

Summary of Water-Modeling Activities

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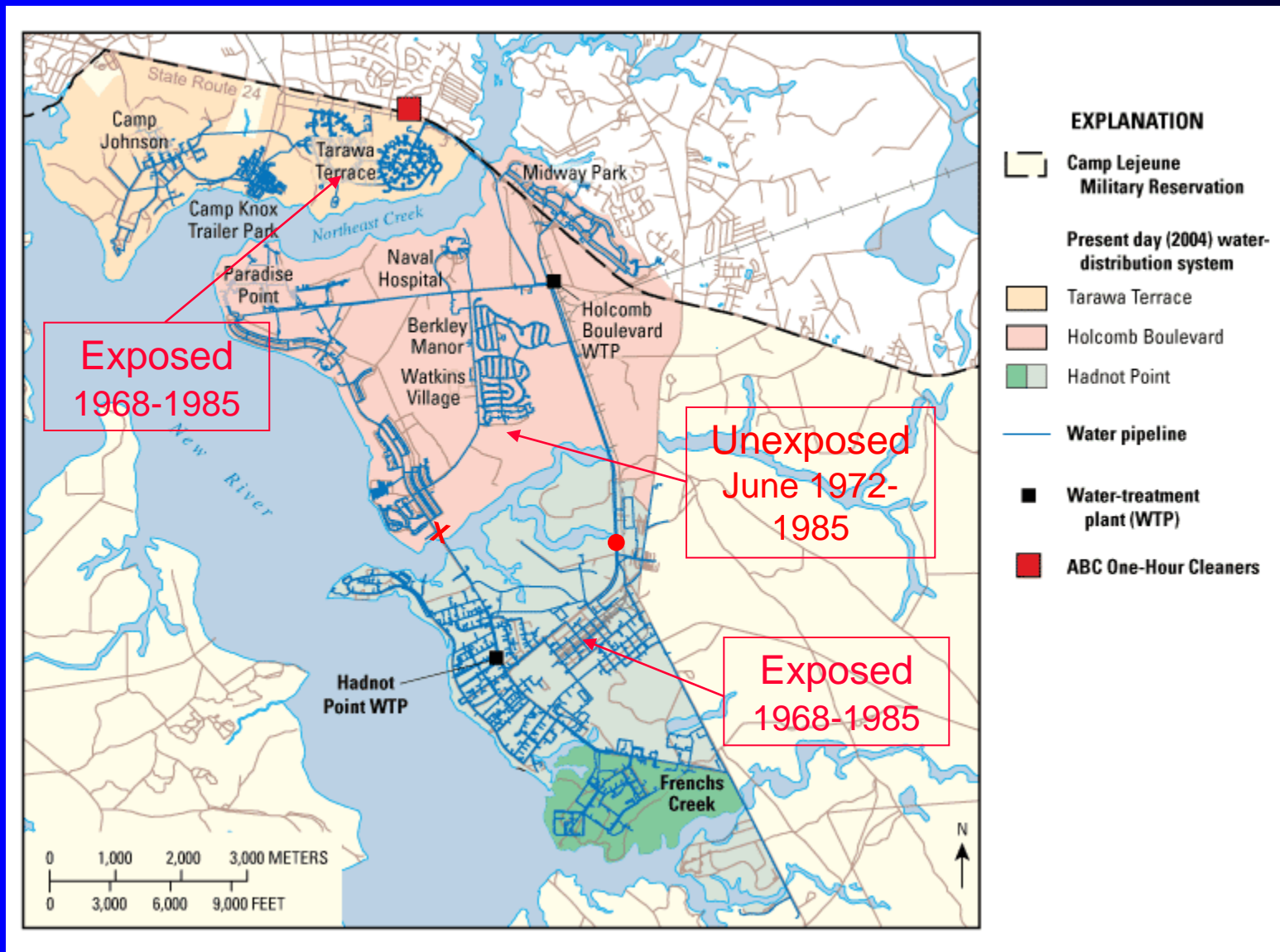
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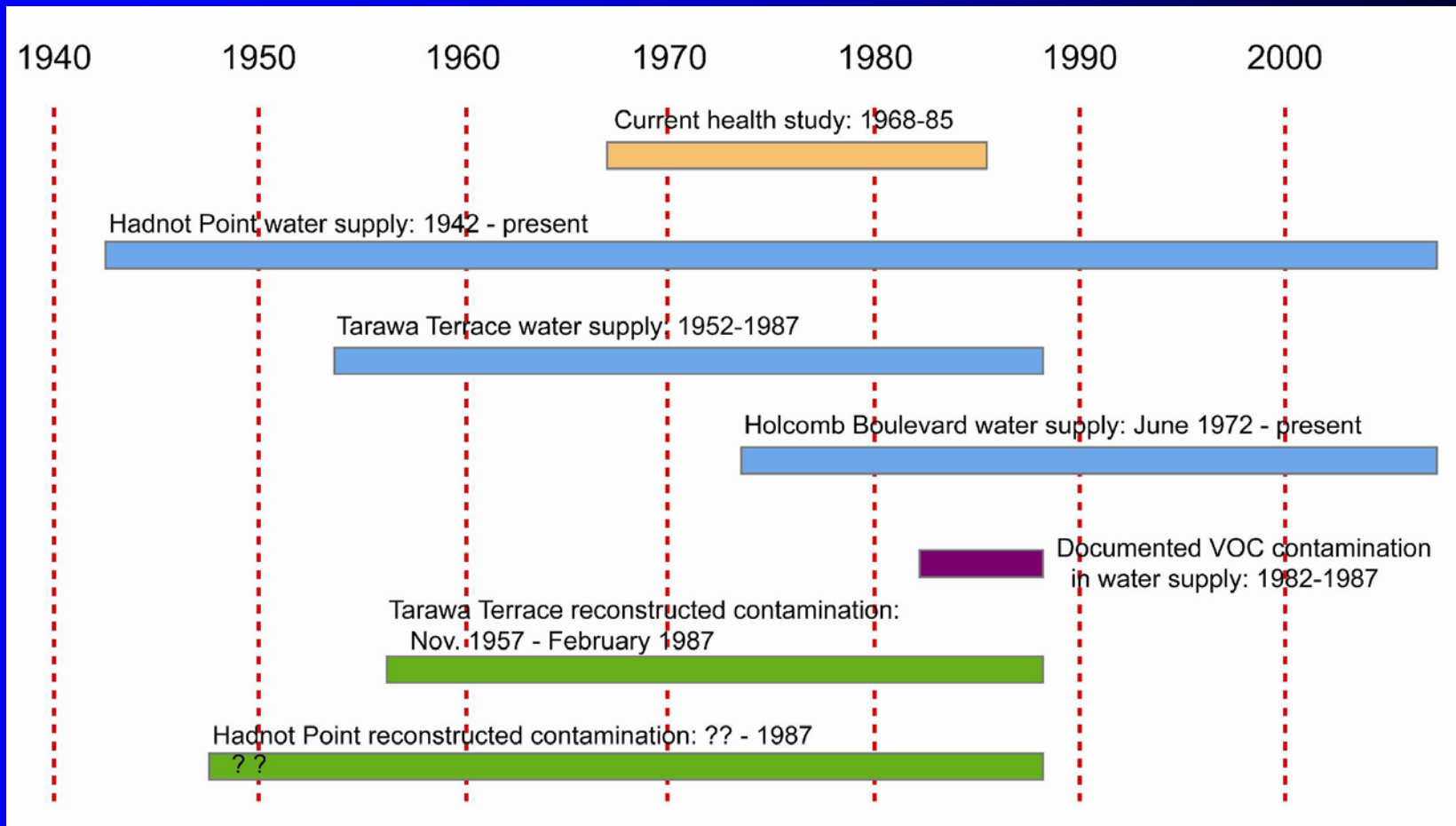
Goals and objectives of water-modeling activities supporting current health study

- Arrival dates of contaminants at wells
- Distribution of contaminants by housing location
 - Concentration of finished drinking water at water treatment plant (WTP)
- Monthly mean concentrations
- Reliability of, and confidence in, water-modeling results
 - Range of concentration values for a specified month

Epidemiological study areas



Generalized chronology of events



Presentation topics

- Tarawa Terrace expert panel recommendations
- Tarawa Terrace water-modeling results
- Hadnot Point, Holcomb Boulevard, and vicinity
 - Activities and analyses

Tarawa Terrace Expert Panel Recommendations



Expert Peer Review Panel Evaluating ATSDR's Water Modeling Activities in Support of the Current Study of Childhood Birth Defects and Cancer at U.S. Marine Corps Base Camp Lejeune, North Carolina –

Analyses of Groundwater Resources and Present-Day (2004) Water-Distribution Systems, March 28-29, 2005



Edited by
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**Agency for
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- 6.1: Data discovery
- 6.2: Event chronology
- 6.3: Groundwater modeling for Tarawa Terrace
- 6.4: Data analyses for Hadnot Point
- 6.5: Water-distribution analyses

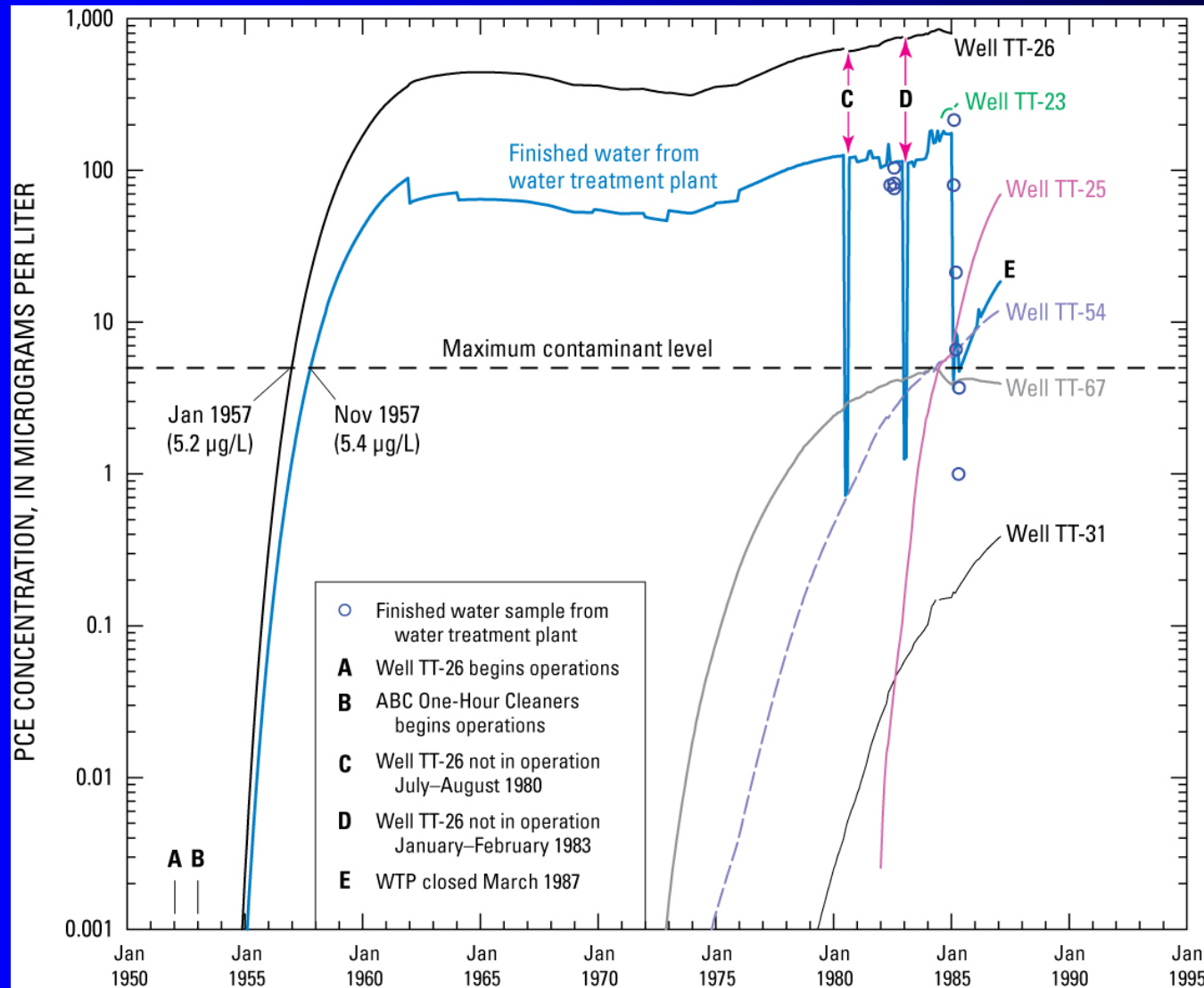
Implementation of Tarawa Terrace Expert Panel Recommendations

TT Chapter A Report Section	Page No.	Recommendation Number
Data Needs and Availability	A14	6.1
Chronology of Events	A15	6.2
Relation of Contamination to Water Supply, Production, and Distribution	A17-A22	6.1, 6.3
Selected Simulation Results	A32-A39	6.3.4 (dispersive fate/transport)
Concentration of PCE in Finished Water	A40	6.5 (simple mixing)
Water-Supply Well Scheduling	A47-A49	6.3.3 (on-off scheduling)
Sensitivity Analysis	A50-A60	6.3.1 (sensitivity and uncertainty analysis)

Tarawa Terrace Modeling Results: The “Big” Picture

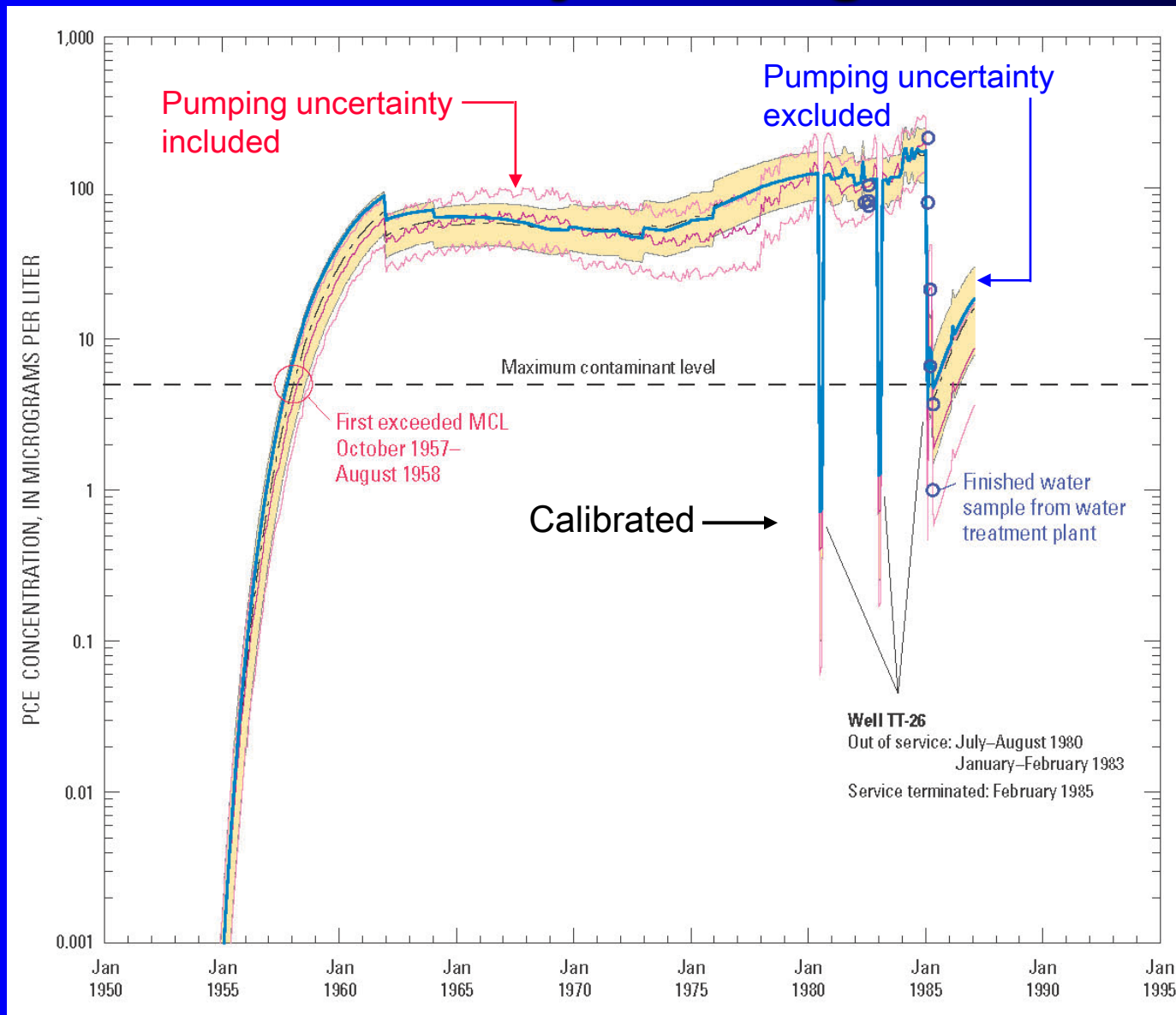
- Calibrated models are useful for the epidemiological study
 - Groundwater flow, fate and transport, and mixing
- Concentrations measured during 1980s are representative of high concentrations experienced over many years
 - No indications that finished water had higher concentrations
- Conclusions would not be possible without using groundwater modeling

Calibrated results – mean values



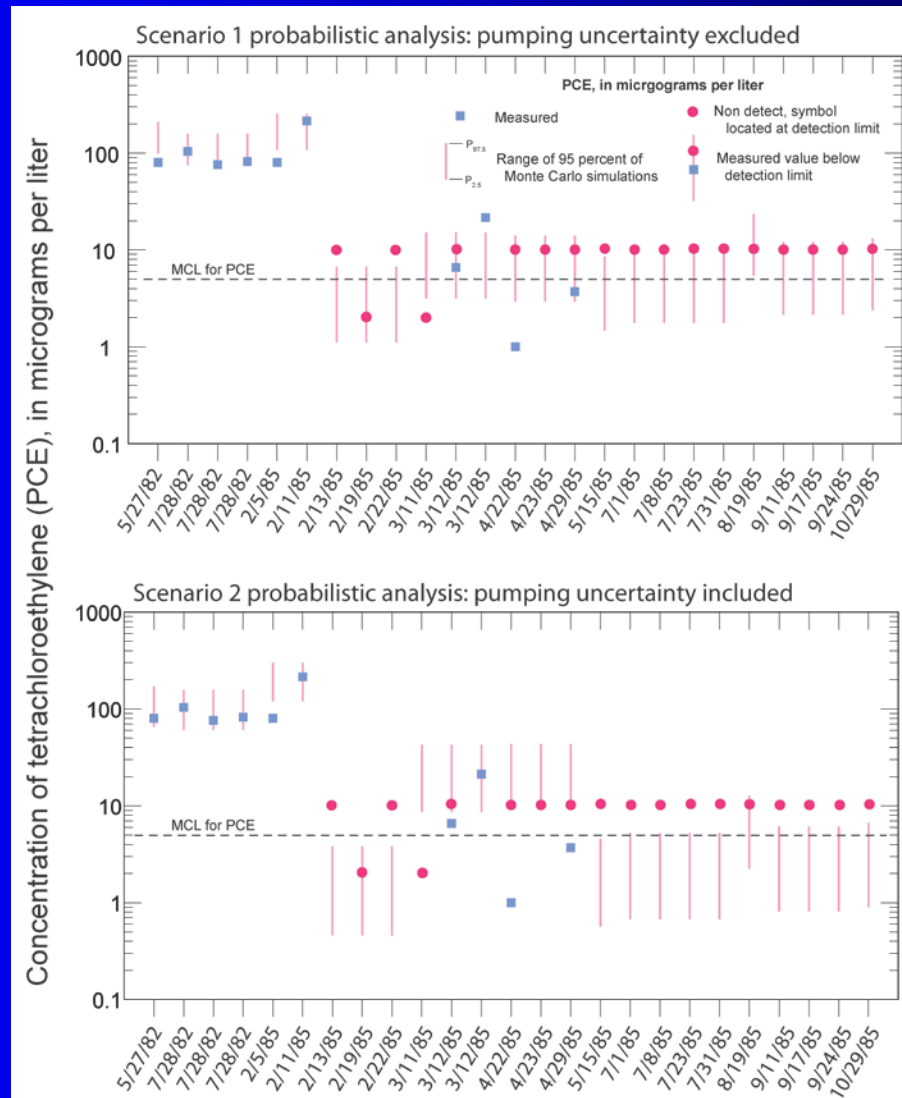
*** DRAFT - SUBJECT TO CHANGE ***

Probabilistic analysis range of values



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Tarawa Terrace water treatment plant: measured vs. range of values



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Hadnot Point, Holcomb Boulevard and vicinity: activities and analyses

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Status of HP/HB water-modeling analyses – March 2009

- Data analyses
 - 95% complete*
- Data report
 - Draft 95% complete
- Statistical and fate property analyses
 - 95% complete
- Groundwater flow/fate and transport modeling
 - 10% complete
- Water-distribution system modeling
 - Calibrated “all-pipes” network models for HP and HB
 - Initial simulations of “HP/HB interconnection scenarios”

*Does NOT include information from 100+ UST reports

*** *D R A F T - S U B J E C T T O C H A N G E* ***

Data Availability

Item	Hadnot Point and vicinity	Tarawa Terrace and vicinity
Active model domain	50 mi ²	2.1 mi ²
Wells and boreholes (including hydropunch)	868*	222
Water-level measurements	5,407*	789
Groundwater samples analyzed for chlorinated solvents (PCE, TCE, DCE, Vinyl Chloride)	2,420*	192
Groundwater samples analyzed for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)	2,611*	191
Supply well tests	69 supply wells 132 pump/aquifer tests	No supply well test data
Monitor well tests	67 monitor wells 25 pump/aquifer tests 60 slug tests	28 monitor wells 32 pump/aquifer tests

*Does NOT include information from 100+ UST reports

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Thank You!

Questions and Discussion