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An Assessment of Underground Storage Tanks at Massachusetts' Public Use Airports

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USTs at MA Public Use Airports

Master of Community Planning
Research Project
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Chapter One – Introduction

1.1 Introduction/Background

A proactive approach for planning capital improvements, specifically the replacement of underground storage tanks (UST's), is essential. In a time when Federal Airport Improvement Program (AIP) funds for capital improvement projects have seen a steady decline state governments, such as Massachusetts, have been forced to fund a larger share of costly capital improvements and play a more active role in running our national aviation system. Many believe that the state's role in funding, distribution of funds, and on-going management of U.S. airports will likely increase as the Federal Aviation Administration (FAA) is streamlined.

"Airports return dollars to the community they serve. Nationally, aviation generates roughly $771 billion dollars to the economy which exceeds the gross national product of all but four countries in the world (Michigan Aviation, 1997)." Local communities also benefit from the money air travelers spend in the community, which from surveys conducted in other states, amounts to about $97 per day (Michigan Aviation, 1997). Despite these contributions to the local economy many of the smaller general aviation (GA) and reliever airports are unable to generate the necessary revenue to maintain existing facilities.

1.2 Economic Importance of Airports

The importance of GA airports cannot be overstated. Airports are more than just a place to land and takeoff, they are an economic entity. General aviation airports support corporate and business flight activities, law enforcement, cargo transport,

emergency medical services, charter flights, flight schools, agricultural flying, aerial photography services and recreational flying. "A survey of company presidents and CEO's, conducted by Dow Jones & Company, found that air transportation access is the single most important locational attribute in selecting a location for corporate headquarters, and the second most important attribute for locating a research and development facility (Cambridge Systematics, 1988)". A survey conducted in 1989 for the Massachusetts Aeronautics Commission (MAC) found that "...companies that rely on GA airports as a tool in doing business would have to either relocate or go out of business if they lost access to their GA airport (MASP, 1989)." In either of those scenarios, the loss in sales resulting from these business relocating out of state or going out of business was estimated at nearly $200 million per year (MASP, 1989).

Although not as visible to the general public as the airlines, general aviation is of major importance, socially, politically and economically. "The airlines serve only about 600 of the nation's airports. General aviation extends the air transportation system to the remaining 17,000 landing sites in the United States (Gesell, 1993)." Since the 1960's, there have been a number of studies on the economics of airports and their importance to the communities which they serve. Generally these studies have found that:

- Airports are part of the community development program;
- Airport development is a catalyst for business and industrial growth;
- Airports attract new industry;
- Airports provide access to the national transportation system;
- Airports are a nucleus for industry; and
- Airports are a boon to the local economy.

The Massachusetts Aeronautics Commission exercises general supervision and control over aeronautics and is charged with the "promotion of aviation while establishing and maintaining a safe, efficient airport system to meet the current and future air transportation and economic needs of the Commonwealth". The Massachusetts airport system includes 44 public use airports, 3 seaplane bases and 2 heliports, each playing a significant role in the state's aviation and transportation system (see Table 1). These airports range in size from small general aviation facilities handling single engine aircraft to larger reliever and primary airports that support jet traffic and offer scheduled air passenger service.

At the present time there is no data which allows the MAC to monitor the number of USTs, their age, size or condition at Massachusetts airports. The MAC needs to know about UST replacement projects well in advance so it may seek funding to finance them. If the MAC is not advised of projects it is unlikely that appropriate funding and staffing requirements will be available to meet this need. State funding assistance for replacement/upgrade/closure of UST's is generally based on an 80%/20% split with the MAC reimbursing the airport for 80% of the total project cost. The MAC does have the discretion to reimburse airports for up to 100% of the expenses related to Airport Safety & Maintenance Program (ASMP) projects.

1.3 Environmental Protection Agency's Role

In an effort to prevent damage to the environment and preclude expensive cleanup costs the United States Environmental Protection Agency (EPA) has established new requirements for underground storage tank systems (UST's). The EPA considers any

Table 1 - Massachusetts State Airport System

Primary Airports:

1. **Logan International Airport ***
2. **Barnstable Municipal Airport**
3. **Martha's Vineyard Airport**
4. **Nantucket Memorial Airport**
5. **New Bedford Regional Airport**
6. **Provincetown Municipal Airport**
7. **Worcester Regional Airport**

Reliever Airports:

1. **Hanscom Field (Bedford) ***
2. **Beverly Municipal Airport**
3. **Lawrence Municipal Airport**
4. **Minute Man Airfield (Stow) ****
5. **Norwood Memorial Airport**

General Aviation Airports:

1. **Cape Cod Airport ****
2. **Chatham Municipal Airport**
3. **Edgartown - Katama Airpark**
4. **Falmouth Airpark ****
5. **Fitchburg Municipal Airport**
6. **Gardner Municipal Airport**
7. **Great Barrington Airport ****
8. **Hanson - Cranland Airport ****
9. **Hopedale Airport ****
10. **Mansfield Municipal Airport**
11. **Marlboro Airport ****
12. **Marshfield Municipal Airport**
13. **Norfolk Airport ****
14. **North Adams - Harriman & West Airport**
15. **Northampton Airport ****
16. **Myricks Airport****
17. **Orange Municipal Airport**
18. **Oxford Airport ****
19. **Palmer Metropolitan Airport ****
20. **Pittsfield Municipal Airport**
21. **Plum Island Airport ****
22. **Plymouth Municipal Airport**
23. **Shirley Airport ****
24. **Southbridge Municipal Airport**
25. **Spencer Airport ****
26. **Sterling Airport ****
27. **Tanner-Hiller Airport ****
28. **Taunton Municipal Airport**
29. **TEW-MAC Airport**
30. **Turner's Falls Municipal Airport**
31. **Westfield-Barnes Municipal Airport**
32. **Westover Metropolitan Airport**

Seaplane Bases:

1. **Agawam-Springfield Harbor**
2. **Merrimack Valley**
3. **Monponsett Pond**

Heliports:

1. **Boston Heliport ****
2. **Boston (Nashua Street)**

*** Owned and operated by the Massachusetts Port Authority (Massport).**
**** Privately owned facilities operated for public use.**

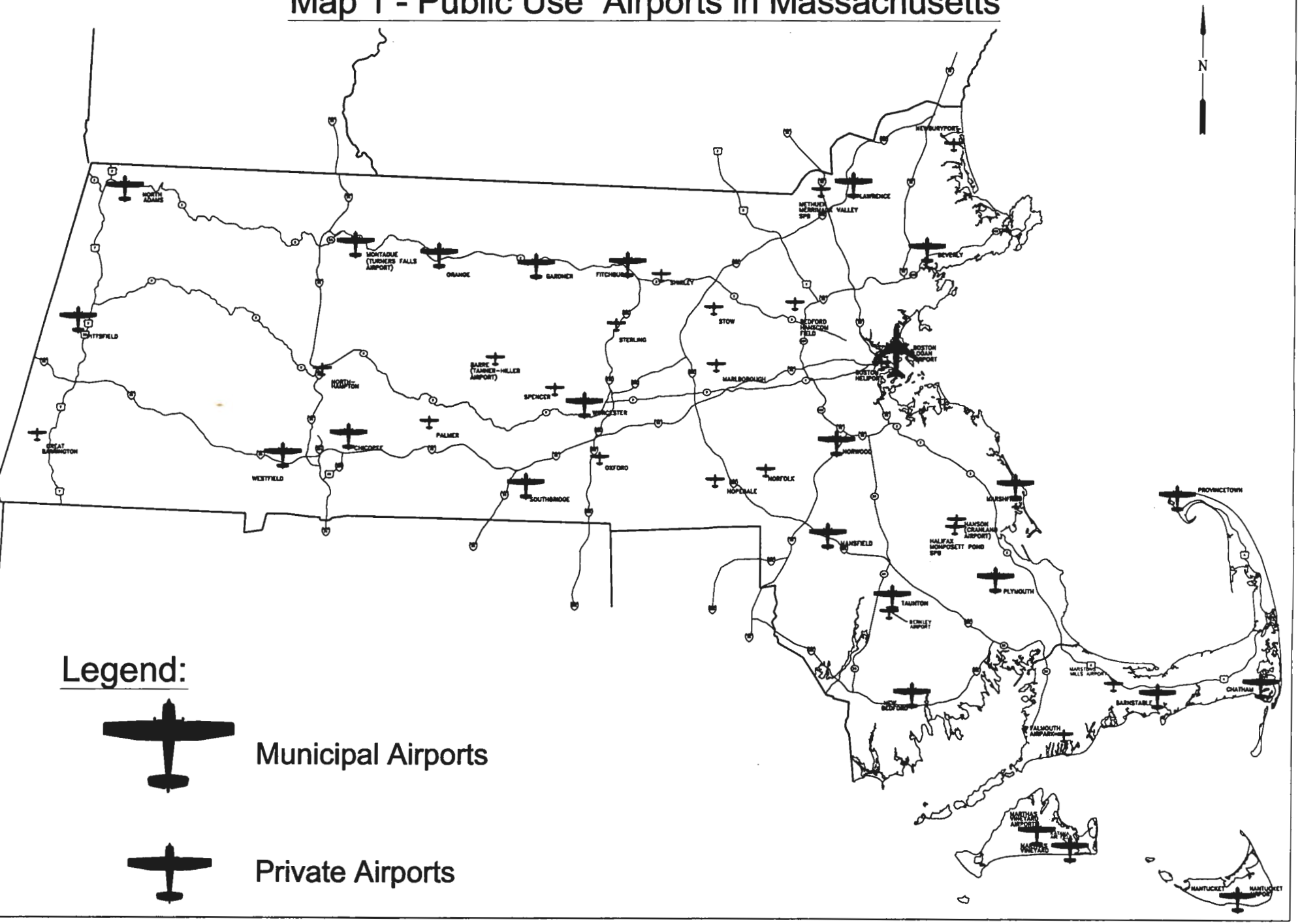
Source: Massachusetts Aeronautics Commission Annual Report: Fiscal Year 1998

tank installed before December 22, 1988 an "existing UST". Federal rules require existing USTs to have the following by December 22, 1998:

Spill protection;

Overfill protection; and

Map 1 - Public Use Airports in Massachusetts



Legend:

Municipal Airports

Private Airports

Corrosion protection.

Several actions may be taken by owners of USTs to ameliorate the issues identified by the EPA. Owners must choose one of the following actions for an existing UST:

Add spill, overfill, and corrosion protection by December 22, 1998

Close the existing UST by December 22, 1998

Replace the closed existing UST with a new UST (EPA, 1994).

1.4 Statement of the Issues

The EPA's UST requirement presents a unique problem for many public use airports in Massachusetts. To be classified as a "public use" airport and therefore be eligible for state funding assistance through the MAC, an airport is required to make fuel available to the public. An airport's "public use" certification and funding eligibility are dependent on the availability of this fuel. Closing an UST in effect closes the airport (no fuel available, no "public-use" certification). Without a "certificate" from the MAC, the airport cannot operate.

If existing USTs have not been upgraded or properly closed by the 1998 deadline, airports (or municipalities which own or operate the airport) may be cited for violations and a fine of up to $25,000 per day per violation (Department of Fire Services, 1994). Airports simply cannot afford these fines. Many airports create operational deficits which must be made up by public subsidies. All airports rely principally on FAA and MAC funding support for capital improvements.

This assessment is especially important not only from a financial planning perspective but also from an environmental point of view. When the majority of the Commonwealth's airports were first developed they were sited in areas which were unsuitable or less desirable for any other type of development. Airports were generally located in areas which would be least intrusive to the surrounding communities. For most airports this means they have been located in, or adjacent to large tracts of wetlands or other environmentally sensitive areas. Being located within such important ecological resources makes determining the existing condition of USTs that much more important.

This study will benefit the MAC as well as the airports; allowing the MAC to have a better understanding of the scope and magnitude or projects that must be factored into the state's Airport Safety & Maintenance Program – Capital Improvement Program (ASMP-CIP). The identification of priorities and funding requirements will assist the MAC in preventing bottlenecks or delays in the state reimbursement process for airports as the 1998 deadline nears.

1.5 Objectives/Approach of the Study

The loss of any airport may have a substantial impact on other airports or the Massachusetts airport system as a whole. Statewide, fuel storage projects have generally taken a lower priority than more immediately apparent infrastructure needs such as pavement repairs, obstruction and tree clearing, and other airport capital improvement projects. In many cases fuel storage replacement only occurs after some type of problem or release has occurred. Many fuel storage tanks have not been replaced since originally

installed and are in desperate need of replacement. This study is necessary to provide the MAC with an assessment of the condition of UST's at the state's public-use airports.

This study has three major objectives:

I) To create an inventory/database of USTs.

II) To determine the existing condition of USTs at Massachusetts' public use airports.

III) To assess the funding needs created by implementing corrective actions for the deadlines established by EPA and state regulatory agencies.

The objectives of this study will be accomplished in the following manner:

Objective I: A survey will be developed to collect the relevant data and create an inventory of existing underground storage tanks at each of the public use airports in Massachusetts. The survey will include questions which will allow the UST data to be analyzed and recommendations made based on survey responses. The survey will be distributed to each public use airport in the Commonwealth. A database of Airport Commission Chairman and Airport Managers is maintained by the MAC and will be used for distribution of the surveys. A high survey response rate is anticipated because state funding assistance is made available by the MAC to these airports for UST projects.

Objective II: Once the survey has been completed the results will be analyzed to develop an "existing conditions" picture. It is anticipated that the existing conditions will serve as the basis for future recommendations related to the upgrade or replacement of UST systems. The "existing conditions" analysis will determine which airports are

currently in compliance with EPA requirements; those which require minimal upgrades to become compliant; and, those requiring significant upgrades and expenditures to meet the EPA's December deadline.

Objective III: Knowing the range of which airports are currently in compliance with EPA requirements and those requiring significant capital expenditures will allow for a preliminary discussion regarding the funding requirements for upgrading/replacing USTs.

1.6 Organization of the Study

This study is divided into six chapters. Following this introduction, the study will review the current literature regarding the EPA's UST regulations and requirements and discuss how other states are handling the approaching deadline. Chapter Three will address the existing UST situation and conditions at Massachusetts' public use airports. Chapter Four will identify priority projects and the funding requirements to bring the airports into compliance with the EPA's requirements. Chapter Five will reflect on how the MAC's planning and priorities compare with other types of planning. Chapter Six will conclude the study outlining strategies to comply with EPA requirements and recommendations on how to best implement these strategies.

Chapter 2 – Regulatory Overview

2.1 Introduction

The purpose of this chapter is to provide an overview of how the Environmental Protection Agency's requirements were promulgated; what types of tanks are regulated and why; and how Massachusetts' UST situation compares to the other states in the New England region and the nation. This chapter will also examine the EPA's State Program Approval process and briefly discuss how the December 1998 deadline impacts other aviation related businesses.

2.2 Background of EPA UST Requirements

During the mid-eighties three-pronged legislation was enacted to prevent slow leak environmental contamination. First, tanks exceeding a specified capacity were required to be "registered". In 1986, UST's with capacity in excess of 1,100 gallons had to be registered with the appropriate state regulatory agency. In the Commonwealth of Massachusetts tanks are registered with the Massachusetts Department of Fire Services.

As a second measure, regular tank inventory control programs including periodic environmental audits were recommended, but not required. Environmental audits were to be systematic reviews and inspections of environmental records, facilities, operations and activities to assess the owners compliance with the applicable activities.

The third measure of the legislation required tank owners to assume financial responsibility for any fuel leak contamination. For UST owners who could not afford to pay for cleanup out of pocket, mandatory insurance coverage would cover damages. Current law (40 C.F.R. 302) requires that fuel spills or leaks be reported to the EPA and,

where there is any possibility of contamination reaching navigable waterways, the U.S. Coast Guard must be notified.

In 1984 Congress passed the Leaking Underground Storage Tank Liability & Standards Act which mandated development of a federal program that would regulate underground storage tanks, and restricted the type of tanks which could be installed. "In the meantime, the EPA published interim rules stating that the only tanks which could be installed had to be designed, constructed and installed to prevent leaks due to corrosion or structural failure, and made of materials compatible with the substance stored (Gesell, 1993)." Steel tanks which were cathodically protected or tanks constructed or clad with non-corrosive materials were permitted if the cathodes would last the lifetime of the tank and if the non-corrosive materials were applied properly.

In 1988 the EPA released its final rules covering the technical requirements for USTs. These rules were published as the Technical Standards and Corrective Action Requirements for Owners & Operators of Underground Storage Tanks (40 C.F.R. 280). These EPA rules established the December 22, 1998 deadline requiring owners of underground storage tanks to implement leak detection procedures and to upgrade or replace their tanks.

2.3 Regulated USTs

The rules which apply to "underground" storage tanks, are defined in the C.F.R. as "...any one or a combination of tanks that have ten (10) percent or more of their volume below the surface of the ground in which they are installed" (EPA web page, 1997). This definition includes the tank, connected underground piping, underground

ancillary equipment, and containment system. Excluded from the rules are farm and residential tanks that contain less than 1,100 gallons and are not used for commercial purposes; tanks used for storing heating oil for purposes on the premises; tanks that hold less than 110 gallons; and emergency spill and overfill tanks (Gesell, 1993).

2.4 Why Regulate Underground Storage Tank Systems?

"As of March 31, 1997, the total number of releases in the U.S. that were reported by State and local UST programs was 329,940. On the average, about 30,000 new releases are reported each year. Cleanups have been initiated at 276,603 of these sites and cleanups have been completed at approximately 162,431. (EPA, How Many 1997)

These releases have been caused by leaks, spills and overfills from UST systems and many have posed serious threats to human health and the environment. Petroleum products contain many potentially hazardous and toxic chemicals. Fumes and vapors can travel beneath the ground and collect in areas such as basements, utility vaults, and parking garages where they can pose a serious threat of explosion, fire and suffocation or have the potential to cause other adverse health effects. There have been many reported instances where people have lost their lives as a result of these types of accidents.

Gasoline leaking from fueling facilities is one of the most common sources of groundwater contamination. Because nearly one half of the population of the United States relies on groundwater as their source of drinking water, groundwater pollution is a serious problem. Many municipal and private wells have had to be shut down as the result of contamination caused by releases from USTs.

How does Massachusetts' underground storage tank situation compare to other states in the New England region and the nation as a whole? According to the most recent data provided by the EPA, 31% of all active tanks in the New England region are located in the state of Massachusetts. While the Commonwealth is home to approximately one-third of all active tanks in N.E., 40% of confirmed releases in New England have occurred in Massachusetts.

Table 2 Massachusetts and National Underground Storage Tanks; (June 12, 1997)

Region	Number of Active tanks	%	Tanks Closed	%	Confirmed Releases	%	Systems equipped to meet leak detection requirements	%	Systems equipped to meet Upgrade requirements	%
MA	19,858	1.9	16,730	1.5	4,687	1.4	3,122	0.9	9,859	4.7
National	1,031,960	100	1,111,266	100	329,940	100	330,554	100	208,489	100

Source: US EPA, Corrective Action Measures for 1st Half FY 97 for all States by Region, with Regional Totals, as of June 12, 1997,

The data also demonstrates that while Massachusetts has a higher proportion of tanks, 84% do not meet "leak detection" requirements, and only 50% meet "upgrade" requirements (see Table 3).

Table 3 New England Region UST's (June 12, 1997)

Region	Number of Active tanks	%	Tanks Closed	%	Confirmed Releases	%	Systems equipped to meet leak detection requirements	%	Systems equipped to meet Upgrade requirements	%
MA	19,858	31.5	16,730	29.1	4,687	39.9	3,122	25.6	9,859	49.1
CT	17,115	27.1	13,177	23.0	1,600	13.6	487	4.0	30	0.1
ME	12,226	19.4	7,940	13.8	1,415	12.0	1,833	15.0	4,524	22.5
NH	4,145	6.6	7,876	13.7	1,699	14.5	2,467	20.2	2,398	11.9

RI	6,679	10.6	8,110	14.1	920	7.8	1,284	10.5	1,514	7.5
VT	3,061	4.8	3,577	6.3	1,435	12.2	2,997	24.7	1,774	8.9
Total	63,084	100	57,410	100	11,756	100	12,190	100	20,099	100

Source: US EPA, Corrective Action Measures for 1st Half FY 97 for all States by Region, with Regional Totals, as of June 12, 1997,

2.5 EPA's State Program Approval (SPA)

The United States Environmental Protection Agency has recognized that "...because of the size and diversity of the regulated community, state and local governments are in the best position to oversee underground storage tanks:

- State and local authorities are closer to the situation in their domain and are in the best position to set priorities.
- Subtitle I of the Resource Conservation & Recovery Act (RCRA) allows state UST programs approved by the EPA to operate in lieu of the federal program.
- The state program approval regulations set criteria for states to obtain the authority to operate in lieu of the federal program. State programs must be at least as stringent as EPA's." (US EPA, State UST Programs 1997)

The EPA's Office of Underground Storage Tanks (OUST) has adopted the "franchise model" as its implementation approach in managing the national UST program. The State, as a franchise, operates independently under a signed agreement with the EPA to operate the UST program. EPA Regions serve as the field representatives or liaisons between EPA headquarters and the states to relay ideas, need, and information between the EPA and the states. The states are able to run their programs using a management style that is tailored to meet the specific needs and demands of their own regulated community. (EPA, State UST Programs 1997)

The EPA's regional offices coordinate the state program approval process for states under their jurisdiction. EPA regional officials work closely with state officials while state programs are under development. Once state legislatures enact statutes and state agencies develop regulations in accord with EPA requirements and put other necessary components of a program in place, states may apply for formal approval. The state program is "approved" if it is judged to meet three criteria:

1. It sets standards for eight performance criteria that are no less stringent than federal standards.
2. It contains provisions for adequate enforcement.
3. It regulates at least the same USTs as are regulated under federal standards.

It should be noted that state programs may operate under state law without federal approval. There is nothing in subtitle I of RCRA which requires the state to receive EPA blessing before operating their own UST programs under state laws. State program approval signifies Federal authorization of the state program to operate in lieu of the federal program. Approval of a state program also means that the basic environmental protection afforded by the federal program is contained in the state program as well. (EPA, SPA 1997)

2.6 Other Aviation Interests Affected

The EPA's December 1998 deadline is also an issue for a variety of different aviation related organizations. These organizations have attempted to make owners and operators aware of the deadline and the ramifications for not complying with EPA's mandate. Regulations relating to the upgrade and replacement of USTs have been in

place for almost a decade and the EPA has publicly stated that no extension will be granted to the December 1998 deadline. In a May 14th, 1997 letter to EPA Regional Administrators, the Administrator of the EPA, Carol Browner, specifically states that the "...EPA does not intend to extend this deadline...extending it would reduce the incentive to comply and would be unfair to the many UST owners and operators who have already complied."

This EPA deadline will effect more than just the local/regional airports. Many airports rely on independently owned airport businesses to provide aviation related services. These business, commonly referred to as "fixed base operators (FBOs)" provide services that include flight training, aircraft charter services, sightseeing and aircraft fueling. According to a recent survey conducted by the National Air Transportation Association, "...nearly 40 percent of FBOs with underground fuel storage tanks either don't know about Environmental Protection Agency rules concerning tank upgrade deadlines or will not be able to comply by 1998 (Business & Commercial Aviation, 1997)."

The Commonwealth of Massachusetts and Massachusetts Aeronautics Commission are not alone in trying to address this situation. In an attempt to get a feel for just how other states are addressing this issue contact has been made with several other state aeronautical agencies.

Of the several aeronautics agencies contacted, the State of Michigan has taken the most proactive approach to addressing UST compliance issues. Other aeronautics agencies were either unaware of the EPA requirements or had no planned approach to dealing with the problem. In the state of Michigan the Department of Transportation,

Bureau of Aeronautics has been struggling with an underground storage tank situation similar to that of Massachusetts. The Michigan Aeronautics Commission has approved funding assistance for improving fuel tank systems at general aviation departments. Grants are allocated for 80% of project costs with a maximum of $20,000 per airport. Their state policy does not allow them to participate in reimbursement for previously completed projects. Any airport that receives funding assistance will be required to certify that:

- All state and/or federal environmental rules will be followed for the installation of the fuel tanks;
- Tanks and piping were installed properly according to industry codes, and;
- Fuel availability will be maintained for not less than 10 years from acceptance of grant.

In reviewing existing literature it has become apparent that the issues and problems surrounding UST upgrades and replacement cannot be ignored and will not be easily solved. The goal of this study will be to prepare an overview of the existing UST situation in Massachusetts and provide recommendations that can be implemented to meet the EPA's deadline and requirements.

Chapter 3 – Assessment of Existing Conditions

3.1 Introduction

With more than forty-six (46) public use aviation facilities stretching across the state of Massachusetts there has not been a single source for underground storage tank data at these airports. One of the primary objectives of this study is to provide a "snapshot" in time of the existing condition of USTs at MA Airports. With the exception of a few airports, most Massachusetts' airports experience annual operating deficits. The lack of funds means that nearly all of these airports have significant difficulty maintaining existing infrastructure and facilities. For this reason it was assumed that the many, if not all airports would be unable to meet EPA's December 1998 compliance deadline without significant financial assistance.

This chapter will provide an overview of the types of fuels used to power aircraft and methods by which these fuels are stored. A review of the survey responses will aid in determining which airports are currently in compliance with EPA's requirements and which airports will require assistance in meeting standards. This chapter will examine the current state of USTs at Massachusetts' airports and set the stage for identification of priorities and funding requirements.

3.2 Aviation Fuels

There are four predominant types of fuel used to power aircraft; 100 LL (low lead) Aviation Gas (AvGas), automotive gasoline (MoGas), and jet fuel (Jet A). Because there are a variety of different aircraft using an airport on any given day, most airports provide several types of fuel, whether it be mogas, avgas or Jet A. This generally means

that there may be numerous underground storage tanks at an airport, especially if the airport supports a large amount of air traffic.

Because there are several grades of aviation fuel available, care must be exercised to assure that the correct aviation grade is being used for the specific type of engine. It can be harmful to the engine and dangerous to the flight if the wrong kind of fuel is used. Different grades of aviation fuel are identified by colored dyes that have been added to the fuel:

Grade	Color
MoGas	Red
100 AvGas	Green
100LL AvGas	Blue
Jet A	Clear

It should be noted that if fuel grades are mixed together they will become clear or colorless. The type and design of underground storage tanks options is more diverse than the types of fuels being stored.

3.3 Evolution of Underground Storage Tank Design

As a result of the historical leaks due to corrosion failure of steel tanks that were unprotected from corrosion, many advanced technologies in tank materials and design/installation standards have evolved. These past leaks were part of the impetus for the institution of EPA's December 1998 deadline.

"For some 60 years, since storage tanks became commonly used underground, the typical tank met Underwriters Laboratory Standard 58 entitled "Standard for Steel Underground Tank for Flammable and Combustible Liquids," which first appeared in October 1925. The typical tank used in underground petroleum storage ranged in size from 500 to 8,000 gallons volume. The tanks were usually manufactured by small steel manufacturing companies servicing a relatively localized geographical area. Except for minor design and construction modifications from time to time, there was little new developmental work on underground tanks until the early 1960's. Until that time, the typical carbon steel UL58 model tank served the majority of needs for underground storage of liquids (Government Institutes, 1998)."

Shortly after World War II and through the 1950's, a growing fiberglass industry was seeking new product applications. Fiberglass appeared to have interesting potential as a construction material for storage tanks, especially to compete with steel tanks that were showing problems arising from corrosion. Being non-corrosive, fiberglass offered a natural customer benefit not possible with steel. Various designs and shapes of fiberglass tanks were introduced in the 1960's and initially received good acceptance for many applications in the chemical industry. However, there were some serious problems with the tank shape and the methods of installation in high traffic areas. A number of tanks failed prematurely.

"Many installing contractors who had learned their trade working with steel tanks had considerable difficulty adjusting to the requirements of the fiberglass material. Where steel was structurally strong and tended to be forgiving of rough handling, fiberglass tanks proved less rugged and more susceptible to handling damage

(Government Institutes, 1998)." In addition to these problems, fiberglass tanks could not compete with steel in price.

The basic price of a fiberglass tank was higher than a comparable steel unit. Rough handling during shipment or on the job site sometimes caused extra expense in repairs and installation procedures proved more expensive than for steel tanks.

By the late 1960's the fiberglass industry's desire to penetrate the large petroleum market had stimulated considerable research into solving these disadvantages. Fiberglass tank manufacturers recognized the need for a different installation method by the 1970's. Through trial and error, they determined that the use of pea stone or crushed rock provided the type of support required to overcome some of the structural deficiencies associated with the fiberglass tanks. Eventually manufacturers reworked the economics of tank production to become more price competitive and began to erode steel's previously almost exclusive hold on the petroleum market.

At the same time that the steel versus fiberglass tank competition was evolving, the American public was showing more and more environmental awareness. "Events such as Earth Day in 1970, the publication of Rachel Carson's best selling book, "The Silent Spring", and passage of the Clean Water Act gave evidence of a gathering momentum of the environmental movement (Government Institutes, 1998)." As these events were occurring, owners and operators of underground storage tank systems were experiencing increasing rates of tank failure due to corrosion and were looking for protection against those failures. After the fiberglass industry resolved their early problems, petroleum companies and tank users saw a partial solution in these new tank materials and began to swing over to fiberglass in increasing numbers.

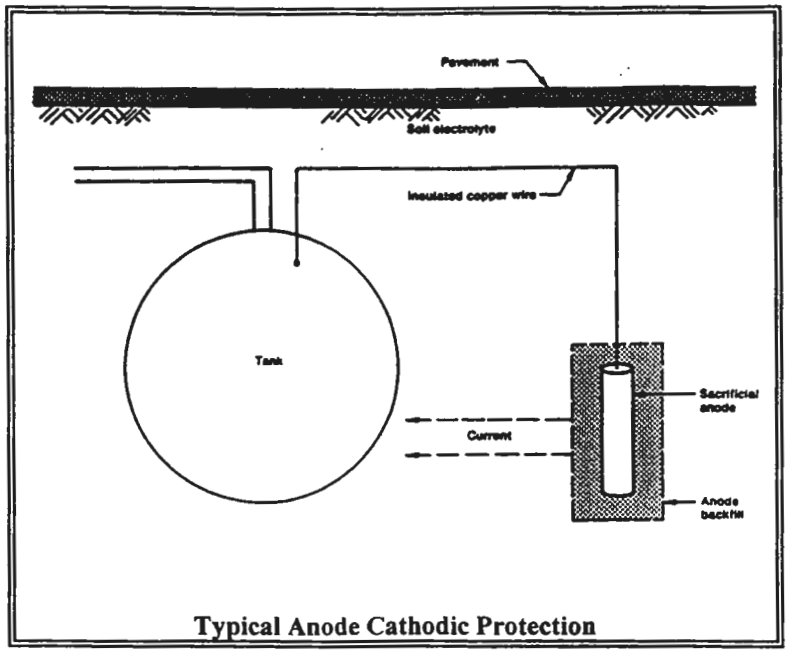
In the meantime, the steel fabrication industry, watching their market being seriously attacked, struck back with newer technology, specifically cathodically-protected steel tanks which offered better protection against corrosion failure and all the benefits of steel. Corrosion of buried steel structures may be nearly eliminated by proper application of cathodic protection. Cathodic protection is a technique for preventing corrosion by making the entire surface of the metal to be protected (steel USTs) into a cathode of an electrochemical cell. Corrosion is not completely eliminated, but is simply transferred from the metal surface to an external anode.

There are two types of cathodic protection systems; sacrificial anodes and impressed current systems.

- Sacrificial Anodes: This system is commonly used with new steel tanks having corrosion-resistant coatings. The anodes (pieces of zinc attached externally to USTs) are designed to corrode before the tank's steel. Thus, the UST is protected while the attached anode is "sacrificed" (see figure 1).
- Impressed Current System: This system is recommended for existing bare metal tanks. It uses an on-site electrical current to counteract the effects of corrosion on USTs. The current is sent through an insulated wire to the anodes (special bars buried in the soil near the UST). It then flows through the soil to the UST system , returning to a rectifier attached to the UST. The system is protected because the current going through it overcomes the corrosion-causing current flowing away from it. An impressed current system should be inspected every 60 days to verify that the system is operating

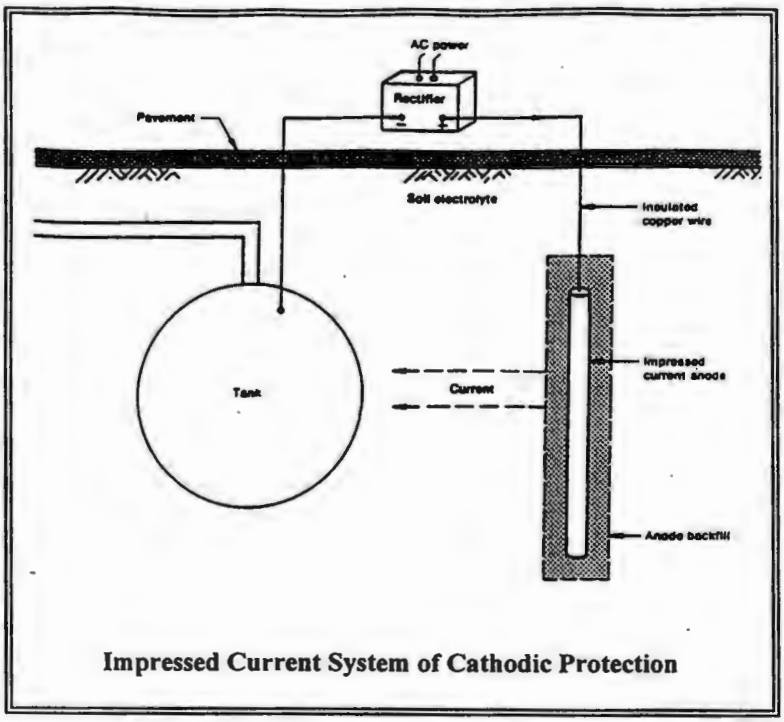
properly. Results of the last three inspections are also required to be kept (see figure 2) (NATA, 1998).

Figure 1 - Sacrificial Cathodic Protection Diagram

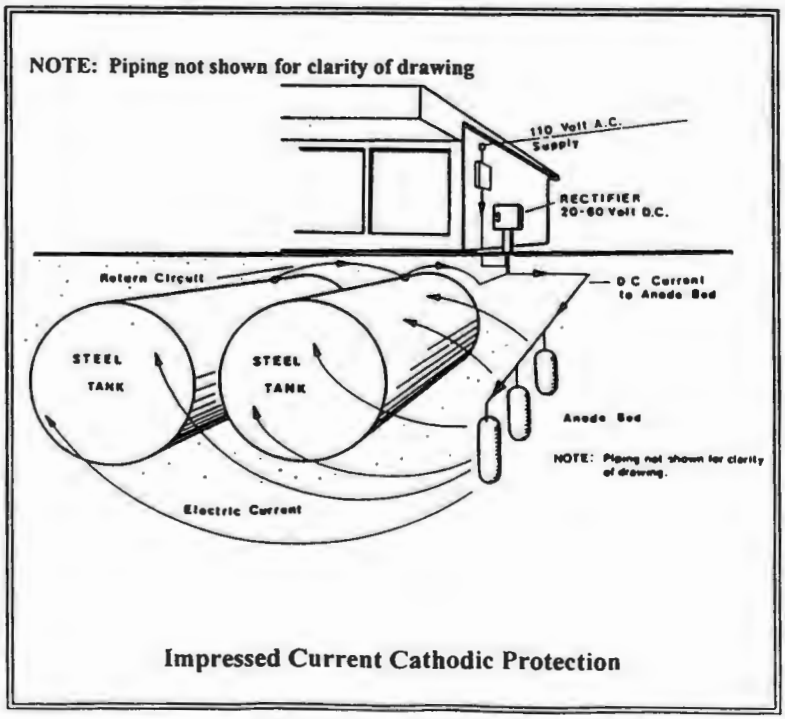


Source: Government Institutes, 1998.

Figure 2 - Impressed Current Cathodic Protection Diagram



Impressed Current System of Cathodic Protection



Impressed Current Cathodic Protection

Source: Government Institutes, 1998.

3.4 Tank Design - Single Wall v. Double Wall

In addition to the varieties of materials used to construct USTs, there are also several UST designs which have evolved and are in use today. The first double wall steel tank was introduced in the early 1980's by steel tank manufacturers. "The original design consisted of a standard steel tank surrounded by an outer steel shell for 300° of its circumference; the top 60° of the tank was single walled. (this has now been supplanted by a newer 360° outer shell design.) (Government Institutes, 1998)." The double wall design generally incorporates a monitoring port at one end which can be used for inspection of the interstitial space. Depending on the number of added features the tank owner desires, the tank could be ordered with external fiberglass reinforced plastic coating, automatic monitoring and cathodic protection installed. Depending on the number of options the tank owner orders, the cost of the tank design and installation can become rather expensive. The double wall tank, however, offers the tank owner a relatively high degree of security against tank failure and, without question, meets all criteria of the new regulations for hazardous materials and petroleum storage. It also provides certain economies by incorporating secondary containment and monitoring capabilities that would have to be purchased separately in other types of installations.

Improvements in technology seldom come without added complications, and the double wall tank is no exception. Corrosion can occur in the interstitial space due to moisture accumulation. In newer double wall tanks this space is filled with some form of inert gas, usually Argon, to displace oxygen and inhibit the formation of corrosion. Also, double wall tank weight is approximately twice that of a single walled tank, a condition that must be anticipated in planning tank movement during installation.

The variety of tank designs discussed briefly above, provide a range of choices when planning an upgrade or new tank installation. There are advantages and disadvantages with each, both when used alone or in combination with other tanks. In terms of cost, the double wall models are obviously more expensive. Yet, in a single tank installation, they include ancillary features which, if purchased separately, might result in even greater cost. The total capital investment of any storage system includes the cost of equipment and its installation. Ultimately, final cost is the price per gallon of available storage volume amortized over the expected useful life of the system. For example, when installing a single tank in one tank hole in a jurisdiction where secondary containment is required, the overall cost may be lowest using a double wall tank. However, where a number of tanks are to be placed in the same hole, a more economical choice may be a number of single wall tanks with one containment liner for the entire hole.

3.5 Review of Survey Responses

In an effort to determine the existing conditions of USTs, a survey was developed to gather the relevant data. A high survey response rate was anticipated because the airports which comprise the aviation system could be considered a "captive audience".

A total of forty-six (46) surveys were distributed, one survey to each public use facility which is overseen by the MAC. The survey consisted of a one page form which requested general information as well as fuel storage tank data and any past MAC financial information associated with USTs (see attachment A). The survey was distributed in early November 1997 with a requested return date by the end of December. In mid-December a follow-up request was sent to those airports who had not responded

to the initial request for information. In the end thirty-eight (38) survey responses were received, representing an 82.6% response rate. The database containing all survey responses can be found in Appendix B.

As stated previously, to be classified and certificated as a "public use" airport, facilities are required to make fuel available to the flying public. However, this requirement does not require the owner, whether the owner be an individual, municipality or corporation, to actually own the storage tanks providing the fuel. In some cases fuel may be provided by an independently owned fixed base operator (FBO). If fuel is supplied to the public by an FBO, the airport would not be fined by the EPA for not being in compliance by the deadline because the tank is actually owned and operated by the FBO. Surveys conducted by professional aviation organizations indicate that a significant portion of FBOs are either unaware of the deadline or will not be in compliance by the deadline. Should the FBO be unable to provide fuel, the airport will be unable to meet its obligation and places its "public use" certification in jeopardy.

Based on survey results it appears at though eight of the thirty-eight airports responding to the survey (21%) do not own any USTs and fuel is provided by one or more FBOs (see Table 4).

Table 4 - Non Airport Owned USTs

Airport	Airport Owned USTs?	FBO Provided Fuel?
Mansfield Municipal Airport	No	Yes
Merrimack Valley SPB	No	Yes
Newburyport-Plum Island Airport	No	Yes
Norfolk Airport	No	Yes

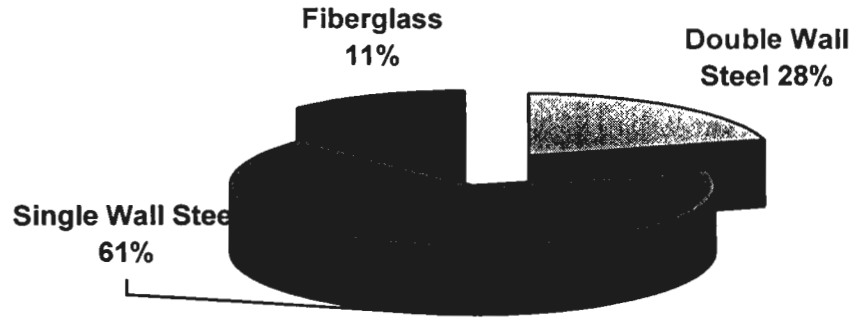
Norwood Memorial Airport	No	Yes
Shirley Airport	No	Yes
Spencer Airport	No	Yes
Turners Falls Municipal Airport	No	Yes

The fact that an FBO provides fuel means that the airport owner, whether it be a municipality or private owner, is not responsible for meeting the EPA's compliance deadline. However, should the FBO be unable to meet the deadline and provide fuel, the airport would be in jeopardy of losing its public use certification.

The remaining thirty airports who responded to the survey own at least one, and in many cases several USTs. A review of the survey responses indicates that a variety of tank designs are currently being used at Massachusetts airports. There are a variety of types of USTs owned by the airport's who responded "Yes" to question II (a) on the survey form. The majority of airport-owned USTs appear to be single wall steel tanks (see figure 1).

The survey responses indicated that eleven of the thirty airports who own underground storage tanks, currently meet the EPA's requirements for the spill and overfill protection as well as corrosion protection. Those airports which currently meet EPA's compliance requirements are identified in Table 5.

Figure 3 - Categories of Airport-Owned Tanks at MA Airports



For the purposes of this study it is assumed that the airports identified as currently meeting EPA requirements (Table 5) will not require financial support from the MAC to meet the December deadline. No additional analysis will be conducted for these eleven airports.

Table 5 – Airport-Owned UST's Currently Meeting EPA Requirements

✈ **Barnstable Municipal Airport**	✈ **Hopedale Airport**
✈ **Chatham Municipal Airport**	✈ **Marshfield Municipal Airport**
✈ **Falmouth Airpark**	✈ **Marston's Mills Airport**
✈ **Gardner Municipal Airport**	✈ **Plymouth Municipal Airport**
✈ **Great Barrington Airport**	✈ **Taunton Municipal Airport**
✈ **Hanson Cranland Airport**	

The remaining nineteen airports which own USTs will require some form of MAC assistance. These nineteen airports include:

✈ **Beverly Municipal Airport**	✈ **Orange Municipal Airport**
✈ **Boston Heliport**	✈ **Palmer-Metropolitan Airport**
✈ **Fitchburg Municipal Airport**	✈ **Pittsfield Municipal Airport**
✈ **Lawrence Municipal Airport**	✈ **Provincetown Municipal Airport**
✈ **Marlboro Airport**	✈ **Southbridge municipal Airport**
✈ **Martha's Vineyard Airport**	✈ **Stow Minute Man Airfield**
✈ **Monponsett Pond SPB**	✈ **Westfield Barnes Municipal Airport**
✈ **Nantucket Memorial Airport**	✈ **Westover Metropolitan Airport**
✈ **New Bedford Regional Airport**	✈ **Worcester Regional Airport**
✈ **Northampton Airport**	

The tanks identified at these airports range in age from the 1940's through the late 1980's and are comprised of single wall steel, double wall steel, and fiberglass tanks. The remainder of this study will be devoted to resolving the UST issues specific to these nineteen airports.

Chapter Four – Priorities

4.1 Introduction

This chapter will provide background on past and future capital expenditure issues at both the state and federal levels of government. The programming of funds (state and federal) for capital expenditures generally occurs within the context of a Capital Improvement Program (CIP). An overview of the CIP process will be discussed later in this chapter. This chapter will also examine in greater detail issues identified in Chapter 3, specifically focusing on the nineteen airports identified as requiring MAC assistance and the funding requirements needed to bring these facilities into compliance. Airports requiring MAC assistance will be divided into two separate categories for further analysis. The categories will include:

- Airports requiring minimal upgrade to become compliant; and
- Airports requiring significant upgrades/replacement to become compliant.

No further analysis will be conducted for those airports who did not respond to the survey, as well as those who indicated they did not own any USTs or are currently compliant with EPA requirements.

4.2 The Capital Improvement Program

The CIP is a multi-year schedule of physical improvements. The schedule usually covers a period of five or six years. In general terms a CIP sets forth a list of proposed expenditures for systematically constructing, maintaining, upgrading and replacing infrastructure and facilities. While the CIP is generally used as a "planning" document, a CIP may also be riddled with policy issues, choices, and political pressures. The policy

issues are often unwritten or unstated assumptions, but play a significant role in driving the program. These policy issues will be discussed in greater detail in Chapter 5 of this study.

Separate CIP's are used to program both state and federal funds for airports in the Commonwealth. The CIP process begins when the airport submits what is called a "Justification Worksheet" for a specific project. The justification worksheet provides a brief description about the requested project, a preliminary cost estimate, and a justification for why the MAC or FAA should participate in funding the project. Based on the information contained in the worksheets a decision is made whether the requested project is justified and should be included as part of the CIP. Some worksheets may be returned to the airports for further clarification. These worksheets are used as one component which determines the level of funds needed to implement improvement projects.

4.3 Funding Picture

During the course of a single fiscal year the MAC will receive many more funding requests than it is able to fund. While the majority of these requests are justified, the MAC is forced to make difficult funding decisions and must prioritize the requests using a variety of criteria. In the past, the decision to fund (or not fund) a particular project was based on the "squeaky wheel gets the grease" theory of planning - those airports that made the most noise would receive the funding. During the past few years the MAC has tried to develop a more critical approach to the way in which projects are

prioritized. When determining which justified projects will receive state funding the MAC reviews several factors and generally asks the following questions:

- Does the requested project correct some type of deficiency which has been identified by either the MAC or FAA in the airport's most recent inspection?
- Will the requested project increase public safety for pilots or the neighboring community?
- What is the airport's economic contribution to the Commonwealth?
- Will this project support or promote economic development at the airport or in the local/regional economy?
- If this project is *not* undertaken will it create or promulgate an unsafe condition at the airport?
- What role does the airport play in the local, regional or state transportation system, specifically the Massachusetts Airport system?

These factors as well as many others are examined on a project by project basis for which there is a request, regardless of whether federal or state funds are sought.

4.4 Federal Aviation Administration's Airport Improvement Program (AIP)

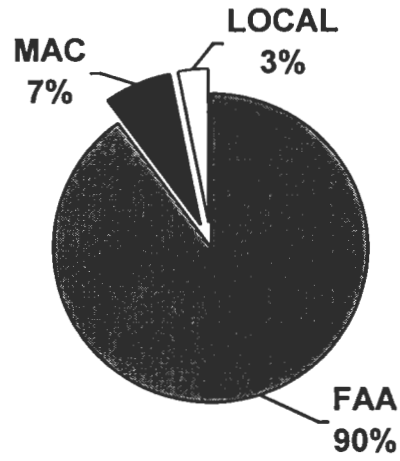
To promote the development of a system of airports to meet the needs of the nation, the federal government embarked on a grants-in-aid program to units of state and local government shortly after World War II. This early program, the Federal-Aid Airport Program (FAAP), was authorized by the Federal Airport Act of 1946 and drew its funding from the general fund of the treasury. In 1970, a more comprehensive program was established with the passage of the Airport and Airway Development Act which

provided grants for airport planning and development projects. These two programs, the Planning Grant Program (PGP) and the Airport Development Aid Program (ADAP), were funded from a newly established Airport and Airway Trust Fund. By the time the two programs expired in September of 1981, approximately $4.5 billion were approved for airport planning and development projects.

The current grant program, known as the Airport Improvement Program (AIP), was initially established by the Airport and Airway Improvement Act of 1982 and was later amended by the Airport and Airway Safety and Expansion Act of 1987 which also created a new funding category for air cargo activity. Funding for the program was originally established through fiscal year 1992 to include projects for airport development, airport planning, noise compatibility planning and noise abatement programs. The AIP program is extended each year with funds appropriated by Congress and signed into law by the President of the United States.

The Airport and Airway Trust Fund provides the revenue source used to fund AIP projects. Taxes and user fees are collected from the various segments of the aviation community and placed in the Trust Fund. These revenue sources include taxes on airline tickets and freight waybills, international air carrier departure fees, and fuel taxes on general aviation gasoline and jet fuel.

The 1982 Act defined eligible airports into five categories: Commercial Service Airports, Primary Airports, Cargo Service Airports, Reliever Airports and General Aviation Airports. In Massachusetts, 28 airports are potentially eligible for AIP funding. Two of the 28, Logan International Airport and Hanscom Field in Bedford, MA, are owned and controlled by the Massachusetts Port Authority (MASSPORT). The remaining 26 airports fall under the jurisdiction of the MAC. Funding of projects that qualify under the AIP are typically divided into three sources: federal, state and local. The federal share of most projects is 90 percent of the eligible cost to be reimbursed under the AIP. The remaining 10 percent is usually divided between the state (7 percent)



and local airport sponsor (3 percent).

In Massachusetts, the MAC acts as the agent, or conduit, by which airports apply to the FAA for funding of airport development projects, and through which airport sponsors receive federal funds for reimbursement. In every way, the MAC acts in a similar manner that the FAA does during project development. The stages of project development include; initial planning of each project, review and approval of project

design, processing of grant applications, construction of the project, approval of payment requests, and finally, close out of each project.

FAA eligible development projects may include facilities or equipment associated with the construction, improvement, or repair of an airport (excluding routine maintenance). Unfortunately, the FAA considers the removal, upgrade or replacement of underground storage tanks "routine maintenance" and will not participate in funding such projects. Recognizing the fact that not all airports are eligible for federal AIP funding, and of those who are, none are eligible for AIP funding from the FAA for routine maintenance, the MAC initiated a grants-in-aid program; the Airport Safety and Maintenance Program (ASMP), specifically for this purpose.

4.5 Massachusetts' Airport Safety & Maintenance Program (ASMP)

The initial guidelines for the ASMP program were promulgated pursuant to Chapter 811 of the Acts and Resolves of 1985, which authorized the establishment and administration of a program to assist in the maintenance and repair of airports included in the state airport system plan, excluding those airports owned and operated by MASSPORT. The program is administered by the MAC pursuant to its authority under the Massachusetts General Laws, Chapter 90, § 39.

The MAC obtains its funding for airport development and planning projects from the General Appropriations account and from Transportation Bond Issues, both of which are approved by the State Legislature. Appropriated funds are derived from aircraft registration fees, aviation gas tax, and fees for air transportation charged to other state agencies. The 1995 Transportation Bond Bill authorized expenditure of $22 million for

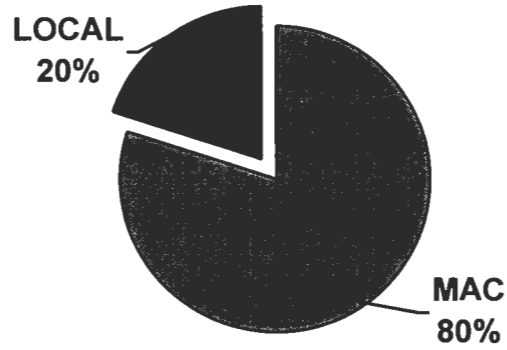
airport development and planning projects under AIP and ASMP. Subsequent bond issues have appropriated an additional $56 million for airport development and planning projects statewide. Since 1991 state funding for airport improvement, safety & maintenance projects has increased by more than 500%.

The fact that recent bond issues have appropriated more than $78 million dollars to airport improvement projects can be deceiving. The state funding process is complicated by what is called a "bond cap". The MAC is one of numerous transportation agencies which is overseen by the secretariat known as the Executive Office of Transportation & Construction (EOTC). EOTC working with the Legislature and Governor annually determine the amount of money the state is willing to borrow for transportation related projects for any given year. This "bond cap" is self-imposed by the state and is influenced by the state's current bond rating. Put simply, while there may be a justified "need" for $20 million dollars worth of aviation projects, the bond cap may be established at $8 million because that is all the state feels it can safely borrow without negatively impacting its bond rating. This scenario is further impacted by the "Big Dig" currently underway in the City of Boston. Many of the state funds which would have been earmarked for highway, transit and aviation improvements have been allocated to pay for increasing costs associated with this massive public works project.

4.6 Past Funding

Historically, the MAC contributed up to 70 percent of a project cost adjusted for federal participation. Section 59 of the 1995 Transportation Bond Bill increased the percentage of state participation for eligible projects and authorized the MAC to

reimburse an airport sponsor for up to 80 percent of the total project cost adjusted for federal reimbursement, if any. In the most recent Supplemental Bond Bill the legislature authorized the MAC to fund in excess of 80 percent of the total cost of a project, provided that: "...the project, program or activity is required to comply with federal, state, or local environmental or safety rules, regulations, orders, or advisories; or, that the project, program or activity contributes to economic development of the Commonwealth (Commonwealth of MA, 1996)." Essentially this means the MAC has the ability to fund 100% of a project's cost if it meets the criteria outlined above.



State grants for projects under the ASMP are only given to the public use airports included in the Massachusetts Airport System Plan (MASP). Further, to be eligible for a grant, the project must be included in MAC's statewide CIP. Projects are often programmed for routine maintenance which address deficiencies noted in annual state airport inspections, but airport planning and new construction are also considered eligible projects under the ASMP.

Eligible development projects may include facilities or equipment associated with the construction, improvement, maintenance and repair of an airport. Typical work items include:

- Site preparation;
- Vegetation management projects (including tree clearing & herbicide treatment for long-term management);
- Fuel storage replacement/upgrade;
- Construction, alteration, and repairs of runways, taxiways, aprons and roads within airport boundaries;
- Construction and installation of lighting, utilities, navigational aids, and aviation related weather reporting equipment;
- Safety equipment;
- Maintenance equipment;
- Snow removal equipment;
- Terminal buildings and related site development; and
- Equipment to measure runway surface friction.

Since 1991 the MAC has participated in numerous fuel storage upgrade or replacement projects at various Massachusetts airports. These airports are identified in Table 6.

Table 6 MAC Funded UST Upgrade/Replacement Projects Since 1991

Airport	Vote Date	Description	MAC $	Local $	Total $
Provincetown	FEB 1991	Install Fuel Tank	$44,520	$19,080	$63,600
Westfield	APR 1991	Remove (8) USTs	$10,255	$4,395	$14,650
Southbridge	APR 1991	Replace Fuel Tank	$26,883	$0	$26,883
Marshfield	APR 1991	Replace (2) Fuel Tanks	$45,500	$20,000	$65,500
Fitchburg	APR 1991	Remove (6) USTs	$16,800	$7,200	$24,000
Beverly	APR 1991	Remove Fuel Tanks	$31,595	$13,441	$45,036

Provincetown	MAY 1991	Install 10,000 gal. UST	$8,400	$3,600	$12,000
Barnstable	APR 1992	Fuel Tank Conversion	$28,000	$12,000	$40,000
Sterling	APR 1992	Replace Fuel Tanks	$60,200	$25,800	$86,000
TEW-MAC	SEP 1992	Replace Fuel Tanks	$80,710	$34,590	$115,300
Barnstable	JAN 1993	Phase 2 Fuel Farm	$77,070	$33,030	$110,100
Orange	APR 1993	Remove Fuel Tanks	$5,600	$2,400	$8,000
Stow Minute Man	APR 1993	Replace Fuel Tanks	$87,500	$37,500	$125,000
Beverly	APR 1993	Remove Fuel Tanks	$6,650	$2,850	$9,500
Plymouth	JUN 1993	Emergency Repairs to Fuel	$12,253	$5,251	$17,504
Plymouth	OCT 1995	Fuel Farm Improvements	$135,601	$33,900	$169,501
Taunton	AUG 1996	Fuel Farm	$85,417	$21,354	$106,771
Barnstable	MAY 1997	Replace Auto Fuel Tank	$63,996	$15,999	$79,995
Westover	MAY 1997	Fuel Farm (Design Only)	$34,640	$8,660	$43,300
Lawrence	AUG 1997	Fuel Tank Removal	$14,870	$3,717	$18,587
Westover	DEC 1997	Construct Fuel Farm	$282,052	$70,513	$352,565
		TOTAL	**$1,158,512**	**$375,280**	**$1,533,79**

4.7 Current Funding

The MAC currently finds itself in a very difficult situation. Recent policy decisions have had significant impacts on the amount of bond cap funds which are available for capital improvements. Unfortunately, the way in which the state funding system is structured there is little flexibility in the way projects may be funded. The Massachusetts Aeronautics Commission has made major commitments to a number of "big ticket" projects. These large scale projects are not limited to design and construction projects but also include numerous planning initiatives. While these "big ticket" projects are much needed and long overdue, they place additional stress on a limited amount of funds and a funding system which is already under extreme pressure.

As discussed previously, the MAC's funding is limited by a "bond cap". This bond cap has been set at approximately $8 million dollars for the past several years. Based on these limited funds, the MAC must expend funds on projects that will, in the words of the Chairman of the MAC, provide the "biggest bang for the buck".

4.8 Categorization of Airports Requiring MAC Assistance

The nineteen airports identified as requiring assistance to meet the December deadline can be separated into two broad categories:

- Airports requiring minimal upgrade to become compliant; and
- Airports requiring significant upgrades/replacement to become compliant.

In an attempt to gather more detailed information on the USTs at these nineteen airports a follow up interview was performed to better determine the severity of their compliance issues. This additional review began with a detailed examination of the survey responses and an analysis of previous MAC grants issued for UST projects. This review and subsequent interview proved extremely beneficial for both this study as well as for the airports involved.

Three of the airports who were contacted as part of the follow up initially indicated that they did not comply with the EPA mandates were actually found to have tanks which meet or exceed EPA compliance requirements. The Provincetown Municipal Airport, Southbridge Municipal Airport, and Stow Minute Man Airfield have received past MAC grants which brought their systems into compliance. I believe this confusion over whether their systems met EPA requirements stems from the fact that the

Airport Managers at these three airports were hired in the past several years. As is the case with many small businesses, poor record keeping on the part of the airports prevented them from knowing exactly what types of systems and technical specifications were used when these systems were installed or upgraded. A review of MAC "as built" drawings for these projects revealed that they actually meet current EPA specifications. A fourth airport, Westover Metropolitan Airport has upgraded their fuel farm facility since the survey was distributed. MAC grants for the design and construction of this facility were awarded in late 1997.

A fifth landing facility, the Boston Heliport, also indicated that their tanks did not meet EPA requirements. Discussions with the heliport owner revealed that the site on which the heliport now exists is planned as the future location for a major Boston Convention Center. The construction of this convention center is scheduled to begin in late spring/early summer of 1999. The heliport will be closed to air traffic sometime in early 1999. For this reason, the heliport owner has indicated that no plans are in place to upgrade the storage tanks at the facility. Convention center plans call for a new heliport to be constructed on the roof of the new facility. Any fuel storage facilities constructed as part of this heliport will meet all applicable regulations at the time of construction.

After reviewing the surveys for the other fourteen airports and contacting airport representatives, a preliminary determination was made as to which airports needed minimal upgrades to become compliant. Those airports include:

- Beverly Municipal Airport
- Lawrence Municipal Airport
- Pittsfield Municipal Airport

For the purpose of this study "minimal upgrades" is being defined as work required to bring the airport into compliance with EPA requirements with a cost less than $25,000. The scope or magnitude of these projects is much smaller as compared to the larger group of airports requiring MAC assistance. All three of the airports listed above have underground storage tanks which are not currently being used and must be removed from the ground. Additional tanks will not be installed to replace these tanks.

Lawrence Municipal owns two tanks that must be removed; one 1,000 gallon single wall steel tank used to store auto fuel, and one 1,000 gallon single wall steel tank used to store diesel fuel. The estimated cost to remove these tanks is $25,000.

The Beverly Municipal Airport owns four USTs that must be pulled from the ground. They include; one 10,000 gallon Jet A single wall steel tank (installed 1963), one 500 gallon single wall steel heating oil tank (installed 1954), and two 1,000 gallon single wall diesel fuel tanks (installed 1954). The estimated cost to remove these tanks is $21,000.

Pittsfield Municipal owns three tanks that must be removed; one 4,000 gallon single wall steel tank used to store auto fuel, and one 8,000 gallon single wall steel tank used to store AvGas, and a third 12,000 gallon single wall steel tank used to store Jet A fuel. The estimated cost to remove these tanks is $25,000.

The Lawrence and Beverly Municipal Airports are classified as "reliever" airports, designed to alleviate some of the congestion at Logan International Airport by attracting smaller jets and single engine aircraft away from the Boston area. The Pittsfield Municipal Airport serves an important role because of its location within the state. As one of only a few airports located along the westernmost border of the state, the

airport provides a safe landing area for small jets and other multi and single-engine aircraft. Without this airport, pilots experiencing problems with their aircraft would be forced to fly over the Berkshire mountains, or many miles to the north or south to find a suitable place to land.

There are a number of airports requiring substantial upgrades/replacements of their fuel storage facilities. These airports include:

- Fitchburg Municipal Airport
- Marlboro Airport
- Martha's Vineyard Airport
- Monponsett Pond SPB
- Nantucket Memorial Airport
- New Bedford Regional Airport
- Northampton Airport
- Orange Municipal Airport
- Palmer-Metropolitan Airport
- Westfield Barnes Municipal Airport
- Worcester Regional Airport

Substantial upgrades include any tank improvements with an estimated cost in excess of $25,000. These airports have at least one, and in some cases several USTs which require closure, removal, or upgrade. Because of the size and number of tanks at these facilities, the design and construction of these upgrades is significantly more complicated.

Four of the twelve airports are classified as "primary" or "reliever" airports that handle significant levels of air traffic, and play a major role in the Commonwealth's airport system.

Chapter 5 – Policy Issues

5.1 Introduction

The purpose of this chapter is to examine some of the policy issues involved in upgrading/replacing/closing underground storage tank systems, the manner in which these issues have been addressed, and ways in which they may have been better handled. This chapter will examine the following issues/questions:

- Process and policy issues of gaining compliance with EPA requirements and review the overall status of the Massachusetts airports involved;
- Should all tanks be upgraded according to specific UST requirements?;
- Should some airports be closed, and how might the land be used? and;
- Should the regulations be changed that require airports to provide fuel in order to be certificated as a public use facility?

The issues discussed in this chapter will lead to recommendations which will be made in Chapter 6.

5.2 EPA Policy Issues

The philosophy that has guided the UST program since its inception is that states have the primary responsibility for implementation and enforcement of UST regulations. EPA has therefore devoted a major share of its UST resources to supporting and helping strengthen state programs and have stated that they will continue to do so. The EPA expects the states to take the lead in securing compliance with the 1998 UST requirements. By December 1998, UST owners/operators will have had ten years to comply with these requirements. During this 10-year period, EPA conducted outreach

activities to inform the regulated community of the 1998 technical requirements and provided compliance assistance to owners and operators of underground storage tank facilities. The EPA's UST regulations seem to take on the characteristic of a form of "regulatory planning" deployed to achieve the social goals of clean water and conservation of natural resources. This planning takes time to filter from the federal level to the local communities, as has been the case with USTs at Massachusetts' airports.

5.3 MAC Planning/Policy Issues

In the past, as has been described in previous chapters, the MAC practiced the "squeaky wheel gets the grease" approach to planning and upgrade of facilities. Great efforts have been made to change this process and implement a more sound approach to planning and development issues.

MAC's pragmatic approach may have worked in the past, but conditions and situations have changed, which require that a new approach to implementing capital improvements be adopted or developed. In the past capital improvement funds were in such short supply that the method by which projects were selected and funds distributed tended not to be scrutinized. Airports seemed to be resolved to the fact that because of the politics involved and limited funding available, only a handful of facilities would receive improvement projects, usually the airports with the most political clout. In some cases the airports which needed the least amount of assistance received what limited funds were available.

Significant increases in requests for MAC funding for capital projects over the years has been followed by an increase in the level of state funding MAC has received. I

believe this increase in project requests reflects the lack of funds invested in infrastructure improvements at airports during the 1970's and 1980's. The increase in funding has been accompanied by a greater scrutiny on the part of the airports and MAC staff regarding the method by which these funds are prioritized and distributed. While there probably is no feasible way to totally remove politics from the process, efforts have been made to reduce these outside influences.

5.4 Policy of Sorting Out the Status of State Airports Involved

Because of the limited planning staff and funding constraints, minimal efforts were made to identify or catalog the condition of USTs at Massachusetts public use airports. Prior to the current administration few, if any outreach activities were initiated to make the Commonwealth's airport owners and operators of USTs aware of the EPA's compliance deadline. One of the major objectives of this research project was to develop a database of underground storage tanks located at airports. This database was used to determine the level of compliance (or non-compliance) and the magnitude of the compliance problem. The survey was completed with an 82.6% response rate, meaning only eight of the forty-six surveys distributed were not returned. This is a significant fact considering that in the past the use of a survey to gather this type of "system–wide" information would not even have been considered. I believe the approach to this problem is one example of how the MAC has attempted to better address system-wide issues facing airports.

As discussed in the previous chapter there are fourteen airports that require MAC assistance to meet EPA requirements. Of these fourteen airports, ten require

"substantial" upgrades. As this study began it was anticipated that a significant number of airports would be non-compliant and unable to meet the EPA deadline. The fact that there are only fourteen airports requiring substantial upgrades is surprising. It is surprising because there was no plan in existence which systematically examined airport compliance, which is the primary reason for conducting this study.

The previous philosophy of the Massachusetts Aeronautics Commission was that airports needed to be self sufficient and by default, were forced to familiarize themselves with all information related to the management of their facilities including regulations pertaining to USTs. While some airports were able to familiarize themselves with the regulations and upgrade their facilities, others either did not comprehend the potential ramifications of the EPA's requirements or simply ignored the requirements all together. Also, because USTs tend to be "out-of-sight, out-of-mind", upgrades may not have taken priority as other more visible improvements such as pavement repairs were undertaken. MAC is addressing the UST issue now, but could have started the process that much sooner in order to avoid unnecessary delays as the deadline approached.

U.S. Senator John Kerry was invited to speak to the Massachusetts Association of Planning Directors and chose as his topic the deteriorating state of infrastructure. Senator Kerry spoke knowledgeably and eloquently about the need and enormous capital investment required. One of the planning directors observed that the problem with infrastructure was that it lacked political visibility; it was underground, out of sight and out of mind. He suggested that the infrastructure would not get much attention until ribbon cuttings and photo opportunities could be held in a trench fifteen feet below the street. Senator Kerry agreed. (PAS, 1993)

During the course of this study as airports and other states were contacted on various unrelated issues it became apparent that MAC was taking a more proactive approach to addressing non-compliance as compared with other state aviation agencies charged with the same responsibility. These other aeronautics agencies and departments of transportation located in the New England region seem to have little staff devoted to planning functions. The Massachusetts Aeronautics Commission oversees more airports than most of these states with a limited number of staff (12 employees); making MAC one of the smallest state agencies in the Commonwealth. Many other states in the region are staffed with only one or two persons to oversee an entire airport system and have little or no time to devote to UST compliance issues. This is similar to the way MAC handled things in the past. Though the MAC planning process is changing, it is changing slowly.

I believe the MAC now recognizes that many, if not all airports require some type of assistance. Whether it's in the form of technical planning/engineering assistance or funding support, airports need to be viewed as a businesses and handled accordingly. Any type of business would be destined to fail if little or no investment was made to maintain or upgrade facilities and infrastructure. Many of Massachusetts' airports were neglected for so long that serious deterioration has occurred and significant investment of public dollars is required to return these facilities to the condition they once were. If serious change is to occur, MAC's planning must include the commitment and power to carry out the planned strategies, actions, projects or programs to successful conclusion.

5.5 Should All Tanks Be Upgraded to Meet UST Criteria?

The question of whether all tanks at an airport should be upgraded is a difficult one, one which will not have a single, agreed upon answer. As discussed previously, countless USTs at airports have been in the ground for many years. There is no doubt that if these underground tanks are not removed or properly upgraded they will fail to perform at some time in the future placing both the environment and human health at risk. The question then becomes, 'should tanks which have been properly closed or removed be replaced by newer environmentally safe units?'; are all these tanks really necessary? Is there a strategic advantage to using aboveground fuel storage tanks as opposed to burying the problem and living with the "out of sight – out of mind" mentality? Could an airport remove its fueling facilities and still be considered a viable business/aviation facility?

These are difficult questions. An argument can be made that yes, in fact tanks which have been removed should be replaced. If an airport serves a variety of types of aircraft it would make sense that they have the ability to provide the types of fuels these aircraft need to operate safely. That being said an airport should examine exactly what types of aircraft they are serving. If an airport serves primarily as a recreational facility handling smaller, single-engine aircraft with an occasional twin-engine or larger aircraft, it may want to examine whether it is economically feasible to construct and maintain a fuel facility to serve larger aircraft that may have limited usage. How important is it for this airport to provide several types of fuel and would it make more sense for this type of airport to supply only one?

Of the ten Massachusetts airports requiring significant fuel farm improvements some support operations of single-engine, multi-engine and jet aircraft. It may make sense for these airports serving different categories of aircraft to provide a variety of fuel types. The airports should examine exactly how much storage capacity they require for each type of fuel before moving forward with a new or upgraded fuel farm. Perhaps they do not need to replace the fuel farm on a "tank-for-tank" basis. Because they remove two, four or even six tanks does not necessarily mean that each tank needs to be replaced. The airport could store a variety of fuels in smaller tanks and simply refill these tanks more often. This reduced size fuel farm would serve the needs of the flying public, reduce the up-front construction costs, annual maintenance costs, and inventory costs. Any additional delivery cost for suppliers to make additional trips to refill tanks may be offset by potential revenue gained from aircraft parking apron space that may be gained with the reduced size fuel facility.

Whether it is a small recreational facility or a larger airport serving multi-engine and jet aircraft certain criteria or questions for evaluating UST replacement or upgrade should be examined. First, an airport should investigate whether a proposed project will protect and conserve natural resources. A project that protects natural resources that are at risk of being reduced in amount or quality may be a higher priority than one that does not. Second, a project should be evaluated to determine if the proposed project will prevent deterioration of an existing facility. A project that protects the investment in existing infrastructure against excessive demand or overload, or threatens the capacity or useful life of a facility may be a higher priority than a project which expands an airport's fueling capacity. Third, will the project protect against a clear and immediate risk to

public safety or public health. Evaluation of the proposed project should identify a clear and immediate safety or health risk. And finally, an evaluation of the project should determine whether constructing a facility will provide for a level of service not currently available.

5.6 Should Certain Airports Be Closed?

Airports are irreplaceable transportation assets. Both public and private airports are disappearing at an alarming rate. According to the Aircraft owners and Pilots Association (AOPA), this country is losing one public use airport a week (Elliot, 1998). In addition to reducing access to many communities, airport closures compromise safety with more aircraft being squeezed into fewer facilities. Airports cannot be allowed to go the way of other transportation modes such as rail. Many of the rail right-of-ways were abandoned years ago and have been sold or developed for bikeways or other non-rail uses. Today with our nations roadways as congested as any other time in history proponents of rail are looking to reintroduce service to areas that have been developed as trails and bikeways. To try and recapture these lost right-of-ways has proven to be a daunting task, often times taking years to resolve.

Airports face tremendous development pressures. With the amount of developable land in scarce supply, airports offer large tracts of land suitable for residential, commercial and industrial uses. Municipalities generally overlook the importance of having an airport in their community and often times would prefer to convert these sites to industrial or commercial development, not recognizing the role that airport plays in the local economy. Over the last ten years Massachusetts has seen more

than ten aviation facilities fall victim to these pressures. Several other facilities are in imminent danger of loss either because the owner has placed it on the market for sale, or because the owner has indicated its intention to close it for another purpose.

Despite enormous benefits to employment, tax revenue and community service, airports have vocal opponents. Because of a lack of land use controls in many communities, residential development has also taken place in areas adjacent to airports. Residential development is generally considered an incompatible land use because of noise and safety related reasons. Airports pay their share of taxes but require fewer municipal services than a residential development of the same size. Often residential development creates an "anti-airport" sentiment on the part of neighbors, many of whom built their homes with the knowledge there was an airport in the vicinity. This perception of hazard or noise is very powerful and many battles are an outgrowth of a "not in my backyard" mentality.

Airports can also provide a community with many unseen benefits:

- Rescue and life saving applications, such as medical flights, police patrol and aerial fire fighting;
- Airports are the number one market for car rental companies, which add jobs and tax revenue to the local economy;
- Business locate near airports, creating new development and generating tax revenue;
- Aircraft carry cargo and mail around the country;
- Airports have national defense value for pilot training, civil air patrol, logistical and relief efforts, whether in wartime or during a natural disaster;
- High profile visitors arrive by air; and

- The park like setting of many airports provides visual relief.

Several studies have been undertaken since 1991 that suggest that regional airport transportation capacity will become inadequate some time in the next 15-25 years even with improvements at both Logan and all the other New England Region airports. In order to plan for the future, and allow decision making to occur prior to an air capacity crisis, MAC in its 1989 Massachusetts Airport System Plan (MASP) recommended the initiation of a siting study for a second major airport. This initial siting study was to answer the question: Are there any suitable sites for a second major airport in the Commonwealth of Massachusetts? The study included preparing airport models used to identify and evaluate possible sites, establishing the siting criteria and range of issues important to evaluating sites, preparing an inventory of all possible sites, undertaking the first level of analysis and developing an interim list of twelve sites to be looked at in greater detail.

In 1994 the Regional Air Service Development Study was initiated by the MAC in response to concerns raised during the Second Major Airport (SMA) study. The SMA recommended that in the short term regional airports in New England could be enhanced to relieve some of the capacity issues at Logan International Airport. This has started to occur as evidenced at T.F. Green Airport in Rhode Island, Manchester Airport in New Hampshire and to a lesser degree at the New Bedford and Worcester Regional Airports in Massachusetts. The use of these regional airports is a short term solution as air capacity continues to be an issue. Smaller general aviation airports also serve to relieve Logan and these regional airports of some of the smaller aircraft that add to the congestion problems.

To suggest that an airport should be permanently closed because of their UST situation is probably not sufficient justification alone for such action. Massachusetts aviation assets should not be allowed to go the way of railroad right-of-ways. They can plow up airports today to build housing and industrial developments , but twenty or thirty years from now they are not likely to bulldoze homes to build airports. Other alternatives to airport closure are available and will be discussed in the recommendations of Chapter Six.

5.7 Should Regulations Be Changed Requiring Airports to Provide Fuel?

The Code of Massachusetts Regulations (CMR) requiring airports to provide fuel was instituted for several reasons. First, the MAC was established "...for the purpose of protecting and insuring the general public interests in public safety, and the safety of persons receiving instructions concerning, or operating or using, aircraft and of persons and property being transported in aircraft , and for the purpose of developing and promoting aeronautics within the Commonwealth...(MGL, 1998)." The major reason for requiring airports to provide fuel is safety.

702 CMR 5.03 (1)(d) states that "...there must be a hangar for the housing of aircraft; aviation gasoline and oil must be available for sale; there must be facilities for minor aircraft and engine repairs and facilities for tying down aircraft." This CMR outlines the minimum operating requirements to be classified as an airport. Other minimum requirements include; airport size, airport markings, wind direction indicator, airport manager, communications, emergency equipment, fencing and rest rooms. Should a pilot encounter some type of engine problem, he/she would need a safe area to

land and make necessary repairs or adjustments to the aircraft. The provision of fuel and oil would allow transient pilots to land at any facility designated as an "airport" and refuel their aircraft. For the pilot community, facilities classified as airports are generally assumed to provide fuel. If an airport did not provide fuel, an aircraft could potentially be stranded.

Could a landing facility function without providing fuel? The short answer is yes. Each year the MAC registers several thousand Private Restricted Landing Areas (PRLAs). 702 CMR (3)(c) outlines the minimum requirements for these facilities. A PRLA is a restricted landing area used for private non-commercial use. These landing areas are used solely for non-commercial, private use and do not require certification from the MAC, but must be registered annually on forms provided by the Commission. The requirements for these facilities are much less stringent than those for an "airport" and PRLAs are not required to provide fuel, though some do.

These facilities can be used by pilots but they must obtain "prior permission". A pilot would contact the facility in advance of landing there to obtain the owners approval to use the facility. Many of the PRLAs registered with the MAC actually have longer runways and more amenities than some Massachusetts "airports". One of the major benefits to registering as a PRLA is that the owner is subject to fewer MAC and FAA regulations. The downside to this is that PRLAs are not eligible to receive MAC funds. Recommendations for potential solutions to the problems outlined above will be included in the following chapter.

Chapter 6 - Conclusions/Recommendations

6.1 Introduction

The purpose of this chapter is to make recommendations that when implemented will allow airports to become compliant with EPA requirements. Previous chapters have provided background information and data on underground storage tank issues setting the stage for these recommendations. Certain recommendations made in this chapter may be specific to individual airports and may not prove useful system-wide. Other recommendations are more general and may be used not only to resolve the UST issues, but for programming and funding of other capital improvements as well.

6.2 EPA Compliance Assistance Priorities

In a memorandum issued by the EPA's Assistant Administrator to Regional Administrators on December 9, 1998, Steven A. Herman clarified several EPA UST deadline enforcement strategies. The primary concern of the EPA remains finding the most efficient way to ensure that USTs do not leak by meeting standards for protection from spills, overfills and corrosion. Assistant Administrator Herman states that "Working in partnership with States, we believe that focusing EPA's resources over the next six months on compliance assistance activities, especially for small businesses and local governments, and high priority inspections is the most effective approach to reaching our environmental goals of protecting human health and the environment from substandard USTs." The enforcement strategy goes on to identify both "high" and "low" federal enforcement priorities.

During the first six months following the deadline, EPA will focus its federal inspection resources in areas that are a "high priority", focusing its resources where they can produce the greatest benefit. Those facilities identified as "high priority" include:

- Federal Facilities;
- Owners and operators of multiple UST facilities;
- Owners and operators of large facilities with multiple USTs; and
- Facilities that are endangering sensitive ecosystems or sources of drinking water by failing to upgrade, replace or close USTs.

The EPA has strongly urged owners/operators who meet the criteria above to move quickly to come into compliance as they could be subject to state enforcement actions or citizen lawsuits. In addition, many fuel distributors have stated that they may not deliver fuel to USTs that have not been upgraded or replaced.

EPA has identified "low priority" facilities and will not focus inspection resources on the following types of UST facilities during the first six months following the deadline:

- Small UST facilities (generally four or fewer tanks) owned and operated by one person not owning or operating other regulated UST facilities; and
- USTs owned or operated by local governments and states (including public service entities such as school districts, fire departments, and police departments).

The EPA is also urging these facilities to come into compliance as soon as possible. Airports, whether publicly or privately owned, would tend to be classified as low priority facilities.

The establishment of EPA's priorities should not be construed as an extension to the December compliance deadline. While these guidelines may seem to give certain owners and operators a six month reprieve, it should be noted that the primary enforcers of this law are the states. In the State of Massachusetts enforcement occurs through the Department of Fire Services UST Regulatory Compliance Unit, although compliance inspections are generally initiated at the local level by a municipality's fire chief or fire marshal. Should the local fire chief choose to inspect an airport's fuel facility for compliance he/she may do so and potentially impose significant fines, or close the facility if it is non-compliant.

6.3 Recommendations for Allocation of State Funds

As documented in the previous chapters the financial need for capital improvement funds far exceed the level of funding available, not only for UST projects, but all capital improvements. A funding mechanism should be established that will allocate state funds for various "categories" of airports. By establishing different categories of airports and allocating certain levels of funding for each category, a more equitable distribution of funds could begin to occur. The current funding scenario forces smaller, general aviation facilities to compete with larger airports for a finite amount of dollars. To expect that an airport servicing the recreational aircraft market can compete with an airport which is providing scheduled air passenger service is simply unrealistic. A "level playing field" needs to be created.

The categories of airports could be classified similar to the way in which the FAA has determined its classification of airports (i.e. Primary Airport, Reliever Airport,

General Aviation Airport). Each of these categories of airport receive a percentage of whatever federal funds are allocated for a specific fiscal year. Using the FAA's funding formula, Primary airports receive federal funds based on the Airport Improvement Program (AIP) level of funding and the total number of passengers the airport handled during the previous calendar year. The funding level for Reliever and General Aviation (GA) airports is calculated based on the level of AIP authorization and a formula based on the population of the state. The GA and Reliever airports compete for the same pool of money during any calendar year and not all GA airports in Massachusetts are eligible to receive federal funds. FAA classifications could be further refined to suit the needs of Massachusetts' funding limitations.

Recognizing that there is probably no way to totally eliminate political influences from the way in which funding decisions are made is important. By establishing different categories of airports and funding these categories based on a percentage of the total state allocation would provide for a more equitable distribution of funds while also allowing "decision makers" to set certain priorities. For example, should those establishing policies determine that airports who providing air passenger service (Primary airports) are a high priority, they may allocated a higher percentage of state funds to this category of airport. In this way the other categories of airports may receive a smaller portion of the total funds but would receive some level of state funding.

Other categories of airports could include "Reliever", "General Aviation", "Recreational" and "Privately Owned". A different set of criteria would be established to ensure that airports are competing with airports of similar use, function and size. A more "level playing field" could be created when airports of similar size/use are competing

with one another within their own category of funds. Those airports serving a specific need or providing a service not available or desirable at other facilities would no longer be overlooked or forced to compete for the limited funds remaining after larger facilities have been funded. For example, an airport which provides recreational uses such as gliders, ballooning or parachuting plays an important role in the airport system. Without an airport to serve this role other airports would be forced to accommodate these activities, creating a potential safety problem. Gliders, balloons, and parachutists are generally considered incompatible uses at facilities servicing corporate or business aircraft. Airports taking these recreational activities away from busier commercial and passenger airports should not be penalized for serving this role, but should be accommodated and funded accordingly.

If it were assumed that the MAC was to receive "level funding" from the state for the next several years, meaning that the agency receives the same amount of state funds in future years as for the past year, there would be roughly $8 million dollars available annually for capital improvement projects throughout the Commonwealth. Even if half of the total annual state funds were allocated to Primary airports ($4 million), an additional $4 million would remain and could be allocated to other categories. If you assume that four additional categories of airports would be established, and each category received equal priority, there would be approximately $1 million per category available for improvements. Access to this level of funding would be significant for many of the smaller airports in Massachusetts that are currently unable to implement state or federal compliance programs, and have not received state funding in the past. Priority funding should be targeted at those airports in each category that still have UST issues that need

to be resolved. Funds remaining in each category could then be distributed for other capital projects.

6.4 Alternative Funding Sources for Fuel Farm & Capital Improvements

Most, if not all airport sponsors/owners in the Commonwealth's airport system recognize that there are limited MAC funds available and competition for these funds is intense. That being the case, airports should seek alternative funding sources for UST upgrades and other capital improvement projects.

In the past several years the MAC has undertaken major runway reconstruction projects at a number of airports in "rural" communities. As described earlier, the typical construction project requires that a local share be provided by the airport which is undertaking the project. A local share helps to offset the total project cost as well as encouraging the airport sponsor to take some ownership in the project. Runway reconstruction projects tend to be very expensive. Many times smaller communities have difficulty providing the necessary funds for the local share of the project. Airports in Southbridge and Gardner, both located in central Massachusetts, recently had their runways reconstructed and experienced this problem.

Without some source of additional funding for their local share these airports probably would not have been able to proceed with their reconstruction projects. With assistance from their consultants on the project, both airports were able to secure Rural Economic and Community Development grants as local shares for the construction. This source of innovative funding was unique and had not been used in the past. This type of creative funding source may not be available to all airports in the system but may prove

extremely useful for a number of smaller facilities who are unable to develop the required capital to upgrade or replace USTs. Additional research into alternative funding sources determined that there are a number of state and federal organizations which have programs in place to assist individuals, communities and businesses with underground storage tank upgrades/replacement, and other costly capital improvement projects.

Table 7 provides a list of agencies providing assistance, a description of their program, the type of assistance they offer and specific eligibility requirements. A review of these programs indicates that there are alternative sources of funding for many of the Massachusetts airports which still require assistance in meeting EPA requirements.

6.5 Establish Less Restrictive Minimum Airport Requirements

As discussed in earlier chapters, the loss of safe landing areas is unacceptable. However, many of the currently certificated "public use" airports experience extreme difficulty in meeting the minimum requirements outlined in the Massachusetts General Laws and associated aeronautical regulations. These regulations should be reviewed and rewritten establishing a classification for aviation facilities somewhere between a "public use" certification and a "private restricted landing area (PRLA)". This new classification would allow smaller airport owners to change the status of their facility to something with higher standards than a PRLA but less stringent requirements than the certification to be an "airport". This new classification could be considered a Commercial Restricted Landing Area (CRLA). As a CRLA a facility would still be required to meet a minimum set of standards, although the standards would not be as onerous as the current "airport" regulations contained in section 702 of the Code of Massachusetts Regulations (CMR).

Table 7 - Federal/State Financing Sources for Underground Storage Tanks

Agency / Administration	Program	Program Description	Type of Assistance	Eligibility	Restrictions
Commonwealth of Massachusetts, Department of Revenue	Petroleum Product Cleanup Fund	This program was established in 1991 pursuant to MGL c21J. The primary purpose of this program is to provide reimbursement to owners and operators of underground storage tank dispensing facilities for costs they incur in remediating environmental releases. The program operates similar to a trust fund and receives its revenue from owners and operators of dispensing facilities through annual tank fees and per delivery load fees. The program collects approximately $17 million per year. To date the program has reimbursed back to owners and operators in excess of $50 million.	Reimbursement	The program is solely for individuals who own a facility which dispenses gasoline or diesel to motor vehicle, aircraft or boat as engine fuel. These individuals must first conduct a response action at their own expense and then seek reimbursement back from the fund.	
Commonwealth of Massachusetts, Department of Revenue	Cities & Towns Municipal Grants Program	This program was established in 1991 pursuant to MGL c21J and MGL c148 s37A. The purpose of this program is to provide up to 50% reimbursement to city and town governmental bodies for costs they incur in removing and/or replacing underground storage tanks. Annually, up to $2 million is allocated to this program and the funding is from the fees collected by the Petroleum Product Cleanup Fund. To date, the program has awarded nearly $3 million in grants to approximately 200 governmental bodies	Grants	Cities and towns must first remove and/or replace a tank at their own expense and then file a grant with the program for reimbursement. The program is on an annual basis with grant awards occurring at the end of each June.	

Source: USEPA, 510-B-95-010, September 1995; Commonwealth of MA, Dept. of Revenue, 1998.

Table 7 - Federal/State Financing Sources for Underground Storage Tanks

Agency / Administration	Program	Program Description	Type of Assistance	Eligibility	Restrictions
Small Business Administration (SBA)	Loan Guarantees (7 (a) and Pollution Control Programs	The SBA administers two loan guarantee programs available for a wide range of activities, including tank replacements, upgrades, and cleanups. These SBA loan guarantee programs help small business secure loans that they may not be able to receive otherwise. Loans may be used to construct, expand, or modify business facilities or pollution control equipment, or to purchase new equipment and materials.	Loan Guarantees	You must be a for profit business and must meet the federal definition of a small business.	The amount of the loan is not restricted, but SBA will only guarantee up to $1M. If you wish to use the loan to purchase, upgrade or modify pollution equipment, your bank or lending institution must be willing to finance the loan with SBA's guarantee. You must provide full collateral to secure the loan. You must demonstrate that financing on reasonable terms is not otherwise available.
Small Business Administration (SBA)	Local Development Company Loans	The SBA provides loans to local development companies which, in turn, make long-term financing for the purchase of land, buildings, machinery, and equipment.	Loan Guarantees	You may only access loans if a chartered Local Development Company serves your location. You must be a for profit business and must meet the federal definition of a small business.	The maximum loan guarantee is $1M. The term of the land may not exceed 25 years. Ten percent of the project cost is provided by the Local Development Company; 50 percent of the project cost must be provided by a local lender. You must finance the remaining 40 percent of the project with personal equity, private investments, or through other government sources.

Source: USEPA. 510-B-95-010. September 1995; Commonwealth of MA, Dept. of Revenue, 1998.

Table 7 - Federal/State Financing Sources for Underground Storage Tanks

Agency / Administration	Program	Program Description	Type of Assistance	Eligibility	Restrictions
Rural Development Administration (RDA)	Business and Industrial Loans	The Department of Agriculture's Rural Development Administration (RDA) offers Business and Industrial (B & I) loan guarantees to provide credit to businesses that expand and preserve the non-agricultural job base in rural areas. You may use B & I loan guarantees to purchase land, a business, machinery or equipment; to construct, enlarge, or modernize your existing equipment; to abate or control pollution; and for various other purposes.	Loan Guarantees	You must be an individual business owner or part of a partnership, corporation, or cooperative trust. Municipalities, counties, other legal entities, and Indian tribes are also eligible. You must be located in a defined rural area having a population of less than 50,000 and a population density of fewer than 100 persons per square mile. You will be given priority if your business is located in an area with a population of less than 25,000 or if you will help to save existing jobs, expand a business, or open a new business.	RDA guarantees 90 percent of loans less than $2 million and $5 million; and 70% of loans in excess of $5 million. The maximum loans size is $10 million. If you own an existing business, you must provide a minimum of 10% tangible equity; if you have a new business, you must provide 20 to 25 percent tangible equity. You must secure the entire loan with collateral. Acceptable collateral includes cash, land buildings, machinery, equipment, accounts receivable, or inventory. Upon receiving the loan, you must pay the RDA a fee equivalent to two percent of the guaranteed portion of the loan.
Rural Development Administration (RDA)	Rural Business Enterprise Grants	The Department of Agriculture's Rural Development Administration (RDA) administers Rural Business Enterprise (RBE) Grants to assist with the development of small and emerging private businesses and industries. RBE grants are awarded to public bodies and non-profit organizations that, in turn, make loans or grants to small emerging business that will improve the economies of designated rural areas. You must show how your business helps enhance your rural economy. You may use the funds to enlarge, modernize, develop, or repair land or buildings; purchase machinery, equipment, or land; or to control or abate pollution.	Direct Loans & Grants	You must be located in a defined rural area (non-city), with a population of less than 50,000 and a population density of fewer than 100 persons per square mile, served by a recipient public body or non profit organization. Your business must employ fewer than 50 persons and have less than $1 million in projected annual gross revenue.	The maximum grant to an intermediary lender (that is, a public body or non-profit organization) is $500,000. The intermediary lender may determine the maximum grant or loan that will be available to you. You must use the grant or loan to support the local community and enhance non-agricultural employment.

Source: USEPA, 510-B-95-010, September 1995; Commonwealth of MA, Dept. of Revenue, 1998.

Table 7 - Federal/State Financing Sources for Underground Storage Tanks

Agency / Administration	Program	Program Description	Type of Assistance	Eligibility	Restrictions
Economic Development Administration (EDA)	Public Works and Development Facilities Program	The Department of Commerce's Economic Development Administration (EDA) administers the Public Works and Development Facilities Program. The program provides grants to help distressed communities attract new industry, encourage business expansion, diversify their economies, and generate long-term private-sector employment. These grants are not available to individual owners and operators, bout to public bodies or organizations that own and operate tanks. These groups may use the funds for public works projects that create or retain private sector jobs. Such projects include construction, facility improvements, and modernization of existing facilities.	Grants	You may represent a city, town, Indian Tribe, or village in and EDA-approved Overall Economic Development Program redevelopment area, or be a private or public non-profit organization or association representing any redevelopment area. Eighty percent of the country qualifies as an EDA designated redevelopment area. You may also represent an organization that is proposing a public works project that benefits a redevelopment area, even if your organization is not located in the redevelopment area. You will receive priority if your organization assists in creating or retaining private-sector jobs; benefits low-income families and those who have been unemployed for long periods; fulfills the community's needs in a timely manner; and	Grants awarded range between $100,000 and $1.5 million. EDA grants generally do not exceed 50 percent of the total estimated cost of the project; under certain circumstances (for example, in areas of extremely high economic distress) EDA may provide direct grants of up to 80 percent. You must complete projects in a timely manner and within the schedule agreed upon in the grant documentation.

Source: USEPA, 510-B-95-010, September 1995; Commonwealth of MA, Dept. of Revenue, 1998.

The CMR language specific to the provision of fuel should be rewritten to allow an aviation facility the option of not providing fuel or providing fuel in limited quantities so as not to require a full fuel farm to be installed. The CRLA classification would still be eligible to receive state funds and would compete with airports in the same category for these funds. This recommendation would work well for certain smaller airports which either cannot, or chose not to upgrade their tanks. While this recommendation will not affect an airport's ability to meet the current EPA compliance deadline, it benefits the airport by allowing for some flexibility in future decision making. The Massachusetts airport system also benefits because valuable aviation facilities are not forced to close, but can remain open, maintaining the facility as a safe landing area.

6.6 Establish and Maintain "Back-Up" Project List

In late Winter or early Spring the MAC reviews the status of its projects to determine whether any committed transportation bond funds will not be spent by the end of the fiscal year which ends June 30th. Occasionally funds for projects become available near the end of the fiscal year because planned projects could not go forward for various reasons. These unexpended funds should be made available to a pre-approved list of "backup" projects with priority given to fuel storage, tank replacement/upgrade projects.

"Backup" projects should be pre-approved and subject to MAC's typical review, scoping and design process. Airports are required to comply with EPA requirements regardless of whether the MAC participates in funding the upgrade/replacement. Using the backup project process, airports would move forward with their upgrade projects using funds other than those provided by MAC (local funds, grants, etc.) to complete the

necessary work. If near the end of the fiscal year funds are unspent, which has been the case for the past several years, funds can then be allocated to the backup UST projects. Other safety and maintenance projects could proceed using this process if they are able to be completed in a short timeframe. Ideal "backup" projects include such things as the purchase of equipment, where the airport is able to purchase through the city or town's pre-approved "blanket contracts".

This recommendation benefits both the MAC and the airports requiring financial assistance. The airports benefit because they would be the recipients of state funding for their project, although it would be "after the fact". This process would require the airport to seek a source of "up front" funding and carry the cost to complete the project, and as with most state grants, would be subject to the availability of state funds at the end of the fiscal year.

MAC also benefits from this process. Although the MAC would like to have all projects proceed in the fiscal year which they are programmed, unforeseen delays inevitably arise which cause projects to move forward to subsequent fiscal years. Having the ability to fund these backup projects at the end of the fiscal year helps the MAC meet the spending levels the agency specified it would meet early in the year. Should the MAC be unable to meet this spending level, legislators and the Executive Office of Transportation and Construction (EOTC) may hesitate to fund MAC at the same level in future fiscal years.

6.7 Creative Funding for Capital Improvements

Future Transportation Bond Bills for aviation development should include language to allow MAC to be more creative with the funds it is allocated. The most recent Bond Bill allows MAC to fund in excess of the typical 80 percent of the total cost of a project, provided that "...the project, program or activity is required to comply with federal, state, or local environmental or safety rules, regulations, orders, or advisories; or, that the project, program or activity contributes to economic development of the Commonwealth."

The MAC would be able to better assist those airports not eligible for federal AIP funding if it had the ability or flexibility to fund a higher percentage of a projects costs. Airports not eligible for federal funds are required to provide 20 percent of the total project cost whereas, if the project was funded as part of the federal AIP program, the local share would only be 3 percent. The MAC should have the ability to fund 97 percent of the total project cost (3 percent local share) for projects that would be AIP eligible if these airports were included in the FAA's capital improvement program. This type of creative financing would help to create a more level playing field as discussed previously.

6.8 Establish Airport Revolving Loan Fund

The MAC should seek legislation that would allow the agency to establish a "local match bank" or revolving loan fund to encourage airports to take advantage of the funding available to them. Often, an airport will not apply for state assistance simply because the local share is too difficult or impossible to obtain.

Many airports are owned by municipalities which "tolerate" the airport provided it doesn't request financial assistance from the community. This leaves the airport in the untenable position of either not applying for the funding assistance and foregoing a needed project, or applying for financing with a private institution. Neither of these choices are acceptable in ensuring that an airport maintains itself in a safe, operational state. Having an "interest free" bank overseen by the state where the airport could amortize the local share of a project over the life of the investment, would allow the airport to make manageable re-payments while pursuing needed projects. It is one thing to have to generate substantial cash for a local share payment, but quite another to spread that cost over a twenty to twenty-five year time frame.

6.9 Aboveground Storage Tanks v. USTs

Once the determination has been made that a facility needs to replace its fuel system, a decision needs to be made about whether to locate the tanks above or below ground. For many liquids presently stored underground, aboveground storage may be a perfectly safe and acceptable alternative. This is the first consideration tank owners should assess when selecting which of the available storage options best suits their needs.

Safety is a major concern for some airports who wish to install aboveground fuel storage tanks. Underground storage makes sense from an aviation safety perspective because aircraft are less likely to have an incursion with tanks located underground as opposed to those sited aboveground on a concrete pad. USTs also make sense when dealing with products that require an "even" temperature environment, such as alcohol

which has a high evaporative rate, or certain alkyds which will not flow in low temperature conditions.

Aircraft transiting a ramp or apron where aboveground tanks are present must have proper separation to ensure that the aboveground tanks are not compromised. At some airports existing ramp or aircraft parking is currently lacking and to remove additional space for aboveground tank installation simply is not feasible. In these cases the only available option is underground tank installation. Environmentally, aboveground storage tanks seem to make the most sense. A leak or spill becomes more readily apparent as opposed to an underground storage tank that may be leaking for some time.

6.9 Conclusion

This study began with three major objectives:

1. To create an inventory/database of USTs;
2. To determine the existing condition of USTs at Massachusetts' public use airports; and
3. To assess the funding needs created by implementing corrective actions for the deadlines established by EPA and state regulatory agencies.

While this study may not provide solutions to each of the issues identified it has accomplished each of the objectives as intended. The Massachusetts Aeronautics Commission now has the framework of a database established which may be used for a number of different applications. Prior to this study there was no single source for UST

related information at the Commonwealth's airports. It is hoped that this type of study can be used as a model for future system issues.

The database was used to determine the existing conditions of USTs and in retrospect, while there are still airports in need of assistance and issues that must be addressed, the problem does not appear to be as dramatic as originally thought. It is hoped that the recommendations section of this study might be used to assist those airports in meeting EPA requirements.

Attachment "A"

UNDERGROUND FUEL STORAGE TANK (UST) ASSESSMENT SURVEY

Mass Aeronautics Commission

Please provide data which specifically pertains to the airport.
Please read entire questionnaire before completing any answers.
Attached additional pages if necessary.

********Please return completed Survey on or before December 15, 1997.********

General Information:

Airport Name: _____

Name of Person to Contact Regarding this Survey: _____

Title: _____

Phone#: _____ Fax#: _____

e-mail address: _____

I. Fuel Storage Tank Data:

Does the Airport own any UST's? Yes___ No___

If yes, how many USTs does the airport own? 1.____ 2.____ 3.____ 4.____ Other____

When was (were) these USTs installed (what year?) _____

What type of USTs? Single wall steel_____ Double wall steel_____
Other (please describe)_____

What type of fuel is stored in the UST? AvGas____ Jet A_____ Auto_____ Home heating____

Please identify the most recent date the condition of the UST was assessed. _____

What capacity (how many gallons) are these USTs? Tank 1_____ Tank 2_____ Tank 3_____ Tank 4_____

Do USTs installed before December 22, 1988 currently have EPA approved *Spill & Overfill Protection*?
Yes___ No___

Do USTs installed before December 22, 1988 currently have EPA approved *Corrosion Protection*?
Yes___ No___

Do you have any cost estimates on what it would cost to :
Remove UST's? $_____ Upgrade USTs? $_____ Replace USTs? $_____

Using the attached airport layout plan, please indicate the approximate location of the airport's UST's and identify the same as question II (g) above.

II. MAC Financial Information:

Has the airport requested MAC state funding assistance for replacement/upgrade of its UST's? Yes____ No____

What year was the request made? _____

Please be advised that the MAC will not participate in funding of contamination cleanup related to USTs removal.

December 18, 1997

Dear

The Planning Department of the Massachusetts Aeronautics Commission (MAC) is developing an inventory of underground storage tanks (UST's) located at Massachusetts' public use airports. At the present time the MAC has limited data regarding the number of USTs, their age or condition. The attached survey is intended to be a first step in developing this much needed database. Completion of this survey will benefit both the MAC and your airport, allowing the MAC to have a better understanding of the scope and magnitude of projects that must be factored into the state's Airport Safety and Maintenance Program - Capital Improvement Plan (ASMP-CIP).

Under federal regulations issued more than eight years ago, owners and operators of underground storage tanks (USTs) have until December 22, 1998 to upgrade, replace, or close USTs that do not meet the Environmental Protection Agency's (EPA) technical standards for protection against spills, overfills, and corrosion. If existing USTs have not been upgraded or properly closed by the 1998 deadline, airports (or municipalities which own or operate the airport) may be cited for violations and a fine of up to $25,000 per day per violation (Department of Fire Services, 1994).

While the MAC cannot guarantee state funding for UST projects if the Commission is not advised of projects it is unlikely that appropriate funding and staffing requirements will be available to meet this need. Please take the time to answer all questions on the attached survey in as much detail as possible attaching additional sheets if necessary.

Should you have any questions or concerns please do not hesitate to call (617) 973-8893.

Sincerely yours,

Scott C. MacLeod
Aviation Planner

Bibliography

Alexander, Ernest R. 1993. Approaches to Planning: Introducing Current Planning Theories, Concepts and Issues. Yverdon, Switzerland. Gordon & Breach Science Publishers.

Cambridge Systematics. 1988. Business Benefits of General Aviation Access. (Boston: Cambridge Systematics, Prepared for the Massachusetts Aeronautics Commission).

Commonwealth of Massachusetts, Aeronautics Commission. 1989. (1989 Massachusetts Airport System Plan.)

Commonwealth of Massachusetts, Department of Environmental Protection, Bureau of Waste Site Cleanup. 1996. *Commonwealth of Massachusetts Underground Storage Tank Closure Assessment Manual.* Commonwealth of Massachusetts.

Commonwealth of Massachusetts, Department of Fire Services, UST Regulatory Compliance Unit. 1994. Boston, MA: City of Boston *A Brief Guide to Leak Detection and Corrosion Protection Upgrades for Underground Storage Tanks in Massachusetts.*

Commonwealth of Massachusetts, Office of the State Fire Marshal. 1994. *UST Owner/Operators Compliance Guide.* Commonwealth of Massachusetts.

Commonwealth of Massachusetts, Massachusetts General Laws. 1998. Chapter 90 §35-51G. Commonwealth of Massachusetts.

Elliot, Jack. 1998. *"When will local officials realize that airports are critical to their communities?"* Atlantic Flyer, November 1998.

Gesell, Laurence E. 1993. The Administration of Public Airports. Arizona: Coast Aire Publications.

Horonjeff, Robert. 1975. Planning and Design of Airports. New York: McGraw-Hill Book Company.

Michigan Aviation. June, 1997. Volume 30, Number 3.

National Air Transportation Association (NATA). 1998. Aviation UST Management Manual.

Planning Advisory Service (PAS). Capital Improvement Programs: Linking Budgeting and Planning. Robert A. Bowyer, 1993.

Rizzo, Joyce A. 1998. Underground Storage Tank Management: A Practical Guide. Rockville, MD: Government Institutes.

Steel Tank Association. 1996. *How to Get Peace of Mind about your Underground Storage Tank Decision*. Lake Zurich, IL: Steel Tank Institute.

United States Environmental Protection Agency, Solid Waste and Emergency Response. 1994. *Don't Wait Until 1998: Spill, Overfill, and Corrosion Protection for Underground Storage Tanks*.

United States Environmental Protection Agency, Solid Waste and Emergency Response. 1994. *Straight Talk on Tanks: A Summary of Leak Detection Methods for Petroleum Underground Storage Tanks*.

United States Environmental Protection Agency, Solid Waste and Emergency Response. 1994. *Oh No! Petroleum Leaks and Spills: What Do You Do?*

United States Environmental Protection Agency, Solid Waste and Emergency Response. 1994. *Guide to EPA Materials on Underground Storage Tanks*.

United States Environmental Protection Agency, Solid Waste and Emergency Response. 1995. *Musts For UST's: A Summary of Federal Regulations for Underground Storage Tank Systems*.

United States Environmental Protection Agency, Solid Waste and Emergency Response. 1995. *Dollars and Sense: Financial Responsibility Requirements for Underground Storage Tanks*.

United States Environmental Protection Agency, Solid Waste and Emergency Response. 1995. *UST Program Facts: Implementing Federal Requirements for Underground Storage Tanks*.

Wiley, John R. 1986. Airport Administration and Management. Connecticut: Eno Foundation for Transportation.