

# Fairchild Air Force Base

## CHAPTER 4

### CONSERVATION PROGRAM, WATER RIGHT ANALYSIS, SYSTEM RELIABILITY AND INTERTIES

#### 1. CONSERVATION PROGRAM DEVELOPMENT AND IMPLEMENTATION

##### 1.1. REQUIRED MEASURES FOR ALL SYSTEMS:

1.1.1. WATER CONSERVATION PROGRAM PUBLICITY: Conservation program promotion will be implemented on an annual basis. All 1,302 Military Family Housing families living on Fairchild AFB received the "Family Housing Brochure" dated Jan 2001. In Section B ("Occupant Responsibilities"), there is a paragraph on "Water Conservation":

"It is not intended that normal and reasonable use of water be restricted; however, since excessive usage results in increased costs and depletion of the source of supply, it is necessary that all waste be eliminated. The base watering schedule is on an odd/even system. Odd-numbered houses water on odd-numbered days, etc. Watering should not be done after dusk or during the heat of the day (1100-1600). Watering during the heat of the day may actually cause the grass to burn, while excess watering may cause the grass roots to rot or mold."

1.1.2. SOURCE METERS: Source meters are already installed for all groundwater sources.

1.1.3. LEAK DETECTION AND REPAIR: Through aggressive leak detection surveys and repairs during 1998-1999, unaccounted-for water has been reduced from 15% to approximately 3%.

1.2. OTHER MEASURES AND LEVEL OF IMPLEMENTATION: See Chapter 4, paragraph 1.3 below.

##### 1.3. CONSERVATION PROGRAM OUTLINE:

###### 1.3.1. CONSERVATION OBJECTIVES:

1.3.1.1. In compliance with Executive Order (E.O.) 13123, the Department of Energy has declared FY00 as the baseline year for potable water usage. Fairchild AFB (main base and off-base sites) used a total of 1,009,124,000 gallons (1.01 billion gallons) in FY 00. The average cost of water to the Air Force was approximately \$1.42 per thousand gallons (kgal); Fairchild's cost was \$0.40024 per kgal (28% of the average USAF cost). This baseline will be used to gauge the effectiveness of our water conservation program.

1.3.1.2. Water conservation goals for the Air Force are based on each location developing a water management plan and the implementation of water efficiency Best Management Practices (BMPs). This is in place of a mandated percentage reduction in potable water usage.

1.3.1.3. Each installation must implement at least 4 of the 10 water efficiency BMPs. 5% of the bases must have this done by 2002, 15% by 2004, 30% by 2006, 50% by 2008, and 80% by 2010. Fairchild AFB should be able to meet 4 or more BMPs by 2004, or perhaps sooner. The BMPs are:

TABLE 4-1 CONSERVATION MEASURES					
NO.	TYPE OF MEASURE	DISCUSSION / ANALYSIS	LEVEL OF IMPLEMENTATION	DURATION	DATE BEGUN/ SCHEDULE FOR IMPLEMENTATION
1	Public Information & Education Programs	This should be fairly easy to implement using the <u>Fairchild Connection</u> newspaper, base bulletins, e-mail messages, etc. <b>The base has selected this initiative. Projected Budget = \$0.</b>	Basewide	Every summer	Begun June 2001
2	Distribution System Audits, Leak Detection & Repair	92 CES/CEOIB (Utilities Shop) has done extensive leak detection surveys in recent years. Some leaks found were in excess of 200,000 gallons per day (gpd). The base has selected this initiative; <b>we have met this BMP and it is complete.</b>	Basewide	March 1998 - June 1999	Begun March 1998; Completed June 1999
3	Water-Efficient Landscaping	This is very hard to do with our thirsty Kentucky Bluegrass and deciduous trees. With the great emphasis on Base Appearance, this BMP is not likely to be supported by senior leadership.	[None]	[None]	[None]
4	Toilets & Urinals	Current Federal law requires that residential toilets manufactured after 1 Jan 94 must use no more than 1.6 gallons per flush (gpf). Commercial toilets manufactured after 1 Jan 97 must use no more than 1.6 gpf and urinals must use no more than 1 gpf. Some of the recent MFH renovation projects involved replacement of the older residential toilets. However, very few of the older O&M facilities have had their old plumbing fixtures replaced.	Family Housing	Indefinite (depends on Family Housing renovation project funding)	~1990

**TABLE 4-1  
 CONSERVATION MEASURES**

NO.	TYPE OF MEASURE	DISCUSSION / ANALYSIS	LEVEL OF IMPLEMENTATION	DURATION	DATE BEGUN/ SCHEDULE FOR IMPLEMENTATION
5	Faucets & Showerheads	Federal guidelines mandate that all lavatory and kitchen faucets and aerators manufactured after 1 Jan 94 must use no more than 2.2 gpm; showerheads must use no more than 2.5 gpm. Recent MFH renovation projects have low-flow faucets and showerheads. However, the older O&M facilities have not been retrofitted. Projected Budget = unknown (part of upcoming Family Housing renovation projects).	Family Housing	Indefinite (depends on Family Housing renovation project funding)	~1990
6	Boiler/ Steam Systems	Although our steam condensate lines are in generally good condition, there is always some water loss involved in central steam systems. In FY01, the amount of "make-up water" needed at the three Fairchild AFB steam plants was 4,251,335 gallons (costing \$2,290). It is not cost-effective to spend large amounts of money to tighten up our steam distribution lines, especially since central steam plants may be replaced by distributed natural gas systems in 2002. The base has selected this initiative; we have met this BMP. Projected Budget = \$15.2M.	Basewide (except for Deep Creek Steam Plant)	1 Year	Begun March 2002; Estimated Completion in Oct 2002
7	Single-Pass Cooling Equipment	Condensers, air compressors, vacuum pumps, ice machines, x-ray equipment and air conditioners typically use single-pass cooling. Water is circulated once through a piece of equipment and then disposed down the drain. To remove the same heat load, single-pass systems use 40 times more water than a cooling tower operated at 5 cycles of concentration. Since there is no comprehensive inventory of these types of equipment, it is not yet known how we stand against	[None]	[None]	[None]

TABLE 4-1 CONSERVATION MEASURES					
NO.	TYPE OF MEASURE	DISCUSSION / ANALYSIS	LEVEL OF IMPLEMENTATION	DURATION	DATE BEGUN/ SCHEDULE FOR IMPLEMENTATION
		this BMP.			
8	Cooling Tower Management	Cooling towers help regulate temperature by rejecting heat from air-conditioning systems or by cooling hot equipment. There is no comprehensive inventory of cooling towers, so it is not yet known how we stand against this BMP.	[None]	[None]	[None]
9	Miscellaneous High Water-Using Processes	Kitchens, cleaning/laundry services, aircraft wash racks, etc. all use large amounts of water. Specific high-water processes must be identified and analyzed for potential water and energy efficiency improvements. <b>The base has selected this initiative, and it is complete.</b>	Aircraft Wash Rack Hangar 1019	One-time renovation	Completed in 2001
10	Water Reuse and Recycling	Water from showers/baths and clothes washers (not used to wash diapers or process food) could possibly be reused for landscape irrigation and flushwater for toilets and urinals. However, use of this water at Federal facilities is generally not recommended because of high capital costs and health and safety issues.	[None]	[None]	[None]

1.3.2. EVALUATION OF CONSERVATION MEASURES:

1.3.2.1. The use of water conservation measures to reduce overall water demands (and to conserve the water resources of a water purveyor) have become standard practice in much of the country, especially during high summer maximum demand periods. Conservation measures used by water purveyors vary, but normally include rate structures and public education that encourage conservation. Measures encompass reduction of irrigation, eliminating unmetered uses, and using water-saving devices.

1.3.2.2. The FY01 Grounds Maintenance Contract specifications direct that no more than 3/4 inch of water be applied to "Improved Grounds" every two days. If the Grounds Maintenance Contractor and Military Family Housing (MFH) residents were to reduce the irrigation usage to the application rates recommended by the Soil Conservation Service (3/4 inch of water every three days), the landscaping

and greenery should remain essentially the same aesthetically. Some potential areas of water conservation that could be utilized by Fairchild AFB include:

- (1) Use irrigation levels recommended by the Soil Conservation Service.
- (2) Shift watering to nighttime hours to reduce the rate of transpiration and evaporation.
- (3) Enforce the odd/even MFH watering schedule on alternate days.

**1.3.3. IDENTIFICATION OF SELECTED CONSERVATION ACTIVITIES:**

**1.3.3.1. REPLACEMENT OF MANUALLY-OPERATED, ABOVE-GROUND LAWN IRRIGATION SYSTEMS WITH AUTOMATED, UNDERGROUND SPRINKLERS:** The base's Grounds Maintenance contractor still irrigates many lawns on base with manually-operated, above-ground lawn irrigation systems. Laborers travel around the base to set up aluminum pipes on the surface to manually irrigate lawn areas. This labor-intensive irrigation practice is somewhat wasteful of water. Over the past two years, over a dozen irrigation systems have been converted from a manual/above-ground to an automatic/underground setup. There are several more areas remaining to be done; they are listed below in Table 4-2. Anticipated savings in water use is 10%.

REFERENCE #	DESCRIPTION	EST. COST	FY
GJKZ 99-0082	Irrigation System, East of Mitchell Drive		05+
GJKZ 99-0083	Irrigation System, NE of Eaker Avenue		05+
GJKZ 99-0093	Irrigation System, Heritage Park		05+
GJKZ 98-0174A	Lawn Sprinklers, Youth Center		05+
W/R 25512	Drip Irrigation/Landscape Comm Area	?	?
W/R 27893	Underground Sprinkler Systems – Basewide	?	?

**1.3.3.2. INSTALLATION OF WATER-SAVING TOILETS AND SHOWERHEADS IN REPLACEMENT HOUSING:** Low-flow (1.6 gallons/flush) toilets and restrictive shower heads will be installed (in accordance with Spokane County building codes) via these projects:

- Project GJKZ 02-0066, "Whole-House Repairs, Army Capehart MFH, Phase 1 (26 units)"
- Project GJKZ 02-0066, "Whole-House Repairs, Army Capehart MFH, Phase 2 (22 units)"

**1.3.4. TARGET WATER SAVINGS PROJECTIONS:**

1.3.4.1. An additional 10% savings in water can be achieved through water conservation measures. During the past 12-year period (1989-2000), overall water demand on Fairchild AFB has remained relatively constant (and has even declined slightly). Despite the fact that the "Improved Grounds" (irrigated) acreage has increased by 60% during that timeframe, the overall water demand has remained constant through successful conservation and leak detection initiatives.

1.3.4.2. Even though an additional 10% water savings can be achieved, it may be offset by the construction of 227 additional MFH units on Fairchild AFB. The Geiger Heights MFH area may be privatized, and new units constructed to take their place. As a result, no net change is factored into the water demand forecasts identified in Chapter 2.

**1.4. REGIONAL CONSERVATION PROGRAMS:** Fairchild AFB has developed its own independent water conservation program. It has not participated in the development or implementation of a regional conservation program.

**2. SOURCE OF SUPPLY ANALYSIS:** 92 CES is commissioning an A-E study of the base's water supply and distribution system. The feasibility of replacing the Ft Wright Wellfield with on-base wells will be pursued.

**2.1. ENHANCED CONSERVATION MEASURES:** Fairchild AFB is considering installing a Rainbird "Smart Irrigation" system to control automatic sprinkler systems. Instead of having automatic sprinkler systems controlled by timers (which never vary as a function of the weather), the "smart irrigation" system would measure soil and atmospheric conditions to meter out only the amount of water needed to keep plants healthy. A central computer would measure soil moisture, evapotranspiration rate, relative humidity, etc. to determine how much water is required for plants on a daily basis. Potential water savings could amount to 17 percent. The \$300,000 project could be funded under the Bonneville Power Administration's Demand Side Management (DSM) program.

**2.2. WATER RIGHT CHANGES:** See Chapter 4, paragraph 3.6.

**2.3. INTERTIES:** Fairchild AFB has an emergency water intertie with the City of Spokane at the base's Geiger Reservoir facility. Since the intertie is for emergency use only, adjustments to Fairchild AFB's water rights are not necessary.

**2.4. ARTIFICIAL RECHARGE:** There is not enough surface water at Fairchild AFB to artificially recharge the groundwater aquifer. There are no creeks or other watercourses, only drainage ditches. The underlying basalt rock makes it difficult to pinpoint exactly where water could seep downwards, and where water would be trapped near the surface and just evaporate over time.

**2.5. USE OF RECLAIMED WATER, REUSE, AND OTHER NON-POTABLE SOURCES:**  
Potential Uses For Reclaimed Water (from the General Services Administration's Water Management Guidebook, page 4-1):

- (1) Flushwater for toilets and urinals
- (2) Landscape irrigation
- (3) Makeup water for cooling towers