-W14-11	566901.69	136287.63	117.52	855	04/20/05
299-W14-11	566901.69	136287.63	116.91	855	04/20/05
299-W14-11	566901.69	136287.63	115.99	855	04/21/05
299-W14-11	566901.69	136287.63	114.47	855	04/21/05
299-W14-11	566901.69	136287.63	112.94	855	04/22/05
299-W14-11	566901.69	136287.63	111.42	855	04/22/05
299-W14-11	566901.69	136287.63	110.81	855	04/25/05
299-W14-11	566901.69	136287.63	106.85	842	04/25/05
299-W14-11	566901.69	136287.63	104.71	751	04/26/05
299-W14-11	566901.69	136287.63	105.32	520	04/26/05
299-W14-11	566901.69	136287.63	102.28	472	04/27/05

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W14-11	566901.69	136287.63	103.80	467	04/27/05
299-W14-11	566901.69	136287.63	100.75	399	04/27/05
299-W14-11	566901.69	136287.63	98.62	352	04/27/05
299-W14-11	566901.69	136287.63	99.23	335	04/27/05
299-W14-13	566872.92	136275.45	132.96	6360	08/16/07
299-W14-14	566898.38	136181.05	132.89	116	08/23/07
299-W14-15	566870.89	136223.73	132.28	2760	08/20/07
299-W14-16	566972.53	136311.55	132.08	156	08/20/07
299-W14-17	566977.97	136211.43	132.08	342	08/20/07
299-W14-18	566868.67	136337.22	132.46	603	08/20/07
299-W14-19	566898.63	136135.06	124.13	399	10/28/02
299-W14-19	566898.63	136135.06	130.22	265	10/28/02
299-W14-19	566898.63	136135.06	100.05	44.4	10/29/02
299-W14-19	566898.63	136135.06	111.94	41.3	10/29/02
299-W14-19	566898.63	136135.06	105.84	37	10/29/02
299-W14-19	566898.63	136135.06	118.03	25.4	10/29/02
299-W14-19	566898.63	136135.06	134.80	24.5	10/28/02
299-W14-6	566899.19	136100.83	133.70	231	08/20/07
299-W14-71	567733.43	135567.81	85.93	85.5	10/13/06
299-W14-71	567733.43	135567.81	112.75	65	09/27/06
299-W14-71	567733.43	135567.81	97.94	23.95	10/09/06
299-W14-71	567733.43	135567.81	128.72	20	09/19/06
299-W14-71	567733.43	135567.81	106.78	17.1	10/05/06
299-W14-71	567733.43	135567.81	90.32	0.2	10/12/06
299-W14-71	567733.43	135567.81	120.49	0	09/22/06
299-W14-72	567328.44	135941.28	98.32	85.5	10/12/06
299-W14-72	567328.44	135941.28	121.18	65.9	10/04/06
299-W14-72	567328.44	135941.28	126.06	63.3	10/02/06
299-W14-72	567328.44	135941.28	107.46	9.8	10/11/06
299-W14-72	567328.44	135941.28	90.39	8.55	10/17/06
299-W14-72	567328.44	135941.28	82.47	8.55	10/24/06
299-W14-72	567328.44	135941.28	113.25	6.85	10/09/06
299-W15-11	566383.52	135993.81	135.11	40	08/29/07
299-W15-15	566088.81	135751.50	135.20	327	07/11/07
299-W15-152	566280.63	135543.11	131.85	199	07/17/07
299-W15-17	566306.88	135718.95	78.63	4.16	07/26/07
299-W15-2	566093.75	136336.23	135.20	10.3	09/21/07
299-W15-224	566280.25	135919.45	131.19	144	07/26/07
299-W15-30	566304.63	135748.94	134.40	65	07/17/07
299-W15-31A	566377.13	135856.11	135.20	92.7	05/24/07
299-W15-34	566613.44	135960.44	132.89	38.9	08/23/07
299-W15-35	566739.25	135853.06	131.97	130	09/25/07
299-W15-36	566773.88	135429.59	131.97	95.3	08/23/07
299-W15-40	566652.50	136204.97	132.89	130	09/19/07
299-W15-41	566728.80	136024.77	134.60	1590	08/31/07
299-W15-42	566581.81	135627.02	121.31	13.5	02/27/02
299-W15-42	566581.81	135627.02	121.28	13.5	02/27/02
299-W15-42	566581.81	135627.02	119.36	1.2	01/24/02
299-W15-42	566581.81	135627.02	136.09	0.7	01/18/02
299-W15-43	566490.13	136210.03	101.01	32.7	11/12/02

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W15-43	566490.13	136210.03	115.34	31	11/12/02
299-W15-43	566490.13	136210.03	121.43	24	11/11/02
299-W15-43	566490.13	136210.03	109.24	20.3	11/12/02
299-W15-43	566490.13	136210.03	128.14	18.9	11/11/02
299-W15-43	566490.13	136210.03	132.10	16.5	11/12/02
299-W15-44	566685.00	136066.47	132.58	2100	09/27/07
299-W15-45	566432.94	135961.16	128.01	55.8	08/23/07
299-W15-46	566752.25	135586.67	119.04	850	10/14/04
299-W15-46	566752.25	135586.67	113.86	580	10/19/04
299-W15-46	566752.25	135586.67	132.00	160	09/28/04
299-W15-46	566752.25	135586.67	91.73	81.8	11/10/04
299-W15-46	566752.25	135586.67	122.09	58	10/12/04
299-W15-46	566752.25	135586.67	133.22	54	09/14/04
299-W15-46	566752.25	135586.67	112.18	40	10/25/04
299-W15-46	566752.25	135586.67	87.80	16	11/15/04
299-W15-46	566752.25	135586.67	94.66	11	11/08/04
299-W15-46	566752.25	135586.67	106.09	5.7	10/28/04
299-W15-46	566752.25	135586.67	81.55	3.4	11/23/04
299-W15-46	566752.25	135586.67	75.15	2.7	11/30/04
299-W15-46	566752.25	135586.67	43.45	0.4	01/26/05
299-W15-46	566752.25	135586.67	99.99	0.35	11/02/04
299-W15-46	566752.25	135586.67	55.80	0.25	01/13/05
299-W15-46	566752.25	135586.67	126.97	0	10/06/04
299-W15-46	566752.25	135586.67	125.14	0	10/11/04
299-W15-47	566776.44	135642.38	126.79	135	08/23/07
299-W15-49	566307.19	135972.91	130.75	101	11/28/06
299-W15-49	566307.19	135972.91	107.80	26	12/10/04
299-W15-49	566307.19	135972.91	115.42	4.5	12/09/04
299-W15-49	566307.19	135972.91	85.24	3.2	12/14/04
299-W15-49	566307.19	135972.91	74.27	0.75	12/15/04
299-W15-49	566307.19	135972.91	75.03	0.45	12/15/04
299-W15-50	566793.50	135790.72	115.63	76	02/02/05
299-W15-50	566764.68	135783.82	122.96	62.7	08/24/07
299-W15-50	566793.50	135790.72	120.81	52	01/31/05
299-W15-50	566793.50	135790.72	105.57	11	02/07/05
299-W15-50	566793.50	135790.72	99.78	0.1	02/09/05
299-W15-6	566772.72	135647.50	84.89	43	07/23/07
299-W15-7	566647.10	135913.30	123.17	28.9	08/29/07
299-W15-763	566780.41	136021.85	132.28	1970	08/30/07
299-W15-765	566697.00	136373.06	131.67	2650	09/27/07
299-W15-83	566275.75	135819.34	131.98	95.3	07/16/07
299-W15-94	566278.81	135633.45	132.11	121	09/12/07
299-W17-1	565281.96	135031.88	134.08	10.4	08/31/07
299-W18-16	566605.06	135425.69	131.69	73.3	11/22/04
299-W18-16	566605.06	135425.69	119.49	71	12/01/04
299-W18-16	566605.06	135425.69	108.83	68	12/09/04
299-W18-16	566605.06	135425.69	108.52	63	12/09/04
299-W18-21	566068.94	134971.83	135.20	300	07/16/07
299-W18-22	566059.88	134983.30	69.36	2.75	01/26/07
299-W18-23	566055.78	135335.56	135.20	360	07/31/07

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W18-30	566841.96	135186.75	133.84	843	08/30/07
299-W18-31	566692.75	135068.31	134.60	31.2	05/09/07
299-W18-40	566694.50	134989.55	130.86	26.7	08/24/07
299-W19-101	567910.29	135007.21	128.75	460	08/24/07
299-W19-101	567939.14	135014.07	97.56	68.5	08/23/05
299-W19-101	567939.14	135014.07	106.70	42.75	08/22/05
299-W19-104	568007.74	135206.88	129.02	29.25	03/28/06
299-W19-104	568007.74	135206.88	125.06	8.65	03/29/06
299-W19-105	567565.13	134745.44	127.61	205	01/11/06
299-W19-105	567565.13	134745.44	109.32	205	01/13/06
299-W19-105	567565.13	134745.44	119.08	85.5	01/12/06
299-W19-105	567565.13	134745.44	97.13	34.2	01/16/06
299-W19-107	567997.89	135205.66	94.75	85.5	04/07/06
299-W19-107	567970.17	135199.06	119.71	63	08/31/07
299-W19-107	567997.89	135205.66	106.94	17.45	04/05/06
299-W19-107	567997.89	135205.66	86.52	8.55	04/10/06
299-W19-12	566868.33	135052.59	129.49	384	08/24/07
299-W19-18	567331.83	135005.50	125.90	65	08/30/07
299-W19-20	567873.94	134901.08	134.23	1460	04/10/02
299-W19-34A	567644.80	135005.39	113.34	170	08/30/07
299-W19-34B	567634.04	135003.80	87.57	18.2	01/18/07
299-W19-35	567963.25	135008.30	133.10	840	06/19/07
299-W19-36	567605.90	135010.19	129.62	9700	09/14/07
299-W19-37	567695.00	134943.49	133.10	700	09/04/07
299-W19-39	567872.89	134879.89	131.52	260	02/22/07
299-W19-4	567921.08	135343.92	98.30	0	08/31/07
299-W19-41	566867.73	134997.65	133.35	47.4	08/24/07
299-W19-42	566868.01	135116.03	133.00	1370	08/24/07
299-W19-43	567670.31	134997.16	130.54	2100	09/11/07
299-W19-44	566868.15	135035.11	131.11	139	08/28/07
299-W19-45	566868.85	135080.79	132.02	866	08/31/07
299-W19-46	567782.69	134842.45	115.85	1360	11/20/02
299-W19-46	567782.69	134842.45	109.76	715	11/20/02
299-W19-46	567782.69	134842.45	98.17	215	11/21/02
299-W19-46	567782.69	134842.45	121.95	212	11/20/02
299-W19-46	567782.69	134842.45	128.04	163	11/19/02
299-W19-46	567782.69	134842.45	131.40	153	11/19/02
299-W19-46	567782.69	134842.45	103.66	55.7	11/21/02
299-W19-47	566866.51	135154.99	131.01	1590	08/28/07
299-W19-48	567822.94	134925.98	123.74	1520	11/30/04
299-W19-48	567822.94	134925.98	120.69	154	12/09/04
299-W19-48	567822.94	134925.98	106.98	154	12/09/04
299-W19-48	567822.94	134925.98	82.90	37	12/16/04
299-W19-48	567822.94	134925.98	89.60	34.2	12/14/04
299-W19-49	567568.06	134894.38	106.75	1320	09/02/05
299-W19-49	567568.06	134894.38	97.60	385	09/06/05
299-W19-49	567568.06	134894.38	116.50	171	09/01/05
299-W19-49	567568.06	134894.38	122.60	77	09/01/05
299-W19-49	567568.06	134894.38	128.69	60	09/01/05
299-W19-50	567939.25	135011.84	128.40	427.5	08/08/05

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W19-50	567939.25	135011.84	115.59	256.5	08/11/05
299-W19-50	567939.25	135011.84	122.30	196.5	08/09/05
299-W21-2	568124.38	134573.80	126.05	257	11/24/04
299-W21-2	568124.38	134573.80	98.01	51.3	12/07/04
299-W21-2	568124.38	134573.80	101.66	34.2	12/06/04
299-W21-2	568124.38	134573.80	107.76	24	12/02/04
299-W21-2	568124.38	134573.80	119.95	0	11/29/04
299-W21-2	568124.38	134573.80	112.33	0	12/01/04
299-W22-20	567564.26	133872.45	130.28	62	09/18/07
299-W22-26	567176.37	134458.40	132.48	1450	10/25/06
299-W22-44	566927.19	134477.59	134.50	10000	09/09/07
299-W22-45	566916.36	134285.69	130.77	260	09/14/07
299-W22-47	566908.75	134076.28	125.37	20900	01/11/05
299-W22-47	566908.75	134076.28	123.54	20900	01/12/05
299-W22-47	566908.75	134076.28	128.42	20700	01/10/05
299-W22-47	566908.75	134076.28	126.89	20400	01/11/05
299-W22-47	566908.75	134076.28	129.94	19700	01/10/05
299-W22-47	566908.75	134076.28	132.38	16900	01/05/05
299-W22-47	566908.75	134076.28	119.27	16600	01/13/05
299-W22-47	566908.75	134076.28	117.75	15300	01/13/05
299-W22-47	566908.75	134076.28	120.80	15100	01/12/05
299-W22-47	566908.75	134076.28	122.32	14100	01/12/05
299-W22-47	566908.75	134076.28	114.70	12500	01/19/05
299-W22-47	566908.75	134076.28	131.47	11300	01/06/05
299-W22-47	566908.75	134076.28	116.23	11200	01/17/05
299-W22-47	566908.75	134076.28	133.91	10700	01/05/05
299-W22-47	566908.75	134076.28	113.18	1970	01/19/05
299-W22-47	566908.75	134076.28	110.13	628	01/19/05
299-W22-47	566908.75	134076.28	105.56	337	01/20/05
299-W22-47	566908.75	134076.28	135.12	323	01/05/05
299-W22-47	566908.75	134076.28	108.61	323	01/19/05
299-W22-47	566908.75	134076.28	111.65	267	01/19/05
299-W22-47	566908.75	134076.28	104.03	93.1	01/20/05
299-W22-47	566908.75	134076.28	107.08	86.2	01/20/05
299-W22-47	566908.75	134076.28	102.51	25.65	01/21/05
299-W22-47	566908.75	134076.28	100.99	25.65	01/21/05
299-W22-47	566908.75	134076.28	99.46	25.65	01/21/05
299-W22-48	566967.84	134418.27	133.59	1300	09/17/07
299-W22-49	566875.58	134194.81	133.69	1300	09/11/07
299-W22-50	566875.46	134132.94	135.00	6900	09/14/07
299-W22-50	566904.25	134139.75	130.69	812	11/29/99
299-W22-50	566904.25	134139.75	125.50	3.515	12/14/99
299-W22-50	566904.25	134139.75	69.73	0.2885	12/22/99
299-W22-50	566904.25	134139.75	108.74	0	12/15/99
299-W22-50	566904.25	134139.75	84.36	0	12/17/99
299-W22-50	566904.25	134139.75	38.03	0	01/12/00
299-W22-69	567179.60	134347.83	128.32	1080	01/30/06
299-W22-69	567179.60	134347.83	110.80	85.5	02/02/06
299-W22-69	567179.60	134347.83	118.88	8.55	02/01/06
299-W22-69	567179.60	134347.83	92.42	8.55	02/08/06

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W22-72	567209.69	134200.53	129.77	160	09/26/07
299-W22-72	567237.37	134207.08	118.95	51.5	02/24/06
299-W22-72	567237.37	134207.08	112.85	34.2	02/27/06
299-W22-72	567237.37	134207.08	109.81	8.55	02/28/06
299-W22-72	567237.37	134207.08	98.30	8.55	02/28/06
299-W22-79	567600.70	134458.01	131.66	9.9	09/17/07
299-W22-80	566814.06	134118.84	132.13	1.55	09/09/07
299-W22-81	566971.46	134347.36	131.45	190	09/09/07
299-W22-82	566975.93	134160.25	131.85	870	09/09/07
299-W22-83	566980.28	134085.73	131.67	16000	09/17/07
299-W22-84	566949.96	134540.78	131.74	63	09/09/07
299-W22-85	566874.10	134253.76	132.18	140	09/09/07
299-W22-86	567159.06	134034.77	129.80	4200	09/25/07
299-W22-86	567186.74	134041.31	124.32	1310	03/14/06
299-W22-86	567186.74	134041.31	117.31	645	03/14/06
299-W22-86	567186.74	134041.31	108.16	167	03/15/06
299-W22-86	567186.74	134041.31	111.21	161	03/14/06
299-W22-86	567186.74	134041.31	99.02	113	03/16/06
299-W22-86	567186.74	134041.31	115.78	102	03/15/06
299-W22-87	567541.75	134539.88	129.28	171	12/20/05
299-W22-87	567541.75	134539.88	95.45	25.65	12/27/05
299-W22-87	567541.75	134539.88	119.83	8.55	12/21/05
299-W22-87	567541.75	134539.88	110.69	8.55	12/22/05
299-W22-88	568046.08	134390.40	118.21	8.55	02/15/08
299-W22-88	568046.08	134390.40	106.02	8.55	02/20/08
299-W22-88	568046.08	134390.40	95.96	8.55	02/27/08
299-W22-88	568046.08	134390.40	78.28	8.55	02/28/08
299-W22-9	567710.85	134035.92	128.42	8.4	09/18/07
299-W23-15	566794.00	134127.23	134.60	5	09/11/07
299-W23-19	566730.33	134159.84	135.00	35100	06/26/07
299-W23-20	566688.88	134439.36	132.07	0.6	09/11/07
299-W23-21	566678.95	134287.17	132.11	110	09/11/07
299-W23-9	566613.20	134267.80	132.64	100	09/18/07
299-W26-14	566653.90	133532.43	131.25	0	06/20/07
299-W7-3	566263.26	137631.65	66.39	0.4	09/11/07
299-W7-4	566380.00	137301.27	133.99	11	09/24/07
299-W8-1	565720.68	137639.65	134.31	0	09/28/07
699-33-76	566621.48	133600.48	127.92	8.55	03/03/08
699-33-76	566621.48	133600.48	118.78	8.55	03/04/08
699-33-76	566621.48	133600.48	109.66	8.55	03/05/08
699-34-72	567859.97	133785.33	126.50	85.5	02/28/08
699-34-72	567859.97	133785.33	105.02	25.65	03/04/08
699-34-72	567859.97	133785.33	92.73	8.55	03/05/08
699-35-66A	569828.91	134092.43	133.76	84.3	09/27/07
699-36-70A	568437.80	134302.02	131.40	37	09/16/07
699-36-70B	568398.91	134619.14	128.64	300	09/27/07
699-36-70B	568427.81	134625.98	100.19	30	09/14/04
699-36-70B	568427.81	134625.98	121.53	0	09/02/04
699-36-70B	568427.81	134625.98	110.86	0	09/09/04
699-36-70B	568427.81	134625.98	86.48	0	09/27/04

Table A-5. 2007 Technetium-99 Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
699-38-68A	569151.39	134924.75	132.05	730	09/24/07
699-38-70	568472.06	135082.34	120.93	420	07/02/07
699-38-70B	568469.13	135331.05	126.11	10	02/04/04
699-38-70B	568469.13	135331.05	115.75	0	02/05/04
699-38-70B	568469.13	135331.05	107.83	0	02/06/04
699-38-70B	568469.13	135331.05	97.16	0	02/06/04
699-38-70B	568469.13	135331.05	88.01	0	02/11/04
699-38-70B	568469.13	135331.05	75.97	0	02/27/04
699-38-70C	569084.13	135325.58	125.65	1600	02/18/04
699-38-70C	569084.13	135325.58	104.32	1200	02/20/04
699-38-70C	569084.13	135325.58	98.53	1200	02/20/04
699-38-70C	569084.13	135325.58	114.68	970	02/19/04
699-40-62	571135.28	135757.55	120.88	36	08/06/07
699-40-65	570057.50	135881.16	120.91	190	12/18/03
699-40-65	570057.50	135881.16	90.13	0	12/31/03
699-44-64	570361.68	136890.48	106.37	93.5	08/06/07
699-45-69C	568947.12	137233.81	102.80	13	09/06/07
699-45-69C	568947.12	137233.81	83.60	0.35	10/01/07
699-45-69C	568947.12	137233.81	124.75	0	08/10/07
699-45-69C	568947.12	137233.81	122.31	0	08/15/07
699-45-69C	568947.12	137233.81	90.91	0	09/12/07
699-47-60	571445.35	137961.72	118.50	11.8	09/28/07

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
699-50-74	567359.50	138646.73	97.32	0.5	07/21/05
699-50-74	567359.50	138646.73	106.77	0.5	07/19/05
699-50-74	567359.50	138646.73	115.61	0.5	07/18/05
699-50-74	567359.50	138646.73	122.01	0.5	07/15/05
699-50-74	567359.50	138646.73	132.07	0.5	07/14/05
699-48-77D	566404.53	138112.25	133.00	0.5	07/23/07
699-48-77C	566440.18	138079.79	114.42	0.5	07/23/07
699-48-77A	566384.45	137961.85	133.00	0.5	09/16/07
699-48-71	568359.04	138049.93	128.42	0.5	06/30/07
699-47-60	571445.35	137961.72	118.50	0.05	09/28/07
699-45-69A	568700.41	137175.71	124.60	0.05	09/30/07
699-40-65	570057.50	135881.16	90.13	1	12/31/03
699-40-65	570057.50	135881.16	120.91	1.7	02/07/07
699-40-62	571135.28	135757.55	120.88	0.5	08/06/07
699-38-70C	569084.13	135325.58	98.53	7	02/20/04
699-38-70C	569084.13	135325.58	104.32	8	02/20/04
699-38-70C	569084.13	135325.58	114.68	9	02/19/04
699-38-70C	569084.13	135325.58	125.65	6.8	12/06/06
699-38-70B	568469.13	135331.05	75.97	1	02/27/04
699-38-70B	568469.13	135331.05	88.01	7	02/11/04
699-38-70B	568469.13	135331.05	97.16	8	02/06/04
699-38-70B	568469.13	135331.05	107.83	6	02/06/04
699-38-70B	568469.13	135331.05	115.75	5	02/05/04
699-38-70B	568469.13	135331.05	126.11	10	12/27/06
699-38-70	568472.06	135082.34	120.93	0.5	07/02/07
699-38-68A	569151.39	134924.75	132.05	0.5	09/24/07
699-36-70B	568427.81	134625.98	86.48	1	09/23/04
699-36-70B	568427.81	134625.98	100.19	1	09/14/04
699-36-70B	568427.81	134625.98	110.86	1	09/09/04
699-36-70B	568427.81	134625.98	121.53	1	09/01/04
699-36-70B	568427.81	134625.98	128.31	0.42	01/26/07
699-36-70B	568427.81	134625.98	130.67	1	08/18/04
699-36-70A	568437.80	134302.02	131.40	2.5	09/16/07
699-35-78A	566034.83	134264.45	132.02	0.5	06/26/07
699-35-70	568537.60	133980.77	131.40	0.5	09/30/07
699-35-66A	569828.91	134092.43	132.00	2.5	09/27/07
699-32-72A	567913.83	133355.84	98.74	0.5	09/30/07
699-30-66	569962.02	132732.44	90.82	0.1	12/01/06
299-W8-1	565720.68	137639.65	133.00	0.1	11/17/06
299-W7-4	566380.00	137301.27	132.00	0.5	09/24/07
299-W7-3	566263.26	137631.65	66.39	0.1	10/26/06
299-W27-2	566879.47	133663.56	81.14	0.0185	01/29/07
299-W26-14	566653.90	133532.43	131.25	0.5	06/20/07
299-W26-13	566395.61	133286.82	132.04	0.5	06/20/07
299-W23-9	566613.20	134267.80	132.64	0.5	09/18/07
299-W23-4	566628.19	134391.88	133.00	0.5	08/31/07
299-W23-21	566678.95	134287.17	132.11	0.5	09/11/07
299-W23-15	566794.00	134127.23	133.00	0.5	09/11/07
299-W22-9	567710.85	134035.92	128.42	0.5	09/18/07
299-W22-87	567541.75	134539.88	95.47	1	12/27/05

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W22-87	567541.75	134539.88	110.67	1	12/22/05
299-W22-87	567541.75	134539.88	119.83	1	12/21/05
299-W22-87	567541.75	134539.88	129.28	1	12/20/05
299-W22-86	567186.74	134041.31	99.00	1	03/16/06
299-W22-86	567186.74	134041.31	108.16	1	03/15/06
299-W22-86	567186.74	134041.31	111.21	1	03/14/06
299-W22-86	567186.74	134041.31	115.78	1	03/15/06
299-W22-86	567186.74	134041.31	117.31	1	03/14/06
299-W22-86	567186.74	134041.31	124.32	1	03/14/06
299-W22-86	567186.74	134041.31	129.50	1	03/13/06
299-W22-83	566980.28	134085.73	131.67	0.5	09/17/07
299-W22-72	567237.37	134207.08	98.30	1	02/28/06
299-W22-72	567237.37	134207.08	109.80	1	02/28/06
299-W22-72	567237.37	134207.08	112.85	1	02/27/06
299-W22-72	567237.37	134207.08	118.95	1	02/24/06
299-W22-72	567237.37	134207.08	125.04	1	02/23/06
299-W22-72	567237.37	134207.08	130.84	1	02/23/06
299-W22-69	567179.60	134347.83	92.42	1	02/08/06
299-W22-69	567179.60	134347.83	110.80	1	02/02/06
299-W22-69	567179.60	134347.83	118.88	1	02/01/06
299-W22-69	567179.60	134347.83	128.33	1	01/30/06
299-W22-50	566904.25	134139.75	38.04	0.08	01/12/00
299-W22-50	566904.25	134139.75	69.74	0.08	12/22/99
299-W22-50	566904.25	134139.75	84.34	0.08	12/17/99
299-W22-50	566904.25	134139.75	108.74	0.08	12/15/99
299-W22-50	566904.25	134139.75	125.50	0.08	12/14/99
299-W22-50	566904.25	134139.75	130.68	0.08	11/29/99
299-W22-50	566904.25	134139.75	133.00	0.08	11/23/99
299-W22-49	566875.58	134194.81	132.00	0.5	09/11/07
299-W22-48	566967.84	134418.27	132.00	0.5	09/17/07
299-W22-47	566908.75	134076.28	99.28	1	01/21/05
299-W22-47	566908.75	134076.28	105.56	1	01/20/05
299-W22-47	566908.75	134076.28	111.65	1	01/19/05
299-W22-47	566908.75	134076.28	117.75	2.2	01/13/05
299-W22-47	566908.75	134076.28	123.54	1	01/12/05
299-W22-47	566908.75	134076.28	130.06	1	01/10/05
299-W22-45	566916.36	134285.69	130.77	0.5	09/14/07
299-W22-20	567564.26	133872.45	130.28	0.5	09/18/07
299-W21-2	568124.38	134573.80	98.01	1	12/07/04
299-W21-2	568124.38	134573.80	101.64	1.2	12/06/04
299-W21-2	568124.38	134573.80	107.74	1	12/02/04
299-W21-2	568124.38	134573.80	112.34	1	12/01/04
299-W21-2	568124.38	134573.80	119.86	1	11/29/04
299-W21-2	568124.38	134573.80	127.33	1	11/29/04
299-W21-2	568124.38	134573.80	129.23	0.5	06/20/07
299-W19-50	567939.25	135011.84	115.59	6	08/11/05
299-W19-50	567939.25	135011.84	122.30	4	08/09/05
299-W19-50	567939.25	135011.84	128.40	0.5	08/08/05
299-W19-49	567568.06	134894.38	97.60	2	09/06/05

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W19-49	567568.06	134894.38	116.50	0.5	09/01/05
299-W19-49	567568.06	134894.38	122.60	0.5	09/01/05
299-W19-49	567568.06	134894.38	128.69	0.5	09/01/05
299-W19-48	567822.94	134925.98	79.54	1	12/16/04
299-W19-48	567822.94	134925.98	82.93	1.2	12/16/04
299-W19-48	567822.94	134925.98	89.63	3.5	12/14/04
299-W19-48	567822.94	134925.98	106.93	2.4	12/09/04
299-W19-48	567822.94	134925.98	120.69	2.8	12/09/04
299-W19-48	567822.94	134925.98	122.52	1	11/30/04
299-W19-48	567822.94	134925.98	123.74	0.5	11/30/04
299-W19-48	567822.94	134925.98	126.49	0.99	04/05/07
299-W19-46	567782.69	134842.45	98.19	4	11/21/02
299-W19-46	567782.69	134842.45	103.69	0.08	11/21/02
299-W19-46	567782.69	134842.45	109.79	2.1	11/20/02
299-W19-46	567782.69	134842.45	121.95	0.46	11/20/02
299-W19-46	567782.69	134842.45	130.14	0.5	09/04/07
299-W19-43	567670.31	134997.16	130.54	2.8	02/22/07
299-W19-4	567921.08	135343.92	98.30	0.5	08/31/07
299-W19-39	567872.89	134879.89	131.52	0.5	02/22/07
299-W19-37	567695.00	134943.49	132.00	0.5	09/04/07
299-W19-36	567605.90	135010.19	129.62	4.4	12/14/06
299-W19-35	567963.25	135008.30	132.00	1.2	11/16/06
299-W19-34B	567634.04	135003.80	87.57	5.8	01/18/07
299-W19-34A	567644.80	135005.39	113.34	2.6	08/30/07
299-W19-18	567331.83	135005.50	125.90	0.5	08/30/07
299-W19-107	567997.89	135205.66	86.57	7	04/10/06
299-W19-107	567997.89	135205.66	106.97	5.1	04/05/06
299-W19-107	567997.89	135205.66	119.13	3.5	04/04/06
299-W19-105	567565.13	134745.44	97.16	1	01/16/06
299-W19-105	567565.13	134745.44	109.36	1	01/13/06
299-W19-105	567565.13	134745.44	118.47	1	01/12/06
299-W19-105	567565.13	134745.44	127.62	1	01/11/06
299-W19-105	567565.13	134745.44	129.53	0.5	11/29/06
299-W19-104	568007.74	135206.88	125.06	2.3	03/29/06
299-W19-104	568007.74	135206.88	129.02	2.2	03/28/06
299-W19-101	567939.14	135014.07	97.58	4.9	08/23/05
299-W19-101	567939.14	135014.07	106.68	4.2	08/22/05
299-W19-101	567939.14	135014.07	106.70	1.1	12/01/06
299-W18-30	566841.96	135186.75	132.00	0.5	08/30/07
299-W18-23	566055.78	135335.56	134.00	0.5	04/20/07
299-W18-22	566059.88	134983.30	69.36	0.5	07/16/07
299-W18-21	566068.94	134971.83	134.00	0.5	07/16/07
299-W18-16	566605.06	135425.69	104.25	0.5	12/15/04
299-W18-16	566605.06	135425.69	108.52	1	12/09/04
299-W18-16	566605.06	135425.69	119.49	1	12/01/04
299-W18-16	566605.06	135425.69	131.69	1	12/12/06
299-W18-15	566380.06	134733.48	130.45	0.5	09/21/07
299-W18-1	566421.50	135465.20	97.30	4	05/18/05
299-W18-1	566421.50	135465.20	100.96	4	05/18/05
299-W18-1	566421.50	135465.20	108.89	5	05/18/05

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W18-1	566421.50	135465.20	117.12	23	05/17/05
299-W18-1	566421.50	135465.20	125.04	9	05/17/05
299-W18-1	566421.50	135465.20	132.36	12	05/17/05
299-W18-1	566421.50	135465.20	133.00	25	05/16/05
299-W17-1	565310.69	135038.73	106.05	1	11/19/03
299-W17-1	565310.69	135038.73	112.33	1	11/18/03
299-W17-1	565310.69	135038.73	120.19	1	11/17/03
299-W17-1	565310.69	135038.73	134.00	1	11/17/03
299-W15-94	566278.81	135633.45	132.11	0.77	01/29/07
299-W15-83	566275.75	135819.34	131.98	0.11	07/16/07
299-W15-765	566697.00	136373.06	126.78	10	01/12/05
299-W15-765	566697.00	136373.06	127.70	19	09/29/05
299-W15-765	566697.00	136373.06	129.52	10	01/12/05
299-W15-765	566697.00	136373.06	131.67	14	11/30/06
299-W15-765	566697.00	136373.06	132.57	10	01/12/05
299-W15-765	566697.00	136373.06	133.00	11	01/12/05
299-W15-763	566780.41	136021.85	132.28	6.2	02/09/07
299-W15-7	566675.88	135920.20	112.81	5	02/22/05
299-W15-7	566675.88	135920.20	117.69	5	02/22/05
299-W15-7	566675.88	135920.20	122.56	4	02/22/05
299-W15-7	566675.88	135920.20	127.13	5	02/21/05
299-W15-7	566675.88	135920.20	130.79	4	02/21/05
299-W15-7	566675.88	135920.20	132.62	4	02/21/05
299-W15-6	566801.50	135654.39	77.72	6	11/14/05
299-W15-6	566801.50	135654.39	83.21	6	11/14/05
299-W15-6	566801.50	135654.39	89.30	7	11/19/05
299-W15-6	566801.50	135654.39	95.09	9	05/25/05
299-W15-6	566801.50	135654.39	99.67	10	05/24/05
299-W15-6	566801.50	135654.39	107.90	11	05/23/05
299-W15-6	566801.50	135654.39	115.82	12	05/23/05
299-W15-6	566801.50	135654.39	124.05	11	05/23/05
299-W15-6	566801.50	135654.39	131.97	9	05/19/05
299-W15-6	566801.50	135654.39	132.00	9	05/19/05
299-W15-50	566793.50	135790.72	99.78	5.3	02/09/05
299-W15-50	566793.50	135790.72	105.57	11	02/07/05
299-W15-50	566793.50	135790.72	115.63	26	02/02/05
299-W15-50	566793.50	135790.72	120.81	33	01/31/05
299-W15-50	566793.50	135790.72	127.82	30	01/25/05
299-W15-49	566307.19	135972.91	74.27	1	12/15/04
299-W15-49	566307.19	135972.91	86.16	1	12/14/04
299-W15-49	566307.19	135972.91	107.80	1	12/10/04
299-W15-49	566307.19	135972.91	115.42	1	12/09/04
299-W15-49	566307.19	135972.91	126.09	1	12/07/04
299-W15-49	566307.19	135972.91	130.75	0.37	11/28/06
299-W15-47	566776.44	135642.38	117.94	5.5	09/29/05
299-W15-47	566776.44	135642.38	126.79	4.4	11/14/06
299-W15-46	566752.25	135586.67	42.08	2	01/26/05
299-W15-46	566752.25	135586.67	44.98	4	01/26/05
299-W15-46	566752.25	135586.67	56.56	1	01/13/05
299-W15-46	566752.25	135586.67	75.76	4	11/30/04

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W15-46	566752.25	135586.67	81.55	2	11/23/04
299-W15-46	566752.25	135586.67	87.80	4	11/15/04
299-W15-46	566752.25	135586.67	88.56	8	11/15/04
299-W15-46	566752.25	135586.67	90.85	5	11/10/04
299-W15-46	566752.25	135586.67	92.22	7	11/10/04
299-W15-46	566752.25	135586.67	94.66	3	11/08/04
299-W15-46	566752.25	135586.67	100.14	3	11/02/04
299-W15-46	566752.25	135586.67	106.09	4	10/28/04
299-W15-46	566752.25	135586.67	112.95	7	10/19/04
299-W15-46	566752.25	135586.67	114.47	11	10/19/04
299-W15-46	566752.25	135586.67	115.38	6	02/01/06
299-W15-46	566752.25	135586.67	119.04	147	10/14/04
299-W15-46	566752.25	135586.67	122.09	15	10/14/04
299-W15-46	566752.25	135586.67	125.44	4	10/14/05
299-W15-46	566752.25	135586.67	128.80	5	10/13/05
299-W15-46	566752.25	135586.67	132.00	3	09/28/04
299-W15-46	566752.25	135586.67	132.00	3	01/31/06
299-W15-45	566432.94	135961.16	121.14	2.6	09/29/05
299-W15-45	566432.94	135961.16	128.01	1	09/19/07
299-W15-44	566685.00	136066.47	127.66	12	01/05/05
299-W15-44	566685.00	136066.47	128.27	16	09/29/05
299-W15-44	566685.00	136066.47	130.41	12	01/05/05
299-W15-44	566685.00	136066.47	132.58	14	08/21/07
299-W15-44	566685.00	136066.47	132.00	12	01/05/05
299-W15-43	566490.13	136210.03	101.01	3	11/12/02
299-W15-43	566490.13	136210.03	109.24	3	11/12/02
299-W15-43	566490.13	136210.03	115.34	6	11/12/02
299-W15-43	566490.13	136210.03	121.43	7	11/11/02
299-W15-43	566490.13	136210.03	127.22	2	01/04/05
299-W15-43	566490.13	136210.03	128.14	7	09/29/05
299-W15-43	566490.13	136210.03	132.28	4.2	10/17/06
299-W15-43	566490.13	136210.03	133.00	2	01/03/05
299-W15-42	566581.81	135627.02	119.36	2.5	01/24/02
299-W15-42	566581.81	135627.02	121.49	2	02/25/05
299-W15-42	566581.81	135627.02	124.54	2	02/25/05
299-W15-42	566581.81	135627.02	127.28	2.5	01/22/02
299-W15-42	566581.81	135627.02	129.11	2	02/25/05
299-W15-42	566581.81	135627.02	130.33	3	02/27/02
299-W15-42	566581.81	135627.02	132.16	2	02/24/05
299-W15-42	566581.81	135627.02	132.00	2.5	01/19/02
299-W15-42	566581.81	135627.02	133.00	2.5	01/18/02
299-W15-41	566728.80	136024.77	133.00	9.3	02/15/07
299-W15-40	566652.50	136204.97	128.86	17	09/29/05
299-W15-40	566652.50	136204.97	130.99	6	01/10/05
299-W15-40	566652.50	136204.97	132.89	15	02/15/07
299-W15-40	566652.50	136204.97	133.00	8	01/07/05
299-W15-39	566790.38	135546.08	133.00	0.85	02/22/07
299-W15-38	566784.13	135666.01	133.00	1	02/15/07
299-W15-37	566716.44	135248.31	125.61	1	02/23/05
299-W15-37	566716.44	135248.31	129.88	1	02/23/05

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W15-37	566716.44	135248.31	132.58	0.5	08/28/07
299-W15-37	566716.44	135248.31	133.00	1	02/23/05
299-W15-36	566773.88	135429.59	126.44	1	09/29/05
299-W15-36	566773.88	135429.59	131.97	1	09/19/07
299-W15-35	566739.25	135853.06	125.46	7.9	09/29/05
299-W15-35	566739.25	135853.06	131.97	6.9	12/05/06
299-W15-34	566613.44	135960.44	125.97	6.8	09/29/05
299-W15-34	566613.44	135960.44	132.89	5.7	10/17/06
299-W15-31A	566377.13	135856.11	130.55	1	02/18/05
299-W15-31A	566377.13	135856.11	132.99	1	02/18/05
299-W15-31A	566377.13	135856.11	133.00	1	02/18/05
299-W15-30	566304.63	135748.94	130.64	1	02/09/05
299-W15-30	566304.63	135748.94	132.00	1	02/09/05
299-W15-30	566304.63	135748.94	133.00	1	02/09/05
299-W15-224	566280.25	135919.45	131.19	0.1	01/22/07
299-W15-2	566093.75	136336.23	133.00	1	02/10/05
299-W15-17	566306.88	135718.95	78.17	1	12/15/04
299-W15-17	566306.88	135718.95	79.39	1	12/14/04
299-W15-152	566309.38	135550.00	100.30	0.5	09/20/05
299-W15-152	566309.38	135550.00	110.05	0.5	09/19/05
299-W15-152	566309.38	135550.00	121.94	0.5	09/19/05
299-W15-152	566309.38	135550.00	130.78	0.5	07/17/07
299-W15-15	566088.81	135751.50	134.00	0.5	07/11/07
299-W15-11	566412.31	136000.72	121.70	2	02/01/05
299-W15-11	566412.31	136000.72	124.44	2	01/27/05
299-W15-11	566412.31	136000.72	127.79	2	01/27/05
299-W15-11	566412.31	136000.72	131.15	2	01/26/05
299-W15-11	566412.31	136000.72	132.00	2	02/26/07
299-W15-1	566554.31	135942.94	123.48	4	02/08/05
299-W15-1	566554.31	135942.94	127.75	3	02/08/05
299-W15-1	566554.31	135942.94	129.88	2	02/07/05
299-W15-1	566554.31	135942.94	131.71	2	02/07/05
299-W15-1	566554.31	135942.94	132.00	3.8	02/22/07
299-W14-9	567031.75	135650.69	77.63	6	02/14/05
299-W14-9	567031.75	135650.69	79.46	6	02/14/05
299-W14-72	567328.44	135941.28	82.47	2.79	10/24/06
299-W14-72	567328.44	135941.28	87.20	3.6	04/05/07
299-W14-72	567328.44	135941.28	90.39	1	10/17/06
299-W14-72	567328.44	135941.28	98.32	5.52	10/12/06
299-W14-72	567328.44	135941.28	107.46	4.92	10/11/06
299-W14-72	567328.44	135941.28	113.25	1	10/09/06
299-W14-72	567328.44	135941.28	121.18	1	10/04/06
299-W14-72	567328.44	135941.28	126.06	1	10/02/06
299-W14-71	567733.43	135567.81	76.30	1	11/29/06
299-W14-71	567733.43	135567.81	85.93	2.88	10/13/06
299-W14-71	567733.43	135567.81	91.17	13	04/02/07
299-W14-71	567733.43	135567.81	97.94	2.4	10/09/06
299-W14-71	567733.43	135567.81	106.78	1	10/05/06
299-W14-6	566899.19	136100.83	133.00	1	01/21/05
299-W14-16	566972.53	136311.55	132.08	2.5	05/09/07

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W14-14	566898.38	136181.05	128.42	1	01/12/05
299-W14-14	566898.38	136181.05	131.47	1	01/13/05
299-W14-14	566898.38	136181.05	132.89	7.4	08/23/07
299-W14-14	566898.38	136181.05	133.00	1	01/13/05
299-W14-11	566901.69	136287.63	98.62	4	04/27/05
299-W14-11	566901.69	136287.63	104.71	7	04/26/05
299-W14-11	566901.69	136287.63	110.81	4	04/25/05
299-W14-11	566901.69	136287.63	129.10	0.5	04/18/05
299-W13-1	568148.75	136048.59	62.18	1	12/22/03
299-W13-1	568148.75	136048.59	74.07	1	12/20/03
299-W13-1	568148.75	136048.59	83.21	3.45	12/19/03
299-W13-1	568148.75	136048.59	92.05	10.2	12/12/03
299-W13-1	568148.75	136048.59	99.98	7.04	12/05/03
299-W13-1	568148.75	136048.59	110.95	1	12/05/03
299-W13-1	568148.75	136048.59	116.44	1	12/04/03
299-W13-1	568148.75	136048.59	128.63	9.3	11/27/06
299-W12-1	568302.38	137199.15	128.26	0.5	09/04/07
299-W11-87	568113.36	136602.03	104.16	4	06/20/07
299-W11-86	568143.53	136610.04	73.68	1	08/04/06
299-W11-86	568143.53	136610.04	81.58	1	07/31/06
299-W11-86	568143.53	136610.04	89.48	2	07/25/06
299-W11-86	568143.53	136610.04	97.08	3.7	07/17/06
299-W11-86	568143.53	136610.04	106.28	4.7	07/12/06
299-W11-86	568143.53	136610.04	111.38	2.1	07/10/06
299-W11-86	568143.53	136610.04	119.98	2	07/07/06
299-W11-86	568143.53	136610.04	126.97	1.9	06/30/06
299-W11-7	567260.88	136675.33	132.00	11	05/08/07
299-W11-6	567452.79	136485.91	132.29	1.1	10/03/06
299-W11-48	566881.97	136846.18	87.28	2	06/05/07
299-W11-48	566881.97	136846.18	89.72	2	06/01/07
299-W11-48	566881.97	136846.18	92.46	2	05/29/07
299-W11-48	566881.97	136846.18	97.40	3.28	05/25/07
299-W11-48	566881.97	136846.18	101.30	4.57	05/23/07
299-W11-48	566881.97	136846.18	104.35	4.3	05/22/07
299-W11-48	566881.97	136846.18	107.40	2.1	05/21/07
299-W11-48	566881.97	136846.18	109.53	10	05/17/07
299-W11-48	566881.97	136846.18	113.49	2.32	05/16/07
299-W11-48	566881.97	136846.18	116.85	6.3	04/25/07
299-W11-48	566881.97	136846.18	119.59	5.72	04/17/07
299-W11-48	566881.97	136846.18	122.94	5.98	04/13/07
299-W11-48	566881.97	136846.18	127.52	8.13	04/11/07
299-W11-48	566881.97	136846.18	132.09	6.33	04/10/07
299-W11-47	566933.82	136680.70	92.36	1	03/14/06
299-W11-47	566933.82	136680.70	98.36	3.8	03/10/06
299-W11-47	566933.82	136680.70	104.46	3.9	03/08/06
299-W11-47	566933.82	136680.70	110.60	7.5	03/06/06
299-W11-47	566933.82	136680.70	116.70	11	03/03/06
299-W11-47	566933.82	136680.70	119.44	5.8	02/28/06
299-W11-47	566933.82	136680.70	122.48	13	02/09/07
299-W11-46	566886.06	136766.32	126.77	7.2	11/27/06

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W11-45	566992.84	136775.64	80.88	1	11/10/05
299-W11-45	566992.84	136775.64	86.98	1	11/07/05
299-W11-45	566992.84	136775.64	93.08	5.4	11/01/05
299-W11-45	566992.84	136775.64	99.34	2.6	10/28/05
299-W11-45	566992.84	136775.64	105.44	11	10/26/05
299-W11-45	566992.84	136775.64	111.38	10	10/20/05
299-W11-45	566992.84	136775.64	117.17	12	10/17/05
299-W11-45	566992.84	136775.64	123.27	7	10/11/05
299-W11-45	566992.84	136775.64	129.46	12	02/09/07
299-W11-43	567269.75	136971.05	79.88	14	06/21/05
299-W11-43	567269.75	136971.05	89.33	2	06/16/05
299-W11-43	567269.75	136971.05	105.79	2	06/09/05
299-W11-43	567269.75	136971.05	116.76	7	06/07/05
299-W11-43	567269.75	136971.05	125.90	11	08/16/07
299-W11-42	566920.44	136745.67	133.00	4	09/30/05
299-W11-41	566935.50	136677.78	133.00	0.5	09/26/05
299-W11-37	567635.19	137018.00	132.00	4	05/03/07
299-W11-3	567641.69	136663.89	132.28	0.7	12/01/06
299-W11-25B	566912.31	136774.77	84.93	9	03/08/05
299-W11-25B	566912.31	136774.77	87.83	9	03/07/05
299-W11-25B	566912.31	136774.77	93.92	9	03/04/05
299-W11-25B	566912.31	136774.77	99.71	9	02/24/05
299-W11-25B	566912.31	136774.77	105.81	7	02/23/05
299-W11-25B	566912.31	136774.77	111.91	8	02/17/05
299-W11-25B	566912.31	136774.77	118.00	6	02/16/05
299-W11-25B	566912.31	136774.77	124.10	7	02/08/05
299-W11-25B	566912.31	136774.77	130.19	5	02/08/05
299-W11-18	567153.10	137154.52	132.00	2.3	08/29/07
299-W11-13	567070.56	136417.10	106.67	3.2	11/03/06
299-W11-12	566927.13	136604.02	132.90	1	01/24/05
299-W11-10	568147.50	136610.03	131.40	2.9	05/14/07
299-W10-8	566848.81	136811.22	133.00	2	08/25/05
299-W10-5	566578.63	136474.83	133.00	3.1	11/03/06
299-W10-4	566734.63	136578.08	133.00	6.4	02/08/07
299-W10-33	566772.75	136610.18	77.16	0.5	08/29/07
299-W10-33	566772.75	136610.18	80.21	0.5	08/24/07
299-W10-33	566772.75	136610.18	83.10	0.5	08/21/07
299-W10-33	566772.75	136610.18	86.00	0.5	08/15/07
299-W10-33	566772.75	136610.18	89.05	0.5	08/13/07
299-W10-33	566772.75	136610.18	92.40	0.5	08/08/07
299-W10-33	566772.75	136610.18	95.45	0.5	08/06/07
299-W10-33	566772.75	136610.18	99.41	2.65	08/03/07
299-W10-33	566772.75	136610.18	101.24	11.6	08/02/07
299-W10-33	566772.75	136610.18	104.59	15.8	08/01/07
299-W10-33	566772.75	136610.18	107.64	3.55	07/31/07
299-W10-33	566772.75	136610.18	109.77	3.6	07/27/07
299-W10-33	566772.75	136610.18	113.74	2	07/24/07
299-W10-33	566772.75	136610.18	116.78	7.12	07/17/07
299-W10-33	566772.75	136610.18	119.83	10.2	07/16/07
299-W10-33	566772.75	136610.18	122.18	6.42	07/12/07

Table A-6. 2007 Trichloroethene Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W10-33	566772.75	136610.18	124.71	4.4	07/11/07
299-W10-33	566772.75	136610.18	130.04	7.35	07/10/07
299-W10-33	566772.75	136610.18	131.72	6.94	07/06/07
299-W10-31	566266.44	136968.34	130.75	0.61	10/03/06
299-W10-30	566055.15	136732.65	131.65	0.32	10/03/06
299-W10-29	566055.36	136822.06	80.01	0.38	10/03/06
299-W10-24	566885.44	136798.78	133.00	0.5	09/20/05
299-W10-23	566823.75	136815.34	132.28	6.2	08/20/07
299-W10-22	566803.82	136876.10	133.00	8.8	05/07/07
299-W10-14	566017.19	136608.89	78.84	1	12/13/04
299-W10-1	566663.13	136734.56	133.00	4.7	08/20/07

Table A-7. 2007 Tritium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W10-1	566634.31	136727.62	133.00	1370	11/17/06
299-W10-14	565988.44	136601.95	78.84	11.75	03/28/07
299-W10-22	566803.82	136876.10	133.00	9990	11/16/06
299-W10-23	566794.93	136808.39	132.52	6310	11/16/06
299-W10-24	566856.63	136791.83	132.62	3040	11/16/06
299-W10-26	566814.60	136393.66	133.16	6800	02/09/07
299-W10-27	566815.17	136434.85	132.19	7890	11/16/06
299-W10-28	566672.76	136702.98	132.12	3700	09/04/07
299-W10-29	566055.36	136822.06	80.01	61	03/27/07
299-W10-30	566055.15	136732.65	131.65	0.615	03/27/07
299-W10-31	566238.81	136961.65	131.18	66.5	04/13/07
299-W10-33	566772.75	136610.18	77.16	0	08/29/07
299-W10-33	566772.75	136610.18	80.21	65	08/24/07
299-W10-33	566772.75	136610.18	83.10	2500	08/21/07
299-W10-33	566772.75	136610.18	86.00	370	08/15/07
299-W10-33	566772.75	136610.18	89.05	55	08/13/07
299-W10-33	566772.75	136610.18	92.40	490	08/08/07
299-W10-33	566772.75	136610.18	95.45	380	08/06/07
299-W10-33	566772.75	136610.18	99.41	630	08/03/07
299-W10-33	566772.75	136610.18	101.24	6300	08/02/07
299-W10-33	566772.75	136610.18	104.59	8600	08/01/07
299-W10-33	566772.75	136610.18	107.64	1700	07/31/07
299-W10-33	566772.75	136610.18	109.77	1700	07/27/07
299-W10-33	566772.75	136610.18	113.74	1000	07/24/07
299-W10-33	566772.75	136610.18	116.78	4100	07/17/07
299-W10-33	566772.75	136610.18	119.83	5400	07/16/07
299-W10-33	566772.75	136610.18	122.18	3400	07/12/07
299-W10-33	566772.75	136610.18	124.71	3200	07/11/07
299-W10-33	566772.75	136610.18	130.04	3100	07/10/07
299-W10-33	566772.75	136610.18	131.72	3000	07/06/07
299-W10-4	566705.85	136571.14	133.00	3480	11/17/06
299-W10-5	566549.81	136467.90	133.00	865	11/03/06
299-W10-8	566820.03	136804.27	133.00	5410	12/04/06
299-W11-12	566898.34	136597.07	133.00	38800	02/08/07
299-W11-13	567070.56	136417.10	106.93	8150	11/03/06
299-W11-18	567153.10	137154.52	132.00	11000	08/29/07
299-W11-25B	566912.31	136774.77	100.02	8770	02/24/05
299-W11-25B	566912.31	136774.77	106.11	7280	02/23/05
299-W11-25B	566912.31	136774.77	111.91	6660	02/17/05
299-W11-25B	566912.31	136774.77	118.00	5300	02/16/05
299-W11-25B	566912.31	136774.77	124.71	7020	02/08/05
299-W11-25B	566912.31	136774.77	130.50	5760	02/08/05
299-W11-3	567612.88	136656.95	132.54	1020	10/24/06
299-W11-37	567606.35	137011.04	132.00	12000	05/03/07
299-W11-39	566879.58	136772.97	131.81	4140	11/21/06
299-W11-40	566898.04	136702.72	131.78	11500	02/23/07
299-W11-41	566906.71	136670.84	132.17	26400	11/30/06
299-W11-42	566891.64	136738.72	132.66	4810	11/21/06
299-W11-43	567269.75	136971.05	79.88	48000	06/21/05
299-W11-43	567240.92	136964.08	84.99	24200	10/24/06

Table A-7. 2007 Tritium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W11-43	567269.75	136971.05	89.33	33000	06/16/05
299-W11-43	567269.75	136971.05	105.79	55000	06/09/05
299-W11-43	567269.75	136971.05	116.76	61000	06/07/05
299-W11-43	567269.75	136971.05	125.90	58000	06/01/05
299-W11-45	566965.17	136768.96	124.92	7300	11/17/06
299-W11-46	566886.06	136766.32	126.77	4900	11/27/06
299-W11-47	566933.82	136680.70	92.36	794	03/14/06
299-W11-47	566933.82	136680.70	98.36	4900	03/10/06
299-W11-47	566933.82	136680.70	104.46	12500	03/08/06
299-W11-47	566933.82	136680.70	110.60	14500	03/06/06
299-W11-47	566933.82	136680.70	116.70	15900	03/03/06
299-W11-47	566933.82	136680.70	119.44	15500	02/28/06
299-W11-47	566906.15	136674.03	121.40	11100	02/09/07
299-W11-47	566933.82	136680.70	122.79	19400	02/23/06
299-W11-47	566933.82	136680.70	125.23	8470	02/21/06
299-W11-48	566881.97	136846.18	87.28	0	06/05/07
299-W11-48	566881.97	136846.18	89.72	4500	06/01/07
299-W11-48	566881.97	136846.18	92.46	660	05/29/07
299-W11-48	566881.97	136846.18	95.21	6300	05/25/07
299-W11-48	566881.97	136846.18	101.30	15000	05/23/07
299-W11-48	566881.97	136846.18	104.35	18000	05/22/07
299-W11-48	566881.97	136846.18	107.40	12000	05/21/07
299-W11-48	566881.97	136846.18	109.53	12000	05/17/07
299-W11-48	566881.97	136846.18	113.49	5900	05/16/07
299-W11-48	566881.97	136846.18	116.85	10000	04/25/07
299-W11-48	566881.97	136846.18	119.59	12000	04/17/07
299-W11-48	566881.97	136846.18	122.94	7700	04/13/07
299-W11-48	566881.97	136846.18	127.52	7700	04/11/07
299-W11-48	566881.97	136846.18	132.09	9500	04/10/07
299-W11-7	567232.07	136668.39	132.00	23000	05/08/07
299-W11-86	568143.53	136610.04	73.68	8.25	08/04/06
299-W11-86	568143.53	136610.04	89.48	66	07/25/06
299-W11-86	568143.53	136610.04	106.28	46.8	07/12/06
299-W11-86	568143.53	136610.04	119.98	66	07/07/06
299-W11-86	568143.53	136610.04	126.97	305	06/30/06
299-W11-87	568113.36	136602.03	104.16	70	06/20/07
299-W12-1	568302.38	137199.15	133.59	8700	09/04/07
299-W13-1	568119.88	136041.69	98.32	85	08/16/07
299-W14-11	566901.69	136287.63	98.62	27400	04/27/05
299-W14-11	566901.69	136287.63	104.71	45300	04/26/05
299-W14-11	566901.69	136287.63	110.81	86000	04/25/05
299-W14-11	566901.69	136287.63	116.91	152000	04/20/05
299-W14-11	566872.89	136280.70	123.10	244000	08/16/07
299-W14-11	566901.69	136287.63	129.10	686000	04/18/05
299-W14-11	566901.69	136287.63	133.00	2150000	04/15/05
299-W14-13	566872.92	136275.45	132.96	1760000	11/17/06
299-W14-14	566869.59	136174.13	133.14	5430	05/15/07
299-W14-15	566870.89	136223.73	132.28	171000	08/20/07
299-W14-16	566972.53	136311.55	132.08	4940	11/17/06
299-W14-17	566977.97	136211.43	132.08	3700	08/20/07

Table A-7. 2007 Tritium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W14-17	566977.97	136211.43	132.08	3700	08/20/07
299-W14-18	566868.67	136337.22	132.46	6760	08/20/07
299-W14-19	566898.63	136135.06	100.05	2990	10/29/02
299-W14-19	566898.63	136135.06	105.84	3870	10/29/02
299-W14-19	566898.63	136135.06	111.94	4570	10/29/02
299-W14-19	566898.63	136135.06	118.03	2040	10/29/02
299-W14-19	566898.63	136135.06	124.13	676	10/28/02
299-W14-19	566898.63	136135.06	130.22	2290	10/28/02
299-W14-19	566869.80	136128.14	131.43	4770	08/20/07
299-W14-19	566898.63	136135.06	133.00	387	10/28/02
299-W14-6	566870.40	136093.92	133.00	1170	05/15/07
299-W14-71	567705.73	135561.19	91.18	60	06/12/07
299-W14-72	567328.44	135941.28	90.39	434	10/17/06
299-W14-72	567328.44	135941.28	107.46	958	10/11/06
299-W14-72	567328.44	135941.28	121.18	0	10/04/06
299-W14-72	567328.44	135941.28	126.06	0	10/02/06
299-W15-11	566383.52	135993.81	134.00	390	08/29/07
299-W15-15	566060.05	135744.60	134.00	1700	07/11/07
299-W15-152	566280.63	135543.11	131.85	1750	01/29/07
299-W15-17	566278.12	135712.06	78.92	44.35	07/26/07
299-W15-224	566280.25	135919.45	131.19	1360	07/26/07
299-W15-30	566275.85	135742.04	134.00	1000	07/17/07
299-W15-31A	566348.33	135849.20	134.00	1000	02/27/07
299-W15-34	566584.63	135953.53	133.15	1300	02/26/07
299-W15-35	566710.47	135846.17	132.02	1300	02/26/07
299-W15-36	566745.11	135422.71	132.02	720	06/04/07
299-W15-40	566623.72	136198.05	133.27	3800	07/23/07
299-W15-41	566728.80	136024.77	133.00	6810	11/28/06
299-W15-42	566581.81	135627.02	119.36	464	01/24/02
299-W15-42	566581.81	135627.02	130.33	54	02/27/02
299-W15-42	566581.81	135627.02	134.00	54.5	01/18/02
299-W15-43	566490.13	136210.03	101.01	357	11/12/02
299-W15-43	566490.13	136210.03	109.24	662	11/12/02
299-W15-43	566490.13	136210.03	115.34	3320	11/12/02
299-W15-43	566490.13	136210.03	121.43	4120	11/11/02
299-W15-43	566490.13	136210.03	128.14	3900	11/11/02
299-W15-43	566490.13	136210.03	132.10	4010	11/12/02
299-W15-44	566685.00	136066.47	99.93	59	10/18/02
299-W15-44	566685.00	136066.47	105.11	70	10/18/02
299-W15-44	566685.00	136066.47	111.20	8780	10/17/02
299-W15-44	566685.00	136066.47	117.30	7100	10/17/02
299-W15-44	566685.00	136066.47	123.40	5850	10/17/02
299-W15-44	566685.00	136066.47	129.49	4950	10/16/02
299-W15-44	566656.23	136059.56	132.91	6030	02/15/07
299-W15-44	566685.00	136066.47	133.00	5310	10/16/02
299-W15-45	566404.17	135954.25	128.08	660	08/23/07
299-W15-46	566752.25	135586.67	42.08	0	01/26/05
299-W15-46	566723.44	135579.78	127.42	330	12/12/06
299-W15-46	566752.25	135586.67	132.15	35	09/28/04
299-W15-47	566747.66	135635.48	126.97	280	07/23/07

Table A-7. 2007 Tritium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W15-49	566307.19	135972.91	74.27	420	12/15/04
299-W15-49	566307.19	135972.91	86.16	0	12/14/04
299-W15-49	566307.19	135972.91	107.80	490	12/10/04
299-W15-49	566307.19	135972.91	115.42	210	12/09/04
299-W15-49	566307.19	135972.91	126.09	1200	12/07/04
299-W15-49	566278.43	135966.00	131.18	1300	02/22/07
299-W15-50	566793.50	135790.72	99.78	12.5	02/09/05
299-W15-50	566793.50	135790.72	105.57	0	02/07/05
299-W15-50	566793.50	135790.72	115.63	3.5	02/02/05
299-W15-50	566793.50	135790.72	120.81	0	01/31/05
299-W15-50	566764.68	135783.82	122.96	27	08/24/07
299-W15-50	566793.50	135790.72	127.82	80	01/25/05
299-W15-6	566772.72	135647.50	84.89	100	07/23/07
299-W15-763	566780.41	136021.85	132.28	12000	06/05/07
299-W15-765	566668.23	136366.13	132.10	4260	11/30/06
299-W15-83	566275.75	135819.34	131.98	1910	07/16/07
299-W15-94	566278.81	135633.45	132.11	1140	09/12/07
299-W17-1	565281.96	135031.88	134.08	220	08/31/07
299-W18-16	566605.06	135425.69	108.83	450	12/09/04
299-W18-16	566605.06	135425.69	119.49	540	12/01/04
299-W18-16	566605.06	135425.69	131.69	600	11/22/04
299-W18-21	566068.94	134971.83	134.00	1650	01/22/07
299-W18-22	566059.88	134983.30	69.36	33.5	01/26/07
299-W18-23	566055.78	135335.56	134.00	1830	02/12/07
299-W19-101	567910.29	135007.21	128.75	340	02/27/07
299-W19-105	567536.32	134738.60	129.80	82.5	10/03/06
299-W19-107	567970.17	135199.06	119.71	14000	12/21/06
299-W19-46	567782.69	134842.45	98.19	33.35	11/21/02
299-W19-46	567782.69	134842.45	103.69	0	11/21/02
299-W19-46	567782.69	134842.45	109.79	33.65	11/20/02
299-W19-46	567782.69	134842.45	115.85	21.4	11/20/02
299-W19-46	567782.69	134842.45	121.95	141	11/20/02
299-W19-46	567753.83	134835.61	130.32	680	09/04/07
299-W19-48	567822.94	134925.98	82.93	0.9	12/16/04
299-W19-48	567822.94	134925.98	89.63	0	12/14/04
299-W19-48	567822.94	134925.98	106.93	0	12/09/04
299-W19-48	567822.94	134925.98	123.74	490	11/30/04
299-W19-48	567794.08	134919.13	126.89	330	08/31/07
299-W19-49	567539.21	134887.53	129.00	95	08/31/07
299-W21-2	568095.53	134566.95	129.49	13000	11/29/06
299-W22-20	567564.26	133872.45	130.28	310000	09/18/07
299-W22-44	566927.19	134477.59	133.00	1000	03/23/07
299-W22-45	566916.36	134285.69	133.00	14300	11/17/06
299-W22-47	566879.94	134069.47	130.49	19800	03/28/07
299-W22-48	566967.84	134418.27	133.00	17100	10/04/06
299-W22-49	566875.58	134194.81	133.69	32200	10/27/06
299-W22-50	566904.25	134139.75	38.04	0	01/12/00
299-W22-50	566904.25	134139.75	69.74	0	12/22/99
299-W22-50	566904.25	134139.75	84.34	92.5	12/17/99
299-W22-50	566904.25	134139.75	108.74	304	12/15/99

Table A-7. 2007 Tritium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
299-W22-50	566904.25	134139.75	125.50	969	12/14/99
299-W22-50	566904.25	134139.75	130.68	19900	11/29/99
299-W22-50	566875.46	134132.94	133.00	27000	03/26/07
299-W22-50	566904.25	134139.75	133.00	31400	11/23/99
299-W22-69	567151.92	134341.27	129.37	2200	09/24/07
299-W22-72	567209.69	134200.53	129.77	54000	09/26/07
299-W22-80	566814.06	134118.84	132.13	308	03/27/07
299-W22-81	566971.46	134347.36	131.45	18300	03/26/07
299-W22-82	566975.93	134160.25	131.85	24900	03/26/07
299-W22-83	566980.28	134085.73	132.01	26200	10/04/06
299-W22-84	566949.96	134540.78	131.74	33.35	03/27/07
299-W22-85	566874.10	134253.76	132.18	23900	03/26/07
299-W22-86	567159.06	134034.77	129.80	10600	03/29/07
299-W22-87	567512.92	134533.04	129.65	28	09/26/07
299-W23-15	566765.21	134120.41	133.00	584	11/17/06
299-W23-19	566730.33	134159.84	133.00	51300	03/30/07
299-W23-20	566688.88	134439.36	132.07	34	03/26/07
299-W23-21	566678.95	134287.17	132.11	86000	09/11/07
299-W23-4	566599.43	134385.05	129.85	26000	08/31/07
299-W23-9	566613.20	134267.80	133.00	150000	09/18/07
299-W26-13	566395.61	133286.82	132.04	41	06/20/07
299-W26-14	566653.90	133532.43	131.25	25.5	06/20/07
299-W6-11	567133.70	137627.83	133.00	3290	02/07/07
299-W6-12	566886.74	137628.17	133.00	263	02/07/07
299-W6-6	567289.92	137631.73	86.21	13.3	02/07/07
299-W7-3	566263.26	137631.65	62.17	19.6	05/14/07
299-W7-4	566380.00	137301.27	133.00	64.5	04/20/07
299-W8-1	565720.68	137639.65	134.00	90	09/28/07
699-30-66	569962.02	132732.44	90.82	85	06/01/07
699-32-62	570980.56	133209.16	98.46	8000	09/26/07
699-32-72A	567913.83	133355.84	66.74	59000	09/30/07
699-35-66A	569828.91	134092.43	133.76	160000	03/29/07
699-35-70	568537.60	133980.77	131.00	240000	09/30/07
699-36-61A	571366.45	134550.27	119.46	53300	10/05/06
699-36-70A	568437.80	134302.02	132.20	70000	09/16/07
699-36-70B	568427.81	134625.98	86.49	360	09/23/04
699-36-70B	568427.81	134625.98	100.19	3500	09/14/04
699-36-70B	568427.81	134625.98	110.89	1000	09/09/04
699-36-70B	568427.81	134625.98	121.53	1200	08/31/04
699-36-70B	568398.91	134619.14	128.64	9500	06/01/07
699-36-70B	568427.81	134625.98	130.67	8800	08/18/04
699-38-65	570061.23	135032.99	117.93	35700	11/02/06
699-38-68A	569151.39	134924.75	132.05	23000	09/24/07
699-38-70	568472.06	135082.34	120.93	7410	11/02/06
699-38-70B	568440.22	135324.16	95.56	1300	12/27/06
699-38-70C	569055.20	135318.70	103.03	110000	02/20/07
699-40-62	571135.28	135757.55	120.88	9000	08/06/07
699-40-65	570028.52	135874.26	124.14	15000	06/01/07
699-44-64	570361.68	136890.48	106.67	540	08/06/07
699-47-60	571445.35	137961.72	118.50	78	11/03/06

Table A-7. 2007 Tritium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Activity (pCi/L)	Sample Date
699-48-71	568359.04	138049.93	128.42	640	06/30/07
699-48-77A	566384.45	137961.85	133.00	75000	09/16/07
699-48-77C	566440.18	138079.79	114.42	82000	10/09/06
699-48-77D	566404.53	138112.25	133.00	130000	07/23/07
699-49-79	565742.38	138264.08	134.00	1.61	01/18/07
699-50-74	567330.70	138639.69	127.22	98.5	11/09/06
699-51-75	566949.27	138899.23	111.22	8.87	05/01/07

Table A-8. 2007 Uranium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W10-14	565988.44	136601.95	78.84	0.895	10/03/06
299-W10-22	566803.82	136876.10	132.50	4.15	05/07/07
299-W10-23	566794.93	136808.39	132.52	1.08	08/20/07
299-W10-29	566055.36	136822.06	80.01	0.774	10/03/06
299-W10-30	566055.15	136732.65	131.65	1.19	10/03/06
299-W10-31	566238.81	136961.65	131.18	1.08	10/03/06
299-W10-33	566745.09	136603.52	131.72	6.27	07/06/07
299-W10-33	566745.09	136603.52	130.04	8.21	07/10/07
299-W10-33	566745.09	136603.52	124.71	6.77	07/11/07
299-W10-33	566745.09	136603.52	122.18	4.91	07/12/07
299-W10-33	566745.09	136603.52	119.83	1.6	07/16/07
299-W10-33	566745.09	136603.52	116.78	1.09	07/17/07
299-W10-33	566745.09	136603.52	113.74	0.226	07/24/07
299-W10-33	566745.09	136603.52	109.77	0.831	07/27/07
299-W10-33	566745.09	136603.52	107.64	0.906	07/31/07
299-W10-33	566745.09	136603.52	104.59	1.02	08/01/07
299-W10-33	566745.09	136603.52	101.24	1.2	08/02/07
299-W10-33	566745.09	136603.52	99.41	0.801	08/03/07
299-W10-33	566745.09	136603.52	95.45	0.794	08/06/07
299-W10-33	566745.09	136603.52	92.40	0.592	08/08/07
299-W10-33	566745.09	136603.52	89.05	0.688	08/13/07
299-W10-33	566745.09	136603.52	86.00	0.725	08/15/07
299-W10-33	566745.09	136603.52	83.10	0.88	08/21/07
299-W10-33	566745.09	136603.52	80.21	1.08	08/24/07
299-W10-33	566745.09	136603.52	77.16	0.99	08/29/07
299-W11-18	567153.10	137154.52	133.00	1.35	08/29/07
299-W11-3	567612.88	136656.95	132.54	2.48	10/24/06
299-W11-37	567606.35	137011.04	132.00	56	08/30/07
299-W11-43	567269.75	136971.05	125.90	2	06/01/05
299-W11-43	567269.75	136971.05	116.76	2	06/07/05
299-W11-43	567269.75	136971.05	105.79	3	06/09/05
299-W11-43	567269.75	136971.05	89.33	3	06/16/05
299-W11-43	567269.75	136971.05	79.88	3	06/21/05
299-W11-45	566965.17	136768.96	124.92	1.56	05/08/07
299-W11-46	566886.06	136766.32	126.77	1.27	11/27/06
299-W11-47	566906.15	136674.03	121.40	2.66	05/08/07
299-W11-48	566854.31	136839.50	133.00	1.77	04/06/07
299-W11-48	566854.31	136839.50	132.09	1.56	04/10/07
299-W11-48	566854.31	136839.50	127.52	1.08	04/11/07
299-W11-48	566854.31	136839.50	122.94	0.44	04/13/07
299-W11-48	566854.31	136839.50	119.59	1.57	04/17/07
299-W11-48	566854.31	136839.50	116.85	1.34	04/25/07
299-W11-48	566854.31	136839.50	113.49	0.352	05/16/07
299-W11-48	566854.31	136839.50	109.53	1.29	05/17/07
299-W11-48	566854.31	136839.50	107.40	0.679	05/21/07
299-W11-48	566854.31	136839.50	104.35	2.42	05/22/07
299-W11-48	566854.31	136839.50	101.30	0.648	05/23/07
299-W11-48	566854.31	136839.50	99.57	1.38	05/25/07
299-W11-48	566854.31	136839.50	92.46	1.11	05/29/07
299-W11-48	566854.31	136839.50	89.72	0.264	06/01/07

Table A-8. 2007 Uranium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W11-48	566854.31	136839.50	87.28	1.06	06/05/07
299-W11-6	567452.79	136485.91	132.29	1.5	12/21/06
299-W11-7	567232.07	136668.39	132.50	2.18	05/08/07
299-W11-86	568143.53	136610.04	126.97	1.35	06/30/06
299-W11-86	568143.53	136610.04	119.98	1.16	07/07/06
299-W11-86	568143.53	136610.04	106.28	1.19	07/12/06
299-W11-86	568143.53	136610.04	89.48	1.09	07/25/06
299-W11-86	568143.53	136610.04	73.68	1.05	08/04/06
299-W11-87	568113.36	136602.03	104.16	1.45	06/20/07
299-W14-71	567705.73	135561.19	91.18	0.596	10/12/06
299-W14-72	567300.76	135934.65	87.19	0.976	10/02/06
299-W15-15	566060.05	135744.60	135.50	8.33	01/22/07
299-W15-152	566280.63	135543.11	131.85	2.16	07/17/07
299-W15-17	566278.12	135712.06	78.92	1.03	07/26/07
299-W15-224	566280.25	135919.45	131.19	0.91	07/26/07
299-W15-30	566275.85	135742.04	135.00	0.813	07/17/07
299-W15-37	566687.68	135241.45	132.68	0.61	08/28/07
299-W15-46	566752.25	135586.67	132.00	3	09/28/04
299-W15-46	566752.25	135586.67	112.95	1	10/19/04
299-W15-46	566752.25	135586.67	90.85	0	11/10/04
299-W15-46	566752.25	135586.67	42.08	0	01/26/05
299-W15-49	566307.19	135972.91	126.09	1	12/07/04
299-W15-49	566307.19	135972.91	115.42	0	12/09/04
299-W15-49	566307.19	135972.91	107.80	1	12/10/04
299-W15-49	566307.19	135972.91	86.16	0	12/14/04
299-W15-49	566307.19	135972.91	74.27	1	12/15/04
299-W15-50	566793.50	135790.72	127.82	1	01/25/05
299-W15-50	566793.50	135790.72	120.81	1	01/31/05
299-W15-50	566793.50	135790.72	115.63	1	02/02/05
299-W15-50	566793.50	135790.72	105.57	1	02/07/05
299-W15-50	566793.50	135790.72	99.78	0	02/09/05
299-W15-83	566275.75	135819.34	131.98	0.716	07/16/07
299-W15-94	566278.81	135633.45	132.11	0.803	09/12/07
299-W18-15	566351.26	134726.63	130.74	22.9	02/27/07
299-W18-16	566605.06	135425.69	131.69	3	11/22/04
299-W18-16	566605.06	135425.69	119.49	3	12/01/04
299-W18-16	566605.06	135425.69	108.52	2	12/09/04
299-W18-21	566068.94	134971.83	135.50	21.3	01/22/07
299-W18-22	566059.88	134983.30	69.36	1.12	01/26/07
299-W18-23	566055.78	135335.56	135.50	9.89	02/12/07
299-W18-30	566841.96	135186.75	132.00	1.9	08/30/07
299-W19-101	567910.29	135007.21	128.75	158	02/27/07
299-W19-105	567536.32	134738.60	129.80	68	11/29/06
299-W19-107	567970.17	135199.06	119.71	1.22	08/31/07
299-W19-18	567331.83	135005.50	125.90	436	10/26/06
299-W19-34A	567644.80	135005.39	113.34	1.25	08/30/07
299-W19-34B	567634.04	135003.80	87.57	0.941	01/18/07
299-W19-35	567963.25	135008.30	131.00	47.2	06/19/07
299-W19-36	567605.90	135010.19	129.62	613	04/09/07
299-W19-37	567695.00	134943.49	132.50	350	04/05/07

Table A-8. 2007 Uranium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W19-39	567872.89	134879.89	131.52	75.2	02/22/07
299-W19-4	567921.08	135343.92	98.30	0.981	08/31/07
299-W19-43	567670.31	134997.16	130.54	379	07/02/07
299-W19-46	567753.83	134835.61	130.32	169	09/04/07
299-W19-46	567782.69	134842.45	121.95	134	11/20/02
299-W19-46	567782.69	134842.45	115.85	22.9	11/20/02
299-W19-46	567782.69	134842.45	109.79	2.26	11/20/02
299-W19-46	567782.69	134842.45	103.69	0.883	11/21/02
299-W19-46	567782.69	134842.45	98.19	1.57	11/21/02
299-W19-48	567794.08	134919.13	126.89	255	11/29/06
299-W19-48	567822.94	134925.98	123.74	147	11/30/04
299-W19-48	567822.94	134925.98	106.93	1.31	12/09/04
299-W19-48	567822.94	134925.98	89.63	0.965	12/14/04
299-W19-48	567822.94	134925.98	82.93	1.63	12/16/04
299-W19-49	567539.21	134887.53	129.00	63.7	08/31/07
299-W21-2	568095.53	134566.95	129.49	3.8	06/20/07
299-W21-2	568124.38	134573.80	107.74	1.49	12/02/04
299-W21-2	568124.38	134573.80	101.64	0.87	12/06/04
299-W21-2	568124.38	134573.80	98.04	0.52	12/07/04
299-W22-20	567564.26	133872.45	130.28	2.33	09/18/07
299-W22-44	566927.19	134477.59	133.50	4.63	03/23/07
299-W22-45	566916.36	134285.69	133.50	5.83	11/17/06
299-W22-47	566879.94	134069.47	130.49	4.53	03/28/07
299-W22-48	566967.84	134418.27	133.50	3.72	10/04/06
299-W22-49	566875.58	134194.81	133.50	5.63	03/26/07
299-W22-50	566875.46	134132.94	133.50	4.65	03/26/07
299-W22-50	566904.25	134139.75	130.68	3.34	11/29/99
299-W22-50	566904.25	134139.75	125.50	1.09	12/14/99
299-W22-50	566904.25	134139.75	108.74	0.58	12/15/99
299-W22-50	566904.25	134139.75	84.34	0.787	12/17/99
299-W22-50	566904.25	134139.75	69.74	0.43	12/22/99
299-W22-50	566904.25	134139.75	38.04	30.9	01/12/00
299-W22-69	567151.92	134341.27	129.37	0.848	10/04/06
299-W22-72	567209.69	134200.53	129.77	1.06	10/04/06
299-W22-80	566814.06	134118.84	132.13	1.31	03/27/07
299-W22-81	566971.46	134347.36	131.45	6.45	03/26/07
299-W22-82	566975.93	134160.25	131.85	1.2	03/26/07
299-W22-83	566980.28	134085.73	132.01	1.95	06/19/07
299-W22-84	566949.96	134540.78	131.74	3.61	03/27/07
299-W22-85	566874.10	134253.76	132.18	2.61	03/26/07
299-W22-86	567159.06	134034.77	129.80	3.86	10/04/06
299-W22-87	567512.92	134533.04	129.65	1.16	06/05/07
299-W22-9	567710.85	134035.92	128.42	0.321	09/18/07
299-W23-15	566765.21	134120.41	133.50	8.08	11/17/06
299-W23-19	566730.33	134159.84	133.50	12.4	03/30/07
299-W23-20	566688.88	134439.36	132.07	3.53	03/26/07
299-W23-21	566678.95	134287.17	132.11	13.8	03/26/07
299-W23-4	566599.43	134385.05	129.85	33.4	08/31/07
299-W23-9	566613.20	134267.80	134.00	19.8	09/18/07
299-W26-13	566395.61	133286.82	132.04	1.92	06/20/07

Table A-8. 2007 Uranium Plume Shell Data Set, 200 West Area

Well Name	Easting (m)	Northing (m)	Elevation (m msl)	Concentration (ug/L)	Sample Date
299-W26-14	566653.90	133532.43	131.25	0.961	06/20/07
299-W7-3	566263.26	137631.65	62.17	1.12	09/11/07
299-W7-4	566380.00	137301.27	134.00	1.79	04/20/07
299-W8-1	565720.68	137639.65	134.50	1.1	10/26/06
699-30-66	569962.02	132732.44	90.82	1.88	06/01/07
699-35-66A	569828.91	134092.43	131.00	12.55	03/29/07
699-35-78A	566034.83	134264.45	132.02	11.5	06/26/07
699-36-70A	568437.80	134302.02	132.20	2.6	03/29/07
699-36-70B	568398.91	134619.14	128.64	5.23	04/18/07
699-36-70B	568427.81	134625.98	121.53	0.598	08/31/04
699-36-70B	568427.81	134625.98	110.89	0.05	09/09/04
699-36-70B	568427.81	134625.98	100.19	1.59	09/14/04
699-36-70B	568427.81	134625.98	86.49	0.11	09/23/04
699-38-68A	569151.39	134924.75	130.00	3.05	09/24/07
699-38-70	568472.06	135082.34	120.93	47.2	11/02/06
699-38-70B	568469.13	135331.05	126.11	1	02/04/04
699-38-70B	568469.13	135331.05	115.75	1	02/05/04
699-38-70B	568469.13	135331.05	107.83	1	02/06/04
699-38-70B	568469.13	135331.05	97.16	1	02/06/04
699-38-70B	568469.13	135331.05	88.01	1	02/11/04
699-38-70B	568469.13	135331.05	75.97	1	02/27/04
699-38-70C	569084.13	135325.58	125.65	3	02/18/04
699-38-70C	569084.13	135325.58	114.68	3	02/19/04
699-38-70C	569055.20	135318.70	103.03	6.03	02/20/07
699-38-70C	569084.13	135325.58	98.53	3	02/20/04
699-40-62	571135.28	135757.55	120.88	1.94	08/06/07
699-40-65	570057.50	135881.16	120.91	2	12/18/03
699-40-65	570057.50	135881.16	90.13	3	12/31/03
699-44-64	570361.68	136890.48	106.67	1.61	08/06/07
699-47-60	571445.35	137961.72	118.50	2.51	03/29/07
699-48-71	568359.04	138049.93	128.42	1.36	06/30/07
699-48-77A	566384.45	137961.85	133.50	0.233	07/23/07
699-48-77C	566440.18	138079.79	114.42	0.444	04/03/07
699-48-77D	566404.53	138112.25	133.50	1.2	04/03/07

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