FIVE-YEAR REVIEW REPORT

SECOND FIVE-YEAR REVIEW REPORT FOR AGRICO CHEMICAL COMPANY, OPERABLE UNITS 1 AND 2, PENSACOLA, ESCAMBIA COUNTY, FLORIDA EPA ID: FLD980221857

Prepared for

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July 2005

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Mobile District
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ESCAMBIA COUNTY, FLORIDA
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LIST OF ACRONYMS, SYMBOLS, AND ABBREVIATIONS

AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
BCGs	Biota Concentration Guidelines
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
COCs	contaminants of concern
ConocoPhillips	ConocoPhillips, Inc.
COPCs	contaminants of potential concern
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FS	Feasibility Study
HQ	Hazard Quotient
IMC Global	IMC Global Operations, Inc.
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NA	not applicable
NCP	National Contingency Plan
NOAEL	No Observed Adverse Effects Level
NPL	National Priorities List
O&M	Operation and Maintenance
OU-1	Operable Unit 1
OU-2	Operable Unit 2
PAHs	polycyclic aromatic hydrocarbons
pCi/L	picocuries per liter
PRPs	potentially responsible parties
QA	quality assurance
RAIS	Risk Assessment Information System
RAGS	Risk Assessment Guidance for Superfund
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPD	Relative Percent Difference
SLERA	screening-level ecological risk assessment
TOC	total organic carbon
µg/L	micrograms per liter
URS	URS Corporation
USAE	U.S. Army Corps of Engineers
Williams	The Williams Companies, Inc

EXECUTIVE SUMMARY

The remedial action for the Agrico Chemical Company site in Pensacola, Florida, addressed soil and sludge material as Operable Unit 1 (OU-1) and groundwater as Operable Unit 2 (OU-2). The remedy for OU-1 consisted of stabilizing the soil and sludge material under a RCRA cap along with groundwater monitoring. The remedy for OU-2 specified monitoring of groundwater for natural attenuation and included surface water sampling. In September 1999, the Preliminary Close Out Report was issued to document completion of all construction activities associated with the Agrico site. Groundwater monitoring for OU-1 was initiated in May 1997 and has continued semi-annually. Groundwater and surface water monitoring for OU-2 was initiated in November 1999 and has continued annually. The trigger for this five-year review was the initial five-year review for OU-1 completed in February 2000 and the commencement of the remedial action for OU-2 in July 1999.

This five-year review determined the remedy is functioning as intended by the Record of Decision (ROD). The remedy is expected to attain groundwater cleanup goals through natural attenuation and continues to be protective of human health and the environment. In order to assure protectiveness, groundwater and surface water monitoring should continue until the remedial action objectives (RAOs) are achieved.

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FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Agrico Chemical Company		
EPA ID *(from WasteLAN)*: FLD980221857		
Region: 4	**State:** FL	**City/County:** Pensacola/Escambia
SITE STATUS		
NPL status: ☐ ☒ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete		
Multiple OUs?* ☒ YES ☐ NO	**Construction completion date:** 04/10/1997	
Has site been put into reuse? ☐ YES ☒ NO		
REVIEW STATUS		
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author name: Sheri Zettle		
Author title: Geologist	**Author affiliation:** U.S. Army Corps of Engineers	
Review period:** 12 / 9 / 2003 to 12 / 30 / 2004***		
Date(s) of site inspection: 6 / 30 / 2004		
Type of review: ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review number: ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify)		
Triggering action: ☒ Actual Remedial Action On-site Construction (OU-2) ☐ Actual Remedial Action Start at OU# NA ☐ Construction Completion ☒ Previous Five-Year Review Report (OU-1) ☐ Other (specify)		
Triggering action date *(from WasteLAN)*: 2/01/2000 (OU-1) and 7/1999 (OU-2)		
Due date *(five years after triggering action date)*: 06/28/2005		

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]
*** End of actual review period.

Five-Year Review Summary Form, cont'd.

Issues:

1. Lack of an upgradient monitoring location. 2. Inaccurate results for combined radium at locations across Bayou Texar.

3. Inaccurate results for combined radium in the background well (ETC-MW-12DP).

4. Lack of community updates regarding the status and activities at the Agrico site.

5. Uncertainty associated with unavailable benchmarks for chloride.

Recommendations and Follow-up Actions:

1. Groundwater sampling should be conducted at a location upgradient of the site.

2. Groundwater sampling should be conducted across Bayou Texar for one year to validate radium results.

3. Identify a more representative background location for monitoring, and sample this location as part of the annual groundwater monitoring for Operable Unit 2 until the next Five-Year Review.

4. Update and revise the O&M Plan for OU-2 to provide an improved natural attenuation monitoring approach for the site.

5. The Community Relations Plan should be updated to include a current contact listing of community members.

6. Site-specific benthic community analysis or sediment toxicity testing should be conducted at the site.

Protectiveness Statement:

The remedy at the Agrico site remains protective of human health and the environment. Monitoring data indicate the remedy is functioning as required. The remedy is expected to attain groundwater and surface water cleanup goals through natural attenuation during an estimated seventy-year time-frame (as specified in the OU-2 ROD for groundwater). In order to verify protectiveness, groundwater and surface water monitoring should continue until remedial action objectives are achieved.

Other Comments:

No other comments are provided.

SECOND FIVE-YEAR REVIEW REPORT
AGRICO CHEMICAL COMPANY
OPERABLE UNITS 1 AND 2
PENSACOLA, FLORIDA

I. INTRODUCTION

The U.S. Army Corps of Engineers (USACE) was tasked by the U.S. Environmental Protection Agency (EPA) to conduct a five-year review of the remedial action implemented at the Agrico Chemical Company site in Pensacola, Florida, to evaluate the protectiveness of the site remedy for Operable Unit 1 (OU-1) and Operable Unit 2 (OU-2). The five-year review was conducted from December 2003 to December 2004, and this report documents the results of the review.

The primary purpose of the five-year review is to determine whether the site remedy remains protective of human health and the environment. In addition to presenting the findings and conclusions of the review, deficiencies are identified, and corrective actions are recommended. The five-year review documents the evaluation of the site remedy, operation and maintenance activities, and the continued appropriateness of remedial action objectives (RAOs) at the site.

This, five-year review is prepared pursuant to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) § 121 and the National Contingency Plan (NCP). CERCLA § 121 states the following:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

This, requirement is interpreted further in the NCP; 40 CFR § 300.430(f)(4)(ii) states the following:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

This five-year review is the second review for the Agrico site. The trigger for this statutory review was the first five-year review for OU-1 completed in February 2000 and the commencement of the remedial action for OU-2 in July 1999. The initial trigger for OU-1 was the commencement of the remedial action in March 1995. The Preliminary Closeout Report was issued in September 1999, with the completion of all construction activities for the site. This

five-year review is required for the reason that contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. SITE CHRONOLOGY

The site chronology has been summarized based on the EPA Administrative Record and documents listed in Attachment 1. Table 1 presents the chronology of events for the Agrico site.

Table 1
Chronology of Site Events

Event	Date
Industrial Process Began at the Site	1889
Fertilizer Production at the Site	1920-1975
Hazardous Waste Site Investigation - EPA	October 18, 1983
Groundwater Assessment - Florida Department of Environmental Regulation	January 1987
Administrative Order of Consent	September 29, 1989
Site Listed on National Priorities List	October 4, 1989
Final Phase I Remedial Investigation	March 12, 1992
Draft Feasibility Study	April 30, 1992
Record of Decision, Operable Unit 1	September 29, 1992
Administrative Order of Consent Modified	February 3, 1993
Final Phase II Remedial Investigation	November 26, 1993
Final Feasibility Study	November 26, 1993
Consent Decree Filed	May 3, 1994
Record of Decision, Operable Unit 2	August 18, 1994
Consent Decree Amended	January 31, 1995
Remedial Action Initiated for Operable Unit 1	March 1995
Explanation of Significant Differences, Operable Unit 1 Record of Decision	September 18, 1995
Final Site Inspection for Operable Unit 1	April 10, 1997
Remedial Action Initiated for Operable Unit 2	July 1999
Preliminary Closeout Report	September 1999
Initial Five-Year Review Completed	February 2000
Second Five-Year Review	April 2005

III. BACKGROUND

The following subsections present background information for the Agrico site including physical characteristics, land resource use, history of contamination, initial response, and basis for taking action.

PHYSICAL CHARACTERISTICS

The Agrico site is located in Pensacola, Florida, and covers approximately 35 acres. The site is located at the northwest corner of Fairfield Drive and Interstate 110. The site is bounded by Interstate 110 to the east, Fairfield Drive to the South, CSX railroad tracks to the west, and a construction aggregate company to the north. See Figure 1 in Attachment 2.

Access to the Agrico site is obtained from the north side of Fairfield Drive. The site is surrounded by a gated and locked chain-link fence with posted warning signs. A multimedia Resource Conservation and Recovery Act (RCRA) cover system occupies the central portion of the site and covers an area of 12 acres. Stormwater retention ponds are located to the north and south of the RCRA cap and provide for collection of runoff water from the cap. See Figure 2 in Attachment 2. Gravel access roads surround the cap and retention ponds, and grass covers the remaining portions of the site including the cap. A concrete foundation from a former storage warehouse is located in the south-central portion of the site.

Surface water drainage is currently contained on site. The RCRA cap was designed to prevent rainfall from contacting the stabilized soil. Piping and runoff collection devices were installed as part of the system to direct the stormwater to retention ponds designed to allow the collected water to infiltrate. Additionally, a slurry wall was constructed between the North Pond and the capped area to prevent infiltrating stormwater from contacting the stabilized material under the cap.

Bayou Texar is a surface water feature located 1.5 miles east of the Agrico site. The bayou has been identified as a discharge area for groundwater migrating from the Agrico site. Potentiometric maps for the surficial zone and main producing zone of the Sand-and-Gravel aquifer were developed from groundwater level data collected in January 2004 and are presented as Figures 3 and 4 in Attachment 2. A more generalized view showing the potentiometric surfaces for the surficial zone and main producing zone in Escambia County are provided as Figures 5 and 6 in Attachment 2. These two figures clearly show the groundwater gradient towards Bayou Texar from both the east and west sides of the bayou.

The figures included in this five-year review report were provided by URS Corporation. The contour maps are generated by interpretation between a finite number of data points, so the contour lines should be considered to represent a generalized view of the contamination plume and not absolute boundaries.

LAND AND RESOURCE USE

The: land surrounding the Agrico site within a one mile radius consists of industrial, commercial, municipal and residential zoned areas. A CSX railroad switching yard lies to the immediate west of the site. A mini-storage company is located in the south-central portion of the site just outside the site boundaries and fencing. The Escambia Wood Treating Company, a National Priorities List (NPL) site currently under interim remedial action activities, is located to

the north of the Agrico site beyond the construction aggregate company. The former Kaiser fertilizer plant and a bulk fertilizer storage site are located to the southwest of the Agrico site on Palafox Street, and these sites are being investigated by Florida Department of Environmental Protection (FDEP) under Project No. 348.

HISTORY OF CONTAMINATION

Industrial processes at the site began in 1889 with the Agrico Chemical Company producing sulfuric acid from pyrite. The production of sulfuric acid continued until 1920. The production of superphosphate fertilizer was initiated in 1920. Several companies produced fertilizer on site between 1920 and 1975, including Conoco, Inc. (currently ConocoPhillips, Inc.) and Agrico Chemical Company. Conoco purchased the facility in 1963 and operated the fertilizer plant until 1972. Agrico Chemical Company purchased the facility in 1972 and operated the plant until 1975 when operations ceased.

The source rock used in the production of the superphosphate fertilizer was fluorapatitie, which also contained silica and trace elements such as aluminum and uranium at 20 to 200 parts per million. Superphosphate was produced through the digestion of the source rock with sulfuric acid and water. The reaction produced fluoride as a byproduct.

Wastewater resulting from the processes was discharged to four unlined on-site ponds. The wastewater, sludge material, and associated constituents from the industrial processes are considered the source of soil and groundwater contamination at the Agrico site.

INITIAL RESPONSE

EPA conducted a Hazardous Waste Site Investigation in October 1983. The results of the study indicated the on-site soil and surface water were contaminated with elevated levels of fluoride and lead. Groundwater was not sampled during the investigation.

The Florida Department of Environmental Regulation (now FDEP) conducted a groundwater assessment at the site in January 1987. The study concluded the site contaminants, primarily fluoride and sulfate, had polluted the area groundwater.

On October 4, 1989, EPA listed the site on the NPL of abandoned or unregulated hazardous waste sites eligible for attention under the Superfund long-term cleanup program. Conoco and Freeport McMoRan entered into an Administrative Order on Consent (AOC) on September 29, 1989. Subsequently, Freeport McMoRan was sold to IMC Global Operations, Inc. (IMC Global). According to the terms of the AOC, the companies agreed to conduct the source (soil) and groundwater investigations at the site. Currently, The Williams Companies, Inc. (Williams) represents Agrico Chemical and is responsible, along with ConocoPhillips, for implementing the remedial actions at the site.

The Remedial Investigation (RI) was conducted in two phases to characterize the nature and extent of soil and groundwater contamination at the site. The Phase I RI was initiated in mid-1990, and confirmatory sampling was required in April and November 1991. The Phase II RI was conducted in February 1992.

Following the Phase II RI, further groundvvater investigation was necessary, particularly assessing impacts to the nearby Bayou Texar. Results of the investigation were submitted in May 1993. The Bayou Texar Study determined groundwater migrating from the site was discharging to the bayou.

BASIS FOR TAKING ACTION

The basis for taking action at the Agrico site relates to soil and groundwater contaminants found at the site and the risk assessment conducted during the Phase II RI. The following subsections present a summary of the contaminants and risk assessment for the Agrico site.

Contaminants

Phase I and Phase II of the RI indicated soil and groundwater contamination resulted from the storage of residual waste materials in unlined ponds and associated constituents from the industrial activities conducted at the Agrico site. The RI investigations identified 38 chemical contaminants in soil and sediment at the Agrico site. Based on chemical screening guidelines, 21 chemicals of potential concern (COPCs) were retained for the detailed health risk assessment. The COPCs for soil and sediment are listed below.

Inorganic Constituents

- Arsenic
- Aluminum
- Fluoride
- Nitrate
- Lead

Volatile Organic Compounds

- Acetone
- Methylene chloride

Semi-Volatile Organic Compounds

- Carcinogenic polycyclic aromatic hydrocarbons (PAHs)
- Total PAHs
- Di-n-butylphthalate

Pesticides

- 4,4'-DDT
- Dieldrin
- 2,4-Dinitrotoluene*
- 2,6-Dinitrotoluene*
- Endosulfan I
- Aldrin
- Beta-BHC
- 4,4'-DDE

Radionuclides

- Radium-226
- Radium-228
- Uranium-238

* 2,4-Dinitrotoluene and 2,6-Dinitrotoluene were mistakenly listed in the 1992 OU-1 ROD as pesticides.

The groundwater investigations identified inorganic contaminants in the shallow and deep zones of the Sand-and-Gravel aquifer. The most highly concentrated area of the plume is in the deep portion of the Sand-and-Gravel aquifer and extends east to Bayou Texar. The site groundwater contamination is less pervasive in the shallow zone of the Sand-and-Gravel aquifer. Contaminants of concern (COCs) for groundwater in the shallow and deep zones of the Sand-and-Gravel aquifer are presented below.

Shallow Zone

- Arsenic
- Fluoride
- Manganese
- Mercury
- Nickel
- Nitrate
- Benzene
- 2,4-Dinitrotoluene
- Radium-226
- Radium-228

Deep Zone

- Arsenic
- Copper
- Fluoride
- Mercury
- Nickel
- Nitrate
- Benzene
- Dibenzofuran
- Fluorene
- 2-Methylnaphthalene
- Naphthalene
- 2,4-Dinitrotoluene
- 2,6-Dinitrotoluene
- Radium-226
- Radium-228

Risk Assessment

A risk assessment was conducted as part of the Phase II RI to evaluate the public health and environmental risks associated with constituents detected in soil and groundwater at the Agrico site. The RAOs for soil and groundwater were calculated at 1E-06 risk level for industrial exposures.

Ecological risks were not fully evaluated in the risk assessment conducted for the Phase II RI. A screening-level ecological risk assessment (SLERA) was conducted as part of this five-year review to determine if the remedy is protective of the environment. The SLERA is presented in Attachment 3.

IV. REMEDIAL ACTIONS

The following subsections present the remedial actions for the Agrico site including remedy selection, remedy implementation, and operation and maintenance.

REMEDY SELECTION

The remedy at the Agrico site was organized into two operable units. OU-1 includes contamination of on-site soil and sludge material. OU-2 includes contamination of groundwater. Details of the remedy for each operable unit are summarized below.

Operable Unit 1

The Record of Decision (ROD) for OU-1 was signed on September 29, 1992. The OU-1 ROD addressed on-site soil and sludge material. Stabilized sludge material and soil were consolidated under a RCRA cap constructed on site.

The major components of the remedy included the following:

- Excavation and solidification/stabilization of contaminated sludge and soil from site sludge ponds
- Consolidation of stabilized sludge and soil into one of the sludge ponds that had been excavated to cleanup standards
- Construction of a RCRA cap over the sludge pond

- Construction of a slurry wall up gradient of the RCRA cap
- Implementation of institutional controls to include security fencing, access, and deed restrictions
- Groundwater monitoring at OU-1

The RAOs for soil were established to prevent current or future exposure to the contaminated soil and sludge on site and to mitigate or eliminate any further impacts to the groundwater. Soil cleanup goals were required for direct contact, ingestion, and inhalation of dust. The RAOs for soil were established to be protective of groundwater (leachability-based) for organic and inorganic constituents.

RAOs were established for fluoride, arsenic, and lead. These three chemicals were considered representative of the entire inorganic profile and were used as target compounds. The remedial goal for fluoride was based on protection of groundwater, and lead and arsenic were based on health based soil exposure scenarios. RAOs for soil are presented in Table 2.

Table 2
Remedial Action Objectives for Soil

Contaminant	Remediation Goals
Fluoride	1,463 mg/kg
Lead	500 mg/kg
Arsenic	16 mg/kg

Source: Record of Decision, Operable Unit 1, September 1992

mg/kg = milligrams per kilogram

Operable Unit 2

The ROD for OU-2 was signed on August 18, 1994. The OU-2 ROD presented the selected remedial action for groundwater. The selected remedy is monitored natural attenuation. This action is aimed at limiting exposure while natural attenuation of the site groundwater occurs.

The major components of the remedy include the following:

- Groundwater monitoring of the Sand-and-Gravel aquifer, including installation of two additional monitoring wells adjacent to Bayou Texar
- Surface water monitoring of Bayou Texar
- Irrigation well survey
- Institutional controls including on-site deed restrictions and groundwater use restrictions
- Voluntary well abandonment program for impacted irrigation wells
- Advisory Program

Additionally, the remedy utilizes a comprehensive groundwater monitoring plan to periodically evaluate the hydrogeologic conditions and water quality in the Sand-and-Gravel aquifer underlying the site.

The RAOs established for groundwater include the following:

- Prevent continued degradation of the groundwater from on-site sources
- Prevent or minimize degradation of the groundwater resource due to effects associated with the selected remedy, such as the spreading of offsite plumes including the organics plume emanating from the adjacent Escambia Treating Company site and salt water intrusion
- Prevent or minimize future exposure to contaminated groundwater that would result in unacceptable risk
- Prevent or minimize future impacts to surface water due to discharge of contaminated groundwater into Bayou Texar

Groundwater cleanup goals were based on federal or state primary and secondary drinking water standards. The list includes all chemicals with unacceptable risks for the current risk scenario. Because of the accessibility of public water supply in this area, it was considered unlikely that residents would be exposed in the future risk scenario. Therefore, the future risk scenario from the baseline risk assessment was not considered in the development of the cleanup levels. RAOs for groundwater are presented in Table 3.

A contingency remedy was selected to be implemented if the Agrico plume threatened nearby municipal water supply wells. As stated in the OU-2 ROD for the Agrico site, "Specifically, if fluoride levels detected in nearby municipal water supply wells exceed Florida's secondary drinking water standard of 2 mg/L, EPA will evaluate whether implementation of this contingency remedy is appropriate." The contingency remedy would consist of the following institutional controls and treatment technologies: site deed restrictions, groundwater use restrictions, groundwater monitoring, wellhead treatment or well replacement.

EPA viewed the natural attenuation remedy as more protective of human health and the environment than the pump and treat technologies considered. The natural attenuation remedy along with the contingency remedy avoid adverse impacts associated with the groundwater extraction and treatment alternatives. The negative impacts of a pump and treat cleanup method include the following: spreading of groundwater contamination not related to the site, salt water intrusion, and alteration of the groundwater flow patterns in the Sand-and-Gravel aquifer.

Table 3
Remedial Action Objectives for Groundwater

Contaminant	Remediation Levels
Fluoride	4mg/L[1]
Arsenic	0.05 mg/L[2]
Chloride[3]	250 mg/L
Sulfate[3]	250 mg/L
Nitrate/nitrite	10 mg/L
Radionuclides Radium-226 Radium-228	 5pCi/L (Radium-226, 228 combined)

Source: Record of Decision, Operable Unit 2, August 1994

1 The maximum contaminant level (MCL) of 4 mg/L for fluoride is the cleanup level for groundwater. The Florida secondary standard of 2 mg/L contained in Section 62-550.320, F.A.C. will apply al nearby municipal supply wells as specified in the contingency remedy.

2 Effective January 1, 2005, the drinking water standard for arsenic will change to 0.010 mg/L based on revisions to the Florida primary drinking water standard for arsenic described in Rule 62-550.310. EPA has also revised the arsenic standard to 0.010 mg/L, and compliance with the new federal standard begins January 23, 2006.

3 Chloride and sulfate were not included in the baseline risk assessment because no toxicity values exist. The remedial goals presented for chloride and sulfates are the Florida ARARs.

ARARs = Applicable or Relevant and Appropriate Requirements
F.A.C. = Florida Administrative Code
MCL = maximum contaminant level
mg/L = milligrams per liter
pCi/L = picocuries per liter

REMEDY IMPLEMENTATION

Remedial action activities were implemented for OU-1 and OU-2, and activities were conducted in accordance with the RODs and associated remedial design and remedial action plans. Details specific to each operable unit are presented below.

Operable Unit 1

On February 3, 1993, the AOC was modified and the potentially responsible parties (PRPs) agreed to conduct the remedial design for OU-1. On May 3, 1994, a Consent Decree was filed requiring the PRPs to perform the remedial action and operation and maintenance for OU-1. The Final Design Analysis Report for OU-1 was submitted on September 20, 1994. The remedial action was initiated in March 1995. The components of the selected remedy for the treatment of soil on site were completed in April 1997. The final inspection was conducted by EPA on April 10, 1997.

Groundwater monitoring for OU-1 was initiated in May 1997. The groundwater monitoring portion of the remedy for OU-1 consisted of collecting baseline groundwater data from five wells (2 background and 3 compliance wells) on a semi-annual basis for a period of five years. The baseline sampling was conducted from May 1997 through November 2001. The purpose of the baseline data was to determine concentration variability and to evaluate the effectiveness of the OU-1 remedy. Groundwater monitoring of OU-1 has continued semi-annually.

Operable Unit 2

On January 31, 1995, the Consent Decree was amended to include remedial design, remedial action and operation and maintenance of OU-2. In July 1999, the monitoring well installation for OU-2 was completed. In September 1999, the Preliminary Close Out Report was issued to document completion of all construction activities associated with the Agrico site.

The groundwater monitoring well network for OU-2 was developed to assess the natural attenuation remedy. The groundwater conditions are monitored annually on a long-term basis for the surficial and main producing zones of the Sand-and-Gravel aquifer. Groundwater monitoring for OU-2 was initiated in November 1999 and has continued annually.

Surface water monitoring at Bayou Texar is being conducted to determine if groundwater discharge is having any effect on the surface water. Surface water samples are collected from three locations annually. See Figure 7 in Attachment 2. Surface water sampling was initiated in November 1999 and has continued annually.

The irrigation well survey was initiated on July 8, 1999. A survey form was distributed to residences in the OU-2 area to identify wells and the type of use for the wells. The irrigation well program is continued annually and consists of identifying any additional irrigation wells and sampling and/or abandoning wells on a voluntary basis. Sampling of irrigation wells was requested in 1999, 2000, and 2001. Irrigation wells were not sampled in 2002 or 2003. Permission has been obtained from two irrigation well owners to abandoned wells, and these wells were abandoned in 2001.

Institutional controls for groundwater use restrictions are coordinated annually for the site. A memorandum is distributed to local, regional, and state agencies to solicit information on any changes in regulatory rules or policies that may affect the institutional controls administered for OU-2. The memorandum was first issued on December 17, 1999. This memo also requested information regarding the Kaiser Fertilizer Site and radium sampling conducted by FDEP and the Escambia County Health Department. Memoranda have been issued annually.

In July 1999, the advisory program was initiated. Annually, a notice is sent to water well contractors, irrigation system installers, and pool contractors conducting work in southern Escambia County. The notice is intended to inform the contractors of groundwater conditions in the vicinity of the Agrico site and restrictions on well construction due to impacted groundwater. Advisory notices have been distributed annually.

OPERATION AND MAINTENANCE

Operation and Maintenance (O&M) activities are conducted for OU-1 and OU-2 in accordance with the associated O&M plans. Details specific to each operable unit are presented below.

Operable Unit 1

O&M requirements for OU-1 include site inspections, general facility maintenance, closure cover system maintenance, and surface water management system maintenance. O&M activities are to be conducted in accordance with the O&M Plan for OU-1 dated September 20, 1996. Site inspections and general facility maintenance have been conducted biannually. Based on a review of the last five years of site inspections for OU-1, additional maintenance was required for resodding in May 2003 and repairs to perimeter fencing in November 2001.

Site inspections are required biannually to ensure the OU-1 remedy is maintained and in good working condition. Inspections are conducted on perimeter. fencing, gates and locks, signage, and roadway conditions. The RCRA cap is inspected for erosion, cracking, and ponding of water. Stormwater runoff ditches and structures are inspected for leaks or diversions resulting from erosion. Surface water ditches and retention ponds are inspected for erosion or sediment buildup. Inspections are also required following major hurricane or tornado events to ensure fencing is still in place and major damage to the remedy has not occurred.

General facility maintenance includes monthly and annual maintenance and activities. Mowing is required twice a month from April through October and monthly from November through March. Annual maintenance activities include any fertilizing or reseeding and cleaning of the pipe underdrain system as necessary at the site.

Closure cover system maintenance may be required as deemed necessary from the site inspections and includes any maintenance for surface water runoff control, ponded water on the RCRA cap, presence of erosion or gullying, and any problems with the coverage of topsoil and vegetation. Topographic surveying of the cap, retention ponds, and storm drainage system is performed every five years as needed.

Surface water management system maintenance may be required as deemed necessary from the site inspections and includes any maintenance for inlets, culverts, drainage pipes, sediment controls, erosion of drainage ditches or berms, and the condition of retention ponds.

Operable Unit 2

O&M requirements for OU-2 include inspections of groundwater monitoring wells and cross-section locations for surface water monitoring, abandonment of irrigation wells, and coordination of institutional controls. O&M activities are conducted in accordance with the O&M Plan for OU-2 dated November 9, 1998. OU-2 O&M requirements are conducted in conjunction with the OU-2 groundwater monitoring events, and O&M reporting is provided in the OU-2 Annual Reports.

Monitoring wells are inspected during each sampling event for security, wellhead integrity and changes in well depth. For the surface water sampling locations, markers used to identify sampling locations are inspected during each sampling event for integrity. Abandonment of irrigations wells, as deemed necessary based on contamination impacts or voluntary requests, is conducted as part of the OU-2 O&M. For the institutional controls coordination, progress reports are submitted annually to notify agencies of project status and to request notification of any rule or policy changes affecting institutional controls for OU-2.

Total O&M Costs

Estimated total annual O&M costs from the Feasibility Study (FS) were $25,000 for the OU-1 remedy and $61,000 for the OU-2 remedy. The combined O&M annual costs estimated in the FS were $86,000.

O&M costs presented in Table 4 for 1999 through 2004 were provided by URS Corporation (URS), the consultant to the PRPs, and include implementing tasks associated with the approved O&M Work Plan for each operable unit. The O&M costs presented for the last five years include long term monitoring costs for groundwater and surface water sampling; therefore, a direct comparison to the FS estimated costs is not possible. It is believed the actual O&M costs do not differ significantly from the FS estimates.

Table 4
Operation and Maintenance Costs

Dates		Total Cost Rounded to Nearest $1,000
From	To	
1999	2000	$161,000
2000	2001	$164,000
2001	2002	$181,000[a]
2002	2003	$209,000
2003	2004	$154,000[b]

a Irrigation wells sampled
b Annual sampling event moved to 2004-2005 time-frame

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

The protectiveness statement from the initial five-year review for the Agrico site was included in a memorandum from EPA signed June 28, 2000, and stated the following:

> *After review of the remedial objectives for OU-1 and OU-2, no areas of noncompliance have been identified. O&M activities are being conducted as outlined in the O&M plans. The remedy remains protective of human health and the environment.*

EPA provided recommendations for the following:

- Continue to monitor the groundwater as described in the O&M plans until Remedial Action Objectives are achieved as specified in the ROD.
- Once the statistical evaluation of the OU-1 monitoring wells has been completed those wells should be considered for inclusion in the overall ground water monitoring system, i.e., OU-2.

- Attachment of this memorandum to the report which presents the data for the five year review for the Agrico site. The report which is titled Five-Year Review, Agrico Site, Pensacola Florida was prepared by URS Greiner Woodward Clyde, on behalf of the potentially responsible parties, in February 2000.

Groundwater monitoring has continued annually since November 1999 as recommended in the initial five-year review. OU-1 monitoring wells continue to be sampled semi-annually and results are reported in the annual reports for OU-1. The memorandum was attached to the initial five-year review.

VI. FIVE-YEAR REVIEW PROCESS

The second five-year review was conducted by the USACE under guidance from the EPA Remedial Project Managers, Caroline Robinson and David Keefer, for the Agrico site. The five-year review process consisting of administrative and additional components, document review, data review, site inspection, and interviews is described in the following subsections.

ADMINISTRATIVE COMPONENTS

The Agrico site five-year review was led by Sheri Zettle of the USACE. FDEP; the PRPs including ConocoPhillips, Williams on behalf of the Agrico Chemical Company, and IMC Global; URS, contractor to the PRPs; and the EPA Community Involvement Coordinator for Agrico were notified of the initiation of the five-year review for the Agrico site. A public notice was also issued on November 24, 2003, by EPA to notify the community of the second five-year review for the Agrico site.

A schedule was established by USACE to facilitate the five-year review process. Tasks included scoping, annual sampling by URS, records search, records review, site inspection, interviews, SLERA, and report development including preliminary draft, draft and final versions.

ADDITIONAL FIVE-YEAR REVIEW COMPONENTS

EPA requested the Agrico site five-year review include the following additional components:

- Groundwater sampling for the entire Agrico monitoring well network, including OU-1 wells and one background main producing zone monitoring well (ETC-MW-12D).
- Porewater sampling from four stations along each of the two transects in Bayou Texar.
- Sediment sampling from four stations at each Bayou Texar transect, Carpenter Creek baseline station, and OU-1 North and South Ponds.
- Surface water sampling from the OU-1 North Pond (South Pond was dry).
- Expanded analytical list.
- Level IV format for laboratory data packages.
- SLERA.
- Split sample collection with USACE.

The additional sampling was coordinated to coincide with the annual sampling event for 2003. Routinely, the annual event is conducted in November; however, the 2003 sampling event was delayed until January 2004 to incorporate the additional sampling.

Sediment, porewater, and surface water analytical results were used for conducting a SLERA for the Agrico site to confirm the remedy is protective of the environment. The SLERA was conducted by the USACE, Omaha District, and details are provided in Attachment 3.

Quality assurance split samples were collected by the USACE during January 2004. These samples were used to verify results from the primary analytical laboratory. Overall, correlations between the split samples were acceptable with the exception of select sulfate, nitrite and radiological results. Details of the split sample comparison are provided in Attachment 4.

DOCUMENT REVIEW

This second five-year review consisted of a review of relevant documents including decision documents, monitoring reports, site inspection reports, and O&M records. Attachment 1 provides a list of all documents reviewed for this effort. RAOs established in the ROD were also reviewed and compared to current Applicable or Relevant and Appropriate Requirements (ARARs) (see Section VII).

DATA REVIEW

Historical inorganic data for groundwater and surface water were reviewed through January 2004 based on current ARARs for the site. The historical radiological data review for groundwater and surface water included results through November 2004 due to inaccurate results reported for radium during the January 2004 sampling event (see below - Radionuclides in Groundwater for a detailed discussion).

Overall, the inorganic data for groundwater appear to be stabilized or decreasing in concentration at locations in the immediate vicinity of the Agrico site. Contaminants appear to be moving from the surficial zone of the Sand-and-Gravel aquifer downward through the semi-confining layer to the main producing zone within one-half mile of the Agrico site. A zone of increased concentration is evident (for most constituents) down gradient of the site in the main producing zone and appears to be moving with the groundwater flow towards Bayou Texar. A conceptualized hydrogeologic model is presented as Figure 8 to illustrate the affected area of groundwater contamination and the discharge of the plume to Bayou Texar. The increases in the inorganic contaminant concentrations in groundwater are within the expected range, and the natural attenuation remedy appears to be functioning as expected. Contaminant concentrations in surface water met the ARARs for all sampling locations at Bayou Texar.

Inorganics in Groundwater

Fluoride concentrations in groundwater exceed the ARAR at several locations in the surficial and main producing zones. Fluoride exceeded the standard in two wells screened in the surficial zone and ten locations in the main producing zone for the January 2004 data set. See Figures 9 and 10 in Attachment 2. These figures show the direction of groundwater migration toward Bayou Texar, along with the areal limit of the Agrico plume. Historical review of the fluoride data indicates, fluoride appearing to move from the surficial zone downward through the semi-confining layer

to the main producing zone within one-half mile of the Agrico site. A zone of high concentration is evident in the main producing zone and appears to be moving with groundwater towards Bayou Texar. This migration of the fluoride plume over time is illustrated in the series of fluoride plume figures for 1992, 1997, 1999, 2000, and 2004 shown in Figures 11 through 15.

Overall, the fluoride data appear to be stabilized or decreasing in concentration at locations in the immediate vicinity of the Agrico site. Time versus concentration plots for the surficial zone wells and the main producing zone wells, provided as Figures 16 and 17 illustrate the historical trends for fluoride data. In the locations where the fluoride concentrations are increasing, the results are within the expected range, and the natural attenuation remedy appears to be functioning as expected.

Arsenic concentrations were below the ARAR for all locations sampled in the surficial and main producing zones for the January 2004 data set.

Chloride concentrations were below the ARAR in the surficial zone, and exceed the ARAR at two locations in the main producing zone for the January 2004 data set. Chloride concentrations exceeded the ARAR at wells AC-25D (410 mg/L) and AC-35D (530 mg/L) located adjacent to Bayou Texar. Similar to the fluoride plume, the chloride plume appears to be migrating through the main producing zone toward the bayou.

Sulfate concentrations exceeded the ARAR for three locations in the main producing zone for the January 2004 data set including wells AC-3D (300 mg/L), AC-29D (310 mg/L), and AC-12D (280 mg/L). Although concentrations in the main producing zone down gradient of the site are increasing, the sulfate plume appears to be migrating toward the bayou.

Total nitrate and nitrite exceeded the ARAR at nine locations in the surficial and main producing zones for the January 2004 data set. The exceedances range from 11 to 16 mg/L and are only slightly above the ARAR of 10 mg/L.

Radionuclides in Groundwater

Results of the radium analysis of groundwater samples collected by URS in January 2004 should be considered estimated concentrations. The results of these samples were not in agreement with the EPA split samples or with the site historical data. An investigation of the results was initiated by URS. The investigation showed that for the first time during the life of this project, a different radium-226 analytical method (903.0 instead of 903.1) was used by STL-St. Louis for the January 2004 samples resulting in biased high values, and some of the radium-228 results were biased high due to incomplete separation of carrier elements. The January 2004 data are not considered comparable to historical results: a different laboratory method was used to analyze radium-226, and Quality Control problems were associated with the radium-228 analysis. A memorandum, provided in Attachment 5, provides a detailed explanation of the problems with the January 2004 radium data. STL-Richmond used the same analytical methods that have been historically used during analysis of the split samples and did not encounter quality control problems during analysis. The STL-Richmond results of the January 2004 samples should be considered accurate. URS collected samples for radium-226 and radium-228 from the annual sampling locations in November 2004. These samples, like the historical samples and the January 2004 splits, were analyzed for radium-226 using method 903.1. Radium results from the November 2004 sampling event are more in line with the historical data, and no problems with the laboratory analysis

have been found. For these reasons, the November 2004 radium results were reviewed and presented in this five-year review report.

For the November 2004 data set, combined radium-226 and 228 concentrations were below the ARAR for all locations in the surficial zone. The ARAR was exceeded at 8 locations in the main producing zone for the November 2004 data set. See Figures 18 and 19 in Attachment 2.

For the January 2004 data set, combined radium-226 and 228 was detected at locations cross-gradient, across Bayou Texar, and the background monitoring well; however, these locations were not re-sampled during the November 2004 sampling event. Since the radium values from the January 2004 sampling event are not considered accurate (see discussion above), these locations should be re-sampled during the November 2005 monitoring event and analyzed using the same methodology as the historical samples to verify results. In addition, groundwater monitoring data should be obtained from an up gradient location (directly west of OU-1) during the November 2005 sampling event.

Surface Water

Contaminant concentrations in surface water met the ARARs for all sampling locations at Bayou Texar for the January 2004 data set. Fluoride concentrations ranged from non-detect to 1.5 mg/L. Arsenic concentrations were all non-detect. Chloride concentrations ranged from 8.5 to 10,000 mg/L. Sulfate concentrations ranged from 5.1 to 1400 mg/L. Total nitrate and nitrite concentrations ranged from 0.19 to 1.4 mg/L.

Results of the radium analysis of porewater and surface water samples collected by URS in January 2004 should be considered estimated concentrations. For a more accurate comparison with historical data (see Radionuclides in Groundwater discussion above), combined radium-226 and 228 results from the November 2004 data set were reviewed. Concentrations of combined radium-226 and 228 ranged from 0.572 to 1.44 pCi/L for the November 2004 data set. Surface water monitoring results are presented in Figure 20 in Attachment 2.

SITE INSPECTION

The site inspection was conducted at 8:30 AM on June 30, 2004, by Sheri Zettle (USACE). Attendees included Caroline Robinson (EPA), Nancy Murchison (FDEP), Rick Greiner (ConocoPhillips), Don Davis (Williams on behalf of Agrico Chemical Company), Jim Van Nortwick (IMC Global), Jeff Wagner (URS), and Eric Mann (URS). The purpose of the inspection was to assess the protectiveness of the remedy. Notes and observations from the site inspection were recorded on the Site Inspection Check List provided in Attachment 6. Photographs were taken by Sheri Zettle and are provided in Attachment 7.

The RCRA cap was inspected for erosion, cracking, settlement, and ponding of water. The RCRA cap is well maintained, and no issues were identified regarding the cap. The site has good vegetative cover (Photograph 1), and no major areas of erosion were noted. The surface water inlets (Photograph 2), culverts (Photographs 3 and 4), and retention ponds were inspected. No obstructions or hindrances to the drainage system were observed. The North Pond (Photograph 5) was full of stormwater and the South Pond (Photograph 6) was dry. The ponds were inspected for erosion and sediment buildup, and no issues were identified. The stormwater runoff ditch was inspected for leaks or diversions resulting from erosion, and none were noted (Photograph 7). The fencing around the property was undamaged and functional. All locks and gates are in proper working condition (Photograph 8). Warning signs are

posted along the fence line (Photograph 9). The gravel access roads on site are maintained and in good condition (Photograph 10).

The groundwater monitoring wells identified during the site inspection included AC-34S, AC-7SR, AC-33S, ACB-31S, and ACB-32S (See Photographs 11 through 15). The monitoring wells have been maintained and are in good condition. All monitoring wells were secured with a lock.

The site inspection demonstrated the O&M activities have been carried out in accordance with the ROD and O&M Plans. The O&M activities are supporting the remedy at the Agrico site, and unexpected changes in O&M scope or cost have not occurred to suggest ineffectiveness of the remedy.

INTERVIEWS

During the five-year review process, several individuals were interviewed in June and July 2004 concerning the Agrico site. The individuals interviewed include PRPs, the state regulator, irrigation well owners, and homeowners. Some issues and concerns were expressed during a few of the interviews.

The PRPs and state regulator interviewed expressed satisfaction with the remedy, O&M, monitoring results, and rapport between all of the involved parties. A few issues were raised, such as the radium increases in the area, and the lack of cooperation with the irrigation well owners regarding the well survey. Donald Davis (Williams on behalf of Agrico Chemical Company) recommended improving the communication with the community in a timely, consistent and continual manner.

In general, the interviewed irrigation well and property owners do not feel well informed about the status and activities at the Agrico site. They would like to be better informed as a community, separate from the local news and newspaper. In general, the irrigation well owners felt the financial offer for well abandonment was too low. If the compensation had been higher, more well owners may have participated in the offer. Most of the property owners had little to say or express. A few people were very expressive in their views on the Agrico site. Sarah Sanchez, an irrigation well owner, feels the remedy is adequate, and she does not understand the opposition to the current remedy. Ms. Sanchez believes that "panic hysteria" has overcome many people who are extremely concerned about the ill effects of the contamination. She believes the class action lawsuit is damaging. In contrast, Samuel Bearman, an irrigation well owner and one of the lawyers involved in the class action lawsuit, strongly believes other remedies should be investigated. He feels Conoco should "step up to the plate" and pay for a better remedy. Details of all the interviews are provided in Attachment 8.

VII. TECHNICAL ASSESSMENT

The following Questions A, B, and C were answered to provide a technical assessment of the site remedy.

QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

Remedial Action Performance

The remedy at the Agrico site is functioning as designed to protect human health and the environment. This conclusion is based on the review of site documents, groundwater and surface water monitoring data, ARARs, risk assumptions, and results from the site inspection.

The remedial action for OU-1 appears to be functioning as intended. The OU-1 source area has been contained to eliminate future impacts to groundwater. In general, the inorganic data for OU-1 monitoring wells appear to be stabilized or decreasing in concentration.

The OU-2 natural attenuation remedy appears to be proceeding as expected, and contamination appears to be moving with groundwater flow towards Bayou Texar. OU-1 monitoring wells appear to exhibit stabilized or decreasing levels of contamination indicating the OU-1 source control remedy is effective. The increases in contaminant concentrations down gradient of the site are within the expected range for the Agrico site, and results seem typical for a natural attenuation remedy.

Surface water sampling results meet ARARs, and the bayou does not appear to have been adversely affected by the groundwater contamination.

For the January 2004 data set, combined radium-226 and 228 was detected at locations cross-gradient, across Bayou Texar, and the background monitoring well; however, these locations wen; not re-sampled during the November 2004 sampling event. Since the radium values from the January 2004 sampling event are not considered accurate, these locations should be re-sampled during the November 2005 monitoring event and analyzed using the same methodology as the historical samples to verify results. In addition, groundwater monitoring data should be obtained from an up gradient location (directly west of OU-1) during the November 2005 sampling event.

System Operations

The site inspection demonstrated the O&M activities have been conducted in accordance with the ROD and O&M Plans. All O&M requirements are adequate for the site and are being implemented properly. The sampling frequency of groundwater and surface water is sufficient to monitor and ensure the remedy is performing properly. No unexpected changes have occurred in cost or scope of the O&M to suggest compromised effectiveness of the remedy.

Opportunities for Optimization

Opportunities for optimization were not identified during this review. The groundwater and surface water sampling locations provide sufficient data to assess the progress of the natural attenuation.

Early Indicators of Potential Issues

No early indicators of potential issues that could lead to remedy failure or jeopardize the protectiveness were identified during this five-year review.

Implementation of Institutional Controls and Other Measures

The institutional and access controls in place at the site provide adequate protection. No other actions were identified for the site.

QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEANUP LEVELS, AND REMEDIAL ACTION OBJECTIVES USED AT THE TIME OF THE REMEDY STILL VALID?

Changes in Standards

The cleanup levels established in the ROD have not changed for the Agrico site. The National Primary and Secondary Drinking Water Regulations are defined in 40 CFR Part 141. The Florida Primary and Secondary Drinking Water Standards are defined in Chapter 62-550, and Surface Water Quality Standards are defined in Chapter 62-302 of the Florida Administrative Code (F.A.C.). Tables 5 and 6 present the RAOs and the current ARARs for groundwater and surface water, respectively.

Effective January 1, 2005, the drinking water standard for arsenic will change to 0.010 mg/L based on revisions to the Florida primary drinking water standard for arsenic described in Rule 62-550.310. EPA has also revised the arsenic standard to 0.010 mg/L and compliance with the new federal standard begins January 23, 2006. The change in the arsenic standard does not affect this five-year review; however, the new regulatory limit should be considered for future groundwater sampling events with regard to laboratory reporting limits for arsenic.

Changes in Exposure Pathways

Significant changes have not occurred at the site to affect the exposure pathways. The protectiveness of the RAOs is still valid. The contaminants of concern remain the same, as well as the land usage and human usage of resources.

Table 5
Summary of RAOs and Current ARARs for Chemical-Specific Standards for Groundwater

	Record of Decision RAOs			Current ARARs		
Contaminant	**RAO**	**Source**	**Year**	**ARAR**	**Source**	**Year**
Fluoride	4mg/L[1]	Federal and State Primary Drinking Water Standard	1994	4mg/L[1]	Federal and State Primary Drinking Water Standard[2]	2004
Arsenic (total)	0.05 mg/L	Federal and State Primary Drinking Water Standard	1994	0.05 mg/L[3]	Federal and State Primary Drinking Water Standard	2004
Chloride	250mg/L	State Secondary Drinking Water Standard[4]	1994	250 mg/L	Federal and State Secondary Drinking Water Standard	2004
Sulfate	250mg/L	State Secondary Drinking Water Standard	1994	250 mg/L	Federal and State Secondary Drinking Water Standard	2004
Total Nitrate and Nitrite	10 mg/L	State Primary Drinking Water Standard	1994	10 mg/L (as Nitrogen)	State Primary Drinking Water Standard	2004
Radium-226 and Radium-228 (combined)	5pCi/L	Federal and State Primary Drinking Water Standard	1994	5 pCi/L	Federal and State Primary Drinking Water Standard	2004

1 The MCL of 4 mg/L for fluoride is the cleanup level for groundwater. The Florida Secondary Standard of 2 mg/L contained in Section 62-550.320, F.A.C. will apply at nearby municipal supply wells as specified in the contingency remedy.

2 National Primary Drinking Water Regulations, 40 CFR Part 141, and Florida Primary Drinking Water Standards, Chapter 62-550.310, F.A.C.

3 Effective January 1, 2005, the drinking water standard for arsenic will change to 0.010 mg/L based on revisions to the Florida primary drinking water standard for arsenic described in Rule 62-550.310. EPA has also revised the arsenic standard to 0.010 mg/L and compliance with the new federal standard begins January 23, 2006.

4 Florida Secondary Drinking Water Standard, Chapter 62-550.320, F. A. C.

ARARs = Applicable or Relevant and Appropriate Requirements
CFR = Code of Federal Regulations
F.A.C. = Florida Administrative Code
MCL = maximum contaminant level
mg/L = milligrams per liter
pCi/l. = picocuries per liter
RAOs = remedial action objectives

Table 6
Summary of Current ARARs for Chemical-Specific Standards for Surface Water[1]

Contaminant	ARARs	Source	Year
Fluoride	<5.0 mg/L	State Surface Water Quality Standard	2004
Arsenic (total)	<50 µg/L	State Surface Water Quality Standard	2004
Chloride	Not increased more than 10% above normal background. Normal daily and seasonal fluctuations shall be maintained.	State Surface Water Quality Standard	2004
Sulfate	NA	NA	2004
Total Nitrate and Nitrite	NA	NA	2004
Radium-226 Radium-228 (combined)	<5pCi/L	State Surface Water Quality Standard	2004

1 Chapters 62-302 and 62-302.530, F.A.C. provides surface water quality standards. Bayou Texar is included in the Class 111, Predominantly Marine Waters defined under 62-302.400 (10), F.A.C.
ARARs = Applicable or Relevant and Appropriate Requirements
F.A.C. = Florida Administrative Code
NA = not applicable
mg/L = milligrams per liter
pCi/L = picocuries per liter
µG/L - micrograms per liter

Changes in Toxicity and Other Contaminant Characteristics

Toxicity factors and other characteristics for contaminants of concern have not changed at the site to affect the protectiveness of the remedy.

Changes in Risk Assessment Methods

As part of the Phase II RI, a risk assessment was conducted to evaluated public health and environmental risks; however, ecological risks were not fully evaluated. A SLERA was conducted as part of this five-year review to confirm the remedy is protective of the environment. The SLERA was conducted by the USACE, Omaha District, and details are provided in Attachment 3.

Expected Progress Towards Meeting RAOs

Seven years of an estimated seventy-year natural attenuation remedy have elapsed, and the remedy is progressing as expected. Monitoring of the groundwater and surface water should continue to assess the progress of the remedy.

QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

No other information has been identified during this five-year review that calls into question the protectiveness of the remedy. Receptors are not being impacted by the plume migration from the Agrico site. Groundwater use is restricted, and surface water criteria are being met in Bayou Texar where affected groundwater is discharging to the bayou. In the event receptors are impacted in the future, which is highly unlikely, the contingency remedy may need to be implemented as set forth in the OU-2 ROD.

TECHNICAL ASSESSMENT SUMMARY

According to the data review, site inspection, and interviews, the remedy is functioning as intended by the ROD. The remedy for OU-1 has contained the source, and natural attenuation is expected to effectively remediate the site groundwater (OU-2). The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid. No other information was found during the five-year review of the Agrico site to indicate the remedy is not protective. The existing remedy continues to be protective of human health and the environment.

VIII. ISSUES

Table 7 presents issues to be resolved at the Agrico site.

Table 7
Issues

Issue	Currently Affects Protectiveness (Yes/No)	Affects Future Protectiveness (Yes/No)
1. Lack of an upgradient monitoring location.	No	Yes
2. Inaccurate results for combined radium at locations across Bayou Texar.	No	Yes
3. Inaccurate results for combined radium in the background well (ETC-MW-12DP).	No	Yes
4. Lack of community updates regarding the status and activities at the Agrico site.	No	No
5. Uncertainly associated with unavailable benchmarks for chloride.	No	Yes

IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 8 provides recommendations and follow-up actions to address the issues presented in Section VIII.

Table 8
Recommendations and Follow-Up Actions

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes/No)	
					Current	Future
1. Lack of an upgradient monitoring location.	Ground water sampling should be conducted at a location upgradient of the site.	PRPs	EPA	November 2005	No	Yes
2. Inaccurate results for combined radium at locations across Bayou Texar.	Groundwater sampling should be conducted across Bayou Texar for one year to validate radium results.	PRPs	EPA	November 2005	No	Yes
3. Inaccurate results for combined radium in the background well (ETC-MW-12DP).	Identify a more representative background location for monitoring, and sample this location as part of the annual groundwater monitoring for OU-2 until the next Five-Year Review.	PRPs	EPA	November 2005	No	Yes
4. Issues #1, #2, and #3	Update and revise the O&M Plan for OU-2 to provide an improved natural attenuation monitoring approach for the site.	PRPs	EPA	November 2005	No	Yes
5. Lack of community updates regarding the status and activities at the Agrico site.	The Community Relations Plan should be updated to include a current contact listing of community members.	PRPs	EPA	November 2005	No	No
6. Uncertainty associated with unavailable benchmarks for chloride.	Site-specific benthic community analysis or sediment toxicity testing should be conducted at the site.	PRPs	EPA	April 2010	No	Yes

The change in the arsenic standard does not affect this five-year review; however, the new regulatory limit should be considered for future groundwater sampling events with regard to laboratory reporting limits for arsenic.

To ensure protectiveness, groundwater and surface water monitoring should continue until RAOs are achieved as specified in the ROD.

X. PROTECTIVENESS STATEMENT

The remedy at the Agrico site remains protective of human health and the environment. Monitoring data indicate the remedy is functioning as required. The remedy is expected to attain groundwater and surface water cleanup goals through natural attenuation during an estimated seventy-year time-frame (as specified in the OU-2 ROD for groundwater). In order to verify protectiveness, groundwater and surface water monitoring should continue until RAOs are achieved.

XI NEXT REVIEW

The next five-year review for the Agrico site is required by April 2010, five years from the date of this review.

ATTACHMENTS

ATTACHMENT 1

LIST OF DOCUMENTS REVIEWED

Documents Reviewed

DuPont Environmental Remediation Services (DuPont). 1994. Final Design Analysis Report for Operable Unit One at the Agrico Chemical Site, Pensacola, Florida, September 20, 1994.

DuPont. 1996. Operation and Maintenance Plan for Operable Unit One, Agrico Chemical Site, Pensacola, Florida, September 20, 1996.

Entrix, Inc. 1993a. Bayou Texar Study Phase I Report Sediment and Porewater Sampling and Analysis, May 6, 1993.

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EPA. 1992. EPA Superfund Record of Decision: Agrico Chemical Company, EPA ID: FLD980221857, OU-1, Pensacola, FL, September 29, 1992.

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EPA. 1999. Preliminary Close Out Report, Agrico Chemical Superfund Site, Pensacola, Escambia County, Florida, September 1999.

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Geraghty & Miller, Inc. 1993b. Final Feasibility Study, Agrico Chemical Site, Pensacola, Florida, June 23, 1993.

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URS. 20015. 2000 Annual Report. Operable Unit Two (OU-2), Agrico Site, Pensacola, Florida, March 9, 2001.

URS. 2002a. Ground Water Sampling Results - May and November 2001, Operable Unit One, Agrico Site, Pensacola, Florida, March 1, 2002.

URS. 2002b. 2001 Annual Report, Operable Unit Two (OU-2), Agrico Site, Pensacola, Florida, March 1,2002.

URS. 2003a. 2002 Annual Report, Operable Unit One (OU-1), Agrico Site, Pensacola, Florida, April 2, 2003.

URS. 2003b. 2002 Annual Report, Operable Unit Two (OU-2), Agrico Site, Pensacola, Florida, April 2, 2003.

URS. 2004a. 2003 Annual Report, Operable Unit One (OU-1), Agrico Site, Pensacola, Florida, April 2, 2004.

URS. 2004b. 2003 Annual Report, Operable Unit Two (OU-2), Agrico Site, Pensacola, Florida, June 25, 2004.

URS Greiner Woodward Clyde. 1999. Ground Water Sampling Results - May and November 1999. Operable Unit One, Agrico Site, Pensacola, Florida, January 7, 2000.

URS Greiner Woodward Clyde. 2000a. Five-Year Review, Agrico Site, Pensacola, Florida, February 2000.

URS Greiner Woodward Clyde. 2000b. Remedial Action Implementation and First Annual Report (1999), Operable Unit Two, Agrico Site, Pensacola, Florida, February 4, 2000.

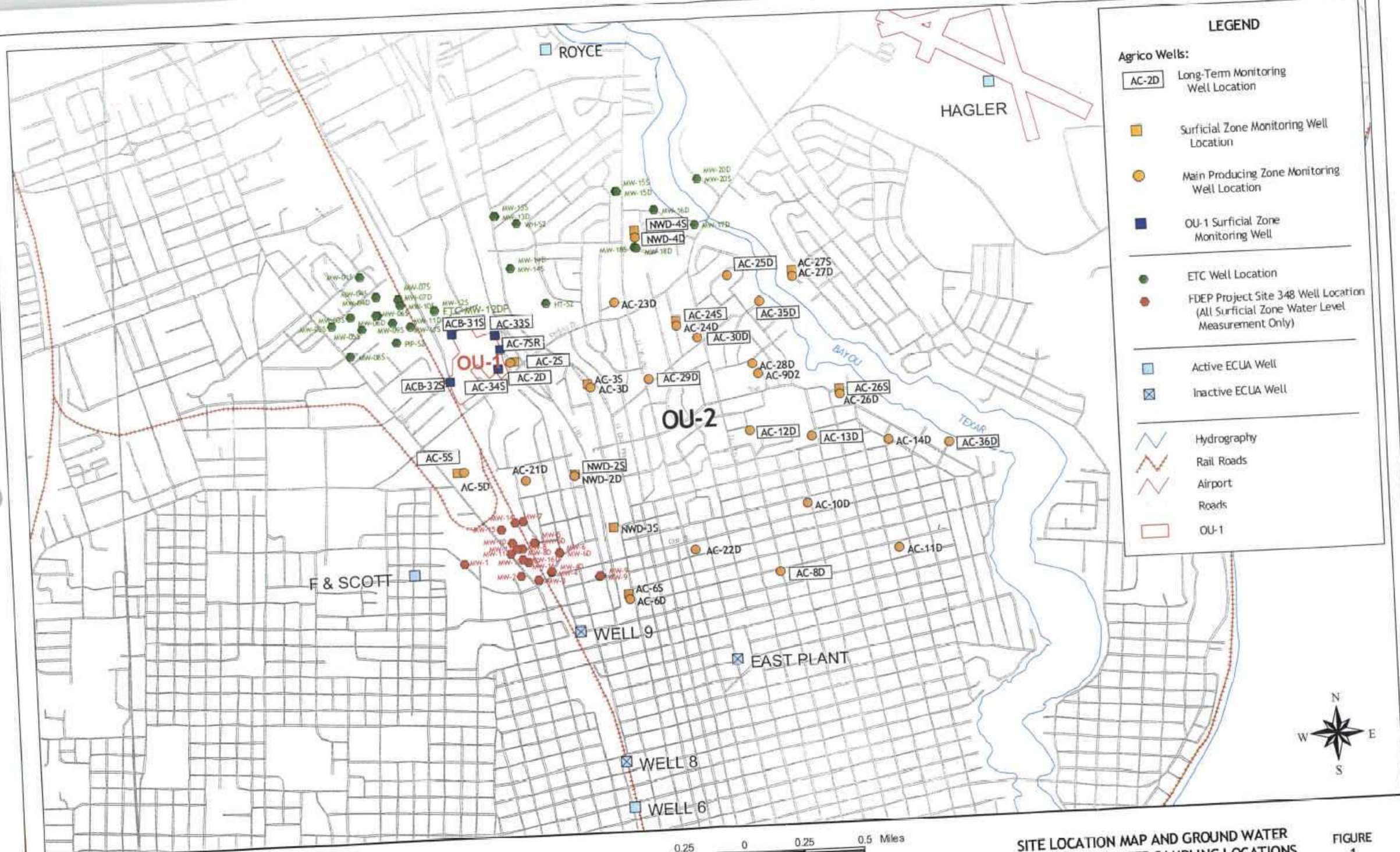
Woodward-Clyde Americas International. 1998a. Operation and Maintenance Plan, Operable Unit Two, Agrico Site, Pensacola, Florida, November 1998.

Woodward-Clyde. 1998b. Ground Water Sampling Results - May and November 1997. Operable Unit One, Agrico Site, Pensacola, Florida, January 9, 1998.

Woodward-Clyde. 1999. Ground Water Sampling Results - May and November 1998. Operable Unit One, Agrico Site, Pensacola, Florida, January 1999.

ATTACHMENT 2

FIGURES



OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

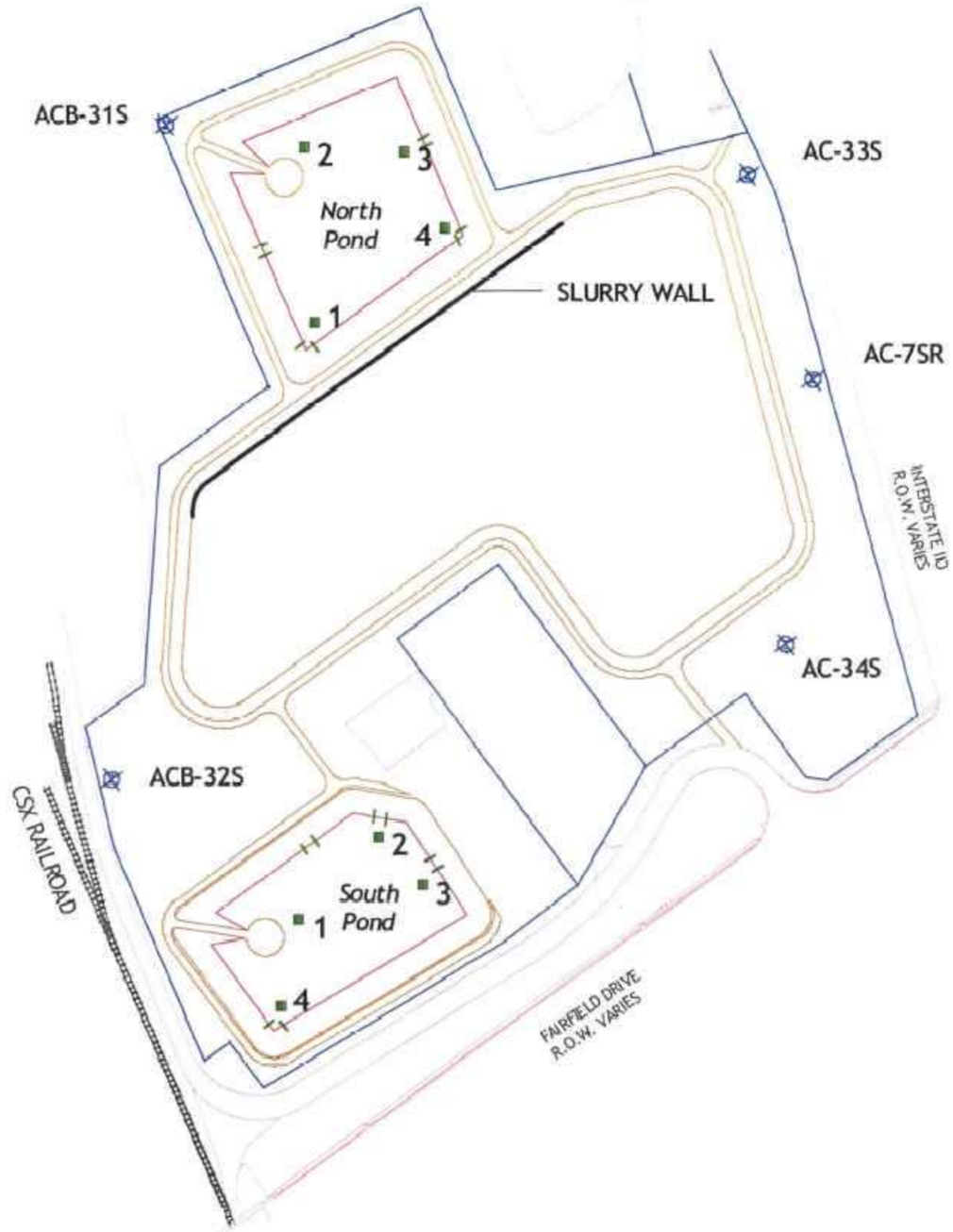
Base Map Data Provided By:
Florida Department of Environmental Protection
and Northwest Florida Water Management District

Projection: UTM
Zone: 16
Datum: NAD 27

SITE LOCATION MAP AND GROUND WATER AND SURFACE WATER SAMPLING LOCATIONS

FIGURE 1

Bell/Normile - Tallahassee
07/15/01



LEGEND

- Monitoring Well Location
- Station Location and Identifier
- Outfall Location

AGRICO SITE
PENSACOLA, FLORIDA

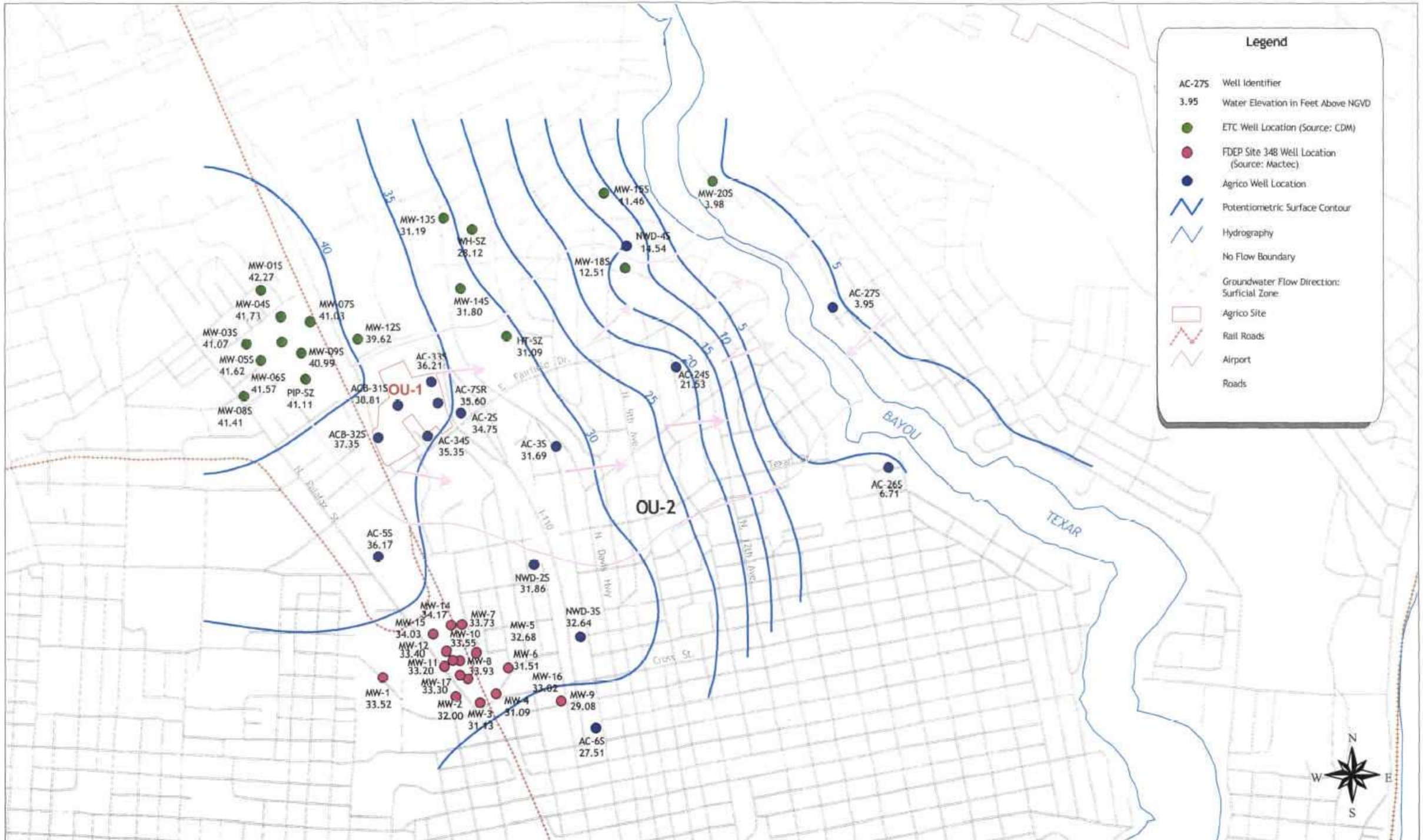
URS

200 0 200 400 Feet

C. Beauvais - Tallahassee
05/06/2004

FIGURE 2

NORTH AND SOUTH PONDS (OU-1)
SAMPLE LOCATIONS



OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

0.25 0 0.25 0.5 Miles

Base Map Data Provided By:
Florida Department of Environmental Protection
and Northwest Florida Water Management District

Projection: UTM
Zone: 16
Datum: NAD 27

POTENTIOMETRIC SURFACE
SURFICIAL ZONE
JANUARY 12, 2004

FIGURE
3

B. Norman - Tallahassee - 09/03/04

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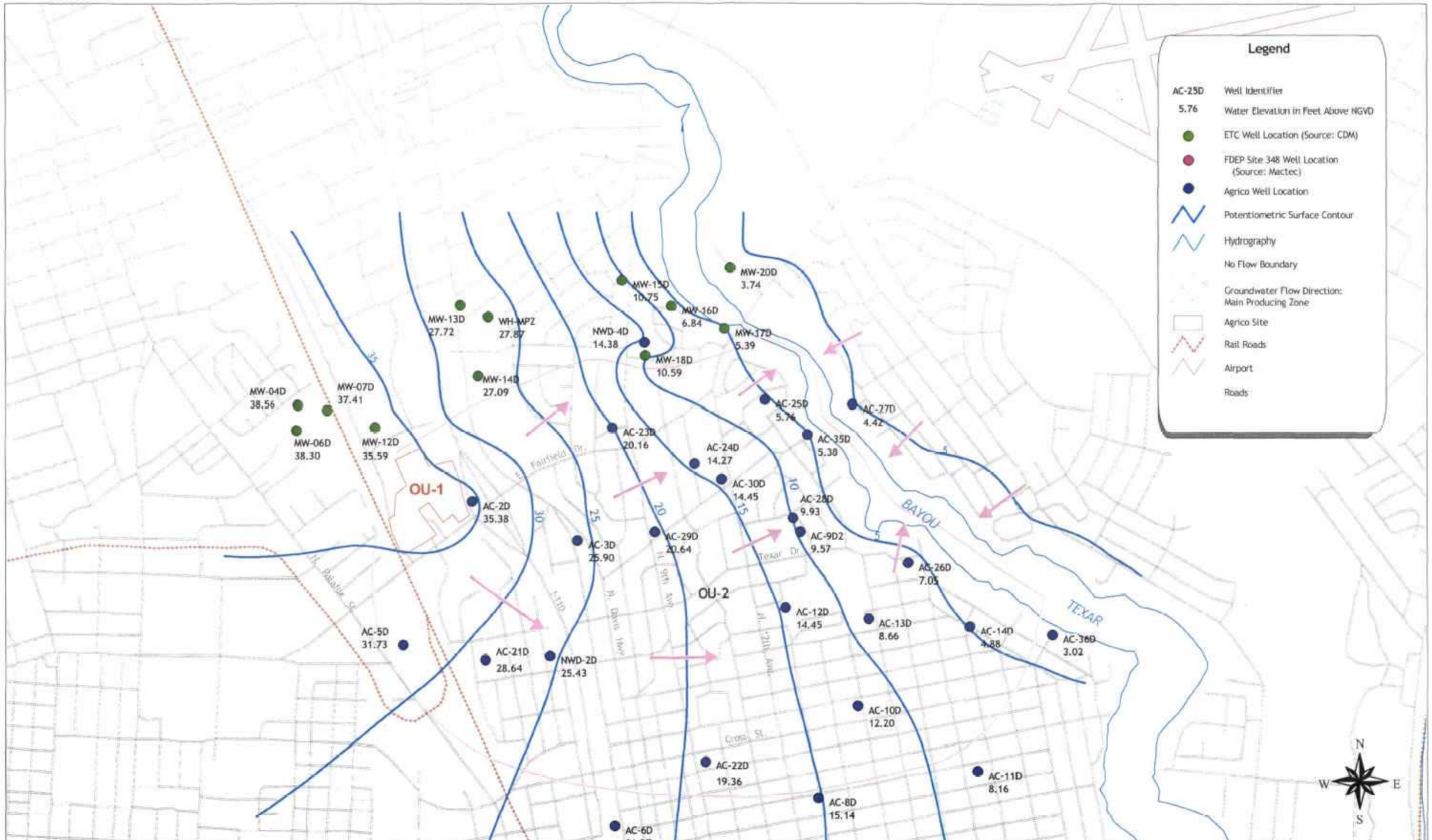

OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

0.25 0 0.25 0.5 Miles

Base Map Data Provided By:
Florida Department of Environmental Protection
and Northwest Florida Water Management District

Projection: UTM
Zone: 16
Datum: NAD 27

POTENTIOMETRIC SURFACE
MAIN PRODUCING ZONE
JANUARY 12, 2004

FIGURE
4

B. Norman - Tallahassee - 09/01/04

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POTENTIOMETRIC SURFACE OF THE SURFICIAL ZONE OF THE SAND-AND-GRAVEL AQUIFER, ESCAMBIA COUNTY, FLORIDA
OCTOBER/NOVEMBER 2000

Nwf Id	Site Id	Well Name	Elev	Water Level (bsd)	Water Level (msl)	Date Measured
1078	301946087215303	SANCHEZ SHALLOW	17	-7.3	9.8	11-OCT-00
1381	302226087200203	WELLER AVE SZ	26	-9.1	16.9	11-OCT-00
2182	302530087133002	MW-13S	75	-58.0	16.3	04-OCT-00
2277	302542087105603	BALL PARK SZ	42	-38.8	3.7	11-OCT-00
2302	302549087124002	MW-3S	70	-56.1	16.1	04-OCT-00
2371	302605087132303	MW-2S	45	-21.5	23.2	04-OCT-00
2434	302616087125502	AC-6S	70	-47.9	21.9	12-OCT-00
2482	302627087143201	O STREET SZ	84	-51.8	32.2	04-OCT-00
2510	302631087125801	LEONARD/ALCANIZ SZ	77	-53.3	24.0	04-OCT-00
2558	302641087130702	ANDERSON ST - SZ	76	-48.9	26.9	11-OCT-00
2569	302643087133602	AC-5S	83	-50.7	32.1	04-OCT-00
2662	302703087130302	AC-3S	88	-62.2	25.9	12-OCT-00
2671	302704087134102	PALAFOX IND PK SHALL	84	-46.0	38.2	13-OCT-00
2680	302707087132102	AC-2S	89	-58.6	30.4	11-OCT-00
2736	302720087131001	HIGHLAND TERRACE SZ	86	-59.2	26.4	03-OCT-00
2768	302727087135301	CP-1	85	-49.6	35.8	21-OCT-00
2774	302728087152401	MONTCLAIR SHALLOW	89	-47.7	41.3	24-OCT-00
2804	302737087121902	WOODLAND HEIGHTS - SZ	83	-56.8	26.6	12-OCT-00
2835	302750087155101	GLASS DR. SZ	90	-48.4	41.3	04-OCT-00
2839	302751087143102	BRENTWOOD PARK - SZ	88	-45.6	42.9	03-OCT-00
2850	302756087132002	HEWITT ST - SZ	84	-61.0	22.8	03-OCT-00
2934	302831087134302	BELAMY ST - SZ	102	-71.8	30.8	12-OCT-00
3100	302934087155702	WEDGEWOOD SHALLOW	123	-51.9	71.1	24-OCT-00
3449	303158087160503	9 MILE ROAD SHALLOW	118	-68.5	49.2	10-OCT-00
3589	303251087150201	USGS TH20	100	-74.0	26.2	25-OCT-00
3674	303327087135401	USGS TH101	122	-109.1	13.0	25-OCT-00
3684	303333087134601	SCENIC HILLS DEEP	125	-115.1	9.9	05-OCT-00
3714	303346087165401	USGS TH 18	126	-84.5	41.5	25-OCT-00
3891	303459087172801	GONZALEZ #2	152	-131.4	20.6	20-NOV-00
3909	303504087175301	GONZALEZ #1	135	-111.7	23.3	16-NOV-00
3985	303532087224203	MUSCOGEE SHALLOW	56	-19.9	36.1	19-OCT-00
4076	303610087152602	MONSANTO SHALLOW	45	-35.7	9.3	05-OCT-00
4131	303634087211601	FARM HILL #2	168	-121.8	46.2	15-NOV-00
4478	303946087173003	QUINTETTE SHALLOW	29	-7.1	21.9	05-OCT-00
5462	305450087264002	OAK GROVE SHALL USGS	259	-77.4	181.8	18-OCT-00
5481	305514087263403	OAK GROVE SHALLOW	235	-59.7	175.3	04-OCT-00

Scale 1:230,000

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Kilometers

5 0 5 10 15
Miles

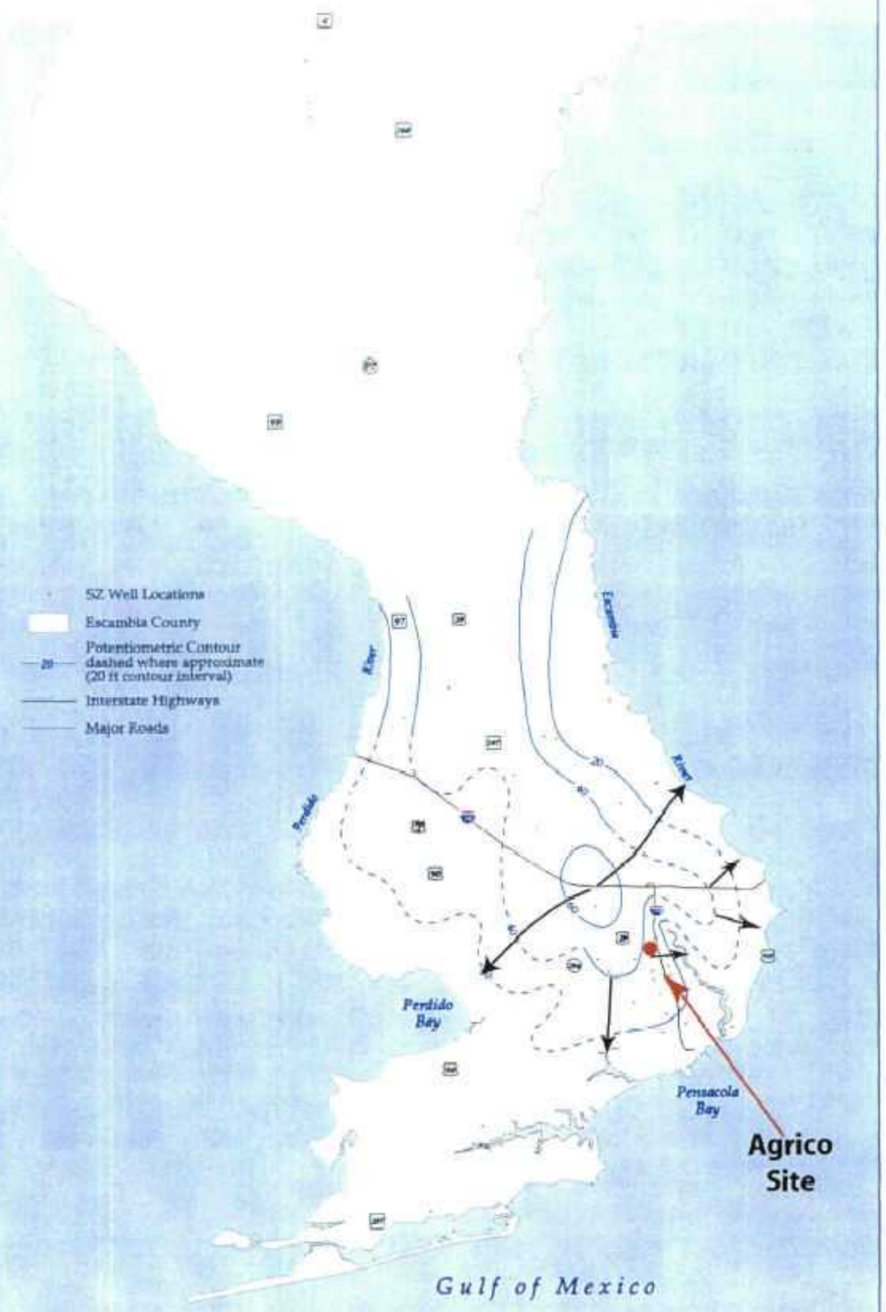


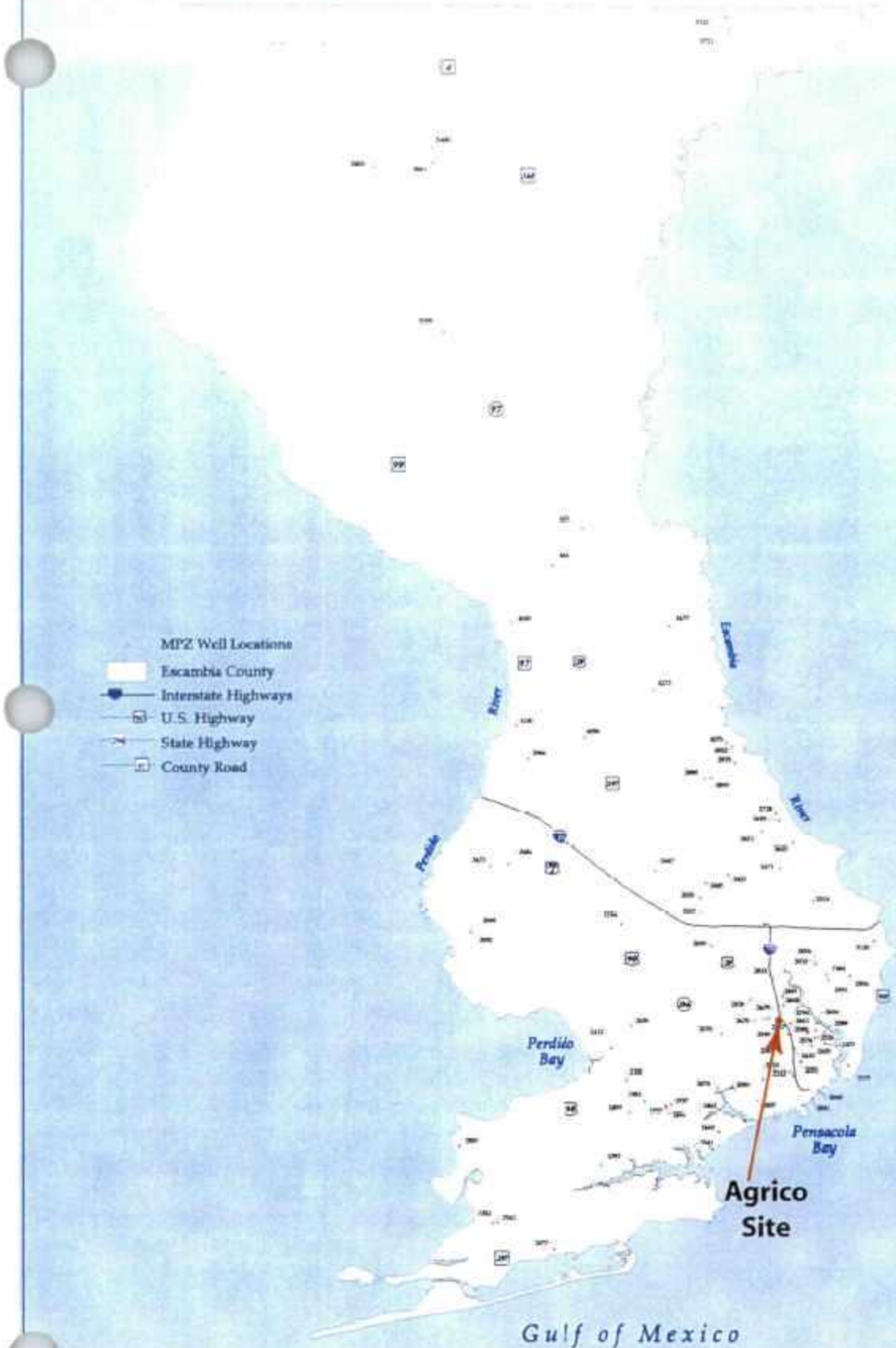
Figure 5
Map modified by URS (9/02)
→ Groundwater Flow Direction

Roger A. Countryman, Alan Baker, Tom Pratt and Gary Miller

NORTHWEST FLORIDA
WATER MANAGEMENT DISTRICT
WATER RESOURCE MAP SERIES 01-1
GIS MAP ID 13-08-002

POTENTIOMETRIC SURFACE OF THE MAIN PRODUCING ZONE OF THE SAND-AND-GRAVEL AQUIFER, ESCAMBIA COUNTY, FLORIDA
OCTOBER/NOVEMBER 2000

Nwf id	Site id	Well Name	Elev	Water Level (lsd)	Water Level (msl)	Date Measured
1077	301944087151302	SANCHEZ INT	17	-10.3	6.8	11-OCT-00
1383	302220087200202	WELLER AVE LPZ	25	-19.4	5.6	11-OCT-00
1509	302302087252501	USGS TH107	11	-6.6	4.6	01-DEC-00
1541	302308087163501	ESCAMBIA 30 HANNA IR	10	-10.1	-0.2	11-OCT-00
1660	302332087154102	PEOPLES #4A	23	-22.1	0.9	07-NOV-00
1658	302411087190003	ECUA #37-VILLA DR	29	-25.7	3.3	26-OCT-00
1863	302412087162401	PEOPLES #5	30	-30.3	-0.7	07-NOV-00
1896	302420087173701	CORRY #9	30	-26.1	3.4	14-NOV-00
1920	302424087174502	CORRY #15	30	-24.6	5.4	14-NOV-00
1937	302426087172702	CORRY #13	27	-26.6	0.7	14-NOV-00
1981	302432087182501	USGS TH3	31	-21.0	10.0	15-NOV-00
2007	302435087141703	ROMANA ST LPZ	23	-16.7	6.1	11-OCT-00
2041	302443087121501	ADMIRAL MASON PARK	6	-2.9	3.3	08-NOV-00
2068	302453087120002	MUSCOGEE WHARF IRRIG	7	-3.8	3.6	08-NOV-00
2076	302459087154401	USGS TH105	54	-44.6	9.2	14-NOV-00
2080	302502087151301	REICHOLD #11	28	-18.4	8.6	14-NOV-00
2105	302512087190401	ECUA #10-LILLIAN	23	-17.9	5.1	25-OCT-00
2110	302514087140001	ECUA #5-WEST PLANT	42	-31.2	10.8	29-OCT-00
2142	302523087125601	ECUA #1-(#6)	33	-23.7	9.3	25-OCT-00
2275	302543087105601	BALL PARK MPZ	42	-40.4	2.1	11-OCT-00
2301	302549087124001	MW-5D	70	-58.1	12.2	04-OCT-00
2369	302605087132301	MW-2D	45	-26.3	18.8	04-OCT-00
2412	302612087194102	AVONDALE STP LPZ	11	-4.3	6.7	25-OCT-00
2433	302616087125501	AC-6D	70	-52.4	17.5	12-OCT-00
2459	302620087121701	AC-8D	77	-66.3	10.8	12-OCT-00
2475	302625087114701	AC-11D	74	-68.2	5.4	12-OCT-00
2526	302635087120901	AC-10D	80	-71.1	8.9	04-OCT-00
2557	302641087130701	ANDERSON ST - MPZ	76	-55.1	20.6	11-OCT-00
2568	302643087133601	AC-5D	83	-55.4	27.4	11-OCT-00
2570	302643087153601	USGS TH2	60	-27.3	32.7	07-NOV-00
2576	302644087122501	12TH AVE MPZ	79	-67.5	12.0	04-OCT-00
2588	302647087114801	AC-14D	50	-46.5	3.8	04-OCT-00
2589	302647087122701	AC-12D	79	-68.4	11.0	04-OCT-00
2604	302650087120701	AC-13D	75	-68.5	6.6	04-OCT-00
2639	302657087185701	ECUA #30-AVONDALE	60	-31.9	28.2	25-OCT-00
2661	302703087130301	AC-3D	88	-66.8	21.3	12-OCT-00
2670	302704087134101	PALAFOX IND PK DEEP	84	-49.7	34.3	12-OCT-00
2679	302707087132101	AC-2D	89	-62.0	27.0	11-OCT-00
2790	302734087124801	PINEGLADES MPZ	33	-22.3	10.8	03-OCT-00
2803	302737087131901	WOODLAND HEIGHTS-MPZ	83	-59.6	23.7	12-OCT-00
2836	302751087143101	BRENTWOOD PARK MPZ	88	-46.8	41.3	03-OCT-00
2849	302756087132001	HEWITT ST - MPZ	84	-62.8	21.1	03-OCT-00
2931	302803087113901	PENSACOLA MUNIC APRT	110	-88.0	19.1	01-DEC-00
2933	302803087134301	BELAMY ST - MPZ	103	-72.7	29.8	12-OCT-00
2954	302837087105301	ECUA #19-AIRPORT NOR	116	-113.5	2.5	26-OCT-00
3006	302900087120701	9TH AVE DEEP WELL	93	-76.0	16.6	15-NOV-00
3010	302901087120801	ECUA #17-9TH AVENUE	92	-75.0	17.0	25-OCT-00
3089	302929087235501	HUNT CLUB DEEP S&G	9	6.8	16.8	10-OCT-00
3090	302929087235502	HUNT CLUB SHALLOW SG	9	5.6	14.6	10-OCT-00
3099	302934087155701	WEDGEWOOD DEEP	123	-74.4	48.6	24-OCT-00
3120	302944087095801	GULL POINT PARK	101	-93.9	7.1	29-NOV-00
3194	303015087192001	ECUA #25-DUNAWAY	76	-40.8	35.2	25-OCT-00
3265	303041087162001	ECUA #24-BROAD ST	128	-86.5	41.6	26-OCT-00
3318	303102087121401	ELLYSON DEEP	97	-79.4	17.6	08-NOV-00
3335	303108087162301	USGS DETROIT BLVD	131	-88.9	42.2	08-NOV-00
3405	303142087161201	ECUA #23-ENSLEY	134	-95.3	38.7	25-OCT-00
3433	303154087152201	ECUA #28-OLF 44	130	-98.5	31.5	25-OCT-00
3447	303158087160501	9 MILE ROAD DEEP	118	-72.4	45.6	10-OCT-00
3471	303208087132701	USGS TH6	56	-38.5	17.7	15-NOV-00
3473	303208087241101	USGS 032-724-1A	123	-96.1	26.9	19-OCT-00
3484	303212087234001	BEULAH FIRE DEPT	117	-86.8	30.2	10-OCT-00
3603	303258087125701	UWF #2	67	-76.5	10.5	08-NOV-00
3651	303318087141701	CRIST PLANT #6	85	-75.0	10.0	16-NOV-00
3695	303338087132801	CRIST PLANT #3	65	-65.8	-0.8	18-NOV-00
3728	303352087133201	CRIST PLANT #4	27	-29.0	-2.0	15-NOV-00
3888	303458087151401	MONSANTO #0 (#14)	100	-108.2	-8.2	21-NOV-00
3899	303501087155901	MONSANTO #C (#13)	125	-137.1	-12.1	21-NOV-00
3975	303528087152901	MONSANTO #5	40	-37.2	2.8	21-NOV-00
3984	303532087224202	MUSCOGEE INT	58	-22.5	35.5	19-OCT-00
4052	303559087151401	MONSANTO #2	39	-36.8	2.2	21-NOV-00
4075	303610087152601	MONSANTO DEEP	45	-40.3	4.7	05-OCT-00
4096	303616087204101	FARM HILL #1	157	-118.4	38.6	15-NOV-00
4145	303642087232301	USGS TH 12	108	-85.5	22.5	30-NOV-00
4275	303754087180601	COTTAGE HILL #3	60	-49.7	10.3	20-NOV-00
4477	303946087173002	QUINTETTE INTER	29	-16.1	12.9	05-OCT-00
4500	303958087233201	USGS TH 13	140	-94.3	45.7	18-OCT-00
4644	304155087220101	MOLINO #3	192	-145.9	46.1	16-NOV-00
4710	304304087204801	MOLINO #1	190	-142.1	47.9	16-NOV-00
5159	304922087260802	DOGWOOD PARK MPZ	232	-94.1	137.9	04-OCT-00
5453	305444087284301	WALNUT HILL #2	240	-52.5	187.6	18-NOV-00
5461	305450087264001	OAK GROVE DEEP USGS	259	-91.8	167.7	18-OCT-00
5480	305514087263402	OAK GROVE MEDIUM S&G	232	-68.7	163.3	04-OCT-00
5721	305909087152701	CENTURY #1	102	-50.8	51.2	15-NOV-00
5742	305933087153501	CENTURY #2	75	-17.9	57.2	15-NOV-00
7341	302034087235904	SORRENTO MW-1 WEST	23	-14.6	8.4	01-DEC-00
7342	302034087235905	SORRENTO MW-2 WEST	25	-17.3	7.8	01-DEC-00
7484	302838087114201	PENSACOLA AIR #2R	108	-96.7	11.3	01-DEC-00



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Miles

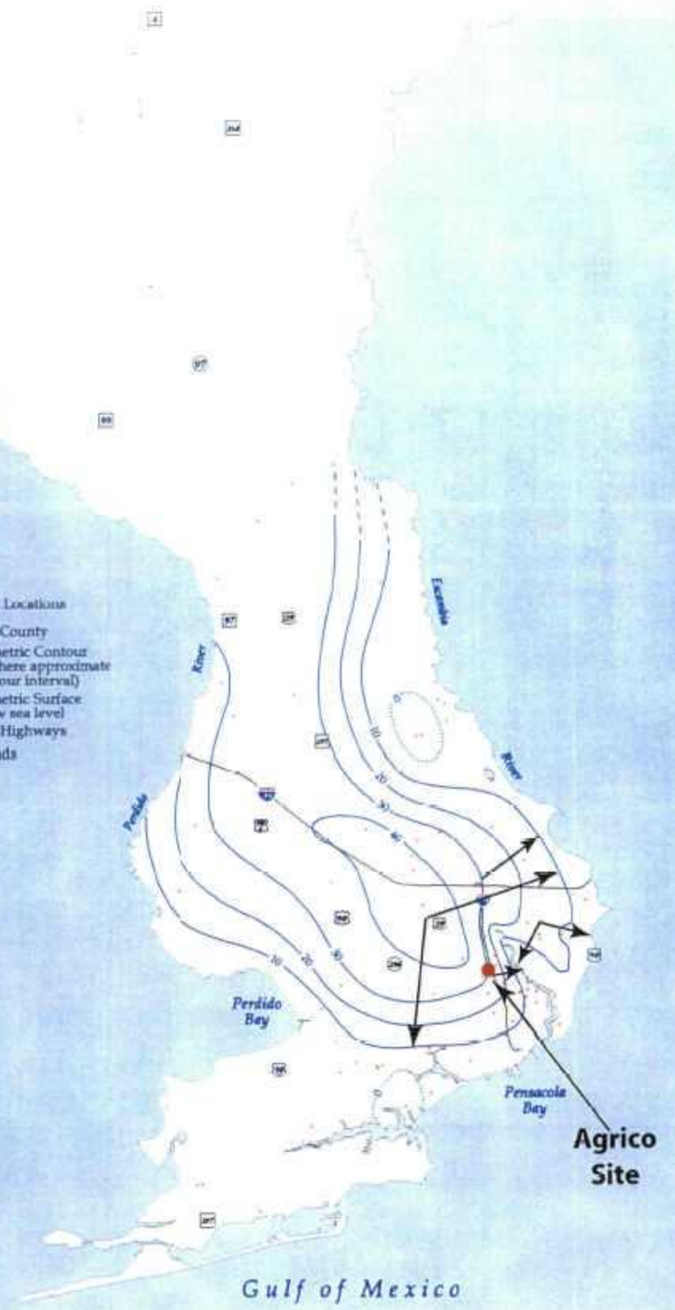


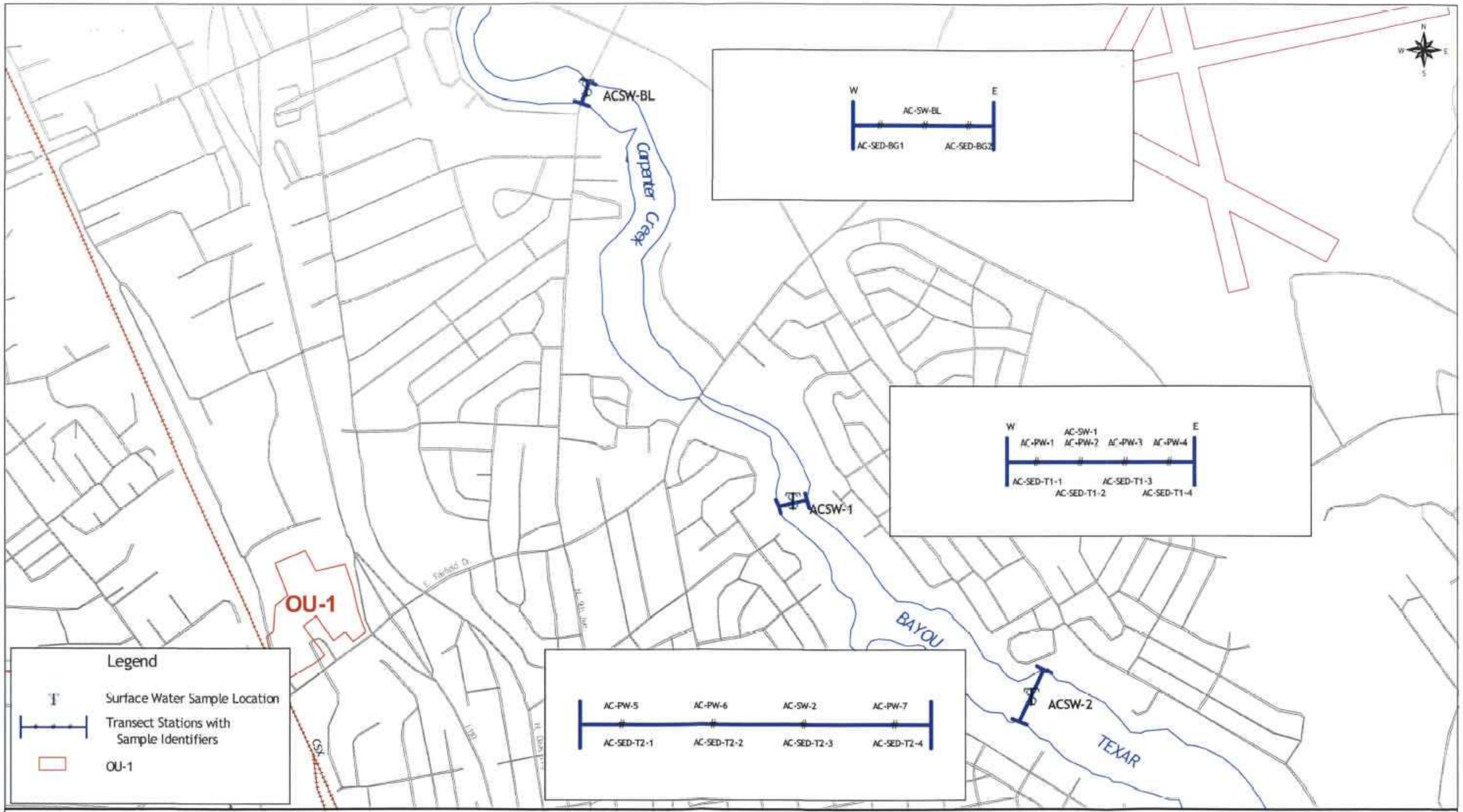
Figure 6

Map modified by URS (9/02)

→ Groundwater Flow Direction

Roger A. Countryman, Alan Baker, Tom Pratt and Gary Miller

NORTHWEST FLORIDA
WATER MANAGEMENT DISTRICT
WATER RESOURCE MAP SERIES 01-2
GIS MAP ID 13-08-001



OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

0.25 0 0.25 0.5 Miles

Base map data provided by:
Northwest Florida Water Management District

Projection: UTM
Zone: 16
Datum: NAD27

BAYOU TEXAR
SAMPLE LOCATIONS

FIGURE
7

C. Beauvais - Tallahassee - 05/08/04

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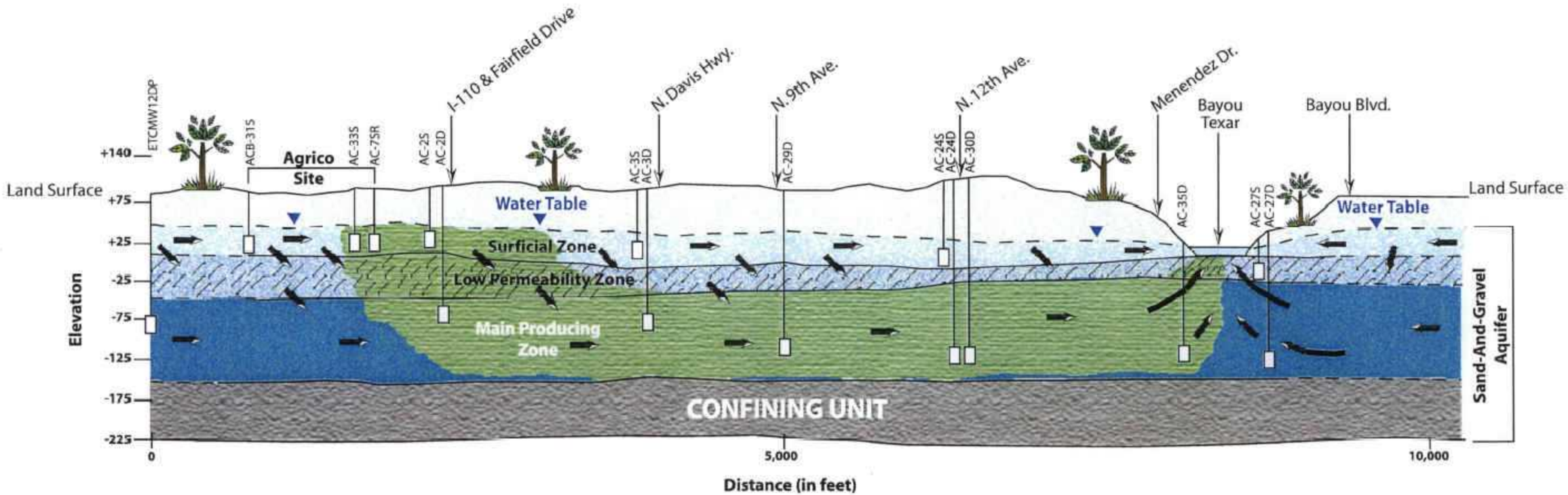
Hydrogeologic Conceptual Model from Agrico Site to Bayou Texar

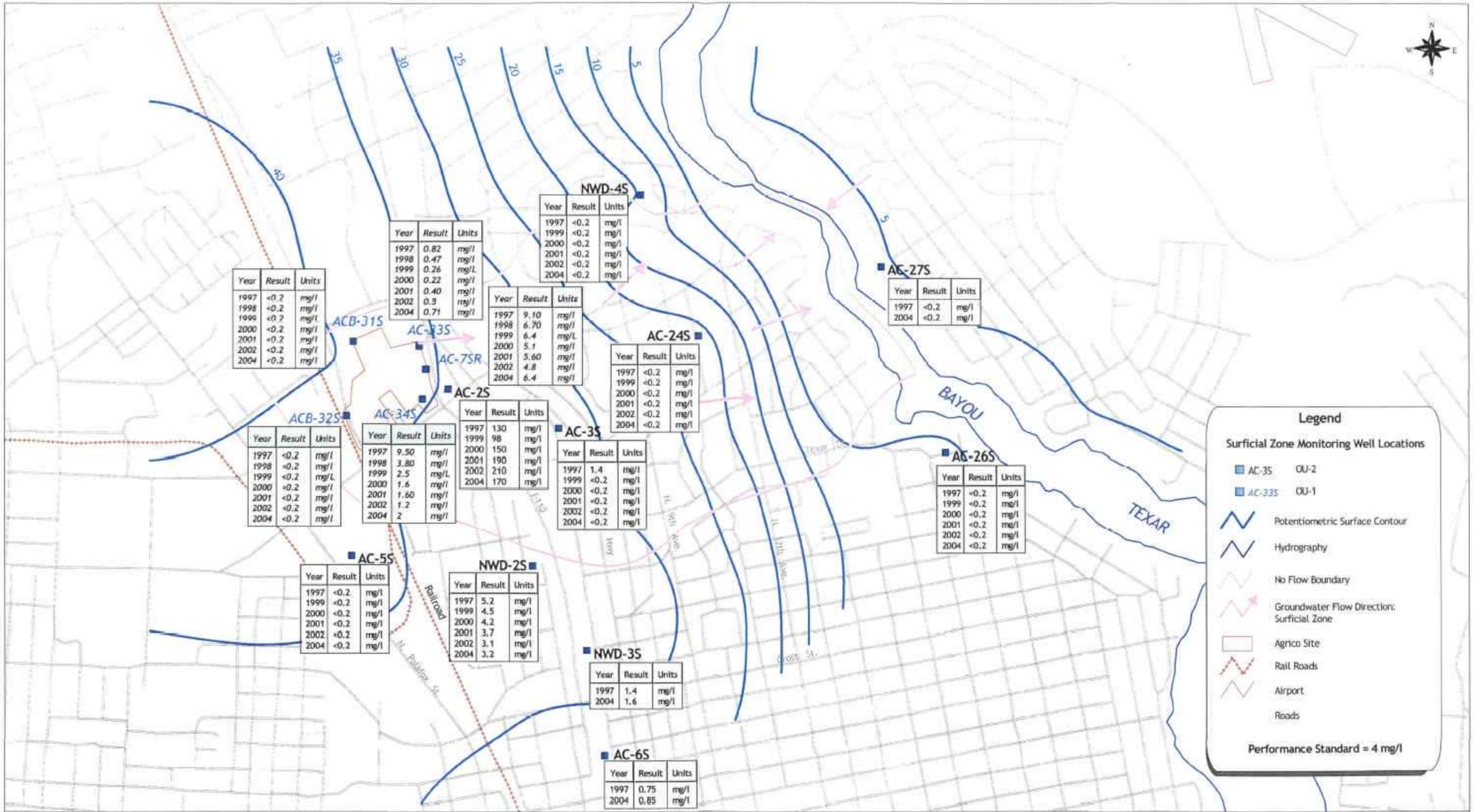


Legend

- Groundwater Flow
- Monitoring Well
- Screen Interval
- Water Table
- Area of Affected Groundwater

Figure 8

s:\williamsconoco\2004 agrico\ou-2\EPA Figures\schematicsand_and_gravel_aquifer.ai



Year	Result	Units
1997	<0.2	mg/l
1998	<0.2	mg/l
1999	<0.2	mg/L
2000	<0.2	mg/l
2001	<0.2	mg/l
2002	<0.2	mg/l
2004	<0.2	mg/l

Year	Result	Units
1997	0.82	mg/l
1998	0.47	mg/l
1999	0.26	mg/L
2000	0.22	mg/l
2001	0.40	mg/l
2002	0.3	mg/l
2004	0.71	mg/l

Year	Result	Units
1997	9.10	mg/l
1998	6.70	mg/l
1999	6.4	mg/L
2000	5.1	mg/l
2001	5.60	mg/l
2002	4.8	mg/l
2004	6.4	mg/l

Year	Result	Units
1997	<0.2	mg/l
1999	<0.2	mg/l
2000	<0.2	mg/l
2001	<0.2	mg/l
2002	<0.2	mg/l
2004	<0.2	mg/l

Year	Result	Units
1997	<0.2	mg/l
1998	<0.2	mg/l
1999	<0.2	mg/L
2000	<0.2	mg/l
2001	<0.2	mg/l
2002	<0.2	mg/l
2004	<0.2	mg/l

Year	Result	Units
1997	9.50	mg/l
1998	3.80	mg/l
1999	2.5	mg/L
2000	1.6	mg/l
2001	1.60	mg/l
2002	1.2	mg/l
2004	2	mg/l

Year	Result	Units
1997	130	mg/l
1999	98	mg/l
2000	150	mg/l
2001	190	mg/l
2002	210	mg/l
2004	170	mg/l

Year	Result	Units
1997	1.4	mg/l
1999	<0.2	mg/l
2000	<0.2	mg/l
2001	<0.2	mg/l
2002	<0.2	mg/l
2004	<0.2	mg/l

Year	Result	Units
1997	<0.2	mg/l
1999	<0.2	mg/l
2000	<0.2	mg/l
2001	<0.2	mg/l
2002	<0.2	mg/l
2004	<0.2	mg/l

Year	Result	Units
1997	<0.2	mg/l
1999	<0.2	mg/l
2000	<0.2	mg/l
2001	<0.2	mg/l
2002	<0.2	mg/l
2004	<0.2	mg/l

Year	Result	Units
1997	5.2	mg/l
1999	4.5	mg/l
2000	4.2	mg/l
2001	3.7	mg/l
2002	3.1	mg/l
2004	3.2	mg/l

Year	Result	Units
1997	1.4	mg/l
2004	1.6	mg/l

Year	Result	Units
1997	0.75	mg/l
2004	0.85	mg/l

Year	Result	Units
1997	<0.2	mg/l
2004	<0.2	mg/l

OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

0.25 0 0.25 0.5 Miles

Base Map Data Provided By:
Florida Department of Environmental Protection
and Northwest Florida Water Management District

Projection: UTM
Zone: 16
Datum: NAD27

COMPARISON OF FLUORIDE CONCENTRATIONS
SURFICIAL ZONE

FIGURE
9

B. Norman - Tallahassee - 09/03/06

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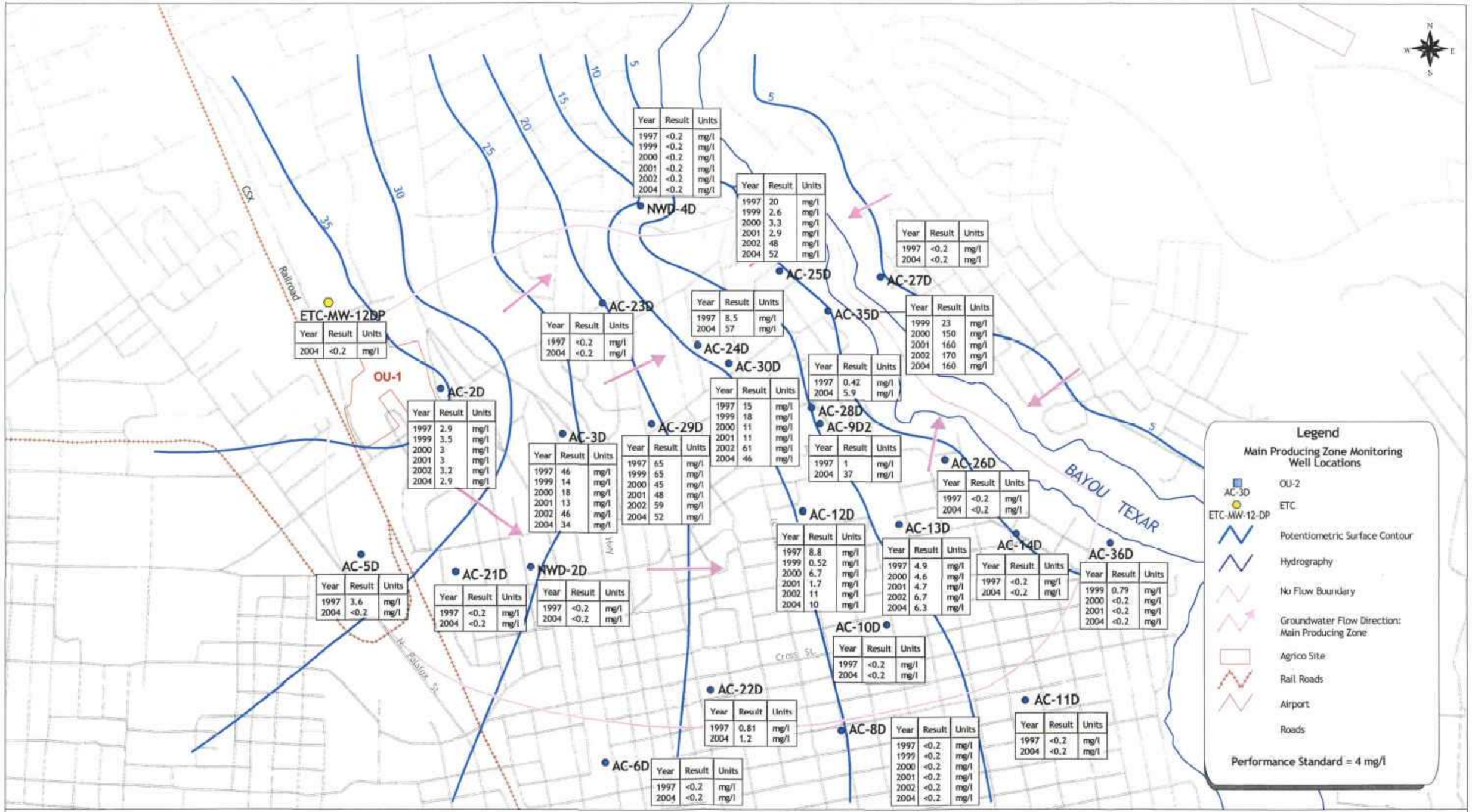

OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

0.25 0 0.25 0.5 Miles

Base Map Data Provided By:
Florida Department of Environmental Protection
and Northwest Florida Water Management District

Projection: UTM
Zone: 16
Datum: NAD27

COMPARISON OF FLUORIDE CONCENTRATIONS
MAIN PRODUCING ZONE

FIGURE
10

B. Newman - Tallahassee - 09/01/04

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OU-2
AGRICO SITE
PENSACOLA, FLORIDA

Legend

Wells

- ECUA Wells
- Irrigation Well
- Monitoring Well
- Agrico Site

Fluoride Concentrations (mg/L)

- 4 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120
- 120 - 130
- 130 - 140
- 140 - 150

N

700 0 700 1400 Feet

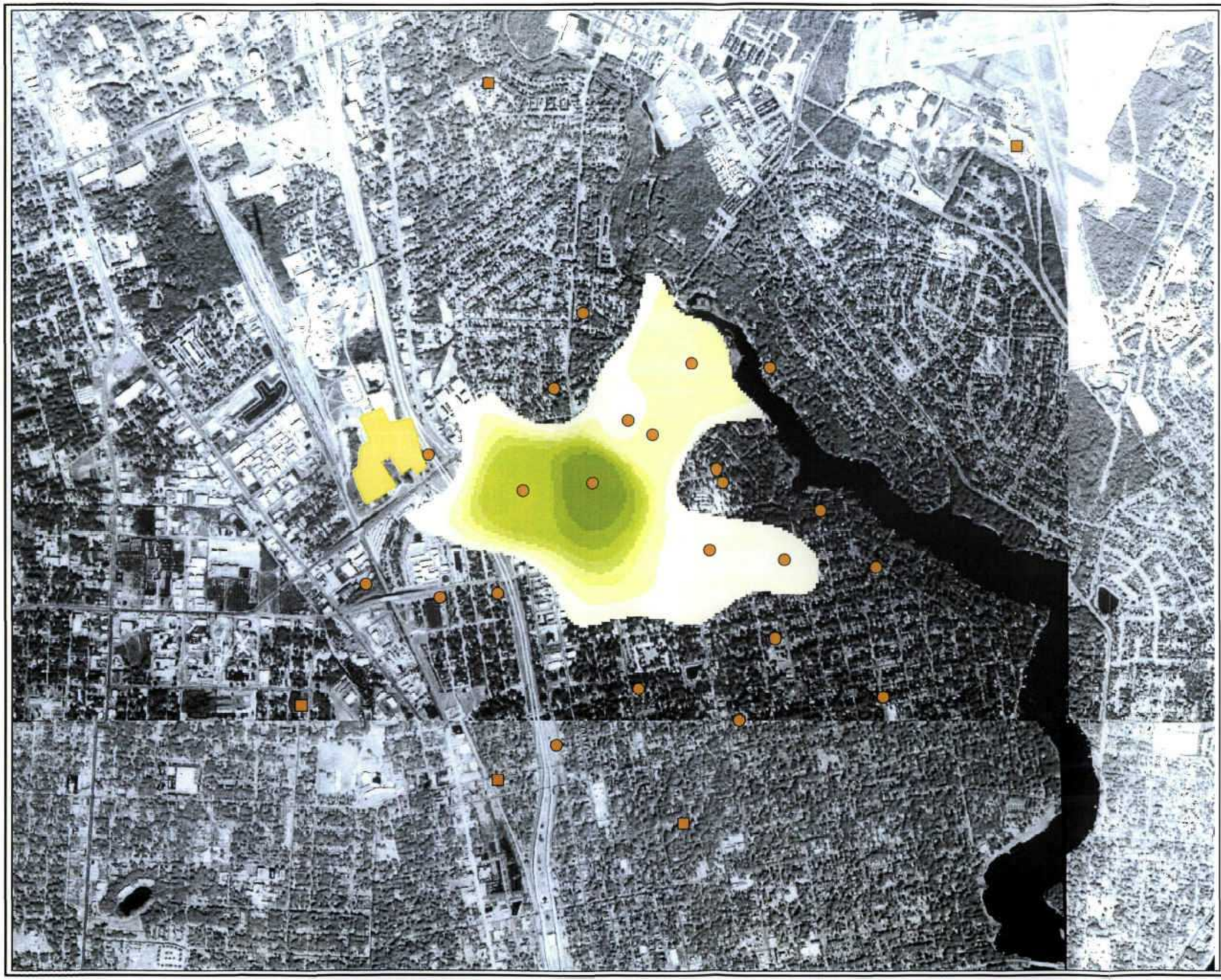
Projection:
FL Albers, HPGN, Meters, NAD83

URS

G:/Agrico/Ou2/Deliverables/08 2004 Fluoride Maps.apr

FLUORIDE CONCENTRATIONS IN GROUNDWATER: 1992

PROJECT NUMBER	FIGURE
12804306	11



OU-2
AGRICO SITE
PENSACOLA, FLORIDA

Legend

Wells

- ECUA Wells
- Irrigation Well
- Monitoring Well
- Agrico Site

Fluoride Concentrations (mg/L)

- 4 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120
- 120 - 130
- 130 - 140
- 140 - 150

N

700 0 700 1400 Feet

Projection:
FL Albers, HPGN, Meters, NAD83

URS

FLUORIDE CONCENTRATIONS IN GROUNDWATER: 1997

PROJECT NUMBER	FIGURE
12804306	12

OU-2
AGRICO SITE
PENSACOLA, FLORIDA

Legend

Wells

- ECUA Wells
- Irrigation Well
- Monitoring Well
- Agrico Site

Fluoride Concentrations (mg/L)

- 4 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120
- 120 - 130
- 130 - 140
- 140 - 150

N

700 0 700 1400 Feet

Projection:
FL Albers, HPGN, Meters, NAD83

URS

G:/Agrico/Ou2/Deliverables/08 2004 /Fluoride Maps.apr

FLUORIDE CONCENTRATIONS IN GROUNDWATER: 1999

PROJECT NUMBER	FIGURE
12804306	13

OU-2
AGRICO SITE
PENSACOLA, FLORIDA

Legend

Wells

- ECUA Wells
- Irrigation Well
- Monitoring Well
- Agrico Site

Fluoride Concentrations (mg/L)

- 4 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120
- 120 - 130
- 130 - 140
- 140 - 150

N

700 0 700 1400 Feet

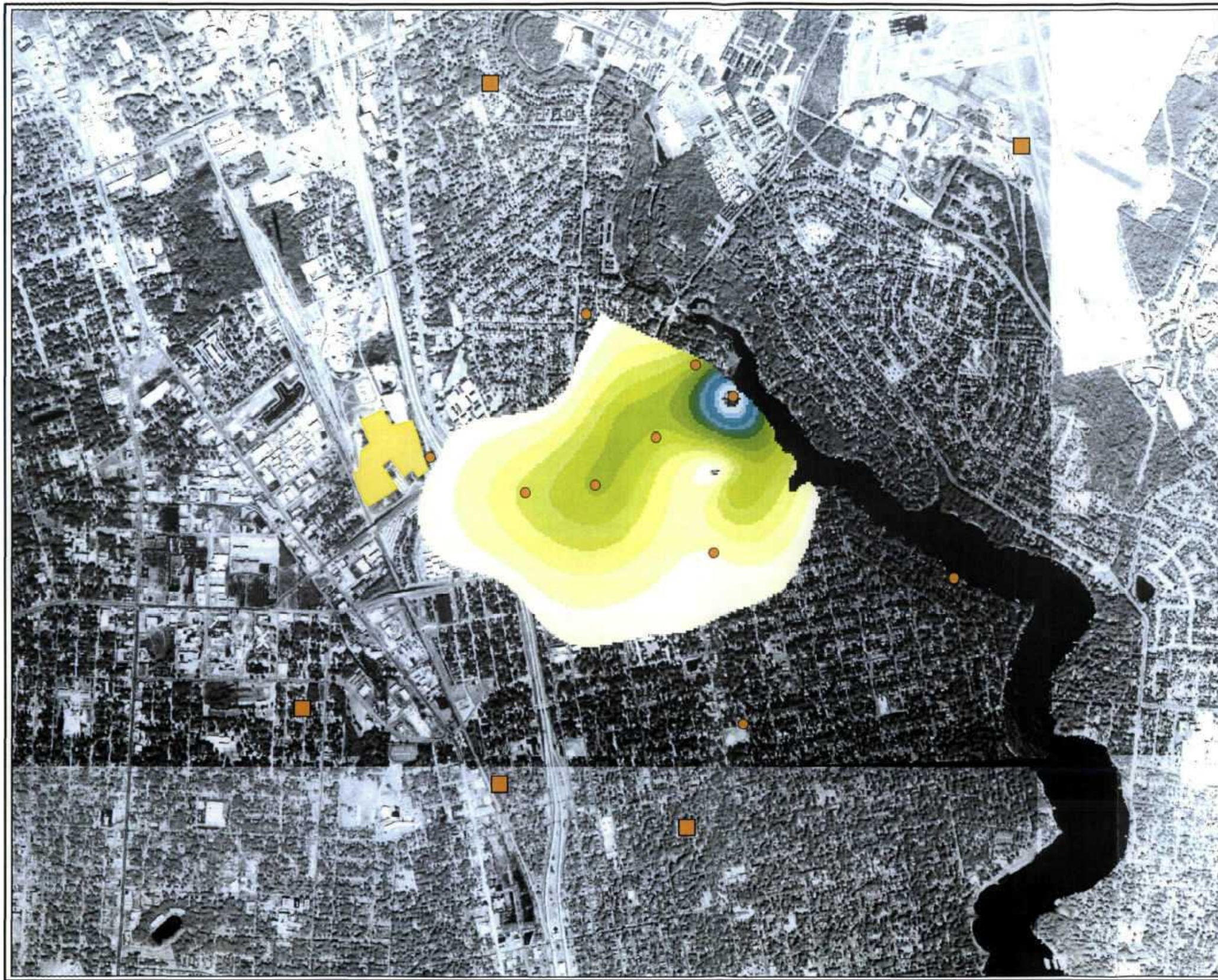
Projection:
FL Albers, HPGN, Meters, NAD83

URS

G:\Agrico\OU2\Deliverables\OU_2004_Fluoride_Maps.apr

FLUORIDE CONCENTRATIONS IN GROUNDWATER: 2000

PROJECT NUMBER	FIGURE
12804306	14



OU-2
AGRICO SITE
PENSACOLA, FLORIDA

Legend

Wells

- ECUA Wells
- Monitoring Well
- Agrico Site

Fluoride Concentrations (mg/L)

- 4 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120
- 120 - 130
- 130 - 140
- 140 - 150

N

700 0 700 1400 Feet

Projection:
FL Albers, HPGN, Meters, NAD83

URS

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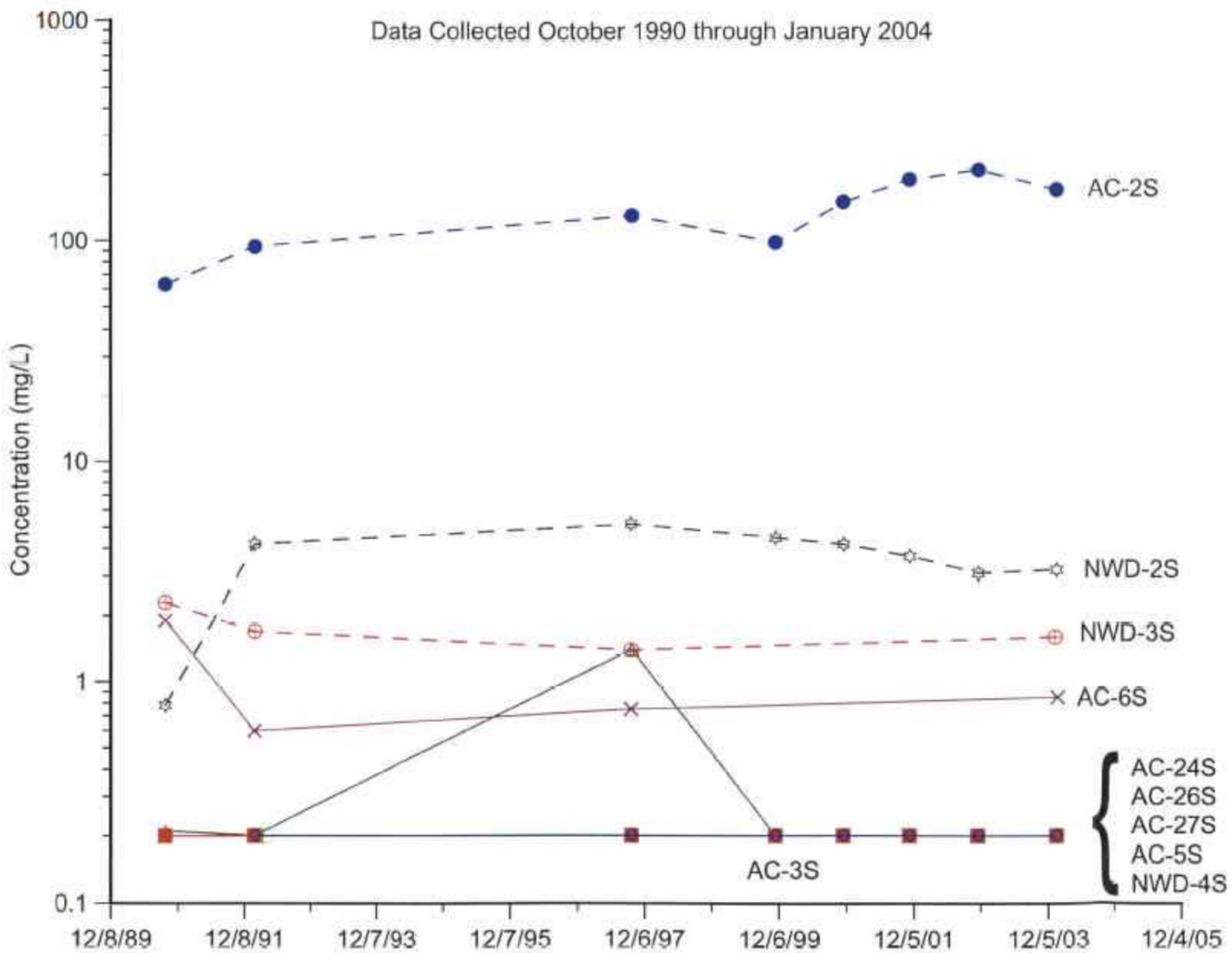
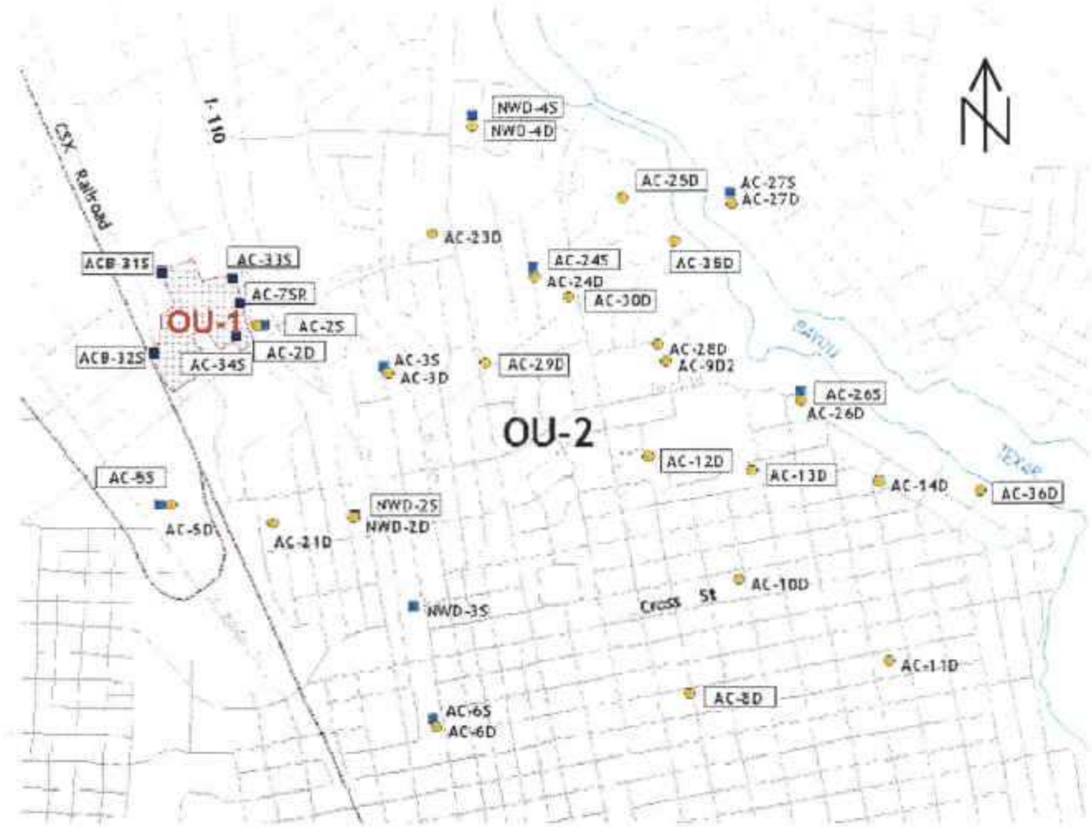
FLUORIDE CONCENTRATIONS IN GROUNDWATER: 2004

PROJECT NUMBER	FIGURE
12804306	15

Fluoride Concentrations Versus Time
Surficial Zone

Agrico Site
Pensacola, Florida





Performance Standard for Fluoride = 4 mg/L

FIGURE 16

URS

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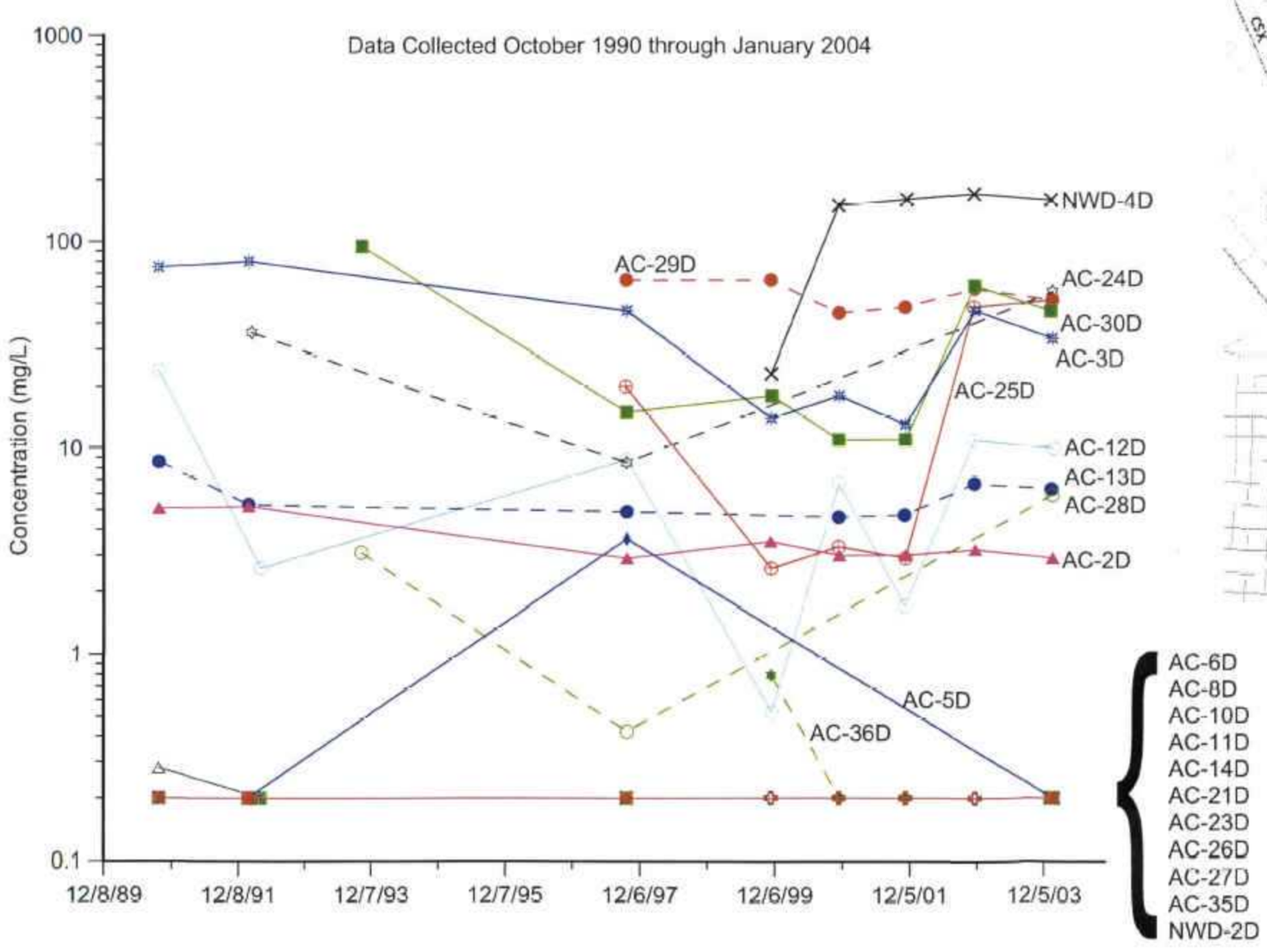
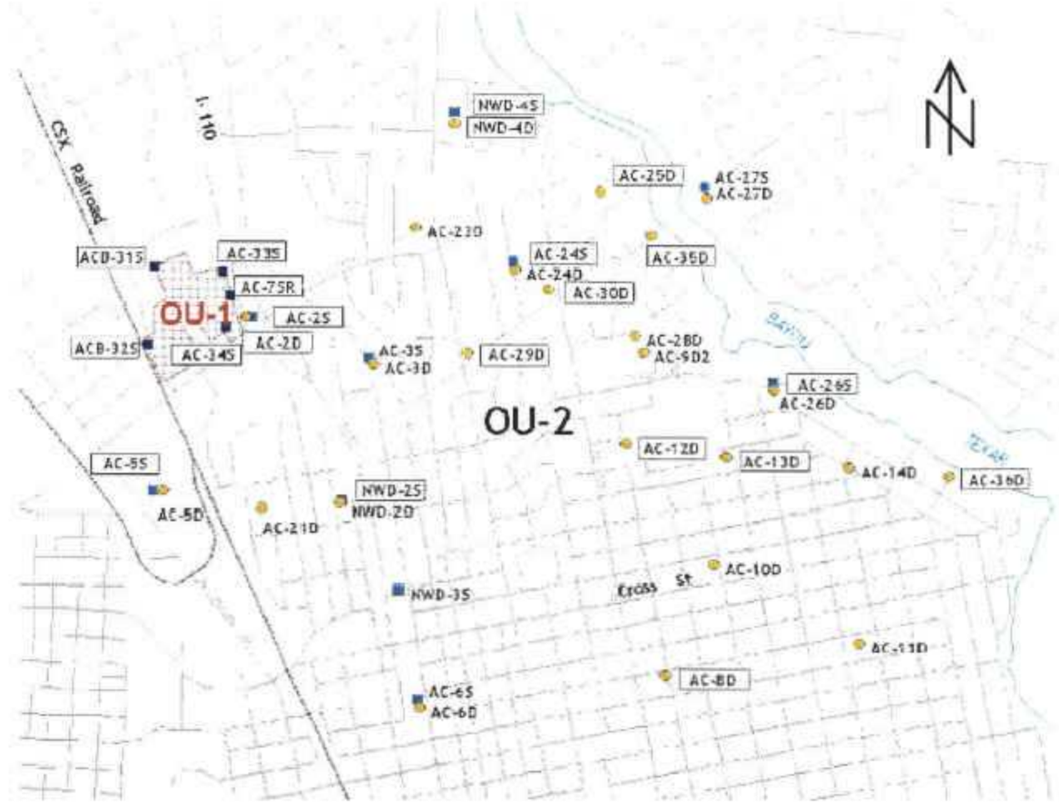
Fluoride Concentrations Versus Time
Main Producing Zone

Agrico Site
Pensacola, Florida





Performance Standard for Fluoride = 4 mg/L

FIGURE 17

URS

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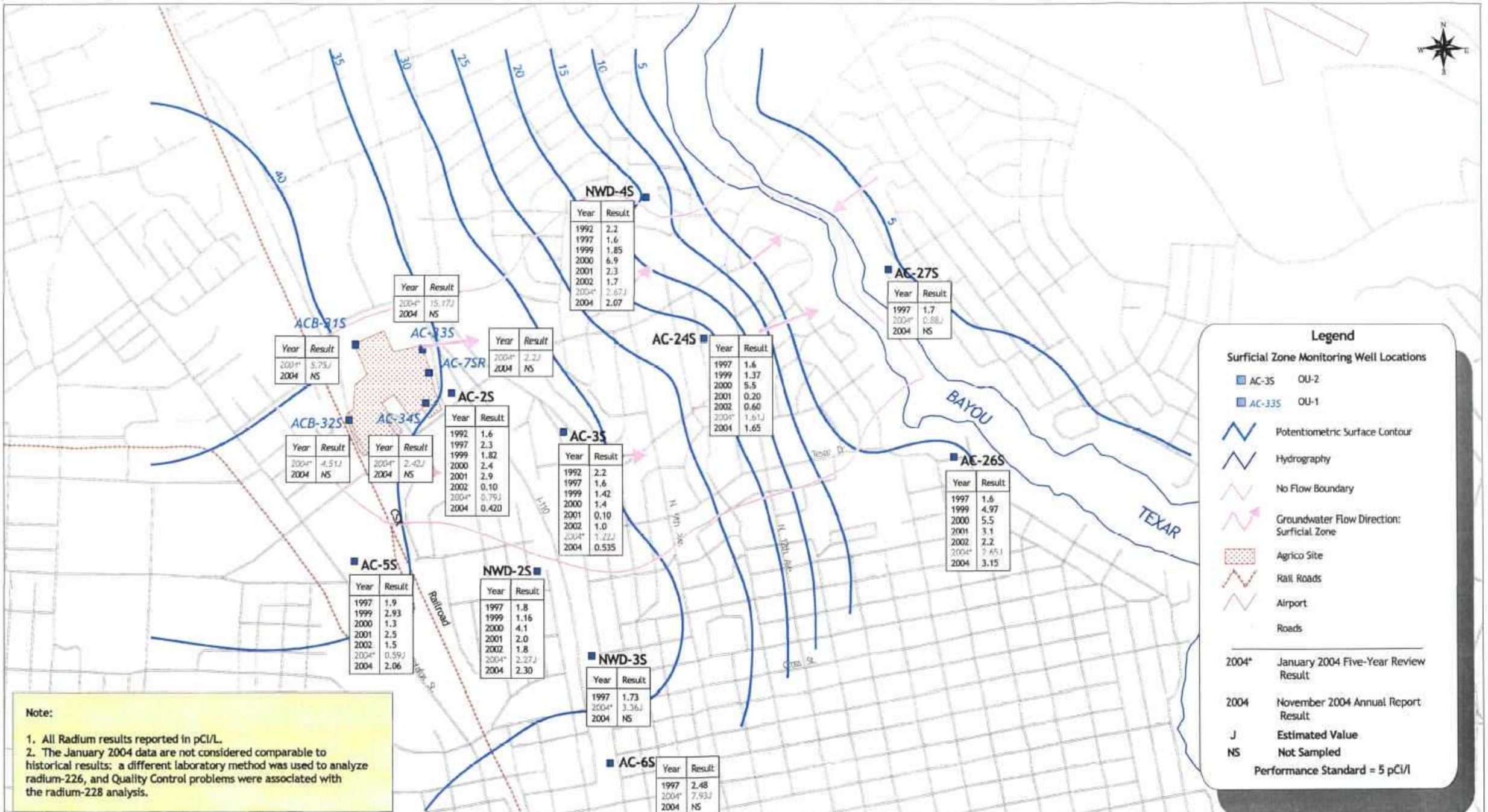


OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

0.25 0 0.25 0.5 Miles

Base Map Data Provided By:
Florida Department of Environmental Protection
and Northwest Florida Water Management District

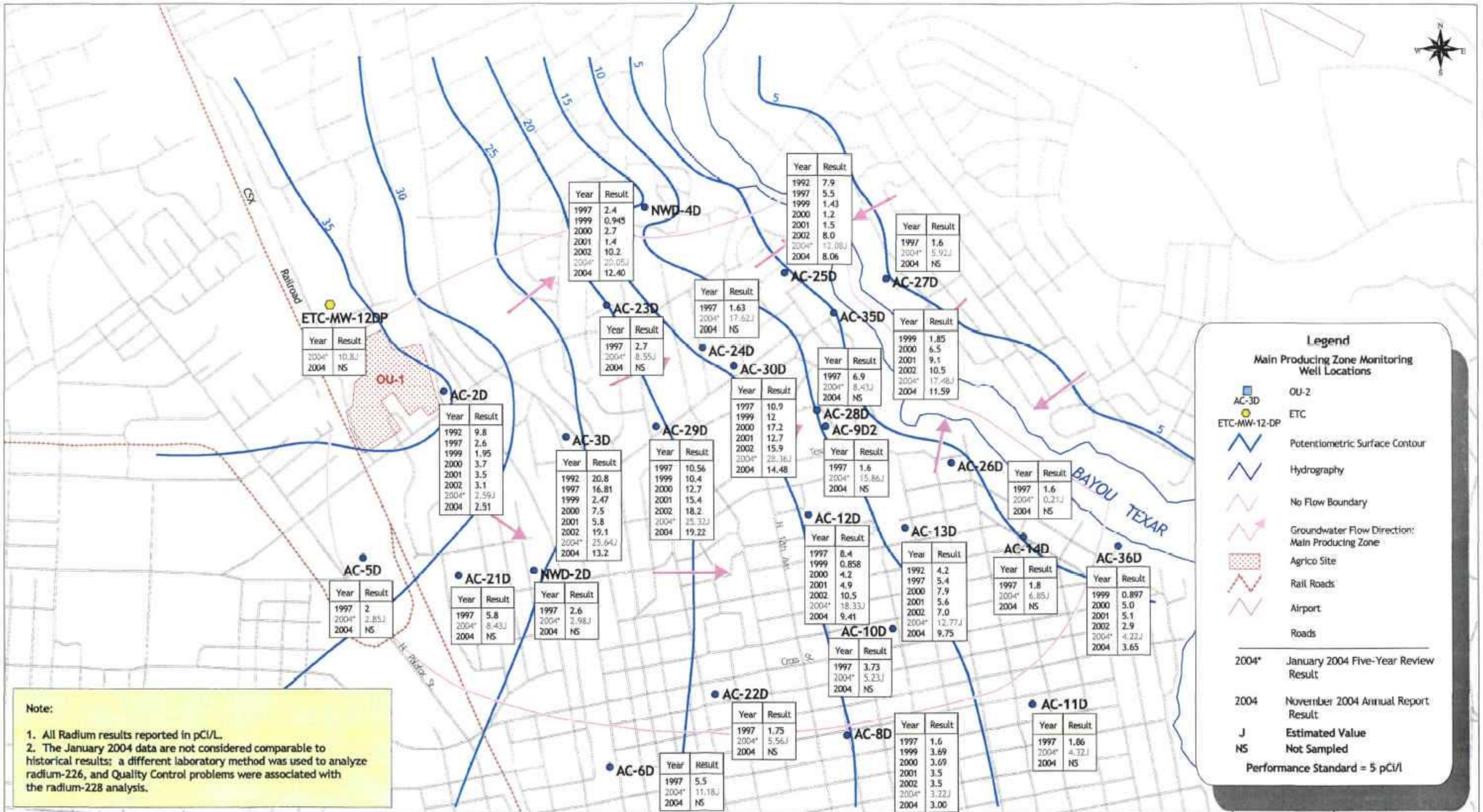
Projection: UTM
Zone: 16
Datum: NAD27

COMPARISON OF RADIUM 226 + 228
CONCENTRATIONS
SURFICIAL ZONE

FIGURE
18

B. Norman - Tallahassee - 09/01/04

FILE:G:\agrico\ou2\deliverables\annual_report_2004.apr

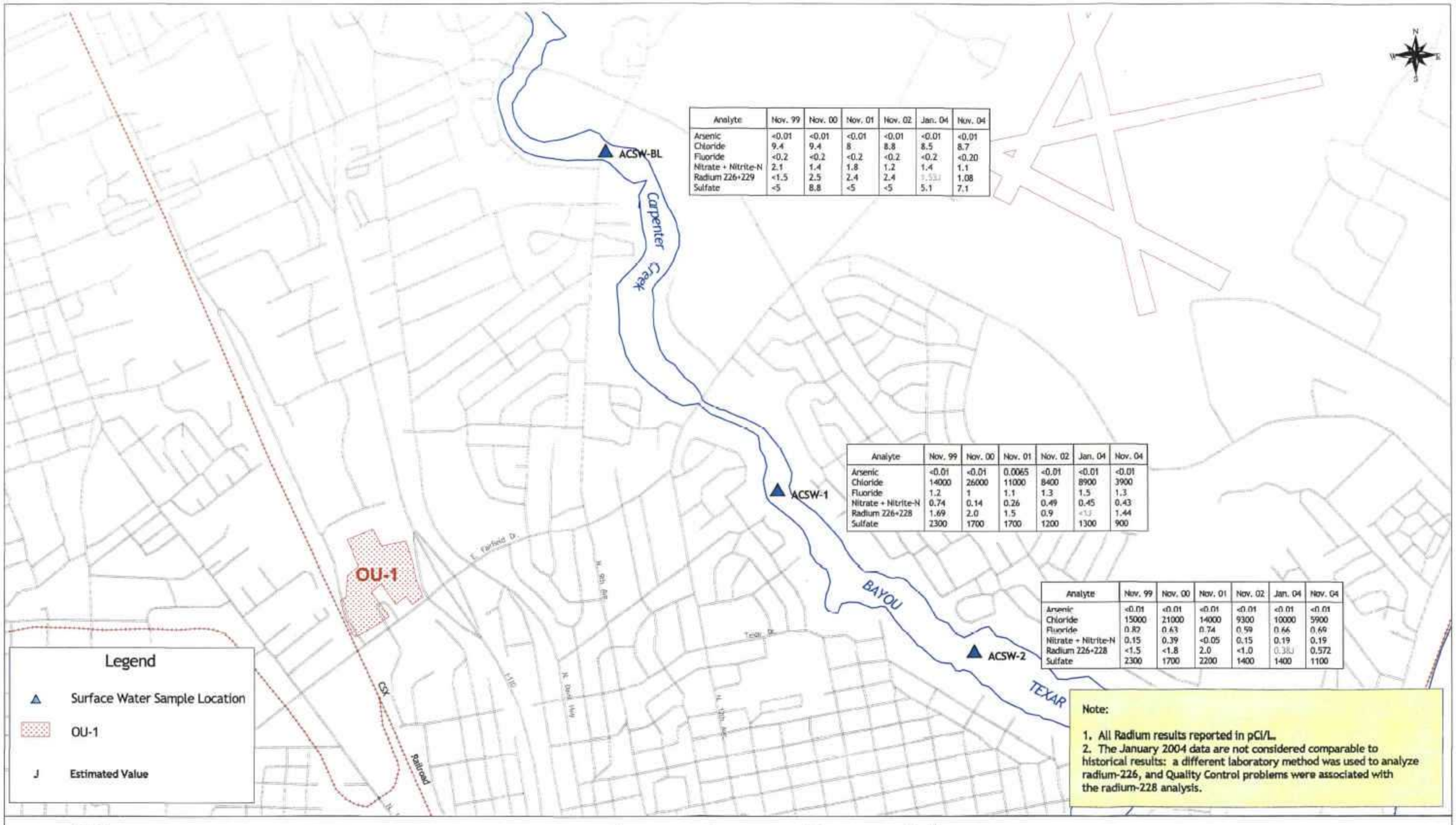


OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

COMPARISON OF RADIUM 226 + 228 CONCENTRATIONS MAIN PRODUCING ZONE

FIGURE 19



Analyte	Nov. 99	Nov. 00	Nov. 01	Nov. 02	Jan. 04	Nov. 04
Arsenic	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloride	9.4	9.4	8	8.8	8.5	8.7
Fluoride	<0.2	<0.2	<0.2	<0.2	<0.2	<0.20
Nitrate + Nitrite-N	2.1	1.4	1.8	1.2	1.4	1.1
Radium 226+229	<1.5	2.5	2.4	2.4	1.53J	1.08
Sulfate	<5	8.8	<5	<5	5.1	7.1

Analyte	Nov. 99	Nov. 00	Nov. 01	Nov. 02	Jan. 04	Nov. 04
Arsenic	<0.01	<0.01	0.0065	<0.01	<0.01	<0.01
Chloride	14000	26000	11000	8400	8900	3900
Fluoride	1.2	1	1.1	1.3	1.5	1.3
Nitrate + Nitrite-N	0.74	0.14	0.26	0.49	0.45	0.43
Radium 226+228	1.69	2.0	1.5	0.9	<1J	1.44
Sulfate	2300	1700	1700	1200	1300	900

Analyte	Nov. 99	Nov. 00	Nov. 01	Nov. 02	Jan. 04	Nov. 04
Arsenic	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chloride	15000	21000	14000	9300	10000	5900
Fluoride	0.82	0.63	0.74	0.59	0.66	0.69
Nitrate + Nitrite-N	0.15	0.39	<0.05	0.15	0.19	0.19
Radium 226+228	<1.5	<1.8	2.0	<1.0	0.38U	0.572
Sulfate	2300	1700	2200	1400	1400	1100

OU-2
AGRICO SITE
PENSACOLA, FLORIDA

URS

0.3 0 0.3 0.6 Miles

Base map data provided by:
Northwest Florida Water Management District

Projection: UTM
Zone: 16
Datum: NAD27

SURFACE WATER
MONITORING RESULTS

FIGURE
20

C. Beaumais - Tallahassee - 05/04/04

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ATTACHMENT 3

SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT SECOND FIVE-YEAR REVIEW REPORT AGRICO CHEMICAL COMPANY PENSACOLA, FLORIDA

As a part of the second 5-year review, EPA requested the U.S. Army Corps of Engineers (USACE) to perform a screening-level ecological risk assessment (SLERA) for the site. Sediment, porewater and surface water sampling was conducted in January 2004 at the north and south retention ponds (on-site), as well as the established transects within the Bayou Texar. Results of the analyses will be used to determine if the site is impacting the local communities of ecological receptors at both areas. This SLERA will follow Steps 1 and 2 of Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final (EPA, 1997).

Step 1: Screening-Level Problem Formulation and Ecological Effects Evaluation.

1.1 Screening Level Problem Formulation.

Problem formulation establishes the goals, breadth, and focus of the assessment.

1.1.1 Environmental Setting and Contaminants at the Site.

The site description and historical information can be found in Section III of the 5-year report. Additional information has been taken from the Phase I and Phase II RI reports (G&M, 1992 and 1993), as well as the Annual Monitoring Reports for OU-2 (URS, 2000, 2001, 2002, 2003).

Currently, the site is a maintained open field community, providing minimal terrestrial habitat. Surrounding site use is residential, municipal, commercial, and industrial. There are two storm water retention ponds on-site, one on either side of the OU-1 cap. Of the two storm water retention ponds, the North Pond is a perennial water body, attractive to typical aquatic species. During a site visit for this 5-year review, shore birds were observed wading and swimming. The South Pond does not allow water to stand, therefore, provides no aquatic habitat. For this SLERA, however, samples will be evaluated for aquatic receptors as well as terrestrial receptors. Mowing of the site is required twice a month from April through October and monthly from November through March, as part of the operation and maintenance (O&M) plan (DuPont, 1996). Annual maintenance activities include any fertilizing or reseeding and cleaning of the pipe underdrain system as necessary at the site.

Bayou Texar is a brackish tributary to Pensacola Bay, approximately 1.5 miles down gradient, and is the ultimate discharge point of on-site groundwater. The bayou is subject to urban runoff along its entire length, with an estimated 50-80 storm-water outfalls (G&M, 1993). Previous investigations have indicated that impacts from contaminated groundwater are negligible; however, this SLERA will utilize the latest sediment and surface water samples to verify if that trend is still ongoing.

The contaminants of concern are inorganics (chloride, fluoride, sulfate, metals, nitrates, orthophosphates) and radium associated with fertilizer production.

1.1.2 Contaminant Fate and Transport.

The remediation for OU-1 has resulted in elimination of the transport pathways for contaminants from site soils. Contaminants above the remediation goals have been excavated, stabilized and covered with a RCRA cap, and are no longer a source for ground water contamination. Contaminated ground water, however, is moving away from the site, discharging to Bayou Texar and may impact the ecosystem there. The ROD for OU-2 specifies monitored natural attenuation for the remedy; therefore, no active remediation is planned.

1.1.3 Ecotoxicity and Potential Receptors.

The ecotoxicity of the metals is well understood. For many of the other contaminants, however, mechanisms of ecotoxicity, if they exist, have not been studied. Therefore, this assessment will compare media concentrations with conservative ecological benchmarks, considered to be protective of ecological communities, both plant and animal.

1.1.4 Complete Exposure Pathways.

Exposure pathways considered complete are direct contact with contaminated media (sediment, soil and surface water), and transfer of contaminants through the food chain via predation.

1.1.5 Assessment and Measurement Endpoints.

For this SLERA, assessment endpoints will be any adverse effects on ecological receptors, where receptors are plant and animal populations and communities and habitats.

1.2 Ecological Effects Evaluation.

For the on-site freshwater aquatic habitat, the on-site terrestrial habitat and the off-site brackish aquatic habitat, the EPA Region 4 Ecological Risk Assessment Bulletins - Supplement to Risk Assessment Guidance for Superfund (RAGS) (EPA 2001) Ecological Screening Values will be preferentially used to evaluate contaminants in sediments, soils and surface water. These values are based on contaminant levels associated with a low probability of unacceptable risks to ecological receptors. Where R4 values are not available, benchmarks will be taken from the following references, in order of preference: Florida Department of Environmental Protection (FDEP) (http://www.dep.state.fl.us/legal/rules/shared/62-302t.pdf, other EPA Regions, and other sources (as cited). The Risk Assessment Information System (RAIS), Ecological Benchmark Values database will be accessed to find alternate benchmark values. The RAIS database can be found at: http://risk.lsd.ornl.gov/cgi-bin/eco/ECO_select. Radioisotopes will be compared to the Biota Concentration Guides (BCGs) taken from USDOE, 2002.

Step 2: Screening-Level Exposure Estimate and Risk Calculation.

2.1 Screening-Level Exposure Estimates.

As this assessment will utilize conservative ecological benchmark screening values, rather than evaluating literature values for no observed adverse effects level (NOAEL) data, estimating exposure parameters will not be required. The benchmark values will evaluate the ecosystem from the bottom (i.e., plants and benthos). If the site is protective of

those receptors, it is reasonable to assume that the site will also be protective of higher level receptors, as the list of constituents are not known to significantly bioaccumulate.

2.2 Screening-Level Risk Calculation.

The maximum detected concentration will be compared to the benchmark screening values. Where the maximum site concentration exceeds the benchmark screening values, hazard quotients (HQs) will be calculated. The HQ is the site concentration divided by the benchmark value. HQs at or below unity indicate that adverse effects to biota are not expected. HQs above unity indicate the potential for adverse effects.

2.2.1 North Pond.

Sample locations for the North Pond are shown on Figure 2 of Attachment 2.

North Pond Sediments

Constituent	Sample I.D.	Maximum Concentration (mg/kg)	Screening Value (mg/kg)
Inorganics (Miscellaneous)			
Chloride	AC-NP-SED 3	610 J	
Fluoride	AC-NP-SED 4	12 J	
Sulfate	AC-NP-SED 1	<690 J	
Alkalinity	AC-NP-SED 1	1,000	
TOC	AC-NP-SED 1	11,000	10,000-100,000[4]
Silica	AC-NP-SED 4	3,000	
Bromide	AC-NP-SED 1	<28	
Metals			
Aluminum	AC-NP-SED 2	15,000 J	58,000[3]
Arsenic	AC-NP-SED 4	3.4	7.24[1]
Calcium	AC-NP-SED 1	19,000	
Chromium	AC-NP-SED 4	15	52.3[1]
Copper	AC-NP-SED 1	6.2	18.7[1]
Iron	AC-NP-SED 4	9,700	
Lead	AC-NP-SED 1	11	30.2[1]
Magnesium	AC-NP-SED 1	1,400	

Constituent	Sample I.D.	Maximum Concentration (mg/kg)	Screening Value (mg/kg)
Manganese	AC-NP-SED 2	130 J	460[4]
Potassium	AC-NP-SED 1	220	
Sodium	AC-NP-SED 1	<140	
Nutrients			
Nitrate+Nitrite	AC-NP-SED 1	<6.9	
Nitrate	AC-NP-SED 1	<6.9	
Nitrite	AC-NP-SED 3	<14 J	
Ammonia-N	AC-NP-SED 1	13	
Orthophosphate-P	AC-NP-SED 4	<6.8 J	
Radium (pCi/kg)			
Radium 226	AC-NP-SED 4	0.75+/-0.26	1E+05[2]
Radium 228	AC-NP-SED 4	0.78+/-0.3	9E+04[2]
Radium 226 & 228	AC-NP-SED 4	1.53	

< xxx indicates that the analyte was not detected at the detection limit shown
1 - EPA, 2001.
2 - USDOE, 2002.
3- EPA, 1996.
4- Persaud, et al., 1993.

Discussion. For the miscellaneous inorganics, a screening value was available only for total organic carbon (TOC). The maximum detected concentration was slightly above the "low" value, yet significantly below the "severe" level. Note that these miscellaneous inorganics are typically not evaluated in a CERCLA ecological risk assessment (ERA), and their impact on the local ecosystem cannot be estimated.

Detected concentrations of all metals with screening values (Al, As, Cr, Cu, Pb and Mn) were significantly below their respective screening values, and would not be expected to cause adverse ecological effects. The metals without screening values (Ca, Fe, Mg, K and Na) are essential nutrients for wildlife. The detected levels of Ca, Fe and Mg, however, are rather elevated compared with the samples taken at the South Pond.

Screening values for the nutrients were unavailable. As noted for the miscellaneous inorganics above, these nutrients are typically not evaluated in a CERCLA ERA, and their impact on the local ecosystem at the detected levels is unknown.

Both isomers of radium (226 and 228) were significantly below their screening values and would nol: be expected to produce adverse impacts.

North Pond Surface Water

Constituent	Sample I.D.	Maximum Concentration (mg/L)	Acute Screening Value (mg/L)	Chronic Screening Value (mg/L)
Inorganics (Miscellaneous)				
Chloride	AC-NP-SW 4	4.3	860[1]	230[1]
Fluoride	AC-NP-SW 4	0.31		3.71[3]
Sulfate	AC-NP-SW 4	21 J		
Alkalinity	AC-NP-SW 2	95		
TOC	AC-NP-SW 3	8		
Silica	All	<0.50		
Bromide	All	<1.0		
Metals (Total/Dissolved)				
Aluminum	AC-NP-SW 1	1.9/<0.20	0.750[1]	0.087[1]
Arsenic	All	<0.010/<0.010	0.360[1]	0.190[1]
Calcium	AC-NP-SW 3	40/36		116[3,4,5]
Chromium	All	<0.010/<0.010	0.016 (Cr6+)[1]	0.011 (Cr6+)[1]
Copper	All	<0.020/<0.020	0.00922[1]	0.00654[1]
Iron	AC-NP-SW 1	1.9/<0.050	-	1[1]
Lead	All	<0.0050/<0.0050	0.03378[1]	0.00132[1]
Magnesium	AC-NP-SW 1	2.7/2.2		82[3,4,5]
Manganese	AC-NP-SW 1	0.15/<0.010		1.1[3]
Potassium	AC-NP-SW 1	1.8/1.6		53[3,4,5]
Sodium	AC-NP-SW 3	2.8/2.6		680[3,4,5]
Nutrients				
Nitrate+Nitrite	All	<0.050 J		
Nitrate	All	<0.050		
Nitrite	All	<0.050		
Ammonia-N	All	<0.030		
Orthophosphate-P	All	<0.050		

Constituent	Sample I.D.	Maximum Concentration (mg/L)	Acute Screening Value (mg/L)	Chronic Screening Value (mg/L)
Radium (pCi/L)				
Radium 226	AC-NP-SW 3	1.77+/-0.51		4[2]
Radium 228	AC-NP-SW 4	0.32+/-0.82		3[1]
Radium 226& 228	AC-NP-SW 3	1.9		

< xxx indicates that the analyte was not detected at the detection limit shown
1- EPA, 2001.
2 - USDOE, 2002.
3- Suter, G. W. II., 1996.
4 - Suter and Tsao, 1996.
5- Suter, et al., 1987.

Discussion. For the miscellaneous inorganics, only chloride and fluoride had screening values. Both were significantly below their respective screening value. It should be noted that these miscellaneous inorganics are typically not evaluated in a CERCLA ERA, and their impact on the local ecosystem at the levels detected cannot be estimated.

For the metals, Al and Fe exceeded their respective screening values using the total concentrations. HQs of 3 (acute) and 22 (chronic) were calculated for total Al, and an HQ of 2 (chronic) was calculated for total Fe. For Al, the dissolved fraction was still above the chronic screening value, even though the result was non-detect. Comparing the detection limit and the chronic screening value resulted in an HQ of 4. For Fe, the dissolved fraction was non-detect, and did not exceed the chronic screening value. Cu was not detected, but the detection limits were above both the acute and chronic screening value. Using the detection limit, HQs of 2 (acute) and 3 (chronic) were calculated. Pb was not detected, but the detection limits exceeded the chronic screening value. Using the detection limit, an HQ of 5 was calculated. All other metals (As, Ca, Cr, Mg, Mn, K, and Na) were below their respective screening values.

Screening values for the nutrients were unavailable; however, all samples were below detection limits. It is expected that no adverse impacts from these nutrients would, occur.

Both isomers of radium (226 and 228) were significantly below their screening values and would not be expected to produce adverse ecological impacts.

2.2.2 South Pond.

Sample locations for the South Pond are shown on Figure 2 of Attachment 2.

South Pond Sediments

Constituent	Sample I.D.	Maximum Concentration (mg/L)	Acute Screening Value (mg/L)	Chronic Screening Value (mg/L)
Inorganics (Miscellaneous)				
Chloride	SP-3	330 J		
Fluoride	SP-4	5.4 J		
Sulfate	SP-3	<590 J		
Alkalinity	SP-3	66		
TOC	SP-4	6,600	10,000-100,000[4]	
Silica	SP-1	1,800		
Bromide	SP-3	<24		
Metals (Total/Dissolved)				
Aluminum	SP-3	1 3,000 J	58,000[3]	50[1]
Arsenic	SP-1	3.6	7.24[1]	10[1]
Calcium	SP-4	450		
Chromium	SP-3	11	52.3[1]	0.4[1]
Copper	SP-1	5.3	18.7[1]	40[1]
Iron	SP-3	6,700		200[1]
Lead	SP-1	10	30.2[1]	50[1]
Magnesium	SP-4	160		
Manganese	SP-1	130 J	460[4]	100[1]
Potassium	SP-3	140		
Sodium	SP-3	<120		
Nutrients				
Nitrate+Nitrite	SPS-3	<5.9		
Nitrate	SPS-3	<5.9		

Constituent	Sample I.D.	Maximum Concentration (mg/L)	Acute Screening Value (mg/L)	Chronic Screening Value (mg/L)
Nitrite	SPS-1	<5.7J		
Ammonia-N	SPS-1	0.92		
Orthophosphate-P	SPS-4	4.4 J		
Radium (pCi/kg)				
Radium 226	SPS-3	0.84+/-0.2	1E+ 05[1]	5E+04[1]
Radium 228	SPS-4	0.73+/-0.24	9E+04[1]	4E+04[2]
Radium 226& 228	SPS-4	1.44		

< xxx indicates that the analyte was not detected at the detection limit shown
1 - EPA, 2001.
2 - USDOE, 2002.
3 - EPA, 1996.
4 - Persaud, et al., 1993.

Discussion. All samples taken in the South Pond were identified as sediment. This area, however, does not pond water beyond heavy rain events. Therefore, the sample results were compared to both sediment and soil screening values.

For the miscellaneous inorganics, only TOC had a sediment screening value. The highest reported concentration was below the "low" value. No soil screening values were available for any of the inorganics. Note that these miscellaneous inorganics are typically not evaluated in a CERCLA ERA, and their impact on the local ecosystem cannot be estimated.

For the metals, Al, As, Cr, Cu, Pb and Mn were below their respective sediment screening value. Only As, Cu and Pb were below their respective soil screening values. For the other metals with screening values (Al, Ca, Cr, Fe and Mn), all detected concentrations were above the screening value. It should be noted that all soil screening values were based on protection of plants, taken from Efroymson, et al., 1997. The following is taken directly from the Efroymson reference: "If chemical concentrations reported in field soils that support vigorous and diverse plant communities exceed one or more of the benchmarks presented in this report or if a benchmark is exceeded by background soil concentrations, it is generally safe to assume that the benchmark is a poor measure of risk to the plant community at that site." As the site supports the appropriate plant communities for the maintained open field ecosystem, it appears that exceedances of the plant screening values do not reflect adverse effects. The metals without screening values (Ca, Mg, K and Na) are essential nutrients for wildlife. The detected levels of Fe, however, are rather elevated when compared to the baseline station at Bayou Texar.

Both isomers of radium (226 and 228) were significantly below their sediment and soil screening values and would not be expected to produce adverse ecological impacts.

2.2.3 Bayou Texar.

Sample locations at the Bayou Texar are shown on Figure 7 in Attachment 2. Samples were taken at the baseline station and at transects 1 and 2.

Bayou Texar Sediments

Constituent	Baseline Concentration [1] (mg/kg)	Sample I.D.	Maximum Concentration (mg/kg)	Screening Level (mg/kg)
Inorganics (Miscellaneous)				
Chloride	<25 J	AC SED-T1-1	25,000 J	
Fluoride	<5.1 J	AC SED-T1-3	790 J	
Sulfate	<130 J	AC SED-T1-1	1300 J	
Alkalinity	53	AC SED-T1-1	6,900	
TOC	<640	AC SED-T1-4	63,000	10,000-100,000[4]
Silica	28	AC SED-T1-2	17,000	
Bromide	<25	AC SED-T1-1	<110	
Metals (Total/Dissolved)				
Aluminum	700 J	AC-SED-T1-1	67,000 J	58,000[4]
Arsenic	<1.3	AC-SED-T1-4	15	7.24[2]
Calcium	170	AC-SED-T1-1	3,000	
Chromium	<1.3	AC-SED-T1-3	53	52.3[2]
Copper	<2.5	AC-SED-T1-3	270	18.7[2]
Iron	630	AC-SED-T1-4	38,000	
Lead	1.5	AC-SED-T1-1	140	30.2[2]
Magnesium	<63	AC-SED-T1-1	4,700	
Manganese	1.9 J	AC-SED-T1-3	97 J	460
Potassium	<130	AC-SED-T1-4	2,700	
Sodium	<130	AC-SED-T1-1	15,000	
Nutrients				
Nitrate+Nitrite	<6.3	AC-SED-Tl-1	<26	
Nitrate	<6.3	AC-SED-Tl-1	<26	
Nitrite	<1.3	AC-SED-Tl-4	<17 J	

Constituent	Baseline Concentration [1] (mg/kg)	Sample I.D.	Maximum Concentration (mg/kg)	Screening Level (mg/kg)
Ammonia-N	<0.63	AC-SED-T1-3	65	
Orthophosphate-P	<1.3	AC-SED-T1-1	17 J	
Radium (pCi/kg)				
Radium 226	0.12+/-0.1	AC-SED-T2-2	0.96+/-0.28	1E+05[3]
Radium 228	0.09+/-0.17	AC-SED-T2-2	1.64+/-0.52	9E+04[3]
Radium 226& 228	0.25	AC-SED-T2-2	2.22	

< xxx indicates that the analyte was not detected at the detection limit shown
1 - Baseline concentration is the lower of AC SED-BG-1 and AC-SED-BG-2
2- EPA, 2001.
3 - USDOE, 2002.
4- EPA, 1996.

Discussion. For the miscellaneous inorganics, only TOC had a sediment screening value. The maximum concentration (63,000 mg/kg) is significantly above the baseline value and between the "low" and "severe" screening values. Although the other inorganics did not have screening values, all concentrations were significantly above the baseline station values. This indicates that these inorganics have impacted the sediments at transects 1 and 2. The extent and severity of those impacts cannot be determined without further testing (see Section 4.3.4, below).

For the metals, only Mn was below the screening value, although the detected concentration exceeded the baseline station value by two orders of magnitude. No screening values were available for Ca, Fe, Mg, K and Na, however, all were significantly above the baseline station values. For the rest of the metals with screening values, the calculated HQs were 1 (Al), 2 (As), 1 (Cr), 14 (Cu) and 5 (Pb). Although these HQs are at or above unity, they would not be expected to result in adverse ecological effects, due to the conservative nature of the screen. It should also be noted that all concentrations of Al, As, Cr, Cu and Pb at transects 1 and 2 were significantly higher than the baseline station values.

Screening values for the nutrients were unavailable. All except for Ammonia-N and Orthophosphate-P were non-detect at elevated detection limits, significantly above the baseline station values (also non-detect). It should be noted that these nutrients are typically not evaluated in a CERCLA ERA, and their impact on the local ecosystem at the Bayou Texar is unknown.

Both isomers of radium (226 and 228) were significantly below their screening values, although significantly above the baseline station values. Although the level of radium in sediments at transects 1 and 2 is elevated, adverse ecological impacts would not be expected, as the concentrations are below screening values.

Bayou Texar Surface Water

Constituent	Constituent Concentration at ACBLSW (mg/L)	Sample I.D.	Maximum Concentration (mg/kg)	Acute Screening Value (mg/kg)	Chronic Screening Value (mg/kg)
Inorganics (Miscellaneous)					
Chloride	8.5	ACSW-2	10,000		FDEP[4]
Fluoride	<0.20	ACSW-1	1.5		5.0[3]
Sulfate	5.1	ACSW-2	11,400		
Alkalinity	12	ACSW-2	67		
TOC	1.3	ACSW-2	<1.0		
Silica	7.0	ACSW-1	2.4		
Bromide	<1.0	ACSW-2	29		
Metals (Total/Dissolved)					
Aluminum	<0.20/<0.20	ACSW-1	1.4/<0.20		0.013[1]
Arsenic	<0.010/<0.010	All	<0.010/<0.010	0.069[1]	0.036[1]
Calcium	5.7/5.7	ACSW-2	190/190		
Chromium	<0.010/<0.010	All	<0.010/<0.010	l. l (Cr6+)[1]	0.050 (Cr6+)[1]
Copper	<0.020/<0.020	All	<0.020/<0.020	0.0029[1]	0.0029[1]
Iron	0.41/0.17	ACSW-2	0.067/<0.050		
Lead	<0.0050/<0.0050	All	<0.0050/<0.0050	0.220[1]	0.0056[3]
Magnesium	1.6/1.6	ACSW-2	640/630		
Manganese	0.018/0.018	ACSW-1	0.025/0.024		
Potassium	<1.0/<1.0	ACSW-2	220/220		
Sodium	.5.9/5.9	ACSW-2	6,700/5,300		
Nutrients					
Nitrate+Nitrite	1.4	ACSW-1	0.45		
Nitrate	1.4	ACSW-1	0.45		
Nitrite	<0.050	All	<0.050		
Ammonia-N	<0.030 J	ACSW-1	0.069 J		
Orthophosphate-P	<0.050	ACSW-1	<0.050		

Constituent	Constituent Concentration at ACBLSW (mg/L)	Sample I.D.	Maximum Concentration (mg/kg)	Acute Screening Value (mg/kg)	Chronic Screening Value (mg/kg)
Radium (pCi/L)					
Radium 226	0.8+/-0.27	ACSW-1	0.48+/-0.21		4[2]
Radium 228	1.53+/-0.55	ACSW-1	0.49+/-0.46		3[2]
Radium 226+ 228	2.33	ACSW-1	0.97		

< xxx indicates that the analyte was not detected at the detection limit shown
1 - EPA, 2001.
2- USDOE. 2002.
3 - FDEP, 2004.
4 - Chloride cannot be more than 10% above normal background. FDEP, 2004.

Discussion. For the miscellaneous inorganics, saltwater screening values could be found only for chloride and fluoride. Chloride at ACSW-2 (10,000 mg/L) exceeded the value at ACBLSW (8.5 mg/L) by much more than the allowed 10% criterion (FDEP, 2004). Fluoride, at ACSW-1 (1.5 mg/L) was below the FDEP criterion (5.0 mg/L), but well above the non-detect value at ACBLSW (<0.20 mg/L). Additionally, the maximum concentrations of sulfate, alkalinity and bromide were significantly above the concentrations detected at the baseline station. This indicates that these inorganics have impacted the surface water at transects 1 and 2. The extent of the impact is not known without further testing (see Section 4.3.4 below). A search of the USEPA's ECOTOX database relative to chloride toxicity resulted in no usable information for this SLERA. There have been many chloride studies done with aquatic systems, however, all were done using various salts, and the effects of the chloride without the accompanying anion was not studied.

For the metals, only Al, As, Cr, Cu and Pb had saltwater screening values. Concentrations of As, Cr and Pb were non-detect with detection limits below both the acute and chronic screening values, at transects 1 and 2 and the baseline station. Cu was also non-detect, but the detection limits were an order of magnitude above both the acute and chronic screening values. Using the detection limits and the screening values, HQs were calculated at 7 for both acute and chronic exposures. For Al, the maximum concentration (total) was above the chronic screening value and although the dissolved fraction was non-detect, the detection limit was also above the chronic screening value. HQs of 108 (total) and 15 (dissolved) for Al were calculated. Concentrations of Al (total), Ca (total and dissolved), Mg (total and dissolved), K (total and dissolved) and Na (total and dissolved) were significantly above the baseline station values. Concentrations of Mn were slightly above the concentrations at the baseline station.

Saltwater screening values for nutrients were not available. Detected concentrations at transects 1 and 2 were not significantly different from those at the baseline station. Therefore, adverse effects on the local ecosystem are not expected due to the nutrients.

Both isomers of radium (226 and 228) were significantly below their screening values and the baseline station. Therefore, adverse impacts would not be expected.

Note. Concentrations of As, chloride, fluoride, nitrate+ nitrite, Radium 226+ 228 and sulfate were also compared with concentrations from the annual monitoring of Bayou Texar surface water. Ths concentrations from this sampling event were consistent with the historical data.

Bayou Texar Porewater

Constituent	Sample I.D.	Maximum Concentration (mg/L)	Acute Screening Value (mg/L)	Chronic Screening Value (mg/L)
Inorganics (Miscellaneous)				
Chloride	ACPW-4	490		FDEP[4]
Fluoride	ACPW-4	140		5.0[3]
Sulfate	ACPW-2	190 J		
Alkalinity	ACPW-1	10		
TOC	ACPW-2	1.8		
Silica	ACPW-1	26		
Bromide	All	<1.0		
Metals (Total/Dissolved)				
Aluminum	ACPW-4	120/110		0.013[3]
Arsenic	All	<0.010/<0.010	0.069[1]	0.036[1]
Calcium	ACPW-4	27/26		
Chromium	All	<0.010/<0.010	1.1 (Cr6+)[1]	0.050 (Cr6+)[1]
Copper	ACPW-4	0.24/0.24	0.0029	0.0029[1]
Iron	ACPW-6	1.1/<0.050		
Lead	All	<0.0050/<0.0050	0.03378[1]	0.0056[3]
Magnesium	ACPW-4	17/17		
Manganese	ACPW-4	0.94/0.93		
Potassium	ACPW-4	7.5/7.4		
Sodium	ACPW-4	130/130		
Nutrients				
Nitrate+Nitrite	ACPW-2	8.7		
Nitrate	ACPW-2	8.7		
Nitrite	All	<0.050		
Ammonia-N	ACPW-3	3.9		
Orthophosphate P	ACPW-1	0.14		

Constituent	Sample I.D.	Maximum Concentration (mg/L)	Acute Screening Value (mg/L)	Chronic Screening Value (mg/L)
Radium (pCi/L)				
Radium 226	ACPW-4	3.49+/-0.56		4[2]
Radium 228	ACPW-4	19.5+/-2.4		3[2]
Radium 226+ 228	ACPW-4	22.99		

< xxx indicates that the analyte was not detected at the detection limit shown
1- EPA, 2001.
2 - US DOE, 2002.
3 - FDEP, 2004.
4 - Chloride cannot be more than 10% above normal background. FDEP, 2004.

Discussion. Pore water samples were not taken at the baseline station. Also, pore water screening values were not available for comparison. For this SLERA, the pore water samples will be compared to surface water screening values. This adds to the uncertainty of the assessment.

For the miscellaneous inorganics, saltwater screening values were available only for chloride and fluoride. The FDEP criterion for chloride could not be evaluated as no background samples were

taken. Fluoride (140 mg/L) exceeded the FDEP criterion (5.0 mg/L), resulting in an HQ of 28. For the other miscellaneous inorganics, saltwater screening values were not available. Note that these miscellaneous inorganics are typically not evaluated in a CERCLA ERA, and their impact on the local ecosystem of the Texar Bayou cannot be estimated without further testing.(see Section 4.3.4 below).

For the metals, only Al, As, Cr, Cu and Pb had saltwater screening values. Concentrations of As, Cr and Pb were non-detect with detection limits below both the acute and chronic screening values. Al (total and dissolved) was detected at approximately four orders of magnitude above the chronic screening value, resulting in HQs of 9231 (total) and 8461 (dissolved). Cu (total and dissolved) was detected at approximately two orders of magnitude above the screening values, resulting in HQs of 83 for both acute and chronic exposures. Concentrations of Ca, Mg, K and Na could not be evaluated, as no screening level values were available and pore water samples were not taken at the baseline station to allow comparison.

No saltwater screening values were available for the nutrients, and pore water samples were not taken at the baseline station to allow comparison. Note that these nutrients are typically not evaluated in a CERCLA ERA, and their impact on the local ecosystem of the Texar Bayou cannot be estimated.

The detected concentrations of Ra228 exceeded the screening value. The concentration of Ra226 was approximately equal to its screening value. Use of the surface water screening value to evaluate pore water may not be appropriate, as the surface water value is intended for use where collocated sediment and surface water samples have been taken. Additional discussion will be presented in the uncertainty section.

3.0 Uncertainty Analysis.

Uncertainty is inherent in all risk assessments. However, procedures were employed in this SLERA to maintain a conservative bias, whereby potential risks would not be underestimated. Typically, a qualitative or quantitative uncertainty analysis is not done for a SLERA, as the results of a SLERA are used to determine whether or not to move forward to a baseline ERA. In this instance, however, a brief assessment of the uncertainties applicable to this SLERA is important to interpret the results of the screen.

Sampling and Analysis. The analytical results used in the SLERA are from samples taken in areas assumed to be representative of site contamination that is residual to the remedial action. As such, there is some uncertainty as to whether the samples are representative. For the Bayou Texar, the sampling locations are up gradient, downgradient and at the area corresponding to elevated fluoride concentrations defined by the 1993 study (Entrix, 1993). Samples taken at ACSW-1 and ACSW-2 are considered to be within the potential Agrico plume discharge areas, and are assumed to be representative of potential impacts from the site groundwater. As the nature and extent of on-site contamination was determined in the RI, it is; assumed that samples taken for this SLERA are representative of current site conditions, and also adequately represent current exposures to ecological receptors. The analytical results are uncertain as well, yet quality control parameters were within limits and it is assumed that the concentrations are reflective of actual site conditions. There were an inadequate number of samples to conduct statistical analysis, and the maximum detected concentration was used instead of calculating an exposure point concentration. This procedure most likely overestimates the actual concentrations of contaminants to which receptors would be exposed.

Screening-Level Benchmarks. The screening-level benchmarks are derived using laboratory test species under controlled laboratory conditions. The receptor species may be less or more sensitive to the contaminants than the test species, and field exposures may or may not equate directly to those used in the laboratory setting. Applying these values to field conditions adds uncertainty to the assessment, but most likely overestimates actual field toxicity. Many of the constituents do not have benchmark values, as the toxicity of that compound has not been adequately tested to date. This may over- or underestimate site risks, as the toxicity of the constituents at levels detected may or may not cause adverse effects to actual receptors. Application of surface water screening values for evaluation of pore water may also over- or underestimate actual site risks. Finally, the benchmarks are generally set to maintain a conservative bias in order to overestimate rather than underestimate risks.

4.0 Results and Conclusions.

This section will present the results of this SLERA and describe the potential for risks at the North Pond, South Pond and Bayou Texar.

4.1 North Pond.

The investigation at the North Pond collected both sediment and surface water samples. They are evaluated in the sections below.

4.1.1 Sediment Results.

Screening values were not available for the miscellaneous inorganics chloride, fluoride, sulfate, alkalinity, silica and bromide. There were also no screening values for the metals calcium, iron, magnesium, potassium and sodium. There were no screening values for any of the nutrients (nitrate, nitrite, ammonia-N and orthophosphate-P). The effect of the lack of screening values for these constituents is unknown. TOC was slightly above the "low" screening level, yet well below the "severe" level. All other constituents (aluminum, arsenic, chromium, copper, lead, manganese, radium 226 and radium 228) were below their respective screening values.

4.1.2 Surface Water Results.

Screening values were not available for the miscellaneous inorganics sulfate, alkalinity, TOC, silica and bromide. There were also no screening values for the nutrients (nitrate, nitrite, ammonia-N and orthophosphate-P). The effect of the lack of screening values for these constituents is unknown. HQs of 3 (acute) and 22 (chronic) were calculated for total aluminum, and an HQ of 2 (chronic) was calculated for total iron. Several metals were not detected but had detection limits above their screening values. Comparing the detection limit for dissolved aluminum and the chronic screening value resulted in an HQ of 4. Using the detection limit for total and dissolved copper, HQs of 2 (acute) and 3 (chronic) were calculated. Using the detection limits for total and dissolved lead, a chronic HQ of 5 was calculated. All other constituents (arsenic, calcium, chromium, magnesium, potassium, sodium, radium 226 and radium 228) were below their respective screening values.

4.1.3 Conclusions.

For the constituents in sediment with screening values, detected concentrations were below levels that would cause concern. For surface water, aluminum, iron, lead and copper had HQs above unity, although aluminum (dissolved), copper (total and dissolved), and lead (total and dissolved) were non-detect. The chronic HQ for total aluminum was 22, however, the chronic HQ for dissolved aluminum was 4, using the detection limit. All other HQs were 5 or less. Although several exceedances of screening values were noted, and screening values were unavailable for many of the constituents detected in sediment and surface water at the North Pond, the ecosystem at the impoundment appears healthy. During the site visit for the five-year review, shore birds were observed swimming and wading. Therefore, it appears that the remedy at the North Pond is functioning as intended and is protective of the environment at this time.

4.2 South Pond.

All samples taken at the South Pond were identified as sediment. As the impoundment does not pond water, the samples were compared to both sediment and soil screening values.

4.2.1 Sediment Results.

Sediment screening values were not available for the miscellaneous inorganics chloride, fluoride, sulfate, alkalinity, silica and bromide. There were also no screening values for the metals calcium, iron, magnesium, potassium and sodium. There were no screening values for any of the nutrients (nitrate, nitrite, ammonia-N and orthophosphate-P). The effect of the lack of screening values for these constituents is unknown.

4.2.2 Soils.

There were no screening values for soil found for any of the miscellaneous inorganics or any of the nutrients. Calcium, magnesium, potassium and sodium also had no soil screening values. The maximum detected concentration exceeded the soil screening value for aluminum, arsenic, chromium, copper, iron, lead and manganese. The screening values are for protection of plants, and the site sustains a healthy plant community. As such, these exceedances are not a concern.

4.2.3 Conclusions.

The samples taken at the South Pond were identified as sediment, although this depression does not support an aquatic ecosystem. Therefore, the more appropriate evaluation compared the detected concentrations against the soil screening values. Although several metals exceeded the soil screening values for protection of plants, the area supports a healthy plant community, indicating that the screening values are a poor measure of risk to the plant communities at the site. Therefore, it appears that the remedy at the South Pond is functioning as intended and is protective of the environment at this time.

4.3 Bayou Texar.

Samples were taken at transects 1 and 2 and were compared to the baseline station, as well as screening values.

4.3.1 Sediment Results.

Sediment screening values were not available for the miscellaneous inorganics chloride, fluoride, sulfate, alkalinity, silica and bromide. Although the other inorganics did not have screening values, all concentrations were significantly above the baseline station values. There were also no screening values for the metals calcium, iron, magnesium, potassium and sodium, however, all were significantly above the baseline station values. Only manganese was below the screening value, although the detected concentration exceeded the baseline station value by two orders of magnitude. For the rest of the metals with screening values, the calculated HQs were 1 (aluminum), 2 (arsenic), 1 (chromium), 14 (copper) and 5 (lead). All concentrations of these metals at transects 1 and 2 were significantly higher than the baseline station values. There were no screening values for any of the nutrients (nitrate, nitrite, ammonia-N and orthophosphate-P). All except for Ammonia-N and Orthophosphate-P were non-detect at elevated detection limits, significantly above the baseline station values (also non-detect). Both isomers of radium (226 and 228) were significantly below their screening values, although significantly above the baseline station values

4.3.2 Surface Water Results.

No saltwater screening values could be found for the miscellaneous inorganics, except for chloride and fluoride. The maximum concentration of chloride significantly exceeded the FDEP criterion of no more than 10% above background. Fluoride was below the FDEP criterion. The maximum concentrations of chloride, fluoride, sulfate, alkalinity and bromide were significantly above the concentrations detected at the baseline station. For the metals, only aluminum, arsenic, chromium, copper and lead had saltwater screening values. Concentrations of arsenic, chromium and lead were non-detect with detection limits below both the acute and chronic screening values, at transects 1 and 2 and the baseline station. Copper was also non-detect, but the detection limits were an order of magnitude above both the acute and chronic screening values. Using the detection limits and the screening values, HQs were calculated at 7

for both acute and chronic exposures. For aluminum, the maximum concentration (total) was above the chronic screening value and although the dissolved fraction was non-detect, the detection limit was also above the chronic screening value. HQs of 108 (total) and 15 (dissolved) for Al were calculated. Concentrations of aluminum (total), calcium (total and dissolved), magnesium (total and dissolved), potassium (total and dissolved) and sodium (total and dissolved) were significantly above the baseline station values. Concentrations of manganese were slightly above the concentrations at the baseline station. Saltwater screening values for nutrients were not available. The detected concentrations at transects 1 and 2 were not significantly different from those at the baseline station. Both isomers of radium (226 and 228) were significantly below their screening values and the baseline station.

Concentrations of arsenic, chloride, fluoride, nitrate+ nitrite, radium 226+ 228 and sulfate were also compared with concentrations from the annual monitoring of Bayou Texar surface water. The concentrations from this sampling event were consistent with the historical data.

4.3.3 Pore Water Results.

Pore water samples were not taken at the baseline station. Also, pore water screening values were not available for comparison, so the transect 1 and 2 samples were compared with surface water screening values.

No saltwater screening values were available for the miscellaneous inorganics, except for chloride and fluoride. As the FDEP value for chloride is based on a comparison to background, and because no background pore water samples were taken, the potential for impacts could not be evaluated. The maximum fluoride concentration resulted in an HQ of 28. For the metals, only arsenic, chromium, copper and lead had saltwater screening values. The concentrations of arsenic, chromium and lead were non-detect, with detection limits below both the acute and chronic screening values. Copper (total and dissolved) was detected at approximately two orders of magnitude above the screening values, resulting in HQs of 83 for both acute and chronic exposures. Aluminum (total and dissolved) was detected at approximately four orders of magnitude above the chronic screening value, resulting in HQs of 9231 (total) and 8461 (dissolved). No saltwater screening values were available for any of the nutrients. The detected concentrations of Ra228 exceeded the screening value, and the concentration of Ra226 was approximately equal to its screening value.

4.3.4 Conclusions.

There was a general lack of screening values for constituents detected in sediments, surface water and pore water at transects 1 and 2. Sediment HQs above unity were calculated for arsenic (7), copper (14) and lead (5), and most other constituents without screening values were significantly above the concentrations at the baseline station. Copper in surface water exceeded its screening value, with an HQ of 7, and chloride significantly exceeded the FDEP criterion of no more than 10% above background. Total aluminum in surface water exceeded the chronic screening value resulting in an HQ of 108. Most other constituents in surface water were detected at concentrations significantly above those at the baseline station. It is notable that both isomers of radium were detected at levels below their surface water screening values and the concentrations detected at the baseline station. Pore water concentrations were evaluated against surface water screening values and copper, with an HQ of 83, exceeded both the acute and chronic values, fluoride, with an HQ of 28, exceeded the FDEP criterion. Aluminum in pore water greatly exceeded the FDEP chronic surface water value with HQs of 9231 (total) and 8461 (dissolved). Copper is very toxic in saltwater ecosystems, and this result may be significant. However, it may not be attributable to ground water migrating from the site, as most upgradient ground water sample concentrations were very low or non-detect for copper.

The bayou shows degradation of surface water and sediment quality compared to the baseline station. It is not clear whether or not the baseline station (approximately 2 miles upstream of transect 1) is a good choice for background at the bayou, due to its location in Carpenter Creek and the disparity of concentrations detected there versus transects 1 and 2. The levels of constituents detected at transects 1 and 2 do not appear to be directly related to the site, as the up gradient ground water concentrations do not seem to support that conclusion. Chloride and fluoride, however, are elevated in the main producing zone monitoring wells just up gradient of the bayou transects. The results for arsenic, chloride, fluoride, nitrate+ nitrite, radium 226+ 228 and sulfate were compared with concentrations from the annual monitoring of Bayou Texar surface water. The concentrations from this sampling event were consistent with the historical monitoring data.

Due to a general lack of screening values for the contaminants of concern, the effects of the degradation of the bayou downstream of the baseline station are not known. It is recommended, therefore, that additional work be conducted to determine the effect of the elevated chloride and fluoride concentrations in the bayou. Toxicity testing of the sediments, pore water and surface water should be done in conjunction with benthic structure analyses to evaluate the effects of these constituents on the bayou ecosystem. These tests will assist in determining if the remedy for OU-2 is protective of the environment.

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ATTACHMENT 4

COMPARISON OF SPLIT SAMPLE ANALYTICAL RESULTS

COMPARISON OF SPLIT SAMPLE ANALYTICAL RESULTS AGRICO SUPERFUND SITE FIVE-YEAR REVIEW

Eight quality assurance (QA) split samples were collected during the January 2004 sampling event for the Agrico Superfund site. QA samples are replicates of field samples, but are sent to different laboratories for analysis. QA splits are one way of verifying the analytical results obtained from the primary laboratory, since samples collected at the same time and from the same locations should have results that are consistent. Sample-pairs were analyzed using the same methods although there were some differences in sample preservation between the primary and split laboratories.

Locations for each of the split samples were chosen for specific reasons: each water matrix (groundwater, surfacewater and porewater) would have at least one split sample, and the groundwater splits would be collected from locations whose past sample-results covered the concentration spectrum.

Samples were collected from all areas being monitored: shallow groundwater; deep groundwater; Bayou Texar and the north retention pond at the Agrico site. Five monitoring wells were chosen for obtaining split samples, one of which (**ETC-MW-12D**) was used as a background location. The other four MWs were chosen based on historical data. Well **AC-2D** was chosen since historically, there has been very little contamination present. MWs AC-29D and **AC-30D** were chosen because their past results were in the middle of the concentration range. AC-2S was chosen since its historical results had very high concentrations of the *constituents of concern* analytes. The porewater sample (**AC-PW-4**) and surfacewater sample (**AC-SW-1)** collected from Bayou Texar were chosen since they were located in a section of the bayou that research has shown to be an entrance point for a groundwater contamination plume. The location of the surfacewater sample collected from the North Pond (**AC-NP-SW-1**) was chosen based on its location next to an outfall.

The results from each pair of split samples were compared and the Relative Percent Difference (RPD) for each analyte was calculated using the formula shown below:

$$\text{Relative Percent Difference} = \frac{[\text{Primary Lab result - QA Lab result}]}{\text{Primary Lab result + QA Lab result}} \times 200$$

The Split Sample Data Comparison tables (attached) list both sample-pair results for each of the analytes, the calculated RPD of each analyte, and notes/remarks when applicable.

F'PDs were only calculated when both results for a specific analyte were greater than five times the analytes' reporting concentration. When results were within five times the reporting concentrations, comparison of the data points is difficult since small differences in concentrations result in large RPDs. For example: if the reporting concentration for *silver* is 1 mg/L, and the results of the split samples were 5 mg/l and 2 mg/L, the resulting RPD of 86 does not reflect the reality of the sample concentrations, it is greatly skewed.

An RPD not greater than twenty was set as the acceptance limit between the split sample pair. Corps of Engineers guideline document (Engineering Manual 200-1-6) states that there is disagreement between results if the sample-pair's results have a concentration difference greater than two.

There were 256 common data points in the split samples, of this total 129 RPDs, or 50%, were able to be calculated. Twenty-eight of the calculated RPDs, or 22%, were greater than the RPD acceptance limit of twenty.

Ten of the calculated RPDs greater than the acceptance limit can be attributed to errors introduced when samples were diluted when analyzed so that the results were within the calibration range. Five of the RPDs greater than twenty are from the radium analyses. URS states in the Agrico Operable Unit Two. 2003 Annual Report that the radium results obtained from the January 2004 set of samples are higher than the historical values. Before this round of samples, URS used KNL Laboratory Services to analyze the samples for radium, for the latest set of samples; STL-St. Louis was used for the radium analysis. URS believes that the change in laboratories could explain the difference in radium concentration. It should be noted that in all five cases of radium results with RPDs greater than twenty, the results from STL-St. Louis are higher than those obtained from the split sample's analytical lab.

For twelve of the thirteen remaining sample-pair results with RPDs greater than twenty, low concentrations can be seen as the explanation. Although the sample results are greater than five times the reporting concentrations, they are still on the low end of the scale where small differences in concentrations result in large RPDs. For example, the *sulfate* results in the sample pair **AC-NP-SW-1** are 20J and 16 mg/L. The difference of 4 mg/L is small, but the RPD calculated from these results is 22%.

The sulfate results for the sample-pair collected from monitoring well **AC-2S** are the only ones that fail the Corps of Engineers regulation that sample results not have a concentration difference greater than two. The result of the primary sample was 15 mg/L, while the split sample results was 33 mg/L. Neither of the samples was diluted, and all associated quality control samples were within acceptance limits. There is no easy explanation for these results.

The nitrite results from monitoring well **AC-SW-1** also present a challenge. Nitrite was not detected in the primary sample, but was found at a concentration of 3020 mg/L in the split sample. Both laboratories were asked to review their data to see if reporting errors were responsible for the vastly divergent results, both labs stated that their results are accurate. Since this is a surfacewater location, it is possible that a plug of nitrite did pass through the sampling area while the samples were collected. It should be noted that this was the only detection of nitrite in any of the samples collected during the event.

With the exception of the sulfate and nitrite results discussed in the two previous paragraphs, and some of the radiological results, correlations between the split sample-pair results are acceptable.

The QA split samples were not analyzed for alkalinity or total organic carbon, so data comparison could not be performed on those analytes. Due to an error when the Corps of Engineers' Environmental Chemistry Branch laboratory was contacted prior to sample collection, the QA split samples were analyzed for silicon, while the primary samples were analyzed for silica. It is not possible to compared results of two different analytes.

No attempt was made to calculate RPDs for Nitrate + Nitrite and Radium-226 + Radium-228, since their concentrations are simply the sum of the individual analytes.

Agrico Superfund Site 5-year review
Prepared by : Richard Kinsella, Chemist US Army Corps of Engineers, Mobile District
Primary Laboratories: STL-Tallahassee, STL-Savannah and STL- St Louis
QA Laboratories: USACE Environmental Chemistry Branch and STL-Richland

Sample name/location: **AC-35D**
Sample matrix: Groundwater Date of collection: 15 January 2004

Analysis	Primary lab results	QA Split lab results	Relative Percent Difference	Notes/remarks
Aluminum	130 mg/L	126 mg/L	3.1	
Aluminum, Dissolved	130 mg/L	125 mg/L	3.9	
Ammonia-N	11 mg/L	10 mg/L	9.1	
Arsenic	0.015 mg/L	0.005J mg/L	NC	Results are less than 5 X the reporting concentrations
Arsenic, Dissolved	0.023 mg/L	0.005J mg/L	NC	Results are less than 5 X the reporting concentrations
Bromide	<1.0 mg/L	0.46 mg/L	NC	Amount in split was below detection of 1° lab.
Calcium	39J mg/L	36.7 mg/L	6.1	
Calcium, Dissolved	39J mg/L	36.8 mg/L	5.8	
Chloride	530 mg/L	493 mg/L	7.2	
Chromium	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Chromium, Dissolved	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper	0.74 mg/L	0.689 mg/L	7.1	
Copper, Dissolved	0.74 mg/L	0.691 mg/L	6.8	
Fluoride	160 mg/L	216 mg/L	29	Believed to be the result of dilution errors
Iron	0.067 mg/L	0.100J mg/L	NC	Results are less than 5 X the reporting concentrations
Iron, Dissolved	<0.050 mg/L	0.070J mg/L	NC	One result is a non-detect
Lead	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Lead, Dissolved	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Magnesium	21 mg/L	19.6 mg/L	6.9	
Magnesium, Dissolved	21 mg/L	19.6 mg/L	6.9	
Manganese	0.98 mg/L	0.923 mg/L	6.0	
Manganese, Dissolved	0.98 mg/L	0.924 mg/L	5.9	
Nitrate-N	13 mg/L	9.8 mg/L	28	Believed to be the result of dilution errors
Nitrite-N	<0.050 mg/L	<0.02 mg/L*	NA	Both results are non-detects
Orthophosphate-P	0.063 mg/L	<0.03 mg/L*	NC	One result is a non-detect
Potassium	24 mg/L	17.9 mg/L	29	
Potassium, Dissolved	23 mg/L	17.8 mg/L	25	
Radium 226	4.58 +/- 0.69 pCi/L	1.70 +/- 0.33 pCi/L	92	
Radium 228	12.9 +/- 1.6 pCi/L	8.01 +/- 1.7 pCi/L	47	
Sodium	130J mg/L	110 mg/L	17	
Sodium, Dissolved	120J mg/L	110 mg/L	8.7	
Sulfate	210 mg/L	208 mg/L	0.9	

NA: Not Applicable; both sample results are below reporting concentrations
NC: Not Calculable; either one result is a non-detect, or at least one result was less than 5 times the reporting concentration
mg/L: milligrams per Liter pCi/L: picocuries per Liter J: Estimated Concentration
*: Reporting Limit concentration, all other non-detects are reported at the Detection Limit concentration

Agrico Superfund Site 5-year review
Prepared by : Richard Kinsella, Chemist US Army Corps of Engineers, Mobile District
Primary Laboratories: STL-Tallahassee, STL-Savannah and STL- St Louis
QA Laboratories: USACE Environmental Chemistry Branch and STL-Richland

Sample name/location: **ETC-MW-12D**
Sample matrix: Groundwater Date of collection: 23 January 2004

Analysis	Primary lab results	QA Split lab results	Relative Percent Difference	Notes/remarks
Aluminum	<0.20 mg/L	<0.030 mg/L	NA	Both results are non-detects
Aluminum, Dissolved	<0.20 mg/L	<0.030 mg/L	NA	Both results are non-detects
Ammonia-N	<0.030J mg/L	<0.01 mg/L	NA	Both results are non-detects
Arsenic	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Arsenic, Dissolved	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Bromide	<1.0 mg/L	0.04J mg/L	NC	Amount in split was below detection of 1° lab.
Calcium	1.6 mg/L	1.50 mg/L	NC	1° result is less than 5X the reporting concentration
Calcium, Dissolved	1.5 mg/L	1.30 mg/L	NC	1° result is less than 5X the reporting concentration
Chloride	4.9 mg/L	3.4 mg/L	NC	1° result is less than 5X the reporting concentration
Chromium	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Chromium, Dissolved	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper, Dissolved	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Fluoride	<0.20 mg/L	<0.10 mg/L*	NA	Both results are non-detects
Iron	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Iron, Dissolved	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Lead	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Lead, Dissolved	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Magnesium	0.87 mg/L	0.820 mg/L	5.9	
Magnesium, Dissolved	0.84 mg/L	0.790 mg/L	6.1	
Manganese	<0.010 mg/L	0.0075 mg/L	NC	Amount in split was below detection of 1° lab.
Manganese, Dissolved	<0.010 mg/L	0.0075 mg/L	NC	Amount in split was below detection of 1° lab.
Nitrate-N	1.8 mg/L	1.4 mg/L	25	
Nitrite-N	<0.050 mg/L	<0.02 mg/L*	NA	Both results are non-detects
Orthophosphate-P	<0.050 mg/L	<0.03 mg/L*	NA	Both results are non-detects
Potassium	<1.0 mg/L	0.410 mg/L	NC	Amount in split was below detection of 1° lab.
Potassium, Dissolved	<1.0 mg/L	0.370 mg/L	NC	Amount in split was below detection of 1° lab.
Radium 226	0.8 +/- 2.9 pCi/L	0.291 +/- 0.006 pCi/L	NC	1° result is less than 5X the reporting concentration
Radium 228	10 +/- 18 pCi/L	1.30 +/- 0.46 pCi/L	NC	Results are less than 5 X the reporting concentrations
Sodium	5.2 mg/L	5.19 mg/L	0.2	
Sodium, Dissolved	5.2 mg/L	4.94 mg/L	5.1	
Sulfate	<5.0 mg/L	0.34 mg/L	NC	Amount in split was below detection of 1° lab.

NA: Not Applicable; both sample results are below reporting concentrations
NC: Not Calculable; either one result is a non-detect, or at least one result was less than 5 times the reporting concentration
mg/L: milligrams per Liter pCi/L: picocuries per Liter J: Estimated Concentration
*: Reporting Limit concentration, all other non-detects are reported at the Detection Limit concentration

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Prepared by : Richard Kinsella, Chemist US Army Corps of Engineers, Mobile District
Primary Laboratories: STL-Tallahassee, STL-Savannah and STL- St Louis
QA Laboratories: USACE Environmental Chemistry Branch and STL-Richland

Sample name/location: **AC-29D**
Sample matrix: Groundwater Date of collection: 23 January 2004

Analysis	Primary lab results	QA Split lab results	Relative Percent Difference	Notes/remarks
Aluminum	43 mg/L	41.6 mg/L	3.3	
Aluminum, Dissolved	42 mg/L	41.7 mg/L	0.7	
Ammonia-N	24J mg/L	22 mg/L	8.7	
Arsenic	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Arsenic, Dissolved	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Bromide	<1.0 mg/L	0.71 mg/L	NC	Amount in split was below detection of 1° lab.
Calcium	40 mg/L	36.6 mg/L	8.9	
Calcium, Dissolved	39 mg/L	36.7 mg/L	7.7	
Chloride	93 mg/L	92 mg/L	1.1	
Chromium	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Chromium, Dissolved	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper	0.70 mg/L	0.619 mg/L	12	
Copper, Dissolved	0.69 mg/L	0.620 mg/L	11	
Fluoride	52 mg/L	56 mg/L	7.4	
Iron	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Iron, Dissolved	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Lead	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Lead, Dissolved	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Magnesium	10 mg/L	9.74 mg/L	2.6	
Magnesium, Dissolved	10 mg/L	9.74 mg/L	2.6	
Manganese	0.61 mg/L	0.551 mg/L	10	
Manganese, Dissolved	0.60 mg/L	0.552 mg/L	8.3	
Nitrate-N	16 mg/L	15 mg/L	6.4	
Nitrite-N	<0.050 mg/L	<0.02 mg/L*	NA	Both results are non-detects
Orthophosphate-P	0.065 mg/L	<0.03 mg/L*	NC	One result is a non-detect
Potassium	48 mg/L	35.1 mg/L	31	Believed to be the result of dilution errors
Potassium, Dissolved	48 mg/L	34.9 mg/L	32	Believed to be the result of dilution errors
Radium 226	3.42 +/- 0.55 pCi/L	1.61 +/- 0.32 pCi/L	72	
Radium 228	21.9 +/- 2.5 pCi/L	20.1 +/- 4.0 pCi/L	8.6	
Sodium	28 mg/L	24.4 mg/L	14	
Sodium, Dissolved	27 mg/L	24.4 mg/L	10	
Sulfate	310 mg/L	335 mg/L	7.8	

NA: Not Applicable; both sample results are below reporting concentrations
NC: Not Calculable; either one result is a non-detect, or at least one result was less than 5 times the reporting concentration
mg/L: milligrams per Liter pCi/L: picocuries per Liter J: Estimated Concentration
*: Reporting Limit concentration, all other non-detects are reported at the Detection Limit concentration

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Prepared by : Richard Kinsella, Chemist US Army Corps of Engineers, Mobile District
Primary Laboratories: STL-Tallahassee, STL-Savannah and STL- St Louis
QA Laboratories: USACE Environmental Chemistry Branch and STL-Richland

Sample name/location: **AC-2S**
Sample matrix: Groundwater Date of collection: 23 January 2004

Analysis	Primary lab results	QA Split lab results	Relative Percent Difference	Notes/remarks
Aluminum	46 mg/L	42.5 mg/L	7.9	
Aluminum, Dissolved	44 mg/L	43.1 mg/L	2.1	
Ammonia-N	0.91J mg/L	0.91 mg/L	0	
Arsenic	0.046 mg/L	0.034 mg/L	NC	1° result is less than 5X the reporting concentration
Arsenic, Dissolved	0.04 mg/L	0.032 mg/L	NC	1° result is less than 5X the reporting concentration
Bromide	<1.0 mg/L	<0.10 mg/L*	NA	Both results are non-detects
Calcium	8.5 mg/L	7.15 mg/L	17	
Calcium, Dissolved	7.9 mg/L	7.17 mg/L	9.7	
Chloride	5.7 mg/L	9.2 mg/L	47	
Chromium	<0.010 mg/L	0.002J mg/L	NC	Amount in split was below detection of 1° lab.
Chromium, Dissolved	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper, Dissolved	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Fluoride	170 mg/L	157 mg/L	8	
Iron	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Iron, Dissolved	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Lead	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Lead, Dissolved	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Magnesium	4.8 mg/L	4.23 mg/L	13	
Magnesium, Dissolved	4.5 mg/L	4.28 mg/L	5	
Manganese	0.27 mg/L	0.229 mg/L	16	
Manganese, Dissolved	0.25 mg/L	0.230 mg/L	8.3	
Nitrate-N	3.5 mg/L	2.8 mg/L	22	
Nitrite-N	<0.050 mg/L	<0.02 mg/L*	NA	Both results are non-detects
Orthophosphate-P	16 mg/L	20 mg/L	22	
Potassium	21 mg/L	15.6 mg/L	29	
Potassium, Dissolved	19 mg/L	15.7 mg/L	19	
Radium 226	0.22 +/- 0.17 pCi/L	0.0265 +/- 0.012pCi/L	NC	Results are less than 5 X the reporting concentrations
Radium 228	0.57 +/- 0.66 pCi/L	0.251 +/- 0.29 pCi/L	NC	Results are less than 5 X the reporting concentrations
Sodium	86 mg/L	82.5 mg/L	4.2	
Sodium, Dissolved	80 mg/L	83.7 mg/L	4.5	
Sulfate	15 mg/L	33 mg/L	75	

NA: Not Applicable; both sample results are below reporting concentrations
NC: Not Calculable; either one result is a non-detect, or at least one result was less than 5 times the reporting concentration
mg/L: milligrams per Liter pCi/L: picocuries per Liter J: Estimated Concentration
*: Reporting Limit concentration, all other non-detects are reported at the Detection Limit concentration

Agrico Superfund Site 5-year review
Prepared by : Richard Kinsella, Chemist US Army Corps of Engineers, Mobile District
Primary Laboratories: STL-Tallahassee, STL-Savannah and STL- St Louis
QA Laboratories: USACE Environmental Chemistry Branch and STL-Richland

Sample name/location: **AC-2D**
Sample matrix: Groundwater Date of collection: 23 January 2004

Analysis	Primary lab results	QA Split lab results	Relative Percent Difference	Notes/remarks
Aluminum	2.3 mg/L	2.08 mg/L	10	
Aluminum, Dissolved	2.2 mg/L	2.05 mg/L	7.0	
Ammonia-N	<0.030J mg/L	0.02J mg/L	NC	Amount in split was below detection of 1° lab.
Arsenic	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Arsenic, Dissolved	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Bromide	<1.0 mg/L	0.1J mg/L	NC	Amount in split was below detection of 1° lab.
Calcium	3.1 mg/L	2.70 mg/L	14	
Calcium, Dissolved	3.0 mg/L	2.70 mg/L	11	
Chloride	9 mg/L	6.6 mg/L	31	
Chromium	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Chromium, Dissolved	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper, Dissolved	<0.020 mg/L	0.008J mg/L	NC	Amount in split was below detection of 1° lab.
Fluoride	2.9 mg/L	3.2 mg/L	9.8	
Iron	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Iron, Dissolved	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Lead	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Lead, Dissolved	<0.0050 mg/L	0.002J mg/L	NC	Amount in split was below detection of 1° lab.
Magnesium	2.9 mg/L	2.66 mg/L	8.6	
Magnesium, Dissolved	2.8 mg/L	2.66 mg/L	5.1	
Manganese	0.061 mg/L	0.0536 mg/L	13	
Manganese, Dissolved	0.059 mg/L	0.0532 mg/L	10	
Nitrate-N	2.5 mg/L	1.9 mg/L	27	
Nitrite-N	<0.050 mg/L	<0.02 mg/L*	NA	Both results are non-detects
Orthophosphate-P	0.052 mg/L	0.02J mg/L	NC	Results are less than 5 X the reporting concentrations
Potassium	2.0 mg/L	1.90 mg/L	5.1	
Potassium, Dissolved	1.9 mg/L	1.90 mg/L	0	
Radium 226	1.05 +/- 0.25 pCi/L	1.06 +/- 0.22 pCi/L	0.9	
Radium 228	1.54 +/- 0.71 pCi/L	2.11 +/- 0.63 pCi/L	NC	Results are less than 5 X the reporting concentrations
Sodium	6.9 mg/L	6.39 mg/L	7.7	
Sodium, Dissolved	6.6 mg/L	6.43 mg/L	2.6	
Sulfate	13 mg/L	14 mg/L	7.4	

NA: Not Applicable; both sample results are below reporting concentrations
NC: Not Calculable; either one result is a non-detect, or at least one result was less than 5 times the reporting concentration
mg/L: milligrams per Liter pCi/L: picocuries per Liter J: Estimated Concentration
*: Reporting Limit concentration, all other non-detects are reported at the Detection Limit concentration

Agrico Superfund Site 5-year review
Prepared by : Richard Kinsella, Chemist US Army Corps of Engineers, Mobile District
Primary Laboratories: STL-Tallahassee, STL-Savannah and STL- St Louis
QA Laboratories: USACE Environmental Chemistry Branch and STL-Richland

Sample name/location: **AC-PW-4**
Sample matrix: Porewater Date of collection: 28 January 2004

Analysis	Primary lab results	QA Split lab results	Relative Percent Difference	Notes/remarks
Aluminum	120 mg/L	113 mg/L	6.0	
Aluminum, Dissolved	110 mg/L	113 mg/L	2.7	
Ammonia-N	2.2J mg/L	2.1 mg/L	4.6	
Arsenic	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Arsenic, Dissolved	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Bromide	<1.0 mg/L	0.23 mg/L	NC	Amount in split was below detection of 1° lab.
Calcium	27 mg/L	24.8 mg/L	8.5	
Calcium, Dissolved	26 mg/L	24.8 mg/L	4.7	
Chloride	490 mg/L	478 mg/L	2.5	
Chromium	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Chromium, Dissolved	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper	0.24 mg/L	0.219 mg/L	9.2	
Copper, Dissolved	0.24 mg/L	0.220 mg/L	8.7	
Fluoride	140 mg/L	174 mg/L	22	Believed to be the result of dilution errors
Iron	0.43 mg/L	0.410 mg/L	4.8	
Iron, Dissolved	0.42 mg/L	0.400 mg/L	4.9	
Lead	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Lead, Dissolved	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Magnesium	17 mg/L	16.8 mg/L	1.2	
Magnesium, Dissolved	17 mg/L	16.8 mg/L	1.2	
Manganese	0.94 mg/L	0.879 mg/L	6.7	
Manganese, Dissolved	0.93 mg/L	0.880 mg/L	5.5	
Nitrate-N	4.3 mg/L	2.9 mg/L	39	
Nitrite-N	<0.050 mg/L	<0.02 mg/L*	NA	Both results are non-detects
Orthophosphate-P	<0.050 mg/L	0.23 mg/L	NC	One result is a non-detect
Potassium	7.5 mg/L	6.12 mg/L	20	
Potassium, Dissolved	7.4 mg/L	6.09 mg/L	19	
Radium 226	3.49 +/- 0.56 pCi/L	2.14 +/- 0.41 pCi/L	48	
Radium 228	19.5 +/- 2.4 pCi/L	10.6 +/- 2.2 pCi/L	59	
Sodium	130 mg/L	120 mg/L	8	
Sodium, Dissolved	130 mg/L	120 mg/L	8	
Sulfate	82 mg/L	85 mg/L	3.6	

NA: Not Applicable; both sample results are below reporting concentrations
NC: Not Calculable; either one result is a non-detect, or at least one result was less than 5 times the reporting concentration
mg/L: milligrams per Liter pCi/L: picocuries per Liter J: Estimated Concentration
*: Reporting Limit concentration, all other non-detects are reported at the Detection Limit concentration

Agrico Superfund Site 5-year review
Prepared by : Richard Kinsella, Chemist US Army Corps of Engineers, Mobile District
Primary Laboratories: STL-Tallahassee, STL-Savannah and STL- St Louis
QA Laboratories: USACE Environmental Chemistry Branch and STL-Richland

Sample name/location: **ACSW-1**
Sample matrix: Surfacewater Date of collection: 29 January 2004

Analysis	Primary lab results	QA Split lab results	Relative Percent Difference	Notes/remarks
Aluminum	1.4 mg/L	1.45 mg/L	3.5	
Aluminum, Dissolved	<0.20 mg/L	0.080J mg/L	NC	Amount in split was below detection of 1° lab.
Ammonia-N	0.069J mg/L	0.16 mg/L	NC	Results are less than 5 X the reporting concentrations
Arsenic	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Arsenic, Dissolved	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Bromide	29 mg/l	33 mg/L	13	
Calcium	180 mg/L	197 mg/L	10	
Calcium, Dissolved	180 mg/L	198 mg/L	9.5	
Chloride	8900 mg/L	5570 mg/L	45	Believed to be the result of dilution errors
Chromium	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Chromium, Dissolved	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper, Dissolved	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Fluoride	1.5 mg/L	1.7 mg/L	12	
Iron	<0.050 mg/L	0.100J mg/L	NA	One result is a non-detect
Iron, Dissolved	<0.050 mg/L	0.090J mg/L	NA	One result is a non-detect
Lead	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Lead, Dissolved	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Magnesium	590 mg/L	694 mg/L	16	
Magnesium, Dissolved	610 mg/L	703 mg/L	14	
Manganese	0.025 mg/L	0.025 mg/L	0	
Manganese, Dissolved	0.024 mg/L	0.024 mg/L	0	
Nitrate-N	0.45 mg/L	0.36 mg/L	22	
Nitrite-N	<0.050 mg/L	3020 mg/L	NA	Both labs confirmed their results.
Orthophosphate-P	<0.050 mg/L	<0.03 mg/L*	NA	Both results are non-detects
Potassium	200 mg/L	160 mg/L	22	Believed to be the result of dilution errors
Potassium, Dissolved	210 mg/L	157 mg/L	29	Believed to be the result of dilution errors
Radium 226	0.48 +/- 0.21 pCi/L	0.268 +/- 0.059 pCi/L	NC	1° result is less than 5X the reporting concentration
Radium 228	0.49 +/- 0.46 pCi/L	1.26 +/- 0.43 pCi/L	NC	Results are less than 5 X the reporting concentrations
Sodium	4900 mg/L	3200 mg/L	42	Believed to be the result of dilution errors
Sodium, Dissolved	5000 mg/L	3170 mg/L	45	Believed to be the result of dilution errors
Sulfate	1300 mg/L	1550 mg/L	18	

NA: Not Applicable; both sample results are below reporting concentrations
NC: Not Calculable; either one result is a non-detect, or at least one result was less than 5 times the reporting concentration
mg/L: milligrams per Liter pCi/L: picocuries per Liter J: Estimated Concentration
*: Reporting Limit concentration, all other non-detects are reported at the Detection Limit concentration

Agrico Superfund Site 5-year review
Prepared by : Richard Kinsella, Chemist US Army Corps of Engineers, Mobile District
Primary Laboratories: STL-Tallahassee, STL-Savannah and STL- St Louis
QA Laboratories: USACE Environmental Chemistry Branch and STL-Richland

Sample name/location: **AC-NP-SW 1**
Sample matrix: Surfacewater Date of collection: 29 January 2004

Analysis	Primary lab results	QA Split lab results	Relative Percent Difference	Notes/remarks
Aluminum	1.9 mg/L	2.22 mg/L	16	
Aluminum, Dissolved	<0.20 mg/L	<0.030 mg/L	NA	Both results are non-detects
Ammonia-N	<0.030 mg/L	0.02J mg/L	NC	Amount in split was below detection of 1° lab.
Arsenic	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Arsenic, Dissolved	<0.010 mg/L	<0.003 mg/L	NA	Both results are non-detects
Bromide	<1.0 mg/L	<0.10 mg/L*	NA	Both results are non-detects
Calcium	40 mg/L	38.1 mg/L	4.9	
Calcium, Dissolved	34 mg/L	34.1 mg/L	0.3	
Chloride	3.4 mg/L	2.3 mg/L	NC	1° result is less than 5X the reporting concentration
Chromium	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Chromium, Dissolved	<0.010 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Copper, Dissolved	<0.020 mg/L	<0.002 mg/L	NA	Both results are non-detects
Fluoride	0.27 mg/L	0.22 mg/L	NC	Results are less than 5 X the reporting concentrations
Iron	1.9 mg/L	1.92 mg/L	1.0	
Iron, Dissolved	<0.050 mg/L	<0.040 mg/L	NA	Both results are non-detects
Lead	<0.0050 mg/L	0.004J mg/L	NC	Amount in split was below detection of 1° lab.
Lead, Dissolved	<0.0050 mg/L	<0.002 mg/L	NA	Both results are non-detects
Magnesium	2.7 mg/L	2.59 mg/L	4.2	
Magnesium, Dissolved	2.2 mg/L	2.14 mg/L	3.7	
Manganese	0.15 mg/L	0.139 mg/L	7.6	
Manganese, Dissolved	<0.010 mg/L	0.011 mg/L	NC	One result is a non-detect
Nitrate-N	<0.050 mg/L	<0.02 mg/L*	NA	Both results are non-detects
Nitrite-N	<0.050 mg/L	<0.02 mg/L*	NA	Both results are non-detects
Orthophosphate-P	<0.050 mg/L	<0.03 mg/L*	NA	Both results are non-detects
Potassium	1.8 mg/L	1.90 mg/L	NC	1° result is less than 5X the reporting concentration
Potassium, Dissolved	1.6 mg/L	1.60 mg/L	NC	1° result is less than 5X the reporting concentration
Radium 226	0.37 +/- 0.27 pCi/L	0.172 +/- 0.038 pCi/L	NC	1° result is less than 5X the reporting concentration
Radium 228	1.3 +/- 2.5 pCi/L	0.423 +/- 0.32 pCi/L	NC	Results are less than 5 X the reporting concentrations
Sodium	2.7 mg/L	3.0 mg/L	NC	1° result is less than 5X the reporting concentration
Sodium, Dissolved	2.4 mg/L	1.90 mg/L	NC	1° result is less than 5X the reporting concentration
Sulfate	20J mg/L	16 mg/L	22	

NA: Not Applicable; both sample results are below reporting concentrations
NC: Not Calculable; either one result is a non-detect, or at least one result was less than 5 times the reporting concentration
mg/L: milligrams per Liter pCi/L: picocuries per Liter J: Estimated Concentration
*: Reporting Limit concentration, all other non-detects are reported at the Detection Limit concentration

ATTACHMENT 5

LABORATORY CORRESPONDENCE

URS Memorandum

Date: February 4, 2005

To: Rick Greiner (ConocoPhillips) and Don Davis (Williams)

From: Jeffry R. Wagner

Subject: *Agrico Pensacola STL Radium Analysis Explanation for Significant Differences in Analytical Results for the EPA Split Samples Analyzed by STL Richland and the URS Samples Analyzed by STL St. Louis for the January 2004 Sampling Event.*

Attached is a letter from STL Richland, explaining radium result differences that occurred for split samples with STL Richland arid STL St. Louis for the January 2004 sampling event. This sampling event encompassed EPA's 5-Year Review and the site's annual sampling activities for the Agrico Site in Pensacola, Florida.

Following STL's internal evaluation of the differences in Radium 226 and 228 results, STL recommended that. future radium analyses for the site should be performed by STL Richland; The November 2004 annual sampling event was conducted and the radium 226 and. 228 analyses were performed by STL Richland. Overall, the radium total results are lower and more in line with what historical. results have been. Given the November 2004 results and STL's explanation of the differences between the two laboratories, the results for January 2004 can be explained as a function of analytical factors and not ground water factors.

SEVERN TRENT STL

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Radium Issues

Summary of Conversations

This memo is a summary of the conversations held late last week and Monday October 4, 2004 with Joel Kempema and Steve Wheland and the subsequent conversation with Todd Baumgartner regarding the reasons why some STL Richland and STL St. Louis ^{226}Ra and ^{228}Ra results differ.

STL St. Louis and STL Richland radium procedures are from EPA-600/4-80-032. STL St. Louis uses from this manual; Method 903.0 - Alpha-Emitting Radium Isotopes for the Radium-226 measurement and Method 904.0 - Radium-228 for the ^{228}Ra measurement. STL Richland uses from this manual; Method 903.1- Radium – 226 - Radon Emanation Technique for the ^{226}Ra measurement and Method 904.0 – Radium-228 for the ^{228}Ra measurement.

For the purpose of this evaluation, STL Richland results for the high ^{226}Ra and ^{228}Ra were considered "correct" for the following reasons. The radon emanation technique that STL Richland uses is very specific for ^{226}Ra. STL Richland's chemical yields for ^{228}Ra are nearer 100% and its ^{228}Ra LCS results do not have a high bias. It is postulated that the St. Louis ^{226}Ra results were higher for a different reason than the corresponding ^{228}Ra. The reasons for this are briefly discussed below.

Radium-228
There were apparent chemical yields problems with some STL St. Louis ^{228}Ra analyses, those with the high results in particular. This occurred on some samples as well as some LCSs analyzed with the same batches. This is possibly due to incomplete separation of the yttrium carrier from the barium and strontium carriers. This can lead to disequilibrium between the ^{228}Ac and yttrium carrier. The result is that the 228Ra supported ^{228}Ac is over corrected with decay corrections. The ^{228}Ac progeny is used to determine ^{228}Ra.

In conversation with Joel Kempema, St. Louis, it appears that some LCS recoveries significantly exceeded 100% in February, the time when most of the ^{228}Ra results were high.

Radium-226
When the ^{228}Ra is high it is possible to expect the presence of ^{224}Ra. The ^{224}Ra is the immediate progeny of ^{228}Th and ^{228}Th results from the decay of ^{228}Ra through ^{228}Ac. For ^{224}Ra to be present it must be produced by ^{228}Th, which must be either in the rock formation from which the water came or in the water itself. Thus if ^{228}Th is also present in the water ^{224}Ra will continue to ingrow.

If there is enough ^{224}Ra still remaining in the $BaSO_4$ precipitate containing the radium isotopes, the ^{226}Ra result will be biased high when Method 903.0 - Alpha-Emitting Radium Isotopes is used for the ^{226}Ra measurement. Method 903.0 does not discriminate between the alphas from ^{223}Ra, ^{224}Ra and ^{226}Ra. Method 903.1, the radon emanation method, uses ^{222}Rn to determine ^{226}Ra. The other radon progenies (with half-lives in seconds and minutes) are allowed to decay (~ 4hours) before the count is made for ^{222}Rn. Allowance is made for the decay of the other alpha emitting isotopes by not counting the $BaSO_4$ precipitate for 14 or more days after the chemical separation of the radium progeny from radium. However even after 14 days some ^{224}Ra could remain (half-life of 2.66 days). Radium-223, from the ^{235}U chain, with a half-life of 14.35 days is not as likely to be present.

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If this is the case, that ^{224}Ra is still present, it would be better to wait 21 days before counting the $BaSO_4$ precipitate. This would allow more ^{224}Ra to decay. Furthermore it would be wise to recount the high ^{228}Ac counts to check for decay. This recount could give an indication of the purity of the ^{228}Ac and verify that it really is ^{228}Ac. If it is verified it would be wise to go back and check or recount the $BaSO_4$ precipitate for ^{226}Ra determination. If ^{224}Ra is present, a second ^{226}Ra count should be considered. The second count will demonstrate the presence of ^{224}Ra by the decrease in count rate (caused by ^{224}Ra decay) from the first to the second count.

It is assumed that the water from these samples came from Florida, in proximity to phosphate mines. Phosphate mines contain considerable amounts of naturally occurring radioactive materials, including alpha emitters, in particular those in the ^{238}U and ^{232}Th chains. This could be the reason for the presence of ^{228}Ra and ^{224}Ra.

STL St. Louis at login includes, when Method 903.0 - Alpha-Emitting Radium Isotopes for Radium-226 measurement is requested, the requirement for 14 day or 21 day wait time in its sample processing instructions. STL St. Louis laboratory personnel monitor the sample processing schedules carefully to assure that the 14 or 21 day wait time is followed. STL St. Louis recommends a 21 day wait/decay time. Based upon client requested turn around time for analysis project management selects the time allowed for the wait time.

Performance Data:
During the conversation with Joel Kempema he checked the ^{228}Ra LCS QC data and found that the LCS recoveries were reasonable from January 1, 2004 to September 30, 2004, with the exception of perturbations in the February 2004 time period. The ^{226}Ra LCS QC data were reasonable, that is within STL ST. Louis limits.

St. Louis and Richland performance on the ERA (EPA performance study samples) ^{226}Ra and ^{228}Ra performance samples were within the ERA established control limits.

EPA Procedures:
The procedures in EPA-600/4-80-032 were developed for use on drinking water samples. Subsequently they began to be used to analyze samples that had more and different interferences, such as additional radionuclides, higher radioactivity and higher dissolved solids, than that normally contained in drinking water. Using these methods beyond their intended scope leaves one open to these kinds of problems.

In conclusion:
Although it appears that the problem of high LCS and anomalously high sample results may be a thing of the past, St. Louis should evaluate the precipitation steps involved in the ^{228}Ra procedure. In particular the final oxalate precipitation step should be looked at to establish that the manipulations and heating is being handled adequately.

When ^{224}Ra is suspected to be present, the $BaSO_4$ precipitate for the alpha-emitting procedure for ^{226}Ra should be counted after a 21 day waiting period instead of the 14 day waiting period. Alternatively the $BaSO_4$ precipitate should be recounted a few days after a result greater than the CRDL is measured.

The ^{228}Ac residue, especially when the 228Ra value is some multiple of the CRDL, should be recounted within 24 hours to verify the ^{228}Ac half-life. This would also aid in determining whether ^{224}Ra might be present.

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The laboratory should be made aware of the origin and potential interferences in samples. This will aid the laboratory in taking the necessary appropriate chemical to reduce the effect of these interferences.

Jackie Waldell
for Matt Lardy
2-4-05

Leaders in Environmental Testing

Severn Trent Laboratories, Inc.

ATTACHMENT 6

SITE INSPECTION CHECK LIST

I. SITE INFORMATION

Site Name: Agrico Chemical Company	**Date of Inspection:** June 30, 2004
Location and Region: Pensacola, FL	**EPA ID:** FLD980221857
Agency, office or company leading the five-year review: U.S. Environmental Protection Agency	**Weather/temperature:** Partly cloudy and humid

Remedy Includes (Check all that apply)

- ☒ RCRA cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☒ Vertical barrier walls (slurry wall)

☒ Inspection team roster provided in five-year review report
☒ Site map provided in Attachment 2

II. INTERVIEWS (Check all that apply)

1. O&M Site Manager N/A

Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
Problems, suggestions; ☐ Report attached

2. O&M Staff N/A

Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
Problems, suggestions; ☐ Report attached

3. Local regulatory authorities and response agencies (i.e., State and Tribal Offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Florida Department of Environmental Protection
Contact: Nancy Murchison (Name) Project Manager (Title) 30 June 2004 (Date)
Problems, suggestions: ☒ Report provided in Attachment 7

4. Other Interviews: ☒ Reports provided in Attachment 7

o John F. (Rick) Greiner	PRP – ConocoPhillips	30 June 2004
o Donald R. Davis	PRP – Williams on behalf of Agrico Chemical Company	30 June 2004
o James Van Nortwick, Jr.	PRP – IMC Global	30 June 2004
o Jeffry R. Wagner	Consultant to PRPs – URS	30 June 2004
o Larry Parks	Irrigation Well Owner	13 July 2004
o John Morgan	Representative/Employee of Diocese	13 July 2004
o Sarah Sanchez	Irrigation Well Owner	13 July 2004
o Samuel Bearman	Former Irrigation Well Owner and Class Action Attorney	14 July 2004
o Gene Schmidt	Irrigation Well Owner	14 July 2004
o Margaret Williams	CATE Representative	15 July 2004
o Jude White	Irrigation Well Owner	15 July 2004

III. DOCUMENTS & RECORD VERIFIED (Check all that apply)

1. O&M Documents

☐ O&M Manual ☒ Readily available ☐ Up to date ☐ N/A
☐ As-built drawings ☐ Readily available ☐ Up to date ☒ N/A
☐ Maintenance Logs ☒ Readily available ☐ Up to date ☐ N/A

Remarks _____

2. Site-Specific Health and Safety Plan ☐ Readily available ☐ Up to date ☒ N/A

Contingency Plan/Emergency Response Plan ☐ Readily available ☐ Up to date ☒ N/A

Remarks _____

3. O&M and OSHA Training Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks _____

4. Permits and Service Agreements

☐ Air Discharge Permit ☐ Readily available ☐ Up to date ☒ N/A
☐ Effluent discharge ☐ Readily available ☐ Up to date ☒ N/A
☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☒ N/A
☐ Other permits _____ ☐ Readily available ☐ Up to date ☒ N/A

Remarks: _____

5. **Gas Generation Records**
☐ Readily available ☐ Up to date ☒ N/A
Remarks_____

6. **Settlement Monument Records**
☐ Readily available ☐ Up to date ☒ N/A
Remarks_____

7. **Groundwater Monitoring Records**
☒ Readily available ☒ Up to date ☐ N/A
Remarks: _____

8. **Leachate Extraction Records**
☐ Readily available ☐ Up to date ☒ N/A
Remarks_____

9. **Discharge Compliance Records**
☐ Air ☐ Readily available ☐ Up to date ☒ N/A
☐ Water (effluent) ☐ Readily available ☐ Up to date ☒ N/A
Remarks: _____

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☒ Contractor for PRP
☐ Other _____

2. **O&M Cost Records**
☒ Readily available ☒ Up to date
☐ Funding mechanism/agreement in place
☒ Original O&M cost estimate: $86,000

Total annual costs provided for 1999 through 2004. ☒ Breakdown provided in five-year review report.

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: None noted by Contractor to PRP.

V. ACCESS AND INSTITUTIONAL CONTROLS

A. Fencing

1. Fencing damaged ☐ Location shown on map ☒ Gates secured ☒ N/A
Remarks: Fence in good condition.

B. Other Access Restrictions

1. Signs and other security measures ☐ Location shown on map ☐ N/A
Remarks: All required signs and warnings are posted on fencing.

C. Institutional Controls (ICS)

1. Implementation and enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Site inspections and security monitoring
Frequency Biannual monitoring by contractor to PRPs; semiweekly monitoring by security company
Responsible party/agency ConocoPhillips and Williams on behalf of Agrico Chemical Company
Contact John F. (Rick) Greiner (Name) PRP – ConocoPhillips (Title) (832) 379-6452 (Phone no.)

Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents are met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☒ N/A
Other problems or suggestions: ☐ Report attached

2. Adequacy ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks: _____

D. General

1. Vandalism/trespassing ☐ Location shown on site map ☒ No vandalism evident
Remarks_____

2. Land use changes on site ☒ N/A
Remarks_____

3. Land use changes off site ☒ N/A
Remarks_____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks: Gravel roads on the site are in good condition.

B. Other Site Conditions ☐ Applicable ☒ N/A
Remarks _____

VII. SOIL COVERS/RCRA Cap ☒ Applicable ☐ Not Applicable

A. Cap Surface ☒ Applicable ☐ Not Applicable

1. Settlement (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____
Remarks _____

2. Cracks ☐ Location shown on site map ☒ Cracking not evident
Areal extent _____ Widths _____ Depths _____
Remarks _____

3. Erosion ☐ Location shown on site map ☒ Erosion not evident
Areal extent _____ Depth _____
Remarks _____

4. Holes ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____
Remarks _____

5. Vegetative Cover ☒ Grass ☒ Cover properly established ☒ No signs of stress
Remarks _____

6. Alternative Cover (armored rock, concrete, etc.) ☒ N/A
Remarks _____

7. Bulges ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Height _____
Remarks _____

8. Wet Areas/Water Damage ☒ Wet areas/water damage not evident

☐ Wet Areas	☐ Location shown on site map	Areal extent _____
☐ Ponding	☐ Location shown on site map	Areal extent _____
☐ Seeps	☐ Location shown on site map	Areal extent _____
☐ Soft subgrade	☐ Location shown on site map	Areal extent _____

Remarks _____

9. Slope Instability
☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
Areal extent _____
Remarks _____

B. Benches ☐ Applicable ☒ Not Applicable

C. Letdown Channels ☐ Applicable ☒ Not Applicable

D. Cover Penetrations ☐ Applicable ☒ Not Applicable

E. Gas Collection and Treatment ☐ Applicable ☒ Not Applicable

F. Cover Drainage Layer ☒ Applicable ☐ Not Applicable

1. Outlet Pipes Inspected ☒ Functioning ☐ Not Applicable
Remarks _____

2. Outlet Rock Inspected ☐ Functioning ☒ Not Applicable
Remarks _____

G. Retention/Sedimentation Ponds ☒ Applicable ☐ Not Applicable

1. Siltation Areal extent _____ Depth _____ ☐ Not Applicable
☒ Siltation not evident
Remarks _____

2. Erosion Areal extent _____ Depth _____
☒ Erosion not evident
Remarks _____

3. Outlet Works ☒ Functioning ☐ Not Applicable
Remarks _____

4. Dam ☐ Functioning ☒ Not Applicable
Remarks _____

H. Retaining Walls ☐ Applicable ☒ Not Applicable

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ Not Applicable

VIII. VERTICAL BARRIER WALLS ☒ Applicable ☐ Not Applicable
☒ Location shown on site map (Figure 1 in Attachment 2)

1. Settlement ☒ No evidence of settlement
Areal extent _____ Depth _____
Remarks _____

1. Performance Monitoring ☒ Performance not monitored
Type of Monitoring _____
Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES

A. Groundwater extraction wells, pumps and pipelines
☐ Applicable ☒ Not Applicable

B. Surface water collection structures, pumps and pipelines
☒ Applicable ☐ Not Applicable

1. Collection Structures, Pumps and Electrical
☒ Good condition ☐ Needs O&M
Remarks_____

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☒ Good condition ☐ Needs O&M
Remarks_____

3. Spare Parts and Equipment

☐ Readily available ☐ Good Condition ☐ Requires upgrade
☐ Needs to be provided ☒ N/A

Remarks: Pipelines are gravity fed; spare parts and equipment not applicable.

C. Treatment System ☐ Applicable ☒ Not Applicable

D. Monitoring Data

1. Monitoring Data
☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggest**
   ☒ Groundwater plume is effectively contained (the plume is stable)
   ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy) ☐ N/A
   ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled
   ☒ Good condition ☒ All required wells located ☐ Needs O&M

Remarks: _____

X. OTHER REMEDIES

☐ Applicable ☒ Not Applicable

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

The natural attenuation remedy appears to be functioning as expected. The increases in contaminant concentrations that have occurred in groundwater are within the expected range for the site.

B. Adequacy of O&M

O&M activities are adequate for the site. The site inspection demonstrated the O&M activities have been carried out in accordance with the ROD and O&M Plans. The O&M activities are supporting the remedy at the Agrico site.

C. Early Indicators of Potential Remedy Problems

No early indicators of potential remedy problems were identified during this five-year review.

D. Opportunities for Optimization

Opportunities for optimization were not identified during this review. The groundwater and surface water sampling locations provide sufficient data to assess the progress of natural attenuation.

ATTACHMENT 7

PHOTOGRAPHS DOCUMENTING SITE CONDITIONS

PHOTOGRAPH 1. VEGETATIVE COVER, RCRA CAP (LOOKING EASTERLY)

PHOTOGRAPH 2. SURFACE WATER INLET, EASTERN SIDE OF RCRA CAP

PHOTOGRAPH 3. CULVERT, NORTH POND (LOOKING SOUTH-WESTERLY)

PHOTOGRAPH 4. CULVERT, SOUTH POND (LOOKING WESTERLY)

PHOTOGRAPH 5. NORTH POND (LOOKING NORTH-WESTERLY)

PHOTOGRAPH 6. SOUTH POND (LOOKING WESTERLY)

PHOTOGRAPH 7. STORMWATER RUNOFF DITCH, TOP OF RCRA CAP (LOOKING SOUTHERLY)

PHOTOGRAPH 8. FENCING, AGRICO SITE ENTRANCE (LOOKING NORTHERLY)

PHOTOGRAPH 9. TYPICAL WARNING SIGN, AGRICO SITE ENTRANCE

PHOTOGRAPH 10. GRAVEL ACCESS ROADS, NORTH OF RCRA CAP

PHOTOGRAPH 11. GROUNDWATER MONITORING WELL AC-34S

PHOTOGRAPH 12. GROUNDWATER MONITORING WELL AC-7SR

PHOTOGRAPH 13. GROUNDWATER MONITORING WELL AC-33S

PHOTOGRAPH 14. GROUNDWATER MONITORING WELL ACB-31S

PHOTOGRAPH 15. GROUNDWATER MONITORING WELL ACB-32S (JUST OUTSIDE FENCING)

ATTACHMENT 8

INTERVIEW RECORDS

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 9:50	**Date:** 6/30/04
Type: ☐Telephone ☒Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Sheri Zettle	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Nancy L. Murchison	**Title:** Project Manager	**Organization:** FDEP

Telephone No: (850) 245-8927 **Fax No:** (850) 245-8976 **E-Mail Address:** nancy.murchison@dep.state.fl.us	**Street Address:** 2600 Blair Stone Rd, MS 4535 **City, State, Zip:** Tallahassee, FL 32399-2400

Summary Of Conversation

When asked her overall impression of the project, Ms. Murchison replied she thinks it is handled pretty well. She is satisfied with the inspections of the site; however, she has not had an opportunity to review the 2003 Annual Sampling Report.

When asked about routine communications or activities conducted by FDEP at the site, Ms. Murchison replied that FDEP is involved in an oversight capacity only. She is copied on all reports and attends site visits when it is important to attend.

When asked about any complaints, violations, or other incidents related to the site, Ms. Murchison indicated that no formal complaints have been lodged regarding Agrico. Occasionally, people call and complain trying to blame the Agrico site for issues related to nearby sites.

Ms. Murchison feels very well informed about the site's activities and progress. She is copied on all documents. She noted that FDEP has a good rapport with EPA.

When asked if she had any comments, suggestions, or recommendations regarding the site, Ms. Murchison replied that she is not familiar enough with the site to comment.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 10:00	**Date:** 6/30/04
Type: ☐Telephone ☒Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Sheri Zettle	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: James Van Nortwick, Jr.	**Title:** Director of Environmental Affairs	**Organization:** IMC Global Operations, Inc.

Telephone No: (847) 739-1814 **Fax No:** (847) 739-1612 **E-Mail Address:** jwvanortwick@imcglobal.com	**Street Address:** 100 South Saunders Rd., Suite 300 **City, State, Zip:** Lake Forest, IL 60045-2561

Summary Of Conversation

When asked his overall impression of the project, Dr. Van Nortwick replied the solution is proper and adequate. A very expensive cover was installed at the site, having all the bells and whistles. The natural attenuation remedy is a sound engineering practice. The remedy is being handled effectively; it is a good design and effectively managed.

When asked if the remedy was functioning as expected, Dr. Van Nortwick indicated it was functioning as expected, and the remedy includes 70 years for monitored natural attenuation.

When questioned about the trends in the monitoring data, Dr. Van Nortwick stated that the concentrations were stable or decreasing in the monitoring wells. No anomalies exist.

When questioned about the O&M activities, Dr. Van Nortwick indicated that he was not specifically involved with the O&M at the site.

When asked if he had any comments, suggestions, or recommendations regarding the site, Dr. Van Nortwick made the point that one shouldn't jump to conclusions with only 5 years worth of data. The remedy has isolated the source, and nature should be allowed to take its course. We should look at the overall trends and give it some time.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 10:20	**Date:** 6/30/04
Type: ☐Telephone ☒Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Sheri Zettle	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Donald R. Davis	**Title:** Lead Project Manager	**Organization:** Williams on behalf of Agrico Chemical Company
Telephone No: (918) 573-2474 **Fax No:** (918) 573-4421 **E-Mail Address:** don.davis@williams.com	**Street Address:** One Williams Center **City, State, Zip:** Tulsa, OK 74172	

Summary Of Conversation

When asked his overall impression of the project, Mr. Davis replied that the project seems well managed. He stated the cap is in great shape, and the maintenance and appearance look good. He indicated there was good communication with all associated parties. An open sharing of information exists with all parties including EPA.

When asked if the remedy was functioning as expected, Mr. Davis indicated the data suggest the remedy is functioning as expected. The OU-1 data show the cap working. With OU-2 data, there are no huge surprises. The remedy is natural attenuation, and people don't understand what it means. Concentrations will decrease with time. The concentrations are currently on the upper portion of the curve and headed in the downward direction. Time is necessary to see a significant decrease. People need to understand how the remedy fits into the overall community. The pump and treat option has implications to community, as it pulls pollutants into wells. Consider the remedy for the site and how it relates to the area.

When questioned about the trends in the monitoring data, Mr. Davis stated the 2003 Annual Report for OU-2 shows everything is happening as expected, except the radium levels came up. They recognize several variables could be affecting the radium increase. They don't know exactly what the cause is, but they intend to figure it out. One variable could be the change in laboratories. All labs are different, and the change could have a dramatic impact. Seasonal variables could also have an effect. He does not understand how the increase in radium is related to this site. It could be a result of the analytical methods, or radium could be naturally occurring. Concentrations are high within the plume, outside of plume, and up gradient. Radium is present, and they don't know why it is increasing. Several variables may be affecting it.

Summary Of Conversation - Donald R. Davis (cont'd)
When questioned about the O&M frequency, Mr. Davis indicated URS handled the O&M activities. ConocoPhillips and Williams share the responsibility for oversight of URS. Overall, O&M are handled very well. Mr. Davis indicated there have not been any significant changes in O&M requirements, maintenance schedules, or sampling routines in the last 5 years. Mr. Davis indicated there have not been any unexpected O&M difficulties or costs at the site in the last 5 years. When questioned about opportunities to optimize O&M or sampling efforts, Mr. Davis indicated that they are not overly concerned with the cost of the project. The most important issue is the sampling is done in accordance with the QA plan. The money is a secondary issue. When asked if he had any comments, suggestions, or recommendations regarding the site, Mr. Davis stated from a technical perspective, he did not have any. He believes it is too early to talk about changes or modifications. From a public relations standpoint, we should be careful and open minded to communicate with the community in the best way possible. He stated the community is polarized, and we should be careful to communicate the information on a timely, consistent and continual basis.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 10:40	**Date:** 6/30/04
Type: ☐Telephone ☒Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Sheri Zettle	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Jeffry R. Wagner	**Title:** Vice President	**Organization:** URS Corporation

Telephone No: (850) 574-3197 **Fax No:** (850) 205-3246 **E-Mail Address:** jeffry_wagner@urscorp.com	**Street Address:** 3676 Hartsfield Road **City, State, Zip:** Tallahassee, FL 32303

Summary Of Conversation

When asked his overall impression of the project, Mr. Wagner stated everything is moving along smoothly. Agrico is an example of the way a remedy should work. He stated the results are indicating what is expected for a natural attenuation remedy. The remedy consists of 70 years for monitored natural attenuation. People want things quicker than Mother Nature will allow. He is not surprised by the results for the past 5 years.

When asked if the remedy was functioning as expected, Mr. Wagner stated it is functioning better than expected. He expected residual impacts under OU-1. The concentrations declined quicker than expected. He expected them to peak and then drop off. The decrease was quicker than expected.

When questioned about the trends in the monitoring data, Mr. Wagner stated that one should be careful in how trends are characterized. The source material is cut off. Down gradient concentrations are decreasing, and the performance standards have been generally met from the surficial zone down gradient of the site. Below the surficial zone is where impacts primarily reside. Contaminants are transported through surficial zone; they move down and are captured by the main producing zone. It will take longer for natural attenuation in the main producing zone. You don't see the same decrease as in the surficial zone. Hot spots are moving in down gradient direction. Overall concentrations are not higher than seen during the remedial investigation. The plume is moving as expected.

Summary Of Conversation - Jeffry R. Wagner (cont'd)
When questioned about the O&M frequency, Mr. Wagner stated the O&M is not continuous. The cap is maintained, and the grass is cut. URS personally inspects the site twice a year, sometimes more frequently when required. Landscaping occurs once a month in the summer, and the landscapers notify URS if there is an issue. Security guards inspect the site by driving through twice a week, and they fax reports weekly. Regarding significant changes in O&M requirements, maintenance schedules, or sampling routines in the last 5 years, Mr. Wagner indicated that there have been no changes. O&M is the same as the original plan. When asked about unexpected O&M difficulties or costs at the site in the last 5 years, Mr. Wagner indicated that there have been none. Everything is routine. When questioned about opportunities to optimize O&M or sampling efforts, Mr. Wagner indicated that they have become more efficient with the groundwater sampling effort. He stated the design and construction of the cap was good. Overall, cost is low. When asked if he had any comments, suggestions, or recommendations regarding the site, Mr. Wagner indicated that everything is what they envisioned. The only difficulty was with the institutional controls for the irrigation survey. People want to be private about well ownership. The mail-out generated an incomplete response to determining the locations of all irrigation wells. People don't want the government to know they have a well. It was difficult to get cooperation from the well owners.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 11:10	**Date:** 6/30/04
Type: ☐Telephone ☒Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Sheri Zettle	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: John F. (Rick) Greiner	**Title:** Geoscience Consultant	**Organization:** ConocoPhillips

Telephone No: (832) 379-6452 **Fax No:** (928) 447-5737 **E-Mail Address:** john.f.greiner@conocophillips.com	**Street Address:** 600 N. Dairy Ashford (77079-1175) **City, State, Zip:** Houston, TX 77252-2179

Summary Of Conversation

When asked his overall impression of the project, Mr. Greiner indicated it was a great project overall. He stated that OU-1 is a model construction project. The cap looks good. OU-2 seems reasonable and is a low risk in general. He questioned how it could not work. Agrico was one of the first NPL sites to have monitored natural attenuation as a remedy. It is ground breaking for a NPL site.

When asked if the remedy was functioning as expected, Mr. Greiner indicated OU-1 was a text book case. The solidification, stabilization and the cap look like they couldn't work any better. With OU-2, it is hard to get a definitive trend. In general, he doesn't see anything alarming. The radium is puzzling, and there are things they do not know about it. It needs to be looked at in the context of radium in Escambia county.

When questioned about the trends in the monitoring data, Mr. Greiner indicated a very strong trend in decreasing concentrations for OU-1. OU-2 is on a larger scale, so with the size of plume you find decreasing trends and locally increasing trends. It needs to be looked at on a statistical basis. Not enough data exists to evaluate the plume over the long term. He expects it will decrease. The source pattern is declining, and OU-2 can not do anything but decrease. He thinks it will take more data over time to show the average decreasing trend.

When questioned about the O&M frequency, Mr. Greiner indicated the site inspections are conducted quarterly, and the security is continuous.

Summary Of Conversation - John F. (Rick) Greiner (cont'd)
Mr. Greiner indicated that no significant changes in O&M requirements, maintenance schedules, or sampling routines have occurred in the last 5 years. He also indicated that no unexpected O&M difficulties or costs have been associated with the site in the last 5 years. When questioned about opportunities to optimize O&M or sampling efforts, Mr. Greiner commented that there is always an opportunity to optimize. However, optimization has not been initiated at the site yet. He expects optimization efforts will be implemented in concert with EPA when the time is right. He suggested incorporating irrigation wells as a selected subset of wells to sample, if the wells are located in a position to delineate the plume or evaluate concentration trends. The initial well selections were good; however, there may be the opportunity to optimize the network by using irrigation wells for monitoring. When asked if he had any comments, suggestions, or recommendations regarding the site, Mr. Greiner indicated he did not. He commented that EPA and FDEP were good to work with, and they had a good working relationship.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 3:15 p.m.	**Date:** 7/13/04
Type: ☒Telephone ☐ Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☒ Outgoing	

Contact Made By:

Name: Laura Roebuck	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Larry Parks	**Title:** Irrigation well owner	**Organization:**

Telephone No: (850) 433-6321 **Fax No:** **E-Mail Address:**	**Street Address:** 1210 Durnford Pl **City, State, Zip:** Pensacola, FL 32503

Summary Of Conversation

Mr. Parks' irrigation well was drilled a long time ago. It was never used because the city (or county?) condemned the well after several sampling events. It was so long ago, he can't remember the time frame. It could have been 10 years ago. He said the well sat idle, capped and unused for several years, but it was finally filled with concrete for safety reasons. He said the well water had a strong odor. He said it was drilled for water for their lawn, their swimming pool and for washing the car. But since the city condemned the well, and it was never used.

When asked his overall impression of the project, Mr. Parks said he did not really know that much about it, except there is a lawsuit and all. He said his only remark would be his surprise and disappointment over the condemnation and the fact the water was contaminated. He said he eventually concluded that the groundwater was contaminated from somewhere else, and the water in his well was "on its way" to the bayou. His home is about 7 to 8 blocks from the site, but is closer to the bayou. He said there were no gas stations, etc. in the area that could have contaminated the groundwater.

When asked about the effects the site operations had on the surrounding community, he did not know much about that either, except that the difficulties with some folks in the area of the site having to be relocated, etc.

When asked if he feels well informed about the site's activities and progress, he said "Well, no, not really." All he knows about the site and the information has been obtained from the newspaper and television. He said he knows of the lawsuit groups through newspaper and television, but is not involved with any of the groups. He said he may have talked to some folks in the groups in the past, answered some questions, etc., but he can't remember any details.

Summary Of Conversation - Larry Parks (cont'd)
When asked if he has any comments, suggestions, etc., he said he has no comment because he does not know enough about the site. He said his main thoughts and feelings are that he was irritated and disappointed at the time when he was unable to use his well for its intended purpose.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 4:00 p.m.	**Date:** 7/13/04
Type: ☒Telephone ☐ Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☒ Outgoing	

Contact Made By:

Name: Laura Roebuck	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: John Morgan	**Title:** Representative and employee of Diocese	**Organization:** Holy Cross Cemetery

Telephone No: (850) 432-1515 **Fax No:** **E-Mail Address:**	**Street Address:** 1300 E. Hayes **City, State, Zip:** Pensacola, FL 32503

Summary Of Conversation

The Diocese has 3 wells, 2 at the cemetery and 1 at the Bishop's residence. The Bishop's residence is at 1231 Durnford Place.

When asked his overall impression of the project, Mr. Morgan said all the info he has, he obtained from the newspaper, and it seems to be a step in the right direction to compensate the folks who have been injured.

When asked what effects site operations had on the surrounding community, he said he has seen no physical effects. He said he feels the most damaging effects are intangible, like carcinogens, etc., of which the effects may not be known for quite some time. He said the physical effects would be hard to assess at this time.

When asked if he is aware of any community concerns regarding the site or its operation and administration, he said he has only read of the details in the newspapers. He said some politicians and community leaders feel there is not enough being done, but he does not know enough about the subject to know if that is true.

When asked about site vandalism, trespassing, or emergency responses, he knows of none.

When asked if he feels well informed about the site's activities and progress, he said that he is probably is as informed as most people, but he is informed by the media. The forms he filed he found out about in the newspaper and requested them. He'll be filling them out before the deadline in August. He said a letter was received by them in 2000, regarding compensation if they filed a claim. He said they decided not to file a claim.

Mr. Morgan had no other comments or suggestions on the site.

When asked about the sampling and analysis results of their well, he did not know about the results.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 5:15 p.m.	**Date:** 7/13/04
Type: ☒Telephone ☐ Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☒ Outgoing	

Contact Made By:

Name: Laura Roebuck	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Sarah Sanchez	**Title:** Irrigation well owner	**Organization:**

Telephone No: (850) 432-3920 **Fax No:** **E-Mail Address:**	**Street Address:** 1221 Durnford Pl **City, State, Zip:** Pensacola, FL 32503

Summary Of Conversation

When asked her overall impression of the project, Ms. Sanchez said she has a very strong opinion. She said, "It's a joke." (The class action lawsuit is a joke.) She feels EPA has done what should be done, and the class action suit is not going to do anything but degrade their property value. Everyone is super sensitive about the contamination. Most of the people in the area look down on ECUA (Escambia County Utilities Authority) and FDEP because they don't think they have done their job, but she feels they have done everything they can. She does not know what else could be done to cleanup the site, and does not understand what everyone else thinks that could have been done to cleanup the site.

Most people don't think the way she does about the site. But she and her husband feel the same way. She thinks the newspaper makes the facts very clear, but she feels that most people don't understand the facts (she interjected at this point that she is a geotechnical engineer). She said in the newspaper, an analogy was used, comparing the volume of contamination to one ping pong ball in a million ping pong balls (or an idea along those lines) in the ground. But she reckons the people just don't get it.

When asked the effects the site operations have had on the surrounding community, she feels the effects have terrified the folks in the area. She thinks the plume has minimal impact, but she thinks most people think there is something green and glowing under the ground that is going to jump out and kill them.

She said a grand jury indicted the government for not doing what should be done to cleanup the site (or similar). She was floored because she does not know what else FDEP could do to cleanup the site. She feels that everything that can be done to cleanup the site has been done. She said FDEP goes by the "rule book." She said people in the area there think we live in a pristine world, and the world is not pristine, and Pensacola is a very old city and is not pristine.

Summary Of Conversation - Sarah Sanchez (cont'd)

Ms. Sanchez' irrigation well was sampled and analyzed by Woodward Clyde. She is not concerned with the results.
Radium-226 (?)
Radium-228 was 3.5 pCi/L + or - 1. (exceeded detection limits)
semivolatile organics less than 1 µg/L (all below detection limits)
fluoride .32 mg/l
nitrate 2.5 mg/l
sulfate < 5 mg/l
volatile organic compounds were all less than detection limits

Ms. Sanchez said all the rich people in the area filed the class action lawsuit. She is not in favor of the lawsuit. Her property is directly between Agrico and the bayou, directly down gradient from Agrico, about 1 block from the bayou. The ground elevation of her property is at elevation 75 feet - very steep. The well is over 100 feet deep. They use the well all the time; use it for irrigation and washing the car. Did not fill the pool with it, because she was afraid of the turbidity, not necessarily other contaminants.

When asked if she was aware of any events at the site, such as vandalism, trespassing, emergency responses, etc., she said no.

When asked if she feels well informed about the site's activities and progress, she said "Actually, no, she does not feel they have kept the folks in the area as informed with the facts as they should be." Ms. Sanchez feels they should send out flyers with basic facts, without the hysteria and the bias in the news. She feels the newspaper is biased.

Woodward Clyde came out and talked to them, and she mentioned several times that Woodward Clyde was very nice. Woodward Clyde asked the Sanchez' if they would agree to abandonment of their well. Ms. Sanchez told them no. They want the "free" water and are not worried about the quality. They use their well all the time and do not want to give it up.

Ms. Sanchez said one of the primary contaminants is fluoride, and how much money does the water authority spend putting fluoride into the water? A small child died in the neighborhood of bone cancer. And the people in the neighborhood are convinced that it was from the contamination. Have had a lot of deaths, but feels they are in no way related. A man down the street died of lung cancer in his late 40's, and everyone thinks that is why he died.....but his dad died one year earlier, who lived in Buffalo NY.

Summary Of Conversation - Sarah Sanchez (cont'd)
She said one of her neighbors had some oil puddled up in a certain spot on her lawn, and showed it to Ms. Sanchez, and saying "Don't you think this is that ooze from the Agrico site?" Ms. Sanchez responded to her neighbor, "You parked your car here, oil leaked out of your car onto the ground in this spot, and you need to clean it up ASAP." Her children play in the irrigation well sprinkler. She said if anyone in the area should be concerned about contamination from the site, and the contaminated ground water, it should be her, because she has three very young children. But she's not concerned. As far as her greatest concerns regarding potential harmful effects to her children when playing outdoors, is from overexposure to the sun, and playing around her husband and the boat when her husband is washing his boat with Clorox. Ms. Sanchez described her overall opinion on how some people are overreacting to the contamination and its effects as "panic hysteria."

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 4:00 p.m.	**Date:** 7/14/04
Type: ☒Telephone ☐ Visit ☐Other **Location of Visit:** Pensacola, Florida	☒ Incoming ☐ Outgoing	

Contact Made By:

Name: Laura Roebuck	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Samuel Bearman	**Title:** Former irrigation well owner and Class Action Attorney	**Organization:**

Telephone No: (850) 438-1000 **Fax No:** **E-Mail Address:**	**Street Address:** 1501 Gamara Rd **City, State, Zip:** Pensacola, FL 32503

Summary Of Conversation

Mr. Bearman is a former homeowner in the area; sold the property in Febuary 2004. Mr. Bearman grew up on the property. Mr. Bearman is also an attorney in the class action lawsuit.

His impressions of the site: We (speaking for many folks in the area) feel strongly that the plume of contaminants is not going to attenuate in any type of timely manner, if ever. We do not feel good about living on top of a plume of contaminants trespassing on our property, affecting our property values, which will probably affect the bayou and the bay, contaminants that could affect the city wells and private wells. We strongly request that EPA not commit itself any longer to the attenuation theory, but make an effort to clean it up.

Although he understands that the Bush Administration has not committed unlimited funds to cleanup all sites in the U.S. properly, Mr. Bearman feels that EPA should be knocking on the door of Conoco to get on board to cleanup the Agrico contamination to come up with alternate methods to clean the site up, instead of doing nothing. If attenuation works, it will be in the next millennium. There is a strong feeling that the attenuation is a "bill of goods" that was sold to the public.

The plume is generally considered to be 5000 x 7000 feet. Attenuation of the contaminants would take several generations.

Bill Nelson is one of the senators that has been grandstanding, hopefully with good intent, to get EPA to take another look at remedies. There is a new EPA director in Atlanta, so EPA may reconsider. There was an article in the local newspaper in Pensacola today (July 14, 2004) about it.

Summary Of Conversation - Samuel Bearman (cont'd)
Mr. Bearman stated that the Escambia County Grand Jury found reason for concern that the attenuation may not work and that EPA should not have bought the attenuation theory. Politicians wrote letters to EPA for reconsideration. However, the grand jury probably heard only one side of the story. Doubt that neither the federal government nor Conoco were there to present their side to the grand jury for a well rounded view of the situation. When asked if he feels well informed, Mr. Bearman replied he is well informed, and he needed to be informed since he is one of the class action attorneys. He feels he is probably better informed than the average person in the area. Mr. Bearman feels the parties who contaminated the site should "step up to the plate." The government should not accept the attenuation argument if it does not seem like a valid approach. The judge in his ruling found the plume had traveled at least several square miles and was 5000 x 7000 feet in size. Mr. Bearman stated that other people involved in the problem probably do not feel as strongly as he does, probably because they don't know as much about the site, and are not as informed of the facts.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 11:30 a.m.	**Date:** 7/14/04
Type: ☒Telephone ☐ Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☒ Outgoing	

Contact Made By:

Name: Laura Roebuck	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Gene Schmidt	**Title:** Irrigation well owner	**Organization:**

Telephone No: (850) 438-0050 **Fax No:** **E-Mail Address:**	**Street Address:** 4141 Menendez Dr. **City, State, Zip:** Pensacola, FL 32503

Summary Of Conversation

Mr. Schmidt has an irrigation well on his property that was sampled and analyzed by Conoco. It showed no contaminants from the Agrico site, but Conoco said they found evidence of contamination from a dry cleaning site. The named contaminant may have been TCE. He uses his well all the time.

When asked his overall impression of the project, Mr. Schmidt said he feels EPA did all they could do. He did not really know there was a site, until he started reading the information in the newspaper. His in-laws owned this property (home), and most likely lived there when the site was active. He and his wife moved in, and his father-in-law lives there too.

When asked the effects the site operations have had on the surrounding community, Mr. Schmidt said he does not know of any. The cleanup, etc. was finished by the time he moved in.

When asked if he was aware of any community concerns regarding the site, he said no, not really. He said that folks are stirred up by the lawsuit. But he has seen no ill effects on anything, and no effect on property values. Property values are going up rapidly, and his well is not contaminated.

When asked if he knows of any incidents at the site of trespassing, vandalism, emergency response, he said no.

Summary Of Conversation - Gene Schmidt (cont'd)
When asked if he feels he is well informed about the site's activities, he said, no, not really. The only contact he has had is with Conoco. Conoco initially made an offer to abandon his well for $5K, which he declined because he uses the well a lot. And then they came and sampled the water. The other contact is when he received the invitation to join the class action lawsuit (a mass mailing by the lawyers), which he declined to join. When asked if he had anything else he would like to comment on regarding the site, he said "no."

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 5:15 p.m.	**Date:** 7/15/04
Type: ☒Telephone ☐ Visit ☐Other **Location of Visit:** Pensacola, Florida	☒ Incoming ☐ Outgoing	

Contact Made By:

Name: Laura Roebuck	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Jude White	**Title:** Irrigation well owner	**Organization:**

Telephone No: (850) 432-8869 **Fax No:** **E-Mail Address:** jwhit101@bellsouth.net	**Street Address:** 1710 E. Cross St **City, State, Zip:** Pensacola, FL 32503

Summary Of Conversation

This residence has an irrigation well that is actively used. They filled their swimming pool with it in 1997. The well was sampled in 1999, and the results were "OK" with everything below limits. They still use the well to top off the pool when the water gets low, water the lawn, etc. The well water has not been sampled since 1999. The well was sampled and analyzed by Woodward Clyde.

A while back he was offered $5K if he agreed to abandonment of his well. He did the math, and declined the offer because of the cost of the water to water his lawn, fill up his pool, over the years if he no longer had this well. He said if he had an outside tap that was metered and the water use paid for by someone else forever, he may have considered abandonment of the well.

When asked his overall impression of the site, the ongoing monitoring, and/or the project in general, he said he did not have any impression. Recently the class action suit was started and he is looking to receive compensation. He is on the southern edge of the settlement boundaries.

When asked if he was aware of any community concerns regarding the project, he said the people who are benefiting from the class action lawsuit are pleased. However the people who live very close to the site (in zone 1) have a lot of concerns about their health, children, etc. And he understands those concerns.

When asked if he knows of any vandalism, emergencies, trespassing on the site or any other wrongdoings regarding the monitoring, the site, etc., he said no.

Summary Of Conversation - Jude White (cont'd)
When asked if he feels well informed about the activities and progress of the ongoing work, he said the only information he gets is on the news or newspapers. He is not getting any additional information on the status and ongoing work. He would like to be better informed. He would rather get more updated info and status reports on Agrico, rather than relying on the news and newspaper. Mr. White did mention that he assumes what EPA can do to remediate the site, he feels they have done. When asked if he had anything he would like to comment on, recommend, etc., he said no. He did mention that he will continue using the well for washing his car, watering the lawn, etc., but he will have the well sampled and analyzed again at some point.

INTERVIEW RECORD

Site Name: Agrico Chemical Company	**EPA ID No.:** FLD980221857	
Subject: Five-Year Review	**Time:** 10:00 a.m.	**Date:** 7/15/04
Type: ☒Telephone ☐ Visit ☐Other **Location of Visit:** Pensacola, Florida	☐ Incoming ☒ Outgoing	

Contact Made By:

Name: Laura Roebuck	**Title:** Geologist	**Organization:** USACE

Individual Contacted:

Name: Margaret Williams	**Title:** Citizens Against Toxic Exposure (CATE) Representative	**Organization:** Citizens Against Toxic Exposure

Telephone No: (850) 436-7557 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:** Pensacola, FL 32503

Summary Of Conversation

(I called Ms. Williams to interview her on the Agrico Site, but during the course of the interview, it was evident she was discussing some aspects of the Escambia Wood Treating project, particularly in regards to the relocation.)

Ms. Williams was relocated because of Escambia Wood Treating Site.

Ms. Williams stated that CATE's involvement in Agrico was late because the community was not kept informed about Agrico, and she found out about Agrico after she got involved with the Escambia Wood Treating site. Ms. Williams overall impression is she does not feel the remediation (cleanup) was adequate. She does not think the site was cleaned up properly because the groundwater at the site is still contaminated, and the contaminated plume is still in the area, traveling away from the site, southeast of the site, between the site and the bayou. Also some significant changes were made during the cleanup, such as the slurry wall. She feels that EPA just decided to cleanup the site the way they wanted to.

When asked if she was aware of any community concerns, Ms. Williams started discussing the relocation issues [Escambia]. She said the relocation was a disaster for a lot of people. Ms. Williams was surprised to hear that the Corps asked the people to sign a release accepting the homes "as is." Some of the people are still having electrical problems, plumbing problems and roof problems. They were moved into substandard homes, and the Corps wanted the people to sign the release accepting these substandard homes. Some of these people were old, and signed the releases, and had lots of problems with their home. It is difficult for these people to get help now because they signed the release.

Summary Of Conversation - Margaret Williams (cont'd)
The settlement was in 2002, but Ms. Williams said she did not get her settlement funds. They gave her only $70K for two houses and 20,000 square feet of land, and did not get the $20K relocation. Another lady did not get enough $$ for her business property and went out of business as a result. Ms. Williams then started reading me the release that the government (the Corps) gave these people to sign. "I understand that there is no warranty to the government.....I understand the inspection by the Corps was done....." Ms. Williams said that in many of these homes termites are prevalent, roofs are leaking, the plumbing is bad, etc. It was very sad what these people had to go through in this relocation. When asked about the effects of the ongoing monitoring since the remediation, she was not aware of any. She said she does not have any information on it. When asked if she knows of any other issues at the site, such as vandalism, trespassing, etc., she said no. The site is fenced off. When asked if she feels well informed about the project and the monitoring progress, she said she gets a report from Caroline on the Escambia (wood treating) site, but nothing on Agrico. When asked what else she had to comment on or suggest, she said that she does not know what can be done now, but help some of the folks experiencing difficulties in their relocated homes. And Ms. Williams wants her relocation benefit that she never received. She did not want to continue living in her home because so many folks in her family died there. Therefore, she relocated. She had one baby born dead; one died at 3 months, her uncle died in the home, etc. She feels she was purposely picked on in being denied the relocation benefit. Now she must pay $26K in taxes on the property that she no longer owns. She must now hire an attorney to get that straightened out. She wants more information about the Agrico progress. She feels the surrounding community has not been kept adequately informed about Agrico.