



# ANDERSEN AFB GUAM

---

## ADMINISTRATIVE RECORD COVER SHEET

AR File Number 239

**ANDERSEN AIR FORCE BASE  
RESTORATION ADVISORY BOARD (RAB)**

**MINUTES OF MEETING - 12 OCTOBER 1995  
ANDERSEN AIR FORCE BASE, CE CONFERENCE ROOM**

**MEMBERS PRESENT:** Col V. Jaroch - Installation co-chair  
Sen. J. Brown - Community co-chair  
Mr. M. Cruz - RAB Member  
Mr. J. Jenson - RAB Member  
Ms. C. Taitano - RAB Member  
Mr. F. Castro - RAB Member  
Mayor E. Artero - RAB Member  
Mr. J. Flores - RAB Member  
Mr. M. Carey - RAB Member  
Mr. M. Gawel - RAB Member  
Mr. M. Stacy - RAB Member  
Mr. N. Rodriguez - RAB Member  
Ms. R. Limtiaco - RAB Member  
Mr. V. Wuerch - RAB Member  
Ms. J. Duwel - RAB Member  
Mr. J. Iglesias - RAB Member  
Ms. J. Poland - RAB Member

**MEMBERS ABSENT:** Mr. D. Cruz  
Sen. M. Charfauros  
Mayor N. Blas  
Mr. V. Blaz

**PUBLIC ATTENDEES:** Capt. A. Torem - AAFB  
LtCol M. Trost - AAFB  
Mr. A. Marquez - GEPA  
Col. J. Kuconis - AAFB  
Ms. S. Goldman - EA Engineering  
Mr. P. Gyenas - Montgomery Watson  
Mr. B. Glascott - Montgomery Watson  
Capt. R. Jones - AAFB  
Maj. G. Herr - HQ PACAF  
Mr. M. Husain - HQ PACAF  
1Lt D. Biles - AAFB  
Ms. M. Miclat - AAFB  
Mr. R. Schotter - AAFB  
Mr. G. Ikehara - AAFB  
Mr. R. Tsutsui - AAFB

The meeting started at 6:36 p.m.

Senator Joanne S. Brown introduced the new installation co-chair, Colonel Victor D. Jaroch to other Restoration Advisory Board members. Each member in turn introduced themselves and mentioned their affiliations.

**I. Review of Old Business:** Members reviewed the previous meeting minutes. Sen. Brown asked whether the board had recommended revisions. There was no response. Sen. Brown then made a motion to adopt the previous meeting minutes. Julie Duwel seconded the motion. The meeting minutes were adopted.

**II. Presentation of Tumon-Maui Well:** Col. Jaroch mentioned Sen. Brown and he shared a goal to keep the board informed with respect to the perchloroethylene (PCE) detections in the Tumon Maui well. The Air Force sent press releases and put paid public notices in the newspaper to inform the community. Col. Jaroch also mentioned a recent meeting held to brief Delegate Robert Underwood of the situation. PCE Fact sheets were provided to all RAB members before commencement of a presentation by Roy Tsutsui, Chief Environmental Flight.

Mr. Tsutsui began his slide presentation by providing the geologic framework of the Tumon area. Mike Gawel interjected and asked whether the surface of the volcanics was above the sea level or below in the area. Mr. Tsutsui explained that in the particular area shown on the slide where Tumon Maui well is, the volcanics are below sea level. Volcanics play a role in groundwater flow by controlling how the groundwater is directed towards the coast. Above sea level the volcanics control direction and amounts of water that makes its way to the groundwater table. Mr. Victor Wuerch added that the slope of the water surface controls how the water flows in the area since the volcanics were so deep. When the volcanics are below sea level, the volcanic's role in directing the flow is less significant since the water table slope primarily controls how the water reaches the coast.

While Mr. Tsutsui was explaining the changes of PCE concentrations at Tumon Maui over time, Mr. Fred Castro asked whether the other MARBO wells that fed into Booster No. 2 were also checked for PCE. Mr. Tsutsui stated that as part of the Air Force investigation the other wells' test results were evaluated and it was determined that the Tumon Maui well was the only entry point into the base distribution system for the elevated PCE levels.

Sen. Brown asked about the persistence of PCE and its ability to naturally decompose. Mr. Tsutsui answered that he did not know since he was not aware of any state of the art technology that would fingerprint PCE's decomposition age. Col. Jaroch added that all sampling data was provided to the Guam Environmental Protection Agency.

Mr. Marquez talked about the development of the regulatory requirements on PCE. Prior to 1993 the list of unregulated compounds included PCE. In July of 1993, the second phase of the SDWA included the setting of a standard for PCE in drinking water sources at 5 micrograms/L. Roy mentioned that the AF wanted to get several years' worth of quarterly sample sets for water suppliers and that even though water suppliers were given two and a half years to conduct and complete sampling, the base by its own accord began testing early to obtain more data.

Sen. Brown asked what the impact of the Tumon well shutdown was to the base water supply. Mr. Tsutsui responded that since the base gets 20% of its water from the well that it was looking at several courses of action, including implementing a treatment mechanism or investigating a new water supply. Col. Jaroch added that there were individuals from the Pacific Air Forces Command who were looking at the well and identifying possible alternatives. Treatment methods he explained include charcoal or air filtration systems. He indicated it was important to find a solution and get this high water producing well back on line.

Mark Stacy asked if shutting down the well will increase the PCE concentration. Mr. Tsutsui explained that since the water was continually flowing the volatile PCE solvent should be flushing out, therefore the concentrations would not increase.

Jerry Flores asked whether there was any way to date the PCE that was detected in the well and if GEPA was aggressively pursuing restoration sites if PCE was indeed identified in any of the IRP areas. Sen. Brown said it would seem that the PCE came from a current source. Mr. Flores concurred. Mr. Tsutsui responded that there is currently no scientific technology able to date the PCE. Joan responded that the next presentation scheduled in the evening addresses Flores' concern. Joan later mentioned in the meeting that the IRP sites did not contain drums of PCE.

Bob Glascott, a member of the community, asked whether there are any other wells in the vicinity not being operated by the Air Force that's being tested for water quality. Mr. Wuerch said that he was working with Angel Marquez, GEPA, on the issue.

Sen. Brown commented that with the susceptibility of the groundwater lens to contamination, there's a definite need for people to know the kind of commercial activities that transpire within production well areas. She stressed the fact that controlling groundwater contamination involved the entire island. She mentioned that controls should be enforced to account for incoming hazardous waste to the island and their disposal.

Additional discussion was held on IRP site activity. It was determined that there is less possibility that the cause of the PCE contamination is from an IRP site since current information show the IRP sites to be largely outside the suspected hazard area. All agreed that an update of this issue be presented at the next meeting.

### **III. Technical Staff update/Presentation:**

**A. Representation of OU3 Data Summary:** Ron Schotter of the base Installation Restoration Program team re-presented the Andy South (Operable Unit 3) data summary material that was to have been presented in the last RAB meeting but was interrupted due to a power outage. Operable Unit 3 is a portion of the Installation Restoration Program (IRP) which is directed towards field investigations on the soils and waste materials at sites in the MARBO Annex. Mr. Schotter explained the procedures involved in geophysical surveys, soil gas surveys, and exploratory test ditches. Preliminary findings show the sites to primarily contain construction debris. No drums of solvents were found.

**B. Outline of Relative Risk Prioritization:** Discussions resumed at 8:10 p.m. Col. Jaroch asked members to review the Relative Risk Procedures handout for next meeting. This information will be used when the board reviews the 39 IRP sites' relative risk and provide advice.

### **IV. Action Items:**

**A. Vote to delist RAB Members:** Ms. Marriane Miclat addressed termination of members who consistently failed to show up at the meetings. Ms. Miclat explained that Harold Cruz and Nelson Rodriguez were verbally notified to determine if they were still interested in participating in the RAB. A follow up letter was sent on June 5 to inform both individuals of their impending termination. Mr. Rodriguez called after receiving the letter and expressed his desire to remain on the board. Mr Rodriguez was present and presented his reason for wishing to participate as a board member. Ms. Duwel asked Mr. Rodriguez if he had any alternates representing him, Mr. Rodriguez responded "no".

Sen. Brown explained that with the Restoration Advisory Board, members are expected to possess a certain level of commitment and that in order for meetings to be conducted quorums must be met. Sen. Brown however added that she would have no problem granting clemency to Rodriguez. Sen Brown asked if there was dissension from other members. No one objected to keeping Rodriguez on the board.

Mr. H. Cruz did not respond to the written letter, or express an interest to remain on the board, RAB members agreed to his termination as a RAB member.

**V. Public Comment:** Col Jaroch asked whether any members from the public signed up to comment. Ms. Miclat responded that there were no signatures on the sign in sheet.

**VI. Discussion of Next Meeting Agenda:** Discussions progressed to the next meeting agenda. Members requested a short information/update briefing on the RAB program. Mr. Stacy said he felt that with specifics being discussed there was danger of losing sight of the longitudinal view and that members should know enough to be able to fit accomplishments into the overall context of the program. Mr. Carey asked members not to lose site of the fact that the board functions as an advisory board. Mr. Carey said he

agreed with Col Jaroch's suggestion that executive level information briefings be provided at the January meeting.

It was also agreed to have a Tumon-Maui update and to discuss relative risk prioritization at the next meeting.

The next RAB meeting is scheduled for January 18, 1996. Mayor Edward Artero volunteered the village of Yigo as the meeting location. Logistics will be taken care of on a later date.

**VII. Adjournment.** The meeting adjourned at 8:40 p.m.

**APPROVED/DISAPPROVED**

\_\_\_\_\_  
**COLONEL VICTOR D. JAROCH, USAF**  
Installation Co-Chair  
Restoration Advisory Board

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**SENATOR JOANNE SALAS BROWN**  
Community Co-Chair  
Restoration Advisory Board

\_\_\_\_\_  
**Date**

## **AAFB RESTORATION ADVISORY BOARD**

### **AGENDA**

**12 OCTOBER 1995**

**6:30 p.m. - 7:30 p.m.**

**Civil Engineer Conference Room, AAFB**

- I      Review of Old Business: (meeting minutes)**
- II.     Presentation on Tumon Maui**
- III    Technical Staff Update/Presentation**
  - A. Representation of OU3 Data Summary**
  - B. Outline of Relative Risk Prioritization**
- IV    Action Items**
  - A. Vote to delist RAB members**
  - B. Signatures for Mission Statement**
    - Sen. Mark C. Charfauros, Mayor Nonito C. Blas, Ms. Conchita Taitano**
- V      Public Comment**
- VI    Discussion of Next Meeting Agenda**
- VII   Adjournment**



Andersen AFB

***Welcome***  
***Restoration Advisory Board***

**12 Oct 95**

---



Andersen AFB  
**Tetrachloroethylene**

- **What is tetrachloroethylene?**
- **Where was it found?**
- **How did it get there?**
- **What happens now?**





Andersen AFB

## What is tetrachloroethylene?

- **Other names:**
  - Perchloroethylene (PCE)
  - PERC
  - Not trichloroethylene (TCE)
- **Uses:**
  - Dry cleaning solvent
  - Degreaser
- **Suspected carcinogen**



Andersen AFB

## Where was it found?

- **Tumon Maui Well**
  - Harmon-Tumon Groundwater
    - » 19 Sep Test Level was 0.013 ppm
  - Booster Station No. 2
    - » Located in Yigo (MARBO Andy South)
    - » 19 Sep Test Level was 0.0077ppm
    - » Collects Water from Tumon Well

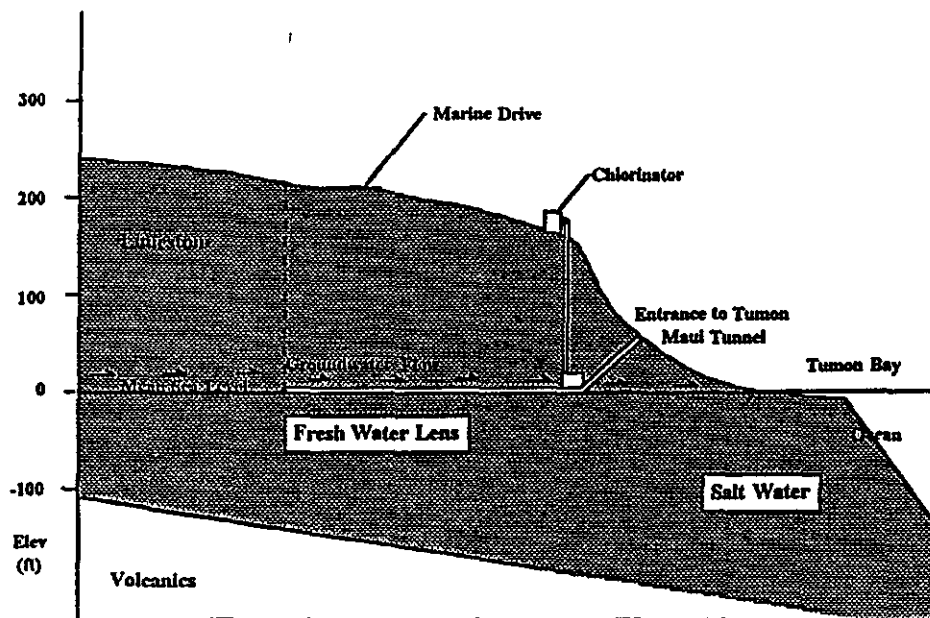
EPA Standard is 0.005 ppm for Annual Average



## Andersen AFB Aerial of Tumon Area



## Andersen AFB Geological Crossection of Tumon Maui





**Andersen AFB**  
**How did it get there?**

- **UNKNOWN**
- **Seep to groundwater**
  - Groundwater tapped by well
- **GEPA investigating source**
  - Improper commercial disposal suspected



**Andersen AFB**  
**What happens now?**

- **22 Sep--Tumon Maui Closed**
- **Public Notified**
- **Possible Courses of Action**
  - Treatment
  - New water supply
- **Continue Monthly Testing**
- **GEPA Investigating Source**

ANDERSEN AIR FORCE BASE  
Restoration Advisory Board Submittals

<u>DOCUMENT</u>	<u>SCHEDULE</u>
Groundwater Monitoring Plan - Defines a strategy to evaluate threats to human health and the environment and to comply with regulatory requirements through long-term monitoring of groundwater quality.	Nov/Dec 95
Operable Unit 3 (Andy South) Data Summary Report - Includes the analyses for soil sampling and soil gas and results from geophysics for the six sites at MARBO.	Nov/Dec 95
Water Level Maps - Elevations are measured in monitoring and production wells to develop groundwater level contour maps which illustrate general groundwater flow directions and to determine the effects of seasonal, tidal and storm influences on the freshwater lens.	Monthly/Dec 95
Management Action Plan - Presents, in summary fashion, the status of the base environmental restoration program and the comprehensive strategy for implementing response actions Also, includes a schedule of planned and anticipated activities to be performed throughout the duration of the program.	Yearly (Dec)
Installation Restoration Program Status Report - Includes the field, document and community activities conducted.	Monthly

OCTOBER 12, 1995

---

**ANDERSEN AIR FORCE BASE, GUAM**

---

**FACT SHEET**

---

**PCE DETECTION AT TUMON MAUI WELL**

---

**AAFB REPORTS PCE DETECTION**

The Air Force, through press releases and paid public notice advertisements, notified the public that tetrachloroethylene (PCE) levels were detected at the Air Force Tumon well and Booster Station No. 2. Four quarterly test results, including confirmation samples between September 1994 and May 1995 showed water from the AF Tumon Maui well contained an average of 0.010 parts per million (ppm) of PCE and Booster Station No. 2 contained 0.006 ppm of PCE. The Environmental Protection Agency set a maximum level of 0.005 parts per million (ppm) for an annual average.

Public notifications revealed that PCE was first detected at the Tumon Maui well. Continuous Air Force water monitoring later showed that water tested at Booster Station No. 2 had elevated PCE levels as well. Booster Station No. 2 is a pump station which obtains water from the Tumon Maui well. The water is then blended with water from other wells where PCE was not detected. To eliminate any possible health concerns, the Air Force temporarily discontinued water supply from the Tumon Maui well on September 22. Residents are not required to seek

alternative water supplies. Tumon Maui will remain inoperative until alternative solutions or treatment is implemented; or water sampling shows the water consistently meets EPA drinking water standards.

The Air Force is working with the Guam Environmental Protection Agency (GEPA) and others to determine appropriate courses of action; this may include the installation of a treatment system.

**WATER SYSTEM**

Prior to discontinuing its use on September 22, Tumon Maui well supplied water to the Tumon Tank Farm area and the Stars and Stripes Building; then after combining the Tumon Maui well water with other AF well water, the water was then distributed to Andersen South and the main base. The AF has an agreement to sell, only when requested, water to the Public Utility Agency of Guam (PUAG) from a connection at Andy South. PUAG further combined the blended water with PUAG water to supplement water supply to Yigo, Mangilao, Dededo and Barrigada.

### REGULATORY STATUS

Tetrachloroethylene(PCE) is on the list of many solvents and chemicals regulated under the Safe Drinking Water Act (SDWA). The solvent is listed as requiring monitoring in all community water systems. To ensure the public's health and safety Andersen AFB, by its own accord, conducts water quality sampling over and above what is required by the Act. In addition to sampling at entry points into the water distribution system, AF officials also conduct water testing at consumer taps.

### USES

The major application for PCE is in the dry cleaning industry. Dry cleaners use it as their primary cleaning agent. Its popularity in this area is due to its nonflammability, ease of recovery for reuse and its compatibility with various fabrics. Cold cleaning and vapor degreasing of metals account for a small percentage of its use. Minor applications include various manufacturing and industrial practices as well as medicinal uses

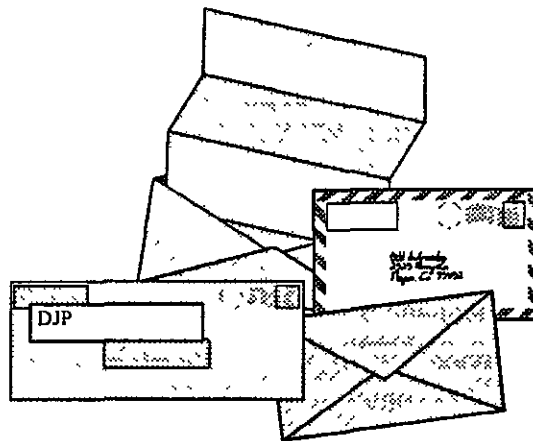
### PATHWAYS

PCE is relatively mobile in highly permeable soils and rock and other areas where there's a lot of rainfall. The solvent may evaporate from soil surfaces, but any portion not removed by volatilization may eventually migrate to groundwater. PCE detected in water wells generally evaporate and dissipate as it is pumped and blended in a water distribution system In areas where

rainfall is abundant, PCE may be flushed out of the groundwater lens more quickly. Based on hydrogeological data, groundwater flows to the Tumon Maui well from the Dededo and Harmon area.

### EFFECTS ON HUMANS

Laboratory tests have shown PCE to be cancer causing in rats and mice when exposed to high concentrations throughout their lifetime. Although cancer risk is based solely on studies performed by exposing PCE to laboratory animals throughout their lifetime, ingestion through drinking water is a route of exposure for humans.



### FOR INFORMATION CONTACT:

36 CE/CEV  
Unit 14007  
APO AP 96543-4007

(671) 366-5080 Voice  
(671) 366-5088 Fax

## Your Questions Answered

### Introduction

The Department of Defense is working to clean up the environment at military bases around the world. At any base, many different areas of possible contamination may need to be studied and cleaned up. How does the Department of Defense know where to begin?

The Department of Defense has developed a new way to set priorities for environmental cleanup at military bases. This process is called the Relative Risk Evaluation Process. It is used to rate areas on or near bases that contain chemicals or other dangerous materials that may be harmful to people or the environment. Each area (or "site") is evaluated and rated as having a high, medium, or low chance to harm humans or the environment. This rating is the site's Relative Risk. Sites with a higher Relative Risk are usually studied and cleaned up first.

This fact sheet explains the Relative Risk Evaluation Process, gives an example of how the process works, and tells you where to get more information.

### Why Is This Process Necessary?

In the past, we didn't know that everyday work at military bases could cause environmental problems. Some of the jobs that caused environmental problems were fueling, fuel storage, equipment upkeep, fire fighter training, and waste disposal. These jobs often caused chemicals to be released into the air, soils, groundwater, and surface water. One Air Force base may have 100 or

more sites of possible contamination that need to be studied. Some of these sites will be found to be harmless. Others will need to be watched closely to see if any environmental problems develop. Others will need to be cleaned up. Studying and cleaning up these sites is complicated, and it can take years.

The Relative Risk Evaluation Process puts each site into either the *High*, *Medium*, or *Low* Relative Risk category. That way, the high-risk sites can be studied and cleaned up first.

### How Does This Process Work?

First, three separate evaluations are conducted at each site, for (1) surface water, (2) groundwater, and (3) soil. Surface water is water that is above ground, such as lakes and streams. Groundwater is under the ground's surface, such as the water found in wells. Air is not studied separately, because air contamination usually comes from soil contamination.

During the evaluation process, three questions are asked. How much contamination exists? Is the contamination moving? Are there people or sensitive environments nearby? Answers to these questions are put together into a chart to find how much risk may be posed by the contamination.

The process gives three separate risk ratings for each site: one for surface water, one for groundwater, and one for soil. The overall Relative Risk rating for the site is the highest of the three ratings.



## ? What Questions Are Asked?

### Question 1: How Much Contamination Exists?

First, the contamination itself is studied. The level of contamination is compared to standard levels that are used to tell if cleanup is needed. For cancer-causing chemicals, the standard is based on the level that poses no more than a 1 in 10,000 risk of an additional case of cancer in the population. For chemicals that do not cause cancer, the standard is the daily exposure level below which scientists expect no harmful health effects.

The concentration of each chemical found at the site is divided by the standard concentration level to get a ratio. If there is more than one chemical at the site, the ratios for each chemical are added together. Depending on how large this number is, one of three ratings is assigned: *Significant* (over 100), *Moderate* (2-100), or *Minimal* (less than 2).

### Question 2: Is the Contamination Moving?

As contamination moves through the environment, people and animals in its path may become exposed.



Therefore, the ability of contaminants to move through the environment is an important factor in evaluating possible risk. For example, if fuel is spilled on hard clay soil, it may not move very far. In contrast, fuel spilled on sandy soils will move more quickly, and could reach surface water or groundwater used as a drinking water source.

In evaluating the likelihood for contamination to move away from a site, one of three ratings will be assigned. If contamination is moving through the environment, the site's rating for contaminant movement is *Evident*. If it could move or if more evidence is needed, its rating is *Potential*. If there is evidence that it cannot move away from the site, its rating is *Confined*.

### Question 3: Are People or Sensitive Environments Nearby?

This factor evaluates the likelihood of people, wildlife, or plants near the site becoming exposed to and harmed by the contamination. Again, one of three ratings is assigned.

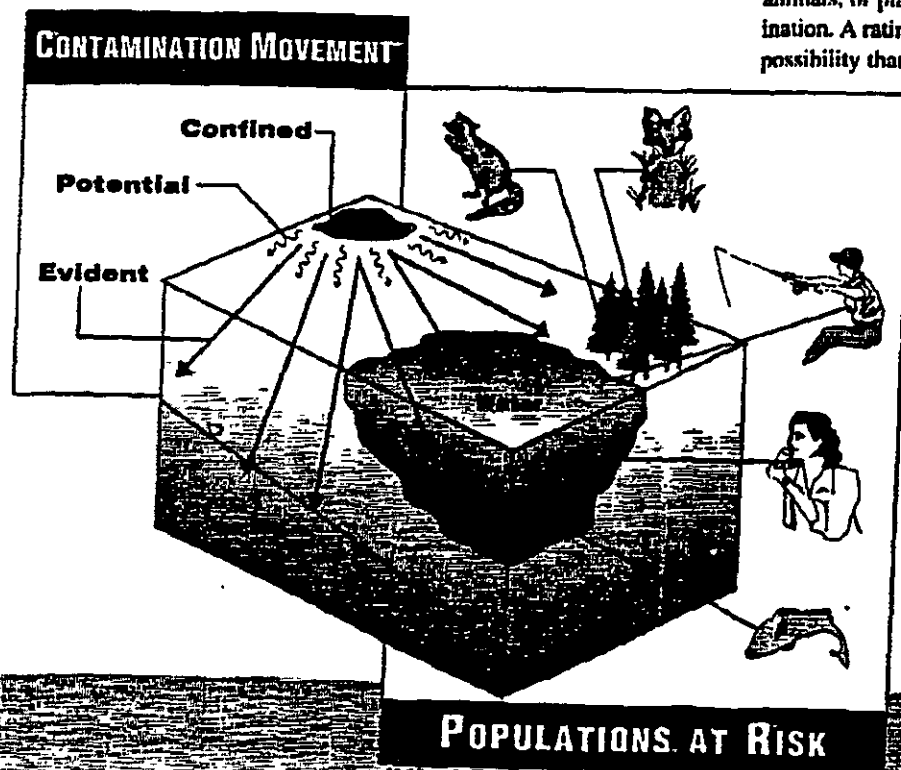


When evaluating soil or surface water, a rating of *Identified* is made if there are people, plants or animals that could come in direct contact with the contamination. A rating of *Potential* is made if it is possible that people, animals, or plants could come in contact with the contamination. A rating of *Limited* is made if there is little or no possibility that people, animals, or plants could come in contact with the soil or surface water.

For groundwater, a rating of *Identified* is made if there is a water supply well downgradient from the contamination. A rating of *Potential* is made if there isn't a water supply well downgradient from the contamination, but the groundwater could be used in the future for drinking or agriculture. A rating of *Limited* is made if there is no water supply well downgradient, and the water is not used for drinking or is not usable.

## ? What Happens To These Ratings?

The results of these three ratings are combined in a chart (see figure on page 3). This results in a rating of either *High*, *Medium*, or *Low*.





## The Relative Risk Evaluation Matrix

CONTAMINATION MOVEMENT	CHEMICAL HAZARD SIGNIFICANT			CHEMICAL HAZARD MODERATE			CHEMICAL HAZARD MINIMAL		
	HIGH	HIGH	MED	HIGH	HIGH	MED	HIGH	MED	LOW
E	HIGH	HIGH	MED	HIGH	HIGH	MED	HIGH	MED	LOW
P	HIGH	HIGH	MED	HIGH	MED	LOW	MED	LOW	LOW
C	MED	MED	LOW	LOW	LOW	LOW	LOW	LOW	LOW
	I	P	L	I	P	L	I	P	L
POPULATIONS AT RISK									

Because we are combining three factors in this chart, and not just two, we start by choosing which version of the chart we will use, based on how much contamination is present. If the chemical hazard rating is Significant, we use version 1. If it is Moderate, we use version 2. If it is Minimal, we use version 3.

We then find the square where the correct information about contamination movement and populations at risk meet. That square indicates the Relative Risk rating.

E = Evident  
P = Potential  
C = Confined  
I = Identified  
L = Limited

At the end of the process, each site has three separate ratings, one for groundwater, the second for soil, and the third for surface water. The highest risk rating becomes the overall rating for the entire site. For example, if a site has groundwater rated as *High*, and soil and surface water rated as *Low*, the overall Relative Risk for the entire site would be *High*.

### ? Can You Give Me An Example of How This Process Works?

Certainly. Let's say that the site we are examining is a fire fighter training area on base. For twenty years, fire fighters trained here, putting out practice fires fueled by waste oils, fuel, and solvents. These materials have contaminated the soil and groundwater. No one works there now, and a fence around the area keeps people out.

First, we conduct a groundwater Relative Risk evaluation.

**Chemical Hazard.** The groundwater near the fire training area contains benzene and vinyl chloride. In groundwater, benzene was found at levels up to 130 parts per billion. (Parts per billion is a unit of measurement used to express small quantities of chemicals in water, soil, or air. In this example, it means that there are 130 parts of benzene for every billion parts of water.) This amount is above the accepted standard for benzene of 39 parts per billion. By dividing 130 by 39, a ratio of 3.3 is identified for benzene. In groundwater, vinyl chloride was found at levels up to 2,000 parts per billion, which is above the accepted standard of 2 parts per billion. By dividing 2,000 by 2, a ratio of 1,000 is reached for vinyl chloride. Adding 3.3 to

1,000 results in a total of 1,003.3. Because this is above 100, the hazard level is *Significant*.

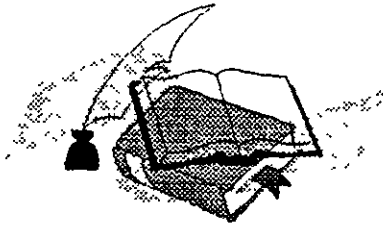
**Contamination Movement.** Monitoring wells placed around the site indicate that the contaminated groundwater is moving. Therefore, contamination movement is *Evident*.

**Populations at Risk.** There is a threatened water supply well downgradient from the fire fighter training area. Therefore, the possibility that contamination could reach people is *Identified*.

Putting all this information together into the Defense Department's chart produces a Relative Risk rating of *High* for groundwater. The same process will be completed for soil and for surface water, but we already know that the fire fighter training area has an overall Relative Risk rating of *High*, because the overall site rating is always equal to the highest rating assigned at that site.

### ? What Happens Next?

Every site on base that may be contaminated is evaluated using this system. Relative Risk is one factor used to decide which sites will be studied and cleaned up first. Other factors include regulatory agreements and other risk related studies, such as risk assessments and public health assessments which identify and evaluate risks to public health and/or the environment from potential exposure to contamination. The focus will always be on cleaning up the most potentially harmful sites first to protect people living or working nearby and the environment.

**FOR MORE INFORMATION**

**Information Contact**  
**Marriane Miclat**  
**Community Relations Coordinator**  
**36 CE/CEV**  
**(671) 366-5080 VOICE**  
**(671) 366-5088 FAX**

Anyone interested in learning more about environmental restoration issues at Andersen Air Force Base should visit one of the information repositories listed below. They contain materials about environmental cleanup programs at Andersen AFB.

**NIEVES M. FLORES MEMORIAL LIBRARY**  
254 Martyr Street  
Agana, Guam 96910  
(671) 472-6417 or  
(671) 472-8264

**UNIVERSITY OF GUAM**  
Federal Documents Dept.  
RFK Library  
UOG Station  
Mangilao, Guam 96923  
(671) 734-2482

---

**ANDERSEN AIR FORCE BASE, GUAM**  
36 CE/CEVR  
Unit 14007  
APO AP 96543-4007  
Attn: Community Relations Coordinator, IRP

## **OPERABLE UNITS**

---

- **Andersen AFB Operable Units (OUs):**

- **OU 1 is directed towards the soils and waste materials at sites in the vicinity of the base active landfill.**
- **OU 2 is directed towards the groundwater underlying the Main Base, Northwest Field, MARBO Annex, and Harmon Annex.**
- **OU 3 is directed towards the soils and waste materials at sites in the MARBO Annex.**
- **OU 4 is directed towards the soils and waste materials at sites within the Groundwater Protection Zone (GWPZ).**
- **OU 5 is directed towards the soils and waste materials at sites outside the GWPZ.**
- **OU 6 is the basewide OU designed to cover the addition of any new sites that might be found, and to summarize the results of all other OUs.**

## STATUS OF INVESTIGATION

### ■ OU 1 - Three sites are being investigated.

- The following activities are in progress:

- Site reconnaissance/inventory
- Geophysical surveys

- The following activities will follow:

- Test ditch excavations
- Soil gas surveys
- Test pit excavations
- Soil sampling
- Habitat survey

### ■ OU 2

- Groundwater monitoring wells are being drilled in the MARBO Annex. Thirteen of the new wells have been drilled.
- Water level measurements have been collected several times across the Main Base, North West Field, MARBO Annex, and Harmon Annex. Subsequent water level maps are being generated.

## **STATUS OF INVESTIGATION** (continued)

- A round of groundwater samples will be collected from existing monitoring and production wells in the near future.

### ■ **OU 3**

- Planned investigative activities have been performed at all OU 3 sites.
- Awaiting laboratory analytical data.

### ■ **OU 4 and OU 5**

- Work plans and Sampling and Analysis Plans have been finalized.
- There are no field activities in progress at this time.

### ■ **OU 6**

- Natural resource survey has been completed.
- Records search has been performed. Documentation of the findings are being finalized.

## **STATUS OF INVESTIGATION** (continued)

---

- **Expanded Source Investigation (ESI) has been completed. The ESI was done to identify solid waste management units (SWMUs) and potential areas of concern that might be candidates for inclusion in the Remedial Investigation/Feasibility Study (RI/FS). Documentation of the findings are being finalized. SAPs are being prepared to further investigate SWMUs and potential areas of concern.**
- **Background Soil Sampling Plan has been submitted to Guam EPA and USEPA for review.**

## **ACTIVITY: EXPLORATORY TEST DITCH EXCAVATIONS**

---

**PURPOSE:** - To visually determine the edge of buried waste areas after geophysical surveys

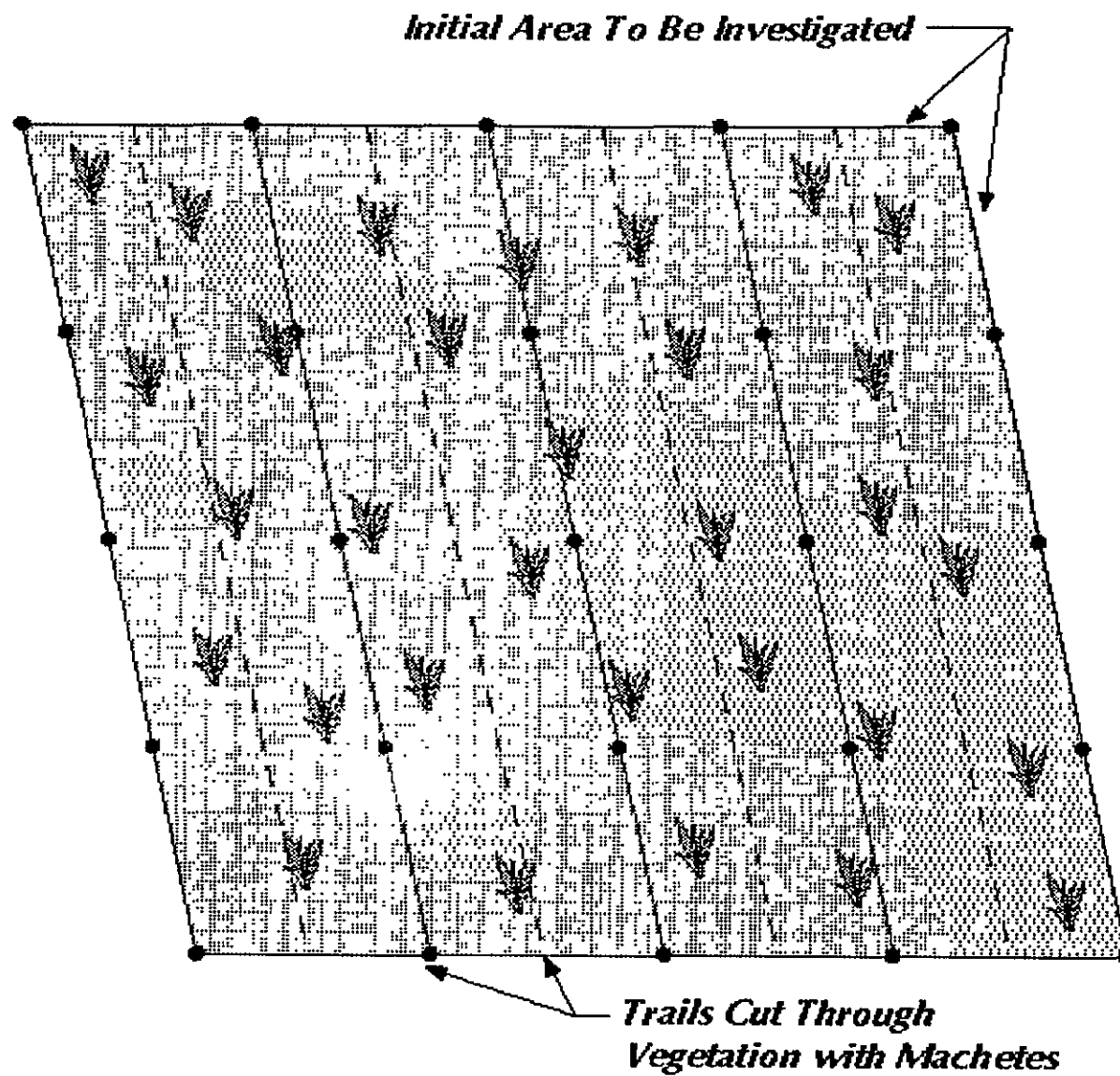
- PROCEDURE:**
- 1) Begin outside burial area, and dig a SHALLOW ditch using a backhoe until waste is encountered.
  - 2) Mark and record edge of waste.
  - 3) Excavate ditches as required around area perimeter.

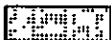


## **ACTIVITY: SOIL GAS SURVEYS**

**PURPOSE:** - To evaluate the near subsurface for volatile organic compounds (VOCs) contamination

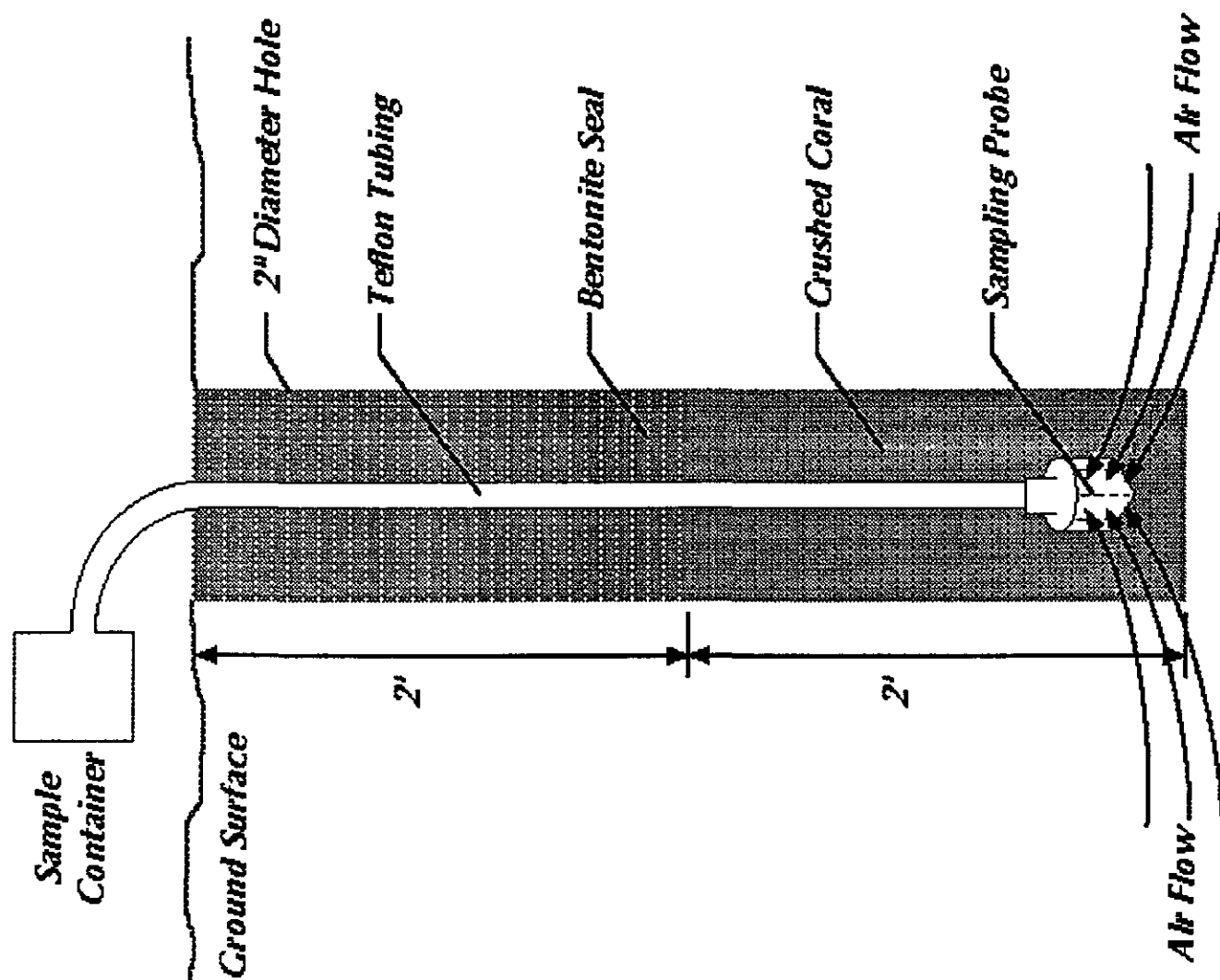
- PROCEDURE:**
- 1) Perform soil gas survey on 100-foot grid (for large, wide areas), or on 50-foot linear pattern (for long, narrow areas).
  - 2) Analyze samples for VOCs.
  - 3) Define "hot spot" if initial survey yields significant positive results.
  - 4) Confirm the negative" with a second round of samples if none of the initial samples yield significant positive results.





-  *Thicker Vegetation*
-  *Thinner Vegetation*
-  *Initial Soil Gas Sampling Point*

## Soil Gas Sampling Well



## **ACTIVITY: TEST PIT EXCAVATIONS**

---

- PURPOSE:**
- To characterize contents of buried waste areas
  - To provide access for subsurface sampling

- PROCEDURE:**
- 1) Prioritize locations for test pits using geophysics, test ditch, and soil gas survey results, and Remedial Project Manager (RPM) input.
  - 2) Dig a test pit through the waste as deep as possible at the selected locations.
  - 3) Collect a subsurface soil sample from the bottom of the test pit. Also collect samples of potential hazardous waste.

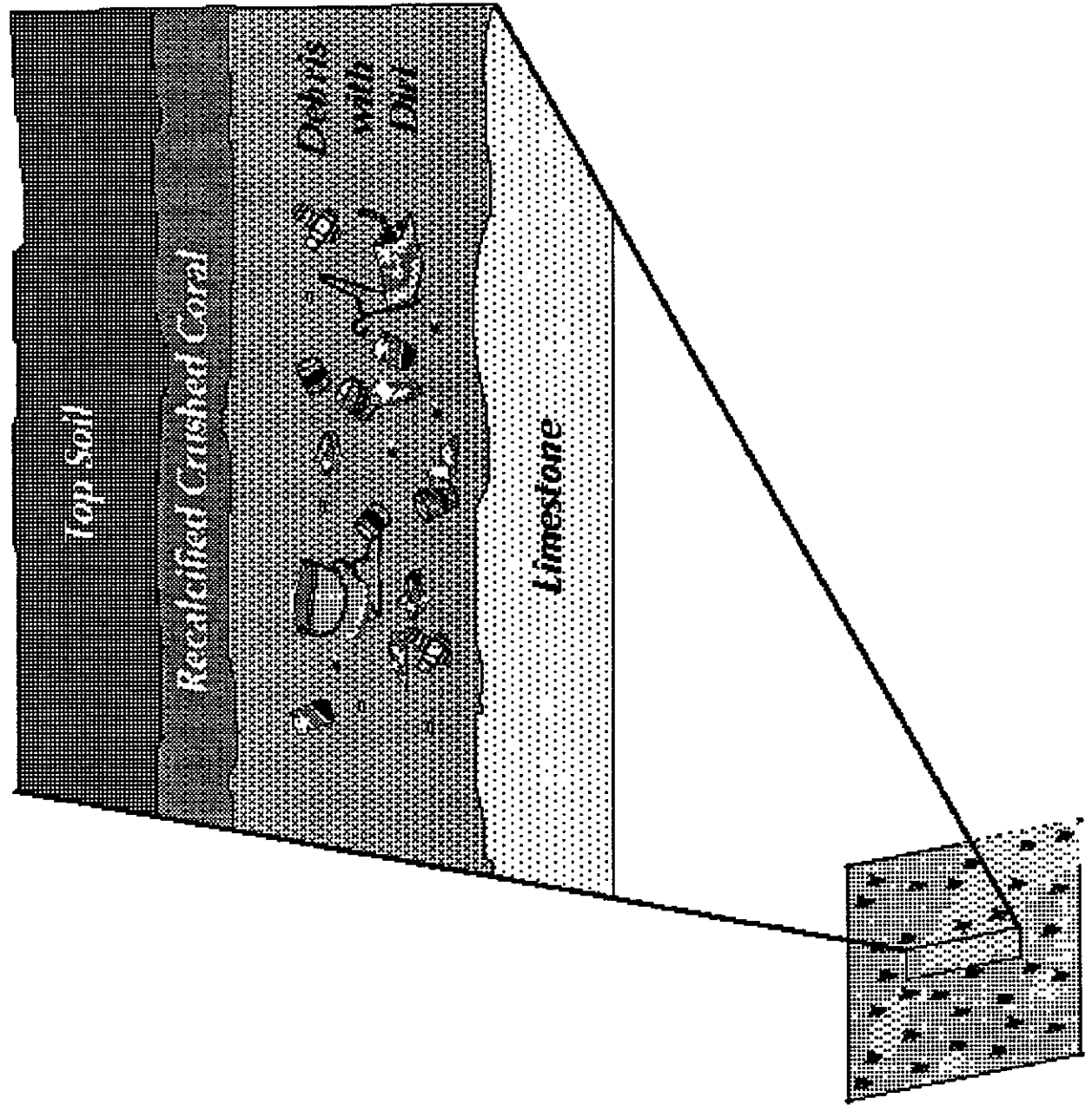
## **ACTIVITY:      GEOPHYSICAL SURVEYS**

---

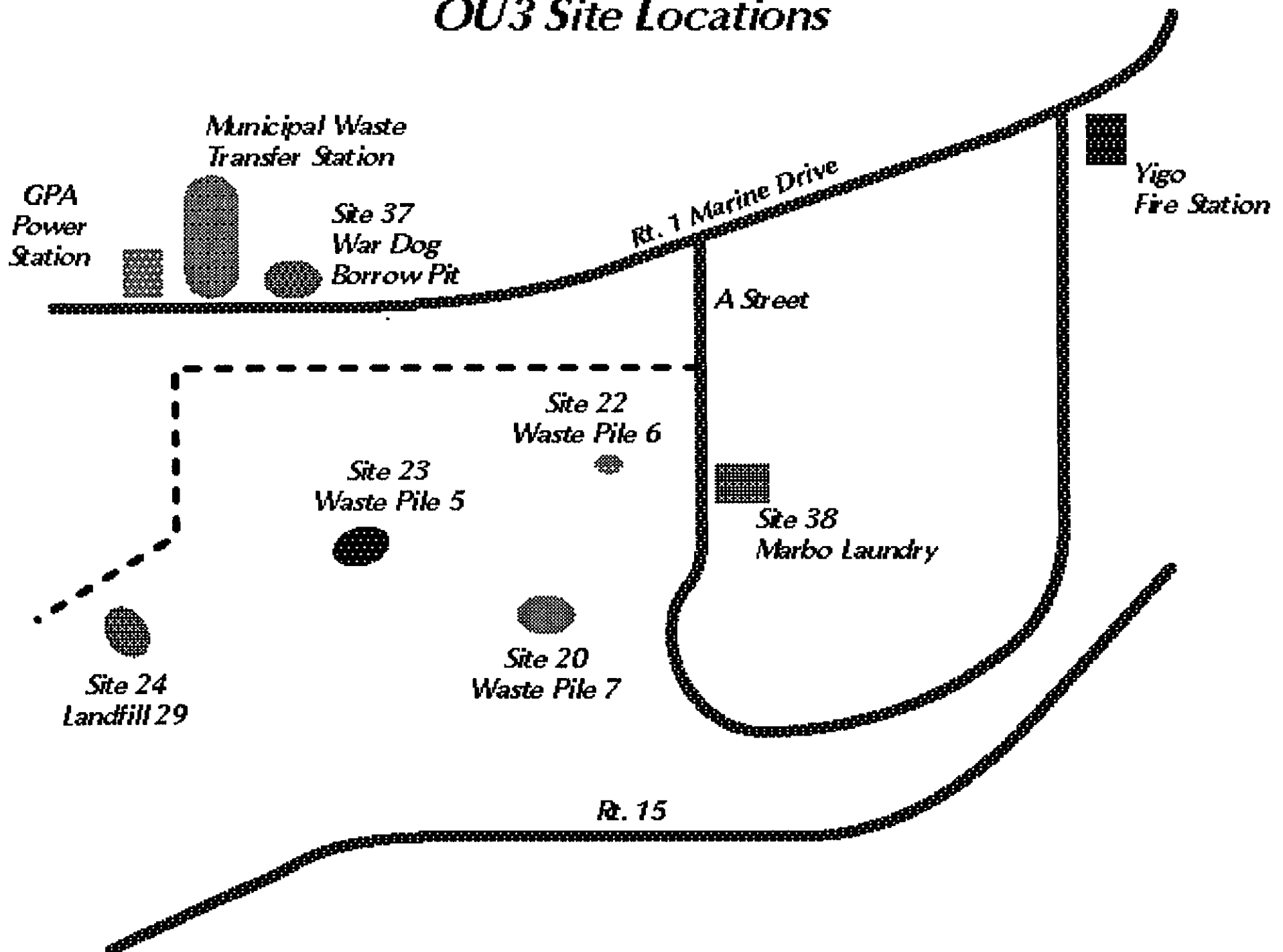
- PURPOSE:**
- To determine the horizontal extent of buried waste at fill areas
  - To aid in locating buried metallic objects

- PROCEDURE:**
- 1) Measurements at 10-foot intervals along recon lines/trails.
  - 2) Plot values on topographic map and contour to identify anomalies.
  - 3) Geophysical technique used is by electromagnetic or natural potential.

## Example Test Pit Cross-Section



# OU3 Site Locations



## **OU 3 PRELIMINARY RESULTS**

### **■ Site 37 - War Dog Borrow Pit**

- Soil gas survey showed no VOC detections.
- Surface soil samples were collected across the quarry floor.
- Test ditches revealed a 2.3-acre landfill under the floor of the quarry. The waste encountered was mostly rusty automobile parts.
- Test pits were excavated through the buried waste.
- Subsurface soil samples were collected from the test pits.

### **■ Site 22 - Waste Pile 6**

- Site inventory revealed a waste pile of about 100 drums of asphalt.
- Soil gas survey showed no VOC detections.
- Surface soil samples were collected around and under the pile of drums.
- Test ditches showed scattered metal debris mixed in with the soil.
- Test pits were excavated through the soil to bedrock.
- Subsurface soil samples were collected from the test pits.

## **OU 3 PRELIMINARY RESULTS** (continued)

### **■ Site 20 - Waste Pile 7**

- Soil gas survey showed no VOC detections.
- Test ditches revealed a 1.7-acre landfill containing mostly construction debris (concrete slabs) and metal debris. Several empty, crushed drums were also encountered.
- Test pits were excavated through the buried waste. Several of the test pits were located in areas where empty, crushed drums were observed.
- Subsurface samples were collected from the test pits.
- Surface soil samples were collected across the landfill.

### **■ Site 38 - MARBO Laundry**

- Records search data showed that a dry cleaning room was operated in the laundry building from 1970-1973. The records also suggest that dry cleaning fluids may have been discharged into the sanitary sewer system.
- Soil gas survey showed very low levels of VOCs were present under and around the building mostly in areas covered with concrete or asphalt.
- Surface soil samples were collected around the building.



## **OU 3 PRELIMINARY RESULTS (continued)**

### **■ Site 23 - Waste Pile 5**

- Soil gas survey showed no VOC detections.
- Test ditches revealed the presence of a 2.2-acre landfill containing eight waste disposal trenches. The waste encountered was mostly glass bottles and metal debris.
- Test pits were excavated through the buried waste.
- Subsurface soil samples were collected from the test pits.
- Surface soil samples were collected along the trenches.

### **■ Site 24 - Landfill 29**

- Soil gas survey showed no VOC detections.
- Test ditches revealed a 2.8-acre landfill containing mostly glass bottles and metal debris. Several empty, crushed drums were also encountered.
- Test pits were excavated through the buried waste. Several of the test pits were located in areas where empty, crushed drums were observed.
- Subsurface samples were collected from the test pits.
- Surface soil samples were collected across the landfill.

**FINAL PAGE**

**ADMINISTRATIVE RECORD**

**FINAL PAGE**