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## FACSIMILE COVER PAGE

To: Deirdre Nurre  
Time: 15:35:04  
Pages (including cover): 4

From: Michael A. West  
Date: 5/12/95

Deirdre -

Thanks for meeting with me last week on ALC environmental issues which are more relevant today. Attached is a cleaned up copy of the table I provided with the biological subelement comparison included--I must have copied over it when I put in the headers which is one of the perils of modern word processing. I am also faxing over copies of the ALC compliance funding figures contained in last year's DOD Environmental Compliance Report to Congress--none of which seem to correspond to those contained in the various base questionnaires. This discrepancy and the inconsistent manner compliance costs are captured and arrayed is troubling. I recognize that projecting compliance costs poses serious challenges to DOD and the installations, but there should be a more consistent and credible way of doing this--it is hard to believe that these costs will decline in the foreseeable future.

We will be providing additional information as the process moves forward. Let me know if there is anything I can do to clarify or elaborate on the issues that have been raised.

Thanks

Mike West

**ENVIRONMENTAL DATA FROM  
BASE QUESTIONNAIRE  
15 February 1995**

Environmental Issue	Warner-Robins Robins AFB	Oklahoma City Tinker AFB	Sacramento McClellan AFB	Ogden Hill AFB	San Antonio Kelly AFB
Recent Violations				RCRA	Clean Air Act
Clean Air Act	Attainment	Attainment	Nonattainment Area for: Ozone - Serious (EPA is proposing "severe" classification) CO - Moderate PM-10 - Moderate; California has BACT/LAER emissions thresholds that exceed Federal standards; State requires permits for AGE equip.	Nonattainment Area for Ozone - Moderate	Attainment, but getting close on Ozone
Water Availability	No constraints on base water supply	No constraints on base water supply	No constraints on base water supply	No constraints on base water supply	Quantity constraints and seasonal shortages/ESA suit and water availability could constrain future operations
Groundwater Contamination	Yes - but does not affect a potable water source	Yes - but does not affect potable water source - 4 wells closed due to proximity to contamination	Yes and effects potable water sources - 15 of 385 wells closed	Yes - but not to drinking water supply	Yes and affects potable water source
Clean Water Act	No discharge violations or open enforcement actions	No discharge violations or open enforcement actions	No discharge violations or open enforcement actions	No discharge violations or open enforcement actions	No discharge violations or open enforcement actions

ENVIRONMENTAL DATA FROM BASE QUESTIONNAIRE 15 February 1995					
Environmental Issue	Warner-Robins Robins AFB	Oklahoma City Tinker AFB	Sacramento McClellan AFB	Ogden Hill AFB	San Antonio Kelly AFB
Asbestos	38% of facilities have asbestos, but none friable	No facilities surveyed for asbestos	75% of facilities surveyed (60% of total) have asbestos and 4 facilities considered regulated areas	39% of facilities have asbestos, but not friable	60% of facilities have asbestos, but not friable
Biological	5 Threatened and Endangered Species, but no Special Concern Species or critical/sensitive habitat identified on base--do not constrain current or future construction activities or operations	1 Threatened Species and 4 Special Concern Species; no critical/sensitive habitats identified on base--do not constrain current or future construction, activities or operations	5 Endangered species and 9 Special Concern Species and 15 acres of critical/sensitive habitat identified on base--do not constrain current or future construction, activities or operations	No Threatened or Endangered or Special Concern Species or critical/sensitive habitat identified on bases	No Threatened or Endangered or Special Concern Species or critical/sensitive habitat identified on bases
Wetlands	2482 acres, but do not constrain current operations	1 acre and does not constrain current or future operations	300 acres, but do not constrain current or future operations	123 acres, but do not constrain base operations	18 acres and constrain future construction within 600 area
Cultural	No NRHP facilities on base, but some potential candidates; archeological sites and Native American sites identified	No NRHP facilities on base, but several eligible properties; no archeological sites or Native American sites identified	1 district on NRHP, no more are candidates; no archeological sites	Some archeological sites, but none on or nominated for Historic Landmarks	No NRHP properties on base, but some are potential candidates. No archeological sites
Environmental Cleanup	2 NPL sites with 33 IRP sites, but none extending off base; 16 RCRA sites	NPL with 36 IRP sites with 2 sites extending off base; 31 RCRA sites	NPL with 258 IRP sites with none extending off-site	NPL with 88 sites with 14 extending off base. 7 RCRA sites	Only ALC not on NPL, but have 52 IRP sites with 9 extending off bases

ENVIRONMENTAL DATA FROM BASE QUESTIONNAIRE 15 February 1995					
Environmental Issue	Warner-Robins Robins AFB	Oklahoma City Tinker AFB	Sacramento McClellan AFB	Ogden Hill AFB	San Antonio Kelly AFB
Environmental Cleanup Costs through FY 2000	\$88.5 M	\$159.7 M	\$372.4 M - All remediation to be completed by 2079	\$135.1 M - All remediation to be completed by 2008	\$148.1 M - All remediation to be completed by 2000
Environmental Compliance Costs through FY 2000	\$36.3 M	\$105 M	\$41.4 M	\$22.8 M	\$61.6 M

## APPENDICES

The Defense Environmental Quality Annual Report to Congress for Fiscal Year 1994 contains eight appendices. The appendices are:

### **Appendix A      Who to Contact**

This appendix lists the points of contact in DoD's Environmental Quality and Environmental Technology Offices. A contact name is provided for each of the elements of the environmental quality program.

### **Appendix B      Acronyms**

This appendix lists acronyms used throughout this report and their definitions.

### **Appendix C      Key U.S. Environmental Laws Relevant to the Office of the Deputy Under Secretary of Defense for Environmental Security**

This appendix lists the major environmental laws, executive orders, and international agreements that were considered in the preparation of this report. The list is by no means exhaustive; rather, it includes the laws, executive orders, and international agreements that are most relevant to DoD's environmental quality program. This listing is organized according to elements of the environmental quality program.

### **Appendix D      Defense Environmental Quality Program Personnel by DoD Component**

This information is not included in this report but will be provided at a later date.

### **Appendix E      Defense Environmental Quality Program Personnel by State**

This information is not included in this report but will be provided at a later date.

### **Appendix F      Defense Environmental Quality Program Funding by DoD Component**

This appendix presents the Defense Environmental Quality Program funding requirements for fiscal year 1996 through fiscal year 2000, with tables organized by DoD Component. Funding information is provided for the following program elements: pollution prevention, compliance, and conservation. Funding information for Technology is not included.

### **Appendix G      Defense Environmental Quality Program Funding by State**

This appendix presents the Defense Environmental Quality Program funding requirements for fiscal year 1996 through fiscal year 2000, with tables organized by state. Funding information is provided for the following program elements: pollution prevention, compliance, and conservation. Funding information for Technology is not included.



# APPENDIX G

## DEFENSE ENVIRONMENTAL QUALITY PROGRAM FUNDING REQUIREMENTS BY STATE

### STATE SUMMARY

	F I S C A L Y E A R				
	96	97	98	99	00
ALABAMA	27,111	21,680	19,283	18,788	19,685
ALASKA	41,865	39,093	28,569	27,454	27,617
ARKANSAS	10,168	9,645	5,969	6,876	7,797
ARIZONA	18,821	15,782	18,567	19,397	20,200
CALIFORNIA	281,637	247,186	237,269	249,345	242,347
COLORADO	34,482	21,851	20,029	20,462	20,290
CONNECTICUT	19,127	20,801	19,345	19,658	27,428
DELAWARE	1,800	3,262	3,276	3,388	2,683
DISTRICT OF COLUMBIA	171,758	234,626	133,144	104,906	110,136
FLORIDA	102,406	100,147	97,729	109,538	101,403
GEORGIA	82,289	76,888	73,671	71,506	73,569
GUAM	33,824	15,063	15,577	15,230	15,153
HAWAII	65,490	89,771	69,755	67,355	93,634
IDAHO	4,796	4,715	2,902	3,563	3,843
ILLINOIS	37,191	33,512	29,279	29,279	26,649
INDIANA	12,990	11,726	10,409	11,794	9,031
IOWA	2,032	1,641	1,235	4,125	2,763
KANSAS	21,698	19,135	20,479	20,173	21,364
KENTUCKY	28,351	23,805	22,661	22,377	21,991
LOUISIANA	34,417	31,001	27,678	28,271	28,389
MAINE	11,666	13,968	13,478	27,764	13,862
MARYLAND	113,618	105,128	99,784	96,133	98,330
MASSACHUSETTS	15,649	12,524	11,277	11,429	11,865
MICHIGAN	88,795	81,523	71,169	55,049	54,211
MINNESOTA	4,239	6,519	3,632	4,434	4,732
MISSISSIPPI	8,591	8,123	7,458	8,814	9,268
MISSOURI	14,719	30,410	25,564	19,857	16,721
MONTANA	522	461	358	554	628
NORTH CAROLINA	100,231	56,866	63,634	65,421	66,455
NORTH DAKOTA	4,300	4,205	4,350	4,576	4,378
NEBRASKA	5,382	2,378	2,882	3,111	3,244
NEVADA	15,157	13,042	11,913	12,498	12,546
NEW HAMPSHIRE	685	712	1,601	1,928	2,063
NEW JERSEY	21,041	16,838	14,615	13,868	13,429
NEW MEXICO	16,591	14,771	13,815	14,134	14,028

### DEFENSE ENVIRONMENTAL QUALITY FUNDING REQUIREMENTS BY STATE (\$000)

TABLE G - 1 CONTINUED

STATE SUMMARY	F I S C A L Y E A R				
	96	97	98	99	00
	NEW YORK	16,606	17,681	12,452	12,901
OHIO	23,911	20,932	24,101	24,769	25,348
OKLAHOMA	37,411	30,781	40,863	39,801	40,362
OREGON	990	1,061	877	1,203	1,325
PENNSYLVANIA	31,165	26,247	25,346	25,474	23,109
PUERTO RICO	23,113	16,937	15,519	16,565	16,349
RHODE ISLAND	7,913	5,876	8,000	5,930	5,838
SOUTH CAROLINA	27,468	27,040	28,989	29,337	30,119
SOUTH DAKOTA	1,433	1,270	1,300	1,495	1,586
TENNESSEE	17,657	14,735	17,542	18,354	18,098
TEXAS	99,195	97,480	85,817	88,429	85,857
UTAH	21,010	20,025	18,668	19,596	19,652
VERMONT	458	493	2,065	2,379	2,512
VIRGINIA	353,120	344,091	319,983	319,472	319,575
VIRGIN ISLANDS	544	570	445	701	798
WASHINGTON	71,623	56,009	55,181	55,216	64,179
WEST VIRGINIA	954	996	822	1,161	1,273
WISCONSIN	9,396	8,739	10,318	10,845	11,061
WYOMING	3,692	3,550	3,445	3,767	3,943
<b>TOTAL</b>	<b>2,201,098</b>	<b>2,083,311</b>	<b>1,874,089</b>	<b>1,870,450</b>	<b>1,885,930</b>

**DEFENSE ENVIRONMENTAL QUALITY  
FUNDING REQUIREMENTS BY STATE (\$000)**

4.11.95

To: Commissioner Benjamin Montoya  
From: Deirdre Nurre, Interagency Team Environmental Analyst  
Through: Ben Borden, Director of Review and Analysis  
RE: DRAFT Costs of Compliance and Costs of Cleanup for Air Force Logistic Centers (ALCs)

You requested me to provide data on costs of compliance and costs of cleanup for Air Logistic Centers. The following draft response presents such information budgeted for the Air Force Bases hosting ALCs for Fiscal Year 1995.

My analysis of compliance costs derives from the comprehensive base questionnaires which were answered at the base level. The questionnaires permitted individual bases some flexibility in categorizing environmental compliance costs. Thus, comparing costs from one base to another cannot be done with much specificity. Environmental cleanup costs for ALC bases were submitted to the Commission by the Base Closure Executive Group.

#### ENVIRONMENTAL COMPLIANCE BUDGET AT ALC BASES FOR FY95

ALCs	Haz Waste Disposal	Natural Resources	Permits	General - Est.
Hill	\$ 1,300,000.00	\$ 784,000.00	\$ 175,000.00	\$ 1,863,000.00
Robins	1,500,000.00	176,000.00	498,000.00	7,730,700.00
Tinker	5,653,000.00	630,000.00	105,000.00	15,876,000.00
Kelly	2,384,000.00	0-	0-	1,232,000.00
McClellan	1,321,000.00	112,000.00	158,000.00	4,416,000.00

#### ENVIRONMENTAL CLEANUP BUDGET AT ALC BASES

ALCs	Year Complete	Costs to FY94-Actual	Costs FY95 to Complete-Est.
Hill	2050	\$ 110,000,000.00	\$ 235,858,000.00
Robins	2011	1,512,000.00	71,938,000.00
Tinker	2023	36,600,000.00	249,007,000.00
Kelly	2023	95,000,000.00	181,949,000.00
McClellan	2034	130,661,000.00	705,446,000.00

## **I. Environmental Compliance Costs:**

**Hazardous Waste Disposal/Remediation:** This figure includes costs of storing, treating, and disposing of hazardous and toxic wastes, as well as immediate spill response activities. This figure could vary from one year to the next according to the kinds of waste-producing industrial activities and status of storage compliance efforts which increase or decrease from year to year.

**Natural Resources:** This figure funds the base's natural resources management plan, wetlands inventory, forest survey, and timber management including the planting of new trees as needed. The figure varies from one base to another depending upon natural factors such as existence of wetlands and endangered species, and could vary over time depending upon scheduled requirements to complete surveys and inventories.

**Permits:** Funds identified in this category pay for permits including National Pollution Discharge Elimination System (NPDES) Permits for wastewater, permits for stormwater runoff, and operating permits established under Title V of the Clean Air Act. Note that the amounts identified purchase the permits and do not pay for cost of compliance with permits. The cost of one permit at one base was estimated; all other permits costs reported are reflected in the base questionnaire.

**General:** This category groups a number of cost categories together for purposes of this brief analysis, because the Air Force environmental offices which submitted data identified their compliance costs in categories which were not comparable. Among the activities grouped under this category may include, but are not limited to:

- Underground Storage Tank (UST) survey and remedial work
- Resource Conservation and Recovery Act (RCRA) costs for spill control plans, spill control supplies, and compliance training
- National Environmental Policy Act (NEPA) costs for completion of Environmental Impact Statements
- Compliance with air, NPDES, and stormwater permits
- Capital purchases for pollution control equipment such as air scrubbers, etc.

## **II. Cleanup Costs:**

Costs to complete cleanup are estimates which could change depending upon several factors. Additional contamination discovered as investigation and cleanup proceeds, contaminated areas which prove not to be as extensive as initially estimated, and changing costs of developing technologies for investigation and cleanup could increase or decrease estimated costs. In general, the earlier a base is in the Remedial Investigation/Feasibility Study (RI/FS) process, the more uncertain is the knowledge of contamination, and the less accurate is cost to completion.

Col. Ken Marshall

3/22/95.

re: Depot sheets -

Are there actual <sup>budget</sup> requests of \$ & actual costs?  
what might be the diff's?

When do the numbers come from? Why 5 years?

Budget requests -  
or actual estimated costs.

What would go into IRP site data to cause depots to vary in cost?

Local cleanup costs  
# IRP sites - how would this affect?  
Particular stage of the process you're at  
How many diff. types of activities are going on simultaneously  
Types of contamination or variety of types of contamination.

DERA - is forced -

we don't use DERA overseas -  
uncont spills - compliance -

Congress appropriates

env. rest. Dept transfer to OSD

services come in to OSD

added up in services.

In Budget

AF asks for DERA funding -

Navy -

Army -

"Bottom up"  
kind of review

~~Board~~

Tank: pull a tank - 12/22/93 - all tanks tested etc by this time - Broad indicators

Cont operations

Col. Ron Marshall.

3/22/95

Robins - lines (from environ. questionnaire.)

- 1 - cont day disposal / spill response
  - 2 - IRP - sludge lagoon, landfill ops/excavation -
  - 3 - Nat'l resources inst plan, wetlands inventory, forest survey, saleable timber, planting trees
  - 4 - Title V permit fee pd to Georgia - pay for permit app which requires ~~sample~~ sampling, etc.
  - 6 - Compliance, Gen.
  - 8 - NEPA compliance, etc.
  - 9 - RCRA hazardous materials - current activities not cleanup related. spill plans, training, etc
  - 10 - Spills - supply costs for spills (not cat. 1)
  - 11 - USTs -
- you don't pay for <sup>cleanup activities</sup> ~~the~~ diff. under ~~RCRA~~ RCRA or CERCLA.

## 1995 AIR FORCE BASE QUESTIONNAIRE

### Robins AFB - AFMC

#### 13. Environmental Cleanup - Installation Restoration Program (IRP) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

- VIII.13.A A preliminary assessment of the installation has been performed.
- VIII.13.A.1 33 IRP sites have been identified
- VIII.13.A.2 No IRP sites extend off base.
- VIII.13.A.3 All on-site remediation is estimated to be in place in 2002
- VIII.13.B The installation is a National Priority List (NPL) site or has been proposed as an NPL site.
- VIII.13.C Federal Facility Agreements to clean up the base are in place.

Federal Facility Agreements include Interagency Agreements, Administrative Orders of Consent, and other agreements.

- VIII.13.D There reported or known uncontrolled or unregulated occurrences of specific contaminate types and sources.
- VIII.13.E There are sites or SWMUs currently being investigated and remediated pursuant to RCRA corrective action.

SWMU - Solid Waste Management Units  
RCRA - Resource Conservation and Recovery Act

- VIII.13.E.1 16 sites are being investigated and remediated.
- VIII.13.F The IRP currently restricts construction (siting) activities/operations on-base.

#### 14. Compliance / IRP Costs (\$000)

Expenditure Category	Current FY	FY + 1	FY + 2	FY + 3	FY + 4
Hazardous Waste Disposal/Remediation	\$1,500.000 K	\$2,325.000 K	\$1,325.000 K	\$1,330.000 K	\$1,380.000 K
IRP	\$17,300.000 K	\$22,835.300 K	\$24,873.600 K	\$19,276.300 K	\$4,262.300 K
Natural Resources	\$176.000 K	\$0.000 K	\$0.000 K	\$0.000 K	\$0.000 K
Other(s) Specify: AIR QUALITY Title V permit - permit fees	\$432.000 K	\$157.000 K	\$83.000 K	\$391.000 K	\$37.000 K
Other(s) Specify: ASBESTOS/LEAD	\$243.000 K	\$265.000 K	\$290.000 K	\$295.000 K	\$300.000 K
Other(s) Specify: COMPLIANCE, GENERAL	\$2,961.000 K	\$2,642.500 K	\$2,696.500 K	\$2,720.500 K	\$2,832.000 K
Other(s) Specify: CULTURAL RESOURCES	\$63.700 K	\$110.000 K	\$60.000 K	\$60.000 K	\$60.000 K
Other(s) Specify: ENVIRONMENTAL ASSESSMENTS	\$120.000 K	\$200.000 K	\$400.000 K	\$400.000 K	\$400.000 K
Other(s) Specify: RCRA/HAZARDOUS MATERIALS	\$180.000 K	\$225.000 K	\$175.000 K	\$200.000 K	\$75.000 K
Other(s) Specify: SPILLS - spill materials supply costs	\$505.000 K	\$810.000 K	\$680.000 K	\$680.000 K	\$655.000 K
Other(s) Specify: USTs	\$282.800 K	\$430.000 K	\$0.000 K	\$0.000 K	\$51.000 K
Other(s) Specify: WATER/WASTEWATER	\$3,504.900 K	\$266.000 K	\$66.000 K	\$66.000 K	\$66.000 K

*Scrubbers - might go with industrial*  
~~from new~~  
*medical waste incin. scrubber -*  
*could be compliance cost -*  
*pollution prevention \$\$\$ - kinds of*  
*initiative compliance things ->*

*Are 1 & 2 conducted under RCRA or CERCLA?*

*Diff betw. 1 & 2?*  
*What do you spend 3 on?*  
*Why does 4 go up & down? What does 4 include?*  
*What does 5 include - inspection, repair, both?*  
*What's in 6?*  
*What's in 8 only is it separate?*  
*What's in 9? Does it include cleanup or what?*

*Count FY \$: 613*  
*Project & clean*  
*sewer lines - to*  
*open stormwater -*  
*stormwater permit ->*  
*NPDES*

*Why is 11 split -*  
*Can't you use*  
*compliance \$\$\$?*

*9 rec'tfy'g spill*  
*plans - training -*  
*not related*  
*to disposal.*

# 1995 AIR FORCE BASE QUESTIONNAIRE

## Robins AFB - AFMC

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VIII.13.B The installation is a National Priority List (NPL) site or has been proposed as an NPL site.

VIII.13.C Federal Facility Agreements to clean up the base are in place.

Federal Facility Agreements include Interagency Agreements, Administrative Orders of Consent, and other agreements.

VIII.13.D There reported or known uncontrolled or unregulated occurrences of specific contaminate types and sources.

Contaminate types and sources include landfills, medical wastes, radioactive wastes, etc.

VIII.13.E There are sites or SWMUs currently being investigated

SWMU - Solid Waste Management Units  
RCRA - Resource Conservation and Recovery Act

VIII.13.E.1 16 sites are being investigated and remediated.

VIII.13.F The IRP currently restricts construction (siting) activities

*For purposes of my table, I'll say that 66,000 out of "water/waste water" is permits + the rest \$\$ for sewer line project.*

$$\begin{array}{r}
 3504900 \\
 - 66000 \\
 \hline
 3438900
 \end{array}
 \rightarrow
 \begin{array}{r}
 432000 \text{ air perm} \\
 + \\
 66000 \text{ H}_2\text{O perm} \\
 \hline
 498000
 \end{array}$$

### 14. Compliance / IRP Costs (\$000)

VIII.14.A Expenditure Category	Curr				
Hazardous Waste Disposal/Remediation	\$1,100,000				
IRP	\$17,000				
Natural Resources	\$1,000				
Other(s) Specify: AIR QUALITY	\$4,000				
Other(s) Specify: ASBESTOS/LEAD	\$2,000				
Other(s) Specify: COMPLIANCE, GENERAL	\$2,900				
Other(s) Specify: CULTURAL RESOURCES	\$0				
Other(s) Specify: ENVIRONMENTAL ASSESSMENTS	\$1,000				
Other(s) Specify: RCRA/HAZARDOUS MATERIALS	\$180.000 K	\$225.000 K	\$175.000 K	\$200.000 K	\$75.000 K
Other(s) Specify: SPILLS	\$505.000 K	\$810.000 K	\$680.000 K	\$680.000 K	\$655.000 K
Other(s) Specify: USTs	\$282.800 K	\$430.000 K	\$0.000 K	\$0.000 K	\$51.000 K
Other(s) Specify: WATER/WASTEWATER	\$3,504.900 K	\$266.000 K	\$66.000 K	\$66.000 K	\$66.000 K

## 1995 AIR FORCE BASE QUESTIONNAIRE

## Robins AFB - AFMC

Permits	\$21.000 K	\$320.000 K	\$50.000 K	\$500.000 K	\$50.000 K
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## 15. Other Issues

## VIII.15.A Description of other activities which may constrain or enhance base operations:

LOCAL: LOCAL ENHANCEMENTS -SEE ADDITIONAL COMMENTS

STATE: STATE ENHANCEMENTS - SEE ADDITIONAL COMMENTS

## 16. Air Quality - Clean Air Act

## VIII.16.A Air Quality Control Area (AQCA) geographic region in which the base is located:

Houston County, GEORGIA

VIII.16.B Air quality regulatory agency responsible for the AQCA.: GEORGIA DEPARTMENT OF NATURAL RESOURCES,  
ENVIRONMENTAL PROTECTION DIVISION, AIR PROTECTION  
BRANCH

## VIII.16.B Name and phone number of the AQCA program manager for issues pertaining to the base:

JAMES A. CAPP

(404) 363-7110

The EPA has designated the AQCA (or the specific portion of the AQCA containing the base) to be:

VIII.16.C.1 In Attainment for Ozone

VIII.16.C.2 In Attainment for Carbon Monoxide

VIII.16.C.3 In Attainment for Particulate matter (PM-10)

VIII.16.C.4 In Attainment for Sulfur Dioxide

VIII.16.C.5 In Attainment for Nitrogen Dioxide (Not NOx)

VIII.16.C.6 In Attainment for Lead

VIII.16.C.7 The EPA has Not proposed that any AQCA pollutant in ATTAINMENT be listed as NONATTAINMENT

VIII.16.D.1 Ozone daily maximum hourly design value for the portion of the AQCA in which the base is located: 0.12 ppm

VIII.16.D.2 Carbon monoxide 8 hour design value for the portion of the AQCA in which the base is located: 9.0 ppm

VIII.16.D.3 Ozone Design value is 100.0% of NAAQS

VIII.16.D.4 Carbon monoxide Design value is 100.0% of NAAQS

Air Quality Survey complete, No additional data required.

U. NCLASSIFIED

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**1995 AIR FORCE BASE QUESTIONNAIRE**

**Robins AFB - AFMC**

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U. S. CLASSIFIED

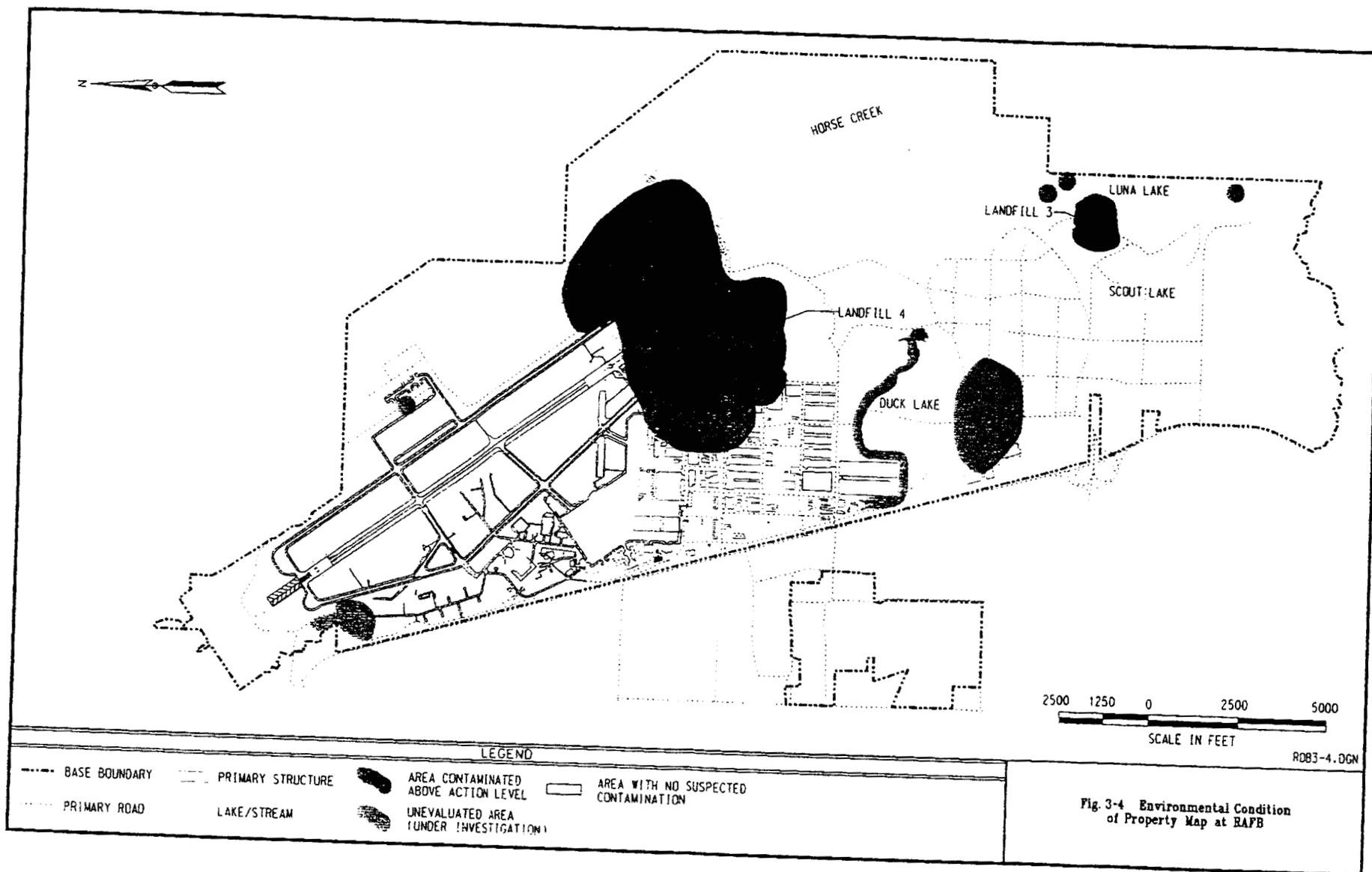
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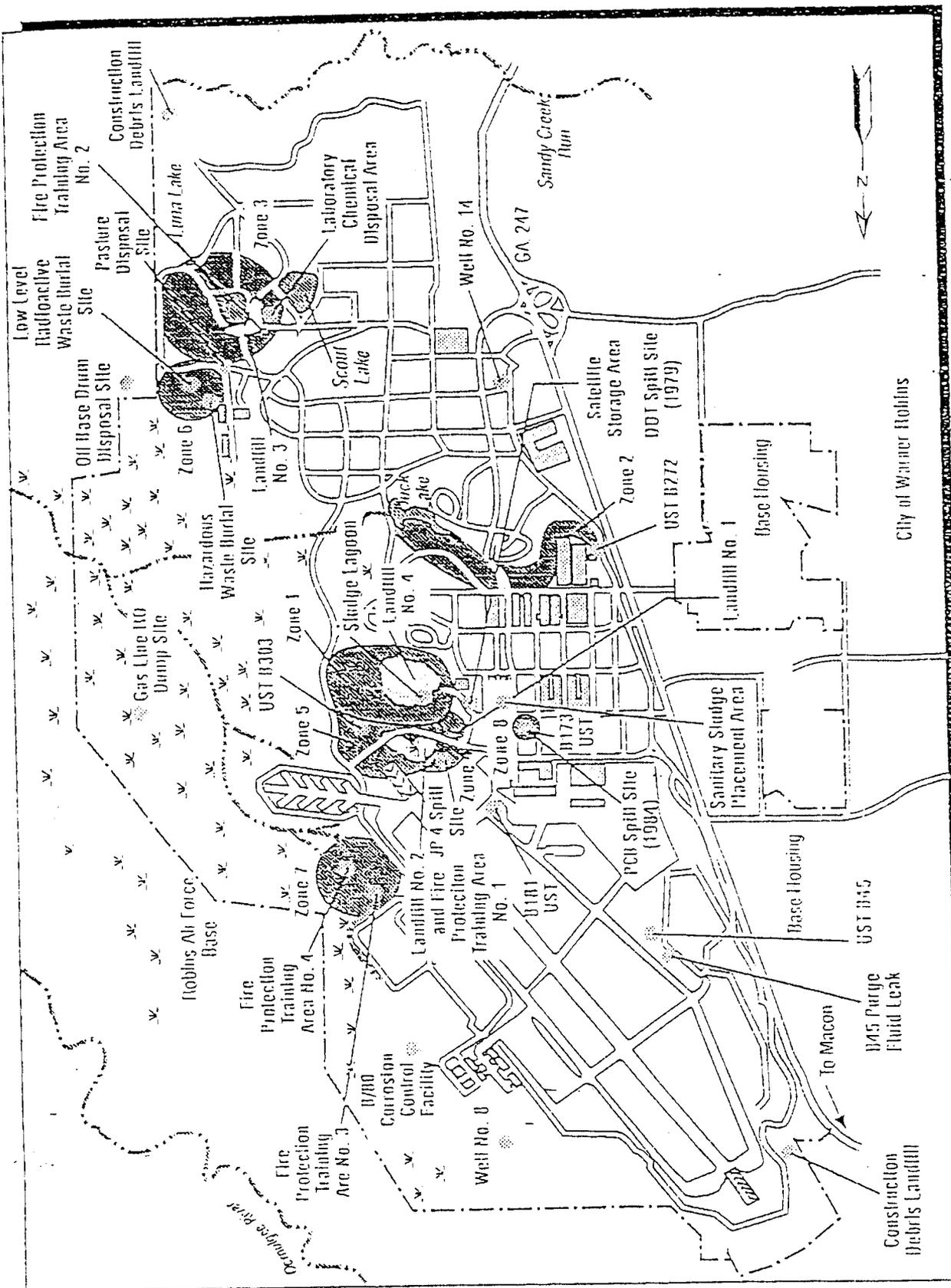
**1995 AIR FORCE BASE QUESTIONNAIRE**  
**Robins AFB - AFMC**

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**Section IX**

# Document Separator





CHAMHILL

**WR-ALC/EM**

216 Ocmulgee Court  
Robins AFB, GA 31098-1646

**Fax Cover Sheet**

**DATE:** June 15, 1995      **TIME:** 3:29 PM  
**TO:** Dedra  
BRAC Staff      **FAX:** (703) 696-0550  
**FROM:** Fred Hursey      **Phone:** (912) 926-9777  
   **Fax:** (912) 926-9642

**RE:** IRP Info for Robins AFB

**CC:**

**Number of pages including cover sheet: 3**

Message:

The following information is provided per your request:

Groundwater pump and treat costs are estimated at \$6,843,000 under project No. 967019.

Page 2 is a map of IRP areas.

Page 3 is a map showing upper aquifer plume contamination. Again, this does not affect our drinking water supply which is obtained from the third aquifer (400 Ft).

Estimated area of contamination for Robins AFB based on very rough calculations is 3 square miles (approximately 1,900 acres).

Please let us know if we can be of further assistance.

Robins AFB

6/9/95 conf. call  
w/ Haygood, Branton,  
et. al.

~~10-year~~

From funds reports, DERA will pay for closure + 10 years  
O&M

Base \$O&M pays for ~~the~~ cleanup.

Decades until we finally start the pays off.

~~From~~ Pump & treat technology - for decades of

we estimate that most jobs

2002 before we have closed sites -

those sites when it will be = pump & treat  
it will be .

2001 all construction complete - anything beyond is pump & treat - is 50% + pay for.

Some pump & treat is ongoing. Some  
Then 2001, it will ~~be~~ 88,000 -  
O&M for the next 10 years -

process will continue beyond this point.  
\$6M/yr. - add inflation on each year.  
80 for 10 years.

~~88M~~ 88M would include manpower costs.

drinking water

Upper most aqu. is contain  
process - of ~~the~~

~~912 926~~

~~0923~~

916  
(912) 926-9045

- [ upper most aquifer - goes down to 50 ft.
- [ alluvial or surficial
- [ clay layer about 15 ft.
- [ ~~upper~~ providence aquif ↓ 190 ft depth
- [ 50ft clay layer
- [ Cassett formation

TRE plume -  
CROSS - contamination

some contain.

~~Blufftown~~ aquifer - drinking water source.  
Blufftown

NPL site: Largest part of contain is in alluvial aquif  
low part of providence is not shown contain.

In sludge lagoon:

drums of used solvent -  
plating stuff -  
Go out to pit & throw it in it →

Treatment:

Looked at what's required to be done -

sent out - proposal to contractors - to

Plant:  
batch studies - vsolidify sludge -

injects steam → drive off volatiles -  
capturing it on surface. The surface  
part is like an SVE  
system.

extract sludge →

place it in <sup>blocks</sup> chunks on surface of landfill -  
let it solidify/dry, ex situ.

912 (926) 9777

Lt. Col Branta:

Tip fees for solid  
waste: why isn't this  
considered?  
why

} low tip fees.

# Document Separator

## **ROBINS AFB/WARNER ROBINS ALC** **SUSTAINABLE ENVIRONMENTAL EXCELLENCE**

The Air Force BRAC 95 Environmental ratings of ALC bases do not accurately reflect the relevance of environmental criteria subelements to depot operations.

1. The following environmental criteria subelements are critical to current and future depot operations:

- \* Clean Air Act
- \* Availability and Quality of Water
- \* Clean Water Act
- \* RCRA - Hazardous Materials and Wastes

### **2. Clean Air Act**

\* Robins is 1 of only 2 depots (Tinker is the other one) not in a Clear Air Act (CAA) nonattainment area or near nonattainment area (Kelly AFB/San Antonio);

\* Operating an industrial operation the size of an ALC in a CAA nonattainment area significantly increases compliance costs and the likelihood of serious constraints on depot operations;

\* The phasing in of progressively more stringent CAA requirements over the next decade--especially in nonattainment areas--will significantly increase compliance costs and the need for mitigating action at the ALCs;

\* Increasing CAA requirements will increase compliance costs at Robins, but it will remain in a nonattainment area to minimize the impact on depot operations and manday rates.

### **3. Water Availability and Quality**

\* Adequate water is essential for depot operations and Robins enjoys access to a plentiful and high quality water source;

\* Robins has its own wells and their operation is the only cost for the water it uses;

\* The high quality of water at Robins water minimizes treatment costs.

**4. Clean Water Act**

- \* Robins is in full compliance with the Clean Water Act
- \* Robins discharges its treated wastewater into the Ocmulgee River and the effluent meets NPDES permit requirements; <sup>in 1994</sup>
- \* Robins has awarded a \$5.4 million contract to upgrade its industrial wastewater and sewage treatment plants.

**5. RCRA--Hazardous Materials and Wastes**

- \* Robins in full compliance with RCRA
- \* Significant progress in recent years to improve management of hazardous materials and wastes;
- \* Pollution prevent efforts to ensure compliance in the future.

**6. Non Relevant Environmental Issues**

- \* Robins depot operations are not significantly impacted by:
  - Asbestos--Installation survey completed and no friable asbestos;
  - Biological--Although 5 Threatened and Endangered species have been identified, there are no critical habitats on base and existing wetlands do not constrain current or future depot operations;
  - Cultural--Although several building have historical significance and some archeological sites have been located on base, they do not constrain current or future depot operations; and
  - Installation Restoration Program involving NPL sites and RCRA cleanup efforts are well underway, are the least costly of any ALC and do not constrain current or future depot operations.

## 7. Solid Waste

\*Robins has an active recycling program to minimize the amount of solid waste it must landfill;

\* The landfill Robins uses to dispose of solid waste has a 50 year capacity and probably the lowest tipping fees of any of the ALCs.

## 8. Outyear Compliance Costs

\* According to figures reported to Congress on environmental compliance and quality costs, Robins projected funding requirements for the period FY 96-FY 00 are the least of the ALCs:

(\$ in millions)

Kelly AFB	76.5
Tinker AFB	70.1
McClellan AFB	42.9
Hill AFB	35.5
Robins AFB	30.6
	255.6

\* Although these compliance cost projections are very conservative because the Air Force does not include any requirements into the future that do not exist now, Robins AFB has the least uncertainty about potential environmental compliance costs of any other ALC.

**BOTTOM LINE--Robins AFB Environmental Excellence is Real and Sustainable**

\* Robins AFB has no environmental problems that would significantly constrain or add to the cost of depot operations in the foreseeable future;

\* Robins AFB is totally self supporting in dealing with its environmental requirements into the 21st century--it does not need regulatory waivers, air emission credits; or water allocations.

\* Robins AFB can continue depot operations in an environmentally responsible fashion without asking communities or businesses in Central Georgia to assume any of the costs or burdens of its environmental compliance.

**PROJECTED ALC COMPLIANCE COSTS, FY 95 - FY 99\***

(\$ in millions)

Kelly AFB	130.6
Tinker AFB	109.0
McClellan AFB	65.6
Hill AFB	44.3
Robins AFB	41.2
	390.7

Source:  
\* FY 1994 Report to Congress (prior edition to numbers quoted on p. 3).

# Document Separator



UNITED STATES AIR FORCE

1993-1994

SECRETARY OF DEFENSE

ENVIRONMENTAL QUALITY

AWARD



WARNER ROBINS AIRFIELD, GEORGIA  
ROBINS AIR FORCE BASE, GEORGIA

## INTRODUCTION

Robins Air Force Base is a major Department of Defense Air Logistics Center. The largest industrial complex in the state of Georgia, it is home to more than 40 separate organizations employing approximately 43,400 civilians and 4,500 military personnel. The base has an annual economic impact of \$2.9 billion, reaching almost one-third of the state of Georgia. The Air Logistics Center encompasses approximately 3.1 million square feet of maintenance shops, 1.8 million square feet of administrative space, and 3.8 million square feet of storage space.

Team Robins performs many missions, including:

- Worldwide management and engineering responsibility for the F-15 fighter, the C-141 and C-130 transport aircraft, all Air Force helicopters, and all special operations aircraft which includes repair, overhaul, modification, and acquisition of these aircraft and related systems
- Repair of airborne avionics, electronic warfare, communications, radar, and navigation equipment, using the largest repair facility in the world
- Worldwide management responsibility for Air Force fleet of more than 126,000 vehicles
- Support for hosted organizations such as the Headquarters Air Force Reserve, the 19th Air Refueling Wing, 5th Combat Communications Group, the 9th Space Warning Squadron, and the Defense Logistics Agency

Robins AFB is situated on 8,722 acres of an upper coastal plain, of which 2,500 acres are natural wetlands and 1,150 acres are timberland. Wildlife and vegetation are abundant, ranging from the American alligator and Florida panther to the flycatcher and loblolly pine. Artifacts recovered from 36 archaeological sites indicate that Robins was once a major Native American settlement.

The city of Warner Robins is immediately west of the base, with a population of some 40,000. Political and community support for the base are exceptionally strong—Senator Sam Nunn is from the same county, and the Governor has visited the base many times. The community coined a phrase and has made it a reality—Every Day in Middle Georgia is Air Force Appreciation Day.

## BACKGROUND

Middle Georgia was selected for the site of an Army Air Corps supply and maintenance depot because it had level land for an airfield and abundance of water. These were important points to consider in 1941, when emphasis was

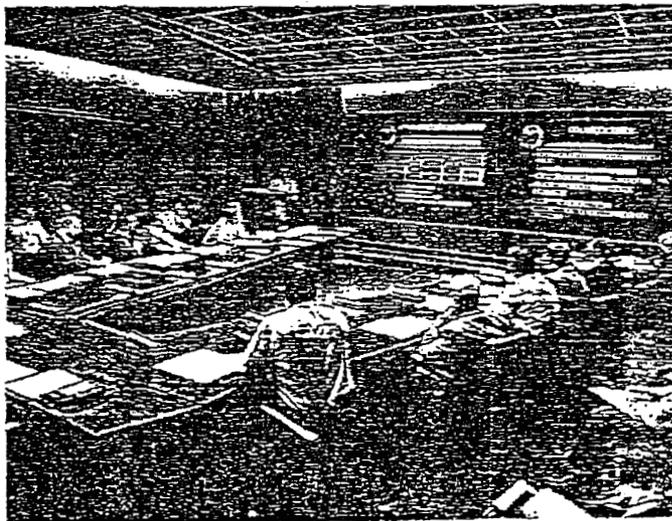
on speed of construction. But with haste came waste.

The environment suffered as a result of the rapid defense buildup. Industrial cleaning chemicals and aircraft fuel were released into the environment. Surplus material was dumped into landfills. From 1942 through 1978, these practices were acceptable and legal. Today, these practices are forbidden, and Robins is on the National Priorities List (NPL) for expedited cleanup.

Base environmental specialists are working diligently to clean up damage from the past—complying with today's laws and forging ahead with pollution prevention and conservation efforts for tomorrow. Today's charter is to ensure that Team Robins remains a leading steward of the environment and a role model for the Department of Defense and private industry.

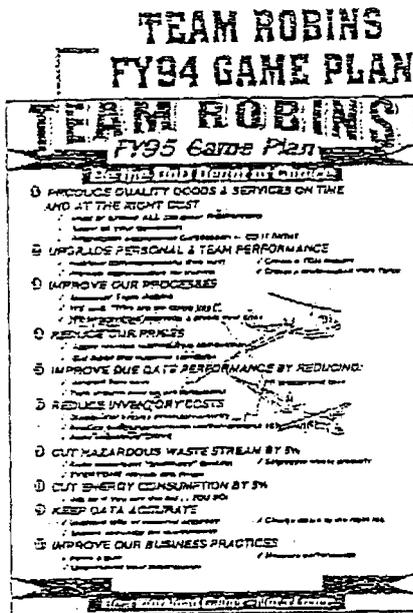
The principles of Total Quality Management are integrated throughout the installation's environmental program. The impetus for the management philosophy comes directly from the Air Logistics Center Commander (Installation Commander) through the Environmental Protection Committee (EPC) and the Environmental Management Directorate to each employee directly involved with the base's environmental management program. The Environmental Management Directorate, a team of 78 employees, works directly for the Installation Commander.

The installation's EPC, chaired by the Executive Director, meets quarterly to track the status of issues and provide an open forum to discuss environmental challenges facing the installation. Each of the installation's director/ commanders is an active member of the EPC.



Environmental Protection Committee

The Team Robins Game Plan, developed to focus the entire base on critical management challenges, was established in FY94. Each of the installation's employees has an input through Total Quality working teams starting at the lowest organizational level, proceeding through the chain of command directly to the Installation Commander. Both the FY94 and FY95 Game Plan contain specific environmental objectives for the entire installation.



FY94 and FY95 Game Plan

The status of the objectives is measured throughout the year, and progress is briefed to the entire work force by the Installation Commander. Top management at Robins AFB doesn't just talk the talk of environmental protection/leadership - they walk the talk!

In line with Total Quality Management principles, Integrated Product Teams (IPTs) have been developed in a number of environmental programs, including Water Quality, Hazardous Waste, Hazardous Materials, and Environmental Compliance Assessment. These IPTs bring together representatives of each organization on the installation impacted by a particular environmental protection program.

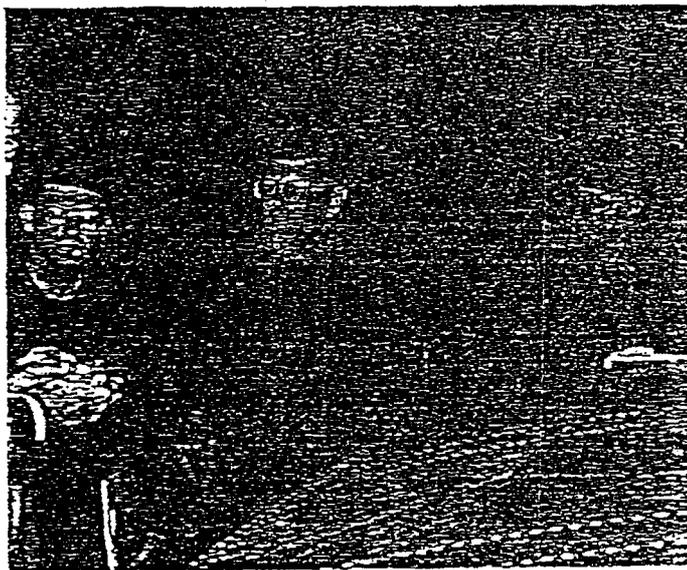
Recent successes of the IPTs have been the establishment of a storm water management plan, a significant increase of the number of base employees trained in hazardous waste management, implementation of the hazardous materials pharmacy, and rectifying discrepancies identified in the FY94 external compliance audit, greatly exceeding goals established by the Major Command.

Through the initiative established by the Installation Commander, the base fixed 30% of the audit's findings within 30 days following the evaluation versus the command goal of 50% fixed within 90 days.

Forming partnerships with the community has been at the forefront of the Environmental Management philosophy. A Restoration Advisory Board (RAB), formed in 1994, advises the Restoration Division, especially in ranking sites using a relative risk decision matrix. The RAB is co-chaired by a community member and the Director of Environmental Management, a community-base partnership. We regularly participate in Clean-Community events.

The community's most vocal environmentalist was given a close-up tour of the base's mission and environmental successes, resulting in a new respect for the Air Force's environmental initiatives. She has become a positive, primary member of the Restoration Advisory Board.

The head of the Georgia Environmental Protection Division (EPD) was hosted by the Installation Commander and given a firsthand view of the base's environmental successes and challenges, along with an understanding of the complexities of the installation. Three EPD branch chiefs spent a day at the installation in May 1994, also becoming more familiar with the complexity of operations at Robins AFB. A direct result of this partnering was receipt from the Georgia Chamber of Commerce of their first Pollution Prevention Award recognizing the base's drastic reduction in use of paint stripping chemicals.



Georgia Environmental Protection Division Visit

Table 1 lists significant environmental management plans, agreements, and permits along with date approved. Status of plan review is briefed at each EPC meeting.

MANAGEMENT PLANS/PERMITS	DATE APPROVED
Integrated Natural Resources Management Plan	Nov 91
Air Episode Management Plan	Feb 93
Pollution Prevention Management Plan	Apr 93
Resources Conservation & Recovery Act Part B Permit	Sep 93
Comprehensive Environmental Response/Compensation and Liability Act (CERCLA) Federal Facility Agreement	Dec 93
Storm Water Pollution Prevention Plan	Dec 93
Insulation Restoration Program Management Action Plan	Jan 94
Asbestos Abatement Management/Operations Plan	Mar 94 Dec 94
Hazardous Waste Management Plan	Jul 94
Air Permit	Nov 94
Underground Injection Permit	Dec 94
Lead Abatement Management/Lead Operations Plan	Jan 95

Table 1

## PROGRAM SUMMARY

The objectives of the environmental quality program are site cleanup, complying with today's laws, and staying ahead of future requirements (conservation and pollution prevention initiatives.)

We're attaining our objectives. In the cleanup area, 22 of 93 sites in the Installation Restoration Program (IRP) are finished. Remaining sites are under active remediation (5) or have preliminary study efforts well under way (6). All funds requested in FY95 are for remedial action or manpower to manage the program. The installation was free of compliance Notices of Violation (NOVs) at the end of CY94, and all permits were current or waiting regulatory action.

In the conservation area, the installation won the Air Force Natural and Cultural Resources Protection Award for CY92-94. In the pollution prevention area, purchase of Ozone Depleting Substances (ODS) at the end of CY94 was down 84% from a CY92 baseline. Purchase of EPA 17 most toxic chemicals at the end of CY94 was down 77% from a CY92 baseline.

Many outstanding features and accomplishments of the program are listed in the "Accomplishments" section of this report, but three stand out.

First, the partnering that is taking place between the base, Environmental Protection Agency Region IV (EPA IV), and the Georgia Environmental Protection Division (EPD) is paying huge dividends in the restoration area. In years past, EPA IV and/or EPD would readily take us to formal dispute resolution. Partnering/teambuilding initiatives, often with a formally trained facilitator, have brought all parties together in a spirit of cooperation, building mutual respect and trust among party members. At least two disputes have been avoided since we began the process in mid-1994.

Another significant accomplishment was destruction of Agent Orange dioxin contaminated waste left over from the Vietnam era. Aircraft used for spraying operations were brought to Robins, and the Agent Orange tanks, pumps, etc., were removed from the aircraft and stored on base because of land ban restrictions. We found a permitted destruction facility in 1993 and today, our dioxin waste is destroyed and our Resource Conservation Recovery Act (RCRA) Part B permit has been modified: the final result - "clean closure." Reductions in ODS and EPA-17 chemical purchase described above are the most significant features of the pollution prevention program.

Perhaps the most unique feature of the overall environmental quality program is the EPC restructuring that took place in late 1993. The EPC has a myriad of important matters to address and track. We use objective criteria and a color coded rating system to direct senior management focus to areas requiring the most attention to maintain compliance and the largest opportunities for pollution prevention efforts. In a glance, senior managers can assess the general health of more than 50 environmental items that are important to operation of the installation. By staying in compliance and reducing the quantity of hazardous material in the workplace, Robins AFB has become a recognized leader in environmental stewardship and advocacy.

## ACCOMPLISHMENTS

This section describes in detail many environmental accomplishments of the 1993-1994 time frame. The list is not all-inclusive but illustrates the top notch quality of the installation environmental management program.

a. *Activities/achievements during past 2 years in NEPA Implementation*

- (1) *Proposals analyzed, decisions made, and NEPA process carried out for each*
- (2) *Coordination and public involvement techniques used and their effectiveness*
- (3) *Methodology for integrating environmental analysis into planning and decision making*
- (4) *Results of impact mitigation measures*

The National Environmental Policy Act (NEPA) guided installation decision making. In FY94 an \$85 million construction program to beddown the Joint Surveillance Target Attack Radar System (Joint STARS) aircraft was initiated. Georgia Power began construction of a \$55 million combustion turbine peaking power plant on base. These and other major federal actions required an efficient and effective environmental review process to comply with both the spirit and letter of NEPA. Robins AFB is fully committed to and deeply involved in performing meaningful environmental planning.

- In 1994, Environmental Management reviewed more than 1,200 civil engineering work requests for actions varying from "self-help" to in-house maintenance and repair, to large contract construction projects. These reviews immediately helped decision-makers to make environmentally sound decisions. For example, a work order for connecting a drain identified the wetlands as the gray water disposal site. The current action was immediately halted. Of the 1,200 informal reviews, approximately 200 required further analysis through the USAF's environmental impact analysis process. Ten actions from this smaller group required a formal environmental assessment. The remaining 190 projects were categorically excluded. In CY94, an Environmental Impact Statement was begun for the beddown of the B-1B aircraft at Robins AFB.

- Environmental assessments are forwarded to state and federal clearing houses for coordination. Our relationships with the State Historic Preservation Office and the U. S. Fish and Wildlife Service are particularly strong. Environmental assessments are published in local newspapers and can be readily reopened or supplemented if new information is available to the decision maker. Public acceptance of the effectiveness of this method has been acknowledged.

- Robins AFB personnel successfully negotiated the signing of the Interim Record of Decision for the NPL Site Operable Unit 2, Wetlands Remediation, to implement natural attenuation versus dredging. The National Resource Trustees (National Oceanographic and Atmospheric Administration and U.S. Fish and Wildlife

Service) played an important role in convincing the regulators to monitor this sensitive ecosystem, vice destroying it and helped the Air Force avoid \$11.2 million in cost.



Wetlands

- An environmental checklist, developed in mid-1993, identifies key issues such as cultural resources, wetlands, pollution prevention, air quality, recycling, etc. The checklist enables program managers to evaluate their projects and seek help from appropriate environmental specialists early in the project planning stage. It also focuses the use of limited resources on more complex and environmentally significant projects. Consequently, we attained the dual goals of public education concerning the need for environmental reviews and targeted formal reviews rather than shotgun NEPA application. Simple projects to replace door-knobs are no longer reviewed.

- The Environmental Management staff sponsored an executive level NEPA workshop to impress upon senior managers the need to begin the NEPA process early in the planning cycle. Environmental Management also sponsored a base-wide workshop on preparation of proposed actions and alternatives, resulting in more complete proposals for environmental review.

- For contract projects, all environmental specifications have been consolidated and centralized for ease of review and inspection by field personnel. This action is particularly crucial when environmental assessments have specified mitigation measures such as soil erosion and sedimentation control actions. As a direct result, mitigation measures are being implemented.

b. Activities/achievements during past 2 years in Air Pollution Control:

- (1) Permits, compliance records, and plant improvements
- (2) Emission sampling and ambient air monitoring
- (3) Control of activities in consideration of meteorological conditions
- (4) Participation in regional air quality planning and protection

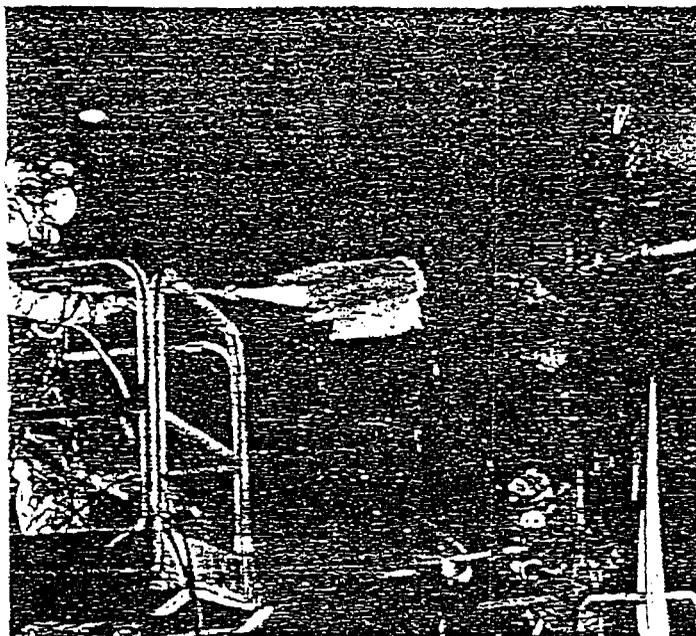
The Clean Air Act has resulted in numerous air pollution control measures. Most significant is the requirement for a vastly more complex permit application under Title V of the Act.

- The Georgia EPD revised our Air Quality Permit in 1994 to add additional sources. Since hiring an additional environmental engineer in 1993 to work the air program, Robins AFB has ensured continued compliance in air quality. An emissions inventory was completed to identify all stationary emission sources and which sources will need to be permitted under Title V. A \$996,000 contract is underway to complete the Title V permit application, incorporating all air pollution requirements into one permit.

- We completed the first phase of the Risk Management Program for Chemical Accidental Release Prevention: identification of five applicable chemical sources/processes for this program at Robins AFB and completed modeling for the risk analysis at each site. Phase II, development of a risk management plan, will be completed after the federal regulations are finalized.

- Plant improvements are being implemented to reduce air emissions. Prior to 1993, Robins AFB used more methylene chloride than any other Air Force facility for aircraft depaint operations because of the volume of large aircraft overhauled. Chemical depainting is being replaced with alternate technologies, such as Bicarbonate of Soda Stripping (BOSS) or Plastic Media Beadblasting (PMB), to significantly reduce or eliminate the emissions of methylene chloride and Volatile Organic Compounds (VOCs).

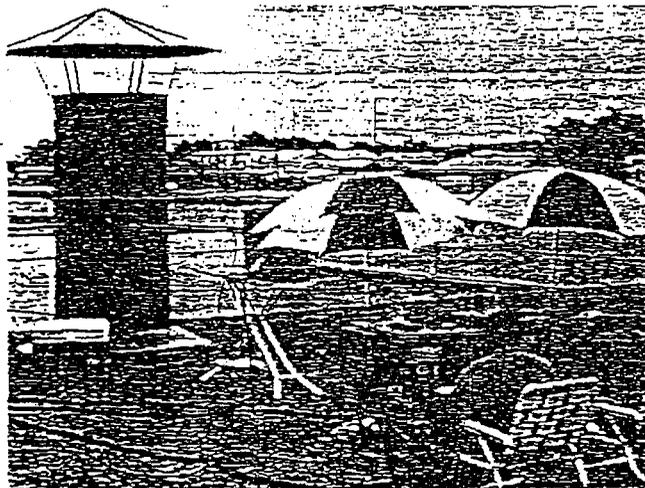
Following engineering evaluation of the alternate technology, we implemented the BOSS method for depainting C-130 thin skin aircraft. Methylene chloride use is down from 37 drums to less than two drums per aircraft for spot depainting. This equates to a reduction in excess of one million pounds and contributes to a 77% reduction in pounds of EPA-17 chemicals purchased in 1994 versus 1992. This process change will reduce emissions of methylene chloride and VOCs from the depainting of aircraft by approximately 95%.



Bicarbonate of Soda Stripping Process

- Robins AFB has a fully trained and equipped Asbestos Removal Team (A-Team) capable of handling emergency and cleanup situations. The A-Team has implemented procedures for asbestos floor tile removal which resulted in 50% savings as compared to previous methods.

- Acurex Environmental Corporation completed an emission sampling and ambient air monitoring study for Robins AFB in conjunction with the U.S. EPA Air and Energy Research Laboratory at Research Triangle Park, N.C. Robins AFB contributed \$550,000 towards this effort which identified hazardous air pollutants and emission rates for the base. Several representative stacks were sampled to analyze for hazardous air pollutants.



Stack Sampling

- Robins AFB is in an attainment area for criteria pollutants, resulting in little control of activity in consideration of meteorological conditions. Although air pollutant emissions are being reduced, there is no requirement to provide for additional reductions for meteorological conditions. Even under conditions which would induce higher levels of ozone such as hot days, the Middle Georgia area remains in attainment with federal and state standards.

- Robins AFB took the initiative to actively participate in regional air quality planning and protection by helping to develop the Aerospace National Emission Standard for Hazardous Air Pollutants (NESHAP). Robins AFB, including representatives from Environmental Management and the Technology and Industrial Support Directorate, participated in roundtable meetings with EPA, Aerospace Industries Association, DoD, and state regulators.

*c. Activities/achievements during past 2 years in Water Pollution Control:*

- (1) Permits, compliance records, and plant improvements
- (2) Management of point and non-point sources
- (3) Spill prevention and response
- (4) Water conservation
- (5) Drinking water protection
- (6) Ground water protection

Compliance with the Clean Water Act has resulted in numerous accomplishments over the past two years. Robins AFB generates all of its drinking water (permitted up to 5 MGD) from a deep aquifer and treats virtually all of its sewage (2 MGD) on base.

- The Georgia EPD reissued the National Pollutant Discharge Elimination System (NPDES) permit on Dec 1, 1993. This permit covers two industrial wastewater treatment plants, a sewage treatment plant, six stormwater ditches, and leachate from Zones 1 and 3 of the Installation Restoration Program (IRP). Robins AFB has maintained full compliance with discharge limits during this time period.

- Robins completed a \$1.2 million pipeline in May 1993 moving all treatment plant discharge points from Horse Creek to the Ocmulgee River. This was a direct result of lower discharge limits placed on Robins in 1988. A second project (\$5.4 million) to upgrade the industrial wastewater and sewage treatment plants was awarded in FY94. The project includes a new biological treatment plant for one industrial plant, polishing filters at a second plant, an additional filter press for industrial sludge, and

recycling wastewater back to industrial processes. A \$3.3 million project was funded to correct inflow/infiltration problems.

- Parsons Engineering Science, Inc., completed an oil/water separator investigation during 1994 as part of management of our stormwater point sources. Operation manuals for each separator were prepared and recommendations for repairs and removal of non-operational separators were included.

- Robins implemented a fish, water and sediment monitoring plan for recovery of Duck Lake. Duck Lake is in the central part of the base, immediately adjacent to a military family housing area and the base golf course. The lake is contaminated with DDT as a result of a spill in 1979. A RCRA Corrective Measures Study was funded in FY94 in an effort to return the lake to recreational purposes. Restoring this lake will further enhance its aesthetic value and be a reflection of our environmental stewardship philosophy for all to see and enjoy.

- Within the 1993-1994 time period Robins AFB brought all regulated Underground Storage Tanks (USTs) into compliance with the EPA/EPD regulatory requirements, well ahead of the Dec 22, 1998 deadline. Compliance includes corrosion protection, overflow protection, and leak detection and monitoring. An on-going program is removing "vulnerable" USTs (due to age, single wall construction, bare steel material, etc.). More than half of our heating oil tanks have been removed and replaced with more energy efficient natural gas heating systems. A \$145,000 background site characterization was performed, identifying locations, age, material, construction, contents and site condition of all USTs. Due to this investigation, soil remediation is in progress at two sites.

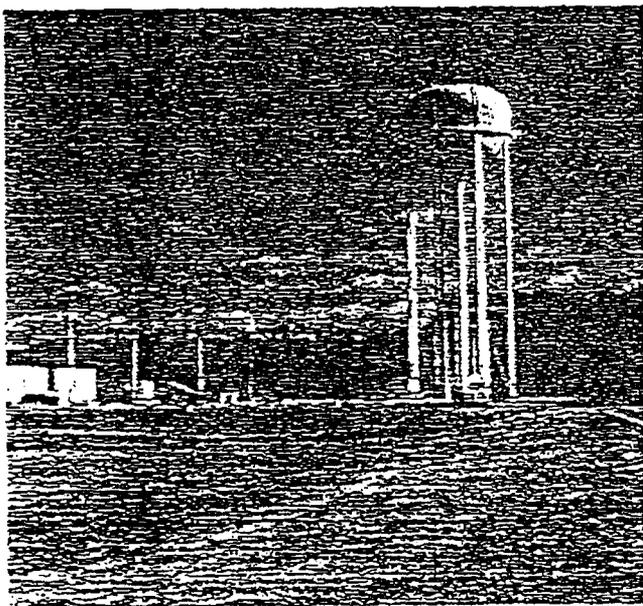


Underground Storage Tank Removal

- In mid-1994, an Aboveground Storage Tank (AST) program was launched so that Robins AFB would have an upgrade effort in progress before AST regulations are issued, as is anticipated in the near future. Several projects are already in design to equip our tanks with secondary containment, overflow prevention, and leak detection; when accomplished, the tanks will meet new regulation standards.

- The base spill team has handled approximately 100 incident responses in the last two years, with no contamination allowed into any wetlands, ponds, or waterways on the installation or in surrounding vicinity. The base spill team has also been used to test new absorbent materials. These new materials are lighter, more absorbent, and can be used for energy recovery due to a higher BTU value instead of being placed in landfills. The new material saves government funds and makes a useful contribution to the Air Force's pollution prevention initiative. The results of these tests have been "crossed" to other Air Force bases.

- Water conservation efforts include reuse of leaves as mulch in and around shrub beds and trees on base. Sprinkler heads on the golf course are capable of using recycled wastewater from the domestic wastewater treatment plant. Water conserving shower heads are in place in base billing and the 1,393 military family housing units on base.



Joint STARS Water Well

- A project to properly cap and abandon 15 water wells to protect drinking water was a major initiative in 1993-1994. This project is especially timely in light of low levels of VOC contamination found in shallow aquifers in the base industrial area and in the vicinity of our large aboveground JP-8 fuel storage tanks. Two replacement wells for existing drinking water wells were constructed in 1993/1994, and a new well, water storage tank, and new water mains costing \$3.6 million are under construction to support the Joint STARS beddown.

- Groundwater protection efforts included securing all well heads and a project to delineate all jurisdictional wetlands on base. Wetlands delineation was accomplished over the past three years with the U.S. Army Corps of Engineers fully involved during that time.

*d. Activities/achievements during past 2 years in Noise Pollution Control:*

- (1) Noise sources and management methods
- (2) Planning and zoning activities

Noise pollution is a success story at Robins. Noise sources are predominately aircraft related, and while Robins is an operational base, it is relatively quiet. The Public Affairs Office receives noise complaints - there were four in 1993 and only three in all of 1994.

- The KC-135 aircraft operated by the 19th Air Refueling Wing have been re-engined (KC-135R), and no longer use water for additional thrust, therefore reducing overall noise.

- The four to five functional flight checks performed on F-15 aircraft following programmed depot maintenance are spread out during the day. Functional flight checks are not performed at night.

- Robins' Air Installation Compatible Use Zone (AICUZ) plan was updated in 1993. An area north of the base was identified as being in Accident Potential Zone (APZ) 1. The Georgia State Legislature appropriated \$1.5 million to buy land in APZ 1 to reduce the public safety risk from low overflights. Local real estate agencies and banks are waiving fees to help homeowners relocate to other areas.

*e. Activities/achievements during past 2 years in Radiation Pollution Control:*

- (1) Radiation sources (unless classified)
- (2) Control and management methods

- Robins' Bioenvironmental Engineering Office has maintained strict control of radiation sources. There are eight permitted radioactive (ionizing) sources on base as well as thousands of radiofrequency (RF) emitters. The permitted sources belong to six different organizations and are used in gas chromatographs, chemical agent monitors, calibration equipment, lead detection instruments, inflight blade inspection systems, and the LANTIRN weapons system. In many organizations, the most hazardous RF emitter operations occur on the highline and with the 5th Combat Communications Group.

- The Base Radiation Protection Program (WR-ALC RAFBR 161-3) defines responsibilities, guidelines, procedures, and precautionary measures for the control of ionizing and non-ionizing radiation sources. Air Force policy is that all exposures to ionizing radiation be "As Low As Reasonably Achievable" (ALARA). Bioenvironmental Engineering personnel visit all shops with radiation sources at least annually to ensure operating instructions exist, procedures and safeguards are in place, and proper protective equipment is worn (when necessary) to make sure exposures are kept ALARA. Disposal of Radioactive Items is handled in accordance with Technical Order 00-110N-2, Radioactive Waste Disposal, and is coordinated through the Base Radiation Safety Officer in Bioenvironmental Engineering and with the Low Level Radioactive Waste office in Environmental Management at Kelly AFB, Texas.

- One ionizing source not permitted, but tracked, was the old radium dial painting operation from the late 1940s until 1952. Waste was buried in a vault, and Bioenvironmental Engineering monitored the site annually. In 1993 the site was excavated and found to contain mixed waste. The vault was removed in 1994 as part of the IRP, and the mixed waste was properly disposed in Utah, restoring yet another site providing generations to come with a cleaner and safer environment for tomorrow.

*f. Activities/Achievements during past 2 years in Waste Management and Resource Recovery:*

- (1) Solid (municipal) waste management
- (2) Toxic and hazardous waste management

Waste management and resource recovery has been a dynamic area in 1993/1994. There have been significant achievements and accomplishments.

- The Qualified Recycling Program (QRP) council, chartered in 1994 and chaired by the base commander, has drafted an aggressive QRP operational plan that will ultimately result in reduction of waste by 72% from the

1992 baseline. At the end of CY94 Robins had achieved a 73.5% reduction in the amount of non-hazardous municipal solid waste sent to the Houston County landfill compared to the baseline year of 1992. Robins disposed of 9,381 tons of waste in the landfill - a five-year-low volume. The decrease of waste disposal is the result of source reduction initiatives such as two-sided copying and use of electronic mail. Recycling accounted for the diversion of more than 8,000 tons of material which included: recycled aluminum cans, cardboard, newspaper, office paper, glass, industrial wood, metal scraps, tires, cooking grease, and beef fats. A study, near completion, addressing the beneficial reuse of yardwaste, domestic sludge, and horse-stable waste, will also determine the feasibility of a cooperative effort between the city of Warner Robins composting facility and the base. Future plans for waste reduction include recycling steel/aerosol cans, fluorescent lamps, and plastics. Robins is negotiating a contract with the National Institute for the Severely Handicapped (NISH) to provide base-wide recycling operations.

- Robins uses affirmative procurement for both industrial and administrative purchases. Environmentally friendly materials are encouraged for use wherever possible. In 1993, 48% of all EPA regulated non-paper purchases contained recycled materials and 54% of all paper contained post-consumer recycled materials. During 1994, Robins required its copy machine contractor to provide paper containing 20% post-consumer content. Procedures are in place to recycle toner cartridges and purchase remanufactured cartridges. EPA Region IV and GSA Region IV offices recognized Robins as an environmental leader in Affirmative Procurement by inviting us to participate in planning "Buy Recycled Workshops" to be held at several locations within the region.

- Robins uses recycling to bridge the gap between industry and community by being involved in local recycling activities. For the past two years, base volunteers have assisted in the community Christmas Tree recycling program. More than 3,000 trees were chipped for mulch.

- Robins AFB benchmarked the hazardous waste disposal process at other Air Logistics Centers as well as facilities in the aerospace and hazardous waste disposal business, looking for effective methods that could be implemented at Robins to improve the hazardous waste disposal process. Licensing of Initial Accumulation Points (IAPs) for hazardous waste collection, bar-coding, and site management plans containing the facility hazardous waste management plan, waste characterization data, operational checklists, and training references implemented in 1994 are already showing improvements.

Licensing accumulation points and bar-coding will reduce the probability of enforcement actions and improper hazardous waste management through tighter control. Site management plans will provide the correct hazardous waste management procedures and relevant information to the process owner of each of the installation's 250 accumulation points. Tighter control of the installation's hazardous waste and clear understanding of responsibilities within the base's production shops have directly led to more favorable regulatory inspection results.



Installation Commander and Environmental Director inspect a hazardous waste drum.

- Robins AFB is using plastic bead blast media to replace chemical paint strippers for depainting F-15 aircraft. We eliminated use of 35,000 pounds of methylene chloride, and we're now negotiating a contract to recycle the spent bead blast media into consumer and industrial products, such as bathroom fixtures and highway pavement.

- Another aspect of the base's hazardous waste management program is the operation of solvent reclamation stills. The stills annually recycle more than 14,000 gallons of used solvent and save the Air Force more than \$200,000 in the purchase of new hazardous materials.

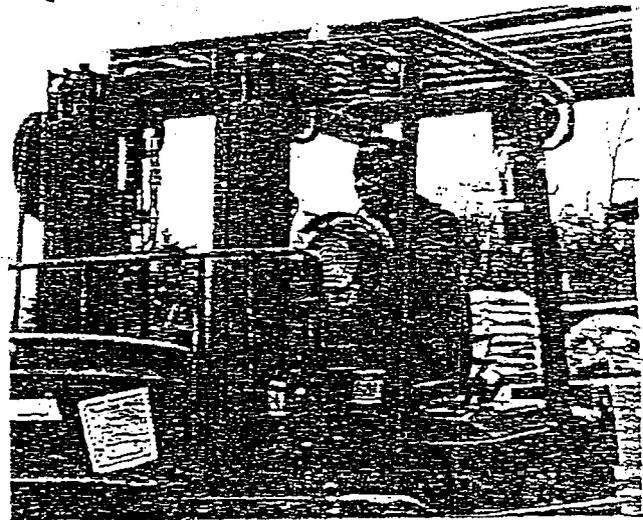
- In Oct 93, Robins AFB initiated a revised hazardous waste training program.

— The base's philosophy was to train site managers of 90 day storage facilities. During the 1993 Georgia EPD inspection, regulators identified lack of required training for personnel handling hazardous waste, including Unit Environmental Coordinators (UEC), primary and alternate accumulation site managers, and their supervisors. The revised training was directed at

base personnel who handle or manage hazardous waste or material. The training was conducted once a month for approximately four hours. Assistance was provided by representatives from other organizations such as the Base's Fire Department, Safety Office, Office of Special Investigation (OSI), and Legal Office. Again, positive results were reflected in subsequent regulatory inspections. Additionally, thousands of base personnel have gained a greater appreciation of hazardous waste management requirements and protection of the environment.

- The scope of the training included Introduction to Resource Conservation Recovery Act (RCRA), accumulation point management, container use, marking and labeling, waste turn in procedures, personnel safety and fire safety. The program was successful. To better disseminate the training to the base populace, an Accumulation Point Management film was televised via local area network. Several copies of the film were reproduced and distributed throughout the installation for viewing at worker leisure.

- UECs developed a program to meet their specific needs. The UECs will be responsible for site-specific training of their accumulation point managers and alternates with guidance from Environmental Management.

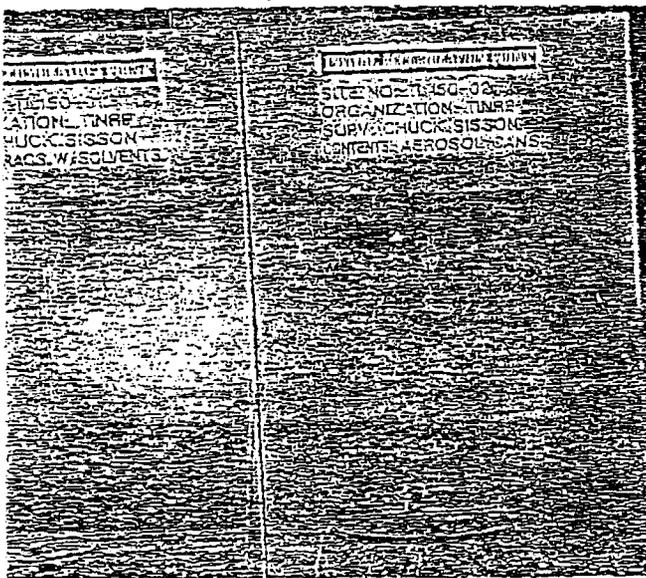


Hazardous Waste Collection

- An eight-hour Accumulation Site Managers Seminar, originating at the Air Force Institute of Technology (AFIT), was presented via satellite telecommunication on Sep 21, 1994 for 42 personnel involved in the management of waste/materials.

- A Good Management Practice (GMP) initiated by Environmental Management was to identify more LAPs. This procedure was implemented to better manage the waste streams coming from each organization and eliminate processing partially filled containers. This GMP not only saved disposal dollars but also focused hazardous waste management attention at the point of generation.

- An LAP number, along with a Waste Identification Number (WEN), will be assigned for proper identification of the container. Approximately 200 LAP containers have been identified throughout the center, with an estimate of about 250-300 being the final count. Standardized signs are being located at the LAPs. The signs list location, contents, supervisor, and primary and alternate persons responsible for the management of the containers. The hazardous waste integrated product team, through the direction of Environmental Management, has taken on this significant challenge to maintain an accurate inventory of waste streams and waste collection points. Signs will be provided to each process supervisor by the base's hazardous waste management staff.



Hazardous Waste Container Identification

- Specially designed lids for non-liquid hazardous waste accumulation were designed by the C-141 Product Directorate with approval from Environmental Management and the Georgia EPD. These lids spring shut yet allow easy addition of waste, eliminating a problem with "open containers" during RCRA inspections. This "easy open" lid encourages base employees to properly dispose of regulated wastes preventing hazardous substances from reaching the solid waste landfill.

- Robins AFB continues to maintain its status of "PCB-Free" under Air Force guidelines by eliminating regulated equipment sources exceeding PCB concentrations of 50 ppm. The base continues to control items less than 50 ppm for management purposes to preclude possible Comprehensive Environmental Response, Compensation, and Liability Act liabilities resulting from uncontrolled disposal in landfills.

3. Activities/achievements during past 2 years in Pest Management:

- (1) Integrated pest management program elements and management methods
- (2) Reductions in pesticide use and other improvements

A highly effective Integrated Pest Management Plan (IPMP) is fully implemented at Robins AFB. During the inspection process of this plan, pest management personnel identify various pests, locate breeding sites, identify potential food sources, and implement corrective actions. Where cracks and crevices are detected, caulking is often all that is required.

- Other IPMP measures implemented to control pests are public education about various pests, their life cycles, and how proper sanitation will eliminate sources of food, water, and harborage - providing up to 90% control without chemicals.

- Surveillance of disease vectors, such as mosquitoes, helps reduce chemical usage by reducing the number of replications. We use ultra-low-volume sprayer equipment with a biological chemical possessing fast knock-down properties and low residual qualities.

- Increased use of air blowers at entry ways to prevent flying insects from entering facilities and replacing wood shelving in food facilities with easy-to-clean metal units, have proven effective.

- Mouse traps, fly swatters, and limited quantities of pesticides are available through the Civil Engineering Self Help Store. Before pesticides are distributed, education on their proper use is emphasized. Facility occupants sign a statement acknowledging proper uses of pesticides and quantities issued are loaded into a central computer database for required reporting.

- Robins AFB eliminated herbicide usage (with the exception of Round-up) in all grounds maintenance activities. Disease-resistant grass species are specified for new projects.

- Robins AFB implemented a cooperative agreement with the USDA Animal Damage Control Unit to work with base personnel to eliminate bird problems in work areas, especially on the flightline. This agreement has been very successful because it mitigates the concerns of wildlife advocates.

- An initiative to plant more than 2,000 hardwood and ornamental trees was undertaken following a major snow storm in early 1995. The tree planting initiative increases diversity, reducing the probability that a disease or natural disaster will wipe out trees in a large portion of the base. In so doing, Robins AFB achieved "Tree City USA" status from the National Arbor Day Foundation.



Tree City USA

*h. Activities/achievements during past 2 years in Environmental Research and Education (on and off installation):*

- (1) Programs to enhance environmental ethic and awareness
- (2) Environmental research and development projects
- (3) Community involvement, activities, and affiliation of base people with civic and environmental organizations
- (4) Cooperation with Federal, State, and local agencies, organizations, and academic institutions

Robins AFB takes full advantage of our mission diversity by exploiting all environmental research and education opportunities.

- The Environmental Management Directorate hosted Robins' first Environmental Fair on Earth Day 1994. Festivities included an Arbor Day Proclamation, presentation of Tree City USA certification and an historic forest

dedication. More than 1,000 people including base employees, children from the base schools, and several outside agency participants, attended the fair. Earth Day 1994 was an extremely successful program and an all day event is planned for 1995.

- Robins AFB hosted Air Force-wide Emergency Planning and Community Right-to Know Act (EPCRA) training for the Southeast Region. This training was conducted in June 1994 and, besides providing a facility for formal training, allowed a forum for Air Force personnel from various bases and Major Commands to discuss various challenges and reporting requirements each had encountered through meeting the requirements of EPCRA.

- The Installation Commander has conducted five "green carpet tours" where he visits work centers and discusses environmental awareness with employees. His most recent "dumpster diving" tour, Dec 14, 1994, was video taped and shown at the weekly senior staff meeting to help drive home everyone's environmental responsibilities.

- The base newspaper features an environmental awareness article almost weekly. Topics have ranged from pollution prevention initiatives to environmental compliance self audits to recycling opportunities.

- In 1993, a hazardous materials pharmacy was implemented and a Hazardous Material (HazMat) Cell formed. The HazMat Cell is comprised of personnel from the Directorate of Environmental Management, the 78th Air Base Wing Supply Division, the 78th Medical Group Bioenvironmental Engineering Section, and the ALC Contracting Office.

- The HazMat Cell's goal is to provide those customers who must use hazardous materials with the right amount in the right quantity at the right time. By carefully monitoring the amount of chemical distributed to users and the quantity of material initially ordered, the base is able to minimize both waste generation and employee exposures to harmful chemicals.

- During an AFMC Inspector General visit in 1994, two elements of the pharmacy concept were selected to be benchmark programs for the Department of Defense Depot Maintenance Hazardous Material Management System. The dispensing facility in the Avionics Directorate was commended for its daily management of the issue and return of hazardous materials. Also, Robins was the first installation to manage a "Freebie List." A customer with excess or expired shelf life materials advertises it through an

on-base computer program managed by the HazMat Cell. Other authorized users can select materials from this list at no cost for use in their areas. This program has saved the installation an estimated \$24,000 in its first year of use.

- The Technology and Industrial Support Directorate has taken on numerous process development initiatives. Using Air Force pollution prevention funds, several prototype projects such as Bicarbonate of Soda Stripping have been proven successful. Another is flame spray application of thermoplastic powder coatings which is a safe, highly reliable, single-coat method of painting which eliminates toxic chemicals and ODSs in the aircraft component coating process. We're now looking at electrostatic and plasma spray application of powder coatings to make the process even better.

- Robins is working with the U.S. Department of Energy and Armstrong Laboratory to be the first Air Logistics Center to implement spray casting. The project will reduce and eventually eliminate hazardous waste by replacing chromium plating with a pressure controlled atomization process coating. Spray casting will save on disposal costs and improve operational efficiency.

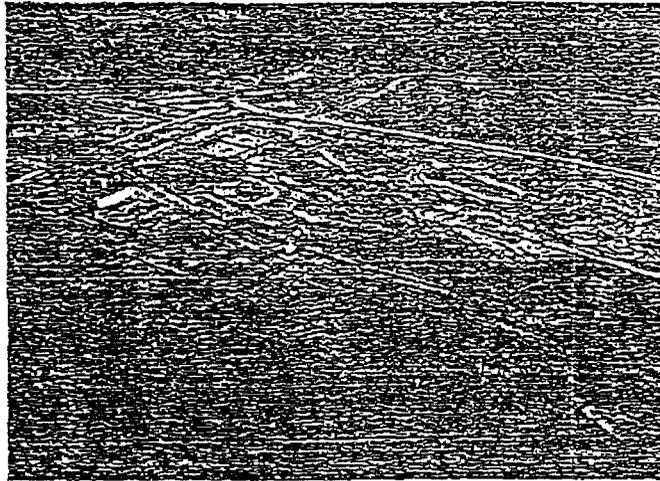
- Robins has eliminated cadmium plating from its industrial processes. The ion vapor deposition process involves the deposition of a pure aluminum film, which is 200 times less toxic than cadmium, on aircraft parts.

- An innovative contracting strategy allowed simultaneous tests based on performance criteria only of five waste solidification technologies at bench scale stage and three at pilot scale stage. The tests validated cost and efficacy prior to selecting a technology for solidifying the National Priorities List Sludge Lagoon.

- A study and assessment was conducted of a suspected drum disposal site using the Field Assessment and Study Team (FAST) concept which provided real-time analytical results, saving both time and money. Use of three-dimensional digital imaging software enabled the investigation team to visualize subsurface conditions for immediate understanding of location, depth, and concentration of pollutant mass to be remediated.

- The Restoration Division initiated interim remedial actions, where possible, enhancing Robins' image with state and federal regulators. Remediation of Landfill No. 3 was started in 1993 and will be completed in early 1995. The landfill mass will be totally enclosed by a combination of a slurry wall, an impervious cap system, and a lower confining natural impermeable clay layer.

- Stoving systems were installed to clean up petroleum contaminated soils at two RCRA sites. This technology replaced the traditional remediation method of soil excavation and disposal for a ten-fold savings.



Landfill No. 3

- The Middle Georgia Military Affairs Committee, representing nine communities surrounding the base, has been "adopted" by various installation organizations to learn more about specific units on base. The committee has been instrumental in spreading environmental "good news" stories in their communities.

- We continue to research and study the feasibility of various innovative, cutting edge paint application technologies. Robins paints more than 100 C-130, C-141, and F-15 aircraft each year. Prior to 1992, the coating system applied to most aircraft consisted of conversion coating, epoxy primer, and polyurethane topcoat. Since then, low VOC coatings, high-volume-low-pressure paint guns, and automatic paint gun washers have been used wherever possible.

- When fully developed, vapor corrosion inhibitors and electrostatically applied/infrared cured powder coatings will reduce inspection and maintenance requirements and increase the life of new and existing munitions. It is estimated that this process will extend the current two-year inspection and refurbishment cycle to up to 10 years. Another paint technology being developed at Robins involves using a plasma spray application of thermoplastic powder coatings to rapidly fuse the coating onto the aircraft substrate. This coating will eventually enhance the aircraft's resistance to abrasion, reduce hazardous material usage requirements, and generate minimal hazardous waste.

- Base personnel regularly participate in the Warner Robins Clean Community Commission and share program highlights. The commission has undertaken a beautification project on the highway that runs parallel with the west boundary of the base. Robins cleans up the base perimeter - the local community cleans up the city side of the highway.

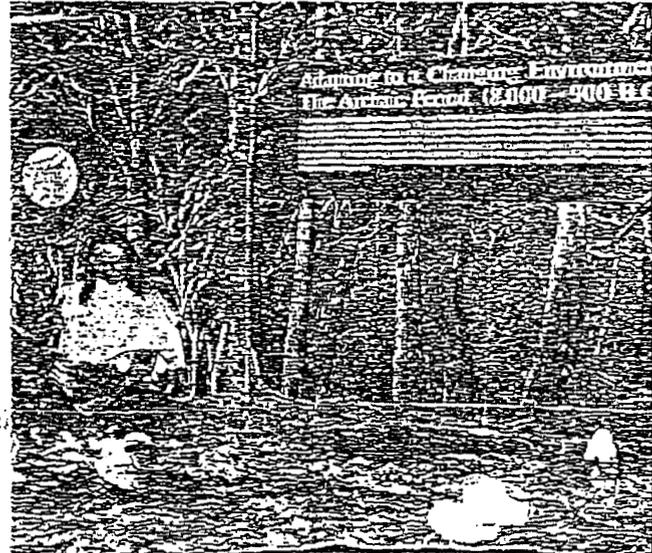
- Cooperation with federal, state, and local agencies is at an all-time high. Georgia has been delegated authority to administer the Resource Conservation and Recovery Act (RCRA) as it relates to hazardous waste management. Within two weeks of a compliance inspection, the base provides current status on any findings/questions asked at the regulator's office. We follow up with monthly status reports. As a result, enforcement actions have been minimal and no fines/penalties have been imposed. Robins AFB was NOV free at the end of CY94.

- Robins AFB actively keeps the public informed of our restoration program. Robins' IRP was showcased by Channel 11 News in Atlanta in a three-part telecast. This telecast showed the Air Force's commitment in cleaning up contaminated sites in an expeditious manner. Bioventing remediation at Robins was televised on Cable News Network, highlighting innovative environmental technologies and demonstrating Air Force resolve to clean up sites through efficient, cost-effective means. Personnel from the Restoration Division were routinely interviewed for the local Robins' Report and Middle Georgia news stations.

- Robins provided testbeds for validating experimental cleanup technologies in cooperation with regulators, research laboratories, and local universities. Robins' sites have proven to be ideal for conducting chlorinated hydrocarbon bioreclamation of groundwater, bioventing of petroleum contaminated soils, and sludge solidification.

- In tandem with aggressive restoration activities, a good working relationship with the community is resulting in a new respect for base initiatives. At the forefront of this effort in Environmental Management was the Restoration Division's establishment of a Restoration Advisory Board (RAB). The RAB is a coordinated, concerted effort by the Air Force, state and federal regulators, and local citizens to facilitate the early and continued exchange of information between all parties concerning the IRP at Robins AFB. This exchange in turn helps all parties understand the impacts of competing needs and requirements on affected communities and permits consideration of issues associated with environmental restoration and associated activities.

- From a modest beginning in 1984, the Museum of Aviation has become an important cultural, economic, and educational asset to the Air Force-Community Partnership which built and helps operate its unique facilities and programs. In 1993, Robins obtained a \$229,000 grant from the Legacy Resource Management Program for curation and display of native American artifacts found on base, some dating back to 3,000 B.C. In 1994, the museum received a \$913,000 grant from the Georgia State Legislature to build yet another hangar and MissionQuest Education Center to help educate students at all levels outside the classroom in the areas of math and science principles relating to aerospace technology.



Native American Museum Display

- Robins is also home of the Air Force Alternative Fuel Vehicle Systems Program Office (AFVSPO) which manages more than 1,000 converted natural gas and electric vehicles. The AFVSPO was appointed as the technical and management focal point within the Department of Defense (DoD) for the Advanced Research Projects Agency (ARPA) which allocates funding for DoD alternative fuel vehicles. The AFVSPO is working under Memoranda of Agreement with both the Army and the Navy to fully develop and integrate non-tactical, alternative fueled vehicles into their programs. The AFVSPO was recently asked to join the Southern Coalition for Advanced Transportation (SCAT), one of six regional consortiums, to promote electric and hybrid vehicle technology throughout the country. During 1993 and 1994, Robins converted 80 of its fossil-fuel-burning vehicles to natural-gas-fueled vehicles. Robins also opened the Air Force's first compressed natural gas station with an automated management system capable of reporting fuel amount dispensed via the Vehicle Identification Link (VIL) system. Robins assisted in establishing

## Clean sweep a MUST for ECAMP

Environmental responsibility is clearly in everyone's job lot. We have an opportunity to prove we recognize our responsibility and are serious about practicing environmental compliance when we undergo our Environmental Compliance Assessment and Management Program (ECAMP) evaluation by Headquarters Air Force Materiel Command the week of April 13-22.

What does it take to have a successful ECAMP? Quite simply, know the ground rules, scrutinize your work areas, fix problems on the spot—before the evaluators arrive—and then keep 'em fixed. If you see an open hazardous waste collection drum—close it! If you notice aluminum cans intermingled with paper in the recycling bin—segregate them! ECAMP is a positive, self-help program that enables us to pinpoint and fix environmental problems before they become major issues. The ECAMP

protocol checklist clearly outlines procedures to help us avoid notices of violation and fines from environmental regulatory agencies. Aggressive tracking, reporting and correction of findings ensure our base remains environmentally sound. ECAMP is also an effective educational tool. It is one of the best ways the Air Force has to increase environmental awareness.

This year's external ECAMP will happen when all eyes are focused on BRAC '95. Bad news, like good news, can travel fast. A great deal of time and resources have been invested training our folks and implementing progressive environmental management programs.

I expect every member of Team Robins to champion environmental responsibility and ensure we emerge from this upcoming evaluation as a leading steward of the environment.

Straight Talk Column from Robins Rev-Up

similar programs at many other Air Force Bases. Three electric vehicles, to include one bus, are expected to arrive on base by fall of 1995. Discussions are underway to showcase these electric vehicles during the 1996 summer Olympic games in Atlanta.

1. *Activities/achievements during past 2 years in Environmental Compliance Assessment and Management Program:*

- (1) *Self-Assessments*
- (2) *Interaction with regulators, inspections, NOVs, agreements, fines/penalties, & other regulatory actions*
- (3) *Budget data, to illustrate adequate funding is being budgeted and received*
- (4) *Long-term planning for full and sustained compliance*
- (5) *Training programs*

The Environmental Compliance Assessment and Management Program (ECAMP) is the backbone of our success in attaining environmental compliance. At the end of 1994 Robins AFB had no open enforcement actions, and there were no fines or penalties assessed in 1993/1994.

• Robins AFB's ECAMP team developed and began to use an installation specific list of ECAMP protocol items to perform self-inspections and ECAMPs in September 1994. The list summarizes what protocol items each base organization should check in their area to determine compliance with environmental regulations. Additionally, the ECAMP Integrated Product Team (IPT) developed management action plans to correct ECAMP findings as soon as they were discovered. The ECAMP IPT reviewed these plans at least quarterly and briefed metric information at quarterly EPC meetings, facilitating proper senior leadership attention.

- This metric requires 100% of all findings programmed for closure in a management action plan within 90 days of the inspection's outbreak; 50% of findings fixed within the first 90 days, 35% fixed within 180 days, 95% of findings fixed within one year, and 100% of the findings fixed within two years.

• Robins AFB conducts an annual concentrated base-wide evaluation, periodic self-inspections by ECAMP coordinators, and periodic no notice spot-checks by Environmental Management personnel. In addition, Robins' Installation Commander performs no-notice ECAMP inspections. The Commander's "dumpster-diving" and frequent reference to the importance of ECAMP in his staff meetings, Team Talk Addresses, and base newspaper publications have greatly served to promote environmental compliance.

• Additionally, the Commander challenged the base at the Team Talk to fix 50% of the External ECAMP findings with 30 days of the evaluation. The base met the challenge, beating the Major Command goal by 60 days.

• The periodic self-inspections by ECAMP coordinators and spot-checks by Environmental Management personnel serve to keep attention focused on the goal of full environmental compliance. Self-inspections help ECAMP coordinators discover and correct problems before regulatory agencies inspect. The no-notice spot-checks by Environmental Management personnel serve to focus senior leadership attention on problems in their areas, tangentially measuring the success of their ECAMP coordinator's performance. The primary goal of both types of ECAMP is to discover problems before they become regulatory issues.

• Environmental Management personnel always accompany regulatory agency inspectors while they tour the installation. Any discrepancies discovered are often corrected on the spot or very shortly thereafter by actions performed by the ECAMP IPT. The goal is to correct any findings prior to receipt of NOVs. In addition, AFM/C policy requires a message be sent from the Installation Commander to the AFM/C command section within five days of the receipt of an NOV. The message informs the Major Command of the NOV and if the citation is a

This is a glimpse of Team Robins. We're good stewards of the environment, approaching the next century with sound leadership and a strong sense of accomplishment. Our cleanup goals are within reach; by maintaining persistent surveillance and progressive training programs, we'll stay in compliance: our conservation and pollution prevention efforts are paying huge dividends today and as we exploit new technologies, will provide a better tomorrow. At Team Robins, environmental quality and mission are on the same team.

## CONCLUSION

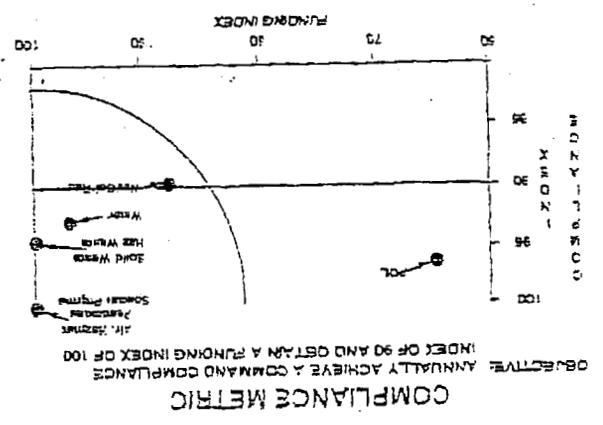
During the past two years, the Center has participated in several Air Force Integrated Process Teams (IPT) aimed at improving the way business is done. As a member of the Acquisition Pollution Prevention and Tools IPT, we helped to identify management techniques to assist Air Force Weapon System Single Managers in achieving hazardous material reductions. The Pollution Prevention and Weapon System Acquisition Handbook, published in December 1994, for use by the Weapon System Single Managers was a direct result of this effort. As a member of the Air Force Ozone Depleting Substances (ODS) IPT, we assisted in establishing Brooks AFB, Texas as the Air Force focal point on ODS alternatives.

In 1993, Robins began to digitize and screen technical orders to identify references to ODS and other hazardous materials. Robins' format has become the criterion for the Air Force. By combining and implementing Air Force and local strategies, we have eliminated 62% of the ODS references in the 40,000 technical orders managed at Robins.

We aggressively train production as well as environmental management personnel. First, ECAVP coordinators receive yearly training on how to conduct ECAVPs. For instance, in 1992, 42 ECAVP coordinators received the Air Force Institute of Technology's one week ECAVP course via satellite transmission. Next, since the majority of the ECAVP coordinators also serve as their organization's environmental coordinator, they receive yearly RCA and Accumulation Point Management training. Environmental Management also provides staff assistance to the various ECAVP and Environmental coordinators by performing site-specific training at the various facilities. Finally, the ECAVP manager uses the ECAVP IPT to disseminate information. The ECAVP program manager has provided band-ours containing helpful items of information, changes in policy, and examples of what to look for and avoid at each IPT.

Long-term planning-for full and sustained compliance at Robins goes far beyond complying with today's laws. The Air Logistics Center aggressively seeks process improvements that will allow us to meet mission needs of the 21st century while minimizing discharge or pollution. Robins is serious about source reduction rather than end of the pipe treatment. Process changes, alternate technologies, material substitutions, and best management practices are continually identified and implemented at every level.

Compliance Metric Chart



Robins uses AFM's Compliance and Funding Index Metric to measure the adequacy of budgetary programs. Robins obligated \$17.5 million in FY93 and \$24.7 million in FY94 on environmental requirements. This effort serves to highlight funding shortfalls. Money can be resubmitted to more pressing concerns.

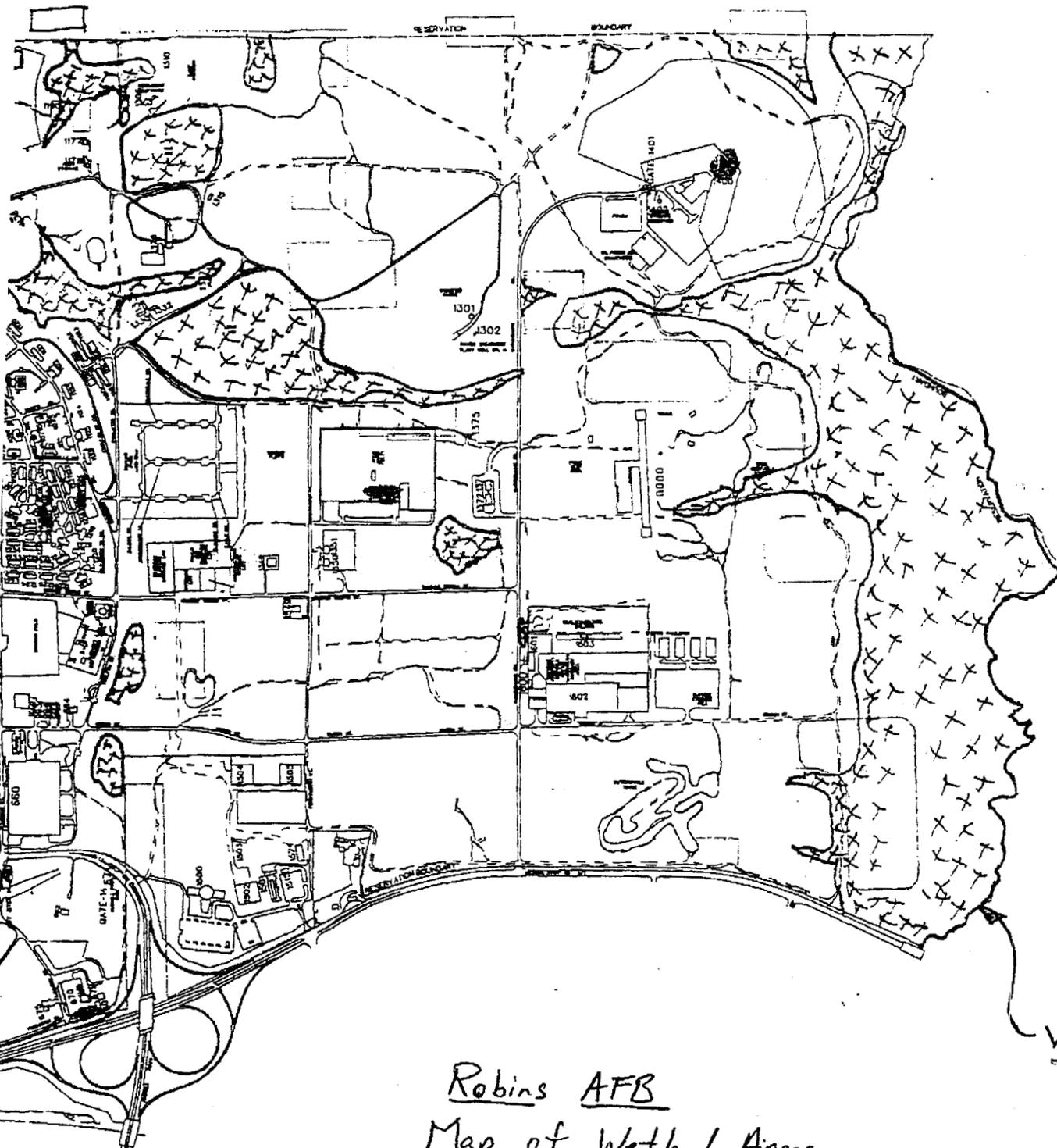
The compliance index (y-axis) is a measure of how well the base is meeting statutory requirements identified in ECAVP protocols. The funding index (x-axis) is the ratio of funded projects to the validated, executable projects.

AFM's Compliance and Funding Index Metric will soon be revised. This often serves to curtain planned or initiated. This often serves to curtain planned or initiated action since the regulators know the issue will soon be resolved.

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# Document Separator



Wetlands

Robins AFB  
 Map of Wetland Areas

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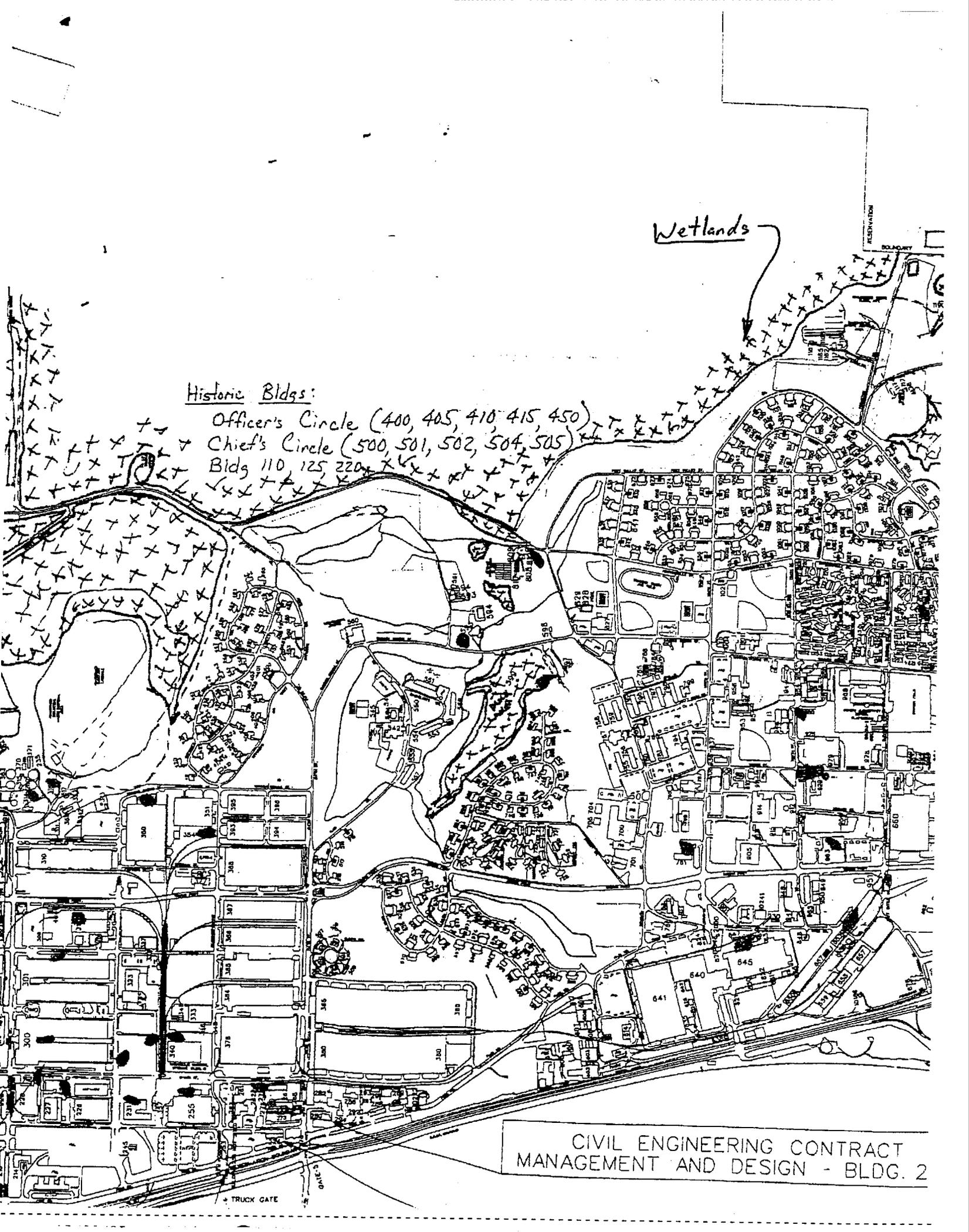
Wetlands

Historic Bldgs:

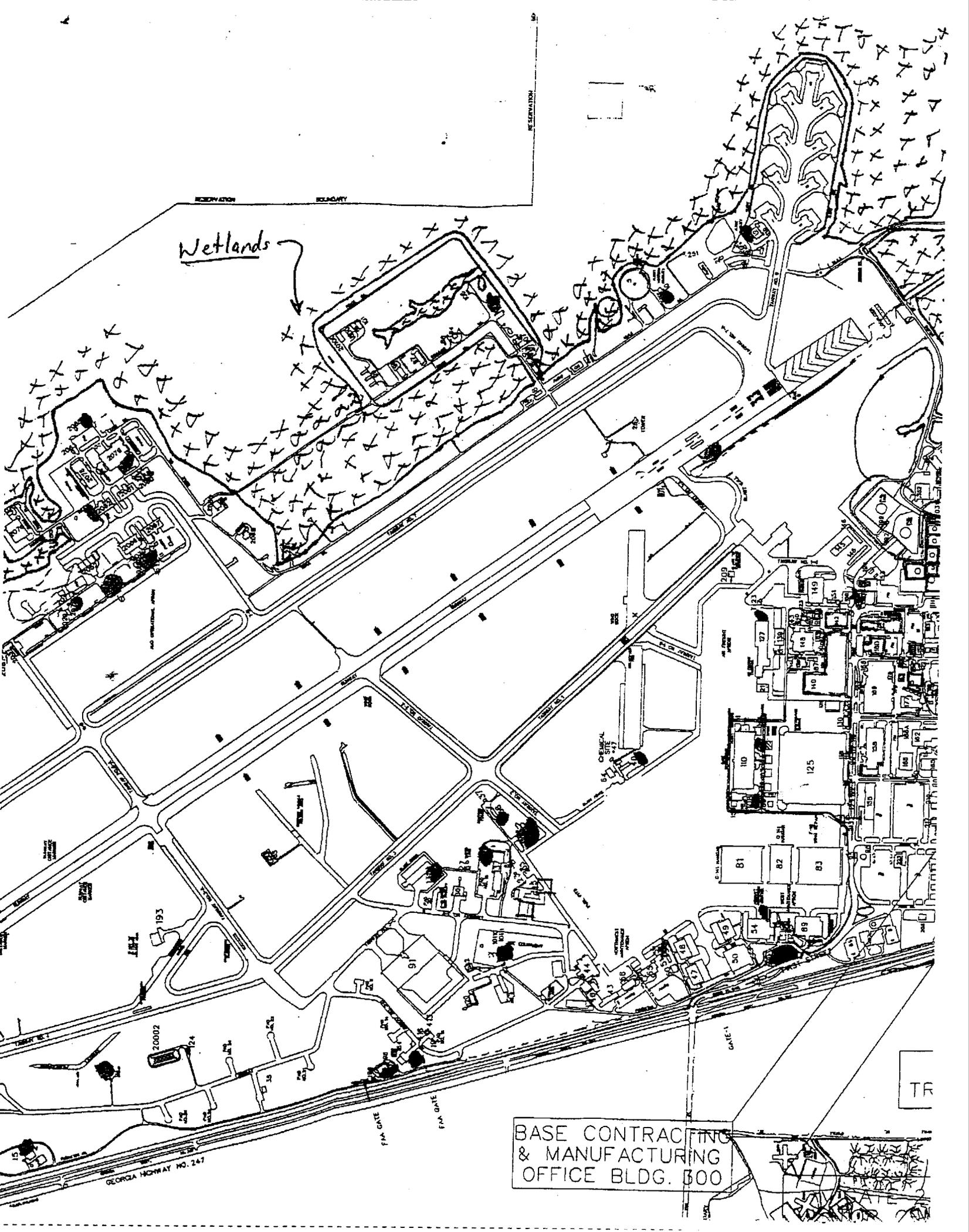
Officer's Circle (400, 405, 410, 415, 450)

Chief's Circle (500, 501, 502, 504, 505)

Bldg 110, 125, 220



CIVIL ENGINEERING CONTRACT  
MANAGEMENT AND DESIGN - BLDG. 2



Wetlands

BASE CONTRACTING  
& MANUFACTURING  
OFFICE BLDG. 500

GEORGIA HIGHWAY NO. 247

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# Document Separator



Wetlands

Robins AFB  
 Map of Wetland Areas

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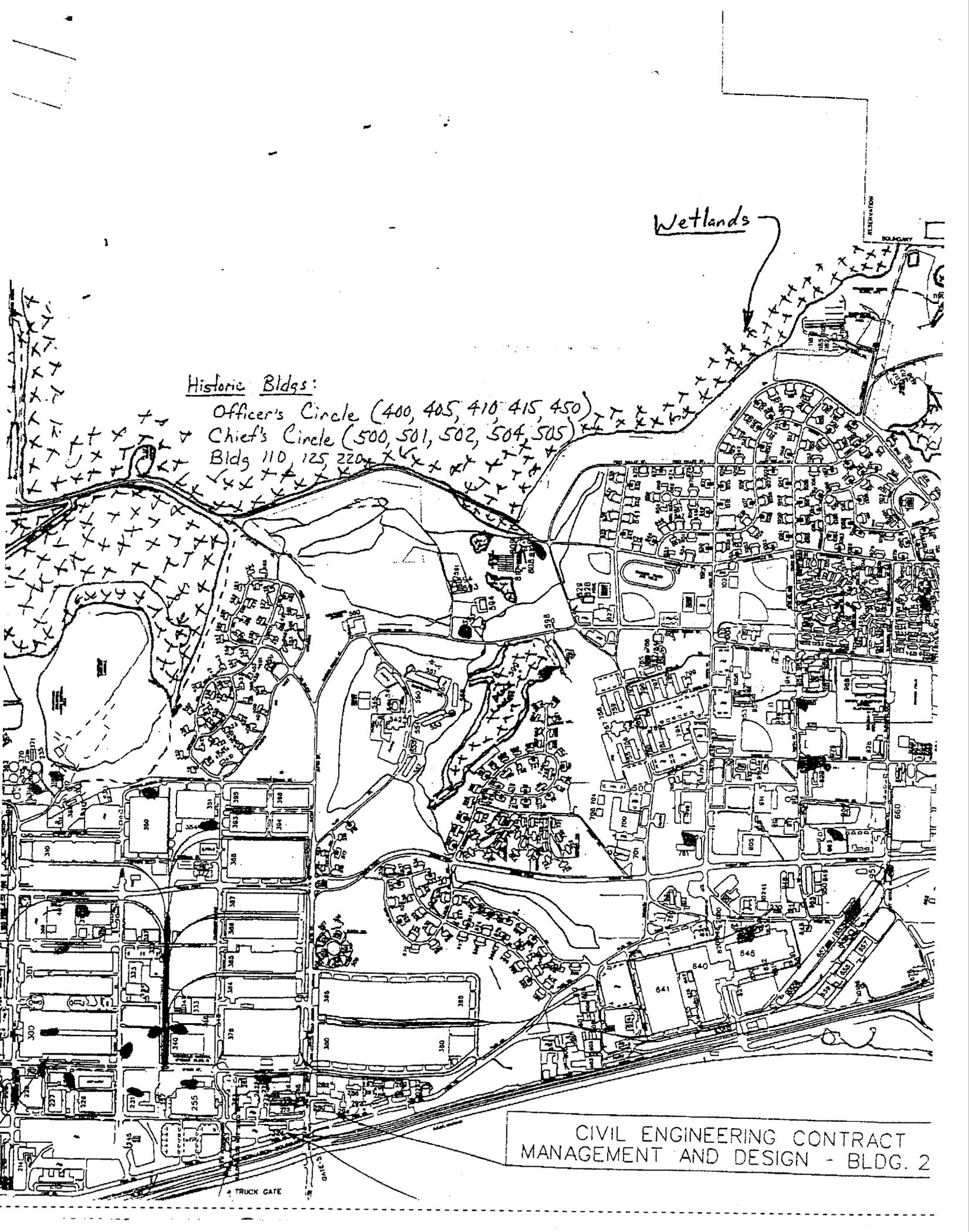
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Historic Bldgs:

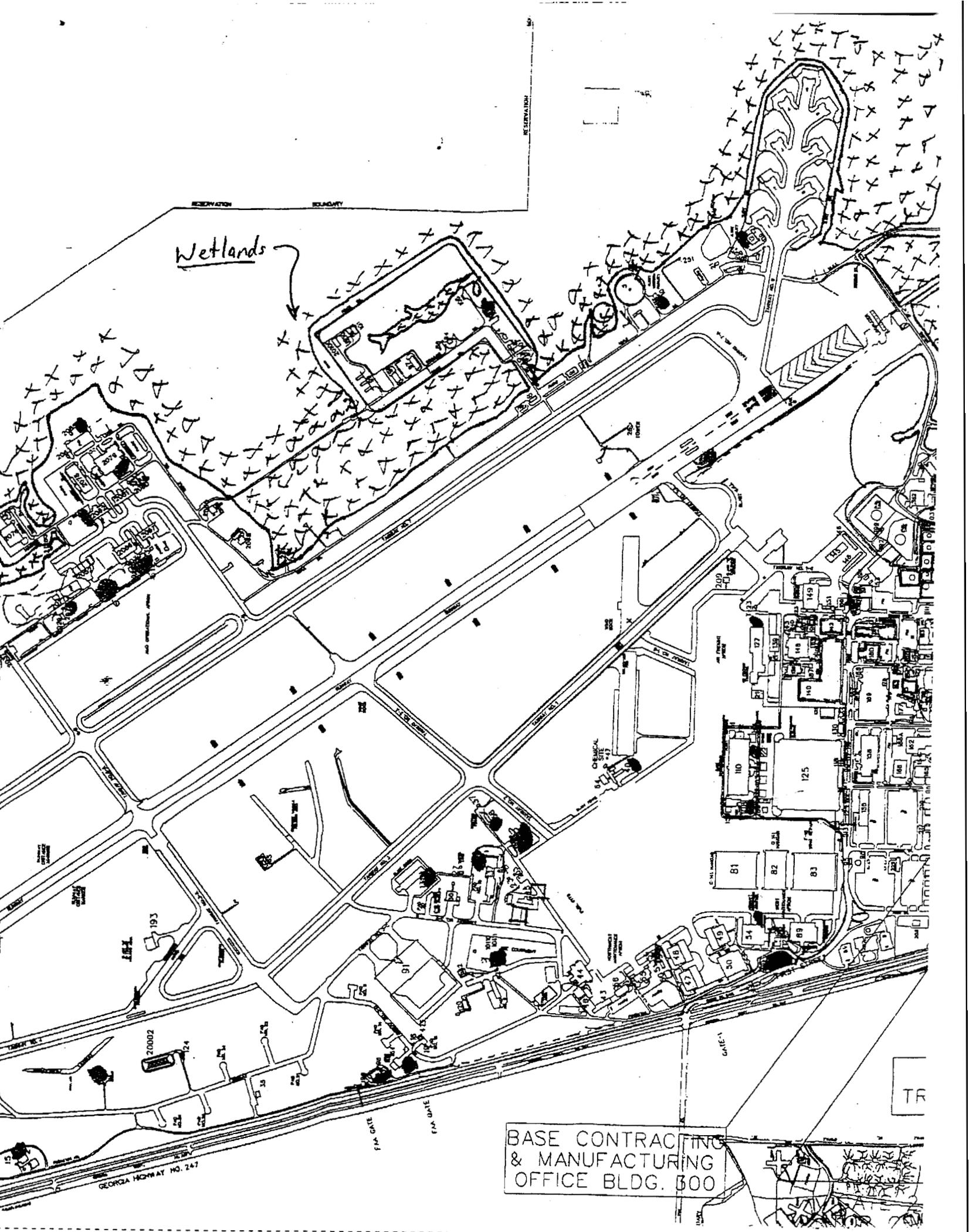
Officer's Circle (400, 405, 410, 415, 450)

Chief's Circle (500, 501, 502, 504, 505)

Bldg 110, 125, 220



CIVIL ENGINEERING CONTRACT  
MANAGEMENT AND DESIGN - BLDG. 2

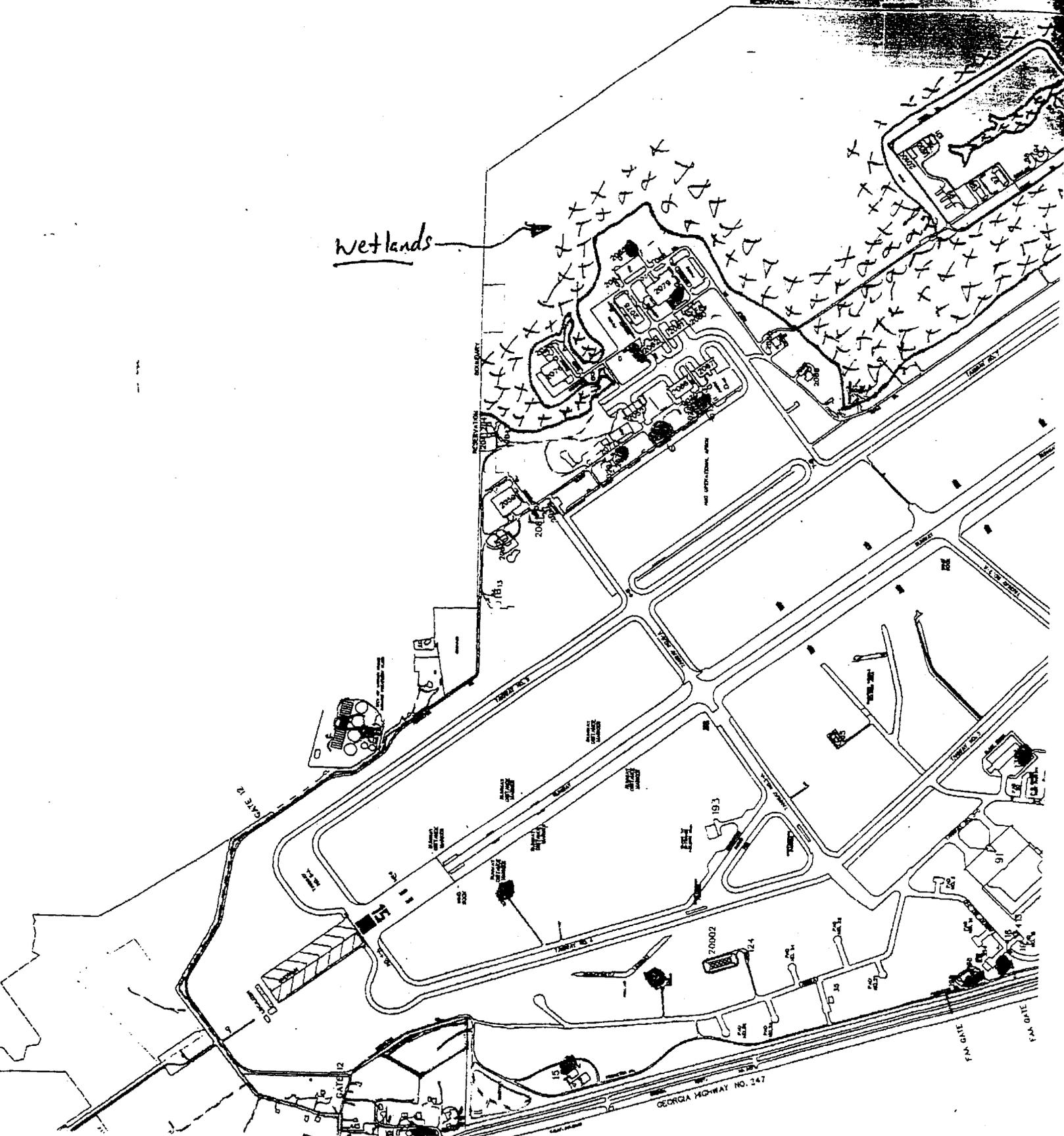


Wetlands

BASE CONTRACTING  
& MANUFACTURING  
OFFICE BLDG. 300

TR

Wetlands



# Document Separator

Title V permit application cost  
Contract - \$996K

Air regulations are more restrictive for McClellan AFB than for Robins AFB.

McClellan is in a nonattainment area for ozone. Robins is in an attainment area for all criteria pollutants. If EPA does approve Sacramento's petition to be designated as an attainment area for CO and PM-10, they will still be designated as a maintenance area for 20 years. The requirements for a maintenance area could be more restrictive than attainment, as they are working to maintain their air quality standards.

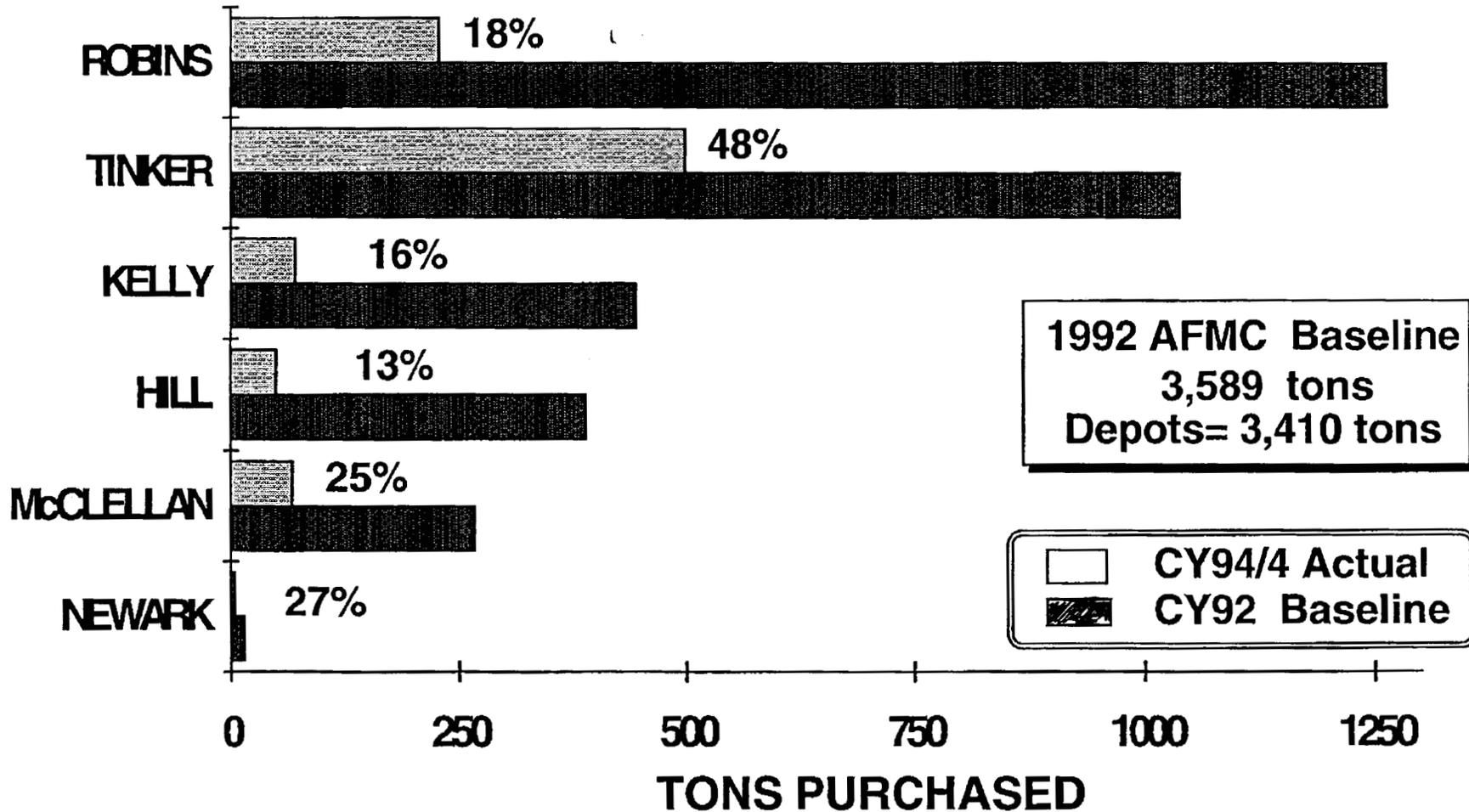
Since McClellan is in a non-attainment area, they are subject to the conformity rule. Robins does not have to comply with this rule, currently. The conformity rule could restrict programs from moving to McClellan, unless they have sufficient emissions offsets or manage the program to limit emissions.

Under Title III of the CAAA-90, EPA is writing National Emission Standards for Hazardous Air Pollutants (NESHAP). These regulations will reduce emissions of hazardous air pollutants (HAP) by source category, for example Aerospace Surface Coatings. The NESHAPs will level the playing field for some of the current requirements that are currently more stringent in California. For some source categories, such as Aerospace, a Control Technologies Guideline (CTG) will be written as well. The CTG requirements will be implemented in nonattainment, and may be implemented in attainment areas by the state. Therefore, the CTGs could impose more stringent requirements on sources in nonattainment areas.



# DEPOTS EPA-17 REDUCTION

## CY 94/4 vs CY 92 BASELINE



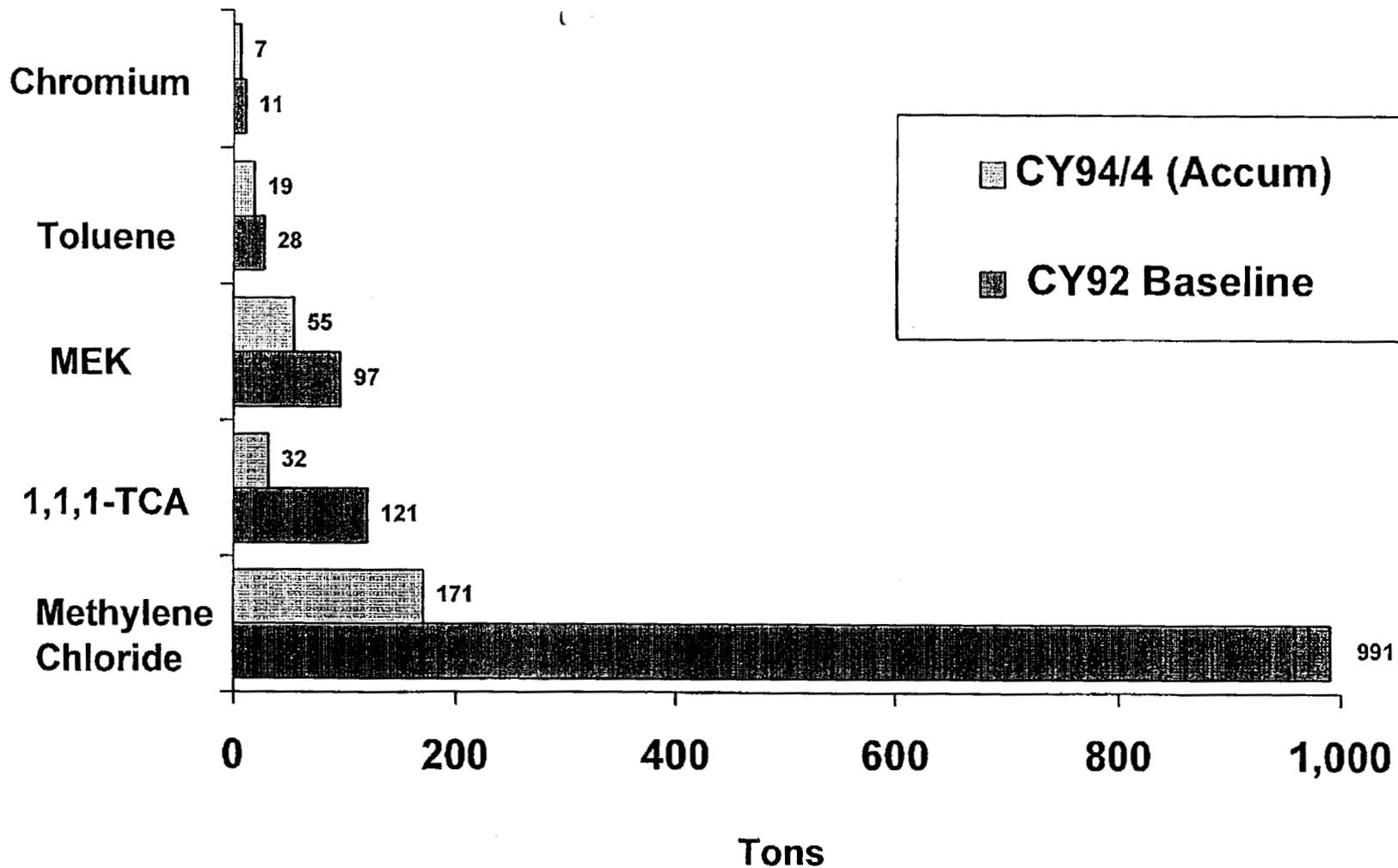
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EPA-17 Rollup

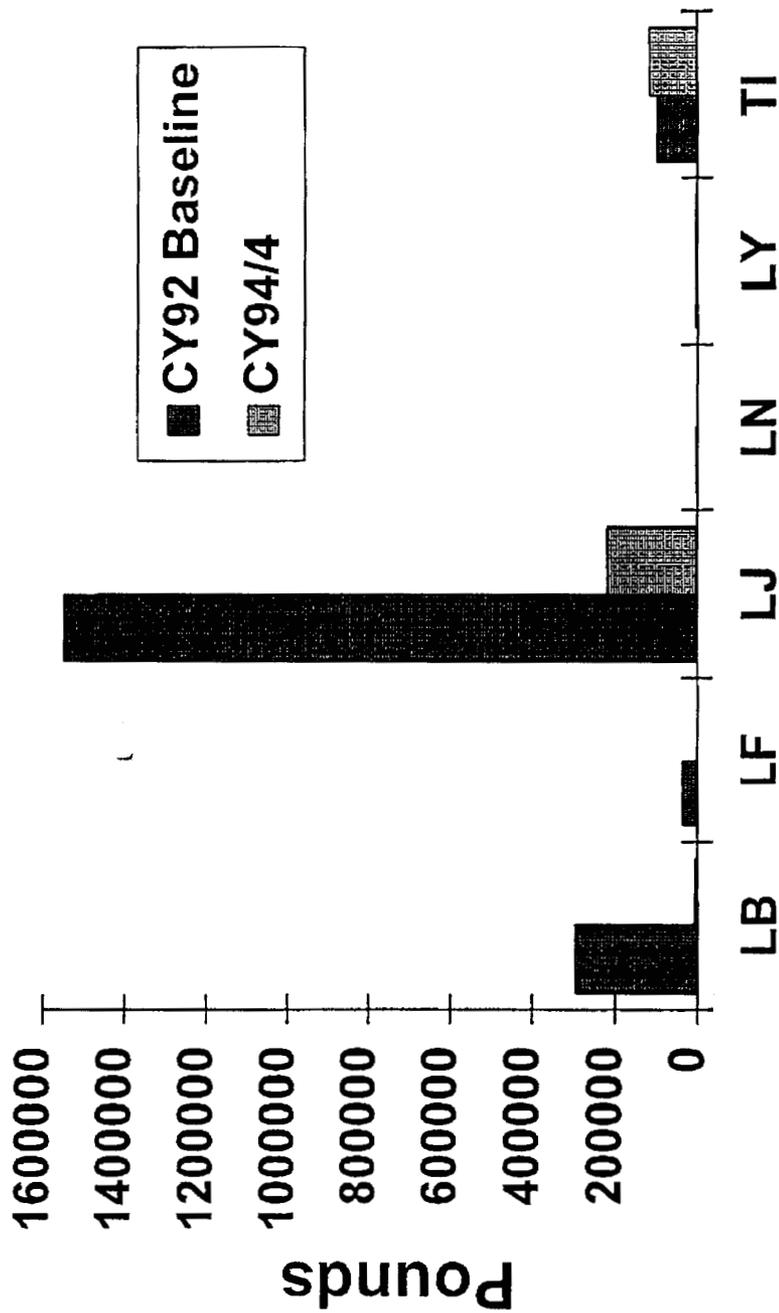
	Supply System DM-HMMS											
	CY92 Baseline	CY93/1	CY93/2	CY93/3	CY93/4	CY 93 Total	CY94/1	CY94/2	CY94/3	CY94/4	CY94/4Total	CY94/4
Benzene	11	3	1	0	2	6	3	3	3	3	12	60
Cadmium	332	72	94	139	43	348	31	192	64	0	287	3
Carbon Tet	6	0	0	0	0	0	0	1	0	0	1	8
Chloroform	0	0	0	0	0	0	0	0	0	0	0	0
Chrome	22,865	2,895	10,000	6,049	1,027	19,971	2,219	7,937	1,216	2,144	13,516	4924
Cyanides	3,411	3	0	1,251	529	1,793	577	0	0	0	577	450
Methylene Chloride	1,981,657	251,926	637,184	472,838	362,500	1,724,448	137,286	144,967	22,776	36,165	341,194	31665
Lead	819	214	67	157	233	671	104	59	56	222	451	82
Mercury	978	241	170	271	232	914	232	120	5	0	357	2
MEK	194,435	27,325	44,428	33,551	27,611	132,915	42,627	15,409	23,780	27,576	109,392	343934
MIBK	13,655	3,497	3,672	3,637	2,262	13,068	2,811	2,660	3,108	1,903	10,482	276502
Nickel	1,397	165	143	152	128	588	116	264	44	75	499	9
Perchloroethylene	3	0	0	0	22	22	0	0	0	0	0	529
Toluene	56,218	27,444	15,510	27,865	11,406	82,225	7,172	8,050	15,435	7,645	38,302	734659
1,1,1-TCA	242,468	12,328	23,230	33,216	25,620	98,394	21,234	17,254	6,871	19,107	64,466	33859
Trichloroethylene	23	3	6	0	0	9	3	0	0	0	3	0.5
Xylene	11,566	10,036	1,976	8,244	1,524	21,780	1,518	1,887	1,336	1,761	6,502	17587
<b>Total</b>	<b>2,529,844</b>	<b>336,152</b>	<b>736,481</b>	<b>587,390</b>	<b>437,139</b>	<b>2,097,152</b>	<b>215,933</b>	<b>198,803</b>	<b>74,704</b>	<b>96,601</b>	<b>586,041</b>	<b>2044274</b>
% Reduction						17.10%					76.83%	



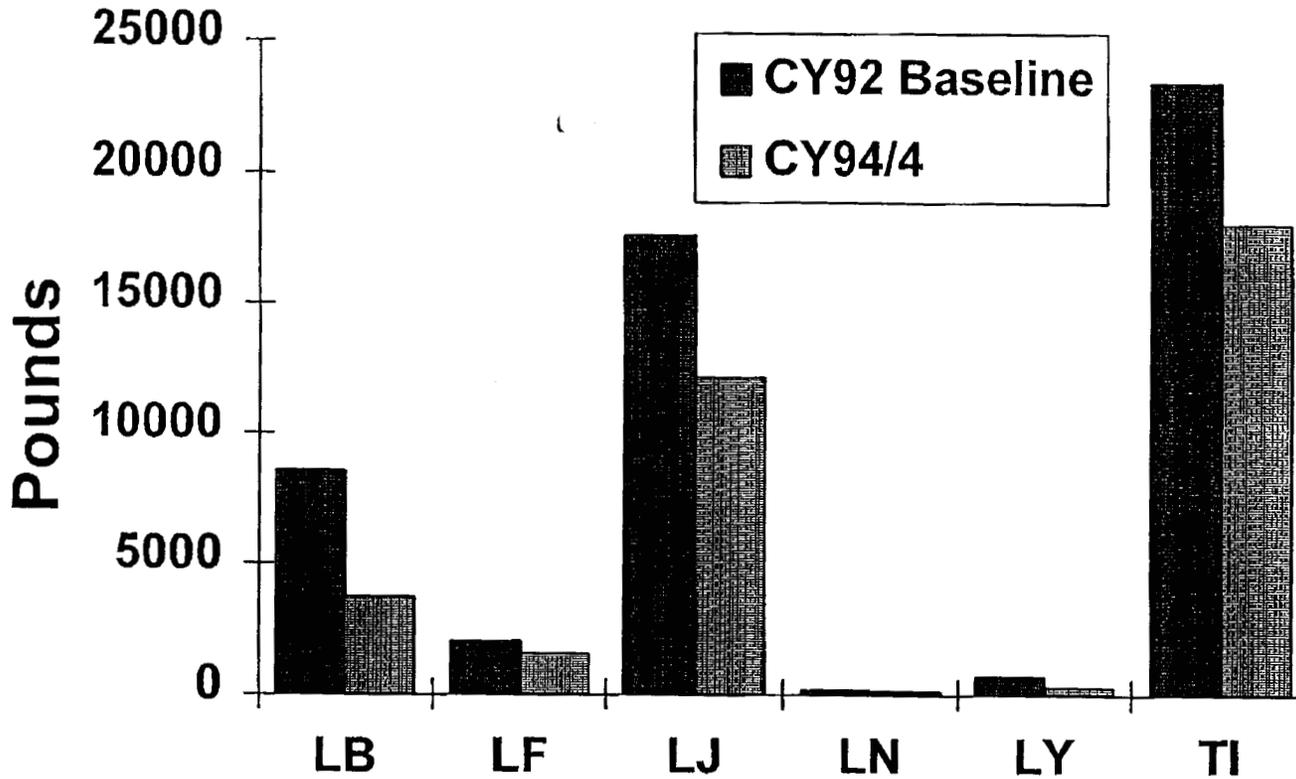
# EPA-17 Pounds Purchased Basewide



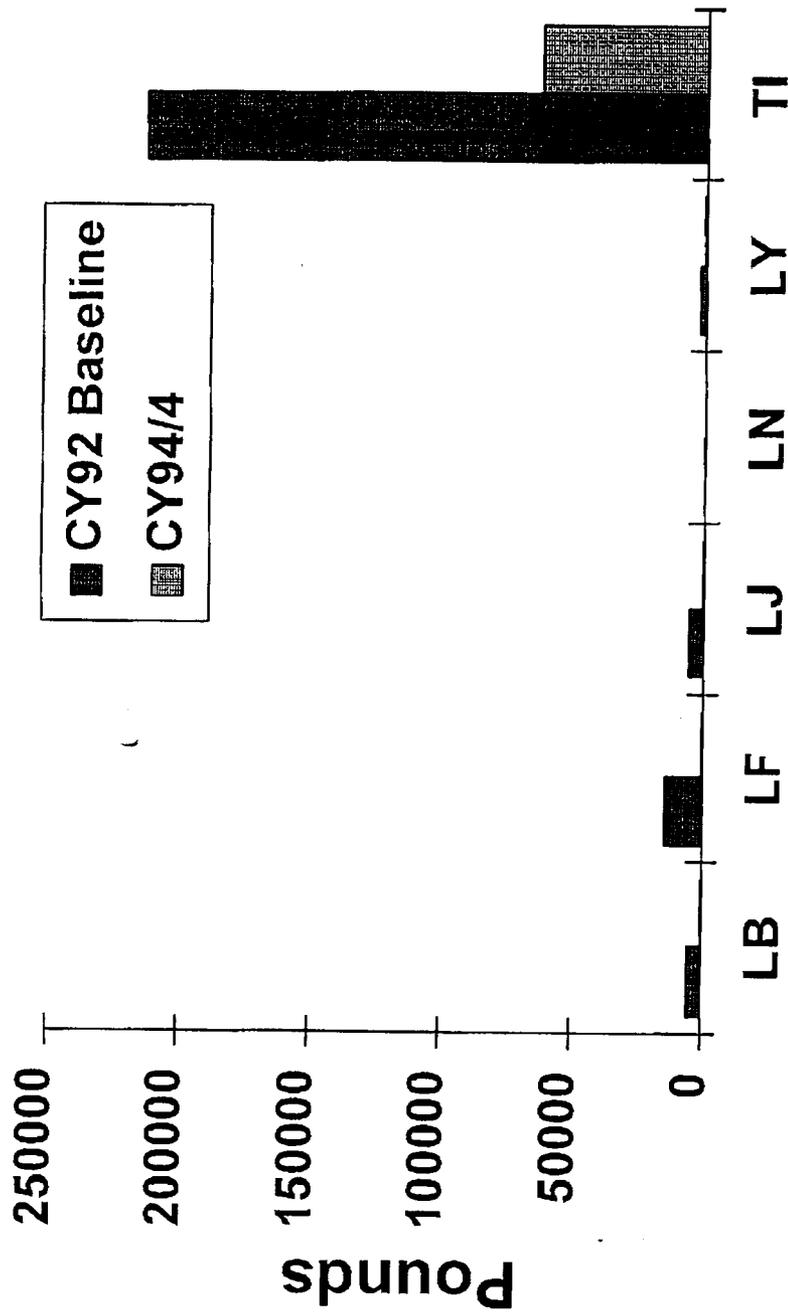
# Methylene Chloride Reductions (As of CY94/4)



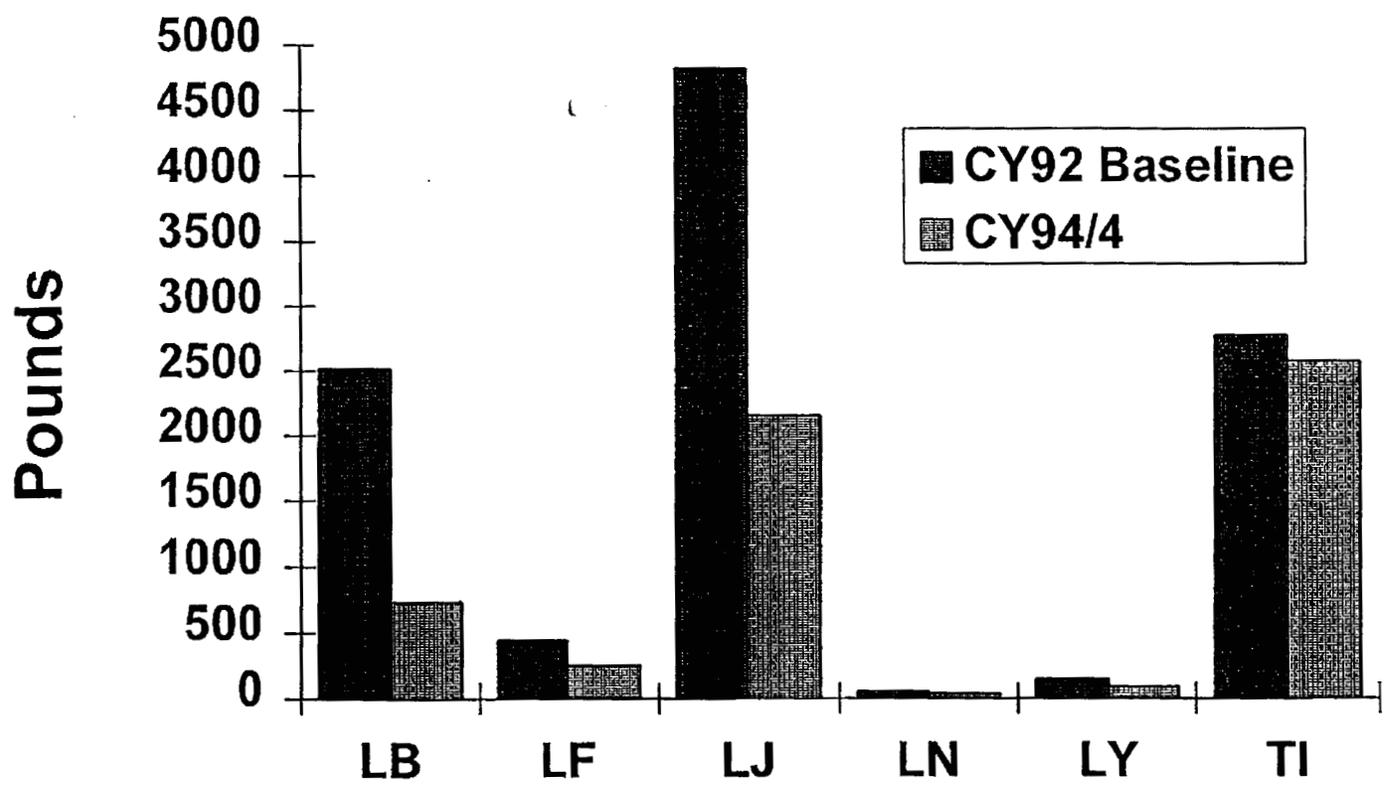
# Toluene Reductions (As of CY94/4)



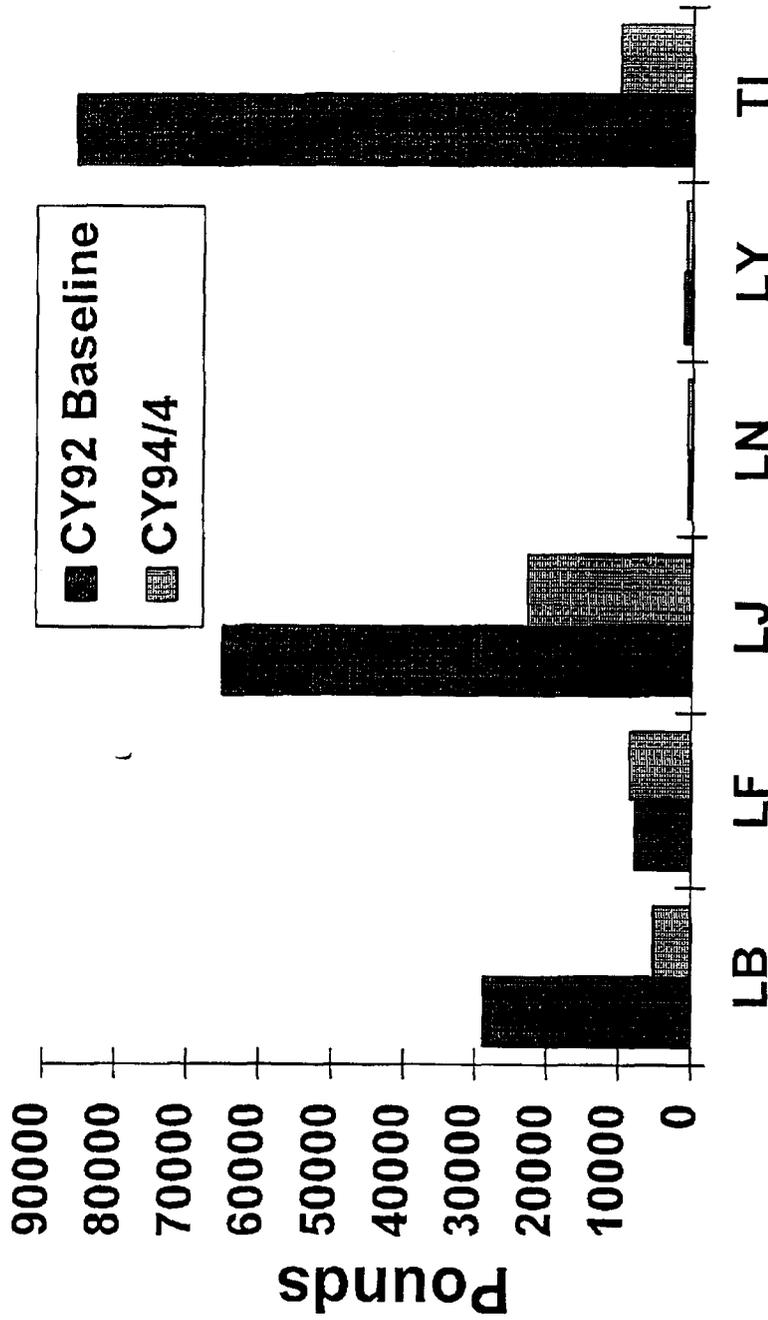
# TCA Reductions (As of CY94/4)



# Xylene Reductions (As of CY94/4)



# MEK Reductions (As of CY94/4)



# Document Separator

Mtg. w/ Mike West

2/1/95  
M West.

Sacramt AQMD - <sup>new</sup> "severe" status  
MC will be biggest ~~impact~~ "hit" on base.

nonattainment & maintenance in NOx & PM10-

Robins - no one has to make a trade off into  
Central Georgia with ~~the~~ doing what they don't want to  
do.

All depots look just about the same, eventually  
speaking (red/yellow/green).

Kelly ATB near nonattainment: San Antonio is going rapidly.

Mane Island / NAPA Island: have contracted out because of  
RCRA, CWA constraints.

water supply costs:

Kelly: the water situation looks a lot better than it did.

Ratepayers don't want to pay the money. Up until  
agreement, you couldn't get citizens to buy into additional  
costs. Providing regional authorities will get reimbursed.

Extra costs for running a pipe out to San Antonio for water  
supply.

Robins: want to put into "Blue Creek": didn't meet permit  
req's.

GAT Environ. Protection Division -

Problems could have been foreseen: look at the "hammers"  
in the law & figure out what the costs are that are  
comp at you.

Recommendations for future BRTZ rounds:  
Figure out for funds purposes (cost avoidances)  
but also for ~~cost~~ compliance numbers.

In ~~the~~ 93 BRTZ,

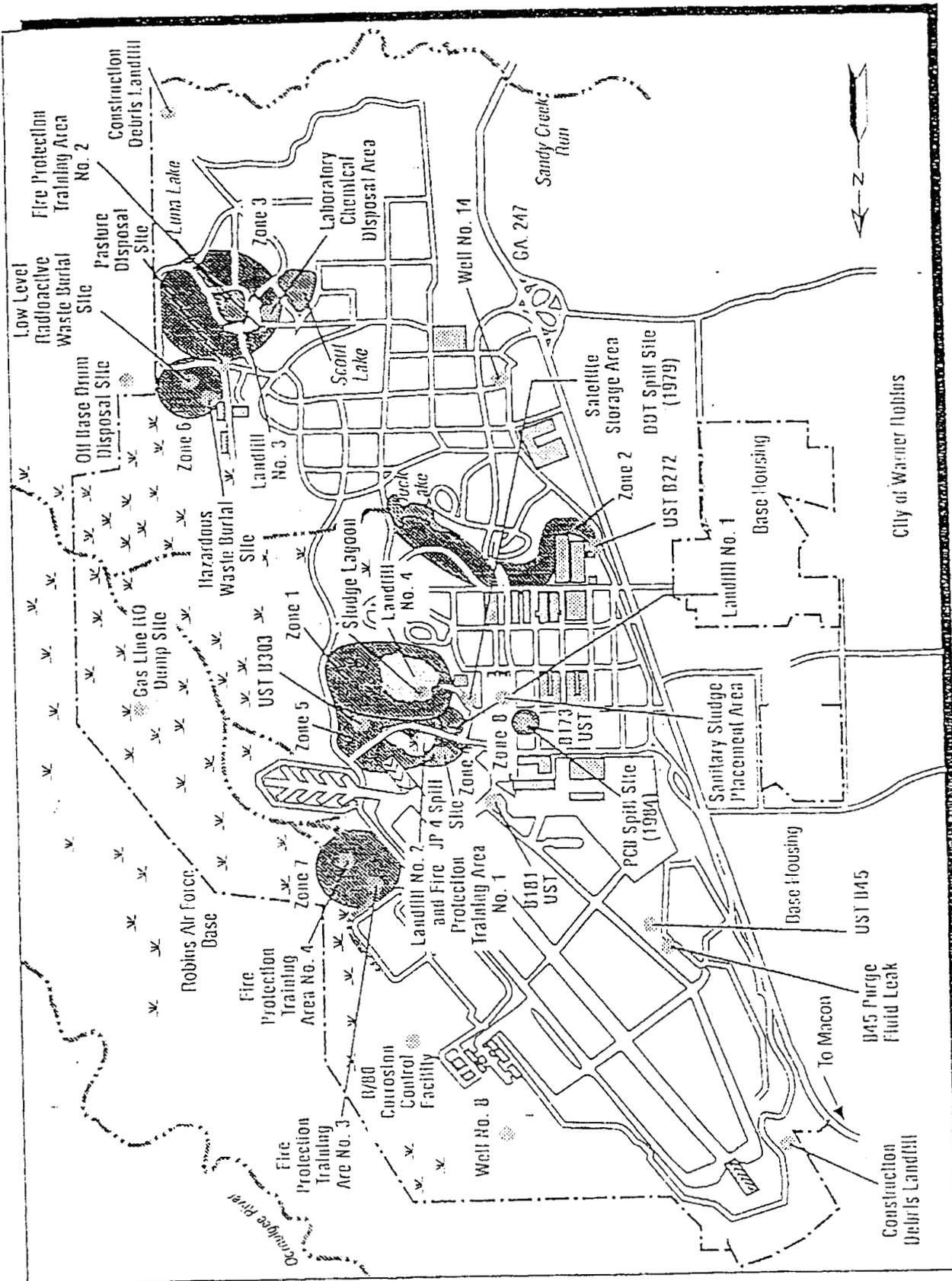
④ Plattsburgh/McGuire: no one dealt w/ the CAA  
problem until the last minute.

compliance costs should not be taken out of funds by spots that  
can't afford it.

Point of fact, your TCE w/ some trace so that it's known  
who it's for.

There is no source of funds as such - base closure cleanup  
funds.





CHAM HILL

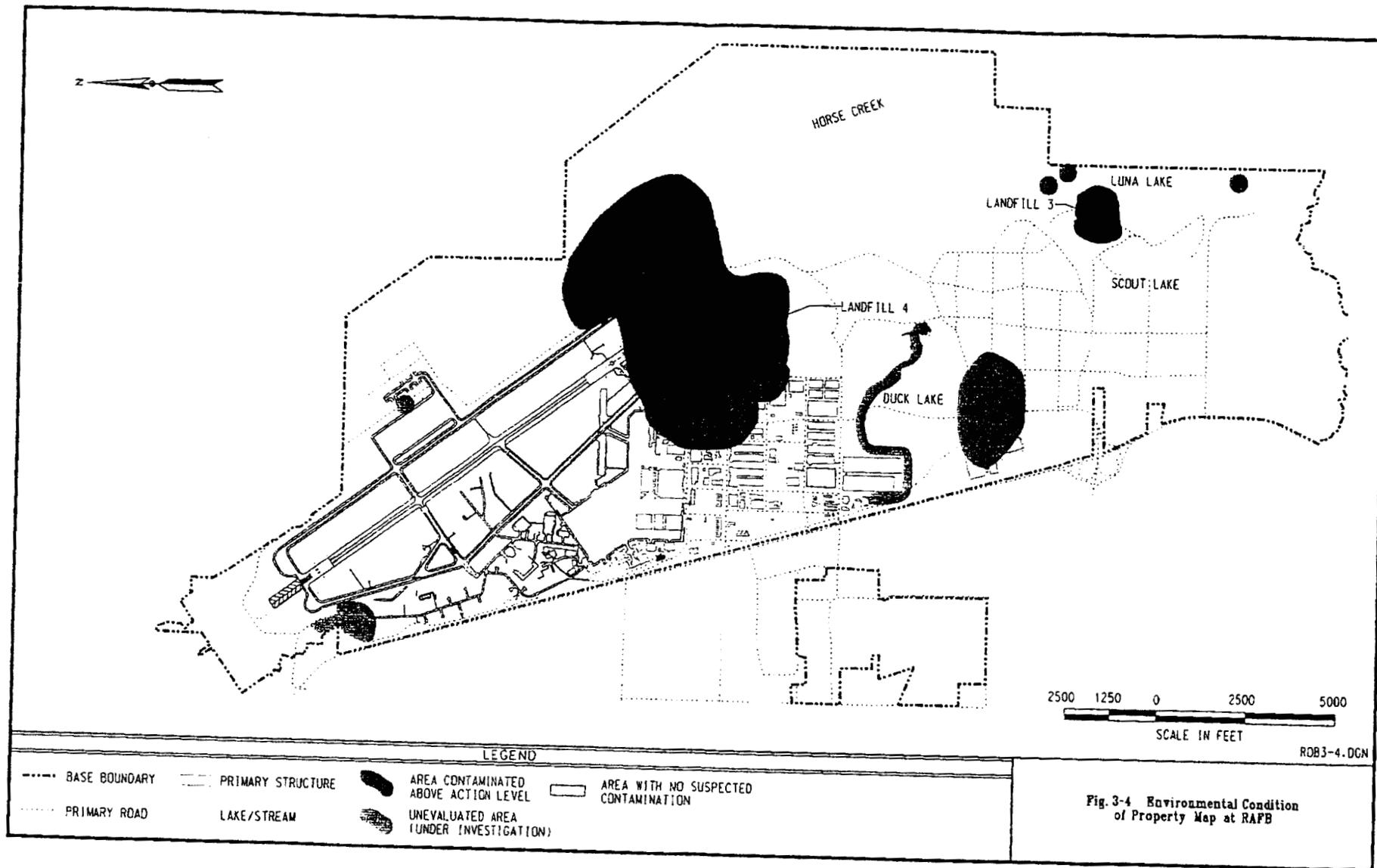


Fig. 3-4 Environmental Condition of Property Map at RAFB

# Document Separator

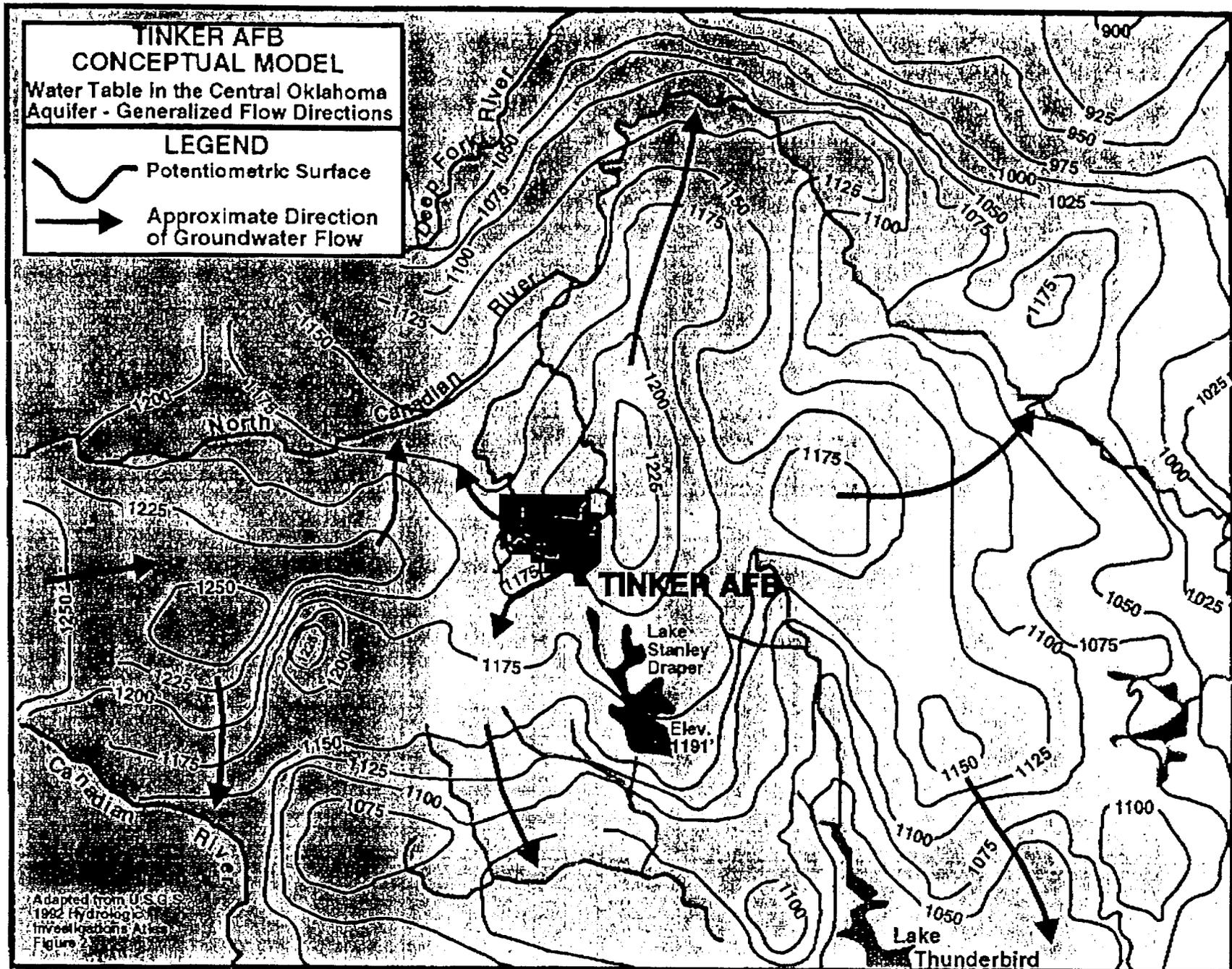
from wells in the southwest portion of the base. Measured water levels in two of the new wells show that the LSZ becomes confined at these locations by the shale separating the USZ and LSZ where the shale intersects the lower water level. No unsaturated interval is present.

To the southwest around Crutch Creek, measured water levels from wells screened in the Garber Sandstone at Landfills 2 and 4 which correspond in the conceptual model to the upper unconfined water surface (USZ) under the east part of the base (Figure 1-4), show that the USZ remains unconfined or is partially confined. This is essentially the first water level encountered in the Garber Sandstone on the base. Potentiometric data from wells in the southwest screened in deeper intervals which correspond roughly to the lower saturated zone to the east indicates that the LSZ is confined in this area. Data from wells screened at various intervals to a depth of about 90 feet in this area also shows that no vadose (unsaturated) zone separates the upper saturated zone from the rest of the aquifer. The upper and lower zones cannot be distinguished in this area except by correlating geologic units across base.

Further to the southwest of the landfills near the edge of the base another unsaturated zone is found separating groundwater in the Hennessey Group from the Garber-Wellington aquifer. This unsaturated zone is not continuous with that encountered on the east side of the base. The groundwater in the overlying Hennessey represents the third groundwater zone of more limited areal extent mentioned earlier and shown on Figure 1-4. This shallow unconfined aquifer system is located on a topographic high (groundwater divide) in strata of the Hennessey Group. Radial flow of groundwater off the divide toward nearby tributaries of Crutch Creek is suggested from limited water level measurements. Additional shallow perched saturated zones of limited areal extent are thought to exist in other sandstone and siltstone beds within the Hennessey. Along the western margin of Tinker west of Crutch Creek, the shallow groundwater in the Hennessey and probably groundwater in the most shallow saturated zone in the Garber-Wellington appears to flow toward stream tributaries and therefore does not follow regional flow patterns to the west/southwest.

The aquifer zones in the conceptual model are hydraulically connected, although sometimes only to a very local extent, either directly as in the west part of the base or indirectly through leakage and/or recharge/discharge patterns related to local streams. Because Tinker is located in a recharge zone for the Central Oklahoma aquifer both horizontal and vertical (downward) components of groundwater flow exist. Measured potentiometric levels from well clusters with screens and filter packs placed at varying depths within the lower saturated zone show that hydraulic heads decrease with depth and that the magnitude of the vertical component of flow varies with location. This is particularly important to recognize where data from these wells is being used to generate potentiometric contour maps.

Although the variability in the geology and the recharge system at Tinker makes it difficult to predict local flow paths, Central Oklahoma aquifer water table data taken from the 1992 U.S.G.S. Hydrologic Atlas (Figure 1-6) shows that regional groundwater flow under Tinker



1-20

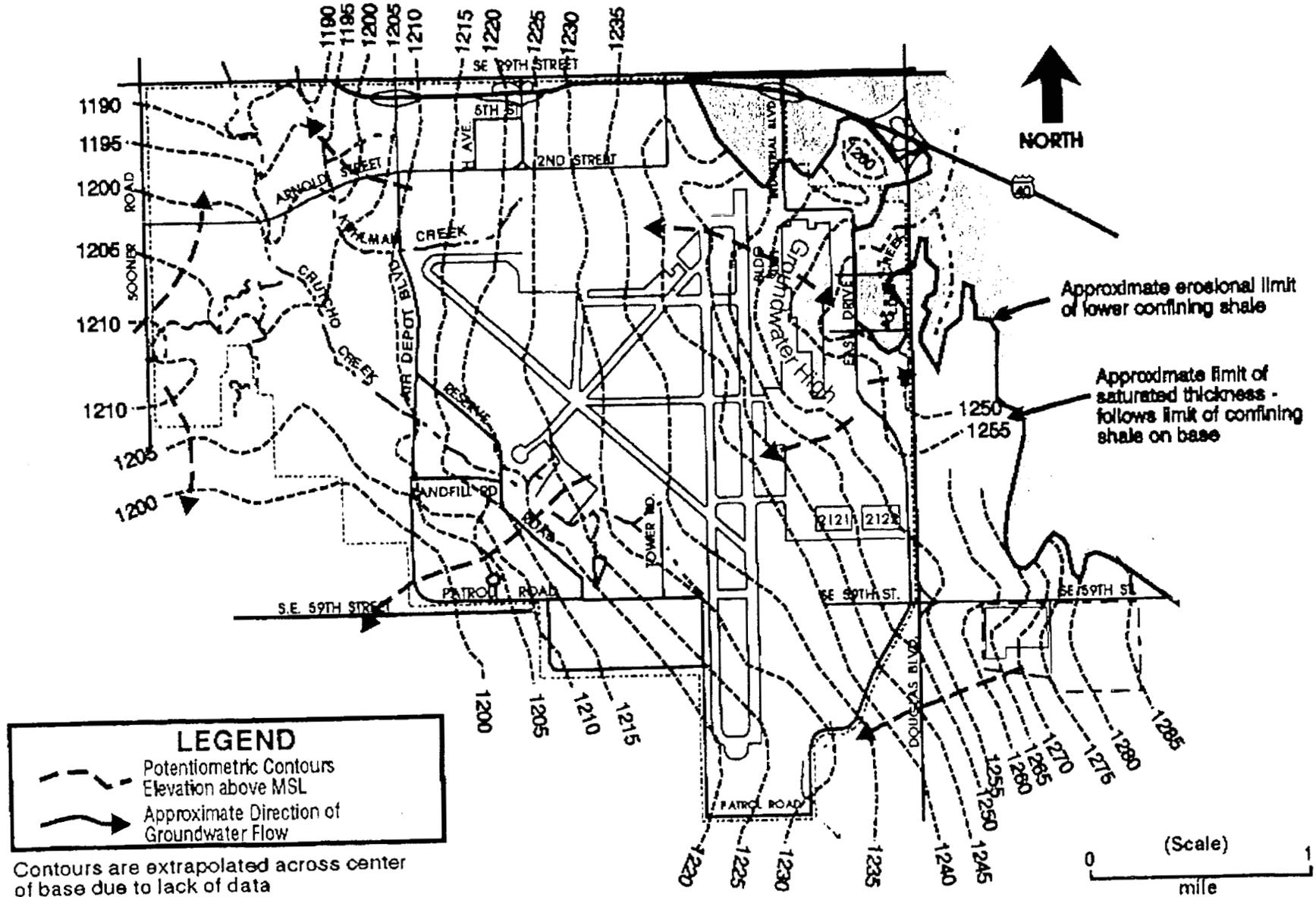
Figure 1-6 Regional Potentiometric Surface Contours

varies from west/northwest to southwest depending on location. This is supported by contoured potentiometric data from base monitoring wells (Figures 1-7 & 1-8) which show groundwater movement in the upper aquifer zones to generally follow regional dip. Measured normal to potentiometric contours, groundwater flow gradients range from 10 to 30 feet per mile. However, because flow in the near surface portions of the aquifer at Tinker is strongly influenced by topography, local stream base-levels, complex subsurface geology, location in a recharge area, and proximity to water supply wells, both direction and magnitude of groundwater movement is highly variable. The interaction of these factors not only influences regional flow but gives rise to complicated local, often transient, flow patterns at individual sites. Several examples demonstrate this variability. Historical water level data around Crutcho Creek indicates that groundwater flow in that area is predominantly to the southwest. However, during high flow conditions bank recharge occurs and shallow local flow patterns close to the creek may be reversed. This pattern is probably in effect at other streams as well. In the northeast quadrant of the base several factors contribute to groundwater "mounding" in the USZ and to formation of a groundwater high in the LSZ. This leads to radial or semi-radial groundwater flow at shallow depths. Finally, in the northeast part of the base where sufficient data exists, comparison of potentiometric contours from successively deeper levels in the LSZ suggests that groundwater flow directions may change with depth, gradually turning from west/southwest to northwest. This change in regional flow is attributed either to effects of pumping from deep water supply wells in the area and/or to the presence of the Deep Fork River located to the north. This river, along with the Canadian River south of Tinker, has been demonstrated by the U.S.G.S. to act as a major discharge point for regional ground water in Central Oklahoma.

**Surface Water:** The interaction of surface water with groundwater is an important factor in predicting local groundwater flow patterns at Tinker. Although the technical stream study data is still being analyzed to determine the degree of interaction that occurs between streams and groundwater, some qualitative observations provide clues to the importance of this system. The direction of stream flow on Tinker appears to be controlled largely by a topographic divide which extends from southwest to northeast across the south part of the base. Streams which originate on the north side of the divide flow to the north. These include Soldier Creek, Crutcho Creek, and Kuhlman Creek. Elm Creek which has its origin on the southeast side flows to the south. Streams which flow northward become perennial before leaving the base. Crutcho and Kuhlman Creeks are considered to be recharged by the aquifer (gaining streams). East Soldier Creek probably gains much of its water from discharge from the wastewater treatment plant and from outfalls on base. Some data indicates however that these streams may become losing streams north of the base and may lose water to the aquifer. Information from wells and piezometers near the ponded section of Soldier Creek at the Industrial Waste Treatment Plant also suggests that the pond contributes to the groundwater (a losing stream) in the LSZ at that location. The elevation above mean sea level of the bottom of a portion of Soldier Creek tributaries near their headwaters off-base is higher than the groundwater. These stream segments flow only intermittently and probably recharge the aquifer through infiltration during periods of higher precipitation. Finally, where groundwater and stream elevations are

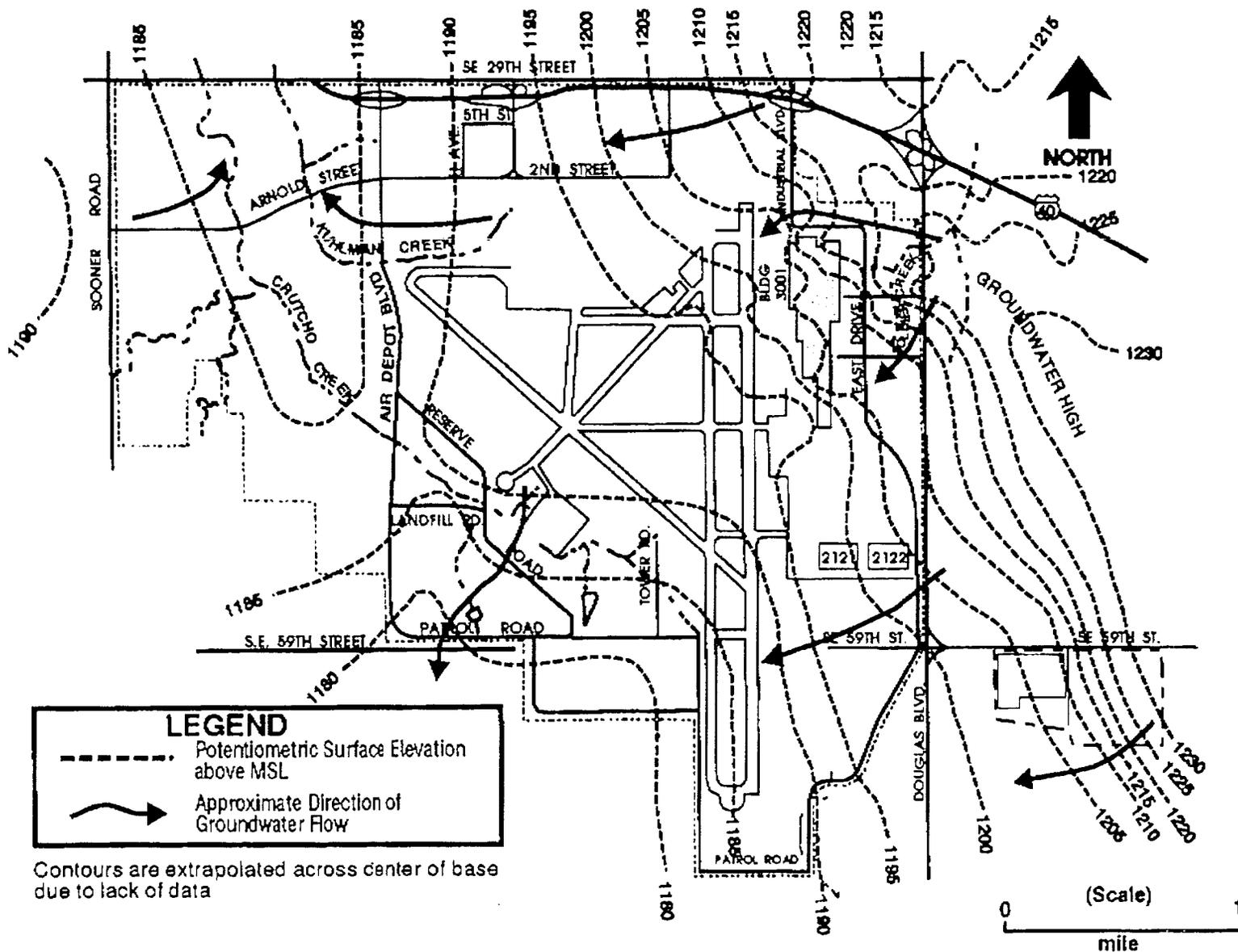
# TINKER AFB CONCEPTUAL MODEL

## Water Table Surface of Upper Saturated Zone



# TINKER AFB CONCEPTUAL MODEL

## Potentiometric Surface of Lower Saturated Zone





**INTEGRATED ENVIRONMENTAL TEAM**  
**OC-ALC/EM**  
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**Tinker AFB, OK 73145-9500**  
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From: ALBERT AGUILAR FOR PATTI FORD

OC-ALC.EMX

Telephone (405) 734-4100

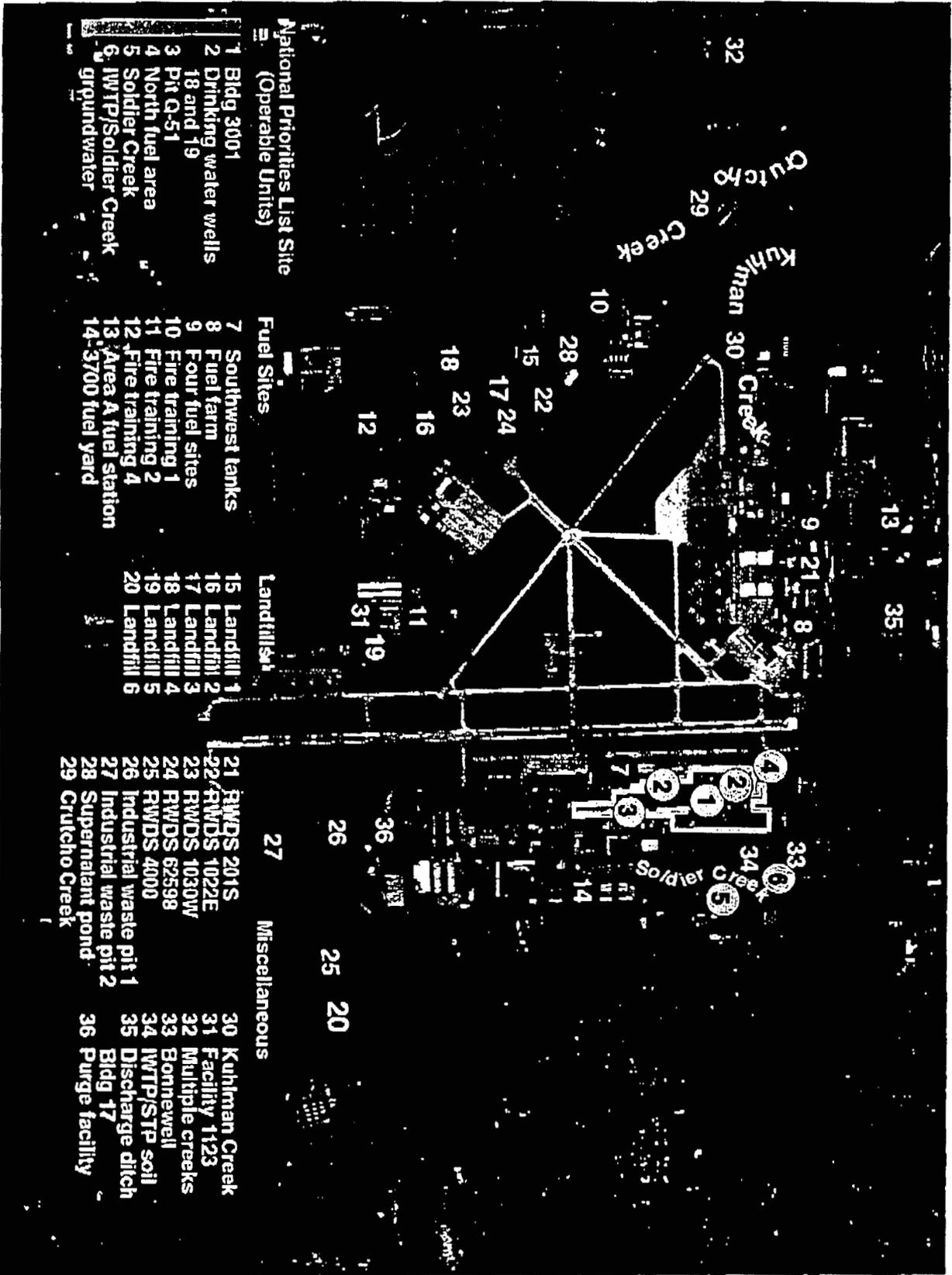
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# TINKER AIR FORCE BASE



**National Priorities List Site  
(Operable Units)**

- 1 Bldg 3001
- 2 Drinking water wells 18 and 19
- 3 Pit Q-51
- 4 North fuel area
- 5 Soldier Creek
- 6 IWTP/Soldier Creek groundwater

**Fuel Sites**

- 7 Southwest tanks
- 8 Fuel farm
- 9 Four fuel sites
- 10 Fire training 1
- 11 Fire training 2
- 12 Fire training 4
- 13 Area A fuel station
- 14 3700 fuel yard

**Landfills**

- 15 Landfill 1
- 16 Landfill 2
- 17 Landfill 3
- 18 Landfill 4
- 19 Landfill 5
- 20 Landfill 6

**27**

**Miscellaneous**

- 21 RWDS 201S
- 22 RWDS 1022E
- 23 RWDS 1030W
- 24 RWDS 62598
- 25 RWDS 4000
- 26 Industrial waste pit 1
- 27 Industrial waste pit 2
- 28 Supernatant pond
- 29 Crutcho Creek
- 30 Kuhlman Creek
- 31 Facility 1123
- 32 Multiple creeks
- 33 Bonnewell
- 34 IWTP/STP soil
- 35 Discharge ditch Bldg 17
- 36 Purge facility

## ENVIRONMENTAL RESTORATION PROGRAM SITES

# TINKER AFB, OKLA. RESTORATION SITES

## LEGEND OF SITES

National Priorities  
List Site  
(Operable Units)

- 1 Bldg 3001
- 2 Drinking Water Wells 18 and 19
- 3 Pit Q-51
- 4 North Fuel Area
- 5 Soldier Creek
- 6 IWTP/STP Groundwater

### Fuel Sites

- 7 Southwest Tanks
- 8 Fuel Farm
- 9 Four Fuel Sites
- 10 Fire Training 1
- 11 Fire Training 2
- 12 Fire Training 4
- 13 Area A Fuel Station
- 14 3700 Fuel Yard

### Landfills

- 15 Landfill 1
- 16 Landfill 2
- 17 Landfill 3
- 18 Landfill 4
- 19 Landfill 5
- 20 Landfill 6

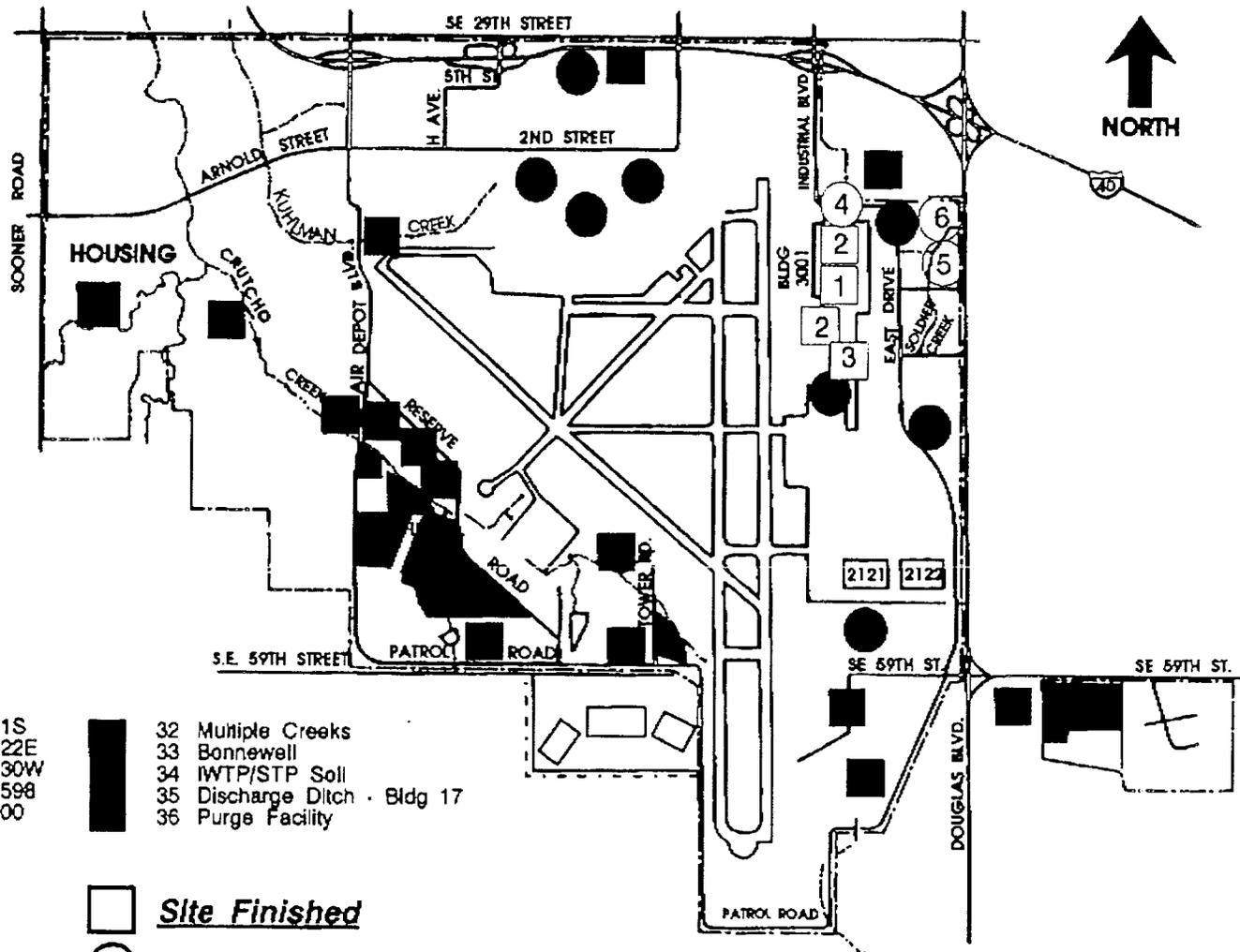
### Miscellaneous

- 21 Radioactive Waste 201S
- 22 Radioactive Waste 1022E
- 23 Radioactive Waste 1030W
- 24 Radioactive Waste 62598
- 25 Radioactive Waste 4000
- 26 Industrial Waste Pit 1
- 27 Industrial Waste Pit 2
- 28 Supernatant Pond
- 29 Crutcho Creek
- 30 Kuhlman Creek
- 31 Facility 1123

- 32 Multiple Creeks
- 33 Bonnewell
- 34 IWTP/STP Soil
- 35 Discharge Ditch - Bldg 17
- 36 Purge Facility

□ Site Finished

○ Site Investigation/Remediation



(NOT TO SCALE)

The following information has been extracted from chapter one of the...

## **Tinker AFB MAP**

### **1.4.3 Geography**

The Oklahoma City area is located within the Central Redbed Plains section of the Central Lowland Physiographic Province. The area is characterized by nearly level to gently rolling hills, broad flat plains and well-entrenched main streams. The valleys of secondary streams may exhibit a sag and swale appearance, indicative of the erosion of somewhat cohesive residual soils.

### **1.4.4 Topography**

The topography of Oklahoma City and surrounding area varies from generally level to gently rolling in appearance. Local relief is primarily the result of dissection by erosional activity or stream channel development. At Oklahoma City, surface elevations are typically in the range of 1,070 to 1,400 feet MSL. At Tinker Air Force Base, ground surface elevations vary from 1,190 feet MSL near the northwest corner where Crutcho Creek intersects the base boundary to approximately 1,320 feet MSL at Area D (EID), located on 59th Street, east of the main installation.

### **1.4.5 Surface Drainage**

Drainage of Tinker Air Force Base land areas is accomplished by overland flow of runoff to diversion structures and thence to area surface streams, which flow intermittently. The northeast portion of the base is drained primarily by tributaries of Soldier Creek. The north and west sections of the base including the main instrument runway, drain to Crutcho Creek, a tributary of the North Canadian River. Two small unnamed intermittent streams crossing installation boundaries south of the main instrument runway generally do not receive significant quantities of base runoff due to site grading designed to preclude such drainage. These streams, when flowing, extend to Stanley Draper Lake, approximately one half mile south of the base.

## 1.4.6 Soil Characteristics

The surface soils of Tinker Air Force Base have been studied by the USDA, Soil Conservation Service and by several soil boring projects conducted for geotechnical (foundation construction) investigations. Surface soils of the installation area are predominantly of two basic types: residual and alluvial. The three major soil associations mapped within installation limits are Darrell-Stephenville, Renfrow-Vernon-Bethany, and Dale-Canadian-Port.

The residual soils associations, Darrell-Stephenville and Renfrow-Vernon-Bethany are the product of the weathering of underlying bedrock. The alluvial materials of the Dale-Canadian-Port association are stream-deposited silts and sands, whose occurrence is typically restricted to the floodplains of area streams.

## 1.4.7 Geology

**Stratigraphy:** Tinker AFB lies atop a sedimentary rock column several thousand feet thick composed of strata that ranges in age from Cambrian to Permian above a Precambrian igneous basement. Quaternary alluvium and terrace deposits can be found overlying bedrock in and near present day stream valleys. At Tinker, Quaternary deposits consist of unconsolidated weathered bedrock, fill material, wind blown sand, and interfingering lenses of sand, silt, clay, and gravel of fluvial origin. The terrace deposits are exposed where stream valleys have downcut through older strata and have left them topographically above present-day deposits. Alluvial sediments range in thickness from less than a foot to nearly 20 feet.

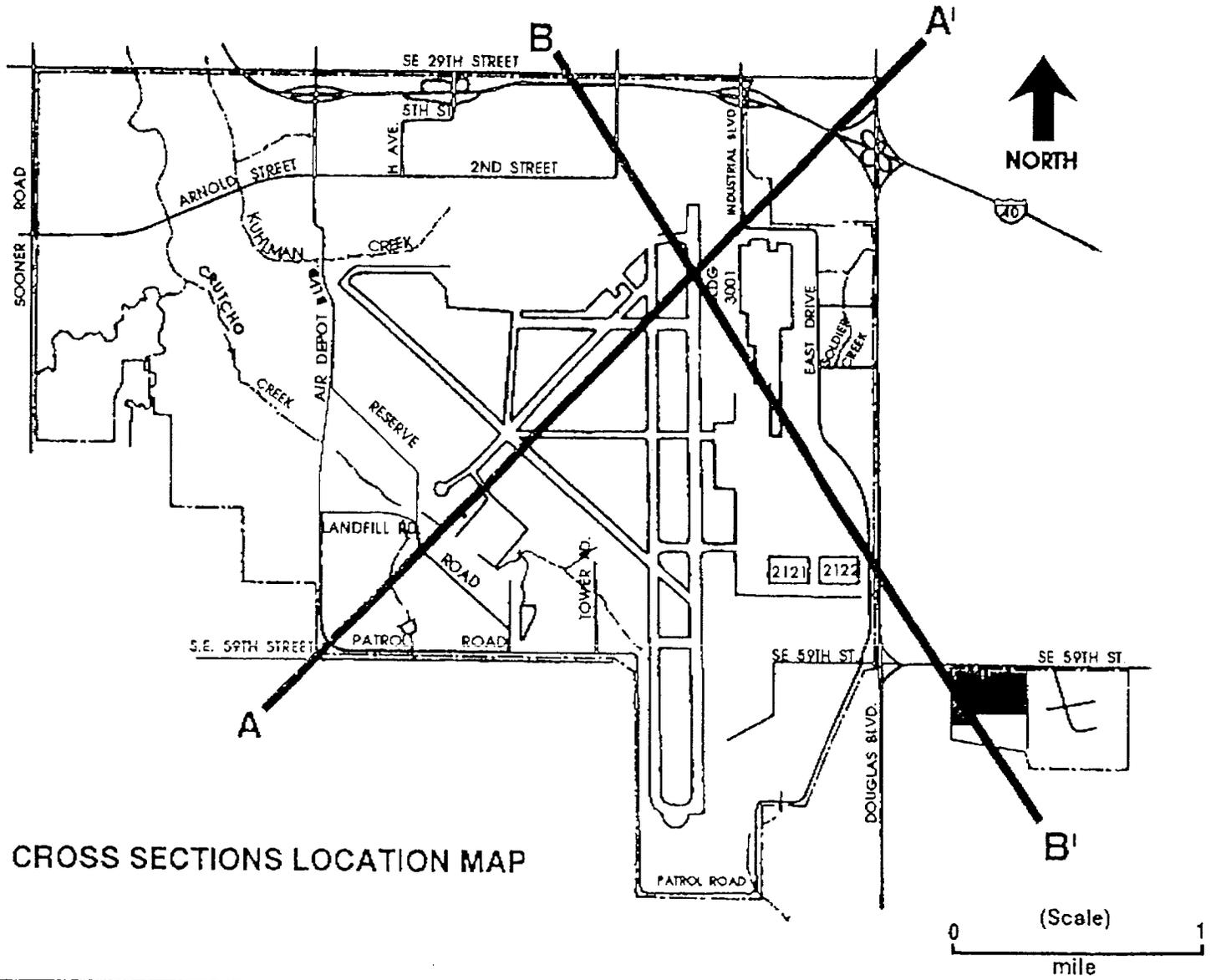
Subsurface (bedrock) geologic units which outcrop at Tinker and which are important to understanding groundwater and contaminant concerns at the base consist of, in descending order, the Hennessey Group, the Garber Sandstone, and the Wellington Formation. These bedrock units were deposited during the Permian Age (230 to 280 million years ago) and are typical of redbed deposits formed during that period. They are composed of a conformable sequence of sandstones, siltstones, and shales. Individual beds are lenticular and vary in thickness over short horizontal distances. Because lithologies are similar and because of a lack of fossils or key beds the Garber Sandstone and the Wellington Formation are difficult to distinguish and are often informally lumped together as the Garber-Wellington Formation. Together, they are about 900 feet thick at Tinker. The interconnected, lenticular nature of sandstones within the sequence forms complex pathways for groundwater movement.

The surficial geology of the north section of the base is dominated by the Garber Sandstone, which outcrops across a broad area of Oklahoma County. Generally, the Garber outcrop is covered by a thin veneer of soil and /or alluvium up to 20 feet thick. To the south the Garber Sandstone is overlain by outcropping strata of the Hennessey Group including the Kingman Siltstone and the Fairmont Shale. Drilling information obtained as a result of geotechnical investigations and monitoring well installation confirms the presence of these units.

---

model. These intervals are represented on geologic cross-sections A-A' and B-B'

# TINKER AIR FORCE BASE Conceptual Model



CROSS SECTIONS LOCATION MAP

Figure 1-3 Cross Sections Location Map

and the attached flips (Figures 1-4 & 1-5). Section A-A' is roughly a dip section and B-B' is approximately a strike section. The first correlatable interval is marked by the base of the Hennessey Group and the first sandstone at the top of the Garber Sandstone. This interval is mappable over the southern half of Tinker. The second interval consists of a shale zone within the Garber Sandstone which in places is comprised of a single shale layer and in other places of multiple shale layers. This interval is more continuous than other shale intervals and in cross-sections appears mappable over a large part of the base. It is extrapolated under the central portion of Tinker where little well control exists.

**Structure:** Tinker Air Force Base lies within a tectonically stable area; no major near-surface faults or fracture zones have been mapped near the base. Most of the consolidated rock units of the Oklahoma City area dip westward at a low angle. A regional dip of thirty to forty feet per mile in a generally westward direction is supported by stratigraphic correlation on geologic cross-sections at Tinker. Bedrock units strike slightly west of north.

Although Tinker AFB lies in a tectonically stable area, regional dips are interrupted by buried structural features located west of the base. A published east to west generalized geologic cross-section which includes Tinker supports the existence of a northwest trending structural trough or syncline located near the western margin of the base. The syncline is mapped adjacent to and just east of a faulted anticlinal structure located beneath the Oklahoma City Oil Field. The fault does not appear to offset Permian age strata. There are indications that the syncline may act as a "sink" for some regional groundwater (southwest flow) at Tinker before it continues to more distant discharge points.

### 1.4.8 Groundwater Hydrology

The most important source of potable groundwater in the Oklahoma City metropolitan area is the Central Oklahoma aquifer system. This aquifer extends under much of central Oklahoma and includes water in the Garber Sandstone and Wellington Formation, the overlying alluvium and terrace deposits, and the underlying Chase, Council Grove and Admire Groups. The Garber Sandstone and the Wellington Formation portion of the Central Oklahoma aquifer system is commonly referred to as the "Garber-Wellington Aquifer" and is considered to be a single aquifer because these units were deposited under similar conditions and because many of the best producing wells are completed in this zone. On a regional scale, the aquifer is confined above by the less permeable Hennessey Group and below by the Late Pennsylvanian Vanoss Group.

Tinker Air Force Base lies within the limits of the Garber-Wellington Ground-Water Basin. At the present time, Tinker derives most of its water supply from this aquifer and supplements the supply by purchasing from the Oklahoma City Water Department. The nearby communities of Midwest City, and Del City derive water supplies from both surface sources and wells tapping the aquifer. Industrial operations, individual homes, farm irrigation, and small communities not served by a municipal distribution systems also depend on the Garber-Wellington Aquifer. Communities presently depending upon surface supplies

# NUMERICAL MODEL

E3001

(Continued)

Water Saturated Zone

Oil Zone

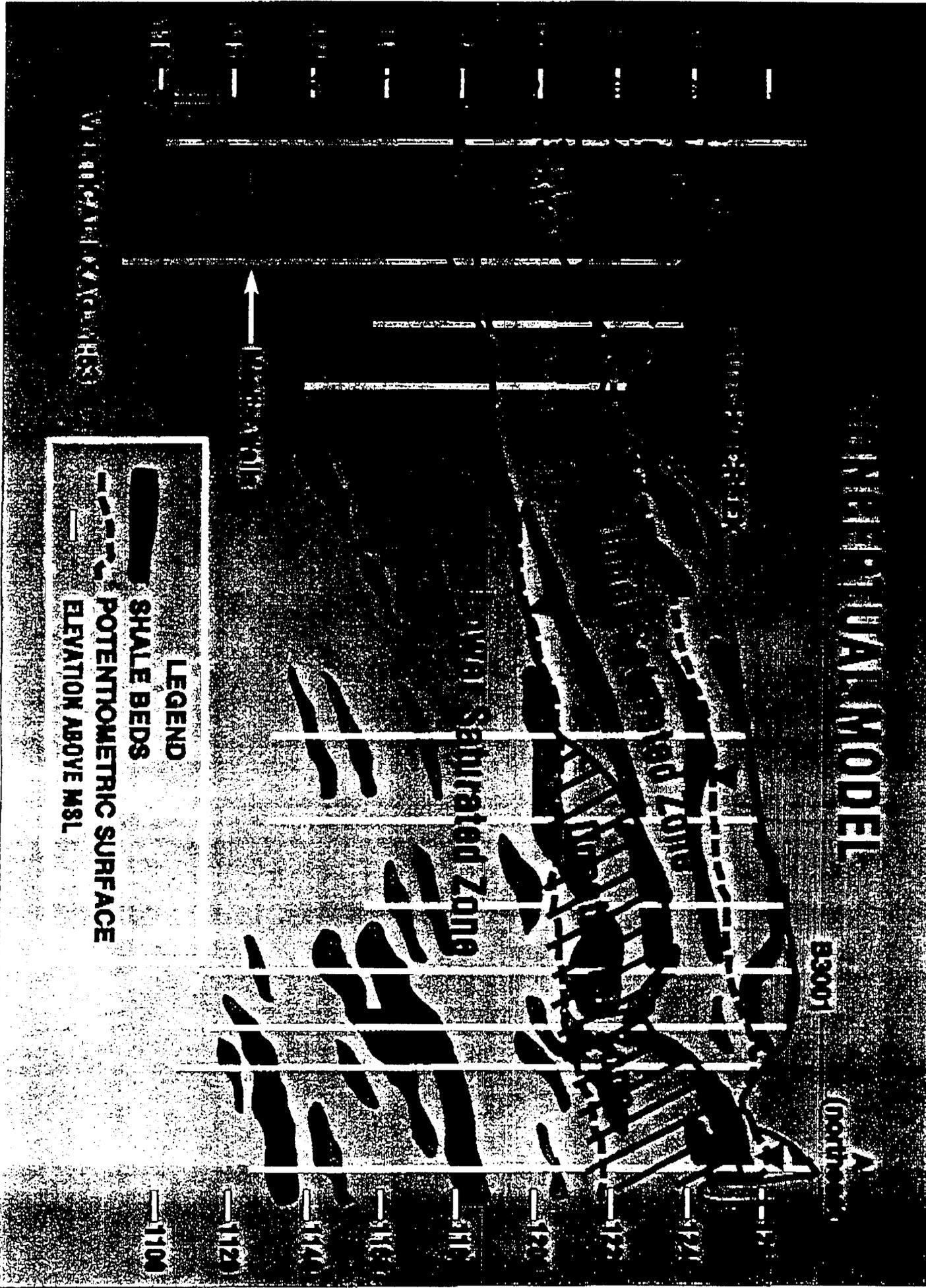
Water Zone

— 1100  
 — 1120  
 — 1140  
 — 1160  
 — 1180  
 — 1200  
 — 1220  
 — 1240

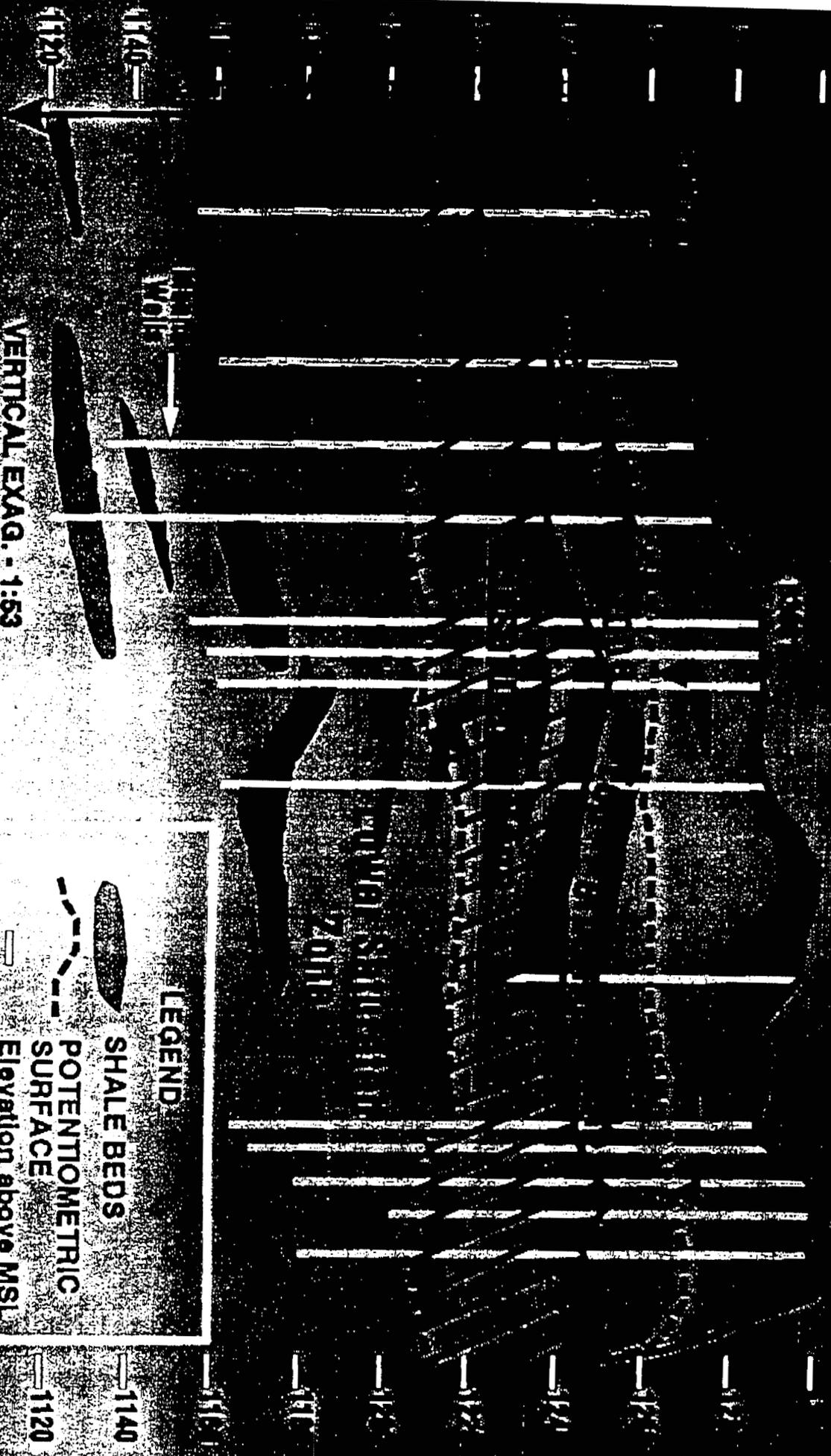
**LEGEND**

-  SHALE BEDS
-  POTENTIOMETRIC SURFACE
-  ELEVATION ABOVE MSL

1000 ft



# ORIGINAL MODE



VERTICAL EXAG. - 1:53

WATER

## LEGEND

SHALE BEDS

POTENTIOMETRIC SURFACE

Elevation above MSL

1120

1140

1160

1180

1200

1220

1240

1260

1280

1300

such as Oklahoma City also maintain a well system drilled into the Garber-Wellington as a standby source of water in the event of drought.

Recharge of the Garber-Wellington Aquifer is accomplished principally by percolation of surface waters crossing the area of outcrop and by rainfall infiltration in this same area. Because most of Tinker Air Force Base is located in an aquifer outcrop area the base is considered to be situated in a recharge zone.

The quality of ground water derived from the Garber-Wellington Aquifer is generally good, although wide variations in the concentrations of some constituents are known to occur. Wells drilled to excessive depths may encounter a saline zone, generally greater than 900 feet below ground surface. Wells drilled to such depths or those accidentally encountering the saline zone are either grouted over the lowest screens or may be abandoned.

Tinker Air Force Base presently obtains its water supplies from a distribution system comprised of 26 water wells constructed along the east and west base boundaries and by purchase from the Oklahoma City Water Department. All base wells are finished into the Garber-Wellington Aquifer. Base wells range from 700 to 900 feet in finished depth, with yields ranging from 205 to 250 gallons per minute. The wells incorporate multiple screens, deriving water supplies from multiple sand zones at depths between 200-600 feet. Shallow aquifers exist temporarily in zones of alluvium that border streams, or where sandy residual soils overly bedrock at shallow depths. Alluvial aquifers are typically recharged directly by precipitation, gradually running dry seasonally as base flow to local streams and recharging of underlying rock aquifers deplete limited supplies. Shallow aquifers may not facilitate the detection of developing ground-water contamination problems because of their localized nature and ephemeral character.

### 1.4.9 Conceptual Hydrologic Model

The hydrogeologic conceptual model of Tinker Air Force Base integrates geologic and hydrologic data from across the base. Such a conceptual model involves a comprehensive review of available data, including those from direct measurement sources (borings, water level measurements, pump/slug tests, stream studies) as well as indirect sources (aerial photographs, topographic maps, published reports). The hydrogeologic system at Tinker is complex, but the model provides both an approximation of depth to water and an estimated direction of groundwater movement and is therefore useful as a basis for designing field investigations. As information is derived from investigations the model is continually updated and refined.

**Groundwater:** Approximately 600 groundwater monitoring wells have been installed at the base during remedial investigations. A conceptual hydrologic model based largely on information from these wells divides the groundwater system under Tinker into several saturated zones. The current conceptual model has been revised from an earlier model

adopted by the Tulsa Corps of Engineers which divided groundwater into four water-bearing zones, the perched aquifer, the top of regional aquifer, the regional aquifer, and the producing zone. In the current model two principal water table aquifer zones and a third less extensive zone have been identified. The third is limited to the southwest quadrant. In addition, numerous shallow, thin saturated beds of siltstone and sandstone exist throughout the base. These are of limited areal extent and are often perched.

Over the eastern portion of the base, including the area at Landfill 6, an upper saturated zone (USZ) and a lower saturated zone (LSZ) are recognized (Figures 1-4 & 1-5). In this area both the upper and lower zones exist mainly under water table (unconfined) conditions although locally they appear to be partially confined. These two zones are separated by a low permeability shale interval of variable thickness and a vadose (unsaturated) interval about 20 feet thick. The shale interval acts as the lower confining bed for the upper saturated zone and therefore perches the upper saturated zone. This shale interval is the second mappable layer discussed earlier under the section on stratigraphic correlation.

The USZ (perched zone) in the east is found at a depth of 15 to 30 ft below ground surface and has a saturated thickness ranging from less than 1 foot at its eastern boundary to over 20 feet in places west of Building 3001. This perched zone is erosionally truncated by Soldier Creek along the northeastern margin of Tinker (Figure 1-4). In areas where several shales interfinger to form the lower confining interval rather than a single shale bed, "gaps" may occur. In general, these "gaps" are not holes in the shale but are places where multiple shales exist which are separated by slightly more permeable strata. Hydrologic data from monitoring wells indicates that these zones allow increased downward flow of groundwater above what normally leaks through the confining layer.

Below the unsaturated interval, the lower saturated zone (LSZ) is hydraulically connected to the rest of the aquifer system down to approximately 900 feet. This includes what was referred to by the Corps of Engineers as the top of regional, regional, and producing zones. However, 250 feet marks the maximum identified depth of contamination and this was chosen as the base of the current conceptual model. Due to variations in topography the top of the lower zone is found at depths ranging from 50 to 100 feet below ground surface under the eastern parts of the base. Differences in potentiometric head values found at successive depths are due to a vertical (downward) component of groundwater flow in addition to lateral flow and the presence or absence of shale layers which locally confine the aquifer system. The LSZ extends east of the base (east of Soldier Creek) beyond the limits of the USZ (perched zone) where it becomes the first groundwater zone encountered in off-base wells. Because of the regional dip of bedding, groundwater gradient, and topography, the LSZ just east of the base is generally encountered at depths less than 20 feet.

Across the central portion of Tinker the unsaturated zone separating the USZ and LSZ disappears where the intervening shale layer dips below the surface of the lower saturated zone (Figure 1-4). The disappearance of the unsaturated zone is supported by data from recently completed wells just west of the north-south runway and near Base Operations and by data

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## 1995 AIR FORCE BASE QUESTIONNAIRE Tinker AFB - AFMC

### 13. Environmental Cleanup - Installation Restoration Program (IRP) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

- VIII.13.A A preliminary assessment of the installation has been performed.
- VIII.13.A.1 36 IRP sites have been identified
- VIII.13.A.2 2 IRP sites extend off base.
- VIII.13.A.3 3 All on-site remediation is estimated to be in place in 7987

VIII.13.B The installation is a National Priority List (NPL) site or has been proposed as an NPL site.  
Federal Facility Agreements to clean up the base are in place.

VIII.13.C Federal Facility Agreements to clean up the base are in place.

VIII.13.D There are no known uncontrolled or unregulated occurrences of specific contaminate types or sources.  
Contaminate types and sources include landfills, medical wastes, radioactive wastes, etc.

VIII.13.E There are sites or SWMUs currently being investigated and remediated pursuant to RCRA corrective action.  
SWMU - Solid Waste Management Units  
RCRA - Resource Conservation and Recovery Act

VIII.13.E.1 31 sites are being investigated and remediated.

VIII.13.F The IRP does Not currently restrict construction (siting) activities/operations on-base.

### 14. Compliance / IRP Costs (\$000)

Expenditure Category	Current FY	FY + 1	FY + 2	FY + 3	FY + 4
Capital Purchases Program (any other equip)	\$3,545,000 K	\$2,500,000 K	\$6,465,000 K	\$6,952,000 K	\$7,978,000 K
Hazardous Waste Disposal/Remediation	\$5,653,000 K	\$6,025,000 K	\$57,345,000 K	\$27,630,000 K	\$20,730,000 K
IRP	\$20,785,000 K	\$33,225,000 K	\$3,100,000 K	\$0,000 K	\$20,000,000 K
Military Construction Program (any other)	\$10,920,000 K	\$2,000,000 K	\$428,000 K	\$750,000 K	\$750,000 K
Natural Resources	\$630,000 K	\$105,000 K	\$105,000 K	\$105,000 K	\$105,000 K
Permits	\$105,000 K	\$5,338,000 K	\$707,000 K	\$4,235,000 K	\$1,660,000 K
Other(s) Specify: air, water, asbestos, RCRA, USTs	\$12,331,000 K				

*what's 1? better purchase equip?*  
*3: why variation or years? what's budget in FY+2?*  
*the is 4 diff from 1? funding source - type 8 activity?*  
*what permits are purchased?*

### 15. Other Issues

VIII.15.A Description of other activities which may constrain or enhance base operations:  
 LOCAL: 100 acre urban wildlife sanctuary enhances natural resources of base; aggressive Pollution Prevention Program exceeding all AF goals; base has eliminated ozone depleting chemicals for engine repair (1993); EPA 17 usage reduced by 39% from CY92 baseline

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**1995 AIR FORCE BASE QUESTIONNAIRE**  
**Tinker AFB - AFMC**

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**16. Air Quality - Clean Air Act**

- VIII.16.A** Air Quality Control Area (AQCA) geographic region in which the base is located:  
Central Oklahoma Intrastate Air Quality Control Region
- VIII.16.B** Air quality regulatory agency responsible for the AQCA: City/County Health Department of Oklahoma County OK (CCHDOC)
- VIII.16.B** Name and phone number of the AQCA program manager for issues pertaining to the base:  
Lynn Wainner 405-427-8651
- The EPA has designated the AQCA (or the specific portion of the AQCA containing the base) to be:
- |   |  |
|---|--|
| <b>VIII.16.C.1</b> In Attainment for Ozone                      | <b>VIII.16.C.2</b> In Attainment for Carbon Monoxide |
| <b>VIII.16.C.3</b> In Attainment for Particulate matter (PM-10) | <b>VIII.16.C.4</b> In Attainment for Sulfur Dioxide  |
| <b>VIII.16.C.5</b> In Attainment for Nitrogen Dioxide (Not NOx) | <b>VIII.16.C.6</b> In Attainment for Lead            |
- VIII.16.C.7** The EPA has Not proposed that any AQCA pollutant in ATTAINMENT be listed as NONATTAINMENT
- VIII.16.D.1** Ozone daily maximum hourly design value for the portion of the AQCA in which the base is located:
- VIII.16.D.2** Carbon monoxide 8 hour design value for the portion of the AQCA in which the base is located:
- VIII.16.D.3** Ozone % of NAAQS can not be computed
- VIII.16.D.4** Carbon monoxide % of NAAQS can not be computed

Air Quality Survey complete, No additional data required.

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**1995 AIR FORCE BASE QUESTIONNAIRE**  
**Tinker AFB - AFMC**

**Section IX**

**15-Feb-95**

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IX.66

12 JUNE 1995

**1995 AIR FORCE BASE QUESTIONNAIRE  
TINKER AFB - AFMC  
SECTION VIII.14  
(COMPLIANCE/IRP COSTS)**

Updated Table for VIII.14.A

Expenditure	Current FY	FY+1	FY+2	FY+3	FY+4
Capital Purchase Program	\$4,213K	\$4,098K	\$485K	\$180K	\$525K
Hazardous Waste Disposal	\$5,217K	\$5,825K	\$4,625K	\$5,475K	\$5,560K
IRP	\$20,785K	\$10,819K	\$18,275K	\$13,514K	\$14,549K
Military Construction Program	\$5,629K	\$1,171K	\$1,374K	\$0	\$1,726K
Natural Resources	\$630K	\$428K	\$750K	\$750K	\$750K
Permits	\$105K	\$105K	\$105K	\$105K	\$105K
Other(s) Specify: air, asbestos, RCRA, USTs	\$12,331K	\$5,138K	\$707K	\$5,235K	\$1,660K

**Table Notes:**

**Capital Purchase Program (CPP).** CPP listed in current FY and FY+1 includes both DMBA CPP and Pollution Prevention (PPP) Large Dollar Equipment (3080 Funds) requirement(s). The breakout is as follows: for current FY, DMBA CPP is \$1,000K and PPP is \$3,213K; for FY+1, DMBA CPP is \$518K and PPP is \$3,580K. FY+2 through FY+4 indicate DMBA CPP only. No "3080 funds" is anticipated to be received for large dollar equipment PPP requirements. Beginning in FY96, the PPP requirements will be covered by "3400 funds" and not considered a part of CPP.

**Hazardous Waste Disposal.** The table above contains the updated figures regarding the Hazardous Waste Disposal requirements. Although Tinker AFB's Hazardous Waste volume is reducing, the cost to dispose each unit volume is increasing (each FY).

**Installation Restoration Program (IRP).** The original cost figures provided (\$20M, \$33M, \$57M, \$27M, & \$20M) reflect an aggressive cleanup schedule. \$5M to \$10M per year of the total is for innovative technology initiative. The schedule's overall purpose was to achieve the AF's "Cleanup 2000" goal where all the base's cleanup activities would be completed and/or in-place by the year 2000.

The table above contains the updated figures regarding the IRP requirements based on the new Defense Environmental Restoration Account (DERA) guidance and fiscal "reality" constraints. Some of the new DERA guidance requirements include emphasis on installing interim remedial (cleanup) actions while delaying "studies" whenever possible. Delayed "studies" will be performed after the interim action benefits can be quantified thus reducing the scope and funds required to complete the study. The new DERA guidance will still meet all regulatory obligations. The FY to FY variance reflects the different types and number of interim actions that the base will install in a particular FY.

**Military Construction Program (MCP).** The Current FY and FY+1 figures displayed above reflects the actual total contract awards for the MCP projects. The FY+2 figure reflects the postponement of one environmental MCP project to FY+4 (FY98). The \$20M project previously shown in FY+4 was postponed to FY00.

**Permits.** Tinker AFB's environmental permits are as follows: 1) Air permit, where the fee is based on chemical(s) per ton emitted; 2) NPDES permit (water, wastewater, & stormwater), where the fee is based on the type of treatment plan (in our case is a Tertiary plant - most expensive) and size of (TAFB) community; 3) Underground Storage Tanks (USTs) permits, where the fee is based on the number of tanks; 4) HAZWASTE (RCRA) permit, where the fee is based on the number of waste streams (of which TAFB has 71).

**Other(s).** The figure(s) in FY+1 and FY+3 reflect a corrected math error from our previous submittal. The breakout can be found in the following table:

OTHERS	Current FY	FY+1	FY+2	FY+3	FY+4
Air	\$2,443K	\$405K	\$404K	4,235K	\$0
Wastewater	\$3,097K	\$327K	\$0	\$0	\$0
Asbestos	\$3,792K	\$3,822K	\$0	\$0	\$0
RCRA	\$2,299K	\$584K	\$303K	\$0	\$0
USTs	\$700K	\$0	\$0	\$1,000K	\$1,660K
<b>FY Total</b>	<b>\$12,331K</b>	<b>\$5,138K</b>	<b>\$707K</b>	<b>\$5,235K</b>	<b>\$1,660K</b>

**ADDITIONAL IRP INFORMATION  
(BASED ON THE DERP REPORT TO CONGRESS)**

1) Q. Do we agree with the IRP cost shown in table VIII.14.A and the "Report to Congress"?

A. Based on the Table Note provided in the IRP section above, Tinker AFB is currently working with updated cost figures primarily due to the new DERA guidance requirements and "fiscal reality". In addition to the numbers provided in the VIII.14.A cost table, the following cost data is provided for the "Report to Congress": The figure provided above reflects our planned FY96 DERA program while the DERP report to congress appears to reflect anticipated funding levels. In FY99 the estimated IRP cost is \$15,439K; in FY00 the estimated IRP cost is \$17,539K; in FY01, \$14,724K; and from FY02 to complete (FY23) \$178,748K (total).

2) Q. What is the known quantity of contaminated acreage?

A. Tinker AFB's estimated known quantity of contaminated acreage is:  
Contaminated Soil - approximately 120 acres.

This figure reflects the "tight" clay soils beneath the base that helps slow the lateral movement of contamination. This geological condition has also minimized the amount of contamination moving off-base. The "tight" soils also reflect the difficulties in remediating the contaminated soil (and groundwater).

3) Q. Will there be any more IRP sites?

A. Possibly, yes. Tinker AFB is currently investigating five (5) areas of concern to determine whether further action will be necessary. If so, these sites shall be added to the IRP. Additionally, as part of the investigation to determine the nature and extent of contamination at known IRP sites other sites may be identified. Tinker AFB has conducted investigation(s) for the majority of the base, it is therefore anticipated that the number of additional sites that may added to the IRP to be low.

4) Q. What is the depth of the groundwater contamination?

A. The primary groundwater contamination has been detected in the upper 200-feet of the primary drinking water aquifer. The current operating groundwater supply wells have not been impacted and continue to operate and supply drinking water to the base. Additionally, Tinker AFB supplements its drinking water from Oklahoma City municipality. As part of the groundwater Remediation system for the Building 3001 NPL site, the groundwater is being extracted, treated and re-used in the base's various industrial processes. Because of the "tight" geological conditions beneath the base this groundwater recovery and treatment system could be in operation for over 30 years.

5) Q. Has Tinker AFB ever calculated costs for IRP cleanup based on closure timelines?

A. No.

#### IN ADDITION...

Tinker AFB would also like to re-iterate the fact that our response to question VIII.12.C.1 and VIII.12.C.2 were recorded incorrectly.

Our response to VIII.12.C.1 should be: Yes Tinker does have properties that may be eligible for the NRHP. For a list of those resources please refer to attachment 1.

Our response to VIII.12.C.2 should be: Building 4029 has been determined to be potentially eligible for the NRHP because of Cold War Activities.



**INTEGRATED ENVIRONMENTAL TEAM  
OC-ALC/EM  
7701 2nd St., Suite 204  
Tinker AFB, OK 73145-9500  
Fax (Comm) 405-736-3346 (DSN) 336-3346**

**FAX SERVICE COVER SHEET**

Date: 12 JUN 95 Time: 13:25 Number of pages (including cover sheet) 6

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BRAC

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From: PATTI FORD

OC-ALC.EMX

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(VIII.12.C.1) -- Are there any properties that may be, or been determined to be, eligible for the NRHP?

These resources may be eligible for the NRHP:

<u>Bldg No.</u>	<u>Year Built</u>	<u>Resource Name</u>
1	1942	Material Processing
24	1942	Locomotive Shelter
208	1942	Steam Facility
214	1943	Shop Engine Test & Storage
230	1942	Hangar Maintenance Center
236	1942	Shop Instrument Overhaul
238	1943	Aircraft Storage Shop
240	1942	Base Ops Maintenance Hangar
3001	1943	Shop Jet Engine Maintenance Maintenance Depot Hangar
3102	1943	Maintenance Depot Hangar
3105	1942	Maintenance Depot Hangar
3108	1943	Shop Aircraft & Engine Depot
3113	1943	PMEL
3202	1943	Fire Pump Station

15 Apr 94/11:53AM

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- 3203 1943
- 3204 1943
- 3303 1943
- 4029 1951

- Fire Protection Water Storage
- Fire Protection Water Storage
- Water Supply
- Headquarters Specified

Two potentially historic districts: 200 series sector - area including and surrounding Building 3001.

(VIII.12.C.2) -- Have any buildings or structures been surveyed for other historical or Cold War significance?

Building 4029 has been determined to be potentially eligible for the NRHP because of Cold War Activities.

(VIII.12.D) - Has the base been archaeologically surveyed? (YES/NO)

Yes.

(VIII.12.D.1) -- If yes, what percentage of the base has been surveyed?

100 percent of the base has been archaeologically surveyed.

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Albert Asuilan - Budget for IRP -  
manpower management costs -

TINKER

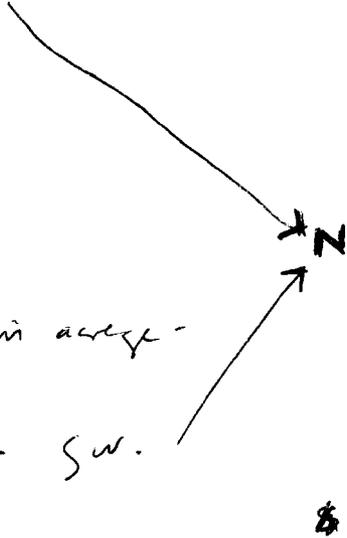
120 acres soils - contaminated soils - total surface →

purely

- SW handle -

we were debating this acreage -

Est > 400 acres. SW.



Take 10% of  
IRP maint /  
manpower costs for  
IRP sites +  
~~disregard~~ Subcontract,  
to provide consistency.  
OK

200 ftst

~~200~~

3 pits

industrial pit #1 #2

~~the~~ pond -

chlorinated solvent -

"expansion ponds"

1 large industrial shop building bldg 3001 -

inside bldg. max # is 24 subsurface

pits - degreasing pits - 2 doz. were cleaned up

Supps - wood - concrete - leakage ~~and~~

Pit Q-51

1990-

Many pits -

All Q-51's all

Radioactive waste burial sites - 4 sites -

2 have been removed & closed

1 removed & closed empty in process.

1 more is left to go.

low-level ~~radioactive~~ <sup>rad point waste</sup> - remove ~~radioactive~~ <sup>from</sup> point by dig & encased in lead pigs & buried - + reg - low-rad sites.

Jeff Bradley -

third person.

We don't

double walled pipes of industrial pipes  
& protection pipe.

6 landfills - some haz waste in cell - not a large problem.

- 6 landfills
- industrial
- rad waste sites
- fuel sites or  
some sites - UST  
petroleum.
- fuel farm - closed in 1980 -

NPL designation.

NPL - SW 3001 sumps / plots

25-25 ft deep -

5 ~~is~~ <sup>is</sup> many units - encase industrial portion of the base

(415) 744-2384  
June D.

when we had those bits - when we had the  
issue at not > under what a total plume boat

is the invariant was for Tinker or not?

You can't really accelerate pumps in a clay bed.

Proposed cleanup in place -  
cleanup all the way to basement for residential.

At ~~what~~ what point

Contamination is very widespread across the installation

Not for any in the realm of contamination.

days of overdesigning cleanup -

Not that many orders of magnitude.

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**1995 AIR FORCE BASE QUESTIONNAIRE  
Hill AFB - AFMC**

**16. Air Quality - Clean Air Act**

**VIII.16.A Air Quality Control Area (AQCA) geographic region in which the base is located:**  
Davis County

**VIII.16.B Air quality regulatory agency responsible for the AQCA:** Utah Division of Air Quality, Department of Environmental Quality

**VIII.16.B Name and phone number of the AQCA program manager for issues pertaining to the base:**  
Director, Division of Air Quality (801) 536-4000

The EPA has designated the AQCA (or the specific portion of the AQCA containing the base) to be:

**VIII.16.C.1** In Non-Attainment for Ozone **VIII.16.C.2** In Attainment for Carbon Monoxide

**VIII.16.C.3** In Attainment for Particulate matter (PM-10) **VIII.16.C.4** In Attainment for Sulfur Dioxide

**VIII.16.C.5** In Attainment for Nitrogen Dioxide (Not NOx) **VIII.16.C.6** In Attainment for Lead

**VIII.16.C.7** The EPA has Not proposed that any AQCA pollutant in ATTAINMENT be listed as NONATTAINMENT

**VIII.16.D.1** Ozone daily maximum hourly design value for the portion of the AQCA in which the base is located: 0.14 ppm

**VIII.16.D.2** Carbon monoxide 8 hour design value for the portion of the AQCA in which the base is located: 9.0 ppm

**VIII.16.D.3** Ozone Design value is 116.7% of NAAQS

**VIII.16.D.4** Carbon monoxide Design value is 100.0% of NAAQS

**VIII.16.E.1** The EPA-designated severity of nonattainment for OZONE is Moderate

**VIII.16.E.2** Davis County

**VIII.16.E.3**

**VIII.16.E.4** The base is Not in a rural transport area

**VIII.16.E.5** The EPA has Not proposed that the AQCA severity of nonattainment for OZONE be redesignated

**VIII.16.G. Specific ozone precursor (Volatile organic compounds(VOCs) and nitrogen oxides (NOx)) emissions for the base:**  
based on the AQCA 1990 baseline AND In the required attainment year  
inventory.

	VOCs		NOx		VOCs		NOx
Mobile Source Including Aircraft	G.1.a		G.1.d		G.2.a		G.2.d
		335		354		335	454

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**1995 AIR FORCE BASE QUESTIONNAIRE**
**Hill AFB - AFMC**


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Military Aircraft Associated with the Base	G.1.b	291	G.1.e	165	G.2.b	291	G.2.e	265
Stationary Source	G.1.c	261	G.1.f	123	G.2.c	261	G.2.f	123

Amount of reduced annual emissions of VOCs and NOx resulting from permanent reductions in base activity levels, process changes, or any other measures implemented at the base since 1 Jan 1990

	VOCs		NOx	
Mobile Source Including Aircraft	G.3.a	65	G.3.c	13
Stationary Source	G.3.b	33	G.3.d	0

Amount of increased annual emissions of VOCs and NOx resulting from increased activity levels, facility expansion, process changes, or other means implemented at the base since 1 Jan 1990

Mobile Source Including Aircraft	G.4.a	0	G.4.c	0
Stationary Source	G.4.b	0	G.4.d	0

Computed allowable growth	VOCs		NOx	
Mobile Source Including Aircraft	G.5.a	19.40%	G.5.c	31.92%
Stationary Source	G.5.b	12.64%	G.5.d	0
TOTAL	G.5.e	16.44%	G.5.f	23.69%

## 1995 AIR FORCE BASE QUESTIONNAIRE

### Hill AFB - AFMC

II.1.B.1.i	216-642a:
II.1.B.1.j	217a:
II.1.B.1.j.i	217-712a:
II.1.B.1.j.ii	217-712aa:
II.1.B.1.j.iii	217-713a:
II.1.B.1.k.i	218-712a:
II.1.B.1.k.ii	218-852a:
II.1.B.1.k.iii	218-868a:
II.1.B.1.l	219a:
II.1.B.1.m	310a:
II.1.B.1.n	311a:
II.1.B.1.o	312a:
II.1.B.1.p	315a:
II.1.B.1.q	317a:
II.1.B.1.r	318a:
II.1.B.1.s.i	411-135a:
II.1.B.1.t	422a: See additional information disk/p[aper copy.
II.1.B.1.t.i	422-253a:
II.1.B.1.t.ii	422-258a:
II.1.B.1.t.iii	422-264a:
II.1.B.1.t.iv	422-265a:
II.1.B.1.t.v	422-275a:
II.1.B.1.u	441a:
II.1.B.1.v	442a: See additional information disk/paper copy.
II.1.B.1.v.i	442-257aa: See additional information disk/ paper copy.
II.1.B.1.v.ii	442-258a: See additional information disk/paper copy.
II.1.B.1.v.iii	442-758a: See additional information disk/paper copy.
II.1.B.1.v.iv	442-758aa: See additional information disk/paper copy.
II.1.B.1.v.v	442-758ba: See additional information disk/paper copy.
II.1.B.1.w	510a:
II.1.B.1.x	530a:
II.1.B.1.z	550a:
II.1.B.1.aa	610a:

## 1995 AIR FORCE BASE QUESTIONNAIRE

### Hill AFB - AFMC

II.1.B.1.aa.i	610-144a:
II.1.B.1.aa.ii	610-144aa:
II.1.B.1.bb	721a:
II.1.B.1.bb.i	721-312a:
II.1.B.1.cc	722a:
II.1.B.1.cc.i	722-351a:
II.1.B.1.dd	724a:
II.1.B.1.ee	730a:
II.1.B.1.ff	740a:
II.1.B.1.gg	852-273a:

#### II.1.B.2 From in-house survey:

	Facility Category Code	Category Description	Units of Measure	Current Capacity	Percentage (%) Cond Code 1	Percentage (%) Cond Code 2	Percentage (%) Cond Code 3
II.1.B.1.a	111	Aircraft Pavement-Runway(s)	SY	300,000	100.0	0.0	0.0
II.1.B.1.b	112	Airfield Pavements-Taxiways	SY	368,434	100.0	0.0	0.0
II.1.B.1.c	113	Airfield Pavement-Apron(s)	SY	843,133	100.0	0.0	0.0
II.1.B.1.d	116-662	Dangerous Cargo Pad	SY	47,336	100.0	0.0	0.0
II.1.B.1.e	812	Elec Power-Trans & Distr Lines	LF	1,265,212	100.0	0.0	0.0
II.1.B.1.f	822	Heat-Trans & Distr Lines	LF	417,391	70.0	30.0	0.0
II.1.B.1.g	832	Sewage and Indust Waste Collection (Mains)	LF	484,175	63.0	37.0	0.0
II.1.B.1.h	842	Water-Distr Sys-Potable	LF	1,123,706	80.0	20.0	0.0
II.1.B.1.i	843	Water-Fire Protection (Mains)	LF	48,502	80.0	20.0	0.0
II.1.B.1.j	851	Roads	SY	2,752,196	100.0	0.0	0.0
II.1.B.1.k	852	Veh/Equip Parking	SY	1,274,630	100.0	0.0	0.0

#### Notes for specific Cat Codes:

II.1.B.1.a	111a:
II.1.B.1.b	112a:
II.1.B.1.c	113a:
II.1.B.1.d	116-662a:
II.1.B.1.e	812a:
II.1.B.1.f	822a:
II.1.B.1.g	832 Above is sewage: 447,000. Industrial Waste Water is: Current -37,175 GPD; Cond Code 1 - 75%, Cond Code 2 - 25%
II.1.B.1.i	843a:

**1995 AIR FORCE BASE QUESTIONNAIRE  
Hill AFB - AFMC**

II.1.B.1.j a: 150 miles, 45,000 PSF  
 II.1.B.1.k a: 45,000 PSF

**C. Family Housing (Facility Category Code 711)**

**II.1.C.1 Capacity (housing Inventory)**

II.1.C.1.a Number of adequate units from current DD Form 1410, line 18d:   
 II.1.C.1.b Number of substandard units from current DD Form 1410, line 18e:   
 II.1.C.1.c Current deficit (-) or surplus units in validated Market Analysis:  (includes E-1 - E3 requirements)  
 II.1.C.1.ci A Market Analysis was used to answer the questions in Section II.1.C.  
 II.1.C.1.d FY95/4 projected net housing deficit (-) or surplus of units:  (includes officers and enlisted extrapolated to FY95 if necessary, uses validated market analysis corrected to include realignment actions)

**II.1.C.2 Condition**

II.1.C.2.a Number of adequate units meeting current whole-house standards of accommodation and state of repair:  (includes projects programmed through FY95/4. Units meeting whole-house standards are those that were programmed after FY88)  
 II.1.C.2.a Number of adequate units requiring whole-house renovation or replacement:  (Units meeting whole-house standards are those that were programmed/ renovated after FY88).  
 II.1.C.2.a Number of new housing units projected to meet current deficit.

II.1.C.3 Percentage of military families living on base as compared to the total number of families (officer and enlisted) assigned to the base

II.1.C.3.a 31.0 percent of officer families live on base.

II.1.C.3.b 30.0 percent of enlisted families live on base.

II.1.C.3.a 31.0 percent of all military families live on base.

**2. Airfield Characteristics**

**II.2 Runway Table:**

Primary Designation	Dimensions:		Cross Runway	Aircraft Arresting Systems (II.2.1) Number Types	
	Length	Width			
14 Primary	13500 ft	200 ft	No	4	RAK 12 and RAK 9

## 1995 AIR FORCE BASE QUESTIONNAIRE

### Hill AFB - AFMC

- II.2.A There are 1 active runways.
- II.2.A.1 There are NO cross runways
- II.2.B There are 1 parallel runways (excluding main runway).
- II.2.C Dimensions of the primary runway (14).
- II.2.C.1 Length: 13,500 ft
- II.2.C.2 Width: 200 ft
- II.2.D Dimensions of all secondary runways are in the runway table.
- II.2.E The primary taxiway is 75 ft wide.
- II.2.F Determination if PRIMARY PAVEMENTS can support aircraft operations based on latest Air Force Civil Engineering Support Agency (AFCESA) Pavement Evaluation Report or the procedures in AFM 88-24 (Airfield Flexible Pavement Evaluation).

An AFCESA Pavement Evaluation Report was used to complete this section.

Aircraft Group	Criteria	Primary Pavements				
		Runways	Taxiways	Aprons		
II.2.F.1 Fighter	F-15	61 Kips	300,000 Passes	Supports Now	Supports Now	Supports Now
II.2.F.2 Fighter	F-16C/D	37 Kips	300,000 Passes	Supports Now	Supports Now	Supports Now
II.2.F.3 Bomber	B-52	450 Kips	15,000 Passes	Upgrade Needed	Upgrade Needed	Upgrade Needed
II.2.F.4 Bomber	B-1B	450 Kips	50,000 Passes	Upgrade Needed	Upgrade Needed	Upgrade Needed
II.2.F.5 Tanker	KC-135R	320 Kips	50,000 Passes	Supports Now	Supports Now	Supports Now
II.2.F.6 Tanker	KC-10	550 Kips	15,000 Passes	Supports Now	Supports Now	Supports Now
II.2.F.7 Airlift	C-5B	800 Kips	50,000 Passes	Supports Now	Supports Now	Supports Now
II.2.F.8 Airlift	C-141	325 Kips	50,000 Passes	Supports Now	Supports Now	Supports Now

- II.2.F.9 Work required to upgrade pavement to the required strength:

Pavement:	Aircraft:	(9.a) Unit of Measure	(9.b) Quantity	(9.c) Description of Work
Aprons	B-1B	CY	11,160	Increase PCC depth, 15" to 18"
Taxiway	B-1B	CY	39,055	Rebuild taxiway keel, 20"
Runway	B-1B	CY	613,730	REBUILD ACTIVE RUNWAY KEEL, 15"
Aprons	B-52	CY	11,160	increase PCC depth, 15" to 20"
Taxiway	B-52	CY	39,055	rebuild taxiway keel, 20"
Runway	B-52	cy	61,373	Rebuild active runway keel, 15"

- II.2.G Excess aircraft parking capacity for operational use.

## 1995 AIR FORCE BASE QUESTIONNAIRE

### Hill AFB - AFMC

**II.2.G.1** The total usable apron space for aircraft parking is 472,222 Sq Yds.

**II.2.G.1.a** Specifications for individual parking areas (irregularly shaped areas are approximated by rectangle).

Parking area name:	Dimensions (Equivalent Rectangle)		CURRENT USE DATA. (Type of Aircraft and which of the permanently assigned aircraft use the area.)	
270 Area Ramp	200 ft	1,600 ft	Primary Aircraft	Depot Aircraft
388 FW Ramp	1,100 ft	2,000 ft	Primary Aircraft	3 (18UE) Squad F-16
419 FW Ramp	700 ft	1,100 ft	Primary Aircraft	1 (18UE) Squad. F-16
Air Freight Ramp	375 ft	325 ft	Transient Aircraft	Not Used
Air Freight Ramps	275 ft	1,200 ft	Transient Aircraft	Not Used
Alert Parking Spot 2	50 ft	200 ft	Transient Aircraft	KC-135 Aircraft
Alert Parking Spot 3	50 ft	200 ft	Transient Aircraft	KC-135 Aircraft
Alert Parking Spot 4	50 ft	200 ft	Transient Aircraft	KC-135 Aircraft
Alert Parking Spot 5	50 ft	200 ft	Transient Aircraft	KC-135 Aircraft
Alert Parking Spot 6	50 ft	200 ft	Transient Aircraft	KC-135 Aircraft
Alert Parking Spot 7	50 ft	200 ft	Transient Aircraft	KC-135 Aircraft
Alert Parking Spot 1	50 ft	200 ft	Transient Aircraft	KC-135 Aircraft
Base Ops North Ramp	300 ft	800 ft	Transient Aircraft	C-5, C-141, etc.
East Ramp	600 ft	1,600 ft	Primary Aircraft	Flight Test/C-130s
Transient West Ramp	600 ft	1,000 ft	Transient Aircraft	C-5, C-141, etc.

**II.2.G.2** Permanently assigned aircraft currently require 414,257 Sq Yds of parking space.

**II.2.G.3** 109,281 Sq Yds of parking space is available for parking additional non-transient aircraft.

**II.2.G.4** The following factors limit aircraft parking capability:

None

**II.2.H** The dimensions of the (largest) transient parking area:

**II.2.I** Details of operational aircraft arresting systems on each runway are in the Runway Table (II.2)

**II.2.J** There are No critical features relative to the airfield pavement system that limit its capacity:

## 1995 AIR FORCE BASE QUESTIONNAIRE

### Hill AFB - AFMC

#### 3. Utility Systems

**II.3.A The overall system capacity and percent current usage for utility system categories:**

Utility System	Capacity	Unit of Measure	Percent Usage
II.3.A.1 Water:	13.6 MG/D	MG/D - million gallons per day	36 %
II.3.A.2 Sewage:	14.8 MG/D		10 %
II.3.A.3 Electrical distribution:	74.0 MW	MW - million watts	56 %
II.3.A.4 Natural Gas:	61.10 MCF/D	MCF/D - million cubic feet per day	17 %
II.3.A.5 High temperature water/steam generation/distribution:	820.0 MBTUH	MBTUH - million British thermal units per hour	27 %

**II.3.B Characteristics regarding the utility system that should be considered:**

- Utah Power and Light Electrical Distribution system can supply an additional 45% above current requirements.
- Mountain Fuel Supply can supply an additional 54% above current requirements.
- Hill AFB is located in an energy rich area.

#### 4. Aircraft Maintenance Hangar Facilities

Specifications for general maintenance hangars and nose docks, excluding Depot and Test & Evaluation facilities.

II.4.A.1	Facility number: 25	Hanger		
	Current Use:	Scheduled periodic maint, inspection, overhaul		
II.4.A.2	Size (SF):	38,024 SF		
II.4.A.3-4	Largest aircraft the hanger/ nose dock can COMPLETELY enclose:	C-23A		
	<b>DIMENSIONS:</b>	<b>Width</b>	<b>Height</b>	<b>Length</b>
II.4.A.5	Door Opening:	90 ft	23 ft	
II.4.A.6	Largest unobstructed space inside the facility:	275 ft	24 ft	68 ft
II.4.A.1	Facility number: 37	Hanger		
	Current Use:	Weapons Loading Training		
II.4.A.2	Size (SF):	23,938 SF		
II.4.A.3-4	Largest aircraft the hanger/ nose dock can COMPLETELY enclose:	C-23A		
	<b>DIMENSIONS:</b>	<b>Width</b>	<b>Height</b>	<b>Length</b>
II.4.A.5	Door Opening:	153 ft	22 ft	
II.4.A.6	Largest unobstructed space inside the facility:	144 ft	20 ft	84 ft

## 1995 AIR FORCE BASE QUESTIONNAIRE

## Hill AFB - AFMC

II.4.A.1 Facility number: 40 Hanger

Current Use: Maintenance Training

II.4.A.2 Size (SF): 19,940 SF

II.4.A.3-4 Largest aircraft the hanger/ nose dock can COMPLETELY enclose: C-130

DIMENSIONS:	Width	Height	Length
II.4.A.5 Door Opening:	179 ft	25 ft	
II.4.A.6 Largest unobstructed space inside the facility:	133 ft	20 ft	60 ft

II.4.A.1 Facility number: 42 Hanger

Current Use: Squadron Maintenance

II.4.A.2 Size (SF): 17,261 SF

II.4.A.3-4 Largest aircraft the hanger/ nose dock can COMPLETELY enclose: C-130

DIMENSIONS:	Width	Height	Length
II.4.A.5 Door Opening:	148 ft	22 ft	
II.4.A.6 Largest unobstructed space inside the facility:	137 ft	20 ft	59 ft

II.4.A.1 Facility number: 43 Hanger

Current Use: Corrosion Control

II.4.A.2 Size (SF): 21,594 SF

II.4.A.3-4 Largest aircraft the hanger/ nose dock can COMPLETELY enclose: A-10

DIMENSIONS:	Width	Height	Length
II.4.A.5 Door Opening:	179 ft	25 ft	
II.4.A.6 Largest unobstructed space inside the facility:	172 ft	21 ft	57 ft

II.4.A.1 Facility number: 45 Hanger

Current Use: Squadron Maintenance

II.4.A.2 Size (SF): 98,436 SF

II.4.A.3-4 Largest aircraft the hanger/ nose dock can COMPLETELY enclose: C-130

DIMENSIONS:	Width	Height	Length
II.4.A.5 Door Opening:	180 ft	25 ft	
II.4.A.6 Largest unobstructed space inside the facility:	316 ft	21 ft	58 ft

**1995 AIR FORCE BASE QUESTIONNAIRE**  
**Hill AFB - AFMC**

II.4.A.1 Facility number: 48 Hanger  
Current Use: Corrosion Control

II.4.A.2 Size (SF): 24,985 SF

II.4.A.3-4 Largest aircraft the hanger/ nose dock can COMPLETELY enclose: C-130

DIMENSIONS:	Width	Height	Length
II.4.A.5 Door Opening:	179 ft	25 ft	
II.4.A.6 Largest unobstructed space inside the facility:	121 ft	18 ft	58 ft

II.4.A.1 Facility number: 576 Hanger  
Current Use: Fuel Dock

II.4.A.2 Size (SF): 4,800 SF

II.4.A.3-4 Largest aircraft the hanger/ nose dock can COMPLETELY enclose: F-111

DIMENSIONS:	Width	Height	Length
II.4.A.5 Door Opening:	50 ft	21 ft	
II.4.A.6 Largest unobstructed space inside the facility:	70 ft	30 ft	73 ft

II.4.A.1 Facility number: 578 Hanger  
Current Use: Avionics Dock

II.4.A.2 Size (SF): 4,064 SF

II.4.A.3-4 Largest aircraft the hanger/ nose dock can COMPLETELY enclose: F-111

DIMENSIONS:	Width	Height	Length
II.4.A.5 Door Opening:	50 ft	21 ft	
II.4.A.6 Largest unobstructed space inside the facility:	60 ft	30 ft	46 ft

II.4.A.1 Facility number: 590 Hanger  
Current Use: Aircraft Maintenance

II.4.A.2 Size (SF): 35,160 SF

II.4.A.3-4 Largest aircraft the hanger/ nose dock can COMPLETELY enclose: C-141

DIMENSIONS:	Width	Height	Length
II.4.A.5 Door Opening:	160 ft	40 ft	
II.4.A.6 Largest unobstructed space inside the facility:	173 ft	40 ft	196 ft

### 5. Unique Facilities

II.5.A Unique (one-of-a-kind) Air Force facilities which must be replaced if the base is closed:

A.1 Name or type of facility	A.2 Total square footage	A.3 Category code	A.4 Present use
Lith bat strge/disch fac	7,636 SF	215555	Only AF facility environmentally controlled and equipped with bat

# Document Separator

# HILL AIR FORCE BASE

Ogden, Utah



**Size:** 6,666 acres  
**Mission:** Provide logistics support for weapons systems  
**HRS Score:** 49.94: Placed on the NPL in 1987  
**IAG Status:** IAG signed in April 1991  
**Contaminants:** Volatile organic compounds, sulfuric acid, chromic acids, solvents, and petroleum wastes  
**Funding to Date:** \$49.7 million

## CLEANUP BACKGROUND

Preliminary Assessments and Site Inspections (PA SIs) have been completed for 63 sites identified at the installation. The initial PA was completed in FY82. Subsequent SIs were conducted in FY84 and FY87. In addition, 22 sites have been identified, bringing the total number of sites at the installation to 85. Of the 85 sites, 31 are on the NPL and are divided into seven operable units (OU).

The Remedial Investigation and Feasibility Study (RI/FS) was initiated for the seven OUs in FY85.

An interim Record of Decision (ROD) for a Chemical Disposal Pit site was signed in FY91, and a ROD for a Sodium Hydroxide Spill site was signed in FY92. The Remedial Design of a trichloroethylene (TCE) Source Recovery Facility was completed in FY92.

The installation has initiated several Remedial Actions (RA). To date, 7,500 gallons of solvents, 10,600 gallons of fuel, and 1,700 cubic yards of contaminated soil have been removed. In addition, the installation capped 70 acres of landfill, extracted and treated groundwater from seven wells and two infiltration galleries, and installed a mile-long slurry wall. More than 140 million gallons of contaminated groundwater have been treated. As a result of these actions, volatile organic compound concentrations in off-base groundwater samples decreased 99 percent since FY84.

## FY93 CLEANUP PROGRESS

The PA SIs were completed for the 22 AOCs this past year and RI/FSs were initiated. An Interim Remedial Action (IRA) for OU2 was completed in FY93, and in one week, 1,200 gallons of TCE were recovered.

The RA for OU3 consisting of an asphalt cap was designed and installed to prevent infiltration and leaching of contaminants.

Horizontal drains were installed at OU4 as part of a technology demonstration project to collect contaminated groundwater from a nearby hillside.

RI activities continued at OU5. An IRA was implemented at OU6 to intercept and treat the TCE seeping into the duck pond located in an off-base residential subdivision. Sampling of the air in basements in the subdivision also was initiated.

A vapor exposure Risk Assessment performed on base housing located downgradient from the fuel farm tanks that have leaked free product into the shallow aquifer showed that there was no need to relocate 56 residences.

## PLAN OF ACTION

Three RODs for OU1, OU2, and OU4 are planned during FY94. For sites not yet at the ROD stage, IRAs are scheduled to reduce the risk at the source area.

## Table B-1 Defense Environmental Cleanup Program

Installation Status as of September 30, 1993

Installation		Status								Estimated Costs by Fiscal Year (\$000)	Additional Progress Information
Phase	Completed	Under-way	Future	Schedule Impact in FY93 *	Costs Incurred Through FY93 (\$000)	FY93 Funds Obligated (\$000)	FY94 Funds Allocated (\$000)	FY95 Planning Estimate (\$000)			
Sites (Actions)											
<b>UTAH</b>											
<b>ARMY — TOOELE ARMY DEPOT, SOUTH AREA</b>											
Total No. of Sites: 27	Study		27			\$9,888	\$0	\$0	\$0	FY96	\$11,500
No. of Sites with Remedy in Place:	Interim Action	1(1)				\$223	\$0	\$0	\$0	FY97	\$10,850
No. of Sites with Response Complete:	Design			16		\$0	\$0	\$0	\$0	FY98	\$14,000
Estimated Completion Year: 2000	Cleanup			18		\$0	\$0	\$0	\$0	FY99	\$6,550
	<b>Total</b>					\$10,111	\$0	\$0	\$0	<b>FY94 to Completion</b>	<b>\$44,400</b>
<b>Progress During FY93</b>											
Completed Phase I RCRA Facility Investigation recommending No Further Action at seven of the 29 Solid Waste Management Units.											
<b>Progress Planned for FY94-95</b>											
Complete Phase II RCRA Facility Investigations for Solid Waste Management Units by the end of FY95.											
<b>DEPARTMENT OF THE NAVY — NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT MAGNA</b>											
Total No. of Sites: 6	Study	6				\$296	\$0	\$0	\$0	FY96	\$0
No. of Sites with Remedy in Place:	Interim Action					\$0	\$0	\$0	\$0	FY97	\$0
No. of Sites with Response Complete:	Design					\$0	\$0	\$0	\$0	FY98	\$0
Estimated Completion Year: 1995	Cleanup					\$381	\$0	\$0	\$0	FY99	\$0
	<b>Total</b>					\$677	\$0	\$0	\$0	<b>FY94 to Completion</b>	<b>\$0</b>
<b>Progress During FY93</b>											
Work on the Remedial Investigation/Feasibility Study continued during FY93.											
<b>Progress Planned for FY94-95</b>											
Remedial Investigation/Feasibility Study work continued through FY94 and will be completed in FY95.											
<b>AIR FORCE — HILL AIR FORCE BASE</b>											
<b>NPL</b>											
Total No. of Sites: 85	Study	40	45			\$30,218	\$8,689	\$4,157	\$2,625	FY96	\$18,781
No. of Sites with Remedy in Place: 2	Interim Action	9(9)	2(2)			\$4,899	\$4,899	\$6,034	\$3,415	FY97	\$20,830
No. of Sites with Response Complete: 18	Design	19	3	40		\$10,800	\$897	\$879	\$3,330	FY98	\$20,669
Estimated Completion Year: 2010	Cleanup	12	5	50		\$1,810	\$400	\$600	\$2,200	FY99	\$18,158
	<b>Total</b>					\$48,747	\$14,885	\$11,070	\$11,570	<b>FY94 to Completion</b>	<b>\$286,966</b>
<b>Progress During FY93</b>											
Completed studies for nine sites, cleanups for six sites, and interim actions for three sites.											
<b>Progress Planned for FY94-95</b>											
Plan to accomplish studies for 45 sites, interim actions for one site, designs for 10 sites, and cleanups for 31 sites.											

\* Includes: FUND - Personnel, REG - Regulatory, FUND - Funding

Bob Van Orman

6/12/95

1 1/2 years ago - we may be forced to clean it up within  
2 years.

Some of the original BRAC demands

"immediately"

1 m. cu. yds., some soils down 60 ft. 25 bill.  
How do you get soils to bring it back.

Why would you

You can't "clean" it in 2 years. "Cleaning" it isn't a  
strategy.

- Heavy layers that separate the clay layer from the  
aquifer.  
Clay lenses

~~Clay lenses~~ soils "grab on" to the soils.

Under the law,

we're going to have to be creative.

Designing a diff. cleanup standard for is desired  
over.

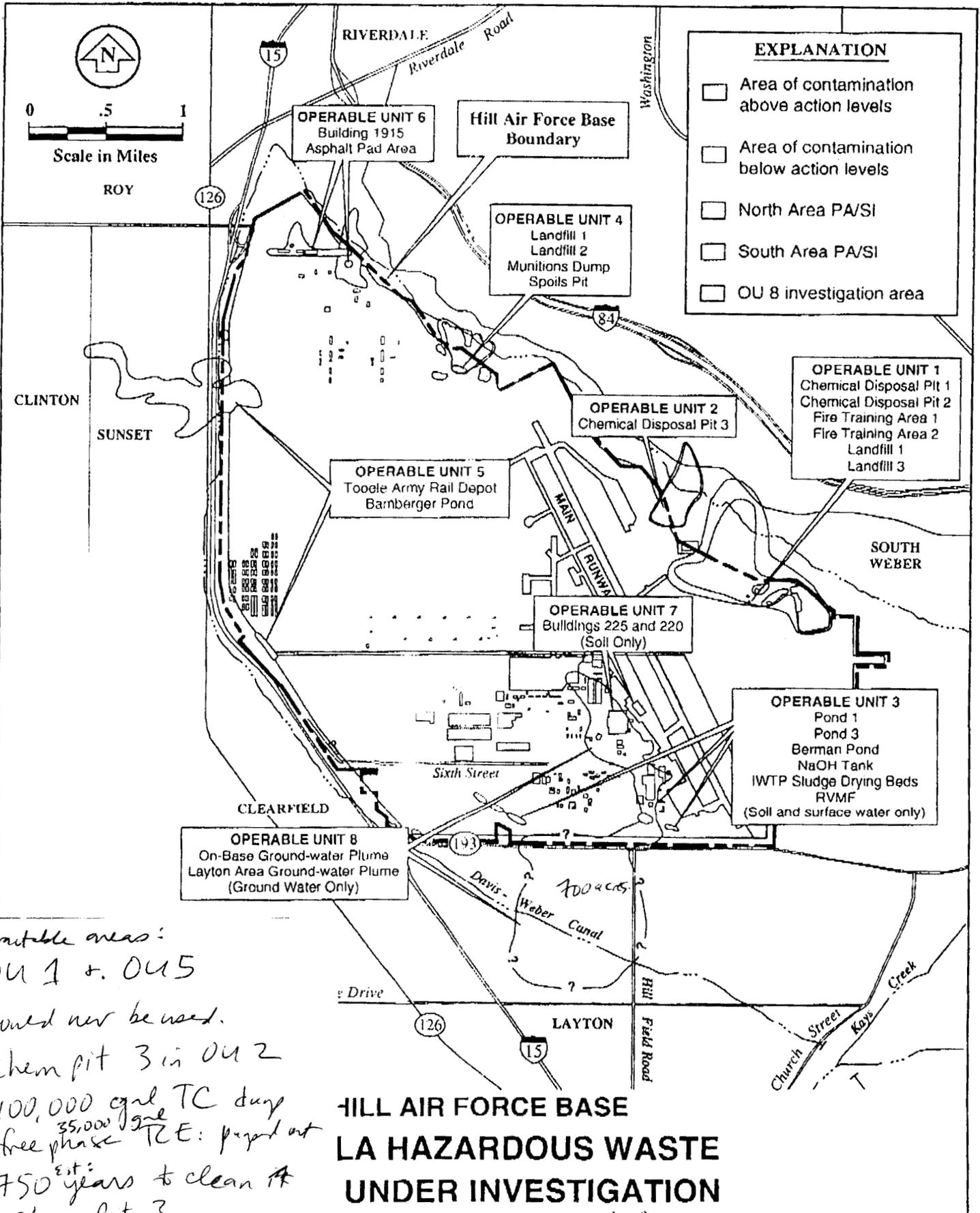
DNA PLs - hard to find it.

You've contaminated the aquifer  
underneath, confining

90% TCE - + chlorinated solvents + degraded  
vinyl chloride.

out there in Sects.

Any industrial activity will cause additional  
environmental contamination. Any choice for doing this  
stuff will add to contam.



*Intractable areas:*

- OU 1 + OU 5  
could never be used.
- Chem pit 3 in OU 2
- 100,000 gal TC dump  
35,000 gal  
free phase TCE: piped out
- 750<sup>est</sup> years to clean at  
Chem Pit 3.

**HILL AIR FORCE BASE  
LA HAZARDOUS WASTE  
UNDER INVESTIGATION**

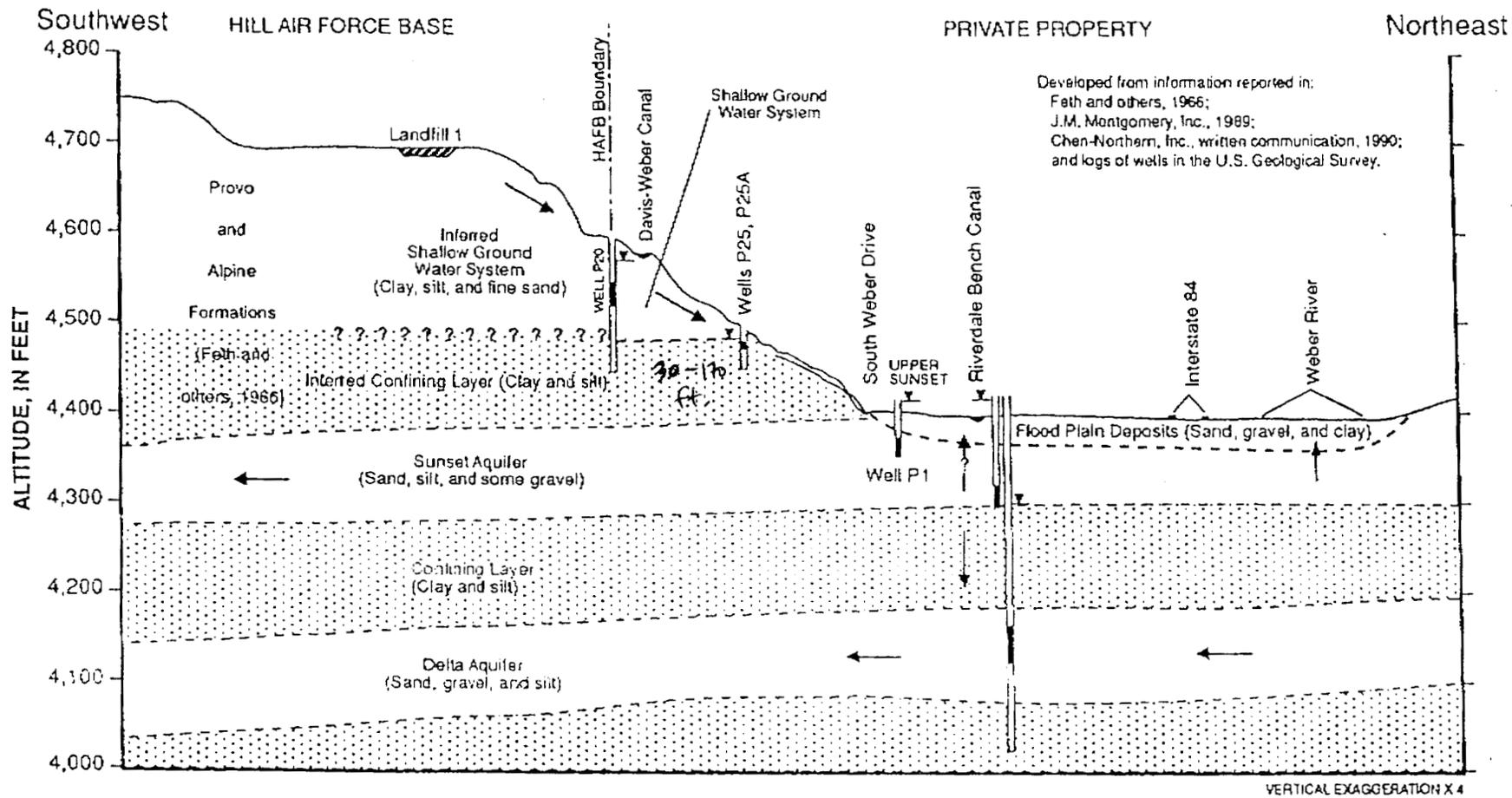
801 777 4306 P.002/003

00-ALC/EM HILL AFB UT

JUN-08-1995 12:46

ES-12

*seeps + spring along hillside  
landslide complex.*



Developed from information reported in:  
 Fath and others, 1966;  
 J.M. Montgomery, Inc., 1989;  
 Chen-Northern, Inc., written communication, 1990;  
 and logs of wells in the U.S. Geological Survey.

**EXPLANATION**

- APPROXIMATE CONTACT
- ????? QUESTIONABLE CONTACT
- ← ASSUMED DIRECTION OF GROUND-WATER MOVEMENT
- ⊥ SCREENED WELL SHOWING HEAD

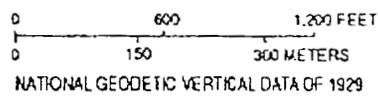


Figure ES-3.--Diagrammatic section of the probable relation between the shallow ground-water system in the area of Operable Unit 4, the flood-plain deposits of the Weber River, and the underlying regional confined aquifers.

**FAX**

**Date** 8 JUN 95

**Number of pages including cover sheet** 3

**TO:** DEIDRE NURRE

**FROM:** Bob Elliott  
Environmental  
Restoration Division  
OO-ALC/EMR  
7274 Wardleigh Road  
Hill AFB, Utah 84056-  
5137

Phone (703) 696-0504  
Fax (703) 696-0550  
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DSN 458-8790 x 3370  
Fax (801)777-4306  
Phone

**CC:**

**REMARKS:**  Urgent  For your review  Reply ASAP  Please Comment

Copy of Hill AFB areas of contamination (1) &  
regional aquifers (2)

# Document Separator

HILL AFB

7:09 PM Roger D. Supervisor Office  
916 440 5485

> Hill: Do they buy off on Defense Rpt - to Congress #'s?  
OK - Based on In-place tech. Does not anticipate

yes, off base;  
no, drinking water

biodegradation, ~~to~~ encapsulation, pump & treat ~~not~~ removal.  
off base migration: is it off base drinking H<sub>2</sub>O?

Depth to SW - what is it?

Ask Bob E. Are you investigating the location of possible additional sites? or has this concluded?

RERT corrective action model - we've added 97 areas - 88 ID'd sites  
170 ~~total~~ areas of concern - RERT people - 39,000 ft<sup>2</sup> industrial site < SW  
97 of 170 = SWMU's  
88 1K sites = 1/2 are UST - known contamination

Ask Bob E. Any ROD's signed?  
1 ROD signed 04-4 soils, groundwater.

1 ROD pending reg. approval By end of sept: 1 more ROD } 3 RODS by (?) by end '95

Do you know what year you estimate to be moving in to Log for pump & treat?  
funding depth - 2010

Ask Bob E.

Groundwater: we have 250-300 ft <sup>of clay layer</sup> above drinking water - large clay layer.

Bob E.

~~400 ft~~ ~~at base~~ ~~(Base in water)~~  
3-400 ft below surface of base Appx 300 ft of silt. <sup>multiple perched aquifers</sup>  
No SW <sup>upper perched aquifer</sup> 10-20ft / 60-80ft. massive  
~~used for irrigation or washed gotten to water table~~  
wear River not used as drinking water source either.

Bob E:

Do any of yr. cleanup plans assume cleanup of wear River?  
wear River swept through it areas, causing  
River is not impacted. It will not become impacted.

Source ~~is~~ cut off. chlorinated solvent -  
TCE & by - oils - fine trace over TCE -  
chlorinated & degraded.

~~Bill~~

Roger Dickinson: what costs did you use?

open drain into the ditch.

ditches were opened into the ~~the~~ trench -  
open trenches. Chem Pit #3  
~~Chem Pit #3 -~~

45 acres - 2 landfills in 1 continuous area.

2 other landfills - 55 acres total landfill  
land

off ~~the~~ base plume from landfill - Much Chem Pit 3 →

Bob Elliott - 777 8790 - all but

The whole thing is driven by time available.  
How much time do you have to collapse?

Assumptions:

You don't have natural systems - you  
get into removal - a massive scale.

Incubate it on site

Treatment - shipment - bring it back -

Biodiversity in situ -

<sup>Biodiversity.</sup>  
Fuel site : almost exclusively fuel sites.  
Fuel tank leaks -

Enhanced biodeg on JP-4 -

Bob Elliott

OU-

• 28 acres = Landfills 1 + 3

2 landfills

Footprint of Pmi ≈ 50 acres

appx 50 acres - soils + gw in OU  
About

Total: About ≈ 200 acres - anticipated soils cleanup  
≈ ~~170~~ 170 acres

~~200 acres~~

340 - 70 acres of on-base sw contain.

+ 1 plum not fully defined. (chasing it)

5 ppb TCE concentration.

off-base sw contain: 1200 acres.

electroplating in the industrial.

Landfills would have to maintain ownership.  
Leave contamination in place.

Window wants -

DNAPLs / LNAPLs

Areas where we don't have free phase { LNAPLs  
dissolved phase  
plumes in fix area

in final soil  
contain overlies  
sw contain.

• working a risk-based cleanup based on scenario and use.  
→ using an industrial scenario for cleanup.

if OK, move to RCRA cleanup.

→ some overlap.  
Assume most soils cleanup overlap sw areas.

punched 200-300 ft thick. <sup>initial confining layer</sup>  
Boring logs tell us: 200-300 ft thick.

Summit Aquifer - 3-400 ft ± both of aquifer. It appears  
as though SW is only contaminated in the inferred shallow SW  
system.  
Depth to both

Avg. of 20 ft thick -  
Inferred shallow GW system is an aquitard/aquit.

A 20 billion scenario -

Get in → get out; transfer prop. in 2 yrs.

\$ 20 billion → to clean it up in 2 ~~yr.~~ yr.  
time frame.

~~If we have to~~

Current

BRAC or no BRAC, this is not a lot of  
change that you could do.

Route from effort doesn't make sense.

Contaminator under the hangar floor.  
Metals contain

# Document Separator

# Document Separator

There are several documents that are too large to be scanned in for electronic view regarding military installations in Montana, Macdill AFB Tampa, FL, and the Long Beach Naval Complex