

**Arizona
Solid Waste
Management
Plan**

March 1981



ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Fife Symington, Governor Edward Z. Fox, Director

June 22, 1994
REF: SWS94-026

Eileen Miller
Maricopa Association of
Governments
1820 West Washington
Phoenix, Arizona 85007

Dear Eileen:

After receiving your letter dated March 17, 1994, regarding the Solid Waste Regional Plan, I requested the Waste Programs Division and the Water Quality Division to do a thorough review of the Plan. This review and the ensuing discussions took time to coordinate and complete.

As indicated in my November 16, 1993 letter to Dennis Smith, I agree in concept that solid waste facility planning should be conducted in coordination with other municipalities and governmental entities on a regional basis.

The Arizona Department of Environmental Quality (ADEQ) does not foresee amending the water pollution control rules your letter references within A.A.C. §§ R18-9-804(I). This language applies to ensuring consistency of permit actions with regard to the relevant certified water quality management plan or applicable facility plan. Although these types of plans may address solid waste issues with regard to water quality, it is not the intent to address solid waste planning documents. Rather, the intent is based in requirements found throughout the federal Clean Water Act (33 USC 1251), which seek to assure consistency across and among water quality management planning and permitting efforts.

As also noted in my previous letter, ADEQ's mission is to protect the public health and environment of the state. It appears the MAG plan is fundamentally an economic development plan and does not necessarily further ADEQ's mission. While I believe that the cities and counties may do what they wish for purposes of economic development, I do not believe it is proper for ADEQ to participate in any activity that could adversely impact the competitive nature of solid waste disposal. I am also concerned that if the plan can be amended as easily as suggested, this process would be just another bureaucratic hurdle to the siting of landfills that would otherwise meet federal and state environmental standards.

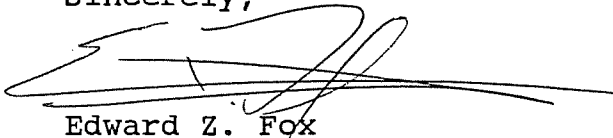
Ms. Eileen Miller
REF: SWS94-026
Page 2

As always, I am committed to reducing bureaucracy in government,
not expanding it.

The Department neither supports nor opposes the MAG solid waste
facility regional planning concept.

Thank you for the opportunity to respond

Sincerely,



Edward Z. Fox
Director

cc: Governor Fife Symington
Matthew Moore, ADEQ

ARIZONA
SOLID WASTE
MANAGEMENT PLAN

BRUCE BABBITT, Governor
State of Arizona

JAMES E. SARN, M.D., M.P.H., Director
Arizona Department of Health Services

MARCH 1981

Prepared by

Division of Environmental Health Services
Bureau of Waste Control

Principal Staff

Philip W. King

Norman L. Weiss

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Acknowledgement

Each of the six regional Councils of Governments in Arizona contributed to the development of this State Plan through their respective Areawide Solid Waste Needs Assessments.

We extend our appreciation to the staff members of each of these regional planning agencies for the assistance they provided.

The contributions of the following individuals were particularly helpful:

District I - Pat Campbell
Mark Frank

District II - Lois Hager
Jesse Brown

District III - Bill Towler

District IV - Terry Kearney

District V - Valerie Feuer
Lester Snow

District VI - Ken Zehentner
Richard Francaviglia

Our special thanks to the following
members of the Bureau of Waste Control,
whose cooperation and technical expertise
made the publication of this plan possible.

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ARIZONA DEPARTMENT OF HEALTH SERVICES

Office of the Director

BRUCE BABBITT, Governor

JAMES E. SARN, M.D., M.P.H., Director

August 20, 1981

Ms. Sheila Prindiville
Acting Regional Administrator
U.S. Environmental Protection Agency
Region IX
215 Fremont Street
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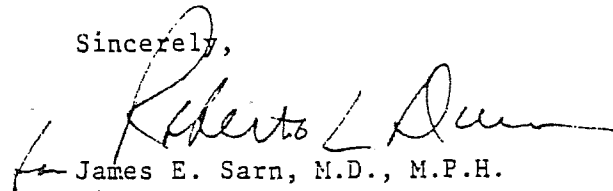
Dear Ms. Prindiville:

Enclosed for your review is the 1981 "Arizona Solid Waste Management Plan" prepared pursuant to Section 4003 of the Resource Conservation and Recovery Act and in accordance with U.S. Environmental Protection Agency regulations contained in 40 CFR Part 256.

The draft State Plan, submitted to your office on February 23, 1981, was reviewed extensively by Federal, State, substate, and local agencies, as well as by interested and affected members of the public. Public hearings were held on March 20, 24, and 27 in Phoenix, Tucson, and Flagstaff, respectively, and numerous verbal and written comments were received. As a result of this public comment, a variety of changes were effected to the draft plan. These changes, as well as the Department's response to various issues that were raised, have been documented in the Responsiveness Summary included as Appendix C.

The planning process employed in the development of the State Plan, including public participation, has been in accordance with proper State administrative procedures. The Plan is also supported and complemented by "Areawide Solid Waste Needs Assessments" which were prepared by each of Arizona's six regional Councils of Governments. For these reasons, I am pleased to inform you that I have approved the 1981 Arizona Solid Waste Management Plan on behalf of the Arizona Department of Health Services pursuant to authority vested in me by A.R.S. § 36-132.01. The State Plan will serve as a valuable policy document guiding our solid waste program activities. Its implementation, however, will be conditioned upon the continued availability of resources.

Sincerely,


James E. Sarn, M.D., M.P.H.
Director

JES:JWC:jr
Enclosure

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Compliance Checklist Under 40 CFR Part 256:
Guidelines for Development and Implementation
of State Solid Waste Management Plans.

Regulation	Plan Reference
<u>256.01 - Purpose and Scope of the Guidelines</u>	
a	n/a
b.1.i	Chapter VIII, Sec. A
b.1.ii	Chapter VIII, Sec. B
b.1.iii	Chapter VIII, Sec. C
b.2	Chapter VIII, Sec. E
b.3	Chapter VIII, Sec. E
b.4	Chapter VIII, Sec. D
b.5	Chapter VIII, Sec. F
b.6	Chapter VIII, Sec. F
c	Chapter VIII, Sec. D
<u>256.02 - Scope of the State Solid Waste Management Plan</u>	
a.1	Chapter I
a.1.i	Chapter VII, Sec. A
a.1.ii	Chapter VII, Sec. B
a.1.iii	Chapter VII, Sec. C
a.1.iv	Chapter VII, Sec. G
a.1.v	Chapter VII, Sec. E
a.1.vi	Chapter VII, Sec. F
a.1.vii	Chapter VII, Sec. H
a.1.viii	Chapter VII, Sec. I
a.1.ix	Chapter VII, Sec. D
a.2.i-x	Chapter VII
b	Chapter III
c	Chapter II
d	Chapter I
e	Chapter V
<u>256.03 - State Plan Submission, Adoption and Revision</u>	
a	Chapter I
b	Chapter I
c	Chapter IV
d	Chapter I
e	Chapter I
<u>256.04 - State Plan Approval, Financial Assistance</u>	
a	EPA responsibility
b	EPA responsibility
c	EPA responsibility
d	Cooperative Agreement
e	Cooperative Agreement

40 CFR Part 256 (con't)

Regulation	Plan Reference
256.05 - <u>Annual Work Program</u>	
a.	EPA responsibility
b.	Cooperative Agreement
c.	EPA responsibility
d.	Cooperative Agreement
e.	Cooperative Agreement
256.10 - <u>Requirements</u>	
a.1.	Chapter VIII, Sec. A.
a.2.	Chapter VIII, Sec. B.
a.3.	Chapter VIII, Sec. C.
b.	Chapter VIII, Sec. E.
c.	Chapter VIII, Sec. D.
d.	Chapter VIII, Sec. F.
e.	Chapter V, Sec. B.
(Solid Waste)	
(Hazardous Waste)	Chapter VII, Sec. A.
f.	Chapter VIII, Sec. B.
256.20 - <u>Requirements for State Legal Authority</u>	
	Chapter V, Sec. B.
256.21 - <u>Requirements for State Regulatory Powers</u>	
a.	Chapter VIII, Sec. D.
b.	Chapter VIII, Sec. D.
c.	Chapter VIII, Sec. D.
d.	Chapter VIII, Sec. D.
256.22 - <u>Recommendations for State Regulatory Powers</u>	
a.	Chapter VI
b.	Chapter VII, Sec. B.
c.	Chapter VIII, Sec. D.
d.	Chapter VIII, Sec. E.
e.	Chapter VIII, Sec. D.
256.23 - <u>Requirements for Closing or Upgrading Open Dumps</u>	
a.	Chapter VIII, Sec. E.
b.	Chapter VIII, Sec. E.
c.	Chapter VIII, Sec. E.
d.	Chapter VIII, Sec. E.
256.26 - <u>Requirement for Schedules leading to Compliance with the Prohibition of Open Dumping</u>	
	Chapter VIII, Sec. E.

Regulation	Plan Reference
256.30 - <u>Requirements</u>	
a	Chapter VIII, Sec. F
b	Chapter V, Sec B.7
	Chapter VIII, Sec. F
256.40 - <u>Requirements</u>	
	Chapters I - VIII
256.50 - <u>Requirements</u>	
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c	Chapter IV
d	Chapter IV
e	Chapter IV
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g	Chapter IV
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j	Chapter IV
k	Chapter IV
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m	Chapter VIII, Sec. A
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256.61 - <u>Requirements for Public Participation in the Annual State Work Program</u>	
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d	State/EPA Agreement
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CHAPTER ONE

INTRODUCTION

Chapter I
INTRODUCTION

Preface

This Arizona Solid Waste Management Plan has been prepared in accordance with U.S. Environmental Protection Agency (EPA) guidelines promulgated pursuant to Subtitle "D" of the Resource Conservation and Recovery Act of 1976 (P.L. 94-580 or RCRA). As the centerpiece of the State's solid waste management program, it is intended to establish policies, procedures, priorities and future direction for this continuing program effort. Its basic orientation is two-fold; (a) the protection of public health and the environment, and (b) the conservation of valuable material and energy resources.

This plan has been prepared in response to both a legislative mandate and a recognized need to develop an improved solid waste management system. Problems related to solid waste management in the State of Arizona are numerous, diverse and widespread. Their magnitude is growing. The need to address these many problems in a comprehensive planning framework has never been greater. This action-based, problem-solving, multi-year document is intended to address this pressing need. The policy framework it provides will primarily guide the activities of State agencies exercising regulatory jurisdiction over solid waste management facilities and/or practices. Its regulatory impact however, will also influence local decisions and actions, both public and private.

In Arizona, the Department of Health Services has been designated as the lead

agency responsible for statewide solid waste management planning (A.R.S. Sec. 36-132.01). Within the Department, the recently established Bureau of Waste Control administers the solid and hazardous waste management programs authorized under RCRA (Subtitles D & C respectively). Each of these State administered environmental programs relies heavily upon federal EPA funding .

Subtitle D of RCRA authorized the provision of financial assistance to the States for; (a) the preparation of State Solid Waste Management Plans, and (b) conducting the nationwide inventory of "open dumps" within their respective borders. The former objective was designed to establish formal state planning mechanisms and processes to support statewide solid waste management systems. The latter was designed as a supplemental tool to promote improved solid waste management practices and facilitate State actions geared toward upgrading or closing sub-standard disposal facilities. By receiving and expending RCRA funds for these purposes, the State of Arizona committed itself to the performance of these continuing activities.

Federal financial support of Subtitle D objectives however, is now in the process of being withdrawn. Earlier, EPA had indicated that this funding might be phased-out completely by FY 85. More recently, Subtitle D funds have been recommended for total elimination in FY 82. Prospectively, this will leave the State solid waste management program confronted by an impending fiscal dilemma at a time when its resource requirements are dramatically increasing.

Table I-I

Sources and Amounts of Funding
for the
Arizona Solid Waste Management Program

<u>Fed. Fiscal Year</u>	<u>Fed Share</u>	<u>State Share Allocated</u>	<u>Total</u>
1979	245,000	67,000	312,000
1980	190,000	56,000	246,000
1981	167,000	23,000	190,000

This State Plan presents and endorses a strong leadership and coordinative role for Arizona State Government in promoting the environmentally sound management of solid wastes. It further documents the need for a continuing planning process, and prescribes a rigorous timetable for activities geared toward State Plan implementation. At a minimum, this will require a maintenance level of effort.

Similarly, commencement of the Open Dump Inventory has committed the State to a long term effort, and dramatically expanded the scope and responsibility of the solid waste management program. The broadened definition of "solid waste" provided by RCRA has now encompassed numerous solid waste management practices and solid waste disposal facilities that previously fell outside the scope of the State's management program. The net effect has been an estimated five-fold increase in the number of regulated facilities, and a corresponding increase in supporting responsibilities. Although the State of Arizona is seriously committed to protecting public health and the environment, to closing or upgrading substandard solid waste disposal facilities, and to effectively prohibiting the establishment of new open dumps, a replacement for this declining source of revenues has not yet been found.

Section 4007 of RCRA specifically required that each State prepare and maintain an EPA approved State Plan as a condition upon the receipt of continued Subtitle D grant assistance. Accordingly, this State Plan has been prepared to meet this condition, and to insure Arizona's continued eligibility for as long as federal funds remain available. In essence, it will thereby afford the State a grace period within which to appropriate or otherwise secure these needed monetary resources.

This State Plan is organized to provide a structured analysis of the State solid waste management program. Its purposes, strengths, weaknesses and needs are each addressed. Most importantly, the plan presents an overall program strategy for achieving full compliance with both State and federal law. At issue in this context, and at stake, is the quality of Arizona's unique environment, and the future quality of life for its residents.

Purpose and Goals

The Resource Conservation and Recovery Act became law on October 21, 1976. At the time of its passage, the Act was heralded as a landmark in the evolution of national environmental legislation. Because it dealt primarily with the management and prevention of land-based pollution, it provided the missing link between the Water Pollution Control Act and the Clean Air Act. Together, these three laws established a comprehensive national resource management program for pollution abatement and the preservation of environmental quality. These air, land and water pollution control programs are each administered at the federal level by the Environmental Protection Agency. Enforcement, compliance and implementation responsibilities however, have largely been delegated to the States.

Under authority of Subtitle D, the EPA subsequently promulgated two sets of regulations which profoundly impacted Arizona's solid waste management program. These regulations were the "Guidelines for Development and Implementation of State Solid Waste Management Plans" (40CFR Part 256) and the "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR Part 257). The guidelines for State Plans have shaped the scope, content and direction of this policy document. The classification criteria established new minimum performance and design standards for the operation of solid waste disposal facilities and the conduct of solid waste disposal practices. These criteria provided a new operational definition of the "act of open dumping", mandated its nationwide prohibition, and required the closure or upgrading of all disposal facilities failing to meet one or more of these national land disposal standards. The implementation mechanism under this latter requirement is known as the Open Dump Inventory.

Because Arizona's existing regulatory powers are equivalent to the new federal land disposal criteria, the conduct of the Open Dump Inventory in Arizona will essentially constitute a State enforcement activity. In those States deficient in regulatory powers, the inventory will represent a planning activity conducted in anticipation of future enforcement action.

Despite Arizona's regulatory equivalency, the new federal criteria have substantially expanded and redirected the State's enforcement orientation. Henceforth, the State's regulatory powers will be more broadly interpreted and applied so as to fully embrace both the spirit and the letter of the federal criteria. It will be the policy of the Department to consider any solid waste facility in violation of federal regulations as also being in violation of State laws and regulations. Previously, State enforcement actions were limited almost exclusively to landfill facilities receiving municipal solid waste. Through the Open Dump Inventory, the State program will now be inspecting, classifying and monitoring all solid waste disposal facilities (including municipal, agricultural, mining and industrial landfills, surface impoundments and landspreading sites). Once inventoried and classified, these facilities will be added to the State's inspection schedule, and become subject to enforcement action for violations of either State or federal regulations.

This State Solid Waste Management Plan establishes the broad policy framework within which all of these continuing program activities will occur. It espouses four general goals, each of which is consistent with the stated objectives of the Resource Conservation and Recovery Act. The goals of the State Plan are:

1. TO PROMOTE improved and environmentally sound methods of solid waste management and disposal.
2. TO PROMOTE the recovery and reuse of valuable material and energy resources from solid waste.
3. TO PROVIDE policy and procedural guidance to State, substate and local agencies in the proper management of solid waste, and
4. TO FULFILL the requirements of Section 4007 of the Resource Conservation and Recovery Act, and thereby secure the State of Arizona's continuing eligibility for federal financial assistance under the provisions of Subtitle D.

In developing and preparing the Solid Waste Management Plan, the State's planning objectives were:

- to identify and address the management of all types of solid waste that are now presenting either a potential for adverse environmental impact or an opportunity for resource recovery.
- to identify and describe the potentially adverse health and environmental impacts associated with improper solid waste management practices.
- to assess the adequacy of existing statewide solid waste management practices, and suggest methods for improving such practices.
- to identify and prioritize statewide solid waste management problems, issues and needs.
- to document the legal basis for the regulation of solid waste management in the State of Arizona.
- to describe the State's current solid waste management, regulatory and enforcement program.
- to provide a basis for federal, State, substate and local planning coordination.
- to establish an implementation timetable for State actions geared toward improving statewide solid waste management practices and upgrading substandard solid waste disposal facilities.
- to define agency roles and responsibilities for the continuing development and implementation of the State Plan.

Legal Authority

Legal authority for the preparation and adoption of this Arizona Solid Waste Management Plan has been vested in the Department of Health Services (ADHS) by State law. A.R.S. § 36-132.01 holds that the Department shall prepare, and update as necessary, a comprehensive statewide solid waste management plan for the collection, storage, transportation, processing, reclamation and disposal of solid wastes. Other provisions of this statute authorize ADHS to receive federal grant monies for State planning purposes (36-132.01 D), and require the Department to consider other State, local or regional plans in the preparation of the State Plan (36-132.01 B).

The first Arizona Solid Waste Management Plan was prepared under this specific authority, and adopted in 1973. Subsequent to the enactment of RCRA, the Governor of Arizona reaffirmed this responsibility designation in a letter to EPA Region IX (dated January 10, 1979). This letter stated that "...the Arizona Department of Health Services is authorized to develop and implement a comprehensive solid waste management plan in accordance with federal criteria and standards required by Subtitle D of RCRA".

This same letter further stated that "...in accordance with Executive Order 70-2 and consistent with the action of the Department of Health Services in establishing solid waste planning district boundaries coterminous with those of E.O. 70-2, the (six regional Councils of Governments) are authorized to undertake areawide solid waste management planning responsibilities". Each regional Council of Governments subsequently prepared and submitted to the Department an areawide solid waste assessment. These areawide assessments were instrumental in the development of this RCRA update to the State Solid Waste Management Plan. Conversely, this State Plan is intended to supplement and complement these six areawide plans.

Scope

This plan is designed to address the activities and policies of the State solid waste management program for a period of five years. Officially, it will take effect at such time as it is formally adopted by the Director of ADHS and approved by the EPA Administrator. State adoption is anticipated in June of 1981, with EPA approval shortly thereafter. If this schedule is adhered to, the State Plan shall remain in effect until July of 1986, unless otherwise revised or updated.

The Department of Health Services however, will continuously review and monitor the State Solid Waste Management Plan to assure its validity and appropriateness. At a minimum, it shall be revised as necessary, and readopted (after notice and public hearing) not less frequently than every three years. Its initial re adoption is therefore scheduled for the Spring of 1984. Legal authority has been granted for this purpose under A.R.S. § 36-132.01. It is also a federal requirement under 40 CFR Part 256.03. Federal approval of the State Plan may be withdrawn at any time the EPA Administrator determines the State Plan is no longer in compliance with minimum requirements. Such a federal action would also necessitate the revision and re adoption of the State Plan according to State administrative procedures.

The Department's annual work program, submitted each year with its basic grant application to EPA, will provide the primary basis for evaluating State progress in plan implementation. Accordingly, the goals and priorities enunciated in this State Plan shall be actively considered by the State and by EPA in negotiating the State's annual work program.

The content of this State Plan is concerned with solid waste management in the State of Arizona, and the State's Solid Waste Management Program. The plan addresses all solid wastes in the State that either; (a) pose a potential for adverse effect on public health or the environment, and/or (b) provide an opportunity for resource conservation or recovery. The major categories of solid waste meeting these criteria include; (1) hazardous wastes, (2) municipal wastes, (3) wastewater treatment sludges, (4) septic tank pumpings, (5) industrial wastes, (6) mining wastes, (7) pollution control residuals, (8) agricultural wastes and (9) water treatment sludges. Each of these waste categories is considered in terms of the management aspects of; (1) resource conservation, (2) source separation, (3) collection, (4) transportation, (5) storage, (6) transfer, (7) processing, (8) treatment and (9) disposal.

The following outline briefly describes the organization and structure of the Arizona Solid Waste Management Plan.

Summary- Chapter II

This chapter presents a summary of Arizona's projected and proposed five-year Subtitle "D" program. It defines both policy and major actions necessary for State Plan implementation. The State's implementation timetable is also presented herein.

SECTION A - PLANNING FRAMEWORK

This section encompasses Chapters III-VII of the State Plan, and establishes both the framework and basis for the State's proposed five-year program.

Needs, Problems and Priorities - Chapter III

This Chapter identifies both statewide and areawide solid waste management problems, issues and needs. It also describes the criteria and justification for the selection of statewide priorities.

The Planning Process - Chapter IV

The purpose of this Chapter is to describe the structure of the solid waste management planning system in Arizona, and to describe the various mechanisms which have been, and will be employed to facilitate program coordination, public

participation and the continuing planning process.

The Legal Framework - Chapter V

This Chapter overviews pertinent federal legislation, and describes the statutory and regulatory powers available to the State of Arizona in seeking to comply with the mandates of RCRA.

The Environmental Setting - Chapter VI

This Chapter identifies and describes the adverse environmental consequences associated with improper solid waste management practices in Arizona. Potentially adverse impacts on public health and the environment are discussed in terms of their relationship to the "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR Part 257). The federal criteria are defined, and mitigation/prevention options are reviewed. The intent is to present a guideline for environmentally sound solid waste disposal.

Solid Waste Management Practices in Arizona - Chapter VII

This Chapter surveys current management practices to the extent that they are now known. Each major waste category is addressed separately, and waste-specific problems are identified.

SECTION B - PLAN IMPLEMENTATION

This section identifies the proposed means by which statewide compliance with RCRA will be achieved. It addresses the State's overall implementation strategy.

Program Implementation - Chapter VIII

This Chapter addresses each of the basic elements necessary for proper program development and implementation, and the ways in which they will be structured and administered to meet the various goals of the State Plan. In general, these elements have been organized to reflect the "Minimum Requirements for Approval of Plans" stipulated in Section 4003 of RCRA. They include:

- a. Agency Roles and Responsibilities
- b. Distribution of Federal Funds
- c. Means to Coordinate Regional Planning and Implementation
- d. Regulatory and Enforcement Program
- e. Open Dump Inventory
- f. State Strategy for Resource Conservation and Recovery

Definitions

The key words listed below appear repeatedly throughout the text of this State Plan. In this context, they have the following assigned meanings.

"Criteria" - means the "Criteria for Classification of Solid Waste Disposal Facilities and Practices", 40 CFR Part 257, as promulgated under Section 4004(a) of RCRA.

"Disposal" - means the discharge, deposit, injection, dumping, spilling, leaking or placing of any solid waste or hazardous waste into or on any land or water so that such waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

"Facility" - refers to any resource recovery system or component thereof, any system, program or facility for resource conservation, and any facility for collection, source separation, storage, transportation, transfer, processing, treatment or disposal of solid waste, including hazardous waste, whether such facility is associated with facilities generating such wastes or not.

"Open Dump"- means any facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under Section 4004 of RCRA and which is not a facility for the disposal of hazardous waste.

"Open Dump Inventory" - means the inventory required under Section 4005(b) of RCRA, and is defined as the list published by EPA of those disposal facilities which do not meet the Section 4004 criteria (40 CFR Part 257).

"Sanitary Landfill" - means any facility for the disposal of solid waste which meets the criteria published under Section 4004 of RCRA (40 CFR Part 257).

"Solid Waste" - means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended.

Definitions (Con't)

"Solid Waste Management" - means the systematic administration of activities which provide for the collection, source separation, storage, transportation, transfer, processing, treatment and disposal of solid waste.

"Resource Recovery" - means the retrieval and reuse of valuable energy and/or materials from solid waste.

CHAPTER TWO

SUMMARY

Chapter II

SUMMARY

A. Overview of Subtitle D

The federal Resource Conservation and Recovery Act of 1976 (RCRA, P.L. 94-580) established a broad-based national program to improve solid waste management. Its primary objectives were the protection of public health and the environment and the conservation of valuable material and energy resources. The basic elements of this ambitious national program were; (a) the control of hazardous wastes, (b) resource conservation, (c) resource recovery, and (d) the establishment of environmentally sound solid waste disposal practices and facilities. Congress intended these programs to be implemented through a cooperative effort among Federal, State and substate governments, as well as private enterprise.

Subtitle D of the Act encouraged such cooperation by providing for the development of State and regional solid waste management plans that involved all three levels of government. EPA, as the Federal partner in this process, sought to aid State initiatives in the formulation and implementation of such plans through the provision of guidelines and financial assistance.

Section 4002 (b) of the Act required EPA to promulgate guidelines for the development and implementation of State Solid Waste Management Plans, and Section 4003 identified minimum requirements which State Plans had to address in order to meet with EPA approval. The guidelines were published in the Federal Register

on July 31, 1979 (40 CFR Part 256), and this Arizona Solid Waste Management Plan was subsequently developed in terms of content and structure largely on the basis of the Section 4003 requirements. Arizona received its first grant award under RCRA in FY 77, and is currently in its fifth year of federal funding under this enabling legislation.

The legislative history of Subtitle D clearly indicates that Congress intended States and localities to retain overall responsibility for the planning and actual operation of solid waste management programs, including the enforcement of regulatory standards. The provision of financial assistance under Subtitle D was meant to encourage, not preclude, State initiatives in this regard. The minimum requirements and standards established by EPA do not therefore pre-empt Arizona from developing broader programs or stricter regulatory standards under authority of State law. It is the formal position of EPA, that so long as Federal requirements are satisfied by State programs, Subtitle D does not limit State powers concerning solid waste management.

B. Role of the State Plan

This State Solid Waste Management Plan is the centerpiece of Arizona's Subtitle D system, as well as its coordinating mechanism. Through this Plan, Arizona has established its overall strategy for protecting public health and the environment from adverse effects associated with solid waste disposal, for encouraging resource recovery and resource conservation, for providing adequate disposal capacity in the State, and for dealing with all other issues relevant to solid waste management. This plan further establishes the institutional arrangements which the State will engage to implement this strategy, including the respective responsibilities of State,

regional and local authorities. By reconciling the goals and requirements of RCRA with State priorities and institutional arrangements, the State Plan provides the organizational framework necessary to operate the Subtitle D system in Arizona, and thereby enables the State to comply with the mandates of this Federal law.

In addition to the State Plan, the Subtitle D system has three other major components. These are; (1) the Open Dump Inventory, (2) the annual work program, and (3) federal financial assistance. Each of these system components is designed to support the continuing maintenance and implementation of the State Plan.

1. Open Dump Inventory

Under authority of Section 4004 (a), EPA promulgated the "Criteria for Classification of Solid Waste Disposal Facilities and Practices" on September 13, 1979. These regulations contained criteria for classifying solid waste disposal facilities as either "sanitary landfills" or "open dumps", provided a functional definition of these terms and established a minimum level of protection necessary to ensure that no reasonable probability of adverse effects on health or the environment would result from the operation of any such disposal facility.

Under RCRA Section 4005 (b), EPA is required to publish in the Federal Register an inventory of open dumps; i.e. a nationwide listing of all those facilities which violate the criteria. The first such listing appeared in 1981 and included the names of thirty-six substandard disposal facilities in Arizona. It is anticipated that this listing will be updated and published

on an annual basis. Whenever a non-compliant facility is closed or upgraded to standard, its name will be removed from the list.

On the basis of continued federal financial support, the Department of Health Services (ADHS) will be conducting inspections of all solid waste disposal facilities in the State to determine their status of compliance or non-compliance with the federal criteria. This project is expected to require five years for completion, and will identify all those problem facilities now operating in the State. Periodically, ADHS will submit forms to EPA which identify non-compliant facilities for inclusion in the nationwide list. ADHS will also be responsible for taking appropriate enforcement actions necessary to close or upgrade all those facilities classified as open dumps.

The Open Dump Inventory is intended to perform two major functions. First, it serves to inform Congress and the public of the extent of the problem presented by disposal facilities which do not adequately protect public health and the environment. Secondly, it provides the State with an agenda for action by identifying a set of problem sites which need to be addressed through continued planning and other corrective activities.

2. Annual Work Program

At present, the annual RCRA work program is developed by ADHS through the State/EPA Agreement mechanism. It is submitted to EPA each year along with the State's basic grant application, and identifies those program activities planned for the coming year. Importantly, it provides EPA with a basis for determining whether the State Plan continues to be eligible for approval, and

whether or not and to what extent it is being implemented by the State. Accordingly, it serves as a planning tool for the State and provides EPA with a means of evaluating the progress of State program activities pursuant to RCRA. Each year, a State's priorities and activities should be reexamined to ensure that the program is directed toward achieving the desired health, environmental and resource conservation goals. When adopted, this State Plan will provide an additional basis for preparing the annual work program over the next five years.

The annual work program represents a joint agreement between EPA and the State. It presents a mutually satisfactory statement of reasonable progress in meeting the requirements of RCRA, and represents a State's obligation incurred by acceptance of federal financial assistance. It is required that this work plan be prepared in consultation with local elected officials and with public participation.

3. Financial Assistance

Federal financial assistance under Subtitle D is authorized by Sections 4008 and 4009 of RCRA. Section 4008 (a)(1) authorized grant assistance for the development and implementation of State Solid Waste Management Plans. Funds have been appropriated for this purpose on an annual basis since FY 77, but are projected to be phased-out completely by FY 85. For the current year (FY81), Arizona has been awarded a basic grant of \$167,000 for this purpose (including its conduct of the Open Dump Inventory). Grant funds are allotted to the States according to a population and level of effort formula. Such funds are to be distributed by States to State and substate agencies based

upon the responsibilities of the respective parties for development and implementation of the State Plan.

During FY 79, \$25,000 was subvented on a one-shot basis to the Councils of Governments for the conduct and preparation of areawide solid waste needs assessments in support of the State Plan (several COG's also relied heavily upon Section 208 monies under the Clean Water Act to supplement these efforts). Although this subvention of funds from ADHS was small in dollar terms, it was significant in the sense that few other State programs were able to financially aid substate planning efforts. In addition, this was accomplished despite the fact that Arizona was confronted by increasing resource demands and a progressively diminishing Subtitle D appropriation under Section 4008 (a)(1).

Other assistance authorized under Subtitle D included state and local implementation grants (Section 4008 (a)(2)), special community grants (Section 4008 (e)) and rural community grants (Section 4009). Unfortunately, funding for these assistance programs has never been appropriated, and consequently, they have never been of benefit to either State or local governments.

Limited funds are now available under the Urban Resource Recovery Assistance Program established by the President's Urban Policy of 1978. These monies however, are targeted to urban areas, and their award is highly competitive. In addition, the Used Oil Recycling Act of 1980 (signed into law on 10/15/80) amended Section 4008 to add a subsection authorizing discretionary State grants for programs related to recycled oil.

In sum, RCRA failed to provide funding for the acquisition of land or for the operation or maintenance of facilities. Funding for the construction of facilities is severely limited, and essentially restricted to resource recovery projects. Consequently, the costs of regulatory compliance with RCRA land disposal standards will be borne directly by State and substate governments, and by solid waste generators and facility users.

For this reason, it is imperative that all levels of government commence efforts to identify alternative sources of funding for solid waste management activities, operations and facilities. Existing sources of revenues are already strained, and will likely become more so as the Subtitle D system matures and develops in Arizona. Cognizant of this clear and present local revenue shortfall, EPA is now strongly encouraging State and local governments to develop self-supporting programs through such methods as user charges. Obviously, EPA has an interest in protecting and preserving the massive investment (sunken cost) which has been made in Subtitle D to date.

C. Statewide Problem Perspective

Problems relating to solid waste management in the State of Arizona are large and growing. In the context of increased environmental regulation and governmental oversight, these problems are also becoming increasingly costly and complex. The resolution of these problems will be gradual and resource intensive. It will require an increased level of commitment to environmental protection, and a cooperative effort between those who regulate and are regulated. Perhaps most importantly, it will require a public recognition of the value of solid waste as a productive and recoverable resource.

In developing the State Solid Waste Management Plan, the areawide needs assessments prepared by the Councils of Governments were used as the basis for identifying statewide problems and needs. These problems and needs were then aggregated, summarized and prioritized for inclusion in the State Plan. A detailed discussion of these findings is presented in Chapter III of the text. An overview of the existing situation is presented below by major problem categories.

Water Quality

Improper waste disposal practices can directly contribute to the degradation of surface and ground water resources in a variety of ways. Disposal sites situated in floodplains can be washed out or inundated during periods of peak flow. This can result in surface water contamination via direct contact with refuse, and the pollution of ground water via leachate generation and percolation. Improper surface drainage at landfill sites can have similar effects. Many disposal facilities throughout the State have failed to employ protective measures (dikes, berms, liners etc.) necessary to mitigate

these potential hazards. Consequently, there are numerous case examples where water quality has been adversely impacted by waste disposal operations. Where this has happened, the problem can be extremely difficult and sometimes impossible to correct. In addition, disposal facilities situated in flood prone areas or areas of high ground water should properly be equipped with monitoring wells to provide early warning of potential pollution, but few such facilities presently evidence any such capability. This lack of reliable data on water quality at disposal sites renders it difficult to gauge the magnitude and extent of these pollution problems. Accordingly, there is a statewide need for increased data collection, improved landfill siting and the installation of devices at existing, closed and abandoned facilities designed to protect the integrity of water resources. This need is critical, and is of a very high priority.

Adequate Disposal Capacity

Continuing population growth, the diminishing availability of undeveloped land and the advent of new federal environmental controls have combined to exert tremendous pressure on the capacity of existing solid waste disposal facilities and systems. Population growth has increased waste volume, increased landfill requirements and shortened landfill life. Urban development has reduced the amount of land available and suitable for waste disposal purposes, and has dramatically increased its cost. New environmental controls have resulted in the generation of new types of waste (i.e. sludges) which have necessitated special waste handling and disposal provisions and increased facility development and operating costs. In certain localities, system demands have already exceeded system capabilities. In numerous other jurisdictions, these system capabilities are now being severely strained.

A host of special wastes are now particularly troublesome. This group includes hazardous wastes (those wastes which are toxic, ignitable, reactive, or corrosive), wastewater treatment plant sludges, air pollution control residuals and septic tank pumpings. Suitable disposal facilities for these increasing waste loads are critically lacking statewide. Many landfills now receiving these wastes may ultimately be closed through enforcement actions taken pursuant to the Open Dump Inventory. The acquisition of new facilities will be inhibited by an increasingly vocal public opposition to landfill siting. There is an urgent need for improved systems and facility planning in this regard. Increased resource recovery and improved regional cooperation offer two other promising means of alleviating this pressing situation.

Systems & Facility Planning

Many solid waste disposal facilities and systems throughout Arizona are plagued by problems of undercapitalization and neglect. Traditionally, elected officials have relegated solid waste management to a low priority during budgetary deliberations. This has resulted in a lack of proper facility siting and design, a lack of operational planning, a lack of cost-effective systems management, a lack of adequate disposal capacity and an often unacceptable level of environmental degradation. In addition, many completed disposal sites have been abandoned with little thought given to post-closure maintenance, liability or reclamation. A tremendous savings could be realized in both economic and environmental terms by means of improved systems and facility planning. It is far less costly to anticipate and prevent management problems than it is to correct them once they have been allowed to occur.

Systems and Facility Operation

These problems relate primarily to substandard facilities and practices. As of January 1981, nearly fifty out of some seventy municipal landfills inspected by ADHS had been classified as "open dumps" under the EPA land disposal criteria. It is projected that most municipal landfills in Arizona will be so designated. Common operational deficiencies include open burning, inadequate cover and compaction, litter, fly-breeding, uncontrolled access and salvaging, lack of supervision and security, the lack of trained operators, the lack of weigh-stations, proper cost-accounting and recordkeeping, and the disposition of unauthorized loads. Improved operational planning and site maintenance, the acquisition of necessary equipment and manpower and the training of site personnel would greatly alleviate these problems.

Explosive Gases

The natural decomposition of organic refuse in a landfill will result in the generation of methane, an explosive and dangerous gas. If allowed to accumulate in on-site or off-site structures this volatile gas can present serious safety hazards. Few disposal sites presently monitor methane concentrations, and even fewer have collection or venting systems. The new federal regulations require that methane gas concentrations be controlled so as to protect both persons and property. Compliance with this rule will be costly in many cases.

Financing

The need for increased levels of funding for solid waste management is urgent across the board. Public and private collection and disposal authorities are confronted by rapidly escalating costs in terms of land, labor, fuel, equipment and regulatory compliance. For their part, federal, state and local regulatory

and planning agencies are not given sufficient funds to perform their mandated functions. In many cases, management authorities are fragmented and costs are inequitably distributed. The taxpayers revolt has further constrained an already limited revenue base, and authorities are hesitant to levy user charges for fear of aggravating illegal dumping. Federal and State financial assistance for land acquisition and facility construction, operation and maintenance is virtually non-existent. This lack of financial assistance also inhibits the development of innovative management alternatives such as regional cooperation and resource recovery. The prospect of increased funding remains bleak because solid waste management in general remains a low priority. A great deal of public education will be required in order for adequate resources to be secured.

Special Wastes Management

Certain kinds of waste materials pose unique management, environmental and health related problems. These kinds of wastes include hazardous wastes, water and wastewater treatment plant sludges, infectious hospital wastes, air pollution control residuals and septic tank pumpings. For a variety of reasons, these wastes are generally not well suited for sanitary landfilling in the customary sense. In many instances, special handling and disposal provisions are highly desirable. A separate disposal capacity is often necessary for their safe disposition.

As of December, 1980, ADHS was in receipt of some 55 permit applications for hazardous waste storage, treatment and disposal facilities. Many of these facilities are now operating under temporary approval status pending review and ultimate permit issuance. In the meantime, exempted hazardous waste loads from small generators (less than 1,000

kg/month) continue to enter municipal landfills throughout the State. All too often these loads are not properly policed at the gate, and operating authorities are unaware of their contents. Many non-exempt loads generated within Arizona must now be safely hauled for disposal at out-of-state facilities. This entails enormous expense for these generators.

Similarly, disposal capacity for sludge and septage is also in critically short supply. Codisposal with refuse is difficult to accomplish due to the semi-solid constituency of these wastes, and disposal by sewer may result in wastewater treatment plant overload and failure. Many landfills and sewage treatment plants refuse to accept such wastes, forcing haulers to transport these loads long distances at great expense.

This lack of disposal capacity for special wastes contributes to the statewide problem of illegal dumping. It is a high priority problem which urgently needs to be addressed in the near-term.

Enforcement

Illegal dumping of solid waste is a serious statewide problem. Based upon estimates provided by local health departments, the number of promiscuous dumpsites in Arizona may range as high as 3,000 or more. Most often, these sites contain materials such as construction debris, refuse and bulky wastes. Increasingly however, they are being found to contain sludges, septage and hazardous wastes. Such practices create aesthetic blight, and may result in significant hazards to public health. Public apathy and disposal economics are often cited as the reasons for these wanton practices.

State and local laws now prohibit illegal dumping, but enforcement is largely inadequate. Law enforcement and regulatory agencies lack sufficient resources to provide the extent of coverage and surveillance necessary. Consequently, this age-old problem persists, and its severity grows.

A related problem is the lack of collection service in many unincorporated and rural areas of the State. Resources are desperately needed to improve public education and awareness in this regard.

Education/Information

Many of Arizona's solid waste management problems are directly attributable to a lack of public education and information. Disposal facility operators often suffer from a lack of formalized training and are often unaware of regulatory requirements. This results in substandard management practices and substandard disposal facilities. It can also result in a lack of cost-effective management and in unnecessary environmental degradation.

Public opposition to landfill siting is another information based problem. An enhanced public awareness of modern disposal technology and the pressing need for new facilities might help to expedite the siting process and allay citizen fears.

Last but not least, an enhanced public awareness and appreciation of the environment would go a long way towards solving the problems of littering and illegal dumping. Ultimately, these problems can only be resolved through voluntary citizen cooperation.

D. Arizona's Solid Waste Management Program

In Arizona, the responsibility for regulating solid waste disposal facilities and practices is vested in the Department of Health Services (ADHS). The RCRA programs are administered by the Bureau of Waste Control, an organizational unit within the Division of Environmental Health Services. This Bureau was recently established (1980) for the purpose of implementing the state's solid and hazardous waste programs. Prior to 1980, these program activities had been subsumed under the broader mandate of the Bureau of Sanitation.

The legal authority for ADHS to regulate solid and hazardous waste is contained in A.R.S. § 36-136. Pursuant to this authority, the Department has adopted separate regulations which govern the management of solid and hazardous waste (A.C.R.R. Title 9, Chapter 8, Articles 4 and 18 respectively). Under these regulatory powers, the Department enforces prescribed standards relative to the storage, collection, transportation, treatment, handling, disposal and reclamation of solid and hazardous wastes.

As it is presently structured, the Department's solid waste management program consists of three functional components; (1) planning, (2) regulation, and (3) enforcement. Each of these program components are described in turn below.

Planning

The planning aspects of the solid waste management program are oriented toward both the prevention and correction of adverse health and environmental impacts. They are also directed toward the promotion of environmentally sound and cost-effective management systems and practices. Related functions and activities include;

- development, implementation and maintenance of the State Solid Waste Management Plan.
- negotiation of the State/EPA Agreement.
- negotiation of the annual Cooperative Agreement (RCRA Grant) and Annual Work Program.
- interagency and program coordination.
- program planning and development (including necessary regulations and legislation).
- promotion of resource conservation and recovery goals, activities and programs.
- technical assistance in disposal facility siting, design and operation.
- statewide administration of the federal (EPA) Technical Assistance Panels (TAP) Program.
- statewide administration of the federal (EPA) Waste Alert Program.
- public participation (i.e. meetings, hearings, training seminars, etc.).
- substate and local solid waste planning assistance.

Regulation

The regulatory component of the solid waste management program is preventative in orientation. Its primary objective is to ensure that solid waste disposal facilities are properly sited, designed and operated so as to ensure that such facilities will not pose a hazard to human health or the environment. Functions

and activities in this respect include;

- facility inspections, and evaluations of regulatory compliance.
- monitoring for leachate migration and methane gas at select facilities.
- facility classifications on the basis of the federal ODI criteria.
- plan review and approval of all disposal facilities, subdivisions and trailer parks (the functional equivalent of permit issuance).
- licensure of septic tank pumpers/haulers.

Enforcement

The enforcement component of the solid waste management program is the State's corrective mechanism. It deals with violations of both State and Federal statutes and regulations. Its primary purpose is to close or upgrade substandard facilities and abate existing health threats and pollution problems. Functions and activities in this regard include;

- notifications to facility owners/operators of specific regulatory violations.
- the issuance of administrative Cease and Desist Orders.
- filing in Superior Court for injunctive relief in cases where consent agreements are not reached.
- filing suit against facility owners/operators in cases of criminal conduct or negligence.
- negotiating compliance schedules with owners/operators of facilities classified as open dumps under the federal criteria.
- as appropriate, providing technical, legal and investigative assistance to local enforcement agencies in conducting prosecutions and in abating health threats and pollution problems.

E. Five Year Solid Waste Program Overview

In viewing the Arizona solid waste program from a five-year perspective, one salient paradox emerges. Program needs will continue to increase as program resources decline. The prospect of federal support for solid waste management remains unchanged, with a scheduled phase-out by 1985 (possibly as early as FY 82). The prospect of State funding meeting this resulting shortfall appears better than before, but still far from adequate. At the same time that these resource reductions are being implemented, the solid waste program will be attempting to undertake new activities and develop in new directions. Consequently, funding remains the key issue which will determine the shape and substance of Arizona's five-year program for solid waste management.

As presently conceived, the State's five-year strategy revolves around eight basic goals. These include;

- A. implementation and maintenance of an adopted State Solid Waste Management Plan.
- B. the inventory and classification of solid waste disposal facilities (ODI).
- C. the closing or upgrading of existing open dumps.
- D. the prohibition of new open dumps.
- E. the development of a secure hazardous waste disposal site.
- F. the provision of adequate resources to maintain the planning, enforcement and regulatory aspects of the solid waste program.
- G. the provision of adequate solid waste disposal capacity throughout the State.
- H. implementation of the State strategy for resource conservation and recovery.

The proposed means to achieve these goals will be discussed in terms of their relevance to existing program elements. Existing program activities provide

the requisite framework for attaining these goals, but will require refinement and expansion as various milestones are achieved. In the discussion that follows, each program activity will be broadly described in terms of its five-year orientation. Each activity will also be discussed in terms of its anticipated contribution to the achievement of the program goals defined above.

I. Open Dump Inventory

Based upon projected resource levels, it is expected that the inventory and classification process will be completed by the end of FY 84. Beginning in FY 85, all solid waste disposal facilities are anticipated to be either in full compliance with the federal criteria, or operating under a State-established compliance schedule. This is the process by which the State will achieve program goals B and C.

These activities have been time-phased by facility and waste-type categories, and will tentatively occur on the basis of the following schedule;

<u>Category</u>	<u>Projected Completion</u>
1. Landfills:	
a. Municipal	FY 81
b. On-Site Industrial	81
2. Surface Impoundments:	
a. Industrial	82
b. Wastewater Treatment Sludge	82
c. Agricultural	83
d. Mining	84
3. Landspreading Facilities:	
a. Wastewater Treatment Sludge	82
b. Agricultural	83
4. Special Practices:	
a. Water Supply Treatment Plants	84
b. Air Pollution Control Facilities	84

II. Prohibiting New Open Dumps

Program goal D will be achieved primarily by maintaining the Department's vigilance with respect to facility plan review. With the implementation of upgraded submittal requirements, and their expansion to include surface impoundments and landspreading facilities in FY 81, the effectiveness of this program activity should be improved. In addition, the monitoring and inspection of facilities will be continued to ensure full compliance with both State and Federal standards.

III. Technical Assistance

The Department's on-going provision of technical assistance will be instrumental in the realization of each program goal. Its major emphasis however, will focus upon State Plan implementation, facility planning and development, the prohibition and upgrading of open dumps and resource recovery implementation. The level of this activity is expected to increase over time, particularly in relation to the conduct of the Open Dump Inventory.

IV. Public Education

This continuing activity is critical to the development of an informed public, and a solid waste management constituency. It will also support the implementation of program goals. A large resource expenditure will be required relative to; (a) effectively prohibiting new open dumps, (b) developing a hazardous waste disposal facility, (c) promoting resource recovery, and (d) maintaining a departmental newsletter for the periodic transmittal of program information.

V. Program Coordination

In conducting the Open Dump Inventory and in implementing the State Plan, it will be necessary to coordinate and cooperate with a host of external agencies. This coordination will expedite and support both task accomplishment and goal attainment, as well as minimize the potential for duplication of effort. From a planning and management perspective, it will be necessary for this coordination to occur with Federal, State, substate and local agencies.

VI. Resource Recovery

Implementation of the State strategy for resource recovery as presented in the State Plan will require a steadily increasing resource allocation throughout the five-year planning period. Proposed activities scheduled to begin in FY 82 include; (a) the funding of related staff positions, (b) the initiation and coordination of a State agency wide secondary materials "utilization audit", (c) joint purchasing of recycled products by State and local procurement agencies, (d) the development of technical information repositories, and (e) the periodic publication of resource recovery articles in the solid waste newsletter. These activities are geared toward the development and operationalization of a greatly expanded State role by FY 85, and the attainment of program goal H.

VII. Regulatory Powers

As experience is acquired in classifying the various types of disposal facilities through the Open Dump Inventory, desirable modifications to existing State regulations may from time to time be identified. Any revisions necessary to expedite the enforcement of compliance schedules will be developed as the need arises. This contingency activity will be oriented primarily to program goals C and D.

VIII. Self-Supporting Program

Throughout the five-year planning period, the Department will continue to seek every opportunity for developing a self-supporting program. It is anticipated that the attainment of program goal F will occur incrementally, and be ultimately achieved through the State budgetary process. A continuing effort will be necessary to secure the full conversion of existing Subtitle D funded staff to State appropriations.

IX. State Plan

The State Solid Waste Management Plan will define the framework for solid waste management in Arizona, establish policies, procedures and goals, designate agency responsibilities and identify both planning and management activities to be undertaken within this five-year period. Management studies of certain waste types have been time-phased, and will be conducted in sequence throughout this period. Detailed surveys of disposal practices for air pollution control residuals and mining wastes are planned for FY 82. Industrial waste management practices will be investigated in FY 83, and water treatment plant sludges studied in FY 84. Special waste practices will then be explored in FY 85. When completed, the findings and recommendations from these studies will be incorporated into the State Plan, and provide a comprehensive overview of solid waste management in Arizona. It is also anticipated that the State Plan will be formally updated in FY 83, and readopted in early FY 84.

X. Public Participation

Active and meaningful public participation will be necessary for the achievement of all program goals. Target publics will be expanded over time, and kept informed

of program developments and events through the Department's periodic newsletter. Formal public hearings will be scheduled in FY 84 for the purpose of adopting the updated State Plan, and citizen involvement will be solicited at key decision points during the course of State Plan implementation.

XI. Development of a Hazardous Waste Facility

With the final selection and approval of a hazardous waste disposal site in FY 81, efforts have subsequently turned to developing and preparing the requisite contractor RFP. Following the award of contract, the State will maintain an active role in monitoring both site development and operation. Efforts will also focus on the development of additional disposal capacity.

XII. Administration

The administration of the solid waste program will be required to demonstrate dynamism and flexibility in adapting to changing circumstances and program requirements. As program mandates broaden and resources decline, difficult decisions will need to be made. Throughout this five-year period, new sources of funding will be aggressively pursued, and new methods of managing programs and resources will be explored. The management reorganization into the current Bureau of Waste Control should provide an adequate foundation upon which to build, and the adopted State Solid Waste Management Plan will provide an enhanced sense of program policy and direction. With these tools, it is anticipated that the Department will be better prepared to meet these challenges than ever before.

F. Action Plan for Time-Phased Activities

Pursuant to the program goals discussed in the preceding section, a five-year planning and implementation timetable has been developed to identify program priorities and guide future resource allocations. In essence, this schedule is intended to define a sequence of actions necessary to achieve these program goals. Its content reflects both the continuing planning process and those activities necessary for State Plan implementation. It represents a summary compilation of all those recommendations scattered throughout the text of the Arizona Solid Waste Management Plan and provides definite milestones upon which the State's progress can be monitored and evaluated.

Two separate schedules are presented. The first is a breakdown of activities on the basis of federal fiscal years. These activities are scheduled for conduct and completion within the particular fiscal year indicated. The second schedule contains all those activities which are on-going and cannot be neatly divided on a calendar basis. These activities are continuous throughout the five-year planning period.

Each activity is assigned a priority designation of 1, 2 or 3, with 1 being the highest. These priority designations reflect the degree to which each program recommendation is expected to address and/or alleviate priority state-wide needs (see page II-17). Each activity is also identified as being either new (N) or a modification of an existing activity (M). Finally, it is identified as being either on-going (O) or limited (L) in duration. Implicit to this action plan, is the assumption that sufficient resources (both State and Federal) will be available to accomplish these tasks within the schedule provided.

Table II-I

PLANNING AND IMPLEMENTATION TIMETABLE

Federal Fiscal Year 1980

Management Activity	Priority Designation	New or Modified Activity	Limited or On-going	Plan Reference
- Conduct COG workshops for Open Dump Inventory (ODI) training and orientation	1	N	L	VII-B-36
- Sponsor initial landfill operator training seminar	1	N	L	VII-B-36
- Sponsor initial resource recovery training seminar	3	N	L	VIII-F-16

PLANNING AND IMPLEMENTATION TIMETABLE

Federal Fiscal Year 1981

Management Activity	Priority Designation	New or Modified Activity	Limited or On-going	Plan Reference
- Complete ODI classifications of municipal waste landfills	1	-	O	VII-B-36
- Promulgate/disseminate new landfill location guidelines	3	M	L	VII-B-36
- Update/revise submittal requirements for disposal facility plan review	2	N	L	VII-B-37
- Encourage disposal facility plan preparation by registered professional engineers	3	N	O	VII-B-37
- Develop Sludge management strategy and plan in cooperation with BWQC	2	N	L	VII-C-11
- Conduct survey of wastewater treatment plant sludge disposal practices	2	N	L	VII-C-11
- Conduct survey of septage disposal practices and inventory of disposal sites	2	N	L	VII-D-8
- Evaluate feasibility of establishing industrial waste information exchange program	1	N	L	VII-E-9 & VIII-F-15
- Secure State adoption and EPA approval of State Solid Waste Management Plan	1	N	L	I-9
- Establish resource recovery mailing lists	3	M	O	VIII-F-15

II-26

Federal Fiscal Year 1981 (con't)

Management Activity	Priority Designation	New or Modified Activity	Limited or On-going	Plan Reference
- Appoint task force to investigate hospital waste management practices and needs	1	N	L	VII-J-8
- Revise and update "State Public Participation Plan for Activities under the Resource Conservation and Recovery Act"	1	M	L	IV-8

PLANNING AND IMPLEMENTATION TIMETABLE

Federal Fiscal Year 1982

Management Activity	Priority Designation	New or Modified Activity	Limited or On-going	Plan Reference
- Request Governor's decree proclaiming resource recovery as a preferred alternative in solid waste management	1	N	L	VIII-F-13
- Establish and maintain resource recovery information repositories at COG's	3	N	O	VIII-F-15
- Secure designation of OEPAD resource recovery staff liaison	3	N	O	VIII-F-16
- Revise ADHS Engineering Bulletins # 10 & 11 to reflect new sludge requirements and hazardous waste regulations	3	N	L	VII-C-11
- Phase-out ADHS program for the licensure of septic tank pumper haulers	2	M	L	VII-D-8 & VIII-D-32
- Revise ADHS Engineering Bulletin # 11 to provide for septage injection to wastewater collection and treatment systems	3	N	L	VII-D-8
- Collect and analyze data on mining waste disposal practices and facilities	1	N	L	VII-F-10
- Survey thermal processing and air pollution control residue disposal practices and facilities	2	N	L	VII-G-10
- Initiate Memorandums of Agreement (MOA's) with State Agencies having regulatory jurisdiction over agricultural waste management	2	N	L	VII-H-9

II-28

Federal Fiscal Year 1982 (con't)

Management Activity	Priority Designation	New or Modified Activity	Limited or On-going	Plan Reference
- Modify ADHS training course for water treatment plant operators to address residuals management	3	N	L	VII-I-8
- Complete review of legal barriers to resource recovery implementation	1	N	L	VIII-F-13
- Complete review of State procurement barriers to the use of recycled materials by State Government	1	N	L	VIII-F-13
- Secure funding for two staff positions to coordinate State resource recovery strategy implementation/develop staff expertise.	1	N	O	VIII-F-14 & VIII-F-16
- Complete ODI classification of industrial waste disposal facilities	1	N	O	VIII-E-14
- Complete ODI classification of wastewater treatment sludge landspreading and surface impoundment disposal facilities	1	N	O	VIII-E-14
- Develop guidelines for evaluating rural transfer system feasibility	3	N	L	VII-B-27
- Amend R9-8-1231.B. to allow for "appropriate" septage pumper tank size	3	N	L	VII-D-8 & VIII-D-32
- Amend R9-8-432 to formally recognize surface impoundment and landspreading disposal methods in solid waste (Article 4) regulations	3	N	L	VIII-D-33

11-29

PLANNING AND IMPLEMENTATION TIMETABLE

Federal Fiscal Year 1983

Management Activity	Priority Designation	New or Modified Activity	Limited or On-going	Plan Reference
- Complete ODI classification of agricultural surface impoundments and commercial composting facilities	1	N	O	VII-H-9
- Update State Plan elements as necessary for Plan readoption	1	M	L	I-9
- Survey local municipal waste storage ordinances	3	N	L	VII-B-25
- Develop model municipal solid waste (MSW) storage ordinance for municipalities	3	N	L	VII-B-25

II-30

PLANNING AND IMPLEMENTATION TIMETABLE

Federal Fiscal Year 1984

Management Activity	Priority Designation	New or Modified Activity	Limited or On-going	Plan Reference
- Complete ODI classification of mining waste disposal facilities	1	N	O	VII-F-10
- Complete ODI classification of on-site water treatment sludge disposal facilities	1	N	O	VIII-E-14
- Complete ODI classification of thermal processing and air pollution control residue disposal facilities	1	N	O	VII-G-10
- Initiate State administrative procedures to readopt State Solid Waste Management Plan	1	N	L	I-9
- Complete secondary (recycled) materials utilization audit of State agencies, boards & commissions	2	N	L	VIII-F-14 & VIII-F-18
- Conduct survey of water treatment plant sludge disposal practices and facilities	3	N	L	VII-I-8

II-31

PLANNING AND IMPLEMENTATION TIMETABLE

Federal Fiscal Year 1985

Management Activity	Priority Designation	New or Modified Activity	Limited or On-going	Plan Reference
- Complete ODI project and shift to monitoring and enforcement mode	1	M	O	VIII-E-6
- Bring all municipal waste disposal sites into full compliance with State and Federal regulations	1	M	L	VII-B-36
- Ensure provision of monitoring wells at all municipal waste facilities in violation of RCRA ground water criterion which are situated in high water table areas	1	N	O	VII-B-37
- Investigate special waste management problems, practices and facilities	2	N	L	VII-2

II-32

PLANNING AND IMPLEMENTATION TIMETABLE

On-going Subtitle D Program Activities

Management Activity	Priority Designation	New or Modified Activity	Plan Reference
A. <u>Municipal Waste</u> (Chapter VII-B)			
- minimum once yearly inspections of all municipal waste disposal facilities	1	M	VII-B-36
- continuation of ADHS technical and planning assistance for facility planning and implementation	1	-	VII-B-37
- encourage regional planning for adequate disposal capacity and regional approaches to solid waste management	1	-	VII-B-37 & VII-B-23
- administration and coordination of EPA's TAP program	1	-	VII-B-37
- strengthened emphasis on post-closure landfill reclamation through plan review	2	M	VII-B-14
- encouragement of local user fee financing	3	M	VII-B-14
- encourage additional collection/transfer station development in rural areas	3	M	VII-B-19, 22 & 27
- encourage augmented waste processing where economically feasible	3	M	VII-B-22
- improve public awareness regarding collection/transfer alternatives	3	M	VII-B-27
- develop BWC expertise in processing technology	3	M	VII-B-29
- emphasize processing technology transfer through technical & planning assistance	3	M	VII-B-29
- inform public of technology advances through periodic newsletter	3	M	VII-B-29

II-33

PLANNING AND IMPLEMENTATION TIMETABLE

On-going Subtitle D Program Activities

II-34

Management Activity	Priority Designation	New or Modified Activity	Plan Reference
<p>B. <u>Wastewater Treatment Sludge</u> (Chapter VII-C)</p> <ul style="list-style-type: none"> - continued ADHS training for water and wastewater treatment plant operators in residuals management - secure submittal of sludge disposal plans from all water and wastewater treatment facilities - encourage development and utilization of treatment methods which will enable recovery and reuse of valuable sludge components - expand monitoring and enforcement capabilities to provide comprehensive coverage of sludge generation and disposal facilities 	<p>3</p> <p>2</p> <p>3</p> <p>2</p>	<p>M</p> <p>M</p> <p>N</p> <p>M</p>	<p>VII-C-11</p> <p>VII-C-11</p> <p>VII-C-11</p> <p>VII-C-11</p>
<p>C. <u>Septic Tank Pumpings</u> (Chapter VII-D)</p> <ul style="list-style-type: none"> - where appropriate, all future wastewater treatment facilities should be required to provide a septic disposal capability as a condition of ADHS design plan approval 	<p>2</p>	<p>N</p>	<p>VII-D-8</p>
<p>D. <u>Non-Hazardous Industrial Waste</u> (Chapter VII-E)</p> <ul style="list-style-type: none"> - encourage local waste management authorities to analyze composition of local non-hazardous industrial waste streams to evaluate potential landfill disposal problems and develop separate disposal capacity as required. - secure plan submittal from non-hazardous industrial waste disposal facilities 	<p>1</p> <p>2</p>	<p>N</p> <p>M</p>	<p>VII-E-9</p> <p>VII-E-9</p>

PLANNING AND IMPLEMENTATION TIMETABLE

On-going Subtitle D Program Activities

Management Activity	Priority Designation	New or Modified Activity	Plan Reference
<p>E. <u>Mining Waste</u> (Chapter VII-F)</p> <ul style="list-style-type: none"> - coordinate with BWQC in developing and implementing BMP's for control of non-point sources of water pollution at mining disposal sites - participate in federal/state/local and/or regional study efforts geared toward identifying and preventing the potential for pollution posed by mining wastes - secure plan submittal from all mining waste disposal facilities - cooperate with other agencies in encouraging proper closure and reclamation of all completed mining waste disposal sites 	<p>2</p> <p>3</p> <p>2</p> <p>3</p>	<p>M</p> <p>M</p> <p>N</p> <p>N</p>	<p>VII-F-10</p> <p>VII-F-10</p> <p>VII-F-10</p> <p>VII-F-10</p>
<p>F. <u>Pollution Control Residuals</u> (Chapter VII-G)</p> <ul style="list-style-type: none"> - secure plan submittal from thermal processing and air pollution control residue disposal facilities - encourage development of markets, technologies & management practices designed to promote the recovery and reuse of thermal processing and air pollution control residual wastes 	<p>2</p> <p>3</p>	<p>N</p> <p>N</p>	<p>VII-G-10</p> <p>VII-G-10</p>
<p>G. <u>Agricultural Waste</u> (Chapter VII-H)</p> <ul style="list-style-type: none"> - encourage industry to continue research and development of management practices which employ resource conservation techniques 	<p>3</p>	<p>M</p>	<p>VII-H-9</p>

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PLANNING AND IMPLEMENTATION TIMETABLE

On-going Subtitle D Program Activities

Management Activity	Priority Designation	New or Modified Activity	Plan Reference
H. <u>Special Waste Management Problems</u> (Chapter VII-J) <ul style="list-style-type: none"> - investigate littering/wildcat dumping problems to identify alternative management/enforcement options and enter into formal agreements as appropriate with other enforcement agencies - develop a public information education program methodology for use by local governments in combatting litter/wildcat dumping - negotiate with local management agencies and industries in an effort to identify appropriate local options for the environmentally sound disposition of exempt (small generator) hazardous wastes 	<p style="text-align: center;">1</p> <p style="text-align: center;">3</p> <p style="text-align: center;">1</p>	<p style="text-align: center;">M</p> <p style="text-align: center;">N</p> <p style="text-align: center;">M</p>	<p style="text-align: center;">VII-J-8</p> <p style="text-align: center;">VII-J-8</p> <p style="text-align: center;">VII-J-8</p>
I. <u>Distribution of Federal Funds</u> (Chapter VIII-B) <ul style="list-style-type: none"> - subvent RCRA funds as available to statewide priority projects - monitor congressional RCRA appropriations, state funding levels and trends 	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p>	<p style="text-align: center;">M</p> <p style="text-align: center;">M</p>	<p style="text-align: center;">VIII-B-3</p> <p style="text-align: center;">VIII-B-4</p>
J. <u>Means to Coordinate Regional Planning</u> (Chapter VIII-C) <ul style="list-style-type: none"> - utilize WQMWG as coordination mechanism for projects statewide or interregional in scope - utilize COG environmental advisory committees as coordination mechanisms for projects intraregional or intermunicipal in scope - encourage improved coordination, communication & cooperation in State Plan implementation. 	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p>	<p style="text-align: center;">M</p> <p style="text-align: center;">M</p> <p style="text-align: center;">M</p>	<p style="text-align: center;">VIII-C-2</p> <p style="text-align: center;">VIII-C-2</p> <p style="text-align: center;">VIII-C-3</p>

PLANNING AND IMPLEMENTATION TIMETABLE

On-going Subtitle D Program Activities

Management Activity	Priority Designation	New or Modified Activity	Plan Reference
<p>K. <u>Regulatory and Enforcement Program</u> (Chapter VIII-D)</p> <ul style="list-style-type: none"> - implement regulatory revisions & amendments as necessary to meet enforcement needs - seek additional resources to strengthen & further specialize legal & enforcement capabilities - seek additional resources to expand monitoring and inspection capabilities - implement mandatory plan submittal for all facilities utilized for the disposal of solid wastes - seek legislative change authorizing the Director of ADHS to assess civil penalties for certain classes of violations 	<p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>1</p>	<p>M</p> <p>M</p> <p>M</p> <p>N</p> <p>M</p>	<p>VIII-D-32</p> <p>VIII-D-32</p> <p>VIII-D-32</p> <p>VIII-D-32</p> <p>VIII-D-32</p>
<p>L. <u>Resource Conservation and Recovery</u> (Chapter VIII-F)</p> <ul style="list-style-type: none"> - maintain and update AZ Dept. of Administration listing of available recycled procurement items - coordinate with DOA in monitoring State Agency procurement practices to ensure compliance with RCRA Section 6002 - encourage local governments to jointly procure recycled materials with DOA - endorse federal TAP program utilization for resource recovery projects 	<p>3</p> <p>3</p> <p>3</p> <p>3</p>	<p>N</p> <p>N</p> <p>N</p> <p>M</p>	<p>VIII-F-12</p> <p>VIII-F-13</p> <p>VIII-F-13</p> <p>VIII-F-16 & VIII-F-18</p>

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G. Statements of Policy

The following statements of policy are presented to guide State implementation activities conducted pursuant to the Solid Waste Management Plan.

1. It is the policy of the State to promote the protection of public health and the environment.
2. It is the policy of the State to promote the conservation, recovery and reuse of valuable material and energy resources from solid waste.
3. The State is committed to the timely implementation of the Arizona Solid Waste Management Plan and should provide sufficient resources for this purpose.
4. The Arizona Department of Health Services shall cooperate with federal, state, interstate, tribal, substate and local agencies in striving to fulfill the mandates of the federal Resource Conservation and Recovery Act.
5. All solid waste shall be disposed of in sanitary landfills, utilized for resource recovery or otherwise disposed of in an environmentally sound manner.
6. No solid waste disposal facility shall be allowed to open or continue to operate which is in violation of the federal RCRA 4004 criteria.
7. All open dumps within the State of Arizona shall be either closed or upgraded on the basis of a State-established compliance schedule.
8. Any facility classified as an open dump under the RCRA 4004 criteria which is operating under a State-established compliance schedule shall be exempted from the citizen suit provisions of RCRA Section 7002.
9. The State shall hold public hearings on proposed facility plans wherever justified on the basis of expressed public interest. This requirement however, may be met at the local level, as determined by the State, as a part of a local decision-making process.
10. The development of new solid waste disposal facilities within areas designated as 100-year floodplains is strongly discouraged. No new facility will be allowed within these areas unless it can be satisfactorily demonstrated to the Department (ADHS) that, (1) no other reasonable alternative site location exists, (2) the facility will be adequately protected from inundation and wash-out during a 100-year flood (1% chance event), (3) the facility will pose no significant threat of contamination to surface or ground water resources, and (4) responsibilities and liabilities are clearly defined for closure and post-closure site maintenance and monitoring.

11. Solid waste disposal facilities shall not degrade the quality of ground water resources.
12. The State shall require the installation of monitoring devices, including ground water monitoring wells, at solid waste disposal facilities where justifiable on health or environmental grounds.
13. The open burning of residential, commercial, institutional and industrial wastes is prohibited at all solid waste disposal facilities.
14. The Department of Health Services shall coordinate with the Arizona Game and Fish Department in enforcing the federal endangered species landfill criteria.
15. No local government within the State shall be prohibited under State or local law from entering into long-term contracts for the supply of solid waste to resource recovery facilities.
16. It is the policy of the State that all State procurement agencies shall purchase items containing the highest percentage of recovered material practicable, consistent with maintaining a satisfactory level of competition in the marketplace.
17. It is the policy of the State that all State agencies shall utilize recoverable and recyclable resources to the maximum extent practicable in the performance of their statutory duties.
18. The State shall cooperate with the Federal Government, interstate agencies, local governments and private enterprise in promoting the demonstration, construction and application of solid waste management, resource recovery, and resource conservation systems which preserve and enhance the quality of air, land and water resources.

References

1. Central Arizona Association of Governments. Comprehensive Solid Waste Management Plan. 1979.
2. MAG 208 Water Quality Management Program. Maricopa Association of Governments Regional Solid Waste Needs Assessment. 1980.
3. Mohave County Engineering Department, Yuma County Engineering Department & District IV Council of Governments. District IV's Solid Waste Management Assessment. 1979.
4. Northern Arizona Council of Governments. Solid Waste Management Plan. 1979.
5. Pima Association of Governments. State Planning Region II: Solid Waste Disposal Needs Survey, 1980 to 2,000. 1980.
6. SouthEastern Arizona Governments Organization. Assessment of Solid Waste Disposal System (Landfill) Problems and Improvement Alternatives in the SEAGO Region. 1980.
7. U.S.E.P.A. "Guidelines for Development and Implementation of State Solid Waste Management Plans". Federal Register. Vol. 44. No. 148. Tuesday, July 31, 1979.

PLANNING FRAMEWORK

CHAPTER THREE

PROBLEMS, NEEDS AND PRIORITIES

Chapter III

PROBLEMS, NEEDS AND PRIORITIES

A. Introduction

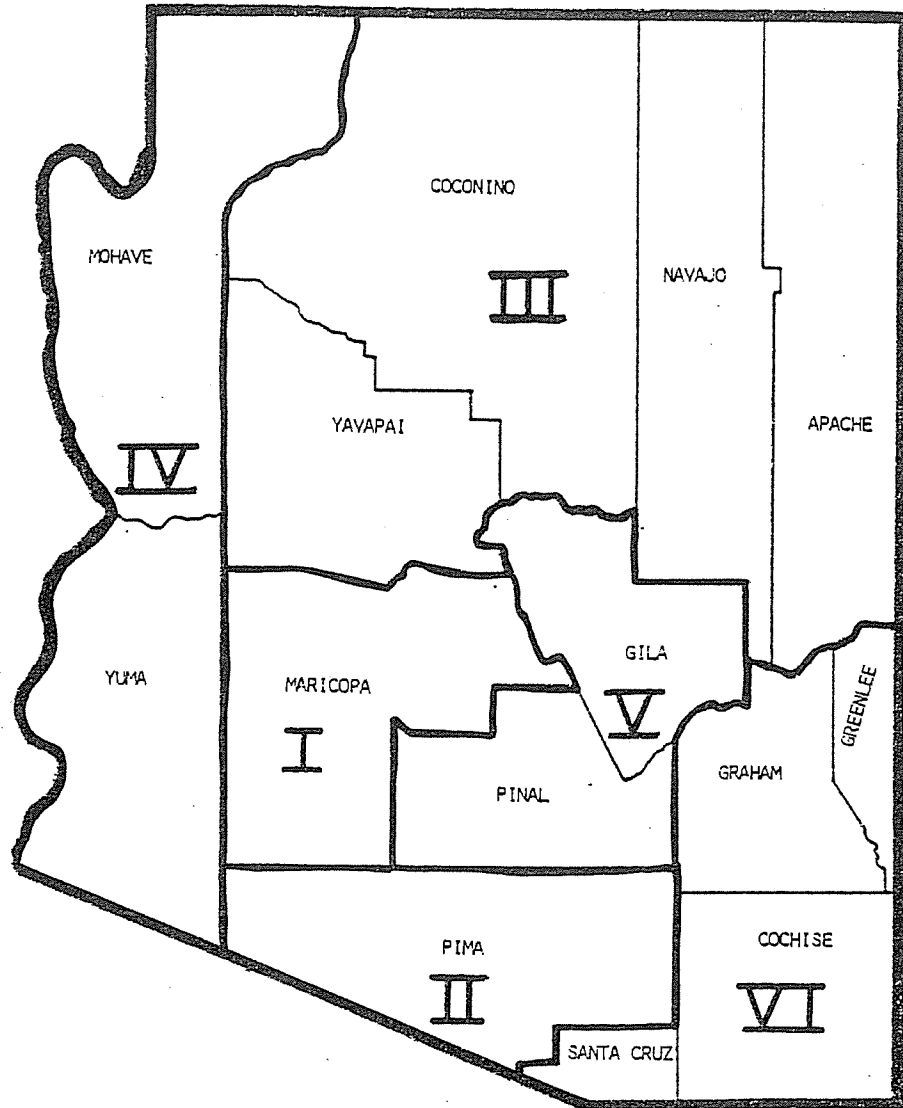
From a functional standpoint, problems and needs are opposite sides of the same coin. They are virtually interchangeable in a cause-effect relationship. Problems are symptomatic of needs, and needs are symptomatic of problems. In the context of solid waste management, either one is indicative of a resource deficiency.

In order for this State Plan to be an effective and useful program management tool, it must accurately document and assess the relative magnitude of the many problems and needs now confronting solid waste managers throughout the State. The identification of problems and needs is essential to the process of establishing statewide priorities, and the assessment of problems and needs is critical to the justification of those priorities which are selected. On this basis, problems and needs may be used to define future program directions, and priorities may be used to allocate limited resources and appropriately time-phase necessary program activities. Accordingly, the purpose of this chapter is to document statewide problems and needs which have been identified on an areawide basis, synthesize those given parameters, and thereby establish priorities which will provide direction to the State program in the future.

This chapter has been divided into three separate sections dealing with opportunities and constraints now confronting solid waste management in Arizona. The first section summarizes regional problems and needs as they have been identified by the six Councils of Governments. These regional profiles have been included to provide a substate perspective. The second section defines criteria for priority selection and assigns a magnitude of importance to each problem/need category from a statewide perspective. The final section of this chapter has been designed to overview program activities which have been or are now being undertaken to address these priority concerns.

Table III-I

REGIONAL PLANNING DISTRICTS IN ARIZONA



- I - Maricopa Association of Governments
- II - Pima Association of Governments
- III - Northern Arizona Council of Governments
- IV - District IV Council of Governments
- V - Central Arizona Association of Governments
- VI - SouthEastern Arizona Governments Organization

B. Regional Profiles

Planning District I

Planning District I is represented by the Maricopa Association of Governments (MAG). It is comprised of Maricopa County and is situated in the south-central portion of the State. This district contains approximately 55% of the State's total population. Because of its highly urbanized character, this region is the source of generation for most of the State's residential, commercial, institutional, industrial and hazardous waste.

The MAG "Regional Solid Waste Needs Assessment" was completed in August, 1980. The major problems identified by this study included:

1. Floodplain locations of Landfills (six of seventeen landfills in the region are so situated).
2. Insufficient Landfill Capacity (the Open Dump Inventory may result in the closure of critical landfill sites).
3. Financial Difficulties (due primarily to rising costs associated with fuel, equipment and regulatory compliance).
4. Landfill Operational Problems (i.e. open burning, fly breeding and inadequate cover and compaction due to a lack of trained operators).
5. Illegal Dumping (in excess of 800 known sites).
6. Potential Gas Hazard (methane generation, migration and accumulation in on-site or nearby structures).
7. Unregulated Access (inadequate site security results in the disposition of unauthorized and potentially dangerous loads).
8. Hazardous Waste Disposal (the absence of an approved disposal facility increases the likelihood of illegal dumping).

Identified needs corresponding to these problems included:

1. Ground water monitoring at existing floodplain sites in addition to other protective measures (i.e. berms, dikes, liners, etc.).
2. Studies of the economic feasibility of regional cooperation in the provision of disposal capacity.
3. The development of alternative or supplemental revenue sources (i.e. increased utilization of EPA's TAP program, user fees, etc.).
4. The development of site-specific operational plans and landfill operator training programs.
5. More frequent collection of bulky wastes with improved public education and enforcement of anti-littering/dumping laws.
6. The installation of gas monitoring probes and collection/venting systems at existing landfill sites where suspected gas hazards exist.
7. Upgraded security measures at operating sites (i.e. spotters, fencing, signs, etc.).
8. The enforcement of State hazardous waste regulations and the development of an approved disposal facility within the State.

Planning District II

Planning District II is represented by the Pima Association of Governments (PAG). It is comprised of Pima County and is situated in the southernmost central portion of the State. This district contains approximately 20% of the State's population and is also highly urbanized.

The PAG "Solid Waste Disposal Needs Survey, 1980 to 2000" was completed in March of 1980. The major problems identified by this areawide assessment included:

1. Population Growth (impacts on solid waste volume and disposal capacity).
2. Lack of Funding (local/State/Federal).
3. Landfill Siting (due to public opposition, conflicting land use demands and increasing haul distances).
4. Old Landfills (their inherent potential for hazards resulting from a lack of post-closure monitoring and maintenance).
5. Indiscriminate Dumping (both hazardous and non-hazardous waste).
6. Hazardous Waste Disposal (persistence of illegal practices and the lack of a local long-term disposal capacity).

The following primary needs were identified in accordance with these problems:

1. Studies of the economic feasibility of solid waste management system alternatives (i.e. resource recovery, regional cooperation, etc.).
2. The development of self-supporting services through the establishment of user-charges.
3. Improved public relations and accelerated land acquisition and banking.

4. An inventory and assessment of closed and abandoned landfill sites with an assignment of liability and the imposition of controls over future adjacent land uses.
5. Greater enforcement efforts, improved public awareness programs and a study of the relationship between levels of collection service and wildcat dumping.
6. The development of additional hazardous waste disposal capacity.

Planning District III

Planning District III is represented by the Northern Arizona Council of Governments (NACOG). It is comprised of Apache, Navajo, Coconino and Yavapai Counties, and covers most of the land area in the northern half of the State. This district contains approximately 10% of the State's population and is essentially rural in character. Geographically, collection and disposal service areas tend to be very large within this district.

NACOG completed its regional "Solid Waste Plan" in July, 1979. Identified problems that were general in nature and common to the region as a whole included the following:

1. A lack of trained Landfill Operating Personnel (unfamiliar with both proper sanitary landfilling procedures and regulatory requirements).
2. Wind-blown debris at Disposal Sites (causing unsightly conditions and providing harborage for disease vectors).
3. Open Burning at Disposal Sites (resulting in the degradation of air quality).
4. A lack of Facility Operating Plans (in violation of State regulations and resulting in a lack of continuity in landfill operations).
5. Cost Inequities (resulting from unfair cost allocations amongst landfill users).
6. A lack of appropriate State Landfill Site Selection Criteria (potentially resulting in the degradation of water resources).
7. A lack of State regulation restricting haul distance (resulting in distant landfill locations and promiscuous dumping).
8. A lack of State regulation controlling septage disposition (resulting in improper disposal practices).
9. A lack of septage disposal capacity (caused by a lack of suitable facilities and practices).

10. A lack of sludge disposal alternatives.
11. Landfill disposal of Hazardous Waste (necessitating special policing, handling and disposal provisions).
12. Economic barriers to Resource Recovery Implementation (lack of capital, distance to markets, etc.).

The following needs corresponded to these general problems:

1. The development of a training program sponsored by ADHS to upgrade operator skills in all aspects of landfill management.
2. The conduct of frequent clean-up programs at landfill sites utilizing community based resources.
3. The enforcement of necessary measures to prevent open burning practices.
4. The preparation and submittal to ADHS of site-specific operating plans for all solid waste disposal facilities.
5. The conduct of surveys/studies to identify landfill users, their respective waste contributions and equitable cost shares.
6. ADHS should update and revise its sanitary landfill site selection criteria.
7. ADHS should develop a regulation controlling the maximum distance between population centers and disposal facilities.
8. State regulations need to be made more specific regarding permissible methods of septage disposition.
9. The development of requisite pretreatment capabilities at wastewater facilities receiving septage, and stepped-up research regarding land application techniques.
10. Improved planning for acceptable sludge disposal provisions.
11. Implementation of special provisions at sanitary landfills for the proper handling and disposition of exempt (small generator) hazardous waste loads.
12. The development of community source separation programs for the systematic recovery of materials for solid waste.

Planning District IV

This planning district is represented by the District IV Council of Governments. It is comprised of Yuma and Mohave Counties and encompasses the entire western flank of the State. It contains approximately 5% of the State's population and is predominantly rural. Collection and disposal service areas also tend to be very large within this district.

The District IV Council of Governments completed its "Solid Waste Management Assessment" in August, 1979. Regional solid waste problems identified by this document included:

1. Fragmented Management Authority (resulting in a lack of cost-effective systems and programs).
2. A lack of Weigh Stations, record-keeping and cost-accounting at disposal facilities (complicating systematic planning efforts).
3. A lack of adequate Disposal Capacity (critical sites may be closed as a result of the Open Dump Inventory).
4. Littering/Wildcat Dumping (creating unsightly conditions and potential health hazards).
5. A lack of Federal/State financial assistance for management system improvements (a situation which aggravates local tax burdens).

Identified regional needs corresponding to these problems included:

1. State legislation which would clarify and delegate solid waste management authority and responsibilities.
2. Systematic planning for facility acquisition, development and operation.
3. The strict enforcement of laws against illegal dumping.
4. The establishment of a State revolving loan program to support and encourage local resource recovery initiatives.

Planning District V

Planning District V is represented by the Central Arizona Association of Governments (CAAG). This region is situated in the south-central portion of the State and includes both Gila and Pinal Counties. The area is predominantly rural and contains approximately 5% of the State's total population.

CAAG completed its "Comprehensive Solid Waste Management Plan" in October, 1979. An updated "solid waste needs assessment" was subsequently adopted in August of 1980. The needs assessment identified the following regional problems:

1. Landfill operating costs are high and increasing in rural areas.
2. Federal and State financial assistance is practically non-existent.
3. Small communities lack professional staff and financial resources for solid waste management.
4. Unincorporated areas lack collection services (resulting in wild-cat dumping).
5. Disposal facilities are not prepared to receive septage waste.
6. Available Federal and State technical assistance is inadequate.
7. Ground water depth in the region is generally unmapped, wells near disposal sites are not being monitored and water quality impacts are unknown.
8. Some disposal facilities are not properly operated and maintained.
9. Solid waste management planning is crisis oriented and short term.
10. Awareness of adverse environmental impacts resulting from improper waste disposal practices is low.
11. Resource recovery systems/programs are not designed or well adapted for small communities.

The CAAG assessment further recommended the following actions to address areawide needs:

1. Regional landfills should be developed where possible to minimize costs.
2. Management and operator training seminars should be regularly conducted.
3. The availability of technical assistance should be increased.
4. Public information programs should be instituted to discourage wildcat dumping.
5. Planning grants should be made available to COG's to enable on-going areawide solid waste management planning.
6. State and Federal grants should be made available to public facility managers for engineering studies and equipment purchases.
7. Septage disposal capacity should be developed at existing and future landfills.
8. A rural resource recovery demonstration program should be initiated in Arizona.

Planning District VI

Planning District VI is represented by the SouthEastern Arizona Governments Organization (SEAGO). It is comprised of Cochise, Graham, Greenlee and Santa Cruz Counties and is situated in the southeastern portion of the State. This region is predominantly rural and agricultural, and contains approximately 5% of the State's total population.

SEAGO completed its "Assessment of Solid Waste Disposal System (Landfill) Problems and Improvement Alternatives" in September, 1980. The major regional problems identified by the assessment included the following:

1. Small communities are not financially capable of supporting the personnel, equipment and site development necessary to comply with existing regulations.
2. Large service areas (available equipment and personnel must be rotated/shared between various landfill facilities).
3. Operational deficiencies at landfill sites (i.e. open burning, litter, uncontrolled salvaging and access, lack of cover and compaction).
4. A lack of site-specific operational plans.
5. Physical site deficiencies (i.e. floodplain location, residential proximity, poor soil conditions) and a lack of suitable land for new sites.
6. A lack of trained operating personnel.
7. Wildcat dumping/littering.
8. Inflating costs of land , labor and equipment.

The SEAGO assessment also identified the following areawide needs:

1. Improved facility planning and management.
2. Post-closure site planning.

3. Landfill operator training,
4. Research on the environmental effects of landfill operations on arid lands.
5. State sponsorship of a ground water monitoring program at disposal sites.
6. Research on the feasibility of small scale resource recovery technologies for rural areas.
7. State legislation which would eliminate "double taxation" for solid waste management (city taxpayers presently support both municipal and county solid waste systems).
8. EPA should eliminate regulatory requirements inappropriate to Arizona.
9. The achievement of international parity in solid waste regulatory standards (U.S. - Mexico border).
10. Federal and State financial assistance for system development and operation.

C. Priority Selection

Based upon a review of the preceding section, it is apparent that certain solid waste management problems and needs are common to each of the various regions of the State. From a practical standpoint, it is expedient to cluster these related problems and needs into distinct categories which can then be dealt with and addressed in more general or statewide terms. The COG areawide assessments have enabled the identification of nine such clusters or categories. Each of these nine problem/need categories was discussed in detail in Chapter II. This earlier discussion addressed statewide problems and needs under the following general headings:

- a. Water Quality
- b. Disposal Capacity
- c. Systems and Facility Planning
- d. Systems and Facility Operations
- e. Explosive Gases
- f. Financing
- g. Special Wastes Management
- h. Enforcement
- i. Education/Information

The purpose of this section is to establish statewide priorities from amongst these major need clusters. This process of selecting priorities is necessary in order to ensure that limited program resources are allocated amongst competing needs in a manner which will provide for the greatest program impact and resulting benefit. Resources for solid waste management activities are extremely limited at every level of government. This is no less true for the State regulatory program than it is for local governments struggling to comply with new federal and state requirements. This funding

situation will likely worsen long before it improves. Federal financial assistance to the State under RCRA Subtitle D has been progressively declining for several years. This trend is expected to continue until a total phase-out is achieved circa FY 85. This may occur as early as FY 82. Alternative sources of revenue will have to be found in order to compensate for this loss. Confronted by these deepening fiscal constraints, it has not been possible for the State program to subvent funds (to substate and local governments) from its basic RCRA grant since FY 79. For these same reasons, it is more critical now than ever before that the State establish priorities for solid waste management, and tailor its program scope accordingly.

On this basis, the following criteria have been applied to the nine general need clusters in order to screen those statewide needs which are of a highest priority magnitude.

SELECTION CRITERIA

1. the current level of management activity directed toward solving the problem.
2. the extent and scope of the solid waste management problem,
3. the potential for adverse health, environmental or economic impact associated with the problem,
4. the level of resources currently available to address the problem, and
5. the management approaches available to address the problem.

To a great extent, the priorities selected by this method are fixed in time. Because of this limitation, they are viewed as dynamic and may be modified through subsequent negotiations (i.e. Annual Work Program, State/EPA Agreement). They do however, represent a valid profile of major state needs as they presently exist.

The application of the above criteria segregated statewide need clusters into two groups. That group which satisfied the criteria to the fullest extent is identified below as "highest priority statewide needs". For purposes of this State Plan, this group comprises the State's program priorities for solid waste management.

HIGHEST PRIORITY STATEWIDE NEEDS

- Water Quality
- Disposal Capacity
- Systems and Facility Planning
- Financing
- Special Wastes Management

Those needs which satisfied the criteria to a lesser extent are listed below as "other statewide priorities". These needs are also priority needs on a statewide basis, but are of a lesser or reduced magnitude.

OTHER STATEWIDE PRIORITIES

- Systems and Facility Operation
- Explosive Gases
- Enforcement
- Education/Information

The extent to which each of the "highest priority statewide needs" fulfilled the criteria is documented in the brief analysis which follows. Each need cluster within this group is assigned an equal weight, and the selection of each is justified on the basis of the established criteria.

Water Quality

This cluster focuses upon the need for monitoring and data collection (sampling and analysis) at disposal sites as well as the implementation of enhanced preventative measures (dikes, berms, proper grading, liners, etc.). There is presently a statewide lack of water quality monitoring at disposal locations, despite the fact that many facilities are situated in floodplains. Management resources, despite support from the "208" program, have been grossly inadequate to address this prevalent need. Many facilities statewide are situated in areas of shallow ground water aquifers relied upon as sources of domestic water supply. The potential for ground water contamination in particular is very high. Increased state enforcement efforts against "open dump" facilities would improve this situation by requiring site operators to upgrade their facilities and to monitor for water quality impacts in high risk areas. The technical avenues for addressing these problems are therefore clearly defined, but implementation obstacles (i.e. resources, etc.) remain.

Disposal Capacity

This cluster relates to the need for improved system expansion and facility planning, and to the statewide shortage of approved solid waste disposal facilities. It has recently been exacerbated by the generation and designation of new types of solid waste (i.e. wastewater treatment sludges, hazardous wastes) which require special handling and disposal provisions. Historically, solid waste management has been crisis oriented. Substandard facilities and facilities which are allowed to exceed their design capacity can pose serious health hazards. Where alternative disposal options do not exist, the closure of a particular facility can also result in severe economic hardship. Management

authorities often lack the professional staff necessary to address these problems. Nevertheless, existing state law requires that cities, towns and counties provide public dumping grounds at convenient intervals. A restructuring of local budget priorities would appear to be the most expeditious short-term solution available for the development of additional disposal capacity.

Systems and Facility Planning

This need cluster revolves around the planning activities necessary to ensure environmentally sound and cost-effective solid waste management systems and facilities. Both collection and disposal operations have been hampered by the relegation of solid waste to a low budget priority. Because of a lack of financial resources, solid waste management has been corrective in nature and crisis oriented. In large measure, preventative systems maintenance and planning has not been possible. This fact is evidenced by the sheer numbers of substandard facilities now in existence throughout the State. To some extent, system inefficiencies are now being addressed through the provision of state and federal technical assistance. It is believed that greater efficiencies may yet be achieved however, through such alternatives as regional cooperation and resource recovery. Continuing technical assistance will be necessary to properly evaluate their feasibility on a case-by-case basis.

Financing

In these times of taxpayer revolt, it will become increasingly difficult for

solid waste management and regulatory authorities to secure adequate financial resources for their operations. This current predicament is further aggravated by a long history of undercapitalization in both equipment and facilities. Many landfills in the State were substandard prior to the imposition of the RCRA regulations. Under the new RCRA requirements, the costs of upgrading these facilities have now multiplied by an exponential factor. The lack of federal and state financial assistance has increased local tax burdens while operating as a disincentive for regulatory compliance. Furthermore, it is feared that a shift to user-charge financing may result in an increased level of wildcat dumping. Nevertheless, this particular approach appears most promising in light of current fiscal trends.

Special Waste Management

Until very recently, most wastes in this category (i.e. hazardous wastes, wastewater treatment sludges, septic tank pumpings) were either mismanaged or unmanaged. Generators were unaware of proper practices and procedures and regulatory requirements were often either vague or silent. This situation posed extreme hazards to both public health and the environment. Consequently, its correction will be time-consuming and resource intensive. RCRA has now established an effective regulatory system to ensure the proper management of these wastes, but until such time as disposal facilities are properly designed and constructed to handle these wastes, full compliance will be extremely difficult and costly to achieve. This need will not be adequately addressed until such time as a secure hazardous waste disposal facility is developed within the State.

D. Status of Priority Implementation

Earlier sections of this chapter identified regional and statewide needs, defined selection criteria, and established and justified State program priorities. The purpose of this final section is to describe efforts which are now underway at the State and substate levels to address priority solid waste management needs.

Water Quality

Several on-going programs now exist for the protection and maintenance of water quality. Surface point discharges are now regulated by the NPDES (EPA administered) permit program, and a fixed station water quality sampling network is now being monitored by ADHS under contract with the U.S.G.S. Efforts are currently underway within ADHS to develop and establish two other regulatory programs, one for groundwater protection and another for underground injection control (UIC). The groundwater program will prioritize monitoring needs as well as sites (including waste disposal locations). For its part, the UIC program will regulate this particular method of waste disposal, and correct an existing void in the RCRA management system. Both of these new programs will serve to strengthen and supplement existing RCRA management controls. Recent initiatives have also opened a working dialogue with the Army Corps of Engineers in an effort to expand the 404 dredge and fill permit program on a statewide basis. Through its enforcement efforts, the Bureau of Waste Control is now requiring several substandard landfill facilities to monitor groundwater quality and install protective dikes in floodplain zones. The number of facility operators performing routine on-site monitoring functions will likely grow as the State's ODI project matures and compliance schedules are attained. Technical plan review capabilities have also recently been augmented within the Bureau and plan submittal requirements are now being extended to include sludge and septage disposal facilities.

Disposal Capacity

At the State level, resource expenditures in this regard are presently focused on hazardous waste. A final site for a state-owned hazardous waste facility was recently selected and approved by the Arizona Legislature. This centrally located Rainbow Valley site has been authorized to receive hazardous wastes for purposes of treatment, storage, disposal and recovery (SB 1033). Enabling legislation was filed with the Secretary of State on February 27, 1981. As a consequence, the efforts of ADHS have turned toward the preparation of a request-for-proposals which will be used to solicit proposals from qualified contractors interested in designing, constructing and operating this publicly-owned facility. Following successful contract award, it is anticipated that this facility may be operational by mid - 1983.

Efforts to develop additional non-hazardous waste disposal capacity are underway around the State at every level of government. Under State law, these responsibilities reside primarily with local governments, but federal (EPA) and State governments (ADHS) are active participants through the on-going provision of technical assistance. Regional cooperation and resource recovery are two management alternatives now being promoted by this means. In addition, the COG's are providing a valuable service in this respect by identifying areawide facility needs and by serving as a coordination medium between State and local governments.

The State's emerging resource recovery program is also expected to contribute to the amelioration of these needs by reducing waste volumes destined for land disposal.

Systems and Facility Planning

New landfill location guidelines incorporating RCRA requirements were recently developed under contract to the Department of Health Services. When disseminated, these guidelines should improve both facility siting

and design. The State program's technical plan review function and on-going technical assistance will also contribute to improved systems and facility planning. Where technical assistance fails, State enforcement actions pursuant to the ODI should help to ensure that greater attention is paid to these needs in the future. In addition, the areawide planning agencies (COG's) remain available to local governments for assistance in identifying necessary system improvements.

Financing

Management authorities around the State are now wrestling intensely with this problem. Its effective solution may very well hold the key to resolving the many other problems and needs now confronting the statewide management system. Several jurisdictions are presently utilizing state and federal technical assistance to identify feasible cost-cutting measures, and others are implementing service charges or tipping fees as appropriate. Regional waste management approaches are now being actively considered in several areas as well.

At present, it does not appear likely that federal financial support will be at a sufficiently high level to enable a subvention of funds through the State to local governments. The State program however, will assist local governments through the provision of technical assistance and the issuance of compliance schedules to substandard facilities, thereby enabling them to attain compliance over a reasonable period of time. The State will also be exploring ways of financially aiding resource recovery projects through both grants and loans.

Special Wastes Management

In addition to its current efforts to develop a state-owned hazardous waste disposal facility, the Department is now taking steps to improve

sludge and septage disposal practices. Existing practices are now being studied and evaluated. In the near future, ADHS will require the submittal of plans for all sludge and septage disposal facilities and develop its regulatory powers appropriately. Engineering bulletins will also be updated to better address the handling and disposition of these wastes. Technical assistance will also be necessary to enable municipal facilities to plan for the disposition of exempted hazardous waste loads from small generators.

Systems and Facility Operations

These problems are now being addressed primarily through the conduct of the Open Dump Inventory. The Department's plan review process has also been adjusted to reflect the new RCRA regulatory requirements. Facility plans will not be approved unless a clear means of compliance is demonstrated. Existing facilities which are classified as open dumps will be offered technical assistance for closure or upgrading purposes, and placed on enforceable compliance schedules. The State expects to complete its inventory and classification of solid waste disposal facilities by FY-85. EPA's TAP program will also be instrumental in furthering these efforts.

Explosive Gases

Through the Open Dump Inventory, the State program will be evaluating gas hazards at solid waste disposal facilities. As a result of this process, those facilities now generating gas in excess of allowable standards will be identified. Subsequent enforcement actions will be taken as necessary to correct and abate these hazards. Technical assistance will subsequently play an important role in retrofitting facilities with appropriate gas control technology. Methane collection and recovery for use as an energy source is now being encouraged.

Enforcement

As resources allow, it will be the policy of the State program to take whatever enforcement actions are deemed necessary to protect public health and the environment from the adverse effects of improper solid waste management and disposal practices. These measures will involve administrative, civil and in some cases criminal actions. ADHS will also cooperate with other State and local enforcement authorities to combat the ubiquitous problems of littering and wildcat dumping.

The State Attorney General's Office will play a central role in this respect. A special team of investigators is now locating and assessing uncontrolled disposal sites, and is actively monitoring for midnight dumping violations.

Education/Information

With helpful assistance from the COG's, the Department completed a series of workshops regarding the Open Dump Inventory in 1980. Their purpose was to familiarize landfill operators and managers with new regulatory requirements under RCRA and with the process by which the State will be conducting the ODI. In September 1980, formal training seminars were also held in Casa Grande to instruct operators in proper sanitary landfilling procedures. The final publication and dissemination of this State Plan will also serve as a major informational and instructional tool. The State program is committed to an informed constituency, and to public participation in its decision-making processes. Outreach and educational efforts are expected to increase as the State program matures.

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CHAPTER FOUR

PLANNING PROCESS

CHAPTER IV
PLANNING PROCESS

A. Introduction

This chapter will describe the planning process used to develop and implement the State of Arizona Solid Waste Management Plan. Organizationally, it is divided into three major sections. The first, "Historic Overview", presents a synopsis of solid waste management planning in Arizona. The second section, "State Plan Development and Implementation", discusses public participation and the procedures used to designate planning boundaries, agencies and responsibilities. The last section, "Continuing Planning and Management", outlines State Plan revision procedures and issues and requirements for continuing program coordination.

B. Historic Overview

The legal foundation for solid waste management in Arizona was established by the State Legislature in 1939 through the enactment of Arizona Revised Statutes (A.R.S.) Sec. 9-441. This law required county boards of supervisors and the governing bodies of incorporated cities and towns to provide for "public dumping grounds".

This foundation was never significantly expanded upon until 1962. At that time, the Department of Health promulgated rules and regulations governing the storage, collection, transportation, processing, and disposal of refuse and other objectionable wastes (Title 9, Chapter 8, Article 4 ACRR).

In 1971, the Arizona State Legislature enacted Senate Bill 270 which was codified into law as A.R.S. Sec. 36-132.01. This statute required the

Department of Health Services (ADHS) to develop a comprehensive statewide solid waste management plan. It also authorized the Director of ADHS to adopt regulations to implement provisions of the Law and to update the statewide plan as necessary.

With the enactment of Senate Bill 270 (A.R.S. Sec. 36-132.01), the solid waste management program in Arizona was formally established. Federal financial assistance was provided through grants from the U.S. Environmental Protection Agency. Procurement of these funds, under authority of the Solid Waste Disposal Act (P.L. 89-272), enabled the Department to conduct surveys (1972) and develop its first statewide solid waste management plan (1973).

In 1976, Congress enacted P.L. 94-580 which was entitled the Resource Conservation and Recovery Act. This mandate continued federal financial assistance to the states and incorporated new provisions for the development of State planning guidelines. This Federal assistance subsequently has enabled the Arizona Department of Health Services to develop a State Solid Waste Management Plan meeting the requirements of both P.L. 94-580 and A.R.S. Sec. 36-132.01. A description of the planning process used to designate jurisdictional boundaries and agency responsibilities for development and implementation of the State Plan is presented below.

C. State Plan Development and Implementation

Section 4006 of RCRA provides for the establishment of state procedures necessary to properly develop and implement state solid waste management plans. Under this guidance, agency responsibilities for State Plan development and implementation are established, planning boundaries appropriate for regional solid waste

management are designated, and state, local, and areawide solid waste management functional roles are defined. It is not the intent of these designations to preempt or preclude other jurisdictional controls, resources or decisions. Rather, their intent is to formalize management designations and responsibilities under the State Plan. This effort should ensure the effective use of limited resources and provide for adequate protection to both public health and the environment.

Boundary Designations - Section 4006(a) of RCRA requires the Governor of each State, upon consultation with local officials, to promulgate regulations identifying boundaries appropriate for regional (areawide) solid waste management planning. In order to assist the States in this effort, EPA has published guidelines (40 CFR Part 255) which recommend three steps in this identification process. These procedures include: (1) a preliminary identification of regions by the Governor or his designee; (2) notification and consultation with local officials; and (3) promulgation of regulations to formalize the agreed upon boundary designations.

The Arizona Department of Health Services (ADHS) was designated by Governor Castro (1977) as the lead State agency to coordinate regional and local planning efforts and to develop the State's Solid Waste Management Plan under RCRA. Under Arizona State Law (A.R.S. Sec. 36-136.01) the Department had already been given the statutory authority to develop, implement, and periodically revise a comprehensive statewide solid waste management plan.

Acting pursuant to this authority and the requirements of 4006(a), ADHS adopted new regulations in 1977 which established six regional solid waste planning districts (Article 17, Chapter 8, Title 9, ACRR). The boundaries of these six planning districts were identical to those of the six Councils

of Governments (COG's) established earlier by Executive Order 70-2.

Other provisions of this regulation (R9-8-1717) which relate to solid waste planning boundaries are excerpted below:

- Petitions for a change in regional boundaries may be submitted to the Director of the Arizona Department of Health Services. If the Director finds that the request is justified, he may adopt the revision as a new regulation in accordance with Departmental procedures for adoption of regulations.
- The Director may revise the regional boundary regulations if he finds that such revision is necessary to accomplish a workable statewide comprehensive solid waste management plan. Such revisions shall be made in accordance with Departmental procedures for adoption of regulations.
- To facilitate statewide hazardous waste management, the State of Arizona shall be undivided and shall constitute one district for hazardous waste management planning purposes.

The procedures which were used to develop these boundary regulations included the following:

- (1) Conferences were held between ADHS, the Governor's Office of Economic Planning and Development (OEPAD), the Councils of Governments (COG's), and other A-95 agencies to discuss previous regional designations and RCRA requirements (July 1977).
- (2) ADHS proposed to adopt regulations establishing regional boundaries for solid waste management planning. A memorandum was distributed statewide to solicit comments on the proposed concept (September 1977).

- (3) A notice of intent, hearing dates, and a copy of proposed boundary regulations was distributed statewide (October 1977).
- (4) A public hearing on the proposed regulations was held in Phoenix, Arizona (October 1977).
- (5) Based upon comments received, the hearing panel recommended that the proposed boundary regulations be adopted as written (November 1977).
- (6) ADHS boundary regulations were certified by the Secretary of State (December 1977).

State and Areawide Management Designations - Section 4006(b) of RCRA directs each State, together with appropriate local officials to jointly: (1) identify an agency to develop the State Plan, and (2) identify those solid waste functions to be planned for and carried out by the State, and those functions to be planned for and carried out by regional and local authorities.

In Arizona, as in most States, the state solid waste management agency (ADHS) has been responsible for conducting the 4006 identification process. A key task in this effort was for the State to notify and inform local governments, state agencies, federal facilities, county health departments, councils of governments, Indian tribes and other interested groups of the identification procedures and the Department's preliminary recommendations.

Notifications to this effect were presented in a memorandum distributed statewide to public officials in March of 1978. In this memorandum, notice was given that the Department (ADHS) intended to: (a) develop a statewide solid waste management plan pursuant to RCRA; and (b) secure designation of the six Councils of Governments as regional solid waste management planning agencies. Following this notification, a series of regional seminars were conducted

within the State for the purpose of discussing prospective roles and responsibilities and for developing a consensus regarding joint identifications (April 1978). Subsequent to these workshops, letters were distributed to Mayors, Boards of Supervisors and COG Directors requesting written comments on regional planning responsibilities (April 1978). Based upon the workshop results and correspondence received, the Councils of Governments were ultimately recommended to undertake areawide solid waste management planning activities. Each COG was contacted and requested to submit a formal resolution accepting this responsibility (June 1978). With this accomplished, Governor Babbitt then authorized ADHS to develop and implement a State Plan in accordance with Subtitle D of RCRA and authorized the COG's to undertake areawide solid waste management planning responsibilities (October 1978). In some regions however (i.e. PAG), these regional planning responsibilities were allocated directly to local governments.

Local Management Designations - Under current state law (A.R.S. Sec. 9-441 and 36-132.01), cities, towns, and counties are responsible for providing "public dumping grounds" and the development of local solid waste management plans. The Arizona Department of Health Services has also adopted regulations (A.C.R.R. Title 9, Chapter 8, Article 4) which establish acceptable methods of waste disposal and prescribe standards for the collection, storage, and treatment of solid wastes. These regulations do not require a city, town or county to directly provide collection, storage, processing, or transportation services. Neither do state statutes. The manner in which these services are to be provided is entirely a matter of local determination.

Local governments in Arizona have been involved in solid waste management for a relatively long period of time. Existing management designations, as reflected in both statutes and regulations, only define local responsibilities for solid

waste management planning and disposal. Provisions of RCRA [Section 4006 (b) (2)(B)] however, require the identification of regional and local responsibilities for State Plan implementation as well. Accordingly, cities, towns, and counties have been designated as local management agencies for solid waste collection, transportation, processing, source separation and resource recovery.

The actual provision or purveyor of these services is left to the discretion of the local government. This designation formalizes local management responsibilities for implementation activities conducted pursuant to the State Plan, yet does not infringe upon, nor preclude, local autonomy or interests. A memorandum proposing designation of these local management responsibilities was distributed to all cities, towns, and counties during March of 1980.

Public Participation - Programs, policies, and regulations developed under the Resource Conservation and Recovery Act (RCRA) can have important environmental, health, and economic effects. All interested parties should therefore have clear opportunities to become informed about these programs and participate in their development. These efforts require commitments to public awareness, information and education as well as provisions for public input into programs, policy and regulation development.

For purposes of State Plan implementation, the Bureau of Waste Control has compiled a list of agencies, organizations and individuals affected by or interested in the plan. This list shall be maintained and updated as necessary, and all parties shall be notified as appropriate for programmatic purposes. Individual parties may be added to this list upon request. Should the owner or operator of an "open dump" facility not appear on this list, such owner/operator will automatically be added to this list at such time as his facility is proposed to be so classified.

Public participation as it relates to the State solid waste planning process has been conducted and should be maintained in accordance with the following objectives;

- Assure that the public has an opportunity to understand official programs and proposed actions, and the government fully considers the public's concerns;
- Assure that the government does not make any significant decisions on an activity without consulting interested or affected segments of the public;
- Assure that government action is responsive to public concerns;
- Encourage public involvement in implementing environmental laws;
- Keep the public informed about significant issues and proposed program or project changes as they arise;
- Foster a spirit of openness among all parties involved; and
- Create opportunities for public participation, and stimulate and support such participation.

Public involvement and participation in the four-year state solid waste planning process has been encouraged and provided for in accordance with both state and federal requirements. Numerous "actors" and over 100 distinct public participation activities relative to "solid waste management" have been initiated during the four-year period 1977-81 (refer to Appendix B). These activities have centered upon public awareness, information, education and rulemaking activities, policy development, facility permits, the open dump inventory, review of annual work plans and the State/EPA Agreement. In addition, a "State Public Participation Plan for Activities Under the Resource Conservation and Recovery Act" has been prepared and will be updated periodically for inclusion in the State work program submitted each year to EPA. The continuation of these efforts should allow for substantial public involvement in the State decision making process.

Public participation activities have been conducted in accordance with Federal regulations identified in Title 40 CFR Parts 25 and 256 and state requirements identified in Arizona Revised Statutes 41-1001 et seq., 38-431 et seq., and 36-2800 et seq. The specific requirements of these mandates are also referenced in the State public participation plan which is soon to be updated.

In addition to the requirements specified in the public participation plan, and pursuant to the regulations identified in 40 CFR Part 256.63; the State shall hold a public hearing if there is a significant degree of public interest to solicit public comment and recommendations prior to approving a permit for a resource recovery or solid waste disposal facility. The public hearing requirements, as determined by the State, may also be met if conducted at the local level as part of a local decision-making process.

Public information, education and opportunities for involvement are elements which collectively are used to develop an effective public participation program. These elements are essential and should be provided for throughout the development and implementation of State solid waste management programs.

D. Continuing Planning and Management

The State solid waste management planning process is not an end, but a means by which to assess and prioritize problems, define objectives, analyze alternatives and determine necessary activities and courses of action. The State Plan should be perceived as a policy and guidance document to govern State solid waste management program activities over the next five years. These activities and timelines have been presented in Chapter II of this document.

Provisions for the revision or updating of the State Solid Waste Management Plan are established in A.R.S. Sec. 36-132.01(c) and 40 CFR 256.03. The State Plan shall be revised by the State after notice and public hearings when the Environmental Protection Agency (by regulation) or the State determines that:

- The plan is not in compliance with the requirements specified in 40 CFR 256 or A.R.S. Sec. 36-132.01;
- Information has become available which demonstrates the inadequacy of the plan; or

- Such revision is otherwise necessary;
- The State Plan shall be reviewed by the State and, where necessary, revised and readopted not less frequently than every three years.

A continuing planning process for the State Solid Waste Management Plan is necessary in order to evaluate and revise as appropriate programmatic activities that are to be accomplished over the next five years. The effective implementation of the State Plan is based upon this action and fiscal support from both the State and EPA.

The coordination of RCRA-related activities with other environmental programs is yet another issue of utmost concern, insofar as it relates to the implementation of a continuing state solid waste management planning process. Mandates providing for this effort are contained in both Federal and State law. A.R.S. Sec. 36-132 requires the Department (ADHS) to develop a State Solid Waste Management Plan in consideration of other plans developed by cities, towns, counties and other state agencies. Federal mandates (CFR 256.50) require that state plans developed under RCRA provide for coordination with other local, state and federal programs. While a discussion of related environmental laws is presented in Chapter V, the mechanisms to be used to provide for program coordination are described below.

Local Agency Coordination - At the local level, planning coordination has been maintained and provided for through a variety of mechanisms. Perhaps the most effective of these has been the development of "Areawide Needs Assessments" and "Areawide Solid Waste Management Plans" prepared by each of the six Councils of Government. These documents, in addition to "Areawide Water Quality Management Plans" have been used to identify and prioritize statewide problems, issues and needs as they relate to local solid waste management. Many of the plans

have also recommended local management options and presented recommendations of a programmatic and policy nature. These have been presented in Chapter III "Problems, Needs, and Priorities" and are reflected in the "State's Five Year Planning and Implementation Timetable" and "Statements of Policy" (Chapter II). The continued maintenance of an areawide planning process should continue to provide for an effective means to coordinate State/local solid waste management planning activities.

Another mechanism used for local program coordination has been facility compliance meetings held with cities, towns, counties and private landfill owners. In general, these meetings have been used to discuss specific facility deficiencies and problems, to identify management options and to outline necessary remedial actions. In other cases, they have resulted in the development of consent agreements which have ultimately led to compliance. Other types of direct meetings with local entities are held as needed for pre-engineering or facility development conferences, technical assistance, or program information.

The Water Quality Management Working Group (WQMWG) is yet another means to coordinate programmatic activities with local agencies, particularly those relating to water quality management. The WQMWG was established as an institutional body under the State Water Quality Management (208) Program. The working group identifies and discusses water quality management matters of mutual concern and prepares recommendations for action to the Water Quality Control Council. The Council has the powers under State Law (A.R.S. Sec. 36-1854) to adopt a comprehensive program for the prevention, control and abatement of water pollution. Membership on the Water Quality Management Working Group includes the six areawide Councils of Government and selected state agencies.

Continued use and maintenance of this mechanism will provide for program coordination relative to waste management activities which pose a potential for adverse impact on water quality.

Monthly Health Officers Meetings held between State and County Health Departments provide yet another local coordination mechanism. These meetings provide the opportunity for informal dialogue between State and local health departments. Issues related to solid and hazardous waste management have been discussed in the past and will continue to be presented at these meetings. A more formal means of program coordination is further provided for through the establishment of delegation agreements. Currently, there are several such delegation agreements between County Health Departments and the State which outline respective responsibilities in environmental health. Other delegation agreements should be established as deemed mutually acceptable and necessary by these parties.

There are numerous other mechanisms which have been used and will continue to provide for consultation with local health and environmental programs. These include: (a) annual development of the State/EPA Agreement; (b) A-95 agency review of funding proposals and workplans; (c) the Joint Funding Project; and (d) continued consultation with local officials relative to developing program policy and new regulations.

State Agency Coordination - Many of the mechanisms used to coordinate solid waste management programs with local agencies are also useful for purposes of coordination between State agencies. These mechanisms have included: (a) the State/EPA Agreement; (b) the Joint Funding Project; (c) the Water Quality Working Group; (d) the A-95 review process; and (e) procedural consultation with State agencies in the development of regulations, policy and/or programmatic activities.

Alternative mechanisms may include formal agreements between State agencies relative to environmental programs (including solid and hazardous waste management). Examples of these include Intergovernmental Agreements, Memorandums of Understanding and/or Memorandums of Agreement. Currently, a formal agreement has been signed by several State agencies for purposes of implementing the "Arizona Hazardous Material Emergency Response Plan". Other types of formal ADHS agreements relative to "solid waste" are currently proposed for coordination with the Pesticide Control Board, the Department of Water Resources, the State Land Department, the Arizona Radiation Regulatory Agency, and the Arizona Corporation Commission. Still other agreements either formal or informal, may be established later with other state agencies as warranted by need and/or circumstance.

The coordination of state pollution control programs, particularly those which may be federally administered at the state level, include programs under the Clean Water Act, the Safe Drinking Water Act, the Clean Air Act, and the Resource Conservation and Recovery Act. Mechanisms for the coordination of these programs are administratively established within the Arizona Department of Health Services. Internal structure and review procedures within the Division of Environmental Health Services assure a solid waste coordination effort with and between the following programs and activities;

- the issuance of new or revised National Pollutant Discharge Elimination System (NPDES) permits established under Section 402 of the Clean Water Act as amended.
- coordination with activities for municipal sewage sludge disposal and utilization conducted under authority of Section 405 of the Clean Water Act as amended.

- coordination with the construction grants program for publicly owned treatment works established under Section 201 of the Clean Water Act as amended.
- coordination with water quality management planning programs established pursuant to Section 208 of the Clean Water Act as amended.
- coordination with pretreatment activities conducted pursuant to Section 307 of the Clean Water Act as amended.
- coordination with activities relative to the assessment of surface impoundments situated over underground sources of drinking water conducted under authority of Section 1442(a)(8)(C) of the Safe Drinking Water Act.
- coordination with state underground injection control programs carried out under authority of the Safe Drinking Water Act and with the designation of sole source aquifers under Section 1424 of that Act.
- coordination with State Implementation Plans developed under the Clean Air Act which specify incineration and open burning limitations and State Implementation Plan requirements impacting resource recovery systems.

Continued use of these internal mechanisms should provide for effective state solid waste program coordination and integration within ADHS.

Coordination with Federal Agencies - Throughout the state solid waste management planning process, federal agencies have been consulted through a variety of mechanisms. These have included direct correspondence, representation on state and local working committees and participation in specific projects. Continuation of these efforts should provide for the coordination of state and federal solid waste programs which are administered within Arizona.

Federal agencies have typically been consulted in relation to specific solid waste management issues or programs which are under federal purview. Meetings have been held between ADHS and the U.S. Army Corp of Engineers to provide coordination within the dredge and fill permit program established under Section 404 of the Clean Water Act as amended. The U.S. Department of Interior (and Arizona Game and Fish Department) have also been consulted to ensure that solid waste management activities do not jeopardize the continued existence of endangered or threatened species, nor result in the destruction or adverse modification of critical habitats. At the international level, solid waste coordinative mechanisms have been available and maintained through State participation in U.S./Mexico Border Environmental Health Program Review Meetings. The State/EPA Agreement is yet another state-level mechanism which can be used to address environmental problems which are international in scope or impact.

Federal coordination policies have been prescribed through the enactment of Section 6003 of RCRA and Presidential Executive Order 12088, which requires each federal agency to cooperate with the Environmental Protection Agency and state, interstate and local agencies in the prevention, control and abatement of environmental pollution. Each federal agency is further required to consult with EPA and appropriate State, interstate and local agencies concerning the best techniques and methods available for the prevention, control and abatement of environmental

pollution. RCRA programs are among the environmental programs specified under these mandates.

Methods for coordination between ADHS and federal agencies are also available through formal agreements. Currently, the U.S. EPA (Region IX) and ADHS have a Memorandum of Agreement relative to hazardous waste management within Arizona. Other formal ADHS agreements may be desirable with Federal agencies such as the U.S. Bureau of Land Management, U.S. Forest Service, Indian Health Service, or U.S. Army Corps of Engineers. In this fashion, formal agreements relative to policy, procedures and responsibility may be developed as warranted.

When state coordination is necessary with or between a number of diverse Federal agencies relative to RCRA programs or activities, these matters will be referred to the Federal Interagency Coordinating Committee (established by P.L. 96-482) for resolution as appropriate.

Coordination with Tribal Governments - Solid waste management on Indian lands is a complex issue which raises numerous political, legal, and jurisdictional questions. In addition, cultural values, increasing industrial development, urban growth and the importation of non-Indian waste streams further add to this complexity.

Indian tribal governments have a direct relationship with the Federal government. Most Federal programs on Indian lands are administered directly rather than through a State mechanism. Indian tribes are autonomous and self-governing political jurisdictions within Arizona. As such, the administration of Federal environmental programs by the State may be perceived by some tribal governments as an infringement of their right to self-determination. Consequently, in certain cases, tribal participation has been negligible in the State solid waste management planning process.

In other cases however, tribal participation has been quite successful. One mechanism which was used successfully involved the development of an issue paper for Solid Waste Management on Tribal Lands in Arizona. This paper briefly described pertinent issues and problems, and identified management responsibilities and proposed State policy in this regard. Copies of the issue paper were distributed statewide to tribal governments and various Federal, State, and local agencies. The subject was further discussed at a policy forum sponsored by the Inter-Tribal Council of Arizona.

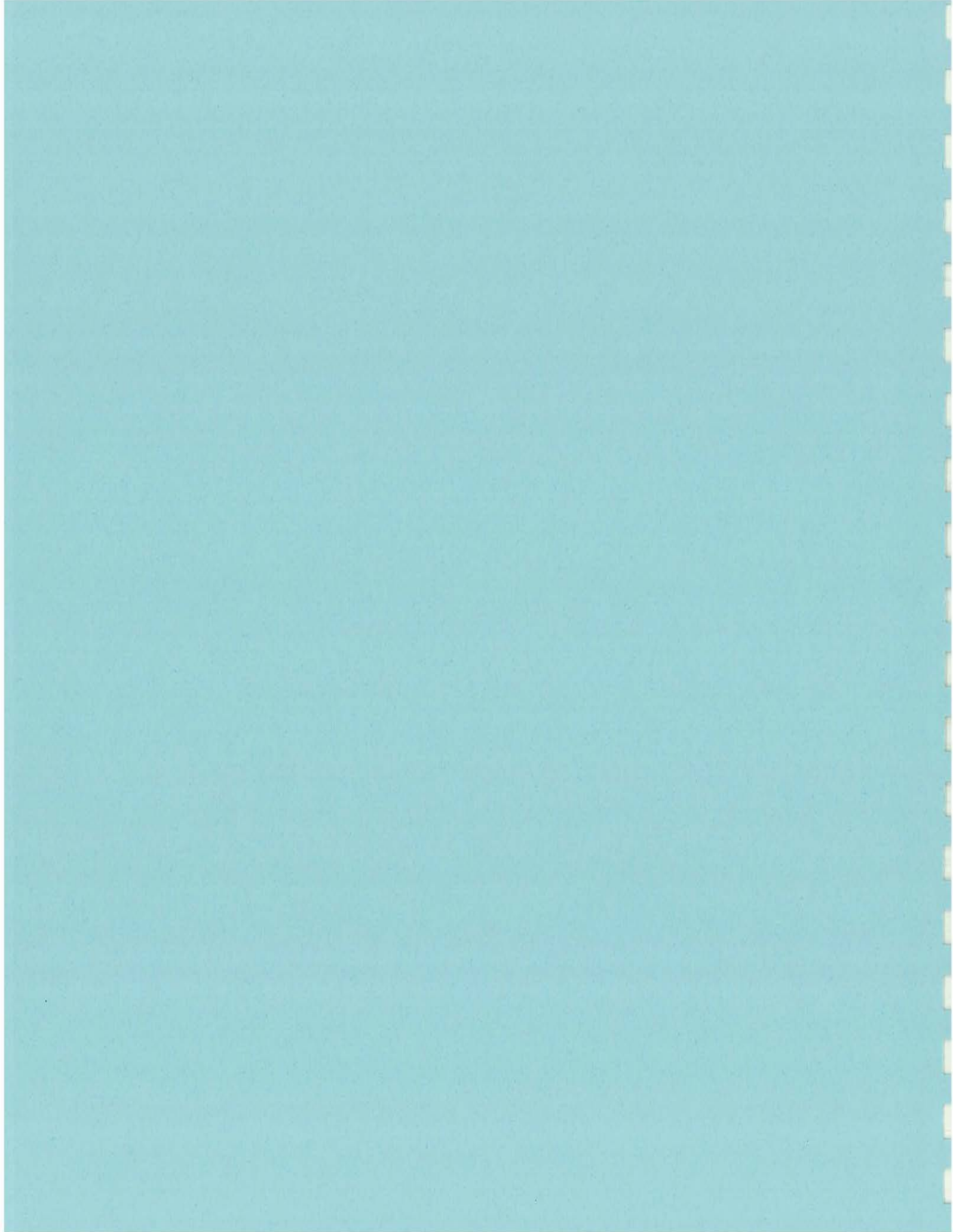
Another successful means of coordination has been provided by the EPA Technical Assistance Panels (TAP) Program. This program was used to address a sensitive State/Local/Tribal "solid waste management problem". In this instance, a landfill located on tribal land was used by several cities for purposes of municipal refuse disposal. Through an independent evaluation by an EPA contractor, problems were defined and remedial action plans were developed. Overall, the negotiations and discussions have involved participants from several Federal, State, County, and local agencies. Although certain issues must be further addressed, this group process has strengthened and improved rapport between many of the affected parties.

Yet another case of inter-agency/tribal agreement has been demonstrated by the development of a regional landfill which is located on tribal land and serves several communities in Western Arizona. Through a negotiated process and signed agreement, shared responsibilities for facility development, equipment, personnel, and oversight have been defined.

There is a pressing need to continue the development of these cooperative relationships and to implement the intent of laws which are intended to protect both public health and the environment. These laws have been developed to correct or minimize public health and environmental problems. Air, water, and land pollution, as well as disease transmission, do not recognize political boundaries or operational jurisdictions. They are governed by land use activities and natural processes which occur on Indian as well as non-Indian lands.

CHAPTER FIVE

THE LEGAL FRAMEWORK



CHAPTER V
THE LEGAL FRAMEWORK

INTRODUCTION

The purpose of this chapter is to briefly overview the three major legislative steps which culminated in the passage of the Resource Conservation and Recovery Act in 1976, and to describe the statutory and regulatory powers now in existence in Arizona to meet the challenge of its various mandates. Accordingly, the chapter has been divided into three parts. The first describes the mandates imposed under RCRA and related federal environmental laws. The second describes the legal tools and resources now available in the State to implement and enforce this law (RCRA). Together, these two parts are intended to delineate the existing legal framework within which solid wastes are now managed in the State of Arizona. The third and final section of the chapter will then document certain legal issues which may require further clarification in order to facilitate proper plan implementation.

A. THE FEDERAL MANDATE

1. The Solid Waste Disposal Act of 1965

The enactment of Public Law 89-272 on October 20, 1965 signaled the first developmental milestone in the evolution of RCRA. It authorized the beginnings of a federal research and development program, committed federal resources, and acknowledged for the first time the national magnitude of the solid waste disposal problem. In laying the foundation for an active federal role in solid waste management, Congress expressed its collective resolve in finding (Section 202 (a));

1. that continued technical progress, and the economic and population growth of our Nation, had resulted in an ever mounting increase, and in a change in the characteristics of

the mass of materials being discarded.

2. that serious financial, management and technical problems in solid waste disposal had emerged as the result of population concentration in urban areas.
3. that inefficient and improper methods of solid waste disposal were resulting in hazards to human health and unnecessary environmental costs.
4. that the failure to reuse or salvage discarded materials results in the waste and depletion of precious natural resources; and
5. that the problems of waste disposal cited above have become a matter national in scope and concern, and necessitate federal action through financial and technical assistance and leadership in the development, demonstration and application of new and improved disposal methods emphasizing resource conservation and recovery.

In order to ameliorate these conditions, Congress mandated the following purposes through the federal Departments' of Interior, and Health, Education and Welfare (Section 202 (b));

1. to initiate and accelerate a national research and development program for new and improved methods of proper and economic solid waste disposal, including studies directed toward the conservation of natural resources by reducing the amount of waste and unsalvageable materials and by recovery and utilization of potential resources in solid waste; and
2. to provide technical and financial assistance to State and local governments and interstate agencies in the planning, development, and conduct of solid waste disposal programs.

In furtherance of these objectives, the respective Departments were authorized to collect relevant data, cooperate with both public and private agencies in joint research endeavors, and to make grants-in-aid to public or private agencies, institutions or individuals for research, training projects, surveys and demonstrations.

Section 206 specifically authorized grants-in-aid for State and Interstate level planning activities. These fifty percent matching grants were provided for purposes of making surveys of solid waste disposal practices and problems, and for the development of State and Interstate solid waste disposal plans. Construction grants for improved or innovative disposal facilities were also authorized (Section 204) with an imposed ceiling not to exceed two-thirds total federal share.

The significance of the Solid Waste Disposal Act of 1965 was to be found principally in its recognition of solid waste disposal as a public concern of national scope. Antecedent to its enactment, solid waste management and disposal was the subject of State and local determination almost exclusively. Most State and local governments had existing statutes or ordinances governing its regulation, but never before had the federal government interceded directly on behalf of the national interest. The impact of this initial commitment to a role of financial and technical assistance was to establish the precedent for an expanded federal regulatory role that would later be defined by subsequent legislative amendments and historic environmental events.

2. The Resource Recovery Act of 1970

The Resource Recovery Act of 1970 (P.L. 91-512) was enacted essentially as an amendment to its forefather, the Solid Waste Disposal Act of 1965. The basic structure of the original Act remained the same, but its purposes were broadly expanded to include greater emphasis on both resource recovery and environmental protection.

Supported research and demonstration activities were reoriented to encompass everything from adverse health and welfare impacts to the composition analysis of current and projected waste streams. The purposes of such activities were broadened in terms of scope, but narrowed with respect to specificity.

An amended Section 205 mandated that special studies be undertaken to determine;

1. the means of recovering materials and energy from solid waste, and the recommended uses of such materials and energy for national or international welfare.
2. the changes in current product characteristics and production and packaging practices which would reduce the amount of solid waste.
3. the methods of collection, separation, and containerization which would encourage an efficient utilization of facilities.
4. the use of Federal procurement to develop market demand for recovered resources.
5. recommended incentives and disincentives to accelerate the reclamation or recycling of materials from solid wastes.
6. the effect of existing public policies on the reuse, recycling and conservation of such materials.
7. the necessity and method of imposing disposal or other charges on packaging, containers, vehicles, and other manufactured goods.

In general, these specific mandates were reflective of the growing national interest in resource recovery, and the increasing technological sophistication of the industry.

On the financial side, the 1970 amendments expanded the grant-in-aid program to assist planning at the local and substate levels (previously only State and Interstate planning was supported), and raised the federal share ceiling to seventy-five percent in the case of intermunicipal efforts (e.g. Councils of Governments). In addition, Section 208 of the amended Act authorized the continuation of grants for the demonstration of resource recovery systems and the construction of new or improved solid waste disposal facilities. The major departure from the earlier Act was to be found in the detailed stipulation of eligibility for federal project participation.

Also authorized, were training grants targeted to eligible organizations for occupations involving the design, operation and maintenance of solid waste disposal and resource recovery equipment and facilities. Such grants had been provided for under the earlier legislation, but no criteria for financial support had been defined until this passage.

In the area of technical assistance, the 1970 Act established bold new federal directions. It mandated the development and promulgation of federal guidelines for solid waste recovery, collection, separation, and disposal systems (both public and private). Such guidelines were to be consistent with public health and welfare, air and water quality standards, and adaptable to appropriate land use plans (Section 209). Another mandate (Section 212), required the preparation of a comprehensive plan for the creation of a system of national disposal sites for the storage and disposal of hazardous and radioactive wastes (this plan

would later provide a cornerstone for Subtitle C of RCRA).

In sum, the Resource Recovery Act of 1970 reaffirmed the federal commitment to resource recovery and environmental protection as they pertain to solid waste management and disposal. It substantially broadened the level and extent of federal involvement in heretofore State and local affairs, and augmented financial incentives for State cooperation in the pursuit of national environmental objectives. Its policy framework provided the basis for the eventual development of comprehensive statewide solid waste management programs and set the direction in which they would later proceed.

3. The Resource Conservation and Recovery Act of 1976

With the passage of Public Law 94-580 (RCRA) on October 21, 1976, the machinery of solid waste regulation was formally brought on-line. Technically, RCRA was yet another amendment to the Solid Waste Disposal Act of 1965, but in actuality, its new provisions and authorities bore little resemblance to the old.

As evidence of this new federal posture, legal authority was transferred to the Environmental Protection Agency (EPA), and broad powers were granted for the development of a comprehensive national solid-waste program. In addition, the Act statutorily established the Office of Solid Waste within EPA to guide the implementation of the law and assist in coordinating its major programmatic thrusts.

The stated objectives of RCRA were essentially twofold; (a) to promote the protection of health and the environment, and (b) to conserve valuable material and energy resources. The Act intended that EPA achieve these objectives (Section 1003) by;

- (1) providing technical and financial assistance to State and local governments for development and implementation of solid-waste

- management plans;
- (2) providing training grants in solid waste occupations;
 - (3) prohibiting future open dumping on the land and requiring the conversion of existing open dumps to facilities which do not pose a danger to the environment or to health;
 - (4) regulating the treatment, storage, transportation and disposal of hazardous wastes;
 - (5) providing for the promulgation of guidelines for solid waste collection, transport, separation, recovery, and disposal practices and systems;
 - (6) promoting a national research and development program for improved solid-waste management and resource conservation techniques;
 - (7) promoting the demonstration and construction of improved solid waste management and resource conservation and recovery systems; and
 - (8) establishing a cooperative effort among Federal, State and local governments and private enterprise in order to recover valuable materials and energy from solid-waste.

This State Solid Waste Management Plan has been prepared under authority of RCRA, and a summary of the Act's major provisions is presented below.

Subtitle A - General Provisions

Under the general provisions of Subtitle A, EPA is directed to integrate RCRA with other related environmental laws and programs for purposes of administration and enforcement, and to avoid duplication to the extent practicable. In addition, the requirement to formulate guidelines for solid waste management is expanded under RCRA to include alternative management practices as well.

Subtitle B - Office of Solid Waste; Authorities of the Administrator

In establishing the Office of Solid Waste, Subtitle B further defines its statutory mission and responsibilities. Headed by a Deputy Assistant Administrator, the Office of Solid Waste is charged with overseeing the implementation of the hazardous waste and open dumping provisions of RCRA (Subtitles C & D), administering the financial and technical assistance programs, and prescribing new regulations as may be deemed necessary to effectuate the goals of the Act. The Administrator is also empowered to award special grants equal to 5% of the purchase price of tire shredders for applicants eligible under specified criteria.

Subtitle C - Hazardous Waste Management

Subtitle C mandates the identification of hazardous wastes and their analysis in terms of what quantities, qualities, concentrations, and forms they become a threat to human health or the environment. EPA is directed to publish a national listing of hazardous wastes, and the Governors of each State are empowered to petition to have any substance so listed.

EPA is further required to issue standards for generators and transporters of hazardous wastes with respect to record-keeping, practices, labeling, appropriate containers, use of a manifest system, and the reporting of quantities and disposition. This particular provision has been commonly referred to as the "cradle to grave" regulation of such substances.

Also, persons owning or operating facilities for the treatment, storage or disposal of hazardous wastes are required to obtain permits as a condition of continued operation. Permit applications must indicate the composition, quantity, rate at which such wastes are to be disposed of, and the location

of the disposal site. In the absence of a "substantially equivalent" program at the State level, the EPA will administer this permitting function directly.

In order to enforce these provisions, EPA and State officials are authorized to inspect facilities, copy records and obtain samples. Civil and criminal penalties may be brought to bear as legal remedies in instances of non-compliance.

Subtitle D - State or Regional Solid Waste Plans

Subtitle D authorizes the provision of technical and financial assistance to State and local governments for the development and implementation of solid-waste management plans. Such plans are to be prepared on the basis of identified geographic areas sharing common solid-waste management problems, and in accordance with guidelines promulgated by EPA. They are required to encompass consideration of the varying characteristics of individual States, including quality of groundwaters and ambient air, methods of waste collection, methods for closing and upgrading open dumps, markets for recovered material, and types of resource recovery systems.

In order to meet with EPA approval, a submitted State Plan must comply with the following requirements (Section 4003);

1. the plan shall identify the responsibilities of State, local and regional authorities in the implementation of the State Plan, the distribution of federal funds to the authorities responsible for the development and implementation of the State Plan, and the means for coordinating regional planning and implementation under the State Plan.

2. the plan shall prohibit the establishment of new open dumps within the State, and contain requirements that all solid waste shall be utilized for resource recovery, or disposed of in sanitary landfills, or otherwise disposed of in an environmentally sound manner.
3. the plan shall provide for the closing or upgrading of all existing open dumps within the State.
4. the plan shall provide for the establishment of such State regulatory powers as may be necessary to implement the plan.
5. the plan shall provide that no local government within the State shall be prohibited under State or local law from entering into long-term contracts for the supply of solid waste to resource recovery facilities.
6. the plan shall provide for such resource conservation or recovery and for the disposal of solid waste in sanitary landfills or any combination of practices so as may be necessary to use or dispose of such waste in a manner that is environmentally sound.

At a minimum, EPA will approve a State Plan so long as it satisfies the requirements of the guidelines (40CFR Part 256) which directly address Sections 4003(1), (2), (3) and (5) of RCRA (items 1, 2, 3, & 5 above), and it contains provisions for revision pursuant to 40 CFR 256.03 (see page IV-9).

In reference to requirement #3 noted above, the EPA has promulgated regulations setting forth criteria for classifying disposal facilities as either "sanitary landfills" or "open dumps". A national inventory of the latter existing in the United States will be published in the Federal Register under the title "Open Dump Inventory".

EPA is authorized to issue grants under this subtitle for the implementation of solid waste management programs for both plan development and implementation.

State and substate governments may receive such assistance providing the State has an approved solid waste management plan. Such grants may be offered to provide assistance in the form of facility feasibility studies, expert consultation, market analyses, legal expenses or other fiscal or economic investigations. However, monies generally cannot be used for construction or the acquisition of land.

Subtitle E - Duties of the Secretary of Commerce in Resource Recovery and Conservation

This subtitle directs the Secretary of Commerce to encourage greater commercialization of proven resource recovery technology by (Section 5001) providing;

(a) accurate specifications for recovered materials, (b) stimulation of development of markets for recovered materials, (c) promotion of proven technology, and (d) a forum for the exchange of technical and economic data relating to resource recovery facilities.

Subtitle F - Federal Responsibilities

Subtitle F stipulates that any Federal instrumentality having jurisdiction over any solid waste management facility or disposal site, or engaged in any activity resulting in the disposal or management of solid or hazardous waste, shall be subject to all procedural and substantive requirements of the Act, including those imposed by State and local jurisdictions.

In addition, beginning two years after enactment (October, 1978) each Federal procurement agency will be required to purchase only those items (exceeding \$10,000 in price) composed of the highest percentage of recovered materials available. Exemptions to this provision may be granted only when such items are not available within a reasonable period of time, or where such items fail to meet reasonable performance standards (Section 6002). EPA is further directed to prepare guidelines for use by these procurement agencies in complying with the recovered materials requirement.

Subtitle G - Miscellaneous Provisions

Pursuant to Subtitle G, any employee who has filed or caused to be filed any proceeding under this Act may not be discriminated against or fired from his work on the basis of such institution of proceedings. Also, upon adequate notice, any person may commence a citizen suit against any other person (including the U.S. government) who is alleged to be in violation of any permit, standard, or regulation under the Act or against the Administrator for alleged failure to perform any duty under the Act which is not discretionary. Accordingly, the Administrator may likewise bring suit to enjoin any handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which is presenting an imminent hazard to public health or the environment.

Subtitle H - Research, Development, Demonstration & Information

Under Subtitle H, EPA is granted broad authority to conduct and encourage a wide variety of studies and research related to solid waste management and disposal. It is also given authority to enter into contracts with public agencies or with private persons for construction and operation of full-scale demonstration facilities or to provide financial assistance in the form of grants for new or improved technologies.

Conclusion

In summary, the Resource Conservation and Recovery Act of 1976 is a major environmental law which will profoundly impact the management of solid-waste throughout the nation. Its implementation is expected to; "(a) improve practices in solid-waste disposal to protect public health and environmental quality, (b) provide for regulatory control over hazardous waste from generation through disposal, and (c) firmly establish resource conservation as the preferred solid-waste management approach."

It is clear however, that the responsibility for the implementation and enforcement of RCRA lies primarily with the States. For its part, EPA is responsible for the establishment of criteria and regulations called for in the Act, but the Agency is not heavily invested with enforcement powers. Its greatest means of leverage is to be found in the various funding mechanisms it administers in support of mandated State activities. Fundamentally, EPA is empowered to intervene only when and if a particular State fails to act upon these mandates (except in instances of imminent hazard to public health or the environment).

4. Related Environmental Laws

Introduction:

As cited earlier, Section 1006 of RCRA requires the EPA to integrate all provisions of the Act with other Acts that grant regulatory authority to the Administrator. The intent of this provision is to prevent; (a) the duplication of administrative and/or enforcement effort, and (b) gaps in program coverage. These related environmental laws have been identified by EPA in the "Guidelines for Development and Implementation of State Solid Waste Management Plans (Federal Register - July 31, 1979)", and are described below in terms of their respective relationships to RCRA. The proposed means for effectuating this program coordination is not addressed here, but is assessed elsewhere in this State Plan (see Chapter IV - Planning Process).

a. The Clean Water Act of 1977

Section 208 of the Clean Water Act, as amended (33 U.S.C. 1288), provides for the identification of complex water quality problem areas and for the designation of areawide agencies to conduct water quality management planning. The State is responsible for such planning in all areas of the State for which an areawide agency has not been identified and for the coordination of all water

quality management activities within the State. As part of this effort, State and areawide agencies are to identify a process to control the disposition of all residuals (solid) waste which affects water quality.

Section 402 as amended (33 U.S.C. 1342), establishes the National Pollutant Discharge Elimination System (NPDES) governing the discharge of pollutants into the navigable waters of the U.S.. Permits issued under Section 402 should be coordinated with hazardous waste and solid waste management permits wherever applicable. Further, the State Solid Waste Management Plan (as authorized under RCRA, Subtitle D) should provide for necessary coordination with;

- (1) State or federal issuance of NPDES permits for facilities disposing of or utilizing municipal wastewater treatment sludge, including new facility permits and compliance schedules under existing permits;
- (2) State or federal issuance of NPDES permits for facilities disposing of or utilizing industrial pollution control sludges, including new and existing facilities; and
- (3) State or federal supervision of pretreatment programs requiring facilities to comply with requirements and compliance schedules before discharging into municipal sewer systems.

Section 404 of the Clean Water Act, as amended (CWA), charges the U.S. Army Corps of Engineers with responsibility for the issuance of permits for the discharge of dredged or fill material into the waters of the U.S.. States may assume this permit responsibility if they have a program which satisfies the requirements specified in Section 404. States are required by EPA guidelines

to at a minimum coordinate the State Plan with the dredge and fill permit program, particularly in regard to the siting of disposal facilities.

b. The Safe Drinking Water Act of 1974

Section 1442 (a)(8)(C) of the Act, as amended (SWDA) (42 U.S.C. 300j-1), requires a nationwide study of the nature and extent of the impact on underground water of ponds, pools, lagoons, pits or other surface disposal of contaminants in underground water recharge areas. Such impoundments which are found to violate the disposal criteria issued under Section 4004 (RCRA) should be listed in the Open Dump Inventory (Section 4005 (b)), and be liable for closure or upgrading (Section 4005 (c)). In addition, those impoundments receiving hazardous wastes are subject to the regulations for hazardous waste disposal facilities promulgated under Subtitle C of RCRA.

c. The Clean Air Act of 1977

RCRA coordination with State Implementation Plans (SIP) as authorized under Section 110 (a)(1) of the Clean Air Act is required. EPA guidelines emphasize the need for full and timely coordination of plans for resource recovery systems with the requirements (including prevention of significant deterioration) of State Implementation Plans. These plans may place certain restrictions on the development of incineration facilities in designated non-attainment air quality control districts.

d. The Surface Mining Control & Reclamation Act of 1977

Title IV of the Surface Mining Control and Reclamation Act (30 U.S.C. 1231) provides for the establishment of a fund for the reclamation of abandoned mining lands. To be eligible to receive this funding, States must first develop an enforcement program for wastes from active mines, subject to the Department of the Interior and EPA approval (Title V). All mine wastes must be disposed of in accordance with performance standards to be promulgated by the Office of Surface Mining, Department of the Interior. Coordination of these programs will facilitate the inventory of mining wastes and may

increase the beneficial use of sludge as a soil conditioner in the reclamation of abandoned lands.

e. The Endangered Species Act of 1973

EPA guidelines under RCRA require that the State Plan provide for coordination with the Office of Endangered Species, Department of the Interior, in order to insure that solid-waste management activities do not jeopardize the continued existence of an endangered or threatened species, nor result in the destruction or adverse modification of a critical habitat (Section 7 (a)) (ESA) (16 U.S.C. 1530 et. seq.).

B. STATUTORY AUTHORITY FOR SOLID WASTE MANAGEMENT IN ARIZONA

Introduction

All governmental activities in Arizona are authorized by State law as embodied in the Arizona Revised Statutes (A.R.S.). These statutes empower the various State and local instrumentalities to carry out assigned responsibilities within specified jurisdictions. As such, these laws may be viewed as the basic resources or tools by which government operates within the State.

The multiplicity of statutes now in existence in Arizona is too vast to accomodate its concise condensation in this section. Consequently, our purview will be limited to those statutes which specifically enable the State to comply with the requirements of RCRA.

As cited earlier, Section 4003 of RCRA contains the "minimum requirements for approval of State Plans". As they pertain to Arizona, the powers of the State to address these requirements must be predicated upon existing State law. Accordingly, it is the purpose of this section to identify those statutes which will enable the State to comply with these specific federal requirements. Discussion will be limited to authorities now in existence, and no attempt will be made herein to assess their adequacy.

1. Responsibilities of State, Local and Regional Authorities

Section 4003(1)(A) of RCRA requires that the State Plan identify the responsibilities of State, local and regional authorities in the implementation of the State Plan. Some of these responsibilities are defined by existing State statutes, while others are to be identified in this planning

document. Our immediate interest lies in the former.

Under A.R.S. § 36-132.A.1., the Department of Health Services (ADHS) is the designated State agency charged with protecting the general health of the people of Arizona. With respect to solid waste, the Department is authorized to prepare a comprehensive statewide solid waste management plan for the collection, storage, transportation, processing, reclamation and disposal of solid wastes (36-132.01.A.). This statewide plan is to be developed in consideration of local plans submitted to the Department (36-132.01.B.), and all political subdivisions of the State are authorized to receive and expend federal grant funds in conjunction with the preparation of the statewide plan (36-132.01.D.). The first such plan for Arizona was adopted in 1973, and this current document represents its first formal revision and update.

The Director of ADHS is empowered to perform all duties necessary to carry out the functions and responsibilities of the Department (36-136.A.2.), to exercise general supervision over all matters relating to health and sanitation throughout the State (36-136.A.6), and to adopt such regulations as may be deemed necessary to implement the State Plan (36-132.01.C.). More specifically, the Director may prescribe reasonably necessary regulations regarding the storage, collection, transportation, treatment, handling, disposal and reclamation of human excreta, garbage, trash, rubbish, manure and other objectionable wastes (36.136.G.9. & 10.),

Under A.R.S. § 36-136.D., the Director may delegate powers to local health authorities, and such local authorities are empowered to adopt ordinances, rules and regulations equal to or more restrictive than those promulgated by the State (36-136.H.), subject to the supervisory control of the Director

(36-162.B.).

In addition to its solid waste responsibilities, ADHS is also the designated agency for air and water pollution control programs in Arizona, which operate under a host of enabling statutes (for water pollution, see A.R.S. § 36-1851 through 36-1864) (for air pollution, see A.R.S. §36-1700 through 36-1780).

For their part, county governments are authorized to form sanitary districts (36-1309) which may construct and operate sewage and solid waste systems (36-1310). Both cities and counties may establish pollution control and industrial development corporations in order to provide facilities for solid waste management (9-1151, et seq., 9-1221, et seq.).

Counties, and incorporated cities and towns are required to provide public dumping grounds (9-441.A.), and are authorized to purchase, lease or otherwise acquire control of sufficient property for such purposes (9-441.B.). In addition, they may levy fees upon commercial collectors in order to defray the costs of operating such dumping grounds (9-441.C.). This particular statute, A.R.S. § 9-441, mandates that it is a local government responsibility to provide for adequate disposal capacity, whether it be on land, or by some other method. The financial burden of acquiring, developing, maintaining and operating such disposal capacity also lies with local government. Local solid waste management plans should adequately address these needs.

The responsibilities of regional authorities are not clearly defined in Arizona statutes. They are, however, addressed by several directives from the Governor's office. These will be discussed at greater length in a following segment (see page V-21).

2. Distribution of Federal Funds

Section 4003(1)(A) also requires that the State Plan identify the distribution of federal funds to the authorities responsible for the development of the State Plan. To date, no systematic formula for the distribution of such federal funds has been implemented. However, some \$25,000 of "Subtitle D" funds were subvented by ADHS to the regional Councils of Governments in FY 79. Existing statutes do not presume that such a formula exists, but do grant authority to certain instrumentalities to receive and expend such funds.

A.R.S. § 36-132.B. authorizes ADHS to accept grants and enter into contracts with the Federal Government to carry out it's assigned purposes. More specifically, A.R.S. § 36-132.01.D. provides that the Department (ADHS), counties and incorporated cities and towns may accept and expend in accordance with the terms of the grant (RCRA), any funds provided by the Federal Government for the purpose of preparing, updating or implementing the comprehensive statewide solid waste management plan. In addition, local health authorities are similarly authorized to accept and expend any State financial assistance that may be received from ADHS (36-132.A.2.).

3. Means for Coordinating Regional Planning

Section 4003(1)(c) further requires that the State Plan identify the means for coordinating regional planning and implementation under the State Plan. In the past, much of this coordination has been accomplished through delegations of authority and traditions of cooperation between agencies. However, in many instances these relationships have not been formalized through cost-sharing or other such financial arrangements, primarily due to limited program funding. This has operated as a serious limiting factor, with such coordination often falling far short of the ideal.

Nevertheless, authorities in this respect are well defined. In response to the Intergovernmental Cooperation Act of 1968 (P.L. 90-577), the Governor of Arizona issued Executive Order 70-2 (7/8/70) establishing six planning districts throughout the State. This order decreed that all planning functions currently underway, or to be undertaken, on a district, regional or areawide basis, be coordinated in conformance with these designated areas or combinations thereof. The stated purpose of this order was to encourage State and local planning agencies to work together in using common or consistent planning bases, and in sharing planning facilities and resources. Implicit in this order, was the desire to avoid needless overlap, duplication and/or resource competition.

In a letter to EPA Region IX, dated January 10, 1979, the Governor officially designated responsibilities for solid waste planning in Arizona. The Department of Health Services (ADHS) was named as the lead agency for the development and implementation of a comprehensive solid waste management plan, and the six Councils of Governments (planning districts) were authorized to undertake supporting areawide planning activities.

As a result of these decrees, a structural framework for the coordination of regional planning and implementation was established, whereby comprehensive State planning under RCRA would be focused in ADHS with areawide responsibilities delegated to the various planning districts.

4. Prohibition on Open Dumping

In accordance with Sections 4003 (2) and 4005(c), the State Plan must prohibit the establishment of new open dumps within the State, and contain requirements that all solid waste shall be; (a) utilized for resource recovery, (b) disposed of in sanitary landfills, or (c) otherwise disposed of in an environmentally sound manner.

The act of open dumping is expressly prohibited under State law, and the public is afforded adequate legal protection. The Arizona Criminal Code (A.R.S. § 13-1603) holds that ". . . a person commits criminal littering or polluting if such person without lawful authority:

- 1) throws, places, drops or permits to be dropped on public property or the property of another which is not a lawful dump, any litter, destructive or injurious material which he does not immediately remove; or
- 2) discharges or permits to be discharged any sewage, oil products or other harmful substances into any waters or onto any shorelines within the State; or
- 3) dumps any earth, soil, stones, ores or minerals on any land.

Such criminal littering or polluting constitutes a class 2 misdemeanor, and graduates to a class 1 misdemeanor if such act involves the placing of any destructive or injurious material on or within fifty (50) feet of a highway, beach or shoreline of any body of water used by the public.

As a supplement to this prohibition, A.R.S. § 9-499 authorizes city or town councils to adopt local ordinances compelling property owners to remove any rubbish or debris constituting a hazard to public health or safety. In addition, city and county boards of health are authorized to investigate all nuisances, sources of filth and causes of sickness, and to adopt regulations necessary for the protection of public health and safety (A.R.S. § 36-167).

Most importantly, ADHS regulations require that all refuse shall be disposed of in an approved manner (A.C.R.R. R9-8-431), including sanitary landfill, incineration, composting, garbage grinding and hog feeding, and that approval be obtained from the Department for all new disposal sites or methods used

for disposal prior to the start of operations (A.C.R.R. R9-8-432). These regulations in particular provide the Department with an appropriate regulatory mechanism for the control and prohibition of new open dumps, for prior to the approval of any new solid waste disposal facility, plans for the operation of that facility must be submitted and reviewed.

State statutes also provide for the resource recovery option insofar as ADHS is authorized to ". . . prescribe reasonably necessary standards and measures regarding the . . . reclamation of garbage, trash, rubbish, manure and other objectionable wastes (36-136.G.10.)."

5. Closure or Upgrading of Existing Open Dumps

Section 4003 (3) of RCRA requires that the State Plan provide for the closing or upgrading of all existing open dumps within the State pursuant to the requirements of Section 4005.

Under A.R.S. § 36-136.A.4., the Director of ADHS is empowered to administer and enforce the laws relating to health and sanitation and the rules and regulations of the Department. Accordingly, the Director may provide for the examination of any premises if there is reasonable cause to believe that a violation exists of any health law, rule, or regulation of the State (36-136.A.5.). Any person found to be in violation is guilty of a misdemeanor, and subject to fine, imprisonment, or both (36-140). In instances of endangerment to public health, the Director is authorized to issue cease and desist orders (36-601.B.), and to enjoin recalcitrant parties in County superior court (36-136.C.). Specific Departmental regulations which enable the State to take administrative, civil and criminal actions against "open dump" facilities are cited elsewhere in this State Plan (see Chapter VIII- Section D).

In addition, all official acts of either the Director or the Department

are subject to the pertinent provisions of the Administrative Procedures Act (41-1001. et seq.). This Act established procedures for; (a) the adoption of rules and regulations (including emergency rules), (b) the giving of notice, (c) the giving of rights to respond and present evidence and argument in contested cases, and (d) for the rendering of administrative decisions supported by substantial evidence and subject to administrative rehearing and judicial review (36-111 thru 36-116).

The adoption or legality of any rule or regulation may be challenged by filing an action for declaratory judgment in the Superior Court of Maricopa County (41-1007). Administrative decisions in contested cases may be appealed to the Superior Court for judicial review; and such review may, upon proper demand, consist of a trial de novo, and include trial by jury (12-901. et seq.).

6. State Regulatory Powers

Section 4003 (4) of RCRA requires that the State Plan provide for the establishment of such State regulatory powers as may be necessary to implement the plan.

Such authority is specifically vested in the Director of ADHS; who, under A.R.S. § 36-132.01.C., may adopt such reasonable regulations as may be deemed necessary to implement and/or update the comprehensive statewide solid waste management plan.

7. Long-term Supply Contracts

Section 4003(5) of RCRA requires that the State Plan provide that no local government within the State be prohibited under either State or local law from entering into long-term contracts for the supply of solid waste to re-

source recovery facilities.

So long as a long-term contract entered into by a political subdivision of the State does not involve any payment to a resource recovery facility for the disposal of solid waste through any resource recovery process, there is no limitation on the duration of such contract under present Arizona law. In any such agreement however, the precise length or period of the contract must be specified (11-952.B.1.). A.R.S. § 11-952 sets forth the conditions governing all intergovernmental agreements and contracts made between or among two or more governing bodies, but is generally silent on the question of the duration period of a contract executed by a political subdivision.

In the event that a county or municipality were required to pay a resource recovery facility for solid waste disposal through such facility, the validity of the contract would be subject to certain fiscal limitations imposed by law. These limitations apply primarily to bonded indebtedness.

Under Article 9 § 8 of the Arizona Constitution as amended, all bonded indebtedness sought by counties and municipalities is subject to voter approval. In most instances, a 6% annual increase limitation applies (based upon the value of taxable property). However, a municipality may incur additional debt of up to twenty percent for the purpose of providing water, electric lights and sewer facilities. Counties and school districts may incur additional indebtedness of up to fifteen percent for certain purposes as well.

Local government budget increases are constrained by a variable expenditure limitation based upon population increase and the GNP implicit price deflator. However, garbage or rubbish utility plants or systems are specifically exempted from this provision (9-521.4.). A.R.S. § 9-521 et seq. sets forth a procedure

whereby a municipality can issue revenue bonds to finance a municipally owned or operated utility enterprise, and where such financing is employed, no constitutional or statutory debt limitation applies. Other exceptions to this debt ceiling include; (a) contractual agreements not requiring the use of funds, (6) federal grants, and (c) revenue sharing entitlement funds.

Municipal governments are authorized to award public utility franchises for periods up to 25 years in duration (9-501 et seq.). In addition, cities may form Industrial Development Corporations (9-1151) or Pollution Control Corporations (9-1221). Either of these types of non-profit corporations might be utilized for activities involving solid waste management, and either would be highly suitable for the provision of resource recovery facilities.

Except for constitutional and statutory debt limitations, there is no provision of Arizona law which would affect the validity of a long-term contract with a county or municipality for the supply of solid waste to a resource recovery facility, and a carefully drafted contract could accommodate these fiscal requirements as well. In general, Arizona statutes contain many provisions that would actually assist the construction, financing, and operation of resource recovery facilities within the State.

In regards to possible prohibitions against long-term contracts under local law, none are currently known to exist. However, should such a local law exist, it would be within the authority of the municipality to rescind the law in its own interest.

8. Resource Conservation

Section 4003 (6) of RCRA requires that the State Plan shall provide for such resource conservation or recovery and for the disposal of solid waste in sani-

tary landfills or any combination of practices so as may be necessary to use or dispose of such waste in a manner that is environmentally sound.

The essential thrust of this requirement focuses on resource conservation and recovery, with the clear implication that States should be doing everything within their power to encourage and accomodate such environmentally sound waste disposal practices. The approach taken by the Federal Government in this regard has been to require that all federal procurement agencies purchase only those items comprised of the highest practicable percentage of recovered materials. This mandate is embodied in Section 6002 of RCRA. However, in defining the term "procurement agency", RCRA states that such definition also includes any or all State agencies or local governments using appropriated federal funds for such procurement, and all persons contracting with such agencies for work to be performed under such contract. Consequently, our discussion here will concern the existing authority of the State to procure recovered materials from the waste stream.

Under State law, the Purchasing Section of the Finance Division, Arizona Department of Administration, is required to (41-721 et seq.);

- (a) investigate and review the type, cost, quality and quantity of supplies, materials, equipment and contractual services presently used by all budget units of the State, and the methods by which such supplies, materials, equipment and contractual services are acquired, delivered, accepted, stored and distributed by all budget units.
- (b) prescribe standards of quality, standard specifications and methods for the acquisition, delivery, acceptance, storage, retention and distribution for all supplies, materials, equipment and contractual services of budget units.

Acting through the Purchasing Section, the Assistant Director for Finance may also authorize any budget unit directly to purchase, rent or otherwise provide for certain specified supplies, materials, equipment or contractual services (41-729.B.). For this purpose, a "budget unit" is defined as any department, commission, board, institution or other agency of the State organization receiving, expending or disbursing State funds or incurring obligations against the State (35-101.5.). Procedures are prescribed for all purchases in excess of \$5,000, and must be made by sealed competitive bids (41-730). School districts are the only political subdivisions of the State required to procure in a conforming manner (15-102.27.).

In sum, there is little probability of conflict between State procurement law and the requirements of 42 U.S.C. 6962.(c). No provision in existing State statutes prohibits State budget units from specifying that procurement items must contain the highest percentage practicable of recovered materials. Although this is not the current purchasing practice, there is no insurmountable legal obstruction to its being implemented.

All political subdivisions, except school districts, are independent of the State procurement statutes administered by the Finance Division of the Arizona Department of Administration. However, all political subdivisions retain the option of purchasing through the Finance Division (41-731) should it be deemed advantageous for them to do so.

9. State Plan Revision

As another condition of plan approval, Section 4007 (a) (2) of RCRA requires that the State Plan provide for its own revision, after notice and public hearing, whenever the Administrator (EPA) determines that;

- (a) revised regulations respecting minimum requirements have been

promulgated with which the existing State Plan is not in compliance;

- (b) information has become available which demonstrates the inadequacy of the plan to effectuate the purposes of Subtitle D;
- (c) such revision is otherwise necessary.

The enabling legislation providing for the preparation of a State Plan, clearly provided for its updating as well. The Director of ADHS is authorized to adopt such reasonable regulations as may be deemed necessary to either implement or update the statewide plan (36-132.01.C.).

Conclusion

In conclusion, it appears that the State of Arizona is well prepared to receive and to satisfy the legal requirements imposed by the Resource Conservation and Recovery Act. Thus far, this chapter has reviewed the mandates of the Act, and the resources available in the State to meet these various challenges. We have found that the powers of the State are fundamentally adequate to meet the minimum requirements for the approval of State Plans, and that the State possesses the potential and the capability to go well beyond. Consequently, the decision to develop new legislation for solid waste management will be primarily a matter of choice rather than necessity.

C. LEGAL ISSUES NEEDING FURTHER CLARIFICATION

The foregoing section concluded that the legal powers available to the State of Arizona were fundamentally adequate to meet EPA's minimum requirements for approval of the Arizona solid waste management plan and program (RCRA Section 4003). This discussion assessed and reconciled the relationship between federal law and state law within the general context of solid waste management.

There are other legal issues however, which also need to be raised and documented. These issues pertain to the legal relationships between the State of Arizona and its political subdivisions (i.e. cities, towns, counties, sanitary districts, etc.) relative to solid waste management authority.

State statutes are the vehicle by which legal powers and authorities are transferred or delegated to local units of government. In Arizona, certain state statutes pertaining to solid waste management are somewhat vague in terms of the actual authorities they delegate, while others have resulted in the creation of undesirable management voids. These concerns have been repeatedly expressed to ADHS by various local governments through a variety of modes. It is felt that these issues which have been raised by political subdivisions of the state merit recognition and further clarification. Such clarification would better enable these local governments to execute their solid waste management responsibilities as prescribed under existing state law.

Accordingly, the purpose of this final section is to identify and document these issues. The appropriate vehicle for resolving these issues is not the Arizona Solid Waste Management Plan. This is because these issues raise

legal questions which can only be satisfactorily resolved through either a legal or legislative process. Nevertheless, it is hoped that their identification herein will ultimately contribute to and lead toward such a resolution. For this reason, they are presented in this context merely as a point of departure.

At the present time, the State Plan does endorse legislative change which would authorize the Director of ADHS to assess civil penalties for certain classes of violations (see Table VII-D-VII). This enabling legislation is deemed necessary in order for ADHS to effectively and expeditiously respond to situations of public health endangerment. Such authority would be particularly helpful in terms of dealing with problems of illegal dumping.

Because this legislative change would enhance the ability of ADHS to implement its solid waste management program, and supplement its authority to enforce state and federal laws relating to public health and the environment, the State Plan does offer an endorsement of this proposed civil penalty legislation.

The legal issues identified below however, may require further clarification before a determination can be made as to whether or not legislative change will be necessary or appropriate. For this reason, ADHS would support a legal clarification of these issues, to the extent necessary, but reserves its endorsement of any legislative change in this regard for the present time.

User Charge Financing

With recent tax reform, local governments have become increasingly interested in the concept of user-charge financing for solid waste management. This financing method, based upon the "enterprise concept", would allow solid waste collection and/or disposal systems to operate in a self-supporting manner. In

the case of public disposal systems (landfills), local governments are authorized to levy user fees upon commercial refuse collectors who utilize public facilities for refuse disposal purposes. Revenues derived from this source may then be applied to defray the costs of facility maintenance and operation. Existing state law however, is silent on the issue of whether or not such public systems may levy comparable charges upon private citizens for their individual use of such facilities.

Solid Waste Collection

Existing state statutes are unclear in terms of the authority granted to local governments for the control of solid waste collection. This issue involves the ability to award collection franchises as well as the ability to control the ultimate disposition of solid wastes (waste flow). It also has implications from a revenue standpoint, and may affect the viability of resource recovery activities and/or projects. Certain county governments in Arizona have asserted control over collection franchises in the past, but have now been advised by legal counsel that such control may be beyond the limits of their authority. Incorporated cities and towns have a wider latitude in this respect, but have not been delegated any specific authority under state law for this purpose. By means of a local ordinance, a municipality may assume authority to award franchises for solid waste collection so long as such franchises are not exclusive, and do not result in monopolies.

Scavenging

Public landfill operating authorities have voiced concern over a perceived lack of enforcement authority regarding scavenging. Although scavenging is prohibited by state health regulation, local law enforcement agencies are

in need of better enforcement tools in order to adequately deal with this problem. The issuance of trespassing citations for scavenging violations at landfills is regarded as an inadequate enforcement tool, because such citations are difficult to verify and prosecute. This situation discourages local enforcement, and contributes to the overall scavenging problem.

Litter Control

Existing litter control legislation in Arizona is generally regarded as inadequate. The problem persists and continues to grow. Current penalty provisions have failed to serve as an effective deterrent, and violations are difficult to enforce and prosecute. New legislation which would hold each producer or generator of solid waste responsible for its proper disposal has been suggested as one possible means of augmenting local enforcement capabilities and alleviating this problem.

Facility Siting

Existing state law imposes certain restrictions upon the siting of public solid waste disposal facilities. Specifically, no public disposal facilities are allowed within one mile of any incorporated city, town or residential area, or within one-quarter mile of any federal or state highway, park, recreational area or monument. In view of present economic and energy constraints, and improvements in disposal technology, the complaint is often heard that these siting restrictions are no longer realistic. In addition, if these restrictions were to be rigorously enforced, it would result in the closure of numerous facilities which are critically needed. Such an action would also entail enormous relocation costs.

Regionalization

With rapidly escalating disposal costs, local management agencies are now focusing greater attention upon opportunities for the regionalization of solid waste disposal systems. This approach is cost-effective insofar as it allows for cost-sharing, and the pooling of limited resources. Operational cost-sharing via intergovernmental agreement is sanctioned under existing state law, but there are unresolved questions regarding the authority of local governments to jointly own solid waste disposal facilities. If this authority is now lacking, it presents a situation which should be rectified.

CHAPTER SIX

THE ENVIRONMENTAL SETTING

CHAPTER VI
THE ENVIRONMENTAL SETTING

A. Overview

The purpose of this chapter is to identify and describe the various environmental consequences associated with improper solid waste disposal practices. As they pertain to Arizona, these consequences are of vital concern to both the quality of life and the environment. Potentially adverse impacts will be discussed in terms of their relationship to disposal facility performance and design-criteria promulgated by the U.S. Environmental Protection Agency (EPA), and alternative remedies and control measures will be reviewed for mitigating or eradicating undesirable outcomes.

B. Introduction

When improperly managed, solid waste disposal activities may result in the pollution of precious air, land and water resources. They may also adversely effect public health and well-being. Proper solid waste management is therefore essential to the maintenance of protection for both public health and the environment.

A fundamental corollary to this tenet is that solid waste disposal facilities are a necessary component of solid waste management. Despite increased

efforts toward resource and energy conservation and recovery, it is safe to assume that there will be a strong and continuing need for solid waste disposal sites. These sites must necessarily be situated on land (landfills, surface impoundments, landspreading operations), but for political, economic and other reasons, suitable new sites are becoming increasingly difficult to obtain. Consequently, in order to meet the dual goals of protecting public health and the environment, it is important to ensure that disposal facilities remain available, that new sites can be obtained, and that all available sites are located, designed, constructed, operated and maintained in an environmentally sound manner.

There are two very basic ways to mitigate the environmental damage resulting from solid waste disposal. The first is to generate less waste, and the second is to recover and reuse the valuable resources contained in waste. Either approach will save energy and materials while concurrently reducing pollution.

In 1976, Congress enacted sweeping legislation designed to espouse these national goals. Known as the Resource Conservation and Recovery Act (RCRA), its stated objectives were the protection of health and the environment, and the conservation of valuable energy and material resources. Central to the purpose of this Act, was the establishment and implementation of environmentally sound solid waste disposal practices.

In order to achieve this objective, Congress mandated that EPA prepare and promulgate criteria for solid waste disposal facilities and practices

which would allow for a determination of whether or not, and to what extent they presented a reasonable probability of adversely impacting either public health or the environment (Sections 4003, 4004, 4005 of RCRA).

These final regulations were published in the Federal Register on September 13, 1979, and were entitled "Criteria for Classification of Solid Waste Disposal Facilities and Practices".

These criteria established minimum levels of protection to be afforded by all solid waste disposal facilities and practices. They set forth both performance and design criteria that address eight broad classes of potential health and environmental effects attributable to solid waste disposal activities. These include; (1) floodplains, (2) endangered species, (3) surface water, (4) ground water, (5) foodchain crops, (6) disease, (7) air and (8) safety, and are structured so as to define unacceptable impacts. RCRA further provided that those solid waste disposal facilities found to be in violation of any of these criteria, would become subject to State actions geared toward closure or upgrading of such facilities.

This chapter has been organized on the basis of these criteria. It is divided into eight sections, with each addressing a separate impact category as defined by the criteria. Each section defines related environmental impacts, describes federal regulatory standards, and identifies alternative control technologies. It has been structured in this manner so as to assist the reader in comprehending both the nature of the problem and the expected performance standard of the operating facility or practice.

C. Floodplains

In the context of solid waste disposal, floodplains represent a critical interface between land and water resources where serious pollution and health problems may arise. They are generally identified as environmentally sensitive areas, and as such, are recognized as valuable natural assets which are ecologically productive and/or important. For this same reason, they are particularly vulnerable to improper waste disposal practices.

Historically, floodplains have played a major role in the land disposal of solid waste in Arizona. This has occurred primarily because urbanization in the State has tended to locate in proximity to rivers and intermittent watercourses, and lands adjoining such watercourses were relatively inexpensive and/or generally well suited for disposal purposes in terms of relief. The Phoenix metropolitan area, being traversed by the Salt, Agua Fria and New Rivers, presents one example for this trend. Dozens of landfills have existed in these floodplains in the past, and some nine or more will in all probability remain active as of this printing. The situation in Tucson along the Santa Cruz & Rillito Rivers, as well as in other Arizona communities, is basically similar. During periods of heavy storm runoff, these watercourses may reach flood stages, potentially subjecting the adjacent landfill sites to either inundation or wash-out. Only very recently has State and Federal law required that attention be given to upgrading these sites for the protection of health and the environment.

As a guideline, EPA has defined floodplains as "...the lowland and relatively flat areas adjoining inland and coastal waters which are inundated by the base

flood." Accordingly, "base flood" has been defined as a flood that has a one percent or greater chance of recurring in any given year, or a flood of a magnitude equalled or exceeded once in 100 years on the average over a significantly long period. It must be noted however, that floodplains are not characterized by static boundaries. To the contrary, their boundaries may fluctuate widely in concert with a host of natural and cultural influences.

From a statewide perspective, floodplains have numerous beneficial uses. They provide fertile soil for the production of food-chain crops, serve as vital conduits for storm drainage and flood control, offer supplies of water for municipal, industrial and agricultural use, facilitate the recharge of ground water aquifers, preserve forage and habitat for wildlife, and afford opportunities for aesthetic and recreational appreciation and pursuits. Because of these inherent values, the protection and maintenance of floodplain viability is rightfully a matter of public concern.

Recent State and federal laws have provided certain basic tools for proper floodplain management, and have increased public awareness of the significance of this essential resource. However, they have not prohibited the land disposal of solid waste in floodplain or flood prone areas. Federal policies have focused on the mitigation of adverse impacts associated with the occupancy and modification of floodplains by discouraging federal support of developments within floodplains whenever and wherever feasible alternatives exist. The U.S. Department of Housing and Urban Development has been quite active in this respect, in terms of

both mapping 100 year floodplain boundaries and administering the national flood insurance program. More recently, the EPA has become involved in the interest of protecting water quality. Other concerned agencies include the Corps of Engineers, the U.S. Geological Survey and the Soil Conservation Service.

For its part, the State of Arizona has been actively engaged in the planning and promotion of structural modifications within floodplains to divert, store and direct floodwaters. These interests have been primarily manifested in channelization and impoundment projects. More importantly, the State has also taken positive steps to regulate and control developments within flood prone areas. Enacted in 1973, ARS Sec. 45-2342 directed the Arizona Water Commission to; (a) prepare criteria for the delineation of 100 year flood areas, (b) to instruct all cities, towns and counties to delineate such areas within their jurisdiction, and (c) to require the governing bodies to adopt floodplain regulations for these areas to control building practices and land uses within them.

The recent federal regulations regarding the "Classification Criteria for Solid Waste Disposal Facilities" (Federal Register, 9-13-79) also fall short of an outright prohibition on landfilling in floodplains. They do however, contain requirements that waste disposal facilities or practices in floodplains shall not; *(a) restrict the flow of the base flood, (b) reduce the temporary water storage capacity of the floodplains, or (c) result in a washout of solid waste which would pose a hazard to human life, wildlife, or land or water resources.* In the event a particular landfill site should fail to meet any of these minimum requirements, it would become subject to listing in the Open Dump Inventory, and to closure or upgrading prescriptions.

Although not a complete panacea, these regulations should afford the State an enhanced degree of floodplain protection. This protection is desirable because of the many and varied adverse effects associated with landfilling in floodplain areas. Such practices may result in noxious wastes being carried downstream by floodwaters to the detriment of public health, water quality and physical structures. Landfilling within a floodplain may also restrict the flow of floodwaters, thereby generating backwater and higher flood stages upstream. Conversely, filling in the floodplain may reduce the size and effectiveness of its floodflow retaining capacity, thereby causing an accelerated flow velocity with consequent higher stages and damages downstream.

In addition to these potential life and property losses, significant environmental costs may be incurred by the erosion and degradation of riparian soils. Floodplains have a direct hydraulic connection to wetlands, surface water and ground water, and waste disposal may further result in leachate contamination through runoff, percolation or seepage. Landfill washout may contribute to the degradation of aquatic life and further augment problems of siltation. The potential consequences to human health are readily apparent, and must include aesthetic as well as pathogenic considerations.

The location of landfills outside the floodplain would minimize the impact of these effects on human health, safety and welfare. It should therefore be both a goal and a policy of the State of Arizona to realize this ultimate objective. In the future, new landfills should not be developed in designated floodplain areas.

Where no feasible alternative for siting exists, the greatest care should be taken to design, construct, operate and maintain such facilities in the most environmentally sound manner practicable. At a minimum, such facilities will be required to satisfactorily demonstrate to the department that; (a) their operation will pose no significant threat of contamination to surface or ground water resources, (b) that adequate protection has been provided against flood inundation and wash-out, and (c) that a responsible party has assumed legal liability for closure and post-closure site monitoring and maintenance.

D. Endangered Species

Climatic and topographical diversity has endowed the State of Arizona with a rich inheritance of plant and animal life. Nearly 300 different mammals are known to exist within its borders, and fish, bird, reptile, amphibian and floral species abound with similar variety.

In recent years however, the population, composition and range of these various life forms, particularly fauna, have been greatly impacted by man. This has occurred primarily through major modifications to the environment, including the damming of rivers, the pumping of groundwater, the construction of roads and buildings, and the development of land for agricultural use. Areas of wildlife habitat are particularly sensitive to these encroachments, and have been steadily destroyed in the face of unrelenting developmental pressures. In some cases, this degradation of habitat, combined with sport killing and a reduction in forage, has resulted in a threat to the very survival of certain species. Already; four fish, two bird, and four mammalian species formerly resident in Arizona are no longer in evidence. Six other species are now in imminent peril of being eradicated from the State, and 18 others are expected to be in jeopardy in the foreseeable future (see table VI-I).

The improper disposal of solid wastes may further contribute to faunal demise by causing the release of toxic substances into their habitat. This may result in the contamination of critical food and water supplies, and the degradation of vegetation necessary for animal shelter. Also worthy of mention in this context, is the symbiotic interdependence of these various species in the natural food chain. The elimination of any one, may have serious adverse consequences on the continued survival of numerous others. The construction and operation of waste disposal facilities

may also restrict the free movement and forage of animal species, and disturb their habitats through the generation of noise, light, dust and other symptoms of human activity.

The growing public awareness of the need to protect endangered plant and animal species was nationally recognized in 1973, with the passage of the Endangered Species Act. The singular purpose of this Act was to arrest the precipitous decline of wildlife species native to the United States. This legislation directed the U.S. Fish and Wildlife Service to identify those species threatened with extinction, and to provide protection for their continued survival. Section 7 of the Act required all federal agencies to consult with the Department of the Interior (DOI) in this regard, and to use their respective authorities in such a manner as to promote the purposes of the Act.

The Act also directed the Secretary of the Interior to identify, and protect from further modification or destruction, those habitats critical to the continued existence of any endangered species. To date, such areas have been designated in four states, and are intended to protect five such species; the snail darter, American crocodile, California condor, Indiana bat and Florida manatee (50 CFR, Part 17, Subpart F). Any specific geographical area so designated may not be developed or modified for any purpose that will jeopardize the continued existence of the particular species targeted for protection.

The Act further required the preparation and promulgation by DOI of a list of Endangered and Threatened Wildlife and Plants. This listing is global in scope,

presently contains over 700 such species and subspecies, and is regularly updated and expanded. As it pertains to Arizona, the list currently contains ten animal species threatened with extinction in the State. Five plant (cacti) species native to Arizona were also added to the endangered list in May of 1980, including; (1) the Nichol's Turk's head cactus, (2) the Arizona hedgehog cactus, (3) the Brady pincushion cactus, (4) the Peebles Navajo cactus, and (5) the Silver pincushion cactus. Up-to-date information regarding the status of this list may be obtained in Arizona by contacting:

U.S. Fish and Wildlife Service
2453 West Indian School Road
Phoenix, Arizona 85017
(Telephone - 602/261-6833)

OR

Arizona Game and Fish Department
2222 West Greenway Road
P.O. Box 9099
Phoenix, Arizona
(Telephone - 602/442-3000)

TABLE VI-I - ARIZONA THREATENED WILDLIFE AS CLASSIFIED BY ARIZONA GAME AND FISH DEPARTMENT - January 1976

Species or sub-species formerly resident in Arizona that may possibly be re-established	Species or sub-species in danger of being eliminated from Arizona	Species or sub-species whose status in Arizona may be in jeopardy in the foreseeable future	Species or sub-species sufficiently limited in distribution in Arizona that major ecological disturbances could jeopardize their existence in the State
<u>FISH</u>			
*Gila Trout Yaqui Shiner	*Humpback Chub Mexican Stone-roller	**Arizona Trout Gila Chub	Round-tailed Chub Yaqui Chub
Yaqui Sucker	*Woundfin	Bonytail Chub	Little Colorado River Spinedace
Yaqui Catfish	*Colorado River Squawfish Loach Minnow Yaqui Topminnow	Razorback Sucker *Gila Topminnow	Virgin River Spinedace Spikedace Sonoran Chub Quitobaquito Pupfish
<u>REPTILES and AMPHIBIANS</u>			
None known	None known	Desert Tortoise Gila Monster	Western Barking Frog Green Toad Sonoran Green Toad Pacific Tree Frog Burrowing Tree Frog Tarahumara Frog Narrow-mouth Toad Desert Boa Green Rat Snake Mexican Black Kingsnake Hook-nosed Snake Vine Snake Rock Rattlesnake Twin-spotted Rattlesnake Ridgenosed Rattlesnake Western Massasauga
<u>BIRDS</u>			
Applomado Falcon *Masked Bobwhite	Mississippi Kite Gray Hawk *Southern Bald Eagle *Peregrin Falcon	Great Egret Snowy Egret Black-crowned Night Heron Black-bellied Tree Duck	Caracara Lucifer Hummingbird Coppery-tailed Trogon Tropical Kingbird

*Yuma Clapper Rail	*Mexican Duck	Thick-billed Kingbird
Black Rail	Zone-tailed Hawk	Beardless Flycatcher
Rose-throated	Black Hawk	Black-capped
Becard		Gnathatcher
Buss-breasted	Osprey	Five-striped Sparrow
Flycatcher		

MAMMALS

**Grizzly Bear	Yuma Mountain Lion	River Otter	Mt. Graham Spruce Squirrel
Wolf	Sonoran Pronghorn	Mexican Pronghorn	Kaibab Squirrel
*Black-footed Ferret		Desert Sheep	Apache Squirrel
Black-tailed Prairie Dog			

*On Federal Endangered List

**On Federal Threatened List

With the enactment of RCRA and other environmental legislation, the EPA has now become actively involved in the protection of such species as well. Under the final regulations, "Criteria for classification of Solid Waste Disposal Facilities and Practices" (Federal Register - September 13, 1979), the EPA specified minimum criteria for the protection of endangered species at solid waste disposal sites and facilities. These criteria hold that;

- (a) *facilities or practices shall not cause or contribute to the taking of any endangered or threatened species of plants, fish or wildlife; and that*
- (b) *the facility or practice shall not result in the destruction or adverse modification of the critical habitat of endangered or threatened species.*

In this context, "endangered or threatened species" is defined as any species so listed pursuant to Section 4 of the Endangered Species Act. "Destruction or adverse modification" is defined as a direct or indirect alteration of critical habitat which appreciably diminishes the likelihood of the survival and recovery of any such species using that habitat. Lastly, the term "taking" is defined to mean harassing, pursuing, hunting, wounding, killing, trapping, capturing, collecting or the attempt to engage in any such conduct.

Under RCRA, any solid waste disposal facility in violation of these criteria is subject to listing in the Open Dump Inventory, and possible subsequent closure or upgrading prescriptions. The State is charged with the primary responsibility for enforcing these regulations and for monitoring compliance.

As with floodplains, these regulations do not prohibit the siting of disposal facilities in critical habitat areas, but rather require that protective measures be taken

in the event there is no feasible alternative to such a siting. This ensures a measure of reasonableness and flexibility in the decision-making process, and allows for extenuating circumstances on an individual case-by-case basis.

It should be a policy of the State of Arizona to protect and preserve its natural wildlife heritage. Habitats critical to the continued existence of endangered species should therefore be aggressively studied, identified and so designated.

Wherever practicable, such areas should not be used for solid waste disposal purposes.

In instances where no alternative exists, the U.S. Fish and Wildlife Service and the Arizona Game and Fish Department should be consulted in the early stages of either new facility or expansion planning, and all possible mitigating measures should be employed to reduce the probability of adverse impact. In addition, prior to the commencement of operations, post-closure plans should be prepared to ultimately blend the finished site with the surrounding ecosystem so as to provide additional habitat and/or food supply for all animal species in the vicinity.

E. Surface Water

Water is the lifeblood of Arizona from virtually every standpoint. In the desert environment, it is relatively scarce in supply, and heavily in demand. All of man's various activities are fundamentally dependent upon it.

For several decades now, the consumptive use of water in Arizona has outpaced its natural replenishment, and a critical imbalance has steadily worsened. In 1970, some forty percent of the State's total water withdrawal was derived from surface sources, and nearly all such waters now in existence in the State have been substantially committed to one use or another. Consequently, the loss of any of these supplies to pollution or contamination would pose a serious and unacceptable outcome, whether great or small.

There is a direct relationship between the quality of surface waters, and the quantities of such water available for consumptive or beneficial uses. Whenever solid waste residues of any kind are ultimately disposed of on the land, the potential for water quality impairment will exist. It is therefore imperative that solid waste disposal be properly managed for the protection of these vital water resources.

Improper waste disposal practices may adversely impact surface water quality through various physical, chemical and biological means. The most common source of contamination however, is leachate, caused by the introduction of chemical and biological pollutants into solution whenever water is allowed to percolate through refuse. Being a highly mineralized fluid, its constituents typically include chloride, iron, lead, copper, sodium, nitrate and a variety of organic chemicals. If manufacturing wastes are involved, its hazardous components may also include cyanide, cadmium, chromium and chlorinated hydrocarbons.

The amount of leachate and its composition are a function of many variable factors, including the nature of the material in the fill, conditions in the fill, soil characteristics, and the volume and type of percolating water. Wherever moisture content is allowed to exceed the absorptive capacity of the fill, leachate will begin to emerge.

A landfill disposal site can become saturated in two basic ways. The fill material can either be in direct contact with ground or surface water, or water can be recharged vertically through the fill as a result of either precipitation or flood inundation. With respect to the latter, the contamination potential is significantly greater in areas where the average annual precipitation exceeds the potential for water loss through evaporation and transpiration. In the predominantly arid lands of Arizona, the greatest danger of leachate generation is therefore from flood inundation or direct contact.

Numerous other impacts may be associated with surface water as well. The reckless dumping of refuse over river banks, onto floodplains or directly into streams or other surface waters may result in conditions of poor aesthetic appearance and create a variety of nuisances. During periods of high water, discarded materials may litter streambeds and beaches, create hazards to swimmers, boaters and fishermen and jam weirs and water diversions. Accidental spills and washouts may also result in these or similar conditions. The runoff of leachate from improper drainage at disposal sites may contaminate surface waters, and so may the drift of spray occurring at dumps, landfills, impoundments, and landspreading operations. In confined, slow moving surface waters, leachate contamination may kill vegetation and fish,

eliminate spawning areas, and jeopardize the use of existing and planned recreational areas. In general, any direct or indirect contact of decomposable solid wastes with surface water will result in an increased organic and mineral content in the water. This is particularly evident in ponded water, where decomposing organic material will cause depletion of dissolved oxygen and result in odors and discoloration.

Because of widespread degradation in recent years, the improvement of water quality has now become a national goal. This is reflected in a host of federal legislation, but two laws in particular are expected to have a considerable impact in Arizona; the Clean Water Act of 1977 (CWA), and the Safe Drinking Water Act of 1974 (SDWA). The paramount objective of the CWA was to restore and maintain the chemical, physical and biological integrity of the Nation's Waters, and it provided for the expenditure of billions of dollars nationally for the planning and construction of facilities (wastewater treatment) to improve water quality. It also provided for stringent regulations designed to control the discharge of pollutants to surface streams (NPDES permit program). For its part, the SDWA mandated that all public water supplies be brought into compliance with certain minimum national water quality standards. In Arizona, the primary responsibility for implementing these federal programs has been vested in the Department of Health Services, Bureau of Water Quality Control.

The water quality objectives of these programs were complemented further by the passage of the Resource Conservation and Recovery Act (RCRA) in 1976. Under authority of this Act, the EPA has promulgated regulations which specify minimum surface water

criteria for solid waste disposal facilities. These regulations now require that;

- (a) *a solid waste disposal facility or practice shall not cause a discharge of pollutants into waters of the U.S. that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES).*
- (b) *a solid waste disposal facility or practice shall not cause a discharge of dredged or fill material to waters of the U.S. in violation of the requirements under Section 404 of the Clean Water Act, as amended.*
- (c) *a solid waste disposal facility or practice shall not cause non-point source pollution of waters of the U.S. that violates applicable legal requirements implementing an areawide or Statewide water quality management plan approved under Section 208 of the Clean Water Act, as amended.*

It should be a policy and goal of the State of Arizona to fully comply with and promote these criteria for the protection of surface water resources. At times, the imperative need of the State to continue development of its land and water resources may be in conflict with these environmental goals, but ultimately, the application of proper management standards and adequate control technologies will permit the realization of both.

As a rule of thumb, proper site selection, design and maintenance are the principal techniques available for minimizing problems of surface water contamination. Advanced waste treatment, physical containment and drainage control are each capable of playing major preventive roles where economic considerations dictate that disposal sites be located in areas of surface water use or high contamination potential. In areas where land disposal is neither economically nor environmentally feasible, alternatives such as waste transfer or resource recovery should be employed to the extent practicable. In the case of landfills, leachate generation should be checked by thickened and compacted impervious soil or synthetic covers, adequate

surface gradients, revegetation and protection berms, dikes or ditches. Flow detectors should be used to monitor the movement of all surface waters. With respect to surface impoundments, impermeable barriers and/or liners should be used to contain liquid wastes, and adequate freeboard should be provided to minimize spray or wave overtopping. Finally, in the case of landspreading operations, the best available management practices should be employed to control surface water runoff and encourage the attenuation of the waste into the soil. Care should also be exercised in the irrigation of agricultural crops, parks or golf courses located on finished and reclaimed land disposal sites.

F. Ground Water

The availability of ground water, in usable quantities and qualities, is essential to the continued prosperity of the State. Under 1970 normalized conditions, some 60% of total water use in Arizona was derived from ground water sources. With continued population growth, this percentage is expected to increase at a disproportionately high rate. Virtually every population center in the State, regardless of size, now depends upon it to meet daily demand requirements, and finite supplies, accumulated in alluvial basins over thousands of years, are now being depleted at an alarming rate. If the future is to hold promise in Arizona, this depletion of ground water reserves will have to be carefully managed, and the quality of these precious supplies will have to be protected against contamination from a variety of threatening sources.

In relation to solid waste disposal, there are five primary sources of ground water contamination; (a) domestic on-site waste disposal systems,

(b) industrial discharges, (c) landfill leachates, (d) animal wastes, and (e) direct recharge from contaminated surface waters. Improperly designed septic systems, or system failures, may result in the infiltration of bacteria and viruses, detergents, metals, nutrients such as nitrates, and a variety of toxic compounds found in cleaners, solvents and other household products. Leakage from sanitary sewer systems may also result in this same effect.

Industrial discharges may result in ground water contamination either through direct underground injection or percolation from surface impoundments. Landfill leachate, as mentioned earlier, can migrate either vertically through percolation, or horizontally through seepage. Likewise, improperly managed animal wastes may leach at feedlots and dairy farms, and thereby contribute to water quality impairment at watering holes, wells and streams. Finally, any waste disposal practice, if managed improperly, may result in the contamination of surface water being directly recharged to ground water.

Ground water in the immediate vicinity of a disposal site may become grossly polluted and unsuitable for domestic or irrigation use if the solid wastes intercept the zone of saturation (i.e. below the level of the high water table) or if the leachate reaches the ground water. Once pollutants reach the ground water, they will travel the greatest distance in the direction of the prevailing flow. Normally, only a limited amount of diffusion will occur because of the naturally limited mixing conditions in the aquifer. Characteristically, the leachate will migrate slowly in plumes or slugs, and resist both dispersion and dilution. It may migrate either a few feet or a few hundred feet per year depending upon the permeability of the affected substrata and gradient of the water table. Once an aquifer has become contaminated, it is likely to remain so for many decades.

The effective monitoring of potential sources of ground water contamination is vitally important, but virtually non-existent. Most are discovered only after a drinking water source has been affected, and all too often, water supply wells become de facto indicator wells of drinking water contamination. The impact of such a discovery can be quite severe in social, psychological and economic terms.

Most users of ground water have an unshakable confidence in the earth's natural filtering capabilities, and operate under the assumption that all ground water is safe and unpolluted. Because contamination originates long before it is detected, few options remain at the time of its discovery. In most cases, flushing the contaminated water from the aquifer is impossible, and it must therefore be declared unfit. Under these circumstances, the owner must either seek another supply, or treat every gallon before it is used. This situation is serious enough for the family farm, but when contamination occurs in municipal wellfields, it can reach crisis proportions.

Monitoring and assessing the overall quality of ground water is a much more difficult task than evaluating surface water. The appearance of physical symptoms is concealed, and the cost of drilling test wells is often prohibitive. In addition, the dynamics of ground water flow are such that it is difficult to predict the movement of contaminants. In

large measure, this is due to the undetermined nature of future pumping patterns, which may dramatically alter the direction of its migration.

Recent federal regulations under RCRA have established a minimum criterion for the protection of ground water in the practice of solid waste disposal. The intent of this rule is to protect all current users of the ground water, and other ground water supplies designated for future usage, particularly drinking water. It prohibits a solid waste disposal facility or practice from contaminating any underground drinking water source beyond the "solid waste boundary". In this instance, the "boundary" is defined as the outermost perimeter of the solid waste (projected in the horizontal plane) as it would exist at the completion of the disposal activity. The establishment of alternate boundaries is permitted only in those States with approved Solid Waste Management Plans, and only where such a change would not result in the contamination of any ground water which may be needed or used for human consumption. Prior to granting any exceptions under this rule, the State must consider and analyze a variety of factors; including the use, volume, quality and characteristics of the ground water, hydrogeological conditions, the volume and composition of the leachate, and public health, safety and welfare effects as well as alternatives.

The anticipated impact of this new rule regarding the "solid waste boundary" will either be to close those sites in violation, or upgrade them by retrofitting with control technology. In either event, it will impose additional costs upon the owners and operators of these substandard disposal sites.

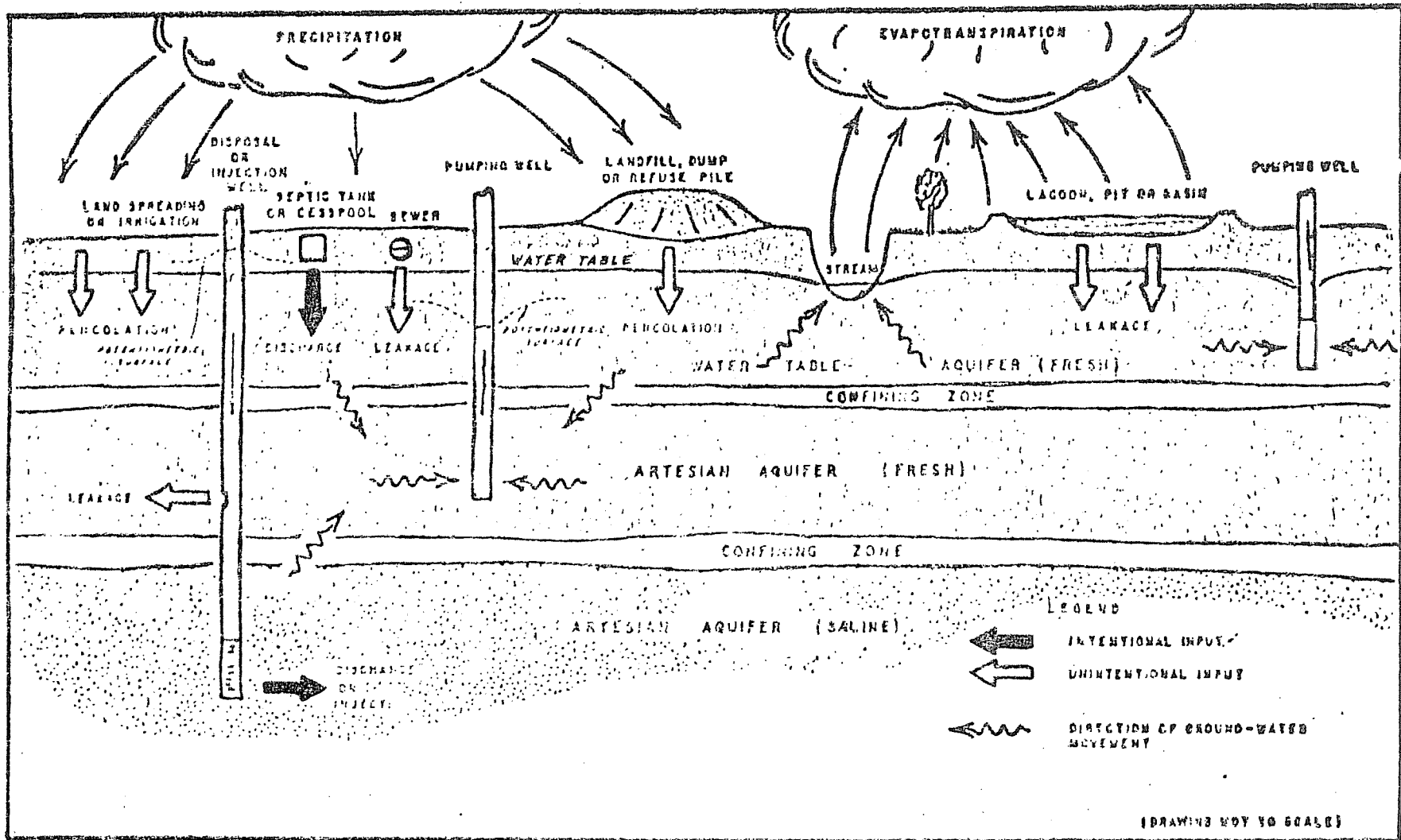
There are now a variety of technologies for controlling leachate contamination. Measures may be taken to; (a) promote natural attenuation, (b) prevent leachate formation, (c) collect and treat leachate, (d) pretreat waste to reduce its volume and solubility, and (e) detoxify hazardous wastes prior to land disposal.

There are advantages and disadvantages to each of these measures. For example, the use of a leachate collection system requires that the leachate be removed on a periodic basis. It must therefore be subsequently managed, treated and finally reintroduced into the environment at some other location. Such systems are expensive, and in order to be effective, must be maintained for many years after the facility ceases to receive wastes.

Ground water contamination is essentially a non-point source of pollution. Consequently, despite the imposition of various control measures at problem sites, the effectiveness of such measures must be monitored in order to ensure satisfactory ground water quality. This is best accomplished by periodic water quality sampling through test wells. In the past, water quality programs at the State and federal level have focused their resources on the protection of surface waters, with ground water monitoring efforts receiving a relatively low priority, and only a fraction of the available funds. Given the importance of quality ground water to the future prosperity of the State, a greater emphasis will need to be placed on the evaluation and monitoring of ground water in the near term. The State "208" Water Quality Management Plan has now identified and designated complex water quality management areas, and in the future, sampling at disposal sites should be undertaken on a regular and aggressive basis, particularly in those areas containing sensitive aquifers.

* Source - Draft EIS Appendices: Criteria for Classification of Solid Waste Disposal Facilities.
 EPA, Office of Solid Waste. April, 1978. p. IV-27.

Table VI-II



VI-24

Sources of Contamination in the Ground-water System

G. Food Chain Crops

Agriculture is one of the chief mainstays of the Arizona economy. In 1977, cropland accounted for over 1.3 million acres of land in the State and total farm output (including livestock) generated cash receipts in excess of \$1.2 billion.

This output has been enhanced by the application of sewage sludge and other solid wastes to the land surface, thereby adding organic matter, nitrogen, phosphorus and certain other essential trace elements to the soil. If properly managed, the application of solid waste to agricultural lands can be an environmentally acceptable and highly desirable method of waste disposal, resulting in both improved crop yield and soil conservation. However, when improperly managed, it can pose a potential threat to the human food chain through the entry of toxic elements and compounds. Because of the potential dangers of soil amendment to public health and the environment, the EPA has recently promulgated regulations governing the land application of sewage sludge and other solid waste residuals. To date, criteria have been established regarding cadmium, a heavy metal, and poly-chlorinated biphenyls (PCB's) a subclass of chlorinated hydrocarbons. In addition, proposed criteria concerning pathogens, pesticides and persistent organics are currently under study. Any of these elements may potentially have long-term health impacts if they are indiscriminately applied to the soil, and have therefore become the subject of federal regulation. However, the existing regulations controlling cadmium and PCB's pertain only to solid waste facilities and practices where the site of disposal is also a field for the production of food-chain crops. This is the interface where the danger is greatest, for either humans or animals might consume food contaminated directly as a result of such waste disposal practices.

These regulations are intended to serve a broader purpose as well. Because they apply to the land disposal and application of municipal sludge, they are also designed to partially fulfill the requirements of Section 405 of the Clean Water Act. This mandate called for the issuance of guidelines on the use and disposal of municipal sludge, including incineration, pyrolysis, giveaway and sale programs, and other options.

Cadmium

The criteria for the land disposal of solid wastes containing cadmium offers two alternative control approaches. The first limits the maximum cumulative loading, and the annual rate at which it may be applied. In addition, it requires that the pH of the solid waste and soil mixture be 6.5 or greater at the time of each solid waste application (except where only trace amounts are present). The prescribed limits for annual application rates are phased and progressive, and a schedule distinction is made between "accumulator crops", and "other crops". Accumulator crops are defined to include root crops, leafy vegetables and tobacco. These have been classed separately due to their greater propensity to absorb (uptake) cadmium in their tissues. The intent of the limit on cumulative loadings is to maintain the soil pH at 6.5 or greater for as long as food chain crops are grown. This also will control cadmium uptake which is more likely to occur under acidic than basic soil conditions. The alternative option would allow an unlimited land application of cadmium so long as four specified control measures are employed; (1) the crop grown could only be used as animal feed, (2) the soil pH must be maintained

at 6.5 or greater for as long as food-chain crops are grown, (3) a facility operating plan must describe how the animal feed will be distributed to preclude human ingestion, and (4) future owners are provided notice (through property deeds) that there are high levels of cadmium present in the soil and that food chain crops should not be grown.

Under either option, the application of solid waste to land is specified as being a disposal practice in which the solid waste is applied to within one (1) meter of the land surface. This particular distance was selected to designate the root zone of food chain crops, where the expected uptake of cadmium by plants would be most likely to occur.

The regulation of cadmium application is deemed necessary because of the variety of adverse health effects that have been documented in both humans and experimental animals under conditions of acute as well as chronic exposure to cadmium. The EPA regulations are quite explicit in this regard, and include the following discussion.

"While acute health effects in humans are generally caused by high-level occupational exposure through inhalation, chronic health effects may result through the diet and/or cigarette smoking, the major avenues of cadmium intake for most people. The kidney is considered the main target organ for chronic exposure to cadmium, although chronic respiratory effects have been observed in long-term occupational settings. Upon ingestion or inhalation, the metal will gradually accumulate in the kidney cortex.

According to both clinical-epidemiological and model-calculation data, the critical concentration of cadmium in the kidney cortex is approximately 200 micrograms per gram (ug/g) net weight, in the average human. At that level, renal tubular dysfunction, characterized by proteinuria, is expected to occur. This condition is manifested by the excretion of B₂ - microglobulin, which is the earliest discernable laboratory evidence of organ damage. Although moderate increases in the excretion of B₂ - microglobulin are not life threatening, the condition is often irreversible, and a continued excessive exposure to cadmium may lead to other renal function abnormalities (i.e. glycosuria, amino-acid uria, and phosphaturia).

Based on studies of fecal excretion, it was found that only about 6% of all ingested cadmium is retained in the body. Daily intake levels vary widely with individual dietary habits, but it is recommended that daily dietary intake not exceed 71 micrograms. Primary food sources include leafy vegetables and root crops, and the FDA has estimated a median intake of 39 ug/day from the average diet. However, this can be substantially supplemented by occupational exposure or cigarette smoking, which may contribute an additional 25 micrograms per/day (based on cigarette consumption of 20/day).

EPA is concerned over the conduct of any practice which could significantly increase the amount of cadmium in the diet beyond current levels. The intent of their rulemaking is therefore to minimize the movement of cadmium into the human food chain from solid waste applied to the land."

Polychlorinated Biphenyls (PCB's)

In promulgating its standard for PCB's, EPA relied upon established FDA maximum tolerance levels to define the risk to human health (0.2 mg/kg actual weight for animal feeds, and 1.5 mg/kg fat basis for milk). The standard stipulated in the ODI Criteria is specifically intended to prevent PCB levels from exceeding this standard due to soil amendment in fields used for the cultivation of animal feed. Wherever solid wastes are applied to the land surface so as to allow a direct contact with crops, animal feed may become contaminated. However, by incorporating the solid waste beneath the root zone of pasture grasses, the anticipated amount of PCB ingestion by grazing animals is greatly reduced. Consequently, EPA's regulatory strategy is to require the incorporation of the solid waste into the soil whenever the PCB content of the waste material is sufficiently high to cause the FDA tolerances to be violated.

PCB's are chlorinated hydrocarbons which are believed to be both toxic and carcinogenic. They are also "bio-accumulative", and the human body's digestive system is incapable of destroying them. When swallowed, they are filtered out of the blood by the liver and pancreas, possibly causing cancer in either of these organs. Ultimately, they will remain in storage within the body's fat tissues.

Historically, PCB's have been widely used in industry, to insulate electric transformers and capacitors, and to stabilize waxes, varnishes, plastics and vinyl papers. They were also extensively used in neon lights, TV sets and a variety of consumer electronic products. Because of acute hazards to human

health, PCB manufacture has been banned since 1977, but it persists in the environment, and commonly occurs in waste materials.

When PCB's are present in solid waste applied to the soil, they are subject to ingestion by grazing animals. Such animals have been known to directly ingest soil (potentially containing wastes) in amounts ranging from 2 to 14% of their total diet. Consequently, the likelihood of their ingesting PCB's is greater where solid waste has been spread directly on grazing land.

The land application of solid waste remains a controversial issue. Potentially, it holds numerous beneficial uses, but many of these may be offset by adverse environmental and health impacts. Cadmium is transmitted directly by the human ingestion of accumulator crops. PCB's are transmitted indirectly by the animal ingestion of amended soil. Consequently, these disposal practices require proper management and regulation.

A variety of management control approaches are now available, and should be employed singularly or conjunctively wherever practicable. They include; (a) pretreatment of waste prior to land application, (b) control of the application rate, (c) sterilization of the waste by heat or radioactive exposure, (d) good site management practices, and (e) banning the application of solid waste to land used for food-chain crops.

Both of these substances demonstrate a tendency to persist in the environment. Accordingly, the greater their presence in the environment, the greater the potential hazard to human health. Consequently, the thrust of regulation is not to preclude the application of solid wastes (containing these substances) to agricultural soils, but rather to limit their allowable concentrations.

H. Disease

The nature of solid waste is such that it often contains pathogenic bacteria, viruses and parasites. Upon contact, either humans or animals may contract harmful and/or fatal diseases. This may occur as the result of; (a) contact with waste during landspreading operations, (b) contact with waste contaminated soil or plants, and/or (c) by ingestion of waste contaminated food and water. When improperly disposed on land, solid waste may also provide food and harborage (breeding) for rodents, flies and mosquitoes, agents capable of transmitting disease organisms to humans and animals. Consequently, the effective control of both vectors and pathogens is central to the regulation of solid waste management practices and facilities, and fundamentally necessary for the protection of public health.

1. Disease Vectors

Disease vectors are commonly defined as agents capable of carrying and transmitting pathogenic organisms. In the context of solid waste management, this classification includes a host of small mammals (i.e. rats, mice, opossums, skunks, ground squirrels, cats etc.), flies, fleas, mosquitoes, and occasionally birds. The purpose of vector control is to ensure the health of disposal site personnel, and that of adjacent communities by minimizing the resident population of the disease carriers. The objective of vector control is to hold down the population by restricting the availability of food and harborage.

Municipal refuse contains constituents (putrescibles) which are particularly attractive to vectors. In many cases, even a properly designed and operated sanitary landfill will not provide adequate protection, and additional control measures become necessary. A few of these more common methods are discussed below.

Flies:

Flies are perhaps the most pervasive nuisance associated with disposal sites. If solid waste has not been properly stored or collected, it will probably contain a large number of fly larvae before it ever reaches a landfill. These larvae will be ready to emerge shortly after disposal, and if immediate measures are not taken, a great number of adult flies will typically result.

An adult female fly can lay 75-150 eggs at a time. They will hatch in 12-24 hours. The larvae (maggots) will feed in the garbage for about five days, and then emerge to pupate in the ground.

The most effective control measure to prevent emergence is the application of daily soil cover in conjunction with compaction. The former without the latter, will not be effective. Fly larvae are capable of crawling up through more than five feet of loose soil, but they are unable to penetrate through six inches of compacted soil.

The presence of a large fly population at a refuse disposal site strongly indicates a sanitary deficiency. The problem becomes especially serious when population pressures result in a spillover into surrounding areas. Because of the many factors which contribute to fly breeding, its effective control requires an areawide solid waste management approach, covering all aspects from waste generation to ultimate disposal. Flies pose a serious hazard because they can serve as carriers of salmonellosis (food poisoning) and other diseases contrary to human welfare.

Rodents:

Exposed solid waste offers a primary source of support for domestic rodents in developed communities as well as rural areas. It readily affords food and harborage for a host of small mammals, including rats, mice, opossums, skunks, ground squirrels and cats. Rats, and other burrowing animals are particularly attracted to landfills by the availability of waste food scraps and ample shelter. A daily cover application can eliminate the open exposure of the waste, but depending upon the cover material used, burrowing may continue. This is undesirable, because the resulting tunnels can damage the structural integrity of the cover, and provide ready pathways for the infiltration of surface waters. For this reason, cover materials should be carefully selected so as to not be structurally conducive or supportive of tunneling.

In the absence of daily cover and compaction, rodent populations at disposal sites can rapidly expand into the thousands. Rodenticides are often ineffective because of the abundance of alternative food supplies. Nevertheless, a given disposal site may only contain sufficient food and shelter to support a certain rat population level. At certain times of the year, this threshold may be exceeded, forcing some to migrate into adjacent land areas in order to survive.

Moreover, refuse dumps may also serve as a meeting place for field and domestic rodents. Field rodents, such as ground squirrels and chipmunks, are primary carriers of bubonic plague. Their interaction with domestic rodents may therefore result in a transfer of infected fleas, and an increase in the

potential for human exposure within the urban population. Certain species of rats (i.e. Norway), have a demonstrated propensity to attack and bite infants and small children.

In general, rats are directly responsible for more human illness and death than any other group of mammals. Their association with diseases such as leptospirosis, trichinosis and murine typhus fever render them a serious threat, regardless of where they occur.

Control measures against rodent populations include; (a) the restriction of public access to disposal sites, (b) proper garbage storage and collection, (c) daily cover and compaction at disposal sites receiving garbage, (d) natural controls (i.e. predators) and (e) the use of rodenticides. Where rodenticides are employed however, great care must be exercised to ensure that their usage does not create a more serious health hazard than it is intended to eradicate.

Mosquitoes:

Mosquitoes will also breed in landfills if surface water is allowed to pond and stagnate. In order to prevent this occurrence, grading may be required on a continuous basis, to compensate for any depressions that may result from either incomplete compaction or differential settling of the waste. Mosquitoes may carry and transmit diseases such as encephalitis, malaria and yellow fever, and like flies, their population can multiply rapidly if left uncontrolled.

Birds:

Birds will occasionally cause problems near disposal sites with exposed refuse.

They may be attracted by odors, and can pose serious hazards to aerial navigation if they congregate near disposal sites for scavenging purposes. As with flies, birds may also carry and indirectly transmit salmonellosis (as reservoirs), but this situation is easily remedied by the provision of adequate cover material over the refuse.

A variety of methods exist to control disease vectors at waste disposal sites. The objective of each is to minimize the availability of food and/or harborage, and thereby discourage vector attraction and breeding. The daily application of cover material with compaction is perhaps the best available method, but others such as poisons, repellants and natural controls may be necessary on a supplemental basis to ensure adequate protection.

The new federal regulations regarding solid waste disposal facilities now require that vector control be regularly practiced at landfills, land-spreading sites and surface impoundments. The regulations further require that access to these disposal facilities be restricted to minimize public exposure to waste as well as its potential to transmit disease.

2. Pathogens

Sewage sludge and septic tank pumpings are often applied to the surface of the land as a common waste disposal practice. It is a practice of growing national concern however, due to the pathogenic content inherent to such waste. Accordingly, the new federal regulations provide for pathogen control by a variety of methods.

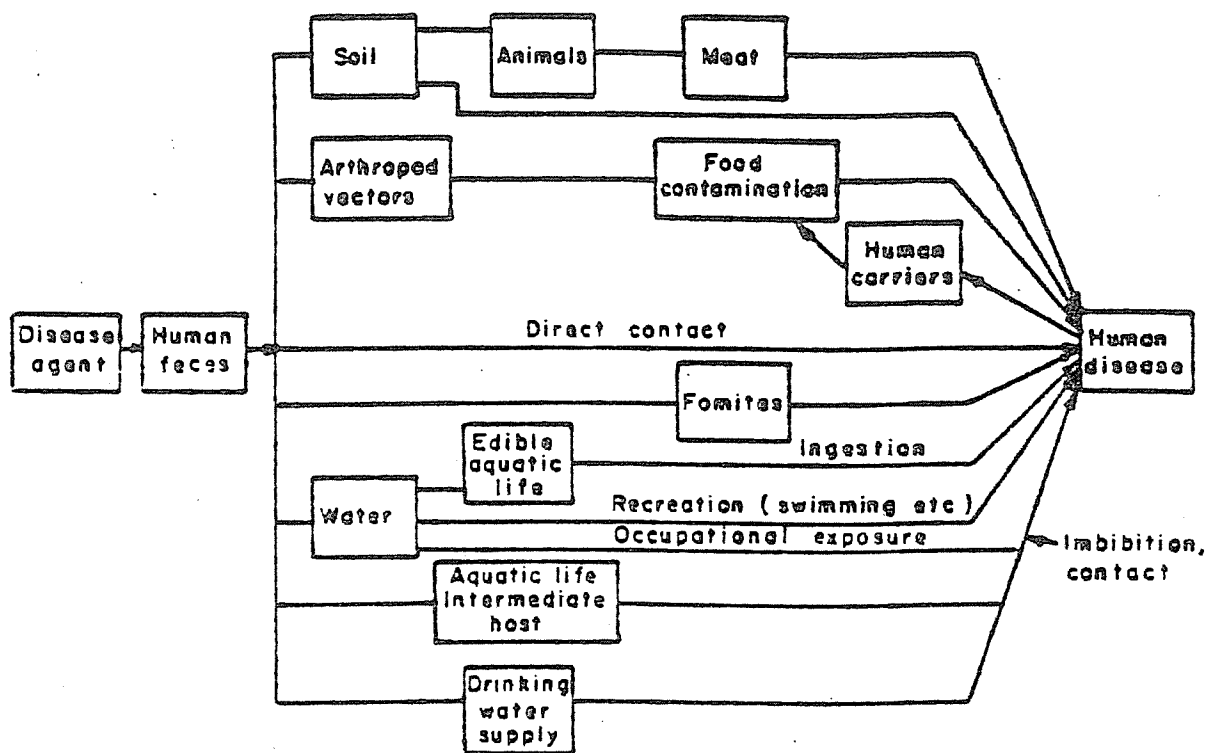
Under new regulations, sewage sludge applied to the land surface or incorporated into the soil is required to be treated prior to application by a "Process to Significantly Reduce Pathogens". A number of alternative treatment processes are available to satisfy this requirement, including aerobic digestion, air drying, anaerobic digestion, composting and lime stabilization. In addition, public access to such application sites must now be controlled for at least 12 months following the last waste application, and grazing by animals whose products are consumed by humans must be prevented for at least one month.

Septic tank pumpings must likewise be treated by a "Process to Significantly Reduce Pathogens", unless public access is controlled for 12 months, and grazing by animals whose products are consumed by humans is prevented for at least one month.

Notable exceptions are allowed in either case where sludge or septage is disposed of by a trenching or burial operation. In those instances where sludge or septage is applied to lands used for the production of crops intended for direct human consumption, and where such production is planned to occur less than 18 months after the waste application, the waste must be additionally treated prior to application by a "Process to Further Reduce Pathogens". Beta ray irradiation, gamma ray irradiation, pasteurization or other equivalent methods will satisfy this requirement if performed after a "Process to Further Reduce Pathogens". However, high temperature composting, heat drying, heat treatment and thermophilic aerobic digestion will satisfy this requirement without pretreatment of any kind. This secondary treatment is also not required where there is no contact between the solid waste and the edible portion of the crop, so long as the waste is treated initially by a "Process to Significantly Reduce Pathogens".

The regulations offer a margin of flexibility in the selection of an appropriate treatment process for a particular waste application. The process selected however, should essentially destroy all bacteria and viruses, and decimate the number of parasites contained in the waste material.

Table VI-III



2-2 Human Fecal Waste/Human Disease Pathways (Postulated).

Source: *Solid Waste/Disease Relationships*, U.S. Department of Health, Education, and Welfare, Public Health Service, 1967, p. 52.

I. Air

Clean air is a basic prerequisite for the continued existence of all living things. Accordingly, it remains a principal goal of the nation's environmental program. In keeping with the Clean Air Act amendments of 1977, the "Classification Criteria for Solid Waste Disposal Facilities" address the need to control air emissions from open burning. This air quality criterion is primarily designed to protect human health and safety. Secondly, it is intended to protect crops, plants and property from the adverse effects associated with air pollution.

The major air quality impact associated with solid waste disposal has been the particulate emissions resulting from the open burning of solid wastes. Open burning is defined in the regulations as being the uncontrolled or unconfined combustion of solid waste. The term "uncontrolled" is applied where; (a) the oxygen to fuel ratio is not governed, (b) the combustion residence time and mixing are not governed, and (c) pollutant emissions into the air are not checked in any manner.

The practice of open burning poses potential hazards to public health and safety. Toxic emissions may cause respiratory illness, and smoke can significantly reduce aircraft and automotive traffic visibility, resulting in accidents and a loss of life. Unconfined fires may also spread from disposal sites causing substantial property damage.

Gaseous emissions from surface impoundments and the open burning of wastes are believed to be principal sources of such potentially harmful pollutants as sulfur dioxide, nitric oxide, photochemical oxidants and hydrocarbons. The evaporation, sublimation and oxidation of impounded chemical, mining and petroleum wastes are prime suspects.

The impact of open burning is particularly acute in sensitive metropolitan air basins where it may compound existing problems associated with smog and auto emissions. Tests conducted by EPA have indicated that smoke from open burning can cause eye irritation within a 400 foot radius of a fire source.

It is also believed that vegetation is adversely impacted by air pollution resulting from improper waste disposal. EPA is presently engaged in further research into this area. However, preliminary findings indicate that air pollutants act as an impediment to the natural process of nitrogen fixation in plants. If this is in fact proved to be the case, the ecological implications may be potentially severe.

At present, the provisions of the Clean Air Act generally prohibit the practice of open burning in critical air quality basins. Variances however, may be obtained from State and/or local air pollution control authorities. Such variances must be in conformity with the State Implementation Plan (SIP), but are difficult to both administer and enforce. This is due to the complexity and dynamic nature of the many variables involved in quantifying air pollution potential. Existing air quality, wind velocity, amount and type of waste are all variables which contribute to the determination of overall impact.

The "Criteria for Classification of Solid Waste Disposal Facilities and Practices" contains two basic elements pertaining to air quality. The first stipulates that the open burning of residential, commercial, institutional and industrial solid waste is prohibited. However, this provision does not apply to the infrequent burning of agricultural or silvicultural waste, land clearing debris, diseased

trees or debris from emergency clean-up operations. These are not considered continuous or on-going practices, and therefore pose little environmental risk. The second stipulates that air emissions caused by solid waste disposal activities shall not violate applicable requirements developed for State Implementation Plans under Section 110 of the Clean Air Act. This latter provision ensures a measure of local control over open burning practices.

Historically, burning has been the principal means by which disposal operations have achieved waste reduction. This has been accomplished either by incineration, or open burning at dumps. Unfortunately, the best available technology for complying with the air criterion is to totally refrain from the practice of open burning. Although there are no direct costs associated with this technology, indirect costs may be substantial. These would include the costs of additional land and cover material necessary to properly manage the corresponding increase in waste volume destined for land disposal.

J. Safety

The safety portion of the "Criteria for Classification of Solid Waste Disposal Facilities and Practices" is intended to address the range of potential accidents which may occur as the result of solid waste disposal activities. Those safety hazards which are specifically regulated include: (a) explosive gases, (b) fires, (c) bird hazards to low-flying aircraft and (d) public exposure to wastes due to uncontrolled access at disposal sites. Because this particular criterion deals with the hazard to human safety posed by improper waste disposal practices, there is a large measure of overlap between it and the other seven criterion contained in the regulations.

The generation of toxic and asphyxiating gases was suspected of posing an additional category of hazard, but due to a limited data base, EPA rendered a decision to exclude it from the final regulations pending further investigation.

1. Explosive Gases

Solid waste disposal activities may result in the production or generation of a variety of explosive gases. Methane is the most common of these associated with landfills, and is a direct product of the natural decomposition of solid waste. When allowed to accumulate in sufficient concentrations, it may pose serious dangers of explosion to facility employees, users of disposal sites and occupants of nearby structures.

Available information strongly indicates that methane gas has been the principal cause of explosions at disposal sites. These have been quite numerous, and are well documented. Lives can be needlessly lost because of improper or in-

adequate gas control practices. In recognition of this hazard, the regulations require that the concentration of explosive gases generated by a facility or practice shall not exceed (1) 25% of the lower explosive limit (LEL) for the gas in facility structures, and (2) the lower explosive limit for the gas at the property boundary of the disposal site. Explosive gases may be generated by a variety of natural processes, including decomposition, oxidation, volatilization, sublimation and evaporation. The products of these processes may include gases such as methane and hydrogen (explosive and asphyxiating), carbon monoxide and carbon dioxide (asphyxiating), and chlorine (toxic). Adverse environmental impacts associated with the production of such gases include human asphyxiation and injury, property damage, ground and surface water contamination and vegetation kills.

The problem of containing and controlling gas is compounded by its ability to migrate either vertically or laterally through porous earth material. Available control technologies include: (a) the selective placement of impervious liners, (b) the selective placement of granular materials for gas venting and/or collection, and (c) the use of induced-flow or pumped wells for the evacuation or venting of gas from the landfill itself. The economics of such control systems will improve over time as the commercial value of methane gas as an energy source becomes increasingly recognized. At present, it remains a costly but necessary component of proper solid waste management. However, it is much less costly to anticipate gas problems in the design of disposal facilities than it is to retrofit existing facilities. Consequently, gas control should be considered in the design and construction of all new disposal facilities.

2. Fires

Fires at solid waste disposal facilities may result from a number of causes, including vandalism, carelessness, spontaneous combustion, the open burning of wastes, sparks from vehicles and the disposal of hot loads (i.e. ashes). Wherever they occur, they may pose a serious hazard to both life and property. As discussed earlier, the regulations require a prohibition on open burning at all waste disposal facilities. This prohibition is reiterated under the safety criterion, and incorporated by reference to the air standard. This prohibition on open burning is also the best available means to prevent fires from occurring.

Another complementary control measure is the periodic application of cover material. When compacted, such cover will hinder any underground or potential fire, and serve as an effective natural barrier to prevent an outbreak of fire from spreading.

The dangers of fire from the dumping of hot loads are best minimized by the proper policing of incoming trucks. These loads should be deposited away from the working face and immediately extinguished by the application of water, cover material, or both.

So long as a facility or practice poses no danger of fire to either persons or property, it is considered to be in compliance with the fire criterion. The recommended compliance measures are the prohibition of open burning in conjunction with the periodic application of cover material. However, if appropriate to particular circumstances, other techniques may be equally acceptable.

3. Birds

Largely because of improper management practices, many disposal facilities attract birds in numbers sufficient to create serious safety hazards to low-flying aircraft. This danger is most often posed by those facilities which receive putrescible wastes on a regular or continuous basis. When located near airports, large schools of birds can interfere with aerial navigation and collide with aircraft, thereby presenting a significant risk of accidents. Jet engines on aircraft have actually been known to ingest large numbers of birds, resulting in engine malfunction and plane crashes.

The safety criterion stipulates that facilities and practices shall not pose a danger to aircraft. It is applicable to only those facilities or practices which occur within 10,000 feet of an airport runway used by turbojet aircraft, or within 5,000 feet of an airport runway used exclusively by piston-type aircraft.

The best method for controlling bird hazards is defined under the disease criterion. It is achieved through the minimization of food and harborage by the application of cover material. This practice should provide adequate protection for low-flying aircraft. Nevertheless, it is strongly recommended that studies be conducted at each proposed disposal site prior to construction and operation in order to determine the potential bird hazard, and necessary mitigating measures to be implemented.

4. Access

The potential for human injury is very great at waste disposal sites, and may be associated with either materials or activities. Its many and varied sources include:

- a. the operation of heavy equipment and haul vehicles.
- b. hazards associated with specific types of waste material (i.e. pathogenic, toxic and ignitable materials, sharp objects, etc.).
- c. accidental or intentional fires.

Persons have suffered needless injury and/or death from exposure to these health and safety hazards. By merely restricting public access to disposal sites, many of these hazards can be reduced or eliminated.

The dangers to facility operating personnel can be mitigated by proper training, use of safety equipment, and specific controls over certain types of waste. The risk of injury to other persons is best minimized by banning non-user access to the site (through fencing), and the implementation of strict controls over users while they are present at the site. An ancillary measure is to provide a drop-box at the entrance to the facility and thereby eliminate the need for access by individuals disposing of only small amounts of waste.

The regulations prescribe that a facility or practice shall not allow uncontrolled access so as to expose the public to potential health and safety hazards inherent to disposal sites. A fenced perimeter per se, is not required so long as access is effectively controlled by some alternative means (i.e. natural earthen barriers). Regardless of the actual access restrictions employed, it is further recommended that signs be posted, and that strict controls be exercised over the practice of scavenging.

In general, these access control measures are inexpensive to implement, and quite cost-effective when viewed from a liability standpoint.

K. Conclusion

The quality of Arizona's natural environment is becoming increasingly threatened by the ever-expanding volume of solid waste which must ultimately be disposed of on the land. Solid waste disposal practices and facilities, if left uncontrolled, will continue to endanger air and water quality, and the health and well being of the public. The federal standards described on the preceding pages will be instrumental in mitigating negative impacts, and in protecting the quality of life throughout the State. From this point forward, it will be primarily the responsibility of the State to ensure compliance with these standards, and to promote and monitor their implementation.

At present, the greatest threats to Arizona's environment posed by solid waste disposal concern public health, water quality and floodplain management. There are currently some 1500 surface impoundments, 150 landfills, 2,000-3,000 promiscuous dumps and an undetermined number of landspreading operations in the State. Increased population pressure is fueling the demand for land disposal, while at the same time diminishing the available resource. The time is not too soon to begin regulating these facilities and practices on the basis of performance and design criteria.

The achievement of this purpose however, will be a costly undertaking. According to an environmental impact statement released by EPA in November, 1979, the costs of implementing the land disposal criteria for non-hazardous solid waste will run about \$5 billion per year nationwide. Of this annual total, \$1.3 billion will be directly attributable to the federal land disposal criteria, and \$3.7 billion will be due to comparable or corresponding State standards. Disposal facilities must first comply

with existing State regulations, projected to amount to nearly 75% of the total compliance cost. The federally induced costs will then occur over and above the State induced costs, and will apply to landfill, surface impoundment and landspreading facilities.

In terms of compliance, the most costly criteria will be those pertaining to ground water, safety and floodplains, in that order. On the basis of the highest cost full-compliance scenario, federally induced impacts alone will increase the national cost of solid waste disposal by an average of \$1.65 per ton. Per capita, this translates into a national incremental cost of \$3.04 per year for landfill upgrading or closure.

At face value, these economic burdens appear awesome. In the short-term, they may cause financial hardships at the local level. However, it is difficult to assign a dollar value to the benefits of environmental protection. Nevertheless, it would seem reasonable to assume that these long-term health and environmental benefits would more than off-set the anticipated near-term costs.

There are also other environmental impacts associated with solid waste disposal not specifically addressed by the criteria but worthy of mention in this context. These include dust, dirt, litter, noise and odors. They were omitted from the federal regulation chiefly because they pose relatively minor degrees of environmental concern. EPA adopted the view that State and local governments were in a much

stronger position to evaluate the site-specific impact of these various parameters, and to recommend remedial actions.

In reviewing this chapter and the requirements of the land disposal criteria, it must be remembered that the State is the responsible enforcement authority in Arizona. Although the Resource Conservation and Recovery Act empowered EPA to develop the criteria, it fell short of granting the agency the authority to carry them out. The States are the implementation mechanism under RCRA, and must include plans for requiring the safe disposal of non-hazardous wastes in sanitary landfills within the framework of their federally funded programs. The Open Dump Inventory will be the principal tool to achieve this end, but sufficient monetary and manpower resources will have to be committed for this effort to reach fruition. The State is permitted to act in a voluntary manner, but if the environmental benefits addressed by the criteria are to be realized, a substantial and forceful commitment will have to be made.

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CHAPTER SEVEN

SOLID WASTE MANAGEMENT PRACTICES IN ARIZONA

Chapter VII

Solid Waste Management Practices in Arizona

Overview

The purpose of this chapter is to address each of the various types of solid waste that are generated within the State. Each waste type will be discussed in terms of its potentially adverse effects on public health and the environment, and the opportunities it affords for enhanced resource conservation and recovery. Our focus will be upon current practices which are employed in the management of these wastes, and the various problems associated with their use.

Essentially, our intention is to define and categorize each waste type, describe the health and environmental dangers that it may pose, and overview its existing management practices. Following this, recommendations for future planning and implementation are presented for mitigating these dangers and improving these practices. Scheduled milestones for future planning and implementation activities will be presented where appropriate.

On a preliminary basis, we have identified ten categories of solid waste. They are not in all cases mutually exclusive categories, but each is marked by discernible characteristics. These categories are presented in their order of priority below :

- A) Hazardous wastes
- B) Municipal wastes (residential, commercial, institutional)
- C) Wastewater treatment sludges
- D) Septic tank pumpings
- E) Industrial wastes
- F) Mining wastes
- G) Pollution control residuals
- H) Agricultural wastes
- I) Water treatment sludges
- J) Special wastes

This 1981 State Solid Waste Management Plan will initially address only the hazardous and municipal waste categories in detail. The remaining waste categories will be overviewed in this context, and their respective investigations time-phased over a five-year planning period. This is necessary due to a general lack of information regarding these wastes. Final reports on wastewater treatment sludges and septic tank pumpings are tentatively scheduled for completion in FY 81. Detailed investigations of pollution control residuals and mining wastes are planned for FY 82. The Department will study industrial wastes in FY 83, and water treatment sludges in FY 84. Special wastes will then be investigated in FY 85.* This preliminary schedule of planning activities is based upon the assumption that adequate resources will remain available to the Department. It also assumes that future State/EPA agreements will not prescribe a change in program priorities, and that these program activities will not be adversely impacted by new Federal or State legislation. As these studies are completed, they will be incorporated into the State Plan through future updating.

In conducting these studies, each particular waste type will be assessed in terms of nine management aspects. These include; (1) resource conservation, (2) source separation, (3) collection, (4) transportation, (5) storage, (6) transfer, (7) processing, (8) treatment, and (9) disposal. These nine management aspects provide a basic study outline that will be consistently applied to the investigations of each waste type. The only exception to this

* Editor's Note: Agricultural waste management will not be further investigated by ADHS due to regulatory oversight administered by other State agencies having more direct jurisdiction over these facilities and practices. It is anticipated that RCRA Section 4004 evaluations of agricultural facilities will be accomplished by means of interagency agreements between ADHS, the Arizona Dairy Commission and the Livestock Sanitary Board.

rule will be the section of this chapter pertaining to hazardous waste. This particular report has been drawn from the program description portion of the State's interim authorization plan for hazardous waste management, and was prepared under authority of RCRA Subtitle "C".

The structure of this chapter has been organized on the basis of the priority rankings assigned to the various waste types. Each report is presented in its proper priority sequence. When taken together, these various reports are intended to provide a comprehensive review of the State's current practices with regard to solid waste management.

These waste categorizations were necessary given the broad definition of "solid waste" provided under RCRA. In the Act, this term was interpreted to include; "...any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities". The only specific exclusions were solid or dissolved materials present in domestic sewage, irrigation return flows and industrial discharges. On this basis, "solid waste" was too broad of a topic to address in a comprehensive manner, and was therefore divided into ten separate categories. This approach will better facilitate reader comprehension, and provide more specific frameworks for solid waste management, planning and regulation.

CHAPTER SEVEN

SECTION A

HAZARDOUS WASTE

Chapter VII

Section A

Hazardous Waste

Introduction

RCRA defined hazardous waste to include "...any solid waste which because of its quantity, concentration, or physical, chemical or infectious characteristics may;

- a) cause or significantly contribute to an increase in mortality or serious illness, or
- b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed."

From a technical standpoint, hazardous wastes may be distinguished from other categories of waste by means of their unique physical and chemical properties. These properties include; (1) toxicity, (2) ignitability, (3) corrosivity and (4) reactivity. These properties are often found in non-hazardous wastes, but are differentiated on the basis of their quantity and/or concentration at the time they become a waste product. The list of identified hazardous wastes is already quite extensive, but not yet exhaustive. It is anticipated that the total number of waste products classified as hazardous for purposes of regulation will increase over time as additional knowledge is developed and acquired.

In general terms, hazardous wastes are the residual by-products of certain industrial and manufacturing processes. Typically, they are comprised of substances such as chemical and metallic wastes, or waste acids, caustics, oils, solvents, paints, pigments, resins, glues, etc. As a classified waste stream, hazardous wastes are not as significant as municipal wastes in terms of their annual

generated volume. However, because of their unique and inherent potential for adverse health and environmental impact, hazardous wastes are considered the most problematic of all wastes from a management perspective.

* Editor's Note

The Bureau of Waste Control (ADHS) submitted a formal application to EPA in November, 1980 requesting interim authorization to administer a hazardous waste management program in the State of Arizona pursuant to Section 3006 of RCRA. The regulatory program described in the following section is based upon interim authorization status, and is now being further developed and implemented. The full stringency of the EPA hazardous waste regulations will not impact Arizona until such time as full federal authorization has been granted. The granting of this authority is anticipated to occur in 1984, and may result in substantive changes to the State's program. The bulk of the narrative presented in this section on hazardous waste was not prepared for purposes of this State Solid Waste Management Plan, but rather, has been extracted from the Bureau's application for interim authorization. The remaining portion has been taken from the "Report to the Arizona State Legislature Regarding Siting of a State-wide Hazardous Waste Disposal Facility" also published by ADHS in January, 1981. Copies of both this report and application are available for public inspection at the office of the Bureau of Waste Control (1740 W. Adams, Phoenix, Arizona).

A. PROBLEM OVERVIEW

Arizona has enjoyed decades of rapid industrial growth. As a result, a substantial amount of industrial waste has been generated, contributing to the environmental loadings of air, land and water. That portion of the industrial waste stream of greatest concern is the part labeled "hazardous". Although hazardous waste accounts for only a small fraction of the State's total solid waste, its environmental impact is out of proportion to its amount because of attendant threats to public health and the environment. The disposal of hazardous waste is also becoming more significant as the implementation of stringent air and water pollution control programs result in the increased land disposal of wastes.

In the past, very little was done to prevent the discharge of these wastes into the environment. It is commonly known that traces of hazardous industrial pollutants have been encountered throughout the environment, including humans, domestic livestock and wildlife. Problems associated with air and water pollutants have been largely addressed, but the problem of hazardous waste disposal, particularly on land, has not received the same degree of consideration. Today, it has become imperative that adequate hazardous waste management be practiced to prevent further degradation of the environment.

Most manufacturing establishments in the State of Arizona generate potentially hazardous wastes as a result of industrial processes. The Arizona Department of Health Services (ADHS) has estimated that approximately 6.4 million gallons of liquid hazardous waste, and approximately 113,000 tons of solid hazardous waste were produced in Arizona during 1980.

Arizona does not have any adequate hazardous waste disposal sites or treatment facilities. Also, the hazardous waste transportation industry in the State is inadequate for providing for the safe transfer of such waste materials to approved facilities located out-of-state. This situation has forced the generators of hazardous waste to transport and dispose of some of their wastes in other states, or inadequately on plant or leased property, or in illegal dumps, sanitary landfills, or the State's sewer systems.

Problems concerning improper land disposal of hazardous wastes have not been widely publicized despite the fact that economic and environmental damages can be very severe and difficult to correct. Adverse health and safety impacts of land disposal may include groundwater contamination via leachate, surface water contamination via runoff, air pollution via open burning, evaporation, sublimation and wind erosion, poisonings via direct contact and through the food-chain, and explosions, fires and other incidents at land disposal sites. It should be noted that these adverse impacts are increasing, and that improper land disposal can produce both acute and chronic (long-term) problems.

1. Program Objectives

To date, five specific objectives pertinent to the establishment of a proper hazardous waste management program have been identified. These objectives are:

- a. The identification of sources, types, quantities, and current processing, treatment and disposal methods of hazardous wastes in Arizona.
- b. The determination of acceptable hazardous waste disposal methods.
- c. The determination of the need for and the selection of a hazardous waste disposal site within the State and the delineation of areas in which other hazardous waste sites should not be located.
- d. The development of regulations to classify specific wastes as hazardous and to insure environmentally acceptable hazardous waste management in the State.
- e. The development of a strategy for the implementation of a hazardous waste management program.

The overall planning goal is to improve hazardous waste management practices to reduce or eliminate the threat of environmental damage.

2. Regulatory Controls

With regard to hazardous waste rules and regulations, on May 2, 1980, the Department adopted a comprehensive set of regulations designed to meet the requirements of Section 3006 of RCRA for interim authorization to administer and enforce a State hazardous waste regulatory program. Amendments were proposed in March, 1981, and are now in the process of being adopted.

Under the regulations, the generator of any hazardous waste produced or disposed of in Arizona has primary responsibility for the safe and proper management of that waste until such time as the waste is accepted at a permitted facility. When a manifest is required, the generator must prepare the manifest and accurately identify the hazardous waste which is to be shipped.

A transporter must also comply with all applicable container, safety, transporting, reporting, cleanup and disposal requirements of the regulations. The transporter is equally responsible with the generator for the safe shipment within Arizona of the generator's waste. When shipments are made under manifest, the transporter is prohibited from accepting possession of any shipment which does not have a properly prepared manifest. The transporter is also prohibited from delivering a shipment of hazardous waste to a non-permitted facility.

As a general rule, neither the generator nor anyone else may store, treat or dispose of hazardous wastes without a permit, nor transport a hazardous waste without a proper shipping manifest. However, even in the case of hazardous wastes which would normally be subject to the permit and manifest requirements, the generator is allowed to collect and store hazardous wastes for up to 90 days from the date of generation without obtaining a permit. This 90 day exemption is limited only to the site of generation; no off-site storage is allowed except at permitted facilities. The regulations specify the kinds of storage, treatment, and disposal activities for which a hazardous waste permit is or is not required.

3. Statutory Powers

As part of the process of authorizing state programs under Section 3006 of RCRA, the EPA has published proposed guidelines indicating that a state

seeking full authorization should have statutory authority to provide the following program components: *

- a. Control over a universe of hazardous wastes nearly identical to that which is controlled by the Federal program;
- b. Regulations governing hazardous waste generators;
- c. Regulations governing hazardous waste transporters;
- d. Manifest requirements;
- e. Regulations governing hazardous waste treatment, storage and disposal facilities;
- f. Enforcement authority; and
- g. A compliance evaluation program.

Current legislation concerning hazardous waste management is scattered throughout various articles of State law (Arizona Revised Statutes), and comes under the authority of several jurisdictional agencies. The following is a summary of existing State laws which directly affect the hazardous waste program.

ARS Sec. 36-136(g)(11) empowers the Director of the Department to adopt rules and regulations relating to public health. Further authority for such regulations can be derived from ARS Sec. 36-1701 (regarding air pollution control) and ARS Sec. 36-1855 (regarding water pollution control), since the disposal of hazardous wastes can produce both air and water pollution.

A permit system is authorized by ARS Sec. 36-132 (A)(12), which states that "...the department shall make and enforce regulations concerning

*See 40 CFR Sec. 123.128, 45 Federal Register 33481 (1980).

plans or specifications for construction, improvement, alteration or operation of...sewage systems and disposal plans for treatment of...industrial wastes and other deleterious matter, gaseous, liquid or solid, and require that all such plans or specifications be first approved by the department...". The Administrative Procedures Act, ARS Sec. 41-1001 (3), equates "approval required by law with "permits" or "licenses" which may be required.

Also under ARS Sec. 36-136 (G)(11), the Director is empowered to adopt regulations to: "...define and prescribe reasonably necessary measures regarding storage, collection, transportation, disposal and reclamation of...objectionable wastes" along with minimum standards for the transportation, disposal and reclamation of such wastes, thus authorizing a manifest system.

This statute, along with ARS Sec. 36-132(A)(12), expressly provides for the promulgation of standards regarding the handling of hazardous wastes ("deleterious" or "objectionable" wastes) from their production to final treatment or disposal.

With respect to the power to conduct inspections , ARS Sec. 36-136 (G)(11) states that the regulations adopted by the Department "...shall provide for the inspection of premises, containers, processes, equipment and vehicles...". Since there is no explicit statutory jurisdiction with respect to sample collection the Department elected to assume this power through its regulations. Regulatory authority to collect samples is set forth in Sec. R9-8-1823.C.1, which states: "In conducting inspections, the Department may:

- a. Obtain samples of any waste.
- b. Conduct tests, analyses, and evaluations on such waste samples."

In this area, it was necessary to compensate for a statutory deficiency with a regulation in order to provide adequate authority to meet federal requirements.

The Department has a variety of enforcement alternatives when violations are detected . One approach is to issue a cease and desist order pursuant to ARS Sec. 36-601 (B). Such an order gives specific notice of the alleged violation, and allows an opportunity for an administrative hearing and/or voluntary compliance. Because the potential health and environmental injury from hazardous waste mismanagement is so great, the Department intends to seek vigorous prosecution of anyone who disposes of hazardous wastes in such a way as to endanger public health.

There are several State statutes which may pertain to such unlawful disposal. Under Arizona's criminal littering or polluting statute (ARS Sec. 13-1603), it is illegal for anyone acting without lawful authority to throw, place, drop or permit to be dropped on public or private property--other than a lawful dump--any destructive or injurious material which is not immediately removed. Likewise, it is unlawful to discharge or permit to be discharged, any oil products or other harmful substances into any waters within the State, or to dump earth, soil, stones, ores, or minerals onto any land. A violation of this statute is a class 2 misdemeanor, but becomes a class 1 misdemeanor if the act involves placing any destructive or injurious material on or within fifty feet of a highway, beach or shoreline of any body of water used by the public.

Also, the disposal of hazardous wastes in violation of the regulations would be a class 3 misdemeanor under ARS Sec. 36-140. Any act of disposal which violates air quality standards can result in a fine of \$50 to \$1000 under ARS Sec. 36-1720(A). The maximum fine which can be imposed upon an individual convicted of a class 1, 2, or 3 misdemeanor is \$1000, \$750, or \$500 respectively (see ARS. Sec. 13-802). However, in the case of an enterprise, the maximum

fine is \$20,000, \$10,000 and \$2,000 respectively (see ARS Sec. 13-804).

An enterprise is defined to include both incorporated and unincorporated businesses. Thus, anyone engaged in a business which results in the generation, transportation, treatment, storage or disposal of hazardous wastes is subject to enterprise liability. The maximum imprisonment that can be imposed upon conviction for a class 1, 2, or 3 misdemeanor is six months, four months, and thirty days, respectively (see ARS Sec. 13-707).

Several criminal sanctions are available when program violations occur.

Under ARS Sec. 36-140, each violation of Department regulations constitutes a class 3 misdemeanor (with fines up to \$2,000 for each day of violation, and up to 30 days imprisonment; ARS Secs. 13-903, 13-1002 and 13-1004). Under ARS Sec. 13-2407 the preparation and filing of false permit applications, manifests, or other reports required by the Department, with an intent to defraud would constitute a class 6 felony (with fines up to \$150,000 against individuals and \$1,000,000 against enterprises, and prison terms of up to one and one-half years; ARS Secs. 13-901, 13-1001 and 13-1004).

General statutory authority in other jurisdictions directly or indirectly concerned with industrial or hazardous wastes include:

ARS Sec. 3-387--regulates to a limited extent the storage and disposal of pesticides and pesticide containers.

ARS Sec. 28-104--gives the Arizona Department of Transportation jurisdiction over State highways, State routes, State airports and all State-owned transportation systems or modes including hazardous waste substances spill clean-up and disposal.

ARS Sec. 36-132.01--provides for the preparation of the Statewide Solid Waste Management Plan.

ARS Sec. 36-601 through 605--authorizes the Director of ADHS to abate public nuisances, improper waste disposal practices and the contamination of domestic waters.

ARS Sec. 36-770 through 791--deal with air pollution control, and prohibit open burning and unauthorized fires.

ARS Sec. 36-1851 through 1869--(State water pollution control laws) prohibit the pollution of State water, either directly or indirectly, through improper waste disposal.

Hazardous waste legislation was adopted during the Spring 1981 session of the Legislature. Attached (Table VII-A-I) is Senate Bill 1033, as adopted, which provides the Director authority to acquire a hazardous waste site, and contract for the construction and operation of a hazardous waste facility. This bill also provides for the establishment of a hazardous waste trust fund and prescribes the source of revenue and purpose of the fund.

ISSUED BY
ROSE MOFFORD
SECRETARY OF STATE

State of Arizona
Senate
Thirty-fifth Legislature
First Regular Session
1981

Table VII-A-I
CHAPTER 9

SENATE BILL 1033

AN ACT

RELATING TO PUBLIC HEALTH AND SAFETY; PRESCRIBING CERTAIN DEFINITIONS; PROVIDING FOR THE ACQUISITION OF A HAZARDOUS WASTE DISPOSAL SITE BY DIRECTOR; PROVIDING FOR A BUFFER ZONE AND EASEMENT FOR ACCESS; PRESCRIBING DUTIES OF DIRECTOR AND DEPARTMENT; PRESCRIBING CERTAIN CONFORMING CHANGES; PRESCRIBING CRITERIA TO BE CONSIDERED FOR FUTURE SITES; PRESCRIBING USES OF HAZARDOUS WASTE TRUST FUND; PROVIDING FOR RULES AND REGULATIONS; AMENDING SECTIONS 36-2801, 36-2802, 36-2804 AND 36-2805, ARIZONA REVISED STATUTES; REPEALING SECTION 36-2803, ARIZONA REVISED STATUTES; AMENDING TITLE 36, CHAPTER 28, ARTICLE 1, ARIZONA REVISED STATUTES, BY ADDING SECTION 36-2806, AND MAKING APPROPRIATIONS.

1 Be it enacted by the Legislature of the State of Arizona:

2 Section 1. Legislative intent

3 Any purchase or other acquisition of lands currently retained by the
4 federal government authorized by the state of Arizona to accomplish the
5 purposes of this act shall not be construed as an abrogation or diminution
6 of any legal claims the state of Arizona has made upon such federal lands
7 pursuant to Laws 1980, chapter 38.

8 Sec. 2. Section 36-2801, Arizona Revised Statutes, is amended to
9 read:

10 36-2801. Definitions

11 In this chapter, unless the context otherwise requires:

- 12 1. "Department" means the department of health services.
13 2. "Director" means the director of the department of health
14 services.
15 3. "~~State~~ Hazardous waste disposal facility" means a hazardous
16 waste disposal facility ~~owned or operated~~ CONTRACTED FOR by this state.
17 4. "SITE" MEANS THAT PORTION OF REAL PROPERTY DESIGNATED IN SECTION
18 36-2802 OWNED BY THIS STATE WHEREON A HAZARDOUS WASTE DISPOSAL FACILITY IS
19 CONSTRUCTED.

20 Sec. 3. Section 36-2802, Arizona Revised Statutes, is amended to
21 read:

22 36-2802. Acquisition of site; powers and duties of director;
23 criteria applicable to future sites

24 A. The director shall ~~select~~ ACQUIRE CLEAR TITLE IN THE NAME OF THIS
25 STATE TO a site for a ~~state~~ hazardous waste disposal facility for the
26 disposal, storage, recovery and treatment of hazardous wastes CONSISTING
27 OF ONE SQUARE MILE LOCATED IN MARICOPA COUNTY WHICH LEGAL DESCRIPTION IS
28 SECTION 32, TOWNSHIP 4 SOUTH, RANGE 1 WEST, GILA AND SALT RIVER BASE AND
29 MERIDIAN.

1 B. THE DIRECTOR SHALL LEASE IN THE NAME OF THIS STATE A BUFFER ZONE
2 CONSISTING OF AT LEAST ONE-HALF MILE SURROUNDING THE SITE ACQUIRED
3 PURSUANT TO SUBSECTION A OF THIS SECTION.

4 C. THE DIRECTOR SHALL OBTAIN SUCH PUBLIC EASEMENTS AS ARE NECESSARY
5 FOR INGRESS OR EGRESS TO THE SITE ACQUIRED PURSUANT TO SUBSECTION A OF THIS
6 SECTION.

7 D. TO CARRY OUT THE PROVISIONS OF SUBSECTION A OF THIS SECTION, THE
8 DIRECTOR MAY OBTAIN LANDS BY PURCHASE, LEASE, LEASE-PURCHASE, GRANT,
9 CONDEMNATION OR OTHER LAWFUL MEANS.

10 ~~B.~~ E. WHEN A HAZARDOUS WASTE DISPOSAL FACILITY BECOMES
11 OPERATIONAL, ~~a~~ NO NEW FACILITY FOR THE PERMANENT DISPOSAL OF hazardous
12 waste site selected by the director shall not OPERATING AWAY FROM THE
13 SOURCE OF GENERATION OF THE WASTE MAY be located within:

14 1. A one hundred year floodplain, as defined in section 45-2341.
15 2. An area so close to public roads, residences, public and private
16 water wells and water supplies as to constitute a threat to human health or
17 the environment.

18 3. An area where up to one mile from the perimeter of the site the
19 depth to groundwater level is less than one hundred fifty feet.

20 4. An area where the surrounding land use for one square mile may
21 impede the proper long-term SITE maintenance. ~~of such site.~~

22 5. An area where the hydrology and geology ~~is~~ ARE incompatible with
23 such use.

24 6. An area where subsidence has occurred or is likely to occur.

25 ~~G. Transportation distances and routings from areas within the~~
26 ~~state that are major sources of hazardous waste shall be a factor in~~
27 ~~determining site location.~~

28 ~~D. The director shall hold public hearings prior to selecting a~~
29 ~~hazardous waste site.~~

30 Sec. 4. Repeal

31 Section 36-2803, Arizona Revised Statutes, is repealed.

32 Sec. 5. Section 36-2804, Arizona Revised Statutes, is amended to
33 read:

34 36-2804. Construction and operation of a site;
35 definition

36 A. ~~Upon selection of a hazardous waste site pursuant to section~~
37 ~~36-2803, subsection B, the director may:~~

38 1. ~~Acquire, construct or operate a hazardous waste disposal site or~~
39 ~~hazardous waste disposal facility.~~

40 2. THE DIRECTOR SHALL contract for the acquisition, construction ~~or~~
41 AND operation of a hazardous waste disposal site ~~or hazardous waste~~
42 disposal facility.

43 B. ~~To carry out the provisions of subsection A, the director may~~
44 ~~obtain lands and facilities by purchase, lease, lease purchase, grant,~~
45 ~~condemnation or other lawful means.~~

46 G. B. For the purpose of identifying wastes to be disposed of at
47 the hazardous waste facility established pursuant to this article,
48 "hazardous waste" means a waste or combination of wastes which because of

1 its quantity, concentration or physical, chemical or infectious
2 characteristics may either:

3 1. Cause or significantly contribute to an increase in mortality or
4 an increase in serious, irreversible or incapacitating reversible
5 illness.

6 2. Pose a substantial present or potential hazard to human health
7 or the environment when improperly disposed.

8 ~~D.~~ C. Hazardous wastes disposed of at any facility established
9 pursuant to this article shall not include solid wastes generated by
10 domestic households or any source, special nuclear, ~~or~~ by-product
11 materials, ~~as defined in the atomic energy act of 1954, as amended (62~~
12 ~~Statute 923),~~ or any radioactive waste material whose storage,
13 transportation, treatment and disposal is regulated by the federal nuclear
14 regulatory commission or its successor agency, or the Arizona atomic
15 energy commission RADIATION REGULATORY AGENCY, or its successor agency.

16 Sec. 6. Section 36-2805, Arizona Revised Statutes, is amended to
17 read:

18 36-2805. Hazardous waste trust fund; fees

19 A. The director may assess commercially reasonable fees for use of
20 any facility established pursuant to this article.

21 B. Fees collected pursuant to this section shall be remitted to the
22 state treasurer and placed in a special fund denominated the hazardous
23 waste trust fund which is available to the director for the following
24 purposes:

25 1. ~~Operation, maintenance and perpetual care of hazardous waste~~
26 ~~sites or facilities established pursuant to this article.~~ FROM AND AFTER
27 JUNE 30, 1984, THE ADMINISTRATIVE EXPENSES INCURRED BY THE DEPARTMENT
28 RELATING TO THE SITE ACQUIRED PURSUANT TO SECTION 36-2802 IS SUBJECT TO THE
29 APPROVAL OF THE JOINT LEGISLATIVE BUDGET COMMITTEE.

30 2. Monitoring the operation and environmental impact of hazardous
31 waste sites and facilities established pursuant to this article.

32 3. Mitigating or abating any imminent and substantial threat to
33 public health or environmental quality that may be caused or created by any
34 hazardous waste site or facility established pursuant to this article.

35 Sec. 7. Title 36, chapter 28, article 1, Arizona Revised Statutes,
36 is amended by adding section 36-2806, to read:

37 36-2806. Rules and regulations; duty of director

38 THE DIRECTOR SHALL PROMULGATE RULES AND REGULATIONS GOVERNING THE
39 MANAGEMENT, CONSTRUCTION AND OPERATION OF HAZARDOUS WASTE DISPOSAL
40 FACILITIES ESTABLISHED PURSUANT TO THIS ARTICLE. RULES AND REGULATIONS
41 ISSUED UNDER THIS SECTION SHALL INCLUDE PROVISIONS RELATING TO:

42 1. TRAVEL ROUTES FOR THE TRANSPORTATION OF HAZARDOUS WASTES WITHIN
43 THIS STATE.

44 2. THE TYPES AND AMOUNTS OF HAZARDOUS WASTES TO BE ACCEPTED FOR
45 DISPOSAL BY HAZARDOUS WASTE DISPOSAL FACILITIES ESTABLISHED PURSUANT TO
46 THIS ARTICLE.

47 3. PERPETUAL CARE AS NECESSARY AND POST-CLOSURE MAINTENANCE OF
48 HAZARDOUS WASTE DISPOSAL FACILITIES ESTABLISHED PURSUANT TO THIS ARTICLE.

1 Sec. 8. Appropriations; purposes; lapsing

2 A. The sum of one hundred sixty-seven thousand one hundred dollars
3 is appropriated from the state general fund to the department of health
4 services for additional studies, sampling, analysis and monitoring of the
5 hazardous waste disposal site.

6 B. The sum of two hundred fifty thousand dollars is appropriated
7 from the state general fund to the department of health services for the
8 acquisition of land for a hazardous waste disposal site pursuant to section
9 3 of this act.

10 C. The sum of two hundred thirteen thousand dollars is appropriated
11 from the state general fund to the department of health services for the
12 administrative expenses incurred by the department relating to the
13 hazardous waste disposal site acquired pursuant to section 3 of this act
14 for the thirty-six month period July 1, 1981 through June 30, 1984.

15 D. The appropriations made by this section are exempt from the
16 provisions of section 35-190, relating to lapsing of appropriations,
17 except that any amounts remaining unencumbered or unexpended on June 30,
18 1984, shall revert to the state general fund.

Approved by the Governor - February 26, 1981

Filed in the Office of the Secretary of State - February 27, 1981

B. PROGRAM DESCRIPTION

Cradle-to-grave control is the goal of Arizona's hazardous waste management program. The many essential components of a comprehensive program include: administration, a permit system, a manifest system, monitoring, enforcement, imminent hazards control, an emergency response system and technical assistance. Each of these elements are discussed in turn below.

1. Administration

Strong administrative support is vitally necessary to develop and operate a program of the magnitude being undertaken. The staff of the Hazardous Waste Program is expected to double during interim authorization, and the hiring and training of staff by administrative personnel during this period will be critical to the development of a program capable of qualifying for full authorization. Other responsibilities of administrative personnel involve coordinating and guiding the activities of the Section, supporting and coordinating office procedures, supervising clerical staff, maintaining a budget, negotiating contracts such as grant applications, and providing legal services for enforcement procedures.

2. Permit System

Arizona's regulatory program addresses requirements for permit issuance, denial, modification, revocation, suspension and renewal. Any facility storing, treating or disposing of hazardous wastes at the time the State regulations were adopted should have notified ADHS by July 1, 1980 of its intent to apply for a hazardous waste facility permit. A sixty (60) day period of advance notice was necessary to enable the ADHS to determine the

approximate number of permits it would be required to process. It was also needed for the preparation of a list of all permitted facilities and temporary disposal sites (which the Department is prescribed by regulations to maintain for public distribution). Formal permit applications (Part A) should then have been filed with ADHS no later than Nov. 19, 1980. New facility permit applications will be accepted for review whenever they are received.

3. Manifest System

As of July 31, 1980, a manifest was required for any hazardous waste transported in Arizona. Controlling the movement of hazardous wastes throughout their life cycle is an essential element in managing hazardous wastes, and the use of a manifest assures that hazardous wastes which leave the site of generation are taken only to permitted storage, treatment or disposal facilities. The staff operating the manifest system is responsible for reviewing and approving manifests, developing policies, coordinating between generators and transporters, tracking the manifest distribution, investigating violations, record-keeping, and coordinating with other agencies.

4. Monitoring

The Bureau staff has developed facility and waste stream selection, priority, inspection and monitoring procedures. These procedures include guidelines on conducting inspections, sampling and analytical methods, quality control and record-keeping. The record-keeping and reporting procedures are required of all permitted facilities. In general, each facility must maintain an annual log containing a record of the type, quantity and rate of each hazardous waste stored, treated or disposed of. Each permitted facility must also submit quarterly reports to the Department specifying the type and quantity of all

hazardous waste received, shipped, disposed of, treated or stored during the quarter.

5. Enforcement

The Bureau's hazardous waste enforcement activities and procedures include; negotiations, non-compliance screening, complaint processing, notification and prosecution of violators, issuing restraining orders, enjoining threatened or continued violations and assessing penalties.

6. Control of Imminent Hazards

The Department currently conducts routine inspections of municipal and county refuse disposal sites throughout the State. It is suspected that these sites receive significant quantities of hazardous waste, although they are intended primarily for the disposal of municipal refuse. Also, approximately ninety potential hazardous waste sites were detected as a result of the recently completed Surface Impoundment Assessment. In conjunction with the Open Dump Inventory now in progress, these sites, as well as other major open dumps in the State, will be carefully studied to determine whether such hazardous waste disposal presents an environmental threat or imminent hazard. The Department also anticipates the discovery of further potential sites through the analysis of aerial photographs to be taken over selected parts of the State.

In addition to the above program elements, the Department detects imminent hazards on the basis of citizen complaints and referrals from local health and/or highway departments. Such complaints and referrals constitute the major source of information concerning promiscuous dumping and accidental spills.

The Department now administers a program for the containment and mitigation of imminent hazards. Additional personnel have been acquired to conduct such a program. In addition to locating and identifying suspected sites, conducting full site investigations, coordinating enforcement procedures, and taking emergency action, the following detection activities are in the process of being implemented:

- a. Routine inspection of areas near pesticide application operations for improper disposal of pesticides and pesticide containers;
- b. Inspection of disposal locations at or near industrial facilities that are known or suspected generators of hazardous waste;
- c. Monitoring of facilities suspected of dumping hazardous wastes illegally;
- d. Searching records to develop data on types of wastes generated and their place of disposal, including abandoned sites and storage facilities;
- e. Remote sensing (e.g. aerial photography) on a routine basis in urban and industrial areas.

In the area of hazard containment, the Department presently has sufficient legal authority, but has only a limited capability to immediately contain or mitigate serious hazardous waste problems. Spills on highways are ordinarily cleaned up quickly by the State police and the State Corporation Commission. Other kinds of waste hazards cannot be cleaned up or contained immediately (i.e. within a few days) unless the responsible party agrees to do so himself. The Department has only limited funds to conduct clean-up operations, and legal action to force clean-up or containment by the responsible party is inevitably time consuming. In regard to hazardous waste problems on Indian lands, the

Department's position is that such problems are primarily matters of tribal and federal responsibility, and should be dealt with accordingly. In effect, the Department has sufficient existing statutory and regulatory authority to undertake a potential imminent hazard survey and correction program, including mining wastes. In the area of hazard containment, the Department has sufficient authority to require clean-up of most hazardous waste problems.

The Department intends to vigorously pursue enforcement action against violators of State laws and regulations governing hazardous waste disposal. There is currently sufficient legal authority to apply for injunctive relief for abatement of hazardous waste nuisances and to seek criminal prosecution for illegal dumping. There may be cases, particularly those with interstate implications, in which court action by EPA will be preferable to action by the Department. The Department anticipates that such cases will be rare, but will endeavor to contact EPA whenever a federal interest may be involved.

The Department has also recently developed procedures for locating, identifying, assessing and correcting solid and hazardous waste related imminent hazards (including inactive hazardous waste sites and mining sites), and has submitted these procedures to the EPA. In the future, the personnel and monetary resources committed to the imminent hazards program will depend upon the extent to which EPA participates in this activity. Further discussion between the EPA and the Department is necessary to resolve questions concerning the extent of and responsibility for the State's imminent hazard program.

7. Emergency Response System

The Department of Health Services is now a formal participant in Arizona's evolving statewide emergency response system. The various agencies involved, and their present emergency responsibilities are identified below.

- Arizona Radiation Regulatory Agency -- regulates and advises regarding radioactive materials.
- Arizona Corporation Commission -- regulates and advises regarding transportation of hazardous wastes and materials; has an emergency response team.
- Arizona Department of Public Safety -- public law enforcement agency which frequently handles "first on the scene" responsibilities.
- Arizona Department of Transportation -- maintains roads; frequently has "first on the scene" responsibilities during highway emergencies.
- Industrial Commission, Division of Occupational Health and Safety -- regulates worker safety.
- Division of Emergency Services -- governor's office division which coordinates during disasters.
- Arizona Department of Health Services -- regulates and advises on hazardous waste disposal and public health.
- Arizona State Fire Marshall -- coordinates with local fire departments.

These responsibility designations are contained in the "Hazardous Material Emergency Response Plan (Interim, Dec. 1980)." As agency capabilities expand and mature, these designations will be finalized.

8. Technical Assistance

The Department conducts an on-going hazardous waste technical assistance program. The technical support staff provides assistance to the affected entities in complying with regulatory requirements, and also advises on technology. Currently, this occurs at the rate of approximately 325 cases per month. This includes telephone and office consultations concerning transportation and disposal of hazardous wastes, correspondence, and re-

view and approval of manifests. Assistance is also provided to other State and local agencies.

The staff also responds to requests for information from the general public.

C. CURRENT MANAGEMENT PRACTICES

Information regarding hazardous waste generation and disposal from industries within Arizona is very limited at this time, primarily because until very recently, hazardous wastes were virtually unregulated. Consequently, there were no defined criteria for identifying what constituted a hazardous waste, nor were there any record keeping or reporting requirements for industry to subscribe to. As a result of this deficiency, information on hazardous waste generation and disposal is somewhat fragmented at this time. Steps to alleviate this deficiency have been initiated on a national scale by the U.S. EPA under the provisions of the Resource Conservation and Recovery Act. These efforts to date, however, have met with only limited success.

Hazardous Waste Generation in Arizona. Although statewide information on hazardous waste generation and disposal is somewhat fragmented, the Arizona Department of Health Services (ADHS) estimates that Arizona industries produce approximately 6.4 million gallons of liquid hazardous waste and 113,000 tons of solid hazardous waste each year. These projections are considered very conservative. The basis and methodology used to develop these projections is presented below.

In 1974 and 1975 the Arizona Department of Health Services conducted industrial waste surveys to determine the extent of potentially hazardous waste generation in the State. Approximately 507 manufacturing industries were surveyed out of 1,580 establishments with a high potential for hazardous waste generation. The surveyed industries were selected from the 13 Standard Industrial Classification (SIC) groups thought to have the highest potential for hazardous waste production. The objectives of the studies were to: (1) identify the sources of hazardous waste, (2) estimate the total quantity and characteristics of hazardous waste generated in Arizona; and (3) identify current treatment and disposal methods.

The total estimated amount of hazardous waste generation was obtained by extrapolation of survey data. The number of employees in each of the individual SIC groups provided the basis for this extrapolation.

The survey data, in effect, has indicated that a theoretical amount of 5.77 million gallons and 102,000 tons of potentially hazardous wastes were generated in 1978. Of these estimated amounts, 2 million gallons were waste acids and caustics, 1.3 million gallons were waste oil, 0.9 million gallons and 13,000 tons were metallic wastes, 0.9 million gallons and 49.00 tons were toxic chemical wastes, 0.37 million gallons were waste solvents, and 0.3 million gallons and 40,000 tons were waste paints, pigments, resins, glues, etc.

Further adjustments to these figures to account for an estimated 10.6% industrial growth rate in the manufacturing sector between 1978 to 1980 show that a theoretical amount of 6.4 million gallons of liquid hazardous waste and 113,000 tons of solid hazardous waste was produced in Arizona during 1980. These

estimates are conservative because the survey data and adjustments only include manufacturing industries. There are other sources of potentially hazardous wastes that would substantially add to the total waste generation. Such sources include the mining industry, agricultural pesticide formulators and applicators, military installations, and the utility industry.

The survey data, supported with manufacturing employee estimates, further indicated that almost all of the potentially hazardous waste from the manufacturing industry is generated in the Phoenix and Tucson areas. Phoenix accounts for approximately 74% of the wastes generated and Tucson about 12%.

A more accurate estimate of hazardous waste generation in Arizona may be developed through data provided through the U.S. EPA 3010 Notification System and annual hazardous waste generator reports which are to be submitted by Arizona industries in March, 1982.

3010 Notification. The Resource Conservation and Recovery Act of 1976 (RCRA) requires the U.S. Environmental Protection Agency (EPA) to institute a national program to control hazardous waste. This control is most easily achieved by identification and tracking of hazardous waste from point of generation through treatment, storage, and ultimate disposal, via transportation manifests and reporting. The keystone of the identification and tracking system is the requirement of Section 3010 of RCRA that those engaged in generating, transporting, treating, storing, or disposing of hazardous wastes notify EPA of their involvement with hazardous wastes within 90 days following the promulgation of the federal regulations identifying hazardous wastes.

Final EPA regulations were published in the Federal Register on May 19, 1980. Subsequently, all generators, transporters and hazardous waste facility owners were required to notify EPA by August 18, 1980. As of February 9, 1981, 639 such notification forms had been submitted to EPA from Arizona.

Table VII-A-II

Arizona 3010 Notification Response
(EPA - February 9, 1981)

Notifiers	Number Reporting
Generators	381
Transporters	96
Storage/Treatment/Disposal Facilities	162
	639

Hazardous Waste Transportation Practices. The transportation and storage of hazardous waste (solids, slurries, sludges, liquids, or contained gases) is a unique environmental problem because the economy of scale as it applies to treatment and disposal requires an accumulation of sufficient quantities of such wastes. The shipment of large amounts of hazardous wastes results in

a major concern for the environmental integrity of transportation methods because of the immediate or future potential for pollution of the land, air, and water, on both a short and long-term basis.

The transportation of hazardous wastes can be by several modes -- highway and road vehicles, pipeline, and railroads. Arizona is fortunate in being transversed by a network of major highways, state roads, and railroads. Every urban area is linked by the network, providing a means to efficiently move any volume of industrial wastes from the point of generation to the point of disposal. Almost all hauling of hazardous wastes in Arizona is conducted by motor vehicles over public highways. Hauling by railroads has been limited to occasional loads of a specialized nature.

The storage and transportation practices concerning hazardous waste disposal in Arizona are quite varied. There are manufacturing establishments with large sophisticated waste storage containers who ship their wastes by proper transportation methods such as tanker trucks. On the other hand, there are numerous generators who use bins, assorted drums, and 55-gallon barrels for the storage and transportation of wastes, often in the bed of small trucks.

During the November 1980 elections in Arizona, deregulation of the transportation industry was mandated by the electorate. Consequently, the future of licensing functions now carried out by the Arizona Corporation Commission for hazardous waste haulers are uncertain. Vehicle safety inspections and emergency response functions may be assumed by other agencies within existing jurisdictions. Regulations recently adopted by the U.S. Department of Transportation (DOT) in cooperation with the U.S. EPA cover transportation of hazardous wastes and supplement existing U.S. DOT regulations covering transportation of hazardous materials. In general, "hazardous materials" are high

strength raw materials (chemicals) while "hazardous wastes" are generally low concentration or "spent" chemicals.

The involvement of the Arizona Department of Health Services (ADHS) in the transportation of hazardous materials and/or wastes has been limited to investigation and assistance in response to transportation spills resulting from accidents. The ADHS is working closely with the State Division of Emergency Services in the preparation of a State Emergency Response Plan for incidents involving chemical spills.

Historically, in Arizona, many types of inadequate vehicles have been used for the transportation of hazardous wastes. Because of the limited availability of adequate truck tanks, most hazardous wastes which are shipped for ultimate disposal on land are transported by septic tank cleaners and oil haulers. The transportation methods for hazardous waste disposal and remote hauling in and around Arizona occurs as indicated in Table VII-A-III.

TABLE VII-A-III

TRANSPORTATION MODES
FOR HAZARDOUS WASTE
IN ARIZONA
1979

<u>TRANSPORTATION METHOD</u>	<u>PERCENTAGE OF WASTE HANDLED</u>
Septic Tank Cleaners	47
Self Haul	30
Oil Haulers	17
Municipal and Contract Refuse Handlers	8

SOURCE: ADHS: 1979

The Arizona Department of Health Services further estimates there are approximately 230 licensed septic tank haulers in the State. In addition, the Arizona Corporation Commission estimates there may be as many as 40 common carriers, or carriers for hire, that are willing and capable of transporting hazardous wastes. The majority of these, however, depend primarily on revenues from hauling other commercial goods.

Transportation is an integral part of a comprehensive hazardous waste management system. Furthermore, a "cradle-to-grave" tracking system is essential for the effective monitoring of waste flow. Implementation of such a system coupled with vehicle safety inspections and a vigorous enforcement program would drastically reduce or eliminate the inadequate transportation of hazardous waste.

Hazardous Waste Disposal. Information regarding hazardous waste disposal practices in Arizona is somewhat incomplete at this time for the same reasons that hazardous waste generation data is limited -- until very recently hazardous wastes were virtually unregulated. Some information however, has been compiled from a variety of sources, including the ADHS industrial waste surveys completed in 1974/75.

Before these are discussed it should be noted that various options are available to industry regarding the management of hazardous wastes. Market demands, increased industrial development, stricter environmental controls, improved technology and inflationary costs have altered the industrial management of hazardous wastes. For example, some industries in Arizona may have begun to neutralize wastes through pretreatment processes in order to avoid costly transportation and disposal costs. Other industries may concentrate certain wastes, thus reducing the volumes of waste that must be transported and dis-

posed. Increased disposal costs may lead larger industries to provide for costly on-site disposal while smaller industries may elect to use off-site storage and treatment facilities. The effect of these variables will remain undefined until such time as additional information and data becomes available.

ADHS Industrial Waste Surveys. The industrial waste surveys completed by ADHS in 1974/75 provided information about waste disposal practices and methods in Arizona. Results of these surveys were then extrapolated and total estimates for 1978 were provided. The results showed that in 1978 approximately 1 million gallons and 14,000 tons of potentially hazardous wastes were recycled or reclaimed, 110,000 gallons evaporated, 39,000 tons incinerated, 37,000 gallons shipped out-of-State, 930,000 gallons of concentrated chemical solutions sewerred, and 3.8 million gallons and 50,000 tons disposed of on land by means of lagoons, pits, ponds, landfills, dumps, and landspreading. In addition, about 940 million gallons of very dilute treated and untreated chemical solutions were discharged into the State's sewer systems.

Recently, however, these waste disposal practices have undoubtedly changed due to the implementation of State and Federal hazardous waste regulations. The impact of these regulations, coupled with the lack of approved treatment and disposal facilities has placed Arizona industries in a very expensive and tenuous position. Faced with this critical turn of events, the Arizona Legislature enacted S.B. 1033 (see Table VII-A-I) in the Spring of 1981 to provide for the development of a state-owned hazardous waste disposal facility which would alleviate this pressing need. An overview of this proposed facility in terms of its intended design and operating parameters is presented in the section which follows.

D. PROPOSED ARIZONA STATEWIDE HAZARDOUS WASTE DISPOSAL FACILITY

This section will briefly overview the basic design and operational characteristics of the hazardous waste facility that is proposed for Arizona as well as probable treatment and disposal technologies that may be employed. Before discussing these issues however, it is necessary to clarify several points so that a clear understanding or perception of the facility can be realized. First, the proposed facility is not a "dump". The term "dump" presents a negative connotation which typifies an uncontrolled and unacceptable disposal practice. The proposed facility would be similar to an oil refinery or chemical manufacturing plant. It should be stressed that hazardous waste management (which includes storage, transportation, treatment and disposal) is subject to stringent controls and standards. The proposed facility will be subject to these regulatory controls and operated in accordance with specified standards as outlined in state and federal regulations.

The second factor that should be emphasized is that the absolute elimination of all risk associated with the development of the proposed facility cannot be achieved. The realistic goal, however, is to minimize the risks associated with the management and ultimate disposal of these wastes. Key preventive measures for minimizing risks include:

1. siting the proposed facility in an environmentally suitable area; (Rainbow Valley in Maricopa County has been selected for this purpose).
2. utilizing waste reduction, reuse, pretreatment, detoxification and encapsulation;
3. incorporating strict environmental and safety considerations in design, construction and operation of the facility;

4. imposing stringent regulatory permitting and plan review requirements;
5. environmental and biological surveillance and monitoring of water, soil and air mediums;
6. facility operator training requirements;
7. stringent enforcement of state and federal regulations; and
8. proper closure and perpetual care of completed disposal cells.

The third issue that should be identified pertains to the issue of "economies of scale". The precise types of treatment and disposal technology to be used at the proposed facility will be directly related to the types and quantities of wastes that are received. Certain types of technology may not be initially developed at the facility because of high capital costs and relatively low waste volumes. Examples of this may include: high temperature incineration, certain forms of chemical pretreatment and detoxification, and deep well injection. Those wastes which must use these types of technologies may be stored at the facility in volume until such time as they can be transported out-of-state for ultimate treatment and disposal. Radioactive waste material whose storage, transportation, treatment or disposal is regulated by the Federal Nuclear Regulatory Commission or the Arizona Radiation Regulatory Agency will not be permitted at the proposed Arizona facility. Explosives, municipal refuse and "non-hazardous" solid waste will also be prohibited.

Description of the Facility. As proposed, the hazardous waste facility would be owned by the State of Arizona and operated by a private company. The dimensions of the proposed facility are estimated at approximately 640 acres or one square mile. The facility proper will be protected from surface water

runoff and sheetflow by the construction of storm water diversion berms and drainage culverts. Access to the site will be controlled by paved roads, signs and security fencing. Ground water monitoring wells will be installed throughout the site and at the facility boundaries. All liquid evaporation ponds and landfill cells will be constructed with natural clay and synthetic liners in order to obtain a liquid permeability rate of less than 10^{-7} cm/sec for each liner. In addition, leak detection devices and leachate collection systems will also be installed. Dust control and mitigation would be achieved by a variety of suppression techniques, which include applications of waste oils, water, and controlled burial. Landfarming areas are generally kept moist while secured burial cells are covered with up to two feet of virgin soils each day; the dust on paved entrance roads will be suppressed through the use of water trucks if needed. Odorous waste that is received at the facility will be filtered or chemically processed prior to being treated and disposed. There will not be any malodors emitted offsite; the facility will be virtually "odor-free" and thus will not constitute a public nuisance.

Each load or shipment of waste accepted by the facility must be accompanied by a shipping manifest which will identify the origin of the waste, the transporter, and the waste characteristics. A sample from each load of waste will be taken to confirm waste characteristics, assure quality control and identify the best treatment and disposal option. A comprehensive on-site laboratory with qualified chemists will be maintained at the facility for this purpose. Holding and receiving tanks, scales, safety equipment and truck washout or rinsing areas will also be provided. The facility will be required to follow stringent record-keeping requirements in accordance with state and federal regulations. A contingency plan and emergency response

plan will be developed by the facility in cooperation with local, state and federal agencies. Surrounding the 640-acre facility proper, a minimum one-half mile buffer will be controlled by the State of Arizona. The purpose of this buffer is to control surrounding land use and development, and for additional monitoring if warranted by need.

Technology. The following discussion will further describe minimum treatment technologies and disposal practices that will be utilized at the proposed facility. Other forms of technology may be phased into the development of the site as needed or as warranted by use.

1. Solar Evaporation and Pretreatment: This technology is used for the reduction of wastes which have a high water content. This type of waste reduction method is not extremely capital-intensive and is highly suitable for southern Arizona, which has a very high solar evaporation rate. Several solar evaporation ponds or impoundments will be developed at the facility. It has been estimated by the ADHS that a minimum of two surface acres of impoundments will be required. These impoundments will be lined and engineered to site-specific hydrological and geological conditions. Depending upon detailed soil studies, the impoundments will have a single or double liner so that a minimum permeability rate of 10^{-7} cm/sec is achieved. Theoretically, this may require the use of a natural clay liner in conjunction with synthetic liners. In addition, lysimeters and soil moisture probes will be used to detect any possible liquid leakage, while a leachate collection system will be installed in order to collect any possible escaped liquids. Monitoring wells will also be installed to assure the maintenance of a zero-discharge facility. Surface water contaminant dikes will be constructed around each impoundment.

It should further be noted that solar evaporation ponds will be used in conjunction with other low level pretreatment technologies, including the following: (1) oils will be eliminated from the aqueous solutions placed in the ponds; oils float on the surface of impoundments, thus reducing the solar evaporation rate; (2) volatile products such as solvents are not placed in impoundments because of ambient air quality considerations, fire hazards and incompatibility with synthetic liners; (3) if a liquid waste is odorous, the solution is filtered and/or chemically treated before it is placed in the impoundment; and (4) low concentrate corrosive wastes which are caustic or alkaline and have a high water content are neutralized prior to being placed in the impoundments.

2. Acid Neutralization and Solidification: This is another type of treatment technology that will be used at the Arizona facility. It is primarily a method used to eliminate acids and is also applicable to certain types of inorganic wastes. This type of system is not extremely capital intensive and can be designed to accommodate various volumes of highly acidic bulk liquid wastes or bulk liquid wastes having high heavy metal concentrations. In this type of process the pH of the liquid waste is adjusted and mixed with varying ratios of calcium hydroxide, fly ash or other chemicals for fixation. This process neutralizes any acids present, changes the soluble metals to the hydroxide form (insoluble chemical state) and produces an earthen-like gypsum material. This material can then be dewatered and directly landfilled or, if there are any potentially toxic organic residuals present, the material can then be containerized or otherwise disposed of in a secure burial cell.

3. Secured Burial Cells: This type of disposal option will also be used at the Arizona facility. Burial cells provide a disposal function for solids and residuals. No liquids are disposed of in these cells, only bulk solid hazardous wastes, drums of solid material or crushed drums that previously contained liquid hazardous waste. Each burial cell is lined with clay and/or synthetic liners in order to achieve a minimum permeability rate of 10^{-7} cm/sec. The cells are further equipped with leak detection devices, soil probes, leachate collection systems, and monitoring wells to assure that a zero discharge facility is maintained. Incompatible wastes are segregated as determined through laboratory analysis. If required, protective disposal operations, i.e., contain-erization or lining of containment cells, will be employed as necessary. The burial cells will also be surrounded by protection berms and dikes to divert and/or collect any on-site surface water. The wastes disposed of in secured burial cells will be covered with adequate cover material in trenches engineered for each individual cell. Once filled, the cells will be capped with an impermeable seal, precluded from other uses, and perpetually monitored. Other cells will be developed as the filled cells are completed.

4. Landfarming: This technique will be used at the Arizona facility to dispose of certain types of organic biodegradable industrial wastes. This method of disposal involves the spreading of liquid, sludge, or solid wastes onto the surface of an area and then tilling the waste into the soil. Organic constituents in the waste are biodegraded by naturally occurring microorganisms near the soil surface. The decomposition produces innocuous end products, such as carbon dioxide and micro-bial cell mass. Refractory organics may be bound chemically in the

soil. Inorganic constituents, such as salts and metals, are absorbed into the soil by physical and chemical phenomena and are immobilized. If vegetable cover is established to prevent erosion, some of the inorganic materials are utilized by the vegetation as nutrients. This vegetation would also be closely monitored for metal buildup. Landfarming can be used as a disposal technique for certain types of biodegradable petroleum wastes, sewage treatment sludges, and lime sludges. Prior to disposing of any waste load by landfarming, lab analysis must be performed to identify leaching characteristics. In addition, soil conditions at landfarming sites are continually monitored.

5. Storage: The proposed Arizona facility will also contain tank facilities for the receipt and storage of certain types of spent materials, i.e., PCBs and other forms of chlorinated hydrocarbons. Basically, this type of waste will consist of chlorinated synthetic material that may be better treated elsewhere in volume. As time goes on and Arizona's waste volumes increase, certain types of technology may be phased into the facility to accommodate the need for the treatment and disposal of these types of waste.

The Arizona facility, at a minimum, will utilize the five types of treatment, storage and disposal technologies which have been briefly described. These include: (1) solar evaporation (with some pretreatment); (2) secured landfill burial; (3) acid neutralization and solidification; (4) landfarming; and (5) storage capabilities. It is anticipated that resource recovery and reclamation at the facility initially will be limited to certain types of waste oil and solvents. The principal variables limiting resource recovery are: types and quantities of wastes, available markets, economies of scale and required technology.

Life Expectancy of the Facility. The life expectancy of the proposed Arizona facility is very long-term because the facility is virtually a self-renewing type of operation which uses primarily physical, chemical, and mechanical technologies. Salts in the solar evaporation ponds can periodically be dredged and neutralized or otherwise treated, landfarming elevations can rise or otherwise be contoured. The only element at the site which is not renewable is the secured burial cells. Once these are filled, others are developed. The old cells are capped with an impermeable seal, precluded from other uses, and monitored indefinitely. A percentage of the disposal fees collected at the facility will be remitted to the Arizona State Treasurer and placed in a special trust fund for the perpetual care, operation and maintenance of the burial cells and other elements of the facility, and for the abatement of any threat to public health or the environment caused by the facility.

Emergency Response Plan. As discussed in the beginning of this Section, the absolute elimination of all risks associated with the development of the proposed facility cannot be achieved. The best solution for dealing with these situations is the development and implementation of accident prevention procedures and programs, as well as remedial procedures and methodologies for responding to accidents and emergency situations.

Once a hazardous waste site has been identified and a facility operator selected, a contingency plan will be required as part of the state and/or federal permitting procedure. This plan must include emergency response capabilities in the event of possible incidents or spills in or around the facility. This plan must contain, at a minimum, the following elements:

1. Description of communication for summoning external emergency assistance
2. Description of internal warning and communication system
3. Description of equipment and personnel available for emergency response
4. Description of procedures established to handle uncontrolled reaction, combustion or explosion
5. Description of procedures established to handle spillage, discharge, or disposal in an area not intended for discharge or disposal
6. Description of protective clothing and breathing equipment available on-site to emergency response team
7. Description of procedures established to handle degradation of air or water quality
8. Description of procedures established to handle escape of leachates
9. List of emergency agencies, including police, fire, ambulance, hospitals, etc., agreeing to provide emergency services
10. Containment, decontamination, and cleanup procedures to be used in emergency situations
11. Training and qualifications of on-site emergency coordinators
12. Contingency plan implementation checklist for emergency situations
13. Training and inspection procedures to be performed by the emergency coordinators
14. Description of procedures established to mitigate effects of equipment failure and power outages.

In addition to on-site emergency response capabilities to be maintained by the facility operator, the State of Arizona has developed and is now implementing a statewide Emergency Response Plan. Principal actors include: local agencies, the Arizona Department of Public Safety, Arizona Corporation Commission, the Arizona Department of Health Services, and the Division of Emergency Services. It is hoped that this facility will be fully operational by mid 1983.

E. CONCLUSION

The purpose of this section was to overview the existing framework for hazardous waste management in the State of Arizona. Hazardous waste was defined, and its principal characteristics were identified. The State's regulatory authority and program for the period of interim authorization was reviewed, and prospective future directions were explored. Current practices were then identified, and evaluated in terms of the management aspects of; (1) transportation, and (2) disposal. Finally, the State's plans for the development of a state-owned hazardous waste disposal facility were reviewed. In sum, this section was intended to provide an understanding of the current status of hazardous waste management in the State, its associated problems and complexities, and the compelling need for its effective management and control.

* Editor's Note

Recommendations and timetables for developing, improving and implementing the State's hazardous waste management program and system may be found under separate cover in the State of Arizona's "Application for Interim Authorization to administer a Hazardous Waste Management Program." Copies of this report are available for public inspection at the offices of the Bureau of Waste Control, Arizona Department of Health Services

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CHAPTER SEVEN

SECTION B

MUNICIPAL WASTE

Chapter VII
Section B
Municipal Waste

INTRODUCTION

For purposes of this State Plan, municipal solid waste (MSW) is defined to include all solid waste originating from residential, commercial and institutional sources.

The residential waste stream is comprised of all types of post-consumer household-generated refuse, including garbage, yard wastes and the full range of consumer products. Commercial waste is essentially comprised of all discarded materials that are generated from wholesale and retail business establishments. For its part, the institutional waste stream contributes all those wastes generated by public and private institutions (i.e. educational, health care, governmental, etc.).

A. CHARACTERISTICS

On the basis of available data, it has been estimated that nearly two million tons of municipal solid waste was generated within the State of Arizona during calendar year 1980. Although the rate of growth in per capita waste generation is beginning to slow nationwide, it is nevertheless still on the upswing. Consequently, the total magnitude of the solid waste management problem can be expected to increase in the foreseeable future.

In late 1979, the Council on Environmental Quality reported that municipal solid waste generation had increased an average of two percent per annum between 1970 and 1978. Total U.S. municipal waste volume was estimated at 154 million tons in 1978, the equivalent of 1400 pounds or .7 tons per capita. Of this national total, the Arizona share was approximately 1.3 percent.

The State's 1980 estimate of municipal solid waste generation for Arizona is presented in Table VII-B-I. This estimate was derived by taking the 1978 national average generation rate of 3.8 lbs. per capita/per day, and projecting a 2% annual growth to 1980. This is consistent with national trends, and results in a generation rate of 4.0 lbs. per capita/per day for Arizona in 1980.

With reference to this particular table (VII-B-I) the estimate of municipal solid waste volume destined for collection is based upon an average compaction factor, and is derived by dividing the total annual pounds of municipal solid waste by 500. This result is expressed in cubic yards.

Assuming that all of this collected refuse is destined for land disposal, the estimate of land disposal volume is then derived by dividing the total annual pounds of municipal solid waste by 800, thereby yielding an estimate of the total cubic yards of municipal solid waste to be disposed of and compacted into sanitary landfills, exclusive of cover material.

The estimate of acreage required for land disposal is then computed by the following method, assuming a 0% salvage rate and an average landfill depth of 12 feet;

Step 1: Total compacted disposal volume (yd^3) \times .25 = yd^3 cover material required.

Step 2: yd^3 cover material required + total compacted land disposal volume = total landfill volume.

Step 3: total landfill volume \div 1613 \div 12 (foot depth) = required acreage

This methodology is described in greater detail in the "Sanitary Landfill Site Selection and Development Guidelines" (see page VIII-D-16), which

TABLE VII-B-1

MUNICIPAL SOLID WASTE*
ESTIMATED GENERATION, VOLUME AND LAND DISPOSAL NEEDS
BY COUNTY
1980

	A	B	C	D	E
COUNTY	1980 POPULATION	TOTAL POUNDS MSW GENERATED PER YEAR (1460 lbs. per capita)	TOTAL COMPACTED COLLECTION VOLUME (yd ³).	TOTAL COMPACTED LAND DISPOSAL VOLUME (yd ³).	ANNUAL ACREAGE REQUIREMENT
APACHE	52,083	76,041,180	152,082	95,051	6.14
COCHISE	86,717	126,606,820	253,214	158,259	10.22
COCONINO	74,947	109,422,620	218,845	136,778	8.83
GILA	37,080	54,136,800	108,274	67,671	4.37
GRAHAM	22,862	33,378,520	66,757	41,723	2.69
GREENLEE	11,406	16,652,760	33,306	20,816	1.34
MARICOPA	1,508,030	2,201,723,800	4,403,448	2,752,155	177.73
MOHAVE	55,693	81,311,780	162,624	101,640	6.56
NAVAJO	67,709	98,855,140	197,710	123,569	7.98
PIMA	531,263	775,643,980	1,551,288	969,555	62.61
PINAL	90,918	132,740,280	265,480	165,925	10.72
SANTA CRUZ	20,459	29,870,140	59,740	37,338	2.41
YAVAPAI	68,145	99,491,700	198,983	124,365	8.03
YUMA	90,554	132,208,840	264,418	165,261	10.67
ARIZONA	2,717,866	3,968,084,360	7,936,169	4,960,105	320.32
TOTAL LAND REQUIRED					.50 sq. miles

COMPUTATIONS

- A. DES POPULATION STATISTICS UNIT (1980 U.S. CENSUS)
 B. $A \times 1460$ (4.0 lbs. per capita/per day)
 C. $B \div 500$
 D. $B \div 800$
 E. $1.25 D \div 1613 \div 12$

* Includes residential, commercial and institutional wastes only.

TABLE VII-B-II

MUNICIPAL SOLID WASTE*
PROJECTED GENERATION, VOLUME AND LAND DISPOSAL NEEDS
BY COUNTY
1985

	A	B	C	D	E
COUNTY	ESTIMATED POPULATION 1985	TOTAL POUNDS MSW GENERATED PER YEAR (1533 lbs. per capita).	TOTAL COMPACTED COLLECTION VOLUME (yd ³).	TOTAL COMPACTED LAND DISPOSAL VOLUME (yd ³).	ANNUAL ACREAGE REQUIREMENT
APACHE	60,000	91,980,000	183,960	114,975	7.43
COCHISE	100,100	153,453,300	306,907	191,817	12.39
COCONINO	89,300	136,896,900	273,794	171,121	11.05
GILA	41,800	64,079,400	128,159	80,099	5.17
GRAHAM	28,200	43,230,600	86,461	54,038	3.49
GREENLEE	12,000	18,396,000	36,792	22,995	1.49
MARICOPA	1,784,000	2,734,872,000	5,469,744	3,418,590	220.77
MOHAVE	72,900	111,755,700	223,511	139,695	9.02
NAVAJO	79,500	121,873,500	243,747	152,342	9.84
PIMA	623,000	955,059,000	1,910,118	1,193,824	77.10
PINAL	102,500	157,132,500	314,265	196,416	12.68
SANTA CRUZ	24,300	37,251,900	74,504	46,565	3.01
YAVAPAI	87,500	134,137,500	268,275	167,672	10.83
YUMA	104,300	159,891,900	319,784	199,865	12.91
ARIZONA	3,209,400	4,920,010,200	9,840,020	6,150,013	397.16
TOTAL LAND REQUIRED					.62 sq. miles

COMPUTATIONS

- A. DES POPULATION STATISTICS UNIT (1981 - UNOFFICIAL & TEMPORARY)
 B. $A \times 1533$ (4.2 lbs. per capita/per day)
 C. $B \div 500$
 D. $B \div 800$
 E. $1.25 D \div 1613 \div 12$

* Includes residential, commercial and institutional wastes only.

serve as the basis for the Departments' (ADHS) facility plan review and approval process. The data and methodology are presented in this context to provide the reader with an overview of the magnitude and scope of the solid waste problem, and an indication of the resources which will be required for its effective management.

As a planning guideline, Table VII-B-II presents these same estimates extrapolated to the year 1985. These projections were computed on the basis of a 1% annual rate of growth in municipal solid waste volume, and are consistent with national trends indicative of a slowing but continuing growth rate.

Municipal solid waste generation varies widely amongst Arizona communities. Our 1980 estimate of 4.0 lbs. per capita/per day is therefore intended to serve as an "average" waste generation multiplier. Daily per capita generation in metropolitan Phoenix and Tucson greatly exceeds that of the smaller rural communities, largely because of their disproportionately higher concentrations of commercial and institutional generators. Other factors which influence this variability include climate, geographic location, socio-economic status, population density and land use.

Very few Arizona communities have access to reliable data regarding quantities of municipal solid waste generated, and weigh stations at sanitary landfills are few and far between, particularly in rural areas. However, as more and more communities implement user fees and resource recovery systems, the prospects for expanding this data base will improve. In the meantime, those communities with reliable data sources are encouraged to utilize the State's "average" multiplier" for their planning needs. This average annual multiplier is presented below for each of the years 1980-1985.

TABLE VII-B-III

Average Daily Per Capita MSW Generation

1980 = 4.0	lbs.	per	capita/per	day
1981 = 4.04	"	"	"	"
1982 = 4.08	"	"	"	"
1983 = 4.12	"	"	"	"
1984 = 4.16	"	"	"	"
1985 = 4.20	"	"	"	"

Reliable information regarding the composition of municipal solid waste is equally lacking in Arizona. Several communities with existing weigh stations have begun to compile this type of analytical information, but it is by no means widely practiced at the present time. The Department of Anthropology at the University of Arizona has conducted some preliminary sampling and analysis of municipal solid waste composition and weight characteristics for research purposes (Garbology Project), but their findings are not yet conclusive for the State as a whole. Likewise, Phoenix, Tucson and Yuma have gathered compositional data for resource recovery feasibility purposes, but the analysis, reliability and results of these studies have varied significantly. Because of this data deficiency, the State is not in a position to estimate the compositional content of municipal solid waste in Arizona. Nevertheless, it is useful to obtain a perspective on this basic characteristic. For this reason, we have presented below a comparison of municipal waste streams as measured nationwide in 1977, and by the City of Phoenix in 1976. These content analyses are presented for illustration purposes only, and are not intended to portray municipal solid waste composition in the State as a whole.

TABLE VII-B-IV

MSW Compositional Comparison

Mixed MSW Composition City of Phoenix		Mixed MSW Composition Nationwide*	
<u>1976</u>		<u>1977</u>	
Paper	46.9%	Paper	29.1%
Plastic	4.6	Plastic	3.4
Wood	1.7	Wood	3.8
Yard Waste	12.6	Yard Waste	20.3
Food Waste	12.3	Food Waste	17.8
Textiles	3.2	Textiles	1.6
Ferrous Metal	5.3	Ferrous Metal	8.4
Aluminum	0.7	Aluminum	0.8
Glass	6.6	Glass	10.4
Residue	6.1	Rubber & Leather	2.6
		<u>Misc.</u>	<u>1.8</u>
Total	100.0%	Total	100.0%

*Source: Office of Solid Waste, EPA, Resource Recovery Division,
& Franklin Associates, Ltd. Revised 2/77.

Two other characteristics of municipal solid waste are also worthy of mention. These are the material properties of processability and combustibility. The former applies to the suitability of the waste material to be changed in physical form prior to disposal. The latter refers to its compatibility to being burned or incinerated. Each of these will be discussed at greater length later in this section.

One final consideration is the inherent moisture content of municipal solid waste. It is a significant variable insofar as it is a primary

determinant of weight. The EPA has established three basic categories to distinguish various levels of moisture content; (a) dry refuse, (b) average refuse and (c) wet refuse. These categories are estimated to average 120, 150 and 180 lbs. per cubic yard, respectively. The weight of municipal refuse is an important cost consideration, particularly as it affects the collection and transportation of municipal solid waste. Generally speaking, the heavier and bulkier the waste material, the more expensive its management becomes. Fortunately, the hot dry climate in Arizona inhibits both the absorption and retention of moisture by municipal solid waste. Consequently, this particular cost variable in Arizona tends to operate well below the national average.

B. PROBLEM OVERVIEW

Problems associated with the management of municipal solid wastes are manifold and complex. In Arizona, they have been particularly exacerbated by dramatic population growth and continuing urbanization. Many of these problems are directly attributable to a general and historic neglect of planning in the broader sense of the term. Evidence to this effect may be found in the widespread persistence of both substandard facilities and practices.

Traditionally, solid waste management decisions were made on the basis of the least-cost alternative, with little regard for public health or the environment. This resulted in unacceptable levels of air, land and water pollution. However, with the passage of RCRA and the onset of an enlightened environmental awareness, these decision criteria have been forcibly and radically altered. Today's decisions must be made in recognition of valid legal, political, physical, social and technical constraints, as well as basic economic logic.

The financial realities of municipal waste management have changed, and so have the politics. The taxpayer revolt and inflation are severely limiting the capability of our cities to provide services. Land has become prohibitively expensive, and is in short supply. Landfill siting is increasingly tenuous, and encountering unprecedented opposition and controversy. Regulatory restrictions are tightening, and narrowing the scope of management options. Last but not least, the sheer volume of municipal waste continues to swell to overwhelming proportions.

Under dynamic conditions such as these, the question of what to do with a city's waste has never been more difficult to answer. By the same token, the need for such an answer has never been greater, nor more imperative than it is today.

Historically, sanitation services have never fared very well in the budgetary process. Municipal waste and its management services have suffered from the stigma of a low priority. This is likely to change however, as a result of increasing public outcry, and the mandates of a newly emerging legal and regulatory climate. Public education will be a key factor in this evolution, and represents perhaps the only ultimate solution to pernicious problems such as littering and wildcat dumping.

The greatest problem with respect to municipal waste however, remains disposal, both today, and for the foreseeable future. Resource recovery will contribute to its resolution, but will never eliminate the need for land disposal. The paramount task facing our public officials will be to provide for an adequate land disposal capacity, and to ensure that such disposal is conducted in the least offensive and damaging manner possible.

There are both positive and negative aspects to the overall problem of municipal waste management. It poses a significant threat to public health and the environment, but also affords a tremendous opportunity for resource conservation and recovery. In the remainder of this section, we will discuss each of the various management aspects of municipal solid waste. Regulatory and management responsibilities will be identified, and current practices will be described to the extent that they are known. The purpose of this section will be to provide the reader with an under-

standing of the statewide municipal solid waste management system, and the methods by which it operates.

C. CURRENT MANAGEMENT PRACTICES

1. Resource Conservation

In the context of municipal waste management, the term "resource conservation" is taken to mean; (a) a reduction in the amount of solid waste generated, (b) a reduction in overall resource consumption, and/or (c) a utilization of recovered resources. It is therefore a broadly defined term that may include everything from incineration to recycling to landfill reclamation. It is also a cardinal objective of the Resource Conservation and Recovery Act, and the cornerstone of many of its mandates.

At present, there is no State law or regulation that prescribes the practice of resource conservation in the management of solid wastes. Nevertheless, in Arizona this objective is being promoted in various ways. A reduction in overall resource consumption is being achieved primarily by means of public education and voluntary recycling. The non-profit BIRP program has certainly been instrumental in both these respects, by the conduct of its public advertising campaign and the expansion of its network of recycling centers around the State.

The utilization of recovered resources is also on the upswing, primarily because of enhanced recycling activity and the increased availability of secondary materials in the marketplace.

Private industry has taken the lead in this respect, and has developed a host of new product applications for such materials. The State will also contribute as it increasingly discriminates in its procurement practices in favor of secondary materials acquisition. In another vein, this objective is also being realized by the emphasis given by ADHS to the post-closure reclamation of sanitary landfills in its plan review and approval process. This is intended to promote the reclamation of closed facilities and to salvage the land resource for productive reuse.

The greatest opportunity for future conservation is to be found in the prospect of centralized resource recovery processing facilities for municipal refuse. These systems will be discussed at greater length later in this section, but are capable of recovering large volumes of recyclable material and may also be employed to generate marketable energy. Several Arizona communities are now beginning to seriously evaluate the feasibility of such systems, and it may only be a matter of time before they are brought on-line.

The most difficult component of management for resource conservation is the attainment of a reduction in overall waste generation. This difficulty is aggravated by a continuing growth in population. However, national figures indicate that the rate of growth in per capita generation is now slowing significantly, and prospects are that it may stabilize or even begin to decline in the not too distant future. The best means to hasten this reduction would be to encourage private industry to modify its product packaging practices, and to educate the public toward a greater efficiency in their consumption of consumable commodities.

The State's overall management objective for resource conservation is to promote the development of efficient solid waste management systems and techniques which will operate to preserve and enhance the quality of air, water and land resources.

The following problems are identified as the major impediments to the realization of this objective;

- a. continuing population growth will intensify pressures to exploit and deplete limited natural resources.
- b. commercial manufacturing processes continue to emphasize convenience and ease of disposal in the design of consumer product packaging (to the detriment of resource conservation).
- c. the use of general tax revenues for municipal waste disposal perpetuates the myth of free disposal and inhibits public awareness.
- d. certain federal economic policies favor the exploitation of virgin materials (i.e. depletion allowances) and thereby discourage conservation.

In order to alleviate these impediments and further this objective, the following State actions are proposed;

- a. full authorization of the State Strategy and Policy for Resource Conservation and Recovery as presented in this State Plan (see Chapter VII-Section F).
- b. full implementation of this strategy as summarized in Table VIII-F-I.

- c. a strengthened emphasis on post-closure landfill reclamation through the plan review and approval process, effective as of the date of State Plan approval.
- d. encouragement of the adoption of user fees by local governments to finance the increasing cost of municipal waste disposal. This would be accomplished through the routine provision of State technical and planning assistance, and become effective as of the date of State Plan approval.

2. Source Separation

Source separation is the most basic method of recovering materials from municipal solid waste. It is conducted by the waste generator at the point of generation, and is accomplished by the sorting of recyclable waste components prior to collection.

In Arizona, those waste materials most often recovered by means of separation include newspaper, glass and metal containers. Following separation, these materials are transported to either a manufacturer or a secondary materials dealer. Often, they are redeemed in exchange for a cash payment.

The purpose of source separation is to recover recyclable materials from solid waste that would otherwise be discarded and lost forever to productive use. It therefore serves to retain the intrinsic economic value of these materials through repeated uses, and thereby lessens the need to exploit virgin resources.

Source separation can be managed in a variety of ways. The three basic methods include the "piggyback system", neighborhood recycling centers and community recycling drives.

Under the piggyback system, waste generators voluntarily separate recyclable materials and store them separately but adjacent to their mixed refuse. The collection vehicle will then handle these materials separately, but collect them along with the regular pickup.

The neighborhood recycling center may serve as either a collection or transfer station. Under this system, waste generators haul their own source-separated materials to the center for redemption and disposition. The materials are then processed or transferred, and sold to a dealer or manufacturer.

Community recycling drives have become a popular practice in Arizona. They are typically sponsored by non-profit organizations for fund-raising purposes. Neighborhood drop-boxes are typically used for collecting the donated materials, and the proceeds of their sale are applied to charitable ends.

Two additional methods of source separation are salvaging and scavenging. These are most often conducted after municipal refuse has been collected and mixed. In Arizona, the salvaging of valuable materials is permitted at sanitary landfills so long as it does not interfere with operations, and is conducted in a controlled manner (A.C.R.R. R9-8-432). Salvaging may be practiced by either private citizens or firms for the cash profit it may bring. In contrast, scavenging is strongly discouraged in the State, it is not permitted at sanitary landfills, and is prohibited in some communities by local ordinance.

At the present time, all source separation in Arizona occurs on a voluntary basis. Citizen support and participation is encouraged, but not required. In other parts of the country however, some cities have adopted mandatory source separation ordinances as an integral part of their municipal waste management systems. Recent studies have shown these ordinances to be effective in terms of both the degree of citizen participation achieved, and the volume of materials recovered.

Existing source separation systems in the State are managed either by private industry, non-profit organizations or local government. In general, the level of recycling activity has increased in recent years due to rising industrial demand for secondary materials and rapidly escalating redemption values.

The state's management objective for source separation is twofold; (a) the maximization of waste materials recycling, and (b) the minimization of waste materials destined for land disposal.

At present, the greatest impediments to the attainment of this objective are;

- a. the public misconception that home separation is expensive, time consuming and inconvenient.
- b. fluctuating markets and prices for secondary materials.
- c. the lack of separation systems and/or redemption centers in many parts of the State.
- d. insufficient population in many rural areas to sustain economically viable separation systems.

In light of these problems, the following State actions are proposed;

- a. full authorization of the State Strategy and Policy for Resource Conservation and Recovery as presented in this State Plan (see Chapter VIII - Section F).
- b. full implementation of this strategy according to the schedule presented in Table VIII - F - I.

3. Collection

Collection is the systematic act of removing municipal solid waste from a central storage point at its primary source of generation. It applies in all parts of the State where self-haul is not practiced, and may be administered by either a public agency or private firm. It is a service which may also be contracted out by a local government to a private concern.

Various Departmental (ADHS) regulations govern the practices of both public and private collection agencies. Regulation R9-8-415 requires that all garbage, ash, rubbish and small dead animals not exceeding 75 lbs. in weight be collected wherever such service is available. Under R9-8-413, all other types of refuse are the responsibility of the owner or occupant of a premise to store, collect and dispose of in a manner approved by the Department. R9-8-426 and R9-8-427 prescribe the frequency and place of collection respectively, but do allow for the issuance of variances on the basis of circumstance or policy of the collection agency.

Accordingly, wherever a collection service is provided, it is the responsibility of the collection agency to manage the collection in a compliant and environmentally sound manner. In those jurisdictions

without collection services, it is the responsibility of the individual citizen. Where private firms offer refuse collection on a subscription basis, such firms are only responsible for collecting the refuse of their fee-paying subscribers. All others retain individual responsibility.

A refuse collection and rate survey conducted by the Arizona League of Cities and Towns (1978) determined that nearly 70% of all incorporated Arizona communities were providing a municipal collection service for their residents. Some 8% were contracting to the private sector. The remaining 21% relied upon a private subscription service.

Municipal refuse collection in Arizona is financed in one of three ways; (a) by general revenues, (b) by direct service charges, or (c) by a combination thereof. The League's 1978 survey also determined that among the 71 communities sampled, 51% utilized service charges, 18% used general funds and 31% operated under a joint funding arrangement.

Most of these communities contracting for collection service levied direct service charges. Often, these charges were based on separate rates for residential and commercial collections. The average cost for residential service was \$3.25 per month. The cost of commercial service averaged \$19.52 per month.

Many of Arizona's problems with respect to refuse collection are a function of the State's rural nature. Outside of a handful of major cities, the State is characterized by small rural communities and a sparse population density. In unincorporated rural areas, four different collection systems are employed. They include;

- a. on-site disposal (i.e. burial)
- b. individual self-haul by the generator to a sanitary landfill
- c. individual self-haul by the generator to a collection station
- d. house to house "mailbox collection" by a collection agency

Critical variables under each of these alternative systems include cost, convenience, distance and citizen cooperation. Where individual self-haul or on-site disposal prevails, problems of littering and wildcat dumping frequently occur. These adverse consequences tend to be directly associated with the cost and convenience of disposal. The increased use of rural collection stations however, most notably in Mohave County (to improve the cost and convenience of disposal) is quite encouraging in this regard.

The State's management objective for collection is to provide for cost-effective, environmentally sound and energy efficient refuse collection practices.

Major obstacles to this objective include;

- a. the lack of collection services in many rural areas
- b. the high cost and energy inefficiency of self-haul practices
- c. physical distances separating collection stations in rural areas
- d. the high cost of public accomodation at disposal sites (individual self-haul results in less in-place compaction, the need for longer operating hours, greater litter control, etc.).

On this basis, it is recommended that ADHS;

- a. encourage regional approaches to the management of municipal solid wastes, and
- b. encourage County Governments to provide for the development of additional collection stations to serve unincorporated rural

areas. This could be accomplished by requiring that a minimum number and distribution of collection stations be provided as a condition on the granting of a franchise to a private collection agency, or through direct provision on the part of the County itself.

Because problems of refuse collection in Arizona are largely geographically based, the rural management system espoused above would appear most cost-effective and suitable in light of existing constraints. By reducing the average trip length of individual self-haul, a substantial cost and energy savings could be realized, and environmental pollution vis-a-vis littering could be mitigated. The expansion of a network of rural collection stations would also be preferable to a proliferation of uneconomical and remotely dispersed disposal facilities.

4. Transportation

Transportation is the movement of municipal solid waste subsequent to it's collection. It provides the means by which the waste material is delivered to a point of either ultimate recovery or disposal, and represents a critical cost variable in the handling cycle. This cost is a direct function of the distance the waste must be hauled.

Potentially, this waste movement may be accomplished through a variety of alternate modes; including rail, water and highway transport. Historically, in Arizona it has been conducted almost exclusively by means of motor vehicles (trucks) over the State highway system. The most promising future prospect for modal diversification is to be found in rail transport, a management alternative

now under consideration by the City of Phoenix. At best, water transportation modes could have only a very limited applicability to Arizona. The water mode (i.e. barges, etc.) is restricted due to a lack of navigable waterways.

All common carrier transportation activities of the railroad, airline, trucking and bus industries are subject to regulation by the Arizona Corporation Commission. This Commission promulgates rules, prescribes rates and issues licenses for all activities of the transportation industry.

Municipal waste transport is more specifically regulated by ADHS. A.C.R.R. R9-8-414 empowers the Department to inspect all vehicles used for the collection, storage, transportation, disposal or reclamation of municipal refuse. In addition, A.C.R.R. R9-8-428 stipulates certain design and performance standards for all such vehicles. In general, it is required that all vehicles; (a) be maintained in good repair, (b) be designed to prevent leakage or spillage, and (c) be operated in such manner as may be necessary to preclude the occurrence of a public nuisance.

In nearly all cases, the waste transportation authority and the waste collection authority are one and the same agency. Typically, municipal waste is collected and transported to a recovery or disposal facility by direct haul. Often, this results in the waste being transported for an extended distance, and is not the most cost-effective system. In some rural areas, individual self-haul is the only method

of refuse transport available. It is conducted by means of private automobile, and sometimes results in wind-blown debris and/or indiscriminate dumping.

The State's management objective for transportation is to provide for economical, energy-efficient and environmentally sound transportation systems for the movement of municipal solid wastes.

The major problems confronting our existing systems include;

- a. the physical distances separating collection points from suitable disposal sites
- b. the lack of waste transportation services in many rural areas
- c. the rising cost of fuel energy
- d. the continuing increase in waste volume requiring transport
- e. the inability of railroads to economically compete with highway transport for the provision of waste haul services
- f. the tradition of local municipal waste management hinders the development of more efficient regional collection, transportation and disposal systems.

The State (ADHS) intends to promote its transportation objective by;

- a. encouraging Counties to provide for additional collection and/or transfer stations in rural areas, thereby contributing to a reduction in overall fuel consumption
- b. encouraging local management agencies to utilize or augment waste processing wherever economically feasible to enhance transportation efficiency

- c. emphasizing the economic advantages of regional approaches to municipal waste management through the provision of technical and planning assistance.

These activities are currently part of the State's on-going solid waste management program and are expected to continue.

5. Storage

Storage is the interim containment of municipal solid waste in an approved manner. It is another step in the waste handling cycle that occurs after generation and prior to ultimate recovery or disposal.

A wide range of containers are employed for storage purposes in Arizona. Rural areas tend to use plastic or paper bags, cardboard boxes, metal or plastic cans, or bulk bins at collection stations. In incorporated urban areas, storage containers tend to be more standardized, and typically include either plastic or metal containers which may be suitable for mechanized collection pick-up.

The storage of municipal refuse is controlled by State (ADHS) regulations, and in many cases, by local ordinance. A.C.R.R. R9-8-413 holds that it is the responsibility of the owner, agent or occupant of any premise to ensure that all accumulated refuse is stored in a sanitary and approved manner. A.C.R.R. R9-8-421 further requires that an owner, agent or occupant provide a sufficient number of suitable and approved containers for the receiving and storing of refuse, and keep all accumulated refuse therein. All garbage is to be stored in durable, rust resistant, non-absorbent, watertight and easily cleanable containers, with close-fitting covers and having adequate handles or bails to facilitate

handling. The size of the container however, is left to the determination of the local collection agency.

Rubbish and ashes are to likewise be stored in durable containers. Bulky items such as tree trimmings, appliances, furniture and large cardboard boxes are to be handled in a manner prescribed by the local collection agency. All containers utilized for the storage of refuse are to be maintained in a manner adequate to prevent the creation of a nuisance or a menace to public health.

As mentioned above, the specifications for special storage requirements (i.e. bulky items) and container size are left to the discretion of the local collection agency. Where this agency is a municipality, these requirements may be prescribed by ordinance. Where a private collection firm operates, they may be prescribed by either policy or ordinance. Where no collection agency operates, these requirements are not controlled, a situation which results in a management void.

Collection agencies are also typically responsible for enforcement of the laws and regulations pertaining to refuse storage. Where no collection agency exists, enforcement occurs most often on a complaint basis with either a local health or police agency conducting the investigation. This situation often results in virtually unregulated storage practices in rural areas.

The State's management objective for storage is to ensure that all municipal solid wastes are contained in an environmentally acceptable manner throughout every phase of the handling cycle, and pose no threat to public health, safety or welfare.

Major problems associated with existing MSW storage conditions in Arizona include:

- a. improperly stored MSW attracts disease vectors and poses a threat to public health.
- b. improper storage practices increase collection costs and contribute to littering.
- c. the lack of effective management and enforcement in many rural areas perpetuates improper storage practices and their attendant health and environmental problems.
- d. many municipalities which regulate on-site storage practices fail to adequately enforce these regulations.
- e. management responsibilities for enforcement are often overlapping and not clearly defined.

The State (ADHS) proposes to undertake the following actions to ameliorate these conditions;

- a. conduct a Statewide survey during federal FY83 to identify those areas of the State where on-site MSW storage practices are not locally regulated.
- b. develop a model MSW storage ordinance for municipalities in FY83, and distribute to all those local governments having jurisdiction over the areas identified in the storage survey.

6. Transfer

Municipal waste transfer directly relates to the management aspects of collection, transportation and processing. A transfer station is essentially a collection point where municipal waste is compacted, and then transferred

to a processing facility or sanitary landfill. The principal advantages of waste transfer include; (a) the elimination of the need for local disposal facilities, (b) reduced hauling distances, and (c) enhanced transportation efficiency resulting from a reduction in waste volume (through compaction). Potentially, a transfer station may also serve as a resource recovery processing facility or recycling center.

The use of transfer stations is most desirable in those parts of the State, both urban and rural, where disposal facilities are distantly located from the sources of waste generation. This situation results in a great expenditure in terms of both time and money in hauling refuse from the collection zone to the disposal area, and may be alleviated by the use of a transfer system. A transfer system is comprised of a facility or a group of facilities where the refuse from numerous small vehicles is mixed and compacted, and then placed into larger capacity vehicles for transport to a central disposal site. It represents an intermediate step in the waste handling cycle between collection and disposal, and in many instances, can translate into a substantial cost-savings to an operating authority.

At present, there are fewer than ten such facilities operating Statewide. Their widespread application has been restrained due to a lack of regional cooperation in solid waste management and the high capital cost required for initial development. However, given the vast expanse of Arizona, and the distances between rural communities, it is likely that transfer systems will appear increasingly attractive and economical in the future. This will primarily result from dramatic increases in the cost of operating and maintaining land disposal facilities.

The State's management objective for transfer is equivalent to its objective for transportation. It is to promote the development of

economical, energy-efficient and environmentally sound transportation systems for the movement of municipal solid wastes from their point of generation to their point of ultimate recovery or disposal.

Major obstacles impeding the implementation of transfer systems include:

- a. the lack of local expertise in conducting economic feasibility studies.
- b. the hesitancy of local jurisdictions to cooperate in regional approaches to solid waste management.
- c. the high capital cost of initial transfer system development.
- d. political opposition to site acquisition.

The State's (ADHS) strategy for promoting waste transfer will entail the following actions;

- a. the preparation of formal guidelines (FY82) for the evaluation of transfer system feasibility in rural areas.
- b. The encouragement of transfer system development wherever feasible through on-going technical and planning assistance.
- c. improving public awareness regarding collection/transfer alternatives through the on-going public participation process (educational and training seminars, public presentations, etc.).
- d. the indirect encouragement of transfer system development through responsible enforcement actions taken against substandard disposal facilities (on-going).

7. Processing

Processing applies to any system or method used to change the physical form of municipal solid waste subsequent to collection and prior to disposal. As a management option, it may be employed for the purpose of facilitating municipal waste transportation, storage, transfer, disposal

or resource recovery. Proven technologies currently include composting, baling, shredding and incineration. These are processes for biological decomposition, high density compaction, size reduction and thermal reduction respectively.

At present, the processing of municipal solid waste is virtually non-existent in the State of Arizona. A few commercial and institutional establishments shred their waste paper prior to disposition, and a school district in Tucson utilizes a waterwall incinerator for heat recovery. However, these examples are the exception rather than the rule. In general, once mixed and collected, all MSW is landfilled without any formal or prior processing.

The application of pre-disposal processing can potentially result in a variety of benefits, including; (a) reduced operating and handling costs, (b) extended landfill life, and (c) enhanced materials and energy recovery. Nevertheless, due to an abundance of available land and a relatively small population base, the economic incentives for implementing capital-intensive processing systems have not yet emerged. With increasing population and regulatory control however, these conditions may change.

The State's management objective for processing is to promote the development of efficient pre-disposal processing systems wherever economically feasible to reduce the volume or weight of mixed municipal waste destined for land disposal.

Existing obstacles to this objective include;

- a. the continuing but diminishing availability of suitable land for MSW disposal near all of the State's major urban centers.
- b. the current lack of sufficient population in most areas of the State

to economically justify capital intensive processing facilities.

- c. insufficient public awareness of the benefits and costs of alternative processing systems.

In consideration of these problems, the State (ADHS) proposes to;

- a. develop its staff expertise in the area of processing technology (continuous).
- b. emphasize processing technology-transfer through its on-going technical and planning assistance programs.
- c. keep the public informed of advances in processing technology through the periodic publication of its solid waste newsletter (first edition scheduled for fed. FY81).
- d. implement its strategy for resource conservation and recovery according to the schedule summarized in table VIII-F-1.

8. Treatment

In the context of nonhazardous municipal solid waste, the term treatment refers to the application of a process designed to render such waste harmless prior to disposal. It necessarily entails a change in the chemical or biological character of the waste material, and is most often accomplished by means of a thermal process.

Historically, treatment has played a very minor role with respect to municipal waste management in Arizona. Its only practical application has been the neutralization of garbage for swine feed, an approvable method of refuse disposal under A.C.R.R. R9-8-432.

Before garbage may be fed to swine, A.R.S. Sec. 24-947 requires that it be thoroughly heated to at least 212 degrees fahrenheit, and be maintained at that base temperature for a minimum of 30 minutes. Any

party desiring to feed garbage to swine is required to secure a permit from the Arizona Livestock Sanitary Board. Any party wishing to dispose of garbage by means of this hog-feeding method is required to secure approval from the Department of Health Services.

The underlying purpose of these permit mechanisms is to protect public health, and prevent the spread of disease among livestock. Only those persons who feed their own household garbage to swine which are raised for personal use are exempt.

The State's management objective for the treatment of nonhazardous municipal waste is to promote sanitary practices and standards, and to protect public health from the transmission of infectious disease.

ADHS recognizes no major obstacles to the attainment of this objective, and proposes no course of action in this regard.

9. Disposal

Disposal is the orderly process of discarding useless or unwanted municipal waste material. Virtually all municipal solid wastes in Arizona are disposed of in the State's 135 active landfills. What remains has either been salvaged, buried on-site at the point of generation or indiscriminately dumped.

ADHS regulation R9-8-432 permits the final disposition of municipal waste by any of five approvable methods. For all practical purposes, sanitary landfilling is the only one of these methods utilized. Basically, it consists of the spreading of refuse on land with a daily cover and compaction of 6" to 12" of earth in order to prevent the emergence of a health hazard or nuisance. Other approvable methods include incineration, composting, garbage grinding and hog-feeding, but none are widely used.

Approved incineration has been essentially limited to on-site disposal operations conducted by certain hospitals, banks, grocery stores and other commercial establishments. For its part, composting and hog-feeding has been limited to a few relatively small private ventures. Garbage grinding has been somewhat more popular, but has not significantly impacted nor reduced total land disposal volumes.

The total number and location of the State's active landfills is depicted in Table VII-B-V. At the present time, many of these sites do not meet the federal criteria for classification as sanitary landfills. The conduct of the Open Dump Inventory however, will enable ADHS to properly classify each of these sites, and ultimately close or upgrade those that are determined to be substandard.

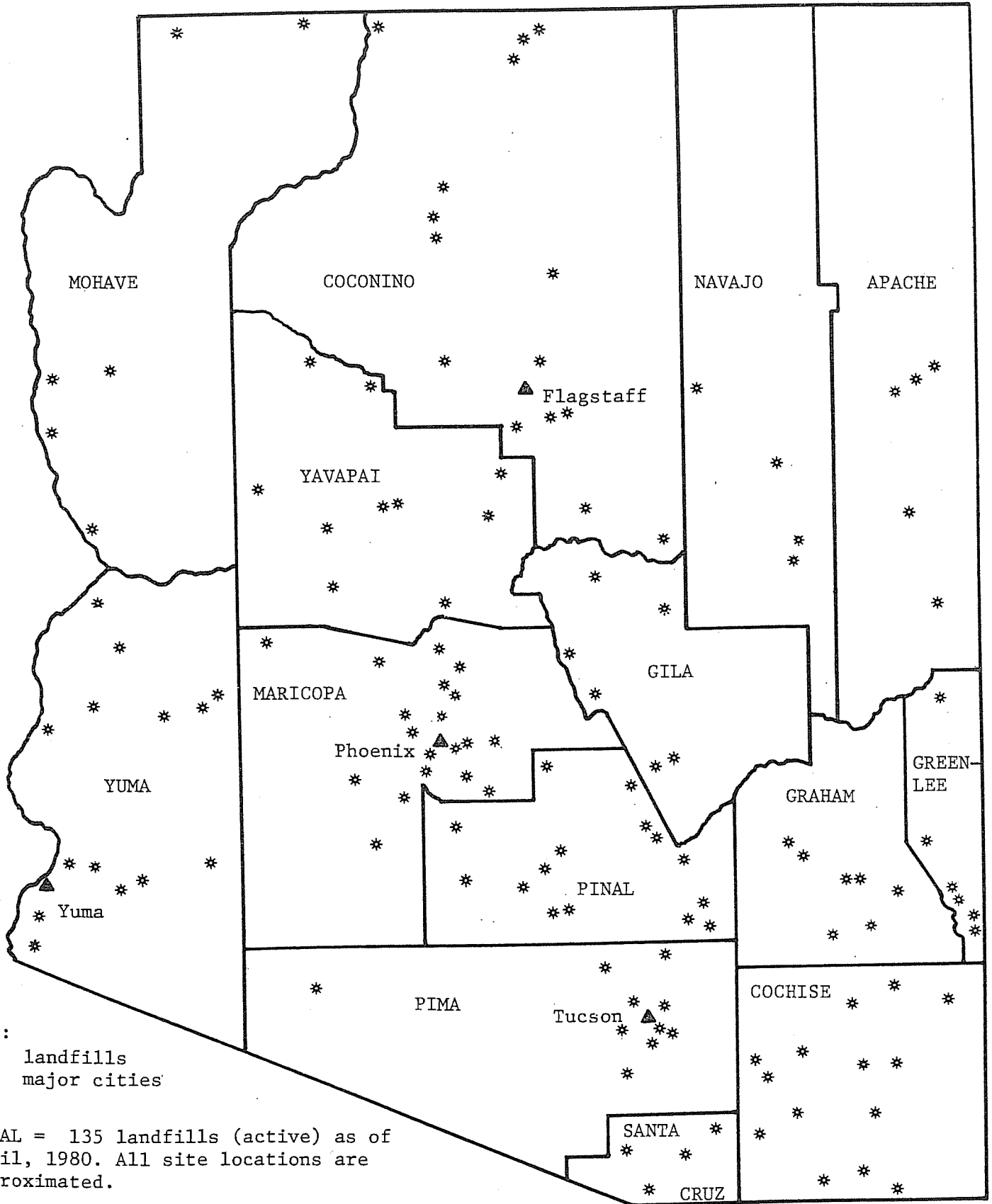
In light of the fact that nearly 45% of the State's land is held in federal ownership, it is not surprising that 55% of the State's landfill disposal sites are located on federal lands. Twenty-seven percent are privately held, with State, County, Municipal and Tribal ownership comprising 26%, 8%, 17% and 2% of all sites respectively (see Table VII-B-VI).

Of the 135 known landfill sites, the highest percentage (53%) are operated by County Governments. Municipalities operate 27%, and 16% are privately maintained. The remaining sites are managed by; the federal government (2%), the State government (1%) and the Indian tribes (1%) (see Table VII-B-VII).

The management of land disposal is replete with contemporary problems. These problems are social, political, environmental, fiscal, and administrative in nature. Perhaps foremost, there is the problem of providing for adequate landfill capacity to absorb the ever increasing volumes of

Table VII-B-V
ARIZONA

STATEWIDE DISTRIBUTION OF EXISTING LANDFILL SITES



KEY:

- * - landfills
- ▲ - major cities

TOTAL = 135 landfills (active) as of April, 1980. All site locations are approximated.

Table VII-B-VI
Land Ownership
of Existing Landfill Sites

County	# Sites	Federal	State	County	Municipal	Tribal*	Private
Apache	5	2	0	2	0	0	1
Cochise	14	1	2	0	1	0	10
Coconino	15	11	0	0	1	0	3
Gila	6	4	0	0	1	0	1
Graham	7	5	1	0	1	0	0
Greenlee	6	2	2	0	0	0	2
Maricopa	19	5	4	2	5	1	2
Mohave	6	6	0	0	0	0	0
Navajo	4	1	1	0	0	0	2
Pima	10	0	5	1	3	0	1
Pinal	15	1	4	3	4	0	3
Santa Cruz	4	1	2	0	1	0	0
Yavapai	10	3	5	0	0	0	2
Yuma	14	13	0	0	0	1	0
TOTAL	135	55	26	8	17	2	27
PERCENT	100%	41%	19%	6%	13%	1%	20%

* Tribal facilities receiving non-Indian wastes

SOURCE: Disposal Site Directory. ADHS, Bureau of Waste Control. 1980.

Table VII-B-VII

Operating Authorities
of Existing Landfill Sites

County	# Sites	Federal	State	County	Municipal	Tribal*	Private
Apache	5	0	0	2	2	0	1
Cochise	14	0	0	8	4	0	2
Coconino	15	3	0	7	4	0	1
Gila	6	0	0	1	1	0	4
Graham	7	0	1	5	1	0	0
Greenlee	6	0	0	4	1	0	1
Maricopa	19	0	0	9	7	1	2
Mohave	6	0	0	4	0	0	2
Navajo	4	0	0	0	3	0	1
Pima	10	0	0	5	5	0	0
Pinal	15	0	0	9	5	0	1
Santa Cruz	4	0	0	2	2	0	0
Yavapai	10	0	0	3	1	0	6
Yuma	14	0	0	12	1	1	0
TOTAL	135	3	1	71	37	2	21
PERCENT	100%	2%	1%	53%	27%	1%	16%

* Tribal facilities receiving non-Indian wastes

SOURCE: Disposal Site Directory. ADHS, Bureau of Waste Control. 1980.

municipal waste generated. This is the responsibility of local government. However, environmental controls on the use of land for waste disposal are tightening, suitable land resources are becoming more scarce, more expensive and further removed, and the public's resistance to landfill siting decisions is becoming increasingly vocal. Faced with these constraints, local authorities are hard-pressed to provide for basic facility needs.

Other persistent problems associated with landfilling in Arizona include the lack of trained landfill operators, the lack of recordkeeping and personnel at many sites, insufficient operating budgets, inadequate daily cover and compaction and resulting wind-blown debris. Because of strengthened enforcement action on the part of ADHS, the quality of land disposal operations has generally improved in recent years, and the total number of disposal sites has been diminished. Once common practices such as open burning have virtually disappeared. Also, many improperly located sites situated in environmentally sensitive areas (i.e. floodplains) have been either closed or forced to implement protection measures. A continued vigilance will be required however, to ensure that surface and ground water resources are not compromised by waste disposal operations.

The State's management objective for municipal waste disposal is to ensure that all such waste materials are; (a) disposed of in sanitary landfills, (b) utilized for resource recovery, or (c) otherwise disposed of in an environmentally sound manner.

In sum, the major problems associated with current disposal practices include;

- a. the siting, acquisition and development of facilities providing an adequate land disposal capacity.

- b. the correction of existing environmental pollution which has resulted from improper disposal practices.
- c. the prevention of further environmental pollution resulting from improper disposal practices.
- d. the costs of regulatory control.
- e. the lack of awareness of current federal environmental laws and regulatory requirements.
- f. local traditions continue to impede the implementation of regional solutions to municipal waste disposal problems.

The State (ADHS) regards disposal as the most problematical aspect of municipal waste management. Accordingly, its strategy for attaining this objective will include the following actions;

- a. the conduct of a workshop in each State Planning District to inform the public of the nature, purpose and requirements of the Open Dump Inventory (FY 80).
- b. the inventory, assessment and classification of all existing land disposal facilities to identify substandard sites and environmental problem areas (ODI classifications for municipal sites to be completed in FY 81).
- c. the exercise of positive enforcement action (closure or upgrading) to bring all land disposal facilities and practices into full compliance with federal and State regulations (FY 85).
- d. scheduled once-yearly (minimum) site inspections of all land disposal facilities.
- e. the sponsorship of training seminars to upgrade landfill operator skills (FY 80, 81).
- f. the development of landfill location guidelines to prevent siting in

environmentally sensitive areas of the State (FY 81).

- g. continuation of ADHS technical and planning assistance for facility planning and implementation.
- h. the encouragement of regional planning for adequate land disposal capacity (on-going).
- i. the encouragement of regional planning to identify those areas where regional approaches to solid waste management may be cost-effective (on-going).
- j. the revision and updating of submittal requirements for disposal facility plan review to reflect the Arizona Solid Waste Management Plan and the new federal ODI regulations (FY 81).
- k. the encouragement of disposal facility design and operating plan preparation by a registered professional engineer (on-going).
- l. continued administration of the EPA Technical Assistance Panels Program (TAP) in Arizona (on-going).
- m. the provision of monitoring wells at all disposal facilities classified as being in violation of the federal ground water criteria, and which are situated in high water table areas (FY 85).

D. CONCLUSION

The purpose of this section was to overview the existing framework for the management of municipal solid wastes in the State of Arizona. Municipal solid waste (MSW) was defined, and its principal characteristics were described. Current practices were then identified and evaluated in terms of the management aspects of; (1) resource conservation, (2) source separation, (3) collection, (4) transportation, (5) storage, (6) transfer, (7) processing, (8) treatment, and (9) disposal. Under each management aspect, the State's problems, needs and proposed solutions were

presented in light of existing regulations and management responsibilities. Various recommendations were offered for conserving valuable material and energy resources, and protecting public health and the environment. In sum, this section was intended to represent a normative statement of the State's aspirations in regard to the environmentally sound management of its municipal solid wastes.

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CHAPTER SEVEN

SECTION C

WASTEWATER TREATMENT SLUDGE

Chapter VII

Section C

Wastewater Treatment Sludge

Introduction

This section will deal with issues and problems related to the management of wastewater treatment sludges in Arizona. These sludges are the solid, semi-solid or liquid residual by-products resulting from various treatment processes commonly applied to municipal, commercial and industrial wastewaters. They are specifically included under the definition of "solid waste" as presented in RCRA, and are generally regarded as pollution control residuals.

The fundamental purpose in treating waste water is to render it suitable for either safe discharge or consumptive reuse (i.e. irrigation, industrial application etc.). Such treatment however, will almost invariably result in the production of a residual material known as sludge, a waste which often requires special handling and disposition.

Municipal wastewater treatment plants are essentially designed to process domestic sewage. Accordingly, they typically exhibit only a limited capacity to accumulate and retain solid residuals. Periodically, these sludges must be removed, and be disposed of either on-site or off-site. Otherwise, their cumulative effect would be to impair the operation of the treatment system.

The chemical, biological and physical properties of wastewater treatment sludge will depend upon three basic variables: (1) the composition of the wastewater influent, (2) the volume of influent, and (3) the particular treatment process being employed. Likewise, the appropriate method for disposing of this sludge will depend upon these same variables.

Domestic sewage and liquid wastes from industrial processes are among the principal waste products typically entering a wastewater treatment system. The constituents of the solid residuals will include organic matter, minerals, heavy metals and a variety of other compounds. If present in sufficient concentration, many of these constituents may be toxic or hazardous in nature.

A more detailed survey and investigation of wastewater treatment sludge practices will be necessary in order to fully document its management implications for Arizona. Only limited data is now available, and this section has been prepared on that basis.* Further investigation has been tentatively scheduled for completion by the Arizona Department of Health Services during fiscal year 1981. When these findings are reported, they will be appended to the State Solid Waste Management Plan by means of future updating. As presently written, this section is intended only to provide an overview of the existing situation. Included is a definition of wastewater treatment sludge in this introductory segment, a general problem statement and a discussion of current management practices to the extent that they are presently known.

*Many (but not all) wastewater treatment plants built with "201" construction grant funds have detailed plans now on file with the Bureau of Water Quality Control (ADHS). Such plans document the intended disposition of all sludges generated at such facilities.

A. Problem Assessment

The environmentally sound management of wastewater treatment sludge is becoming increasingly troublesome for all those Arizona communities now served by sewerage systems. Daily sludge generation is already significant, and prospects are that its volume will continue to swell. As the State's population grows, existing sewer systems will expand, and new systems will develop. Add to this a high rate of inflation, diminishing landfill capacity and increasingly stringent environmental controls, and our cities are left with a costly and difficult problem. Its effective resolution will be years in the making.

In several respects, the Federal Water Pollution Control Act of 1972 is responsible for the current situation. As a result of this Act, billions of dollars were spent by federal, state and local governments for the construction of new wastewater treatment facilities. The purpose of this capital outlay was to produce a higher quality of effluent (through secondary treatment) and thereby better safeguard the nation's water resources. The impact of this action upon existing solid waste disposal systems, however, was largely underrated. The more stringent pollution control standards imposed by this legislation also necessitated the renovation and upgrading of many existing facilities. Together, these actions served to dramatically increase both the rate and volume of sludge generation, as well as the costs involved in its disposal. Some 18,000 municipal wastewater treatment plants across the nation are now producing some 5,000,000 metric tons (dry weight) of sludge each year. This volume is expected to nearly double by 1985. As of today, there are approximately 400 such treatment facilities in operation in Arizona. Their total sludge output is not presently known.

There are a number of major problems currently associated with sludge management in Arizona. Some of these were alluded to earlier. First, there is the problem of compliance with stringent federal pollution control standards (FWPCA, SDWA, RCRA) which in many cases have imposed a tremendous financial burden upon cities and towns. There is also the complementary problem of rapidly escalating costs in the construction of necessary pollution control facilities (wastewater treatment plants). Coupled with this, is the need to provide adequate disposal facility capacity to handle the ever-increasing volumes of sludge now being generated. Historically, there has been the problem of a general lack of regulation in regards to sludge handling and disposal. Jurisdictional overlaps between agencies have compounded this problem, which continues to persist today.

There are two distinct categories of wastewater treatment facilities, and each will produce a sludge of varying characteristics. The first and most common category is lagoons. These may be aerated, aerobic, facultative or anaerobic and may include infiltration systems. The second category includes various mechanical plants. These may include trickling filters, activated sludge systems and other variations. Any of these treatment systems will produce a sludge in one of three ways: (1) by removing influent solids, (2) by precipitating dissolved solids, or (3) by facilitating biological growth. The problem of concern to us here pertains to the handling and disposition of these sludges once they have been produced.

There are three basic methods for the disposition of wastewater treatment sludge, and each has potential health and/or environmental problems associated with its use. These are summarized briefly below.

Land Burial

This method has long been practiced in Arizona, and in most cases has been accomplished either on-site or in off-site trenches or landfills. Proper disposal by this method will not entail any significant risk. The major potential health and environmental impacts associated with improper disposal however, include methane gas generation and leachate contamination of ground and surface waters.

Landspreading

This method is known by a variety of names, including landfarming, land application, soil injection and soil amendment. Composting is a supplemental treatment process which will render sludge suitable for proper disposal by this method. The major benefits of this end-use include cropland fertilization and land reclamation. Potentially adverse impacts include crop uptake of heavy metals (cadmium), the volatilization of mercury, pesticides, PCB's and other organics, storm water runoff contamination of surface water, nuisance odors, and the buildup of salts and pathogenic concentrations in soils. Additional costs may be involved in the use of this disposal method due to the additional sludge handling steps required.

Incineration

This is a sludge disposal technology only insofar as it achieves a substantial volume reduction. The residual ash from this combustion process must then be disposed of by some other acceptable method. The drawbacks of this system include the costs of fuel, necessary plant and equipment, and air emissions control. Pre-treatment may also be necessary to sufficiently dewater the sludge prior to incineration.

One further problem with existing sludge management is the current underutilization of its potential for resource recovery. Technology is now available for both energy and materials recovery, but due to high cost and developmental status, it has remained largely undercapitalized. With further research, development and demonstration, and ever rising disposal costs, prospects are that this scenario will gradually improve.

B. Current Management Practices

At the state level, management responsibility for the control and regulation of wastewater treatment facilities is vested in the Arizona Department of Health Services. As this responsibility pertains to the management of sludge, three Bureaus within the Division of Environmental Health Services are directly involved. The Bureau of Water Quality Control (BWQC) is the Bureau responsible for implementation activities under the Safe Drinking Act and the Clean Water Act. Under the latter mandate, this Bureau;

1. distributes federal construction grant funds for publicly owned wastewater treatment works (Section 201).
2. conducts water quality management planning relative to controlling the disposal of pollutants on land or in subsurface excavations for the protection of ground and surface water quality (Section 208).
3. promulgates water quality standards through the Water Quality Control Council (Section 303).
4. administers the NPDES permit program in Arizona to control effluent discharges (Section 402).
5. assists EPA in the development of appropriate guidelines for the environmentally safe disposal of sludge (Section 405).

The BWQC also reviews and approves plans for all wastewater treatment facilities. Until recently, there were no specific requirements in the 201 construction grants program for the submission of plans relative to sludge disposal. This deficiency however, has since been corrected. The BWQC is further responsible for the enforcement of water quality standards and other health related regulations.

The Bureau of Air Quality Control (BAQC) has lead responsibilities for the implementation of the Clean Air Act provisions. It is responsible for the preparation and maintenance of the State Implementation Plan (SIP), and for the enforcement of State air quality regulations. This Bureau would exercise regulatory authority over air emissions at any facility utilized for the purpose of sludge incineration. One such facility is now under construction at 91st Avenue in Phoenix

and will serve as part of a multi-city regional wastewater treatment system.

For its part, the Bureau of Waste Control (BWC) has lead responsibility for the implementation of the Resource Conservation and Recovery Act. Accordingly, it is vested with authority to enforce State health regulations as they relate to solid and residuals waste disposal, and to inspect all solid waste disposal facilities, including landfills, surface impoundments and landspreading operations. BWC also is responsible for reviewing and approving both design and operational plans for such facilities.

As mentioned earlier, there are presently some 400 wastewater treatment facilities in operation throughout the State. The total number of sites now being used for the disposal of sludge from these plants is currently unknown. These wastewater treatment facilities were surveyed by ADHS in 1975 to determine their methods of sludge disposal. Out of a total of 220 responses received, 59% of these plants were reported as lagoon systems, and 41% were reported as mechanical plants. In addition, the following sludge disposal practices were revealed:

Table VII-C-I

Wastewater Treatment Plant Sludge Disposition

<u>Disposal Method</u>	<u>Percent</u>
1. No sludge disposal to date	64 %
2. On-site landfill	10 %
3. Off-site sanitary landfill	10 %
4. Composted or dried in beds & used as fertilizer	7 %
5. Stored or stockpiled on-site	5 %
6. Hauled off by commercial pumper; final disposition unknown	5 %
TOTAL	101 %*

*due to rounding.

The extent to which these practices have changed since the time of this initial survey is unknown. It may be safe to assume however, that the percentage of facilities reporting "no sludge disposal to date" has declined in the succeeding five year period. There is a recognized need to update and expand upon this existing data base.

C. Conclusion

The proper management of wastewater treatment sludge has presented itself as a major challenge to solid waste managers in the decade of the eighties. New pollution control regulations coupled with increasing wastewater volumes will render sludge disposition a difficult task.

For many years, the sludge lagoon prevailed as the basic and accepted method of sludge disposal. This primacy however, is now giving way to a variety of alternative approaches, most notably landspreading. Research and demonstration are beginning to show that many of these alternatives are both cost and energy effective when compared with more conventional modes. Many of these developing systems will also provide excellent opportunities for participation on the part of private contractors.

Ultimately, the selection of a disposal method for any particular facility or area must be based upon a detailed local analysis that considers environmental, economic, energy and political factors. This analysis should also go beyond the traditional perception of sludge as a waste product. It should be viewed as a potential resource which might be utilized as a means to offset or reduce rapidly escalating disposal costs.

In the future, the Department of Health Services will play a key and expanding role in the management of wastewater treatment sludges. Regulatory control over sludge disposition will tighten as new methods are implemented and wastewater treatment systems proliferate. New environmental standards will further dictate that greater resources be focused in this area. On the basis of the problems and issues addressed in this section, the following State (ADHS) actions are proposed;

Recommendations

1. Preparation by the Bureau of Waste Control in cooperation with the Bureau of Water Quality Control of a sludge management plan in FY81 for the purpose of further clarifying management responsibilities, defining best management practices and evaluating alternative disposal options for Arizona (this activity will support both the ADHS ground water protection program and the State Solid Waste Management Plan).
2. Revision of ADHS Engineering Bulletins #10 (Construction of Water Systems) and #11 (Design of Sewage Works) to address new sludge disposal requirements and hazardous waste regulations (FY 82).
3. Continued training activities geared toward educating wastewater treatment plant operators/managers of their various responsibilities under ADHS regulations.
4. The conduct of a comprehensive survey of current wastewater treatment plant sludge disposal practices (FY 81).
5. Secure the submittal of sludge disposal plans from all existing and future wastewater treatment facilities (on-going).
6. Encourage the development and utilization of treatment methods which would enable the recovery and reuse of valuable sludge components (on-going).
7. Expand existing monitoring and enforcement capabilities to provide comprehensive coverage of sludge generation and disposal facilities (land spreading sites, industrial surface impoundments, etc.) (on-going).

References

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2. Bureau of Waste Control. Guidance Document; Disposal of Sewage Treatment Sludge. ADHS. 1980.
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CHAPTER SEVEN

SECTION D

SEPTIC TANK PUMPINGS

Chapter VII

Section D

Septic Tank Pumpings

Introduction

Septic tank pumpings (herein referred to as Septage) are the residual wastes resulting from the operation of on-site wastewater (sewage) treatment systems. They are included within the RCRA definition of "solid waste", but are treated separately in this section due to their special requirements for handling and disposition.

Essentially, septage is the waste product of septic tank disposal systems. These systems typically consist of: (a) a septic tank - a water tight subsurface container which receives raw sewage and discharges a settled, slightly treated effluent, and (b) a subsurface disposal trench or pit (leaching field) for percolation. Such systems are normally located on-site (at the point of waste generation) and are not connected to any centralized collection or treatment system (certain trailer parks excepted). They may be publicly or privately owned, and may be found at hotels, motels, restaurants, private residences, recreational areas, etc.

Periodically, septic tanks will reach their design capacity, and must be emptied by means of pumping. Otherwise, the systems will fail and saturate the underlying soil. This situation can pose a serious danger to public health, with various undesirable consequences.

In this section, our purpose is to: (a) define septic tank pumpings (septage) as a separate category of solid waste, (b) provide a general problem

statement in the context of Arizona, (c) discuss current management responsibilities and practices, and (d) offer recommendations in regard to related State actions. To date, septage handling and disposal practices in the State of Arizona have not been well documented, although related problems have been identified in various areawide (COG) "208" plans and solid waste assessments. Limited disposal options are fairly well defined, but the extent to which each is presently practiced is largely unknown. A more detailed survey and investigation of septage is planned to be undertaken by ADHS in FY 81. This narrative is intended only to provide an overview of the existing situation.

A. Problem Assessment

In contrast to wastewater treatment sludges, the major problems of septage disposal in Arizona are found primarily in those communities without sewerage systems. In these areas, wastewater disposal by septic tank is basically the only option available. This situation has been aggravated by recent cuts in funding for the "201" Construction Grants Program. Accordingly, ADHS has estimated that perhaps 20% of the State's residents utilize such systems. If this calculation is correct, the volume of septage requiring regular disposition throughout the State is already quite substantial, and may be growing.

The major problem in this respect is the pervasive lack of suitable disposal facilities. Most septage is now disposed of either in sanitary landfills or by direct injection into wastewater treatment plants. Both of these methods have significant limitations.

Many wastewater treatment plants will not accept septage due to its high biochemical oxygen demand (BOD) and concentrations of suspended solids. Where this method is employed, pretreatment or dilution of the septage is necessary to prevent plant overloads. In addition, wastewater treatment facilities are not commonly situated in areas of high septic tank concentration. Consequently, the cost of transporting the septage frequently prohibits disposal by this method.

In the case of landfills, many of these facilities are unsuited for septage disposal due to the presence of a high ground water table or location in an environmentally sensitive area (wash, floodplain). The inherently high moisture content of septage renders disposal by this method particularly susceptible to ground and/or surface water contamination in these instances.

In order to safely receive septage, such facilities must provide special pits or trenches for this purpose, which invariably entails higher operating costs. For these reasons, septage disposition is also prohibited at various landfills.

In many parts of the State, the shortage of adequate septage disposal capacity is acute. This situation has resulted in the widespread practice of indiscriminate dumping of these wastes. Often, this will occur in remote desert washes or other ecologically sensitive areas. The problem is further compounded by the lack of disposal facilities for wastewater originating from recreational vehicles (RV's). This mode of tourism is quite popular in the State, and in many recreational areas, such facilities are non-existent or grossly inadequate.

Another problem of growing concern is related to the increasing frequency of septic tank system failures. Many individual on-site systems were inadequately inspected during construction, and have subsequently been improperly operated and maintained. When these systems fail, septage disposal by any acceptable method is preempted, and the waste overflow will discharge into the immediate environment.

ADHS Engineering Bulletin #12 (Guidelines for Installation of Septic Tank Systems) was prepared in 1976 in response to this need, but lacks the force of regulation. Unfortunately, many subdivisions with septic systems had already been constructed without the benefit of this technical and design guidance. This fact has also contributed to on-site system failures.

Septage is composed primarily of human excreta. As such, its pathogenic content is high, and its uncontrolled discharge into the environment can present a significant danger to public health. Because of the prevalence and wide geographic distribution of septic systems in Arizona, it has been extremely

difficult to effectively monitor and regulate the disposition of these wastes. Sufficient resources have never yet been allocated to the task. If these wastes are to be safely managed, a greater effort will be required in the future.

B. Current Management Practices

In Arizona, regulatory authority over septage is exercised jointly by the State Department of Health Services and various local (county) health departments. ADHS regulation R9-8-314 requires that all plans to construct septic tank disposal systems be submitted to and approved by the local health department. In the event no local health department has jurisdiction, such application must be submitted directly to ADHS for approval.

The construction and use of cesspools is strictly prohibited under existing regulations (R9-8-313). In addition, septic tank disposal systems will not be approved in instances where; (a) connection to a public sewer system is deemed feasible, (b) soil, topography or hydrology indicate that ground water contamination may occur, or (c) such installations create unsanitary conditions or public health nuisance. There are also various other Departmental regulations governing the storage, collection, transportation and disposal of septage.

Regulation R9-8-1231 allows for septage disposal by any of three acceptable methods. These include:

1. Into a community sewer system with approval of the appropriate authority at the place and point in the system designated.
2. By burial - all wastes from chemical toilets shall be disposed of by this method in an area approved by the local health department.
3. By sanitary landfill where operation of the facility is satisfactory and suitable precautions are taken to protect the health of workers and the public.

Any person wishing to engage in the collection or transportation of human excreta is required to obtain both a permit from the local health department and a license from ADHS (R9-8-1232, R9-8-1233). Each vehicle used for the transport of septage requires a separate license, which remains in effect so long as the vehicle is owned by the licensee. This same condition also applies to the county permit.

However, there are several deficiencies in this licensing program as it now operates. These are discussed at greater length in Chapter VIII (see licensing-page VIII-D-21), but will also be noted here. First, there is the fact that once issued, the State license never expires. Consequently, there is no means to monitor whether or not the licensee remains in compliance. If he is found to be in non-compliance however, his license may be revoked. Secondly, because both the State license and the county permit are issued on the basis of a local vehicle inspection, there is an apparent and unnecessary duplication of effort. Thirdly, regulation R9-8-1231 stipulates that pumper tanks must provide for a minimum 750 gallon capacity. This standard is no longer appropriate due to the changing nature of the industry. Finally, the existing program fails to adequately control for the location of final septage disposition. Local health departments are given the authority to designate specific disposal sites, but are often reticent to do so because of a shortage of adequate disposal facilities and capacity. In sum, there is a clear and present need to reform this program.

There is also an imperative need to gather additional data relative to current septage disposal practices throughout the State. Little data is available regarding the volume, rate or location of septage disposition, and existing practices are largely undocumented. The Department's proposed survey of septage practices (FY81) is specifically intended to address this need. This study will also assist in evaluating the effectiveness of existing regulatory programs, and in documenting the need for any necessary revisions.

C. Conclusion

As with other types of solid waste, the improper management of septic tank pumpings can operate to the detriment of public health and the environment. The principal concern is for the protection of ground and surface water resources. When improperly disposed, septage can result in run-off contamination of surface waters, leachate contamination of ground waters, the generation of explosive methane gas, and pervasive and noxious odors. Because septage is both chemically and biologically decomposable, it is vitally important that all land disposal sites be protected by adequate cover, compaction, grading and drainage. Gas venting and leachate collection systems may be desirable at such sites, but are not in all cases cost-effective.

Although ADHS regulatory powers over septage are now fundamentally adequate, the exercise of these powers has been hampered by a general lack of resources at both State and local levels. Historically, commercial pumpers have never been adequately monitored, and the prohibition against indiscriminate dumping has never been adequately enforced. Existing regulations clearly differentiate between acceptable and non-acceptable methods of septage disposal, but fall short of stipulating minimum performance criteria. To some extent, the new federal land disposal regulations under RCRA fill this void with respect to landfill disposal, but offer no assistance relative to wastewater treatment plant injection. As this latter disposal method becomes increasingly practiced, it may become desirable to develop appropriate technical guidance, and modify regulations accordingly.

On the basis of the problems and issues addressed in this section, the following State (ADHS) actions are proposed.

Recommendations

1. The ADHS program for the licensure of septic tank pumper haulers should be phased out and delegated to County governments. This delegation will be contingent upon the willingness of local health departments to assume this responsibility. Thereafter, provision should be made for annual inspections of all vehicles, and the specific designation of approved sites for final septage disposition (FY 82).
2. ADHS regulation R9-8-1231.B. should be amended to allow for the usage by septic tank cleaners of a pumper tank size that is "appropriate" for its intended use (FY 82).
3. Where land or surface disposal is inappropriate due to physical constraints, all future wastewater treatment plants (newly constructed or modified) should be required to provide a septage disposal capability as a condition of ADHS design plan approval (on-going).
4. ADHS should amend Engineering Bulletin #11 to provide design guidance for the injection of septage into wastewater collection and treatment systems. (FY 82.)
5. ADHS should undertake a comprehensive statewide survey of current septage disposal practices and an inventory of septage disposal sites (FY 81).

References

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2. Bureau of Sanitation. Septic Tank Cleaner License Program Needs Assessment. ADHS. 1977.
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CHAPTER SEVEN

SECTION E

INDUSTRIAL WASTES

Chapter VII

Section E

Industrial Wastes

Introduction

Industrial wastes are as numerous and varied as industry itself. They are represented by the solid and liquid waste residuals generated as a result of various manufacturing processes. One need only refer to the Standard Industrial Classification (SIC) code to appreciate the number and diversity of such processes, and each will produce its own waste material.

These wastes, both liquid and solid, are included within the RCRA definition of "solid waste", and comprise two basic categories; (1) hazardous and (2) non-hazardous. Hazardous industrial wastes are dealt with in Section A of this chapter, and include all those waste materials which are toxic, corrosive, reactive or ignitable. The management of all other (non-hazardous) industrial wastes will be addressed in this segment. These wastes are relatively innocuous, and generally exhibit physical and chemical properties quite similar to municipal solid wastes.

A. Problem Assessment

Non-hazardous industrial waste typically includes such diverse materials as scrap metal, cloth, paper, rinse water, coolant solution, wood scraps,

construction debris and refuse. Its annual rate of generation in Arizona numbers in the millions of tons and millions of gallons. The requirements for adequate land disposal of these wastes are large and growing, and the potential for environmental degradation through improper management practices is substantial.

In an effort to gauge this problem, the Department of Health Services contracted for the conduct of an industrial and hazardous waste survey in 1975. Its purpose was to identify the quantities and characteristics of these wastes, and to determine existing methods of disposition. At the time of this survey, there were 1,460 industries listed in the Arizona Directory of Manufacturers (1974). By use of a sampling technique, responses were obtained from 375 or 26% of these manufacturers. The survey findings are presented in Table VII-E-I, and provide an indication of the relative contributions of various industrial groupings. Based upon these findings, the electrical, fabricated metal and lumber industries appear to be the principal generators of non-hazardous industrial wastes in Arizona. As for disposal, sanitary landfilling was almost universal in the case of solids disposition with recycling significantly reducing this burden. Liquid wastes were either disposed of in surface impoundments (for seepage/evaporation), or discharged to sanitary sewers. Although this data is no longer current, it remains the most up-to-date information available and is helpful in understanding the nature and extent of the problem.

Table VII-E-I

SUMMARY OF WASTE QUANTITIES BY CATEGORY
 Surveyed Industries - 1975

SIC	CATEGORY	SOLID ORGANIC (TONS)	SOLID INORGANIC (TONS)	LIQUID ORGANIC (GALS.)	LIQUID INORGANIC (GALS.)
19	Ordnance & Accessories	.02	.01		
22	Textile Mill Products	trace			
24	Lumber & Wood Products	378,378	31		
26	Paper & Allied Products	5,792			
27	Printing, Publishing & Allied	33,480	41		12
28	Chemicals & Allied	1,908	3		
29	Petroleum Refining	15			
30	Rubber & Misc. Plastics	73	20		10
33	Primary Metals	1,905	32,135		1,300
34	Fabricated Metal	1,626	3,995		1,824,000
36	Electrical	13,182	4,881	1,220,000	
38	Instrumentation	205	6		
39	Misc. Manufacturing	2,697	533		
TOTALS:	439,261.02	41,645.01	1,220,000	1,825,322

* SOURCE:

Behavioral Health Consultants, Inc. 1975. (Based upon a sampling survey of 375 manufacturing industries representing 13 standard industrial classification codes)

Non-hazardous industrial waste management is governed by the same set of regulations which control the storage, treatment, transportation and disposal of municipal waste. These are the Departmental regulations pertaining to refuse and other objectionable wastes (DHS Article 4). These regulations also provide the Department with authority to enforce the RCRA land disposal criteria.

Certain non-hazardous wastes however, may necessitate special handling and disposal provisions. To cite an example, sulfur is a common waste product of the fertilizer industry. It is exempt from the State hazardous waste regulations (Article 18), yet when mixed with water in a sanitary landfill, may result in the generation of sulfuric acid which can pollute surface or ground water and spark underground fires. This can pose major problems at those facilities which have no means of monitoring the content of incoming loads. Similarly, liquid wastes should be routinely landfilled separately from mixed refuse to protect water quality. Because separate disposal of incompatible waste material poses additional costs for the operator, it is sometimes not practiced. Furthermore, industry-owned landfills and surface impoundments have historically been subjected to little regulatory oversight. Few such facilities have submitted design or operating plans to ADHS, and their management practices are consequently unknown. This plan submittal is required under A.C.R.R. R9-8-314 and R9-8-432 respectively, but enforcement has been lacking, particularly with respect to industrial liquid waste lagoons.

B. Current Management Practices

Non-hazardous industrial wastes generally will pose a threat to public health and the environment only when improperly handled or disposed. Although this waste stream is large in terms of disposal volume, it is mostly innocuous. Because of limited manpower and uncertain financial resources, the Department (ADHS) has assigned this waste category a low priority. A detailed investigation of industrial waste management and an update of the 1975 survey is tentatively scheduled for FY 83.

Most industrial wastes are now generated in the State's metropolitan areas (Maricopa and Pima counties). Actual waste volumes are difficult to extrapolate from the 1975 survey due to design limitations. Nevertheless, it may be deduced from the survey results that the bulk of such wastes are generated by the electrical, primary metals and lumber industries. Presented below is a brief summary of the survey results as they pertain to management practices. The reader should bear in mind that only thirteen industrial groups were sampled in the survey. These were assumed to be broadly representative of Arizona industry as a whole. Also, in this context, only the non-hazardous waste streams from these industries will be addressed.

Ordnance & Accessories:

Waste-	non-ferrous metal scraps
Storage-	on-site containers
Transportation-	municipal and private haulers
Disposal-	sanitary landfill
Recovery-	metals

Textile Mill Products:

Waste-	cloth, paper, water, water softening compounds
Storage-	on-site containers
Processing-	some shredding
Transportation-	municipal and private haulers
Disposal-	sanitary landfill, sanitary sewer
Recovery-	paper

Lumber & Wood Products:

Waste-	wood, bark, refuse
Storage-	on-site
Processing-	shredding, compaction
Transportation-	municipal, private and self-haul
Disposal-	sanitary landfill
Recovery-	wood & paper products

Paper & Allied Products:

Waste-	paper, refuse, wood scraps, sludge
Storage-	dumpsters, bins, lagoons
Processing-	shredding, compaction
Transportation-	municipal, private and self-haul
Disposal-	sanitary landfill
Recovery-	wood and paper products

Printing, Publishing & Allied:

Waste-	paper, non-ferrous metals, lead
Storage-	on-site
Processing-	shredding, compaction
Transportation-	municipal and private haulers
Disposal-	sanitary landfill
Recovery-	metals, chemicals, paper

Chemicals & Allied Products:

Waste-	refuse, paper, scrap metal
Transportation-	municipal & private haulers
Disposal-	sanitary landfill

Petroleum Refining:

Waste-	refuse, debris
Storage-	on-site
Disposal-	sanitary landfill

Rubber & Miscellaneous Plastics:

Waste-	paper, refuse
Storage-	on-site
Processing-	grinding, crushing
Transportation-	municipal & private haulers
Disposal-	sanitary landfill
Recovery-	rubber

Primary Metals:

Waste-	refuse, scrap metals, rinse water
Transportation-	public/private, truck/rail
Disposal-	sanitary landfill, surface impoundment
Recovery-	ferrous & non-ferrous metals

Fabricated Metals:

Waste-	paper, refuse, wood scraps, metals, ferric rinses & solution
Storage-	on-site
Treatment-	dilution
Disposal-	sanitary landfill, sanitary sewer
Recovery-	scrap metal, coolant

Electrical:

Waste-	refuse, paper, metal scrap, coolant solution
Storage-	on-site
Treatment-	filtration, dilution
Transportation-	municipal, private & self-haul
Disposal-	sanitary landfill
Recovery-	scrap metal

Instrumentation:

Waste-	paper, refuse, wood, scrap metal
Processing-	baling, compaction
Transportation-	public, private & self-haul
Disposal-	sanitary landfill
Recovery-	scrap metals

Miscellaneous Manufacturing:

Waste-	refuse, paper, rubber, wood & metal scrap
Transportation-	public, private & self-haul
Disposal-	sanitary landfill
Recovery-	scrap metals

C. Conclusion

The management of non-hazardous industrial wastes is not a significant problem in Arizona from a health or environmental standpoint. Most of this waste stream is now properly disposed of by sanitary sewer or sanitary landfill. In recognition of recent environmental legislation, private industry has in general voluntarily responded to the call for improved waste management practices. In light of new economic realities, industry has also taken the lead in developing and implementing new resource recovery systems. As a consequence, the overall management system has improved.

In regards to the non-hazardous industrial waste stream, the following State (ADHS) actions are proposed.

Recommendations:

1. ADHS should encourage local waste management authorities to analyze the composition of local non-hazardous industrial waste streams in an effort to evaluate potential landfill disposal problems and develop separate disposal capacity as required (on-going)
2. ADHS should secure the submittal of design and operating plans from all existing and future non-hazardous industrial waste landfills and surface impoundments (on-going)
3. ADHS should undertake an evaluation of the feasibility of various institutional arrangements for the establishment of an industrial waste exchange program which would assist private industry in recycling waste materials in lieu of their disposal (FY 81).

References:

1. Behavioral Health Consultants, Inc. A Report on Industrial and Hazardous Wastes. 1975.

CHAPTER SEVEN

SECTION F

MINING WASTES

Chapter VII

Section F

Mining Wastes

Introduction

Mining wastes are comprised of the solid, semi-solid and liquid residuals resulting from mineral extraction and refining processes. In Arizona, such wastes are composed primarily of overburden, tailings, slag and leaching solution (i.e. sulfuric acid), the common waste products of the copper industry. These wastes may be either hazardous or non-hazardous in nature, ultimately depending upon their composition and the manner in which they are disposed.

Traditionally, mining has been a cornerstone of the Arizona economy. Total mineral production was valued at 1.7 billion in 1978, up from \$600 million one decade earlier. A wide range of minerals, both metallic and non-metallic, are now in production throughout the State. Metallic elements typically include copper, silver, gold, molybdenum, mercury and zinc. Non-metallics commonly include asbestos, stone, sand and gravel, lime and pumice. Coal mining also occurs in the State, but is limited to a few facilities situated on Navajo Tribal lands.

Arizona is and has been the nation's leading copper producing State. In recent years, Arizona's share of U.S. copper production has averaged 65% of total domestic output. This product was valued at \$1.3 billion in 1978, and represents a principal economic mainstay of the State. In dollar terms,

some 75% of Arizona's mining industry is directly related to copper extraction, smelting and refining. In 1978, 983,000 tons of copper were produced in Arizona. The bulk of this was extracted from open pit mines, which necessitated the generation of many more tons of overburden. All of this waste material was returned to the environment. Its precise volume is difficult if not impossible to quantify.

This section will overview the existing management of mining wastes in Arizona, with a particular focus on copper. It will also identify related environmental problems and review current management practices. Particulate residues from copper smelting operations are addressed under the section of this chapter pertaining to pollution control residuals, and represent a separate category of solid waste. They are not dealt with in this context.

A. Problem Assessment

Mining wastes originate from a variety of sources and processes. The process of ore extraction will result in waste overburden, and the process of copper flotation concentration will result in waste sludge. In the copper industry, both of these wastes are generated in large volumes. As with all other forms of solid waste, these materials may result in adverse health and/or environmental impacts when improperly handled or disposed.

Where the open pit method of ore extraction is employed, overburden must be removed in order to gain access to the ore body. This is accomplished by means of both drilling and blasting. Once loosened, the ore and the waste material is loaded by large shovels into trucks ranging in capacity from 50-200 tons, and is then removed from the pit. Alternatively, belts and

conveyor systems may be used for this purpose. The overburden is separated from the ore, and is ultimately deposited in large surface dumps. Although predominantly inert and innocuous, this waste material may result in erosion problems and increased sediment loadings in surface streams. In several cases, overburden has been deposited directly in flood channels or dry washes and precipitation events have generated run-off. This problem may be alleviated by means of proper siting, grading and drainage.

The flotation concentration process is a widely used method of recovering copper compounds from ore. In 1972, 86.3% of all copper produced in Arizona was processed in this manner. It is a process, however, which generates a residual sludge commonly referred to as "tailings". This waste sludge is piped to surface ponds or tanks where the suspended solids are allowed to settle out of solution. Water which is not lost to evaporation and percolation is often reclaimed. There is a potential problem with this disposal practice insofar as percolation rates and volumes are not controlled at unlined ponds. If a high water table is present, groundwater contamination may occur following saturation of the vadose zone. Conversely, a high precipitation event might result in pond overflow, and contaminate surface waters via run-off.

Leaching is another process used in the mining industry for dissolving copper minerals from ore. This process involves the percolation of an acid solution through an ore heap (dump), which dissolves the copper minerals and removes them in solution via drainage. The copper-laden solution is then collected at the bottom or toe of the dump, and piped to a processing plant for further refinement. The copper minerals are subsequently separated, and the acid solution is returned for recycling purposes. The potential for

environmental hazard occurs where the leachate or acid solution escapes from the collection system and percolates at random into the ground. If contact is made with groundwater, quality impairment may result.

Much of the pollution potential posed by mining waste is mitigated by recycling practices. Industrial waters are reclaimed from tailing ponds, and acid solution is recycled from the leaching process. In the absence of these management practices, the pollution potential would be much greater than now exists. The extent to which mining waste disposal practices have actually resulted in environmental degradation is largely undocumented and frequently debated. It is a controversy, however, which merits further study. Historically, and from a practical standpoint, mining wastes have never been actively or effectively regulated in Arizona. The State solid waste management program, due to its limited resources, has of necessity concentrated its efforts on municipal waste. This focus left mining wastes virtually ignored.

At the present time, two regional planning agencies are studying the possible relationships between water contamination and mining waste disposal. The Pima Association of Governments (PAG) has established a "Mines Task Force", and the Central Arizona Association of Governments (CAAG) has created a "Mineral Extraction Task Force". When completed, these studies are expected to identify best-management practices and to provide valuable recommendations relative to the State's future regulation of these waste materials. ADHS will also be inspecting and evaluating mining waste disposal facilities as a part of its Open Dump Inventory project. This process will assist in the generation of baseline data and in the identification of site-specific problems.

B. Current Management Practices

Mining activities are widespread throughout Arizona, but copper production generally occurs in the southern and eastern portions of the State. Specific methods of copper production will vary between locations and companies, but there are certain basic processes which are common to the industry as a whole. As they relate to the "typical" copper producing operation, these processes are described in their order of sequence below.

The initial step in copper production is to remove the ore from the mine. This ore extraction is either conducted in underground shafts or by means of an open pit, with the latter being more common to Arizona. Blasting and drilling are used to loosen overlying material, and unprocessed ore is then removed from the mine by trucks, belts and/or conveyor systems.

Following extraction, the ore will undergo various stages of crushing and grinding. This processing continues until a fine grained powder is achieved. Once the ore has been properly prepared, it is then ready for concentration and refinement. There are two basic processes employed for this purpose, flotation concentration and leaching.

Flotation concentration is the most common method of recovering copper compounds from ore. Initially, the finely ground ore is mixed with water to form a slurry. This mixture enters a flotation cell where reagents are introduced. The solution is then agitated with air to cause a frothing action. The reagents will cause the copper minerals to collect on the surface of the air bubbles, and the froth containing the copper compounds is

then skimmed off the top. The froth subsequently proceeds to thickeners and filters which remove excess water until a concentrated copper cake (normally 20-30% pure) is achieved. Waste residuals resulting from this process are piped to evaporation ponds for settling. Wastewater can then be reclaimed, and is often recycled to the slurry.

Leaching is an alternative method which employs an acid solution to dissolve copper minerals from ore. There are four basic types of leaching operations: dump, heap, vat and in situ. In each case, the acid solution is applied to a low grade ore (by spraying, flooding, or vertical pipe delivery), where it is allowed to percolate through the material and remove the copper it contacts. The enriched solution is then collected at the bottom, and pumped to a processing facility. Dumps or heaps are normally constructed so that the leachate will flow to a central collection point.

Copper is then recovered from the enriched or "pregnant" solution by means of precipitation with iron, or by liquid ion exchange. This latter method is known as solvent extraction. Because it yields almost pure copper, the need for subsequent smelting may be eliminated by this process.

Copper cake resulting from flotation concentration or the leaching-precipitation method is then delivered to a smelter, where it is processed in reverberatory and converter furnaces. This step further reduces impurities, leaving a 99% pure product known as "blister copper". The final step is the electrolytic refinery, where a 99.99% purity is achieved.

Three major waste residuals are generated in the manufacture of copper. Overburden is the waste product of ore extraction, and is disposed of in large

surface dumps. Tailings are the waste product of the flotation concentration process, and are disposed of in surface impoundments and tanks. Acid solution is the waste product of the leaching process. Although this solution is generally recycled, a portion may be lost to percolation.

Mining waste management in Arizona is not controlled by any specific set of regulations. Rather, it is governed by more general regulations pertaining to environmental health. The mining companies are ultimately responsible for their own waste management programs and practices, but are regulated to some extent by the Department of Health Services, particularly with regard to water quality and solid waste. Two other state agencies, the Bureau of Geology and Mineral Technology and the Department of Mineral Resources provide technical assistance to the industry, but exercise no regulatory powers. The State Mine Inspector enforces regulations related only to mine safety. Historically, the disposition of mining waste has occurred largely in the absence of effective State oversight.

C. Conclusion

Potentially, mining wastes pose a variety of water quality problems for the State of Arizona. There are two types of non-point source pollution that may occur: (a) increased sediment loadings in surface waters; and (b) chemical changes in both surface and groundwater (e.g. dissolved solids, metals, pH, etc.). At present, there is only limited data available regarding the relationship between existing mining waste disposal practices and non-point source water quality impairment. There is, however, an assumed correlation at various locales. All point source discharges are presently regulated by the Section 402 NPDES permit program.

Studies are now underway in various mining regions of the State to identify potential problem sites. These investigations will hopefully result in improved management practices and a lessened probability of adverse environmental impact. In all likelihood, site-specific problems that may now exist had their genesis many years ago. These problems are difficult and complex, and will require both time and resources to correct.

Where problems of hazardous waste disposal are encountered, they will be appropriately dealt with by ADHS under its Article 18 regulations. Problems regarding the disposition of non-hazardous mining wastes will be dealt with largely through the Open Dump Inventory process and subsequent compliance negotiations with owners/operators of substandard disposal facilities.* Due to projected resource limitations, inactive and abandoned mining waste disposal sites have been excluded from the open dump inventory for the present time. However, if and where such facilities are shown to present

imminent hazards to either public health or the environment, either ADHS or EPA (under RCRA Sec. 7003), or both agencies, shall respond appropriately to abate such hazards.

With a view to the future, the following actions are recommended to strengthen the ADHS management program for mining wastes (see following page).

* Note: The federal "criteria for classification of Solid Waste Disposal Facilities and Practices" do not apply to overburden resulting from mining operations where such waste is intended for return to the mine site.

** Note: For purposes of this State Plan, overburden is defined to include any common mineral product (i.e. sand, gravel, silt, rock, etc.) which has been removed from an excavation site and has not been subjected to any chemical or leaching agent or process.

Recommendations

1. The Bureau of Waste Control should coordinate with the Bureau of Water Quality Control in the development and implementation of "best management practices" (BMP's) for the control of non-point sources of water pollution at mining sites (on-going).
2. ADHS should actively participate in Federal, State, local and/or regional study efforts geared toward identifying and preventing the potential for pollution posed by mining wastes (on-going).
3. All available information and data regarding mining wastes and disposal practices should be assessed by ADHS in FY 82 as preparation for the conduct of the Open Dump Inventory relative to mining operations.
4. ADHS should inspect and evaluate all mining waste disposal facilities as a part of its Open Dump Inventory project (FY 82-84). Subsequent to evaluation, corrective actions should be initiated at substandard sites geared toward closure or upgrading.
5. ADHS should secure the submittal of design plans for all mining waste disposal facilities (on-going).
6. ADHS should cooperate with other appropriate agencies and institutions in encouraging the proper closure and reclamation of all completed mining waste disposal sites (on-going).

References

1. Areawide Wastewater Management Plan. Pima Association of Governments. 1978.
2. 208 Areawide Water Quality Management Plan. Central Arizona Association of Governments. 1978.
3. Arizona Statistical Review. Valley National Bank of Arizona. 35th ed. 1979.
4. Arizona's Role in Water Quality Management: State Agency Programs and Land and Water Resource Controls. Office of Economic Planning and Development. 1977.

CHAPTER SEVEN

SECTION G

POLLUTION CONTROL RESIDUALS

Chapter VII

Section G

Pollution Control Residuals

Introduction

In the broad sense, pollution control residuals are the waste products resulting from the operation of a variety of pollution control systems and devices. The purpose of these systems is to reduce and control the release of contaminants into the environment. Such systems essentially include water treatment plants, wastewater treatment plants and various thermal processing facilities equipped with particulate emissions control devices.

Because water and wastewater treatment plant sludges are dealt with separately in the State Plan, this section will focus primarily upon thermal processing residuals resulting from air quality control technology. This waste is essentially solid particulate matter which has been filtered from stack gases by various means. As a secondary consideration, this section will also address furnace/incinerator residuals. These solid wastes are comprised of the incombustible fraction which remains in the hearth after a solid waste or fuel has been burned. All thermal processing wastes (residuals) are subject to the RCRA regulatory umbrella, and in the absence of resource recovery practices, ultimately require land disposal.

Thermal processing is employed in Arizona to service one or more of three disparate functions; (1) industrial manufacturing, (2) power generation, or (3) the volume reduction of waste. Manufacturing applications include copper smelters, steel mills, pulp and paper mills, cement plants and lime

processing plants. Power generation is accomplished at utility plants, but residuals are generated almost exclusively at coal-fired facilities. For its part, waste reduction incineration is practiced at hospitals and crematoriums. Mass burning for the volume reduction of sludge will soon be achieved at the City of Phoenix 91st Avenue wastewater treatment plant, where a private contractor is presently constructing a rotary kiln furnace for this purpose. The incineration option may also be viable for the volume reduction of municipal solid waste (with energy recovery).

These various thermal processing applications will generate residuals of widely varying characteristics. The nature, volume and content of the residue will ultimately depend upon three variable factors; (1) the material being processed, (2) the degree to which complete combustion of organic content is achieved, and (3) the air pollution control technology employed. Accordingly, each application will present its own unique residuals management problems, and necessitate certain provisions for proper waste handling, storage and treatment. These discrepancies also translate into widely differing management practices. For these reasons, the organization of this particular section will depart from the format followed in other sections. Rather than assess problems and describe management practices in separate contexts, this narrative will address thermal processing residuals on the basis of seven (7) distinct facility types (generator sources). The section will then conclude with a summary overview of the existing management framework.

A. Sources of Thermal Processing Residuals

Waste Reduction Incinerators

At present, there are no large scale municipal waste incinerators operating in Arizona. Historically, this alternative has not been cost-effective due to the availability of inexpensive land for refuse disposal purposes. Nevertheless, there are now a number of incineration facilities situated throughout the State. For the most part, these are relatively small, privately owned facilities. They are used for the purpose of disinfecting and reducing the volume of pathological and infectious wastes generated by hospitals, medical laboratories, veterinary clinics and crematoriums.

When properly operated (sufficient temperature and residence time), the incineration process will decimate waste volumes by destroying organic matter. What remains is essentially ash. The inert fraction will survive combustion and assume one of two basic forms, residue or particulate matter. The residue will settle on the hearth and remain in the furnace. The particulate matter will become entrained in the flue gas, and depending upon combustion efficiency, may include both organic and inorganic compounds. The particulates will exit with the flue gases (i.e. carbon monoxide, nitrogen oxide, sulfur oxide, hydrocarbons, hydrogen chloride, etc.).

Any of a variety of pollution control devices may be present in the flue to filter and collect these particulates. More sophisticated incineration units might contain electrostatic precipitators, bag-filters or high-pressure-drop scrubbers. Less efficient systems might employ expansion chambers, wet baffles, sprays or cyclones. Once collected, the pollution control residue is temporarily stored on-site and subsequently landfilled off-site. Filtered waste gases are discharged to the atmosphere. Furnace deposits are removed (manually or automatically) on a periodic schedule and stored along with the particulate

residues.

Related management problems pertain to residuals handling, storage and disposal. The waste is often so poorly burned that it may retain its pathological qualities, and thereby present health dangers to handling personnel at storage and disposal sites. If improperly landfilled, such waste might directly or indirectly (through vectors) transmit disease to humans. However, proper incineration will pose little risk to either human health or the environment, and represents a safe and efficient method of waste processing.

Coal-fired Utility Plants

There are presently six coal-fired utility plants operating in Arizona. Each of these units is powered by pulverized low-sulfur coal. The combustion of this fuel will produce a relatively low volume of bottom ash and a large quantity of fly ash. This fly ash assumes the form of round hollow sphericals, and escapes with the flue gases. Pollution control is normally accomplished by means of electrostatic precipitator, water scrubber or powered limestone scrubber. A precipitator will produce a dry residual whereas a scrubber will produce a wet residual. Dry residuals are removed by means of conveyor, and either landfilled on-site or recycled. Wet residuals are removed by slurry, and disposed of in on-site evaporation lagoons.

Fortunately, fly ash is a waste residual with a marketable value. It is often sold, and recycled in the manufacture of a wide variety of products. The major recovery uses of fly ash are indicated in the table on the following page (table VII-G-I).

Table VII - G-I Utilization of Ash in United States, 1967, in 1000 Tons and %.

Markets	Fly ash		Bottom ash ^a		Total	
	Tons	%	Tons	%	Tons	%
Road and construction fill	300	19.2	1150	43.3	1450	37.5
Concrete additive	600	38.5	200	15.2	800	20.7
Lightweight aggregate	150	9.6	-		150	3.9
Stabilization for road base	120	7.7	50	2.2	170	4.4
Cement manufacture	150	9.6	50	2.2	200	5.2
Asphalt filler	129	7.7	35	1.5	155	4.0
Miscellaneous	120	7.7	820 ^b	35.6	940	24.3
Total utilized	1560	100.0	2305	100.0	3865	100.0
Total collected	18,500	8.4	9200	25.1	27,700	14.0

^aIncludes boiler slag.

^bIncludes blasting grit, ice control, agriculture, and roof filler.

Source: Arsen Darnay and William E. Franklin, "Salvage markets for materials in solid wastes," U.S. Environmental Protection Agency, report (SW-29c), 1972.

Copper Smelters

Copper smelting produces a waste material known as slag. In technical terms, slag is a liquid mineral substance formed by chemical action and fusion at furnace operated temperatures. It is composed primarily of iron silicate, and results from the manufacture of copper sulfide. Slag floats on top of the matte within a reverberatory furnace, and is removed in liquid form by skimming. It is then deposited onto a slag heap where it returns to a solid mass. It may then be sold to a limited recovery market.

Particulate emissions are controlled by means of electrostatic precipitator. Dry stack residues may include oxides, sulfides, silicates, copper, arsenic, mercury, lead, etc. Because of valuable copper content, these pollution control residues are recycled to the furnace for reprocessing.

Lime Processing Plants

There are two lime processing facilities in Arizona, one in Cochise County, the other in Mohave County. Limestone is quarried, crushed and ground, and placed in a kiln for thermal processing. Carbon dioxide is then driven off in the furnace, yielding a lime product. Water scrubbers are utilized to filter dust before the gases enter the stack. Residues are then removed by slurry, and disposed of in surface impoundments. As an alternative, these wastes may also be sold for certain recycling purposes.

Cement Plants

There are two cement plants in Arizona. At each, limestone rock is quarried, placed in a kiln, then heated and fused into clinker (partially fused crude

cement). Clinker is then further processed in the manufacture of finished cement. Thermal processing of cement will generate only a marginal furnace residue. Bag filters are used in the stacks for particulate collection, and pollution control residues are recycled to the furnace. There is little, if any, significant environmental discharge to land.

Pulp and Paper Mills

Paper manufacture is another thermal processing industry found in Arizona. In this process, chips are placed in a boiler, chemicals are added, and lignin is removed in solution so as to separate the paper fibers. The organic lignin solution is then concentrated by means of evaporation. When dried, the lignins are placed in a recovery furnace for both heat and chemical recovery. The lignins are consumed, and the chemicals are returned to the separation process. Particulate emissions are filtered by electrostatic precipitator and recycled to the recovery furnace. Little if any solid waste will require land disposal.

Steel Mills

Several casting foundries are also operating in the State. These facilities employ electric arc furnaces to reprocess scrap steel. Slag is the principal waste product, and is disposed of on-site. Iron oxide and other particulates are captured in baghouses, and sold to recovery markets.

B. Management Framework

Thermal processing residuals are generated from a wide variety of sources. They are comprised of constituents which are even more widely diversified. The health or environmental risks they pose are largely a function of the ways in which they are handled and disposed. If recycled, or otherwise properly managed, these residual wastes are not a significant problem for the State of Arizona. Although waste volumes may be large, existing practices are assumed to be fundamentally safe and adequate. For this reason, air pollution control residuals assume a low priority from a State regulatory standpoint.

State air pollution control regulations now require that all thermal processing facilities with stack emissions obtain operating permits, and hold their emissions within limits defined by air quality standards. In practice, this can only be accomplished by means of installing pollution control systems. In this respect, the solution to one environmental problem has given birth to another. By protecting ambient air quality, these regulations have created a new solid waste problem. The use of air pollution control equipment by any thermal processing facility will invariably result in the generation of a waste residual. This waste must be either recycled or disposed of upon the land. Fortunately, recycling is feasible in nearly every case (hospital waste excepted), and serves to dramatically lessen the waste loading destined for land disposal.

At present, only limited reliable data is available regarding solid waste management practices at thermal processing facilities. A thorough study and inventory of these practices has never yet been undertaken by ADHS. The need for such a study however, is recognized. If resources permit, such an effort should be mobilized during FY 82 to identify both disposal sites and practices. Such a

study would enable a more detailed problem identification as well as a determination of "best management practices".

Existing regulatory controls over thermal processing residuals are weak, and enforcement has in many cases been non-existent. Such facilities are sometimes monitored for compliance with State air and water quality regulations, but only rarely have they been inspected on the basis of solid waste regulations (DHS Chapter 8, Article 4). To a large extent, this void will be corrected through the conduct of the Open Dump Inventory.

Federal regulations promulgated pursuant to RCRA (40 CFR 261.4) specifically exclude the bulk of this waste category from federal hazardous waste controls. Exempted under this provision is "...fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuel(s)". Proposed State hazardous waste regulations (DHS Chapter 8, Article 18) which are expected to be adopted shortly, now contain a comparable exclusion.

Because of this present situation, and the existing regulatory framework, ADHS proposes to undertake the following activities as a part of its overall management strategy.

Recommendations

1. All major on-site and off-site thermal processing or air pollution control residue disposal facilities should be inspected, assessed and classified as a part of the Open Dump Inventory (FY 81-84).
2. In conjunction with the Open Dump Inventory, the Department should undertake a study of thermal processing and air pollution control residual wastes. The purpose of this study should be to identify and evaluate waste constituents, management sites and practices, and related health or environmental problems (FY 82).
3. A plan submittal for residuals management should be secured from all thermal processing facilities which generate large volumes of residual waste for on-site disposal (under authority of regulations R9-8-431 and R9-8-432) (on-going).
4. ADHS should cooperate with industry in the development of markets, technologies and management practices designed to further the goals of resource conservation and recovery, and thereby lessen the amount of solid waste residuals destined for ultimate disposal (on-going).

References

1. ADHS. Draft Application for Interim Authorization to administer a Hazardous Waste Management Program. Bureau of Waste Control. 1980.
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3. Greeley & Hansen. City of Phoenix 23rd & 91st Avenue Wastewater Treatment Plants; Draft Residuals Management Facility Plan. John Carollo Engineers. 1980
4. U.S.E.P.A. Incineration in Hazardous Waste Management. Office of Solid Waste Management Programs. 1975.
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6. U.S.E.P.A. Small Modular Incinerator Systems with Heat Recovery. Office of Water and Waste Management. 1979.
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* Our special thanks to the staff of the Bureau of Air Quality Control (ADHS) for their technical assistance and helpful cooperation in the preparation of this section.

CHAPTER SEVEN

SECTION H

AGRICULTURAL WASTE

Chapter VII

Section H

Agricultural Waste

Introduction

Solid wastes resulting from agricultural production in Arizona are of two basic types; (1) crop wastes, and (2) livestock wastes. Crop wastes are comprised of all those solid materials that remain in the field subsequent to harvesting (note - the root systems of some crops may yield two or three harvests per year before dying. These roots become waste only after the final harvest). Livestock wastes consist primarily of animal feces (manure) and urine mixed with bedding materials, spilled feed and soil. This category of waste falls within the RCRA definition of "solid waste" and is composed almost exclusively of organic matter.

The principal source of crop waste is farmland. In 1978, there were over 1.3 million acres of irrigated land in Arizona devoted to producing a wide variety of crops, including alfalfa, citrus, cotton, grains and vegetables. Total production was valued at \$753 million.

The major sources of livestock waste are dairy farms and feedlots. Livestock generating these wastes include cattle, hogs, sheep, horses and poultry. Total livestock production in Arizona was valued at \$718 million in 1978.

This section will overview the management of these agricultural wastes, discuss current handling and disposal practices, and identify related problems.

A. Problem Assessment

A 1973 survey conducted by the Bureau of Sanitation (ADHS) revealed that some 17.5 million tons of agricultural wastes were generated in Arizona in 1972. Of this total, 2.2 million tons were crop wastes and 15.3 million tons were livestock wastes (see tables VII-H-I and VII-H-II). This category of solid waste is quite large in terms of its annual generated volume. Although this estimate is somewhat dated, it is assumed that this quantity and rate have not significantly changed. The 1972 data upon which it was based is still considered valuable insofar as it provides a useful perspective on the various sources of agricultural waste and their relative contributions. Consequently, there is no compelling need to update this baseline information at the present time.

Potentially adverse health and/or environmental impacts may result if agricultural wastes are improperly managed and disposed. Issues of particular concern include vector control and the potential for water quality impairment.

The danger to water quality is posed primarily by (1) evaporation lagoons situated in areas of high water table, and (2) the discharge of effluents from feedlots. Livestock waste (composed mostly of excreta) is characterized by a high moisture content, and typically contains a variety of contaminants, including pathogens. When animal excreta is concentrated and disposed of in unlined evaporation lagoons, leachate may result in the degradation of underlying ground water quality. Also, although regulated by the National Pollutant Discharge Elimination System (NPDES), the discharge of feedlot effluent directly to surface waters (or indirectly through dry tributary washes) may substantially degrade such waters even where standards are not violated.

Table VII-H-1

CROP WASTES IN ARIZONA - 1972

Crop	Solid Waste Factor	Acreage	Total Solid Waste
Alfalfa	1.00 tons/acre	215,000	215,000 tons
Citrus	1.00 tons/acre	50,449	50,449 tons
Hay (Other)	1.00 tons/acre	44,000	44,000 tons
Barley	1.50 tons/acre	109,000	163,500 tons
Corn	1.50 tons/acre	15,000	20,500 tons
Safflower	1.50 tons/acre	33,000	49,500 tons
Wheat	1.50 tons/acre	170,000	255,000 tons
Other Crops *	1.85 tons/acre	28,773	53,230 tons
Bermuda Grass - Seed	2.00 tons/acre	10,100	20,200 tons
Cabbage	2.00 tons/acre	1,200	2,400 tons
Cantaloupe	2.00 tons/acre	11,500	23,000 tons
Carrots	2.00 tons/acre	3,800	7,600 tons
Cotton (All)	2.00 tons/acre	311,200	662,400 tons
Dry Onions	2.00 tons/acre	1,500	3,000 tons
Grapes	2.00 tons/acre	4,004	8,008 tons
Honeydew	2.00 tons/acre	1,200	2,400 tons
Potatoes	2.00 tons/acre	8,000	16,000 tons
Sugarbeets	2.00 tons/acre	11,300	22,600 tons
Watermelons	2.00 tons/acre	4,500	9,000 tons
Alfalfa Seed	3.00 tons/acre	6,800	20,400 tons
Broccoli	3.00 tons/acre	1,200	3,600 tons
Cauliflower	3.00 tons/acre	1,100	3,300 tons
Lettuce	3.00 tons/acre	45,200	135,600 tons
Sorghums	3.00 tons/acre	136,000	408,000 tons
TOTAL			2,160,687 tons

* Assorted minor Arizona crops, including tomatoes, chili peppers, squash, green onions, tangerines, tangelos, apricots, nectarines, peaches, plums, pecans and pistachios.

SOURCE: Bureau of Sanitation. An Inventory of Agricultural Solid Waste Production. ADHS. 1973.

Table VII-H-II

LIVESTOCK WASTES IN ARIZONA - 1972

Class	Solid Waste Factor	Units	Total Solid Waste
Cattle (Dairy/Pasture)	13.00 ton/yr wet	702,000	9,126,000 tons
Cattle (Feedlot)	7.50 ton/yr wet	655,000	4,912,500 tons
Hogs	1.75 ton/yr wet	82,000	143,500 tons
Horses	5.00 ton/yr wet	70,000	350,000 tons
Sheep (Non-Indian)	1.25 ton/yr wet	197,000	246,250 tons
Sheep (Indian)	1.25 ton/yr wet	405,000	506,250 tons
Poultry	40.00 ton/1000 wet	795,000	31,800 tons
TOTAL			15,316,300 tons *

* Animal waste is 80% water. On a dry basis, 3,063,260 tons of livestock wastes were generated.

SOURCE: Bureau of Sanitation. An Inventory of Agricultural Solid Waste Production. ADHS. 1973.

The problem of vector control is related to both agricultural waste storage and disposal. When agricultural wastes are composted, such materials may provide both food and harborage for a variety of vectors. If these populations are allowed to flourish, health implications may ensue with the transmittal of infectious disease. Odors may also present an associated problem where residential areas exist nearby.

The many sources of agricultural waste generation are widely distributed throughout the State of Arizona. Accordingly, it is logistically difficult for ADHS to routinely monitor and inspect the multitude of facilities and site-specific practices which now exist. From a regulatory standpoint, ADHS is not generally concerned with crop or livestock wastes that are returned to the soil as fertilizer. This agricultural waste management practice is specifically exempted from federal regulatory controls under RCRA (40 CFR Part 257). In recognition of the Department's limited resources, and the relatively minor problems typically presented by the agricultural waste stream, the open dump inventory of agricultural facilities will essentially focus upon commercial composting operations and surface impoundments situated at livestock feedlots and dairy farms. The Department will review plans for these facilities, and will seek an appropriate means to monitor their operations in cooperation with other agencies sharing jurisdiction.

B. Current Management Practices

At present, there are three basic methods for the disposition of crop wastes in Arizona. The first method is essentially a recycling method, which involves the collection and reuse of these wastes as livestock feed. A variety of crop residues may be suitable for this purpose, including cantaloupes and other melons, bermuda grass clippings and sugar beet tops. Livestock feeding is an excellent conservation practice insofar as these residuals may provide a partial substitute for other more expensive feeds commonly used in the production industry. In reality however, this practice simply results in the conversion of one form of solid waste (crop trimmings) into another form of solid waste (feces). This conversion process however, will utilize approximately 50% of the crop waste.

The second and most widely used method also involves a recycling of the waste material. This is the practice of plowing after-harvest residuals back into the soil. As these crop residues decompose organically, they return valuable nutrients to the field, and act beneficially as a fertilizer. This practice of returning crop residues to the soil as a fertilizer is encouraged, and is specifically exempted from federal regulatory controls under RCRA.

The third method of crop waste disposal is by means of field-burning. This practice was commonplace in the past, but now occurs less frequently due to more stringent air pollution control regulations. This method may also be beneficial from the standpoint of controlling insects and other pests. It is a permissible disposal method under RCRA so long as it is conducted on an infrequent basis and does not result in a violation of applicable state air quality control regulations.

Disposal methods for livestock waste are considerably different. In the case of feedlots, liquid lagoon systems may be employed to concentrate solids through evaporation. The resulting sludges may then be disposed of in sanitary landfills, or composted with other organic matter for reuse as a fertilizer. Many feedlots

however, will discharge their liquid effluent directly to surface water (this practice requires a NPDES permit), or to irrigation canals for ultimate land application. The Arizona Surface Impoundment Assessment Study (ADHS-1979) revealed that there are presently 66 known agricultural surface impoundment sites in operation statewide. These sites contain 106 separate impoundments. Incineration is yet another disposal alternative, but is costly, and not widely practiced.

In recent years, Arizona industry has been actively experimenting with various innovative methods for processing and recycling livestock wastes. The potential for both resource conservation and recovery in this respect is significant. As a part of its developing resource recovery program, the Department of Health Services proposes to more closely monitor and evaluate this research in the future. As may be appropriate, the Department might also aid in promoting any breakthrough technologies that emerge.

A variety of State health regulations now govern the handling and disposition of agricultural wastes, particularly livestock wastes. A.C.R.R. R9-8-421.E. controls storage practices, R9-8-428.C. governs transportation practices, and R9-8-431.D. regulates disposal practices. In general, the thrust of this regulatory control is aimed at the prevention of public nuisances which might result from the improper handling of these waste materials.

Regulatory responsibility for agricultural waste management is presently divided between three State agencies, the Arizona Dairy Commission, the Livestock Sanitary Board and the Department of Health Services.

The Dairy Commission enforces a body of health regulations related to dairy farms and other facilities concerned with the production, processing, labeling, storing,

transportation or sale of dairy products. Other responsibilities include plan review and site inspections.

The Livestock Sanitary Board is primarily responsible for the protection of the livestock and poultry industries from infectious and contagious diseases, and the public from diseased and unwholesome meat products. The Board conducts routine inspections of slaughter houses and livestock feedlots. It also licenses feedlots, and requires owners/operators to provide for; (a) reasonable methods of manure disposal, (b) adequate site drainage and (c) a mechanical means of scraping, grading and cleaning the feedlot.

The Department of Health Services is broadly responsible for protecting the public health. Accordingly, it enforces a body of regulations which control the management and ultimate disposition of all waste materials (except radioactive materials). The Department's other regulatory responsibilities include inspection, licensing, and plan review. As a part of its RCRA mandated Open Dump Inventory, the Bureau of Waste Control (ADHS) will be evaluating agricultural surface impoundments and commercial composting facilities on the basis of the Section 4004 land disposal criteria. It is anticipated that this will be accomplished by means of interagency agreements or memorandums of understanding negotiated between ADHS, the Arizona Dairy Commission and the Livestock Sanitary Board.

C. Conclusion

Relative to other categories of solid waste, agricultural waste management is generally not a serious problem in the State of Arizona. Despite its large volume, it has been assigned a relatively low program priority. What problems there are, revolve primarily around the management and disposition of concentrated livestock waste. These problems involve vector control and water quality related issues. Regulatory responsibility for agricultural waste management is presently divided between three state agencies; ADHS, the Arizona Dairy Commission and the Arizona Livestock Sanitary Board. Cooperation will be necessary with and between each of these agencies in order for proper program implementation to occur.

On this basis, it is proposed that the following State (ADHS) actions be undertaken:

Recommendations

1. Memorandums of agreement should be entered into by ADHS with other State agencies having regulatory jurisdiction over agricultural waste management practices for purposes of expediting and implementing the Open Dump Inventory (FY 82).
2. All agricultural solid waste disposal facilities (surface impoundments/commercial composting operations) should be evaluated and classified through the Open Dump Inventory process by the end of federal FY 83. Substandard facilities should be placed on a State-established compliance schedule for closure or upgrading in cooperation with other appropriate State agencies.
3. Industry should be encouraged to continue its research and development of innovative management practices which employ resource conservation and recovery techniques.

References

1. Bureau of Sanitation. An Inventory of Agricultural Solid Waste Production. ADHS. 1973.
2. Bureau of Sanitation. Arizona Surface Impoundment Assessment. ADHS. 1979.
3. Bureau of Water Quality Control. Arizona Water Quality Management Plan. ADHS. 1979.
4. Division of Sanitation. The State of Arizona Solid Waste Management Plan. Arizona State Department of Health. 1973.

CHAPTER SEVEN

SECTION I

WATER TREATMENT SLUDGE

Chapter VII

Section I

Water Treatment Sludge

Introduction

Water treatment sludge is the residual waste resulting from the operation of public and private water treatment plants. Such plants operate for the purpose of providing a suitable water supply for either human consumption or industrial application. The constituency of this sludge may be in the solid, semisolid or liquid state. However, this sludge has been defined under RCRA guidelines to comprise a distinct category of "solid waste". As such it is dealt with separately in this section.

The characteristics of water treatment plant sludges will vary considerably depending upon the particular treatment process being employed, and the quality of water influent. This category of waste includes presedimentation basin sludge, coagulation sludge, lime softening sludge, filter wash water, diatomite sludge, regeneration wastes from ion exchange, and demineralization waste brines. The composition of these residuals may range from high concentrations of suspended solids to high concentrations of dissolved solids, but they are typically non-hazardous in nature, and will pose little environmental danger when properly handled and disposed.

This section will define and characterize water treatment sludges, assess problems related to their effective management, and overview current management responsibilities, options and practices.

A. Problem Assessment

Issues of concern regarding water treatment sludge management focus primarily upon its disposal aspects. The proper management objective is to effectively concentrate these sludges, and render them innocuous for safe and permanent disposal. The greatest problem posed by improper disposal relates to the protection of ground and surface water quality.

Historically, filter backwash wastes and waste solids from water treatment plants were often discharged directly to surface waters. This method prevailed because of its low cost and simple technology. It was an unsatisfactory practice however, insofar as it contributed to the degradation of these precious and limited resources.

Recent Federal and State regulations have dramatically impacted disposal practices at water treatment plants. State environmental health regulations now stipulate minimum standards of quality for all surface water resources, and Section 402 of the Federal Clean Water Act now requires that all water treatment plants obtain a National Pollutant Discharge Elimination System (NPDES) permit prior to the discharge of any water treatment plant wastes to any surface waters of the United States. These actions have resulted in a reduced dependence upon this conventional disposal mode, primarily due to the difficulties and costs involved with compliance.

As a consequence of this new regulatory framework, a new generation of more sophisticated disposal technologies has emerged. The more common of these are discussed beginning on the following page.

Lagoons

This method employs a surface impoundment for either sludge treatment or disposal. There are two basic types of lagoons; evaporative and non-evaporative.

In a non-evaporative lagoon, water is removed by decantation until the solids retaining capacity of the pit is achieved. At this point, the lagoon is either cleaned for reuse, or covered and permanently closed. The decantate may be returned to the water treatment plant influent, discharged to a sanitary sewer, or mixed with irrigation water and applied to the land. The on-site land use requirements for this method may be considerable, depending upon sludge volume.

An evaporation lagoon does not require a liquid discharge, and will dewater most sludges to a 10% solids concentration. Greater thickening, up to 50% solids can be achieved with lime sludges, which is adequate for ultimate disposal by landfilling. Lagoons receiving highly mineralized wastes from ion exchange and desalination plants should in all cases be of the evaporative type, with liners installed to prevent seepage of wastes into the ground. These wastes contain dissolved solids which can only be concentrated by means of evaporation.

Drying Beds

Drying beds usually consist of a 6-9 inch layer of sand over a 12 inch deep gravel underdrain system which in turn overlies drain tiles with open joints. Their purpose is to dewater sludge by drainage and air-drying, resulting in a cake yield. Drainage and decantate may be discharged to a sanitary sewer or to surface water if NPDES permit conditions can be met.

Dried sludge cakes are suitable for landfill disposal. The disadvantages of this method include high capital cost, extensive land use, long dewatering times and high maintenance expense. This method is also not suitable for sludge disposition where dissolved solids are present in high concentrations.

Wastewater Treatment Facility

Sludges from the coagulation-sedimentation process (i.e. alum sludge, filter wash wastes, and wastes from ion exchange and desalination plants) may be discharged directly to wastewater facilities via sanitary sewers. This method is suitable where the water treatment wastes are amenable to the wastewater treatment processes. However, the discharge of lime sludges to sanitary sewers should be avoided. This may result in liquid volume and sludge volume complications at the wastewater plant.

Land Application

The direct land application of water treatment sludge is not a common practice. Although the sludge retains a marginal water value, its constituent solids provide little benefit to land or crops. High concentrations of aluminum or iron may actually be harmful, particularly for the alkaline soils of Arizona. Indirect land application via discharge of decant to irrigation canals may also occur to a limited extent. This practice is acceptable so long as NPDES permit restrictions are observed.

Sanitary Landfill

Sanitary landfills are being increasingly utilized as the point of ultimate disposition for both liquid and solid wastes originating from water treatment plants. Waste transport however, can be quite expensive, and the land disposal site must be hydrogeologically secure.

Dewatering

A variety of mechanical processes may be employed to reduce water content and concentrate solids. These include vacuum filters, pressure filters, centrifuges and dual-cell gravity solids concentrators. Sludges can often be thickened further by combining such processes. However, none of these devices are applicable to brine wastes from ion exchange or desalination plants which are laden with dissolved solids.

Materials Recovery

By means of supplemental treatment, it is possible to recover alum (a coagulant), lime (a softener) and magnesium carbonate (a coagulant) from specific water treatment sludges. Any of these recovery processes will result in a reduced quantity of solids requiring land disposal. They will also contribute to resource conservation.

Filter Wash Recovery

Disposal of waste filter wash waters has traditionally been accomplished by discharge to natural receiving waters. However, because this waste flow is often a pollutant, recovery and reuse of this wash water is a preferred alternative. Such reuse may be achieved by mixing the filter wash water with plant influent either before or at the rapid mix basin. This process will result in a conservation of the water resource.

Because of new environmental standards, sludge disposal from water treatment plants has become increasingly costly and complex. Technical knowledge, expertise and wherewithal is a basic prerequisite to its effective management. Due primarily to fiscal constraints, many local communities are ill-prepared

to accept the challenge it presents. Nevertheless, because sludge volumes are increasing, and potable water supplies are diminishing, it is a challenge that must be met. In Arizona, this challenge will be found primarily in preserving surface and ground water quality, providing adequate disposal capacity, and in developing local technical expertise.

B. Current Management Practices

Public drinking water supplies in Arizona are derived from both surface and ground water sources. Most communities which are entirely reliant upon ground water require little or no treatment of their drinking water supplies. Few of these communities have any facilities which could even be considered water treatment plants. Accordingly, the use of ground water does not pose any problems from a sludge or waste disposal standpoint.

In general, it is the treatment of surface water which will result in sludge generation. It is those communities which utilize surface water, or surface water mixed with ground water which are now confronted by sludge management problems. These water treatment plants will typically process useable effluent in four basic steps. First, surface water influent enters a rapid mix basin where a coagulant (i.e. alum, magnesium carbonate) is added. Second, the water proceeds to a flocculation tank where suspended particles are encouraged to aggregate. Thirdly, the floccules are allowed to settle in a clarifier (sedimentation tank). The final treatment step is typically chlorination. From there, the plant effluent will proceed to temporary storage and ultimate distribution. Sludge generation will commonly occur at waste filters (either at ingress or egress to the flocculation tank), and also in the clarifier. The quality of the treated water, as well as the sludge, will ultimately depend upon the quality of the original influent (raw water).

ADHS is the designated State agency responsible for regulating public and semi-public water supply systems. In addition to its plan review and monitoring functions, the Department enforces a body of environmental health regulations germane to water treatment and quality. Approval from the Department is required for both water treatment plant construction and operation, and plant operating personnel must be certified following completion of an approved course of instruction. This course of instruction however, generally fails to adequately train operating personnel for proper sludge management and disposal, and should be modified to correct this deficiency.

At the present time, it is believed that the most common disposal method for water treatment sludge is by means of evaporation lagoon. It is largely undocumented as to whether or not, and to what extent, this practice may be resulting in detriment to public health or the environment. Further investigation of water treatment sludge disposal practices will be necessary in order to identify potential problems.

C. Conclusion

Because of the State's dependence upon ground water resources, there are relatively few water treatment plants in Arizona. Approximately forty such facilities are now in operation statewide, and roughly 75% are ion-exchange plants. Although their amounts and rates of sludge generation are increasing, volumes remain small and the waste disposal problem is of a relatively low magnitude and priority. A potential for adverse effects on health or the environment does exist from improper management practices, but there is no evidence to suggest that this situation has occurred. There is also no record of hazardous sludges being generated by water treatment plant processes in the State. This would most likely result from an accidental spill of hazardous materials into a source of raw water supply.

In regards to the management of water treatment plant sludges, the State (ADHS) proposes to undertake the following actions.

Recommendations:

1. ADHS approved courses of instruction for water treatment plant operating personnel (at facilities where residuals are generated) should be modified to include a greater emphasis on sludge management and disposal. This curriculum should also cover available options for resource conservation and recovery (FY82).
2. ADHS should undertake a comprehensive survey and study of water treatment plant sludge disposal practices throughout the State of Arizona to identify potential problem sites and/or conditions (FY 84).

References:

ADHS. Guidelines for the Construction of Water Systems. Engineering Bulletin #10.1978.

CHAPTER SEVEN

SECTION J

SPECIAL WASTE MANAGEMENT PROBLEMS

Chapter VII

Section J

Special Waste Management Problems

Introduction

Special wastes are comprised of all those miscellaneous wastes which do not neatly fall into any of the nine previously defined waste categories; (1) hazardous waste, (2) municipal waste, (3) wastewater treatment sludge, (4) septic tank pumpings, (5) industrial waste, (6) mining waste, (7) pollution control residuals, (8) agricultural waste, and (9) water treatment sludge. Their inclusion here is intended to address the full spectrum of solid waste to the extent practicable, and to provide the reader with a greater appreciation of the true magnitude and scope of the Arizona "solid waste management problem".

Basically, there are two common links between these miscellaneous wastes. One is found in their potential to create safety, health or environmental problems when improperly disposed. The other is that they require special handling, management or disposal provisions.

This concluding section will identify these remaining waste types, and briefly overview the management problems they present.

Automobiles

Thousands of automobiles are discarded each year throughout the State of Arizona. They are either abandoned, buried in landfills, or processed in scrap yards. When abandoned, these bulky metal wastes create public nuisances, safety hazards and aesthetic blight. In landfills, car bodies are difficult to bury and may interfere with proper site operations. Unfortunately, scrap processing facilities remain few and far between. At present, the high cost of transporting these wastes to the scrap yard prohibits the total recovery of this valuable waste stream.

Tires

Waste tire management is also a significant problem because of difficulties associated with disposal. Burning is no longer a viable option because of stringent air quality control regulations. Consequently, tires are either landfilled or stockpiled. When landfilled, the resiliency of rubber tires renders their successful burial extremely tenuous. Even when shredded, tire chips will often result in differential settling. Stockpiling is also undesirable because of aesthetic blight and the potential for vector infestation. Conditions are likely to improve however, with increased recycling activity. A major recycling plant near Chandler (Genstar) is now reprocessing waste automobile tires in the manufacture of asphalt-rubber, an economical road surfacing compound. This prototype technology may hold considerable promise for the future.

Dead Animals

Much of this waste is generated at stockyards and meat packing plants. Other major sources include wild animals and domestic pets (i.e. cats, dogs, etc.).

If not properly collected and disposed, animal carcasses may pose health problems, particularly in the urban environment. These wastes are odorous and unsightly, and they attract a host of vectors. Where collected, special lime pits are often used for disposal. Such pits are sometimes provided at sanitary landfills to ensure separate disposal from other mixed municipal refuse.

Pesticide Containers

Pesticide is commercially marketed in a variety of containers, including cans, bottles, bags, barrels, drums and tanks. Many of these containers are disposed of in municipal landfills, and may retain residues which are toxic, carcinogenic or mutagenic. Human exposure or contact can result in serious health implications. This danger is particularly acute where such waste has been illegally disposed, and access to the site is uncontrolled. Potentially, such pesticides might also leach into surface or ground water. State health regulations were amended in 1979 to specifically address the disposal of pesticide containers (R9-8-433). Hard containers must now be triple rinsed, and punctured or crushed prior to land disposal. Rinse solution must then be treated as a hazardous waste unless it is disposed of in accordance with label instructions by a farmer on his own land (R9-8-1817.E). Containers which were illegally disposed of in the past, however, continue to litter the landscape. Their effective cleanup will in all probability require years to accomplish.

Hazardous Waste from Small Generators

Under the provisions of A.C.R.R. R9-8-1818, a generator of hazardous waste is exempt from manifest requirements if; (a) his net rate of generation does not exceed 1000 kg (2200 lbs) per month, and (b) he disposes of such waste in a properly maintained sanitary landfill within thirty days of generation (Note: only certain explosives and poisons are ineligible for this exemption).

It is suspected that a great many hazardous waste generators will qualify for this regulatory exclusion. As a consequence, a significant volume of hazardous waste may find its ultimate disposition in sanitary landfills. This means that it would be managed in a manner quite similar to mixed municipal refuse, and largely codisposed. If sufficient quantities of hazardous wastes were allowed to accumulate at landfills, and were not effectively monitored, serious health hazards might result. The State program for closure or upgrading of substandard solid waste disposal facilities should serve to mitigate these hazards. Nonetheless, these waste loads should be identified to landfill operators, and handled separately as appropriate. They may however, be rejected at the discretion of the operating authority. A major related problem is that these same waste loads will not be manifested or monitored during transportation. The danger of accidental spills and/or illegal dumping is therefore heightened.

Infectious Hospital Wastes

Many hospital wastes (i.e. biological, radioactive and chemical wastes, plus sharp objects such as disposable needles) are potentially hazardous, yet presently fall outside the scope of the hazardous waste management and regulatory system. The sources of such wastes within a hospital setting are many and varied, including laboratory, x-ray, dietary and surgical facilities, pharmacies and emergency rooms. Some of this waste may be autoclaved or incinerated prior to disposal. Where these treatment and processing systems are properly employed, infectious disease pathogens are effectively destroyed. Where they are not properly operated however, disease organisms may be discharged to ambient air (via incinerator flue gases) or disposed of in sanitary landfills where the threat of human exposure may be significant.

Although these wastes are technically classified as institutional wastes (municipal), their special characteristics merit a separate identification and management scheme.

The Department of Health Services presently wields minimally sufficient regulatory powers to control this waste stream, but enforcement has traditionally been lacking. A.C.R.R. R9-8-413 requires that all "...dangerous materials and substances shall, where necessary, be rendered harmless prior to collection and disposal." Regulation R9-8-432 further requires plan approval for hospital incineration facilities prior to the start of operations. This latter requirement in particular, has not generally be enforced.

Due to a lack of resources, ADHS has been largely unable to address this specific waste stream. Information regarding current management practices is also scant. Additional resources and regulatory powers, as well as inter-agency agreements, may ultimately be necessary to adequately control these potentially hazardous wastes.

Illegal Dumping and Littering

Based upon local health department estimates, it is suspected that perhaps as many as 3,000 illegal dumpsites now exist throughout the State of Arizona. These dumpsites may contain a variety of waste materials, including garbage, trash, septic tank or recreational vehicle wastes, construction debris, and in some cases, even hazardous wastes. Illegal dumpsites occur in both rural and urbanized areas, and on public as well as private lands. They may present varying degrees of public health nuisance, depending upon the quantity and the composition of the waste.

Littering is another serious and ubiquitous statewide problem. Unlike illegal dumping, it is less likely to be motivated by disposal economics, and more likely to be attributable to public apathy and a lack of environmental awareness. Littering occurs in virtually all public places, and is virtually impossible to control in the absence of voluntary citizen cooperation. Its principle source is careless citizens, whose daily activities create litter, either accidentally or intentionally.

The illegal disposal of solid waste (littering or wildcat dumping) is strictly prohibited under existing state law (A.R.S. § 13-1603) which holds that "...a person commits criminal littering or polluting if such person without lawful authority...throws, places, drops or permits to be dropped on public property or the property of another which is not a lawful dump, any litter, destructive or injurious material which he does not immediately remove". This state statute is further reinforced by a host of local ordinances, adopted by counties and municipalities, designed to abate and prevent litter and other related nuisances.

Historically, both state and local ordinances have been enforced by local law enforcement agencies. Litter control along state highways has been enforced by the Arizona Department of Public Safety, while litter clean-up along state highways has been conducted by the Arizona Department of Transportation. Litter clean-up on other public lands is typically conducted by management agencies which either own or administer such lands, assuming such agencies have sufficient resources for this purpose. Where resources do not provide for routine clean-up operations, litter is simply allowed to accumulate wherever it occurs. This can lead to environmental degradation, and unsightly conditions.

Under existing state health regulations (R9-8-413), the "...owner, agent or occupant of any premise, business establishment or industry (is)...responsible for the sanitary condition of said premise, business establishment or industry". Accordingly, it is the responsibility of any private landowner to maintain his/her property in a litter and nuisance free manner. This responsibility designation is also reflected in many local ordinances. Consequently, whenever solid waste is illegally disposed on private property, the property owner unknowingly assumes this liability.

Because of other more pressing priorities, ADHS has never chosen to allocate its limited resources to effectively address these problems of littering and wildcat dumping. It would inevitably require a massive resource commitment to adequately police these problems on a statewide basis. Consequently, the existing management framework for control of these wastes remains fragmented and largely uncoordinated. Many different actors at every level of government are involved.

In addition to resource deficiencies, state and local law enforcement agencies also lack sufficient enforcement powers to deter violators. Under existing state law, an act of criminal littering or polluting only constitutes a misdemeanor offense, punishable by a maximum \$1,000 fine (A.R.S. § 13-802). In the case of illegally dumped hazardous waste, this penalty could hardly be considered an adequate deterrent.

With respect to illegally dumped hazardous wastes, the Arizona Attorney General's Office (in cooperation with ADHS) applied for and was awarded a special one-year grant from EPA in FY 81 for the purpose of investigating and prosecuting "midnight dumping" violations. This program is now operating, and is currently staffed by two special investigators and an attorney. The

continuation of this program however, at least for the time being, will remain dependent upon federal funding.

Recommendations

1. As resources permit, ADHS should further study the problems of littering and wildcat dumping in an effort to identify alternative management and enforcement options, and enter into formal agreements with other enforcement agencies as appropriate to more effectively deal with these problems (on-going).
2. As resources permit, ADHS should develop a public information education program methodology which could be readily and cost-effectively applied and utilized by local management agencies in their efforts to combat litter and wildcat dumping (on-going).
3. ADHS should negotiate with local management agencies and industries in an effort to identify appropriate local options for the environmentally sound disposition of exempt (small generator) hazardous wastes (on-going).
4. ADHS should appoint a special interdisciplinary task force to investigate hospital waste management practices, identify associated hazards, and formulate appropriate regulatory controls (FY 81).

PLAN IMPLEMENTATION

CHAPTER EIGHT

PROGRAM IMPLEMENTATION

CHAPTER EIGHT

SECTION A

AGENCY ROLES AND RESPONSIBILITIES

CHAPTER VIII
Section A

AGENCY ROLES AND RESPONSIBILITIES

A. Introduction

All governmental activities in Arizona are authorized by State law as embodied in the Arizona Revised Statutes (A.R.S.). These laws empower various State and local agencies to carry out assigned responsibilities within specified jurisdictions.

Sections 4003(1)(A) and 4006 of RCRA require the State to identify the responsibilities of State, local and regional authorities for the development and implementation of the State Solid Waste Management Plan. As presented in this section, some of these responsibilities are defined by existing State statutes while others have been established through a planning process as described in Chapter IV. Only those agency responsibilities which are instrumental to either State plan development or implementation are designated in this context.

B. State Agency Solid Waste Management Responsibilities

Under A.R.S. § 36-132.A.1, the Department of Health Services (ADHS) is the designated State agency charged with protecting the general health of the people of Arizona. With respect to solid waste, the Department is authorized to prepare a comprehensive statewide solid waste management plan for the collection, storage, transportation, processing, reclamation and disposal of solid wastes (36-132.01.A). This statewide plan is to be developed in consideration of state and local plans submitted to the Department (36-132.01.B), and all political subdivisions of the State are authorized to receive and expend federal grant funds in conjunction with the preparation of

the statewide plan (36-132.01.D).

The Director of ADHS is further empowered to perform all duties necessary to carry out the functions and responsibilities of the Department (36-136.A.2), to exercise general supervision over all matters relating to health and sanitation throughout the State (36-136.A.6), and to adopt such regulations as may be deemed necessary to implement the State Plan (36-132.01.C). More specifically, the Director may prescribe reasonably necessary regulations regarding the storage, collection, transportation, treatment, handling, disposal and reclamation of human excreta, garbage, trash, rubbish, manure and other objectionable wastes (36-136.G.9 and 10). The Director of ADHS is also given the authority to promulgate rules and regulations governing the management, construction and operation of a State-owned hazardous waste disposal facility. Such regulations include provisions for travel routes for the transportation of hazardous wastes within the State, the types and amounts of hazardous waste to be accepted for disposal, and perpetual care and post-closure maintenance of the facility (A.R.S. 36-2806).

In support of these State mandates and in accordance with the provisions of RCRA, Governor Castro (1977) designated ADHS as the lead State agency to coordinate regional and local planning efforts and to develop the State's Solid Waste Management Plan under RCRA. In 1978, Governor Babbitt further authorized ADHS to develop and implement a State Plan in accordance with Subtitle D of RCRA and subsequently designated ADHS as the lead State agency for the implementation of RCRA programs (1980).

Based upon these designations and statutory mandates, ADHS is responsible for the following management activities in accordance with 40 CFR Part 256.10:

- responsible for the classification of disposal facilities for the inventory of open dumps as described in 40 CFR Part 256 and presented in Chapter VIII-E of the State Plan
- responsible for the development and implementation of the State regulatory program as described in 40 CFR Part 256 and presented in Chapter VIII-D of the State Plan
- responsible for the development and implementation of the State resource recovery program described in 40 CFR Part 256 and presented in Chapter VIII-F of the State Plan.
- Responsible for the development, implementation and revision of a State Solid Waste Management Plan as defined in ARS 36-132.01 and presented in this document.
- responsible for the development and implementation of a State hazardous waste management program in accordance with Subtitle C of RCRA and as presented in the "State of Arizona, Application for Interim Authorization to Administer a Hazardous Waste Management Program (ADHS, 1980)".

C. Local and Areawide Solid Waste Management Responsibilities

Local and areawide agency responsibilities which are instrumental to either the development or implementation of a State Solid Waste Management Plan have been designated in accordance with the procedures outlined in Chapter IV (Planning Process) and prescribed by Section 4006(b) (1)(B) of RCRA. The purpose of these designations is to define respective

roles and responsibilities so as to identify which solid waste functions are to be planned for and carried out by the State, and which functions are to be planned for and carried out by regional and local agencies. It is not the intent of these designations to preempt or preclude local autonomy or interests. Rather, their intent is to formulate management designations and responsibilities so as to ensure the effective use of limited resources and provide adequate protection to both public health and the environment.

Local governments have been involved in solid waste management for a relatively long period of time. Existing management designations, as reflected in State statutes and Departmental (ADHS) regulations, only define local responsibilities for solid waste planning and disposal. Under current State Laws (ARS) 9-441 and 36-132.01, cities, towns and counties are responsible for providing public "dumping grounds", and for the development of local plans for solid waste management. The Arizona Department of Health Services also has regulations (A.C.R.R. Title 9, Chapter 8, Article 4) which define acceptable methods of solid waste disposal and establish standards for the collection, storage, transportation, and treatment of solid wastes. These regulations do not require a city or town to provide collection, storage, transportation or processing services. The intent is to provide for acceptable practices and minimum standards to protect public health and the environment.

In accordance with RCRA 4006 provisions and the planning process described in Chapter IV; cities, towns and counties have been designated as local management agencies for solid waste collection, transportation, processing, source separation and resource recovery. The provision or purveyor of these services is left to the discretion of individual communities. Decisions to provide for these services should be based

upon local wants, needs, resources and private sector markets.

Areawide (regional) solid waste management planning boundaries, and provisions for the revision of such boundaries have been promulgated by the Arizona Department of Health Services in R9-8-1717. These regulations were adopted in accordance with the planning process described in Chapter IV and requirements presented in RCRA Section 4006(a). For purposes of facilitating solid waste management planning, the State of Arizona has been divided into six districts comprised of the following counties:

I	Maricopa	V	Gila Pinal
II	Pima	VI	Cochise Graham Greenlee Santa Cruz
III	Apache Coconino Navajo Yavapai		
IV	Mohave Yuma		

For purposes of facilitating statewide hazardous waste management, the State of Arizona remains undivided and constitutes a single district for hazardous waste management planning purposes (R9-8-1717).

In accordance with Executive Order 70-2 and consistent with the action of the Arizona Department of Health Services in establishing solid waste planning district boundaries coterminous with those of Executive Order 70-2, the following agencies have been authorized by Governor Babbitt (1979) to undertake areawide solid waste management planning responsibilities:

District I	Maricopa Association of Governments (MAG)
District II	Pima Association of Governments (PAG)
District III	Northern Arizona Council of Governments (NACOG)
District IV	District IV Council of Governments
District V	Central Arizona Association of Governments (CAAG)
District VI	SouthEastern Arizona Governments Organization (SEAGO)

D. Federal Solid Waste Management Responsibilities

Under the provisions of Public Law 94-580 as amended, Subtitle F of RCRA describes the application of federal, state, and local law to federal facilities.

"Each department, agency, and instrumentality of the executive, legislative and judicial branches of the Federal Government (1) having jurisdiction over any solid waste management facility or disposal site, or (2) engaged in any activity resulting, or which may result, in the disposal or management of solid waste or hazardous waste shall be subject to, and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural (including any requirement for permits or reporting or any provisions for injunctive relief and such sanctions as may be imposed by a court to enforce such relief), respecting control and abatement of solid waste or hazardous waste disposal in the same manner, and to the same extent, as any person is subject to such requirements, including the payment of reasonable service charges .".

"Neither the United States, nor any agent, employer or officer thereof shall be immune or exempt from any process or sanction of any State or Federal Court with respect to the enforcement of any such injunctive relief (Section 6001).".

Federal Executive Order 12088 further ensures federal compliance with applicable pollution control standards, including those of the Resource Conservation and Recovery Act. This Executive Order outlines the responsibility of each Federal Agency for ensuring that all necessary actions relative to coordination, compliance, planning, funding and oversight are taken for the prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under the control of the agency.

E. Solid Waste Management Responsibilities on Tribal Lands

Indian tribes are autonomous and self-governing political jurisdictions within Arizona. As such, they are encouraged to participate in state and regional programs related to solid and hazardous waste management.

For purposes of State Plan development and implementation, all Indian tribes or their designated representatives are identified as management agencies for solid waste planning and implementation activities within their jurisdictions. It is the State's position that solid and hazardous waste issues on Indian lands are primarily matters of tribal or federal concern (and responsibility) and should be dealt with accordingly. The State however, reserves the right, to the extent necessary, to consult with tribal governments within whose reservations solid waste facilities are maintained, in an effort to reach agreement regarding the effect such facilities may be having on lands outside the reservation.

All Indian tribes are encouraged to recognize and adopt the federal regulations implementing the criteria defined in Section 4004 of RCRA (40 CFR Part 257). The State will offer technical assistance in this regard to the extent that resources permit. The State will also enter into any such agreements as may be mutually acceptable with tribes regarding the siting of new solid waste facilities located on Indian lands which are to be used by cities, towns and counties.

ADHS however, has a responsibility under state regulations (R2-10-1.1) to review and approve sanitary facilities and engineering plans as conditions upon the approval of new subdivisions. For those cities, towns and counties which designate solid waste facilities on Tribal lands for use by subdivisions,

ADHS will seek assurances that such facilities will be operated in an environmentally sound manner. A workable means of accomplishing this task would be to develop on a case-by-case basis intergovernmental agreements which serve to define respective responsibilities.

CHAPTER EIGHT

SECTION B

DISTRIBUTION OF FEDERAL FUNDS

Chapter VIII
Section B
DISTRIBUTION OF FEDERAL FUNDS

A. Introduction

The entire issue of federal financial support for substate and local solid waste management is currently moot. Although authorized under Subtitle D of RCRA, funds have never been appropriated for this purpose, and are not available in the current fiscal year (FY 81). Nor is a congressional appropriation for local assistance under Subtitle D expected to be forthcoming at any time in the near future.

Federal financial assistance for local solid waste management was specifically authorized under Sections 4008(a)(2), 4008(e) and 4009 of RCRA. This funding was authorized to provide support to counties, municipalities and intermunicipal agencies in the implementation of solid and hazardous waste management programs. These funds were intended for a variety of purposes, including feasibility studies, facility planning, market analyses for recovered resources, etc. They were not however, generally authorized for use in facility construction, operation or maintenance. Subsequent to the enactment of RCRA, Congress has repeatedly failed to appropriate monies for any of these grant programs (known as State and local implementation grants, rural community grants and special community grants respectively). To date, the only EPA funding available to Arizona has been awarded to the State program under authority of RCRA Section 4008(a)(1). These funds have been earmarked for the development and implementation of the Arizona Solid Waste Management Plan (including the State's conduct of the Section 4005 Open Dump Inventory), and have been minimally adequate to support a continuing State program effort.

Federal support of the State Solid Waste Program has progressively declined every year subsequent to the enactment of RCRA. This trend is expected to continue until a total phase-out is achieved in FY 85. Given the scope of mandated State program activities under Subtitle D, and the diminishing revenue base, a significant subvention of State monies to local governments has never yet been possible.

However, should this situation improve at any time in the future, the State program remains committed to the subvention of federal assistance to local levels. Accordingly, the purpose of this section is therefore to establish a mechanism by which available federal funds might be distributed by the State to various substate authorities responsible for the development and implementation of the Arizona Solid Waste Management Plan. These responsibility designations were accomplished earlier in Section A of this Chapter.

B. Subvention Mechanism

The Annual Work Program submitted with the State's basic RCRA grant application shall serve as the mechanism by which federal funds may be subvented to substate and local management authorities. The Annual Work Program is developed on the basis of priority guidance contained in the State/EPA Agreement (SEA), and represents the State's obligation incurred by acceptance of federal financial assistance under RCRA. Essentially, it contains the State's yearly workplan for solid waste management activities, and programs resources for the accomplishment of specified tasks. As a legal contract, it commits the State program to a predetermined course of action at a specified resource level. This contract, known as the "Cooperative Agreement" between the State and EPA, is renegotiated during the final quarter of each federal fiscal year (July - September).

The Arizona Department of Health Services is the State recipient of federal EPA funding pursuant to RCRA. The federal allotment awarded each year to Arizona is then encumbered by the Bureau of Waste Control in the conduct of its solid and hazardous waste management programs.

Normally, EPA will advise the Bureau of Waste Control of the State's anticipated grant allowance for the coming fiscal year well in advance of actual grant negotiations. Typically, this will occur six months prior to the beginning of the new fiscal year. The Bureau will then compare its projected allowance with its projected resource requirements, and adjust its work program either up or down depending upon the balance of these projections. At this juncture in the budgetary process, the Bureau would have a first indication of the potential availability of pass-through funds.

If it appeared that the State Subtitle D grant award would substantially exceed mandated State program requirements in any given fiscal year, the Bureau of Waste Control would make a determination, based upon the State/EPA Agreement, its statewide problem assessment and current five-year strategy, of what priorities could be effectively addressed through the use of these funds. Any surplus funds available under authority of RCRA Section 4008 (a)(1) would be targeted for high priority needs in critical problem areas, and programmed on that basis. In accordance with EPA's standing priority policy (memorandum dated 10/31/78), pass-through funding would be limited to projects which broadly supported either State Plan Implementation or the Open Dump Inventory. Appropriate agencies or entities would then be identified and contacted regarding their willingness and ability to provide the requested services or functions, assuming the Department of Health Services lacked sufficient in-house resources to accomplish the task.

Funds would then be subvented through either the Joint Funding Project (JFP) or by direct subcontract, depending upon whether the prospective subcontractor was a Council of Governments or a unit of local government. In any event, the intended use of the surplus funds would be negotiated with EPA, and ultimately incorporated into the Annual Work Program, thereby becoming an integral part of the State/EPA Cooperative Agreement.

The process described above would apply to the distribution of any federal funds received pursuant to RCRA Section 4008 (a)(1). If Congress were to appropriate local assistance funding under RCRA Sections 4008 (a)(2), 4008(e) or 4009, the Bureau of Waste Control would await further distribution guidance from EPA before taking any action in this regard. If this were to occur, it is expected that EPA would prescribe eligibility and distribution criteria as conditions for each of these grant programs.

In the case of tribal governments and their affiliates, all requests for federal financial assistance shall be forwarded to and deal directly with the federal government.

CHAPTER EIGHT

SECTION C.

MEANS TO COORDINATE REGIONAL PLANNING

Chapter VIII
Section C
MEANS TO COORDINATE REGIONAL PLANNING AND IMPLEMENTATION

A. Introduction

The purpose of this section is to identify viable mechanisms for the coordination of regional planning and implementation activities undertaken pursuant to the State Plan. It is hoped that such coordination will occur both within and between designated regions. This is desirable in order to ensure that activities are cost-effective, synchronized and non-duplicative.

Within this context, the term planning is taken to mean "...identifying objectives, collecting information, analyzing alternatives and determining necessary courses of action". Implementation is taken to mean "...putting the plan into practice by carrying out planned activities, or ensuring that such activities are carried out". The State Plan provides for a continuing program of both planning and implementation activities, and designates management responsibilities for each. All designated management agencies are therefore encouraged to utilize the coordination mechanisms described below in the planning and implementation of actions which are interjurisdictional in nature or scope.

B. Coordination Mechanisms

Certain planning and implementation activities under the State Plan will be interregional or statewide in scope (i.e. conduct of the Open Dump Inventory), while others will be intraregional or intermunicipal in focus (i.e. facility planning, waste flow control, resource recovery, etc.). The scope of a given activity will ultimately govern the level and extent of appropriate

agency involvement. On this basis, a separate coordination mechanism is recommended for each of the cases presented above.

In the case of a project, program or activity which is statewide or interregional in scope, the Water Quality Management Working Group (WQMWG) is recommended as an appropriate coordination mechanism, particularly for those projects or programs which evidence a waste/water problem interface. This group was originally established by the Bureau of Water Quality Control (ADHS) as a working component of the continuing 208 process pursuant to the Clean Water Act. It is an existing and formalized environmental program coordination medium. Its membership includes the six areawide planning agencies (COG's), the Bureau of Water Quality Control (ADHS), the Bureau of Waste Control (ADHS), the Arizona Game and Fish Department, the State Land Department, the Arizona Department of Water Resources and the Governor's Office of Economic Planning and Development. Although the focus of this group is upon water quality management issues of mutual concern, the representation is appropriate to address certain solid waste management issues as well. The selection and use of this existing forum would thereby eliminate the need for the State solid waste management program to develop a parallel or duplicative mechanism for its own programmatic purposes.

For projects, programs or activities which are intraregional or intermunicipal in scope, the Environmental Advisory Committees of the Councils of Governments are recommended as the appropriate coordination mechanisms. These regional advisory groups were also established as part of the 208 water quality program. Their membership is composed of private, industrial and governmental representatives. Historically, these groups have served effectively as vital public participation structures in the development of areawide plans. They readily present themselves as existing forums for the coordination of areawide solid waste management activities as well.

The State Solid Waste Management Program is committed to both effective communication and coordination. The mechanisms described above should be utilized as appropriate in the conduct of planning and implementation activities under the State Plan.*

Communication and coordination, however, necessitate a two-way flow of information. Accordingly, substate authorities undertaking solid waste management programs, projects or activities which are interjurisdictional in scope are strongly encouraged to involve the Department of Health Services in these efforts. Where circumstances warrant, the Department is capable of providing assistance in a variety of ways.

Solid waste management problems are becoming increasingly costly and complex throughout the State. If all management agencies were to commit to the utilization of the coordination mechanisms identified herein, an improved spirit of cooperation would be fostered. This cooperation will be essential to the development of innovative strategies and solutions necessary to address these systematic problems.

* In the event that the above-mentioned mechanisms cease to exist or function at any future time, the solid waste management program will identify and utilize alternative coordination mechanisms as available and appropriate. If no such mechanisms are available, individual coordination with affected parties shall be maintained to the extent practicable.

*Editor's Note: All solid and hazardous waste programmatic activities which impact waters of the State shall be coordinated with the Water Quality Control Council (WQCC) for policy-related issues resolution. The Bureau of Waste Control shall actively participate and provide staff support to the WQCC as appropriate for this purpose.

CHAPTER EIGHT

SECTION D

REGULATORY AND ENFORCEMENT PROGRAM

CHAPTER VIII

Section D

REGULATORY AND ENFORCEMENT PROGRAM

INTRODUCTION:

The State's program for regulating solid waste disposal facilities and practices is administered by the Division of Environmental Health Services (ADHS). The purpose of this program is to protect public health and the environment from the potentially adverse impacts that may result from improper management practices and/or substandard facilities. The existing statutory and regulatory powers of the Department are quite broad in this respect, and are generally adequate. Historically, the focus of the State's enforcement effort has been upon the maintenance of solid waste disposal and water quality standards.

Recent federal guidelines set forth various regulatory requirements for State Plan approval (40 CFR Part 256.21). In accordance with Section 4003(4) of RCRA, the State Plan must provide for State regulatory powers which are;

- (a.) adequate to enforce solid waste disposal standards equivalent to or more stringent than the federal criteria for classification of solid waste disposal facilities (40 CFR Part 257),
- (b.) adequate to ensure surveillance capabilities necessary to detect adverse environmental impacts from solid waste disposal facilities and practices,
- (c.) adequate to ensure that the establishment of new open dumps is prohibited, and

(d.) adequate with respect to administrative and judicial enforcement capabilities necessary to ensure compliance with the Act (RCRA).

State Plan approval by EPA is made contingent upon the satisfactory demonstration of these four basic capabilities. Consequently, the intent of this section is to describe, define and document the State's existing regulatory program, and its statutory authority to enforce compliance.

With respect to the above (a.), the Director of ADHS is empowered to administer and enforce Arizona law relating to public health and environmental sanitation (A.R.S. §36-136.A.4.). The Director is thereby given authority to prescribe reasonably necessary standards and regulations regarding the storage, collection, transportation, treatment, handling, disposal and reclamation of human excreta, garbage, trash, rubbish, manure and other objectionable wastes (36-136.G.9 & 10.). In addition, the Director is specifically authorized to adopt such regulations as may be deemed necessary to implement the State Solid Waste Management Plan (36-132.01.c.). Based upon this broad authority granted by statute, the Department has adopted a host of regulations controlling the management and disposition of solid wastes. These regulations are summarized in Table VIII-D-I, and presented immediately thereafter in Table VIII-D-II.

This narrative continues on page VIII-D-8.

Table VIII-D-I
 DEPARTMENT OF HEALTH SERVICES
 REGULATORY POWERS FOR SOLID WASTE DISPOSAL FACILITIES AND PRACTICES
A COMPARISON OF ARIZONA REGULATIONS TO THE FEDERAL LAND DISPOSAL CRITERIA

Type of Facility	Environmental Criteria										
	Flood-plains	Endangered Species	Surface Water	Ground Water	Open Burning	Land-spreading	Vectors	Explosive Gases	Fires	Bird Hazards	Access
Sanitary Landfill	R9-8-431 R9-8-432 R9-8-1215		R9-8-431 R9-8-432 R9-8-1411 R9-8-313 R9-8-1231 R9-21-201 R9-21-206	R9-8-431 R9-8-432 R9-8-313 R9-8-1411 R9-8-1231	R9-8-431 R9-8-432 R9-3-514 R9-3-409 R9-3-408 R9-3-402 R9-8-433	R9-8-431 R9-8-413 R9-8-329 R9-8-1231 R9-20-403 R9-20-405 R9-20-406	R9-8-431 R9-8-432 R9-8-1231	R9-8-431 R9-8-432	R9-8-431 R9-8-432 R9-3-402	R9-8-431	R9-8-431 R9-8-432
Land-spreading Facility	R9-8-431 R9-8-432 R9-8-314		R9-8-431 R9-8-432 R9-8-313 R9-8-1231 R9-21-201 R9-21-206	R9-8-431 R9-8-432 R9-8-313 R9-8-1231	R9-8-431 R9-8-432 R9-3-409 R9-3-402	R9-8-431 R9-8-413 R9-8-329 R9-8-1231 R9-20-403 R9-20-405 R9-20-406	R9-8-431 R9-8-432 R9-8-1231	R9-8-431 R9-8-432	R9-8-431 R9-8-432 R9-3-402	R9-8-431	R9-8-431 R9-8-432
Surface Impoundment	R9-8-431 R9-8-432 R9-8-1215 R9-8-313		R9-8-431 R9-8-432 R9-8-1411 R9-8-313 R9-8-1231 R9-21-201 R9-21-206	R9-8-431 R9-8-432 R9-8-313 R9-8-1411 R9-8-1231	R9-8-431 R9-8-432 R9-3-514 R9-3-409 R9-3-408 R9-3-402	R9-8-431 R9-8-413 R9-8-329 R9-8-1231 R9-20-403 R9-20-405 R9-20-406	R9-8-431 R9-8-432 R9-8-1231	R9-8-431 R9-8-432	R9-8-431 R9-8-432 R9-3-402	R9-8-431	R9-8-431 R9-8-432
Statutory Authority (A.R.S.)	36-136.G.11 45-2342* 45-2343* 45-2344*	17-309* 17-331*	36-136.G.11 36-132.A.12 36-1856	36-136.G.11 36-132.A.12 36-1856	36-136.G.11 36-132.A.12 36-789	36-136.G.11 36-132.A.12	36-136.G.11 36-132.A.12	36-136.G.11 36-132.A.12	36-136.G.11 36-132.A.12 36-1707	36-136.G.11 36-132.A.12	36-136.G.11 36-132.A.12

* non-DHS authority

Table VIII - D - II (a)
ADHS Regulations
Environmental Sanitation

RS-8-313. GENERAL CONSIDERATIONS

- A. No sewage or industrial wastes shall be permitted to flow into any of the waters, or upon or under any of the lands, of the State in any manner determined by the Department to be detrimental to the quality of the receiving body of water, or to the use of the receiving lands, or prejudicial to the health, safety or welfare of persons who may be affected by the resulting environmental condition. Where characteristics of the wastes or the receiving bodies indicate pollution to exist, treatment works as are determined to be necessary by the Department shall be installed and operated.
- B. The use of cesspools for waste disposal is prohibited.
- C. Individual disposal systems are prohibited under the following conditions:
 - 1. Where connection to a public sewer system is determined by the Department to be practical.
 - 2. Where soil conditions or topography are such that individual disposal systems cannot be expected to function satisfactorily, or where groundwater conditions are such that individual disposal systems may cause pollution of the groundwater supply.
 - 3. Where such installations may create an unsanitary condition or public health nuisance.
- D. Recommendations are found in the Engineering Bulletins of the Department to assist in compliance with these regulations regarding the design, installation and operation of sewage disposal systems. Copies of these Bulletins may be obtained from the Department.
- E. Plans and specifications submitted to the Department will be reviewed and if they demonstrate that the proposed sewerage system or waste treatment works can reasonably be expected to comply with this Article and the water quality standards set forth in Chapter 20 of this Title, the Department will issue a "Certificate of Approval to Construct." If construction has not started within one year after date of issue, the "Certificate of Approval to Construct" will be void, unless an extension of time has been granted.

RS-8-314. APPROVAL OF PLANS REQUIRED

- A. Before any person shall construct or contract for the construction of sewerage systems, sewerage system extensions, waste treatment works, or install any process, device, equipment, disposal or reclamation system, either in whole or in part, an application for approval to construct the contemplated works shall be made to the Department. Such application shall be submitted at least 30 days prior to the date upon which Department approval is desired. Application to construct a septic tank disposal system to serve a private residence, a hotel, motel, restaurant, trailer park, service station, picnic ground, recreational area, camp, or other similar place, shall be submitted to the local health department for approval prior to construction. Where a local health department does not exist, the application shall be submitted to the Arizona Department of Health Services for approval.
- B. All applications except those for septic tank systems shall be accompanied by the following plan documents in duplicate:
 - 1. Prints or photostatic copies of drawings of the work to be done. Sufficient detail shall be shown on the drawings to make clear to the Department the scope of the work.
 - 2. Complete specifications to supplement the drawings.
 - 3. Additional data as may be required by the Department.
- C. The plan documents shall be accompanied by an engineering report, prepared by the designing or consulting engineer which presents a description of the project together with all pertinent data upon which the design is based and other information necessary to permit a clear and full understanding of the work proposed to be undertaken.
- D. All plan documents submitted to the Department must have been prepared by, or under the supervision of, a registered professional engineer as specified under A.R.S. §32-141 through 32-145, inclusive. The engineer shall affix his signature and seal of registration in the State of Arizona to all plans submitted for approval.
- E. Plans and specifications submitted to the Department will be reviewed and, if found satisfactory the Department will issue a "Certificate of Approval to Construct". If construction has not started within one year after the date of issue, the "Certificate of Approval to Construct" will be void, unless an extension of time has been granted.
- F. All work shall conform to the approval plans and specifications. Should it be necessary or desirable to make any change in the design which will affect capacity or sanitary features of the proposed work, revised plans and specifications, together with a written statement of the reasons for such change, shall be submitted to the Department for review, and approval shall be obtained in writing before the work affected by the change is undertaken. Structural changes or minor revisions not affecting capacity, quality, flow, or operation will be permitted during construction without further approval. A set of "as built" drawings showing all changes made during construction shall be filed with the Department upon completion of the project.
- G. The Department shall be notified when the sewerage system or waste treatment works, change or addition, provided for by approved plans and specifications, is to be placed in service. Notification shall be given at least 15 days prior to the expected date of completion of the project to permit final inspection by the Department.

- H. Operation of newly constructed waste treatment works shall not commence before a final inspection has been made and approval to operate has been given by the Department. In the case of septic tank disposal systems, an inspection by the local health department is required before backfilling to determine that the system has been properly constructed and installed. The local health department shall be notified at least one week prior to the completion date so that an inspection can be arranged.

R9-8-329. APPROVAL REQUIRED

No sewage or industrial waste treatment effluents shall be used for irrigation purposes without written approval from the Department. Direct disposal of sewage or industrial waste treatment effluents for irrigation of crops to be used for human consumption or for watering of cattle is prohibited.

R9-8-413. RESPONSIBILITY

- A. The owner, agent, or the occupant of any premises, business establishment, or industry shall be responsible for the sanitary condition of said premises, business establishment, or industry. No person shall place, deposit, or allow to be placed or deposited on his premises or on any public street, road, or alley any refuse or other objectionable waste, except in a manner described in these regulations.
- B. The owner, agent, or the occupant of any premises, business establishment, or industry shall be responsible for the storage and disposal of all refuse accumulated, by a method or methods described in these regulations.
- C. The collection and disposal of all refuse not acceptable for collection by a collection agency is the responsibility of each occupant, business establishment, or industry where such refuse accumulates, and all such refuse shall be stored, collected, and disposed of in a manner approved by the Department.
- D. All dangerous materials and substances shall, where necessary, be rendered harmless prior to collection and disposal.

R9-8-414. INSPECTION

Representatives of the Department shall make such inspection of any premises, container, process, equipment, or vehicle used for collection, storage, transportation, disposal, or reclamation or refuse as are necessary to insure compliance with these regulations.

R9-8-431. DISPOSAL; GENERAL

- A. All refuse shall be disposed of by a method or methods included in these regulations and shall include rodent, insect, and nuisance control at the place or places of disposal. Approval must be obtained from the Department for all new disposal sites and may change in the method of disposal prior to use.
- B. Carcasses of large dead animals shall be buried or cremated, unless satisfactory arrangements have been made for disposal by rendering or other approved methods.
- C. All public "dumping grounds", provided in compliance with A.R.S. §9-441., shall be maintained and operated in accordance with the requirements of these regulations.
- D. Manure shall be disposed of by sanitary landfill, composting, incineration, or used as fertilizer in such a manner as not to create insect breeding or a nuisance.

R9-8-433. PESTICIDE CONTAINERS

- A. For purposes of this section,
1. "Pesticide" means any substance, or mixture of substances intended to be used for defoliating plants or for preventing, destroying, repelling, or mitigating insects, fungi, bacteria, weeds, rodents, predatory animals or any form of plant or animal life which is a pest which may infest or be detrimental to vegetation, humans, animals or households, or be present in any environment.
 2. "Pesticide container" means any package, can, bottle, bag, barrel, drum, tank, or other containing device that is used or has been used to enclose a pesticide.
 3. "Disposal" means the discard of a pesticide container through the deposit, dumping, or placing of the container into or on any land or water.
- B. No person may cause the disposal of any pesticide container except:
1. at a sanitary landfill operated pursuant to the provisions of this Article; or
 2. at a site, or in a manner expressly approved by the Department as safe for disposal of such container; or
 3. by burning in the case of pesticide containers in the form of combustible bags or packages, provided that such burning:
 - a. is permitted by, and conducted in accordance with all applicable State and local regulations; and
 - b. is conducted in an open area isolated and downwind from populated areas; and
 - c. does not involve combustion of more than 50 pounds of empty containers in any single day; and
 - d. does not include combustion of containers that have been used to enclose inorganic pesticides (non-carbon-containing substances used as pesticides) or organic mercury, lead, cadmium or arsenic compounds.

- C. Prior to the disposal of any pesticide container in a sanitary landfill, the following steps must be taken:
1. Pesticide containers in the form of cans, bottles, barrels, drums, or tanks, other than pressurized containers, must be rinsed at least three times, each time using a volume of water (or other solvent where appropriate) equal to 10% of the container's capacity. An equivalent alternative rinsing method may be used provided that equivalent results are achieved. The liquid from rinsing required by this subsection may not be discharged into the environment except where used or disposed of as a pesticide in accordance with all applicable laws and regulations. After containers are rinsed as required by this subsection, they must be punctured or crushed so as to render them incapable of holding liquid.
 2. Pesticide containers in the form of combustible bags or packages must be either:
 - a. folded and tied into bundles; or
 - b. enclosed securely in secondary containers that are labeled as containing pesticide residue.
- D. The steps required by subsection 'C' of this section need not be taken prior to disposal of a pesticide container at any site expressly approved by the Department for disposal of unrinsed pesticide containers.
- E. Salvaging of pesticide containers from a sanitary landfill shall not be permitted unless expressly authorized by the landfill operator and conducted in a safe manner.
- F. The provisions of this section shall not apply to pesticide containers of one (1) gallon or less liquid capacity or five (5) pounds or less solid capacity, unless such containers have been used to enclose highly toxic pesticides as defined in A.C.R.R. § R3-10-03.B.4.
- G. The provisions of this section do not prohibit the shipment of pesticide containers to reconditioning or recycling facilities that are operated in accordance with all applicable laws and regulations.

R9-8-432. METHODS OF DISPOSAL

- A. Approval must be obtained from the Department for any method or methods used for the disposal of refuse prior to the start of operations, and shall be accomplished by one or more of the methods listed below:
1. Sanitary Landfill - Consists of the disposal of refuse on land and the daily compaction and covering of the refuse with 6 to 12 inches of earth so as to prevent a health hazard or nuisance. The final compacted earth cover shall be a minimum of 2 feet in depth. Where sanitary landfill operations are proposed, the Department will require the following:
 - a. The landfill shall be located so that seepage will not create a health hazard, nuisance, or cause pollution of any watercourse or water bearing strata.
 - b. Adequate and proper surface drainage shall be provided to prevent ponding or erosion by rainwater of the finished fill.
 - c. Provision shall be made for the control of insects, rodents, wind blown refuse, and accidental fire.
 - d. Burning of refuse is prohibited.
 - e. An all weather access road is required.
 - f. Suitable equipment and operating personnel shall be provided.
 - g. Salvaging, if permitted, shall be rigidly controlled.
 - h. A variance from the daily compaction and covering requirement may be granted for sites serving less than 2,000 people by the Department of Health Services upon submission of an acceptable plan approved by the local Health Department demonstrating that no public health hazards or nuisances will exist. The variance will allow for compaction and cover every two weeks at sites serving less than 500 people; weekly compaction and cover for sites serving from 500 to 1,000 people; and twice weekly compaction and cover for sites serving from 1,000 to 2,000 people. The variance may be revoked whenever the Department of Health Services determines that the circumstances warranting the variance no longer exist.
 2. Incineration - Where incineration is to be employed, the plans and specifications, along with any other information necessary to evaluate the project, shall be submitted to the Department and approval received prior to construction. In addition, an approved method for the disposal of non-combustible refuse is required. Where incineration is proposed, the following items shall be provided:
 - a. The capacity of the incinerator shall be sufficient for the maximum production of refuse expected.
 - b. Noncombustible refuse shall be disposed of by methods approved by the Department.
 - c. Skilled personnel to assure the proper operation and maintenance of the facilities in a nuisance-free manner.
 3. Composting - This method of disposal is acceptable to the Department under the following conditions:
 - a. That plans and specifications and other information necessary to evaluate the project are submitted to the Department and approval received prior to start of construction.
 - b. That provisions are made for the proper disposal of all refuse not considered suitable for composting.

- c. Skilled personnel shall be provided to assure the proper operation and maintenance of the facilities in a nuisance-free manner.
- 4. Garbage Grinding - This method, involving the separate collection and disposal of garbage into a community sewerage system through commercial type grinders or mandatory community-wide installation of individual household grinders, will be acceptable to the Department provided that suitable means shall be provided for the disposal of all remaining refuse.
- 5. Hog Feeding - This method of disposal will only be approved under the following conditions:
 - a. The garbage is collected and stored in suitable containers.
 - b. Only approved type vehicles are used for collection.
 - c. All garbage is effectively heat-treated in accordance with Title 24, Chapter 7, Article 3 (A.R.S. § 24-941 through 24-949).
 - d. All remaining refuse, including nonedible garbage, is collected and disposed of separately by methods approved by the Department.
- 6. Manure Disposal - Manure shall be disposed of by sanitary landfill, composting, incinerating, or used as a fertilizer in such a manner as not to create insect breeding or a nuisance.

R9-8-1215. RECEPTACLES

Receptacles used for the deposition or storage, either temporary or permanent, of human excreta shall be constructed and maintained so as to conform to the following general requirements.

- A. The receptacle shall be fly-tight and constructed in such a manner and of such material as to afford reasonable assurance of remaining fly-tight and odor free under ordinary conditions of usage.
- B. The receptacle shall be so located and constructed as to prevent:
 - 1. Pollution of any waters of the State above or below ground.
 - 2. Pollution of a swimming pool or other bathing place.
 - 3. Overflow of the contents to the surrounding ground.
 - 4. Flow of surface or ground water into the receptacle.
- C. Where removal of the contents or cleaning is necessary, the receptacle shall be convenient and easily accessible for such service.
- D. The receptacle shall be constructed of such material and in such a manner as to prevent rapid deterioration, to provide adequate capacity, and to facilitate maintenance in a nuisance free manner.

R9-8-1411. KEEPING OF ANIMALS; GENERAL

- A. Any person, firm or corporation is prohibited from keeping or sheltering animals in such a manner that a condition resulting from same shall constitute a nuisance.
- B. In populous districts, stable manure must be kept in a covered watertight pit or chamber and shall be removed at least twice a week. Manure on farms or isolated premises other than dairy farms need not be so protected and removed unless ordered by the State or local health department.
- C. Manure shall not be allowed to accumulate in any place where it can prejudicially affect any source of drinking water.

R9-8-1231. COLLECTION AND TRANSPORTATION; SANITARY REQUIREMENT

- A. The collection, storage, transportation, and disposal of all human excreta shall be carried out in a sanitary manner which does not endanger the public health or create a nuisance.
- B. Each vehicle used for collection and transportation of the wastes shall be equipped with a leak-proof and fly-tight container having a capacity of not less than 750 gallons. All portable containers, pumps, hose, tools, or other implements when not in use shall be stored within a covered and fly-tight enclosure.
- C. Contents to be removed shall be transferred as quickly as possible by means of portable fly-tight containers or suitable suction pump and hose to the transportation container. The transportation container shall be tightly closed and made absolutely fly-tight immediately after the contents have been transferred. Where portable containers are used they must be kept fly-tight while being transported to and from the vehicles. Any waste dropped or spilled in the process of collection shall be carefully cleaned up immediately and the area properly disinfected.
- D. All vehicles, tools, and equipment shall be maintained in good repair at all times. At the end of each day's work all portable containers, transportation containers, suction pumps, hose, and other tools shall be cleaned and disinfected.
- E. All wastes collected shall be disposed of in accordance with recommendations of the local county health department and no change in the recommended method of disposal shall be made without prior approval by the local health department. Disposal shall be accomplished by one of the methods listed below:
 - 1. Into a community sewer system with approval of the appropriate authority at the place and point in the system designated.

2. By burial - all wastes from chemical toilets shall be disposed of by this method in an area approved by the local health department.
 3. By sanitary landfill where operation of the facility is satisfactory and suitable precautions are taken to protect the health of the workers and the public.
- F. Open dumping is prohibited except in designated areas approved by the local health department.

TABLE VIII - D - II (b)
ADHS Regulations
Water Quality Control

R9-20-403. APPLICABILITY

- A. The direct reuse of wastes originally containing human or animal wastes is prohibited unless such wastes comply with the standards in this article.
- B. Nothing in this article shall be construed as an exemption from other applicable Rules and Regulations of the Arizona State Department of Health including but not limited to R9-8-249.

R9-20-405. SECONDARY TREATMENT AND DISINFECTION

- A. All wastes shall receive a minimum of secondary treatment or its equivalent and disinfection before they are used for any of the following purposes:
 1. Irrigation of any food crop where the product is subjected to physical or chemical processing sufficient to destroy pathogenic organisms.
 2. Irrigation of orchard crops by methods which involve direct application of water to fruit or foliage.
 3. Irrigation of golf courses, cemeteries and similar areas.
 4. Watering of producing dairy animals.
 5. To provide a substantial portion of the water supply in any impoundment used for aesthetic enjoyment or for purposes involving only secondary contact recreation.
- B. Following treatment specified in A. above, the monthly arithmetic average density of the coliform group of bacteria in the effluent shall not exceed 5,000 per 100 milliliters and the monthly arithmetic average density of fecal coliforms shall not exceed 1,000 per 100 milliliters. Both of these limits shall be an average of at least two consecutive samples examined per month during the irrigation season, and any one sample examined in any one month shall not exceed a coliform group density of more than 20,000 per 100 milliliters, or a fecal coliform density of more than 4,000 per 100 milliliters.

R9-20-406. TERTIARY TREATMENT AND DISINFECTION

- A. All wastes shall receive a minimum of secondary treatment or its equivalent followed by tertiary treatment and disinfection unless tertiary treatment effects disinfection before they are used for any of the following purposes:
 1. To provide a substantial portion of the water supply in any impoundment used for primary contact recreation.
 2. Irrigation of school grounds, playgrounds, lawns, parks or any other area where children are expected to congregate or play.
 3. Irrigation of food crops which may be consumed in their raw or natural state.
- B. Following the treatment specified in A. above, the effluent shall not contain more than 10 mg/l of 5 day BOD, 10 mg/l of suspended solids and 200 fecal coliform per 100 milliliters. When the arithmetic average of five consecutive daily samples taken over a period not exceeding fifteen days is greater than the values given above for BOD or suspended solids or when the arithmetic average of five consecutive daily samples taken over a period not exceeding fifteen days is greater than the value given above for fecal coliform, use of the effluent shall cease immediately upon notification by the Department. The use of such effluent shall not resume until the values of five consecutive daily samples taken over a period not exceeding fifteen days meet the requirements for BOD, suspended solids and fecal coliform listed above.

R9-21-201. SCOPE

These Water Quality Standards apply to all surface waters of the State except those wholly private waters closed to all public uses and not discharging into or polluting any other waters of the State. Waste from municipal, industrial, or any other type of man's activity shall not degrade the water quality of the surface waters beyond the limits prescribed by the Water Quality Standards. The Standards are designed to protect the surface waters for the designated uses.

R9-21-206. GENERAL STANDARDS APPLICABLE TO ALL SURFACE WATERS

All surface waters shall be:

1. Free from substances attributable to domestic or industrial waste or other controllable sources that will settle to form sludge or bottom deposits in amounts sufficient to be unsightly, putrescent or odorous, or in amounts sufficient to interfere with beneficial uses defined and designated in R9-21-205.
2. Free from floating debris, oil, grease, scum, and other floating materials attributable to domestic or industrial waste or other controllable sources in amounts sufficient to be unsightly or in amounts sufficient to interfere with beneficial uses defined and designated in R9-21-205.

3. Free from materials attributable to domestic or industrial waste or other controllable sources in amounts sufficient to produce taste or odor in the water or detectable off-flavor in the flesh of fish, or in amounts sufficient to change the existing color, turbidity or other conditions in the receiving stream to such degree as to create a public nuisance, defined and designated in RS-21-205.
4. Free from toxic, corrosive, or other deleterious substances attributable to domestic or industrial waste or other controllable sources at levels or combinations sufficient to be toxic to human, animal, plant or aquatic life defined and designated in RS-21-205.

Table VIII - D - II (c)
ADHS Regulations
Air Quality Control

R9-3-402. UNLAWFUL OPEN BURNING

- A. Notwithstanding the provisions of any other Regulation in this Chapter, it is unlawful for any person to ignite, cause to be ignited, permit to be ignited, or suffer, allow or maintain any open outdoor fire.
- B. "Open outdoor fire", as used in this Regulation, means any combustion of combustible material of any type outdoors, in the open where the products of combustion are not directed through a flue. "Flue", as used in this Regulation, means any duct or passage for air, gases or the like, such as a stack or chimney.
- C. The following fires are excepted from the provisions of this Regulation:
1. Fires used only for cooking of food or for providing warmth for human beings or for recreational purposes or the branding of animals or the use of orchard heaters for the purpose of frost protection in farming or nursery operations.
 2. Any fire set or permitted by any public officer in the performance of official duty, if such fire is set or permission given for the purpose of weed abatement, the prevention of a fire hazard, or instruction in the methods of fighting fires.
 3. Fires set by or permitted by the State entomologist or county agricultural agents of the country for the purpose of disease and pest prevention.
 4. Fires set by or permitted by the Federal government or any of its departments, agencies or agents, the State or any of its agencies, departments or political subdivision, for the purpose of watershed rehabilitation or control through vegetative manipulation.
 5. Fires set for the disposal of dangerous materials where there is no safe alternative method of disposal.
- D. Permission for the setting of any fire given by a public officer in the performance of official duty under Paragraphs 2., 3. or 4. of Subsection C., shall be given, in writing, and a copy of such written permission shall be transmitted immediately to the Director of the Department of Health Services and the control officer, if any, of the county, district or region in which such fire is allowed. The setting of any such fire shall be conducted in a manner and at such time as approved by the Director, unless doing so would defeat the purpose of the exemption.
- E. Nothing in this Regulation is intended to permit any practice which is a violation of any statute, ordinance, Rule or Regulation.

R9-3-408. MINERAL TAILINGS

No person shall cause, suffer, allow, or permit construction of mineral tailings piles without taking reasonable precautions to prevent particulate matter from becoming airborne. Reasonable precautions shall mean wetting, chemical stabilization, revegetation and such other measures as are approved by the Director.

R9-3-409. AGRICULTURAL PRACTICES

No person shall cause, suffer, allow or permit the performance of agricultural practices including but not limited to tilling of land and application of fertilizers without taking reasonable precautions to prevent excessive amounts of particulate matter from becoming airborne.

R9-3-514. STANDARDS OF PERFORMANCE FOR EXISTING SEWAGE TREATMENT PLANTS

- A. The provisions of this Section are applicable to all municipal sewage treatment plant sludge incinerators of any size which were existing or for which major alteration or construction commenced on or before the effective date of this Section.
1. Notwithstanding the provisions of Section R9-3-501, no person shall cause, suffer, allow or permit to be emitted into the atmosphere, from any sewage sludge incinerator subject to the provisions of this Section, smoke, fumes, gases, particulate matter or other gas-borne material which exceeds 20 percent for more than 30 seconds in any 60-minute period.
 2. No person shall cause, suffer, allow or permit to be emitted into the atmosphere from any emission point from any sewage sludge incinerator subject to the provisions of this Section or to pass a convenient measuring point near such emission point, particulate matter in concentration in excess of 0.1 grain per cubic foot, based on dry flue gas at standard conditions, corrected to 12 percent carbon dioxide.
- B. Monitoring of operations required by this Section is as follows:
1. The owner or operator of any sludge incinerator subject to the provisions of this Section shall:
 - a. Install, calibrate, maintain and operate a flow measuring device which can be used to determine either the mass or volume of sludge charged to the incinerator. The flow measuring device shall have an accuracy of ± 5 percent over its operating range.
 - b. Provide access to the sludge charged so that a well-mixed representative grab sample of the sludge can be obtained.

- c. Install, calibrate, maintain and operate a weighing device for determining the mass of any municipal solid waste charged to the incinerator when sewage sludge and municipal solid wastes are incinerated together. The weighing device shall have an accuracy of ± 5 percent over its operating range.
- C. The test methods and procedures required by this Section are as follows:
1. The reference method set forth in the Arizona Testing Manual shall be used to determine compliance with the standards prescribed in Subsections A. and B. of this Section as follows:
 - a. Method 5 for concentration of particulate matter and associated moisture content;
 - b. Method 1 for sample and velocity traverse;
 - c. Method 2 for volumetric flow rate; and
 - d. Method 3 for gas analysis.
 2. For Method 5, the sampling time for each run shall be at least 60 minutes and the sampling rate shall be at least 0.015 dscm/min (0.53 dscf/min), except that shorter sampling times, when necessitated by process variables or other factors, may be approved by the Director.

Experience has demonstrated that these regulations provide sufficient latitude for the protection of public health and the environment. They are not in all cases as specific in their application as the federal criteria (40 CFR Part 257), but are comprehensive and flexible enough to allow the State to adequately respond to any health or environmental contingency resulting from solid waste disposal facilities or practices. It is the position of the Department (ADHS) that its existing regulatory standards are substantially equivalent to the federal criteria, and sufficient to ensure compliance with the Act (RCRA).

In those areas where the Department lacks direct statutory authority, other State agencies are empowered to intervene on its behalf and in the public interest (i.e. Game & Fish Department for compliance with the endangered species landfill criterion). In most cases, the State will remain in a stronger enforcement posture by keeping its regulations broad in both substance and scope. As regulations become more specific in their application, they often serve to restrict rather than expand enforcement options. On this basis, it is considered more advantageous to retain our existing regulations fundamentally in their present form.

In regards to the surveillance requirement (b), the Director (ADHS) is empowered to provide for the examination of any premises where there is reasonable cause to believe that a violation of any health law, rule or regulation of the State exists (36-136.A.5.). This authority is strengthened further by A.C.R.R. R9-8-414 which holds that representatives of the Department shall make such inspections of any premise used for the collection, storage, transportation, disposal or reclamation of refuse as may be necessary to ensure compliance with health regulations. In this instance, refuse is defined to include all types of solid and semi-solid waste except human excreta, which may be inspected under separate authority (A.C.R.R. R9-8-324).

It is the position of the Department that these two regulations suffice to provide the requisite surveillance capability required by 40 CFR Part 256.21. In addition, all disposal operations must receive approval from the Department prior to commencing disposal activities. If the Department determines that operator monitoring and reporting requirements will be necessary in order to ensure the continued nuisance-free operation of a given facility (in full compliance with regulations), the Department will require such actions on the part of the operator as a condition of plan approval.

The requirement for a prohibition on new open dumps (c.) is satisfied by A.R.S. § 13-1603 which defines criminal littering or polluting as a misdemeanor offense. This statute is further strengthened by departmental regulations requiring that all refuse be disposed of in an approved manner (R9-8-431) and that approval be obtained from the Department for all new disposal sites, or methods used for disposal, prior to the start of operations (R9-8-432). This plan review and approval authority of the Department is considered to be the substantial equivalent of a permit program, and allows the State greater flexibility in correcting and abating such nuisances. Taken together, these statutory and regulatory powers combine to ensure that the establishment of new open dumps may be legally prohibited.

The final requirement regarding enforcement capabilities is also currently addressed in a satisfactory manner. Any person found to be in violation of any health law, rule or regulation of the State is guilty of a misdemeanor and subject to fine, imprisonment, or both (A.R.S. § 36-140). In instances of endangerment to public health, the Director (ADHS) is authorized to issue an administrative cease and desist order (36-601.B.), and to enjoin recalcitrant parties in the County Superior Court. Whenever a violation of health regulations occurs, a series of administrative, civil and criminal remedies are available to the Department.

Having established that the State's regulatory powers are sufficient to comply with the mandates of RCRA, and adequate to meet EPA requirements for State Plan approval, the following narrative will describe the functional activities and responsibilities of the State's Solid Waste Management Program as they pertain to regulation and enforcement.

A. SOLID WASTE REGULATORY PROGRAM

The State's solid waste regulatory program is comprised of a variety of functional elements or tools. Major activities revolve around inspection, plan review and licensing functions. These activities are primarily designed to ensure that solid waste disposal facilities and practices meet all applicable State standards, comply with all Departmental regulations, and adequately protect public health and the environment. In the following narrative, each of these functional areas will be described in turn.

Inspection

The inspection function is central to the State's regulatory program, and critical from the standpoint of both; (a) preventing the establishment of new open dumps, and (b) closing or upgrading existing open dumps. Continuous monitoring is the principle means available to the Department (ADHS) for ensuring that solid waste disposal facilities and practices are operated and maintained in an environmentally sound manner.

There are presently some 135 landfills, 40 collection stations, 1500 surface impoundments and an undetermined number of landspreading facilities operating statewide. Unofficial estimates have also implied the existence of perhaps as many as two to three thousand promiscuous dumps. These counts will become increasingly reliable as the Open Dump Inventory proceeds and progresses.

Because of the great geographical expanse of the State, and a limited resource base, it is a monumental task to monitor and inspect each of these facilities/sites on a regular basis. Accordingly, efforts thus far have tended to focus upon sanitary landfills and municipal surface impoundments (i.e. wastewater treatment works), which are in fact inspected on a routine schedule. As the State's programs continue to develop, and as future resources permit, these inspection efforts will expand over time to include other types of

surface impoundments (i.e. liquid industrial wastes). Greater attention will also be given to landspreading sites and persistent promiscuous dumps.

In conducting its inspections of solid waste disposal facilities, the Department generally adheres to strict procedural rules. These are outlined and presented below.

Inspection Procedures

1. Prior to a site visit, the inspector will attempt to contact the local operating authority by telephone to inform them of the time of the inspection, and to invite their representative to be present. Where the responsible official is not available, a message is left indicating the time and place of the inspection.
2. The local operating authority is sent copies of all inspection reports, whether positive or negative.
3. An "enforcement letter" is sent to the operating authority whenever the inspector determines an operation to be substandard. This letter will describe all problems evidenced at the site, and remedial steps necessary to effect compliance. It will also include a statement that all subdivision and trailer park applications designating the landfill in question as the proposed refuse disposal site will be disapproved until such time as compliance is effected, and that the Department may consider legal action if the operation is not upgraded. Plans for effecting compliance are requested from the operating authority within a specified period of time, and technical assistance is offered by the Department in formulating such plans.
4. All enforcement letters and subsequent correspondence are to be sent by certified mail, return receipt requested. Copies of enforcement letters should be sent to the mayor or manager of the municipality or county involved, and to the appropriate solid waste planning agency (i.e. Council of Governments).

In all cases, the preferred course of action is to achieve voluntary compliance. Where this is not possible, the Department may resort to administrative, civil or criminal remedies. However, these procedures may be waived where an imminent health hazard is determined to exist, or where otherwise

dictated by circumstance.

Legal authority for this inspection function is derived from Departmental regulations R9-8-324 (Sewerage Systems and Treatment Works) and R9-8-414 (Refuse and Other Objectionable Wastes). The basis for site evaluation is provided by Departmental regulations (Chapters 3, 8, 20 & 21), State law and the federal environmental criteria for classifying solid waste disposal facilities and practices (40 CFR Part 257).

The preponderance of Departmental inspections are conducted in a routine fashion. These functions however, are designed and structured to respond to the public need. Frequently, complaints are received about nuisances or objectionable practices occurring at disposal facilities. When received, such complaints may result in the conduct of special investigative inspections intended to identify and abate that particular nuisance or practice which engendered the initial complaint. Citizens are encouraged to utilize this avenue as a means to supplement and assist the State's regulatory effort.

Plan Review

Plan review is another important aspect of the State's solid waste regulatory program. By controlling the design and proposed operation of disposal facilities and practices prior to their start of operations, other elements of the State's program are substantially strengthened and reinforced. Under authority of A.R.S. §36-136. G. 8, 9 and 10, the Department is empowered to review plans for all landfill, landspreading and surface impoundment facilities (A.C.R.R. R9-8-432, R9-8-329, R9-8-1214 respectively). Approval from the Department is required before disposal may begin. In this manner, the likelihood of a disposal system failure, with it's attendant health and environmental consequences, is significantly reduced. Prior to formal plan submittal, applicants are strongly encouraged to meet with appropriate Bureau of Waste Control staff for a conceptual review of the proposed facility and/or operation (preapplication conference).

Authorities proposing to construct facilities for the disposition of solid waste must submit construction design plans to the Department. These prescribed plans should conform to the Department's "Sanitary Landfill Site Selection and Development Guidelines", and contain all pertinent information requested therein (see Table VIII-D-III). The purpose of this submittal is to ensure that minimum design and performance criteria will be satisfied, and that the authority has conducted the basic facility planning (including final closure) necessary to achieve and maintain a successful and environmentally sound operation. When received, such plans are evaluated on the basis of their conformity to applicable State law and Departmental regulations. If inadequate information has been supplied, or if a discrepancy with regulation is detected, the plan is returned for necessary revision. A formal disapproval may be issued whenever a site or proposed method of disposal is grossly unsatisfactory from either a public health or environmental standpoint. Such disapproval may also result from a failure to effect necessary revisions to the facility plan.

Whenever an approved facility proposes to implement a change in its method of disposal, a new operational plan must be submitted. If this proposed change in method will necessitate any modification of existing facilities, a new design plan is also required.

Once formal plan approval has been granted by the Department, a facility may commence and continue its operation for as long as procedural and performance standards continue to be met. The Department does not issue permits for solid waste disposal facilities per se, but considers this plan review and approval process as its functional equivalent.

In addition to its review of facility plans, the Department also exercises an approval function over subdivision and trailer park applications with respect

to their proposed provisions for sanitary facilities and services. As it pertains to solid waste, this process requires that adequate provision be made for both refuse collection and disposal.

Departmental subdivision regulations (R2-10-1.1.) state that ". . . no subdivision or portion thereof shall be sold, offered for sale, leased or rented by any corporation, company or person, or offered to the public in any manner, and no permanent building shall be erected thereon until plans and specifications for the water supply, sewage disposal, and method of garbage disposal to be provided in or to serve such subdivision shall have been submitted to and approved by the Department."

On this basis, the subdivider is required to submit his application for approval of sanitary facilities to the Department, along with appropriate engineering plans and the necessary Garbage Service and Garbage Disposal Agreements (see table VIII - D - IV).

For its part, the Garbage Service Agreement is examined to determine the type of collection service being proposed for the subdivision. All public (municipal or county) collection services are presently acceptable to the Department. If a private service is designated, an inspection of the collection service's equipment may be necessary prior to approval. Individual self-haul will be approved on a case-by-case basis where the subdivision is located within a reasonable distance of an approved disposal facility.

The Garbage Disposal Agreement is then evaluated separately to determine which solid waste disposal site is designated for use by the subdivision. Departmental regulation R9-8-432 specifically allows for six different methods of refuse disposal, five of which apply to residential solid waste. For all practical purposes, sanitary landfilling is the only one of these currently practiced in Arizona. If the subdivider indicates a non-approved solid waste disposal site, he is informed of this fact, and provided with information regarding the three alternatives available to him. These include;

- a) the identification of an alternative and approved sanitary landfill within a reasonable distance of the subdivision.
- b) upgrading the site proposed originally into compliance with standards, and
- c) the construction and operation of his own sanitary landfill.

Once the Garbage Service and Garbage Disposal Agreements are determined adequate, the solid waste portion of the subdivision plan is given final approval and the Department's involvement in the application process is concluded.

TABLE VIII-D-III

SANITARY LANDFILL SITE SELECTION
AND
DEVELOPMENT GUIDELINES

When proposing a sanitary landfill, you should provide the following information in your plan:

I. MAPS

- A. Topographic Map - of a township (6 miles x 6 miles) showing location with respect to towns, or populated areas, mountain ranges, rivers, etc. - U.S. Geological Survey Maps, or equivalent, will suffice.
- B. Plot Map - Scale: 200' per inch or less, showing landfill area in detail:
 - 1. All existing and planned all-weather roads
 - 2. Utility and water lines
 - 3. Fire breaks
 - 4. Water runoff and drainage controls
 - 5. Permanent and portable fences

II. DESCRIPTION, OPERATION, AND CONSTRUCTION - Narrative

- A. Brief Description of Site - legal description, location and type (area or trench) of sanitary landfill, operational authority, etc.; "introduction". Include discussion of "need" for proposed site.
- B. Population and Waste-Type Study
 - 1. Present and future population - how many people are going to use this sanitary landfill?
 - 2. Types of Wastes:
 - a. Household
 - b. Commercial
 - c. Institutional
 - d. Dead animals, carcasses, remains
 - e. Septage
 - f. Other
 - g. Combination of above

TABLE VIII-D-III
(cont.)

3. Estimated life or size requirement for sanitary landfill

a. Assumptions:

1. Population (from para. II.B.1)
2. Daily amount of waste per capita $\left(\frac{1b}{day}\right)$
3. In-place refuse compaction factor $\left(\frac{1b}{yd^3}\right)$
4. Depth of fill area (ft)

b. Estimated weight of refuse per year:

$$\text{Yrly Amt of Refuse} \left(\frac{1b}{yr}\right) = (\text{Population}) \times \left(\frac{\text{Per Capita}}{\text{day}}\right) \times \left(365 \frac{\text{days}}{\text{yr}}\right)$$

c. Estimated volume of refuse per year:

$$\text{Yrly Vol of Refuse} \left(\frac{yd^3}{yr}\right) = \left(\text{Yrly Amt of Refuse}\right) \div \left(\frac{\text{Refuse Compaction}}{\text{Factor}}\right)$$

d. Estimated volume of cover material per year:

$$\text{Yrly Cover Vol} (yd^3) = (.24) \times (\text{Yrly Vol of Refuse})$$

e. Estimated total volume of refuse and cover material per-year:

$$\text{Total Yrly Vol} \left(\frac{yd^3}{yr}\right) = (\text{Yrly Vol of Refuse}) + (\text{Yrly Cover Vol})$$

f. Estimated land use requirement per year:

$$\text{Yrly Land Use} \left(\frac{\text{acre}}{\text{yr}}\right) = \left(\frac{\text{Total Yrly Vol}}{\text{Vol}}\right) \div \left(1613 \frac{yd^3}{\text{acre-ft}}\right) \div \left(\frac{\text{Depth}}{\text{of Fill}}\right)$$

g. Calculate appropriate item:

1. Estimated life of landfill:
Life(yrs) = (Size) \div (Yrly Land Use)
2. Estimated size required for landfill:
Size(acres) = (Yrly Land Use) \times (Life)

C. Site Characteristics

1. Climate, weather conditions
2. Slope
3. Type of site (gully, wash, flat meadow, desert, etc.)
4. Soil data - check with Soil Conservation Office for possible information
 - a. Surface
 - b. Subsurface strata
 - c. Bedrock

TABLE VIII-D-III
(cont.)

5. Water data

- a. 100-year floodplain data, or other area subject to inundation
- b. Depth to groundwater
- c. Quality of groundwater
- d. Proximity to wells
- e. Proximity to rivers or lakes

NOTE: Include rationale for why this operation will not result in the degradation of either surface or groundwater.

D. Operation Plan

1. Types of wastes that will be accepted and plan for their handling
2. Salvage plan
3. Types of wastes that will not be accepted
4. Location of first trench or cell
5. Progression plan ["roadmap" for anticipated progression (location) of future trenches or cells for the life of the site]
6. Maintenance of site - daily (if a variance is requested, incorporate it into the plan)
7. Compaction and cover (minimum requirements)
 - a. Daily cover - six (6) inches of compacted earth
 - b. Intermediate cover - twelve (12) inches of compacted earth (may include daily cover, if already applied). Intermediate cover must be applied to all fill areas which:
 - (1) Will remain inactive for more than thirty (30) days, or
 - (2) Will be subjected to user trafficking
 - c. Final cover - twenty-four (24) inches of compacted earth (may include daily or intermediate cover, if already applied). Final cover must be applied to all fill areas which:
 - (1) Will remain inactive for more than one (1) year, or
 - (2) Are completed

TABLE VIII-D-III
(cont.)

8. Landfill equipment
 - a. Type(s) and size(s)
 - b. Backup equipment
 9. Vector control plan
 10. Fire contingency plan
 11. Litter control plan
 - a. Fencing
 - b. On-site collection of trash and windblown litter
 - c. Off-site collection of trash and windblown litter
 12. Provisions for dust control
 13. Provisions for methane gas production
 14. Inclement weather operation plan
 15. Provisions for access control both to and on the site
 16. Provisions for maintenance of all-weather access road
 17. Post-closure consideration
 - a. Planned use
 - b. Provision for maintenance of completed fill area, if necessary
- E. Description of Items that may have to be constructed:
1. Preliminary excavation - leveling
 2. Cover material site - if different from that of landfill
 3. All-weather access roads
 4. Signs - posted on all appropriate highways
 5. Employee facilities
 6. Maintenance shacks
 7. Fences and gates limiting access
 8. Drainage ditches, culverts, etc.
 9. Fee and weighing stations, if used
 10. Water Supply

JTD:dar
(Rev. 1/79)

ARIZONA DEPARTMENT OF HEALTH SERVICES
Division of Environmental Health Services
Bureau of Sanitation
Phoenix, Arizona

Both agreements below must be filled out and signed, where appropriate, and submitted with application:

GARBAGE SERVICE AGREEMENT -

As required by Arizona Department of Health Services Rules and Regulations, and specifically Regulation 2-10-4.2, A.

The _____ agrees to provide
NAME OF COLLECTION AGENCY

refuse collection service to _____
NAME OF SUBDIVISION

in accordance with applicable rules and regulations governing refuse collection and disposal.

Date _____ Signed _____

Title _____

Address _____

City _____

In order to approve the above collection service we must also have the information in the agreement below.

GARBAGE DISPOSAL AGREEMENT -

As required by Arizona Department of Health Services Rules and Regulations, and specifically Regulation 2-10-4.2, B. or C.

The _____
NAME OF DISPOSAL SITE

is operated by _____
NAME OF OPERATIONAL AUTHORITY

in accordance with applicable rules and regulations governing refuse disposal and will accept refuse from persons living in

NAME OF SUBDIVISION

Date _____ Signed _____

Title _____

Address _____

City _____

Licensing

Currently, the only solid waste licensing function administered by the Department is for septic tank cleaners. This program is mandated under A.R.S. §36-136.G.9., and has been in operation since 1964. A.C.R.R. R9-8-1232 stipulates that such licensing shall be by the Department of Health Services, and further requires that operators obtain permits from the local health departments in each county in which they intend to operate.

Upon receipt of a permit application, the County Health Department is authorized to inspect all vehicles used for the transport of septage to ensure their compliance with State and local regulations (R9-8-1231. B,C&D). The County inspector then signs the "Application for a Septic Tank Cleaner License" (see table VIII-D-V) certifying that the vehicle meets the State requirements, and then forwards the application to the Department of Health Services. ADHS then reviews the application, and either issues the license, or notifies the applicant of denial and the reasons why.

Each vehicle must be separately licensed by the State to control the hauling of human excreta. The license will remain in force so long as the vehicle is owned by the licensee, and remains in good working order. Such licenses are non-transferable, and must be accompanied by a valid county permit.

Several problems have been encountered in the practical administration of this element of the solid waste program, and suggest a need for reform. Perhaps first and foremost, is the fact that once issued, the State license never expires. Because the Department's initial application approval is the only contact made with the operator (pumper), there is no provision for tracking vehicle maintenance over time, and consequently no guarantee that the operator will remain in compliance. This also compounds the difficulties inherent to maintaining accurate records regarding the status of licensed

pumpers, particularly their numbers and distribution. Inspection and permit renewal on an annual basis by the Counties would greatly alleviate this problem.

Secondly, because both the State license and the County permit are issued on the basis of the County inspection, there is an apparent duplication of effort. It would therefore seem reasonable to change the rules to allow licensing by the counties, and to discontinue licensing by the State. The Department's role would then become that of an oversight agency which would receive and review periodic reports from the counties on licenses, inspection results, septage disposal sites, etc.

Thirdly, existing regulations specify a minimum allowable pumper tank capacity of 750 gallons. This limit was originally established in the interest of consumer protection, but has become obsolete insofar as commercial septic tanks are now required to provide for a minimum 960 gallon capacity. In addition, chemical toilets are frequently serviced by vehicles which have a tank capacity that is much less than the 750 gallon minimum. Pumpers of these facilities complain that they do not need a 750 gallon tank to pump chemical toilets, and that equipment of this size is more expensive to operate. Consequently, there does not appear to be sufficient health justification for requiring a minimum tank size. Rather, such vehicle licensing should be based upon the categorical suitability of the equipment for its intended purpose.

Lastly, the existing program fails to adequately control for the location of final septage disposition. A.C.R.R. R9-8-1231.E. requires that sewer systems or landfills be utilized for the disposal of septic tank pumper wastes, and that wastes from chemical toilets be buried. Local health departments are given the authority to designate specific disposal sites, but are hampered by the refusal of certain community sewer systems to accept pumper wastes and federal regulations which prohibit its disposition in land-

ARIZONA DEPARTMENT OF HEALTH SERVICES
Division of Environmental Health Services
Bureau of Sanitation
Solid Waste Section
1740 West Adams
Phoenix, Arizona 85007
602/271-4641

APPLICATION FOR A SEPTIC TANK CLEANER LICENSE

(A Separate Application Shall be made for Each Vehicle)

(Name of Owner) DBA _____
(Name of Firm)
Address _____ City _____
State _____ Zip _____

Request that a license be issued for the vehicle described below to collect, transport, and dispose of the contents of privies, privy vaults, septic tanks, and other sewage treatment systems or devices.

Make _____ Serial No. _____
Year _____ Tank Capacity _____

I (we) agree to operate this vehicle in accordance with the regulations of the Arizona Department of Health Services governing storage, collection, transportation, and disposal of human excreta.

I (we) further agree to dispose of the material removed in accordance with the requirements of the local county health department and to obtain a permit in each county where such operations are performed.

(Date) (Applicant's Signature)

C E R T I F I C A T E

This is to certify that an inspection has been made of the above described vehicle and it is the opinion of this department that the vehicle does comply with the requirements of Regulation R9-8-1231 of the Arizona Department of Health Rules and Regulations for Human Excreta.

(Date) (Health Officer or Sanitarian)

(County Health Department)

DEPARTMENT ACTION:

Approved _____ Disapproved _____

License No. _____ Date Issued _____

ALMS/SAN (7/76 Rev.)

fills located on federal lands. Also, particular landfills may be unsuitable to receive septage due to potential problems of leachate generation. Nevertheless, specific dump sites should be designated by the Counties for each pumper, and the State should retain the right to approve all disposal sites so designated.

Table VIII-D-VI

ARIZONA DEPARTMENT OF HEALTH SERVICES

SEPTIC TANK PUMPER

Issued to _____

For the vehicle described as follows:

MAKE	YEAR	SERIAL NUMBER	TANK CAPACITY
------	------	---------------	---------------

To be used for the collection and transportation of the contents of privies, vaults and septic tanks, subject to the regulations of the Arizona Department of Health Services governing storage, collection, transportation and disposal of human excreta.

This license is issued pursuant to Arizona Revised Statutes 36-136., G., 9., and will be valid as long as the vehicle is used for the purpose indicated above, and is maintained and operated in a satisfactory manner. This license is not transferable from person to person or vehicle to vehicle.

Number _____

Issued _____

Expires _____

By _____ ASSISTANT DIRECTOR

For _____ DIRECTOR

(TO BE FRAMED AND DISPLAYED IN A CONSPICUOUS PLACE)

DHS SAN-102 (REV 8-76)

B. SOLID WASTE ENFORCEMENT PROGRAM

The regulatory aspects of the State's solid waste management program (inspections, plan review/approval, licensing) are essentially preventative in nature. They are intended to maintain solid waste facilities and practices in an environmentally sound manner, and to thereby lessen the likelihood that an endangerment to public health or the environment will emerge. They are also instrumental in preventing the establishment of new open dumps.

These programmatic controls however, are not in all cases foolproof, and where nuisances/violations are allowed to develop or occur, abatement action may become imperative. In such instances, the Department (ADHS) has administrative, civil and criminal remedies available to it. Taken together, these various remedies constitute the enforcement aspect of the State's solid waste management program. The emphasis of this particular function is corrective, and it serves as the legal mechanism for closing or upgrading substandard facilities.

Enforcement proceedings typically begin when a nuisance or violation is detected as the result of an inspection. State law empowers the Director to authorize the routine inspection of any and all sanitary engineering facilities (A.R.S. 36-136.A.4., 36-132.A.12., A.C.R.R. R9-8-414, R9-8-324). If for any reason a departmental inspector is denied access to a private site, a search warrant may be obtained, and the site inspection secured on this legal basis.

Enforcement actions may be initiated by the Department in response to a variety of situations, and may be taken at any one of three levels; administrative, civil or criminal, depending upon the severity of the situation, and relevant antecedent actions. Enforcement may also be pursued by means of the citizen suit provision of RCRA (Section 7002); which enables any person to commence a civil action on his own behalf. In the discussion which follows, each of these alternative remedies will be addressed in turn.

Administrative Actions

In detecting violations, and initiating enforcement proceedings, the Division of Environmental Health Services is aided by legal support from the State Attorney General's Office. At the present time, one full-time Assistant Attorney General is retained jointly by the Solid and Hazardous Waste Management Programs, and handles all of their legal affairs.

Whenever the public health is endangered, the Director of the Department is authorized to issue an administrative cease and desist order, which requires a party in violation to abate or correct any illegal practice or condition (A.R.S. § 36-601.B.). This constitutes the principal administrative remedy available to the Department, and stipulates both the nature of the violation(s) and any necessary corrective actions deemed appropriate by the Department.

In accordance with the Administrative Procedures Act (A.R.S. § 41-1001. et seq.), the recipient of a cease and desist order may request that a review hearing be convened. Review requests must be filed with the Department within 15 days of receipt of the order, and all review proceedings are conducted by an administrative hearing officer.

Cease and Desist Orders are most often issued in response to persistent violations. Prior to issuance, the party in violation is sent an "enforcement letter", notifying him of the findings of the site inspection, and the problems in evidence. At this early stage, technical assistance is offered by the Department, and the violator is encouraged to effect compliance on a voluntary basis. If the violator fails to cooperate and the facility is not brought up to standard, the higher order administrative remedy (C & D order) is then initiated.

When a review hearing is convened, the burden of proof is essentially upon the Department. At this particular review level, a "preponderance of the evidence" is sufficient justification to uphold the administrative order. In all cases, due process is observed, and the party in violation may choose to enter into a consent agreement as a means to resolve the matter outside of court. This "consent decree" will stipulate the nature and timing of actions necessary to effectuate compliance, but will not entail nor imply any admission of guilt. Through the mechanism of the consent decree, the Director may also require a facility operator to conduct monitoring activities, and to report facility conditions on a regular basis, thereby enhancing the Department's surveillance capabilities. This might apply where there is probable cause to believe that health or environmental dangers will persist.

The elements of the Department's administrative recourse therefore include, (a) the enforcement or notification letter, (b) the cease and desist order, (c) the review hearing, and (d) the consent agreement/decree.

Civil Actions

Where a violator chooses not to enter into a consent agreement, the Director is authorized to seek injunctive relief in Superior Court. Such relief may also be sought in instances where the terms and conditions of an existing consent agreement have been broken (A.R.S. 36-601.(c)). This civil proceeding will entail a judicial hearing, and a request that the court permanently enjoin the defendant from any future violations. Typically, the plaintiff (Department) will also seek remuneration for the costs involved in filing and processing this complaint and application. Once all available administrative remedies have been exhausted, the Superior Court will overturn an administrative decision only where it can be shown that such decision was rendered in an arbitrary and capricious manner.

If the Court's ruling is favorable to the Department, a formal Writ of Injunction will be issued against the defendant which legally prohibits him from continuing to act or operate in a non-compliant fashion. If a party in violation fails to comply with the Writ of Injunction, he may then be cited for contempt of court.

Under Section 7002 of RCRA, a civil action may also be initiated by any person, against any person (including the United States, the EPA Administrator, or any other governmental instrumentality) who is alleged to be in violation of any permit, standard, regulation, condition, requirement or order which has become effective pursuant to the Act. For a Subtitle "C" violation, such action may commence immediately following the serving of notice. Under Subtitle "D", a sixty day waiting period is mandated. Also noteworthy, is Section 7003 (RCRA), which pertains to imminent hazards, and empowers EPA to immediately intervene to restrain any party presenting an imminent and substantial endangerment to public health or the environment. These actions are to be filed in the Federal District Court.

Criminal Actions

If administrative and civil remedies fail to effect compliance, the Department may opt to initiate a criminal action. Any person found to be in violation of any health law, rule or regulation is guilty of a misdemeanor, and subject to fine, imprisonment, or both (A.R.S. § 36-140). Also in instances of imminent health hazard, the Director may choose to initiate a criminal action as a first legal step, in lieu of the lesser remedial actions available.

However, because criminal suits are more severe in their adjudication, and more difficult to prosecute, they are infrequently filed. In such cases, the burden of proof is structured to require that "guilt beyond a reasonable doubt" be established.

As of this writing, a criminal action is the only legal remedy by which a penalty may be assessed for a violation. However, legislation is now pending (H.B. 2266) which would authorize the Director (ADHS) to assess civil penalties for certain classes of violation. If this legislation were to be enacted, the Department's hand in regulation would be greatly strengthened, and its legal enforcement process significantly streamlined. The directly pertinent provisions of this proposed bill are presented in Table VIII-D-VII.

Nevertheless, even without this supplemental authority, the Director is vested with sufficient statutory powers to protect public health and the environment. Furthermore, the Department is committed to preventing the establishment of new open dumps, and to the closure or upgrading of existing substandard facilities through the exercise of responsible and affirmative enforcement action.

H. B. 2266

Introduced by Bill Lewis

AN ACT

RELATING TO PUBLIC HEALTH AND SAFETY; PROVIDING FOR AUTHORITY FOR DIRECTOR OF THE DEPARTMENT OF HEALTH SERVICES TO ASSESS CIVIL PENALTIES FOR CERTAIN VIOLATIONS; PROVIDING FOR ENFORCEMENT ACTION, AND AMENDING TITLE 36, CHAPTER 1, ARTICLE 2, ARIZONA REVISED STATUTES, BY ADDING SECTION 36-133.

1 Be it enacted by the Legislature of the State of Arizona:

2 Section 1. Title 36, chapter 1, article 2, Arizona Revised
3 Statutes, is amended by adding section 36-133, to read:

4 36-133. Civil penalty; enforcement action

5 A. A PERSON WHO VIOLATES ANY PROVISION OF A PERMIT, RULE,
6 REGULATION OR ORDER ISSUED OR PROMULGATED UNDER THIS TITLE RELATING TO THE
7 STORAGE, COLLECTION, TRANSPORTATION, DISPOSAL OR RECLAMATION OF GARBAGE,
8 TRASH, RUBBISH, LITTER, MANURE, HAZARDOUS WASTE, OBJECTIONABLE WASTE OR
9 DELETERIOUS MATTER IS SUBJECT TO A CIVIL PENALTY ASSESSED BY THE DIRECTOR
10 IN AN AMOUNT NOT TO EXCEED FIVE THOUSAND DOLLARS FOR EACH VIOLATION, AND
11 FOR A CONTINUING VIOLATION, NOT TO EXCEED FIVE THOUSAND DOLLARS FOR EACH
12 DAY OF EACH VIOLATION.

13 B. THE DIRECTOR MAY REQUEST THE ATTORNEY GENERAL TO BRING AN ACTION
14 IN SUPERIOR COURT TO RECOVER CIVIL PENALTIES ASSESSED BY THE DIRECTOR UNDER
15 THIS SECTION. THE ATTORNEY GENERAL SHALL BRING AN ACTION TO RECOVER SUCH
16 CIVIL PENALTIES IN THE COUNTY IN WHICH THE VIOLATION OCCURRED OR IN A
17 COUNTY IN WHICH THE DEPARTMENT MAINTAINS AN OFFICE.

18 Sec. 2. Intent regarding termination

19 Notwithstanding the provisions of this act, the legislature intends
20 that if the provisions of title 41, chapter 20, Arizona Revised Statutes,
21 operate to terminate an agency, any provisions regarding powers, duties,
22 functions or personnel added or amended by this act terminate on the date
23 of termination of the particular agency.

CONCLUSION

In the foregoing section, it was established that the State currently wields regulatory powers sufficient to achieve compliance with the mandates of RCRA. The regulatory and enforcement functions and procedures of the Department's solid waste management program were also identified, defined and described. The listing presented below will now summarize the major conclusions drawn regarding this program's operation and capabilities.

1. The essential purpose of the solid waste regulatory and enforcement function is to protect public health and the environment from the potentially adverse impacts that may result from improper solid waste management practices and/or substandard facilities.
2. Existing State regulations are not in all cases as specific in their application as the Federal criteria (40 CFR Part 257), but are comprehensive and flexible enough to allow the State to adequately respond to any health or environmental contingency resulting from solid waste disposal facilities or practices.
3. All solid waste disposal and sanitary engineering facilities are subject to inspection by the Department, thereby providing a comprehensive monitoring and surveillance coverage.
4. It is the position of the Department that its plan review and approval process is functionally equivalent to a facilities permitting program.
5. The Department's plan review and approval process, when combined with a vigorous enforcement of existing regulations, will ensure that the establishment of new open dumps is prevented and prohibited.
6. Inspection, plan review/approval and licensing are the major regulatory and preventative aspects of the State's solid waste management program.
7. Historically, the Department's inspection effort has tended to focus primarily upon sanitary landfills and municipal surface impoundments.
8. The Department's existing septic tank cleaner licensing program, (a) fails to guarantee that the operator will remain in compliance with regulations, (b) duplicates the County permitting systems, (c) maintains unrealistic tank size standards, and (d) fails to control for the location of final septage disposition.

9. The enforcement powers of the Department include administrative, civil and criminal remedies for the correction/abatement of nuisances and violations.
10. The Department's solid waste enforcement function will serve as the legal mechanism for closing or upgrading substandard facilities.

On the basis of these summary conclusions, the following recommendations are presented regarding the future orientation of the State's solid waste regulatory and enforcement activities.

1. As experience is acquired in bringing substandard facilities into compliance with the federal land disposal criteria, legal staff should implement regulatory revisions as necessary to meet enforcement needs.
2. Sufficient resources should be identified and secured to expand inspection activities to adequately monitor landspreading sites and non-municipal surface impoundments.
3. Additional resources are required to strengthen and further specialize the legal support available to the Department for enforcement activities.
4. The Department currently has the authority to review and approve plans for all sanitary engineering facilities. At present, plan submittal is only routinely required for landfills, water and wastewater treatment plants, subdivisions and trailer parks. Plan submittal should henceforth be mandatory for all surface impoundments and landspreading facilities as well.
5. The State's program for the licensure of septic tank cleaners should be phased-out. As local health departments assume this responsibility, provision should be made for annual inspections of all vehicles, and the specific designation of approved sites for final septage disposition (FY 82).
6. Departmental regulation R9-8-1231.B. should be amended to allow for the usage by septic tank cleaners of a pumper tank size that is appropriate for its intended purpose (FY 82)
7. Legislative change authorizing the Director of ADHS to assess civil penalties for certain classes of violations (H.B. 2266) should be strongly supported and advocated, and adopted at the earliest possible time.

8. Departmental regulation R9-8-432 (Approved Methods of Refuse Disposal) should be amended to formally recognize pits, ponds, lagoons and landspreading as legitimate and approvable methods of waste disposal, and stipulate the respective conditions necessary for approval of each of these methods (FY 82).

CHAPTER EIGHT

SECTION E

OPEN DUMP INVENTORY

CHAPTER VIII

Section E

OPEN DUMP INVENTORY

I. OVERVIEW

The purpose of this section is to present the State's overall implementation strategy for bringing substandard solid waste disposal facilities into full compliance with applicable State and Federal laws by 1985. Also described, are the methods to be employed by the State in its program to: (1) classify facilities on the basis of the Federal land disposal criteria; (2) prohibit the establishment of new open dumps; and (3) close or upgrade existing open dumps.

The goal of these activities will be to protect public health and the environment from adverse effects resulting from solid waste disposal facilities and practices. A fundamental prerequisite for its achievement will be the conduct of the "Open Dump Inventory" (ODI) as authorized by Section 4005 of RCRA and implemented by subsequent regulations (40 CFR Parts 256 & 257).

II. INTRODUCTION

Certain antecedent conditions and technical parameters have shaped the content and form of the State's ODI strategy. Its genesis is to be found in both Federal statutes and regulations. These determining factors will be discussed briefly in this introductory segment.

Various terms used repeatedly throughout this text were given substance under RCRA. The term "open dump" was defined to include ". . . any facility or site

where solid waste is disposed of which is not a sanitary landfill or a facility used for the disposal of hazardous waste. Its functional antithesis, a "sanitary landfill", was defined as a facility or site in compliance with the "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR Part 257) as required by Section 4004, and hereinafter referred to as the "Criteria". On this basis, RCRA established two basic categories of solid waste disposal facilities, open dumps, and sanitary landfills, and each was calculated to be mutually exclusive. The Criteria, which established a minimum standard for protection, also provided the means to classify solid waste disposal facilities into one or the other of these categories.

Section 4005(c) of RCRA further prohibited the act of open dumping (that which occurs at open dumps) and provided for the imposition of a State-established compliance schedule against any disposal facility meeting the definition of "open dump". Going one more step, Section 4005(b) required the EPA to conduct a nationwide inventory of open dumps, and to publish a listing of such facilities in the Federal Register. This latter provision provided both a technical definition and a legal basis for what has now come to be called the "Open Dump Inventory". Rather than conduct the ODI within the limits of its internal resources, the EPA apportioned funding to the States for this purpose. Beginning in FY 80, the receipt of RCRA grant funding obligated the State of Arizona (ADHS) to identify, locate, evaluate, and classify all those solid waste disposal facilities in the State whose continued operation would present a "reasonable probability" of adverse impact on public health or the environment. Henceforth, determinations (classifications) are to be made by the State strictly on the basis of the federal criteria, and EPA is to be notified of all those facilities failing

to comply. The initial listing of open dumps in the Federal Register is anticipated by early 1981, and annually for a period of years thereafter. The inclusion of a facility in the listing does not constitute an administrative determination by EPA that a particular party is engaging in the prohibited act of open dumping, nor does it subject that party to federal sanctions. Rather, it is intended as an informational and planning tool which will alert the public to the extent of the problem and the need for State-sponsored remedial actions. Once the State has identified its problem facilities, it will be in a much stronger position to provide for the closure or upgrading of its open dumps [as mandated by Section 4003(3)].

A. RCRA Mandates:

The Resource Conservation and Recovery Act imposed a variety of mandates upon the states relative to the Open Dump Inventory. Accordingly, the conduct of the ODI was intended to posture the states into a position whereby they would be capable of complying. A summary of these statutory mandates is presented below:

- Section 4003(2): The State Solid Waste Management Plan shall prohibit the establishment of new open dumps within the State, and contain requirements that all solid waste shall be: (a) utilized for resource recovery, or (b) disposed of in sanitary landfills, or (c) otherwise disposed of in an environmentally sound manner.
- Section 4003(3): The State Solid Waste Management Plan shall provide for the closing or upgrading of all existing open dumps within the State pursuant to the requirements of Section 4005.
- Section 4004(a): At a minimum, the Criteria shall provide that a facility may be classified as a sanitary landfill and not an open dump only if there is no reasonable probability of adverse effects on health or the environment from disposal of solid waste at such facility.
- Section 4005(a): Defines "open dump" to include any facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under Section 4004 and which is not a facility for the disposal of hazardous waste.
- Section 4005(b): Requires the EPA in cooperation with the Bureau of the Census to publish an inventory of all disposal facilities or sites in the United States which are open dumps within the meaning of the Act (site determinations to be made by the States).
- Section 4005(c): Prohibits the open dumping of solid waste except where such practice or disposal occurs under a timetable or schedule for compliance established by the State. Also requires full compliance by all facilities within five years of their date of publication in the Open Dump List.

B. Regulatory Requirements:

A host of additional requirements were imposed upon the states by various federal regulations adopted pursuant to the authority granted EPA under the Act.

The "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR Part 257) were adopted pursuant to Section 4004. These regulations contained eight broad classes of criteria for determining which facilities shall be classified as open dumps and which shall be classified as sanitary landfills (for purposes of the ODI). They also established a level of protection necessary to ensure that no reasonable probability of adverse effects on health or the environment would result from the continued operation of any given facility. These eight classes of criteria are discussed in detail in Chapter VI of this State Plan. They require no further elaboration here because our ODI focus is upon purpose and method rather than content.

The "Guidelines for Development and Implementation of State Solid Waste Management Plans" (40 CFR Part 256) also contained regulations adopted pursuant to RCRA, and imposed requirements related to both open dumps and the act of open dumping. These requirements may be summarized as follows:

- 256.01(b)(3): The State Plan shall provide for the closing or upgrading of all existing open dumps within the State.
- 256.01(b)(6): The State Plan shall provide for resource recovery, the disposal of solid waste in sanitary landfills, or any combination of practices so as may be necessary to use or dispose of such waste in a manner that is environmentally sound.
- 256.23(a): The State Plan shall provide for the classification of all solid waste disposal facilities (according to the Criteria) for publication and listing in the Inventory of Open Dumps.

- 256.23(b): The State Plan shall provide for an orderly time-phasing of classifications, with priorities based upon: (a) probable health and environmental impact; (b) existing State regulatory powers; and (c) federal and State resources available for this purpose.
- 256.23(c): The State Plan shall provide that for each facility classified as an open dump, the State shall take steps necessary to close or upgrade that facility.
- 256.23(d): In providing for the closure of open dumps, the State shall take steps necessary to eliminate health hazards and minimize potential health hazards, including requirements for long-term monitoring or contingency plans where justified.
- 256.26: In implementing the Section 4005(c) prohibition on open dumping, the State Plan shall provide that any entity which demonstrates that it has considered other public or private alternatives to comply with the prohibition on open dumping and is unable to utilize such alternatives to so comply, may obtain a timetable or schedule for compliance which specifies a schedule of remedial measures, and an enforceable sequence of actions, leading to compliance within a reasonable time.

III. IMPLEMENTATION STRATEGY

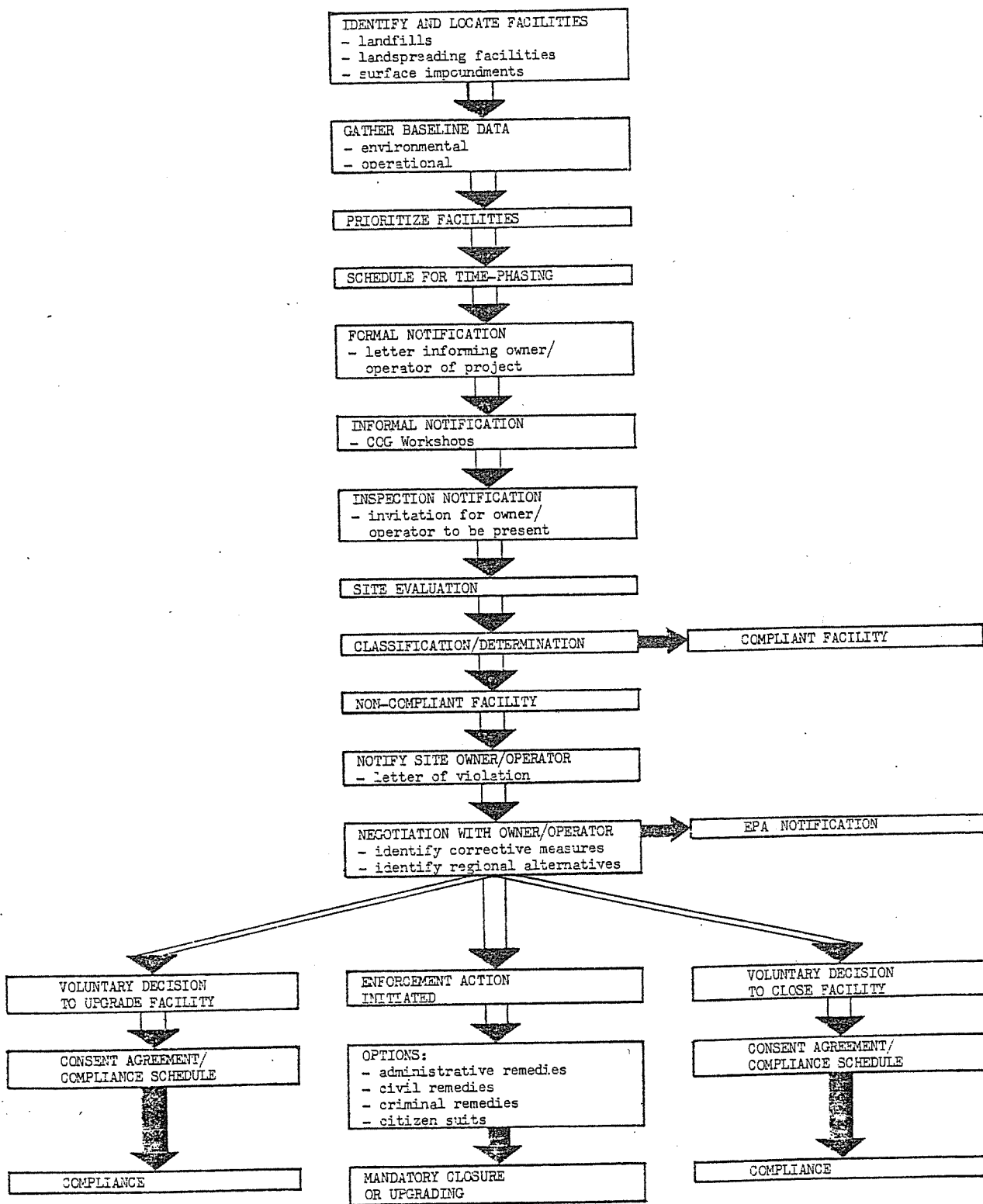
The State of Arizona (ADHS) is committed to: (a) the conduct of facility classifications pursuant to the ODI; (b) the prohibition of new open dumps; and (c) the closure or upgrading of existing open dumps. These goals are closely related and interdependent. It is the objective of the Department to fully realize these goals by October of 1984. This target, however, assumes the continued availability of federal financial support.

A. Open Dump Inventory

In conducting its inventory and classification of solid waste disposal facilities, the Department (ADHS) will rely upon consistent and clearly defined administrative procedures. These procedures are illustrated in Table VIII-E-1.

Table VIII-E-I

OPEN DUMP INVENTORY
DECISION FLOW CHART



Facility classifications will not be determined in an arbitrary or capricious manner. Instead, they will be carefully rendered through the systematic application of the federal criteria, and staff will closely adhere to EPA procedural guidance. This will ensure that facility classifications are uniform and consistent, and that the results of all site evaluations are replicable in every aspect.

Any solid waste disposal facility or site found to be in violation of one or more of the federal criteria will be identified to the EPA, and included in the national list of open dumps. A facility will only be listed if it is found to be in violation of the federal criteria. If a facility is in compliance with the federal criteria, but in violation of more stringent State or local standards, it will not be so listed. EPA notification will be accomplished by means of the reporting form depicted as Table VIII-E-II.

The facility inventory and classification process is intended as a planning tool. By identifying problem facilities, it will enable the State to comply with Section 4003(3) of the Act which requires that the State Plan provide for the closing or upgrading of all existing open dumps. On this basis, it will place the State in a position whereby an agenda for enforcement action can be realistically established and implemented.

A step-by-step description of the State's inventory and classification procedure is presented below. Following this, the State strategies for prohibiting new open dumps and for closing or upgrading existing open dumps will be treated separately in turn.



U.S. ENVIRONMENTAL PROTECTION AGENCY
OPEN DUMP INVENTORY REPORT

Section I - GENERAL INFORMATION

1. Date of determination Enter month, day, and year	Month	Day	Year				
2a. Is this an update of a previous form? Mark (X) one	1 <input type="checkbox"/> Yes		2 <input type="checkbox"/> No				
2b. Is this form being submitted to remove the facility from the open dump inventory?	1 <input type="checkbox"/> Yes		2 <input type="checkbox"/> No				
3. Facility Identification Number	State	Cnty/City	Place	Assigned Site No.	Assigned Facility No.		
4. EPA Surface Impoundment Assessment No. If applicable	State	Cnty/City	Place	Category	Site	Impoundment	
5. State Facility Identification Number If applicable							
6. Name of facility							
7. Facility location	Street, road, or other location description						
	City, town, or place			State	ZIP code		
	County name						
8. Coordinates of facility location	Degrees		Minutes	Seconds	Degrees	Minutes	Seconds
	Latitude		Longitude				
9. Other legal description If applicable	Range	Township	Section				
10. Land owner	Name						
	Mailing address						
	City, town, or place			State	ZIP code		
11. Operator	Name						
	Mailing address						
	City, town, or place			State	ZIP code		

Table VIII-E-II cont.

Section I - GENERAL INFORMATION - Continued			
12. Type of facility Mark (X) one	1 <input type="checkbox"/> Landfill 2 <input type="checkbox"/> Surface impoundment 3 <input type="checkbox"/> Land spreading	4 <input type="checkbox"/> Other - Explain: _____ _____	
13. Primary types of waste received	1 <input type="checkbox"/> Municipal solid waste 2 <input type="checkbox"/> Domestic sewage sludge 3 <input type="checkbox"/> Industrial solid waste 4 <input type="checkbox"/> Agricultural solid waste 5 <input type="checkbox"/> Mining solid waste	6 <input type="checkbox"/> Other - Explain: _____ _____	
Section II - NONCOMPLIANCE WITH FEDERAL CRITERIA			
Indicate noncompliance with one or more of the following categories Mark (X) each category for which a determination of noncompliance was made.	01 <input type="checkbox"/> Floodplains 02 <input type="checkbox"/> Endangered species 03 <input type="checkbox"/> Surface water 04 <input type="checkbox"/> Ground water 05 <input type="checkbox"/> Application to food-chain cropland 06 <input type="checkbox"/> Disease 07 <input type="checkbox"/> Air 08 <input type="checkbox"/> Gases 09 <input type="checkbox"/> Fires 10 <input type="checkbox"/> Bird/aircraft hazard 11 <input type="checkbox"/> Access	} Safety	
Section III - RESPONSIBLE STATE OFFICIAL			
Name			Telephone
Agency			Area code Number
Mailing address (Number and street)	City	State	ZIP code
Comments _____ _____ _____ _____ _____ _____ _____ _____			

Step One - Identify and Locate Facilities:

This is the first and most basic activity. Disposal facilities must first be identified and located prior to being classified. It will be accomplished by a variety of means, including the review of agency files, published studies, facility maps and internal inspection and enforcement records.

Master lists will be prepared of all disposal facilities by major categories. These major categories include landfills, landspreading facilities and surface impoundments. Lists of various facilities by subcategory may also be prepared, depending upon the availability of site-specific information. Certain classes of facilities, however, are statutorily exempted from the inventory and classification process. These include:

- a) facilities where agricultural wastes (e.g., manure and crop residues) are returned to the soil as fertilizers or soil conditioners
- b) facilities where overburden resulting from mining operations is deposited when the overburden is intended for return to the mine site
- c) facilities where domestic sewage or treated wastewater from publicly owned treatment works (POTW's) is applied to the land
- d) facilities constituting point sources of irrigation return flows or industrial discharges which are subject to permits under Section 402 of the Federal Water Pollution Control Act
- e) facilities for the disposal of source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954
- f) septic tanks
- g) hazardous waste disposal facilities subject to regulation under Subtitle C of RCRA
- h) underground well injection facilities subject to regulations for State Underground Injection Control Programs
- i) sites of backyard burning and waste composting

Generally speaking, inactive disposal facilities, and those operating on Indian lands will also be excluded from the inventory process.

These exemptions and exclusions comprise a first elimination step, and will serve to reduce the total number of sites to a more manageable universe.

Step Two - Gather Baseline Data:

Once the initial identification, location and elimination of facilities is completed, baseline data will be gathered on those remaining facilities subject to classification. Record searches will be conducted to derive available site-specific information relative to operational practices and history, and environmental conditions (i.e., soil characteristics, topography, depth to ground water etc.).

Step Three - Prioritize Facilities:

On the basis of data available at this juncture, individual solid waste disposal facilities will be prioritized in accordance with their probable health and environmental impacts. Those facilities known or suspected to pose the greatest probability of adverse effects will be assigned the highest priority rankings. Prioritization on this site-by-site basis is necessary to not only fulfill the intent of RCRA, but also to meet the Department's statutory mandate under State law. For administrative convenience however, individual facilities with similar rankings may be grouped by; (a) type of waste received, (b) type of facility and/or (c) geographic location wherever practicable. Such groupings would better facilitate project time-phasing and the facility inspection process.

Step Four - Schedule for Time-phasing:

Once prioritized, the various disposal facilities will be scheduled for site evaluations. It will be the Department's intent to schedule facility evaluations on the basis of priority ranking to the extent practicable. In general, the highest priority facilities will be evaluated and classified first, with

lesser priorities occurring in descending order. This approach may be modified however, depending upon three variables; (a) the strength of directly relevant State regulatory powers, (b) the projected availability of Federal and State resources to accomplish the scope of work, and (c) the geographic dispersion or concentration of facilities.

From an administrative standpoint, it is advantageous to time-phase facility evaluations on the basis of various facility types. Assuming that priority rankings will have a direct relationship to certain classes of facilities, these facility categories are tentatively scheduled for evaluation as follows (conversely, if priority rankings do not coincide with facility categories, this schedule will not be followed);

Table VIII-E-III

Tentative Schedule for ODI Facility Evaluations

Note - This schedule will apply only to the extent that individual facility priority rankings correspond to general facility categories.

<u>Category</u>	<u>Projected Completion</u>	
1. Landfills:		
a. Municipal	FY	81
b. On-Site Industrial		81
2. Surface Impoundments:		
a. Industrial		82
b. Wastewater Treatment Sludge		82
c. Agricultural *		83
d. Mining		84
3. Landspreading Facilities:		
a. Wastewater Treatment Sludge		82
b. Agricultural *		83
4. Special Practices:		
a. Water Supply Treatment Plants		84
b. Air Pollution Control Facilities		84

* Cooperation will be necessary from other agencies having and/or sharing jurisdiction. Alternatively, these facility evaluations may be conducted by other appropriate agencies on the basis of interagency agreements or memorandums of understanding.

This preliminary schedule is based upon the allocation of two full-time investigative staff for the life of the project. However, it is subject to change if resource levels fluctuate either up or down, or if significant new information is brought to light. Regardless, in all cases it shall remain the policy of the Department to respond immediately to any facility suspected of presenting an imminent hazard to health or the environment.

Step Five - Formal Notification:

When the prioritization and scheduling procedure is completed, the Department will issue a formal letter of notification to each facility owner and/or operator whose site is subject to the inventory and classification. This will be accomplished by means of a general mailing, but may be time-phased on the basis of facility categories. In general, this notification will indicate the nature, purpose and timing of the project, as well as the authority under which it is being conducted. The intent is to ensure that the facility owners and/or operators are aware of the State's activities in this respect, and that due process is observed.

Step Six - Informal Notification

This is another notification step whereby facility owners/operators will be informed of the project through public workshops held in each of the State's six planning districts. These workshops will be coordinated by the Regional Councils of Governments, and will cover the content and scope of the federal criteria. Facility owners/operators will be invited to attend, and will be given the opportunity to discuss the implications and requirements of the project with members of the Department's ODI staff.

Step Seven - Inspection Notification:

When the Department is prepared to visit a particular facility for evaluation purposes, a staff member will contact the facility owner by telephone

shortly prior to the actual site inspection. If the owner is reached, the owner or his designated representative will be invited to be present for the site evaluation. If the owner is not reached, a message will be left indicating the time and location of the inspection. Facility owners are welcome and encouraged to be present for this purpose.

This particular notification is not required by EPA guidance. Rather, it is extended as a courtesy in the interest of public relations. Clearly, if the owner/operator is given an extended notice of pending site inspection, he/she would have the opportunity to prepare for such inspection, and consequently, the conditions found at the site might or might not be artificially improved over the normal operating situation.

Step Eight - Site Evaluation:

This action involves the empirical observation and measurement of the actual conditions at a given disposal site. These conditions will be evaluated on the basis of the eight classes of the federal land disposal criteria, including; floodplains, endangered species, surface water, ground water, food-chain crops, disease, air and safety. In conducting the site evaluations, inspection staff will carry with them all monitoring devices (e.g. gas meters, submersible pumps, etc.) necessary to accurately compare the existing conditions against the minimum federal standards. Both measurements and observations will be recorded relative to each of the eight criteria, and then entered into the master file for that particular facility. The taking of all measurements and observations will be conducted in accordance with EPA guidance.

Step Nine - Classification/Determination:

Based upon the documentation gathered from the site evaluation, staff will determine (with the concurrence of management) whether or not a particular facility is in violation of one or more of the federal criteria. If the facility is in violation, it will be classified as an open dump, and a reporting form will be prepared for later submittal to EPA. If the facility is determined to be in compliance with the federal standards, it will be classified as a sanitary landfill, and no further action on the part of either the Department or the facility owner/operator is required.

Step Ten - Notify Site Owner/Operator:

Each owner of a disposal facility which has been classified as an open dump will receive a formal notice of violation via certified mail. Such notice will describe the conditions constituting the violation and inform the party of the Department's intent to submit the name of the facility to EPA for listing in the Federal Register. This "enforcement letter" will also require that the party in violation prepare and submit to the Department within a specified but reasonable time, a plan for effecting compliance with the Criteria, and will offer the Department's assistance in formulating such plans. The time allowed for plan submittal will depend upon the severity of the violation, and be determined on a case-by-case basis.

There are two noteworthy instances where this notification may not apply. First, where a particular facility has previously been warned by letter of a specific violation or deficiency, and the same violation is discovered again at the time of the ODI inspection, the Department may resort to immediate enforcement action without sending another letter. Also, the

State may take immediate enforcement action or demand immediate corrective measures where a severe and imminent health hazard or environmental threat has been discovered during an ODI site evaluation.

Step Eleven - Negotiation with Owner/Operator:

Throughout the permitted grace period following receipt of the notice of violation, the facility owner/operator is welcome to consult with Departmental staff regarding the identification of correctional measures and regional alternatives. Where regional alternatives are considered, the appropriate Council of Governments may be consulted. By the end of the grace period, the owner/operator will have submitted a plan for either closing the Facility in violation, or for upgrading it to standard. This plan will constitute the basis of a voluntary consent agreement between the parties, and will contain a timetable for compliance which specifies a schedule for remedial measures, and an enforceable sequence of actions, leading to full compliance with the Federal criteria within a reasonable time.

If for any reason, the facility owner/operator fails to file his plan for closure or upgrading within the time allowed, he/she will become immediately subject to further enforcement action on the part of the Department. This will also apply where submitted plans for closure or upgrading are grossly inadequate, or where a facility operator refuses to provide for compliance within the shortest practicable time. In each case however, the Department will attempt to secure the voluntary cooperation and compliance of the party in violation.

Step Twelve - EPA Notification:

Whether or not the owner of a non-compliant facility chooses to enter into a voluntary consent agreement, a reporting form will be sent to EPA identifying the facility as an open dump. These forms will be completed as the facility determinations are made, and submitted to EPA after the facility owners have been properly notified in writing (a minimum 30 day notice will be observed). A separate form will be filed for each such facility.

Once EPA is in receipt of a reporting form for each open dump facility in the State, the Department's contractual obligation under the ODI is fulfilled, and the facility inventory classification task is complete. The State's statutory mandate under RCRA however, will remain. This mandate includes both the closure or upgrading of all existing open dumps (Section 4003(3)), and the maintenance and enforcement of the prohibition on new open dumps (Section 4003(2)). Each of these will now be addressed in the remainder of this section.

B. Closing/Upgrading Existing Open Dumps

The inventory and classification process will identify all those disposal facilities in the State which are open dumps within the meaning of the federal law (RCRA). Once identified and listed in the Federal Register, it becomes the responsibility of the State to enforce that law, and to take steps necessary to close or upgrade those facilities. Through the use of compliance schedules, the State is allowed five years after the date upon which a particular facility is first listed in the Open Dump Inventory to close or upgrade that facility and bring it into full compliance with the federal standards.

It will be the policy of the Department to enforce both State and Federal standards hand in hand. If an open dump as defined by the federal standards is also in violation of additional State standards, compliance with both will be sought through enforcement activity.

As mentioned earlier, when a facility is classified as an open dump, the owner will be properly notified, and instructed to prepare a plan for closure or upgrading. He will be informed of the corrective actions necessary for compliance, and encouraged to consider other public and private alternatives to his disposal operation. If other alternatives are feasible and cost-effective, the owner may decide to close the facility. On the other hand, if he decides to continue the operation, he will be placed on a compliance schedule, and required to upgrade the facility within a definite period of time. These actions may be accomplished either on a voluntary basis, or a mandatory basis, depending upon the degree to which the facility owner chooses to cooperate.

As depicted in Table VIII-E-I, the facility owner has three basic options in this regard. He can voluntarily decide to close, voluntarily decide to upgrade, or he can opt to contest the classification. If the owner concurs in the classification he will submit a plan for closure or upgrading, and be placed on a compliance schedule. If he decides to contest the classification, or fails to meet a compliance schedule, he will become subject to administrative and/or legal enforcement action on the part of the Department. Facilities that do not meet the Criteria and are not under a State-established compliance schedule are also subject to the citizen suit provisions of RCRA. These enforcement options are discussed in detail in Chapter VIII - Section D of this State Plan, and are not repeated here. The Department's objective in undertaking enforcement action is threefold; (1) to eliminate existing health and environmental hazards, (2) to minimize the existing potential for health or environmental hazards, and (3) to secure full compliance of the facility through closure or upgrading.

Regardless of the avenue pursued, all those facilities classified as open dumps will be placed on State-established compliance schedules. These schedules will specify a timetable of remedial measures, and an enforceable sequence of actions, which will lead to full compliance within a reasonable period of time, and provide that the facility will pose no reasonable probability of adverse impact on public health or the environment. If conditions warrant, the compliance schedule may also stipulate that the owner perform long-term monitoring at the site and/or prepare contingency plans for health or environmental emergencies that may occur. On this basis, the State will comply with Sections 4003(3) and 4005(c) of RCRA,

and also with the various regulatory requirements contained in 40 CFR Part 256 (256.01(b)(c), 256.23(c), 256.23(d), and 256.26).

As necessary steps are implemented to close or upgrade substandard disposal facilities, the Department's activities in this regard will be recorded and summarized, and incorporated by reference into the Bureau of Waste Control's annual work program. This annual work program will be available for public review and inspection. If the State's actions concerning open dumps are modified in any way for any reason, such changes will be reflected in subsequent workplans published by the Bureau.

C. Prohibiting New Open Dumps

The act of open dumping is prohibited under both State and Federal law. Likewise, solid waste disposal facilities which practice or permit the act of open dumping are also prohibited. All solid waste in the State of Arizona is to be; (a) utilized for resource recovery, (b) disposed of in sanitary landfills, or (c) otherwise disposed of in a manner that is environmentally sound and acceptable to the Department of Health Services.

The Arizona Criminal Code (ARS § 13-1603) holds that "...a person commits criminal littering or polluting when such person throws, places, drops or permits to be dropped on public property or property of another which is not a lawful dump, any litter, destructive or injurious material which he does not immediately remove". This act constitutes a class 2 misdemeanor. Furthermore, ADHS regulation R9-8-431 requires that all refuse shall be disposed of in an approved manner, and R9-8-432 requires that approval be obtained from the Department for all new disposal sites or methods used for disposal prior to the start of operations. These two regulations in particular, provide the Department with an appropriate regulatory mechanism for the control and prohibition of new open dumps, for prior to the approval of any new disposal facility, plans for the operation of that facility must be submitted and reviewed.

There is only one circumstance under which this prohibition will not apply. If a facility owner can demonstrate that he has considered other public or private alternatives to comply with the prohibition on open dumping, and is unable to utilize such alternatives, he may obtain a compliance schedule from the Department which will enable him to operate in a non-compliant manner for a limited period of time. However, this schedule

will specify a timetable of remedial measures, and an enforceable sequence of actions, leading to full compliance within a reasonable and predetermined period of time. In addition, the Department will closely monitor the operation of the facility, and require that all feasible mitigating measures be applied. Under no circumstances will such a facility be permitted to operate in excess of five years.

The State's strategy for prohibiting new open dumps is therefore rooted in the Department's facility plan review function. Facility plans which do not provide assurance of full compliance with both State and Federal standards will not be approved, and such operations will be disallowed. Those parties wishing to develop new disposal facilities will be required to revise and resubmit their plans until such time as the Department is satisfied that their operation will not pose a reasonable probability of adverse impact on public health or the environment. Any facility which subsequently fails to adhere to its approved plan of operation will become immediately subject to enforcement action.

CHAPTER EIGHT

SECTION F

RESOURCE CONSERVATION AND RECOVERY

CHAPTER VIII

Section F

RESOURCE CONSERVATION AND RECOVERY

INTRODUCTION

The statutory objectives of this State Plan are to facilitate the development of methods for the disposal of solid waste which; (a) are environmentally sound, (b) which maximize the utilization of valuable resources and (c) promote resource conservation. Resource recovery, or the retrieval and reuse of materials and energy from the solid waste stream, represents perhaps the most efficient and positive method available for the achievement of these ends. It holds tremendous potential for reducing the total volume of waste disposed, for reducing overall resource consumption, and for utilizing recovered resources which would otherwise be discarded and lost forever to productive use. As its name implies, this precept is basic and central to the Resource Conservation and Recovery Act.

Federal guidelines prepared under authority of RCRA require that the State Solid Waste Management Plan provide for the development of a policy and strategy to encourage resource recovery and resource conservation activities. This policy and strategy is intended to focus upon the minimization of existing constraints which operate to impede the implementation of these activities on an economic and competitive basis. In order to be approved by EPA, the State Plan must require that all solid waste be; (a) utilized for resource recovery, (b) disposed of in sanitary landfills, or (c) otherwise disposed of in an environmentally sound manner (Section 4003 (2)). The Plan must further provide that no local government within the State is prohibited under

State or local law from entering into long-term contracts for the supply of solid waste to resource recovery facilities (Section 4003 (5)).

More significantly, as of October 21, 1978, all State, local and private agencies using appropriated federal funds became subject to a special procurement requirement regarding secondary materials (Section 6002). This provision (RCRA) requires procurement agencies to purchase items containing the highest percentage of recovered material practicable, consistent with maintaining a satisfactory level of competition in the market place. It applies to any purchase of \$10,000 or more for which federal funds are used, and may be waived only where it can be demonstrated that such procurement items; (a) are not reasonably available within a reasonable period of time, (b) fail to meet applicable standards of the procuring agency, or (c) are only available at an unreasonable price. Contracting officers must require that vendors certify the percentage of the total material used for contract performance which is comprised of recovered (secondary) material. In addition, all procurement agencies that generate heat, mechanical, or electrical energy from fossil fuel in systems that have the technical capability of using recovered material and recovered-material-derived fuel as a primary or supplementary fuel, are required to use such capability to the maximum extent practicable. Agencies may be subject to citizen suits under RCRA if they fail to comply with these provisions. Their intent is to stimulate new and expanded markets for secondary materials through federal leverage, and the continued receipt of federal funds in conditioned upon compliance.

The purpose of this element of the State Plan is to address these RCRA mandates as they pertain to Arizona, and to outline a policy and strategy for encouraging resource conservation and recovery activities

throughout the State. In establishing a framework for resource recovery implementation, our focus will be upon creating conditions and institutional arrangements within our State government which would be conducive to and supportive of such activities. The principal role of the State in this respect is perceived to be facilitation rather than implementation. The actual business of resource recovery more appropriately belongs in the private sector, where the incentives for investment and profit exist. There are however, numerous and varied opportunities for the State to become an active partner in this development process. Several of these near-term opportunities, and the measures necessary to effectuate them will be defined.

It is not the expectation of this State Plan that resource recovery targets and goals will become a reality overnight. The technological, institutional and economic barriers are too many and too great to be overcome in the short-term. Nevertheless, it is hoped that the strategy defined herein will gradually stimulate and facilitate their removal, and prescribe a sequence of actions that will lead to the development of a formal support function within Arizona State Government.

CURRENT STATUS

The solid waste stream, particularly municipal solid waste, is potentially rich in valuable materials which may be recovered, reprocessed and reused as an alternative to land disposal. Typically, it is also comprised of a high percentage of combustible materials which may be burned as an energy fuel. Any process employed for the purpose of recovering materials and/or energy from solid waste may be generally defined as resource recovery.

Nationwide, resource recovery technologies are currently in various stages of development and trial application. Commercially established technologies include such relatively simple processes as composting and magnetic separation. Methods now in developmental stages include pyrolysis and aluminum and glass recovery by mechanical means. Processes now under experimentation include biological systems and nonferrous metals recovery (a detailed description of these various technologies is presented in Appendix A).

In all cases, the pace of technological development is accelerating and the range of recovery options is broadening. Nevertheless, substantial economic, institutional and technological barriers to commercialization persist, and have acted to limit the widespread application of resource recovery systems in Arizona.

There are, however, success stories, and indications that progress is being realized on several fronts. A few examples of this are presented below.

The Beverage Industry Recycling Program (BIRP) has been operating successfully in the State since 1971, and represents a unique example of private sector initiative and the feasibility of voluntary source separation. It is a non-profit corporation operating a statewide network of recycling centers for the redemption of aluminum, steel, glass and paper scrap. Collection and separation is conducted manually by volunteers under the sponsorship of the Arizona Wholesale Beer and Liquor Association and the Arizona Softdrink Bottler's Association.

OFFICE OF
THE GOVERNOR
STATE OF
ARIZONA

Bruce Babbitt, Governor

Proclamation

** RECYCLING MONTH **

WHEREAS, we recognize that our nation's natural resources are finite and must be conserved and reclaimed wherever possible; and

WHEREAS, public littering is a blight on our landscape as well as a hazard to our health and an unnecessary public expense; and

WHEREAS, beverage and food container recycling, pioneered in Arizona, offers citizens an opportunity to reclaim such materials as aluminum, steel and glass, and should be encouraged for all residents; and

WHEREAS, the non-profit Beverage Industry Recycling Program opened its first center in Phoenix on April 1, 1971, and since has developed a comprehensive state-wide network of recycling centers throughout the state, now joined by many other Arizona recyclers; and

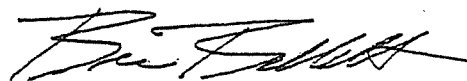
WHEREAS, Keep America Beautiful, a national coalition of those concerned about littering and resource recovery, observes its day on April 25.

NOW, THEREFORE, I, Bruce Babbitt, Governor of the State of Arizona, do hereby proclaim the month of April, 1981, as

** RECYCLING MONTH **

and that all citizens be urged to participate in recycling efforts and recognize the public and private benefits of such resource recovery.

IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Arizona



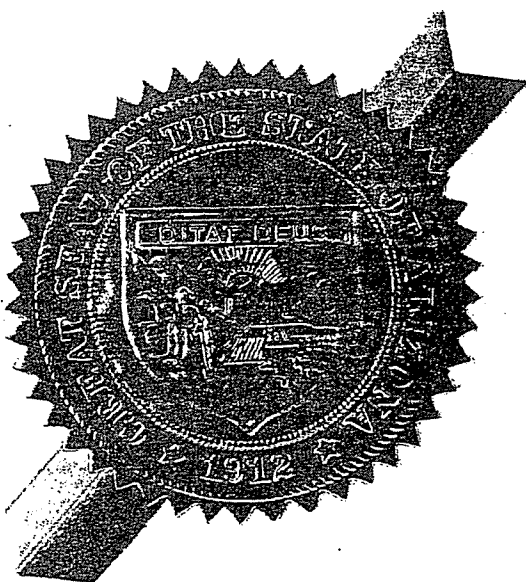
GOVERNOR

DONE at the Capitol in Phoenix on this eighteenth day of March in the Year of Our Lord One Thousand Nine Hundred and Eighty-one and of the Independence of the United States of America the Two Hundred and Fifth.

ATTEST:



Secretary of State



Aluminum scrap is shredded for shipment to secondary processing plants where it is recycled as beverage containers, steel scrap is processed for use as a copper precipitation iron by the mining industry, glass scrap is sorted and sold by color, and newsprint is recycled into the production of cellulose fiber insulation. Approximately 3,000,000 pounds of material is collected, separated and recycled each month, and that volume continues to increase. Primary contractual markets include Alcoa and Kaiser Aluminum, the Glass Container's Corporation, Owens-Illinois and the Ed Brady Company.

A fine example of the practical applications of energy recovery is provided by the Tucson Unified School District, which has installed a heat recovery system at Rincon High School in Tucson. This incineration system, which burns 14,000 pounds of trash per day, provides all the steam required for space heating and domestic hot water, as well as 75% of the steam required for air conditioning in the summer months. It replaced some forty waste-reduction incinerators, and achieved a significant operational cost savings.

Another innovative approach to source separation was introduced in 1977 by a Scottsdale inventor who developed a prototype recycling machine known as the "Golden Goat". It has been described as a "vending machine in reverse", and is an unattended aluminum recycling center that dispenses coins whenever aluminum cans are fed into it. Its commercial feasibility has been tested at a variety of locations and each unit is capable of ingesting some 350 pounds of empty aluminum cans per hour. Now a business firm (Golden Goat, Inc.), the company plans to mass produce the machines and distribute them nationwide.

Other private industry sponsored recycling programs have flourished in recent years as well. In Clarkdale, Arizona, the Phoenix Cement Company is recycling

fly ash from power plants, and utilizing the residue in the manufacture of cement. In the Phoenix area, Genstar Conservation Systems and the Sahuaro Petroleum and Asphalt Company are recycling rubber tires in the manufacture of asphalt-rubber paving products. In northern Arizona, several sawmills are reprocessing lumbering wastes into products such as particle board, decorative bark, mulch and soil conditioners, sweeping compounds and pet litters. Southwest Forest Industries is now converting its Snowflake plant in order to provide a newsprint recycling capability. In addition, a variety of interests now have established routes for the recovery of waste oil from garages and service stations. This oil is either reused directly as fuel, or rerefined to sell as lubricating oil.

These are but a few among the many available examples of practical and economical resource recovery systems now functioning in Arizona. Taken together, they have already rendered a substantial contribution to the conservation of precious natural resources. Their respective operations have reduced waste volumes and land pollution, saved money, energy and virgin materials in short supply, and demonstrated that resource recovery can and does work in the State of Arizona. Most importantly, they have begun the long and difficult process of changing the "waste ethic", and realigning public opinion against the "throw-away" mentality that has historically prevailed.

There are many conceptual virtues regarding resource recovery that may be rightfully extolled, but there are also costs, and very real difficulties involved in its practical implementation. With respect to large-scale facility development, the unbridled optimism of recent years has metamorphosed into circumspect skepticism. None of the centralized resource recovery facilities and systems now being tested around the country have yet been adapted to Arizona, and this

hesitancy reflects problems of high capital cost, developing technology and uncertain product markets. Horror stories about cost-overruns and system failures elsewhere, have alerted prospective investors to the true nature of its speculative risk, and have necessitated a more prudent approach here at home. Until very recently, centralized refuse-to-energy projects were under study for feasibility in both the Phoenix and Tucson metropolitan areas. In January, 1980, the Phoenix City Council resolved that the economics of such a project were inadequate at the present time, and that further project development should be deferred indefinitely. This milestone represented the culmination of a five-year study and investigation of resource recovery options. At the present time, no comparable decision has been rendered by the City of Tucson, but the future of that proposed project remains uncertain. Other Arizona communities however, including Mesa, Scottsdale, Tempe, Yuma and Bisbee are now proceeding in various stages of feasibility planning for similar projects.

The major hurdle to centralized facility development is economics. Landfill disposal costs in Arizona are currently running in the \$0 - 10 per ton range. On this basis, the threshold profitability of resource recovery has probably not yet been realized in most cases. Until this cost profile changes dramatically, it is unlikely that major public or private sector investment in such processing facilities will be forthcoming.

Nevertheless, many factors are now at work to improve its prospects. Continuing inflation in the price of land, fuel and labor is driving the cost of land disposal upwards at an unprecedented rate. In addition, it is anticipated that the economic burden imposed by the new federal land disposal regulations will have a significant impact as well. Also, public opinion is evolving so as to render

conventional land disposal increasingly difficult and unpopular from a political standpoint. When these factors are viewed together, it becomes safe to assume that it will only be a matter of time before these economic variables take a turn for the better.

Another significant constraint is posed by the technological immaturity of the resource recovery industry. Only a few dozen demonstration plants have been introduced nationwide, and their success has not been encouraging in all cases. Problems of regionalization and risk-sharing have been encountered, capital costs have run astronomically high, and various prototype systems have been plagued by mechanical failures. In general, the industry continues to suffer from an earlier underinvestment in research and development. However, this scenario will also improve as the gap between technological need and capability closes.

Certain institutional problems will also have to be addressed if resource recovery is to become a widespread waste management practice. The role of our State Government will be critical in this respect, and must be positioned so as to encourage its development at every possible turn. Problems of inadequate information and underinvestment will need to be directly attacked and rectified. Jurisdictional problems of fragmented and overlapping waste management authority will need to be alleviated. Implementation problems with respect to financing and risk-sharing will need to be remedied, and marketing problems associated with secondary materials will need to be resolved. Clearly, the State cannot be the final adjudicator in each of these potential disputes, but by means of a firm declaration of public policy and the demonstration of effective leadership, a climate can be created which would enhance the likelihood of its success.

Resource recovery and the recycling of materials and energy from solid waste holds the potential of playing a significant role in solving Arizona's problems of waste disposal. Its many social benefits include the wise and efficient use of limited natural resources, the conservation of energy, the enhanced preservation of our unique environment, and an improved ability to control our own destiny; free from a dependence upon outside sources of materials and energy. It enjoys public acceptability, and promises to reduce landfill requirements and disposal costs, both direct and indirect. All things considered, Arizona's support of resource recovery would make good common sense and sound public policy.

Numerous neighborhood recycling and source separation projects have met with proven success. Consequently, the State will continue to encourage and support these source separation activities and efforts. However, the principal task before us now is to promote a larger scale development which would achieve a greater economy and efficiency, and allow for the recapture and reuse of energy. We must come to grips with the solid waste problem, and recognize its value as a resource. In the remainder of this section, we will address ourselves to this task, and outline a strategy and course of action for the State to follow in this pursuit. The strategy proposed herein will only address this approach in general terms. Many of the details will need to be refined at a later time, as expertise and experience are allowed to accumulate. Ultimately, the success of the State's endeavor will depend upon the support of private industry and local government, and the public's recognition of the need for and legitimacy of such an effort.

STATE STRATEGY

Federal regulations recommend resource recovery and resource conservation as the preferred methods of solid waste management and disposal. This recommendation is intended to apply whenever such methods are demonstrated "technically and economically feasible". The State of Arizona is in basic agreement with this principle, recommendation and reservation.

The State is committed to the promotion, facilitation and accommodation of resource recovery. The purpose and goal of the State's strategy will be to achieve an optimal efficiency and economy in the utilization of material and energy resources within its borders. The primary thrust of the effort described herein will be to promote the recovery of valuable materials and energy from solid waste.

This will be accomplished by calculated manipulations of the recovered resources market (supply and demand), positive leadership, and the provision of a variety of supporting services and functions. Market improvements will be realized by stimulating the utilization of recovered resources, and the recycling of recoverable resources, within State Government. Positive leadership will be achieved by demonstrations of resource recovery market feasibility, and the setting of an example for other consumers and suppliers of recoverable resources to follow. Supporting functions and services will include institutional accommodation, public education and information, financial consultation, and technical and planning assistance.

The role of the State will be to encourage and facilitate the development and implementation of resource recovery projects and activities. The State is not in a position to assume direct financial responsibility for actual facility construction. This authority and responsibility will remain vested in the Federal government (grants and loans), private industry (capital investment) and local government (bonds). Nevertheless, the State will aid and encourage this capitalization process in a variety of ways.

The essential elements of the State strategy are presented below, and serve to better define the State's contemplated role in this respect. Each element is intended to define a broad course of action, and generally describes a set of related activities sharing a common purpose or goal. These elements establish both the direction of future planning, and the framework for its effective management.

Elements of the State Strategy

- Element A - the identification, assessment and elimination of existing legal and institutional barriers to the implementation and conduct of resource recovery and resource conservation activities.
- Element B - the assessment of market potential for the utilization of recovered resources within State Government.
- Element C - the implementation of affirmative actions applicable to State Government designed to stimulate the utilization of recovered and recoverable resources.
- Element D - the conduct of public education and the dissemination of technical information regarding the benefits, costs, capabilities and limitations of resource conservation and recovery.
- Element E - the development of the State's capability to provide technical, planning and other forms of assistance to its constituents in the development and implementation of resource recovery and resource conservation systems.

These elements not only outline and summarize the State strategy, but define the State orientation for future resource allocations in this respect as well. In the narrative that follows, we will further develop these elements by recommending specific actions deemed necessary for their respective implementation. These recommendations are grouped by element, and are presented for consideration by both the Legislative and Executive branches of State Government.

RECOMMENDATIONS

Element A - Elimination of Barriers

This element is aimed at the identification and elimination of barriers operating to impede resource recovery implementation in the State of Arizona. In order to further this goal, the following actions are recommended.

1. The issuance by the Governor of an Executive Order or Decree proclaiming resource recovery as the preferred alternative for solid waste management, and putting the State on record as supporting and advocating its further development. This same decree should also espouse State policy in this regard, broadly define the State's role, and direct State agencies to effectuate actions necessary to service this role.
2. A comprehensive review, evaluation and analysis of State statutes sponsored by ADHS and conducted in cooperation with the State Attorney General's Office to identify legal barriers to resource recovery implementation. For review purposes, specific areas of concern should include:
 - a. laws that might indirectly restrict contract length or prohibit long-term contracts for the supply of solid waste to resource recovery facilities (a preliminary review failed to identify any overt or direct prohibitions).
 - b. laws that require split-bidding in construction projects.
 - c. laws that require acceptance of the lowest bid.
 - d. laws that impose ceilings on amounts of pollution control or industrial development authority revenue bonds.
 - e. public utility regulations and/or policies which discriminate against the use of recovered energy.
 - f. laws that restrict the movement of solid waste across jurisdictional boundaries.
 - g. laws that operate to inhibit the procurement and utilization of recovered resources by public agencies.

Following this review, findings should be summarized and reported to ADHS, the Governor's Office, and if appropriate, the Arizona Corporation Commission.

3. A comprehensive review, evaluation and analysis of existing State procurement rules and specifications sponsored by the Arizona Energy Office (OEPAD) in cooperation with the Department of Health Services (ADHS) and the State Department of Administration (DOA) for the purpose of identifying and eliminating any potential barriers to the procurement of recycled materials. This study would also be aimed at the promotion of energy efficient procurement policies in accordance with the Energy Policy and Conservation Act.

Element B - Market Assessment

The aim of this element is to assess the market potential for the utilization of recovered resources within State Government. Knowledge and awareness of the opportunities for utilization, when reinforced by firm policy, will set the stage

for encouraging and implementing such utilization. In order to further this goal, the following actions are recommended;

4. The Arizona Energy Office, in cooperation with ADHS, should sponsor and coordinate the development of a comprehensive listing of recycled materials, and procurement items containing recycled materials, which are energy efficient and currently available in the marketplace. This listing should present the costs of such recycled procurement items as well as the costs of comparable virgin procurement items, and should be maintained and updated on an annual basis.
5. When completed, this listing should be distributed to each State agency, board and commission for the conduct of a "materials utilization audit" which would identify prospective applications for recycled materials in the operations of each State agency, board and commission.

Element C - Market Development

This element is aimed at actions designed to increase the actual utilization of recovered resources within State Government, and thereby increase their utilization outside of State Government by force of example, the demonstration of market feasibility, and the development of State services and functions which would support the promotion of recovered resources utilization. In order to further this goal, the following actions are recommended;

6. As required by RCRA (Section 6002), the State Department of Administration (DOA) should ensure that each State procurement unit utilizing federal funds purchases only those items composed of the highest percentage of recovered materials practicable, where the purchase price of such procurement equals or exceeds \$ 10,000. In addition, the DOA should encourage all State procurement units, regardless of whether or not they utilize federal funds, to apply this standard to all purchases, whether or not they exceed \$ 10,000.
7. The DOA should distribute the listing of available procurement items containing recycled materials to all units of local government, and invite them to enter into joint purchasing agreements for the bulk procurement of such items.
8. Two full-time positions should be created to monitor and coordinate the State's efforts to implement this resource recovery strategy. These positions would be entitled "Materials Recovery Coordinator" and "Energy Recovery Coordinator". The former position should be situated within the Bureau of Waste Control (ADHS). The latter position should be assigned to the Arizona Energy Office (OEPAD). The various responsibilities of these two positions would include:
 - a. the planning, design, development and coordination of pilot demonstration programs within State Government to demonstrate the feasibility of resource recovery (i.e. heat recovery, secondary materials utilization, paper, oil and rubber recycling, etc.).

- b. the preparation and dissemination of public information regarding resource recovery (opportunities, limitations, etc.).
 - c. the coordination and provision of technical assistance to private industry and local government in the planning of resource recovery facilities and projects as appropriate.
 - d. the determination of legislative and regulatory requirements, and the coordination of efforts to draft and enact new enabling legislation and regulatory powers.
 - e. the preparation of reports on a periodic basis concerning the status of statewide resource recovery implementation.
9. ADHS should evaluate the feasibility of various institutional arrangements which might provide for the establishment of a statewide "waste exchange" program. This study would focus primarily upon the industrial waste stream, addressing both its hazardous and non-hazardous components, and would seek to establish a clearinghouse for the exchange of such waste materials between industries for recycling purposes, thereby lessening the need for additional industrial and/or hazardous waste disposal capacity.

Element D - Public Information and Education

The aim of this element is to promote public information and education, and an awareness of the need and opportunity for increased resource conservation and recovery throughout the State. In order to further this goal, the following actions are recommended:

- 10. Information depositories should be established at the district offices of each of Arizona's six regional Councils of Governments. The Materials and Energy Recovery Coordinators should be responsible for collecting pertinent information and literature of both a general and technical nature, and ensuring its distribution to these information centers on a timely basis.
- 11. A mailing list should be developed and maintained by the Energy and Materials Recovery Coordinators for the timely dissemination of information to all parties, in both private industry and local government, which are potentially and prospectively interested in the development or implementation of resource recovery facilities or programs.

Element E - Technical Assistance

The aim of this element is to develop the State's internal capability to deliver technical and other forms of assistance to its constituents in the promotion and implementation of resource recovery and resource conservation systems. These proposed actions are primarily intended to supplement and reinforce the capabilities provided by the aforementioned recommendations.

12. ADHS should periodically sponsor training seminars dealing with resource recovery. The focus of these educational seminars could be upon methods for determining resource recovery options and feasibility in local jurisdictions, methods for assessing alternatives and the transfer of technology.
13. ADHS should strongly endorse the utilization of EPA's Technical Assistance Panels (TAP) program for projects related to resource recovery feasibility, development and implementation throughout the State of Arizona.
14. ADHS should support and encourage resource recovery staff to take advantage of every available training opportunity to develop competency in the field.
15. An environmental policy liaison should be designated within the Office of Economic Planning and Development to monitor and coordinate the efforts of the resource recovery staff with the Governor's Office and other State Agencies. This person could also be instrumental in the development of necessary enabling legislation, and in maintaining the necessary open lines of communication throughout State Government.

Conclusion

The five elements and fifteen recommendations presented herein constitute the State's Resource Recovery Strategy as projected over a five-year period (federal fiscal years 1981-85). This strategy has been broadly addressed in terms of a general goal orientation. Each of its recommendations will undoubtedly require further refinement and planning prior to implementation.

A schedule of anticipated implementation is presented in Table VIII-F-II. It is intended to graphically illustrate the totality and time-phasing of proposed State actions. An X denotes the particular fiscal quarter of the federal budget year in which a State activity is scheduled to commence. The continuation of an X along the horizontal plane indicates the time-span required for implementation and task accomplishment. It is expected that many of these tasks will continue well beyond the projected planning period. In some cases, the commencement of one task will depend upon the successful completion of an earlier task.

Given the current status of resource recovery in the State, it is anticipated that an extended period will expire before substantial progress will be visibly achieved. This will be necessary to allocate and focus adequate resources, develop expertise, educate public opinion, and establish the necessary institutional framework for effective implementation. Nevertheless, certain gains will be realized if these recommendations are adopted and acted upon, and the stage will become set for an accelerated implementation in subsequent years.

It is helpful to remember that in the United States, resource recovery is still a relatively new technology. Until very recently, solid waste remained a virtually untapped resource, both in theory and in practice. Improvements in technology, increasingly stringent environmental controls and the rapidly inflating cost of energy have combined to create a market situation where resource recovery is only now beginning to appear as an economically

TABLE VIII-F-II
 RESOURCE RECOVERY STRATEGY
 PLANNING & IMPLEMENTATION TIMETABLE

Fed. Fiscal Year	81				82				83				84				85			
Fed. Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Governor's E.O.						X														
2. Review of Statutes			X	X	X	X														
3. Procurement Review			X	X	X	X														
4. Secondary materials list			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5. Utilization Audit							X	X	X	X	X	X	X	X						
6. Procurement policy							X	X	X	X	X	X	X	X	X	X	X	X	X	X
7. Joint purchasing							X	X	X	X	X	X	X	X	X	X	X	X	X	X
8. RR Coordinators					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9. Waste Exchange feasibility			X	X																
10. Information Depositories						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11. Mailing Lists			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12. RR training seminars	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13. RR TAP endorsement	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14. Staff Development					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15. OEPAD Liaison						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

VIII-F-18

attractive alternative to the land disposal tradition. In Arizona, where population is small and land resources are great, some distance remains before resource recovery will become the prevailing method of solid waste disposal and management.

Our recommendations pertaining to resource recovery are not an end, but rather a means. In the past, the State's involvement in resource recovery has been limited to a few very small-scale pilot recycling projects, the coordination of federal technical assistance, and the periodic reporting of resource recovery status. If the social and economic benefits of resource recovery are to be realized in Arizona, the State must assume a more active role. What is needed in the near-term, is the establishment of machinery, both legal and institutional, which will allow the development process to proceed and grow. These recommendations are chiefly designed to fulfill this imperative and fundamental need.

With this machinery in place, and the necessary groundwork laid, the State will find itself in a position to assume a more aggressive posture. As the feasibility of resource recovery continually improves, the State must be prepared to exploit these opportunities as they arise. The potential for economic development as a corollary to resource recovery implementation is great, and should not be underestimated. At some future point, it may be advisable for the State to consider various forms of direct financial assistance to this new and fledgling industry. This might include an array of tax incentives and/or a revolving loan fund for facility development. Many other States have already opted for such intervention, and are encountering differing degrees of success. These measures have not been recommended as a part of this initial strategy, but certainly remain a proper subject for continuing consideration and evaluation. The returns on such a public investment may very well exceed it's costs.

In sum, the further development of resource recovery in the State of Arizona is a desirable end. The State can and should play a significant role in this process. This role however, must be guided by an allocation of public value, and operationalized within the framework of a firm and consistent public policy.

In conclusion, we offer the following as a means to serve this purpose.

PROPOSED STATE POLICY FOR RESOURCE CONSERVATION AND RECOVERY

The following policy options are recommended to the Executive branch of State Government in order to maximize the utilization of our valuable material and energy resources, and as a means for the State to comply with the mandates of the Resource Conservation and Recovery Act (P.L. 94-580).

They are further recommended to the State Legislature as a point of departure for the development of additional supporting and enabling legislation which would serve to promote these objectives.

1. It is the policy of the State to promote the protection of public health and the environment.
2. It is the policy of the State to promote the conservation and recovery of valuable material and energy resources.
3. It is the policy of the State that all solid waste shall be utilized for resource recovery, disposed of in sanitary landfills, or otherwise disposed of in a lawful and environmentally sound manner.
4. It is the policy of the State to cooperate with the Federal Government, Interstate agencies, local governments and private enterprise in promoting the demonstration, construction and application of solid waste management, resource recovery, and resource conservation systems which preserve and enhance the quality of air, water and land resources.
5. It is the policy of the State that no local government within the State shall be prohibited under State or local law from entering into long-term contracts for the supply of solid waste to resource recovery facilities.
6. It is the policy of the State that all State procurement agencies shall purchase items containing the highest percentage of recovered material practicable, consistent with maintaining a satisfactory level of competition in the market place.
7. It is the policy of the State that all State agencies shall utilize recoverable and recyclable resources to the maximum extent practicable in the performance of their statutory duties.

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APPENDICES

Description of Resource Recovery Technologies*

In this appendix, the processes for centralized resource recovery are described and the major unit processes of the technologies are identified. Although many processes recover both energy and materials, the technologies for each of these purposes are discussed separately here. A list of additional readings on resource recovery is included.

This appendix is primarily descriptive. It is based on published literature and on conversations with industry, Government, and other experts. Not all of the processes described here are in commercial use.

Energy Recovery Systems

Mass Incineration Processes

WATERWALL INCINERATION

In waterwall incineration, raw municipal solid waste (MSW) is burned directly in large waterwall furnaces, generally without pre-processing the waste. The primary product is steam, which can be used directly or converted to electric power, hot water, or chilled water. Figure C-1 shows schematically the main features of a waterwall furnace for unprocessed MSW.

In some installations shredding to reduce waste size and/or facilitate recovery of materials takes place. For example, at the Saugus, Mass. plant, large bulky items have been shredded before burning. (The shredder is being removed, however.) At Hamilton, Ontario MSW is shredded before burning. Fer-

rous metal can be recovered by magnetic separation from ash after incineration, or before incineration if MSW is pre-shredded.

Waterwall combustion systems have been used commercially in Western Europe since World War II. Data from a recent survey of their experience indicate that European plants tend to achieve large scale using several small modular furnaces. For example, the 634 tons per day (tpd)* Sorain Cecchini facility in Rome, Italy has six, 4.4-ton-per-hour units.(2)

This modular approach contrasts with U.S. practice. The Saugus plant has a design capacity of around 1,500 tpd and uses two European Von Roll furnaces with a capacity of around 31 tons per hour each.

Even though European societies differ from ours, comparisons should be helpful in contemplating future technological directions for U.S. development. The Environmental Protection Agency (EPA) has an intensive, detailed study of European systems underway.

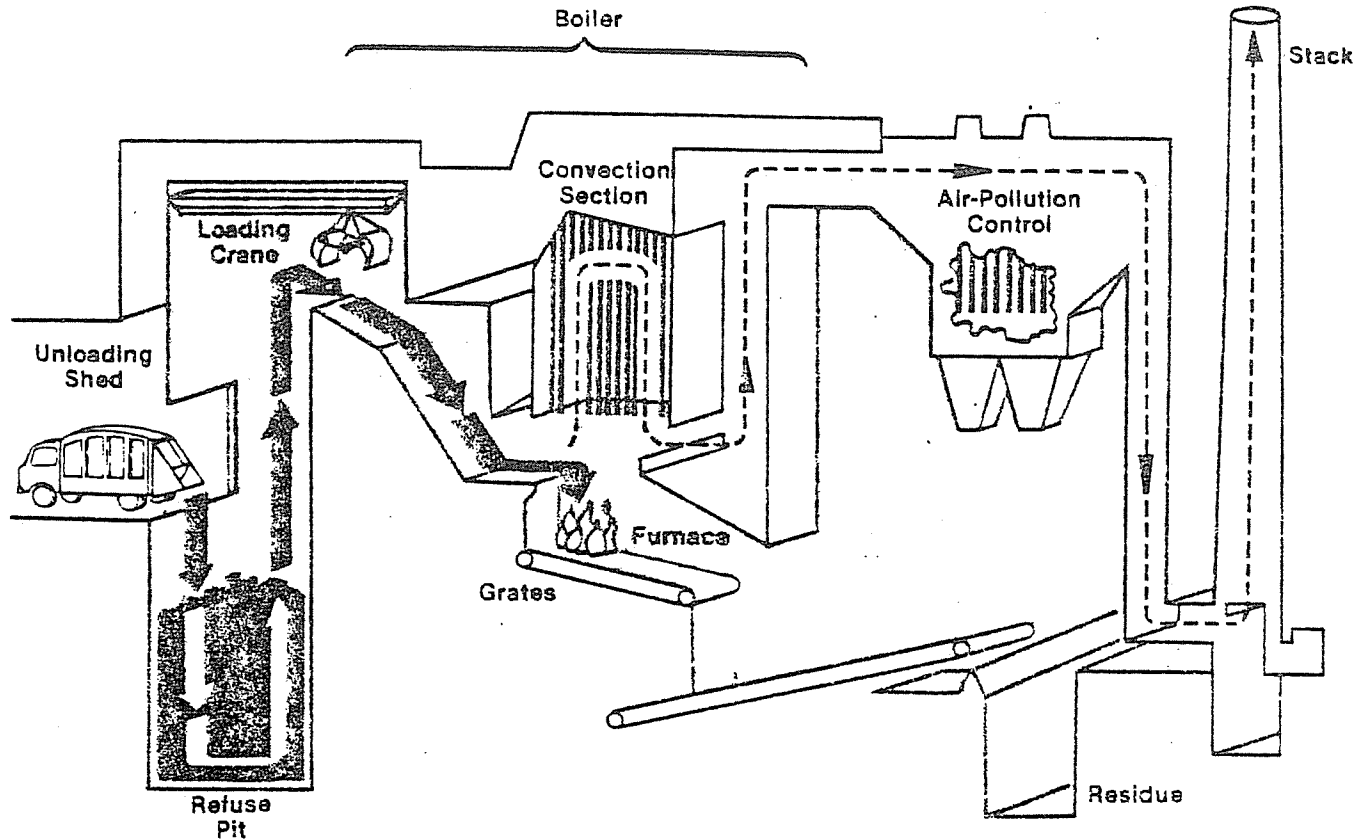
SMALL-SCALE MODULAR INCINERATION

Small-scale modular incinerators feature heat recovery as steam or hot water, and usually forego materials recovery. Most applications to date have been in hospitals, schools, other institutions, and industry whose wastes are more homogeneous than MSW. Thus, application of this technology to MSW is a relatively recent development. Three of these systems were reported as operational in EPA's Fourth Report to the

*All ton units in this appendix are short tons—2,000 pounds.

*SOURCE: Office of Technology Assessment. Materials and Energy from Municipal Waste. Congress of the United States. Wash. D.C. 1979.

Figure C-1.—Typical Waterwall Furnace for Unprocessed Solid Waste



Congress: a 50-tpd unit at Blytheville, Ark., a 30-tpd unit at Groveton, N.H., and a 20-tpd facility at Siloam Springs, Ark.(3)

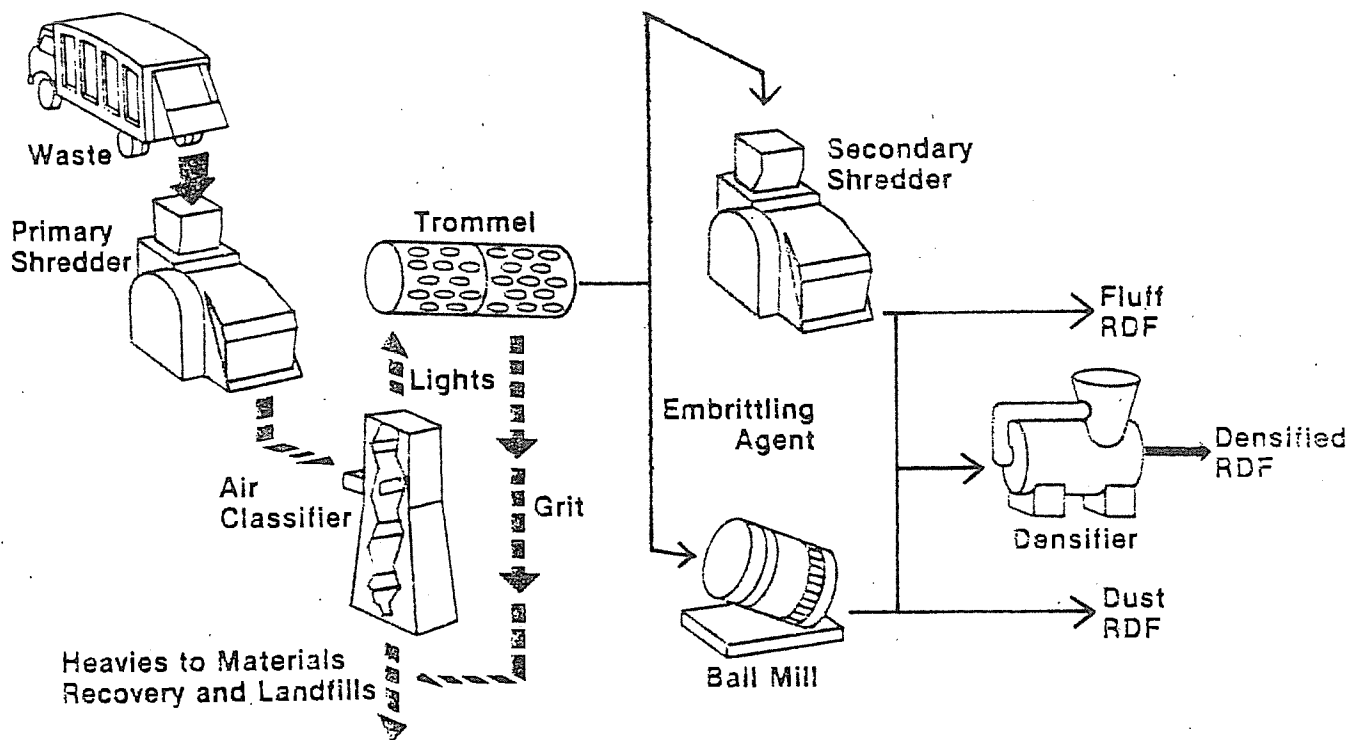
These systems are called modular because individual furnaces are small and desired plant size is achieved by installing several identical units or modules.(4) MSW is incinerated in two stages. First, raw MSW is burned in insufficient air to achieve complete combustion, producing a combustible gas and a byproduct residue. The gas from primary combustion is then burned with an auxiliary fuel (oil or gas) in a secondary combustion chamber with excess air. Hot gases from the secondary combustion chamber are passed through a waste heat recovery boiler or heat exchanger to produce steam, hot water, or hot air. The two-stage combustion process, as contrasted to traditional single-stage incineration, helps to reduce particulate emission problems.

Refuse-Derived Fuel Systems

Solid refuse-derived fuel (RDF) is produced by separating MSW and mechanically removing the organic combustible fraction using wet or dry processes. The fuel product of dry processing can be fluff RDF, densified RDF, or dust or powdered RDF depending on the subsequent processing used. Most RDF plants also recover one or more of the following materials: ferrous, aluminum, glass, or mixed nonferrous metals. Figure C-2 schematically portrays the main processes for producing the different RDF fuels.

In dry mechanical processing of the type used in the St. Louis, Mo.; Ames, Iowa; and Washington, D.C. facilities, raw waste typically is first shredded to 8 inches or less in size. This shredded material is next put through a device called an "air classifier" that separates the light organic material from

Figure C-2.—This Simplified Flow Diagram Shows How the Dry Processing Approach (No Water Slurry) Can Be Used to Produce Fluff, Densified, or Dust RDF



metals and other heavy organic and inorganic materials. The light material then goes through a rotating screen or "trommel" to remove abrasive fine sand, glass, and grit. The heavy materials from the air classifier and trommel move to a magnetic separating device that recovers ferrous material. Some plants also attempt to recover aluminum, glass, and mixed nonferrous metals, using processes described in a later section.

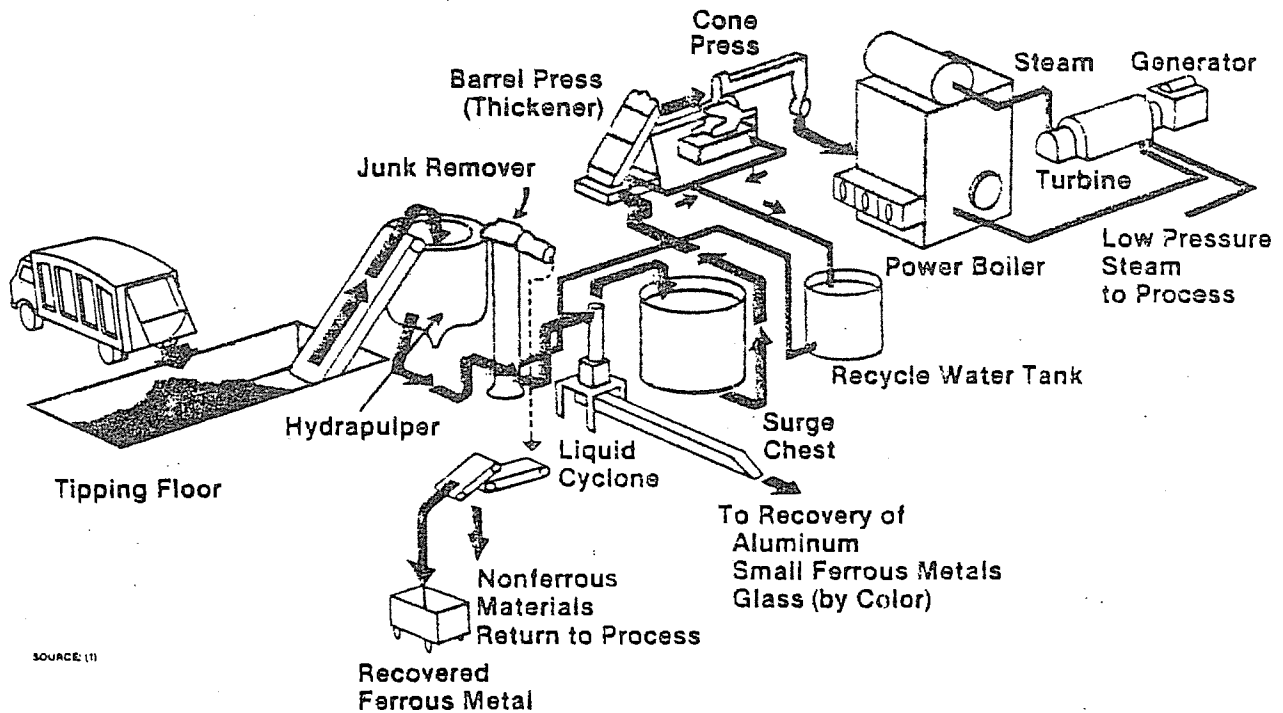
Based on experiences with the first generation of dry waste separation systems that employed shredding and air classification, attention has recently been given to a wider variety of processing schemes. One includes a trommel, or screening device, as the first processing step, to remove whole cans and bottles prior to waste shredding. In another variant, the shredder is eliminated and air classification is used as a first step. This is based, in part, on the concept that shredding, which is the locus of most operating explosions (see chapter 5), should be avoided. The

best arrangement and design of first-stage dry mechanical separation processes is an important area of current research on resource recovery.

As shown in figure C-2, the light organic material from the trommel goes to a secondary shredder that further reduces the particle size to less than 1½ inches. The resultant material is called "fluff RDF." Fluff RDF can be passed through a pelletizing or briquetting machine to yield "densified RDF." The objective of densification is to improve storage, handling, and stoker-furnace burning characteristics. Alternatively, the light output from the trommel can be treated with a chemical embrittling agent and ground to a fine powder in a ball mill to produce a "dust or powdered RDF" with a particle size of around 0.15 mm. This is the basis of the Combustion Equipment Associates ECOFUEL-II® process.

Figure C-3 illustrates the wet process RDF method. With this technology raw refuse is

Figure C-3.—Wet Process Energy Recovery System



SOURCE: (1)

fed to a hydrapulper (a machine like an oversized kitchen blender) where high-speed rotating cutters chop the waste in a water suspension. Large items are ejected and the remaining slurry is pumped into a liquid cyclone separator where smaller heavy materials are removed. Water is then removed to leave "wet RDF" with from 20- to 50-percent water content, which can be burned alone or as a supplement to coal, depending on its water content.

The wet pulping method has several advantages and disadvantages relative to the dry process. Sewage sludge can be mixed with the wet pulp prior to dewatering and the resulting mixture can be burned as a method of codisposal. Dewatering, however, is expensive and energy intensive. The wet process reduces the likelihood of explosion or fire in the size reduction phase, as compared to dry mechanical processing. It is possible to recover some organic fiber by the wet process. However, the quality of this fiber is insufficient for it to be used to produce paper. The

only domestic application in one small plant at Franklin, Ohio, has been as a reinforcement in roofing material.

Pyrolysis Systems

Pyrolysis is destructive distillation or decomposition of organic materials in MSW at elevated temperatures in an oxygen deficient atmosphere. The product of pyrolysis is a complex mixture of combustible gases, liquids, and solid residues usable as fuels or chemical raw materials. The characteristics of the pyrolysis products depend on such variables as time in the reactor, process temperature and pressure, oxygen content of the gas in the reactor, particle size of the MSW feed, and the choices of catalysts and auxiliary fuels. Differences in these parameters distinguish the several proprietary processes that have been developed. Four proprietary systems are presently in some stage of demonstration: Two of these produce low-Btu gas: Monsanto's Landgard and the Andco Torrax

processes. The Union Carbide Purox system produces medium-Btu* gas. The Occidental Research Flash Pyrolysis process produces a liquid fuel.**

In the Monsanto system, figure C-4, MSW is shredded before it is pyrolyzed with a supplementary fuel in a large (20 ft diameter, 100 ft long) horizontal, refractory-lined kiln. Solid residue from the kiln is water quenched and separated into ferrous metal, glassy aggregate, and char. The char is dewatered and landfilled. In the Andco process, figure C-5,

*Low-Btu gas has a heating value of around 100 to 150 Btu per standard cubic foot (scf), the heating value of medium Btu gas is 300 to 400 Btu per scf. By comparison, natural gas has a heating value of about 1,000 Btu per scf.

**Liquid pyrolysis oil has a heating value of about 10,000 Btu per pound, roughly half that of No. 6 fuel oil.

raw MSW enters a vertical shaft furnace after large items are removed and is pyrolyzed with auxiliary fuel. As the charge descends it is dried and converted to gases, char, and ash. The low-Btu gas produced must be burned onsite to produce steam or hot water.

The only Monsanto system in operation, a 1,000-tpd plant in the city of Baltimore, is currently undergoing modification to solve air pollution and other technical problems. Monsanto has withdrawn from the project. Andco has no plants in the United States. A 200-tpd plant is in startup in Luxembourg, and two others are under construction, one in France and one in West Germany.

In the Union Carbide Purox system, figure C-6, ferrous material is magnetically sepa-

Figure C-4.—The Monsanto Landgard System Produces a Low-Btu Gas Which is Immediately Burned Onsite for the Production of Steam

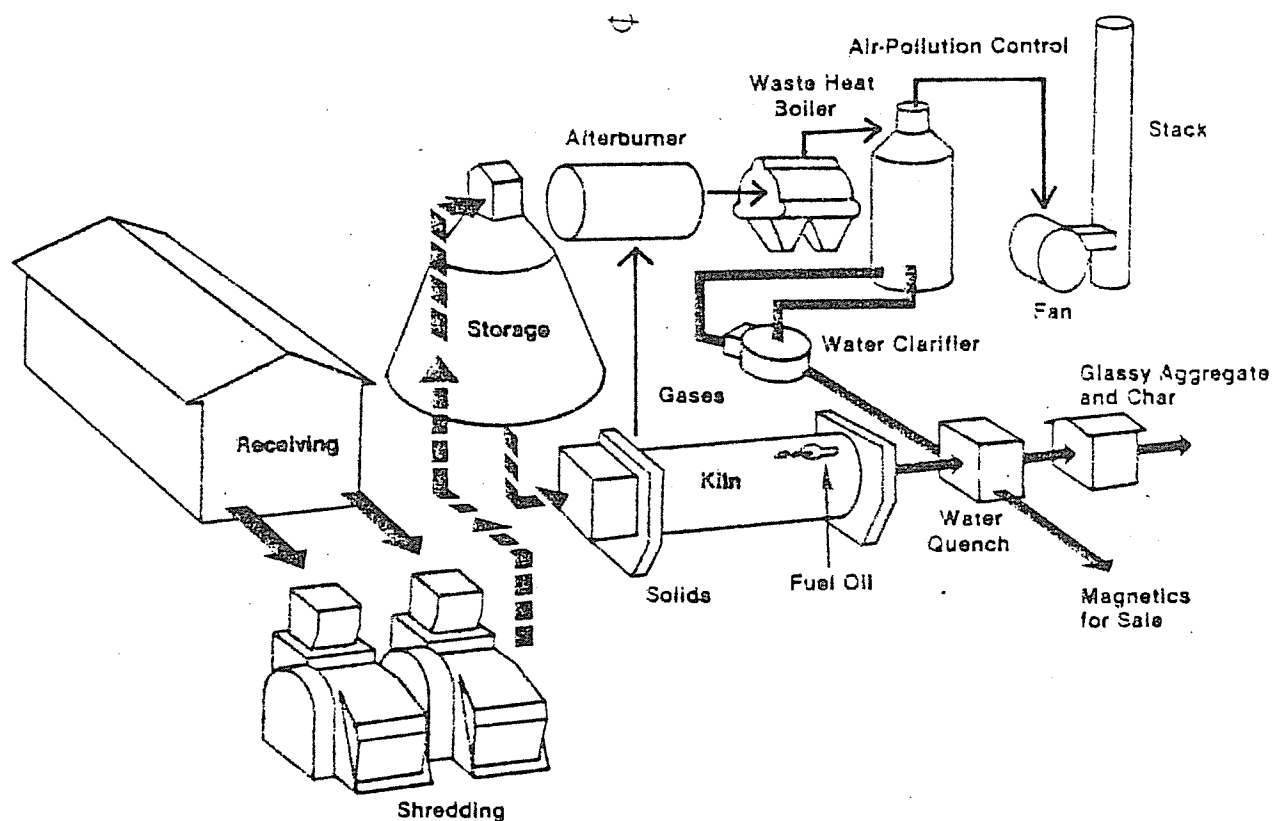
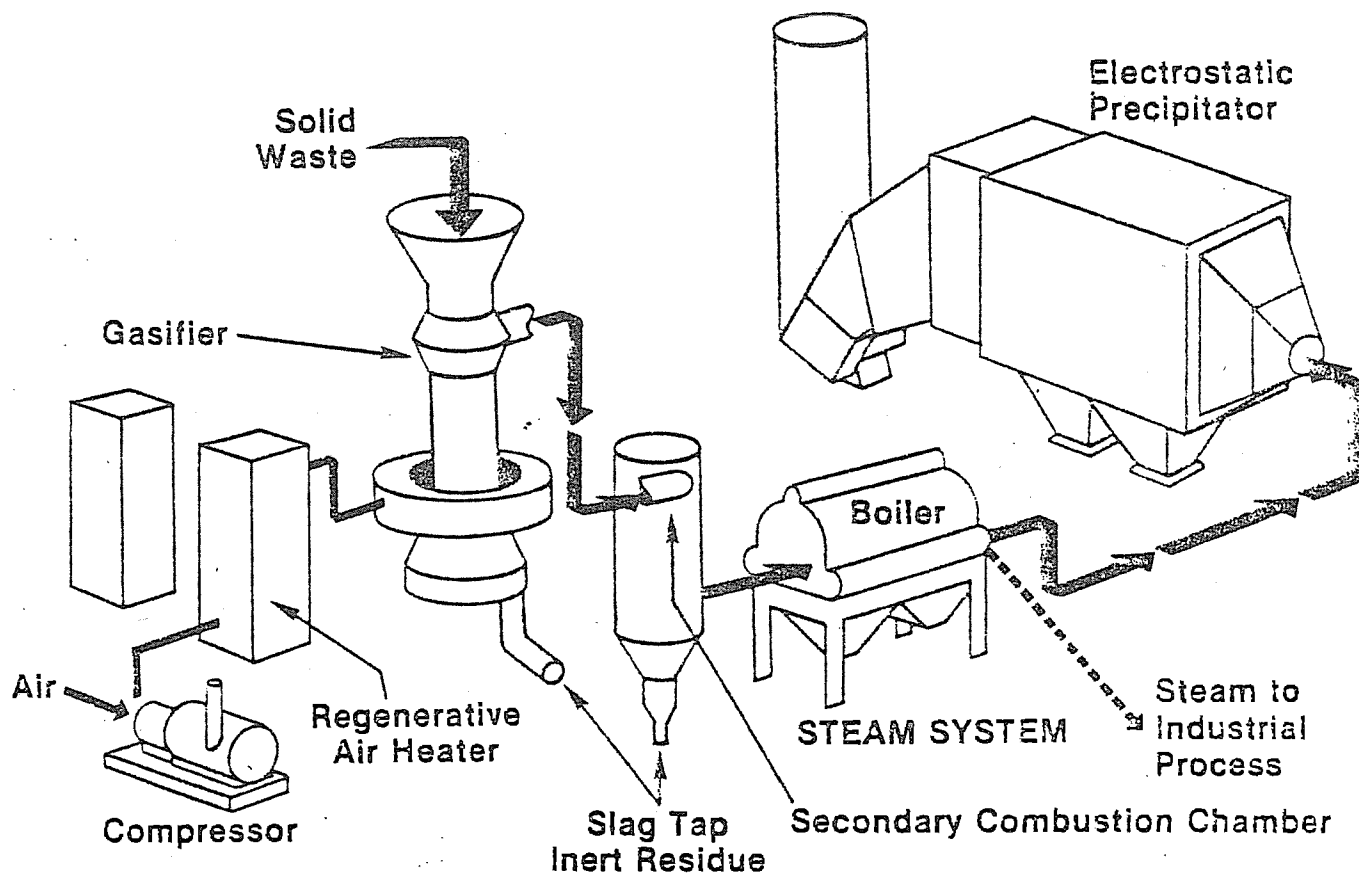


Figure C-5.—Torrax Slagging Pyrolysis System



rated from shredded MSW prior to feeding. Shredded refuse fed into the top of the vertical shaft furnace descends by gravity into zones of increasing temperature where drying, then pyrolysis, and finally char combustion and slagging take place. The temperature in the bottom zone, the slagging zone, is high enough to reduce the residual to a molten slag that continuously drains into a water quench to produce a hard granular aggregate material called frit. The Purox process feeds the furnace pure oxygen, rather than air as in the Monsanto and Torrax systems, and produces medium-Btu gas product. Its smaller volume and higher Btu content facilitates economic shipment over reasonably long distances. Union Carbide has been operating a 200-tpd demonstration plant at Charleston, W. Va., but no commercial facility yet exists.

In the Occidental liquid fuel pyrolysis process, shown in figure C-7, raw MSW is first

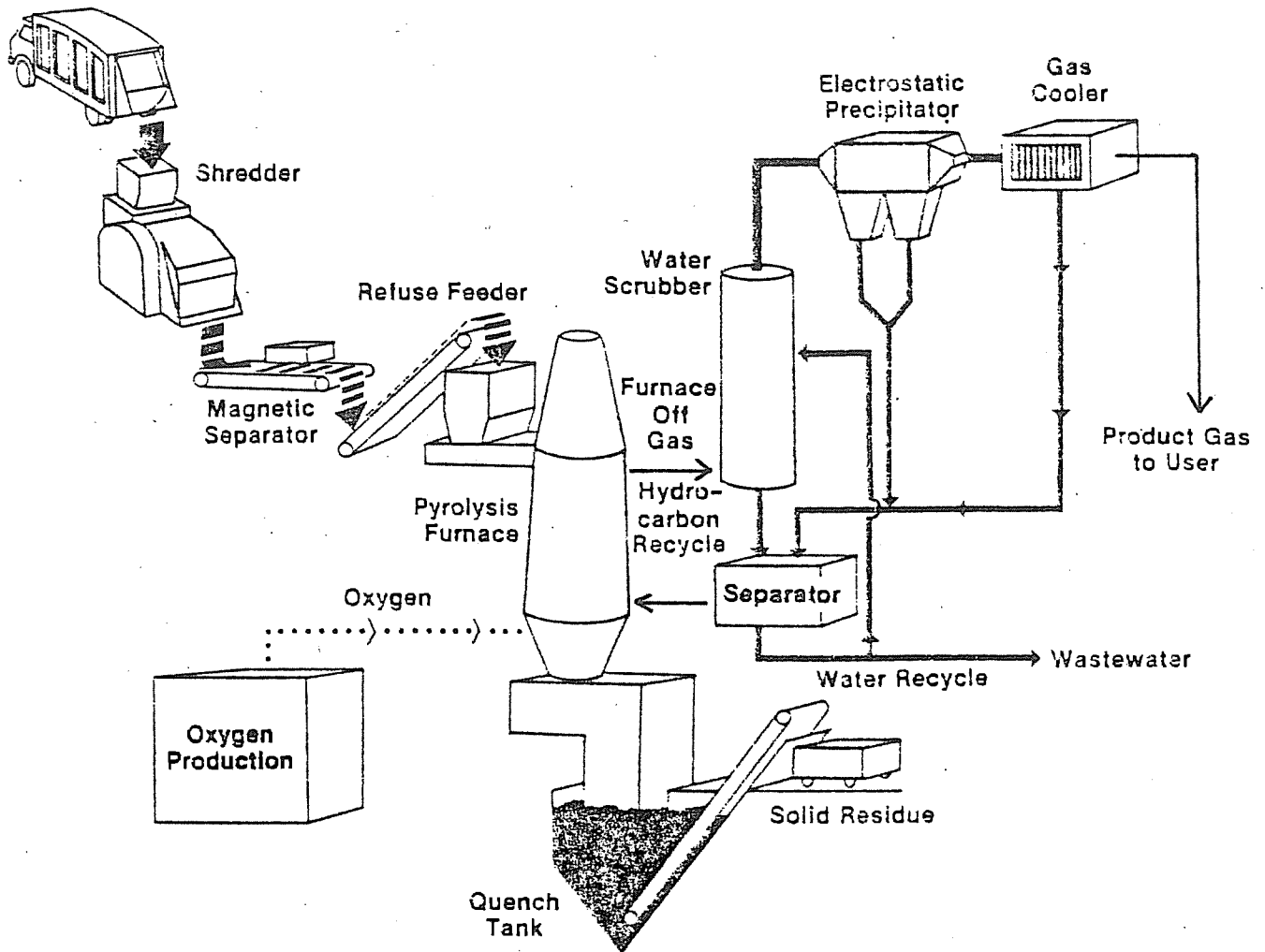
shredded and air classified to recover ferrous metal, aluminum, and glass prior to pyrolysis. The light organic fraction is dried, shredded again in an inert gas atmosphere, and then introduced to the pyrolysis reactor. Pyrolysis in the reactor vessel produces an oil-like fluid somewhat comparable to No. 6 fuel oil* that can be burned in existing oil-fired, steam-electric powerplants. A 200-tpd demonstration plant in San Diego County, Calif., was reported to be undergoing operational testing in early 1978. A subsequent report in May 1978 indicated that this system was not operating and faced major cost increases if it were to be continued.(5)

Biological Systems

This description focuses on three biological waste-to-energy technologies: recovery of

*Ibid.

Figure C-6.—Union Carbide Purox System Produces a Medium-Btu Gas for Sale to Offsite Users



methane from landfills, anaerobic digestion, and hydrolysis.

METHANE PRODUCTION FROM LANDFILLS

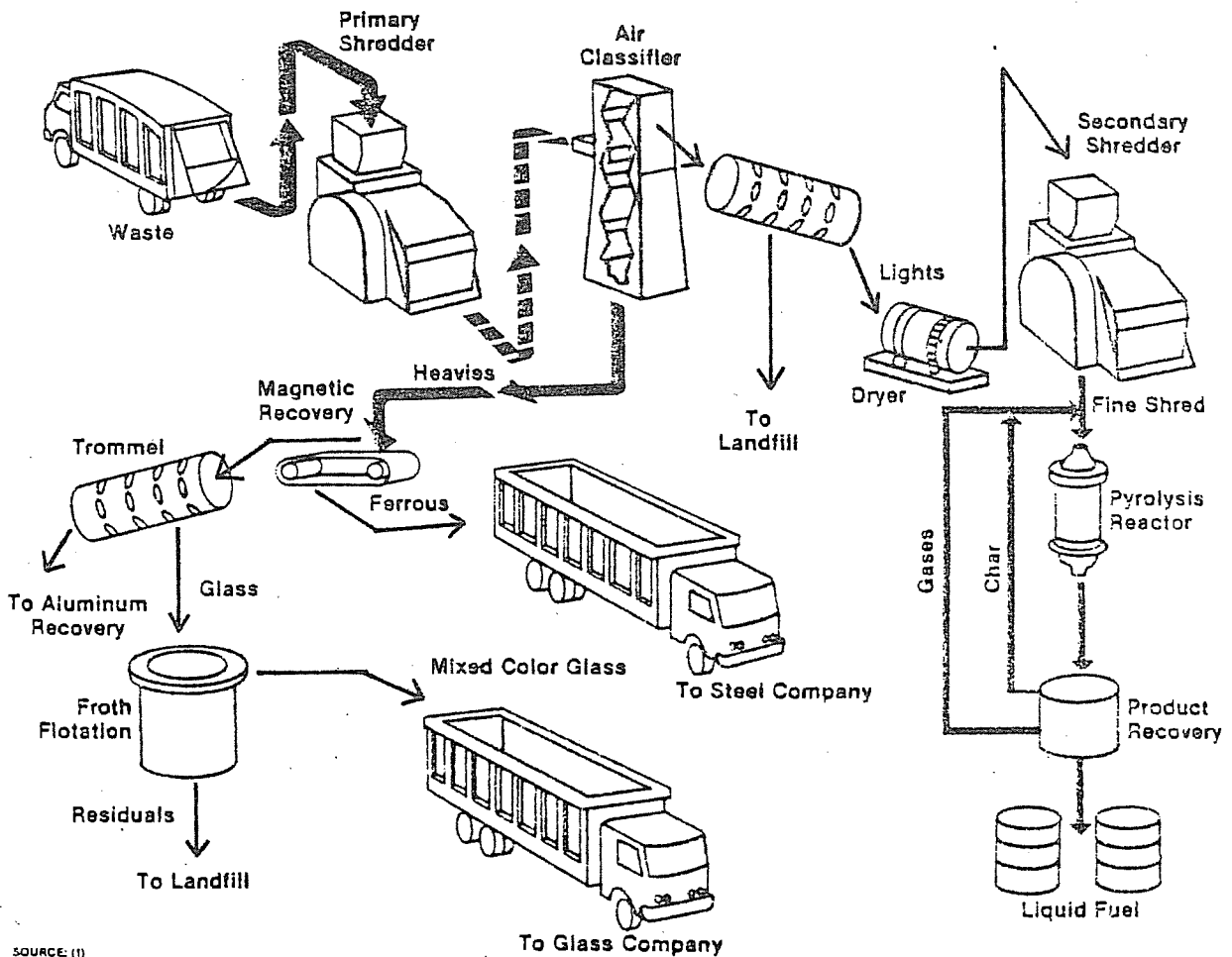
Natural decomposition of MSW in landfills produces a gas composed of roughly 50-percent methane and 50-percent carbon dioxide. If landfill geological characteristics are satisfactory, gas can be withdrawn through wells drilled into the landfill and can be treated to remove moisture, hydrogen sulfide, and other contaminants. Carbon dioxide can be removed leaving pipeline quality methane. Corrosion problems with this technology appear to be under control.(5) Recovery of methane from an old sanitary landfill is being explored at the Palos Verdes landfill at Los

Angeles where approximately 500,000 cubic feet of purified methane is being recovered per day. Enough methane is recovered daily at the Palos Verdes site to meet the energy needs of some 2,500 homes.(5) EPA is evaluating several landfill gas-producing projects.(3)

ANAEROBIC DIGESTION

Methane can be recovered from anaerobic digestion of MSW in large tanks or reactors as shown in figure C-8. Anaerobic digestion of waste is accomplished by two types of bacteria: (i) acid formers that convert waste to organic acids, and (ii) methane producers that convert the acids to carbon dioxide, methane, and small quantities of other gases. One of the potential problems with methane

Figure C-7.—Production of Liquid Fuel From Solid Waste Using the Occidental Process



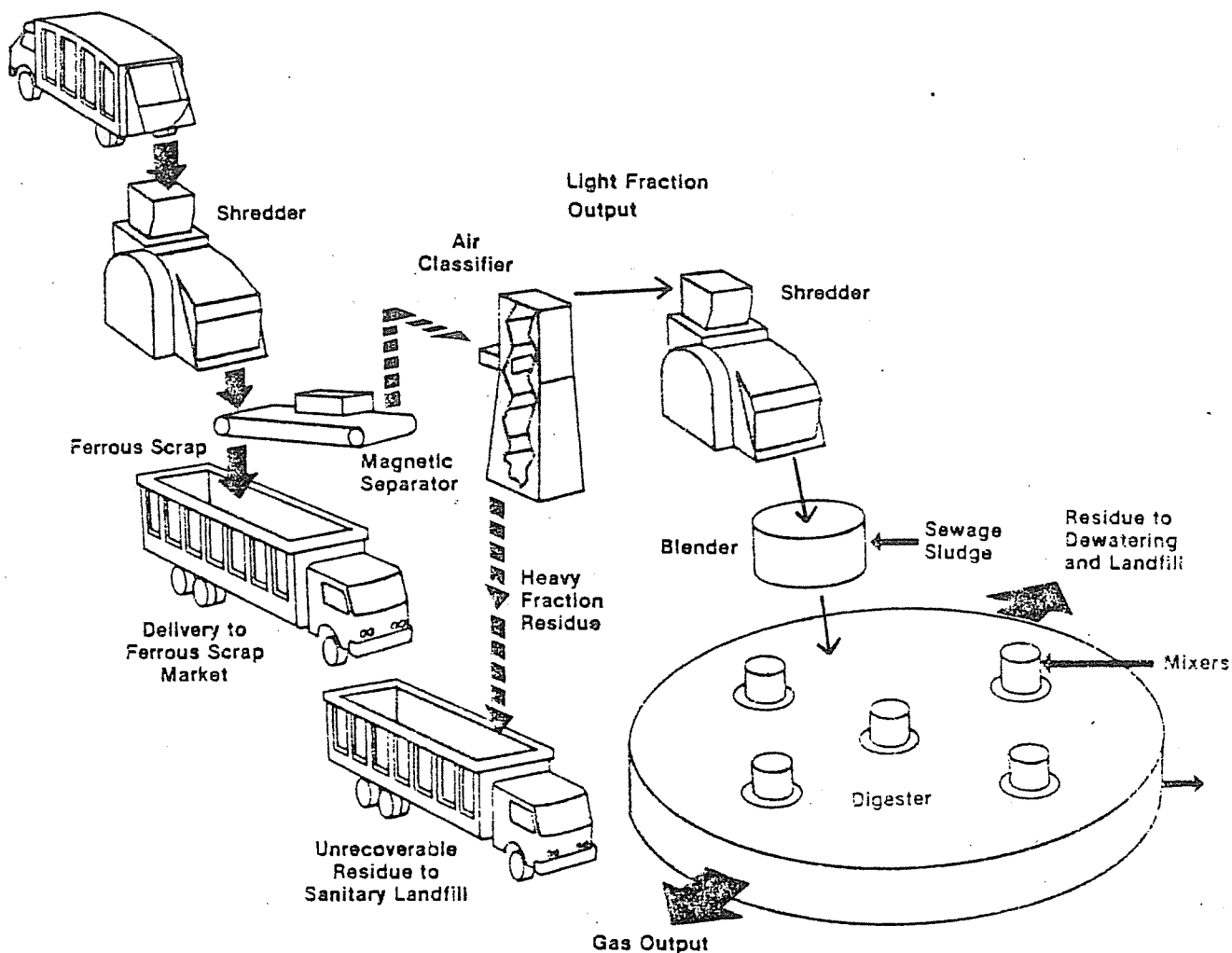
SOURCE: (1)

generation is that MSW sometimes contains toxic components that can kill the methane-producing bacteria. Successful methane production from sewage sludge and animal manure can in part be attributed to the homogeneity of these substances and to the absence of bacteria-killing toxic contaminants.

A demonstration project to assess the feasibility of a 100-tpd anaerobic digestion system for MSW is being supported by the Department of Energy (DOE) at Pompano Beach, Fla., with startup expected in late-1978. At the Pompano Beach facility, MSW will be pre-processed to produce fluff RDF and recover ferrous metal. The wet RDF process could also be used. The RDF will be mixed with raw

sewage sludge and introduced into digester tanks where it is mixed. The MSW-sludge mix will stay in the reactor around 10 days to capture the largest portion of the methane; longer retention times will produce more gas but at a rapidly decreasing rate. The gas produced by this process will contain approximately 50-percent methane and 50-percent carbon dioxide with a heating value of 540 to 700 Btu per cubic foot. The gas can be burned as is, without purification, or with further processing the carbon dioxide and traces of hydrogen sulfide can be removed to yield methane with a heating value of about 1,000 Btu per cubic foot. The digestion process produces large quantities of a liquid effluent, the majority of which will be recycled to the mix-

Figure C-8.— Biological Gasification of Solid Waste in Reactors



ing tanks, with the remainder discharged to a city sanitary sewer system. The remaining solids, about 17 percent of the refuse feed, must be either landfilled or burned in specially designed boilers. Schulz (6) estimates that approximately 3,700 cubic feet of methane will be produced per ton of MSW.

HYDROLYSIS

There are two processes for the production of ethyl alcohol (ethanol) from the organic portion of MSW by hydrolysis: (i) acid hydrolysis, which is a well-developed industrial technology for nonwaste applications, and (ii) enzyme hydrolysis, a recent process still in the research stage. To convert cellulosic ma-

terial to ethanol, it must first be hydrolyzed to produce sugar which then ferments to yield dilute ethanol that can be recovered by distillation. The production of ethanol from MSW by hydrolysis is not currently in the commercial or demonstration stage to our knowledge. Wilson (7) reports that Black Clawson is currently researching this area.

Considerable pioneering research in enzyme hydrolysis has been carried out at the U.S. Army Natick Development Center in Massachusetts. Natick's work in this area arose out of attempts to prevent biological decay of textile materials. Since 1972, they have been authorized to conduct studies of enzyme hydrolysis processes for converting

cellulose wastes of military bases into useful products. The fungus *Trichoderma viride* has been identified as having considerable enzyme productivity, with a potential for commercially feasible conversion processes.(8)

In addition, the Gulf Chemical Company is presently exploring the feasibility of constructing a demonstration plant (50 tpd of biomass feedstock) for the production of ethanol from municipal, agricultural, and industrial waste by enzymatic hydrolysis.(9)

Materials Recovery Systems

Several of the energy recovery systems just described include ferrous metal, aluminum, or glass recovery technologies. Other materials that can be recovered are paper fiber, compost, and other nonferrous metals.

Aluminum

The process for aluminum recovery is based on an eddy current separation system commonly called an aluminum magnet. With this technology, nonferrous conducting metals mixed with other wastes are conveyed through a magnetic field in such a way that an eddy current is induced in the metals. This current causes the metallic conductors to be repelled from the region of the magnetic field and thus out of the conveyor path. Nonmetals are unaffected and are carried on. The device is quite sensitive and can be tuned to repel various shapes, densities, or materials. For example, it can be tuned, or optimized, to recover aluminum cans, the largest part of the aluminum waste. Eddy current separation equipment is currently installed at the following locations: National Center for Resource Recovery (NCRR) experimental test facility in Washington, D.C.; Ames, Iowa; Baltimore County, Md.; Occidental pyrolysis plant in San Diego, Calif.; the Americology plant in Milwaukee, Wis.; and in New Orleans, La. As reported in chapter 5, as of April 1978, none of these facilities was in steady production with a sustained commercial run.

Electrostatic separation is another method for separating nonferrous metals from organic materials. Mixed wastes pass between charged plates and are given an electric charge. Conducting materials such as aluminum lose their charge on an electrically grounded drum and fall off. Nonconductors retain their electrical charge and adhere to the drum. None of these systems is in use in full-scale plants. To further assist in cleaning contaminants from metals, a device called an "air knife" is sometimes used.

Glass

Two systems are being experimented with for the recovery of waste glass from MSW. Research is proceeding on froth flotation, a standard mineral processing technique, for the recovery of glass. In this process the "heavy" portion of the waste stream, rich in finely ground glass, is slurried in water along with chemicals that cause the glass to become attached to air bubbles on the surface of the water. The glass floats out of the mix with the bubbles and is then washed and dried. Froth flotation is being explored at the NCRR facility in Washington, D.C.; in New Orleans, La.; and at the Occidental pyrolysis plant in San Diego. It is being installed in both the Monroe County, N.Y., and the Bridgeport, Conn., plants.

Since glass recovered by froth flotation produces mixed colored cullet, which has a limited market, the process of "optical sorting" is being examined. Glass particles around one-fourth inch in size are sorted, on the basis of their light transmission properties, into three colors, clear (flint), green, and amber. This process currently faces problems with high costs and its inability to reject a sufficiently large fraction of contained ceramics and stones to meet the quality standards required by glass producers. It also cannot recover particles smaller than one-fourth inch in size. Color sorting is being installed at the Hempstead plant in New York and has been used on a pilot plant basis at the Franklin, Ohio, facility.

Ferrous Metals

Ferrous metals have been removed from MSW by magnetic separators for a number of years. A recent study by the American Iron and Steel Institute identified nearly 40 such commercial installations in the United States.(10) Some experience has been gained more recently in magnetic recovery of incinerated ferrous metals from the residue or ash from MSW incinerators. Such a device is currently in regular operation at the Saugus incinerator, but the recovered ferrous material is not currently being marketed. The U.S. Bureau of Mines has experimented with a complex mineral-technology-based process for "back-end" recovery of a variety of materials from incinerator residue.(11) Incinerated ferrous may be less marketable than the unincinerated product.

Compost

Composting permits organic matter to decay to humus, which can be used for fertilizer or soil conditioner. Generally, composting has not been economically successful because of difficulty in selling the humus product. According to EPA, only one composting plant was operating as a commercial facility in 1976, the 50-tpd plant at Altoona, Pa.(3) A 1969 survey identified 18 plants with a total capacity of 2,250 tpd, indicating a major decline in U.S. composting operations in this 7-year period.(12)

Composting is successful in some European countries. In the Netherlands where markets for humus in the flower and bulb industries are good, the Government runs composting operations. A technique for briquetting and joint composting of MSW and sewage sludge has been developed in Germany. Its developers claim that the dried briquets can be used in food for pigs, as a soil conditioner, as a stable element in landfills, or as fuel.(2)

Fiber

Not many centralized resource recovery facilities can reclaim fiber from MSW for recycling as fiber. A 150-tpd demonstration fiber recovery facility has been operating since 1971 at Franklin, Ohio, using the Black Clawson wet process described earlier. Fiber recovered with this process is of poor quality, and it is sold to a nearby manufacturer of asphalt-impregnated roofing shingles. Two wet process plants, the Hempstead, N.Y., facility now under construction, and the plant in Dade County, Fla., about to begin construction, will recover the fiber for use as a fuel, not for paper production.

A dry process for recovering paper fiber and light plastics has been developed by the Cecchini Company in Rome, Italy. Paper from this process is used with straw to make a low-grade paperboard. In general, the quality of the recovered paper is low and it has limited marketability. Roughly 23 percent of the paper in the input waste stream is recovered.(1) Other dry paper recovery processes, such as the Fläkt process, which are being explored on a pilot plant basis in Western Europe, are described by Alter.(13)

Finally, some of the most recent plants (Milwaukee and New Orleans) feature limited paper recovery by hand-packing of bundled paper from the resource recovery plant input conveyor. This method has both economic and quality limitations.

Other Materials Recovery Technologies

There are many other materials recovery technologies which have not been addressed in this brief overview. The most important contemporary processes, however, have been touched upon. Readers wishing to explore further might do well to start with a review of the extensive research in this area carried out over the years by the U.S. Bureau of Mines.(11)

Additional Reading on Resource Recovery-Technologies

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4. _____, *St. Louis Demonstration Final Report: Refuse Processing Plant—Assessment of Bacteria and Virus Emissions* by Midwest Research Institute, Kansas City, Mo., draft report August 1977. EPA Contract No. 68-02-1871, MRI Project No. 4033-L.
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6. _____, *Evaluation of the Ames Solid Waste Recovery System, Part 1. Summary of Environmental Emissions: Equipment, Facilities, and Economic Evaluations*, by Iowa State University and Midwest Research Institute, November 1977. EPA-600/2-77-205.
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3. Environmental Protection Agency, Office of Solid Waste Management, *Fourth Report to the Congress, Resource Recovery and Waste Reduction*, Publication SW-600, Aug. 1, 1977.
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APPENDIX B

Bureau of Waste Control

Public Participation Activities Log

Summary - Fiscal Years 1979, 1980

and 1st & 2nd Quarters of 1981

LIST OF ACRONYMS

ADES - Arizona Department of Emergency Services
ADHS - Arizona Department of Health Services
APWA - American Public Works Association
ASU - Arizona State University
B San - Bureau of Sanitation
BWQC - Bureau of Water Quality Control
CAAG - Central Arizona Association of Governments
Dist. IV - District IV Council of Governments
MAG - Maricopa Association of Governments
NACOG - Northern Arizona Council of Governments
OEPAD - Office of Economic Planning and Development
PAA - Pesticide Applicators Association
PAG - Pima Association of Governments
SEAGO - SouthEastern Arizona Governments Association

FY 79
STATE PUBLIC PARTICIPATION ACTIVITY LOG

DATE	MECHANISM	SPONSOR	ACTIVITY
	PRESENTATIONS, MEETINGS, WORKSHOPS: PROGRAM INFORMATION, PLANNING, AND EDUCATION-RELATED ACTIVITIES		
1/11/79	Presentation: Proposed pesticide container disposal regulations (Scottsdale, AZ)	PAA	Program information
1/24/79	COG/State 208 Meeting (Tucson, AZ)	BWQC	Status Report: Solid and Hazardous Waste Programs
2/8/79	State/COG/Federal JFP Task Force Meeting (Phoenix, AZ)	OEPAD	Status Report: Solid and Hazardous Waste Programs
3/27/79	Solid Waste Task Force Meeting	CAAG	Solid and Hazardous Waste Program Information: literature, slides, discussion
4/5/79	Presentation: Environmental Planning Seminar Class (Phoenix, AZ)	ASU	Solid and Hazardous Waste Program Information: literature, slides, discussion
4/5/79	Presentation: Hazardous Waste Spills	ADHS	Program Information: Health Officers' Meeting
4/13/79	Professional Meeting: Arizona-Nevada Academy of Science	B San	Four RCRA-related papers were presented at this conference.
4/18/79	State/COG/Federal JFP 208 Workshop	OEPAD	Submit draft RCRA overall workplans for FY 80
4/26/79	Mohave County Ad Hoc Solid Waste Committee	Dist IV	Solid and Hazardous Waste Program Information: literature and discussion
5/2/79	Environmental Planning Advisory Group Meeting	NACOG	Solid and Hazardous Waste Program Information: literature, slides, and discussion
5/3/79	Presentation: Hazardous Waste Program and Spills	ADES	Program Information: Conference on Disasters and Spills
5/8/79	Presentation: Education for Survival Seminar	ASU	Program Information: Conference on Disasters and Spills
5/11/79	FY 80 State/EPA Agreement Meeting	ADHS	Solid Waste Priorities FY 80

FY 79

STATE PUBLIC PARTICIPATION ACTIVITY LOG

DATE	MECHANISM	SPONSOR	ACTIVITY
5/23/79	Environmental Coordinating Council and Environmental Planning Advisory Committee Meeting	SEACO	Solid and Hazardous Waste Program Information: literature, slides, and discussion
5/24/79	FY 80 State/EPA Agreement Meeting	ADHS	Solid waste priorities and text revisions
6/8/79	Environmental Planning Advisory Committee	PAG	Solid and Hazardous Waste Program Information: literature, slides, and discussion
6/27/79 thru 7/13/79	Public Meetings: Plans for the Management and Disposal of Hazardous Wastes in Arizona	B San	Program Information: slides, literature, and discussion. Seven meetings held Statewide.
7/10/79	Slide Presentation: Hazardous Waste Facility	ADHS	Slide presentation and discussion: County Health Officers Meeting
7/12/79	Technical Workshop	APWA	Solid and Hazardous Waste Program Information: literature, slides, and discussion.
7/18/79	Public Works Technical Committee	MAG	Solid and Hazardous Waste Program Information: literature, slides, discussion
7/24/79	Solid Waste Meeting	NACOG	Review and comment on NACOG Areawide Assessment
7/25/79	Solid Waste Task Force Meeting	CAAG	Review and comment on CAAG Areawide Assessment
8/3/79	Water Quality Working Group	BWQC	Roles and responsibilities of group and proposal membership criteria for State 208 public participation advisory group.
8/7/79	Public Meeting State/EPA Agreement	ADHS	Solid and Hazardous Waste: State/EPA Agreement
9/5/79	Public Meeting State/EPA Agreement	ADHS	Solid and Hazardous Waste: State/EPA Agreement

17.

FY 79
STATE PUBLIC PARTICIPATION ACTIVITY LOG

DATE	MECHANISM	SPONSOR	ACTIVITY
RULE MAKING			
11/1/78	Mailings of proposed pesticide container disposal regulations	B San	Copies sent Statewide to affected individuals, organizations, and agencies
11/29/78	Public hearings on proposed pesticide container disposal regulations	B San	Hearings were held in Yuma, Phoenix, and Tucson
9/1/78	Mailings on proposed hazardous waste regulations	B San	Copies sent Statewide
9/18/78	Public Meeting (Phoenix, Arizona)	B San	Discussion and explanation of proposed hazardous waste regulations
1/4/79	Public Meeting (Phoenix, Arizona)	B San	Discussion and explanation of proposed hazardous waste regulations
9/25/79- 9/28/89	Public Hearings	B San	Hearings were conducted on the proposed hazardous waste regulations. Hearings were held in Phoenix, Tucson, and Yuma.
MISCELLANEOUS			
4/1/79	Publications: "Arizona-Nevada Academy of Science", Vol. 14, 1979 Proceedings Supplement	B San	Publication of Abstracts: "State Planning Efforts for Solid Waste Management", "Ground water Pollution by Surface Impoundments", "Hazardous Waste Management Program", and "Resource Recovery in Arizona"
	Surface Impoundment Assessment Mailings	B San	Several mailings were distributed Statewide for data collection and program information.
	State 208 Slide Presentation Series (Statewide)	BMQC	"Leachate generated from landfills is a serious non-point pollutant"

18.

Fiscal Year 1980

Public Participation Activities Log: Bureau of Waste Control (ADHS)
 October 1979-September 1980
 Presentations, Meetings, and Workshops

First Quarter (FY 80)

<u>Mechanism</u>	<u>Sponsor</u>	<u>Activity</u>
"Operational Problems in Landfills"	Arizona Society of County Engineers	Presentation
"Solid Waste Management Plan"	Pima Association of Governments	Presentation
"Solid Waste Enforcement Program"	Arizona Association of County Supervisors	Presentation
"Hazardous Waste Planning"	Society of American Military Engineers	Presentation
"Arizona and Hazardous Waste Management"	League of Women Voters	Presentation
"State Solid Waste Management Plan"	Pima Association of Governments, Southeastern Arizona Governments Organization District IV Council of Governments, and Northern Arizona Council of Governments	Local Management Designations Meetings
"Current Problems in Solid Waste Management"	Southeastern Arizona Environmental Planning Group	Presentation
"Arizona Solid Waste Program"	Governmental Refuse Collection and Disposal Association	Presentation at Regional Conference

FY-80

Second Quarter (FY-80)

<u>Mechanism</u>	<u>Sponsor</u>	<u>Activity</u>
"Data Management and Manifests" and "Permits for Hazardous Waste Facilities"	Arizona Chapter, Governmental Refuse Collection and Disposal Association	Presentation of Program Information
"The Process of Regulatory Change"	Arizona State University	Seminar Presentation
"Groundwater Protection"	Bureau of Water Quality Control	Program Information
Open Dump Inventory	District IV Council of Government	Technical Assistance Workshop
"State and Federal Regulatory Policies"	Water Quality Working Group	Program Information
Solid Waste Management	Southeastern Arizona Governments Organization	Workshop
"Hazardous Wastes"	Arcadia High School	Presentation
Asbestos Health Problem	Asbestos Mine Owners Association	Meeting
Pesticide Management	Target Chemical Company	Seminar Presentation
Hazardous Waste Program in Arizona	Indian Health Service	Seminar Presentation
Groundwater Management	Water Quality Advisory Group	Program Information
Leachate and Groundwater Protection	Arizona Department of Health Services	Seminar Presentation
"Solid Waste Management on Tribal Lands"	Maricopa Association of Governments	Program Information
"Hot Dip Tank Wastes"	Arizona Association of Automobile Wholesalers	Program Information
The Open Dump Inventory and Indian Land Issues	Water Quality Advisory Group	Program Information

FY-80

Second Quarter (FY-80)

<u>Mechanism</u>	<u>Sponsor</u>	<u>Activity</u>
Transportation Skills for Hazardous Waste Management and Hazardous Materials	Division of Emergency Services	Technical Assistance

Third Quarter (FY-80)

State Solid Waste Regulations	Central Arizona Association of Governments	Technical Assistance Meeting
"The Resource Conservation and Recovery Act"	Water Quality Legislation Forum of the Inter-Tribal Council of Arizona	Program Information
Hazardous Waste	KIFN (Phoenix Spanish Language Radio Broadcasting)	Talk show interview
"Waste: Liability or Asset?"	Apache Junction Town Hall	Public Meeting
"Status of Landfills in Arizona"	Arizona Environmental Health Association	Professional Presentation
"Groundwater Pollution"	United States Department of Agriculture Water Conservation Laboratory	Seminar Presentation
"Hazardous Wastes in Arizona"	Central Arizona Environmental Advisory Committee	Program Information
"Toxic Wastes and the Environment"	Mesa Rotary Club	Program Information
"Hazardous Wastes Problems"	Mill Owners Association	Public Meeting
Solid Waste Leachate Management	Water Quality Advisory Council	Presentation
Policy on Discharge from Hazardous Waste Facilities	Water Quality Management Working Group	Program Information

Fourth Quarter (FY-80)

<u>Mechanism</u>	<u>Sponsor</u>	<u>Activity</u>
"Uncontrolled Hazards, Technical Assistance Panels, and State Plan Update"	Central Arizona Association of Governments	ODI Workshop
Solid Waste Management Policies for Public Officials	Arizona Department of Health Services and Governmental Refuse Collection and Disposal Association	Training Seminar
Principles of Landfill Operations	ADHS-GRCDA	Training Seminar
"Hazardous Waste Siting"	Southeastern Arizona Economic and Community Coordinating Council	Program Information
"Will Arizona Become the Nation's Toxic Garbage Dump?"	Arizona Public Health Association	Presentation
Solid Waste Issues	Maricopa Association of Government's Managers' Committee	Presentation
"Landfill Siting and Operational Problems	American Public Works Directors	Presentation
"Arizona's Hazardous Waste Management System"	Governor's Commission on the Environment	Program Information
Arizona Hazardous Waste Management Program	Arizona Department of Health Services	Technical Workshop Series held in Phoenix, Tucson, and Flagstaff
Application to EPA for Interim Authorization for Hazardous Waste Management	Arizona Department of Health Services	Public Meetings series held in Phoenix, Tucson, Flagstaff, and Yuma
Arizona's Application to EPA for Interim Authorization	Arizona Department of Health Services	Public Hearing (Phoenix)

FY-80

Fourth Quarter (FY-80)

<u>Mechanism</u>	<u>Sponsor</u>	<u>Activity</u>
Publication of Special Environmental Issue of <u>Arizona Health</u>	Division of Environmental Health Services (ADHS)	Mailed throughout state for public educational and informational purposes
Mailing of Public Responsiveness Summaries Arizona Application for Interim Authorization	Bureau of Waste Control (ADHS)	Responded to public comments submitted during activities period
Publication of article: "Playing Tug-of-War with Hazardous Wastes" in <u>Today's Business</u> (Volume 6, Number 6, September, 1980, Page 74)	<u>Today's Business</u>	Monthly periodical of the general Arizona business community

Rulemaking

First Quarter (FY-80)

(NONE)

Second Quarter (FY-80)

(NONE)

Third Quarter (FY-80)

Mailing of Arizona Hazardous Waste Regulations

Bureau of Waste Control (ADHS)

Copies mailed to regulated community, interest groups, and concerned citizens

Fourth Quarter (FY-80)

(NONE)

FY 81

STATE PUBLIC PARTICIPATION ACTIVITY LOG

DATE	MECHANISM	SPONSOR	ACTIVITY
	PRESENTATIONS, MEETINGS, WORKSHOPS: PROGRAM INFORMATION, PLANNING, AND EDUCATION-RELATED ACTIVITIES		
1st Quarter October through December 1980	Presentation: "Drums Along the Salt"	American Water Resource Association Symposium on Water Quality	Public Information and Educa- tion Poster Session
	Presentation: "Arizona's Hazardous Waste Program"	Sertoma Club	Program Information (literature, slides and discussion)
24.	Presentation: "Hazardous Waste Manage- ment in Arizona"	Society of American Military Engineers and Arizona Machinery Association	Program Information (literature, slides and discussion)
	Presentation: "Hazardous Waste Permits and Hydrology"	Department of Water Resources	Program Information (literature, slides and discussion)
	Presentation: "Hazardous Waste Manage- ment in Arizona"	Arizona Printed Circuits Association	Program Information (literature, slides and discussion)
	Public Hearings (2): EPA Interim Authorization	EPA	Solid/Hazardous Waste program information
2nd Quarter January through March 1981	Presentation: "Hazardous Waste Management in Arizona"	Industrial Hygiene Associa- tion	Program Information: Seminar (literature, slides and discussion)
	Presentation: "Hazardous Waste Management in Arizona"	International Society for Hybrid Micro Electornics	Program Information (literature, slides and discussion)
	Memorandum: "State/EPA/DOT manifest re- quirements"	BWC	Program Information (literature, slides and discussion)

DATE	MECHANISM	SPONSOR	ACTIVITY
2nd Quarter Continued - January through March 1981	Public Hearing: Yuma Sludge Disposal Site	City of Yuma	Public Information
	Mailings: Fact sheet and public hearing notice regarding the Arizona Solid Waste Management Plan	BWC	1800 copies sent statewide, and beyond, to affected individuals, organizations and agencies
	Mailings: Arizona Solid Waste Management Plan	BWC	300 copies sent statewide, and beyond, to affected individuals, organizations and agencies
	Public Forum: "Waste Alert"	ADHS, LWV, AEHA	Program Information, Public Education (literature, slides and discussion)
	Presentation: "ADHS Regulatory Requirements"	Mesa/Scottsdale/Tempe Resource Recovery Task Force	Program Information
	Presentation: "Arizona's Emergency Response Plan Interaction with Hazardous Waste Regulations"	BWC	Program Information
	Public Meetings (2): Arizona Hazardous Waste Disposal Facility Siting	Rainbow Valley Residents	Program Information and Public Education
	Public Meetings (3): Turf Paradise Compost Plant Management	Central Park Village Mobile Home Park	Public Information and Information Exchange
Public Hearings (3): "Draft Solid Waste Management Plan"	BWC	Hearings were conducted in Phoenix, Tucson and Flagstaff	
	RULEMAKING		
1st Quarter October through December 1980	Distribution of proposed hazardous waste regulation emergency amendments and public hearing notice	BWC	3000 copies sent statewide to affected individuals, organizations and agencies

DATE	MECHANISM	SPONSOR	ACTIVITY
1st Quarter Continued October through December 1980	Distribution of "Draft Report to the Arizona State Legislature Regarding Siting of a Statewide Hazardous Waste Disposal Facility", Executive Summary and public hearing notice	BWC	Over 500 copies of full and short reports sent statewide to affected individuals, organizations and agencies
	Public Hearings (3): Draft Siting Report	BWC	Hearings were conducted in Phoenix, Tucson, and Yuma
	Public hearings (2): Proposed Hazardous Waste Regulation emergency amendments	BWC	Hearings were conducted in Phoenix and Tucson
	Joint legislative hearings (2): Draft Hazardous Waste Disposal Facility Siting Report	Arizona Legislature	Hearings were conducted in Phoenix
2nd Quarter January through March 1981	Distribution of "Final Report to the Arizona State Legislature Regarding Siting of a Statewide Hazardous Waste Facility"	BWC	
	Distribution of "Responsiveness Summary" to the Final Hazardous Waste Facility Siting Report	BWC	175 copies sent statewide, to affected individuals, organizations and agencies
	Distribution of Hazardous Waste Regulations proposed amendments and public meeting notice	BWC	Copies sent statewide to prior hazardous waste regulation respondents
	Public meeting on proposed amendments to Arizona Hazardous Waste Regulations	BWC	One Meeting held in Phoenix
	Distribution of the Hazardous Waste Regulations proposed amendments and Public Hearing Notice	BWC	Copies sent statewide to affected individuals, organizations and agencies

DATE	MECHANISM	SPONSOR	ACTIVITY
	MISCELLANEOUS		
1st Quarter October through December 1980	Publication: "Hazardous Waste Management in Arizona"	Southern Arizona Environmental Council	Newsletter publication regarding program information
	Publication: American Water Resource Association Symposium on Water Quality, 1980, Proceedings Supplement	BWC	Publication regarding ground water pollution from solid/hazardous wastes
	Questionnaire: Hazardous Waste Facility Standards	BWC	Mailings to National Hazardous Waste Facility Operations for data collection and program information
2nd Quarter January through March 1981	Publication: "Environmental Health Services", Fall, 1980, Newsletter	ADHS	Copies sent statewide to affected individuals, organizations and agencies
	Survey: "Sludge Disposal"	BWC	Questionnaire sent to statewide public and private sewage treatment facilities for data collection and program information.

APPENDIX C

**Arizona
Solid Waste
Management
Plan**

Responsiveness Summary

March 1981



INTRODUCTION - RESPONSIVENESS SUMMARY FOR ARIZONA'S SOLID WASTE
MANAGEMENT PLAN

The Arizona Department of Health Services provided for public participation in the "Arizona Solid Waste Management Plan" review process, in accordance with EPA regulations and pertinent State statutes.

The Bureau of Waste Control (ADHS) held three public hearings to obtain comments on the draft "Arizona Solid Waste Management Plan". These hearings were held on March 20, 24, and 27 in the cities of Phoenix, Tucson and Flagstaff, respectively. Prior to these hearings, on February 25, 1981, 170 copies of the State Plan (including copies distributed through the State Clearinghouse to the Councils of Government) were mailed directly to all City, Town and County Managers, local health departments, County Boards of Supervisors, State libraries and various County libraries. Public notice of document availability and the times and places of public hearing were published between February 8th and 11th in the Arizona Daily Sun, the Arizona Republic, the Phoenix Gazette, the Arizona Daily Star, and the Yuma Daily Sun. In addition, over 30 copies of the State Plan were loaned to individuals, upon request. On January 30, 1981, 1,800 copies of a combined fact sheet/public hearing notice were distributed using various mailing lists maintained by the Division of Environmental Health Services. The public hearing record, originally slated to close on April 3, was extended to 5:00 pm on April 10, 1981, as per public request, and subsequent decision by the Hearing Panel.

An analysis of the public hearing registration record indicates at least 105 persons, representing a wide variety of sectors, attended the series of public hearings on the draft Plan. Transcripts, as well as all hearing exhibits and correspondence submitted by close of record, will remain on file at the ADHS.

The public comment presented in this Responsiveness Summary has provided ADHS with valuable input regarding public perspectives and technical issues associated with the proposed plan for solid waste management in Arizona. It has been used to document public comment and subsequent agency responses. In addition, the Summary will be used to indicate modifications to the draft report based on public input, and explanation for rejection or acceptance of public proposals. This responsiveness summary will be distributed to those industries and individuals interested in solid waste management in Arizona. It will be deposited throughout the State, at various program depositories, and is available from ADHS upon request.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Bureau of Water Quality	Memo, 3/19/81		The Plan does not adequately delineate bureau responsibilities within ADHS or funding sources necessary to address its recommendations, nor does it address the concerns associated with the failure of a particular bureau to carry out their responsibilities.	Bureau responsibilities within ADHS are designated at a departmental level, as are resource allocation decisions. The plan adequately addresses the issue of limited funding for solid waste program activities.
Tom Allen, Acting State Director Bureau of Land Management	Letter, 3/20/81		Is supportive of federal agency participation in and implementation of the Plan. Believes the Water Quality Management Working Group can facilitate coordination among federal and state agencies and the Councils of Government.	Comments acknowledged.
Gladys Scott, Colorado River Indian Tribes	Written, 3/20/81 Exhibit #5	p. VIII-A-7	Opposes portion of the Plan which states that it be the States responsibility to enforce regulation of solid and hazardous waste standards on Indian land, as 7 USC 136w provides for a direct line of enforcement by the Indian tribe. Requests that ADHS remove any reference in its Plan to having any authority for enforcement actions, or for establishing standards for solid waste disposal sites located on Indian lands.	Language has been clarified. It is the State's position that solid and hazardous waste issues on Indian lands are primarily matters of tribal or federal concern (and responsibility) and should be dealt with accordingly. The State, however, reserves the right, to the extent necessary, to consult with tribal governments within whose reservations solid waste facilities are maintained, in an effort to reach agreement regarding the effect such facilities may be having on lands outside of the reservation.
Karl Kohlhoff	Oral, Phoenix, 3/20/81		Believes that the Plan's intent to prohibit landfill development in designated 100-year floodplain areas, if enacted, will eliminate refuse/reclamation of sand and gravel mining sites, and thus is not indicative of good land use practices. Believes it would be a gross error not to allow sanitary landfills into floodplains for two reasons: (1) landfills can be properly engineered to prevent health hazards/nuisances while serving first as a place to store the public's waste and later, after closure in some landuse (i.e., golf course which will benefit the public;	Plan has been amended. The development of new solid waste disposal facilities within areas designated as 100-year floodplains is strongly discouraged. No new facility will be allowed within these areas, unless it can satisfactorily demonstrate to ADHS that: (1) no other reasonable alternative site location exists; (2) the facility will be adequately protected from inundation and wash out during a 100-year flood (1% chance event); (3) the facility will pose no significant threat of contamination to surface or ground water resources; and (4) responsibilities and liabilities are clearly defined for closure and post-closure maintenance and monitoring.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Karl Kohlhoff - con't			(2) reclamation of mining operations would not be functional. Believes that landfills can be engineered and operated safely so that physical characteristics on site will prevent contact with the groundwater; and so that the types of waste accepted can be dictated so as to exclude hazardous materials.	
		p. VI 20-21	Are the two sites where leachate migration occurred applicable to the geologic/hydrologic conditions of Arizona?	Yes.
			How will the contract study through the University of Arizona recommending guidelines for location of sanitary landfills be used? Will there be a public hearing?	The intent of the Bureau of Waste Control is to revise the University of Arizona document, as resources permit, and disseminate it as an engineering bulletin. Yes, a public hearing will be held.
Robert Yount, State Land Department	Letter, 3/23/81	p. II-37	Believes the Plan to be complete and comprehensive. Believes policy regarding floodplains would be overly restrictive, and that it should be more clearly stated (i.e. "The development of new solid waste disposal facilities within the 100-year floodplain will be approved only when it can be clearly demonstrated that floodproofing is practiceable.").	The Plan has been amended. See response to Karl Kolhoff (page 31).
Robert Showers, Arizona Rock Products Association	Letter, 3/23/81	p. VII-F-9	Suggested language clarification on Mining Wastes, as follows: "Overburden includes any common mineral products (i.e. sand, silt, gravel or rock) which is used in reclaiming an excavation site that has not been subject to any chemical or leaching process." Also suggests that language of A.R.S. 27-272-A defining "common mineral products," be used.	The Plan has been amended. For purposes of the Solid Waste Management Plan, overburden is defined to include any common mineral product (i.e. sand, gravel, silt, rock, etc.) which has been removed from an excavation site and has not been subjected to any chemical or leaching agent or process.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
John Blackburn, Executive Director, Central Arizona Assoc- iation of Governments	Letter, 3/24/81		State litter control program should be integrated into the plan.	The Plan has been amended. See Section VII-J of Plan regarding Special Waste Problems, Litter Control and Wildcat Dumping.
		p. VIII-F-14	There is no mention of educating the general public about solid waste management, except regarding resource conservation and recovery. The State could play an effective role, especially via the mass media, brochures, etc.	The Plan adequately addresses public education, throughout. See pages IV-7 - 9 of the Plan, regarding Public Participation in the Planning Process.
			The Plan discusses responsibilities assigned to the COGs, and mentions working with the COGs via public participation, etc. Future relationships should be considered for funding.	The distribution of funds is discussed in Chapter VIII - B of the Plan. Provided funds are available, this recommendation will be considered.
		p. VII-F-1 - 10	The subject of inactive and abandoned mining disposal sites is not addressed.	The Plan has been amended. For a discussion of inactive/abandoned mining disposal sites see page VII - F-8 of the Plan.
		p. VIII-E-6 - 19	Regarding the Open Dump Inventory site evaluations: (1) the State should make clear to operators what materials are needed or would be helpful at inspection time (e.g. maps, plans, etc.); (2) feels that more notice must be given to operators before an inspection. If a major problem exists at a facility such that it would cause the facility to be classed as an "open dump", it is unlikely that the problem could be corrected within a day or two, which would be a more reasonable time for notification. These facilities have generally been operating under State permits, and generally within previously existing laws. Two day notice would better allow an operator or designate to be present at inspection to answer questions; rather than causing misunderstandings and delays by not being there.	Operators have been notified of the ODI and it's process through public workshops, area-wide assessments and direct correspondence. Adequate notice of an ODI inspection is provided for, prior to inspection.
		In light of the new policies to be expected from Washington, the State should anticipate and analyze taking over some existing federal roles.	Comment acknowledged.	
		The State needs to perform some "hard" analysis of potential funding sources for its program, which might be included in the Plan.	The State has analyzed and evaluated funding options, including the development of a self-supporting program. This requires legislative action and commitment.	

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
John Blackburn - con't			It would have been helpful to place all recommendations in the Summary.	Agreed. A summary of program recommendations is contained in the Plan (see Planning and Implementation Time table, p. II-25)
			A separate Executive Summary should have been provided.	Agreed.
			The State should develop a program to provide funds for planning and designing sanitary landfills.	Limited State funds are presently fully committed to compliance monitoring efforts.
			The State Bureau of Waste Control did a poor job in distributing draft copies of the Plan. There was not adequate time for review.	It is the position of ADHS that all State and Federal requirements regarding public notification and review were satisfied. For a discussion of the public participation process, see the Introduction to this Responsiveness Summary.
Alex Dely, Sierra Club	Written, 3/24/81 Exhibit #6		The Sierra Club feels the five-year plan is incomplete and is not a certainty, since a detailed schedule of financial and other resources is not specified prior to plan adoption. Requests are made for a more detailed plan and more adequate funding.	Comment acknowledged. The Plan fulfills the requirements of both Federal and State mandates. Funding requests are governed by legislative decision and appropriation.
		p.II-5 & 6	Request that ten-member county boards be established to aid the ADHS open dump inventory efforts (i.e. notification of regulation violation, compliance negotiation, evaluation of incentives for waste generators, and advance planning of new disposal sites).	Existing institutional structures and community linkages are deemed adequate.
		p.II-19	Request that temporary storage facilities be legally designated for deposition of small generation hazardous waste quantities.	Small generators of hazardous waste may presently dispose of these wastes at approved facilities with permission from the operating authority. ADHS will negotiate with local management agencies in an effort to identify appropriate local options for the environmentally sound disposition of exempt small generator hazardous waste.
			Suggests that the ADHS request State universities to locate the data and resources to begin an informal inventory of agricultural, mining and wastewater	For certain inventory data needs, this process has been initiated, and proposals have been received.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Alex Dely - con't		p. II-19	Suggest that county-based information repositories for all waste types be established and run jointly by industry, health and environmental groups.	This recommendation will be considered in effecting revisions to the information distribution process, and the evaluation of waste information exchange programs.
		p. II-37	Objects to statement (Policy No. 5) that all solid waste be disposed of in sanitary landfills, because source control, waste reduction, recycling, waste sharing and incineration offer more economic incentive to the generator. Feels that toxic air emissions from landfill operations have been poorly defined.	This policy statement, in its entirety (p. II-38) does provide for resource recovery and other options. Air quality considerations have been addressed on page VI-38
		p. V-19	Believes the costs of waste management should be borne by the generator, and opposes waste facility siting on public land and government ownership/operation of these facilities, due to the potential lack of government funding.	The costs of waste management are borne by the waste generator, either directly or indirectly (through taxation, surcharges, or consumer costs). Existing State law mandates local government (public) responsibilities for the provision of solid waste disposal facilities.
		p. III-17	Requests that public education/information be considered a "highest priority statewide need."	The process used in selecting statewide priorities is documented in the Plan (see p. III-17).
		p. III-21	Requests that groundwater quality be considered the top priority of the Solid Waste Management Plan, and that ambient standards (similar to those of New Mexico) be adopted.	The protection of water quality has been established as a highest priority concern in the Plan. Under State law, the Water Quality Control Council is charged with responsibility for adopting water quality standards.
		p. VI-21	Request that no new landfills be developed in the floodplain areas, and that existing landfills be required to remove toxic chemical wastes due to danger of leachate generation during flood inundation.	Proposed floodplain policy has been amended. Refer to Karl Kohloff comment. Remedial actions regarding existing facilities which may contain toxic wastes are being addressed under the State/Federal "uncontrolled hazardous waste program".
		p. VII-A-18	Objects to the exemption of small quantity hazardous waste generators from regulatory control, as dictated by the Plan, and suggests that ADHS retain the legal right to checkout claims of health hazards and to assess Federal penalties of \$10,000 per violation. These fines should also be made to apply to violators of transportation regulations	The Plan acknowledges the problems associated with the exemption of small generator hazardous waste and supports the augmentation of ADHS enforcement authority.
		p. VII-A-24		

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Alex Dely - con't			<p>Advocates phasing out the evaporation and sewer disposal methods for hazardous waste in favor of incineration and land burial.</p> <p>In general, suggests the need for all levels of government to consider preservation of public health and environmental quality over economic gain, stressing conservation and waste exchanges. Also, suggests the issuance of comprehensive state regulations for mining wastes.</p>	<p>The evaporation of certain types of liquid hazardous waste is an acceptable waste reduction practice. Sewer disposal can also be acceptable with adequate pretreatment and approval from local operating authorities.</p> <p>All levels of government should seek to maintain an acceptable balance between health, environmental and economic considerations. Reasonable new regulatory controls should be implemented for all aspects of solid waste management, as necessary, to protect public health and the environment.</p>
Richard B. Wilks, representing the Salt River Pima-Maricopa Indian Communities	Letter, 3/26/81	VIII-A-7 p. VIII-A-7 Paragraph 2 p. VIII-A-7 Last Paragraph	<p>Reference is made to statements regarding the state's right to pursue enforcement actions for abatement of serious problems on Indian land. Suggests that the following wording be adopted in place of current language: "The State, however, reserves the right to the extent necessary, to consult with tribal governments within those reservations where solid waste disposal areas are maintained, in an effort to reach agreement regarding the effect such solid or hazardous waste areas might be having on land off of the reservation." Suggests the following wording: "The State will enter into such agreements as may be mutually advantageous with tribes regarding the siting of new solid waste disposal areas located on Indian lands and used by cities, towns and counties. The State will offer technical assistance in regard to such siting." Does not believe that it is appropriate for the State to attempt to take a preeminent position in regard to activities that occur within the lands of the Salt River Pima-Maricopa Indian Community, or that it is appropriate or legally permissible for the State to apply pressure on those non-Indian entities with whom the Salt River Pima-Maricopa Indian community has established contractual relationships.</p>	<p>The Plan has been amended. See response to Gladys Scott's comments (p. 31). ADHS has a responsibility under state regulation to review and approve sanitary facilities and engineering plans for new subdivisions. For those cities, towns and counties which designate solid waste facilities located on tribal lands, ADHS will seek assurances that such facilities will be operated in an environmentally sound manner. A workable means of accomplishing this task is to develop, on a case-by-case basis, inter-governmental agreements which may define respective responsibilities.</p>

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Bureau of Air Quality Control	Memo, 3/27/81		Feels that closer coordination between bureaus may be helpful to ensure that federal air quality criteria are incorporated into solid waste disposal site evaluation. Such coordination might also aid in development of a disposal plan for pollution control residuals resulting from thermal processing facilities.	DEHS is now working toward the development of an environmental permit review and approval process which would provide for closer coordination in terms of environmental permit issuance.
		p. VII-G-6	The text on copper smelters should be changed to indicate that slag floats on top of the matte and is removed from the reverberatory furnace by skimming.	This change has been effected.
NACOG Community Planning Division	Written, 3/27/81 Exhibit #7	p. I-1 Paragraph 2	The statement that solid waste problems are growing indicates that BWC has been doing an inadequate job. Perhaps reference should indicate increase in magnitude because of population increase.	The Plan has been changed to indicate that increased solid waste problems are a result of population growth, and the diminished availability and increased cost of land available for waste disposal purposes.
		p. II-1 Paragraph 1	If federal financial help is not forthcoming, will inspections of disposal facilities cease? Will the entire enforcement program be crippled if EPA funds are severely reduced?	No. The State program will be severely impacted by any reduction or elimination of funds. ADHS is committed to State Plan implementation, to the extent that resources permit.
			The Bureau of Waste Control should not be so dependent on federal dollars for implementation of the plan. If the State is committed to plan implementation, the State should be ready to pay for the effort.	Agreed.
			Five years just to inspect all the facilities seems like an unnecessarily long period of time.	Within existing resource constraints, it is projected that the ODI will require five years to complete.

<u>Name</u>	<u>Method, Place</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
NACOG - con't		p. II-11 Paragraph 1	Believes that some of the potential operational deficiencies listed such as litter, lack of weigh stations, etc., are not related to protection of the public health and environment. Can a site be labelled an open dump solely for one of these reasons? This should be made clear somewhere in the report.	A site will only be classified as an open dump if it fails to meet one or more of the RCRA 4004 criteria, as presented in Chapter VI.
		p. II-19	Believes that the term "inventory," when used in reference to the "Open Dump Inventory," should be defined.	Agreed. Use of the term Open Dump Inventory is defined on page I-12.
		p. II-25	Priority designations should be explained.	Agreed. This has been clarified on page II-24 of the final Plan.
		p. II-25 & 28	The acronyms ODI, MOA, FTE, and MSW should be spelled out in the Plan.	These changes have been included in the final Plan.
		p. II-37	Has the Legislature been apprised of the policy that they shall provide sufficient funding for plan implementation?	This policy statement has been modified (see p. II-37 of final Plan).
		p. IV-11, 12 p. VIII-C-2	Believes more and better timed local agency coordination is necessary. Although mention of the COG role throughout the plan is very much appreciated, the role essentially ended in the summer of 1979 when funding ran out. Perhaps the state should sponsor more meetings in each of the districts to explain what the Bureau of Waste Control is doing, particularly after each round of Cease and Desist orders. A separate solid waste advisory committee should be set up, with a small amount of funds set aside for travel expenses to enable participants to attend. Discussion should be initiated at the next Water Quality Working Group meeting to determine whether to review solid waste issues.	Funding for the establishment of a solid waste advisory structure is not currently available. Existing 208 structures will be used to the extent practicable. When infeasible, the BWC will utilize other public participation mechanisms as appropriate. Discussion regarding solid waste management will be initiated at the WQWG meeting in May. The State will continue its efforts to improve public outreach and communication with local governments.
			Coordination must improve between federal and state agencies, regarding solid waste management on federal lands.	The State Plan provides for coordination with federal agencies in solid waste management and RCRA implementation.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
NACOG - con't		p. V-18	Information regarding the 1973 Solid Waste Management Plan should be listed on p. 1.	The 1973 Plan is first mentioned on p. I-8.
		p. VII-B-3	The population figures should be changed to 1980 Census figures. The acreage requirements appear to be very optimistic, particularly for rural areas. For northern Arizona, the acreage should be doubled. The compaction factors which are used are seldom achieved, and trenches are rarely as deep as indicated. The general rule of 1 acre-per-10,000 inhabitants per year can be achieved only under ideal circumstances. In addition, the impact of seasonal residents and tourists should be mentioned.	These tables have been modified to reflect 1980 Census data (pp. VII-B 3 & 4).
		p. VII-B-19	How does the state intend to encourage regional solutions or development of collection stations? The idea is good, but expense is the main hurdle now. Is the state going to provide grant of loan monies to the counties for equipment?	ADHS will work with COGS and local governments as appropriate in determining local options for regional solutions. No State funds are available to assist counties in purchasing equipment.
		p. VII-B-25	Believes that waste does not necessarily have to be compacted at a transfer station. Open containers, similar to those used in Apache County, work very well also, especially in rural sparsely populated areas, and are considerably less expensive.	The common definition of transfer station includes some form of refuse compaction, whereas, those facilities which do not employ compaction are commonly referred to as collection stations.
		p. VII-B-26	Feels more compactors will probably not occur because of the higher cost of operating landfills, but rather as a result of ADHS enforcement action.	Comment acknowledged.
		p. VII-B-28	Feels by far the most important obstacles to resource recovery facilities are lack of population to render such facilities economically justifiable and the high capital costs for such facilities.	Agreed. Small scale techniques are now emerging which may alleviate this situation. All resource recovery facilities require a minimum threshold quantity of waste.
		p. VII-B-32 - 34	Both the map and the table have a few errors. Many of the "landfill" sites are sites where unauthorized dumping occurs-- facilities not operated by any local entity. These include Navajo, Chambers, Gray Mountain, Marble Canyon, and Hillside. In many counties there is no operating authority.	The map and tables presented in Chapter VII reflected BWC records, as of April 1980. This data was official at that time.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
NACOG - con't			Will regional planning <u>only</u> be encouraged if RCRA funding is available? This seems to imply in reality that regional planning will be discouraged.	ADHS will strongly encourage regional approaches to solid waste management, with or without Federal financial assistance.
		p. VII-B-37	If all future disposal facility designs and operating plans are to be prepared by a registered professional engineer, who will pay for this service? This seems like a ridiculous requirement unless the state plans to have an engineer on staff who will perform this activity for each local entity.	The final Plan <u>recommends</u> sanitary landfill plan preparation by a registered professional engineer.
		p. VII-D-5	The Bureau of Waste Control must work with federal agencies and landfill operators to establish a workable policy with regard to septage disposal.	Agreed. The Plan recognizes problems associated with septage disposal (Chapter VII-Sect. D). It also commits the BWC to coordinate with Federal agencies.
		p. VIII-D-1	The ADHS enforcement role goes beyond protecting public health and the environment. RCRA requires that the State Plan provide for State regulatory powers which are "adequate to enforce solid waste disposal standards equivalent to or more stringent than the Federal criteria for classification of solid waste disposal facilities." The difference between this and protecting the public health should be noted. Will the State be more lenient towards operations which are sanitary and environmentally sound, but which may lack fences, weigh scales, etc?	BWC will only take appropriate enforcement action against facilities which violate state regulations. Voluntary compliance will be sought in all cases. The State's regulatory powers are more general, yet equivalent to the Federal solid waste regulations,
		p. VIII-D-11	Contacting local officials prior to an inspection visit is an excellent addition. However, I see no reason there should be only one attempt at phone contact. Two attempts would be more reasonable and would take virtually no additional time.	Agreed. BWC will make every reasonable effort to achieve telephone contact prior to inspection.
			Achieving compliance should only mean compliance with the regulations necessary to achieve public health and protect the environment. There should be some leniency on other reasons for noncompliance.	Agreed. Each instance of noncompliance is handled individually, on a case-by-case basis. Achieving compliance only means compliance with State and Federal regulations

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
NACOG - con't		p. VII-D-16	Under <u>Topographic Map</u> the word "section" should be changed to "township".	Agreed. The Plan has been amended.
Phil Briggs Deputy Director Department of Water Resources	Letter, 3/27/81	p. VI-20	The last sentence on this page should be changed as follows: It may migrate either a few feet or a few hundred feet per year depending upon the permeability of the <u>affected substrata</u> and gradient of the <u>water table</u> .	This change has been made as indicated.
		p. VIII-D-11	During inspection, are monitor wells, or at least nearby wells checked for water quality problems? If not, how would the effects of the facility on the groundwater be determined?	Facilities located in environmentally sensitive areas have been pre-screened and identified as to the potential for groundwater pollution. During inspection, monitoring wells or nearby wells are checked for water quality at these facilities.
		p. VIII-D-18	Regarding guidelines for Plan submittal, it would be helpful to include a water level elevation map showing the direction of groundwater flow as well as a geologic cross section using available well log data. In addition to depth-to-groundwater, it is also important to include data regarding the variability of depth to groundwater, over time.	The BWC is currently in the process of revising plan submittal guidelines for sanitary landfills. The revised guidelines will incorporate and reflect these considerations and criteria concerning groundwater resources.
Ken Zehentner SEAGO	Letter, 3/27/81		SEAGO supports this Solid Waste Management planning effort and is pleased to see the definition of state solid waste needs, problems and priorities taken from assessments that were developed by the State's Area-wide Planning Agencies. SEAGO is particularly supportive of the call for, and need of, federal state and local coordination in regard to the planning process, and the treatment given to solid waste management responsibilities of local, areawide and state agencies in regard to program implementation. If all can implement this plan through their programs, the goals and objectives of this draft plan should largely be realized in an economical and realistic manner.	Comments acknowledged.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Ted Koemb, Bureau of Indian Affairs	Letter, 3/31/81		<p>Feels the draft Plan appears to provide a comprehensive approach to the technical aspects of solid waste management for Arizona.</p> <p>Believes the development of the Plan, as well as its provisions, lack adequate coordination with Indian Tribes and the BIA. Requests that greater attention be given in the Plan to identification of mechanisms for cooperation whereby common problems can be resolved. Since Indian/BIA administered trust lands comprise a significant portion of the State of Arizona, it is imperative that a cooperative posture be developed.</p>	<p>Comment acknowledged.</p> <p>Cooperative mechanisms between ADHS, Indian tribes, the BIA, and the IHS are needed. These issues have been addressed (see pp. IV-16 through IV-18).</p>
Eva Patten, Natural Resource Coordinator, League of Women Voters of Arizona	Letter, 4/3/81		<p>Believes the Bureau of Waste Control has done a good job in developing a solid waste management plan for Arizona, and concurs with the general program goals, especially those accepting State responsibility for initiation of a strong resource recovery effort.</p> <p>Believes that, to the extent which funds are available, the BWC should work with citizen committees, such as the COG environmental committees and Arizona Water Quality Management Advisory Group and special ad hoc forces, to help solve local problems regarding solid waste management. Believes the agency's commitment to public participation should be expanded beyond newsletters and formal hearings to more community outreach.</p>	<p>Comments acknowledged.</p> <p>Agreed. Future BWC public participation activities will be addressed in a forthcoming public participation plan. A goal of this plan will be to improve community outreach and public education. Implementation of this plan will be contingent upon the availability of funds.</p>
		p. II-20	Suggests the following addition under public education: d) resource recovery opportunities.	The Plan has been amended.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Eva Patten - con't			<p>As part of a public education program and through public participation measures suggested above, believes some type of Seek and Find program should be carried out in Arizona.</p> <p>Will closing the State's open dumps, at least in the short run, mean more illegal dumping? Believes the consequences of every closure should be considered. Working out an alternative for the dump's users is important.</p>	<p>The BWC, in cooperation with several public interest groups, is now considering a "Seek and Find" program which would involve a hotline number for anyone reporting illegal dumping.</p> <p>No. ADHS is committed to closing "open dump" facilities only as a last resort, and will carefully consider the consequences of each such action. Upgrading into compliance, where possible, is preferable to site closure. Final closure will only be effected where reasonable alternatives for disposal exist.</p>
Robert W. Hoppe, Cochise County Highway Department	Letter, 4/3/81		<p>Believes the Plan overall displays a comprehensive approach to the many diverse aspects of solid waste disposal regulatory responsibility delegated to the State by Federal authority.</p> <p>While the plan does recognize many of the problems faced by political sub-divisions of the State, alternatives or resolution procedures are handled in a circumlocutory manner. User charges for instance, are advocated as a method to resolve economical paucity, but there is no supporting legal opinion to clarify the ambiguous language of ARS § 9-441 regarding user charges, nor any reference to potential legal ramifications. The statute (ARS § 9-441) merely authorizes charging commercial haulers at public dumping grounds. No significant amount of revenue, in Cochise County could be realized under these circumstances and existing taxing constraints preclude obtaining adequate funding from ad valorem assessments.</p> <p>Legislative authority regarding funding for solid waste disposal must be clearly defined and exempted from statutory budget increase limitations, to enable political sub-divisions of the State to properly effect compliance to regulatory criteria.</p>	<p>Comment acknowledged.</p> <p>The Final Plan documents the need for legislative clarification regarding the authority of County governments to levy user charges for solid waste disposal.</p> <p>Comment acknowledged.</p>

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Robert W. Hoppe- con't			<p>While it is agreed that counties and cities should have responsibility for septic tank pumpings, assessment of licensing fees adequate to fund administration, operation, monitoring, and enforcing an effective program will prove difficult and undoubtedly require additional personnel.</p>	<p>Agree. The State does not charge a fee for licensing septic tank haulers. Local fee structures for permitting/licensing are matters for local determination.</p>
			<p>Believes the provision, stating that trailer park/sub-division approval, where no collection is provided, can be refused if no approved disposal facility is within five miles of the proposed site, to be unrealistic and contradictory to ARS § 9-441.</p>	<p>ADHS intends to deal with each area on a case-by-case basis. Individual self-haul will be approved where a trailer park/subdivision is located within a reasonable distance of an approved disposal facility.</p>
			<p>Suggest the development of a general public education program methodology for use by management agencies. An effective program might create the needed understanding by the general public of the necessity for proper waste disposal, regardless of dollar cost.</p>	<p>Agreed. The Plan has been amended to include this recommendation (see p. VII-J).</p>
			<p>The Plan itself only refers to authority for local governments to enter into long-term contracts regarding the supply of solid waste to resource recovery facilities. The need for this same authority to encompass landfill, collection and transfer, intergovernmental agreements, and other areas of the solid waste program should be stipulated as clearly. Private enterprise is deterred in expending the necessary investment capital to aggressively enter the solid waste disposal field due to local governments inability to award long-term contracts legally.</p>	<p>In a recent Attorney General's opinion (180-D-22)(R79-313) submitted to the AZ. Dept. of Education on 2/21/80, the following conclusion was reached regarding this issue. "...It is our belief that a public governing board, including the State Board of Education, may in general, approve contracts that will bind successor boards, provided the contract is reasonable and made in good faith, includes a release of the Boards' obligations if funds are unavailable, is for a particular and specified service; and does not call for the performance of personal or professional services for board members.</p>
			<p>The need for achievement of international parity in solid waste regulatory standards between the United States and Mexico is listed as a problem, but is not explained. nor is this need noted anywhere as a priority or a goal of the State. It should be both a high priority and a goal.</p>	<p>International policy issues are specifically addressed in the State/EPA Agreement. Where problems can not be resolved at the Local/State level, Federal agencies will have to assume a strong leadership posture.</p>

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Robert W. Hoppe - con't			<p>On-site sewage disposal systems (i.e. isolated residents such as farmers and ranchers) are allowed and regulated, but no provision has been made for individual garbage disposal to accommodate this need. It is fallacy to expect these people to transport garbage to landfills or collection/transfer points.</p> <p>While we agree with the ADHS policy statements which clearly state the position that each site be evaluated independently regarding the need for water quality monitoring wells, it should be noted that placement of monitoring wells in any case is controversial. There are some well qualified professionals that feel creating any potential route to the aquifer is injudicious. Regardless of how much care is exercised in the design and construction, men and machines can err and time takes its toll. Maintenance and repair of monitoring wells could be complex as well as costly, which could prove problematical.</p> <p>We feel the type of cooperation and assistance recently displayed by BWC should be recognized and commended, as well as being established and authorized by the ADHS Director for local governmental entities endeavoring to upgrade facilities.</p> <p>The Plan recommends passage of H.B. 2266 which would empower the ADHS Director to assess fines of up to \$5,000.00 per day of violation. We are against this recommendation. The State currently wields regulatory powers sufficient to achieve compliance with the mandates of RCRA, these powers then should be sufficient.</p>	<p>See page. VII-B-19 of the Plan. Individual on-site refuse disposal is acceptable so long as the generator's property is maintained in a sanitary and nuisance-free manner.</p> <p>ADHS agrees that a potential for well contamination exists, however, standards have been established for site-specific conditions, and the benefits of their establishment outweigh their costs.</p> <p>Comments acknowledged.</p> <p>Disagree. The imposition of civil penalties is necessary to achieve reasonable compliance with RCRA.</p>

<u>Name</u>	<u>Method/Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Edward W. Shrigley, M.D.	Letter, 4/7/81		<p>Believes copies of the draft Plan were inaccessible to the general public. No libraries in Tucson, including the local Governmental Library, had this work on file. Also, felt the length of the document would discourage all but the most concerned from reviewing the Plan.</p> <p>Believes implementation of the Plan is questionable due to: lack of financial resources, lack of personnel to perform regular field monitoring, and lack of enforcement personnel to ensure that regulations are met. Believes that since ADHS was established by the Legislature with charge "to protect the health and welfare of the citizens of Arizona," it is the responsibility of the Legislature to supply the funding for ADHS to carry out this charge. In matters of health and welfare of Arizona citizens, the requirement of "cost effectiveness" has no place, nor can it be calculated.</p>	<p>Copies were distributed to City, Town and County Managers, the Pima County Health Department, the Pima Association of Governments, and the Southern Regional Office of ADHS. In addition, copies were also available in the Tucson Public-Pima County Library System and the University of Arizona Health Services Library. The need for an executive summary of the Plan is acknowledged.</p> <p>Agree, see Alex Dely comment #1 (page 34).</p>
76. George A. Brinsko, Director, Pima County Wastewater Management	Letter, 4/8/81		<p>Requests that new legislation be enacted to facilitate the following: (1) a clear understanding of <u>who</u> county governments can levy user fees against to finance their solid waste management systems, as it is currently unclear if Pima County may or may not charge public citizens for the use of solid waste disposal; (2) provide counties with the ability of controlling solid waste collection, as Pima County currently has no control over solid waste collection; (3) provide clarification of scavenging policy at landfills, as the only control currently recognized by the Pima County Attorney's Office is through the issuance of "trespassing" citations; (4) removal of landfill restrictions from within one mile of a town, city or residential area; and (5) a strengthening of antilitter laws such as to make each producer/generator of solid waste responsible for the correct disposal of that waste, thus enabling law officials to cite generators, once determined.</p> <p>Is in support of the placement of landfills (that can be shown engineeringly, economically and environmentally safe) in a 100-year floodplain.</p>	<p>ADHS recognizes the need for clarification of these legal issues. The Plan has been amended (see page V-30).</p> <p>See response to Karl Kohloff on landfill policy (page 31).</p>

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Scott J. Reger, Water Quality Analyst, Arizona Game and Fish Department	Letter, 4/8/81		<p>Provides a general commendation of the plan and its goals. Supports the State's stance that no new landfill sites be located within 100-year floodplains so as to reduce the potential for environmental perturbation. Concurs with the view that State agencies (in particular, ADHS) need authorization to assess civil penalties for violations of environmental protection standards.</p> <p>Differs with the low priority placed on water protection in that phase of the Plan dealing with mining surface impoundments (1984). Believes that many of the greatest threats to our surface water supplies are mine-related. When considering the extent of mining activity and the implementation time required to alter practices, believes the development and enforcement of a protection plan (similar in scope to that proposed for landfill siting) should be of high priority.</p>	<p>Comments acknowledged.</p> <p>The Plan provides for the inventory and classification of mining waste disposal facilities to begin in FY 82 and be completed by the end of FY 84, contingent upon the availability of funds. In addition, ADHS is now developing a groundwater protection program.</p>
<p>47.</p> <p>Ron Meyerson Assistant Director of Operations, City of Tucson</p>	Letter, 4/9/81	p. II-27	<p>Believes the underlying concept of a guidance manual for the safe disposition of exempt hazardous waste loads at sanitary landfills to be a fallacy, because it does not address the immediate and potential dangers of handling certain hazardous materials, and assumes that operators of sanitary landfills will accept small generator loads of hazardous waste for disposition. At this point in time, the City of Tucson does not and will not accept any hazardous materials at any of its landfills.</p> <p>The City of Tucson supports the 100 Kg criteria for small generators.</p>	<p>This recommendation has been deleted from the Plan. ADHS will re-direct its efforts toward individual negotiations with local governments and industry, in an effort to identify environmentally sound local management options for the disposition of exempt quantities of hazardous waste.</p> <p>Comment acknowledged.</p>
		p. II-28	<p>Believes that mines should not be exempt from hazardous waste regulations any longer because enough data should already exist regarding their potential to contaminate the groundwater supply.</p>	<p>Mines have been excluded from the hazardous waste regulations by the federal government. The inventory process is to begin in 1982, providing Federal funds are available. In the event of potential imminent health hazards, ADHS is prepared to seek abatement/mitigation, as appropriate.</p>

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Ron Meyerson - con't		p. II-37	Agrees, in most cases, that new solid waste disposal facilities should be prohibited within areas designated as 100-year flood plains. Believes, however, that if an entity is willing to assume the expense, and can adequately show that the environment will not be harmed in any way, sanitary landfilling within 100-year floodplains should be allowed and be reflected in the policy statement.	See response to Karl Kohlhoff (page 31).
		p. VI-4	Suggests that it be noted that the City of Tucson has never had any of its landfills inundated from storm runoff in any of the waterways adjacent to closed or existing landfills.	Comment acknowledged. The Plan has been amended.
		p. IV-6	Suggests a clarification, referencing the Pima Association of Governments. The City of Tucson, Department of Operations and Pima County Wastewater Management Department were designated as co-lead agencies for solid waste management planning. PAG was designated as the lead agency to coordinate planning activities	The clarification has been made (see p. IV-6).
		p. VII-B-8	Feel the dry, average, and wet weights of refuse to be considerably short, as a cubic yard of refuse can weigh from 300-350 pounds.	The weight estimates included in the Plan were presented as estimated national averages taken from an EPA publication.
Karen Dotson, PAG Environmental Planning Advisory Committee (EPAC)	Letter, 4/9/81	p. II-37 & 38.	The PAG EPAC unanimously endorses the statements of policy presented in the draft Plan, and wishes to express particular support and urgency concerning the following policy issues and program recommendations: (1) The prohibition against siting new landfills in designated 100-year floodplains (Policy #10) is particularly important in southern Arizona because of the meandering courses of waterways.	Comments acknowledged. See response to Karl Kohlhoff (page 31).

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Karen Dotson - con't			(2) it is urgent that the state immediately take steps to encourage responsible disposal of non-regulated hazardous wastes. Opportunities for such encouragement lie in two primary areas: a) establishment of a procedure to allow non-regulated hazardous waste generators to use designated hazardous waste disposal facilities. b) establishment of a collection and transfer station for both regulated and non-regulated hazardous waste disposal in metropolitan Pima County. A vigorous educational program will be needed;	a) ADHS will redirect its efforts toward individual negotiations with local governments in an effort to identify environmentally sound local management options for the disposition of exempt quantities of hazardous waste. b) Non-regulated hazardous waste generators may dispose of their waste at permitted hazardous waste facilities, provided they are accompanied by a manifest and accepted by the facility operator. No permitted hazardous waste facility will accept exempt hazardous waste shipments without a duly authorized manifest.
		p. VII-E-9, #3	(3) The Department of Health Services must immediately initiate an information exchange for all hazardous waste generators to assist private industry in recycling hazardous wastes in lieu of disposal.	The Department is evaluating its options in this regard during the current fiscal year.
		p. VIII-D-32, #7	(4) Existing penalties for littering, illegal dumping and other regulatory violations are inadequate and cumbersome. The legislature must be encouraged to allow the director of the Department of Health Services to assess civil penalties for regulatory violations.	Comment acknowledged.
		p. VIII-F-19, #7	(5) The Department of Health Services is encouraged to seek issuance by the governor of an executive order proclaiming resource recovery as a preferred alternative for solid waste management, declaring state policy in this regard and directing state agencies to effectuate appropriate actions.	Comment acknowledged. This recommendation is presented in the Plan.
			EPAC's review of the draft state Plan has been necessarily cursory due to insufficient time to adequately review the document; we did not receive notice of either the public hearing date or the extension of the public hearing record. Request that the comment period be extended beyond April 10 to facilitate our ability to adequately review the plan.	A notice of public hearing was sent to interested parties on January 30, 1981. The notification of extension of public hearing record was made verbally at all three hearings. Extension beyond April 10 was deemed inadvisable by the Hearing Panel.

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Alfred E. Pfahl, Public Works Director City of Casa Grande	Letter, 4/10/81		<p>Would prefer that the possibility of locating a disposal facility be left open, but be subject to strict development and maintenance requirements.</p> <p>Provisions should be made for communities to be allowed to prepare their own plans for new disposal sites, as the requirement for a registered engineer might constitute an unnecessary burden on small outlying communities.</p>	<p>Comment acknowledged. See response to Karl Kohlhoff (page 31).</p> <p>The Plan has been amended. This is now a recommendation, not a requirement.</p>
James W. Klinker, Director, Public Affairs, Arizona Farm Bureau Foundation	Letter, 4/10/81		<p>Proposes that before any plan is finally adopted, a complete risk/benefit study be completed. The economic impact, compliance costs, and increased paperwork should be assessed and reported to the public before any part or all of the proposed plan is implemented. The anticipated cost to taxpayers thru local and state enforcement of the Plan should also be evaluated and reported as to benefit versus cost.</p> <p>Recommend that all reference to crop residues as solid waste be removed from the proposed plan.</p> <p>The management of livestock wastes in feedlot and dairy operations is already regulated by the Dairy Commission, the Livestock Sanitary Board, the Department of Health Services, and the National Pollutant Discharge and Elimination Systems. Feels that rules and regulations applying to livestock and wildlife are unenforceable. Recommends that all reference to livestock waste management in range and pasture environments be excluded from the Plan.</p> <p>Recommends that the Plan correspond with the ADHS proposed hazardous waste regulations. Under these rules (R9-8-18) the rinsate from pesticide use is not considered a hazardous waste if disposed of on the farmer's own farm in a manner consistent with the disposal instructions on the pesticide label.</p>	<p>The Solid Waste Management Plan is not a rulemaking action. DEHS has adopted an internal policy that costs and benefits be assessed in any proposed rulemaking activity. In our opinion, the State Plan is a policy and guidance document which does not warrant a risk/benefit study.</p> <p>RCRA defines crop residues as solid waste.</p> <p>The Plan has been amended with regard to livestock wastes. Livestock wastes in range and pasture environments will not be regulated by ADHS. Cooperative agreements will be negotiated with the Dairy Commission and Livestock Sanitary Board in an effort to evaluate and classify disposal facilities under RCRA criteria. These efforts will concentrate on surface impoundment and commercial composting facilities.</p> <p>Pesticide rinsate disposed of by a farmer on his own land, in accordance with label instructions, is not regarded by ADHS as a hazardous waste under R9-8-1817, as amended.</p>

<u>Name</u>	<u>Method, Date</u>	<u>Reference</u>	<u>Comment</u>	<u>Response</u>
Ronald W. Jensen, Public Works Director, City of Phoenix	Letter, 4/10/81		The Plan should be amended to address procedures which local management agencies should follow in pursuing enforcement actions	Recommended procedures will be developed in a separate guideline which will identify specific contacts and resource agencies.
			Is strenuously opposed to a policy which prohibits the development of landfill facilities within the 100-year floodplain. We feel it would be more appropriate to allow facilities to be permitted within the 100-year floodplain if the design and operation of the facility complies with Federal regulations regarding the "Classification Criteria for Solid Waste Disposal Facilities" (Federal Register 9/13/79).	See response to Karl Kohlhoff (page 31).
			The Plan should address the legal, administrative, and financial problems that must be resolved before a regional approach to the planning and actual operation of solid waste disposal facilities can be implemented.	Page V-30 of the final Plan documents the need for legislative clarification in various areas relative to solid waste. ADHS will actively participate on the legislative review committee currently addressing these issues.
			The plan should define a program that would provide preliminary approval of a proposed disposal facility by the ADHS. This program would assist communities in site selection and allow them to pursue the possibility of developing a site with some assurance that it would be approved.	Preliminary approval of a proposed disposal facility is currently within the scope of ADHS technical assistance. Such assistance has been provided to local governments upon request.
			The Plan needs to expand the provisions for disposal of pathological waste.	Future EPA regulations are expected to implement more stringent controls over the storage treatment and disposal of pathological wastes. During the interim, ADHS will develop guidelines for pathological waste generators to follow.
Arizona State Clearing- house District IV, Joint Legislative Budget Committee, Mineral Resources Department, Agriculture and Horticulture Department, Department of Transportation	4/10/81		No comment.	Acknowledged.