Final Report and Recommendations

of the

Hazardous Waste Disposal Committee

Submitted to the Governor and the Legislature

January 12, 1993

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HAZARDOUS WASTE DISPOSAL COMMITTEE REPORT

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Preface

This report by the Hazardous Waste Disposal Committee has been prepared in two parts. Part one contains the body of text with tables/maps included in the text and nine attachments. All tables and maps in this report are based on 1990 data analyzed by the Arizona Department of Environmental Quality (ADEQ) except for the waste minimization and household waste information, which includes 1991 data. Part two is the underlying data that was provided to the Committee in developing the report, and is found in the appendices listed below which are on file and available for public review at ADEQ.

PART ONE ATTACHMENTS

		Reference Date
Attachment 1	"Arizona Waste Code Technologies"	9/92
Attachment 2	"Hazardous Waste Sub-Committee Recommendations to Scientific Panel" *Prepared by Committee	1/16/92
Attachment 3	"Outline for Scientific Panel Report on Hazardous Waste Treatment and Disposal Technologies" *Prepared by Scientific Panel	2/18/92
Attachment 4	"Letter Regarding Scientific Panel Report" *Prepared by Jan Radimsky, Panel Member	8/13/92
Attachment 5	"Correspondence Regarding Legal Issues Before Hazardous Waste Disposal Committee" *Prepared by Rita Pearson, Chair	9/21/92
Attachment 6	"Attorney General Memorandum Responding to the Committee's Legal Questions on 9/21/92" *Prepared by Beryl Dulsky	10/1/92

Attachment 7	Proposed study: Hazardous Waste Management and Treatment for Arizona *Prepared by Jim Kuester, Committee Member	Undated
Attachment 8	Correspondence from Edward Fox, ADEQ Director, to EPA requesting clarification on inclusion of exempt recyclers in Arizona's Capacity Assurance Plan	12/9/92
Attachment 9	EPA response to ADEQ exempt recycler letter on 12/9/92	12/14/92

12/9/92 **PART TWO BACKGROUND APPENDICES**

Appendix A	"Distribution of 1990 Hazardous Waste Generation by County"	4/24/92
Appendix B	"Magnitude and Type of 'Incinerable' Wastes Generated by Arizona's 44 Largest Generators in 1990"	9/16/92 **Revised**
Appendix C	"Potential Technology for Managing Hazardous Waste Generated by LQG & SQG in Arizona"	4/3/92
Appendix D	"The 44 Largest Generators"	9/16/92
Appendix E	"Potential Technology for Managing Household Hazardous Waste in Arizona"	4/3/92
Appendix F	"Memorandum in Response to Previous Sub-Committee Report on the Amount of Hazardous Waste Likely to be Incinerated" *Prepared by Joni Bosh, Committee Member	8/24/92
Appendix G	"Estimation of Quantity of Hazardous Waste That May Require Incineration"	3/20/92 **Revised**
Appendix H	"Amount of Hazardous Waste Imported by Two Major Recyclers, 1990"	8/31/92
Appendix I	"Disposition/Treatment of 1990 Arizona Hazardous Waste"	4/24/92
Appendix J	"Distribution of 1990 Hazardous Waste Generation by Treatment Technology"	4/24/92
Appendix K	"Existing Storage/Treatment Facilities in Arizona"	8/31/92

Appendix L	"EPA Technologies Available for Demonstration" *Prepared by EPA	1/91
Appendix M	"Pollution Prevention Programs in Arizona and in Other States"	2/7/92
Appendix N	"Analysis of 1991 Waste Minimization Data as Reported in the FAR"	8/31/92
Appendix O	"Briefing by Department of Administration on the Estrella Point Facility Site" *Prepared by DOA	12/19/91
Appendix P	"ADEQ Letter to DOA Terminating All Permits and Permit Applications issued to ENSCO"	11/9/92
Appendix Q	"Arizona's 1992 CAP Submitted to EPA"	2/14/92
Appendix R	"The Disposition of 1990 Arizona Generated Hazardous Waste, A Summary"	9/1/92
Appendix S	"Hazardous Waste Generated by Military Facilities 1987-1990"	2/7/92
Appendix T	"Hazardous Waste Generated by Military Facilities 1990" including waste codes by facility	1/24/92
Appendix U	"List and Description of RCRA Waste Codes" *Prepared by EPA	Undated
Appendix V	"Waste Generated by Facility"	1/24/92
Appendix W	"Universe of Small Quantity Generators"	1/24/92
Appendix X	"Directory of North American Waste and Material Exchanges"	4/90
Appendix Y	"Waste Generated by Selected Generators"	1/24/92
Appendix Z	"Estimation of Household Hazardous Waste Generation"	1/24/92
Appendix AA	"1981 DHS Report to the Legislature regarding siting a statewide hazardous waste disposal facility in Arizona"	7/81

Appendix BB	"Environmental Impact Statement for the proposed Arizona hazardous waste management facility"	7/83
Appendix CC	"October 1990 Report of the Governor's Hazardous Waste Technical Advisory Committee"	10/1/90
Appendix DD	Summary and status of Western States Regional Agreement	6/18/91
Appendix EE	Facility Annual Report forms, old (1990) and new (1991)	1/91

Executive Summary

This report was prepared by the Hazardous Waste Disposal Committee created under Section 34, Chapter 315, Laws 1991. The legislative mandate was to prepare a report and recommend what actions, if any, to take regarding the use of incineration to dispose of hazardous waste in Arizona, particularly at the state's hazardous waste site in Mobile, Arizona. To make this recommendation the Committee was directed to review and report on the composition of Arizona's hazardous waste stream, compare that waste stream with the amount of hazardous waste likely to be incinerated, and evaluate hazardous treatment/disposal technologies which were to be presented by a scientific panel established pursuant to the statute.

After a year of study, this report is still incomplete. The scientific panel failed to provide a report. Data on Arizona's hazardous waste stream is not sufficiently current to make final recommendations on what types of hazardous waste treatment/disposal should be encouraged in Arizona. Further study is needed. However, using the available 1990 data, this report presents, what the Committee believes is a fairly accurate portrayal of Arizona's hazardous waste stream and several recommendations that the Committee believes should be acted upon without further work.

Based upon 1990 data, there were 592 generators of hazardous waste in Arizona that generated 102,867,056 pounds (51,407 tons)

of hazardous waste. 98% or 100,814,244 pounds (50,407 tons) were generated by 251 large quantity generators. 96% of the total waste stream is composed of 12 waste types, most of which are susceptible to recycling technologies and pollution prevention techniques. Important to making a decision on what type of treatment/disposal technologies are required in Arizona, only one-quarter of the total waste stream is recurrent, meaning that we can expect that amount to be generated each year. Projected from 1990 data, the recurrent waste stream is 38,127,761 pounds (19,063 tons). 43 generators produce 79% of that recurrent waste stream (See page 28).

Arizona generated 13,348,329 pounds (6,674 tons) of recurrent hazardous waste that was, could be or had to be incinerated. 94% or 12,555,736 pounds (6,278 tons) were generated by just 36 facilities. We know that of the 12,55,736 pounds, 5,761,286 pounds (2,880 tons) were recycled. Therefore, in 1990 the amount of hazardous waste ultimately incinerated was approximately 6,794,470 pounds (3,397 tons), 8% of Arizona's recurrent waste stream. This number may be smaller due to double counting. In any case, this waste stream is small when compared to the 232,827 ton surplus incineration capacity in the Western States.

Arizona does not have a commercial hazardous waste disposal facility. There is one commercial treatment facility for metals and solvents recovery which has the capacity to manage 20,038,000 pounds (10,019 tons) of waste per year. In addition there are

three Arizona facilities that are permitted to store hazardous waste but they are not authorized for permanent disposal. There are also seven treatment facilities in Arizona which are "captive" meaning that they treat waste generated by a facility on or off site with the same owner. Finally, there are three recycling facilities in Arizona that are exempt from some of the Resource Conservation and Recovery Act (RCRA) regulations, such as permit and reporting requirements. The two major recyclers are World Resources and Cyprus Miami which import precious metals containing hazardous waste sludge and then reclaim the precious metals. The third recycling facility is Romic, which is located on Indian lands and is under EPA jurisdiction. In 1990, 32% of the state's total hazardous waste stream was treated at the site of generation and 10% was shipped to Arizona's treatment or storage facilities. The remaining 58% of Arizona generated waste was shipped out-of-state (See pages 38-39).

Two companies, World Resources and Cyprus Miami, import electroplating sludge for the recovery of precious metals. In 1990 they accepted 38,902,624 pounds (19,451 tons) of hazardous waste from out-of-state. World Resources handles this material and then exports it to New Mexico, British Columbia and Finland for processing. Cyprus Miami accepts these wastes and places them in the smelter for metals recovery. In 1990 World Resources accepted 30,357,360 pounds (15,178 tons) of precious metal containing sludge from 21 states including Arizona. During that same period Cyprus Miami accepted 8,545,264 pounds (4,272 tons)

from ten states including Arizona. For comparison Arizona exported 58,410,468 pounds (29,205 tons) of hazardous waste to 23 states plus Finland and British Columbia (See pages 39-42).

Federal law requires Arizona, and all states, to have a plan demonstrating its ability to treat or dispose of in-state generated hazardous waste. While Arizona originally planned to meet this requirement through the operation and management of the ENSCO facility in Mobile, Arizona, this option is no longer available because of the 1991 buyout of that facility. Since that time Arizona has stayed in compliance with the federal mandate through its participation in the Western States Regional Agreement, where 13 western states have agreed to share treatment/disposal capacity. This compliance status is precarious because Arizona is not receiving credit from either the United States Environmental Protection Agency (EPA) or the other western states for its exempt recyclers, World Resources and Cyprus Miami. Arizona must aggressively seek confirmation from EPA and the other states that these recyclers count toward Arizona's capacity. Arizona must start receiving credit for the large amounts of hazardous waste accepted by World Resources and Cyprus Miami.

Finally, it should be pointed out that because of incomplete data this Committee is unable to make final recommendations on how to use the Mobile site or what disposal or treatment technologies are appropriate for Arizona's hazardous waste stream. However, we have been able to determine that Arizona

does not have a large hazardous waste stream. The Committee has come to the conclusion that until more information is known about Arizona's hazardous waste stream and available technologies for dealing with that waste stream, that the Mobile site should not be used for any hazardous waste management activities. Additionally, because Arizona's incinerable waste stream is so small the Committee recommends that the state continue its ban on incineration at state-owned facilities. Finally, the Committee recommends that the Legislature enact an aggressive source reduction (pollution prevention) program which, if successful, would minimize Arizona's need for a publicly-owned or controlled hazardous waste treatment or disposal facility.

Chapter I. Introduction and Background

This report was prepared by the Hazardous Waste Disposal Committee (Committee) created by HB 2121 (Section 34, Chapter 315, Laws 1991). HB 2121 directed the Committee to perform the following tasks:

1. Evaluate the results of a scientific study prepared by a scientific advisory panel regarding hazardous waste treatment and disposal technologies (see Chapter VI);

2. Determine the potential reduction in the amount of hazardous waste generated in Arizona that could result from the application of pollution prevention and waste minimization techniques (see Chapter VII); and,

3. Compare the total amount of hazardous waste generated in Arizona with the amount likely to be incinerated (See Chapter IV).

In addition, HB 2121 directed the Committee to report and recommend to the Governor and the Legislature what actions should be taken regarding utilization of incineration to dispose of hazardous wastes, particularly at the state's hazardous waste facility near Mobile, Arizona. This report was originally scheduled to be completed by July 1, 1992; however, the statutory reporting deadline was delayed by the Legislature until October 1, 1992, in order to permit the Committee to gather additional information on the subject and to permit the Scientific Panel to complete its report to the Committee. (See Chapter VI for a discussion of the report prepared by the Scientific Panel).

The Committee members are as follows:

1. Senator Karan English
   Chairman, Senate Environment Committee

2. Representative William Mundell
   Chairman, House Environment Committee

3. Mr. Edward Fox
   Director, Arizona Department of Environmental Quality

4. Ms. Joni Bosh
   Sierra Club
   Public Member

5. Mr. Richard Keiffer
   Manager, Safety & Environmental Protection Department, Honeywell
   Public Member

6. Dr. James Kuester
   Professor, ASU College of Engineering
   Public Member

7. Ms. Rita Pearson
   Deputy Chief of Staff and Executive Assistant for Environment and Natural Resources
   Governor Symington or his Designee

The Legislature determined the representative make-up of the Committee and provided that the Governor appoint the public members in addition to his designee. The Committee met in House Hearing Room 1 on the following dates:

Wednesday, December 11, 1991
Thursday, December 19, 1991
Friday, January 10, 1992
Friday, January 24, 1992
Friday, February 7, 1992
Friday, February 21, 1992
Friday, April 3, 1992
Friday, April 17, 1992
Friday, May 29, 1992
Wednesday, July 22, 1992
Friday, September 4, 1992
Thursday, September 17, 1992
Thursday, October 1, 1992
Thursday, October 8, 1992
Friday, October 9, 1992
Tuesday, October 13, 1992
Thursday, October 15, 1992
Thursday, October 22, 1992
Monday, November 23, 1992

Wednesday, December 2, 1992
Tuesday, December 15, 1992
Monday, December 21, 1992
Wednesday, January 6, 1993

Minutes of the Committee meetings are on file in the Secretary of the Senate's Office. Materials distributed to Committee members in conjunction with the work of the Committee are attached to the minutes of the pertinent Committee meeting.

Subcommittee meetings were held on the following dates:

March 23, 1992
August 13, 1992
August 31, 1992
September 4, 1992
September 9, 1992
September 11, 1992
September 23, 1992
September 24, 1992
September 30, 1992

These meetings were recorded but the tapes have not been transcribed. However, the tapes are available upon request from the Office of the Secretary of the Senate.

The Hazardous Waste Disposal Committee was created by the Legislature to determine what are Arizona's hazardous waste disposal needs in light of the state's acquisition of ENSCO's hazardous waste disposal facility near Mobile, Arizona. The state, under the direction of Governor Symington, acquired the ENSCO facility (now known as Estrella Point) in May 1991 after extensive public opposition to this facility was expressed. Public opposition principally focused on the following issues: (1) the facility design originally called for a landfill, some treatment and incineration of PCB's, but without public involvement was expanded to include incineration of large

quantities of hazardous waste that could potentially create unacceptable health hazards; (2) the public opposed incineration; (3) the site is within the aerial extent of a flood plain; and (4) the facility was designed with an annual disposal capacity which was significantly greater than required for Arizona's annual hazardous waste generation, thereby requiring hazardous waste to be imported to the facility from other states to sustain its economic viability.

With the acquisition of the Estrella Point facility, the state has banned incineration and conditionally banned the importation of hazardous waste to this site. It is important to note that these prohibitions apply to state-owned facilities only (see A.R.S. § 49-903) and do not apply to privately-owned hazardous waste disposal facilities.

Although the state now owns the Estrella Point facility, it is not operational at this time (see Chapter VIII for a description of the facility). Nevertheless, federal law requires Arizona to provide hazardous waste management (treatment and disposal) capacity for waste streams generated in-state (Section 104(c)(9), Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended in 1986). In addition, CERCLA requires each state to report on its ability to manage its hazardous waste streams in the Capacity Assurance Plan (CAP) which is submitted biennially to the United States Environmental Protection Agency (EPA) for approval (see Chapter II).

Arizona selected the contractor to build and operate the Mobile site in 1983 and entered into a contract with ENSCO, Inc. in 1986. Prior to the passage of HB 2121 (Chapter 315, Laws 1991), state law required the director of ADEQ to contract for the design, financing, construction and operation of a hazardous waste disposal facility (A.R.S. § 49-903). Under current law (as amended by HB 2121), the director is authorized, but not required, to enter such a contract (A.R.S. § 49-903 as amended by Chapter 315, Laws 1991).

Because the Estrella Point facility is not operational and there are no other privately-owned or operated commercial hazardous waste disposal facilities in this state, Governor Symington, on behalf of the state, chose to enter into an interstate agreement for the management of its hazardous waste in order to satisfy the CAP requirements. In February 1992 Arizona joined the Western States Regional Agreement (Agreement) (see Chapter II).

By signing the Agreement, Arizona can meet its CAP obligations by demonstrating to EPA that the Western Region, in which Arizona is a member, has the capacity to manage hazardous waste generated by its member states. The member states are Alaska, Arizona, California, Colorado, Hawaii, Idaho, Kansas, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming, (hereinafter referred to as the "Western States").

Membership in the Agreement should not be viewed as a permanent solution to Arizona's CAP obligations. If the hazardous waste management capacity of these states is fully utilized by local or other out-of-state generators or the member states determine that Arizona can no longer participate in the Agreement, Arizona must provide adequate capacity for its hazardous waste generators. Failure to do so will result in federal sanctions against the state (withholding of Superfund monies) (see Chapter II).

Given the foregoing, the Legislature determined in 1991 that it was necessary to appoint a committee to make recommendations to the Governor and the Legislature about the long-term management of the state's hazardous waste. A similar committee was created by Governor Rose Mofford by Executive Order No. 90-13 on July 11, 1990. This committee was known as the Hazardous Waste Technical Advisory Committee and was made up of 27 individuals with technical expertise in hazardous waste management. Some of the work done by the Technical Advisory Committee was duplicated by this Committee and we refer you to the October 1990 Report prepared by the Technical Advisory Committee for a historical perspective on this issue (see Appendix CC). The Technical Advisory Committee report provided a glossary of terms, a discussion of the legislative history on developing a state-owned site, a discussion of hazardous waste transportation issues, an overview of technologies for treating and disposing of hazardous waste and a discussion of risk

associated with the transportation and treatment of hazardous waste.

The work of this Committee was required in addition to the Technical Advisory Committee report for two reasons. First, at the time the Technical Advisory Committee Report was prepared, the ENSCO facility was scheduled to be fully operational by 1991. This, of course, is not the case and consequently, the means by which Arizona meets its CAP obligations have changed dramatically. Second, the data used by the Technical Advisory Committee was out-dated 1987 information. This report is being prepared two years later and thus, this Committee has more historical data on Arizona's generation, treatment and disposal of hazardous waste streams. The Committee has attempted to use that additional information to provide a more complete picture of the production and disposal trends associated with Arizona-generated hazardous waste.

However, this report also suffers from several serious shortcomings. Among other things, HB 2121 provided that a three-member Scientific Panel evaluate and report to the Committee on hazardous waste treatment and disposal technologies. The Committee requested that the Scientific Panel provide an array of information regarding both human and environmental health and economic factors associated with existing and developing technologies as part of their reports (see Attachments 2 and 7). The Panel provided a list of EPA-approved technologies, but failed to provide the Committee with any scientific evaluation of

these technologies and provided no information on innovative/new technologies (see Attachments 3 and 4). The Committee believes this information is essential to an analysis of the state's disposal options. In addition, the Committee was unable to fulfill its task of determining the potential reduction of hazardous waste generation due to the implementation of pollution prevention programs by hazardous waste generators because Arizona's newly-implemented program (set forth in HB 2121) has not yet provided sufficient data. Thus, the Committee is unable to report and make recommendations on two of the four tasks assigned to it pursuant to HB 2121.

Nevertheless, the Committee has endeavored to provide an accurate, thorough and useful analysis of the generation, treatment and disposal of the state's hazardous waste streams. The Committee has identified the make-up of Arizona's hazardous waste streams, who produces it and where it is produced in the state. It has also identified the amounts imported to and exported from this state. The Committee has also considered the possible ramifications of SB 1053 passed in 1992 (concerning potential constitutional takings by state action) on the state's efforts to restrict operations at a hazardous waste facility whether publicly or privately owned. And finally, the Committee has made recommendations to the Governor and the Legislature about the next steps to be taken to determine how Arizona should manage its long-term hazardous waste needs.

Chapter II. Arizona's Hazardous Waste Capacity Assurance Obligations

As previously mentioned in Chapter I, under the 1986 amendments to CERCLA, each state is required to prepare a CAP which shows that the state has adequate capacity to properly manage all hazardous waste reasonably anticipated to be generated (after application of pollution prevention techniques) within the state for the next 20 years. The first CAP was required to be filed in 1989 and biennially thereafter. EPA has the authority to withhold federal Superfund monies for remediating contaminated sites in those states that do not have an approved CAP (CERCLA, Section 104(c)(9)).

EPA evaluates a state's CAP based upon the magnitude of hazardous waste generated in the state and the availability of in-state treatment and disposal facilities. In order to demonstrate adequate capacity, a state can do one or more of the following:

(1) reduce or eliminate the amount of hazardous waste it generates;

(2) plan for the creation and permitting of hazardous waste capacity; and/or

(3) enter into interstate or regional hazardous waste management agreements to assure the availability of out-of-state facilities.

EPA, *Assurance of Hazardous Waste Capacity: Guidance to State Officials*, December 1988.

Arizona's 1989 CAP was approved by EPA assuming ENSCO's hazardous waste facility would be operational by 1991. The CAP

was amended in 1991 to reflect the state's purchase and closure of the ENSCO facility as well as Arizona's participation in the Agreement (See Appendix DD). On February 14, 1992, ADEQ submitted a second CAP to EPA on behalf of the state (see Appendix Q). The 1992 CAP satisfies the requirements EPA placed on the 1989 CAP and updates Arizona's management capacity needs based upon: (1) the state's newly-implemented pollution prevention program (A.R.S. § 49-961 *et seq.*) which qualifies Arizona for the nationally projected 10% reduction of hazardous wastes to be accorded each state by EPA without documentation; and (2) Arizona's participation in the Western States Regional Agreement as of February 1992.

These steps alone do not assure Arizona's long-term compliance with its CAP requirements. Arizona's participation in the Agreement is dependent upon the other Western States having disposal capacity which exceeds their needs in the management categories set forth in the CAP and the willingness of other Western States to permit Arizona to participate in the Agreement.

The Agreement states that each member state and the federal government have the responsibility to attempt to manage its in-state generation of hazardous waste within its own jurisdiction. Western States "do not desire to be major exporters or importers of waste, or to support the location of existing or emerging treatment, storage and disposal (TSD) facilities that favor unreasonably significant interstate movement of waste" (see Appendix DD). By participating in the Agreement, each Western

State has pledged to "review any practices that may discourage generators from managing waste within the state, or that may encourage export of those wastes to facilities in other states." Western States believe that each state "should maximize the in-state management of waste by appropriate minimization of waste generation and by development of appropriate in-state capacity where needed and economically and environmentally viable" (see Appendix DD).

Thus, as a condition of joining the Agreement, the Western States requested that Arizona re-examine its statutes that (1) ban importation of all types of hazardous waste to state-owned facilities, and (2) ban incineration of hazardous waste at state-owned facilities (A.R.S. § 49-903 (C) and (D)). The work of this Committee is part of that re-examination. The Western States believe it is inequitable for Arizona to ship its hazardous waste to them while banning imported hazardous waste to its state-owned facilities. This objection persists because Arizona has no public or private commercial hazardous waste disposal capacity.

For purposes of equity, Arizona should receive CAP credit for its exempt recyclers accepting federally defined hazardous wastes. In addition, Arizona should receive credit from the states in the Agreement for accepting wastes classified as hazardous in the state of origin (i.e., sludges and asbestos from California). This credit could be significant if EPA were to give clear guidance that recycling federally defined hazardous

waste and treatment/disposal of state-defined hazardous waste would count toward a state's capacity (see Attachments 8 and 9).

The issue of Arizona's status in the Agreement is likely to be raised while ADEQ is preparing the next CAP submittal which is due in October, 1993. The next WGA meeting is in March of 1993 and the other members to the Agreement are awaiting the outcome of this Committee report and any legislative action that may result from its recommendations to determine the need to reevaluate Arizona's membership in the Agreement.

In summary, the state currently faces the legal and moral challenge of developing a long-term plan to assure Arizona's ability to manage its current and future generation of hazardous waste.

Chapter III. Arizona's Hazardous Waste Stream In-State Generation/Importation/Exportation

Background

In order to make recommendations on Arizona's needs for hazardous waste treatment and disposal it is imperative that we understand the state's current hazardous waste stream. That stream consists of wastes generated in Arizona as well as wastes imported into the state.[1] Moreover, to understand what our treatment and disposal needs are we must also know how much of that waste is being exported to out-of-state treatment and disposal facilities. This chapter will present available data which portrays that waste stream.

Hazardous waste consists of various discarded materials often generated in industrial processes that pose or potentially pose a substantial risk to human health or the environment. Hazardous waste is regulated under the federal Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6901, *et seq*. The EPA has authorized Arizona through the ADEQ to administer and enforce these regulations. With limited exceptions, ADEQ has adopted the federal hazardous waste rules by reference (A.C.C. R18-901 *et seq*.). Wastes that are considered to be "hazardous" are subject to federal and state regulations governing its handling, storage, treatment and disposal.

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[1]For CAP purposes, Arizona is only responsible for hazardous wastes generated within its borders.

Reporting Requirements

ADEQ tracks hazardous waste through two documents, the Facility Annual Reports (FARs) and the hazardous waste manifests. The FARs must be filed by all Large Quantity Generators (LQGs), (i.e., businesses that generate at least 1000 kilograms (2,200 pounds) of hazardous waste in any given month). The FARs describe the activities that generate the hazardous waste, the type of waste, the quantity of waste and the location and technology used by the generator to dispose of the waste. For purposes of providing information for this report, ADEQ analyzed the 1990 FARs.

The hazardous waste manifest is a federally mandated document that records the amount and type of hazardous waste shipped off site to storage, treatment and disposal facilities. Manifests are required to be filed with ADEQ by all generators that produce hazardous waste in amounts in excess of 100 kilograms (220 pounds) in any given month (A.A.C. R18-8-262.G). For the purposes of this report, ADEQ analyzed the 1990 manifests for all Small Quantity Generators (SQGs), businesses that generated 100 - 1000 kilograms in any one month.

It is important to note that entities which generate less than 100 kilograms of hazardous waste in any given month are not required to fill out manifests or file FARs. Known as Conditionally Exempt Small Quantity Generators (CESQGs), these small businesses are, for the most part, exempt from the hazardous waste laws; there is no readily available information

concerning the types and quantities of hazardous waste they generate. In 1990, 538 CESQGs reported to ADEQ that they handled hazardous wastes. However, these generators are not required to report how much or what type of hazardous waste they generate.

In addition, the federal and state laws do not require reporting on household hazardous waste. However, based upon some preliminary 1991 and 1992 information from cities in Arizona and national research on programs to collect such wastes, we are able to present a guesstimate on Arizona's household hazardous waste stream.

Arizona-Generated Waste

In 1990 there were 251 LQGs in Arizona that generated a total of 100,814,244 pounds (50,407 tons) of hazardous waste and 341 SQGs that generated 2,053,312 pounds (1,026 tons) of hazardous waste for a total of 102,867,056 pounds (51,433 tons) of hazardous waste (see Appendix A).

Of the hazardous waste generated in 1990, one-quarter or 28,326,000 pounds (14,163 tons) were "one-time waste." One-time waste is generated as a result of a site cleanup or corrective action taken in response to a hazardous material spill or release. We can anticipate that one-time waste will be generated every year due to federal and state superfund cleanups and RCRA corrective actions. The volume and type of this one-time waste will fluctuate and is unpredictable. For example, in the October 1990 Report, ADEQ projected a 1989 one-time generation of 200

tons (400,000 pounds) of hazardous waste. The actual 1989 data, which became available after the Report was published, showed that in 1989 one company, Miller Delinting, generated 1,659 tons (33,188,000 pounds) of one-time waste from cleaning up on-site contamination. In 1990, this same company generated 14,163 tons (28,326,000 pounds) of hazardous waste due to continuing on-site cleanup activities. In 1991 Miller Delinting generated no hazardous waste, having completed the cleanup of its site. However, in 1991 there were 6,497,000 pounds (3,248 tons) of one-time hazardous waste (mostly hazardous waste contaminated soils) generated by other companies (ADEQ, 1991).

Ninety-six percent of Arizona's total hazardous waste stream in 1990 consisted of the following twelve wastes(see Appendix C):

WASTE CODE	DESCRIPTION OF WASTE	AMOUNT/LBS.
D001	Ignitable waste (capable of causing fire, i.e., used oil, spent solvent)	7,186,648
DOO2	Corrosive waste (corrodes steel i.e., acidic wastes, pickle liquor used to clean steel in manufacturing processes	38,306,177
D006	Cadmium waste	2,219,883
D007	Chromium waste	4,510,218
D008	Lead waste	3,290,751
D018	Benzene waste	1,212,594
D039	Tetrachloroethylene (TCE) waste	1,446,613
F001	Spent halogenated solvents used in degreasing	4,216,089

F002	Spent halogenated solvents (i.e., tetrachloroethylene)	3,192,064
F003	Spent non-halogenated solvents (i.e., xylene)	3,715,759
F005	Spent non-halogenated solvents (i.e., toluene)	1,530,727
F006	Sludge from electroplating operations	27,805,248
	TOTAL	98,632,363

Arizona's manifested hazardous waste stream was generated by 592 generators but the majority of the waste (60%) was generated by 44 generators (See Appendix D). Each generator is identified with an EPA identification number by geographic location. Several of the 44 largest generators are owned by the same company. Thus, while there are 44 generators, they are owned by 36 companies. These companies represent a variety of industries that can be described by general categories (see Table 1). For example, five waste handling companies generated 36,413,295 pounds, or 18,206 tons, of hazardous waste in 1990. This represents 49% of all recurrent hazardous waste generated in 1990, making this industry potentially the largest generator of hazardous waste in Arizona.[2] Ten electronic manufacturers were also in the top 44, making electric manufacturing the second largest generator of hazardous waste in the state. These two

[2] It is unclear, however, how much of this waste is "double counted." In other words, we do not know how much waste is from a primary generator that has been picked up by the waste handler and is now being counted again under the waste handler's manifest. The new FAR reporting format currently being utilized by ADEQ will provide information to clarify this issue.

DISTRIBUTION OF THE 12 LARGEST RCRA WASTE CATEGORIES IN ARIZONA BY THE 44 LARGEST GENERATORS - IN POUNDS
TABLE 1

TABLE 1-DISTRIBUTION OF THE 12 LARGEST RCRA WASTE CATEGORIES IN ARIZONA BY THE 44 LARGEST GENERATORS

EPAID	COMPANY NAME	D001	D002	D006	D007	D008	D018	D039	F001	F002	F003	F005	F006	OTHER	TOTALS
AZD980818330	NELCO TECHNOLOGY	35,718	1,764,830	0	0	0	0	0	0	0	35,718	0	79,315	0	1,915,581
AZD043848050	MOTOROLA, INC	215,859	56,042	50	0	1,250	0	0	7,470	50,854	214,094	2,050	0	259,884	807,553
AZD008399636	MOTOROLA, INC.	12,186	20,423	10	0	13	0	0	74,381	1,584	28,840	0	137,640	465	275,542
AZD982519746	3M TUCSON DATA STORAGE	73,854	0	0	453,682	0	0	0	0	0	45,753	17,154	0	17,156	607,599
AZD980735179	NORPLEX OAK INC/ALLIED	0	17,188	0	0	0	0	0	0	0	0	0	0	385,439	402,627
AZD981579634	QUALITY PRINTED CIRCUIT	252,398	2,518	0	0	0	0	0	0	0	0	0	100,600	2	355,518
AZD009004177	MOTOROLA, INC.	207,100	9,504	0	9,785	17,267	0	0	233,733	668	376,902	237,656	23,640	141,087	1,257,342
AZD980896310	CONTINENAL CIRCUITS COR	11,475	1,857,335	0	0	7,282	0	0	0	0	0	0	315,340	5,564	2,196,996
AZD091235457	INTEL CORP PHX CAMPUS	191,220	3,715	0	2,035	740	0	0	0	0	10,120	0	76,050	4,525	288,405
AZD982503385	DYNACO WEST CORP	800	85,168	0	0	52,993	0	0	433	579	800	0	164,120	961	305,854
AZT000623819	DIGITAL EQUIP	0	0	0	0	0	0	0	0	6,086	156	156	336,162	0	342,560
AZD981371628	CIRCUIT TECHNOLOGY INC	0	234,400	0	0	26,240	0	0	0	0	0	0	121,740	1,400	383,780
AZD063274609	CONTINENTAL CIRCUITS	38,260	533,061	0	0	40,153	0	0	0	0	42	372	261,240	1,583	874,711
	ELECTRONIC MFG:	1,038,870	4,584,184	60	465,502	145,938	0	0	316,017	59,771	712,425	257,388	1,615,847	818,066	10,014,068
AZD089308803	SAFETY KLEEN CORP	803,063	0	31,293	15,860	17,483	785,318	803,459	0	60,674	9,758	9,758	0	436,967	2,973,633
AZD980892897	SAFETY KLEEN CORP	300,470	0	4,381	2,941	2,789	300,714	302,063	0	21,380	0	0	0	4,474	939,212
AZD049318009	RECYCLING RESOURCES,INC	593,288	116,983	0	387,348	123,606	150	392,384	347,713	276,535	212,096	195,299	0	340,789	2,986,191
AZD009015389	ROMIC	1,184,289	2,383,961	31,389	90,298	31,639	0	0	931,226	1,145,334	753,198	125,058	1,309	901,779	7,579,480
AZD089304216	VAN WATERS & ROGERS	6,032	4,049	0	0	0	0	557	0	23,086	6,287	5,730	0	263,838	309,579
AZD980735500	WORLD RESOURCES CO	0	0	0	0	0	0	0	0	0	0	0	21,625,200	0	21,625,200
	WASTE HANDLER:	2,887,142	2,504,993	67,063	496,447	175,517	1,086,182	1,498,463	1,278,939	1,527,009	981,339	335,845	21,626,509	1,947,847	36,413,295
AZD097113856	LAMDBA ELECTRONICS DIV	10,250	155,600	0	154,950	1,750	0	0	13,500	0	0	0	28,500	0	364,550
AZD008398505	CHEM RESEARCH CO	0	0	0	273,640	0	0	0	0	0	0	0	7,200	0	280,840
AZT050010636	GILBERT ENGINEERING	0	0	0	0	0	0	0	14,476	0	0	0	248,990	0	263,466
AZD981425010	TALLEY DEFENSE SYS	1,242	69	156,273	65	95	0	0	23,695	504	477	0	0	21,246	203,666
	FABRICATED METAL IND.:	11,492	155,669	156,273	428,655	1,845	0	0	51,671	504	477	0	284,690	21,246	1,112,522
AZD009004961	HONEYWELL, INC.	21,892	720,046	0	0	0	0	0	210,418	0	52,507	16,224	1,144,620	0	2,165,707
AZT000624445	HONEYWELL-CHANDLER	0	170,716	0	0	0	0	0	2,000	1,000	2,000	0	160,320	154	336,190
	NAVIGATION PRODUCT:	21,892	890,762	0	0	0	0	0	212,418	1,000	54,507	16,224	1,304,940	154	2,501,897
AZD982471062	TRW SAFETY SYSTEMS	9	89	0	0	0	0	0	0	0	8	0	0	323,517	323,623
AZD018517698	GARRETT PNEUMATIC SYS	23,443	1,326	0	2,701	260	0	0	61,297	260	3,439	137,948	1,875	105,076	337,625
AZD009000050	GARRETT ENGINE DIV	17,701	350	400	1,027	4,650	0	0	448,100	350	91,302	92,102	263,974	186,172	1,106,128
	TRANSPORTATION EQUIP.:	41,153	1,765	400	3,728	4,910	0	0	509,397	610	94,749	230,050	265,849	614,765	1,767,376
AZT000611426	CAPITAL CASTING-CHANDLE	0	0	950,760	0	950,760	0	0	0	0	0	0	0	0	1,901,520
AZD000625715	GOULD INC FOIL DIV	0	34,430	8,850	14,002	42,230	0	0	0	0	0	0	1,313,007	11,350	1,423,869
AZD982435484	NATIONAL AIRCRAFT, INC.	0	0	549,180	0	549,180	0	0	0	0	0	0	0	0	1,098,360
AZD085453603	CAPITAL CASTINGS INC	0	0	110,340	0	110,340	0	0	0	0	0	0	0	0	220,680
	PRIMARY METAL MFG:	0	34,430	1,619,130	14,002	1,652,510	0	0	0	0	0	0	1,313,007	11,350	4,644,429

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TABLE 1 - DISTRIBUTION OF THE 12 LARGEST RCRA WASTE CATEGORIES IN ARIZONA BY THE 44 LARGEST GENERATORS

EPAID	COMPANY NAME	D001	D002	D006	D007	D008	D018	D039	F001	F002	F003	F005	F006	OTHER	TOTALS
AZ4572190029	LUKE WASTE ANNEX	41,927	2,655	13,505	11,188	196,908	0	0	363	814	55,731	44,448	0	2,816	370,355
AZ8170024493	MARINE CORPS AIR STA	132,544	134,890	21	162,708	50	0	0	170,934	950	13	1,034	0	53,144	656,288
AZ7570028582	WILLIAMS AFB	52,037	43,700	93,451	26,752	91,069	0	0	1,245	6,489	298	2,923	0	82	318,046
AZ0570024133	LUKE AFB	47,971	1,356	10,236	6,491	238,188	0	0	363	814	55,615	43,837	0	5,462	410,333
	MILITARY FACILITIES:	274,479	182,601	117,213	207,139	526,215	0	0	172,905	9,067	111,657	92,242	0	61,504	1,755,022
AZD074452426	SRP NAVAJO GEN STA	2,098	633	547	413,362	3,063	1,236	0	5,367	5,037	18,177	2,922	0	405,998	858,440
AZT000624429	APS/PALO VERDE NUCLEAR	12,224	4,655	15,507	10,539	14,827	3,436	0	18,470	18,010	6,904	6,374	0	115,744	226,690
	PUBLIC UTILITY:	14,322	5,288	16,054	423,901	17,890	4,672	0	23,837	23,047	25,081	9,296	0	521,742	1,085,130
AZD008394397	AZ PORTLAND CEMENT CO	2,580	0	0	988,200	0	0	0	0	1,500	0	0	0	0	992,280
AZT000617548	TEXACO INC	0	0	0	658,729	60,219	0	0	0	0	0	0	0	0	718,948
AZD003987997	HEXAL CORP	85,864	2,655	0	15,750	0	0	0	0	70,999	67,564	67,564	0	37,999	348,395
AZD982041907	HEXCEL ADVANCED PROD FA	68,589	1,200	0	0	0	0	0	0	43,001	73,844	52,245	0	0	238,878
AZD009005422	DARLING RE CO.	93,826	70,183	1,700	3,390	28,383	0	0	177,764	19,488	16,209	13,228	129,908	125,467	679,546
AZD042018689	ROGERS CORP-CIG	37,462	145,859	0	113,235	151,295	0	0	22,296	6,177	34,500	31,532	109,969	25,813	678,138
	OTHERS:	288,321	219,897	1,700	1,779,304	239,897	0	0	200,060	141,165	192,117	164,569	239,877	189,279	3,656,185
	TOTAL FOR 44 LQGS:	4,577,671	8,579,589	1,977,893	3,818,678	2,764,722	1,090,854	1,498,463	2,765,244	1,762,173	2,172,352	1,105,614	26,650,719	4,185,953	62,949,924

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industries produced 74% of the hazardous waste generated by the 44 LQGs. The wastes produced by the waste handlers and electronic manufacturers were mostly corrosive wastes, sludge from metal plating operators and ignitable wastes.

The remaining companies in the top 44 that generated hazardous waste can be categorized as follows (see Appendices B and D):

Three primary metal manufacturers, such as steel foundries, generated pickle liquor and sludge with metal contaminates (4,644,429 pounds or 2,322 tons);

One company at two facilities that manufacture navigation products that generated mostly corrosive wastes and spent solvents (2,501,897 pounds or 1,250 tons);

Three companies in the transportation equipment industry produced degreasing solvents, metals and sludges (2,446,922 pounds or 1,223 tons);

Three military facilities generating all types of wastes (1,755,021 pounds or 877 tons);

Four manufacturers of fabricated metals generated degreasing solvents, electroplating wastes and sludge contaminated with metals and cyanides (1,112,522 pounds or 556 tons);

Two electric services facilities generated chromium, lead and ignitable wastes (1,085,130 pounds or 542 tons);

One cement company generated chromium waste (922,280 pounds or 461 tons);

One petroleum bulk station generated chromium and lead wastes (718,948 pounds or 359 tons);

One plastics products manufacturer generated ignitable, corrosive, cadmium and lead wastes (678,138 pounds or 339 tons);

One miscellaneous manufacturing company generated ignitable wastes (348,395 pounds or 174 tons); and

One coated fabrics facility generated ignitable, corrosive and chromium wastes (2,38,878 pounds or 119 tons).

Not surprisingly, Arizona's hazardous waste generators are concentrated in its two largest counties: 65% of LQGs and 74% of SQGs are located in Maricopa County, while 17% of the LQGs and 15% of the SQGs are in Pima County (see Map 1 and Appendix A). Of the top 44 companies, all but three are located in Maricopa or Pima Counties (see Map 2 and Legend).

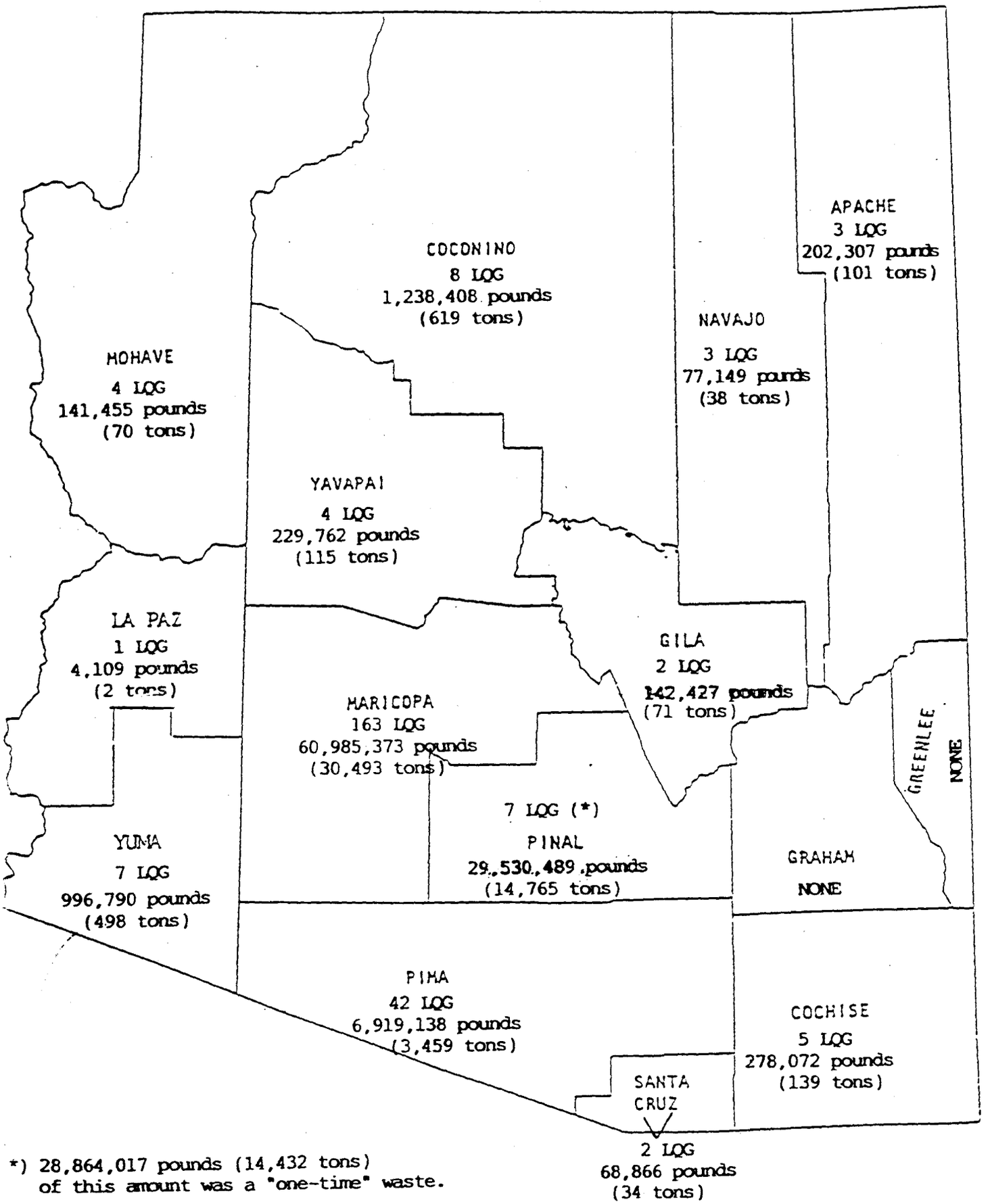
Household Hazardous Waste

As mentioned above, household hazardous waste (HHW) is a component of the state's hazardous waste stream. Available data shows that in 1991 and 1992, 415,802 pounds (2,079 tons) of HHW were collected by the cities of Mesa, Phoenix, Scottsdale, Tempe and Tucson (see Appendices E and Z). HHW generally consists of the following: paint with hazardous waste constituents; oil; anti-freeze; and batteries. 52% of the volume of the HHW collected was classified as RCRA hazardous waste and managed by various technologies (i.e., recycling, fuel substitution, neutralization processes).

The data above regarding HHW are estimates by Mesa, Phoenix, Scottsdale and Tempe based on one-time collection events in 1991. Tucson data is based upon collections at its HHW facility for the year 1991-1992. Local collection data vary from city to city. For example, the City of Phoenix estimated that each household generated just under 30 pounds per year while the City of Tucson

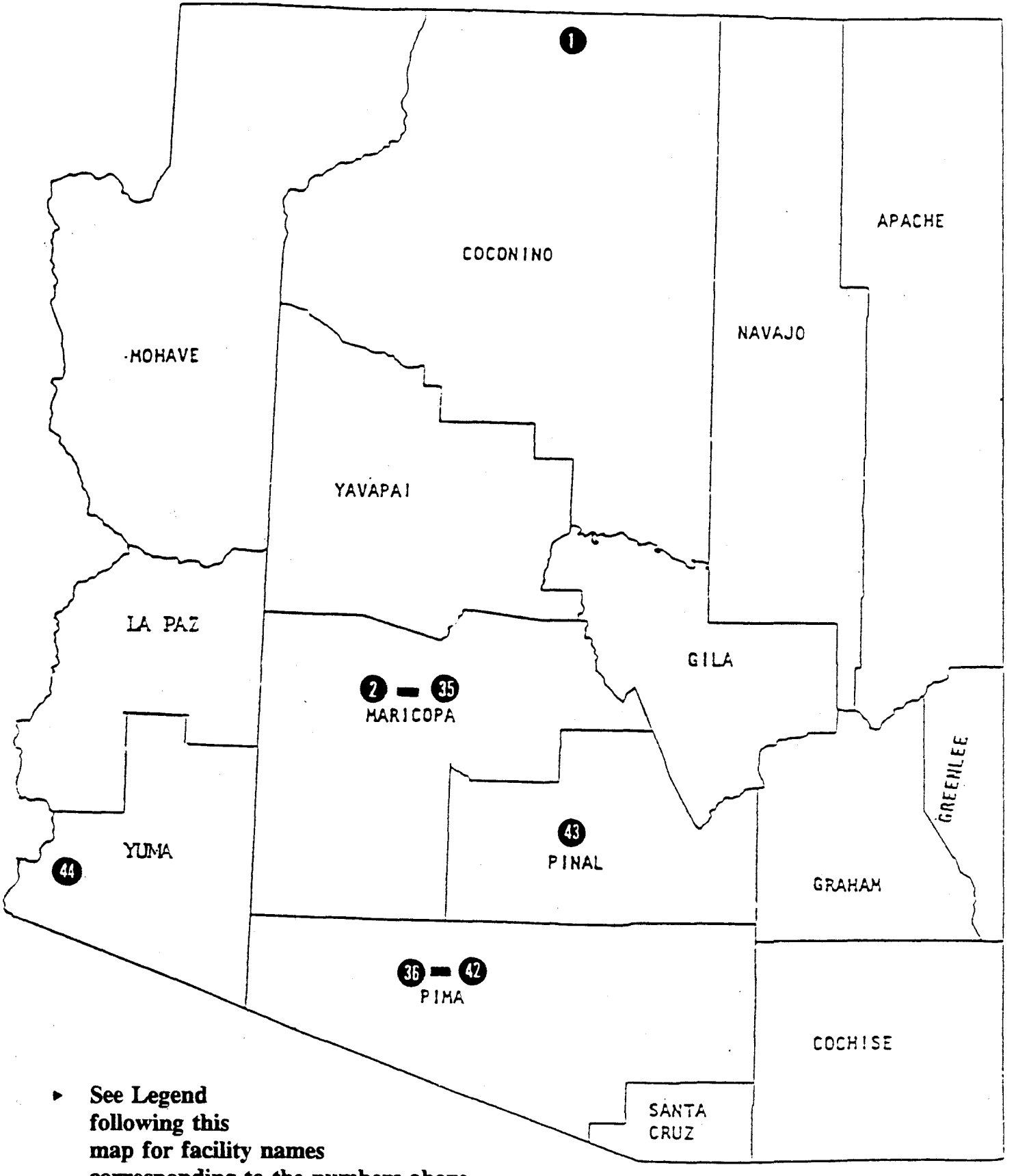
MAP 1
Number of LQG and Volume of Hazardous Waste Generated by County

1990



*) 28,864,017 pounds (14,432 tons)
of this amount was a "one-time" waste.

MAP 2
Distribution of the Largest 44 Generators by County
1990



▸ **See Legend following this map for facility names corresponding to the numbers above.**

MAP 2 LEGEND

1990

44 LARGE QUANTITY GENERATORS

NO	EPAID	COMPANY NAME	CITY	COUNTY	POUNDS	TONS
1	AZD074452426	SRP NAVAJO GEN STA	PAGE	COCONINO	858,440	429
2	AZT000611426	CAPITAL CASTING-CHANDLER	CHANDLER	MARICOPA	1,901,520	951
3	AZD000625715	GOULD INC FOIL DIV	CHANDLER	MARICOPA	1,423,869	712
4	AZD982041907	HEXCEL ADVANCED PROD FAC	CHANDLER	MARICOPA	238,878	119
5	AZT000624445	HONEYWELL-CHANDLER	CHANDLER	MARICOPA	336,190	168
6	AZD091235457	INTEL CORP PHX CAMPUS	CHANDLER	MARICOPA	288,405	144
7	AZD980735179	NORPLEX OAK INC/ALLIED	CHANDLER	MARICOPA	402,627	201
8	AZD042018689	ROGERS CORP-CIG	CHANDLER	MARICOPA	678,138	339
9	AZD009015389	ROMIC	CHANDLER	MARICOPA	7,579,480	3,790
10	AZT050010636	GILBERT ENGINEERING	GLENDALE	MARICOPA	263,466	132
11	AZ4572190029	LUKE WASTE ANNEX	GLENDALE	MARICOPA	370,355	185
12	AZ0570024133	LUKE AFB	LUKE AFB	MARICOPA	410,333	205
13	AZD043848050	MOTOROLA, INC	MESA	MARICOPA	807,553	404
14	AZD981425010	TALLEY DEFENSE SYS	MESA	MARICOPA	203,666	102
15	AZD982471062	TRW SAFETY SYSTEMS	MESA	MARICOPA	323,623	162
16	AZD008398505	CHEM RESEARCH CO	PHX	MARICOPA	280,840	140
17	AZD981371628	CIRCUIT TECHNOLOGY INC	PHX	MARICOPA	383,780	192
18	AZD980896310	CONTINENAL CIRCUITS CORP	PHX	MARICOPA	2,196,996	1,098
19	AZD063274609	CONTINENTAL CIRCUITS	PHX	MARICOPA	874,711	437
20	AZD009000050	GARRETT ENGINE DIV	PHX	MARICOPA	1,106,128	553
21	AZD009004961	HONEYWELL, INC.	PHX	MARICOPA	2,165,707	1,083
22	AZD009004177	MOTOROLA, INC.	PHX	MARICOPA	1,257,342	629
23	AZD981579634	QUALITY PRINTED CIRCUITS	PHX	MARICOPA	355,518	178
24	AZD049318009	RECYCLING RESOURCES,INC	PHX	MARICOPA	2,986,191	1,493
25	AZD089308803	SAFETY KLEEN CORP	PHX	MARICOPA	2,973,633	1,487
26	AZD089304216	VAN WATERS & ROGERS	PHX	MARICOPA	309,579	155
27	AZD980735500	WORLD RESOURCES CO	PHX	MARICOPA	21,625,200	10,813
28	AZD008399636	MOTOROLA, INC.	SCOTTSDALE	MARICOPA	275,542	138
29	AZD085453603	CAPITAL CASTINGS INC	TEMPE	MARICOPA	220,680	110
30	AZT000623819	DIGITAL EQUIP	TEMPE	MARICOPA	342,560	171
31	AZD982503385	DYNACO WEST CORP	TEMPE	MARICOPA	305,854	153
32	AZD018517698	GARRETT PNEUMATIC SYS	TEMPE	MARICOPA	337,625	169
33	AZD980818330	NELCO TECHNOLOGY	TEMPE	MARICOPA	1,915,581	958
34	AZ7570028582	WILLIAMS AFB	WILLIAMS AFB	MARICOPA	318,046	159
35	AZT000624429	APS/PALO VERDE NUCLEAR	WINTERSBURG	MARICOPA	226,690	113
36	AZD008394397	AZ PORTLAND CEMENT CO	RILLITO	PIMA	992,280	496
37	AZD982519746	3M TUCSON DATA STORAGE	TUCSON	PIMA	607,599	304
38	AZD009005422	DARLING RE CO.	TUCSON	PIMA	679,546	340
39	AZD097113856	LAMDBA ELECTRONICS DIV	TUCSON	PIMA	364,550	182
40	AZD982435484	NATIONAL AIRCRAFT, INC.	TUCSON	PIMA	1,098,360	549
41	AZD980892897	SAFETY KLEEN CORP	TUCSON	PIMA	939,212	470
42	AZT000617548	TEXACO INC	TUCSON	PIMA	718,948	359
43	AZD003987997	HEXAL CORP	CASA GRANDE	PINAL	348,395	174
44	AZ8170024493	MARINE CORPS AIR STA	YUMA	YUMA	656,288	328
				TOTAL:	62,949,924	31,475

information indicates that each household generated 12 pounds per year. Nationally, estimates vary from 15 to 20 pounds per household per year. In addition to these variances, it is unknown if the HHW collected in one day by the City of Phoenix had been "stored" for longer than two years, or if the City of Tucson's estimates reflect the actual annual contribution of households to its program. Given these considerations, it is only possible to estimate the volume of HHW generated in Arizona as ranging from 16,042,840 pounds (8,021 tons) to 40,230,000 pounds (20,115 tons).

This limited analysis of HHW suggests that such waste may significantly increase the amount of hazardous waste generated in Arizona. Due to the lack of data regarding HHW, however, further analysis is needed to better understand its true impact on the state's hazardous waste stream.

Imports

In addition to the hazardous waste generated in Arizona, the state's hazardous waste stream includes a significant amount of hazardous waste imported from other states. In 1990, Arizona accepted 38,902,624 pounds (19,451 tons) of hazardous waste from out of state. (This does not include state-defined hazardous waste such as sludge from California for which ADEQ has no records). These wastes were received by two companies, World Resources and Cyprus Miami (see Appendix H). Both facilities are presently deemed "exempt" recyclers under federal hazardous waste

laws. In other words, these facilities receive hazardous waste under manifest and process it to recover valuable materials. The recycling process itself is exempt from the hazardous waste permitting requirements for treatment. While exempt from the RCRA treatment permit requirements, both facilities are subject to all other air, water and solid waste regulations and permits.

Both facilities primarily receive wastewater treatment sludges from electroplating operations (F006). These wastes contain varying percentages of precious metals such as gold and silver. The wastes are received from 23 states, including Arizona, with 63% of the total coming from companies in California (see Table 2).

Table 2

Amount of Hazardous Waste Received by
Two Major Recyclers, by State of Origin
1990

ORIGIN	WORLD RESOURCES	CYPRUS MIAMI	TOTAL POUNDS	PCT
CA	17,597,720	6,816,769	24,414,489	62.76
AZ	4,530,880	418,475	4,949,355	12.72
OR	1,383,180	0	1,383,180	3.56
CO	1,008,380	162,720	1,171,100	3.01
PR	1,083,720	0	1,083,720	2.79
UT	908,080	99,440	1,007,520	2.59
WA	920,140	0	920,140	2.37
MN	575,280	249,250	824,530	2.12
TX	155,360	337,101	492,461	1.27
WI	417,940	0	417,940	1.07
OH	388,500	0	388,500	1.00
MO	203,680	156,640	360,320	0.93
NE	337,480	0	337,480	0.87
AL	278,040	0	278,040	0.71
IA	169,240	65,835	235,075	0.60
ID	0	199,720	199,720	0.51
AR	132,220	0	132,220	0.34
NY	72,240	0	72,240	0.19
MS	67,520	0	67,520	0.17
NV	61,660	0	61,660	0.16
IL	43,200	0	43,200	0.11
TN	0	39,314	39,314	0.10
OK	22,900	0	22,900	0.06
Total	30,357,360	8,545,264	38,902,624	100.00

The hazardous waste shipped to World Resources is blended to concentrate the precious metals. The material is then shipped to several out-of-state smelters. Of the 30,357,360 pounds (15,178 tons) received by World Resources in 1990 (see Table 2), the company shipped 21,625,200 pounds (10,812 tons) of hazardous waste out-of-state. Of the 21,625,200 pounds (10,812 tons), 17,499,200 pounds (8,749 tons) were shipped to the Phelps Dodge in New Mexico and the remaining 4,126,000 pounds (2,063 tons)

were shipped to Finland. The discrepancy between World Resources' imports and exports (8,732,160 pounds or 4,366 tons) may be explained by the fact that the available data is for calendar year 1990 which would not account for those wastes imported to the facility in 1990 but exported in 1991. ADEQ is performing a mass balance to ensure that all wastes imported by World Resources are properly disposed.

All of the 8,545,264 pounds (4,272 tons) of hazardous waste shipped to Cyprus Miami were processed through the smelter to recover the precious metals from the waste.

Exports

Arizona exported 58,410,468 pounds (29,205 tons) of hazardous waste to 23 states plus Finland and British Columbia (see Appendix I). The waste is exported by a combination of individual generators and waste handlers that collect waste from Arizona generators and export that waste. The total includes the waste exported by World Resources which accounts for 37% of all exports. Two states receive more than 50% of Arizona's wastes: New Mexico (29.96%) and California (23.54%). While shipments to California were directed to 34 different treatment, storage, disposal (TSD) facilities, the shipment to New Mexico was destined to one facility, Phelps Dodge in Hurley. Table 3 provides a list of all states and countries that received hazardous waste from Arizona and poundage received.

Table 3

Quantity of Hazardous Waste Received by State and/or Country
Generated in Arizona
1990

No.	Receiving State	Amount Received from Arizona (Pounds)	(Pct)
1.	New Mexico	17,499,200.00	29.96
2.	California	13,751,617.55	23.54
3.	Texas	4,993,064.06	8.55
4.	FINLAND	4,126,000.00	7.06
5.	Kansas	3,244,770.60	5.56
6.	New Jersey	3,081,415.00	5.28
7.	Utah	3,029,379.10	5.19
8.	Nevada	2,715,247.00	4.65
9.	Oklahoma	2,507,220.00	4.29
10.	Louisiana	1,531,334.00	2.62
11.	Missouri	677,208.00	1.16
12.	Illinois	445,786.43	0.76
13.	Tennessee	270,999.74	0.46
14.	Arkansas	210,544.55	0.36
15.	Idaho	170,120.00	0.29
16.	Minnesota	53,835.00	0.09
17.	Colorado	35,350.00	0.06
18.	Florida	26,734.79	0.05
19.	Michigan	12,500.00	0.02
20.	New York	9,789.00	0.02
21.	Indiana	7,000.00	0.01
22.	Pennsylvania	5,550.92	0.01
23.	Oregon	3,033.00	0.01
24.	Georgia	1,519.16	0.00
25.	BRITISH COLUMBIA	1,250.00	0.00
	Total	58,410,467.85	100.00

Summary

To understand Arizona's needs for treatment and disposal, it is important to first identify Arizona's primary or recurrent waste stream. Based upon 1990 ADEQ data, gross assumptions concerning HHW and unreported data from "conditionally exempt" generators (CESQG), we can conclude that hazardous waste

generated in Arizona on a recurrent basis (excluding one-time waste) is as follows:

1) 102,867,056 pounds Total (See Page 26)
-28,326,000 pounds One-time (See Page 26)

74,541,056 pounds

2) HHW = 16,042,840 pounds (8,021 tons) to 40,230,000 pounds (20,115 tons) (See Page 36)

Ninety-six percent of Arizona's recurrent hazardous waste stream consists of twelve (12) types (see Table 2). 49% of this waste stream is generated by five waste handling companies. However, one company, World Resources, accounts for 29% (21,625,200 pounds or 10,812 tons) of the recurrent waste stream. Because World Resources does not generate new hazardous waste in Arizona (it handles wastes from other companies and ships it out of state for recovery of precious metals) we can subtract its amount from the total recurrent waste stream for which Arizona must have disposal and treatment capacity. Thus, Arizona's recurrent waste stream is 38,127,761 pounds or 19,063 tons of which the 43 top generators (see Table 1, eliminating World Resources from the list) produce 79% (41,324,724 pounds or 20,671 tons).

It should also be emphasized that the estimated volumes of HHW are based on limited, preliminary data and furthermore, under current state law, disposing of HHW is prohibited at state-owned hazardous waste facilities (A.R.S. §49-903 (B)).

Finally, it must be noted that without additional research there is no way to quantify or verify the double counting problem previously mentioned when calculating waste generated by waste handlers (other than World Resources) in Arizona. The new FAR reporting format currently utilized by ADEQ will provide better information on the double counting issue. Additionally, research is needed to predict with greater certainty the type and volume of one-time waste Arizona will generate in the future (see Page 26). While the above information is based on 1990 data and more current information is necessary to make final predictions, there is no evidence to suggest that the future composition of Arizona's waste stream will alter substantially from the present.

Chapter IV. Arizona's Incinerable Hazardous Waste Stream

Under HB 2121, the Committee was charged with identifying the amount of Arizona-generated hazardous waste likely to be incinerated and comparing that amount with Arizona's total waste stream. Because of federal law and ADEQ reporting requirements, identifying the amount of hazardous waste actually incinerated, as opposed to that which could be incinerated, is complicated and may not be totally accurate.

RCRA Land Disposal Restrictions (LDRs)

Under RCRA, the EPA established treatment technologies that must be applied to hazardous waste to limit the waste's toxicity and volume (see Appendix J). Known as the Land Disposal Restrictions (LDRs), these regulations mandate the application of specific technologies (i.e., incineration) to particular wastes while permitting other wastes to be treated by several technologies (see Attachment 1).

There were 13,348,329 pounds (6,674 tons) of waste generated by both LQGs and SQGs that had to be, or optimally could be, incinerated in Arizona in 1990. Of this amount, **Arizona's LQGs generated only 12,555,736 pounds (6,278 tons) of recurrent hazardous waste that required incineration, unless the waste was recycled. This waste stream was generated by just 36 facilities (see Table 4). Based upon the 1990 FARs we know that 5,761,286**

TABLE 4 - GENERATION OF INCINERABLE WASTE BY 44 LQG'S

EPAID	COMPANY NAME	D001	F001	F002	F003	F005	5 TYPES OF INCINERABLE WASTE	5 TYPES OF INCINERABLE WASTE LBS % OF TOTAL	OTHER WASTE	OTHER WASTE LBS % OF TOTAL	TOTALS
AZD009015389	ROMIC	1,184,289	931,226	1,145,334	753,198	125,058	4,139,105	54.61%	3,440,375	41.43%	7,579,480
AZD043848050,AZD008399636,AZD009004177	MOTOROLA, INC	435,145	315,584	53,106	619,836	239,706	1,663,377	71.07%	1,304,060	55.72%	2,340,437
AZD049318009	RECYCLING RESOURCES,INC	593,288	347,713	276,535	212,096	195,299	1,624,931	54.41%	1,361,260	45.59%	2,986,191
AZD089308803,AZD980892897	SAFETY KLEEN CORP	1,103,533	0	82,054	9,758	9,758	1,205,103	30.80%	2,307,742	58.98%	3,912,845
AZD009000050,AZD018517698	GARRETT ENGINE DIV	41,144	509,397	610	94,741	230,050	875,942	60.67%	467,811	32.40%	1,443,753
AZD009005422	DARLING RE CO.	93,826	177,764	19,488	16,209	13,228	320,515	47.17%	359,031	52.83%	679,546
AZD009004961,AZT000624445	HONEYWELL, INC.	21,892	212,418	1,000	54,507	16,224	306,041	12.23%	2,195,856	87.77%	2,501,897
AZ8170024493	MARINE CORPS AIR STA	132,544	170,934	950	13	1,034	305,475	46.55%	350,813	53.45%	656,288
AZD003987997	HEXAL CORP	85,864	0	70,999	67,564	67,564	291,991	83.81%	56,404	16.19%	348,395
AZ0570024133,AZ4572190029	LUKE AFB	89,898	726	1,628	111,346	88,285	291,883	37.39%	488,805	62.61%	780,688
AZD981579634	QUALITY PRINTED CIRCUIT	252,398	0	0	0	0	252,398	70.99%	103,120	29.01%	355,518
AZD982041907	HEXCEL ADVANCED PROD FA	68,589	0	43,001	73,844	52,245	237,679	99.50%	1,199	0.50%	238,878
AZD091235457	INTEL CORP PHX CAMPUS	191,220	0	0	10,120	0	201,340	69.81%	87,065	30.19%	288,405
AZD982519746	3M TUCSON DATA STORAGE	73,854	0	0	45,753	17,154	136,761	22.51%	470,838	77.49%	607,599
AZD042018689	ROGERS CORP-CIG	37,462	22,296	6,177	34,500	31,532	131,967	19.46%	546,171	80.54%	678,138
AZD980818330	NELCO TECHNOLOGY	35,718	0	0	35,718	0	71,436	3.73%	1,844,145	96.27%	1,915,581
AZ7570028582	WILLIAMS AFB	52,037	1,245	6,489	298	2,923	62,992	19.81%	255,054	80.19%	318,046
AZT000624429	APS/PALO VERDE NUCLEAR	12,224	18,470	18,010	6,904	6,374	61,982	27.34%	164,708	72.66%	226,690
AZD980896310,AZD063274609	CONTINENTAL CIRCUITS	49,735	0	0	42	372	50,149	1.63%	3,021,558	98.37%	3,071,707
AZD089304216	VAN WATERS & ROGERS	6,032	0	23,086	6,287	5,730	41,135	13.29%	268,444	86.71%	309,579
AZD074452426	SRP NAVAJO GEN STA	2,098	5,367	5,037	18,177	2,922	33,601	3.91%	824,839	96.09%	858,440
AZD981425010	TALLEY DEFENSE SYS	1,242	23,695	504	477	0	25,918	12.73%	177,748	87.27%	203,666
AZD097113856	LAMDBA ELECTRONICS DIV	10,250	13,500	0	0	0	23,750	6.51%	340,800	93.49%	364,550
AZT050010636	GILBERT ENGINEERING	0	14,476	0	0	0	14,476	5.49%	248,990	94.51%	263,466
AZT000623819	DIGITAL EQUIP	0	0	6,086	156	156	6,398	1.87%	336,162	98.13%	342,560
AZD008394397	AZ PORTLAND CEMENT CO	2,580	0	1,500	0	0	4,080	0.41%	988,200	99.59%	992,280
AZD982503385	DYNACO WEST CORP	800	433	579	800	0	2,612	0.85%	303,242	99.15%	305,854
AZD982471062	TRW SAFETY SYSTEMS	9	0	0	8	0	17	0.01%	323,606	99.99%	323,623
AZT000617548	TEXACO INC	0	0	0	0	0	0	0.00%	718,948	100.00%	718,948
AZD982435484	NATIONAL AIRCRAFT, INC.	0	0	0	0	0	0	0.00%	1,098,360	100.00%	1,098,360
AZD085453603,AZT000611426	CAPITAL CASTINGS INC	0	0	0	0	0	0	0.00%	2,122,200	100.00%	2,122,200
AZD981371628	CIRCUIT TECHNOLOGY INC	0	0	0	0	0	0	0.00%	383,780	100.00%	383,780
AZD008398505	CHEM RESEARCH CO	0	0	0	0	0	0	0.00%	280,840	100.00%	280,840
AZD980735179	NORPLEX OAK INC/ALLIED	0	0	0	0	0	0	0.00%	402,627	100.00%	402,627
AZD980735500	WORLD RESOURCES CO	0	0	0	0	0	0	0.00%	21,625,200	100.00%	21,625,200
AZD000625715	GOULD INC FOIL DIV	0	0	0	0	0	0	0.00%	1,423,869	100.00%	1,423,869
	TOTAL FOR 44 LQGS:	4,577,671	2,765,244	1,762,173	2,172,352	1,105,614	12,383,054	19.49%	50,693,870	80.51%	62,949,924

pounds (2,880 tons) of the 12,555,736 pounds (6,278 tons) were recycled. Therefore, in 1990 the amount of hazardous waste ultimately incinerated by LQGs was approximately 6,794,470 pounds (3,397 tons) or 6% of Arizona's total hazardous waste stream (see Chapter III and Appendices B, J and F). ADEQ does not have comparable data for SQGs.

It is difficult to know whether all of the 6,794,470 pounds of incinerated hazardous waste was required to be incinerated or whether some of it could have been recycled. This difficulty stems from two facts. First, the LDRs distinguish between solid and liquids based upon the concentration of waste in the material being disposed. A hazardous waste in solid form (known as "non-wastewater" in EPA jargon) must be incinerated if it is not recycled. But if hazardous wastes are in liquid form ("wastewater") one of the other EPA specified technologies can be applied. For example, isobutanol (F001) is "wastewater" or "liquid" if the waste has isobutanol levels of less than 5.0 mg/L and is "non-wastewater" or "solid" at levels of 5.0 mg/L or more. If it is a solid it must be incinerated or recycled. If it is a liquid, the waste can be recycled, incinerated or subjected to steam stripping, biological treatment or activated carbon. Second, the FARs and manifests do not provide sufficient detail to determine concentrations and therefore, ADEQ is unable to determine whether all the wastes incinerated in 1990 were mandatory incinerable wastes.

Because the Committee does not have access to sufficiently detailed information concerning the makeup of Arizona's incinerable waste stream, it is impossible to predict the amount of waste likely to be incinerated in the future. What we do know is that using 1987 data, the October 1990 Report estimated Arizona's mandatory incinerable hazardous waste stream to be 6% of the total hazardous waste generated. Using available 1990 data, it appears that the 6% figure has not changed.

While it is difficult to project Arizona's future incinerable waste stream, we know that it is small when compared to the available incineration capacity in the Western States. As of February 1992, there was 103,117 tons per year surplus capacity to incinerate hazardous waste liquids and 129,710 tons per year surplus capacity to incinerate hazardous waste solids (see Appendix DD). Given this surplus capacity in the Western states, there is no need for additional incineration capacity in Arizona.

Summary

Using this 6% number, however, is misleading because the total waste stream includes the potential for "double counting," and "one-time waste" (see Chapter III). While we cannot account for all the double counting problem, we can, by subtracting the one-time waste and the World Resources waste (for which treatment and disposal in Arizona is not needed), reduce a major portion of Arizona's recurrent hazardous waste stream as reported in Chapter

III. The calculation is appropriate because the one-time waste may or may not in any given year, require incineration capacity. Therefore, using the recurrent waste stream without the one-time waste, or World Resources, the total of Arizona's waste is 38,127,761 pounds (19,063 tons), making Arizona's 6,794,470 pounds (3,397 tons) of incinerated waste, approximately 8% of the total recurrent waste stream (see Appendix J). This percentage suggests that pollution prevention initiatives directed at incinerable wastes are an appropriate and needed effort.

Chapter V. Current Treatment and Disposal Practices

ADEQ records show that 37 facilities in Arizona have reported accepting hazardous waste (see Map 3 and Appendix K). Only 24 of these facilities are currently operating. The others have closed, are being closed, or have a permit but have not yet been constructed. Of the 24 facilities, only 13 are approved to receive hazardous waste from off-site. The remaining 11 are approved to perform on-site treatment/storage only. This data does not include the exempt recyclers (World Resources, Cyprus Miami and Romic) that do not require RCRA approval.

Twenty of the approved RCRA facilities are private (i.e., available to the owner/operator of the site only). One commercial metals and solvent recovery facility, Recycling Resources, has the capacity to manage 20,038,000 pounds (10,019 tons) of waste per year. Three Arizona commercial facilities are permitted under RCRA to store hazardous waste: Rinchem, Safety Kleen and Chemical Waste Management. However, not one of the Arizona facilities is an authorized permanent disposal site for federally listed hazardous wastes which limits the state's ability to manage its own waste.

As a result, hazardous waste generated in Arizona today is managed by a variety of different methods either occurring at the site of generation or off-site at facilities in Arizona or other states. **In 1990, 32% of the state's total hazardous waste stream**

was treated at the site of generation by 13 companies. Ten percent was shipped to Arizona's commercial treatment/storage facilities, several of which were "captive" facilities that treat waste generated by a facility on or off-site with the same owner (meaning the waste is managed by one company from the point of generation to treatment). The remaining 58% of Arizona-generated hazardous waste was shipped out-of-state (see Appendix I).

There are three recycling facilities in Arizona that are exempt from some of the RCRA regulations such as permit and reporting requirements. The two major recyclers, World Resources and Cyprus Miami, primarily receive imported waste as opposed to Arizona-generated waste (see Chapter III). The third recycling facility, Romic, is under EPA jurisdiction because it is located on Indian lands. Romic recycled 2,518,054 pounds (1,259 tons) of Arizona-generated waste in 1990.

Arizona's 13 approved facilities receiving hazardous waste are listed in Table 5 below by name, volume of waste received from in-state generators and regulatory status.

Table 5

Amount of Hazardous Waste Received by Arizona's
13 Approved Facilities from Arizona Generators

USEPAID#	Company Name	Pounds	Status
1.AZD980735500	World Resources	4,079,841	commer-recycler
2.AZD009015389	Romic Chemical	2,518,054	commer-recycler
3.AZD980892731	Rinchem	1,562,774	commer-storage
4.AZD060624251	Cyprus Miami	641,526	commer-recycler
5.AZT050010180	Chemical Waste Mgmt	227,693	commer-storage
6.AZD089308803	Safety Kleen Phoenix	154,366	commer-storage
AZD980892897	Safety Kleen Tucson	55,178	commer-storage
7.AZD049318009	Recycling Resources	96,451	commer-treat
8.AZ4572190029	Luke AFB DRMO Annex	365,666	storage
9.AZ4570024139	Luke AFB Gila Bend	1,732	priv-treatment
10.AZD020132502	Talley Defense System	170,274	priv-treatment
11.AZ4570024055	Davis Monthan AFB	35,624	priv-treatment
12.AZD008397069	ITT Cannon	34,000	priv-treatment
13.AZD980638290	Unidynamics	2,080	priv-treatment
AZ	N/A	68,979	n/a

Summary

When the above data is viewed in terms of Arizona's recurrent waste stream of 38,127,761 pounds (or 19,063 tons), it becomes clear that Arizona's commercial recyclers already manage approximately 20% of that waste stream. This is significant because it means that there is an unsatisfied treatment/disposal need for only aproximately 30,500,000 pounds or 15,250 tons of hazardous waste. This number may actually include waste that has been double counted, thereby making the actual recurrent waste stream somewhat smaller (see footnote 2 on page 27). The

recurrent waste stream is primarily made up of solvents (see Appendix CC), and a portion of that may be able to undergo recycling or treatment before undergoing other forms of treatment and disposal.

Chapter VI. Evaluation of the Scientific Panel Report

HB 2121 (Chapter 315, Laws 1991) directed the Committee to select three scientists from a list provided by the Governor to study hazardous waste treatment and disposal technologies, including the effects of incineration and other technologies on human health and the environment. The Scientific Panel was to report the results of its study by March 1, 1992 for evaluation by the Committee. The objective of the Scientific Panel was to provide Arizona with an independent, objective overview of new (including experimental) and existing technologies in a format that the Committee could use to develop recommendations that address Arizona's hazardous waste needs and concerns.

The Committee anticipated that the Scientific Panel Report would provide technological information to fill the existing information gaps and identify the human and environmental health and economic impacts of various treatment and disposal technologies. The Scientific Panel was selected by the Committee in December 1991. In January 1992 the Committee provided recommendations of what the Panel's report should address (see Attachment 2). By February 1992 the Panel developed a list of the technologies to be addressed in their report and submitted this to the Committee for review (see Attachment 3). The Panel members were:

Mr. Jan Radimsky, Chief
Office of Statewide Planning
California Department of Toxic Substances Control
Sacramento, California

Mr. Donald A. Oberacker
Thermal Destruction Branch
Waste Minimization, Destruction & Disposal Research Division
U.S. Environmental Protection Agency
Cincinnati, Ohio

Dr. Steven W. Carothers
SWCA Environmental Consultants
Flagstaff, Arizona

Unfortunately, the Scientific Panel never produced a report as specified in HB 2121 (Chapter 315, Laws 1991) due to a lack of resources and other conflicts. In August 1992, Mr. Jan Radimsky submitted a written response (see Attachment 4) to the Committee with attached materials as follows:

1) A list of wastes with corresponding non-liquid and liquid best demonstrated available technologies for treatment (BDAT);

2) A copy of the previously submitted Scientific Panel Report Outline;

3) The Table of Contents of the Standard Handbook of Hazardous Wastes Treatment and Disposal (Harry M. Freeman, Editor, McGraw-Hill, 1989);

4) Copies of eight reports/proceedings issued by the California Department of Toxic Substances.

The materials provided by the Scientific Panel did not include any analysis of hazardous waste treatment and disposal technologies. Consequently, the Committee was unable to fulfill its charge of evaluating the Scientific Panel Report to identify specific environmentally sound technologies that would most likely be utilized by hazardous waste generators in Arizona. **Such analyses are absolutely essential to developing any**

recommendations of appropriate technologies for Arizona's hazardous waste.

While we do not have the Scientific Panel Report, it should be helpful to know what types of technologies are currently being applied to Arizona-generated waste at out-of-state TSD's. We know the technologies below are applied to Arizona-generated waste, but the limited information in the FARs makes it impossible to determine the precise volume of waste treated by each technology. It was the Committee's hope that the Scientific Panel would have provided the information to perform this analysis.

Disposal Technologies Applied to Arizona-Generated Hazardous Waste

1) deactivation - a process to remove the hazardous characteristics of a waste;

2) incineration - the burning of combustible solvents, primarily in cement kilns(see Chapter IV);

3) recovery of organics in waste utilizing specified techniques;

4) thermal recovery of lead in secondary lead smelters;

5) thermal recovery of metals or inorganics;

6) retorting/roasting waste in a thermal processing unit;

7) fuel substitution.

For wastes that are not subject to LDR regulations, the treatment technology utilized is based on EPA-approved hazardous waste handling practices which may include the techniques

described above as well as processes to recover metals, solvents or disposal (see Appendix L). These technologies, such as metals recovery processes, are more representative of the technologies that are commercially available in Arizona.

Summary

Due to the various technological options for managing an individual hazardous waste and the limited information provided in the FARs, it is difficult to project the specific technologies or practices which will be utilized by Arizona generators on the waste in any given year. It depends, in part, on the regulatory status as well as cost-effectiveness of a treatment technology. In addition, some Arizona generators may be committed to manage their hazardous waste under existing contracts with specific TSD facilities outside of Arizona. Therefore, generators need to be surveyed to see if they would use an Arizona site.

Chapter VII. Pollution Prevention/Waste Minimization in Arizona

Pollution Prevention

HB 2121 (Chapter 315, Laws 1991) established an incentive-based pollution prevention program for Arizona businesses to reduce the amount of hazardous wastes generated and toxic substances used (see Appendix M). Under current state law (A.R.S. §49-961), pollution prevention means operational procedures and processes and improvements in housekeeping or management techniques that reduce potential or actual releases of pollutants (i.e., hazardous wastes, toxic substances, water contaminants, air emissions) to the environment. The program requires LQGs and others that use certain amounts of toxic substances to submit a pollution prevention plan to ADEQ (phased in over four years beginning with the largest generators in December 1992). Facilities that file a plan (even those that do not meet the threshold requirements) receive a 50% credit on their hazardous waste generation fees collected by ADEQ for the year the plan is submitted. Because the first submittal date for pollution prevention plans is not until December 1992, limited information was available to the Committee to fulfill its directive to determine the potential reduction in the amount of hazardous waste that could result from pollution prevention plan implementation and waste reduction techniques.

As pollution prevention plans are submitted and evaluated over the next several months, ADEQ will have the information

necessary to assess pollution prevention activities utilized by Arizona businesses and the impacts of those activities on our hazardous waste stream. In January 1994, state law (A.R.S. §49-963) will ensure that ADEQ further promotes the reduction or elimination of hazardous wastes by establishing a numeric waste minimization goal for Arizona.

Waste Minimization

Waste minimization includes any source reduction or recycling activity undertaken by a generator that reduces the volume and/or toxicity of hazardous wastes. Pollution prevention and waste minimization may utilize similar methods and procedures to achieve their distinct goals of eliminating or reducing pollutants and hazardous waste, respectively. Demonstrated techniques include the following:

1) changes/substitutes in raw materials used in the manufacturing process, reduction or elimination of toxic substances;

2) changes in applied technologies or processes;

3) product substitutions;

4) good operating practices such as spill prevention, inventory control to ensure substances are used before they expire and are considered wastes;

5) in-process or other on-site recycling processes that reuse or reclaim valuable materials.

Based on existing data, 54 out of 251 Arizona LQG generators provided waste minimization data from 1990-91 on their FARs submitted to ADEQ in 1992 (see Table 6 and Appendix N). As

reported, these 54 generators reduced the amount of hazardous waste they produced by 11.3%. A total of 22 types of wastes were reduced including the 12 major waste types generated in Arizona (see Table 7).

Table 7

Hazardous Waste Minimized by 54 Selected Generators in 1991, by Waste Type

Waste Type	Pounds	Percent
D002	460,926	26.04
F001	432,422	24.43
D008	163,282	9.22
D006	128,867	7.28
F006	115,700	6.54
F003	100,700	5.69
LABP	93,180	5.26
D001	76,548	4.32
D003	64,024	3.62
F005	53,085	3.00
F002	51,422	2.90
D007	7,544	0.43
P066	6,760	0.38
D005	5,708	0.32
D035	4,575	0.26
D018	1,943	0.11
D009	1,288	0.07
D028	700	0.04
D011	700	0.04
D029	392	0.02
F007	300	0.02
D039	233	0.01
Total	1,770,300	100.00

The 54 generators reduced their wastes primarily by instituting process modifications such as "closed-loop" recycling and/or substituting solvents with aqueous cleaners in the manufacturing process. A significant amount of reduction was achieved by simply implementing good operating practices such as increasing the emphasis on maintenance or more efficient production scheduling. Some generators recycled on-site as an

extension of the production process which also resulted in long-term cost benefits to the generator (see Table 8).

Table 8

Quantity of Hazardous Waste Reduced by
54 Generators in 1991 by Waste Minimization Technique

Technique	Pounds	Percent
Process Modifications	781,877	44.17
Good Operating Practices	423,588	33.93
Recycling Activity	280,640	15.85
Raw Material Modifications	126,060	7.12
Inventory Control	120,765	6.82
Spill and Leak Prevention	31,110	1.76
Product Modifications	6,260	0.35

Under the federal CAP requirements, states may claim the reduction of 10% of hazardous wastes generated within their borders without documentation. The 11.3% reduction reported to ADEQ satisfies the minimum federal standard almost entirely through the implementation of good housekeeping practices. Using these 54 companies as a sample of Arizona's hazardous waste generators, we can conclude that the potential for reduction of hazardous wastes generated through pollution prevention implementation is great.

Summary

The most effective way to handle hazardous waste is to not create it in the first place. Waste minimization/pollution prevention practices will continue to develop in Arizona over the next several years with the implementation of ADEQ's pollution

prevention program and increasing awareness of waste reduction technologies. However, it must be noted that the reduction of hazardous wastes generated or toxic substances used might be offset at any time by economic growth resulting in increased levels of production by Arizona businesses or new business moving to Arizona. Regardless, it is essential that all hazardous waste generators in Arizona commit to promoting and implementing pollution prevention practices if we are to significantly reduce our hazardous waste stream over time. One of the criteria for soliciting new business in Arizona must to be the commitment of those companies to protecting the environment and doing pollution prevention.

Chapter VIII. Utilization of the Estrella Point Site in Mobile

Description

The Estrella Point (also known as ENSCO) facility is located on a 640-acre site approximately 45 miles southwest of Phoenix and six miles west/southwest of Mobile, Arizona. The main facility covers approximately 65 acres and is surrounded by a six-foot chain link fence. Since September 24, 1991, the Department of Administration (DOA) has managed and provided 24-hour security and maintenance for the site. DOA's cost to manage the site is approximately $100,000 annually (see Appendix O).

The Estrella Point site encompasses an assortment of physical structures originally designed for the storage and disposal of hazardous waste. The site houses a number of administrative and maintenance buildings which are completed or near completion. Other structures include a large warehouse designed, upon completion, to store newly arrived hazardous waste from an adjacent truck-rail siding. If completed as designed, the facility could handle numerous hazardous waste transport trucks per day. Based on a 1987 report prepared for the Department of Health Services (DHS), an average of 19 daily shipments to the facility was expected.[3]

The site has several waste processing areas including a partially completed solidification tank and a 750,000 gallon raw

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[3]"Risk Assessment of Transporting Hazardous Waste to the Arizona Waste Management Facility," p. 7 of the final draft prepared by Mountain West on April 17, 1987.

water storage tank. A 350 sq. ft. concrete slab (3.5 ft. thick) has been poured, which was intended to support three portable hazardous waste incinerators and kiln driers. In addition, the site has a lined brine pond to accommodate post processing run-off. The site also has a 7-8 acre landfill area designed for four cells. Excavation has been initiated on two of the cells. A completed stormwater retention pond is designed to provide protection from floods and natural runoff to the main site.

History

The primary purpose of the Estrella Point facility was to serve the hazardous waste needs of Arizona. As a functional disposal site, the Estrella Point facility was designed to alleviate both the high cost of shipping hazardous waste out-of-state for disposal and illegal dumping of hazardous waste in the state's riverbeds and deserts. Currently, disposal of Arizona's hazardous wastes is handled by 23 other states - primarily California (see Chapter III).

The Estrella Point facility was designed to handle a variety of industrial and commercial hazardous wastes including organic waste, solvents, metallic sludges, liquids, and solids. Hazardous material spills from state and federal superfund clean-up sites would also have been disposed of at this site. However, the facility is prohibited from accepting any radioactive materials, explosives, or household wastes (A.R.S. §49-903 (B)).

In 1980, the Arizona Legislature directed the Arizona Department of Health Services (DHS) to select a site for a state hazardous waste disposal facility. Upon the recommendation of ADHS in 1981, legislation was adopted selecting the Mobile site. The land for the site was purchased by the state from the federal Bureau of Land Management (BLM) for $256,000 on June 29, 1984, with no formal restrictions on its use, although the understanding at the time was that it was to be developed as a hazardous waste disposal site. An additional right-of-way easement for access from State Route 238 to the site was obtained from BLM.

This legislation also directed DHS to adopt rules governing the "management, construction and operation" of any state disposal site (see former A.R.S. § 36-2806, now A.R.S. § 49-905). These regulations were to include provisions relating to the transportation of hazardous waste within Arizona to the site and the "types and amounts of hazardous wastes to be accepted for disposal" by the facility. To date, these regulations have not been adopted because there is no operational state hazardous waste facility.

In January 1981, DHS prepared a report to the Legislature on the status of the hazardous waste facility (a copy is on file and available for public review at ADEQ - see Appendix AA). The report informed the Legislature that other states could use the Arizona disposal site, although such use would be discouraged. The report noted that waste importation was a highly sensitive

issue governed by legal, administrative, economic and environmental considerations.

In October 1982, DHS issued an Request For Proposals (RFP) for the design, construction, financing, operation, and maintenance of a hazardous waste management facility to be located in Mobile. While 70 firms received the RFP, only two submitted bids for the project. The first bid proposed a "low technology" approach using only a landfill to dispose of hazardous waste. The second bid, submitted by ENSCO, proposed a "high technology" approach which included not only advanced landfill disposal, but also, advanced technology incineration to be used for PCB's.

In July 1983, the state accepted ENSCO's bid. It called for one incinerator, regional PCB waste disposal, and mobile equipment which would help avoid high capital costs. ENSCO estimated the cost of the facility to be $16 million. In January 1986, the contract between the state and ENSCO was executed.[4]

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[4] Some provisions of this contract included the site being designated as a "full service" facility providing for the storage, treatment, and disposal of hazardous waste, including incineration. A user fee schedule was to be established prior to the operation of the facility by which ENSCO would be provided with a reasonable annual gross profit margin. Fees were to be remitted to the state which was to retain $150,000 annually plus 2% of the gross revenues, subject to an undetermined annual cap (the balance of the fees was to be paid to ENSCO). Finally, it was stipulated that ENSCO would finance, construct, operate, and maintain the facility in accordance with applicable state and federal laws, regulations and permits, and its contract with the state. Six months after the contract was signed, ENSCO estimated the cost of the facility to be $26 million. In 1987, the contract was extended five years until 2001. In September 1989, ENSCO estimated its capital investment in the site to be $47 million. The state acquired ENSCO's interests in the site for $44 million in September 1991.

Status of Permits Issued at Estrella Point

In February 1988, a public hearing was held in Mobile on the ADEQ Proposed Groundwater Protection Permit and Solid Waste Approval. At that time, the Air Quality Installation Permit was issued, but ADEQ lacked statutory authority to hold hearings on proposed air quality installation permits. Revisions to the air quality statute were enacted in 1989 and became effective on September 15, 1989, requiring that all proposed air permits be subject to public comment and the opportunity for public hearings.

With the issuance of the following permits, construction was allowed to begin on portions of the facility:

(1) Permit No. 1203, an Air Quality Installation Permit, issued by ADEQ on February 4, 1988;

(2) A national approval to operate the MWP 2000 incinerator for treatment of PCB's, issued by EPA under the Toxic Substance Control Act on March 16, 1988;

(3) Permit No. G-008-07, a Groundwater Protection Permit issued by ADEQ on April 19, 1988; and

(4) A solid waste approval, reference number SW-8894, issued by ADEQ on April 25, 1988.

On May 7, 1990, a joint ADEQ/EPA public hearing on the following proposed permits was held in Mobile:

(1) Permit No. 1224, a revised Air Quality Installation Permit, proposed by ADEQ under the Arizona Air Quality Act;

(2) A hazardous waste permit, proposed by ADEQ under the Arizona Hazardous Waste Management Act;

(3) A hazardous waste permit, proposed by EPA under the federal Resource Conservation and Recovery Act; and,

(4) A toxic waste facility permit, proposed by EPA under the Toxic Substance Control Act.

Additional public hearings on June 20, 1990, and June 21, 1990, were held in Phoenix and Tucson, respectively. Together, these three public proceedings drew over 3,000 people from which an excess of 300 oral comments were received from individuals and organization representatives.

If the site is completed as originally designed, a subsequent operator of the site would have the opportunity to utilize any documents on file at ADEQ related to the permits to the extent they are relevant and appropriate. **However, all permits and permit applications issued by ADEQ to ENSCO for the facility have been terminated. Any new operator would be required to initiate new permit applications (see Appendix P).** In addition, should completion of the site deviate from the specifications originally presented by ENSCO, the documents would have to be modified accordingly. All records related to ENSCO's

permits and the permit application process are boxed in storage at ADEQ and are available for public review.

Legal Issues Involving the Disposal of Hazardous Waste

It is clear that one of the most contentious issues facing environmental management today is the treatment and disposal of hazardous waste. In Arizona, the principal areas of concern have been the importation and incineration of hazardous waste and attempts to focus on toxic use reduction and pollution prevention.

Many state and local governments have sought ways to prevent or restrict the flow of hazardous waste into their jurisdictions. These attempts have included enacting outright bans on out-of-state waste, levying higher fees on imported waste, and adopting waste management plans that direct certain types of waste to specified facilities. The legality of such restrictions is governed by the Commerce Clause of the U.S. Constitution which limits the rights of states to regulate interstate commerce. Under the Commerce Clause, state and local governments are prohibited from interfering with interstate commerce unless they are deemed to be "market participants." Based on existing case law, outright bans on the importation of hazardous waste based solely on the origin of the waste would be illegal.[5]

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[5] City of Philadelphia v. New Jersey, 437 U.S. 617, 621-22 (1978).

A few state and local government actions have survived judicial scrutiny under the Commerce Clause. If a state qualifies as a "market participant" it may prohibit or limit the processing of imported waste or may charge higher fees for processing through contract, statute or rule. The tests applied by the courts focus on whether the state's activities constituted direct participation in the marketplace. For example, in Swin Resource Systems, Inc. v. Lycoming County, Pennsylvania, 883 F.2d 245 (3rd Cir., 1989) the Third Circuit held that because the county owned and operated the landfill in dispute, the county was free to impose price and volume conditions on waste generated outside of the county. The court reasoned, "residents who reside within the jurisdiction of a county or municipality are unlikely to pay for local government services if they must bear the cost but the entire nation may benefit." Such restrictions, however, could not apply to privately-owned landfills and not beyond the immediate market in which the county transacts its business. Id. at 250-51.

In 1991, Governor Symington led an effort to acquire ENSCO's interests in the Estrella Point facility. Sole ownership of the Estrella Point facility gives the state the ability to control the source, type and amount of hazardous waste handled at this facility. This authority made it possible for the Legislature to amend A.R.S. § 49-903 in 1991 to prohibit disposal of any hazardous waste at the site that is generated outside the state until the Legislature approves an interstate disposal agreement

pursuant to CERCLA or finds that such a prohibition is no longer in the best interests of the state (A.R.S. § 49-903(D)). An outright ban on incineration of hazardous waste at state-owned facilities was enacted by the Legislature at the same time (A.R.S. § 49-903(C)).

During the 1992 Legislative Session, the Legislature enacted SB 1053. This legislation requires all state agencies to perform a constitutional takings implications assessment of proposed rules and related agency actions pursuant to guidelines prepared and interpreted by the Arizona Attorney General's Office (Chapter 107, Laws 1992). Because this legislation focuses on the scope and conditions of regulatory permits issued by state agencies, this Committee asked the Attorney General's Office to provide advice on the impact of SB 1053 on the state's ability to restrict future uses of the Estrella Point facility (see Attachment 5).

The Attorney General's Office provided the Committee with an analysis which breaks down into two areas. First, to the extent the state attempts to place regulatory restrictions on commercial activities performed by private parties at the Estrella Point facility, the provisions of SB 1053 will apply. However, if the state retains ownership and operates this facility, SB 1053 will not apply, nor will SB 1053 apply if the state leases the site to a private party after having obtained the appropriate regulatory permits in the state's name. This is because SB 1053 only applies to governmental actions which limit the use of private

property. As long as Estrella Point is owned by the public or is public property leased to a private party, the state may restrict the use of that property.

The state's ability to impose permit conditions on regulated activities on private property has always been restricted by the scope of the agency's statutory authority. SB 1053, however, imposes an additional layer of regulatory control requiring, among other things, that permit conditions "shall directly relate to the purpose for which the permit is issued, shall substantially advance that purpose and shall be expressly authorized by law" (A.R.S. § 37-222(C)(1)). Moreover, when state action is intended to protect the public health and safety, such action may be "taken only in response to real and substantial threats to public health and safety" and "no greater than necessary to achieve the health and safety purpose" (A.R.S. § 37-221(B)(4)(a) and (c)). The Arizona Attorney General's Office believes this language is ambiguous as to what conditions would meet this criteria (see Attachment 6). Until a permit application is initiated (after the Attorney General's guidelines are in place), it is difficult to determine the extent to which the provisions of SB 1053 will restrict the state's ability to impose permit conditions on commercial activities by private parties at the Estrella Point facility. However, there is no question that SB 1053 will restriction the State's control over the site.

It is important to understand that for the purposes of SB 1053 there is a distinction between regulatory actions taken by the state which restrict the actions of private parties and contractual provisions negotiated between the state and a private party. Nothing in SB 1053 restricts the state's ability to impose restrictions on activities at the Estrella Point facility through a contract executed between the state and a private party. As long as the private party agrees to be bound by the terms and conditions of a contract governing the operations at the Estrella Point facility, the state is free to negotiate operating restrictions. Nevertheless, to minimize the potential for claims against the state alleging unwarranted takings of private property, the Attorney General's Office has advised this Committee that a contractual provision should be obtained from the private party in which the party waives all rights to compensation for loss of any property rights. This will not free the state from its requirement to perform a takings assessment, but it will limit the private party's ability to object to alleged unwarranted governmental takings to those restrictions imposed in a regulatory permit.

The state may also impose restrictions on future owners/operators of the Estrella Point facility by including restrictive covenants in the deed. Such restrictions, if properly drafted, can run with the land indefinitely. To be valid, however, the state must retain an ownership interest in the facility real property or land adjacent to the facility.

SB 1053 requires the Attorney General to adopt guidelines to assist state agencies in the identification of governmental actions that have constitutional takings implications by January 1994. Until these guidelines are prepared, it is difficult to determine the exact nature of the restrictions to be placed upon state agency regulatory actions. Moreover, an initiative proposal which would repeal the provisions of SB 1053 is awaiting a determination by the Secretary of State that sufficient signatures have been obtained to place the initiative on the 1994 ballot. If the Secretary of State determines that sufficient signatures have been obtained, all action to enforce the measure will be in abeyance until the referendum is put to a vote of the people in the 1994 general election. Until this issue is finally addressed by the Attorney General's Office or the public through the voting process, this Committee is unable to thoroughly address the potential ramifications of SB 1053.

Chapter IX. Committee Recommendations to the Governor and the Legislature

The Committee wishes to advise the Legislature that after a year of researching and taking testimony from numerous experts in the field (including the Scientific Panel, the regulated community, state and federal regulators and the environmental community), we believe that additional information is necessary before making any final recommendations on the use of the Estrella Point site. While we believe that additional information is critical to a sound decision on the state's future hazardous waste treatment and disposal needs, the following recommendations are appropriate at this time:

1. Until additional information as itemized below is obtained, the Committee recommends that the Legislature retain the site, but not use it for hazardous waste management. The Committee recommends that, if the Estrella Point site is ever used for hazardous waste handling, the state retain ownership of the site in order to maximize its ability to: (a) control the type of technology used at the site; (b) determine the amount of hazardous waste accepted at the site; and (c) restrict or ban the source of hazardous waste accepted at the site.

2. The Committee recommends that the Legislature fund a balanced scientific study as outlined in Attachment 7 of

this Report to consider all appropriate innovative and existing technologies which: (a) treat and dispose of Arizona's hazardous waste stream in a manner that maximizes the protection of human and environmental health; (b) is economically viable; and (c) could reduce generation of hazardous waste and the subsequent need for hazardous waste management facilities.

3. The Committee recommends that the Legislature maintain the statutory ban on incineration at state-owned hazardous waste facilities (A.R.S 49-903(C)).

4. The Committee recommends that the Legislature maintain the statutory ban on importation at the Estrella Point site (A.R.S. 49-903(D)).

5. The Committee recommends that the Arizona Department of Environmental Quality's (ADEQ) current statutory role of regulation, management and operation of the state site, pursuant to A.R.S. §49-903, be separated, with ADEQ retaining its regulatory authority and the management and operation of the site assigned to an appropriate state agency, depending on the use of the site.

6. The Committee recommends that the Legislature fund ADEQ to conduct a survey of those generators that cumulatively

produce 85% of the hazardous waste in Arizona (identified in this report) to identify opportunities to maximize pollution prevention and to determine the likelihood of these generators using a disposal facility in Arizona, both presently and after implementing aggressive pollution prevention/toxic use reduction programs.

7. The Committee recommends that the Legislature adopt into statute priorities for handling waste in the following manner: (a) source reduction; (b) recycling/reuse; and (c) treatment and disposal. Consistent with these priorities, the Committee recommends that the Legislature embark upon creating an aggressive pollution prevention program in Arizona based upon results of the 1992 pollution prevention plan data required to be submitted to ADEQ on or before December 31, 1992.

8. The Committee recommends that the Legislature consider the feasibility and benefit of expanding the reporting requirements of Conditionally Exempt Small Quantity Generators (CESQGs) to provide more information regarding the number of generators, the amounts and types of hazardous waste generated in Arizona. The Committee recommends that, in obtaining this information to determine the impact on human and environmental health by these generators, the

Legislature be sensitive to the cost of additional reporting requirements on the reporting entities.

9. The Committee recommends that the Legislature consider the feasibility and benefit of expanding the reporting requirements on municipalities to provide more information regarding the amounts and types of hazardous waste generated by households and businesses. The committee recommends that the Legislature be sensitive to the cost of additional reporting requirements on the reporting entities as well as the cost of continuing to place hazardous waste generated by households and businesses in solid waste landfills.

10. The Committee recommends that the Legislature remove the ban on disposal of household hazardous waste at any state-owned hazardous waste facilities (A.R.S. 49-903(B)).

11. The Committee recommends that the Legislature, when attempting to project hazardous waste generation in Arizona, re-examine Arizona's definition of hazardous waste to consider whether it wants to modify that definition to take into consideration more expansive definitions in other states.

12. The Committee recommends that the Governor assure that Arizona receives adequate credit for its receipt of

federally-defined hazardous waste at facilities in Arizona from the other states in the Western States Regional Agreement. Arizona should also receive credit from the members of the Agreement for the importation of all waste deemed hazardous in the state of origin.

13. The Committee recommends that, until the state is successful in receiving credit for the importation of hazardous waste to private facilities in Arizona, the state should impose a ban on the importation of hazardous waste at all state-owned hazardous waste facilities other than Estrella Point.

14. The Committee recommends that the Legislature make no decisions concerning the Estrella Point site until it receives current hazardous waste information from ADEQ's accounting system and data management system.

15. The Committee recommends that the Department of Administration perform an audit of all materials and equipment at the Estrella Point site for the purpose of determining whether such items should be made available for use to state agencies or sold if in danger of deteriorization. The Committee recommends that the disposal of these items should not jeopardize future utilization of the site.

16. The Committee recommends that the Department of Administration find an alternative use for the Estrella Point site.

Arizona
Waste Code/Technologies

Waste Code	Definition	Nonliquid BDAT	Liquid BDAT
D001	Ignitable Liquids ≥10 % TOC	FSUBS;RORGS; or INCIN	
D002	Acid Subcategory	Deactivation - Recovery, neutralization, incineration	Deactivation - Neutralization, incineration
D003	Reactive Cyanide Subcategory	Alkaline chlorination, wet air oxidation, or electrolytic oxidation.	Alkaline chlorination, wet air oxidation, or electrolytic oxidation.
D004	Arsenic	Vitrification	Chemical precipitation
D005	Barium	Stabilization	Chemical precipitation
D006	Cadmium	Stabilization or metal recovery	Chemical precipitation
D007	Chromium	Chromium reduction, stabilization	Chromium reduction, precipitation
D008	Lead	Stabilization	Chemical precipitation, sludge dewatering
D009	Mercury(Low mercury subcategory) <260mg/kg	Acid leaching, chemical oxidation, dewatering	Chemical precipitation with sulfide
D010	Selenium	Stabilization	Chemical precipitation with sulfide
D011	Silver	Stabilization or recovery	Chemical precipitation
D013	Lindane	Incineration	Incineration or carbon adsorption
D018	Benzene		
D021	Chlorobenzene		
D022	Chloroform		
D023	o-Cresol		
D027	1,4 Dichlorobenzene		
D029	1,1 Dichloroethylene		
D030	2,4 Dinitrotoluene		
D035	Methyl ethyl ketone		
D037	Pentachlorophenol		
D038	2,4,5-TP	Incineration	Chemical Oxidation or Incineration
D039	Tetrachloroethylene		
D040	Trichloroethylene		
F001	Spent Solvents Used in Degreasing	Incineration	Steam Stripping, Biological treatment, Activated Carbon.
F002	Spent Solvents Used in Degreasing	Incineration	Steam Stripping, Biological treatment, Activated Carbon.
F003	Spent Solvents Used in Degreasing	Incineration	Steam Stripping, Biological treatment, Activated Carbon.
F004	Spent Solvents Used in Degreasing	Incineration	Steam Stripping, Biological treatment, Activated Carbon.
F005	Spent Solvents Used in Degreasing	Incineration	Steam Stripping, Biological treatment, Activated Carbon.
F006	Wastewater Sludge from Electroplating Operations	Alkaline chlorination (cyanides); chemical precipitation, settling, filtration, and stabilization (metals)	Alkaline chlorination (cyanides);chromium reduction, precipitation with lime and sulfides, sludge dewatering (metals)
F007	Spent Cyanide form Electroplating Operations	Alkaline chlorination (cyanides); chemical precipitation, settling, filtration, and stabilization (metals)	Alkaline chlorination (cyanides); chemical precipitation, settling, sludge dewatering (metals)
F008	Plating bath sludge from Electroplating Operations	Alkaline chlorination (cyanides); chemical precipitation, settling, filtration, and stabilization (metals)	Alkaline chlorination (cyanides); chemical precipitation, settling, sludge dewatering (metals)
F009	Spent Stripping from Electroplating Operations	Alkaline chlorination (cyanides); chemical precipitation, settling, filtration,and stabilization (metals)	Alkaline chlorination (cyanides); chemical precipitation, settling, sludge dewatering (metals)
F019	Wastewater treatment sludges from Aluminum Coating	Alkaline chlorination (cyanides); stabilization (chromium)	Alkaline chlorination (cyanides); chromium reduction, chemical precipitation with lime and sulfides, sludge dewatering (metals) incineration

Arizona
Waste Code/Technologies

Waste Code	Definition	Nonliquid BDAT	Liquid BDAT
F039	MultiLechate	Incineration (organics), stabilization (metals)	Biological treatment followed by chemical precipitation; or wet-air oxidation followed by carbon adsorption followed by chemical precipitation
K052	Petroleum industry tank bottoms (leaded)	Solvent extraction or incineration (organics), stabilization of ash	Incineration (cyanides); chromium reduction, chemical precipitation, vacuum filtration (metals)
P001	Benzopyran	FSUBS; or INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
P005	Allyl alcohol	FSUBS; or INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
P008	4-Aminopyridine	INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
P010	Arsenic acid	Vitrification	Chemical precipitation
P011	Arsenic oxide	Vitrification	Chemical precipitation
P012	Arsenic oxide	Vitrification	Chemical precipitation
P015	Beryllium Dust	RMETL; or RTHRM.	
P016	Dichloromethyl ether	INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
P020	Dinoseb	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
P022	Carbon disulfide	INCIN.	Biological treatment or wet-air oxidation followed by carbon adsorption
P023	Acetaldehyde, chloro-	INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
P024	Benzenamine, 4-chloro-	Incineration	Biological treatment or wet-air oxidation followed by carbonadsorption
P028	Benzene, (chloromethyl)-	INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
P029	Copper cyanide	Electrolytic oxidation followed by alkaline chlorination (cyanides); chemical precipitation, settling, filtration (metals)	Alkaline chlorination (cyanides); chemical precipitation, settling and sludge dewatering (metals)
P030	Cyanides	Electrolytic oxidation followed by alkaline chlorination (cyanides); chemical precipitation, settling, filtration (metals)	Alkaline chlorination (cyanides); chemical precipitation, settling and sludge dewatering (metals)
P037	Dieldrin	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
P040	O,O-Diethyl O-pyrazinyl phosphorothioate	FSUBS; or INCIN.	CARBN; or INCIN
P044	Dimethoate	FSUBS; or INCIN.	CARBN; or INCIN
P054	Aziridine	INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
P063	Hydrocyanic acid	Electrolytic oxidation followed by alkaline chlorination (cyanides); chemical precipitation, settling, filtration(metals)	Alkaline chlorination (cyanides); chemical precipitation, settling and sludge dewatering (metals)
P066	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester	INCIN.	(WETOX orCHOXD) fb CARBN; or INCIN
P068	Hydrazine, methyl-	FSUBS; CHOXD; CHRED; or INCIN.	CHOXD; CHRED; CARBN; BIODG; OR INCIN
P071	Methyl parathion	Rotary kiln incineration	Biological treatment

Arizona
Waste Code/Technologies

Waste Code	Definition	Nonliquid BDAT	Liquid BDAT
P075	Nicotine, & salts	INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
P077	Benzenamine	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
P087	Osmium oxide	RMETL; or RTHRM.	
P088	Endothall	FSUBS; or INCIN.	(WETOX orCHOXD) fb CARBN; or INCIN
P089	Parathion	Rotary kiln incineration	Biological treatment
P094	Phorate	Rotary kiln incineration	Biological treatment
P098	Potassium cyanide	Electrolytic oxidation followed by alkaline chlorination (cyanides); chemical precipitation, settling, filtration(metals)	Alkaline chlorination (cyanides); chemical precipitation, settling and sludge dewatering (metals)
P102	Propargyl alcohol	FSUBS; or INCIN	
P105	Sodium azide	FSUBS; CHOXD; CHRED; or INCIN	CHOXD; CHRED; CARBN; BIODG or INCIN
P106	Sodium cyanide	Electrolytic oxidation followed by alkaline chlorination (cyanides); chemical precipitation, settling, filtration (metals)	Alkaline chlorination (cyanides); chemical precipitation, settling and sludge dewatering (metals)
P109	Tetraethyldithiopyrophosphate	FSUBS; or INCIN	CARBN; or INCIN
P119	Ammonium vanadate	STABL	Chemical Precipitation
P123	Toxaphene	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U002	Acetone	Incineration or fuel substitution	Biological treatment or wet-air oxidation followed by carbon adsorption
U003	Acetonitrile	INCIN	Biological treatment or wet-air oxidation followed by carbon adsorption
U006	Acetyl chloride	INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U007	Acrylamide	INCIN	(WETOX orCHOXD) fb CARBN; or INCIN
U008	Acrylic acid	FSUBS; or INCIN	(WETOX orCHOXD) fb CARBN; or INCIN
U011	Amitrole	INCIN	
U012	Aniline	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U015	Azaserine	INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U019	Benzene	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U020	Benzenesulfonic acid chloride	INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U021	Benzidine	INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U028	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	Rotary kiln incineration	#2
U031	1-Butanol	Incineration or fuel substitution	Biological treatment or wet-air oxidation followed by carbon adsorption
U041	Epichlorohydrin	INCIN	(WETOX or CHOXD) fb CARBN; or INCIN

Arizona
Waste Code/Technologies

Waste Code	Definition	Nonliquid BDAT	Liquid BDAT
U043	Ethene, chloro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U044	Chloroform	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U048	o-Chlorophenol	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U051	Creosote	Incineration (organics); stabilization (lead)	Incineration (organics); chemical precipitation (lead)
U052	Cresol (Cresylic acid)	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U056	Benzene, hexahydro-	FSUBS; or INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U058	Cyclophosphamide	FSUBS; or INCIN	CARBN; or INCIN
U060	DDD	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U061	DDT	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U068	Dibromomethane	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U069	Di-n-butyl phthalate	Rotary Kiln Incineration	
U072	p-Dichlorobenzene		Biological treatment or wet-air oxidation followed by carbon adsorption
U075	Dichlorodifluoromethane	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U080	Methylene Chloride		
U085	2,2-Bioxirane	FSUBS; or INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U092	Dimethylamine	INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U098	1,1-Dimethylhydrazine	FSUBS; CHOXD; CHRED; or INCIN	CHOXD; CHRED; CARBN; BIODG; or INCIN
U103	Dimethyl sulfate	FSUBS; CHOXD; CHRED; or INCIN	CHOXD; CHRED; CARBN; BIODG or INCIN
U107	1,2-Benzenedicarboxylic acid, dioctyl ester	Rotary kiln incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U108	1,4-Diethyleneoxide	Incineration or fuel substitution	Biological treatment or wet-air oxidation followed by carbon adsorption
U109	1,2-Diphenylhydrazine	FSUBS; CHOXD; CHRED; or INCIN	CARBN; or INCIN
U110	Dipropylamine	INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U112	Acetic acid ethyl ester	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U117	Ethane, 1,1-oxybis-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption

Arizona
Waste Code/Technologies

Waste Code	Definition	Nonliquid BDAT	Liquid BDAT
U121	Methane, trichlorofluoro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U122	Formaldehyde	FSUBS; or INCIN	(WETOX orCHOXD) fb CARBN, or INCIN
U123	Formic acid	FSUBS; or INCIN	(WETOX or CHOXD) fb CARBN; or INCIN
U128	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U129	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha,6beta)-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U133	Hydrazine	FSUBS; CHOXD; CHRED; or INCIN	CHOXD; CHRED; CARBN; BIODG or INCIN
U134	Hydrofluoric acid	ADGAS fb NEUTR; or NEUTR	Chemical precipitation
U136	Arsinic acid, dimethyl-	Vitrification	Chemical precipitation
U144	Acetic acid, lead(2+) salt	Incineration followed by stabilization	Chemical oxidation followed by chemical precipitation
U146	Lead, bis(acetato-O)tetrahydroxytri-	Incineration followed by stabilization	Chemical reduction, lime or sulfide precipitation, sludge dewatering
U147	2,5-Furandione	FSUBS; or INCIN	(WETOX orCHOXD) fb CARBN; or INCIN
U151	Melphalan	INCIN	
U154	Methanol	FSUBS; or INCIN.	(WETOX orCHOXD) fb CARBN; or INCIN
U159	2-Butanone	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U160	2-Butanone, peroxide	FSUBS; CHOXD;CHRED; or INCIN.	CHOXD; CHRED; CARBN; BIODG; or INCIN
U161	Methyl isobutyl ketone	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U165	Naphthalene	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U169	Benzene, nitro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U170	p-Nitrophenol	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U185	Benzene, pentachloronitro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U188	Phenol	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U191	2-Picoline	INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
U196	Pyridine	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U201	1,3-Benzenediol	FSUBS; OR INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
U204	Selenious acid	Stabilization	Chemical precipitation with sulfides

Arizona
Waste Code/Technologies

Waste Code	Definition	Nonliquid BDAT	Liquid BDAT
U210	Ethene, tetrachloro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U211	Carbon tetrachloride	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U213	Furan, tetrahydro-	FSUBS; or INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
U219	Thiourea	INCIN.	(WETOX or CHOXD) fb CARBN; or INCIN
U220	Benzene, methyl-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U223	Benzene, 1,3-diisocyanatomethyl-	FSUBS; or INCIN	
U226	Ethane, 1,1,1-trichloro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U227	Ethane, 1,1,2-trichloro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U228	Ethene, trichloro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U229	Ethene, trichloro-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U239	Benzene, dimethyl-	Incineration	Biological treatment or wet-air oxidation followed by carbon adsorption
U246	Cyanogen bromide	CHOXD; WETOX;or INCIN.	CHOXD;WETOX; or INCIN
U249	Dioxin Containing Wastes	Incinceration	Incinceration
U328			
U353	Dioxin Containing Wastes	Incinceration	Incinceration
U359			

The above table does not show any BDATs for newly regulated wastes under the TCLP for organics (D018 through D043). Also the BDATs that are fully capitilized are required treatment under the federal land disposal restriction program, pursuant to 40 CFR Section 268.42. Please see the 40 CFR section 268.42 for EPA description of the technology required treatment standard.

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
Inter-Office Memorandum

TO: ANDY SOESILO

FROM: EMIL KOVACEVICH
ENVIRONMENTAL ENGINEER

DATE: September 17, 1992

SUBJECT: HAZARDOUS WASTE TECHNOLOGY

1).Technologies (BDAT) for the RCRA Waste CODES D018,D021,D022,D023,D027,D029,D030,D037,D039,D040 have not been promulgated by EPA.This information was obtained from EPA Hotline (800-424-9346) on September 17, 1992.

2).The following definitions for waste codes U328 and U359 are:
U328-----2-methyl benzenamine
U359-----2-ethoxy ethanol
The technology for these two waste codes are:
U359
BIODEG fb CARBN,INCIN,CHOXD ;liquid
FUSUB,INCIN ; nonliquid
U328
BIODEG ;liquid
INCIN ;nonliquid
The definitions and technology information was obtained from the Federal Register 57 FR 37200 dated August 18, 1992.

3).A suggested treatment for the D0- Waste Codes are the following.This was obtained from EPA 560/4-92-011.

D018-----Same as U019:INCIN,nonliq.;Biological treatment or wet-air oxidation fb carbon adsorption,liquid
D022-----Same as U044:INCIN,nonliq.;Biological treatment or wet-air oxidation fb carbon adsorption,liquid
D023-----Same as U052:INCIN,nonliq.;Biological treatment or wet-air oxidation fb carbon adsorption,liquid
D027-----Same as U072:Biological treatment or wet-air oxidation fb carbon adsorption,liquid
D039-----INCIN,nonliq;LLEX fb SSTRP fb CABN or INCIN,liquid
D040-----INCIN,nonliq;LLEX fb SSTRP fb CABN or INCIN,liquid

ENC

HAZARDOUS WASTE SUBCOMMITTEE RECOMMENDATIONS

January 16, 1992

The Subcommittee recommends that the Scientific Panel provide a matrix of information with the following subtitles:

Technology - treatment and disposal methods

Substances treated

Stage of development - commercial, research, experimental

How used and where used

Associated problems or successes (technical and environmental)

Direct costs (dollars per volume unit)

Capital expenditures

Narrative on health and environmental impacts

Efficiencies (DRE or similar type measurement and explanation of measurement technique)

Economies of scale

The advisory panel will make a report, not recommendations.

The Subcommittee further recommends that outline be due March 1, 1992, to meet statutory deadlines, a draft report on April 1, 1992, and final report by mid-April.

After discussion among the whole Committee, this report will be finalized at the meeting on January 24, 1992.

HAZARDOUS WASTE TREATMENT AND DISPOSAL TECHNOLOGIES

OUTLINE FOR REPORT OF THE SCIENTIFIC PANEL TO THE HAZARDOUS WASTE DISPOSAL COMMITTEE

Dr. Steve W. Carothers

Don Oberacher, P.E.

Jan Radimsky, P.E.

I. INTRODUCTION

Purpose, Scope and Organization

This report will present an overview of the subject of the environmentally sound treatment and disposal of commercial and industrial hazardous waste streams. The authors are recognized national experts in these fields, and have drawn upon expertise and published references from their professional federal and state government employment and private sector consulting experience.

It should be noted that radioactive waste materials and their management and disposal is beyond the scope of this report.

II. GLOSSARY OF TERMS

(Example):

Off-site facilities: Facilities where waste is not generated, but can be brought to for treatment and/or ultimate disposal. Such facilities can be privately or government owned and/or operated. These facilities typically serve more than one generator.

III. HAZARDOUS WASTE MANAGEMENT STRATEGIES, TREATMENT AND DISPOSAL TECHNOLOGIES

A. Waste Management Hierarchy

1. Source Reduction
2. Recycling On-Site
3. Recycling Off-Site
4. Treatment On-Site
5. Treatment Off-Site
6. Solid Residue Disposal
7. Wastewater Treatment & Disposal

The focus of this report is primarily on items 4, 5, and 6: Treatment On-Site, Treatment Off-Site and Solid Residue Disposal.

The report will discuss issues related to recycling and site mitigation technologies and provide information on impacts on ecological and hyrological systems.

B. Protection of Public Health

1. Regulations
2. Design and Performance Standards
3. Siting Standards
4. Impact Modeling
5. Construction and Trial Burn or Trial Operation
6. Continuous Monitoring

C. Treatment On-Site

The advantages of treatment on-site are: The need to consider only a less complex spectrum of waste streams; can minimize the need for subsequent off-site disposal; can sometimes utilize sewers for treated

stream disposal via POTW. Uniformity of the waste stream(s) can allow a wider variety of technologies to be applicable and recycling can be more feasible.

Disadvantages include: A higher unit cost of operation and increased regulatory compliance efforts, and the necessity for batch treatments rather than continuous.

D. Treatment Off-Site

To be viable, off-site treatment must generally involve and address a wider variety of sources and mixtures or blends of wastes, though in so doing, it can provide "economy of scale" benefits for generators. Because off-site treatment is by definition located separately from the manufacturing and employment locale (unlike on-site), it can more frequently face public opposition as it is usually distant from the areas where most of the economic benefit (manufacturing, employment) occurs. It usually involves adequate and larger waste volumes, allowing it to perform treatment on a continuous basis.

E. Best Demonstrated Available Technologies (BDATs)

1. Technologies Applicable to Major Arizona Waste Streams

As mandated by federal law (Hazardous Solid Waste Amendments, 1984 (HSWA), the United States Environmental Protection Agency has evaluated all known, available, proven and operating hazardous waste treatment technologies and has selected a best demonstrated technology for each specific waste stream listing or code. In some instances, the use of a selected technology is required. In most cases, that technology was actually used to establish the required levels of treatment - called "treatment standards" - which potentially then can also be met by a number of other technologies, depending on the specific chemical and physical waste characteristics (such as liquid vs sludge vs solid, its pH, viscosity, specific compound presence, etc). Details on the technology's applicability, effectiveness and other technical issues are described in detail in the background documents prepared by U.S. EPA for each treatment standard. These technologies will remain the "state of the art" of treatment technologies for the foreseeable future unless competing or newer ones are determined to be superior.

Compliance with treatment standards is required for all waste residues which are to be land disposed, unless the disposal site receives a "no migration" exemption. (To date, this was only granted to underground injection wells which are increasingly limited in types of wastes they may accept).

Technologies with the most general applicability to Arizona's wastes are: incineration, other types of thermal treatment systems, stabilization, alkaline chlorination, neutralization and deactivation.

In this section, further specific information is provided on:

- Incineration
- Other types of thermal treatment
- Stabilization
- Alkaline chlorination
- Neutralization
- Deactivation

2. Alternative Technologies

These are usually more limited in application, feasible only for certain specific types of wastes. These technologies are also generally more suitable for on-site applications, for more "pure," simplistic, and well-defined wastes. Sometimes there is a lack of long-term experience, performance data, and a lack of reliability information.

a) For organic wastes:

- Aerobic biological treatment
- Batch distillation
- Carbon adsorption
- Critical fluid extraction

- Fractionation
- Fuel substitution
- Solvent extraction
- Steam stripping
- Thin film evaporation
- Wet air oxidation
- Chemical oxidation
- Dehalogenation

b) For inorganic wastes:

- Acid leaching
- Chemical precipitation
- Electrolytic oxidation of cyanides
- Hexavalent chromium reduction
- High temperature metals recovery
- Ion exchange
- Retorting
- Acid leaching

c) For mixed or combined organic and inorganic wastes:

(Discussion to be included)

F. **Emerging Technologies**

1. Freeze crystallization
2. Photolysis (ultraviolet)

3. Molten glass

4. Molten salt

5. Molten metal

6. Supercritical water oxidation

7. Pyrolysis

8. Plasma systems

9. New chemical treatment processes such as Base Catalized Decomposition (BCD)

G. **Residue Land Disposal**

Forms of land disposal include landfill and underground injection wells, salt domes, etc.

Land disposal unit design and performance standards (double lining, leachate collection).

Land Disposal Restrictions require treatment prior to land disposal for most wastes.

IV. HEALTH AND ENVIRONMENTAL IMPACT

1. Perceived Risk vs Actual Risk

2. Hazardous Wastes vs Hazardous Materials

3. Comparative Risk

4. Effects on Water Quality, Air Quality and vegetative systems

5. Land Disposal vs Treatment

6. Indirect Exposure Risk (from food consumed on exposed land, etc.)

V. PUBLIC ACCEPTANCE

1. Citizens' Concerns

2. Environmental Activist Group Efforts, Publications, and Viewpoints

3. U.S. EPA Efforts, Viewpoints

VI. REFERENCES

VII. APPENDICES

1. Arizona Waste Generation Per Specific RCRA Waste Code.

2. BDATs for Waste Streams Generated In Arizona.

3. Household and Other Small Generator Hazardous Wastes

   - Types
   - Treatment/disposal methods
     - Recycling of waste oil, solvents,
     - Reuse of paint
     - Laboratory "lab-pack" wastes
     - Incineration of organics
     - Land disposal of inorganics

Office of Statewide Planning
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806
Telephone (916) 324-1819

August 13, 1992

Ms. Rita P. Pearson, Esq.
Deputy Chief of Staff
Executive Office
State of Arizona
1700 West Washington
Phoenix, Arizona 85007

Dear Ms. Pearson:

REPORT ON HAZARDOUS WASTE TREATMENT AND DISPOSAL TECHNOLOGIES

This is to submit a number of reports and materials which I consider relevant to the originally submitted outline of the report the Scientific Panel intended to prepare. Due to a number of factors, it proved impossible to really produce a report in timely fashion and I believe it is also not necessary because of the availability of documents which are referenced or contained in the appendices of this submittal. All Scientific Panel members who are essentially volunteers experienced difficulties beyond their control which prevented them to devote adequate time toward preparation of the originally contemplated report. In my case, the reasons include new major complex work assignments, major reorganization of my agency, and serious budget constraints which left me with many vacancies in my program therefore requiring additional effort on my part to meet my job-related obligations.

For the consideration of the Hazardous Waste Disposal Committee, I have selected the publications listed below or in many cases included as an appendix to this submittal. One of the reports, Standard Handbook of Hazardous Waste Treatment and Disposal, will have to be obtained by the Committee from the publisher. I have included only a copy of the front pages in Appendix III which give an overview of that publication's contents. As you will see, in many ways it resembles the outline of our contemplated report and represents the work of many experts in the hazardous waste management field. Our Scientific Panel, which has not been given any resources for the report preparation, could never match this Handbook.

I have also included in Appendix IV several reports prepared by our agency which are relevant and which represent a long-term effort of my staff. I believe these reports may be of interest to the Committee also.

In my opinion, the best use of the Scientific Panel would be to assist the Committee members in understanding these reports and in responding to any questions which these documents may raise.

By a copy of this letter, I am encouraging my fellow Scientific Panel members to provide similar information which they believe is relevant to the Hazardous Waste Disposal Committee's charge.

I hope that these materials will be helpful to the Committee and sincerely believe that a better report could not be prepared by the Scientific Panel.

Sincerely,

Jan Radimsky, Chief
Office of Statewide Planning

Appendix I: Arizona Hazardous Wastes and Treatment Technologies Required Prior to Land Disposal.

Appendix II: Outline for the Scientific Panel Report as Originally Submitted by the Panel

Appendix III: Standard Handbook of Hazardous Waste Treatment and Disposal (Outline) (copyrai

Appendix IV: Reports Developed by the California Department of Toxic Substances Control (Eight)

cc: Mr. Donald A. Oberacker
Thermal Destruction Branch
Waste Minimization, Destruction & Disposal Research Division
Risk Reduction Engineering Laboratory
26 W. Martin Luther King Drive
Cincinnati, Ohio 45268

Mr. Steven W. Carothers
SWC Environmental Consultants
23 East Fine Avenue
Flagstaff, Arizona 86001

FILE COPY

STATE OF ARIZONA

EXECUTIVE OFFICE

FIFE SYMINGTON
Governor

September 21, 1992

Beryl Dulsky, Esq.
Assistant Attorney General
ARIZONA ATTORNEY GENERAL'S OFFICE
1275 West Washington
Phoenix, AZ 85007

RE: Legal Issues Before Hazardous Waste Disposal Committee

Dear Beryl:

First, let me thank you for attending last Thursday's meeting of the Hazardous Waste Disposal Committee on such short notice. As you heard, the Committee members expressed several concerns about the state's ability to restrict future uses of the former ENSCO facility now known as "Estrella Point." After Thursday's meeting, I met with Joni Bosh and Representative Mundell to develop a set of questions for your review and response at the next Hazardous Waste Disposal Committee meeting. The Committee is scheduled to meet on October 1, 1992, at 3:00 p.m. in House Hearing Room 1.

The following questions were prepared by Representative Mundell and Joni Bosh. I am forwarding them to you for your consideration as Chairman of the Hazardous Waste Disposal Committee.

(1) Will SB 1053 inhibit the state's ability to restrict future commercial activities at Estrella Point?

(2) Would the nature of the transaction between the state and the operator of the site vary the impact of SB 1053 on any permits, licenses or other contractual arrangements between them? That is, would the potential impact of SB 1053 vary because the state leased, sold, entered into an independent contractual relationship or co-partnership

with a party for the treatment and disposal of hazardous waste at Estrella Point?

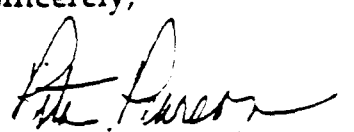
(3) Can the state enter into an agreement which exempts utilization of the Estrella Point facility from the applicability of SB 1053?

(4) Can a private party contractually waive its statutorily prescribed rights under SB 1053?

As I previously indicated, the Hazardous Waste Disposal Committee will meet on October 1. The Committee would appreciate a written response to these inquiries and then your testimony at the Committee hearing. I believe this will enable the Committee members to satisfy their concerns regarding the applicability of SB 1053 to the use of Estrella Point.

Again, thank you for your cooperation and assistance in this matter.

Sincerely,



Rita P. Pearson, Esq.
Deputy Chief of Staff

RPP:dn
cc Representative William A. Mundell
Ms. Joni Bosh

OFFICE OF THE ATTORNEY GENERAL
INTEROFFICE MEMORANDUM

TO: Rita Pearson, Chair
Hazardous Waste Disposal Committee

FROM: Beryl I. Dulsky
Assistant Attorney General

DATE: October 1, 1992

RE: Questions on SB 1053

Following are brief responses to the questions you raised in your September 21, 1992 letter regarding the potential effects of SB 1053 on the State's ability to restrict future uses of the facility known as Estrella Point.

1. Will SB 1053 inhibit the State's ability to restrict future commercial activities at Estrella Point?

Answer: Yes. SB 1053 generally restricts the State's ability to impose permit conditions. Permit conditions "shall directly relate to the purpose for which the permit is issued, shall substantially advance that purpose and shall be expressly authorized by law." A.R.S. § 37-222.C.1. These criteria create many ambiguities. It is unclear what conditions would be considered to directly, as opposed to indirectly, advance the purpose of the permit. It is unclear what would be considered to substantially advance the purposes of the permit. The language requiring that the permit condition be expressly authorized by law is particularly problematic, because permits of this type frequently require conditions for which the authority is only necessarily implied, as opposed to expressly stated.

Similarly, the criteria in A.R.S. § 37-222.C.2 are unclear in their effects. Permit conditions would have to be "proportionate to the extent the use contributes to the overall problem that the restriction is to redress." It is unclear exactly what the language describing the "overall problem" refers to in the context of a hazardous waste disposal permit. Again, the criteria in A.R.S. § 37-222.C.4 require that the analysis to be undertaken "establish that the action substantially advances the purpose of protecting public health and safety against this specifically identified risk." It

appears that the agency would then be required to identify each specific risk from the operations at Estrella Point. There could be practical difficulties in demonstrating that each permit condition substantially advances protection of the public health or environment as to each identified risk. The language in A.R.S. § 37-222.C.4(c) is unclear because it does not state what the "overall risk" refers to, at least in the context of a complex permit of this type. While there are general risks from the operation of any hazardous waste facility, the specific risks that would result would depend on the waste being handled, the methods of disposal, air currents and hydrogeology, and other factors.

To the extent that your question refers to restrictions in the deed from the State to the operator, it is not clear that the State has authority to impose restrictions that would run with the land in a deed to a private party. On the question of restrictions in a lease, the State probably has the authority to impose reasonable restrictions in a lease of the type contemplated. However, it is not clear whether such restrictions would be subject to the analytical requirements imposed by SB 1053. One type of defined government action under the bill is "required dedications or exactions from owners of private property by a state agency." It is arguable that any restrictions placed in a lease would meet the definition of a required dedication from an owner of private property by a state agency. The term "dedication" is not defined and it is clear that the leasehold interest would be a form of real property protected by the state and federal constitutions. Therefore, any attempt to restrict operations at the site through lease provisions would probably require the State to justify the restrictions through the requirements of SB 1053.

2. Would the nature of the transaction between the state and the operator of the site vary the impact of SB 1053 on any permits, licenses or other contractual arrangements between them? That is, would the potential impact of SB 1053 vary because the state leased, sold, entered into an independent contractual relationship or co-partnership with a party for the treatment and disposal of hazardous waste at Estrella Point?

Answer: No. From the language of SB 1053, it has at least two main purposes. The primary purpose appears to be to avoid unexpected claims of governmental takings which might create a drain on the public treasury. The second obvious purpose is to protect private property owners from unnecessary government regulation. Because the law purports to protect both parties to any transaction between the State and any operator of the Estrella Point site, the State is not in a position to waive the requirements.

3. Can the state enter into an agreement which exempts utilization of the Estrella Point facility from the applicability of SB 1053?

Answer: Probably not. As explained above, SB 1053 is not designed to merely protect private property owners. It is also designed to protect the state treasury from unexpected and perhaps unnecessary claims for compensation due to regulatory takings. Therefore, the State could not waive such requirements because the Legislature has imposed them for purposes of protecting the State from unintended liability.

4. Can a private party contractually waive its statutorily prescribed rights under SB 1053?

Answer: The private party could waive the prescribed rights under SB 1053 but the state would have to perform the analysis unless it could show that the waiver was so broad as to preclude any possible claim by the party that a taking had occurred. In such a case, the analysis under SB 1053 would be unnecessary because any potential constitution taking claim would be waived.

8914A/51-53/
MPM:tmp

Proposed Study: Hazardous Waste Management and Treatment for Arizona

INTRODUCTION

The proper management and treatment of hazardous wastes is a significant and growing problem in Arizona. The waste streams need to be identified and characterized. Included are heavy-metal sludges, pesticide residues, biologically contaminated materials and toxic solvents. Appropriate technologies need to be assessed for volume reduction and/or recycle of these materials. The practices of landfilling or incineration are facing increasing public and regulatory scrutiny and may not be considered acceptable alternatives for the future. The goal is to dispose or convert the wastes with maximum economic benefit and minimal environmental damage. The problem is not static, i.e., the amounts, composition and location of the waste streams will change. Thus the purpose of this study is to provide a comprehensive assessment and recommendations for Arizona for a ten year time frame. Included will be a review of the present status, development of technology options and preparation of a bid document (request for proposal) for a detailed engineering study for a selected technology or technologies at a specific site or sites for the major present and anticipated hazardous waste streams in Arizona. A phased study is possible as follows:

(1). Present status review (and report)
(2). Technology assessment (and report)
(3). Bidder's document (RFP) for a detailed engineering study

Thus the present status information is required to select appropriate technology options. The detailed engineering study will be for selected technology and sites from the technology assessment phase.

METHODOLOGY AND ANTICIPATED RESULTS

A. Major Tasks

1. Present Status Review
   a. Define responsible entities and their functions.
   b. Identify major Arizona waste streams. Determine composition, quantities and time variation of the wastes.
   c. Identify relevant environmental regulations.
   d. Identify and assess present and proposed disposal practices for wastes generated in Arizona (location, operating costs, transportation costs etc.).
   e. Evaluate source separation of the waste streams.
   f. Evaluate recycle potential (to original or alternative products).
   g. List legal, social and political issues.
   h. Compare economics of present and planned practices.
   i. Evaluate safety and aesthetic considerations.

2. Technology Options Assessment
   a. Review technology paths (e.g., separation, biochemical conversion, thermochemical conversion etc.) appropriate for specific major Arizona waste streams.
   b. Review and assess commercially available processes for selected technology paths. Include mass and energy balances, economics, economy of scale, operational reliability, environmental, safety, etc.
   c. Review and assess processes under development which are anticipated to be commercially available in the next ten years.
   d. Assess siting of facilities compatible with transportation costs, potential product markets, environmental regulations, safety considerations, aesthetics, process scale constraints, etc.

e. Recommend technologies and locations for specific waste streams.

3. Final Report

4. Engineering Study Request For Proposal (RFP). Prepare a bidder's document for the purpose of a competitive solicitation for a detailed engineering study of recommended hazardous waste management and processing options for selected wastes at selected sites. The engineering study to be solicited will include project costs based on vendor bids and a business plan to include owner/operator financing options.

B. End Result or Products Anticipated

The results/products of the study will be a final report and bidder's document for a detailed engineering study (design, economics) for specified technology(s) at specified site(s) for the major Arizona waste streams.

1. Final Report Proposed Outline
   a. Introduction (waste stream quantities, characteristics, disposal/recycling options, institutional considerations etc.).
   b. Market study for recycled products.
   c. Institutional issues (financing, political, etc.).
   d. Technology options study (commercially available processes in a ten year time frame -- flowsheets, photos, mass and energy balances, operational history, scale, economics, installations, etc.).
   e. Technologies assessment (via technical, economic, environmental and institutional factors, etc.).
   f. Arizona applications (technology recommendations for specified waste streams at specific sites compatible with economic, environmental, safety, aesthetic, institutional, market, scale constraints).

2. Request for Proposal (RFP)
   a. Specifications (processing technology, sites, scale).

b. Statement of work (economics, flowsheets, mass and energy balances, business plan, construction bid documents).

c.. Qualification questionnaire (experience in specified technology area).

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Fife Symington, Governor Edward Z. Fox, Director

December 9, 1992 *VIA FACSIMILE

Mr. Matthew Straus, Director
Waste Management Division
U.S. Environmental Protection Agency
401 M Street S.W.
Washington, D.C. 20460

Dear Mr. Straus:

I am writing to request written guidance from the U.S. Environmental Protection Agency (EPA) regarding a state's ability to count the capacity of hazardous waste exempt recyclers for capacity assurance purposes.

In 1991, the Arizona State Legislature established a Hazardous Waste Disposal Committee to study Arizona's hazardous waste stream and consider appropriate treatment/disposal technologies. The issue of Arizona's existing capacity for treatment and disposal of hazardous wastes has been an area of uncertainty relating to two major facilities in the state that import large volumes of hazardous wastes and are not required to obtain a hazardous waste permit under 40 C.F.R. § 261.6(c)(2). The issue is significant because Arizona does not currently have any public or private hazardous waste disposal capacity.

To date, the recycling capacity of these facilities, World Resources, Inc. and Cyprus Miami Mine Smelter, has not been counted for capacity assurance purposes on the basis that they are not subject to Resource Conservation and Recovery Act (RCRA) permit or reporting requirements. Data on file with the Arizona Department of Environmental Quality (ADEQ) regarding these facilities has been obtained through manifests and, in the case of World Resources, through voluntary annual reporting. Although ADEQ does not currently have sufficient information to determine the exact capacity of these facilities, the manifests document the large volumes of hazardous wastes they receive from out-of-state each year (approximately 19,951 tons in 1990).

The fact that hazardous wastes imported to exempt recyclers in this state are not credited under capacity assurance has created an equity problem for Arizona in relation to the other Western States. As a member of the Western Regional Waste Agreement, it is important for Arizona to receive capacity assurance credit and be

3033 North Central Avenue, Phoenix, Arizona 85012, (602)207-2300

recognized for its exempt recyclers accepting hazardous wastes from other Western States. I have attached, for your reference, a copy of Arizona's comments submitted to Robert Burchard in the Office of Solid Waste expressing the need for EPA to clearly address this issue in the Capacity Assurance Plan Guidance Document.

I respectfully request that you provide written guidance on whether or not your agency will count the recycling of hazardous wastes by exempt facilities toward Arizona's treatment capacity. The next meeting of the Hazardous Waste Disposal Committee is Tuesday, December 15, 1992. If at all possible, I would appreciate your response by that date so that the Committee can definitively present Arizona's options for capacity in its final report to the Governor and the Legislature.

I appreciate your responsiveness and assistance in clarifying this issue.

Sincerely,

Edward Z. Fox, Director

Attachment

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Fife Symington, Governor Edward Z. Fox, Director

October 13, 1992

This letter was faxed 10/13/92.

Robert Burchard
Office of Solid Waste OS-321W
U.S. Environmental Protection Agency
401 M Street S.W.
Washington, D.C. 20460

RE: Capacity Assurance Plan Guidance Document

Dear Mr. Burchard:

The Arizona Department of Environmental Quality hereby submits the following comments concerning the above-referenced guidance document. It is the Department's position that the guidance document must explicitly recognize exempt recyclers in the calculation of the states' capacities. We believe that the EPA should be encouraging recycling by acknowledging these recyclers. Failure to recognize these recyclers only creates a disincentive to recycle hazardous waste. It is incumbent upon EPA as well as the states to encourage source reduction and recycling as first priorities in our calculation of state capacity.

Thank you very much for the opportunity to submit these comments.

Very truly yours,

Edward Z. Fox
Director

EZF:ip

3033 North Central Avenue, Phoenix, Arizona 85012, (602)207-2300

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 14 1992

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

Edward Z. Fox, Director
Arizona Department of Environmental Quality
First Service Title Building
3033 North Central Avenue
Phoenix, Arizona 85012

Dear Mr. Fox:

I am writing to respond to your request for written guidance regarding a state's ability to count the capacity of hazardous waste exempt recyclers for capacity assurance purposes.

Your letter has raised several policy issues which we will not be able to address in time for the next meeting of the State's Hazardous Waste Disposal Committee. Please assure the Committee members that a letter on this issue will be forthcoming.

Sincerely,

T. Michael Taimi, Chief
Capacity Programs Branch

Printed on Recycled Paper