Baker

1/19/01- 01108

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January 19, 2001

Commander
Atlantic Division
Naval Facilities Engineering Command
1510 Gilbert Street (Bldg. N-26)
Norfolk, Virginia 23511-2699

Attn: Mr. Christopher T. Penny
Navy Technical Representative
Code EV23

Re: Contract N62470-95-D-6007
Navy CLEAN, District III
Contract Task Order (CTO) 0034
Naval Station Roosevelt Roads (NSRR)
Tow Way Fuel Farm (TWFF) CMS Meeting Minutes – December 19, 2000

Dear Mr. Penny:

Transmitted under the cover of this letter are the final minutes from the TWFF CMS Meeting conducted at EPA Region II offices in New York City on December 19, 2000. The Draft meeting minutes were distributed to all participants for review and comment via the project web site on January 3, 2001. None of the recipients had any comments on the meeting minutes.

Sincerely,

BAKER ENVIRONMENTAL, INC.

Mark E. Kimes, P.E.
Activity Coordinator

MEK/lp
Attachment

cc: Ms. Madeline Rivera - NSRR (w/attachment)
~~Mr. Kevin Gloe – LANTDIV Code EV23 (w/attachment)~~
Mr. Tim Gordon - USEPA Region II (w/attachment)
Ms. Kathy Rogovin – Booz, Allen & Hamilton (w/attachment)
Mr. Joe Etheridge – Baker Environmental (w/attachment)
Mr. Mark Kimes – Baker Environmental (w/attachment)
Mr. Greg Eades – Booz, Allen & Hamilton (w/attachment)
Mr. John Tomik - CH_2M Hill (w/attachment)
Mr. Alan Leinbach – Baker Environmental (w/attachment)

TWFF CMS Meeting
Meeting Minutes
12/19/00
EPA Region 2, New York, NY

Participants:

Matt Schoen -- EPA Region 2
Tim Gordon -- EPA Region 2
Kathy Rogovin -- Booz Allen & Hamilton
Greg Eades -- Booz Allen & Hamilton
Alan Leinbach – Baker Environmental, Inc.
Mark Kimes – Baker Environmental, Inc.
Joe Etheridge – Baker Environmental, Inc.
John Tomik – CH2MHill
Chris Penny – US Navy (LANTDIV)
Kevin Cloe – US Navy (LANTDIV)

Minutes:

The meeting was held on December 19, 2000 at EPA Region 2 office in New York. The meeting began at 9:45 AM and ended at approximately 3:00 PM. The power point presentation from the meeting has been attached to these minutes (Attachment 1) for reference.

Introduction:

Mr. Gordon initiates introductions.

Mr. Penny introduces purpose of meeting, thanks everyone for coming, and outlines a brief history of the project. He explains the need to update certain information, primarily due to new information obtained since the 1997 RFI.

Mr. Etheridge starts presentation. Introduces figures with well locations, product thickness, screen height, and zones. Discussion of how the figures don't distinguish wells with low product thickness from wells with no product (due to details of query used to generate figure) occurs. Mr. Penny states that final figures will have more explanation accompanying them about what is presented in the map log. Mr. Gordon states for the record that EPA policy is for wells evaluating product to be installed with the screen two feet above the seasonally high water level. Five zones were presented. Zone 1 was the phase separated hydrocarbon plume near RW-1. Zone 2 was the phase separated hydrocarbon plume near the TWFF main gate running east and north along Forrestal Road. Zone 3 was the phase separated hydrocarbon plume associated with the Pier 1 investigation. Zone 4 was the dissolved TCE plume near 7MW-07. Zone 5 was the dissolved benzene plume south of Zone 1. Discussion was primarily on Zone 3 and how product thickness was based on different criteria than product thickness in Zones 1 and 2. It was agreed that the appended presentation (primarily minor map changes) would accompany the meeting minutes

Additional data requirements discussed. Installation of 6 monitor wells and sampling and analysis of 20 monitor wells for VOCs, SVOCs, and RCRA metals. Mr. Etheridge proposed 4 monitor wells in the Pier I area and two replacement wells for key monitor wells with existing screens below the water table. Mr. Tomik suggested that maps and explanation of well locations accompany these minutes so they can be discussed prior to submittal of a work plan. Agreement was reached on this issue. However, some discussion of well locations did occur.

Mr. Etheridge proposed that well UGW-10 should be replaced due to the screened interval being below the water table. Mr. Gordon stressed the importance of determining the purpose of each additional well to optimize location and determine well diameter. The purpose of this well was discussed. Should it

be a compliance well and moved south? Should it be an extraction well? If so, it may need to be larger than a two-inch monitor well.

Mr. Gordon asked whether any product recovery has been occurring in the Pier 1 area. Mr. Kimes replied that some recovery is occurring by truck extraction at the site by J. A. Jones. Volumes were not measured.

Mr. Etheridge proposed another well between UGW-9 and GW-06 in the center of the thickest part of Zone 3 and a well in the Pier 1 separate southern "island" of apparent product. This well should be either an extraction well or compliance well, depending upon the outcome of data collection.

Some discussion of the currently existing bulkhead and the extension that has been constructed occurred. Mr. Penny and Mr. Kimes reported that the new bulkhead along the eastern edge of Pier 1 appears to be deep, steel sheet pilings pounded into the underlying hydrologic confining unit. The construction details of the existing bulkhead along the shore to the east of Pier 1 were not known and LANTDIV and Baker will look into this. Sheens have been observed to the northwest of Pier 1 in two small coves at various times.

It was agreed that a proposal of well locations would be transmitted in the minutes of this meeting to streamline the review process (attachment 2), followed by a formal submittal of a work plan at a later date.

Mr. Gordon summarized the discussion of new data collection efforts and clarified that new monitor wells seemed to be more for the purpose of defining "extent" than specifically for sentinel, compliance, or extraction purposes. The analysis of results from the field effort will determine the specific designation of the new monitor wells.

Discussion of the concept of compliance ensued. Mr. Tomik asked EPA's opinion on this topic. Agreement about compliance point being at surface water/groundwater interface had been reached, but Mr. Gordon also thought that locations to east and west of present locations of plumes also should be monitored. Mr. Gordon explained his view of the sentinel concept versus a cleanup level. The monitoring at compliance locations must show that the plume is characterized, contained, and within levels prescribed by human health and ecological acceptable limits.

Risk Assessment:

Mr. Leinbach went through the chronology of documents prepared for the TWFF (SWMUs 7 and 8). Mr. Gordon pointed out that January 2000 CMS Task I report was missing. Mr. Etheridge agreed to add it in.

Mr. Leinbach presented the augmented risk assessment approach proposed for TWFF. The link between the baseline risk assessment and the CMS in the form of selection of COCs was presented. The draft RCRA guidance on "Results-Based Approach" was presented as supporting justification for the augmented approach.

Discussion of soil background ensued. Mr. Gordon asked about the data set. Mr. Leinbach replied that the four facility-wide samples collected in the RFI might be accompanied by SWMU 9 data. Ms. Rogovin agreed with the proposal to screen out metals based on background prior to calculating corrective action objectives (CAOs). Mr. Kimes added that this data set is being compared against USGS island wide soil data.

Mr. Gordon mentioned that the UST regulations for Puerto Rico include a 100-ppm TPH soil screening level. In the context of discussion about the Johnson and Ettinger model for estimating exposure to indoor air emitted from volatilization of contaminants in groundwater, Mr. Tomik stated that an institutional control could be to not allow buildings over areas underlain by groundwater with free product. Mr. Gordon stated that the numerical free product CAO would also be utilized to mitigate this risk. Mr. Gordon added that the Johnson and Ettinger model is looked at favorably by the recent Environmental Indicator conference. The Environmental Indicator concept applies to the entire facility so it was unclear how this would affect TWFF activities.

The approach to evaluating PAHs was briefly discussed. Ms. Rogovin agreed that dermal contact exposure should be included for developing PAH CAOs although she added that the new 1999 dermal

guidance points out that considerable uncertainty still exists on PAH dermal exposure from soil. Ms. Rogovin also agreed that treating the various carcinogenic PAHs individually was favorable to treating them as an entire class.

Ms. Rogovin wanted to clarify what the non-potable groundwater exposure scenario for construction worker included. Mr. Leinbach replied that inhalation of volatiles emitted from groundwater was added to the exposure pathways of accidental ingestion and dermal contact.

Mr. Gordon questioned the text supporting the land use and receptors in the Task 1 report. He agreed that military land use was expected in the future but thought that it should be supported better with the use of Land Use Plans or Master Plans. Mr. Penny agreed and stated that land use controls and use will be part of the Base commander signature document that should be available at the next meeting. He described how we already possess documentation concerning the process of determining these issues and it will be part of the Section 3.0 report as well as the CMS.

The first slide of "specific differences to TWFF RA" was agreed to. Discussion about the ingestion rate for industrial and construction worker receptors took place. Ms Rogovin agreed to the 100-mg/day ingestion rate for construction workers in order to be consistent with what was previously agreed to at another SWMU. She agreed to provide a better citation to use in the report to justify this agreement. Several participants questioned the reduction of the exposure frequency from 180 days/year for soil to 10 days/year for groundwater. Mr. Leinbach admitted that the 10-days/year value was an arbitrary reduction from the clearly unreasonable value of 180 days/year. Mr. Gordon recommended that it would be more supportable to use the proportion of the total exposure time that the construction worker is at the site that he would be exposed to groundwater (e.g., 10 percent). Mr. Penny suggested that Means or Navy data may be able to be used to calculate actual time required for pipe fitting that could be translated into an exposure frequency. The inhalation rates for the industrial and construction worker scenarios were discussed. Mr. Leinbach proposed using 1.3 m^3/hour for both receptors although in a previous response to a comment it was agreed that 2.5 m^3/hr and 15 m^3/day would be used for the construction worker and industrial worker, respectively. Ms. Rogovin will reevaluate these values and give a recommendation.

It was agreed to place all of the specific differences to the RA at TWFF outlined in Mr. Leinbach's final two slides (Attachment 3), accompanied by non-default Johnson and Ettinger and the SSL VF model variables (Attachment 4), on the NSRR web site for further review.

CMS:

Rick Kuhlthru, a hydrogeologist working for Booz Allen & Hamilton, joined the meeting via phone primarily to discuss issues related to groundwater modeling. Mr. Etheridge went through the CMS flowchart slides and focussed on the preferred alternative. He noted that discharge options were not included in the Task I report for screening. Four options for discharge of effluent water will be added to the CMS.

The modeling effort was briefly discussed. Mr. Kuhlthru asked about the boundary conditions of the model and the purpose of the model. He pointed out that the grid spacing and other modeling details can be affected by the model's purpose. It would be advantageous to discuss this prior to submittal of the CMS so that time and effort are not wasted going through with a model that is not optimally designed. It was agreed that these issues needed to be discussed prior to the CMS and that the best way would be to place on the NSRR web site a framework proposal of the model followed by a teleconference with the appropriate individuals.

The point of compliance came up again with regard to modeling. Mr. Gordon said that the model could be used to determine which wells are located at the optimal point(s) of compliance. Mr. Etheridge and Mr. Gordon stated that the model would hopefully support whatever corrective action was evaluated in the CMS.

Mr. Etheridge raised the issue of discharge, particularly pertaining to UIC (Underground Injection Control). Obtaining UIC permits from Puerto Rico EQB may prove difficult and EPA may be able to assist

to expedite permitting. Mr. Penny stated that UIC delays could seriously affect funding for the project. Mr. Etheridge also pointed out that EQB is sensitive about background metals and that the NSRR treatment plant cannot receive waste waters with metals because only organics are treated and the NPDES permitted values for metals are extremely low. Therefore, background concentrations of metals in groundwater are very important, as infiltration/re-injection are the most likely alternatives. Mr. Etheridge explained that SWMU 9 may be combined with NSRR background wells and other unaffected TWFF wells to create a more robust groundwater data set for background.

Mr. Eades asked Mr. Etheridge his opinion of the pneumatic fracturing pilot study results. Mr. Etheridge replied that it appeared to be successful in some locations to augment recovery of free product and not successful in other places. He thought the CMS would not screen it out but not recommend it either. Rather it would be considered as an enhancement technique in some circumstances.

Schedule:

It was agreed that the Task 1 Section 3.0 report would be submitted January 31, 2001 followed by the CMS Final Report 90 days after receiving preliminary results from the new data collection efforts. Additionally, a work plan for the additional work will be submitted by January 31.

Attachment 1
Power Point Presentation

TOW WAY FUEL FARM CORRECTIVE MEASURES STUDY UPDATE

Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000

TWFF CMS UPDATE

- Introductions
- Overview
- Additional Data Requirements
- Risk Assessment
- Corrective Measures Study
- Questions/Discussion/Agreements

Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000

OVERVIEW

- November 8 Letter from Navy to EPA (Section 3.0 CMS Task 1)
- Section 3.0 CMS Task 1 Submit to EPA 31 Jan 01
- Finalize CMS (Task 2, 3, & 4) Submit to EPA 90 Days after EPA Approval of Section 3.0 Task 1 Submittal
- Identify Steps/Tasks to Finalize CMS

Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000

OVERVIEW

- Complete CMS Section 3.0 Task 1 (Risk Assessment)
- Drill Six Additional Monitor Wells
  - Replace Some Monitor Wells Screened Below Water Table (FP Measurements)
  - Capture Data in Areas Where Monitor Wells Are Needed
- Sample/Analyze Selected Monitor Wells for Dissolved Constituents
- Complete Groundwater Model
- Submit Final CMS

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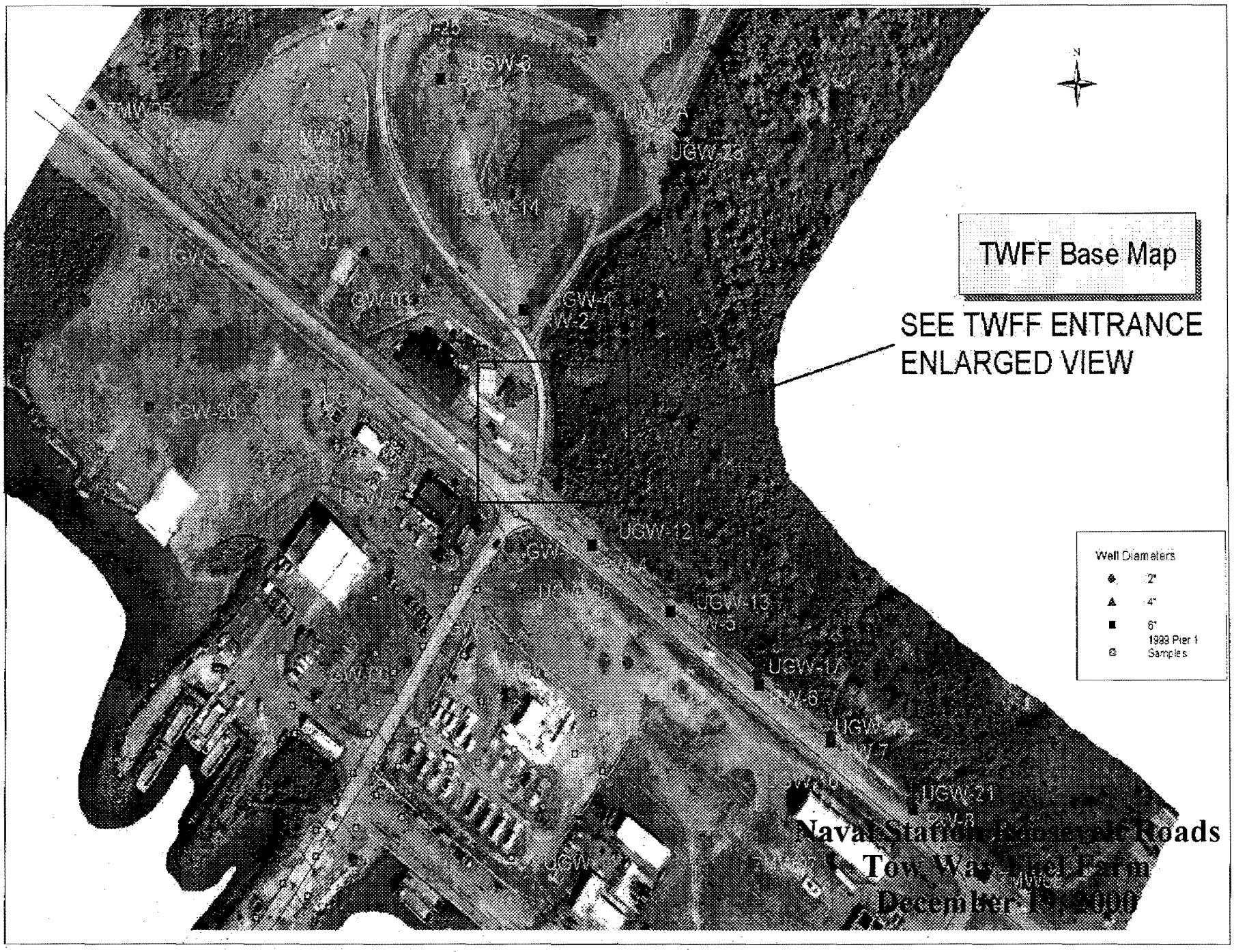
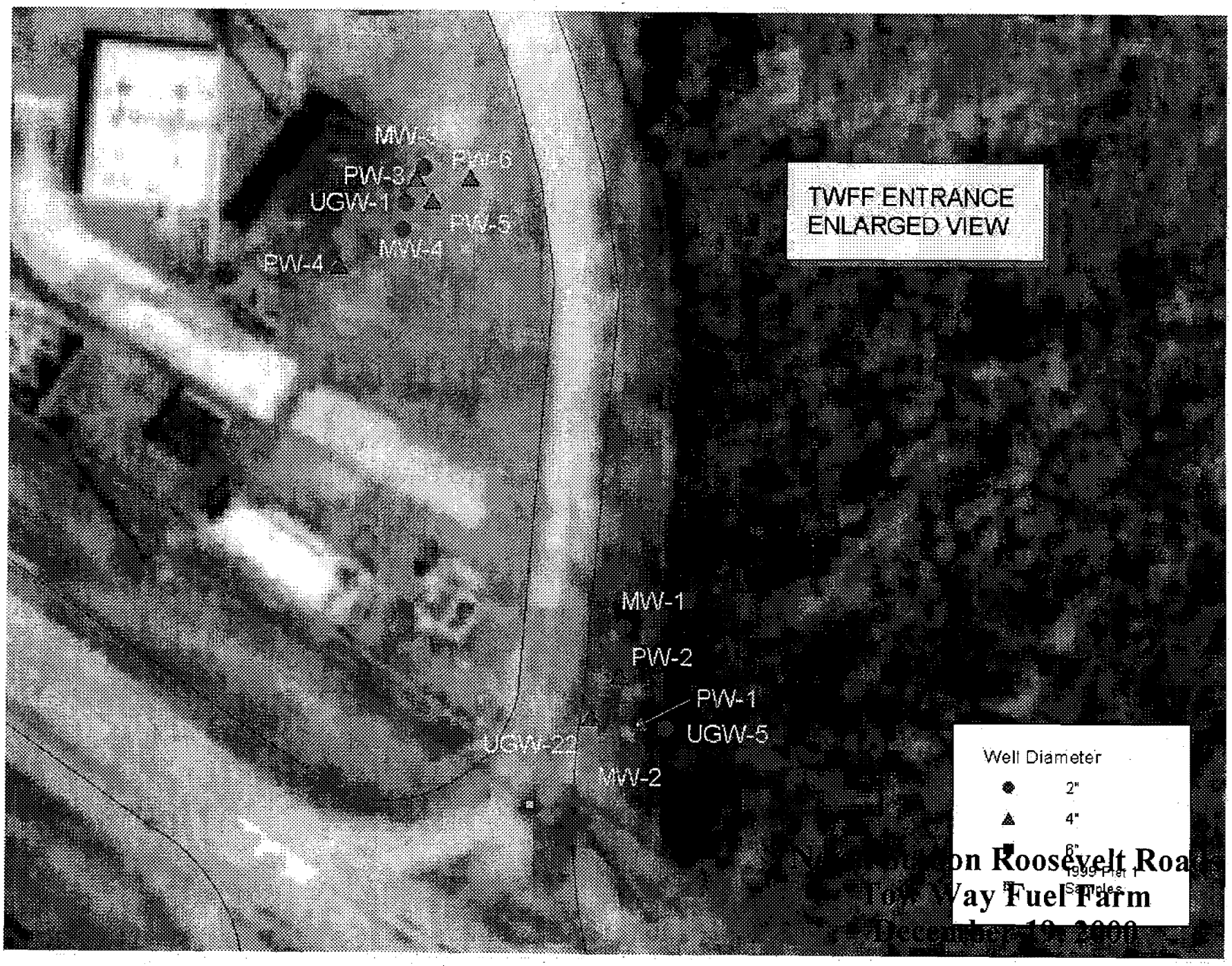
Tow Way Fuel Farm
December 19, 2000


TWFF Base Map
SEE TWFF ENTRANCE
ENLARGED VIEW
Well Diameters
2"
4"
6"
1999 Pier 1
Samples
UGW-3
UGW-23
UGW-14
UGW-4
UGW-12
UGW-13
UGW-17
UGW-21
Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000



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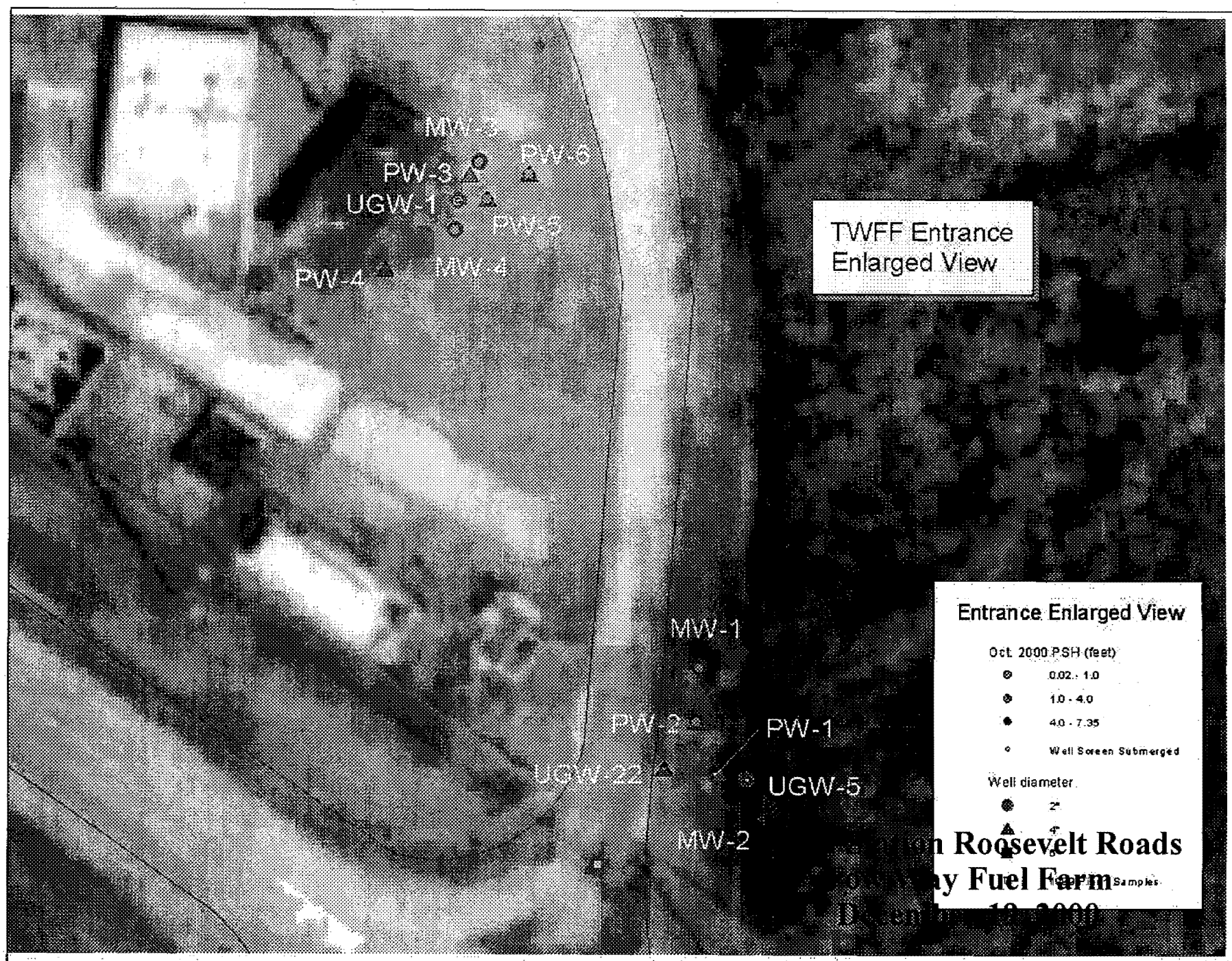
Tow Way Fuel Farm
December 10, 2000



...on Roosevelt Roads
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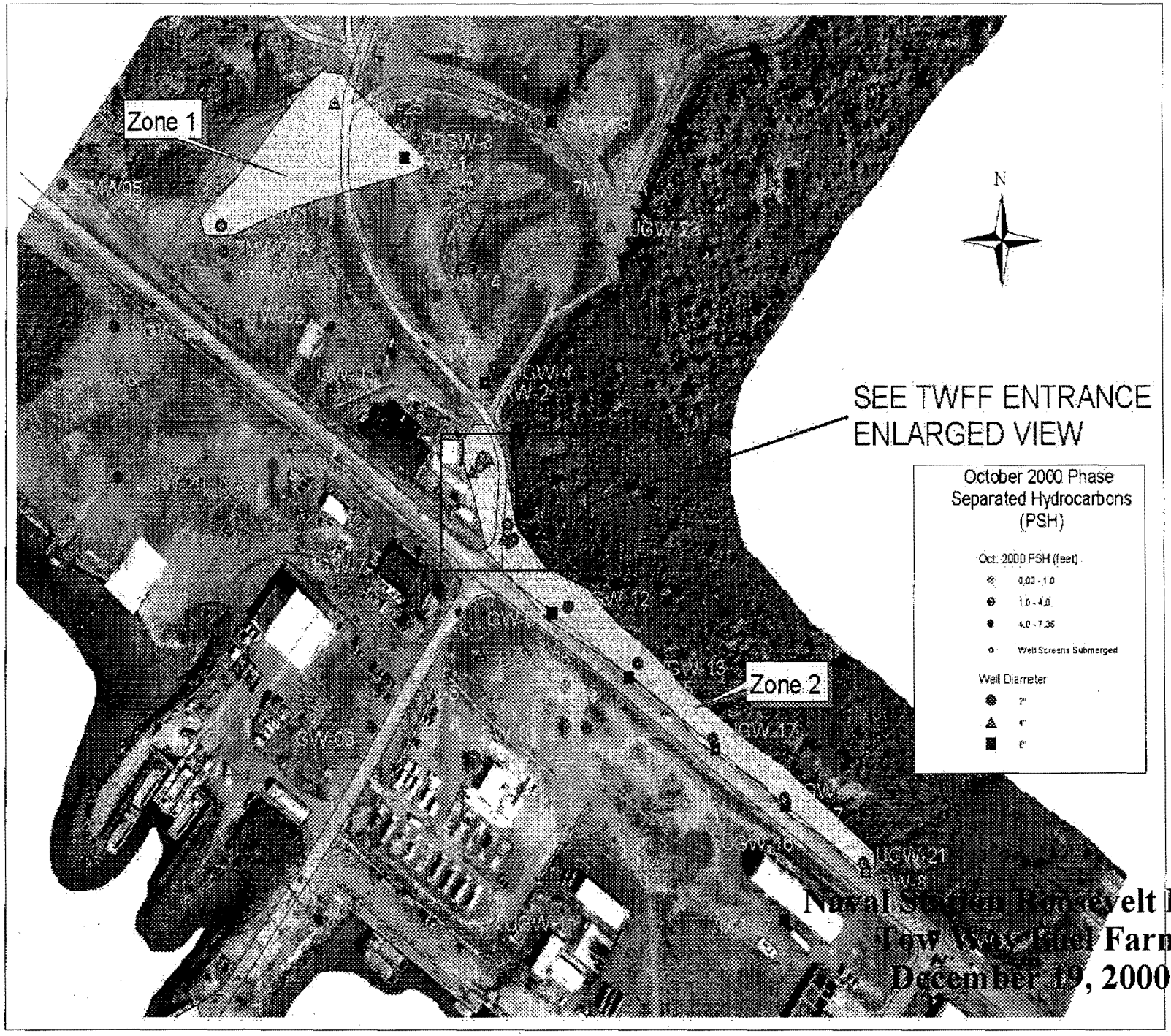
December 19, 2000



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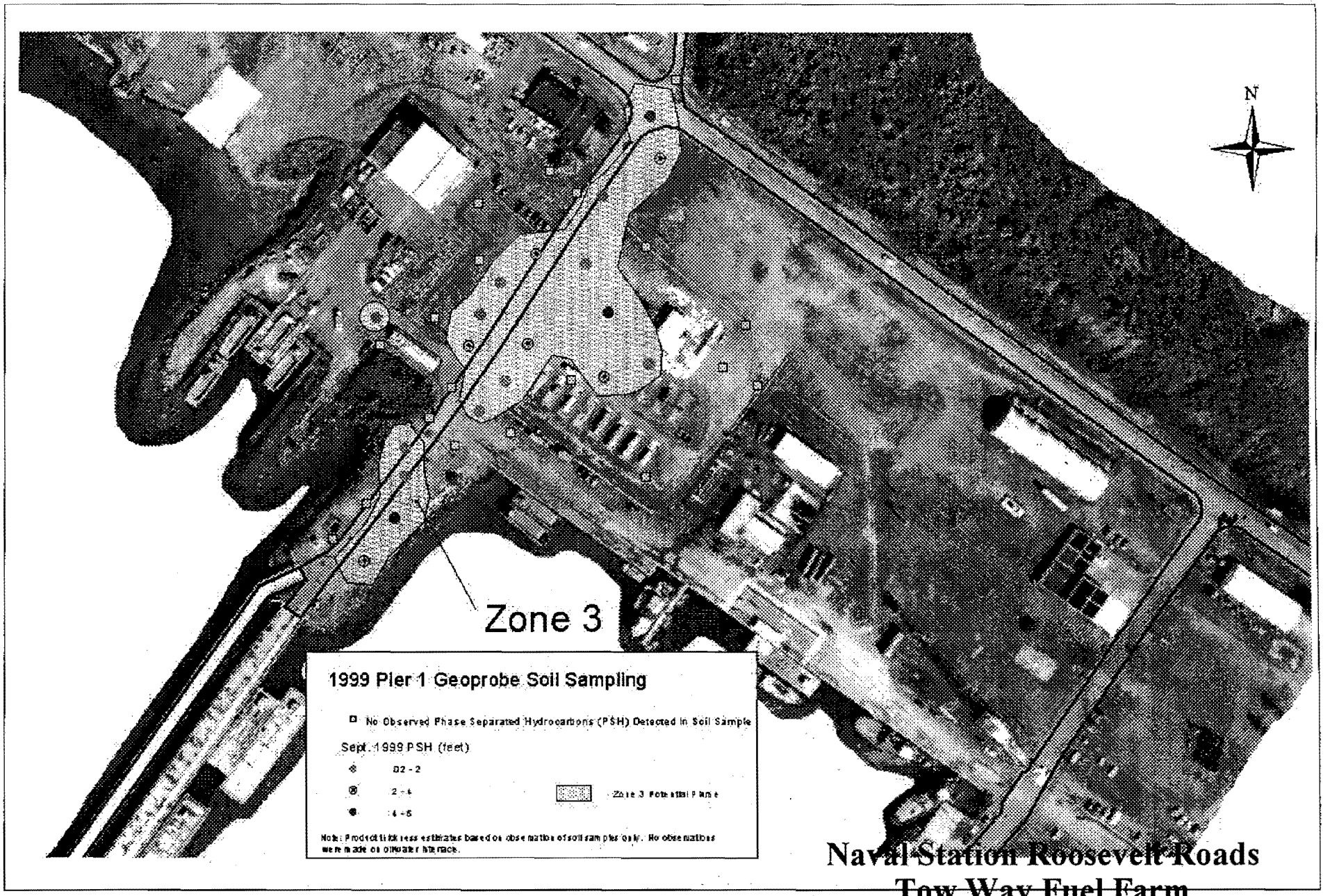

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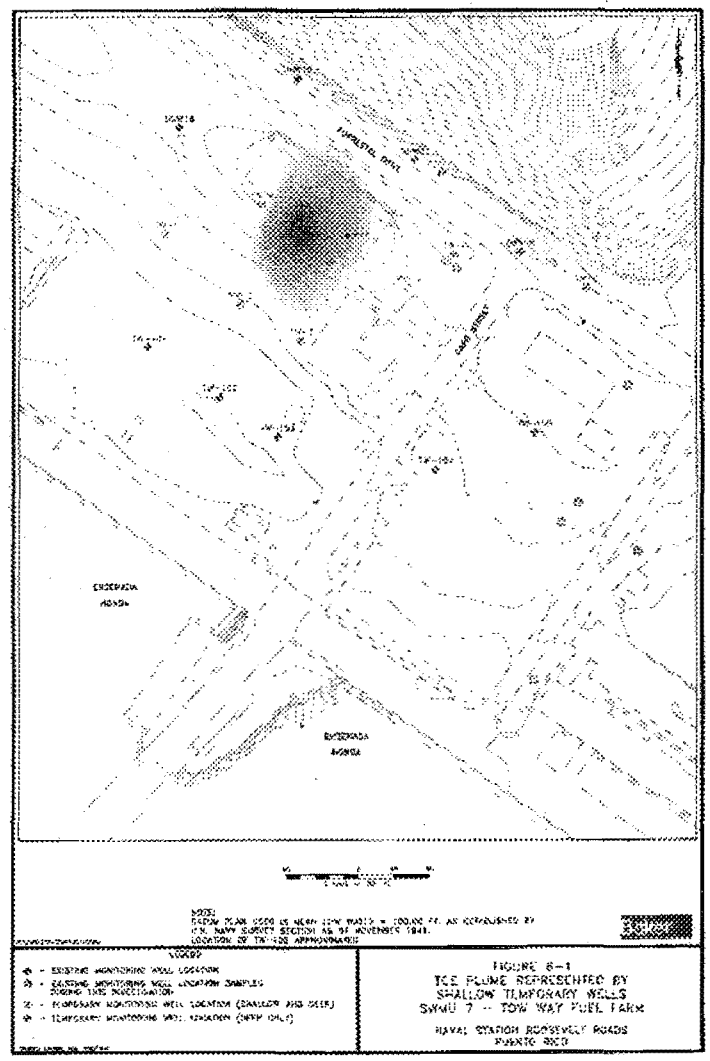

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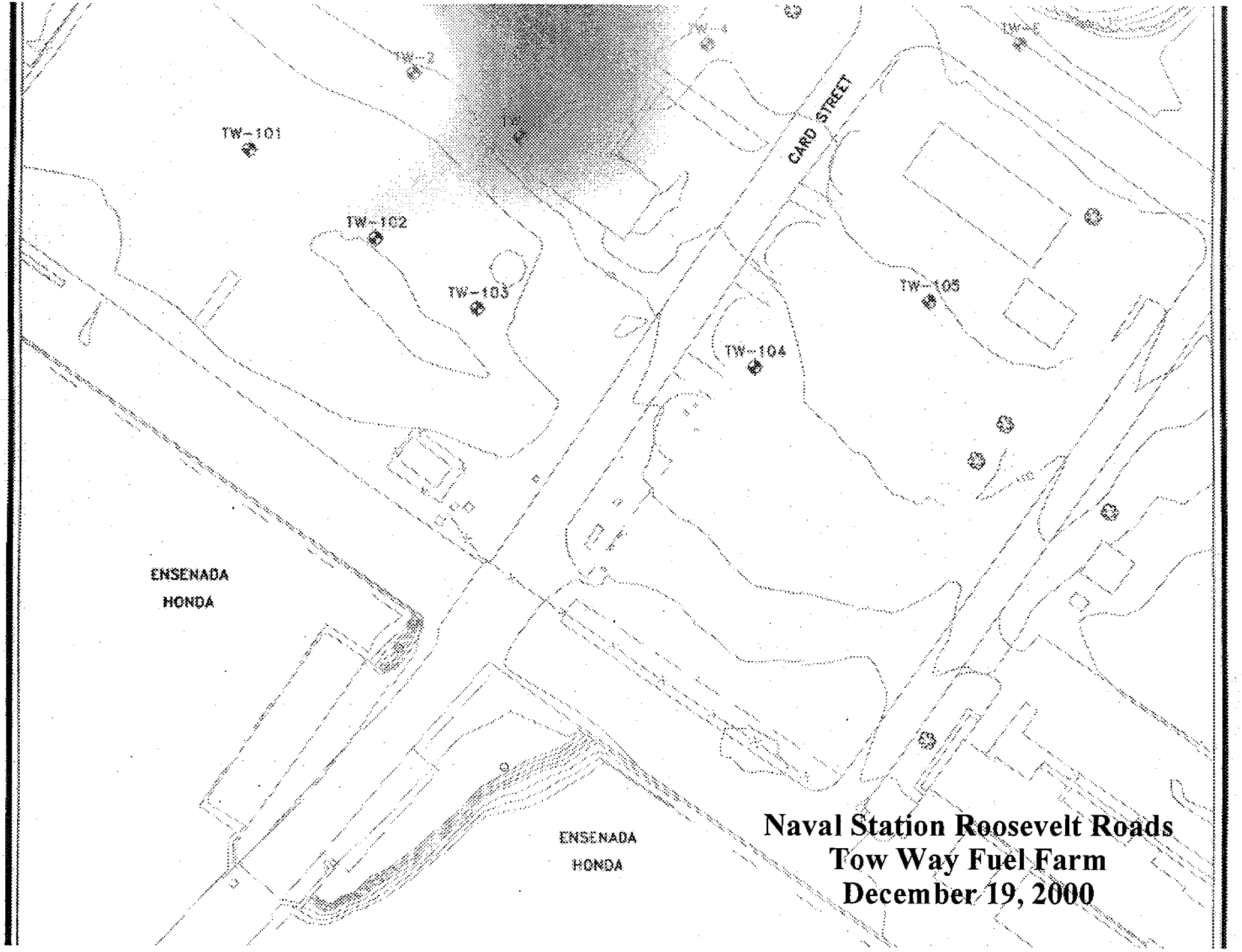

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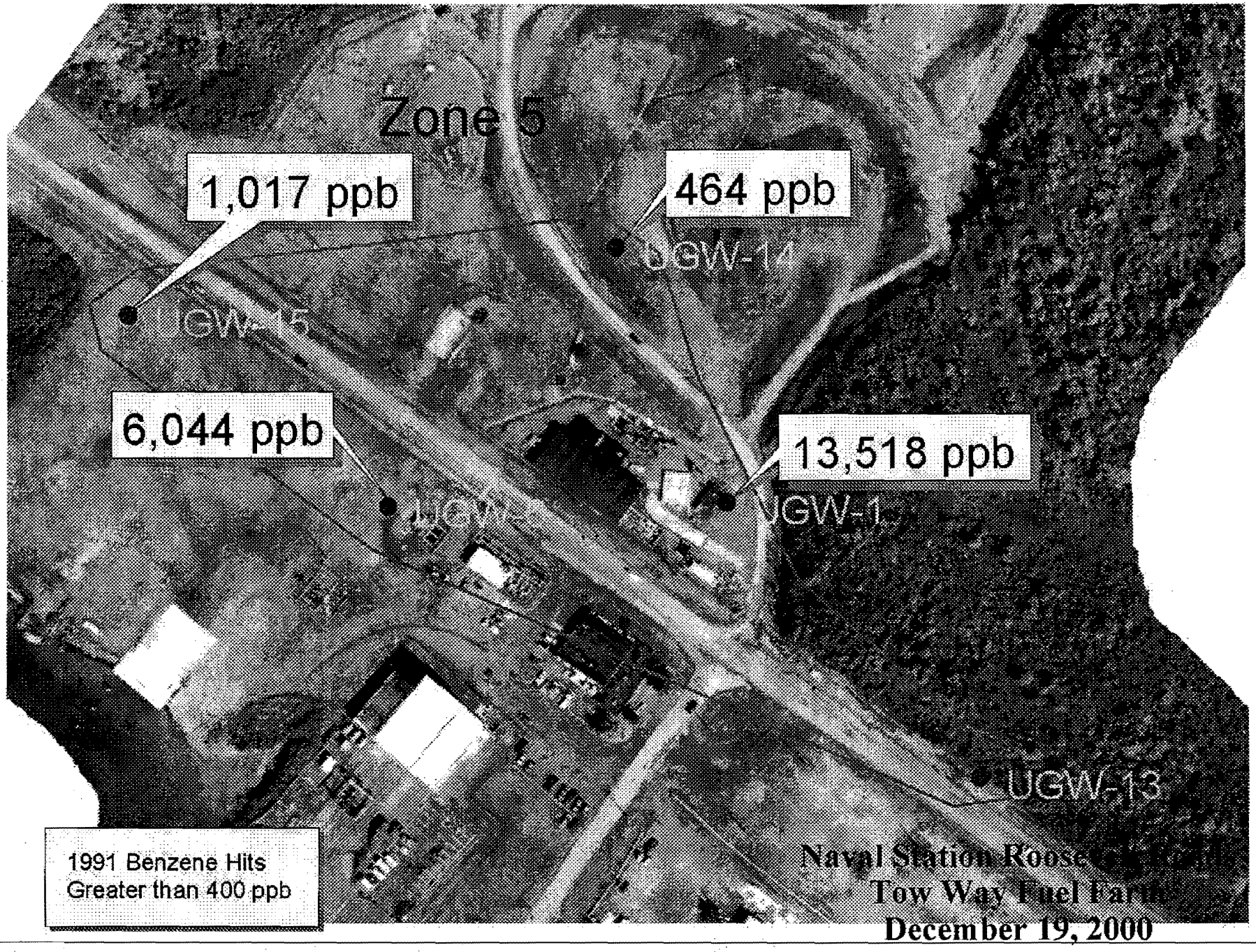
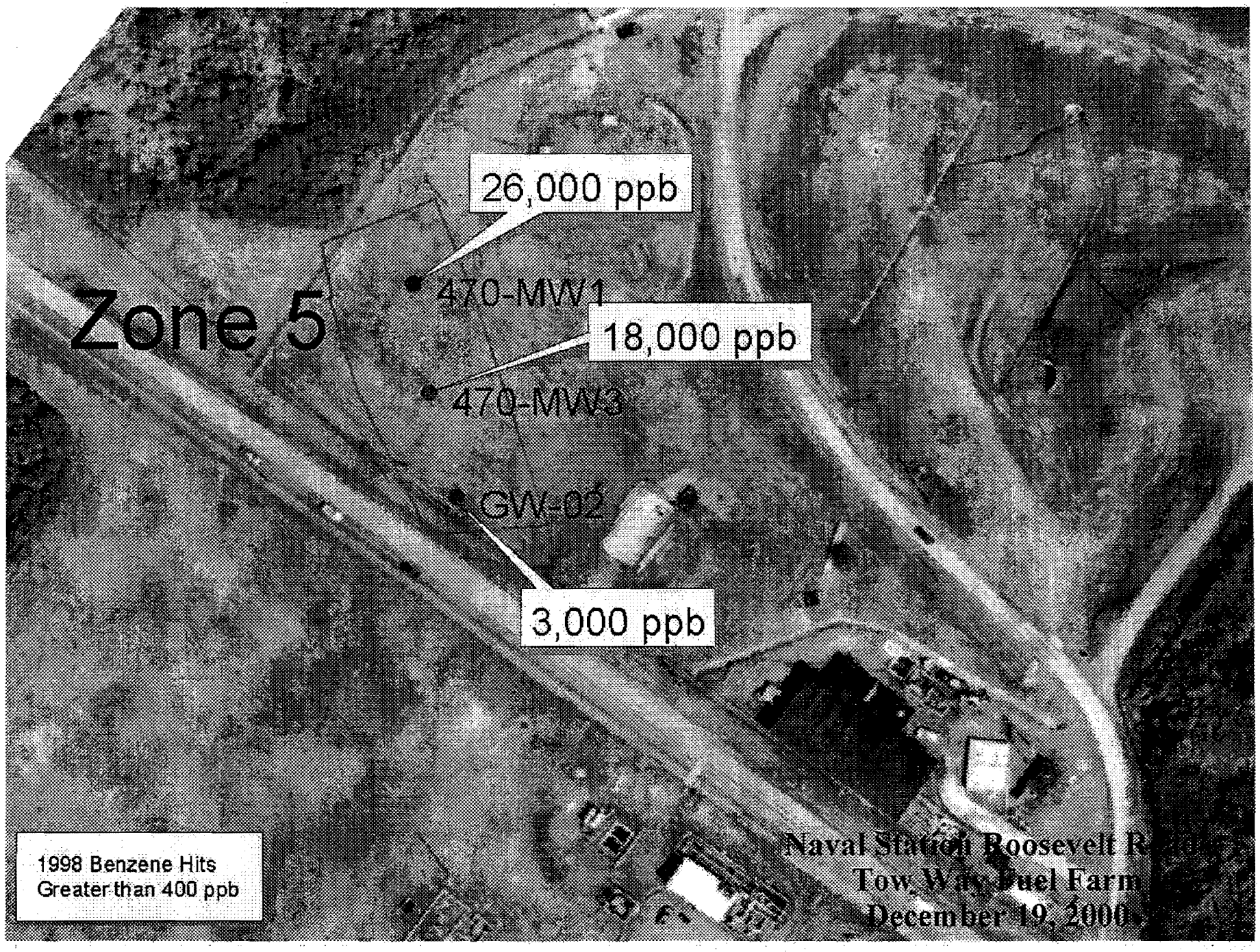
Tow Way Fuel Farm
December 19, 2000


Zone 5
1,017 ppb
464 ppb
6,044 ppb
13,518 ppb
UGW-13
1991 Benzene Hits
Greater than 400 ppb
Tow Way Fuel Farm
December 19, 2000


Zone 5
26,000 ppb
470-MW1
18,000 ppb
470-MW3
GW-02
3,000 ppb
1998 Benzene Hits
Greater than 400 ppb
Naval Station Roosevelt R
Tow Way Fuel Farm
December 19, 2000

ADDITIONAL DATA REQUIREMENTS

- Monitor Well Installation
- Additional Sampling/Analysis

Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000

ADDITIONAL DATA REQUIREMENTS

- 20 Monitor Wells Sampled and Analyzed
  - VOA
  - Semi-VOA
  - RCRA Metals (Filtered/Non-Filtered)

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Tow Way Fuel Farm
December 19, 2000

ADDITIONAL DATA REQUIREMENTS

- Six Monitor Wells
  - Four in Pier 1 Area
  - Two to Replace Wells Screened Below Water Table

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Tow Way Fuel Farm
December 19, 2000

RISK ASSESSMENT

•**Alan Leinbach** - Risk Assessor, Baker Environmental

Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000

DEVELOPMENT OF CORRECTIVE ACTION OBJECTIVES (CAOs)

TOW WAY FUEL FARM, NSRR

Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000

CHRONOLOGY

- 1994 - Permit Issued
- 1996 (May) - RFI Field Work
- 1997 (Jun) - RFI Revised Draft
- 1997 (Apr) - ICM Construction Starts
- 1998 (Apr) - CMSI Field Work
- 1999 (Apr) - CMSI Final Report Completed
- 1999 (Jan) - ManTech CleanOx Pilot Study Field Work

CHRONOLOGY

- 1999 (Oct) - ManTech Final Report
- 1998 (Apr) - TCE Investigation Field Work
- 1999 (Apr) - Hydraulic Characteristics Eval.
- 1999 (Aug) - Hydraulic Characteristics Eval.
- 1999 (Dec) - Pier 1 Investigation Field Work
- 1999 (Sep) - 2000 (Oct) - Pneumatic Pilot Study

CHRONOLOGY

- 2000 (Jan) - CMSI Final Report
- 2000 (Feb) - TCE Investigation Final Report
- 2000 (Spring) - Pier 1 Investigation Final Report

MAJOR TOPICS

- Augmented Approach
- Rationale
- Selected RA Decision Points
- TWFF CMS Task 1
- Specific Differences to CMS Task 1

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Tow Way Fuel Farm
December 19, 2000

Augmented Approach

- Changes since Baseline RA
  - Ongoing data collection from Pier 1 Area & TCE Area
  - Varying RA guidance
  - Changing review (EPA)
  - Inconsistent RAs
- Link between baseline RAs and CMS via COCs

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Tow Way Fuel Farm
December 19, 2000

Rationale

- New Personnel Involved (Baker, BAH, Navy)
- Moving from RFI to CMS process
- Regulatory framework favorable
- Actual cleanup hasn't started yet

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Tow Way Fuel Farm
December 19, 2000

Selected RA Decision Points

- Land Use and Receptors
- Media of Concern
  - *Definition of surface and subsurface soil*
  - *Hot spots*
  - *Definition of plumes and overlapping plumes*
- Exposure Pathways
- Exposure Variable Values
- Target Risks and HQs
- Data Management and Statistics
- Background

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Tow Way Fuel Farm
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Selected RA Decision Points (cont'd)

- COPC Selection
- Toxicity Values
- COC Definition and Selection
- Application of PRG/CAOs
- Cumulative Effects
- Specific Contaminants
  - *Lead*
  - *PAHs*

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TWFF Task 1 CMS and CAOs

- Use "reasonably anticipated land use," which would include industrial and construction workers only.
- Select COPCs using all relevant data compared to residential RBCs. Construction worker COPCs are all surface plus subsurface. Additionally, screen soil and groundwater data to background levels.
- Update exposure pathways, variable values, toxicity criteria, target risks, and fate and transport modeling.
- Add text to discuss qualitative and quantitative CAOs and to support land use and receptor decisions.

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Tow Way Fuel Farm
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Specific Differences to CMS Task 1

Proposed (CMS Task 1)	Existing (CMS Task 1)
• Use Johnson and Ettinger model to evaluate groundwater.	• Used "non-potable" scenario for groundwater exposure.
• No numerical TPH CAO.	• Used a RfD for JP-5 to generate TPH CAOs .
• Use SSL VF model for exposure to soil via inhalation.	• Used Farmer model to show that inhalation was minor.
• Use Andelman approach to evaluate construction worker exposure to GW via inhalation.	• Did not evaluate groundwater inhalation exposure to construction workers.
• Evaluate exposure to PAHs in soil via the dermal pathway.	• Evaluate exposure to PAHs in soil by ingestion only.
• Included inhalation of dust to all soil CAOs using PEF.	• Did not include inhalation of dust due to minor contribution.
• Non-steady-state dermal for GW.	• Steady-state dermal for GW.

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Specific Differences to CMS Task 1 (cont'd)

Proposed (CMS Task 1)	Existing (CMS Task 1)
• 50 and 100 mg/day for IR for industrial and construction.	• 100 and 480 mg/day for IR for industrial and construction.
• 10 day/yr EF for construction worker to groundwater.	• 180 day/yr EF for construction worker to groundwater.
• 0.2 mg/cm2 AF for construction.	• 1 mg/cm2 AF for construction
• SA of 3300 cm2 for industrial and construction.	• SA 5300 and 4100 cm2 for industrial and construction.
• IR of 1.3 m3/hr for industrial and construction.	• IR of 0.83 and 1.25 m3/hr for industrial and construction.
• Sfo 5.5E-02 for benzene.	• Sfo 2.9E-02 for benzene.
• Use subchronic RfDs for construction worker.	• Used chronic RfDs for all exposure scenarios.

CMS

- **Joe Etheridge** - Engineer, Baker Environmental

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CORRECTIVE MEASURES STUDY TOW WAY FUEL FARM

Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000

CORRECTIVE MEASURES STUDY

- Technologies Review
- Preferred Alternative Selection
- Conceptual Site Model
- Selection of Groundwater Model (Groundwater Vistas)
- Discussion of Conceptual Remedial Design (Phased Approach)

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CORRECTIVE MEASURES STUDY

- Point of Compliance
- Schedule (Report)

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CMS - TECHNOLOGIES REVIEW

- Flow Chart (Handout)

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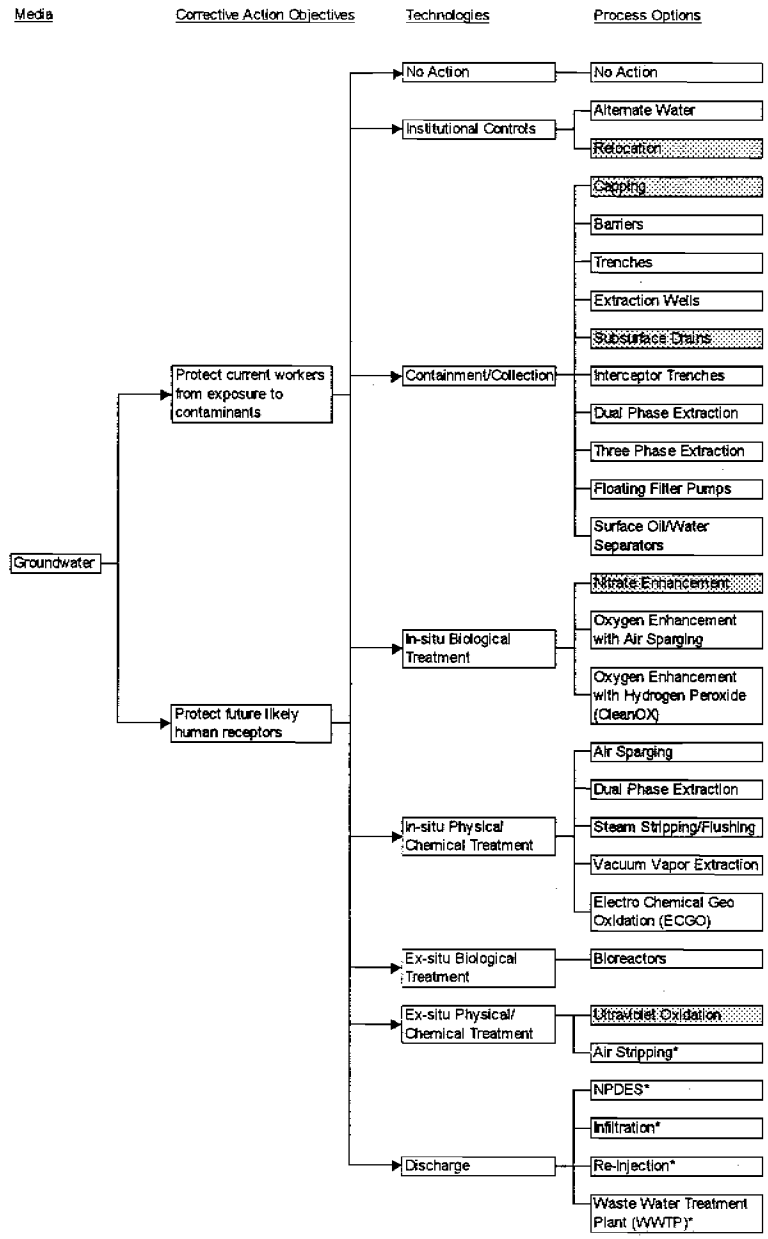

Preferred Alternative

Groundwater -
Institutional Controls (Restrict Water Usage)
Extraction Wells
Surface Oil/Water Separators
Disposal (Infiltration, WWTP, NPDES, Reinjection)
Monitored Natural Attenuation

- Technologies Screened Out
* - Technologies Not Evaluated

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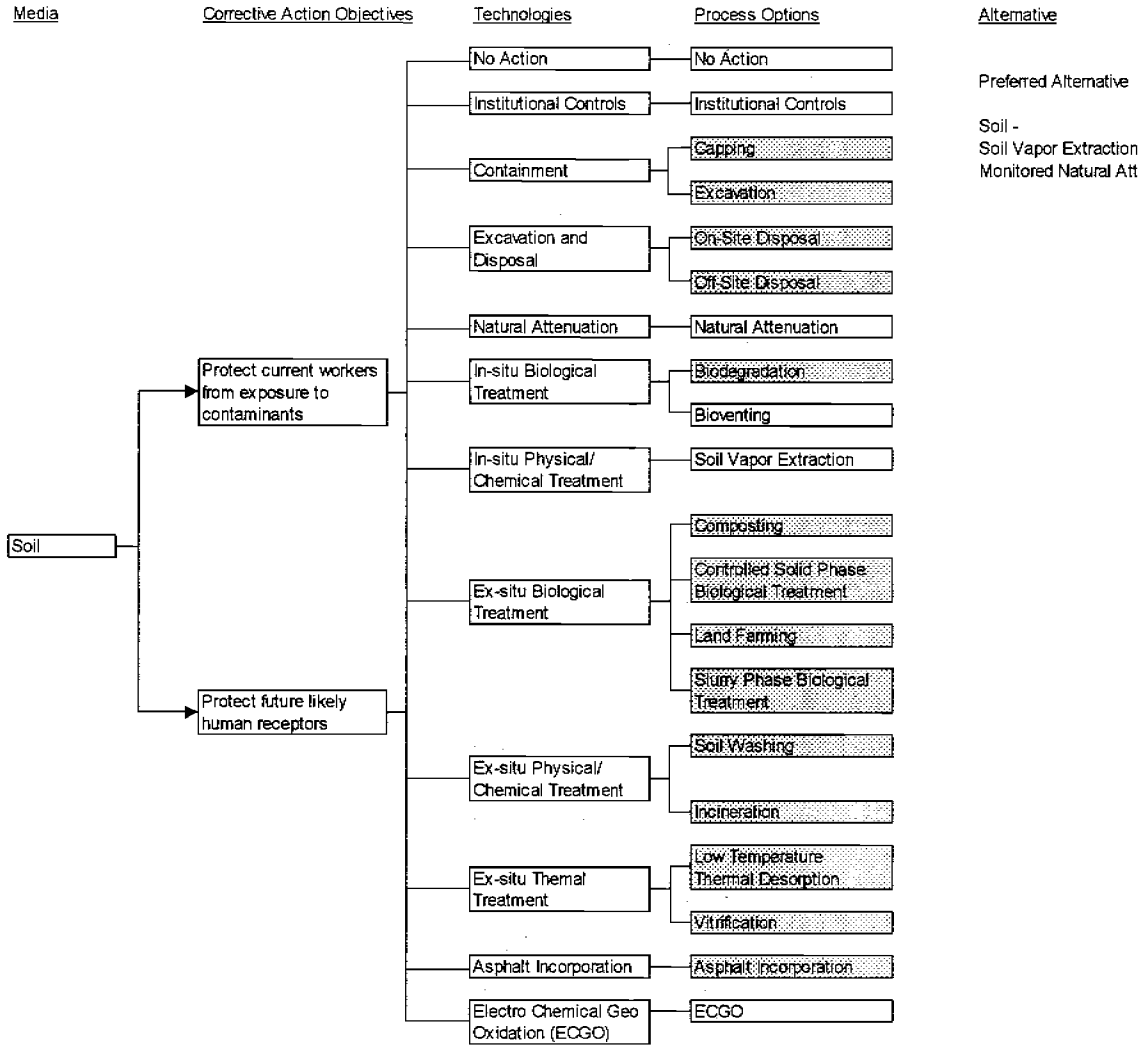

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CMS - CONCEPTURAL SITE MODEL COMPUTER CODE REQUIREMENTS

- Three Dimensional
- Multiphase
- Unsaturated and Saturated Zones
- Dual Porosity
- Multiple Source Types

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Tow Way Fuel Farm
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CMS - CONCEPTURAL SITE MODEL COMPUTER CODE SELECTION

- MODFLOW/SURFACT
- Developed by HydroGeoLogic Inc. in Herndon, VA
- Based on USGS MODFLOW
- Frequently Used to Support EPA Rulemaking
- Linked to Groundwater Vistas for Pre and Post Processing
- Baker Personnel Familiar with Code

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CMS - GROUNDWATER MODEL

- Selection of Groundwater Model (Groundwater Vistas)

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CMS - CONCEPTUAL REMEDIAL DESIGN

- Phased Installation of Remedial System as Funding Becomes Available from the Navy
  - Zone 1 Free Product Plume (RW-1 Area)
  - Zone 2 Free Product Plume (PW-6/Forrestal Road Area)
  - Zone 3 Free Product Plume (Pier 1 Area)
  - Zone 4 TCE Plume
  - Zone 5 Benzene Plume

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Tow Way Fuel Farm
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CMS - POINT OF COMPLIANCE

- POC - At Land/Ocean Interface for All Zones

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CMS - GROUNDWATER BACKGROUND

- Propose Similar Approach to SWMU-9
- Use Existing Background Wells (4) on NSRR Perimeter
- Use TWFF (SWMU-7/8) Monitor Wells Not Impacted by Organic Constituents
- Established Background for Inorganics for UIC Reinjection Purposes Only

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CMS - SCHEDULE

- Draft Final Report Due to EPA 90 Days After CMS Task 1 RA Approved

Naval Station Roosevelt Roads
Tow Way Fuel Farm
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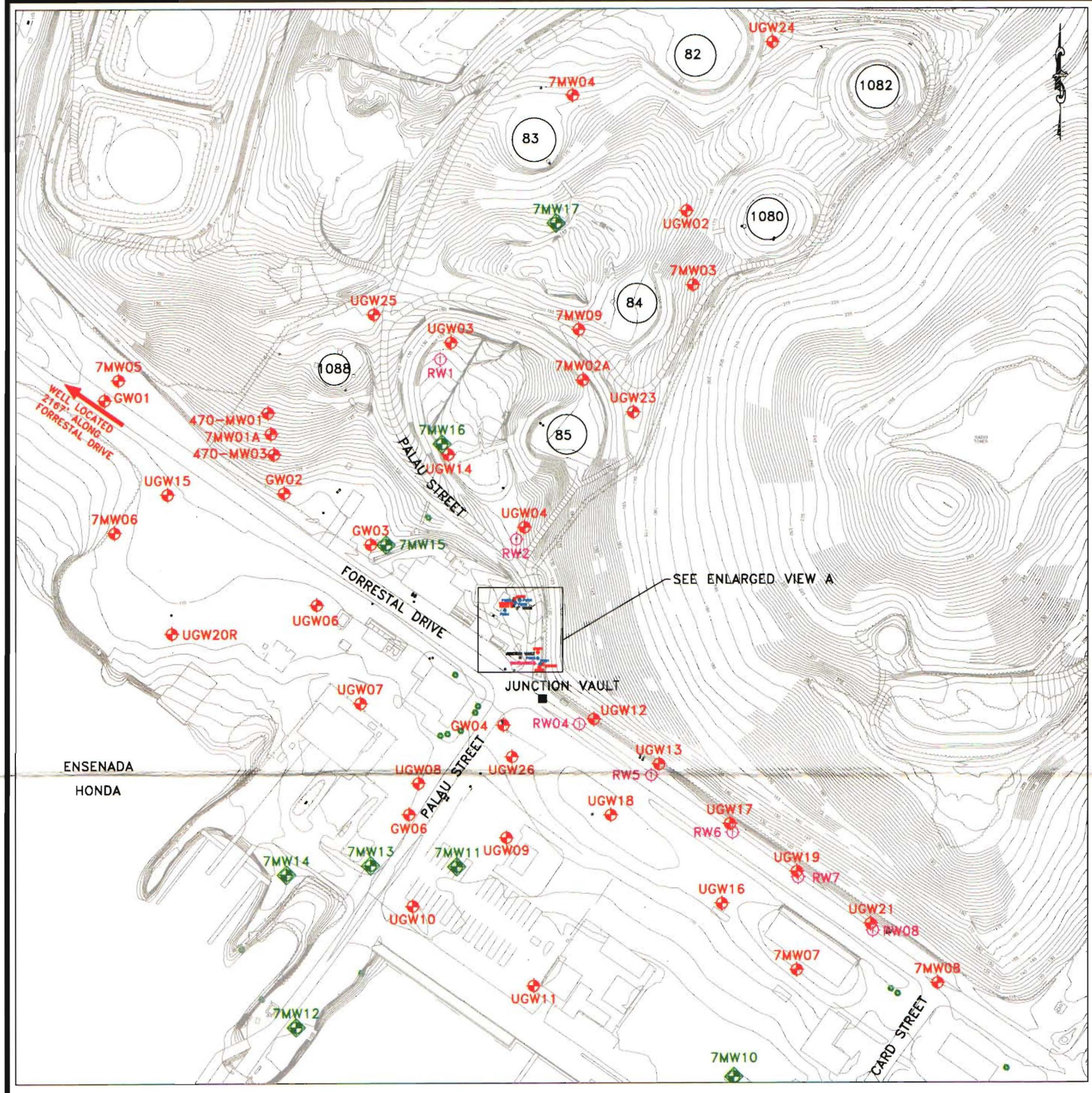
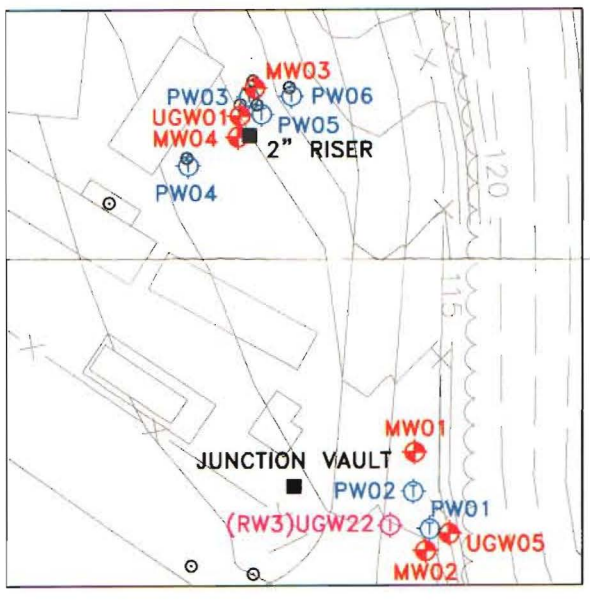
QUESTIONS/DISCUSSION/AGREEMENTS

Naval Station Roosevelt Roads
Tow Way Fuel Farm
December 19, 2000

Attachment 2
Proposed New Monitoring Well Location Map and Rationale





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 ft.

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

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LEGEND

- MONITORING WELL LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- PROPOSED NEW MONITORING WELL LOCATION

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 1
PROPOSED NEW MONITORING WELL LOCATIONS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

Rationale for Monitor Well Placement

7MW-10

A down-gradient compliance well for Zone 4 (dissolved TCE plume). This well will be a 2-inch well since no phase separated hydrocarbon (PSH) is anticipated.

7MW-11

Wells to delineate potential easterly extension of the Zone 3 plume (Pier 1). This well would also be located near UGW-9 and screened to better detect PSH. Since PSH is potentially expected, the well will be a 4-inch well. This will allow recovery of PSH if encountered.

7MW-12

A well to determine the southern most extension of Zone 3. This well will also be 4 inches, since PSH may be encountered.

7MW-13

A well to determine southwesterly extension of the Zone 3 plume. This well will be 4 inches also for potential PSH recovery.

7MW-14

This well will be located in the most westerly section of Zone 3. This well will be to determine if the Pier 1 investigation detection of PSH is correct. This well will also be a 4-inch well for potential future PSH recovery. If no PSH is encountered, then this well will become a compliance well.

7MW-15

This well will be located near GW-03 and will be screened to better detect PSH in this area. To ensure potential future PSH recovery, this well will be 4 inches in diameter also.

7MW-16

This well will be located near UGW-14 and will be screened to better detect PSH in this area. The well will be 4 inches in diameter to ensure potential future PSH recovery.

7MW-17

This well will be located near 7DP15 to better delineate any potential PSH south of Tank 82. The well will be 4 inches in diameter to ensure potential future PSH recovery.

Note

UGW-10 and UGW-11, which are located near Zone 3, were not consistently screened below the water table. Therefore, these wells need not be replaced.

Attachment 3
Proposed Human Health Risk Assessment Changes

Proposed RA Changes to TWFF CMS Task 1

Proposed	Existing	Rationale
Use Johnson and Ettinger (1991) model to evaluate groundwater exposure.	Used "non-potable" scenario for groundwater exposure.	More reasonable to restrict installation of wells than specific groundwater use, and more realistic.
No calculated numerical TPH CAO.	Used a JP-5 RfD to generate TPH CAO as if a single chemical.	TPH consists of many constituents. Each one that has toxicity data will be evaluated.
Use SSL volatilization factor model to evaluate exposure to soil via inhalation.	Used Farmer model from the early 80's to demonstrate that inhalation risks minor.	More up-to-date and technically sound.
Use approach from PRG guidance (i.e., Andelman) to evaluate construction worker exposure to groundwater via inhalation.	Did not evaluate groundwater inhalation exposure to construction workers.	Most realistic exposure pathway for construction worker contact to groundwater.
Evaluate exposure to PAHs in soil via the dermal contact pathway.	Used ingestion only to evaluate exposure to PAHs.	Although uncertain, dermal exposure is realistic for PAHs.
Evaluate carcinogenic PAHs separately (e.g., benzo(a)pyrene, benzo(a)anthracene).	Calculate single benzo(a)pyrene CAO to apply to concentrations adjusted using the relative potency estimate.	Simplifies data analysis and confirmatory sampling.
Include inhalation of dust to all soil CAOs using the PEF from the SSL .	Did not include inhalation of dust because an insignificant contributor to risk in the RFI.	For completeness and in response to comment.
Assume non-steady state dermal uptake to contaminants in groundwater ala 1992 dermal guidance.	Assume steady state dermal uptake.	More up-to-date and technically sound.
Assume 50 mg/day and 100 mg/day for ingestion rate for industrial and construction worker receptors, respectively.	Assumed 100 mg/day (and an FI=0.5) and 480 mg/day for industial and construction.	Based on agreement with EPA Region 2 for SWMU 14
Assume 10 days/year for exposure frequency for construction worker to groundwater.	Assumed 180 days/year.	100% of time exposed to groundwater is excessive. Specific value, however, may change and requires justification.

Proposed RA Changes to TWFF CMS Task 1

Proposed	Existing	Rationale
Assume 0.2 mg/cm^2 adherance factor for construction worker dermal exposure to soil.	Assumed 1 mg/cm^2 adherance factor.	1999 EPA dermal guidance and data from Exposure Factors Handbook.
Assume skin surface area of 3,300 cm^2 for industrial and construction workers.	Assumed 5,300 and 4,100 cm^2 for industrial and construction workers, respectively.	1999 EPA dermal guidance recommendation for outside workers.
Assume inhalation rate of 1.3 m^3/hr for industrial and construction workers.	Assumed 0.83 and 1.25 m^3/hr for industrial and construction workers, respectively	Exposure Factors Handbook recommendation for outside workers.
Use of new slope factor for benzene (5.5E-02 $(mg/kg\text{-}day)^{-1}$).	Used 2.9E-02 $(mg/kg\text{-}day)^{-1}$ as the slope factor for benzene	More up-to-date value from IRIS.
Use subchronic RfDs for construction worker exposure of less than one year.	Used chronic RfDs for all exposure scenarios.	Follows EPA recommendations.

Attachment 4
Site-Specific Assumptions Used for Exposure Models

Site-Specific Assumptions Used for Exposure Models at TWFF

	Variable		Value	Default	Units	Rationale
Johnson and Ettinger (1991):	Depth to GW		300	400	cm	Approximate average measured value from 11 monitoring wells S. of Forrestal Drive.
	Thickness of layers		100/100/100	300/50/50	cm	Simplicity, and no defined structure in logs.
	Soil Type by layer		SIL	SC and C	none	Grain-size analysis.
	Building dimensions	(L)	3,000	961	cm	Measured dimensions of existing building at intersection of Forrestal and Palau.
		(W)	1,800	961	cm	
		(H)	244	488	cm	
	Averaging Time (nc)		25	30	years	Industrial exposure rather than residential.
	Exposure duration		25	30	years	Industrial exposure rather than residential.
	Indoor air exchange rate		1	0.45	1/hours	Approximate value based on calculation using ASHRAE Std. 62-1989 of 20 cfm per 7 people or 1,000 square feet.
EPA SSL VF Model:						
	Q/C		85.61	68.81	g/m^2-s per kg/m^3	Zone IX (Miami), in accordance with SSL User's Guide.
	T		7.9E+08	9.5E+08	s	25 years rather than 30.
	Water-filled porosity		0.2	0.15	none	Johnson and Ettinger default, for consistency.
	Organic carbon content		2	0.6	percent	If supported by site-specific data.