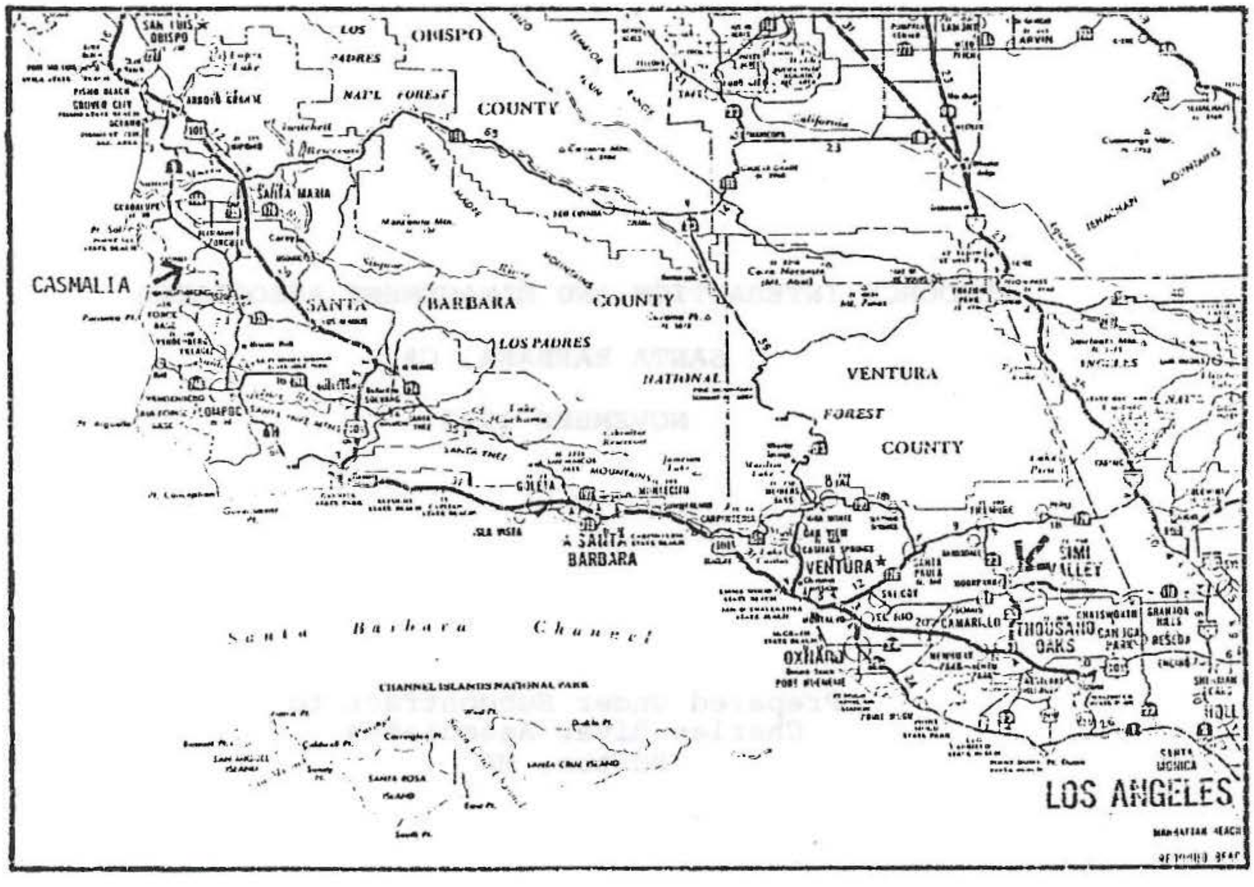
BENEFITS ASSESSMENT OF TWO CALIFORNIA

HAZARDOUS WASTE DISPOSAL FACILITIES



RESOURCE INTERACTION &
MANAGEMENT ASSOCIATES

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SANTA BARBARA, CA

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PREFACE

This study identifies and determines dollar values for the benefits of Federal hazardous waste management regulations on two land disposal facilities in Southern California. The study is part of a major effort of the Envrionmental Protection Agency to develop and use economic information for assessing the benefits of its regulatory activity.

Since Love Canal, public attention has focused on hazardous waste disposal sites and practices. In one form or another, aspects of the hazardous waste disposal problem have occurred near or in many communities. Those who have lived in the immediate vicinity of these facilities have had their consciousness particularly sharpened. Several individuals have proved immensely helpful in providing us with information about the study sites. Their persistence and dedication have been inspirational to the study team, and have proven to be an effective catalyst in bringing about corrective political and regulatory action at the local level. These people are Ann Rock, councilmember, City of Simi Valley; Les Conrad, resident of Santa Maria; and Lew Dunn, resident of Casmalia.

In addition, we wish to thank the staff of the two facility operators for their time and cooperation. These include James L. McBride and Jan Lachenmaier of Casmalia Resources; David M. Long and David Burkhardt of the Ventura County Regional Sanitation District; and Paul W. Abernathy and Richard Gurske of Chemical Waste Management.

There were many others, too numerous to list here, who helped us with specific information; to those, an appreciative thanks.

Dr. Kenneth Wise, Project Director for Charles River Associates, provided useful comments on the draft. Finally, we give our special thanks to Ann Fisher, Office of Policy and Resource Management, Environmental Protection Agency, for her ongoing and thoughtful guidance over the entire course of this project.

CHAPTER 1 EXECUTIVE SUMMARY

This study appeared, at the outset, to be straightforward. There were two sites -- a "good" site and a "bad" site. The study was to trace the effect these regulations had on the practices which led to the closure while demonstrating how the "good" site had stood up to these same regulations. From these differences, certain benefits could be attributed to the regulations, and be assigned an economic value. Clearly, if the regulations conferred benefits in excess of their costs, then they were certainly worth having. Further, if the study of these regulations at the two study sites revealed areas for improving the regulations, additional benefits would be conferred.

So much for appearances. This study presented a challenge beyond our imaginings. The conceptual framework established at the outset could not be applied precisely. Questions easy to ask were not so easily answered. Further, certain points of view held in the beginning were reversed during the course of study.

In this Executive Summary, we have attempted to capture the essence of this investigation by highlighting the following:

- o The key issues which, looking back, have driven the hazardous waste situation locally and guided its investigation;
- o The objectives of the study and the methodology we attempted to use to meet them;
- o The defining similarities of and differences between the two study sites;
- o The principal conclusions; and
- o Possible recommendations.

1.1 THE KEY ISSUES

Several key issues have driven this study of two hazardous waste facilities and shaped the conclusions:

(1) <u>Issue of Damages Due to Site Operation</u>

- o Both sites were alleged to have problems which could not be substantiated by the administrative record or any facts or information which could be documented; these included stories of dead cows, leaking wastes, and a growing waste bulge. These stories, when combined with media coverage of normal events on the sites, increased local fears.

- o Particularly in the case of the Simi Valley facility, fears were magnified by a public agency operator unresponsive to its own regulatory board and insensitive to the public it was supposedly serving. Following a struggle for control, operation and ownership has passed to a nationally known private corporation. Fears have subsided substantially, even though the potential for damages due to past practces still remains.

- o While there have been many alleged incidents and numerous recorded incidents at both sites regarding improper operating practices, and while these incidents still occur (an explosion of an empty fuel tank at Casmalia, a fire due to spontaneous combustion in a former impoundment at Simi), none of these, nor any other act or practice, has ever been reported to cause actual damage. This is not to say something causing damage could not happen, only that, up to this point, nothing resulting in damage has.

- o Out of these fears and concerns, numerous studies were undertaken, especially at the Simi Valley facility. Great controversy arose, and at present the matter is far from settled. At this point, regarding only hydrogeology, no documentation has been made of any actual damage to surface or underground water supplies. Around Casmalia, a number of studies have been done to test for the presence of hazardous waste constituents. While two separate tests undertaken by a private person indicated the presence of PCB's, the findings could not be replicated subsequently. This testing continues.

(2) <u>Overlap of California Regulations with RCRA</u>

California has already had a hazardous waste management program at least as tough as that required by RCRA. The California program has been in effect over the past eleven years. How, then, could the impacts of RCRA be distinguished apart from the California program which both preceded and gave rise to RCRA?

(3) <u>Redundancy within RCRA</u>

The RCRA regulations are both detailed and overlapping in their intended effects. To determine the impacts of each and every regulation would be a Herculean task. How could the regulations be bundled (e.g, using scenarios) to allow a useful treatment of this complexity? The tradeoff appeared to be between doublecounting if each regulation was considered separately versus a fair estimate of benefits, but only for the regulations taken as a whole.

The date available did not support a precise marginal or conditional analysis.

(4) <u>Alternate Definitions of Benefits</u>

Benefits of regulation result because they stop damages that have <u>already</u> occurred or prevented damages that <u>could</u> occur. How were these two types of benefits to be treated? Which particular resources were involved?

(5) <u>Private Versus Public Operator Status</u>

One of the operators was a public agency; the other was a private firm. Did this distinction make a difference? This distinction was somewhat confounded by the fact that one of the sites was an ordinary solid waste facility prior to accepting hazardous wastes while the other was designed from the beginning for treating, storing, and disposing of only hazardous wastes. Did this factor contribute to the differences in benefits?

(6) <u>Nature of Specific Risks Both Sites Presented to Populations and Activities</u>

What specific hazards did the operation of these two facilities present to surrounding populations and land use activities?

(7) <u>Representativeness of Study Sites to Others in the United States</u>

In what ways are these sites typical of other sites across the country and in what ways are they similar? Can the findings and conclusions be generalized so that recommendations of more than local relevance can be made?

1.2 METHODOLOGY

This study was undertaken to assess the benefits of RCRA regulations. Five objectives were identified at the outset as the primary ones to meet:

1. Develop a benefit analysis framework for examining representative "good" and "bad" sites using a before and after policy model design;

2. Compile databases for two hazardous waste land disposal facilities;

3. Compare the good site with the bad site before regulation and after RCRA to pinpoint the specific benefits attributable to RCRA;

4. Examine the benefits of more stringent control;

5. Identify data needs that would have the biggest payoff for future benefit analysis of hazardous waste facilities.

Performance in meeting these objectives was mixed. Two key issues summarized in the previous section -- the overlap of California regulations with RCRA, and the redundancy within RCRA -- forced major revisions in the way Objectives 1 and 3 could be realized. The clean and simple four-part before and after model for the two sites could not be mapped onto the confounded data base. On the other hand, Objective 2 was perhaps over-realized: there is probably not a more thorough description of the two study sites to be found anywhere.

Objective 4, also limited by its connection to the four-part before and after model, was to answer two questions:

1. Were more stringent controls to be placed on the "bad" site, could it be returned to use as a hazardous waste facility?

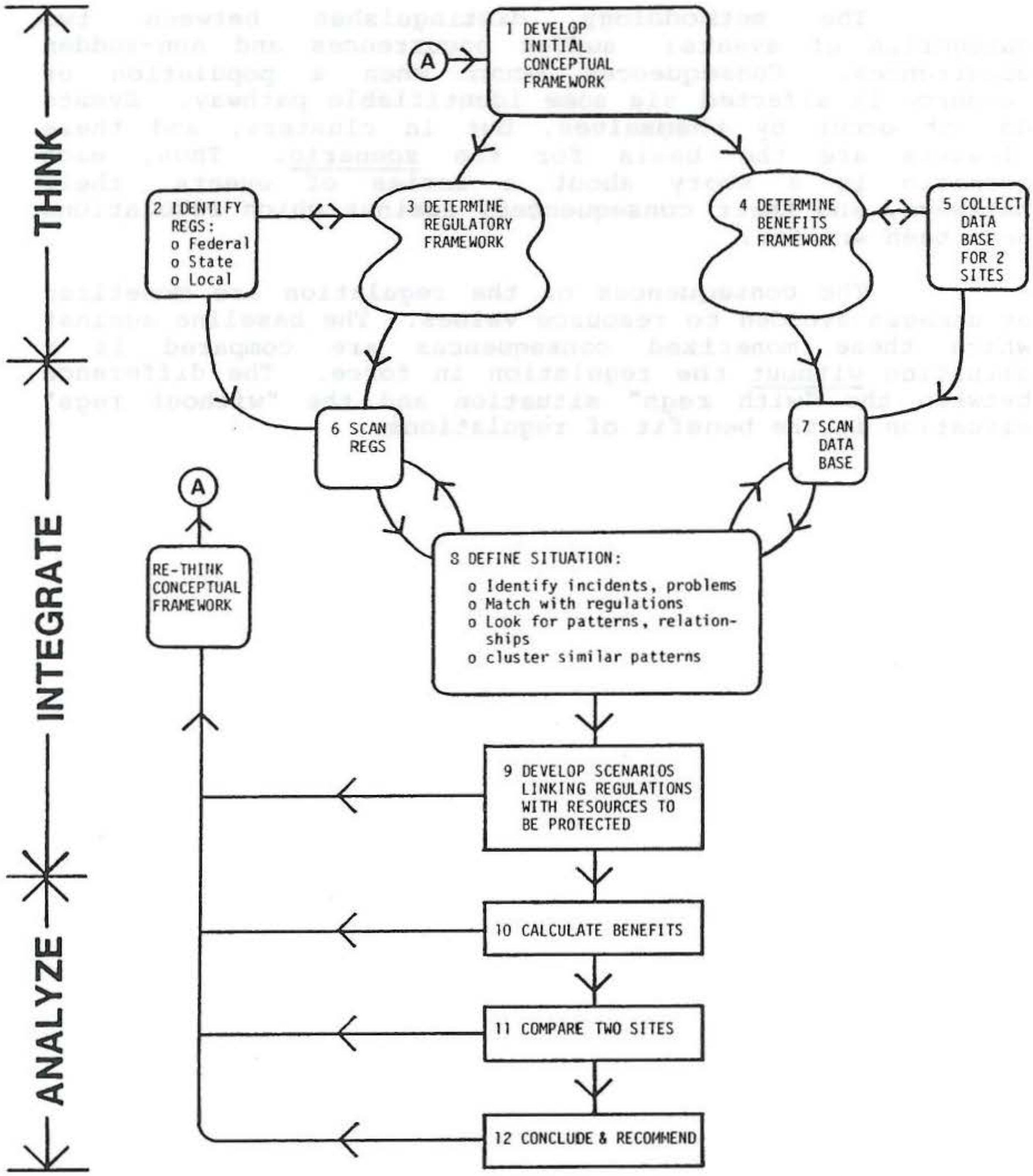
2. Even at the "good" site, what residual risks remain even with RCRA which could be further reduced through more stringent controls?

These are highly speculative questions and are discussed in the conclusions and recommendations of Chapter 8. Objective 5 is also discussed in Chapter 8.

The original methodology developed to meet the above five objectives became modified during the course of the study. A brief overview portraying what ended up being done is given in Figure 1.1; the stages and steps of this methodology are summarized in Table 1.1.

The methodology distinguishes between two categories of events: sudden occurrences and non-sudden occurrences. Consequences occur when a population or resource is affected via some identifiable pathway. Events do not occur by themselves, but in clusters, and these clusters are the basis for the scenario. Thus, each scenario is a story about a series of events, their pathways, and their consequences, against which regulations have been written.

The consequences of the regulation are monetized as damages avoided to resource values. The baseline against which these monetized consequences are compared is a situation without the regulation in force. The difference between the "with regs" situation and the "without regs" situation is the benefit of regulations.



METHODOLOGICAL FRAMEWORK

FIGURE 1.1

TABLE 1.1

STAGES AND STEPS OF METHODOLOGY

Stage 1. THINK

1. Develop initial conceptual framework:
   - o benefits policy model based on a two-site before and after design
   - o systems framework for assessing site and regulations
2. Identify appropriate regulations at three levels: Federal, State, and Local
3. Determine regulatory framework
4. Determine benefits framework
5. Collect data on two sites

Stage 2. INTEGRATE

6. Scan regulations for applicable sections
   - o resources to be protected
7. Scan data base including:
   - o administrative record
   - o hydrogeological, other studies, reports, on resources impacted
   - o anecdotal, other leads, information, media
   - o water tests
8. Define situation:
   - o identify incidents and problems from data base
   - o match incidents and problems with regulations
   - o look for patterns and relationships
   - o cluster similar patterns
9. Develop scenarios linking regulations with resources to be protected
   - o distinguish between sudden and non-sudden occurrence

Stage 3. ANALYZE

10. Calculate benefits:
    - o apply scenarios to sites and environs
    - o distinguish between primary, secondary, tertiary impacts on resources
    - o separate event or consequence from probability of its occurrence
11. Compare two sites
12. Conclude and Recommend

Mathematically, the computation of benefits relies upon an expected value model. This model has two components: the damages avoided under a given scenario and the probability that the scenario will occur. This simplifies the problem considerably by separating what can be estimated (the damages avoided) from what cannot be estimated (the probabilities).

1.3 THE TWO STUDY SITES

Simi Valley and Casmalia have been operated as hazardous waste facilities for twelve and ten years respectively. Both are canyon sites, on soils of varying but low permeabilities, with no or poor groundwater and surface water resources nearby. Both sites have low rainfall and high evaporation potential.

The site in Simi Valley was operated by a public agency, the one near Casmalia by a private firm. Simi Valley had been started as a solid waste facility, then converted in one part to a hazardous waste facility; Casmalia was designed specifically as a hazardous waste facility from the beginning. Simi Valley is located near urban uses and population, Casmalia away from these potential receptors.

In general, the Simi Valley site has attracted considerably more public attention only in recent years, owing to a proposal to build an airport on top of the hazardous waste portion. By contrast, Casmalia has received a lower but continuous level of scrutiny. The administrative record and data base are much larger for Simi Valley because of the airport controversy.

1.4 RESULTS OF THE BENEFITS ANALYSIS

Benefits calculations were made for two types of scenarios: sudden occurrence and non-sudden occurrence, for resources valued at three market prices and for scenarios at three levels of severity. This generated nine estimates for each site. These are summarized in Table 1.2 where the market prices are portrayed as ranges.

These are estimates for damages <u>avoided</u>. At neither facility has actual known damages occurred, on or off site. Many incidents have been reported -- accidental spills have been typical. Anecdotal information abounds, but that which can be documented does not point to damages.

Differences between the two sites are striking. The damages avoided under the worst plausible case sudden occurrence scenario (earthquake plus flooding) for Simi Valley, ranging from $220 - 440 Million, are over 500 times the damages avoided at Casmalia ($0.4 - 0.8 Million). For the worst plausibe case non-sudden occurrence scenario (leachate) the capitalized (at 3%) yearly damages avoided at Simi Valley, $1,600 - 8,000 Million are 1600 times the damages avoided at Casmalia ($1 - 5 Million). The values are undiminished by probabilities.

These differences are, in general, due more to siting than to regulations of RCRA. Properly located, hazardous waste landfills would have few or no off-site impacts, and, therefore, few or no benefits from avoided potential damages.

TABLE 1.2

BENEFITS OF REGULATIONS:
COMPARISON OF SIMI VALLEY WITH CASMALIA

SUDDEN OCCURENCE SCENARIO

Severity of Scenario		Low to High Market Values (Millions of Dollars)
Worst	Simi	$ 220 - 440
	Casmalia	.4 - .8
Moderate	Simi	22 - 44
	Casmalia	.04 - .08
Low	Simi	2.2 - 4.4
	Casmalia	.004 - .008

NON-SUDDEN OCCURRENCE SCENARIO

Severity of Scenario		Low to High Percentage of Population Affected (Millions of Dollars)
Worst	Simi	$ 1,600 - 8,000
	Casmalia	1 - 5
Moderate	Simi	500 - 2,700
	Casmalia	.3 - 1.7
Low	Simi	100 - 500
	Casmalia	.07 - .3

Note: Worst cases are defined differently for sudden and non-sudden occurrence scenarios; see Chapter 7.

1.5 PRINCIPAL CONCLUSIONS

The following conclusions capture the significant findings of this study:

1. There is no evidence that damage has occurred at either facility: therefore, the benefits of regulations lie in the value of damages avoided rather than in resource values restored;

2. Two classes of scenarios seemed most applicable to the two study sites: a sudden occurrence scenario based on an earthquake/heavy rain event and impacting primarily on land uses, and a non-sudden occurrence scenario based on leachate contaminating water supplies and impacting primarily on human health;

3. For the worse plausible case sudden occurrence scenario, the benefits of regulation as measured by damages avoided to land uses range from $220 to 440 Million for Simi Valley, and from $0.4 to 0.8 Million for Casmalia;

4. For the worse plausible case non-sudden occurrence scenario, the benefits of regulation as measured by damages avoided to human health range from $1,600 to 8,000 Million for Simi Valley, and from $1 to 5 Million for Casmalia;

5. Siting emerges as a critical factor in benefits assessment -- if the Casmalia facility had been located near more people, it also would have had higher damage avoided estimates, though not as high as those for Simi Valley;

6. The two study sites have characteristics which make them representative of other hazardous waste sites;

7. There may be performance differences between private and public facility operators which should be further explored;

In addition to the substantive findings, several observations on the methodology which produced these findings are in order:

1. The California and Federal RCRA regulations evolved in close synchrony, making it difficult to apply the methodology and separate their respective impacts;

2. While expected value would have been a better basis for developing benefits estimates, the probability data need for this is absent from the data base -- consequently, assumptions on the severity of scenarios and the sensitivity of cost parameters were substituted to provide a range of damage avoided estimates;

3. For these two sites, there is considerable redundancy among the RCRA regulations in terms of the benefits conferred, making it difficult to conduct a precise marginal analysis of any specific regulation; consequently, the RCRA regulations, and their California RCRA-like counterparts, were treated as a whole.

1.6 RECOMMENDATIONS

The assessment of regulatory benefits has revealed that several factors and trends influence the size and scope of these benefits. This influence will also be brought to bear upon the regulatory framework itself in the future as allocation of resources, economic and technological advancement intermix. The following factors and trends influence regulatory benefits and the regulatory framework:

- operations regulations and disposal technology have had an indirect effect upon the selection of hazardous waste disposal sites;
- siting influence indicates a preference for centralized, remote sites removed from the presence of valued resources and population centers;
- public controversy and inadequate information bases have increasingly made selection of new disposal sites, as well as operation of existing sites, difficult;
- availability of land, cost of land, cost of waste transport, and other considerations will increasingly make economic review of disposal methods critical; and
- changes in and alternatives to the existing means of hazardous waste disposal are rapidly approaching, and may require dramatic rethinking of, present regulatory frameworks.

Further study of regulatory benefits should focus on the potential to create more benefits through increased protection, risk reduction or other means. Improved regulatory vigilance in monitoring and enforcement could very well increase the benefits of existing regulations. Marginal analysis of the benefits added by such vigilance within the existing regulatory framework versus the benefits of new regulatory schemes would be fruitful as the ever increasing amounts of wastes are generated. This study recognizes other trends which indicate that study of new regulatory schemes and resulting benefits may be warranted. The following trends have been recognized:

- ability to locate centralized, remote sites for landfill disposal is necessarily limited as available land, cost of land, cost of waste transport, public controversy, and other factors work against continued disposal means;

- technological advancement and specialization in waste disposal requires dedication to management of single waste types and may further dictate specialization among specified types of hazardous wastes;

- within the confines of this study, the private sector would seem to possess greater flexibility to respond to specialized hazardous waste disposal;

- California, in anticipation of landfill disposal prohibition, has begun to focus upon treatment alternatives which then open the door to alternatives to siting; and

- study of alternative disposal means and alternative siting means may hold potentially great cost savings, effective waste control and risk reduction.

CHAPTER 2: STUDY INTRODUCTION, ISSUES, QUESTIONS

2.0 CHAPTER SUMMARY

This study supports the Federal regulatory assessment program by analyzing benefits that have accrued as a result of land disposal facilities operating within hazardous waste management controls of the Resource Conservation and Recovery Act of 1976. The concept of the analytical framework used is based upon the fact that the State of California has a program of hazardous waste management regulation similar to that required by the Environmental Protection Agency (EPA) which has been in force over the last 11 years.

In the following sections, the study issues are introduced. These include:

- o the rulemaking perspective;
- o the definition of resource values to be protected;
- o the main differences and similarities of the two study sites; and
- o the representativeness of the two study sites for comparison under national policy.

2.1 REGULATORY IMPACT ASSESSMENT OF THE ENVIRONMENTAL PROTECTION AGENCY

The EPA conducts Regulatory Impacts Assessment (RIA) of those regulations it establishes as provided for in Executive Order 12291. In response to E. O. 12291, the RIA program requires review of the economic effects of EPA rulemaking. Regulations mandated by the Resource Conservation and Recovery Act of 1976 (RCRA) include the management and operation of hazardous waste disposal facilities. These hazardous waste management regulations create effects, good and bad, or benefits and costs, which must be evaluated in assessing the overall performance of the regulations.

This project supports the analysis of benefits required in the RCRA land disposal facilities RIA. The benefits analysis will be accomplished through development of a framework designed in response to the regulatory experience in California. The goal of the study is to ascertain the most plausible economic benefits and to demonstrate the usefulness of the framework applied to the California data base.

2.2 BENEFITS ASSESSMENT

2.2.1 Rulemaking Perspective

The evidence of past incidents and the threat of future hazardous waste events which place human health and the environment at risk act to initiate government regulation. The primary initiative began at the state level through a variety of mechanisms across the nation, and in California through a variety of state laws and administrative departments. As the patchwork of regulatory effort addressed the particular waste, environmental, legal and political problems within each state, the need for a comprehensive approach to the conservation of resources and disposal or recovery of waste products became clear. In 1976 RCRA was enacted to address the ultimate disposition of hazardous products. While the directive of this regulatory program may be self-evident, each such program must be tested to determine that benefits actually result.

2.2.2 Study Approach

One indication of performance in rulemaking is the assessment of the beneficial impacts of regulation. If hazardous waste management regulation provides a means to eliminate catastrophic and chronic pollution events in the future, then comparison of the treatment and disposal system with regulation to the system without it should reveal the beneficial effects. In order to project future events, historical data from these sites will be used. The discussion in Chapter 3 reviews the similarity of California regulation to that under RCRA.

2.3 RESOURCE VALUES PROTECTED

The major objective of the study is to estimate the benefits of maintaining and promoting the values of natural resources within the system surrounding each land disposal facility. The regulatory framework and the methodology for assessing and monetizing benefits are provided in Chapter 3.

Benefits of regulation result because damages have <u>already</u> occurred or <u>could</u> occur. There are two types of benefits that accrue from hazardous waste management regulation. These may be defined as:

(1) costs or damages avoided with regulation (but which would occur without reguation); and

(2) the cost of restoring a natural resource after damage has occurred (the restoration cost).

While the study has researched both types of benefits, it has found little evidence of damage, and therefore, cost of a restored natural resource was not relevant. Therefore, this study focuses on damages avoided. Benefits assessment in this study will not include the cost of regulatory implementation or enforcement.

2.4 SITE COMPARISIONS AND REPRESENTATIVENESS

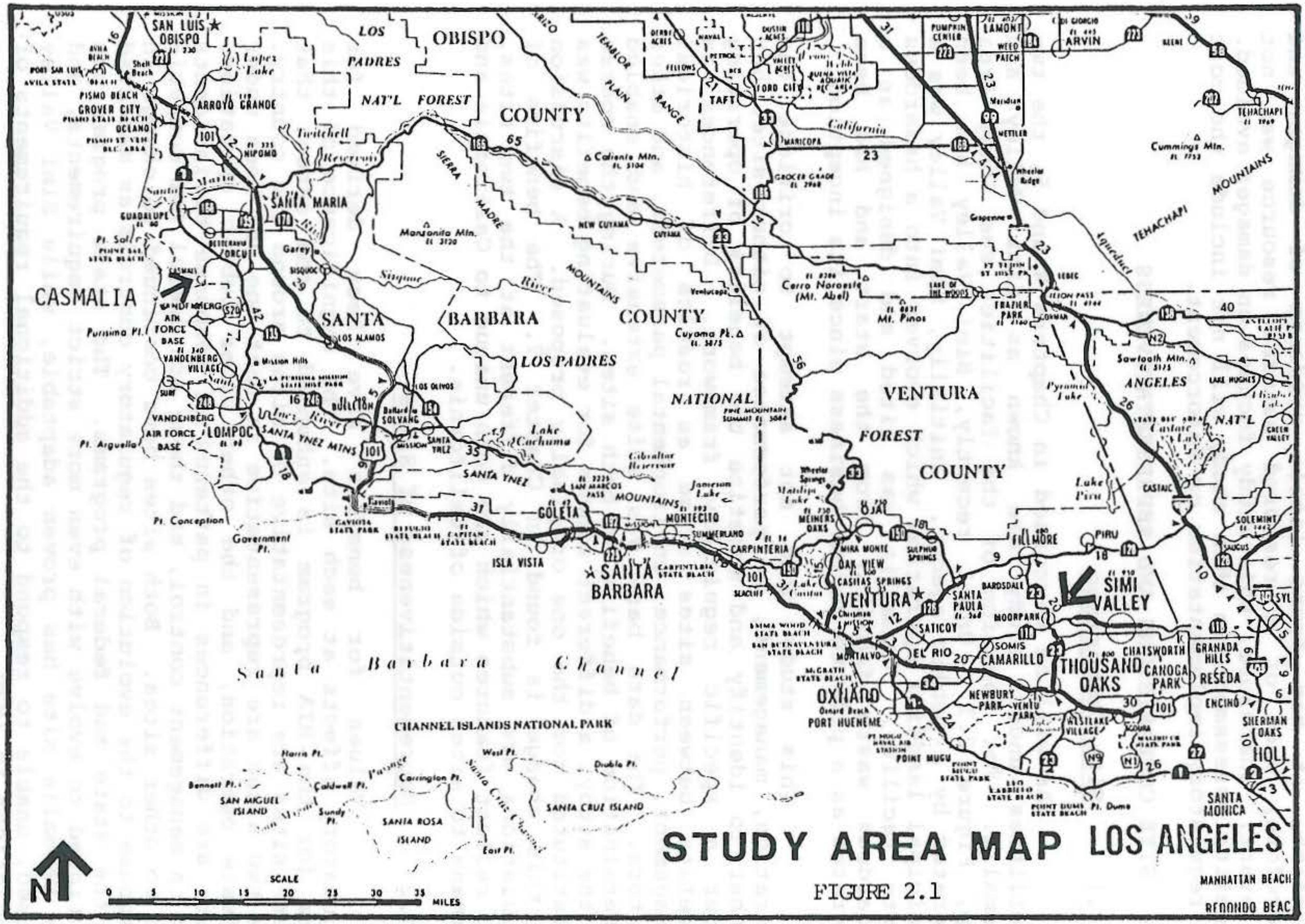
2.4.1 Site Comparison

As will be discussed in Chapters 4 and 5, the two facilities under study are known as Simi Valley and Casmalia. For location of the facilities see Study Area Map, Figure 2.1. Until recently, Simi Valley has been operated by a public agency. Initially, Simi Valley was a municipal landfill operation which evolved into a hazardous waste facility. Casmalia was sited and designed as a hazardous waste facility from the start and has been operated as a private sector business since its inception.

This study does not attempt to critique the operation, management, or performance of either site, but rather to identify and monetize the benefits of operating under a specific regulatory framework. Differences in benefits between sites arise as results of historical management, performance, environmental parameters, and other factors. The data base was quite extensive and enabled determination of benefits at both sites. During the course of the study, a different scheme for evaluating benefits was substituted for the one originally proposed. A discussion of this change is found in Chapter 7. The benefits of regulations are substantially different at the two sites, and reflect features which are both unique to California and germane to sites outside of California.

2.4.2 Representativeness of Sites

Values for benefits have been derived for regulatory effects at each site. The significance of this data for the RIA program is enhanced to the extent that these sites are representative of sites around the country. The two sites are representative in that one has been under private operation, and the other under public operation. There are differences in patterns of response to incidents and in management control, and these are useful for comparison to other sites. Both sites have continued to change in response to the evolution of regulatory controls as mandated by the state and federal programs. The state program has continued to evolve with even more strict requirements, and the Casmalia site has proven adaptable, while Simi Valley closed, unable to respond to the additional requirements of regulations in 1980.



STUDY AREA MAP

FIGURE 2.1

Simi Valley is particularly representative of sites which evolved into hazardous waste management facilities, but which had great difficulty in upgrading operations to meet the latest standards. Amidst a swirl of recordkeeping problems, environmental impacts and public controversy, Simi Valley was unable to restore, either technically or publicly, confidence in its operations.

The sites are unique, or different from other sites, in several ways. Environmentally, the Santa Barbara-Ventura County area is distinguished by its geology and soils, seismicity, and aridity. The geology and soils characteristics which are described in detail in later chapters dictate such important features as the quantity and quality of groundwater and surface water, land stability, land use, and related resource values.

Seismicity is a characteristic hazard widespread in California. This hazard increases risk with or without regulation. Statewide regulation is much more stringent in California, as all constructions are subject to seismic safety regulations. Still, hazardous waste facilities located near urbanized areas pose potentially greater damage due to the earthquake hazard.

Aridity is probably the most distinguishing environmental feature of these two sites relative to the sites in other parts of the country. Total rainfall is very low but seasonal. Rainfall intensity can be severe, and the variation in rainfall amount from year to year is substantial. Groundwater is determined by soils and geology, and is often high in dissolved salts. Most importantly, for water resource values and land use, water supplies may be delivered to urban areas from as far away as northern California. Therefore, the resource value of groundwater may range from very little to the replacement value of expensive imported water.

Simi Valley and Casmalia are also unique in that they differ institutionally from other sites. Urban development largely occurred after initial regulatory programs were developed for municipal waste facilities. This has had a profound effect upon siting. Historically, private and public disposal of wastes and hazardous wastes occurred in industrialized urban areas with only a minimum of disposal technology at hand. The results of this are evident weekly in the media. Near the study sites, sound disposal technology was available as urban centers were developing. Siting was recognized as all-important, and the benefits of establishing regional facilities in rural, remote or sparsely populated areas self-evident. In some areas of the industrialized Los Angeles and San Francisco Bay regions, and certainly in the East, urban and suburban development has literally crept up to disposal sites. This is not the case for Casmalia, but surburban development has reached out toward Simi Valley.

2.5 CONCLUSIONS

Three principal dimensions were drawn which shape the direction of this study:

(1) The California hazardous waste regulations and the EPA regulations are similar;

(2) Damages avoided rather than costs of restoration dictate benfits; and

(3) The two study sites have sufficient similarities to other sites that there is a basis for extending conclusions reached here to other sites across the country.

CHAPTER 3 CONCEPTUAL FRAMEWORK

3.0 CHAPTER SUMMARY

The conceptual framework used to determine the benefits accruing form hazardous waste management regulations has two components: (1) the regulatory framework; and (2) the methodological framework. The regulatory framework is based on the California regulatory infrastructure, which is essentially the same as the comprehensive program established by RCRA. The methodological framework is based on an expected value model. The key features of this two-component conceptual framework are:

- The California regulations are considered RCRA-like, as they preceded the RCRA regulations in time, and are at least as stringent as the RCRA regulation;
- The evaluation of benefits is based upon EPA Title 40, parts 264 and 265;
- Scenarios based on the "worst plausible event" are used to connect the nature of benefits to the regulations;
- The model for determining benefits uses the expected value approach;
- The baseline against which the monetized consequences are compared is a situation without the regulatins in force;
- Compliance to the regulations is assumed; that is, the enforcement of the regulations is assumed to be 100 percent effective.

3.1 REGULATORY FRAMEWORK

The Resource Conservation and Recovery Act of 1976[1] provides technical and financial assistance to develop management plans and facilities for the recovery of energy and other resources from discarded materials and for the safe disposal of discarded materials, and to regulate the management of hazardous wastes. Subtitle "C" of RCRA pertains to hazardous waste management and sets performance standards for all activities related to handling of hazardous wastes and provides for delegation of authority to states.

3.1.1 Regulatory Rationale

Subtitle C includes three sections which are of central interest to this study:

- o Section 3004 provides for standards applicable to owners and operators of treatment, storage or disposal facilities;

- o Section 3005 provides for permits for treatment, storage and disposal of hazardous wastes; and

- o Section 3006 directs the EPA to authorize state hazardous waste programs equivalent to and consistent with the federal program.

Section 3006 provides for the assumption of management responsibility by the State of California through its own programs, and is the essential link allowing review of benefits accrued under state management for RIA purposes.

RCRA section 3004 establishes means for the disposal of hazardous wastes that will conserve land, water, air and human health. The standards for owners and operators of treatment, storage or disposal facilities (TSD facilities) are established to protect human health and the environment through the design, construction and operation of these facilities. This study will seek to identify and monetize the benefits which can result from these protective standards. The regulations which embody these standards include EPA Title 40, parts 260 to 265.[2]

Title 40 part 260 regulations establish the overall hazardous waste management system. Parts 264 and 265 establish the regulations for owners and operators of TSD facilities. Part 265 sets requirements applicable for operation during the interim status period (after facility application, but prior to final disposition of application). Part 264 regulations are not as inclusive as part 265, but are the final facility status requirements. This study will assess the benefits of part 264 regulations. Some subparts of part 265, which refer to activities regulated by the state over time but not provided for in part 264, will be included.

Regulations require facilities to include preparedness for and prevention of hazards; contingency, planning and emergency procedures; the manifest system; recordkeeping and reporting; groundwater monitoring; facility closure and post-closure care; and financial requirements. The use and management of containers; and the design and operation of tanks, surface impoundments, waste piles, land treatment facilities, landfills, incinerators, thermal, physical, chemical, and biological treatment units and injection wells are also regulated.

3.1.2 Regulatory Framework Assumptions

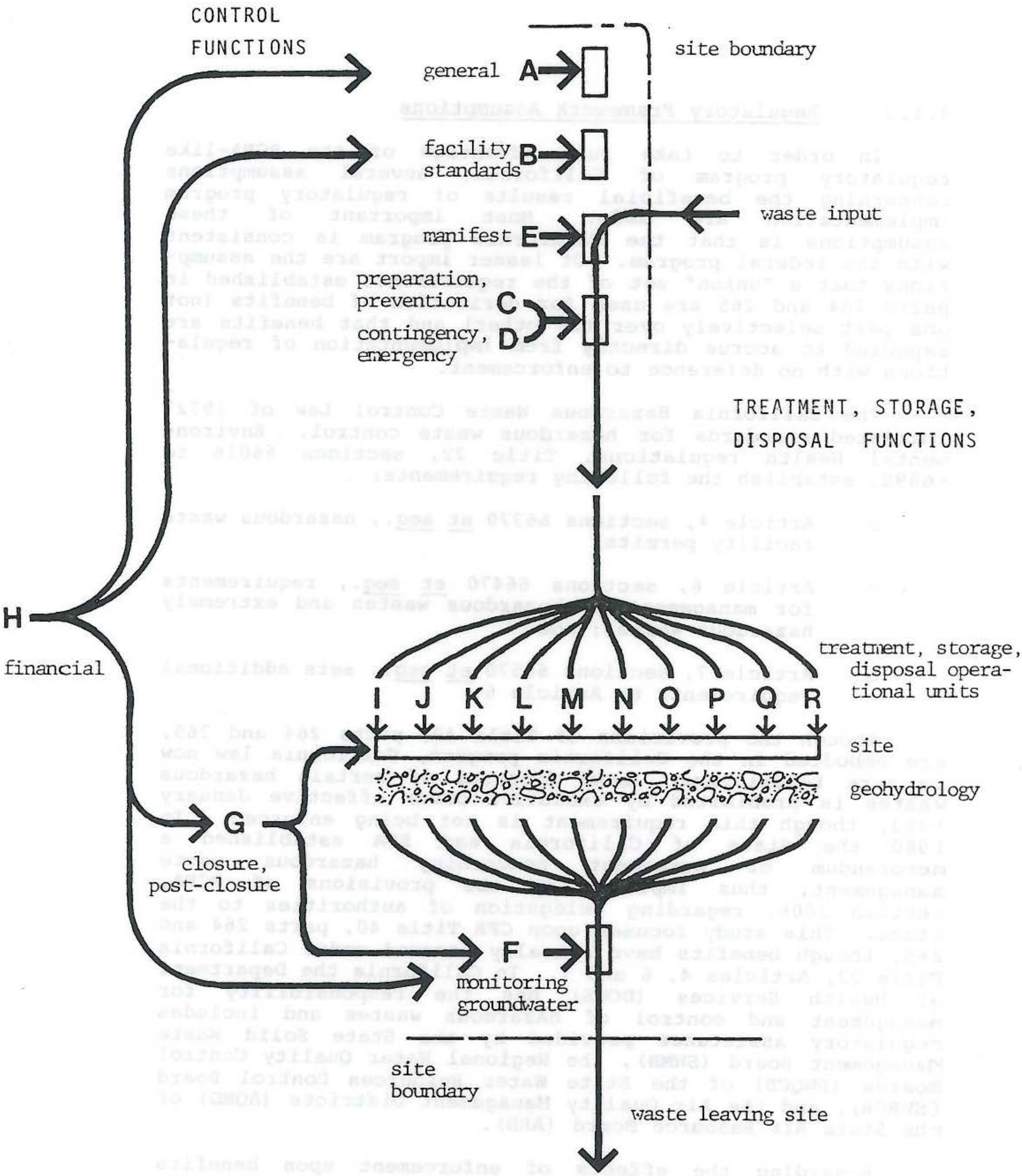
In order to take full advantage of the RCRA-like regulatory program of California, several assumptions concerning the beneficial results of regulatory program implementation are made. Most important of these assumptions is that the California program is consistent with the federal program. Of lesser import are the assumptions that a "union" set of the requirements established in parts 264 and 265 are used for derivation of benefits (not one part selectively over the other) and that benefits are expected to accrue directly from implementation of regulations with no deference to enforcement.

The California Hazardous Waste Control Law of 1972[3] initiated standards for hazardous waste control. Environmental Health regulations, Title 22, sections 66016 to 66898, establish the following requirements:

- Article 4, sections 66370 et seq., hazardous waste facility permits;
- Article 6, sections 66470 et seq., requirements for management of hazardous wastes and extremely hazardous wastes; and
- Article 7, sections 66570 et seq., sets additional requirements to Article 6.

Though the provisions of Title 40, parts 264 and 265, are embodied in the California program, California law now is more restrictive. Land disposal of certain hazardous wastes is prohibited by executive order effective January 1983, though this requirement is not being enforced. In 1980 the State of California and EPA established a memorandum of agreement concerning hazardous waste management, thus implementing the provisions of RCRA, section 3006, regarding delegation of authorities to the state. This study focuses upon CFR Title 40, parts 264 and 265, though benefits have actually accrued under California Title 22, Articles 4, 6 and 7. In California the Department of Health Services (DOHS) has the responsibility for management and control of hazardous wastes and includes regulatory assistance provided by the State Solid Waste Management Board (SWMB), the Regional Water Quality Control Boards (RWQCB) of the State Water Resources Control Board (SWRCB), and the Air Quality Management Districts (AQMD) of the State Air Resource Board (ARB).

Regarding the effects of enforcement upon benefits accruing from regulations, the following assumption is made. In order for any benefit to occur, the regulations must have caused some action. Since benefits are derived in this study from the consequences of plausible scenarios, which



WASTE FLOW AND CONTROL

FIGURE 3.1

3.2 BENEFITS FRAMEWORK

The objective of this section is to describe the method by which benefits of regulations are monetized. In the first section, several key factors which seem generally applicable are identified. Their verification would require a study of many more sites than the two investigated here. The "plausible scenario" is the link between the regulations and the benefits. How these are defined is described next. Finally, while many benefits can be identified, only some of these can be monetized. Chapter 3.2.3 describes how this is done. The methodology is applied to the two study sites in Chapter 6.

3.2.1 Factors Affecting Regulatory Benefits

There are several key relationships to consider in thinking about the benefits of regulations. For the regulations to have an effect, they must be implemented, enforced and performance monitored. Enforcement and compliance, however, depend to a large extent on a degree of trust in the self-policing management abilities of the site operator. Regulatory bodies do not have the resources to monitor a facility continually. Proper site management, then, is assumed for enforcement and compliance.

A variant of this relationship is suggested by the Casmalia operation. Here the facility operator responds to anticipated, as well as existing, regulations. Evidence of this is Casmalia's investment of $2 million in a wet air oxidation plant on the expectation that the State of California will enforce its regulations prohibiting the storage of liquid chemicals in landfill operating units. The operator's desire to stay in business explains compliance with the regulations. The company is trying to protect its investment and secure its return by anticipating a business opportunity.

Similarly, the Simi Valley operator, anticipating that the site would not be able to meet more stringent permeability standards for Class I site operation, closed down the Class I portion before the regulations became official.

An important factor in site operating performance may be the distinction between private versus public sector operation. The private operator is assumed to have profit rather than performance as his main criterion. He stands exposed to accusations of self-interest, and, if he is to stay in business, tries to avoid bringing attention to his operation. Proper site management is his insurance; performance becomes instrumental to profits.

By contrast, the public operator is already assumed to be acting in the public interest. A public review board would seem to provide all the caution needed. Public attention wanes. Without a market to satisfy, the public operator's interest focuses on protecting the agency's budget and long-term stability. In this case, the public operator's status may affect the operation of the facility and act to insulate the public operator from responsiveness to performance.

Two other factors should be highlighted in viewing hazardous waste management in this way. The first is the distinction between regulations dealing with facility siting and those focusing on operation. If the facility is sited properly -- on proper soils and away from population, land improvements, and groundwater and surface water supplies -- failures of enforcement or lapses of management will have impacts less likely to have drastic damages.

The second factor to be highlighted is the contrast between the professional practices of solid waste management and hazardous waste regulations themselves. Sites such as Simi Valley have operated as Solid Waste Facilities either prior to or simultaneous with their hazardous waste component. How much "performance" is due to these professional practices applied to hazardous waste management, which have been operative for years, and how much can be attributed solely to the regulations?

The sample of two sites is far too small to allow an explanation of these highly suggestive factors. These are candidate questions for further study.

3.2.2 Definition of Scenario

The purpose of regulations is to protect resources and resource values from the negative consequences of specific events which could occur. These events can be categorized into two broad classes of occurrences:

(1) Sudden occurrences; and

(2) Nonsudden occurrences.

Explosions, earthquakes and heavy rainstorms are examples of the former; incompatible waste constituents combining and releasing gas, or chemicals leaking through a punctured containment liner are examples of the latter.

Consequences from such events ensue only if exposure to a population or to other resources via some pathway occurs. For nonsudden occurrences, the event is not easily observed and there may be a time delay before a consequence manifests itself. For instance, some time will go by before waste leachate from a leaking drum reaches an underlying aquifer. Additional time passes before symptoms of morbidity appear in the population using the water supply. This information delay increases the extent and potential for damage, particularly if damages are cumulative (as in lead poisoning). By contrast, sudden occurrences are highly visible, meaning that action can be more quickly taken and consequences limited in spatial extent and time duration.

Conceptually, the initiating occurrences, the pathway, and the consequences combine to describe an "Event." Events rarely occur alone, but combine with other events to which they are linked, into complex clusters of events. These clusters of events are termed "scenarios."

The role played by scenarios in linking regulations to benefits is suggested in Figure 3.2 The impacts of a given regulation on the five resource values are described through these scenarios. Each scenario is a story about a series of events, their pathways, and their consequences, against which regulations have been written. The consequences are monetized, where possible, as resource value damages avoided. The baseline against which these monetized consequences are compared is a situation without the regulation in force. Thus, the monetized consequences reflect the differential impact of the regulation on resource value damages avoided. To establish an upper bound for benefits, the scenarios describing the worst plausible case have been selected for comparison with the case of 100 percent compliance.

In the study, the scenario construction exercise was applied to each Subpart of Title 40, Parts 264/265. Appropriate categorization of regulations at the Subpart level, and screening of benefits was accomplished. Further, to avoid redundancy and to capture the most significant values, the major benefits have been summarized by the five resource value categories, with reference to the scenarios and the regulations.

While every Subpart regulation is intended to provide protection against a specific type of event, there is considerable redundancy among the regulations in terms of the benefits conferred. Thus, for example, regulations on containers, tanks, impoundments, waste piles, land treatment, and landfill all have sections detailing special requirements for storing incompatible wastes. The same general event applies to all. Similarly any given regulation usually protects more than one resource value for the simple reason that the physical pathway protected or implied by the regulation traverses several resources. Also, for the two sites studied here, and in general for sites having uniform physical or geohydrological features, movement of hazardous materials is confined to one or two physical pathways, e.g., the stream channel leaving the canyon site. Thus, all the regulations protecting surface water resources will point to many of the same benefits.

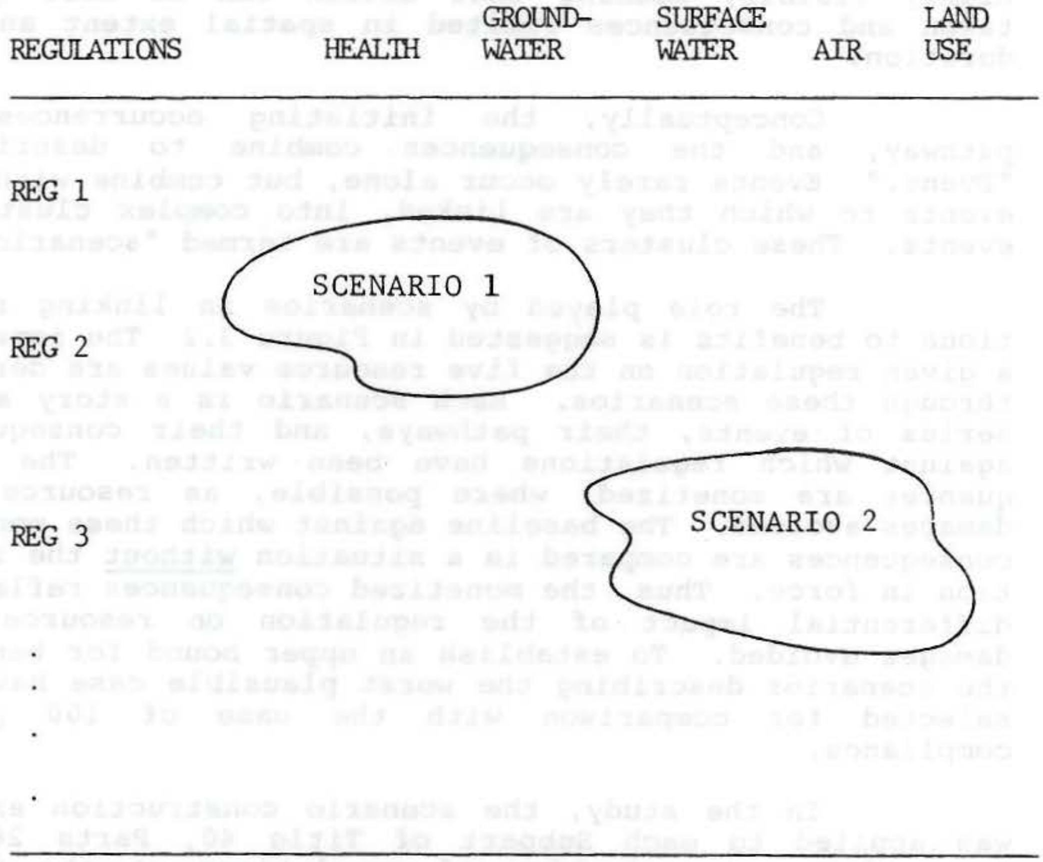

REGULATIONS
HEALTH
GROUND-WATER
SURFACE WATER
AIR
LAND USE
REG 1
REG 2
REG 3
SCENARIO 1
SCENARIO 2

FIGURE 3.2

This redundancy is illustrated in Figure 3.3. Events 1 and 2 (E_1 and E_2) share the same pathway. E_1 and E_3 have the same consequence. In general, the model assumes that specific events either have occurred, or could occur with some probability.

It is useful to distinguish among three types of consequences: primary, secondary and tertiary. Primary consequences are those occurring on the site itself. These may include direct exposure of employees to hazardous wastes. Training regulations are designed to prevent accidents, or to define procedures for minimizing damages should accidents occur. Thus, the benefits of training regulations, for example, include the person-days of accidents or sick leave avoided, plus the savings in medical costs as compared to the person-days of sick leave and medical costs incurred in the absence of regulations.

Secondary consequences are those caused by hazardous waste releases migrating off-site. Leachate from leaking containers could flow underground, contaminate a water supply, and cause injury to human populations drinking the water. Regulations establishing standards for lining containment areas would reduce the probability of waste releases occurring. Monitoring regulations could provide an early warning of water supply contamination. In this case, the benefits of regulations lie in the value of the water protected, as well as in the value of sick days avoided as compared to these values without the regulations.

Tertiary consequences are more indirect, although the results are similar to secondary consequences. Here a stream or water supply is contaminated and hazardous materials enter the food chain--through fish caught in the contaminated water, or through food chain crops irrigated with contaminated water. The pathway from the event to consequence is quite indirect and knowledge about it slow in coming to light. The benefits of regulations can sometimes be traced to these indirect effects at some remove, both in time and space, from the source.

3.2.3 Methodology For Monetizing Benefits

In practice, the benefits of regulation can be monetized as follows: Suppose there are a number n of events which can occur and cause damages. For an event indexed i, let C_i denote the monetary value of the damages due to event i.[1] Let $C_1,...,C_n$ denote the vector of all damages related to hazardous waste management activities at a site.

Each event is probabilistic; let P_i denote the probability that event i occurs. It is convenient to view the regulation as impacting on the probabilities alone, so each P_i depends on whether or not regulations have been

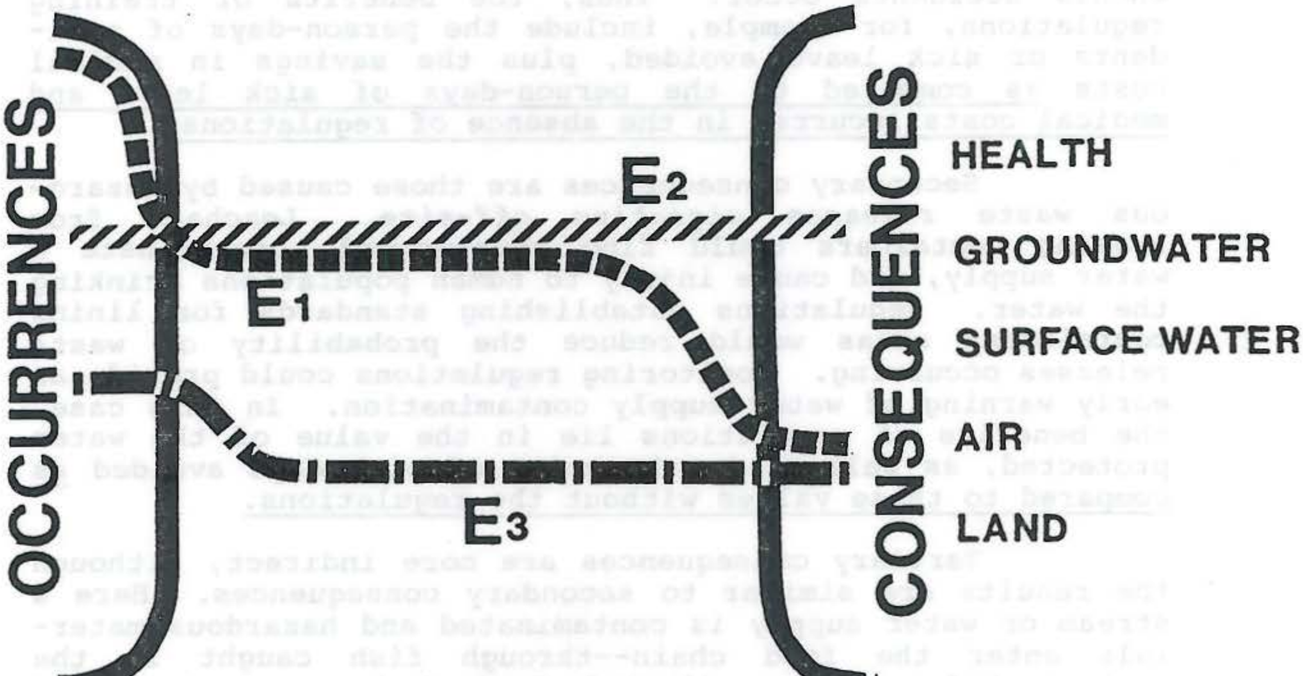

OCCURRENCES
E2
E1
E3
CONSEQUENCES
HEALTH
GROUNDWATER
SURFACE WATER
AIR
LAND

FIGURE 3.3

promulgated and enforced. Neglecting enforcement for the moment, we write $P_i(O)$ to be the probability that event i occurs given no regulation and $P_i(1)$ to be the probability that event i occurs given regulation.

If the number of events considered is sufficiently large, this representation can capture the effects of a regulation designed to reduce the damages resulting from a particular initiating factor. For instance, if a regulation lowers the damages from an earthquake, this can be represented as letting event j be an earthquake with greater damages and letting event k be an earthquake causing lesser damages; i.e., $C_j > C_k$. In this case, the benefits of the regulation can be viewed as a reduction in P_j and an increase in P_k.

Figure 3.4 summarizes this condition. The disbribution of damages shifts to the left following regulations. The probability of the higher damage event, j, decreases, while the probability of the lower damage event, k, increases.

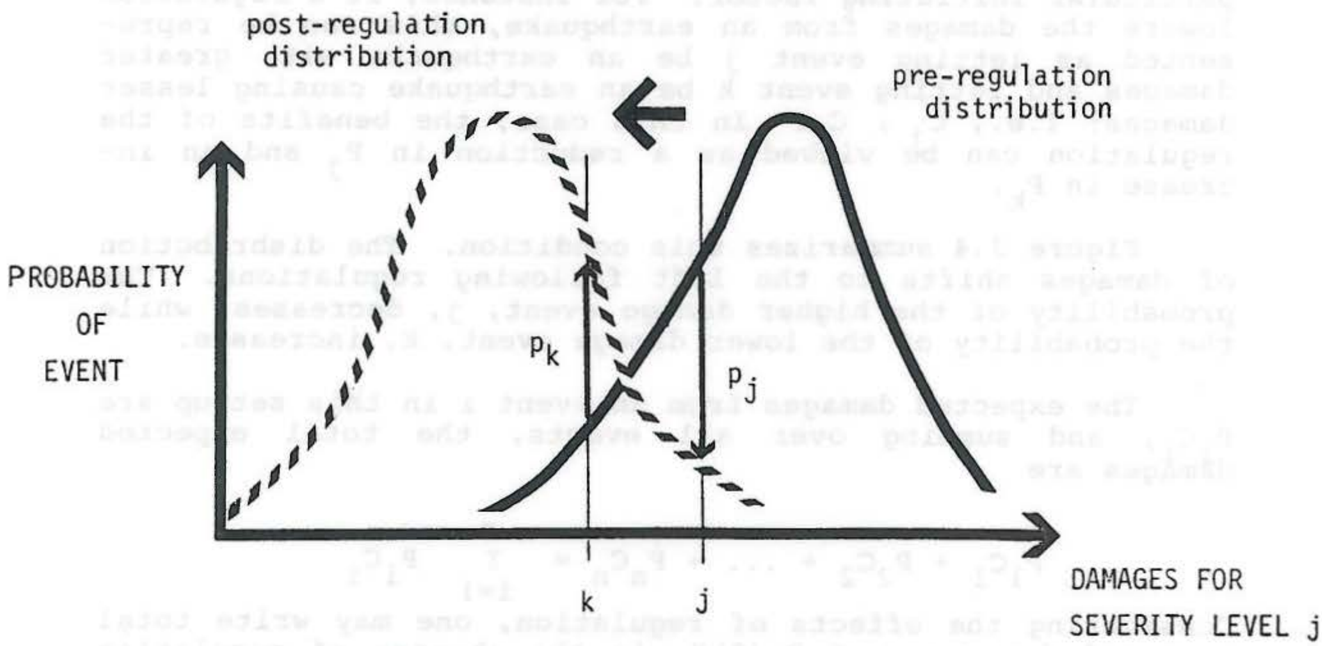
The expected damages from an event i in this set-up are P_iC_i, and summing over all events, the total expected damages are

$$P_1C_1 + P_2C_2 + \ldots + P_nC_n = \sum_{i=1}^{n} P_iC_i$$

Considering the effects of regulation, one may write total expected damages as $\Sigma P_i(O)C_i$ in the absence of regulation and as $\Sigma P_i(1)C_i$ when regulations exist. One measure of the benefits of the regulations is then the reduction in total expected damages which is $\Sigma P_i(O)C_i - \Sigma P_i(1)C_i = \Sigma [P_i(0) - P_i(1)] C_i$

Measuring benefits as the expected reduction in total damages implicitly neglects insurance aspects of the regulation and is thus likely to understate the true benefits of the regulation. In particular, it is generally acknowledged that people dislike taking risks. For instance, individuals commonly purchase actuarially unfair insurance -- that is, they pay insurance premiums greater than the expected reduction in damages that they would suffer without insurance -- in order to avoid the uncertainty of being uninsured. This indicates that individuals considered uncertainty to be a "bad" in itself.

For the problem at hand, it seems likely that one effect of the regulation of hazardous waste disposal is to reduce the probabilities of very large losses and to thereby reduce the degree of uncertainty of people who might suffer losses due to accidents occurring with waste disposal. In principal, this creates additional benefits of the regulations over and above those reflected by the reduction in total expected damages. An intuitive view of these



DAMAGE PROBABILITY DISTRIBUTION SHIFT

FIGURE 3.4

additional benefits can be gained by considering an individual with total wealth of $100,000 who suffers damages due to improper disposal of hazardous wastes. The question to consider is whether the individual would regard the loss of all of his wealth to be ten times as serious as losing only $10,000 of his wealth, or whether being "wiped out" would actually be more than ten times as serious. If being wiped out would affect the individual more than ten times as much as losing $10,000, then the individual is "risk-adverse." In this case, regulations which reduce the likelihoods of very serious damages will have an insurance value <u>over and above</u> their value in reducing expected damages.

At any rate, the technical data required to calculate accurately even the expected reduction in damages due to hazardous waste disposal simply do not exist. There are three reasons why this is so. First, assessing the probabilities of different events (i.e., the P_i's) in the first place--with or without regulation--is impossible given the current state of knowledge. A single event is in reality a complicated combination of meteorological, hydrological, chemical, physical, and biological phenomena which is difficult merely to describe <u>precisely</u>, let alone assign its probability.

Second, the total number of such possible combinations -- that is, the total number (n) of possible events to be considered -- is enormous. Simply writing down exact specifications of all of the possible ways in which damages could arise is a task beyond the capability of present analytical techniques. This problem is not limited to hazardous wastes of the type covered by RCRA or RCRA-like regulations on state and local levels. The problem also surfaced in an important way in the Rasmussen report, which attempted to calculate expected environmental damages from incidents at nuclear power plants.

Third, enforcement of the regulations by the authorities and compliance with the regulations by owners and operators of disposal sites (and by other regulated parties) are intertwined. Presumably, site owner/operators have interests which at times are different than the regulators'. Otherwise, there would be no need for regulations in the first place. If owner/operators find it more profitable not to follow the regulations then they will have an obvious incentive not to fully and immediately comply. Consequently, the extent of compliance with regulations will be a complex function of the extent of enforcement. One might expect more enforcement to lead generally to better compliance, but in a way which cannot be determined without quite extensive research.

Thus, the probabilities of each event, given the regulation, in fact depend on the level of enforcement. In symbols, $P_i(1)$ should be $P_i(e)$, where $P_i(e)$ captures the complex functional relationship wherein changes in enforcement (e) influence the probability that event *i* occurs and P(o) accounts for whatever control occurs without regulation.

As far as the present study is concerned, the problem is that we lack data both on the extent of enforcement (e), and on the way that this influences the probability of occurrence of event *i*, i.e., on the relationship $P_i(e)$. To some extent, this data gap is due to the fact that the regulations are relatively recent and hence that observations of behavior under the regulations are scant (in a statistical sense). As well, the gap is due to the fact that to our knowledge no studies exist which (1) attempt to operationally define and measure the level of enforcement and (2) assess the impact of the level of enforcement on compliance.

As a result of these three factors, it is virtually impossible to calculate from this type of model the benefits of regulation as measured by the expected reduction in total damages. Since the difficulties lie with assessing the probabilities of different events and with enumerating and specifying exactly what all of the events are, we shall in this study adopt the strategy of focusing on a small number of plausible scenarios which could generate significant damages. It should be emphasized that the scenarios we consider, though plausible, are doubtless extremely low-probability events. As well, the nature of the data inadequacies discussed above suggests that it would be largely meaningless to calculate losses under these scenarios to more than one or two significant figures. What is important in this context, as shall be seen, is the relative magnitude of the losses.

Generally speaking, there are two types of useful information which the analysis may provide:

(i) The analysis gives calculations of the benefits of RCRA specific to a particular site (Simi Valley or Casmalia) conditional upon the scenario's being prevented by the regulation. That is, if a particular scenario were to occur and generate losses of X dollars without regulation, then we know that if RCRA is enforced sufficiently to make the scenario impossible -- which is equivalent to reducing the damages to zero -- then the benefits of RCRA are X dollars. Of course, it may be that enforcement (and consequent compliance) would actually be less complete, or that even with full compliance the sequence of initiating factors in the scenario would still lead to some damages. In this case, the benefits of the regulation would be less than X dollars. As well, it should be kept in mind that assessing benefits in this way involves considering an event which actually occurs. This does not correctly measure the expected benefits of the regulation, which also takes account of the (probably very low) probability that the scenarios we consider would occur at all.

(ii) This "assessment of scenarios" provides important general information about which regulatory components are likely to be important. That is, if the most serious plausible scenarios still indicate relatively small losses, then excessive regulations may generate compliance costs which exceed benefits even under optimistic assumptions about the ultimate benefits of the regulations on the environment.

3.2.4 Specific Methodological Considerations for this Study

A number of specific considerations concerning the two sites involved in this study deserve mention:

(i) The Simi Valley site has been run by a public agency while the Casmalia site is privately owned and operated. One might therefore expect that Simi would be better run from an environmental point of view than Casmalia since the latter site's operators are interested in maximizing or maintaining profits, while the former site is (or was) under no such constraint. However, the evidence clearly indicates that Casmalia's operation is at least an environmentally sound as Simi's.

(ii) The Casmalia site is near Vandenberg Air Force Base. As a result, improper disposal procedures, or even proper ones combined with unlucky circumstances, may have impacts on Vandenberg. The most likely impact is on cattle grazing on portions of Vandenberg close to the Casmalia site. These cattle are slaughtered and sold at Vandenberg to military personnel. However, due to data limitations, we have not considered impacts on Vandenberg from the Casmalia site, so the calculations from Casmalia may give scenario-costs which are somewhat too low. In any case, including effects on Vandenberg would not significantly change the conclusions.

(iii) Finally, we will be comparing the Simi and Casmalia sites for a sudden occurrence and a non-sudden occurrence scenario. While these scenarios are not constructed to be absolute worst cases, they do represent what might be considered to be worst "plausible" and for each type of occurrence.

3.3 CHAPTER CONCLUSIONS

Several conceptual hurdles had to be overcome in refining the methodology so that a benefits assessment could be applied to the two study sites. Why and how these departures from an ideal methodology occurred was the subject of this chapter. Three principal conclusions can be stated:

- o Since the California regulations are RCRA-like and preceded the federal regulations, a clean test of the effect of RCRA is difficult;
- o There is considerable redundancy in the regulations which makes it difficult to attribute specific benefits to specific regulations. The concept of scenarios is used to bridge th gap between the regulations and the benefits;
- o The full application of the expected value approach is limited by the inability to determine probabilities.

CHAPTER 3: FOOTNOTES

1. Public Law 94-580, October 21, 1976, amended to the Solid Waste Disposal Act, 42 U.S.C. 3251 *et seq.*

2. SOURCE: 45 FR 33221 and 33232 respectively, May 19, 1980.

3. California State Department of Health Services, Health and Safety Code, Chapter 6.5, Sections 25100 to 25240. See Appendix for law and regulations.

4. U.S. Nuclear Regulatory Commission. "Reactor Safety Study", USNRC report (NUREG-75/014), WASH-1400, October 1975. Main volume, Summary volume, Executive, Appendices, 2nd printing, Dec. 1975 ("The Rasmussen Report")

CHAPTER 4 SIMI VALLEY SITE

4.0 SUMMARY

The history of the Simi Valley facility can be looked at in four time periods and two phases:

	Time Periods	Phases	Regulatory	Operator
I	1970-71	Hazardous Waste Disposed	Local & State	Ventura Co Public Works Dept.
II	1972-80	"	CAL RCRA-like regs applicable	VRCSD
III	1980-82	HW NOT Disposed	CAL RCRA-like regs NOT applicable	VRCSD
IV	1983-present	"	"	CWN

The principal and key events which attracted media and political attention took place during and following the transition from period II to III, and began with the proposal to build an airport over the hazardous waste portion of the site. Subsequent concern over operation of the facility surfaced during the Environmental Impact Review hearings. These concerns were heightened by the local political sensitivity to hazardous wastes being transported to the facility from outside the County, i.e., from Los Angeles. Coincidentally, the OWNER (but not operator) of the site, anticipating its obligations under RCRA, commissioned a series of studies to assess Ventura Regional County Sanitation District's (VRCSD) disposal operations conducted on its property. A number of irregularities and potential hazards surfaced, which received considerable media and local political attention. The operator's credibility became undermined to the point that the property OWNER solicited buyers for its property, and the OPERATOR's Board of Directors refused to support a staff recommendation to purchase the property through eminent domain proceedings.

The OPERATOR, itself anticipating stricter soil permeability requirements in California's RCRA-like regulations, closed down the hazardous waste portion of the site in November 1980. But, the damage, political and otherwise, had already been precipitated; the consequences would continue to unfold over the next two years. In January 1983, Chemical Waste Management (CWM) took over as both new owner and operator of the site -- a site no longer accepting hazardous wastes. Moreover, in what CWM regarded as a retaliatory move, VRCSD withdrew its part A RCRA application, removing the possibility that CWM could operate it as a Hazardous Waste Facility.

At the present moment, and with CWM having taken over as the owner and operator, local public concern has subsided considerably, whatever potential damage could still occur -- and this is open to much question -- is no longer perceived to be as threatening or as probable.

Whatever the facts surrounding the magnitude and probability of hazards, the following feature of this "drama" seem to have retained significance:

(1) As to the potential for hazards:

- o PCB's were stored without a permit;
- o Incompatible and/or potentially leachable materials were stored in several cells in the Class 1 portion, which could create dangers of fire, explosion, release of toxic vapors and gases, or generate toxic leachates;
- o The area underlying the site is faulted, and there are major faults in the vicinity;
- o Groundwater flows from the site to the developed and urbanized flood plain below;
- o Saturated waste deposits are in contact with the underlying permeable alluvium and permeable beds of the Sespe formation;
- o Some test wells have not been properly constructed, sealed or destroyed as required by Ventura County ordinance standards;
- o Infiltration into the buried wastes has occurred, necessitating conditions, in the Closure phase, of infiltration control and run-off control, in addition to appropriate cover and run-on diversion structures.

(2) As to the evidence of damage:

- o At this time, groundwater quality is considered too low for drinking or other purposes;
- o Groundwater recharge to the landfill has not been demonstrated;
- o At most, slow movement of leachate in the Sespe is 0.5 feet/year, 1,500 feet/year in the alluvium;

- o Low concentrations of organic constituents in groundwater within the Sespe below the landfill and immediately off-site, which indicates that leachate may have percolated into the regional goundwater system;

- o There is no evidence of health effects or injuries, accidental or otherwise, due to exposure to hazardous waste constituents, at any time during the entire operaton history of the facility, to humans, domestic livestock, or wildlife.

(3) Because the Simi Valley site is no longer a RCRA-like site, the revised Waste Discharge Requirements do not call for a revised Closure and Post-closure Plan and attendant financial closure estimates. The Plan prepared by VRCSD in 1981 is the only existing one, and this has been deemed inadequate by the RWQCB. Nor is CWM required to prepare a Hazardous Waste Safety Manual, a Written Analysis Plan, Contingency Plan, or provide Emergency Training, as was applicable under VRCSD's period of operation.

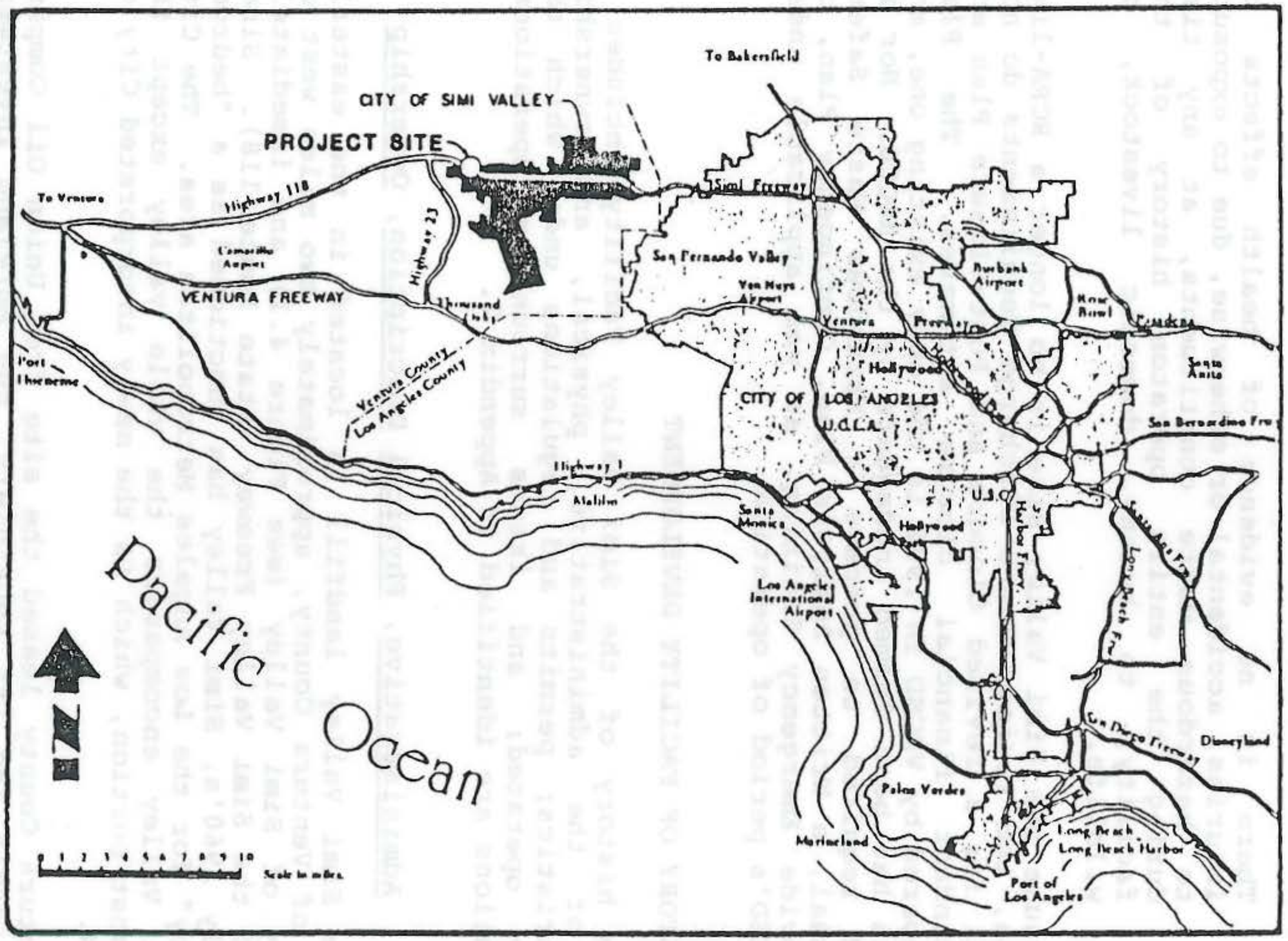
4.1 HISTORY OF FACILITY DEVELOPMENT

The history of the Simi Valley Facility includes a review of the administrative, physical, and ownership characteristics; permits and regulations under which the facility operated; and issues surrounding operations. Abbreviations are identified in Appendix 2.

4.1.1 Administrative, Physical Description, Ownership

The Simi Valley landfill is located in the easterly portion of Ventura County, approximately two miles west of the City of Simi Valley (see Figure 4.1) and immediately north of the Simi Valley Freeway (State Route 118). Since the early 1960's, Simi Valley has functioned as a "bedroom community" for the Los Angeles Metropolitan area. The City of Simi Valley encompasses the whole valley except the westernmost portion, which is the newly incorporated City of Moorpark.

Ventura County leased the site from Union Oil Company of California and its subsidiary, the Moreland Investment Company, in January of 1970. During the first year of the operation, the Ventura County Public Works Department operated this facility. Hazardous wastes were disposed during that time. When the Ventura Regional County Sanitation District (VRCSD) was created, it took over site operations from the County. The site was operated by the



Source: PRC Toups, "Environmental Impact Report, Simi Valley West End Industrial Area Specific Plan," March 1983, p. II-3.

REGIONAL LOCATION MAP

Figure 4.1

Ventura Regional County Sanitation District from 1972 to January 1983 when Chemical Waste Management (CWM), took over operation of the site.

The landfill site covers an area of 230 acres (volume 10,800,000 cubic yards). The site was formerly divided into a Class I (hazardous waste) landfill (75 acres) and Class II and III areas (155 acres). Of the 75 acre Class I portion, approximately 45 acres have been used for waste disposal. The remainder is generally unusable due to the hilly terrain. (See Figure 4.2 and 4.3)

Between 1970 and 1980, hazardous wastes were deposited at Simi. In anticipation of RCRA regulations, and responding directly to a new California permeability standard, the operators followed a request by the owners of the site, Union Oil Comany/Moreland Development Company, to cease hazardous waste activities until comprehensive studies could be undertaken to determine whether the site was in conformance with existing State Water Resources Control Board regulations and Minimum Standards.

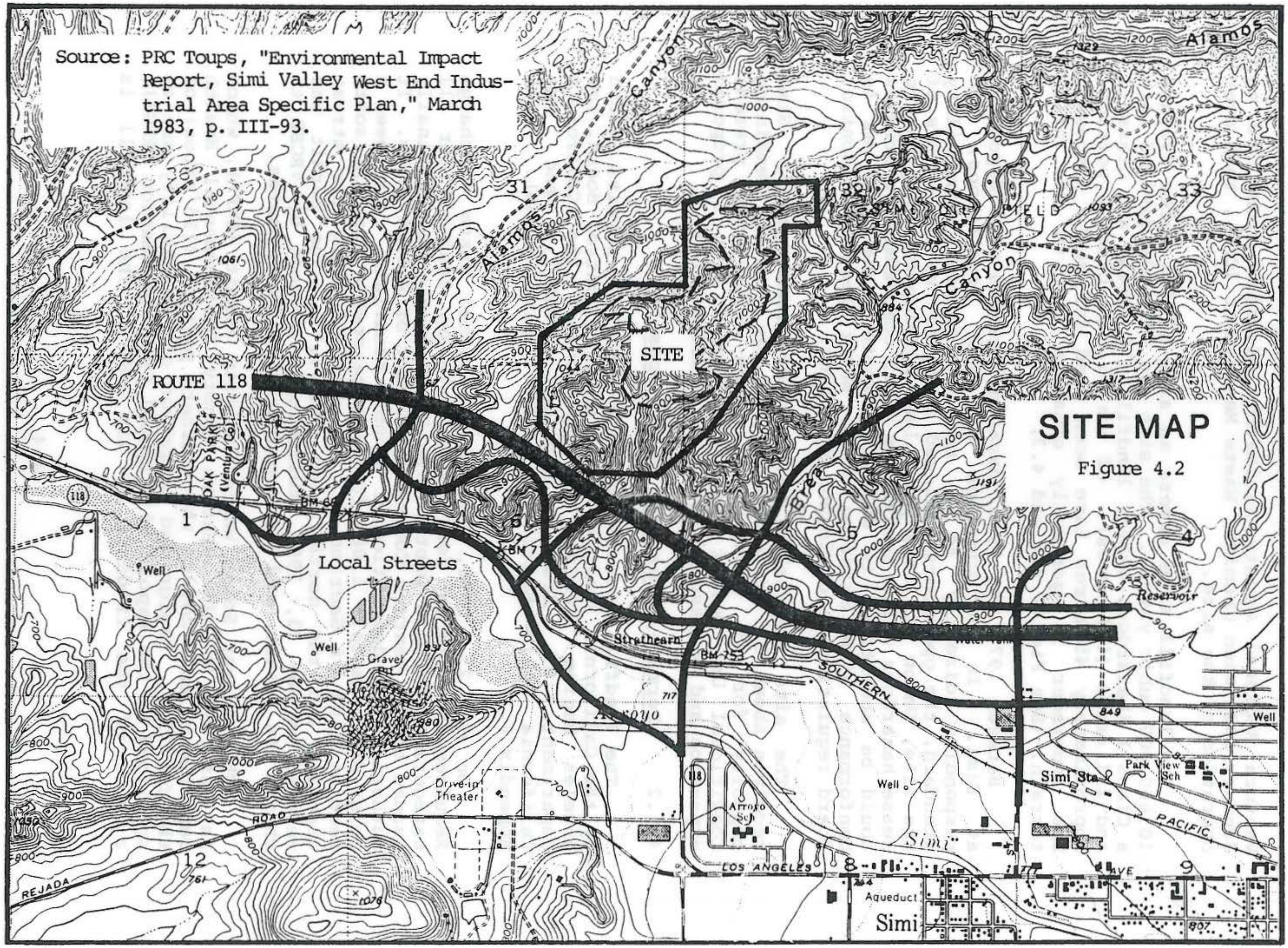
The site now takes only nonhazardous wastes. Simi receives about 635 tons of waste per day, and has remaining capacity for at least five years under the present Conditional Use Permit (up to 25 years with a proposed expansion and corresponding permit modification).

4.1.2 Permits, Operating Regulations

The landfill operated under a series of permits issued by the California Regional Water Quality Control Board, Los Angeles Region (RWQCB); Ventura County; the California Department of Health Services (DOHS); and the California Solid Waste Management Board (SWMB). (See Appendix 4.1)

On May 27, 1970, the RWQCB adopted Waste Discharge Requirements (WDR's) for the Simi Valley landfill for all categories of solid waste. The RWQCB Permit was originally issued to the Ventura County Department of Public Works. It authorized the deposition of Group 1 materials "...between a point approximately 1,000 feet northeasterly from the south section line of Section 31, as measured along the stream channel, and the north ridge line..."[1]. The permit was revised on May 23, 1983, following a request by VRCSD to change its status, and now prohibits hazardous wastes.

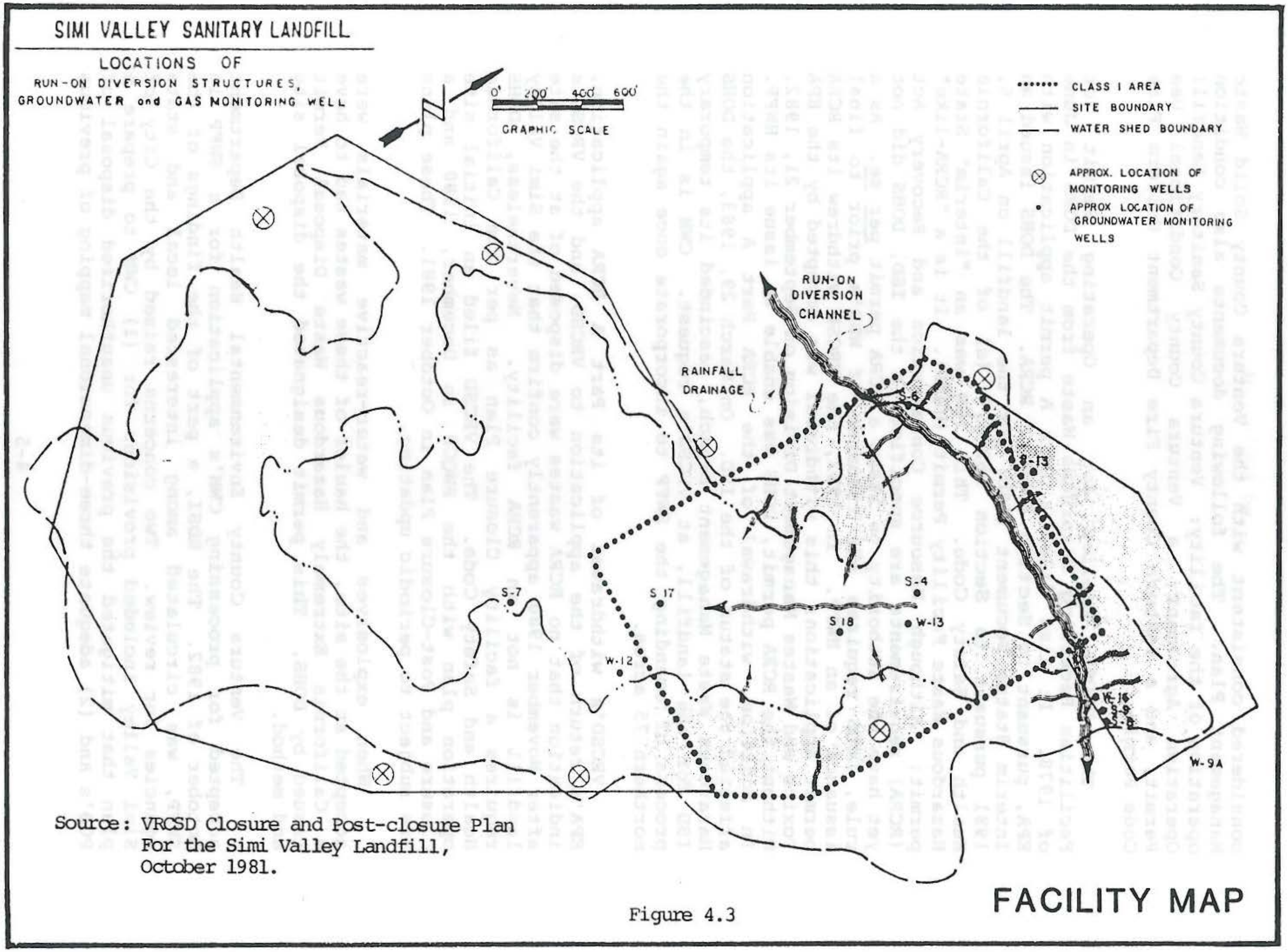
The current Solid Waste Facility Permit (SWFP), which is enforced by the Ventura County Environmental Health Department, only covers the southern portion (155 acres) of the facility. Design and operation of the facility are as specified by the Report of Disposal Site Information (RDSI), a part of the findings of the SWFP. The landfill is



Source: PRC Toups, "Environmental Impact Report, Simi Valley West End Industrial Area Specific Plan," March 1983, p. III-93.

SITE MAP

Figure 4.2



Source: VRCSD Closure and Post-closure Plan For the Simi Valley Landfill, October 1981.

Figure 4.3

considered consistent with the Ventura County Solid Waste Management Plan. The following documents also condition operation of the facility: Ventura County Sanitary Landfill Operation Agreement; a Ventura County Conditional Use Permit, and a Ventura County Fire Department Uniform Fire Code Permit.

The VRCSD applied for an Operating Permit for Facilities Receiving Hazardous Waste from the DOHS in June of 1978. It also filed a Part A permit application with EPA, pursuant to Section 3005 of RCRA. The DOHS issued an Interim Status Document (ISD) for the landfill on April 6, 1981 pursuant to Section 25200.5 (a) of the California Health and Safety Code. This ISD was an "interim" State Hazardous Waste Facility Permit (HWFP). It is a "RCRA-like" permit: Although Resource Conservation and Recovery Act (RCRA) requirements are specified in the ISD, DOHS did not yet have the authority to issue a RCRA permit per se. As a rule, DOHS requires the issuance of WDR's prior to final issuance of an HWFP. In 1982, the VRCSD withdrew its RCRA permit application; this withdrawal was accepted by the EPA Toxics and Wastes Management Division on September 21, 1982. Without the RCRA permit, DOHS was unable to issue its HWFP. In addition, withdrawal of the RCRA Part A application affected the status of the ISD. On March 29, 1983, the DOHS Hazardous Waste Management Branch, rescinded its temporary ISD for the landfill, at VRCSD's request. CWM is in the process of amending the SWFP to incorporate once again the northern 75 acres.

VRCSD's withdrawal of its Part A RCRA application, EPA's return of the application to VRCSD, and the VRCSD's indication that no RCRA wastes were disposed of at the site after November 1980 apparently confirm that the Simi Valley landfill is not an RCRA facility. Nevertheless, DOHS requires a facility Closure Plan as per the California Health and Safety Code. The VRCSD filed an initial site operation plan with the RWQCB in December, 1980 and a Closure and Post-Closure Plan in October 1981. These plans are subject to periodic updating.

When explosives and water-reactive materials were accepted at the site, the hauler of these wastes had to have a California Extremely Hazardous Waste Disposal Permit issued by DOHS. This permit designated the disposal site and method.

The Ventura County Environmental Health Department accepted for processing CWM's application for a SWFP in October of 1982. The RDSI, a part of the findings of the SWFP, was circulated among interested local and state agencies for review. Two concerns raised by the City of Simi Valley included provisions for (1) CWM to prepare a plan that mitigated the previous unauthorized disposal of PCB's and (2) adequate three-dimensional mapping of previous hazardous waste disposals. With regard to the first concern, no permitting authority existed prior to 1979 for the disposal of PCB's. CWM has derived approximate elevations and locations of the PCB's that were deposited previously. The second concern, mapping, has not been addressed *per se*. The City has declined to take positive action in pursuit of three-dimensional mapping because of high costs and technical difficulties. However, the City is keeping its options open in the event any of the current testing indicates the need for subsequent mapping. Comprehensive two-dimensional mapping was performed by SCS Engineers, under contract to Moreland, in 1980. Due to the absence of detailed records indicating when, in calendar time, wastes were disposed of at the facility, it is impossible to provide three-dimensional mapping of these activities. The SWFP was issued to CWM on December 28, 1982.

4.1.3 Issues

4.1.3.1 Airport

The Simi Valley City Council began in the mid- 1970's to support efforts for the creation of a municipal general aviation airport. In 1977, a "Simi Valley-Moorpark Airport Needs and Site Evaluation Report" was prepared. In early 1980, the Council accelerated its actions when the existing Santa Susana Airport was sold as industrial park property, thereby assuring its closure.

A Simi Valley New Site Master Plan was prepared in 1980, which described a proposal for a general utility airport to be located northwest of the existing city limits at the northerly end of the landfill site. The 130-acre airport would have included a single paved runway 4,000 feet long and 75 feet wide with parking for up to 400 aircraft. Runway, taxiway, and terminal areas would have been constructed on a ridgeline on the north end (11 acres) of the landfill.

An Environmental Impact Report (EIR)/Environmental Assessment (EA) for the Airport Master Plan was also prepared (November 1980). This EIR was prepared by the same engineering firm which prepared the Airport Master Plan. There ensued a question on the legality of the same firm preparing both reports. Although the EIR was certified in October 1980, its adequacy was challenged by three citizens' groups on several counts.

One of these issues was that the suitability of constructing an airport over a Class I landfill was not adequately addressed in the EIR, and that the appropriate agencies which would have to deal with this issue were not properly consulted. In addition, the VRCSD, operators of the landfill at that time, had not commented on the inappropriate treatment given to this issue.

The ownership change to CWM and the possibility of future modification of the site operation interfering with the proposed airport activities was also an issue. Before other uses could have been made of the landfill site, it would have had to have been closed in accordance with RWQCB Waste Discharge Requirements and the California Administrative Code's section on Waste Disposal to Land.

In the spring of 1981, a judge found the EIR to be inadequate. Therefore, the City Council rescinded certification of the EIR.

The City Council reinitiated the EIR work program in October of 1981 with considerable citizen input. A new Draft EIR was released in March of 1982. An April 27, 1982 letter from the VRCSD to the State EIR Clearinghouse indicated a detailed discussion of the technical problems to be faced in building an airport on a Class I site had to be addressed, including the effects of a possible change in ownership and operations. The new Final EIR was certified by the City Council on July 19, 1982.

At the same time the airport proposal was being reviewed, serious questions came to light regarding the nature of the materials being deposited at the landfill, site geohydrology, and disposal operations. The findings of a series of reports prepared from April 1980 to early 1981 raised serious concerns over potential migration of wastes and public health hazards.

The airport issue served to galvanize public protest in Simi Valley. Prior to the airport proposal, the landfill had never been a subject of public controversy. Due to the serious questions raised about the appropriateness of sitting an airport over a landfill with possible waste migration problems, the airport proposal has been put on hold. The City Council wants to know more about the environmental status of the site before any further action is taken. At the present time it appears that the airport proposal is no longer viable.

4.1.3.2 Class I Controversy

In 1980, Federal regulations for landfill design and operation were released by EPA pursuant to the 1976 Resource Conservation and Recovery Act (RCRA). These comprehensive regulations dictated the responsibilities and obligations of owners as well as operators of hazardous waste disposal facilities. As a result, Moreland Investment hired several consultants to undertake an objective and critical analysis of VRCSD's disposal operations conducted on its property. (See Appendix 4.3.) One specific study was commissioned to determine the types and quantities of wastes disposed in each cell at the site over VRCSD's nine years of operation.[2]

The consultants advised Moreland that several of the cells in the Class I site probably contained mixtures of wastes which were incompatible, wastes which were unstable, and/or others which were potentially leachable. They further advised that in some of the cells, the above constituents could create dangers of fire, explosion, release of toxic vapors and gases (including hydrogen cyanide), and generation of toxic leachates.

VRCSD was asked to consider the constituents of each of the cells in the Class I site,[3] and to respond to the following three principal concerns:

1. Disposal of incompatible wastes in 22 specific disposal cells;
2. Disposal of acid and cyanide in cell 22; and
3. Landfilling of Group 1-B explosives and water reactive material.

VRCSD replied as follows:

Concern 1: Incompatible Wastes

VRCSD's evaluation showed that incompatible wastes had been buried in most of the 22 cells at some time in the nine-year period. However, VRCSD indicated that it had used proper disposal techniques to ensure that incompatible wastes were never buried where they could react with one another. Reactive materials, such as strong acids and caustics, oxidizers, water-reactive chemicals, and cyanides were always buried separately and away from any possible non-compatible materials, using sound practices and under strict supervision. Examination of quantities of priority pollutants (reactive wastes) disposed of from 1971 to 1980 in the 22 cells, in comparison to non-reactive wastes disposed of in the same cells, showed a dilution ratio in excess of 60 to 1.

Concern 2: Acid and Cyanide

A dilute bulk load of spent acid waste with a pH of four was received. The waste was spread onto the land surface with subsequent tilling. The physical processes of evaporation and absorption into the caustic soil matrix rendered the waste neutralized and harmless. Two and one-half months later, drums of cyanide sludge were received and disposed of in Cell No. 22. It was immediately covered with an excess of non-contaminated soil.

Concern 3: Group 1-B Explosives

According to the VRCSD, it was in compliance with the requirements and permits of the SWRCB and DOHS regarding the disposal of Group 1-B explosives and water reactive wastes. The required disposal method for these wastes was implemented and no safety problems existed.

The VRCSD suspended receipt of Group 1 wastes as of November 19, 1980, pending completion of geohydrologic investigations and evaluation by all interested parties. Under a special waste handling and disposal plan submitted by VRCSD and approved by the RWQCB Executive Officer in December 1980, the site continued to receive limited and selected types of liquid wastes and sludges, primarily sewage sludges from the District's operating sewage treatment plants.

The State Water Resources Control Board (SWRCB) regulations for land disposal of non-sewerable and hazardous wastes were amended in 1980 by setting additional standards and guidelines for classification of land disposal sites. In February of 1982, the RWQCB indicated the site did not meet the SWRCB's new permeability guidelines. These guidelines allow Class I sites to be underlain by usable groundwater only under exceptional circumstances. One of the performance standards which must be met is for the permeability of materials underlying a site to be 1×10^{-8} cm/sec or less. Under portions of the Simi Landfill, the permeability of the Sespe formation exceeded this standard by a factor of $1,000^{4}$.

During this period, Moreland commissioned a hydrogeologic investigation of the site to determine whether past operations had detrimental environmental impacts. Although the full investigation was not completed according to the scope of work recommended by the consultant, concerns were raised over potential migration of wastes. As a result of these concerns, on March 22, 1982, the Executive Officer of the RWQCB issued an order prohibiting the disposal of hazardous wastes until the environmental status of the site was fully determined. The RWQCB also directed that the impoundment which had previously received liquid waste be back-filled and brought up to grade to prevent ponding, and that written confirmation of these actions be submitted. VRCSD responded that by April 30, 1982, it would phase out receipt of all liquid and Class 1 wastes. To Ventura County Resource Management Agency's knowledge, VRCSD did not send confirmation[5] that the pond had been or would be back-filled.

On July 9, 1982, it came to the attention of the DOHS that one ton of PCB's had been accepted in the Class I area between 1971 and 1980. The DOHS indicated that the VRCSD had no permit from state or federal regulators to allow storage of PCB's, and that it would investigate. VRCSD would have to (1) obtain a permit to bring the storage of PCB's into compliance or (2) obtain a permit to dispose of PCB's. The VRCSD had not applied for a retroactive permit prior to the termination of its operations.

On July 14, 1982, the Simi Valley City Council passed Resolution No. 82-81 regarding the landfill. The resolution cited the various reports on the site and requested that the County Board of Supervisors take immediate action to investigate "a very significant potential public health hazard."[6] The Board then directed its staff to request that the DOHS and the RWQCB determine whether a problem existed.

To answer questions about waste migration, the new owner, CWM, commissioned a study of the hydrogeologic setting, identification of primary groundwater flow directions, recommendations for groundwater protection and monitoring, and the feasibility of treatment and disposal of oil field wastes (for which CWM has filed preliminary design plans). On January 18, 1983, CWM, through its consultants (EMCON Associates), submitted a draft report to the RWQCB entitled <u>Environmental Status and Groundwater Protection Plan, Simi Valley Disposal Facility</u>. The report presents the results of the environmental assessment and a recommended groundwater monitoring program and the protection plan for the landfill. As a result of this and other studies, conducted by CWM, following those initiated by CWDD, CWM feels confident that it has found (1) no threat of groundwater contamination; (2) no off-site migration of hazardous components; and (3) no recharge from regional groundwater table.

Revised WDR's approved on May 23, 1983, by the RWQCB, addressed many of the concerns raised by the County and the City of Simi Valley. The features of the revised WDRs of particular interest include:[7]

1. The placement of Group 1 wastes, hazardous wastes, and toxic wastes at the landfill site are prohibited, except as modified by a special condition. This condition would permit the acceptance of oil field wastes or other non-hazardous liquid wastes if pending investigations demonstrated that acceptance of such wastes would not degrade the waters of the State (i.e., ground water and off-site surface water).

2. All leachate from the site must be intercepted and pumped out when detected, and disposed of at a legal disposal site. Leachate collected from the site may be used on internal roads for dust control, or placed with surface improvements for solar evaporation. For the purpose of this requirement, the work program filed with RWQCB to mitigate the leachate problem must be implemented.

3. A field exploratory work program must be submitted to RWQCB to further define regional groundwater conditions, to develop and implement a comprehensive groundwater monitoring program, and to determine any mitigation measures that may be necessary.

4.1.3.3 Change In Ownership

The Simi Valley Landfill was originally leased by the County of Ventura for a period of 18 years beginning January 1, 1970 and ending December 31, 1987 with an option to terminate after 13 years. The County established the site as a Class I facility and in 1972 transferred the leasehold to VRCSD which assumed the operation of all publicly-owned sanitary landfill facilities in Ventura County. Until January 8, 1983, the landfill was operated by VRCSD on lands owned by the Moreland Investment Company, a subsidiary of the Union Oil Company. At that time, title was transferred to Chemical Waste Management, Inc., which assumed responsibility for operation of the disposal site. CWM is a wholly-owned subsidiary of Waste Management, Inc.

The sale of the landfill to CWM was the culmination of several years of negotiations with other potential buyers and operators. In November of 1981, the VRSCD Board directed that an offer be made to Moreland to buy the site. This offer was not accepted. At that time the VRCSD had a strong commitment to continue landfill operations. There was discussion by the District regarding possible condemnation proceedings if a serious threat to the District's continued use of the site emerged. In August of 1982, a special meeting of the VRCSD Board was held which questioned the District staff's ability to continue operating the site. On September 16, 1982, the Board considered a "Finding of Need and Public Necessity" to acquire the site under eminent domain. At this meeting the VRCSD Board declared that it could not support acquisition of the site. The Board vote was one shy of the required two-thirds majority. Therefore, the Board did not approve the condemnation proposal, and the site was sold to CWM.

It is CWM's point of view that VRCSD did everything possible to dissuade CWM from purchasing the site, and to dissuade Union/Moreland from selling the site to CWM. This included the threatened condemnation of the property to maintain VRCSD control. CWM further viewed VRCSD's request to EPA to return its part A application as a tactic to prevent CWM from operating the site as a hazardous waste disposal facility.

4.2 SYSTEM DEFINED

4.2.1 The Physical Site and its Geohydrology

The hydrogeologic setting of the Simi Valley landfill has been extensively studied. (See Appendix 4.3.) Numerous reports from 1970 on describe details of a data base on groundwater conditions. The most recent report (EMCON Associates, Environmental Status and Groundwater Protection Plan Simi Valley Disposal Facility, January 14, 1983) was used as the general basis for the following section, unless otherwise noted.

4.2.1.1 Physical Description

The landfill is situated within the Transverse Ranges geomorphic province with characteristic east-west trending mountain ranges and intervening valleys. The site is enclosed to the north, east and west by roughly northeast trending ridges. Alamos and Brea Canyons lie to the west and east of the site respectively. These canyons and the site drain towards Arroyo Simi. Arroyo Simi is intermittent, containing surface flow only during and shortly after periods of rainfall, although there are indications that flow may be year-round.

The local and regional hydrology is such that the site is not subject to flooding or washout. The site is located in a limited drainage area. The lowest portion of the landfill is at an elevation of approximately 765 feet, 85 feet above the floor of the Simi Valley.

4.2.1.2 Geohydrology

The landfill is underlain by poorly to weakly cemented interbedded sandstone, siltstone, claystone, and minor conglomerate, assigned to the Sespe formation of Oligocene geologic age. Bedding strikes roughly east-west and dips uniformly to the north at 20 to 35 degree inclination.[8] Alluvial materials on-site consist of sandy brown soils rich in humic matter. Except in the extreme southern portion of the site, these soils are essentially devoid of gravel, cobbles, and other highly permeable materials and are rarely more than ten feet thick.

Several faults have been identified on-site and in the vicinity (See Figure 4.4).[9] Major faults in the vicinity include the San Andreas (active), Santa Susana-Sierra Madre (active), and the Simi-Santa Rosa (potentially active). The Simi fault is located approximately one mile south of the landfill and trends east-west. The Strathern fault (inactive) extends through the center of the landfill, roughly separating the Class I and II areas. The Canada de la Brea fault (inactive) dips under the Class I area. The probability of future surface rupture occurring along these two faults is considered low. However, faulting at the landfill is suspected of influencing groundwater occurrence and movement. Movement toward the valley of groundwater within the bedrock is restricted by the inactive faults.

The site lies within the Sespe formation on the northern limit of the extensive Simi Anticline. The anticlinal structure isolates the site from the alluvial acquifers of Simi Valley and creates a perferential groundwater flow path away from the valley. Regional groundwater flow is from northeast to southwest adjacent to and beneath the site at a gradient of about 170 feet per mile. Groundwater flows from this regional system merge in the Arroyo Simi with westward moving discharge from the western end of Simi Valley. The only direct hydraulic connection between the site and Simi Valley alluvium is through shallow alluvial-filled channels of canyons which drain to the south. Groundwater within a mile or less of the landfill occurs under perched, water table, and artesian conditions. Immediately adjacent to the landfill, groundwater occurs at elevations of 870 to 980 feet, or about 10 to 40 feet below the land surface.[10] At the landfill, groundwater moves both vertically downward and laterally to the southwest. Groundwater levels are variable and seasonally dependent on precipitation.

EMCON determined that the lithology of the Sespe formation plays a major role in the movement of groundwater in the landfill vicinity. Groundwater occurs beneath the site in two distinct aquifer systems:

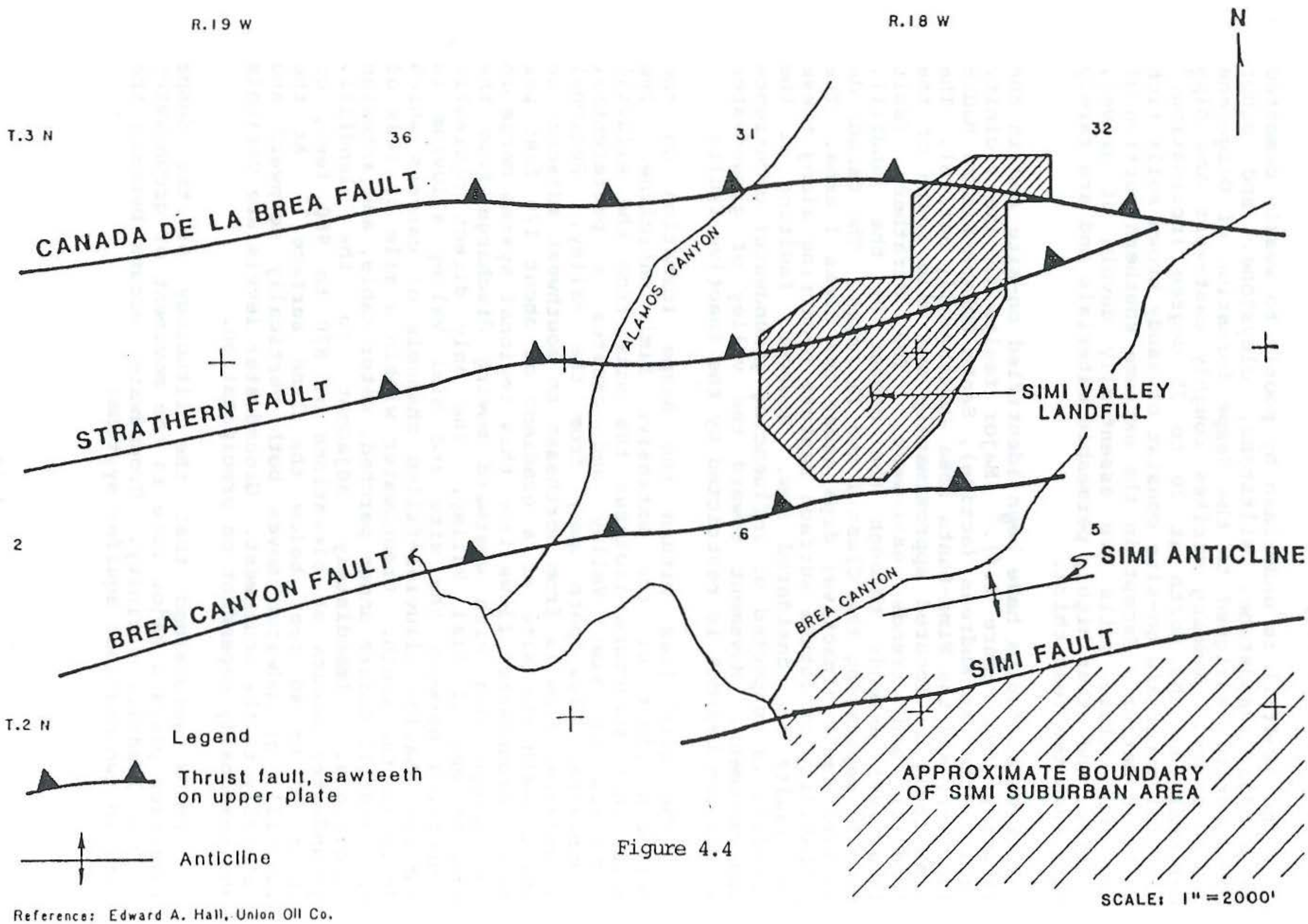


Figure 4.4

Source: Converse Ward Davis Dixon, Inc., "Hydrogeological and Water Quality Investigation", Dec. 1980.

FAULT MAP

- o **Alluvial System** -- Comprised of ground water in the alluvial deposits along the canyon floor; the water in this system moves under a hydraulic gradient parallel to the land surface.

- o **Bed Rock System** -- A series of non-interconnected waterbearing and non-waterbearing beds of the Sespe formation. These beds slope back into the Simi Valley landfill canyon and strike in an east-west direction.

Surface elevations at the landfill range from 760 feet at the lower end to nearly 1,160 feet at the upper end. An ephemeral tributary drainage above the toe of the fill basically conforms in size and shape to the limits of the site. The catchment area for surface water flow into the Class I site amounts to about 50 acres (not including the disposal area which is another 30+ acres). Surface runoff flows generally southwestward. Runoff flowing to the north and west eventually drains to Alamos Canyon, west of the site. (See Figure 4.5.) All other runoff flows to Brea Canyon, east of the site. Both of these canyons open to Simi Valley and drain into Arroyo Simi which flows westward 11 miles to join Calleguas Creek near the town of Somis. Drainage on-site is controlled both temporary and permanent runoff diversion and conveyance facilities, as well as proper grading. A basin located in the southern portion of the site currently serves as a catchment basin for on-site runoff.

Wells

The Sespe formation constitutes a limited source of water supply because of its poor water quality (high total dissolved solids and a calcium sulfate character), insufficient storage capacity, and poor flow characteristics. Groundwater in the Sespe Formation in the landfill vicinity is of poor quality due to:

- o Naturally occurring oil and high salt content (conate) waters.

- o Contamination resulting from the past practice by oil producers of ponding oil production brines for infiltration into the Sespe Formation.

Most of the wells originally drilled in the area have been destroyed or abandoned. Because of the poor water quality, the wells were only used for irrigation, stock watering, or test purposes. The few wells left in the vicinity are currently being planned for permanent sealing by the Union Oil Company.

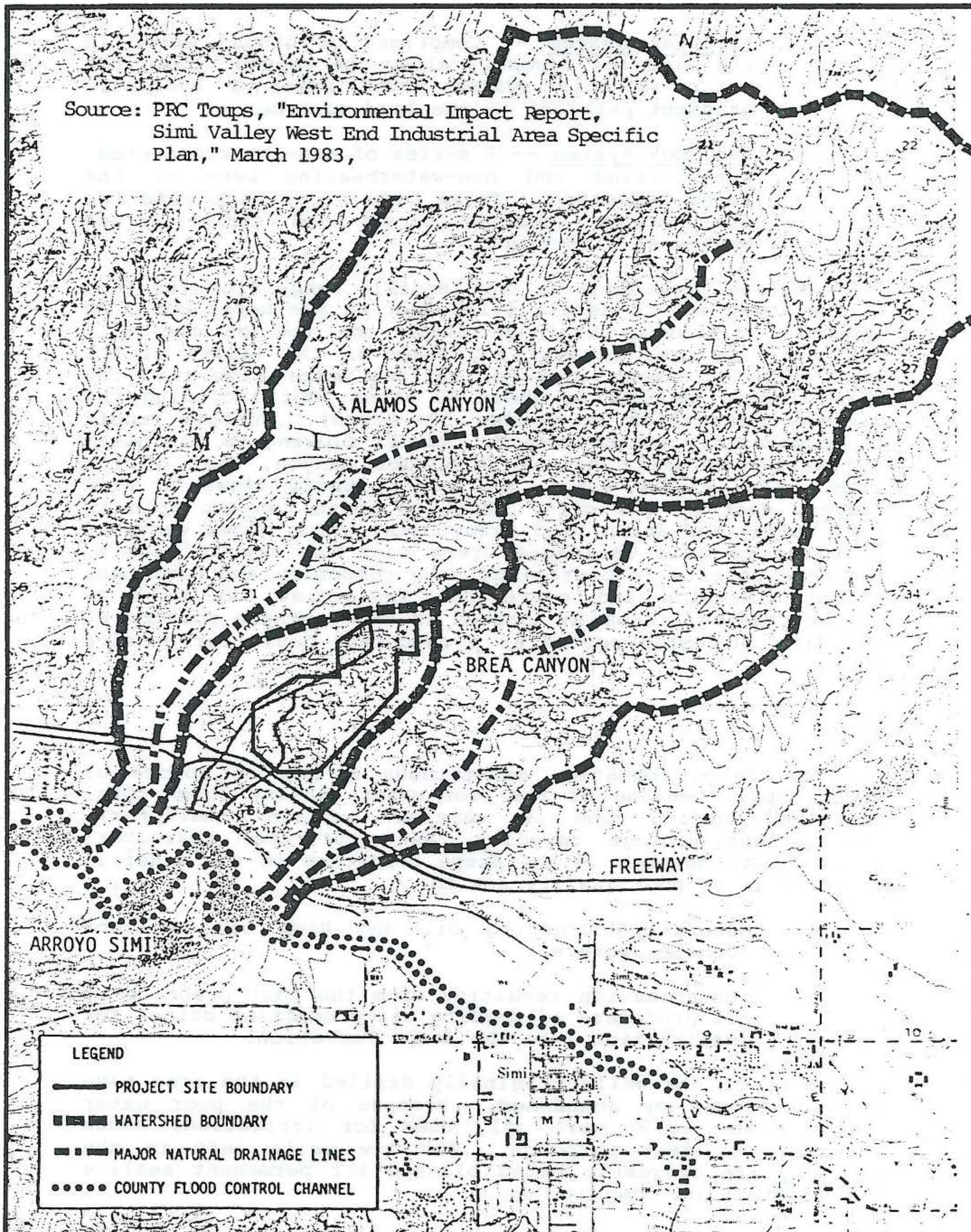


Figure 4.5 **EXISTING HYDROLOGY**

Information concerning groundwater occurrence and development in the pre-operational period is rather limited. A January 1970 study done by the Los Angeles office of the Department of Water Resources concluded that there were no known wells in the proposed disposal area, hence depth to groundwater and groundwater quality were not determined.

A water well inventory was conducted by Converse Ward Davis Dixon (CWDD) in 1980 to estimate groundwater development within a one-mile radius of the Simi site. They reviewed files in the Los Angeles office of the Department of Water Resources and in the Ventura County Water Resources and Flood Control Division. Logs for wells drilled after 1949 are considered proprietary and can be used only with the owners' permission. Most of the wells in the area were drilled after 1949; hence, this ruling limited the records search. Permission was given by the Union Oil Company to review drillers' logs for all water wells on its property. The file search was followed by approximately one week of field reconnaissance to locate wells, measure water levels, and determine present well status (active, inactive, destroyed) and use (domestic, stock, dewatering,* etc.).

Emphasis was placed on locating wells that were adjacent to and hydraulically downgradient from the disposal area. These wells, if any, would be the first to be affected by any off-site contaminant movement. Wells located in areas clearly upgradient from the Class I site in particular were also of interest for background monitoring purposes.

Although numerous wells have been drilled in the westen end of Simi Valley, these are located in the discharge portion of the Simi Valley groundwater flow system and are in areas characterized by upward flow gradients. In addition, the wells are upgradient from groundwater in the area of Brea and Alamos Canyons and the disposal site. Discounting the numerous wells in the upgradient areas, there were approximately 54 wells of record. Of these approximately 20 have been abandoned and 16 more, destroyed. The status of 14 wells was unknown. Only four wells are being used for potable supply. Three of these are hydraulically downgradient from Simi Valley and from the disposal site.

Numerous abandoned and inactive wells dotting the area attest to conditions of poor water quality or yield. Largely because of poor water quality, especially from deeper wells in the Sespe Formation, the wells were primarily used for irrigation, stock watering, or test

* Dewatering in the removal of water from an area to lower the water table level and thereby reduce liquefacation potential.

purposes. Water quality from shallow wells in the alluvium is noticeably better, but well yields are poor owing to inadequate aquifer thickness and storage. Wells in the thicker sections of alluvium, particularly in Arroyo Simi, yield adequate quantities of water of poor quality, and little or no use is made of the water.

In the western end of Simi Valley, and still further westward in Arroyo Simi, very shallow groundwater high in chloride, and occasionally hydrogen sulfide, occurs under artesian conditions. Groundwater flow is upward and westward as well. Discharge occurs naturally as seepage to Arroyo Simi and as evapotranspiration. In addition, the City of Simi Valley operates three dewatering wells installed to lower the water table, thereby facilitating continuing real estate development and safeguarding existing development. Little if any use is made of the deep groundwater because of the high dissolved solids load. Appendix 4.5 contains a map of the location of the dewatering wells and water quality analyses.

The presence of leachate-contaminated groundwater was reported in shallow wells tested near the clay dike at the landfill. Field testing is necessary to determine the in-situ permeability contrast between the alluvial and underlying Sespe (bedrock) deposits near the dike. These tests will provide important data on contaminant transport, if any, in the subsurface bedrock media. The resulting data will further determine the design and construction of an effective leachate control and extraction system to sever any potential hydraulic continuity with the landfill. Groundwater recharge to the landfill has not been demonstrated based on the groundwater levels measured in the existing monitoring well locations.

According to RWQCB, because of sparse and incomplete groundwater quality data, there is only conjecture about landfill-related groundwater pollution which may be attributable to other sources. Thus, it is important to initiate a sampling and analytical program to characterize thoroughly inorganic and organic parameters in groundwater from properly constructed existing and proposed monitoring wells.

4.2.1.3 Waste Leachate Migration Potential [11]

Borings and resistivity soundings indicate that fluids in scattered zones within the Class I area are stratified within the wastes. These fluids are perched in areas where they were spread or ponded and then absorbed in the refuse fill. Attempts to extract fluids from the landfill have been unsuccessful due to their limited mobility. The opportunity for limited quantities of fluids to migrate from the refuse/waste is confined to the following conditions.

- o Contact of saturated wastes with underlying permeable alluvial deposits.
- o Contact of saturated wastes and/or alluvium with the more permeable beds of the Sespe formation.

The alluvium underlying the fill provides by far the greatest potential for collection and transport of any fluids leaving the landfill. In fact, both the relatively high permeability and location at the base (topographically lowest point) of the fill makes the alluvium an ideal natural leachate collection system. Any collected contaminants migrate relatively rapidly to the existing compacted clay seepage barrier at the mouth of the canyon.

Groundwater movement within even the most permeable beds of the Sespe formation is extremely slow (10^{-5} cm/sec). Field test and calculations indicate migration rates of less than 0.5 ft/yr in the Sespe formation, compared with flow rates in the alluvial zone of approximately 1,500 ft/yr. Due to the confined nature of the water-bearing beds, migration of fluids in the Sespe formation is limited to down-dip movement (northward) to the zone of saturation and then along the strike (east-west direction) of individual beds.

The potential movement of groundwater along the strike is influenced by the canyon topography. In the Class II area and most of the Class I area, where steep canyon slopes rise above the landfill, inward groundwater gradients (toward the landfill) are induced along the strike. However, recharge is minimal due to the steep slopes, narrow ridge area, and low permeability of exposed beds. Along the north end of the Class I area, the lower topography east and west of the landfill gives rise to a mild outward gradient along the strike.

The greatest opportunity for migration of pollutants into the Sespe formation occurs in the northeast corner of the Class I area. Here, anomalously high groundwater levels in wells may reflect a residual fluid mound created by past ponding of liquid wastes in the vicinity, or storm runoff waters ponded and entrapped in areas disturbed by previous site activities.

Should pollutants enter selected beds of the Sespe formation, the migration path would mirror groundwater movement and would therefore be confined to down-dip (northward) and/or along strike (east-west) directions. In either case, movement would be extremely slow (0.5 ft/year). In summary, the potential for off-site migration within the Sespe formation is confined to the northern portion of the Class I area of the site, where groundwater piezometric levels (elevations) decrease outward from the waste areas.

Percolation of groundwater occurs downward into the Sespe formation beneath the Class I area. The site is thought to be saturated from a few feet to a maximum of 25 feet, varying with the elevation of the water table and thickness of wastes. Water sampling conducted on the landfill site and within the immediate vicinity indicates low concentrations of organic constituents in groundwater within the Sespe formation below the landfill and immediately off-site, which indicates that leachates may have percolated into the regional groundwater system.[12]

In conclusion, it is necessary to state that there is still significant technical disagreement with regard to the hydrogeological setting of the site and the surrounding Sespe formation. Numerous groundwater monitoring wells have been installed and are being continually monitored under direction of the RWQCB. CWM has proposed a mitigation program if leachate containing chemical constituents becomes a problem. Perhaps the safest statement to make is that firm conclusions cannot be drawn at this time.

4.2.2 Waste Storage/Treatment/Disposal Operating Units

The 230 acre site is divided into three disposal areas to receive different categories of solid waste, identified as Group 1, 2, or 3 waste. Examples of Group 3 wastes include non-decomposible materials such as earth, glass, bricks, concrete, clay and abestos fiber. Group 2 wastes include ordinary residential/commercial rubbish, decomposible organic refuse, and scrap such as street sweepings, wood, lawn clippings, small dead animals, and small quantities of noxious material in mixed loads of rubbish. Group 1 material includes photochemicals, miscellaneous chemicals, grease, caustic, resins, asbestos, and wastewater treatment effluent. Until recently the Simi Landfill operated as a Class I facility, meaning that it accepted Group 1 wastes. As defined by the California Administrative Code, Group 1 wastes "consist of or contain...substances... lethal, injurious or damaging to man, or other living organisms including plants, domestic animals, fish and wildlife...and substances which could significantly impair the quality of usable waters."[13]

Four methods of disposal have been used; landfilling, controlled landfilling (see 4.2.2.3), surface spreading, and impoundment. In 1979, of a total 90,487 tons of Group 1 material accepted, 5,500 tons were hazardous waste. Of the total amount of Group 1 wastes, 1.4% were disposed of by controlled burial (including petrochemicals, solvents, corrosives, pesticides and resin wastes); 0.6% were disposed of by uncontrolled burial (including contaminated soil and sand, grease, paper and rags, and empty containers); and 98% were disposed of by surface spreading (including sewage sludge, brines, mud and water).[14]

The site now receives only Group 2 and 3 solid wastes and no liquids. Dewatered sewage sludge is allowed for disposal only over a designated sludge drying area. The sludge is dried and periodically hauled and landfilled with each day's incoming refuse. The impermeable basin for drying sewage sludge cake was completed in August 1982. The use of the sludge drying basin will allow increased drying times while conveniently handling additional quantities of municipal sewage sludges generated throughout Ventura County. With Regional Water Quality Control Board (RWQCB) approval, the landfill is continuing to provide the County a site for disposal of empty pesticide, herbicide, and fertilizer containers which have been double-washed.

The landfill receives approximately 635 tons of waste per day. As of October 1980, the remaining life expectancy of the landfill was three years. Estimates made in 1982 concluded the landfill could not reach capacity until 1987 or 1989. The new owner (CWM) proposes to expand the area of the landfill operation and increase the depth in certain areas. Thus, the remaining useful life of the landfill will likely be greater than the previous estimates. If expansion[15] is permitted, a 25 year life expectancy could be possible.

Controls are in effect at the landfill against noise, odor, litter, dust, insects, rodents, and fire. Vehicles comply with State and local noise standards and operation of the site is limited to daytime hours (7 a.m. to 4 p.m.). Odors are significantly reduced at night by completely covering the waste at the end of each operating day. Dust from daily cut and fill operations is reduced by sprinkling. No salvaging is permitted. No problems with methane gas have occurred at this landfill.

4.2.2.1 Impoundments: VRCSD Operations

Surface Spreading

A 25 acre surface area is present at the landfill. Only liquid wastes that do not present a hazard to site personel such as sewage sludges, oils and greases, are surface spread. (See Figure 4.6.)

Surface spreading involves the spreading of bulk tanker loads of liquid waste onto the land surface. It takes advantage of evaporation, biodegradation, sedimentation, adsorption, and absorption to concentrate and ultimately dispose of nonhazardous liquids. Evaporation is further increased by decanting the liquid portion and spraying it onto the surrounding land area. This method is currently not in use.

Evaporation Pond

In December of 1980, VRCSD submitted to the RWQCB a special handling plan for the disposal of liquid sewage sludges and other compatible bulk liquids. A specially lined pond was constructed using bentonite as a sealer to provide a minimum of 10^{-8} cm/sec permeability to prevent percolation. The pond is located entirely within the Class I area. The pond covered 0.7 acre and was 10 to 12 feet in depth. A one and one-half foot freeboard was maintained in the pond to prevent overtopping during periods of rain.

In June of 1981, the VRCSD submitted to the RWQCB an Operation Plan for the Spraying of Liquid Waste onto the Simi Valley Landfill Surface and a chemical analysis of the liquid portion of the evaporation pond. The spraying operation began in July 1981. The evaporation pond was decanted and sprayed onto the adjoining landfill surface for evaporation. The application of the decanted liquids was to be continuously monitored to ensure the liquids did not infiltrate through the cover and contribute to the identified saturated wastes problem.

Source: Adapted from RWQCB Revised Waste Discharge Requirements, September 1982; VRCSD Simi Valley Disposal Site Hazardous Waste Operation Plan, Dec. 1980; and SCS Engineers, Simi Valley Landfill Hazardous Waste Evaluation, September 8, 1980 and December 15, 1980.

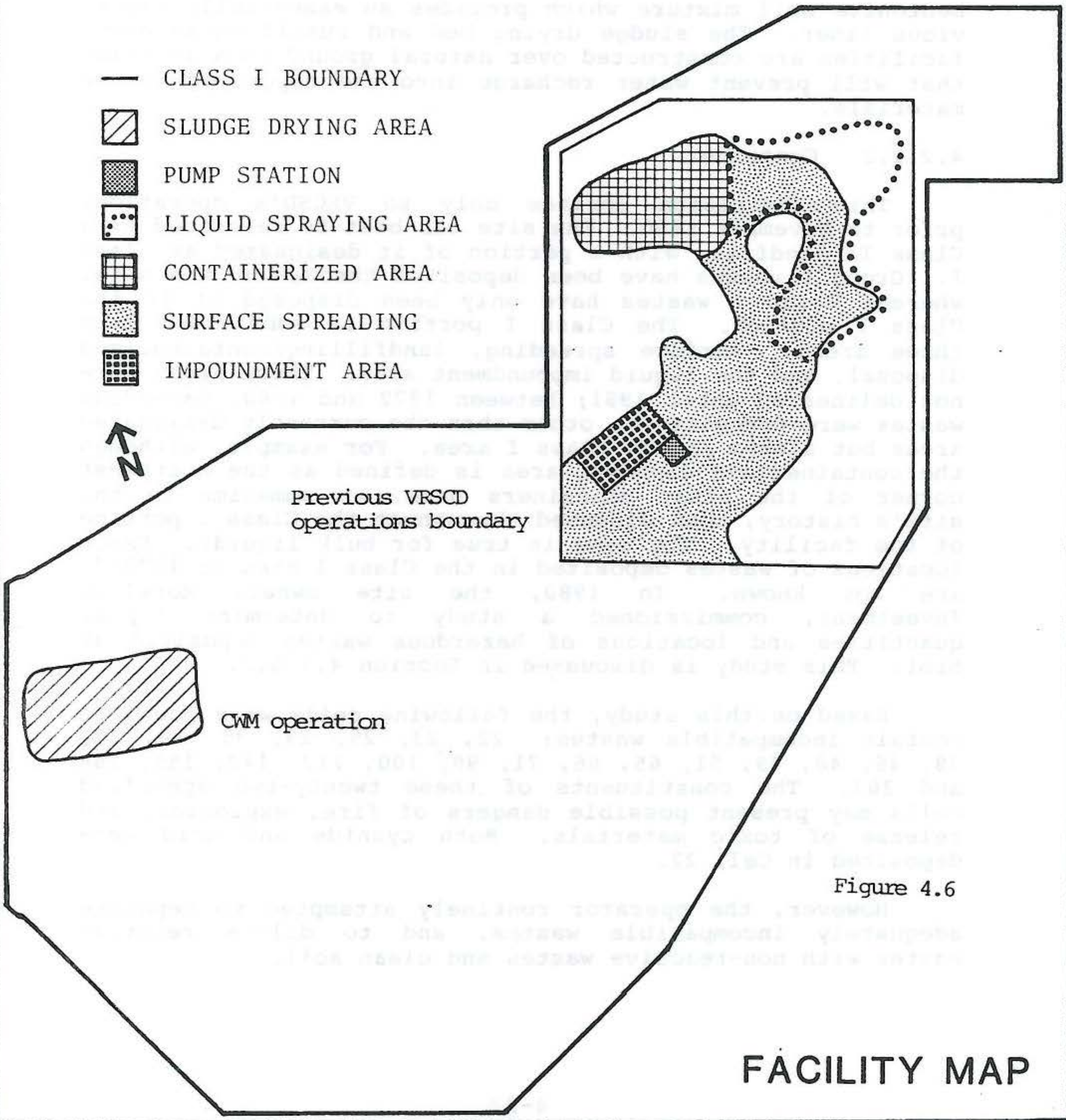


Figure 4.6

FACILITY MAP

Impoundments: CWM Operations

The site now receives only Group 2 solid wastes and no liquids. Dewatered sewage sludge is allowed for disposal only over the designated sludge drying area (See Figure 4.6), which meets the SWRCB's 10^{-6} cm/sec permeability guideline. The sludge is dried to 50% solids content and is periodically hauled and landfilled with each day's incoming refuse. Drainage control and runoff impoundment facilities also have been constructed to prevent surface discharge of polluted rainwater from the sludge drying area. The one-acre runoff containment basin is lined with a bentonite soil mixture which provides an essentially impervious liner. The sludge drying bed and runoff containment facilities are constructed over natural ground in a location that will prevent water recharge into the deposited refuse materials.

4.2.2.2 Containers

This discussion applies only to VRCSD's operations prior to November 1980. The site can best be described as a Class II landfill, with a portion of it designated as Class I. Group 2 wastes have been deposited throughout the site, whereas Group 1 wastes have only been disposed of in the Class I portion. The Class I portion is subdivided into three areas: surface spreading, landfilling/containerized disposal, and the liquid impoundment area. These areas were not delineated until 1981; between 1972 and 1980, hazardous wastes were deposited in other than the currently designated areas but always in the Class I area. For example, although the containerized disposal area is defined as the northwest corner of the site, containers have, at sometime in the site's history, been disposed throughout the Class I portion of the facility. The same is true for bulk liquids. Exact locations of wastes deposited in the Class I area in 1970-71 are not known. In 1980, the site owner, Moreland Investment, commissioned a study to determine types, quantities and locations of hazardous wastes deposited at Simi. This study is discussed in Section 4.1.3.2.

Based on this study, the following cells were found to contain incompatible wastes: 22, 23, 25, 29, 35, 36, 37, 38, 46, 48, 49, 51, 65, 66, 71, 98, 100, 112, 142, 155, 168 and 203. The constituents of these twenty-two specified cells may present possible dangers of fire, explosion, and release of toxic materials. Both cyanide and acid were deposited in Cell 22.

However, the operator routinely attempted to separate adequately incompatible wastes, and to dilute reactive wastes with non-reactive wastes and clean soil.

4.2.2.3 Landfilling (containerized burial)

This method comprises the normal sanitary landfilling of wastes and is used for Group 2 waste and was used for some Group 1 wastes that did not pose a hazard to site personnel. It does not prescribe strict identification and supervision of all waste received and landfilled. The type of operation at the landfill is the area method of landfilling. The Class I cell construction was composed of several layers of waste compacted on a slope by heavy equipment and enclosed on all sides by soil. Compaction was achieved by operating a tractor up and down the working face between three and five times on one-to two-foot waste layers. Daily thickness of compacted soil was not less than six inches after compaction. No waste was visible when the landfill was completed. The top and side slope surfaces of a completed fill noy covered within one week by another cell were covered with a layer of about 12 inches of compacted soil. When filling has reached the final planned grade, a final cover of at least three feet of compacted soil is placed and, in areas where trees are to be planted, four to six feet of cover may be required.

Controlled Landfilling

This method is used for most wastes defined as hazardous. VRCSD followed a strictly controlled permit application and approval procedure including disposal supervision. Briefly, wastes were initially screened for acceptability, a disposal area was specifically chosen for each waste received; incoming inspection, chemical testing, coordination, and disposal supervision were carried out. This method is further described in the following Chapter 4.2.3 (Recordkeeping).

4.2.2.4 Tanks: VRCSD Operations

CWM through its consultant, EMCON Associates,[16] has developed a Groundwater Protection Plan. As part of this plan, an alluvial seepage zone control system has been developed to eliminate leachate buildup behind an existing clay barrier. This seepage control system will involve the use of a 10,000 gallon storage tank to be located adjacent to the landfill entrance gate. Leachate collected in the storage tank will be absorbed on wastes in the active refuse fill area, in accordance with accepted practices in landfills located in semi-arid climates such as Simi Valley. The liquid disposal rate will not exceed the range of 15 to 25 gallons per cubic yard of landfilled solid waste, as suggested by the guidance document <u>Waste Discharge Requirements for Nonsewerable Waste Disposal to Land</u>.[17] This rate will enable up to 17,700 gallons per day of leachate (over four times the expected amount) to be safely absorbed and held in the active fill area at the estimated 1983 solid waste disposal rate of 635 tons per day.

4.2.3 Control Functions

4.2.3.1 General Facility Standards: VRCSD Operations

The landfill has received a wide range of wastes. During 1979 and 1980 approximately 70 companies within Ventura County generated hazardous wastes which were deposited at the landfill. An inventory of wastes disposed in the Class I portion of the landfill between 1971 and March 1980 was compiled by SCS Engineers.[18] Sources of information were the records of VRCSD and RWQCB. Included in this inventory were solvents, asbestos, polychlorinated biphenyls (PCB's), pesticides, petrochemical refining waste, petroleum distillates, cyanide, and industrial and plating sludges. Table 4.1 lists the types and volumes of hazardous waste accepted. Not all areas of the Class I site had been used for hazardous waste disposal. Locations of wastes disposed from 1970 through 1971 are unknown.

The following section was derived from discussions with VRCSD staff and the Simi Valley Disposal Site Hazardous Waste Operation Plan (December 1980) prepared by VRCSD, unless otherwise referenced. It pertains to VRCSD operations only unless otherwise noted.

Prior to 1980, when voluntary restriction on the acceptance of hazardous waste occurred, VRCSD implemented an incoming waste control program. All applications for disposal of Group 1 wastes were reviewed by the VRCSD professional staff to determine if the waste could be disposed of with no adverse effects on personnel or the environment. Wastes were accepted by appointment only, a field person verified the manifest, field tests were run to assure that the analysis matched the manifest, and then the waste was assigned to and placed in one of five different compatibility zones. This procedure was detailed in a procedures manual and a Waste Analysis and Identification Plan.

VRCSD disposal records consisted of individual load slips which indicated waste type, gallonage and/or tonnage, and disposal grid. Most load slips indicated weights, but in some cases only gallons of waste were recorded. In these cases, tonnages calculated by SCS Engineers were based on a presumed average liquid waste density of 8.34 lb/gallon (density of water). Some volumes reported in load slips were tank truck capacity and may not have represented the actual volume of waste disposed. Therefore, the volume and weight of wastes reported in the inventory may have been slightly overstated. In many cases, load slip amounts were reported in both gallons and tons. Where only tonnages were reported, wastes were presumed to be solids if not otherwise indicated on the load slips.

TABLE 4.1

HAZARDOUS WASTE TYPES AND VOLUMES ACCEPTED AT THE SIMI CLASS I DISPOSAL SITE

(Reference: SCS Engineers, 1980)

	Major Waste Types and Quantities Disposed from 1971 to 1980	
	Gallons	Tons
Alcohols/Solvents	335,000	
Asbestos		265
Caustics		2,500
EDC (ethylene dichloride)		1,400
Fireworks (pyrotechnic compounds)		12
Grease		430
Polychlorinated Biphenyls (PCB)		1
Chemical Oxidizers	17,000	
Paper Processing Waste		300
Paper/Rags		300
Pesticides	35,000	
Pesticide Containers		2,300
Petrochemical Wastes (including refining waste, and petroleum distillates)	270,000	
Resin		3,300
Cyanide		120
Industrial and Plating Sludges		335
TOTAL	657,000	11,563

VRCSD maintained a secure facility during the time of its operation. The public was not allowed into the Class I area. Entry was allowed to commercial vehicles only, and only when escorted by site personnel. A system of locked gates was maintained at the landfill. This system included a locked gate at the entrance to the landfill and a second locked gate at the entrance to the Class I portion. An adequate fence was maintained around the operating portions of the site to prevent livestock and unauthorized persons from entering the landfill. This fence also kept the surrounding area generally free of litter and other foreign material. Signs were maintained as required by regulation. Warning signs (in English and Spanish) limited access to the Class I area to authorized personnel only. No incidents of unauthorized entry or vandalism were recorded during VRCSD's operation. No hazardous wastes were ever disposed of by private vehicles.

Waste handling equipment included caterpillar dozers and scrapers, skip loaders, water trucks, fuel trucks, pickups, etc. All of this equipment had safety features such as windshields, spark arrestors, white cap respirators, and ventilation systems. There was an on-site workshop for repairs and preventive maintenance of heavy equipment. No serious equipment failures were recorded.

During the period of VRCSD's operation, approximately 12 persons were employed in full and part-time positions at the landfill. Personnel included Hazardous Waste Engineers, Supervisors, Observers, and Assistants; a Field Chemist; Site Supervisor; Weighmaster; and Heavy Equipment Operators.

VRCSD solid waste operational personnel participated in a biennial training course. Specialized training was given in all phases of Solid Waste Management with special emphasis on hazardous waste. The program was developed with the assistance of an EPA grant and has been nationally recognized. When a candidate successfully passed the course, he obtained a merit increase of five percent. The program had to be completed every two years for the employee to remain certified. The objectives of the course were to develop a sound knowledge of the safe operations of a sanitary landfill; to gain knowledge and skill to establish an efficient operation; to develop outstanding theory of problems and improvement of public relations, work procedures, and radio communications; and to gain knowledge regarding hazardous waste, basic surveying, and resource recovery.

Landfill personnel who supervised the unloading procedures dressed in appropriate clothing, including helmets, respirators, and rubberized overalls. A field radio was also available. Two fully-equipped employees and one observer were present when disposing of hazardous wastes. If a landfill employee and/or hauler were overcome by exposure to or contact with waste fumes, dust, or spray, one safety-equipped employee was to activate a respirator and remove him. The observer was also to don his safety gear and radio for assistance. To the best of VRCSD's knowledge, no such incident involving exposure to waste fumes, dust, or spray has ever occurred.

Inspections of the landfill by outside agencies were often random and unannounced. The County Environmental Health Department conducted regular quarterly inspections of the Class II areas, which were under its jurisdiction. More frequent inspections were made if violations or problems were observed. Minor violations related to litter, odor, ponding during heavy rains, and compaction problems were noted and then abated by VRCSD prior to the next inspection. Frequent inspections by the RWQCB occurred in the late 1970's and early 1980's when possible geohydrologic problems came to light. The inspections did not reveal any releases or discharges. On April 7, 1982 a compliance inspection by DOHS disclosed no violation of the ISD. Thus, at that time, the site was assumed by DOHS to be in compliance with RCRA.

4.2.3.2 Preparedness and Prevention

According to discussions with the County Fire Department, VRCSD did an exceptional job over the years of its operation in coordinating with local enforcement agencies. The District was considered very cooperative, provided good internal access to the site, and provided good employee emergency training procedures.

4.2.3.3. Contingency Plan - Emergency Procedure

VRCSD prepared a Contingency Plan in response to Federal and State requirements. The Plan detailed all of its safety procedures, evacuation routes, access, and means to coordinate with local emergency agencies. It includes details of the site location, access routes, internal roads, and locations of powerlines, pipelines and emergency equipment, and emergency coordinators are designated. Implementation and emergency response are presented.

The Contingency Plan has never been exercised.

4.2.3.4 Manifest System, Recordkeeping, and Reporting

The total Class I area is laid out in a horizontal two-dimensional grid system, with each grid unit being approximately 100 feet by 100 feet. From 1972 on, the Hazardous Waste Engineer assigned a specific disposal location, but not depth, to each incoming Group 1 type waste using the compatibility analysis procedure. There were five compatibility groups divided as indicated below:

A - Mineral Acids
B - Flammables
C - Caustics and Compatibles
D - Materials of Low Reactivity
E - Cyanides

Each compatibility area comprised a number of specific grids. The ultimate grid of disposal in the appropriate compatibility area was recorded. Records were maintained on location and at the VRCSD office on each load of Group 1 wastes received and disposed since the beginning of site operations.

In addition to standard VRCSD forms, a Hazardous Waste Manifest was completed by the waste producer, hauler, and the disposal facility operator for submittal to DOHS. The manifest was required to state, in detail, the waste material and its components. This was checked against the "approved load description" and the generator's analysis. All had to correspond or the load was rejected. This form duplicated records maintained by VRCSD, but had to be submitted pursuant to federal hazardous waste regulations and the California Administrative Code. VRCSD maintained and routed these records pursuant to State and Federal regulations (see Appendix 4.2). Prior approval by DOHS was required for the disposal of all extremely hazardous wastes.

VRCSD started computerizing the hazardous waste data in 1976 (see Appendix 4.4). In addition, hazardous waste information can be retrieved from waste logs and disposal permits. The information available includes waste characteristics, waste producers and haulers, and location of waste disposed. Waste logs contain information on:

- Name of hauler;
- Date and grid number of disposal;
- Type and quantity of waste; and
- Permit number.

Reports were submitted to the DOHS and EPA by VRCSD. The information provided included:

- Amount of State hazardous waste disposal fees due and paid;
- Copies of manifests for each load of hazardous waste received and summary report of the quantities;
- Identity, source, chemical composition, weight/volume, physical state, properties, and methods used to dispose of each waste received;

- o Unresolved discrepancies in the manifest;
- o Unmanifested waste report;
- o Annual report;
- o Releases, fires, and explosions;
- o Groundwater contamination and monitoring; and
- o Facility closure.

Reports of accidents, whenever they occurred, were submitted to the DOHS. During VRCSD's operation, there were no major accidents or fires at the Simi Valley landfill. According to the VRCSD, there were no hazards to public health and safety, or to domestic livestock or wildlife.

4.2.3.5 Groundwater Monitoring

According to RWQCB, as a result of various studies conducted on this landfill, many test wells have been constructed on and around the site, and some are not properly constructed, sealed or destroyed as required by Ventura County Well Ordinance Standards. The Ventura County Resource Management Agency and Public Works have notified CWM and Moreland Investment Company to develop a program by June 1983 for proper construction or abandonment of these wells.

A two-phase groundwater monitoring plan developed by VRCSD for the landfill was adapted from the requirement in the Interim Status Document for the site to: (1) measure the impact of the site on the groundwater, if any, prior to its moving off-site; (2) assess the health and environmental effects of the impact, if any; and (3) monitor mitigation measures. Phase I was to monitor groundwater immediately below and adjacent to the hazardous waste containment area, and to provide an initial data base and a method of annually statistically assessing the effect of the site on the groundwater. Phase Two was to be activated when the statistical evaluations in Phase One indicated that the site impacted the groundwater. It was to comprise the selection of additional monitoring wells and additional analytical parameters to determine:

- o the rate and extent of migration of the hazardous waste or its constituents;
- o the concentrations of the hazardous waste or its constituents in the groundwater; and
- o assessments of the health and environmental effects.

A groundwater monitoring program has also been developed by CWM to (1) evaluate the effectiveness of a proposed groundwater protection plan, and (2) determine whether further remedial action is necessary. This program is required by the RWQCB as part of its Waste Discharge Permit.

A series of 13 monitoring wells are proposed to detect any migration of fluids from both the Class I and II areas of the landfill, in both the Sespe Formation and the alluvium. The monitoring facilities in the alluvium will be positioned down canyon from the alluvial seepage zone barrier. Wells in the Sespe Formation will monitor water-bearing beds/intervals that out-crop and contact the waste fill in the Class I and Class II areas. These wells must be located both down-dip (north) and along the strike (east and west) of the water-bearing beds.

4.2.3.6 Closure and Postclosure

VRCSD prepared a Closure and Postclosure Plan in October of 1981. The following section is adapted from the VRCSD Plan. In 1981 final closure was not anticipated until sometime in 1989; consequently, VRCSD's Plan was viewed as highly dynamic and continually changing as new and better closure technologies became available.

Closure

The Closure Plan describes operation, disposal areas, and proposed mitigation and monitoring measures; discusses various alternative methods to close the facility and protect the environment, and recommends a final Closure Plan. It also summarizes the post-closure maintenance and monitoring program and the financial plan for closure and post-closure.

The California Administrative Code requires a final cover of at least three feet of clean soil, one foot of which is compacted to a permeability of 1×10^{-6} cm/sec or less, sloped at least three percent, and with leachate and gas control measures taken, as needed. The regulations also require a discussion and evaluation of alternatives to these methods and of subsequent maintenance, and a recommendation regarding the most practical method of closure and maintenance which will not pose an adverse threat to the environment. Basically, the alternatives revolve around closing of the entire site (Alternative I) or only the Class I area (Alternative II).

Furthermore, there are slight variations in the manner in which the Class I area can be closed. The options are whether both infiltration control and run-off control systems are needed and whether compaction is necessary based on the permeabilities of the native soils. It is apparent from review of the hydrogeologic data for the site that infiltration into the buried wastes is one of the pressing problems with the site. As a result all practical measures should be taken to mitigate this problem. Consequently, the three foot cover and run-on diversion structures are unconditionally recommended in the Plan. Further, minimizing the infiltration of liquids through the cover will minimize the size and maintenance of the necessary leachate collection and disposal system.

It is recommended that a final cover of three feet of native soil be placed over the approximately one foot of intermediate cover for a total coverage of approximately four feet. The cover is to be composed of native soils consisting of sandstone, siltstone, and claystone. There is sufficient on-site soil to supply the needs for final coverage. Run-on will be diverted from the watershed on the northern end of the Class I area via a diversion channel. The diverted water will be allowed to flow along natural drainage channels into Alamos Canyon on the west and Brea Canyon on the east. The run-on diversion structure will direct run-on from approximately 20 acres of the Class I area's watershed out of approximately 50 total acres. The run-on from the remaining 30 acres of watershed is not practical to collect and divert. The completed disposal area is to be graded and maintained to prevent ponding and to provide slopes of at least three percent. Steep areas, surface drainage courses, or other areas subject to erosion by water and/or wind will be provided with a lining, planted with vegetation, or otherwise designed and constructed to prevent erosion.

Grading will emphasize the development of contours and configurations which will ensure the proper site drainage patterns to minimize erosion. Preparation for revegetation will involve the development of the landfill surface to provide a suitable growth medium for the grass and legume species chosen for the site. In general the species will be chosen on the following criteria:

- o minimize erosion
- o low water requirements
- o survive well in a landfill environment
- o shallow root system
- o rapid ground cover establishment

Post-Closure

The landfill is situated at some distance from homes and residential communities and is not experiencing a methane migration problem now. Nevertheless, VRCSD developed a gas migration monitoring and control program, which is described in detail in the Post-Closure Plan.

Although the generation of methane in a sanitary landfill cannot be eliminated, lateral migration to adjacent areas can be controlled. To monitor this migration, vertical gas wells will be installed along the periphery of the landfill. The probes consist of plastic tubes inserted approximately eight feet in the ground with a filter at the end, and probes will be monitored quarterly.

Substantial settlement (20-25 percent of original depth of fill) of portions of the landfill is anticipated after closure. Unfortunately, it is not possible to predict with any great accuracy the final settlement of any particular portion of the landfill. Among the factors that influence settlement are the age of the refuse, the amount of weight resting upon it, the degree to which the material was compacted during the landfilling, the amount of moisture present, and the makeup of refuse in each location. Settlement can have two adverse effects: (1) creating cracks in the final cover, which could allow gases to escape into the atmosphere and run-off to enter the landfill; and (2) altering drainage patterns, either causing excessive water velocity resulting in erosion, or creating surface depression leading into ponding of water during wet weather.

Maintenance of the final cover will be an important task during the post-closure work. Additional earth fill will be placed and graded to restore the proper drainage patterns as necessary. Areas thus repaired will be landscaped as soon as possible.

Differential settlement can also cause the final cover to crack. Part of the post-closure maintenance will be to excavate and reseal any cracks with soil, and to revegetate the area if needed. A maintenance crew will regularly inspect the cover for such things as settlement, cracks, and stresses on the vegetation. As part of the post-closure care, groundwater will continue to be monitored, and the leachate control system operated and maintained.

4.2.3.7 Financial Requirements

The following section enumerates estimated closure costs from the VRCSD Closure Plan.

Alternative 1. Closure of total site as per RWQCB standards.

	Installation Cost
Final Cover (3 ft. thick)	$330,000
Compaction to 1×10^{-6}	157,000
Run-on Diversion System	30,000
Run-off Drainage & Storage	445,000
Run-off Disposal System	30,000
TOTAL*	$992,000

Alternative 2. Closure of only Class I portion.
2a. Installation of all options.

Final Cover (3 ft. thick)	$140,000
Compaction to 1×10^{-6}	70,000
Run-on Diversion System	30,000
Run-off Drainage & Storage	70,000
Run-off Disposal System	10,000
TOTAL*	$320,000

2b. Installation of only infiltration control options.

Final Cover (3 ft. thick) $140,000

Compaction to 1 X 10^{-6}		70,000
Run-on Diversion		30,000
	TOTAL*	$240,000

2c. Installation of infiltration control options, excluding compaction.

Final Cover (3 ft. thick)		$140,000
Run-on Diversion System		30,000
	TOTAL*	$170,000

* Note: Totals include only those items shown; total cost of site closure, detailed below, is substantially greater.

The estimated cost of closure of the Simi Valley Sanitary Landfill, Class I area, in accordance with the recommended Closure Plan is as follows:

Excavation and placement of final cover	$140,000
Grading and drainage	20,000
Placement, final grading and surface preparation of surficial soil material	20,000
Revegetation	15,000
Installation of gas monitoring wells	5,000
Run-on diversion system	30,000
	$230,000

In order to meet the obligation of closing the Class I portion of the landfill in accordance with the California Adminstrative Code, the VRCSD would have been depositing yearly an amount equal to one sixth of the closure cost (or approximately $40,000/yr). To this end the VRCSD deposited $40,000 in a separate fund during Fiscal Year 1981-82; it would have continued to make a yearly deposit of this amount, plus the factored amount, for the remaining five years. If the VRCSD found that the Class I portion had to be closed prior to the estimated closure date (1989), the VRCSD would have made available an amount equal to the total cost of closing the Class I portion plus the factored amount.

Post-closure maintenance will involve groundwater monitoring, landfill gas monitoring and visual inspections, along with operation and maintenance of leachate control and disposal systems. It is anticipated that post-closure care will involve less than $20,000/yr, and will be allocated as part of the yearly operating budget of the VRCSD.

Concluding Remarks to Chapter 4.2.3

In January of 1983, VRCSD's lease was terminated and CWM took over operation of the facility. An agreement was signed between VRCSD and CWM which declared that CWM would take over full responsibility for site operations. Revised Waste Discharge Requirements (WDRs) were recently approved by the RWQCB in May of 1983 which require CWM to prepare a new Operation Plan for a Class II facility by July 15, 1983. (The DOHS rescinded the ISD in March 1983; thus this site is no longer classified as a Class I facility). The revised WDRs do not call for a revised Closure and Post-closure Plan and attendant financial closure estimations yet. Thus, the Plan prepared by VRCSD in 1981 is the only existing Closure and Post-closure Plan.

In addition, because the site is no longer a Class I facility, CWM is not required to prepare a Hazardous Waste Safety Manual, Written Analysis Plan, Contingency Plan, or provide Emergency Training, as described previously for VRCSD's operating period.

The Class I portion and, more specifically, the liquid impoundment area was not completely closed (backfilled and brought up to grade) as per RWQCB requirements. Inspection logs from the County Environmental Health Department showed that some backfilling did occur. However, discussion with VRCSD staff indicated that CWM did not want the Class I portion completely closed. It is CWM's desire at some time in the future to use non-hazardous solid wastes (i.e. municipal and residential refuse) to improve drainage and the environmental integrity of the Class I area. CWM has proposed to the RWQCB to place a combination of refuse and soil cover to achieve a free-draining, impervious surface in the Class I area. According to CWM's attorney, two precedents exist for the disposal of non-hazardous wastes in the Class I area:

- The VRCSD put garbage in the Class I area from the early 1970s until vacating the facility.
- The RWQCB directed (since 8 January 1983) the ongoing placement of garbage in the abandoned sludge pond in the Class I area to close the pond.

4.2.4 Physical Pathways or Conduits to Resource Receptors

4.2.4.1 Geohydrology

The Simi Valley landfill is considered by some experts to be in hydraulic continuity with groundwater both of the Sespe formation and of the Quaternary alluvium of Arroyo Simi. Leachate could seep from the site either through the sandstone layers, through fractures within the bedrock, through the fill/alluvium contact in the southern portion of the site, or through the fill/bedrock contact in the extreme northwestern and northeastern portions of the site.[19]

Converse Ward Davis Dixon concluded that very low concentrations of organic constituents are present in groundwater in both onsite and immediately offsite sampling locations. Analytical results for offsite groundwater samples indicate that organic constituents may have been transported offsite.[20]

Based on the conclusions of the CWDD hydrogeologic study, it is apparent that the buildup of liquids within the deposited wastes is the basic problem associated with containment. It is apparent that if the liquids could be eliminated or controlled and surface recharge minimized then there would be no driving force or transportation media by which pollutants could be transported off-site.[21]

4.2.4.2 Stream Channel

As discussed in Chapter 4.2.1, surface runoff flows generally southwestward. Runoff flowing to the north and west eventually drains to Alamos Canyon, west of the landfill. All other runoff flows to Brea Canyon, east of the landfill. Both of these canyons open to Simi Valley and drain into Arroyo Simi which flows westward 11 miles to join Calleguas Creek near the town of Somis.

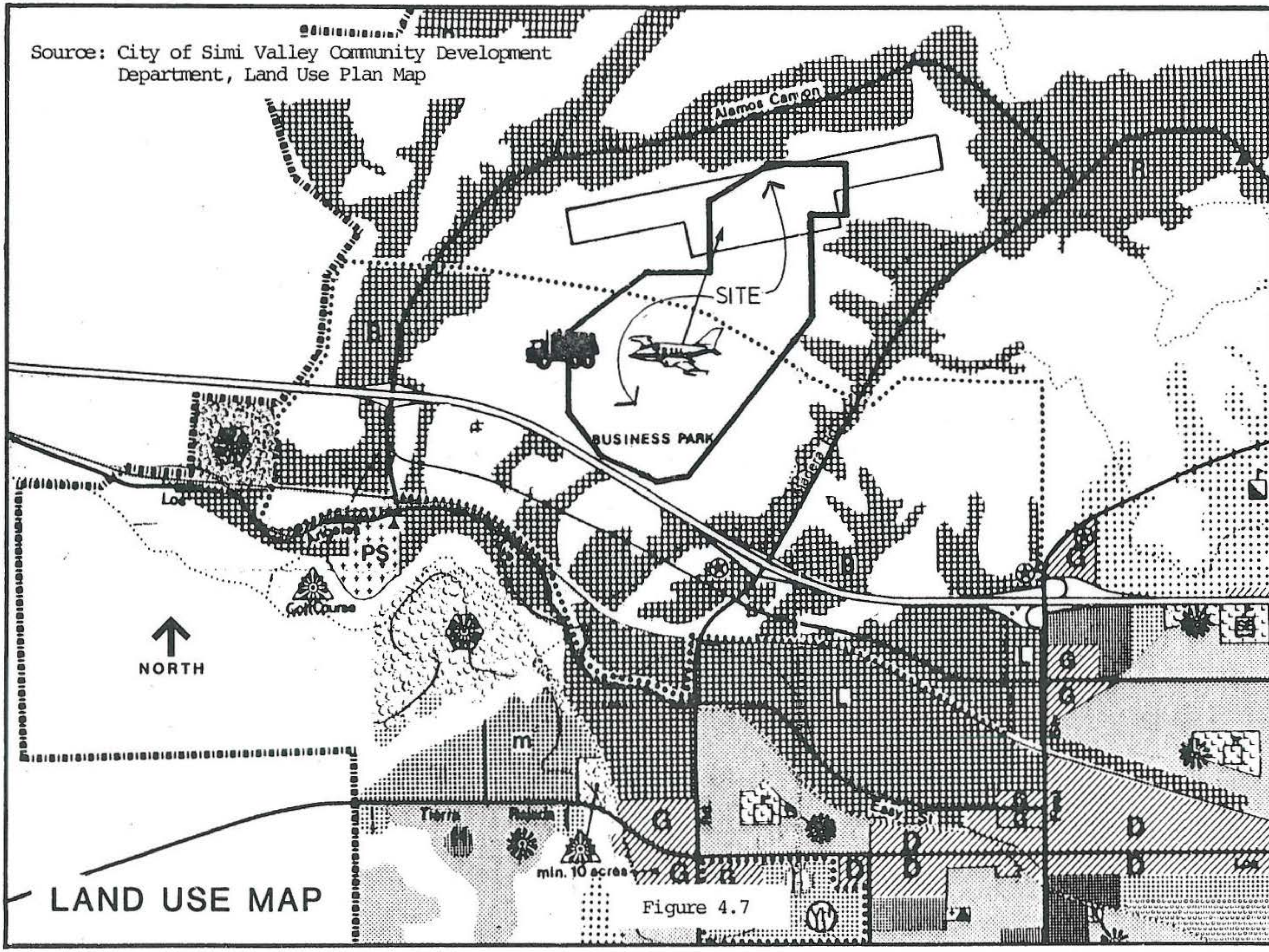
4.2.5 Receptors

4.2.5.1 Land Use

The Simi Valley landfill lies within an unincorporated portion of Ventura County, approximately two miles northwest of the City of Simi Valley. Activities in the immediate vicinity at present include oil exploration and related operations. Union Oil operates four wells and a steam injection plant immediately east of the landfill and approximately 16 other wells in the vicinity. The oil company maintains a service road for ground access to the area. Portions of the Alamos Canyon floor and Brea Canyon east slope in the vicinity of the landfill had been in dry-farm (non-irrigated) barley agriculture and sheep grazing sometime in the past several years.

The Simi Valley General Plan (see Fig. 4.7) designates a large concentration of industrial uses in and around the landfill. To the east of the site, the nearest proposed residential use is a low density hillside development more than a mile and a half away. To the west, no residential uses are planned within at least two miles. Ventura County has planned the mountainous area adjacent to the Simi areas of interest to be open space, indicating that 40+ acres are required for each dwelling unit. Moorpark College lies about two miles to the west of the landfill, and a Rural High Density (RHD) area has been planned north of the College which allows one dwelling unit per acre.

The Simi Valley General Plan reflects existing land use patterns in the areas south of the landfill between the Simi Freeway and Southern Pacific rail line. Future residential development is limited to the area east of First Street where there is now existing residential use. To the west of this point, industrial or open-space uses exist or are proposed well outside the City's boundary. This "band" of open-space and industrial uses between the Simi Freeway and the Southern Pacific right-of-way buffers the landfill operation from the residentially developed sections of Simi Valley. While urban development has not yet occurred in the vicinity of the landfill, the Simi Valley Department of Community Development noted in 1980 that about 80 percent of the land on the valley floor is either developed in urban uses or is committed to development. The growing scarcity of vacant land on the valley floor results in increasing pressure for development in the foothills and canyon areas. This has led to applications for grading for building pads for industrial and/or commercial uses, between the Simi Valley Freeway and the Southern Pacific Railroad, which will not be developed until some future time. Inasmuch as the Simi Valley General Plan shows industrial and commercial uses in the vicinity of the landfill, such uses may develop in the future although specific applications for development have not yet been submitted to the City. However, a specific


Source: City of Simi Valley Community Development Department, Land Use Plan Map
Alamos Canyon
SITE
BUSINESS PARK
Madera Rd
PS
Golf Course
NORTH
Tierra
Rejada
min. 10 acres
Easy St
LAND USE MAP
Figure 4.7

LEGEND

RESIDENTIAL

- Open Space
- RE Residential Estate (1 acre min./lot) See Text Definition.
- Very Low (20,000 sq. ft. minimum lot size)
- Low Target 2.6 units per acre/range 0 - 3.0
- Medium Target 3.7u.p.a. / range 3.1 - 5.0
- I Intermediate Target 7.0 u.p.a. / range 5.1 - 10.0
- H High Target 15.0 u.p.a. / range 10.1 - 18.0
- VH Very High* Target 25.0 u.p.a. / range 18.1+
- m Mobile Home Target 8.0 u.p.a. / range 5.1 - 12.0
- ms Mobile Home Subdivision

*Very High - min 4 acres required

COMMERCIAL

- RC Recreational Commercial
- O Office
- G General
  - Hotel / Motel node
- D District
- R Sub - Regional

INDUSTRIAL

- L Light Industrial
- B Business Park
- R Industrial Reserve

PUBLIC & SEMI-PUBLIC

- CC Civic Center
- PS Public Services Center
- Fire Station
- Law Enforcement Office
- H Hospital
- L Library
- SE Special Education School
- Senior High School
- Junior High School
- Elementary School
- Regional Park
- Community Park
- Neighborhood Park
- Special Purpose Park
- Cemetery
- Brandeis-Bardin Institute
- Sanitary Landfill
- Airport
- Railroad Depot

LEGEND

LEGEND

RESIDENTIAL

RE Open Space

Residential Estate (1 acre min./lot) See Text Definition.

Very Low (20,000 sq. ft. minimum lot size)

Low Target 2.6 units per acre/range 0 - 3.0

Medium Target 3.7 u.p.a. / range 3.1 - 5.0

I Intermediate Target 7.0 u.p.a. / range 5.1 - 10.0

H High Target 15.0 u.p.a. / range 10.1 - 18.0

VH Very High* Target 25.0 u.p.a. / range 18.1+

m Mobile Home Target 8.0 u.p.a. / range 5.1 - 12.0

ms Mobile Home Subdivision

*Very High - min. 4 acres required

COMMERCIAL

RC Recreational Commercial

O Office

G General

⊛ Hotel / Motel node

D District

R Sub - Regional

INDUSTRIAL

L Light Industrial

B Business Park

R Industrial Reserve

PUBLIC & SEMI - PUBLIC

CC Civic Center

PS Public Services Center

Fire Station

Law Enforcement Office

Hospital

L Library

SE Special Education School

Senior High School

Junior High School

Elementary School

Regional Park

Community Park

Neighborhood Park

Special Purpose Park

Cemetery

Brandeis-Bardin Institute

Sanitary Landfill

Airport

Railroad Depot

LEGEND

plan and EIR for the West End Industrial area were approved by the Simi Valley City Council in December of 1982.

4.2.5.2 Population

The City of Simi Valley was incorporated in 1969 to include what had been unincorporated areas of Santa Susana and Simi Valley. At that time, the estimated population was between 55,000 and 57,000 persons. The present populations is estimated at just over 80,000 persons.

4.2.5.3 Floodplain[22]

In the event of a flood and earthquake, hazardous waste constitutents could be carried from the site down the canyon to the occupied flood plain below. This scenario forms the basis for the benefits discussion of Chapter 6. The background on the flood plain is given here.

The City of Simi Valley is located in a valley formed by the Santa Susana Mountains to the north and east and the Simi Hills to the south. The natural elevation is lower in the west end of the valley such that a westerly flowing drainage pattern has developed. Simi Valley is drained by Arroyo Simi and the major tributaries that drain the watersheds of Tapo Canyon, Las Llajas Canyon, Sycamore Canyon, Meier Canyon, and Alamos Canyon.

Arroyo Simi and its tributaries have exposed much of the developed areas of Simi Valley to flooding and recent flood control measures have sought to minimize this exposure. To that end, the length of Arroyo Simi in the vicinity of Simi Valley has been improved, as have short stretches of its tributaries.

The following definitions are based on the basic design criteria utilized by the Corps of Engineers in evaluating flooding situations.

<u>Intermediate Regional Flood</u>. A flood having an average frequency of occurrence on the order of once in 50 years, although the flood may occur in any year.

<u>Standard Project Flood</u>. The flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations.

Although Arroyo Simi has been improved throughout its length, its present design capacity is not adequate given either an intermediate or standard project flood. Given an

Intermediate Regional Flood, Royal High School would be partially flooded and in a Standard Project Flood the entire school, along with a significant portion of the western area of the City (see Figure 4.8). The four motor vehicle bridges which traverse Arroyo Simi would be submerged by both the Intermediate and Standard project floods. With four important transportation links either damaged or destroyed, circulation and potential evacuation efficiency would be reduced.

An estimation of the various land uses in the flood plain was prepared from the Simi Valley General Plan/Zoning Map. The land use types included: five categories of residential, commercial, light industrial, parks, schools, and the public services center (see Appendix 4.6). These land uses are discussed further in Chapter 6 Benefits Scenario.

Rainfall records provided by the Ventura County Public Works Department were examined for the period from September 1980 to May 1983. The average annual mean rainfall for the Simi Valley area is 13.61 inches. This figure is the lowest annual mean for any of the 19 monitoring stations in Ventura County. However, rainfall in the past three and one-half years has been considerably higher than the annual mean as indicated below.

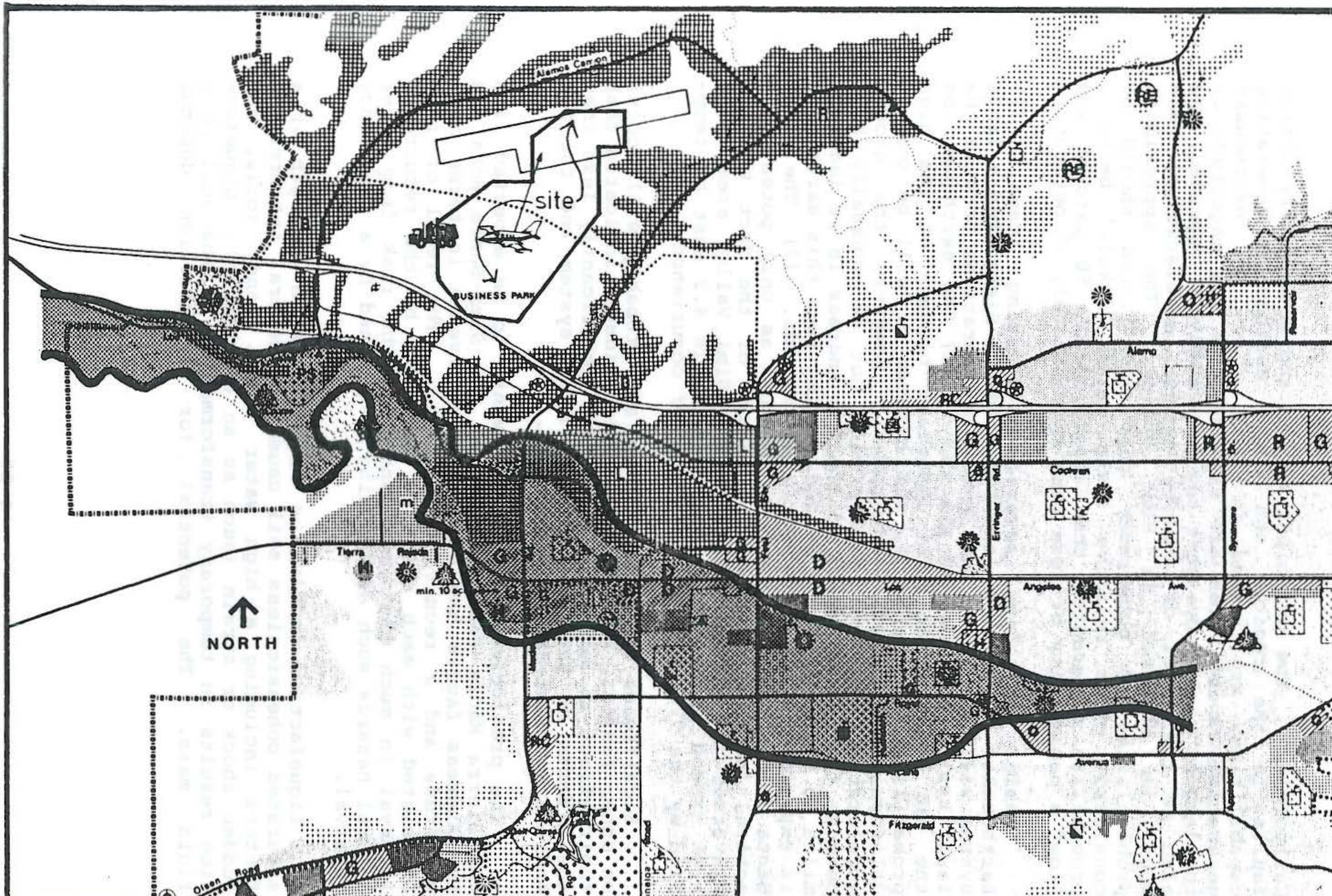
Rainfall*

Season	Inches
1979-80	
Winter	19.70
Summer	3.77
1980-81	
Winter	7.00
Summer	.15
1981-82	
Winter	12.16
Summer	.36
1982-83	
Winter	32.62

* Ventura County Flood Control and Water Resources Dept.

4.2.6 Perturbation Dynamics

The City of Simi Valley is located in a seismically active area, and in relatively close proximity to several of the many active and potentially active faults in Southern



Source: City of Simi Valley Community Development Department, Land Use Plan Map.

Figure 4.8

FLOOD PLAIN

California.[23] The principal active and potentially active faults in the region, and their earthquake generating capabilities, are listed in Table 4.2. The earthquake generating capabilities are expressed as the magnitude of the largest earthquake that can reasonably be expected, and also as the level of shaking (ground acceleration) that would be expected in Simi Valley. The approximate probabilities of occurrence that are listed should be considered on a relative scale, with "likely" being a probability of greater than approximately 50 percent and "low" a probability of less than approximately 15 percent.

Table 4.2 shows several interesting items. (1) Earthquakes generated on the Santa Susana-Sierra Madre fault system will result in high ground accelerations because the fault system is close to the City. (2) The earthquake on the San Andreas fault is important because of its high probability of occurrence, and because it will be one of California's "great" earthquakes. However, the ground accelerations in Simi Valley will not be unusually high because the nearest point on the San Andreas is at least 30 miles to the northeast. Strong shaking from this earthquake is expected to last for nearly 60 seconds. (3) The Simi-Santa Rosa fault, although classified as only potentially active, must be considered in light of the fact that it traverses the northern part of the Simi Valley area. The high ground accelerations shown on Table 4.2 must be tempered by the "Very Low" probability of occurrence.

Significant earthquakes can, and probably will, occur on other faults. However, available evidence indicates that their effect in Simi Valley will be significantly less than the effects of the Sierra Madre fault system and the San Andreas and Simi-Santa Rosa faults.

The predictive analysis of events to be expected from the Sierra Madre fault system and the Simi-Santa Rosa and San Andreas faults has defined these events in terms of a magnitude and a recurrence interval. The level of risk associated with each event is indicated by the recurrence interval in much the same manner as the risk from other natural hazards such as flooding is defined by a recurrence interval.

Liquefaction involves a sudden loss in strength of a saturated cohensionless soil caused by several interrelated factors including a high water table, sandy soils, and sudden shock or strain (such as an earthquake). Liquefaction results in temporary transformation of the soil to a fluid mass. The potential for liquefaction depends

Table 4.2

SUMMARY OF KNOWN ACTIVE AND POTENTIALLY ACTIVE FAULTS

AND THEIR EARTHQUAKE GENERATING CAPABILITY

	Distance from Simi Valley (Miles)	Expected Magnitude (Richter)	Maximum Ground Acceleration on Firm Ground (Gravity)	Approximate Probability of Occurrence (100-Year Period)
Active Faults:				
Santa Susana-Sierra Madre	3 - 10	6.5 - 7.5	0.30 - 1.0+	Intermediate
Malibu Coast-Hollywood	15 - 18	5.5 - 6.5	0.10 - 0.20	Intermediate
Newport-Inglewood	22	6.0 - 6.5	0.10 - 0.15	Intermediate
San Andreas	32	8.0 - 8.5	0.20 - 0.30	Likely
Big Pine	38	5.5 - 6.5	0.05 - 0.08	Intermediate
Potentially Active Faults:				
Simi-Santa Rosa	0 - 3	6.0 - 7.0	0.50 - 1.0+	Very Low
Pine Mountain	20	6.0 - 7.0	0.12 - 0.24	Very Low
Santa Ynez	22	6.0 - 7.0	0.10 - 0.20	Low

SOURCE: Envicom Corporation, "Safety and Seismic Safety Elements Comprehensive General Plan City of Simi Valley," October 1974, p.3.

upon many factors, including earthquake intensity and duration, groundwater level, soil permeability and density. The groundshaking levels which could occur are believed high enough to initiate liquefaction anywhere in the Simi Valley vicinity. The risk of liquefaction is greatest in the areas with high groundwater conditions.[24]

For several years, the City of Simi Valley has undertaken a groundwater pumping program near the west end of the City to alleviate the high groundwater situation and reduce the risk of liquefaction. The program, administered by Water Works District 8, consists of pumping three wells at 300 to 600 gallons per minute (gpm). Discharge from these wells is diverted to the Arroyo Simi. The three wells are discussed in Appendix 4.5. A recent report[25] recommends that the groundwater table be maintained at a depth of at least 50 feet to preclude liquefaction problems.

The potentially adverse consequence of these dewatering wells lies in the possibility that contaminated groundwater containing hazardous wastes constituents could be brought to the surface and discharged into Arroyo Simi. During floods, contaminated soil could be distributed over a wider area. No evidence suggests that this is happening at the moment.

4.3 Conclusions

The following conclusions seem justified by this study of the administrative record and investigating conducted to date:

- While the Simi Valley site was operated, in general, according to the professional practices and regulations then extant, these practices and regulations are no longer felt sufficient to provide adequate safeguards;
- The Simi Valley site does not meet recent permeability requirements;
- While there is evidence of local on and off-site groundwater contamination, there is substantial disagreement among hydrologists regarding the magnitude and extent of this impact on the regional groundwater system;
- Further, since the local groundwater isn't used (except for dewatering to reduce liquefaction potential), the value of groundwater lost to contamination is minimal;
- The political climate which has existed among and between the public, the previous operator, the current operator, and the property owner has heightened the controversy at every step of the

way, and has exaggerated and obscured the levels of real or potential damages.

SIMI VALLEY: FOOTNOTES

1. California RWQCB, Los Angeles, Region, "Revised Waste Discharge Requirements for CWM" (File 69-90), May 5, 1983, P. 1.

2. SCS Engineers, "Simi Valley Landfill Hazardous Wste Evaluation", September 8, 1980 and December 15, 1980.

3. Letter from J.A. Lambie, Chief Engineer-General Manager, VRCSD to J.A. Gordon, President, Moreland Investment Company, October 10, 1980.

4. Ventura County Resouce Management Agency, Report Back on the Simi Vally Landfill (CUP-3142) to the County Board of Supervisors, November 23, 1982, P. 3.

5. Ibid, P. 3.

6. Ibid, P. 4.

7. Ibid, P 4.

8. VRCSD, "Closure and Post-closure Plan for the Simi Valley Sanitary Landfill", October 1981, P. II-1.

9. Converse Ward Davis Dixon, "Hydrology and Water Quality Investigation of the Simi Disposal Site", December 1980, P. 12-13.

10. Ibid, P. 14.

11. EMCON Associates, "Environmental Status and Groundwater Protection Plan Simi Valley Disposal Facility", January 14, 1983, P. 4-6.

12. Wadell Engineering Corporation, "Environmental Impact Report/Environmental Assissment for the Simi Valley Airport New Site Master Plan 1980/2000", March 26, 1982, P. 52.

13. PRC Toups, "Environmental Impact Report, Simi Valley West End Industrial Area Specific Plan", March 1983, P. III-92.

14. Wadell Engineering Corporation, "Environmental Impact Report/Environmental Assessment for the Simi Valley Airport New Site Master Plan 1980/2000", March 26, 1982, P. 42.

15. Personal communication, Richard Gurshe, Regional Engineer with Chemical Waste Management, May 11, 1983.

16. EMCON Associates, "Environmental Status and Groundwater Protection Plan Simi Valley Disposal Facility", January 14, 1983, P. 4-6.

17. SWRCB, "Waste Dicharge Requirements for Nonservable Waste Disposal to Land", July 1980.

18. SCS Engineers, "Simi Valley Landfill Hazardous Waste Evaluation", September 8, 1980 and December 15, 1980.

19. LeRoy Crandall and Associates, "Preliminary Geotechnical Evalustion Existing Simi Valley Sanitary Landfill", April 1980, p. 16-17.

20. Converse Ward Davis Dixon, "Hydrogeology and Water Quality Investigation of the Simi Disposal Site - Phase I and Phase II", December 1980 and May 1981, p. 49.

21. VRCSD, "Closure and Post-closure Plan for the Simi Valley Sanitary Landfill", October 1981, p. III-2.

22. Envicom Corporation, "Safety and Seismic Safety Element of the Simi Valley General Plan", 1974.

23. Ibid.

24. PRC Toups, "Environment Impact Report West End Industrial Area Specific Plan", March 1983, p. III-3.

25. Ibid, P. III-32.

CHAPTER 5 CASMALIA SITE

5.0 CHAPTER SUMMARY

The history of the Casmalia facility is much simpler than that of the Simi Valley facility. The facility has been owned and operated by Casmalia Resources since 1972. It has been operated only as a hazardous waste facility over the entire period of time to the present. Casmalia Resources has successfully met all standards and requirements for operating its facility.

The principal and key issues are two: disposal of PCB's and municipal water contamination. There has been much local controversy over these two issues. The following points summarize the situation surrounding the two key issues:

(1) As to the potential for hazards:

- o The facility is situated on low permeability soils yielding very slow water migration;
- o There is no evidence of incompatible waste mixing or leaking containers;
- o There is no evidence of aquifers, and therefore, of waste constituent contact with the aquifer; in addition, the local water supplies are of very poor quality, insufficient in quality even for stock watering purposes;
- o Site monitoring visits have revealed, over the years, several violations including inadequate security against unauthorized entry and runoff problems, all of which have been corrected;
- o There have been several incidents of waste water spillage/discharge from the site and into the drainage channel leaving the site, especially during or following heavy rainstorms;
- o There is some concern whether, upon closure, the land could revert back to agriculture use under its Agricultural Preserve Status without violating the California Health and Safety Code.

(2) As to the evidence of damage:

- o Local citizens have drawn water samples from local municipal water sources and had them tested; PCB's were found on two occasions, but attempts at replication failed to produce indications of PCB's;

- o California DOHS conducted a special monitoring and sampling for PCB's in 1981, and again in 1982 for 113 organic compounds, of wells throughout the Santa Maria Valley; no evidence of organic constituents was detected at the 1 ppb level;

- o The State RWQCB and DOHS have tested the water in the monitoring wells at the site and have found nothing;

- o Continuing citizen concern has precipitated another round of tests of water supply wells in the vicinity of the site, authorized by the County Board of Supervisors in January of 1983; this testing is still in progress at the time of this writing.

5.1 HISTORY OF FACILITY DEVELOPMENT

The history of the Casmalia Resources facility includes a review of the administrative, physical, and ownership characteristics; permits and regulations for operations and incidents and issues surrounding operation. Abbreviations are identified in Appendix 2.

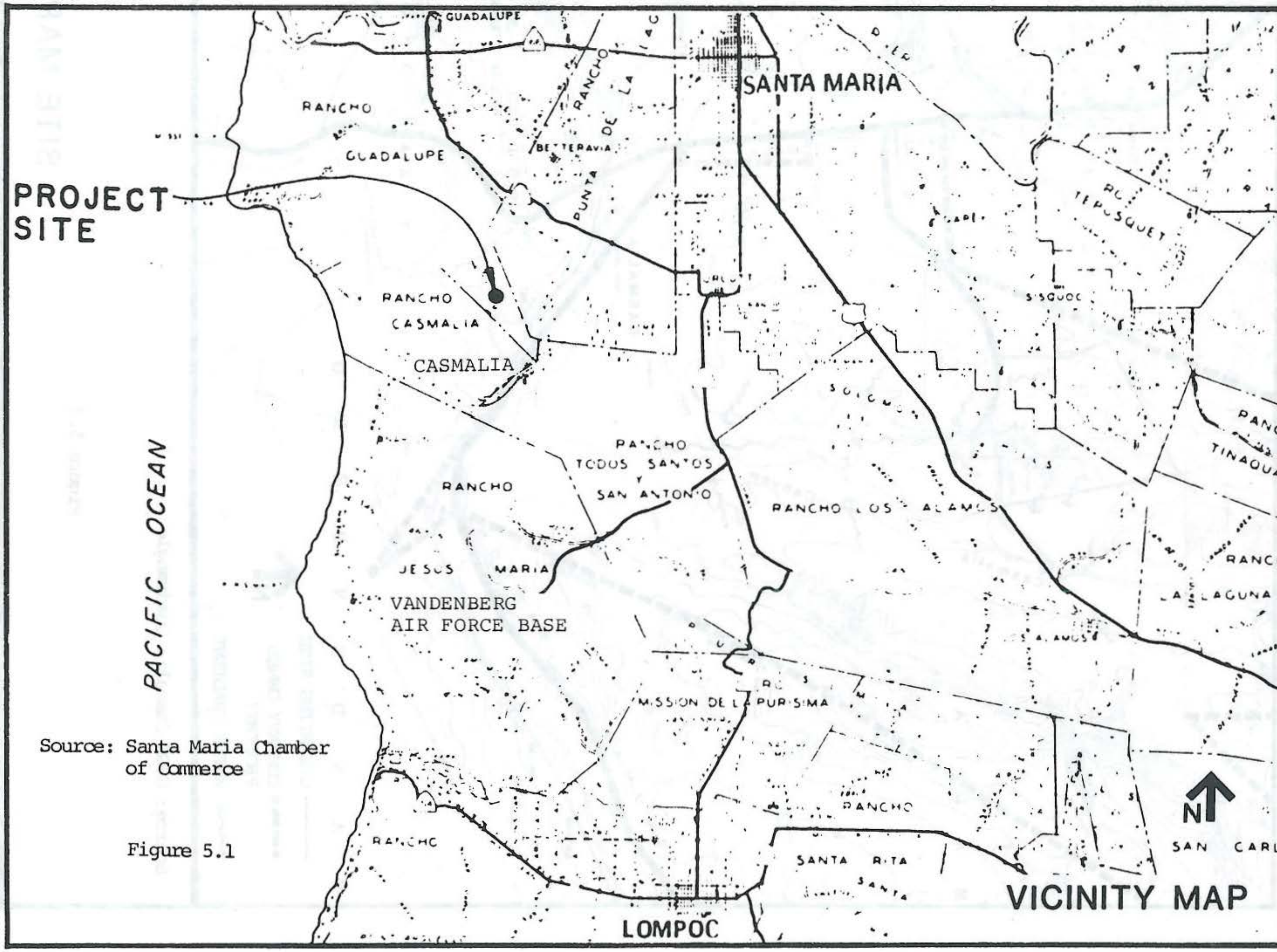
5.1.1 Administrative, Physical, Ownership

Casmalia Resources is located in Northern Santa Barbara County (Figure 5.1). The site is ten miles southwest from the town of Santa Maria (pop. 65,000) and 2.5 miles northeast of the town of Casmalia (pop. 250). Access to the site is via Black Road, a two lane road historically used for access to the Casmalia oil fields, which passes by the small residential area of Tanglewood, with 300 residential units. Black Road connects with the N.T.U. (Nevada, Texas and Utah) Road going into the site. (See Figure 5.2)

Casmalia Resources' operation area is 252.3 acres. The company owns the surrounding 4,047.7 acres, for a total of 4300 acres. Seventeen parcels comprise the property, fifteen of which are zoned agricultural preserve.

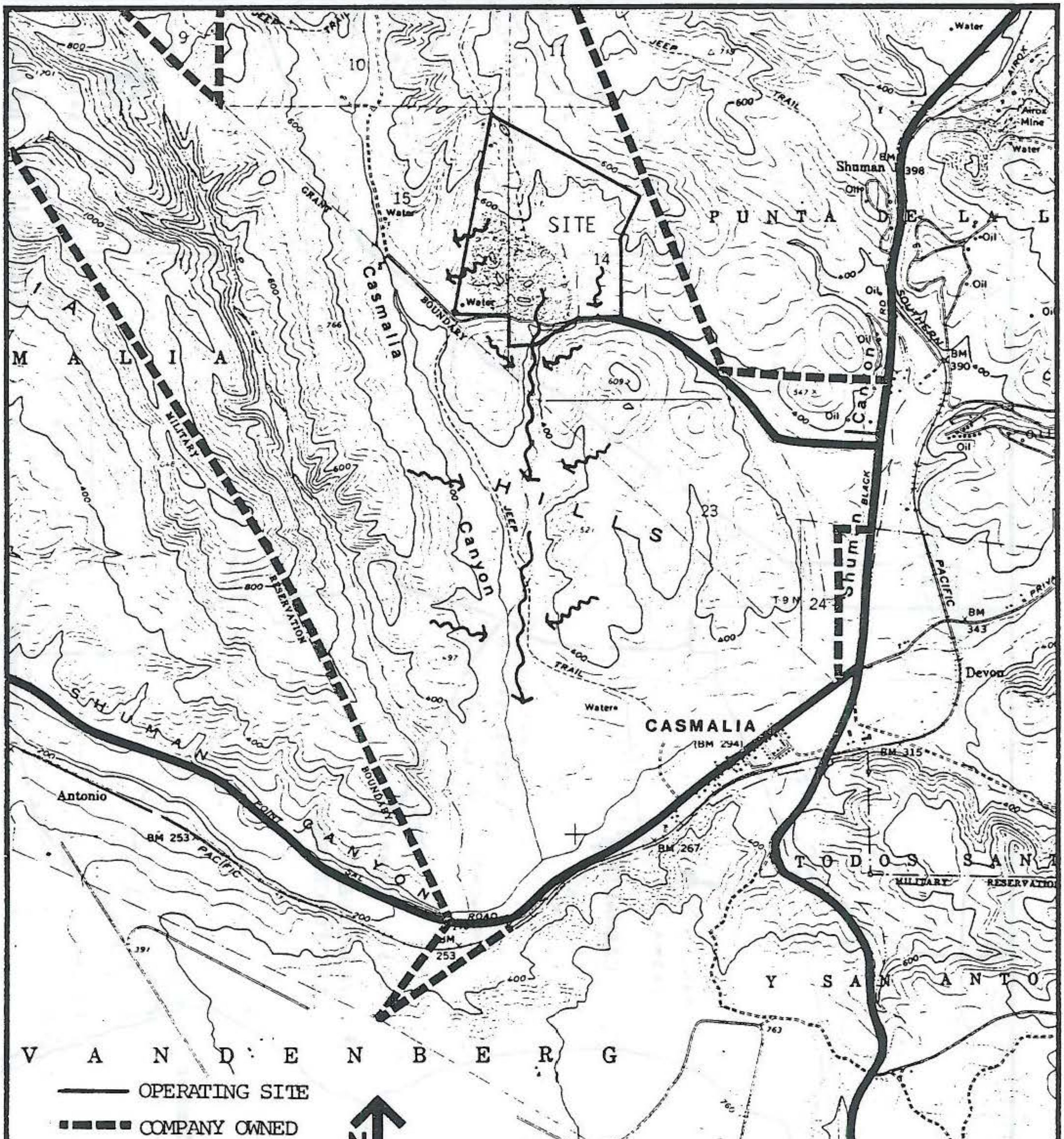
Land surrounding the property is either privately owned agricultural land or involved in the oil industry. Surrounding land use 1000' from the property is cattle ranching. The majority of this land is also designated as agricultural preserve. The land is zoned A-II (40+ acres for agricultural use). The Casmalia Oil fields to the southeast and east of the site are being operated by Arco and Union Oil companies respectively. (See Figure 5.3)

Casmalia Resources is a limited partnership. Hunter Resources, owned by Kenneth Hunter, is the general partner responsible for managing and conducting affairs for Casmalia Resources.



Source: Santa Maria Chamber of Commerce

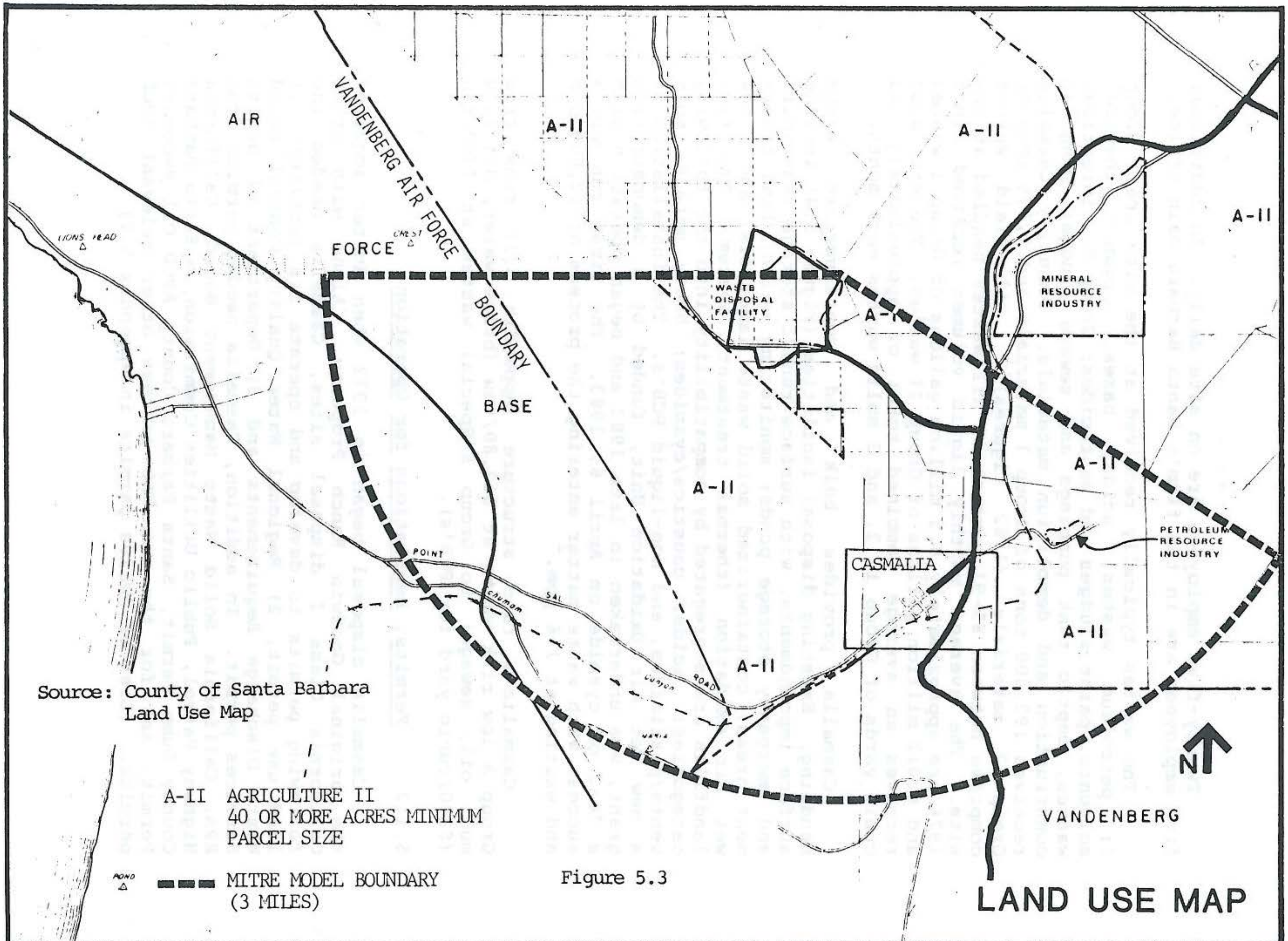
Figure 5.1



Source: USGS Casmalia Quadrangle

Figure 5.2

SITE MAP



Source: County of Santa Barbara
Land Use Map

A-II AGRICULTURE II
40 OR MORE ACRES MINIMUM
PARCEL SIZE

MITRE MODEL BOUNDARY
(3 MILES)

Figure 5.3

LAND USE MAP

Twenty-five employees are on site daily. An additional five employees are in the firm's Santa Barbara main office.

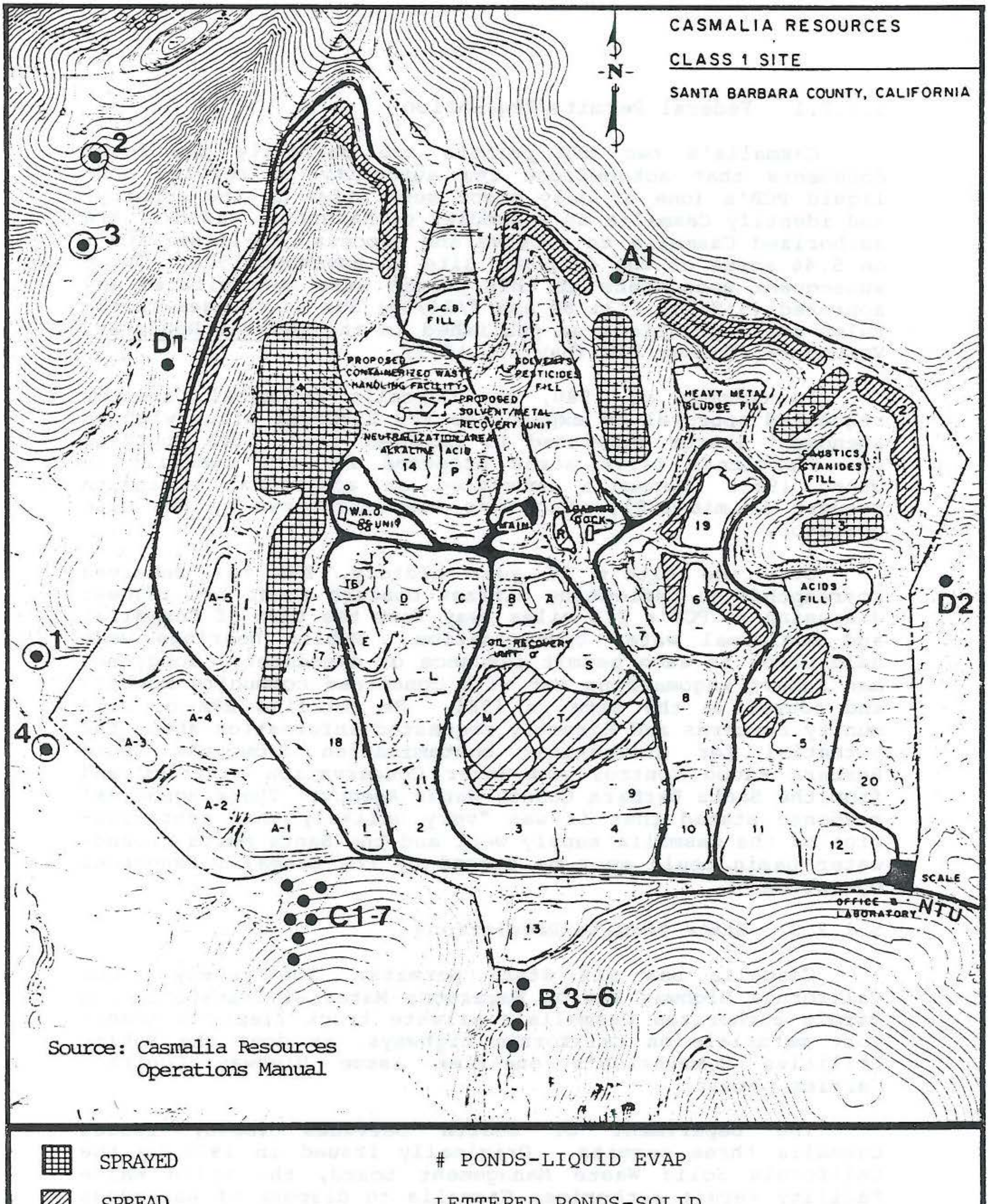
The wastes typically received at the site are: Group 1: petroleum wastes, acids, bases, organic chemical solvents, paint sludges and pesticides; Group 2: infectious wastes, septic tank pumpings and sewage sludge; Group 3: construction and demolition materials. Annually Casmalia receives 192,000 tons of Group 1 materials and 1,175 tons of Group 2 materials (1982 figures).[1] Oil field wastes comprise between 85-91 percent of all wastes handled at the site. The average monthly liquid volumes received since 1976 are approximately 0.5 million gallons of Group 1 wastes and 0.012 million gallons of Group II wastes. The site also receives an average combined total of approximately 180 cubic yards of Group 1, 2, and 3 solid wastes each month.

Casmalia provides bulk and containerized waste handling. Existing disposal facilities (Figure 5.4) include surface impoundments, with surface runoff storage reservoirs and emergency storage ponds; monitoring wells; land treatment areas; containerized solid waste landfills; and a new wet air oxidation (thermal treatment) system. The five landfills are segregated by compatibility into the following categories: acids; caustics/cyanides; heavy metals; solvents/pesticides, and non-liquid PCB's. The installation of a new Wet Air Oxidation Unit, funded by a demonstration grant, was undertaken in late 1982 and began operation with a load of cyanide on April 6, 1983. The first run was a success with waste matter entering the process at 12,000 ppm and exiting at 1-6 ppm.[2]

Casmalia's rate structure (Appendix 5.1) runs from Group A low risk waste at \$12.80/ton (brine water, drilling mud, oil, sewage) to Group E/Special wastes at \$300/ton (\$300/cubic yard for PCB's).

5.1.2 Permits, Regulations for Operation

Casmalia disposal began in 1972 when Hunter acquired the original Goodwin Ranch Property. Along with other California Class I disposal sites, Casmalia needed the following permits to develop and operate its facility: 1) land use permit, 2) Regional Water Quality Control Board Waste Discharge Requirements and 3) Department of Health Services permit. In addition, Casmalia needed permits from EPA, California Solid Waste Management Board, California Highway Patrol, Public Utilities Commission, a Santa Barbara County Dump Permit, Santa Barbara County APCD Oil Recovery Permit, and for the new WAO process other relevant APCD permits. (List of twelve permits in Appendix 5.2)



Source: Casmalia Resources Operations Manual

SPRAYED	# PONDS-LIQUID EVAP
SPREAD	LETTERED PONDS-SOLID
CASMALIA DOMESTIC WELLS	"A-1"-NEW POND
MONITORING WELLS	Figure 5.4

FACILITY MAP

5.1.2.1 Federal Permits/Regulation

Casmalia's two EPA permits are basically pro forma documents that acknowledge its authority to receive non-liquid PCB's (one of only eight such sites in the country) and identify Casmalia as a handler of hazardous wastes. EPA authorized Casmalia to receive and process non-liquid PCB's on 5.46 acres of the disposal site in November 1978. Three subsequent amendments of this permit were necessitated and approved (3/9/79, 1/31/80 and 3/24/80) due to changes in the rules and regulations as published in the Federal Register, Volume 44, Number 106 (May 31, 1979).

In October of 1980, the Casmalia Technical Director requested approval to expand the PCB disposal site, with an amendment letter submitted in December 1980. EPA approved the additional 14.08 acres proposed for PCB landfill in June, 1981. Casmalia submitted an additional expansion request in mid-1981, which was soon withdrawn by the site operator.

Over the site's 11 year history, EPA has received correspondence reflecting citizen concern about two issues: disposing of PCB's 2.5 miles away from the town of Casmalia, and municipal water contamination. Public hearings were held prior to each permit issuance or amendment. Congressman Robert Lagomarsino met with concerned community members and toured in the site in 1981. He notified EPA of community concerns and directly requested information about the potential for groundwater contamination from the Santa Barbara Flood Control and Water Conservation District and from the Santa Barbara County Water Agency. These agencies' response stated that it was "very unlikely that contamination of the Casmalia supply well and the Santa Maria groundwater basin could ever be caused by the Casmalia Resources operation."[3]

5.1.2.2 State Permits/Regulations

Casmalia has six State permits. The yearly-issued California Highway Patrol Hazardous Material Transportation Permit authorizes Casmalia's private truck fleet to transport materials on California highways, as does the Public Utilities Commission's one-time issue Highway Contract Carrier permit.

The Department of Health Services (DOHS) issues Casmalia three permits. Originally issued in 1978 by the California Solid Waste Management Board, the Solid Waste Facility Permit authorizes Casmalia to dispose of hazardous wastes along with municipal solid wastes. Responsibility for this permit was transferred to DOHS in April of 1979. Additionally, the DOHS issues Casmalia a Hazardous Waste Hauler Permit. These DOHS permits are for the most part based on the existence of proper procedures for above-ground handling of chemical wastes, and contain a contingency plan in case of accident or accidental discharge. DOHS's oversight duties are anticipated to change and increase as RCRA is implemented.

The Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements specify what kinds of wastes the facility may receive and what measures must be taken to prevent groundwater pollution. This permit was first issued on April 14, 1972, and has been revised several times.

Contact with and oversight of the operations at Casmalia has originated primarily from DOHS and RWQCB. The major questions focused on the permeability of soils on the site, and the existence and possible contamination of groundwater. From the site's inception State personnel have been encouraging water tests in and around the site. Most tests, other than the self-monitoring required by DOHS and RWQCB, were initiated as a response to citizen concern over the groundwater contamination issue. State Assemblyman Gary Hart requested the Department of Conservation to prepare a report on Casmalia in 1981. In the report, additional laboratory and field permeability tests were recommended.[4] A subsequent site visit in December 1981 was conducted by Gary Hart and DOHS Hazardous Waste Management Chief Peter Weiner.

In late September 1979, RWQCB tested the water in monitoring wells for contaminants, with negative results. Again in June of 1981, RWQCB tested the water; negative results. DOHS tested the water for PCB in December 1981, with negative results. DOHS tested again for 113 organic compounds at the one-part-per-billion level in July 1982, with negative results.

Casmalia has never been denied a State permit, nor has one been rescinded. In December 1973, February and March 1976, and February and March of 1978, wastewater spillage/discharge incidents warranted letters of reprimand from RWQCB to remedy the situations under threat of cease and desist orders or other enforcement action. (See Chapter 5.1.3 for further information.)

5.1.2.3 Santa Barbara County Permits/Regulations

Casmalia obtained a land use permit from Santa Barbara County in August of 1972, which was amended in 1976 to allow for site expansion. These permits certify that the facility does not conflict with existing land use or land use plans. The County also issued a permit authorizing facility operation in 1972. In practice, these permits indicate that the facility has local political support. The Casmalia Resources proposals ran into opposition with the original conditional use and disposal facility permits. The major issue was the compatibility of a Class I site with existing agricultural preserve status of the property. The Planning Commission denied the applicant's requests; the Agricultural Commission wallowed in confusion; the Board of Supervisors, as an appeal body, ordered a change in the definition of Agricultural Preserve and overrode its own Planning Commission's denial.

Three processes produce air emissions on the site: evaporation, neutralization and wet air oxidation. Five permits from the Santa Barbara County Air Pollution Control District regulate these potential emissions. One permit authorizes the oil recovery operations (issued in 1980, for three years.) The remaining four permits are of recent issue (4/83) for the new wet air oxidation unit.

Continued concern about groundwater safety led the County to request the Grand Juries of 1980-81 and 1981-82 to focus upon Casmalia Resources. Many North County citizens felt that the first Grand Jury was too biased to report any conclusive findings. The findings of the 1981-82 Grand Jury led to two major developments in 1983: 1) the initiation of water testing in and around the site by the County Environmental Health Department and 2) a new 7 percent tax on fees for wastes received, intended to help reimburse the County for this testing, as well as for additional road maintenance and patrol near the site.

5.1.3 Incidents/Issues

A continuing issue of concern to citizens, elected officials, and government agencies alike, is the groundwater contamination potential. Though most consultants' reports cite the limited amount of groundwater at very shallow depths (25') and note that aquifer contact is doubtful, the fear continues. A number of monitoring schemes by a variety of site-regulating government entities has attempted to address the issue. Consequently one finds scattered data, each testing for different compounds in different or erratic time frames. Resolving the questions conclusively has eluded the efforts of well-intentioned and alarmed neighboring residents.

Related to the above issue is the topic of permeability of the underlying bedrock. This coupled with the known incidents of waste discharge after heavy rainfall, lead some to question the site's location and capacity to contain waste during a heavy rainfall season, experienced twice in the site's history (1972-73 and 1977-78).

Citizen concern on all these issues remains active, reflecting the inability of current monitoring/regulation activities to allay local concerns.

5.1.3.1 Wastewater Discharge Issue

The major source of violations in Casmalia's 11-year history has been wastewater discharge. The California Regional Water Quality Control Board (RWQCB), Central Coast Region based in San Luis Obispo, has been the regulatory agency in charge of inspecting the facility and documenting reports of violations.

A 1973 wastewater discharge warranted the RWQCB to order immediate action upon threat of "withdrawal of site classification."[5] Staff members of the RWQCB and a geologist from the State Water Resources Control Board made an inspection of the site in September of 1973. The visitors found that a seepage collection gallery contained considerable water. Samples were taken and sent to the State Department of Public Health for analysis. Pending lab results, the general appearance and odor of the sample collected from the seepage collection gallery was highly suspicious.[6] The site owner was notified to pump out the collection gallery and to provide a positive hydraulic barrier between the waste upstream of the dam and water downstream.

Another visit to the site by geologist Alvin Franks of the State Water Resources Control Board in November of 1973 did not discover actual discharge, but cited inadequate discharge prevention measures. Franks specified the following deficiencies that needed correction:

1. Permanent pump installation must be constructed, maintained and operated at both the lowermost reservoir and the infiltration gallery.

2. All wastes discharged into the area to the south of the drainage divide and tributary to Casmalia Creek must be removed and deposited within the authorized place of disposal.

3. All dikes constructed within the Casmalia Creek watershed must be removed and the areas regraded, seeded and returned to as near to pre-disturbed conditions as possible.

4. Levees must be constructed in the disposal area to provide for a minimum of 2 ft. freeboard in all disposal ponds.

5. A full-time operator must be at this site to control, record, and otherwise supervise disposal of the Group I wastes at any time the area is open.

6. Water level recorders or gauges must be installed in the observation well, the lowermost reservoir and the collection gallery to be used in conjunction with a permanently installed pump at the gallery to provide for a positive depression in the water table.[7]

In March of 1975 a site visited was made by a member of the RWQCB staff and the following violations were noted:

1. The site is not adequately protected against unauthorized persons, wildlife, and pets entering and coming into contact with Class I material.

2. The area presently being used for domestic sludge disposal is located on a hillside where runoff can reach the drainageway.

3. The area located just above observation well B-1 appears to have overflowed during the recent rain storms allowing runoff to leave the designated disposal area.[8]

All of these were indirect violations of the Waste Discharge Requirements.

A March 30, 1976, site inspection revealed that Group 1 materials were being used as fill material and being stockpiled. Though this stockpiling did not violate the permit it was felt that "runoff and/or drainage from the dike and the stockpiled material could enter a collection basin... and eventually discharge into Casmalia Creek."[9] Immediate action was requested.

On January 19, 1978, site owner Hunter informed RWQCB that a three inch downpour on January 16, threatened a temporary dam and a permanent one. The site foreman began to pump the water behind the dam to the downstream side. Pumping took place for approximately 24 hours.[10] Subsequent water analysis samples taken by the RWQCB inspector revealed that the discharge contained higher than normal values of sodium, chloride, calcium, and magnesium, but no heavy metals. Discharge again occurred intermittently on February 10-11 and 18-23 and March 11, 1978.

The discharge incidents were attributed to insufficient handling of drainage from the east side of the site (proposed expansion area), due to incomplete embankments. Reports of the discharges were sent to RWQCB and met with considerable concern, especially since the barriers that would normally curtail this discharge had supposedly been constructed 11 months earlier as necessitated by site expansion.[11]

In a report submitted to the RWQCB, Casmalia Resources described reasons for the construction delay and methods being taken to prevent further discharge, and reiterated that no overflow of receiving ponds or toxic materials had occurred; the discharge was "essentially rainwater."

In 1978 the site owner informed the RWQCB that he intended to expand the site to the west. The Board was concerned given the recent discharges at the site and the operator's inability to "adequately contain all water and waste within the designated discharge area," and requested that a "hydrologic balance be completed"[12] (study of water flows entering and leaving the site). The Board's staff recommended no expansion pending the need to address existing site problems. Casmalia was requested to perform a hydrologic balance study and show that the site could contain water and wastes on site during two heavy rainfall years in succession. A revised permit (Order 79-01) required that Casmalia annually demonstrate capacity to contain the wastes during the next rainy season. No expansion was included in this permit.

In 1980 the intent to expand was again expressed by the site owner. The major concern of the RWQCB staff at this time was the permeability of the underlying Sisquoc formation. The site owner responded with supporting consultant reports.[13] Results led to restrictions in areas of waste deposits and strict requirements on construction of the new dam, to prevent impact on groundwater. In November 1980, the RWQCB issued a revised permit (Order 80-43) which includes monthly monitoring of waste discharge, groundwater, pond levels, sedimentation, and climatology. An annual report continues to be required to assure the site's capacity for containment during the on-coming wet winter period. Since the numerous discharges in 1978, no other discharges have been reported.

5.1.3.2 Groundwater Contamination Issue

The issue of groundwater contamination has been of greatest concern to the public and regulating agencies over the 11 years of Casmalia Resource's operation. Private citizens have taken it upon themselves to sample and fund tests of groundwater around the Casmalia site either to substantiate or alleviate their fears of municipal water contamination. (See Chapter 5.2.3.5, Groundwater Monitoring.) Elected officials at all levels have been approached by citizens and have initiated their own investigations into the groundwater contamination issue. To date, there is no hard evidence of groundwater contamination. However, this conclusion exists from an uneven data base over the years with no tests for hazardous work constituents ever conducted for areas outside the subject property before the site's opening, nor, until recent years, after operations began.

Results of the Santa Barbara County Grand Jury of 1981-82 have set the stage for a more comprehensive, local groundwater monitoring system.

5.1.3.3 Agricultural Preserve Issue

Fifteen of the 17 total parcels of land on which the Casmalia site is located maintain agricultural preserve status. Known originally as the Goodwin Agricultural Preserve, the 840 acres are designated 100-AG for open space grazing uses in the Santa Barbara County General Plan, and contracted as an agricultural preserve in a contract dated January 1, 1971. In May of 1972, the County's Agricultural Preserve Advisory Committee heard the preliminary proposal by site owner Kenneth Hunter to use agricultural preserve acreage as a disposal site. The Board of Supervisors amended the Agricultural Preserve rules specifically so that Casmalia could retain its agricultural preserve contract, which reduces property taxes on the site.

The CUP was approved in August of 1972, and the Agricultural Preserve status retained. The key issue was the condition requiring return of the land to normal grazing use. This condition in the permit states:

"The operation of this waste disposal facility shall be conducted so as to comply with the spirit and intent of the California Land Conservation Act and of Article XXVIII of the use for waste disposal purposes of each portion of the site, an overburden of at least three feet in depth shall be placed thereon, the overburden shall be reseeded with pasture grasses suitable for the area, and such procedure shall be performed to assure the return of the land to a normal grazing condition to the satisfaction of the County Agricultural Commissioner and the County Farm Advisor."[13]

To date the question remains as to whether this condition can be met. The most recent inquiry as to compliance with this condition came from Ron Gilman, Assistant Agricultural Comissioner for Santa Barbara County and Chair of the Agricultural Commission. Mr. Gilman requested information from the DOHS about the site's return to grazing as per the conditional use permit. Earl Margitan, Senior Waste Management Engineer with the Hazardous Materials Management Section of DOHS, replied, "Returning the land to a condition suitable for livestock grazing during the post-closure period of the site is a use prohibited under Section 25117.3 of the Health and Safety Code."[14] Margitan added: "We do not believe at this time that the CUP permit condition can be safely met without posing a public health hazard. Our primary rationale for this position is the apparent potential for hazardous constituents to enter the human food chain."[15] He has recently stated that the issue has not been resolved.

receipt of all liquid and Class 1 wastes. To Ventura County Resource Management Agency's knowledge, VRCSD did not send confirmation[5] that the pond had been or would be back-filled.

On July 9, 1982, it came to the attention of the DOHS that one ton of PCB's had been accepted in the Class I area between 1971 and 1980. The DOHS indicated that the VRCSD had no permit from state or federal regulators to allow storage of PCB's, and that it would investigate. VRCSD would have to (1) obtain a permit to bring the storage of PCB's into compliance or (2) obtain a permit to dispose of PCB's. The VRCSD had not applied for a retroactive permit prior to the termination of its operations.

On July 14, 1982, the Simi Valley City Council passed Resolution No. 82-81 regarding the landfill. The resolution cited the various reports on the site and requested that the County Board of Supervisors take immediate action to investigate "a very significant potential public health hazard."[6] The Board then directed its staff to request that the DOHS and the RWQCB determine whether a problem existed.

To answer questions about waste migration, the new owner, CWM, commissioned a study of the hydrogeologic setting, identification of primary groundwater flow directions, recommendations for groundwater protection and monitoring, and the feasibility of treatment and disposal of oil field wastes (for which CWM has filed preliminary design plans). On January 18, 1983, CWM, through its consultants (EMCON Associates), submitted a draft report to the RWQCB entitled Environmental Status and Groundwater Protection Plan, Simi Valley Disposal Facility. The report presents the results of the environmental assessment and a recommended groundwater monitoring program and the protection plan for the landfill. As a result of this and other studies, conducted by CWM, following those initiated by CWDD, CWM feels confident that it has found (1) no threat of groundwater contamination; (2) no off-site migration of hazardous components; and (3) no recharge from regional groundwater table.

Revised WDR's approved on May 23, 1983, by the RWQCB, addressed many of the concerns raised by the County and the City of Simi Valley. The features of the revised WDRs of particular interest include:[7]

1. The placement of Group 1 wastes, hazardous wastes, and toxic wastes at the landfill site are prohibited, except as modified by a special condition. This condition would permit the acceptance of oil field wastes or other non-hazardous liquid wastes if pending investigations demonstrated that acceptance of such wastes would not degrade the waters of the State (i.e., ground water and off-site surface water).

2. All leachate from the site must be intercepted and pumped out when detected, and disposed of at a legal disposal site. Leachate collected from the site may be used on internal roads for dust control, or placed with surface improvements for solar evaporation. For the purpose of this requirement, the work program filed with RWQCB to mitigate the leachate problem must be implemented.

3. A field exploratory work program must be submitted to RWQCB to further define regional groundwater conditions, to develop and implement a comprehensive groundwater monitoring program, and to determine any mitigation measures that may be necessary.

4.1.3.3 Change In Ownership

The Simi Valley Landfill was originally leased by the County of Ventura for a period of 18 years beginning January 1, 1970 and ending December 31, 1987 with an option to terminate after 13 years. The County established the site as a Class I facility and in 1972 transferred the leasehold to VRCSD which assumed the operation of all publicly-owned sanitary landfill facilities in Ventura County. Until January 8, 1983, the landfill was operated by VRCSD on lands owned by the Moreland Investment Company, a subsidiary of the Union Oil Company. At that time, title was transferred to Chemical Waste Management, Inc., which assumed responsibility for operation of the disposal site. CWM is a wholly-owned subsidiary of Waste Management, Inc.

The sale of the landfill to CWM was the culmination of several years of negotiations with other potential buyers and operators. In November of 1981, the VRSCD Board directed that an offer be made to Moreland to buy the site. This offer was not accepted. At that time the VRCSD had a strong commitment to continue landfill operations. There was discussion by the District regarding possible condemnation proceedings if a serious threat to the District's continued use of the site emerged. In August of 1982, a special meeting of the VRCSD Board was held which questioned the District staff's ability to continue operating the site. On September 16, 1982, the Board considered a "Finding of Need and Public Necessity" to acquire the site under eminent domain. At this meeting the VRCSD Board declared that it could not support acquisition of the site. The Board vote was one shy of the required two-thirds majority. Therefore, the Board did not approve the condemnation proposal, and the site was sold to CWM.

It is CWM's point of view that VRCSD did everything possible to dissuade CWM from purchasing the site, and to dissuade Union/Moreland from selling the site to CWM. This included the threatened condemnation of the property to maintain VRCSD control. CWM further viewed VRCSD's request to EPA to return its part A application as a tactic to prevent CWM from operating the site as a hazardous waste disposal facility.

4.2 SYSTEM DEFINED

4.2.1 <u>The Physical Site and its Geohydrology</u>

The hydrogeologic setting of the Simi Valley landfill has been extensively studied. (See Appendix 4.3.) Numerous reports from 1970 on describe details of a data base on groundwater conditions. The most recent report (EMCON Associates, <u>Environmental Status and Groundwater Protection Plan Simi Valley Disposal Facility</u>, January 14, 1983) was used as the general basis for the following section, unless otherwise noted.

4.2.1.1 Physical Description

The landfill is situated within the Transverse Ranges geomorphic province with characteristic east-west trending mountain ranges and intervening valleys. The site is enclosed to the north, east and west by roughly northeast trending ridges. Alamos and Brea Canyons lie to the west and east of the site respectively. These canyons and the site drain towards Arroyo Simi. Arroyo Simi is intermittent, containing surface flow only during and shortly after periods of rainfall, although there are indications that flow may be year-round.

The local and regional hydrology is such that the site is not subject to flooding or washout. The site is located in a limited drainage area. The lowest portion of the landfill is at an elevation of approximately 765 feet, 85 feet above the floor of the Simi Valley.

4.2.1.2 Geohydrology

The landfill is underlain by poorly to weakly cemented interbedded sandstone, siltstone, claystone, and minor conglomerate, assigned to the Sespe formation of Oligocene geologic age. Bedding strikes roughly east-west and dips uniformly to the north at 20 to 35 degree inclination.[8] Alluvial materials on-site consist of sandy brown soils rich in humic matter. Except in the extreme southern portion of the site, these soils are essentially devoid of gravel, cobbles, and other highly permeable materials and are rarely more than ten feet thick.

Several faults have been identified on-site and in the vicinity (See Figure 4.4).[9] Major faults in the vicinity include the San Andreas (active), Santa Susana-Sierra Madre (active), and the Simi-Santa Rosa (potentially active). The Simi fault is located approximately one mile south of the landfill and trends east-west. The Strathern fault (inactive) extends through the center of the landfill, roughly separating the Class I and II areas. The Canada de la Brea fault (inactive) dips under the Class I area. The probability of future surface rupture occurring along these two faults is considered low. However, faulting at the landfill is suspected of influencing groundwater occurrence and movement. Movement toward the valley of groundwater within the bedrock is restricted by the inactive faults.

The site lies within the Sespe formation on the northern limit of the extensive Simi Anticline. The anticlinal structure isolates the site from the alluvial acquifers of Simi Valley and creates a perferential groundwater flow path away from the valley. Regional groundwater flow is from northeast to southwest adjacent to and beneath the site at a gradient of about 170 feet per mile. Groundwater flows from this regional system merge in the Arroyo Simi with westward moving discharge from the western end of Simi Valley. The only direct hydraulic connection between the site and Simi Valley alluvium is through shallow alluvial-filled channels of canyons which drain to the south. Groundwater within a mile or less of the landfill occurs under perched, water table, and artesian conditions. Immediately adjacent to the landfill, groundwater occurs at elevations of 870 to 980 feet, or about 10 to 40 feet below the land surface.[10] At the landfill, groundwater moves both vertically downward and laterally to the southwest. Groundwater levels are variable and seasonally dependent on precipitation.

EMCON determined that the lithology of the Sespe formation plays a major role in the movement of groundwater in the landfill vicinity. Groundwater occurs beneath the site in two distinct aquifer systems:

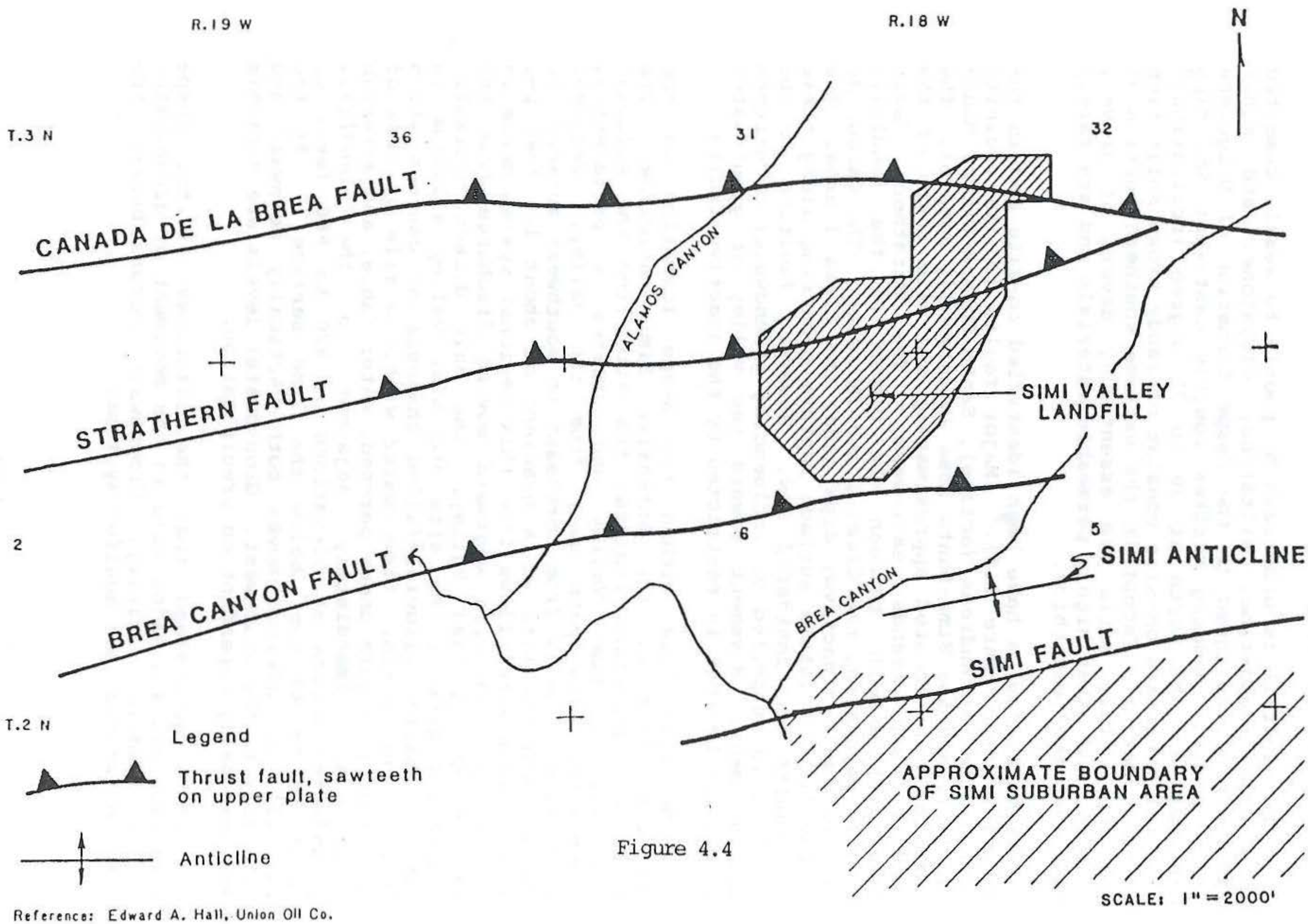


Figure 4.4

Source: Converse Ward Davis Dixon, Inc., "Hydrogeological and Water Quality Investigation", Dec. 1980.

FAULT MAP

- o <u>Alluvial System</u> -- Comprised of ground water in the alluvial deposits along the canyon floor; the water in this system moves under a hydraulic gradient parallel to the land surface.

- o <u>Bed Rock System</u> -- A series of non-interconnected waterbearing and non-waterbearing beds of the Sespe formation. These beds slope back into the Simi Valley landfill canyon and strike in an east-west direction.

Surface elevations at the landfill range from 760 feet at the lower end to nearly 1,160 feet at the upper end. An ephemeral tributary drainage above the toe of the fill basically conforms in size and shape to the limits of the site. The catchment area for surface water flow into the Class I site amounts to about 50 acres (not including the disposal area which is another 30+ acres). Surface runoff flows generally southwestward. Runoff flowing to the north and west eventually drains to Alamos Canyon, west of the site. (See Figure 4.5.) All other runoff flows to Brea Canyon, east of the site. Both of these canyons open to Simi Valley and drain into Arroyo Simi which flows westward 11 miles to join Calleguas Creek near the town of Somis. Drainage on-site is controlled both temporary and permanent runoff diversion and conveyance facilities, as well as proper grading. A basin located in the southern portion of the site currently serves as a catchment basin for on-site runoff.

<u>Wells</u>

The Sespe formation constitutes a limited source of water supply because of its poor water quality (high total dissolved solids and a calcium sulfate character), insufficient storage capacity, and poor flow characteristics. Groundwater in the Sespe Formation in the landfill vicinity is of poor quality due to:

- o Naturally occurring oil and high salt content (conate) waters.

- o Contamination resulting from the past practice by oil producers of ponding oil production brines for infiltration into the Sespe Formation.

Most of the wells originally drilled in the area have been destroyed or abandoned. Because of the poor water quality, the wells were only used for irrigation, stock watering, or test purposes. The few wells left in the vicinity are currently being planned for permanent sealing by the Union Oil Company.

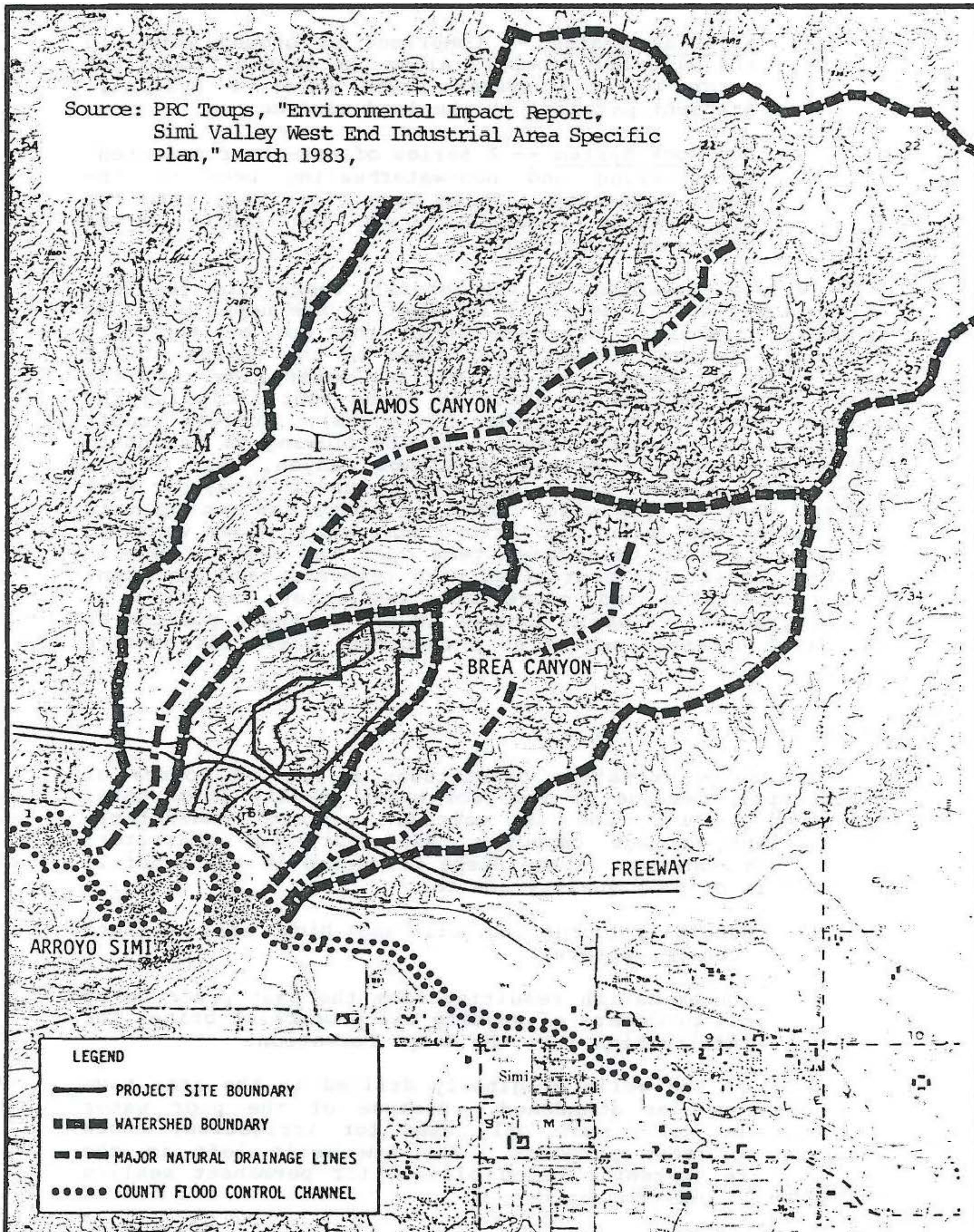


Figure 4.5 **EXISTING HYDROLOGY**

Information concerning groundwater occurrence and development in the pre-operational period is rather limited. A January 1970 study done by the Los Angeles office of the Department of Water Resources concluded that there were no known wells in the proposed disposal area, hence depth to groundwater and groundwater quality were not determined.

A water well inventory was conducted by Converse Ward Davis Dixon (CWDD) in 1980 to estimate groundwater development within a one-mile radius of the Simi site. They reviewed files in the Los Angeles office of the Department of Water Resources and in the Ventura County Water Resources and Flood Control Division. Logs for wells drilled after 1949 are considered proprietary and can be used only with the owners' permission. Most of the wells in the area were drilled after 1949; hence, this ruling limited the records search. Permission was given by the Union Oil Company to review drillers' logs for all water wells on its property. The file search was followed by approximately one week of field reconnaissance to locate wells, measure water levels, and determine present well status (active, inactive, destroyed) and use (domestic, stock, dewatering,* etc.).

Emphasis was placed on locating wells that were adjacent to and hydraulically downgradient from the disposal area. These wells, if any, would be the first to be affected by any off-site contaminant movement. Wells located in areas clearly upgradient from the Class I site in particular were also of interest for background monitoring purposes.

Although numerous wells have been drilled in the westen end of Simi Valley, these are located in the discharge portion of the Simi Valley groundwater flow system and are in areas characterized by upward flow gradients. In addition, the wells are upgradient from groundwater in the area of Brea and Alamos Canyons and the disposal site. Discounting the numerous wells in the upgradient areas, there were approximately 54 wells of record. Of these approximately 20 have been abandoned and 16 more, destroyed. The status of 14 wells was unknown. Only four wells are being used for potable supply. Three of these are hydraulically downgradient from Simi Valley and from the disposal site.

Numerous abandoned and inactive wells dotting the area attest to conditions of poor water quality or yield. Largely because of poor water quality, especially from deeper wells in the Sespe Formation, the wells were primarily used for irrigation, stock watering, or test

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* Dewatering in the removal of water from an area to lower the water table level and thereby reduce liquefacation potential.

purposes. Water quality from shallow wells in the alluvium is noticeably better, but well yields are poor owing to inadequate aquifer thickness and storage. Wells in the thicker sections of alluvium, particularly in Arroyo Simi, yield adequate quantities of water of poor quality, and little or no use is made of the water.

In the western end of Simi Valley, and still further westward in Arroyo Simi, very shallow groundwater high in chloride, and occasionally hydrogen sulfide, occurs under artesian conditions. Groundwater flow is upward and westward as well. Discharge occurs naturally as seepage to Arroyo Simi and as evapotranspiration. In addition, the City of Simi Valley operates three dewatering wells installed to lower the water table, thereby facilitating continuing real estate development and safeguarding existing development. Little if any use is made of the deep groundwater because of the high dissolved solids load. Appendix 4.5 contains a map of the location of the dewatering wells and water quality analyses.

The presence of leachate-contaminated groundwater was reported in shallow wells tested near the clay dike at the landfill. Field testing is necessary to determine the in-situ permeability contrast between the alluvial and underlying Sespe (bedrock) deposits near the dike. These tests will provide important data on contaminant transport, if any, in the subsurface bedrock media. The resulting data will further determine the design and construction of an effective leachate control and extraction system to sever any potential hydraulic continuity with the landfill. Groundwater recharge to the landfill has not been demonstrated based on the groundwater levels measured in the existing monitoring well locations.

According to RWQCB, because of sparse and incomplete groundwater quality data, there is only conjecture about landfill-related groundwater pollution which may be attributable to other sources. Thus, it is important to initiate a sampling and analytical program to characterize thoroughly inorganic and organic parameters in groundwater from properly constructed existing and proposed monitoring wells.

4.2.1.3 Waste Leachate Migration Potential[11]

Borings and resistivity soundings indicate that fluids in scattered zones within the Class I area are stratified within the wastes. These fluids are perched in areas where they were spread or ponded and then absorbed in the refuse fill. Attempts to extract fluids from the landfill have been unsuccessful due to their limited mobility. The opportunity for limited quantities of fluids to migrate from the refuse/waste is confined to the following conditions.

- o Contact of saturated wastes with underlying permeable alluvial deposits.
- o Contact of saturated wastes and/or alluvium with the more permeable beds of the Sespe formation.

The alluvium underlying the fill provides by far the greatest potential for collection and transport of any fluids leaving the landfill. In fact, both the relatively high permeability and location at the base (topographically lowest point) of the fill makes the alluvium an ideal natural leachate collection system. Any collected contaminants migrate relatively rapidly to the existing compacted clay seepage barrier at the mouth of the canyon.

Groundwater movement within even the most permeable beds of the Sespe formation is extremely slow (10^{-5} cm/sec). Field test and calculations indicate migration rates of less than 0.5 ft/yr in the Sespe formation, compared with flow rates in the alluvial zone of approximately 1,500 ft/yr. Due to the confined nature of the water-bearing beds, migration of fluids in the Sespe formation is limited to down-dip movement (northward) to the zone of saturation and then along the strike (east-west direction) of individual beds.

The potential movement of groundwater along the strike is influenced by the canyon topography. In the Class II area and most of the Class I area, where steep canyon slopes rise above the landfill, inward groundwater gradients (toward the landfill) are induced along the strike. However, recharge is minimal due to the steep slopes, narrow ridge area, and low permeability of exposed beds. Along the north end of the Class I area, the lower topography east and west of the landfill gives rise to a mild outward gradient along the strike.

The greatest opportunity for migration of pollutants into the Sespe formation occurs in the northeast corner of the Class I area. Here, anomalously high groundwater levels in wells may reflect a residual fluid mound created by past ponding of liquid wastes in the vicinity, or storm runoff waters ponded and entrapped in areas disturbed by previous site activities.

Should pollutants enter selected beds of the Sespe formation, the migration path would mirror groundwater movement and would therefore be confined to down-dip (northward) and/or along strike (east-west) directions. In either case, movement would be extremely slow (0.5 ft/year). In summary, the potential for off-site migration within the Sespe formation is confined to the northern portion of the Class I area of the site, where groundwater piezometric levels (elevations) decrease outward from the waste areas.

Percolation of groundwater occurs downward into the Sespe formation beneath the Class I area. The site is thought to be saturated from a few feet to a maximum of 25 feet, varying with the elevation of the water table and thickness of wastes. Water sampling conducted on the landfill site and within the immediate vicinity indicates low concentrations of organic constituents in groundwater within the Sespe formation below the landfill and immediately off-site, which indicates that leachates may have percolated into the regional groundwater system.[12]

In conclusion, it is necessary to state that there is still significant technical disagreement with regard to the hydrogeological setting of the site and the surrounding Sespe formation. Numerous groundwater monitoring wells have been installed and are being continually monitored under direction of the RWQCB. CWM has proposed a mitigation program if leachate containing chemical constituents becomes a problem. Perhaps the safest statement to make is that firm conclusions cannot be drawn at this time.

4.2.2 Waste Storage/Treatment/Disposal Operating Units

The 230 acre site is divided into three disposal areas to receive different categories of solid waste, identified as Group 1, 2, or 3 waste. Examples of Group 3 wastes include non-decomposible materials such as earth, glass, bricks, concrete, clay and abestos fiber. Group 2 wastes include ordinary residential/commercial rubbish, decomposible organic refuse, and scrap such as street sweepings, wood, lawn clippings, small dead animals, and small quantities of noxious material in mixed loads of rubbish. Group 1 material includes photochemicals, miscellaneous chemicals, grease, caustic, resins, asbestos, and wastewater treatment effluent. Until recently the Simi Landfill operated as a Class I facility, meaning that it accepted Group 1 wastes. As defined by the California Administrative Code, Group 1 wastes "consist of or contain...substances... lethal, injurious or damaging to man, or other living organisms including plants, domestic animals, fish and wildlife...and substances which could significantly impair the quality of usable waters."[13]

Four methods of disposal have been used; landfilling, controlled landfilling (see 4.2.2.3), surface spreading, and impoundment. In 1979, of a total 90,487 tons of Group 1 material accepted, 5,500 tons were hazardous waste. Of the total amount of Group 1 wastes, 1.4% were disposed of by controlled burial (including petrochemicals, solvents, corrosives, pesticides and resin wastes); 0.6% were disposed of by uncontrolled burial (including contaminated soil and sand, grease, paper and rags, and empty containers); and 98% were disposed of by surface spreading (including sewage sludge, brines, mud and water).[14]

The site now receives only Group 2 and 3 solid wastes and no liquids. Dewatered sewage sludge is allowed for disposal only over a designated sludge drying area. The sludge is dried and periodically hauled and landfilled with each day's incoming refuse. The impermeable basin for drying sewage sludge cake was completed in August 1982. The use of the sludge drying basin will allow increased drying times while conveniently handling additional quantities of municipal sewage sludges generated throughout Ventura County. With Regional Water Quality Control Board (RWQCB) approval, the landfill is continuing to provide the County a site for disposal of empty pesticide, herbicide, and fertilizer containers which have been double-washed.

The landfill receives approximately 635 tons of waste per day. As of October 1980, the remaining life expectancy of the landfill was three years. Estimates made in 1982 concluded the landfill could not reach capacity until 1987 or 1989. The new owner (CWM) proposes to expand the area of the landfill operation and increase the depth in certain areas. Thus, the remaining useful life of the landfill will likely be greater than the previous estimates. If expansion is permitted, a 25 year life expectancy could be possible.[15]

Controls are in effect at the landfill against noise, odor, litter, dust, insects, rodents, and fire. Vehicles comply with State and local noise standards and operation of the site is limited to daytime hours (7 a.m. to 4 p.m.). Odors are significantly reduced at night by completely covering the waste at the end of each operating day. Dust from daily cut and fill operations is reduced by sprinkling. No salvaging is permitted. No problems with methane gas have occurred at this landfill.

4.2.2.1 Impoundments: VRCSD Operations

Surface Spreading

A 25 acre surface area is present at the landfill. Only liquid wastes that do not present a hazard to site personel such as sewage sludges, oils and greases, are surface spread. (See Figure 4.6.)

Surface spreading involves the spreading of bulk tanker loads of liquid waste onto the land surface. It takes advantage of evaporation, biodegradation, sedimentation, adsorption, and absorption to concentrate and ultimately dispose of nonhazardous liquids. Evaporation is further increased by decanting the liquid portion and spraying it onto the surrounding land area. This method is currently not in use.

Evaporation Pond

In December of 1980, VRCSD submitted to the RWQCB a special handling plan for the disposal of liquid sewage sludges and other compatible bulk liquids. A specially lined pond was constructed using bentonite as a sealer to provide a minimum of 10^{-8} cm/sec permeability to prevent percolation. The pond is located entirely within the Class I area. The pond covered 0.7 acre and was 10 to 12 feet in depth. A one and one-half foot freeboard was maintained in the pond to prevent overtopping during periods of rain.

In June of 1981, the VRCSD submitted to the RWQCB an <u>Operation Plan for the Spraying of Liquid Waste onto the Simi Valley Landfill Surface</u> and a chemical analysis of the liquid portion of the evaporation pond. The spraying operation began in July 1981. The evaporation pond was decanted and sprayed onto the adjoining landfill surface for evaporation. The application of the decanted liquids was to be continuously monitored to ensure the liquids did not infiltrate through the cover and contribute to the identified saturated wastes problem.

Source: Adapted from RWQCB Revised Waste Discharge Requirements, September 1982; VRCSD Simi Valley Disposal Site Hazardous Waste Operation Plan, Dec. 1980; and SCS Engineers, Simi Valley Landfill Hazardous Waste Evaluation, September 8, 1980 and December 15, 1980.

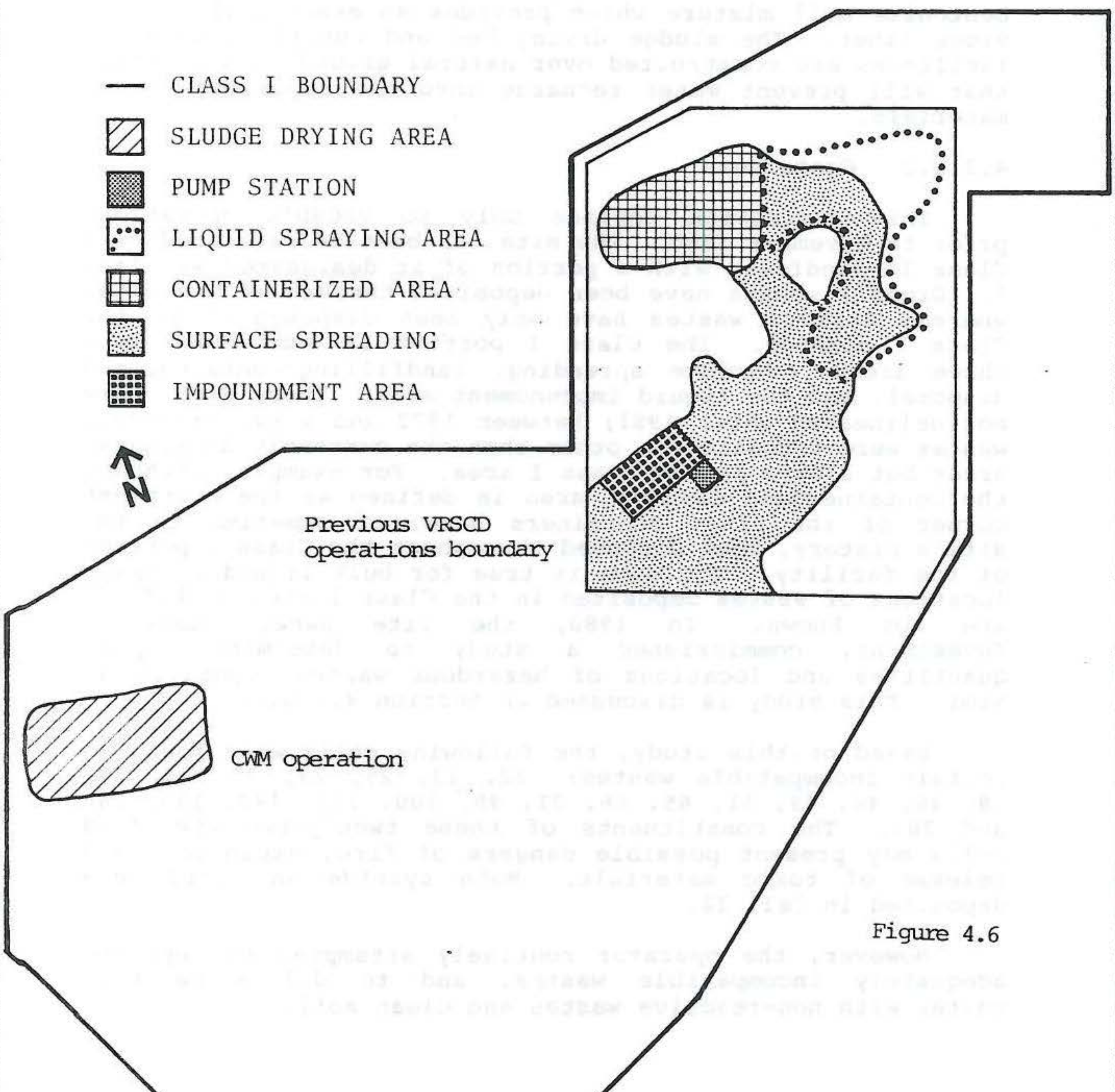


Figure 4.6

FACILITY MAP

Impoundments: CWM Operations

The site now receives only Group 2 solid wastes and no liquids. Dewatered sewage sludge is allowed for disposal only over the designated sludge drying area (See Figure 4.6), which meets the SWRCB's 10^{-6} cm/sec permeability guideline. The sludge is dried to 50% solids content and is periodically hauled and landfilled with each day's incoming refuse. Drainage control and runoff impoundment facilities also have been constructed to prevent surface discharge of polluted rainwater from the sludge drying area. The one-acre runoff containment basin is lined with a bentonite soil mixture which provides an essentially impervious liner. The sludge drying bed and runoff containment facilities are constructed over natural ground in a location that will prevent water recharge into the deposited refuse materials.

4.2.2.2 Containers

This discussion applies only to VRCSD's operations prior to November 1980. The site can best be described as a Class II landfill, with a portion of it designated as Class I. Group 2 wastes have been deposited throughout the site, whereas Group 1 wastes have only been disposed of in the Class I portion. The Class I portion is subdivided into three areas: surface spreading, landfilling/containerized disposal, and the liquid impoundment area. These areas were not delineated until 1981; between 1972 and 1980, hazardous wastes were deposited in other than the currently designated areas but always in the Class I area. For example, although the containerized disposal area is defined as the northwest corner of the site, containers have, at sometime in the site's history, been disposed throughout the Class I portion of the facility. The same is true for bulk liquids. Exact locations of wastes deposited in the Class I area in 1970-71 are not known. In 1980, the site owner, Moreland Investment, commissioned a study to determine types, quantities and locations of hazardous wastes deposited at Simi. This study is discussed in Section 4.1.3.2.

Based on this study, the following cells were found to contain incompatible wastes: 22, 23, 25, 29, 35, 36, 37, 38, 46, 48, 49, 51, 65, 66, 71, 98, 100, 112, 142, 155, 168 and 203. The constituents of these twenty-two specified cells may present possible dangers of fire, explosion, and release of toxic materials. Both cyanide and acid were deposited in Cell 22.

However, the operator routinely attempted to separate adequately incompatible wastes, and to dilute reactive wastes with non-reactive wastes and clean soil.

4.2.2.3 Landfilling (containerized burial)

This method comprises the normal sanitary landfilling of wastes and is used for Group 2 waste and was used for some Group 1 wastes that did not pose a hazard to site personnel. It does not prescribe strict identification and supervision of all waste received and landfilled. The type of operation at the landfill is the area method of landfilling. The Class I cell construction was composed of several layers of waste compacted on a slope by heavy equipment and enclosed on all sides by soil. Compaction was achieved by operating a tractor up and down the working face between three and five times on one-to two-foot waste layers. Daily thickness of compacted soil was not less than six inches after compaction. No waste was visible when the landfill was completed. The top and side slope surfaces of a completed fill noy covered within one week by another cell were covered with a layer of about 12 inches of compacted soil. When filling has reached the final planned grade, a final cover of at least three feet of compacted soil is placed and, in areas where trees are to be planted, four to six feet of cover may be required.

Controlled Landfilling

This method is used for most wastes defined as hazardous. VRCSD followed a strictly controlled permit application and approval procedure including disposal supervision. Briefly, wastes were initially screened for acceptability, a disposal area was specifically chosen for each waste received; incoming inspection, chemical testing, coordination, and disposal supervision were carried out. This method is further described in the following Chapter 4.2.3 (Recordkeeping).

4.2.2.4 Tanks: VRCSD Operations

CWM through its consultant, EMCON[16] Associates, has developed a Groundwater Protection Plan. As part of this plan, an alluvial seepage zone control system has been developed to eliminate leachate buildup behind an existing clay barrier. This seepage control system will involve the use of a 10,000 gallon storage tank to be located adjacent to the landfill entrance gate. Leachate collected in the storage tank will be absorbed on wastes in the active refuse fill area, in accordance with accepted practices in landfills located in semi-arid climates such as Simi Valley. The liquid disposal rate will not exceed the range of 15 to 25 gallons per cubic yard of landfilled solid waste, as suggested by the guidance document <u>Waste Discharge Requirements for Nonsewerable Waste Disposal to Land</u>.[17] This rate will enable up to 17,700 gallons per day of leachate (over four times the expected amount) to be safely absorbed and held in the active fill area at the estimated 1983 solid waste disposal rate of 635 tons per day.

4.2.3 Control Functions

4.2.3.1 General Facility Standards: VRCSD Operations

The landfill has received a wide range of wastes. During 1979 and 1980 approximately 70 companies within Ventura County generated hazardous wastes which were deposited at the landfill. An inventory of wastes disposed in the Class I portion of the landfill between 1971 and March 1980 was compiled by SCS Engineers.[18] Sources of information were the records of VRCSD and RWQCB. Included in this inventory were solvents, asbestos, polychlorinated biphenyls (PCB's), pesticides, petrochemical refining waste, petroleum distillates, cyanide, and industrial and plating sludges. Table 4.1 lists the types and volumes of hazardous waste accepted. Not all areas of the Class I site had been used for hazardous waste disposal. Locations of wastes disposed from 1970 through 1971 are unknown.

The following section was derived from discussions with VRCSD staff and the Simi Valley Disposal Site Hazardous Waste Operation Plan (December 1980) prepared by VRCSD, unless otherwise referenced. It pertains to VRCSD operations only unless otherwise noted.

Prior to 1980, when voluntary restriction on the acceptance of hazardous waste occurred, VRCSD implemented an incoming waste control program. All applications for disposal of Group 1 wastes were reviewed by the VRCSD professional staff to determine if the waste could be disposed of with no adverse effects on personnel or the environment. Wastes were accepted by appointment only, a field person verified the manifest, field tests were run to assure that the analysis matched the manifest, and then the waste was assigned to and placed in one of five different compatibility zones. This procedure was detailed in a procedures manual and a Waste Analysis and Identification Plan.

VRCSD disposal records consisted of individual load slips which indicated waste type, gallonage and/or tonnage, and disposal grid. Most load slips indicated weights, but in some cases only gallons of waste were recorded. In these cases, tonnages calculated by SCS Engineers were based on a presumed average liquid waste density of 8.34 lb/gallon (density of water). Some volumes reported in load slips were tank truck capacity and may not have represented the actual volume of waste disposed. Therefore, the volume and weight of wastes reported in the inventory may have been slightly overstated. In many cases, load slip amounts were reported in both gallons and tons. Where only tonnages were reported, wastes were presumed to be solids if not otherwise indicated on the load slips.

TABLE 4.1

HAZARDOUS WASTE TYPES AND VOLUMES ACCEPTED AT THE SIMI CLASS I DISPOSAL SITE

(Reference: SCS Engineers, 1980)

	Major Waste Types and Quantities Disposed from 1971 to 1980	
	Gallons	Tons
Alcohols/Solvents	335,000	
Asbestos		265
Caustics		2,500
EDC (ethylene dichloride)		1,400
Fireworks (pyrotechnic compounds)		12
Grease		430
Polychlorinated Biphenyls (PCB)		1
Chemical Oxidizers	17,000	
Paper Processing Waste		300
Paper/Rags		300
Pesticides	35,000	
Pesticide Containers		2,300
Petrochemical Wastes (including refining waste, and petroleum distillates)	270,000	
Resin		3,300
Cyanide		120
Industrial and Plating Sludges		335
TOTAL	657,000	11,563

VRCSD maintained a secure facility during the time of its operation. The public was not allowed into the Class I area. Entry was allowed to commercial vehicles only, and only when escorted by site personnel. A system of locked gates was maintained at the landfill. This system included a locked gate at the entrance to the landfill and a second locked gate at the entrance to the Class I portion. An adequate fence was maintained around the operating portions of the site to prevent livestock and unauthorized persons from entering the landfill. This fence also kept the surrounding area generally free of litter and other foreign material. Signs were maintained as required by regulation. Warning signs (in English and Spanish) limited access to the Class I area to authorized personnel only. No incidents of unauthorized entry or vandalism were recorded during VRCSD's operation. No hazardous wastes were ever disposed of by private vehicles.

Waste handling equipment included caterpillar dozers and scrapers, skip loaders, water trucks, fuel trucks, pickups, etc. All of this equipment had safety features such as windshields, spark arrestors, white cap respirators, and ventilation systems. There was an on-site workshop for repairs and preventive maintenance of heavy equipment. No serious equipment failures were recorded.

During the period of VRCSD's operation, approximately 12 persons were employed in full and part-time positions at the landfill. Personnel included Hazardous Waste Engineers, Supervisors, Observers, and Assistants; a Field Chemist; Site Supervisor; Weighmaster; and Heavy Equipment Operators.

VRCSD solid waste operational personnel participated in a biennial training course. Specialized training was given in all phases of Solid Waste Management with special emphasis on hazardous waste. The program was developed with the assistance of an EPA grant and has been nationally recognized. When a candidate successfully passed the course, he obtained a merit increase of five percent. The program had to be completed every two years for the employee to remain certified. The objectives of the course were to develop a sound knowledge of the safe operations of a sanitary landfill; to gain knowledge and skill to establish an efficient operation; to develop outstanding theory of problems and improvement of public relations, work procedures, and radio communications; and to gain knowledge regarding hazardous waste, basic surveying, and resource recovery.

Landfill personnel who supervised the unloading procedures dressed in appropriate clothing, including helmets, respirators, and rubberized overalls. A field radio was also available. Two fully-equipped employees and one observer were present when disposing of hazardous wastes. If a landfill employee and/or hauler were overcome by exposure to or contact with waste fumes, dust, or spray, one safety-equipped employee was to activate a respirator and remove him. The observer was also to don his safety gear and radio for assistance. To the best of VRCSD's knowledge, no such incident involving exposure to waste fumes, dust, or spray has ever occurred.

Inspections of the landfill by outside agencies were often random and unannounced. The County Environmental Health Department conducted regular quarterly inspections of the Class II areas, which were under its jurisdiction. More frequent inspections were made if violations or problems were observed. Minor violations related to litter, odor, ponding during heavy rains, and compaction problems were noted and then abated by VRCSD prior to the next inspection. Frequent inspections by the RWQCB occurred in the late 1970's and early 1980's when possible geohydrologic problems came to light. The inspections did not reveal any releases or discharges. On April 7, 1982 a compliance inspection by DOHS disclosed no violation of the ISD. Thus, at that time, the site was assumed by DOHS to be in compliance with RCRA.

4.2.3.2 Preparedness and Prevention

According to discussions with the County Fire Department, VRCSD did an exceptional job over the years of its operation in coordinating with local enforcement agencies. The District was considered very cooperative, provided good internal access to the site, and provided good employee emergency training procedures.

4.2.3.3. Contingency Plan - Emergency Procedure

VRCSD prepared a Contingency Plan in response to Federal and State requirements. The Plan detailed all of its safety procedures, evacuation routes, access, and means to coordinate with local emergency agencies. It includes details of the site location, access routes, internal roads, and locations of powerlines, pipelines and emergency equipment, and emergency coordinators are designated. Implementation and emergency response are presented.

The Contingency Plan has never been exercised.

4.2.3.4 Manifest System, Recordkeeping, and Reporting

The total Class I area is laid out in a horizontal two-dimensional grid system, with each grid unit being approximately 100 feet by 100 feet. From 1972 on, the Hazardous Waste Engineer assigned a specific disposal location, but not depth, to each incoming Group 1 type waste using the compatibility analysis procedure. There were five compatibility groups divided as indicated below:

A - Mineral Acids
B - Flammables
C - Caustics and Compatibles
D - Materials of Low Reactivity
E - Cyanides

Each compatibility area comprised a number of specific grids. The ultimate grid of disposal in the appropriate compatibility area was recorded. Records were maintained on location and at the VRCSD office on each load of Group 1 wastes received and disposed since the beginning of site operations.

In addition to standard VRCSD forms, a Hazardous Waste Manifest was completed by the waste producer, hauler, and the disposal facility operator for submittal to DOHS. The manifest was required to state, in detail, the waste material and its components. This was checked against the "approved load description" and the generator's analysis. All had to correspond or the load was rejected. This form duplicated records maintained by VRCSD, but had to be submitted pursuant to federal hazardous waste regulations and the California Administrative Code. VRCSD maintained and routed these records pursuant to State and Federal regulations (see Appendix 4.2). Prior approval by DOHS was required for the disposal of all extremely hazardous wastes.

VRCSD started computerizing the hazardous waste data in 1976 (see Appendix 4.4). In addition, hazardous waste information can be retrieved from waste logs and disposal permits. The information available includes waste characteristics, waste producers and haulers, and location of waste disposed. Waste logs contain information on:

- o Name of hauler;
- o Date and grid number of disposal;
- o Type and quantity of waste; and
- o Permit number.

Reports were submitted to the DOHS and EPA by VRCSD. The information provided included:

- o Amount of State hazardous waste disposal fees due and paid;
- o Copies of manifests for each load of hazardous waste received and summary report of the quantities;
- o Identity, source, chemical composition, weight/volume, physical state, properties, and methods used to dispose of each waste received;

- o Unresolved discrepancies in the manifest;
- o Unmanifested waste report;
- o Annual report;
- o Releases, fires, and explosions;
- o Groundwater contamination and monitoring; and
- o Facility closure.

Reports of accidents, whenever they occurred, were submitted to the DOHS. During VRCSD's operation, there were no major accidents or fires at the Simi Valley landfill. According to the VRCSD, there were no hazards to public health and safety, or to domestic livestock or wildlife.

4.2.3.5 Groundwater Monitoring

According to RWQCB, as a result of various studies conducted on this landfill, many test wells have been constructed on and around the site, and some are not properly constructed, sealed or destroyed as required by Ventura County Well Ordinance Standards. The Ventura County Resource Management Agency and Public Works have notified CWM and Moreland Investment Company to develop a program by June 1983 for proper construction or abandonment of these wells.

A two-phase groundwater monitoring plan developed by VRCSD for the landfill was adapted from the requirement in the Interim Status Document for the site to: (1) measure the impact of the site on the groundwater, if any, prior to its moving off-site; (2) assess the health and environmental effects of the impact, if any; and (3) monitor mitigation measures. Phase I was to monitor groundwater immediately below and adjacent to the hazardous waste containment area, and to provide an initial data base and a method of annually statistically assessing the effect of the site on the groundwater. Phase Two was to be activated when the statistical evaluations in Phase One indicated that the site impacted the groundwater. It was to comprise the selection of additional monitoring wells and additional analytical parameters to determine:

- o the rate and extent of migration of the hazardous waste or its constituents;
- o the concentrations of the hazardous waste or its constituents in the groundwater; and
- o assessments of the health and environmental effects.

A groundwater monitoring program has also been developed by CWM to (1) evaluate the effectiveness of a proposed groundwater protection plan, and (2) determine whether further remedial action is necessary. This program is required by the RWQCB as part of its Waste Discharge Permit.

A series of 13 monitoring wells are proposed to detect any migration of fluids from both the Class I and II areas of the landfill, in both the Sespe Formation and the alluvium. The monitoring facilities in the alluvium will be positioned down canyon from the alluvial seepage zone barrier. Wells in the Sespe Formation will monitor water-bearing beds/intervals that out-crop and contact the waste fill in the Class I and Class II areas. These wells must be located both down-dip (north) and along the strike (east and west) of the water-bearing beds.

4.2.3.6 Closure and Postclosure

VRCSD prepared a Closure and Postclosure Plan in October of 1981. The following section is adapted from the VRCSD Plan. In 1981 final closure was not anticipated until sometime in 1989; consequently, VRCSD's Plan was viewed as highly dynamic and continually changing as new and better closure technologies became available.

Closure

The Closure Plan describes operation, disposal areas, and proposed mitigation and monitoring measures; discusses various alternative methods to close the facility and protect the environment, and recommends a final Closure Plan. It also summarizes the post-closure maintenance and monitoring program and the financial plan for closure and post-closure.

The California Administrative Code requires a final cover of at least three feet of clean soil, one foot of which is compacted to a permeability of 1×10^{-6} cm/sec or less, sloped at least three percent, and with leachate and gas control measures taken, as needed. The regulations also require a discussion and evaluation of alternatives to these methods and of subsequent maintenance, and a recommendation regarding the most practical method of closure and maintenance which will not pose an adverse threat to the environment. Basically, the alternatives revolve around closing of the entire site (Alternative I) or only the Class I area (Alternative II).

Furthermore, there are slight variations in the manner in which the Class I area can be closed. The options are whether both infiltration control and run-off control systems are needed and whether compaction is necessary based on the permeabilities of the native soils. It is apparent from review of the hydrogeologic data for the site that infiltration into the buried wastes is one of the pressing problems with the site. As a result all practical measures should be taken to mitigate this problem. Consequently, the three foot cover and run-on diversion structures are unconditionally recommended in the Plan. Further, minimizing the infiltration of liquids through the cover will minimize the size and maintenance of the necessary leachate collection and disposal system.

It is recommended that a final cover of three feet of native soil be placed over the approximately one foot of intermediate cover for a total coverage of approximately four feet. The cover is to be composed of native soils consisting of sandstone, siltstone, and claystone. There is sufficient on-site soil to supply the needs for final coverage. Run-on will be diverted from the watershed on the northern end of the Class I area via a diversion channel. The diverted water will be allowed to flow along natural drainage channels into Alamos Canyon on the west and Brea Canyon on the east. The run-on diversion structure will direct run-on from approximately 20 acres of the Class I area's watershed out of approximately 50 total acres. The run-on from the remaining 30 acres of watershed is not practical to collect and divert. The completed disposal area is to be graded and maintained to prevent ponding and to provide slopes of at least three percent. Steep areas, surface drainage courses, or other areas subject to erosion by water and/or wind will be provided with a lining, planted with vegetation, or otherwise designed and constructed to prevent erosion.

Grading will emphasize the development of contours and configurations which will ensure the proper site drainage patterns to minimize erosion. Preparation for revegetation will involve the development of the landfill surface to provide a suitable growth medium for the grass and legume species chosen for the site. In general the species will be chosen on the following criteria:

- o minimize erosion
- o low water requirements
- o survive well in a landfill environment
- o shallow root system
- o rapid ground cover establishment

Post-Closure

The landfill is situated at some distance from homes and residential communities and is not experiencing a methane migration problem now. Nevertheless, VRCSD developed a gas migration monitoring and control program, which is described in detail in the Post-Closure Plan.

Although the generation of methane in a sanitary landfill cannot be eliminated, lateral migration to adjacent areas can be controlled. To monitor this migration, vertical gas wells will be installed along the periphery of the landfill. The probes consist of plastic tubes inserted approximately eight feet in the ground with a filter at the end, and probes will be monitored quarterly.

Substantial settlement (20-25 percent of original depth of fill) of portions of the landfill is anticipated after closure. Unfortunately, it is not possible to predict with any great accuracy the final settlement of any particular portion of the landfill. Among the factors that influence settlement are the age of the refuse, the amount of weight resting upon it, the degree to which the material was compacted during the landfilling, the amount of moisture present, and the makeup of refuse in each location. Settlement can have two adverse effects: (1) creating cracks in the final cover, which could allow gases to escape into the atmosphere and run-off to enter the landfill; and (2) altering drainage patterns, either causing excessive water velocity resulting in erosion, or creating surface depression leading into ponding of water during wet weather.

Maintenance of the final cover will be an important task during the post-closure work. Additional earth fill will be placed and graded to restore the proper drainage patterns as necessary. Areas thus repaired will be landscaped as soon as possible.

Differential settlement can also cause the final cover to crack. Part of the post-closure maintenance will be to excavate and reseal any cracks with soil, and to revegetate the area if needed. A maintenance crew will regularly inspect the cover for such things as settlement, cracks, and stresses on the vegetation. As part of the post-closure care, groundwater will continue to be monitored, and the leachate control system operated and maintained.

4.2.3.7 Financial Requirements

The following section enumerates estimated closure costs from the VRCSD Closure Plan.

Alternative 1. Closure of total site as per RWQCB standards.

	Installation Cost
Final Cover (3 ft. thick)	$330,000
Compaction to 1 X 10^{-6}	157,000
Run-on Diversion System	30,000
Run-off Drainage & Storage	445,000
Run-off Disposal System	30,000
TOTAL*	$992,000

Alternative 2. Closure of only Class I portion.
2a. Installation of all options.

Final Cover (3 ft. thick)	$140,000
Compaction to 1 X 10^{-6}	70,000
Run-on Diversion System	30,000
Run-off Drainage & Storage	70,000
Run-off Disposal System	10,000
TOTAL*	$320,000

2b. Installation of only infiltration control options.

Final Cover (3 ft. thick)	$140,000

Compaction to 1 X 10^{-6}	70,000
Run-on Diversion	30,000
TOTAL*	$240,000

2c. Installation of infiltration control options, excluding compaction.

Final Cover (3 ft. thick)	$140,000
Run-on Diversion System	30,000
TOTAL*	$170,000

* Note: Totals include only those items shown; total cost of site closure, detailed below, is substantially greater.

The estimated cost of closure of the Simi Valley Sanitary Landfill, Class I area, in accordance with the recommended Closure Plan is as follows:

Excavation and placement of final cover	$140,000
Grading and drainage	20,000
Placement, final grading and surface preparation of surficial soil material	20,000
Revegetation	15,000
Installation of gas monitoring wells	5,000
Run-on diversion system	30,000
	$230,000

In order to meet the obligation of closing the Class I portion of the landfill in accordance with the California Adminstrative Code, the VRCSD would have been depositing yearly an amount equal to one sixth of the closure cost (or approximately $40,000/yr). To this end the VRCSD deposited $40,000 in a separate fund during Fiscal Year 1981-82; it would have continued to make a yearly deposit of this amount, plus the factored amount, for the remaining five years. If the VRCSD found that the Class I portion had to be closed prior to the estimated closure date (1989), the VRCSD would have made available an amount equal to the total cost of closing the Class I portion plus the factored amount.

Post-closure maintenance will involve groundwater monitoring, landfill gas monitoring and visual inspections, along with operation and maintenance of leachate control and disposal systems. It is anticipated that post-closure care will involve less than $20,000/yr, and will be allocated as part of the yearly operating budget of the VRCSD.

Concluding Remarks to Chapter 4.2.3

In January of 1983, VRCSD's lease was terminated and CWM took over operation of the facility. An agreement was signed between VRCSD and CWM which declared that CWM would take over full responsibility for site operations. Revised Waste Discharge Requirements (WDRs) were recently approved by the RWQCB in May of 1983 which require CWM to prepare a new Operation Plan for a Class II facility by July 15, 1983. (The DOHS rescinded the ISD in March 1983; thus this site is no longer classified as a Class I facility). The revised WDRs do not call for a revised Closure and Post-closure Plan and attendant financial closure estimations yet. Thus, the Plan prepared by VRCSD in 1981 is the only existing Closure and Post-closure Plan.

In addition, because the site is no longer a Class I facility, CWM is not required to prepare a Hazardous Waste Safety Manual, Written Analysis Plan, Contingency Plan, or provide Emergency Training, as described previously for VRCSD's operating period.

The Class I portion and, more specifically, the liquid impoundment area was not completely closed (backfilled and brought up to grade) as per RWQCB requirements. Inspection logs from the County Environmental Health Department showed that some backfilling did occur. However, discussion with VRCSD staff indicated that CWM did not want the Class I portion completely closed. It is CWM's desire at some time in the future to use non-hazardous solid wastes (i.e. municipal and residential refuse) to improve drainage and the environmental integrity of the Class I area. CWM has proposed to the RWQCB to place a combination of refuse and soil cover to achieve a free-draining, impervious surface in the Class I area. According to CWM's attorney, two precedents exist for the disposal of non-hazardous wastes in the Class I area:

- o The VRCSD put garbage in the Class I area from the early 1970s until vacating the facility.
- o The RWQCB directed (since 8 January 1983) the ongoing placement of garbage in the abandoned sludge pond in the Class I area to close the pond.

4.2.4 Physical Pathways or Conduits to Resource Receptors

4.2.4.1 Geohydrology

The Simi Valley landfill is considered by some experts to be in hydraulic continuity with groundwater both of the Sespe formation and of the Quaternary alluvium of Arroyo Simi. Leachate could seep from the site either through the sandstone layers, through fractures within the bedrock, through the fill/alluvium contact in the southern portion of the site, or through the fill/bedrock contact in the extreme northwestern and northeastern portions of the site.[19]

Converse Ward Davis Dixon concluded that very low concentrations of organic constituents are present in groundwater in both onsite and immediately offsite sampling locations. Analytical results for offsite groundwater samples indicate that organic constituents may have been transported offsite.[20]

Based on the conclusions of the CWDD hydrogeologic study, it is apparent that the buildup of liquids within the deposited wastes is the basic problem associated with containment. It is apparent that if the liquids could be eliminated or controlled and surface recharge minimized then there would be no driving force or transportation media by which pollutants could be transported off-site.[21]

4.2.4.2 Stream Channel

As discussed in Chapter 4.2.1, surface runoff flows generally southwestward. Runoff flowing to the north and west eventually drains to Alamos Canyon, west of the landfill. All other runoff flows to Brea Canyon, east of the landfill. Both of these canyons open to Simi Valley and drain into Arroyo Simi which flows westward 11 miles to join Calleguas Creek near the town of Somis.

4.2.5 Receptors

4.2.5.1 Land Use

The Simi Valley landfill lies within an unincorporated portion of Ventura County, approximately two miles northwest of the City of Simi Valley. Activities in the immediate vicinity at present include oil exploration and related operations. Union Oil operates four wells and a steam injection plant immediately east of the landfill and approximately 16 other wells in the vicinity. The oil company maintains a service road for ground access to the area. Portions of the Alamos Canyon floor and Brea Canyon east slope in the vicinity of the landfill had been in dry-farm (non-irrigated) barley agriculture and sheep grazing sometime in the past several years.

The Simi Valley General Plan (see Fig. 4.7) designates a large concentration of industrial uses in and around the landfill. To the east of the site, the nearest proposed residential use is a low density hillside development more than a mile and a half away. To the west, no residential uses are planned within at least two miles. Ventura County has planned the mountainous area adjacent to the Simi areas of interest to be open space, indicating that 40+ acres are required for each dwelling unit. Moorpark College lies about two miles to the west of the landfill, and a Rural High Density (RHD) area has been planned north of the College which allows one dwelling unit per acre.

The Simi Valley General Plan reflects existing land use patterns in the areas south of the landfill between the Simi Freeway and Southern Pacific rail line. Future residential development is limited to the area east of First Street where there is now existing residential use. To the west of this point, industrial or open-space uses exist or are proposed well outside the City's boundary. This "band" of open-space and industrial uses between the Simi Freeway and the Southern Pacific right-of-way buffers the landfill operation from the residentially developed sections of Simi Valley. While urban development has not yet occurred in the vicinity of the landfill, the Simi Valley Department of Community Development noted in 1980 that about 80 percent of the land on the valley floor is either developed in urban uses or is committed to development. The growing scarcity of vacant land on the valley floor results in increasing pressure for development in the foothills and canyon areas. This has led to applications for grading for building pads for industrial and/or commercial uses, between the Simi Valley Freeway and the Southern Pacific Railroad, which will not be developed until some future time. Inasmuch as the Simi Valley General Plan shows industrial and commercial uses in the vicinity of the landfill, such uses may develop in the future although specific applications for development have not yet been submitted to the City. However, a specific

[illegible]

[illegible]

The [illegible] lies within an [illegible] area of [illegible] County, approximately [illegible]. Activities in the [illegible] include oil exploration and [illegible]. [illegible] oil operators [illegible] wells and a steam [illegible] immediately east of the landfill and [illegible] other wells in the vicinity. [illegible] access to the [illegible] Canyon floor [illegible] in the vicinity of the landfill, has been [illegible] agricultural and [illegible] in the past several years.

The Simi Valley General Plan (see Fig. [illegible]) designates [illegible] of industrial uses in and around the [illegible]. To the [illegible] of the site, the General Plan designates [illegible] low density [illegible] development [illegible] a mile away. To the west, [illegible] residential [illegible] at least two miles. [illegible] adjacent to the [illegible] open space, [illegible] that the [illegible] existing wells. Moorpark College [illegible] to the west of the landfill, and a [illegible] area has been planned [illegible] dwelling unit per acre.

The Simi Valley General Plan reflects existing land use [illegible] of the areas south of the landfill [illegible] and [illegible] "Patrol" [illegible]. Future [illegible] is limited to the area east of [illegible] Street [illegible] is now [illegible] residential use. To the west [illegible] uses exist [illegible] outside the City's boundary. [illegible] industrial uses between the [illegible] Freeway and [illegible] right-of-way [illegible] the land [illegible] residentially developed sections of [illegible]. [illegible] urban development has not yet occurred in the [illegible] the landfill, the Simi Valley Department of [illegible] development [illegible] that about [illegible] percent of [illegible] the valley floor is [illegible] developed in urban [illegible] commercial development. The [illegible] activity [illegible] the valley floor results in [illegible] development in the foothills and [illegible]. [illegible] applications for [illegible] commercial [illegible], between [illegible] of the [illegible] vicinity of the landfill [illegible] although [illegible] applications [illegible] to the City. However, a [illegible]

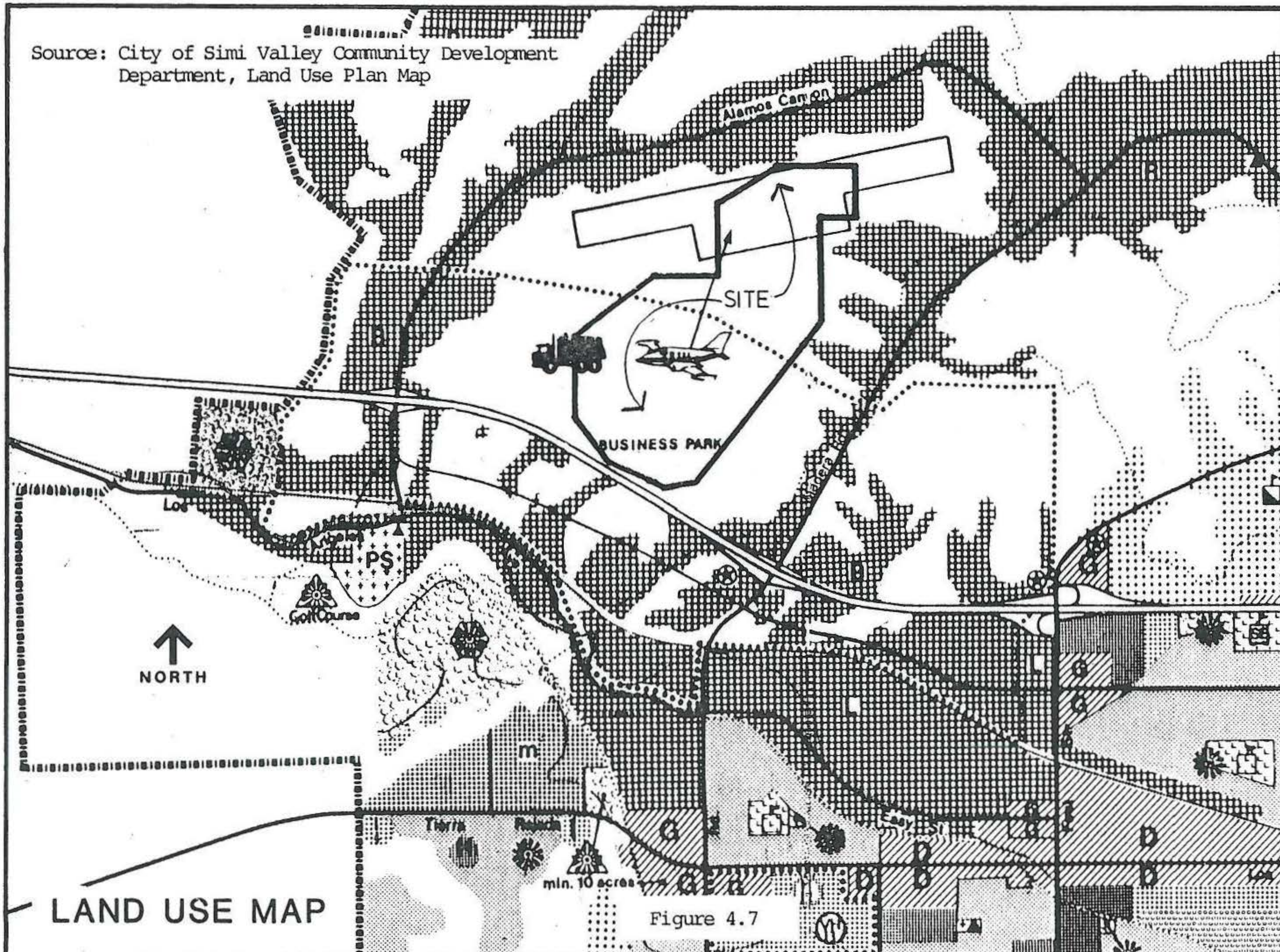

Source: City of Simi Valley Community Development
Department, Land Use Plan Map
Alamos Canyon
SITE
BUSINESS PARK
Madera Rd
PS
Golf Course
NORTH
Tierra
Rejada
min. 10 acres
LAND USE MAP

Figure 4.7

LEGEND

RESIDENTIAL

- Open Space
- RE Residential Estate (1 acre min./lot) See Text Definition.
- Very Low (20,000 sq. ft. minimum lot size)
- Low Target 2.6 units per acre/range 0 - 3.0
- Medium Target 3.7u.p.a. / range 3.1 - 5.0
- I Intermediate Target 7.0 u.p.a. / range 5.1 - 10.0
- H High Target 15.0 u.p.a. / range 10.1 - 18.0
- VH Very High* Target 25.0 u.p.a. / range 18.1+
- m Mobile Home Target 8.0 u.p.a. / range 5.1 - 12.0
- ms Mobile Home Subdivision

*Very High - min 4 acres required

COMMERCIAL

- RC Recreational Commercial
- O Office
- G General
  - Hotel / Motel node
- D District
- R Sub - Regional

INDUSTRIAL

- L Light Industrial
- B Business Park
- R Industrial Reserve

PUBLIC & SEMI - PUBLIC

- CC Civic Center
- PS Public Services Center
- Fire Station
- Law Enforcement Office
- H Hospital
- L Library
- SE Special Education School
- Senior High School
- Junior High School
- Elementary School
- Regional Park
- Community Park
- Neighborhood Park
- Special Purpose Park
- Cemetery
- Brandeis-Bardin Institute
- Sanitary Landfill
- Airport
- Railroad Depot

LEGEND

LEGEND

RESIDENTIAL

Open Space

RE Residential Estate (1 acre min./lot) See Text Definition.

Very Low (20,000 sq. ft. minimum lot size)

Low Target 2.6 units per acre/range 0 - 3.0

Medium Target 3.7u.p.a. / range 3.1 - 5.0

I Intermediate Target 7.0 u.p.a. / range 5.1 - 10.0

H High Target 15.0 u.p.a. / range 10.1 - 18.0

VH Very High* Target 25.0 u.p.a. / range 18.1+

m Mobile Home Target 8.0 u.p.a. / range 5.1 - 12.0

ms Mobile Home Subdivision

*Very High - min. 4 acres required

COMMERCIAL

RC Recreational Commercial

O Office

G General

⊛ Hotel / Motel node

D District

R Sub - Regional

INDUSTRIAL

L Light Industrial

B Business Park

R Industrial Reserve

PUBLIC & SEMI - PUBLIC

CC Civic Center

PS Public Services Center

Fire Station

Law Enforcement Office

H Hospital

L Library

SE Special Education School

Senior High School

Junior High School

Elementary School

Regional Park

Community Park

Neighborhood Park

Special Purpose Park

Cemetery

Brandeis-Bardin Institute

Sanitary Landfill

Airport

Railroad Depot

LEGEND

plan and EIR for the West End Industrial area were approved by the Simi Valley City Council in December of 1982.

4.2.5.2 Population

The City of Simi Valley was incorporated in 1969 to include what had been unincorporated areas of Santa Susana and Simi Valley. At that time, the estimated population was between 55,000 and 57,000 persons. The present populations is estimated at just over 80,000 persons.

4.2.5.3 Floodplain[22]

In the event of a flood and earthquake, hazardous waste constitutents could be carried from the site down the canyon to the occupied flood plain below. This scenario forms the basis for the benefits discussion of Chapter 6. The background on the flood plain is given here.

The City of Simi Valley is located in a valley formed by the Santa Susana Mountains to the north and east and the Simi Hills to the south. The natural elevation is lower in the west end of the valley such that a westerly flowing drainage pattern has developed. Simi Valley is drained by Arroyo Simi and the major tributaries that drain the watersheds of Tapo Canyon, Las Llajas Canyon, Sycamore Canyon, Meier Canyon, and Alamòs Canyon.

Arroyo Simi and its tributaries have exposed much of the developed areas of Simi Valley to flooding and recent flood control measures have sought to minimize this exposure. To that end, the length of Arroyo Simi in the vicinity of Simi Valley has been improved, as have short stretches of its tributaries.

The following definitions are based on the basic design criteria utilized by the Corps of Engineers in evaluating flooding situations.

> <u>Intermediate Regional Flood</u>. A flood having an average frequency of occurrence on the order of once in 50 years, although the flood may occur in any year.
>
> <u>Standard Project Flood</u>. The flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations.

Although Arroyo Simi has been improved throughout its length, its present design capacity is not adequate given either an intermediate or standard project flood. Given an

Intermediate Regional Flood, Royal High School would be partially flooded and in a Standard Project Flood the entire school, along with a significant portion of the western area of the City (see Figure 4.8). The four motor vehicle bridges which traverse Arroyo Simi would be submerged by both the Intermediate and Standard project floods. With four important transportation links either damaged or destroyed, circulation and potential evacuation efficiency would be reduced.

An estimation of the various land uses in the flood plain was prepared from the Simi Valley General Plan/Zoning Map. The land use types included: five categories of residential, commercial, light industrial, parks, schools, and the public services center (see Appendix 4.6). These land uses are discussed further in Chapter 6 Benefits Scenario.

Rainfall records provided by the Ventura County Public Works Department were examined for the period from September 1980 to May 1983. The average annual mean rainfall for the Simi Valley area is 13.61 inches. This figure is the lowest annual mean for any of the 19 monitoring stations in Ventura County. However, rainfall in the past three and one-half years has been considerably higher than the annual mean as indicated below.

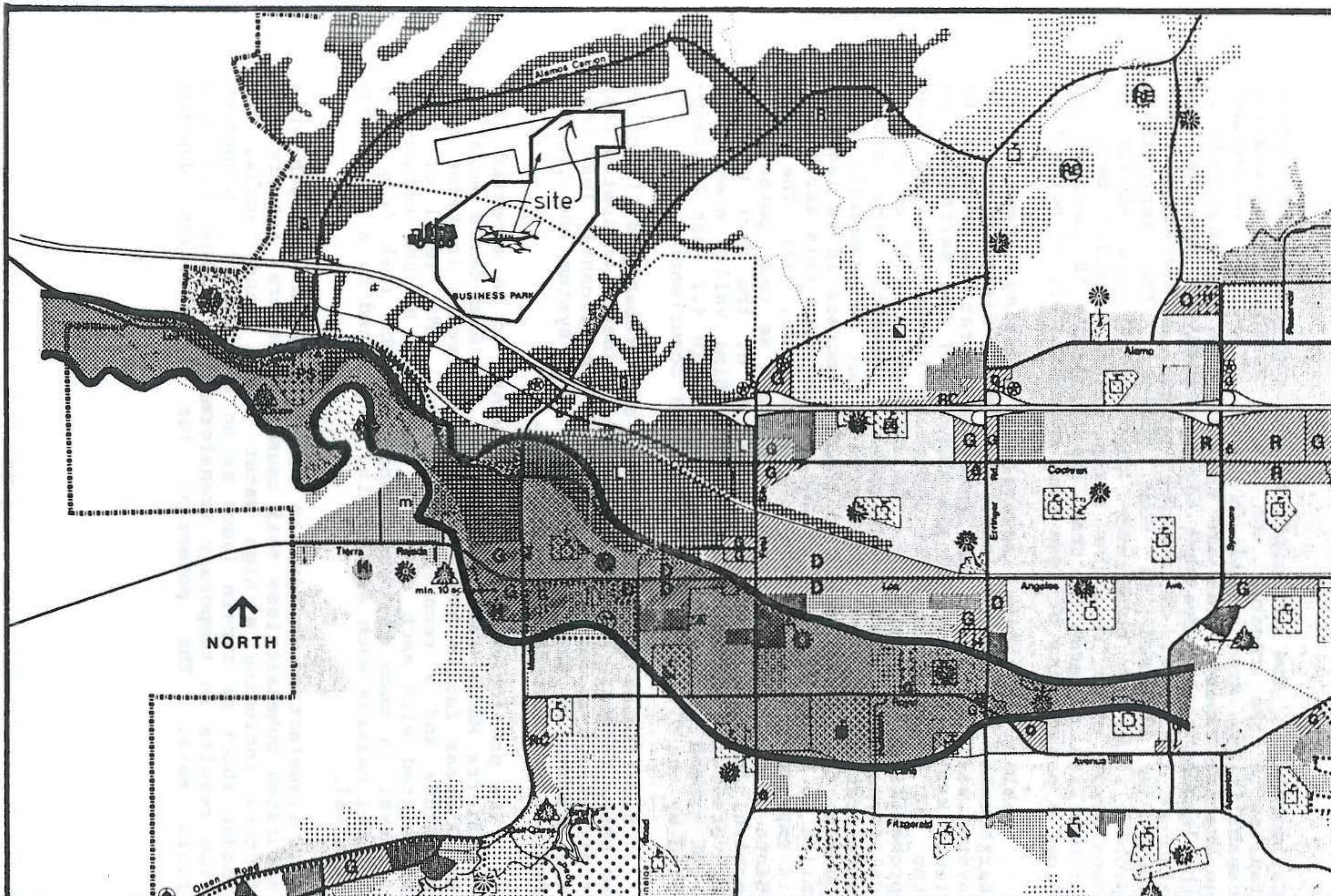
Rainfall*

Season	Inches
1979-80	
Winter	19.70
Summer	3.77
1980-81	
Winter	7.00
Summer	.15
1981-82	
Winter	12.16
Summer	.36
1982-83	
Winter	32.62

* Ventura County Flood Control and Water Resources Dept.

4.2.6 Perturbation Dynamics

The City of Simi Valley is located in a seismically active area, and in relatively close proximity to several of the many active and potentially active faults in Southern



Source: City of Simi Valley Community Development Department, Land Use Plan Map.

Figure 4.8

FLOOD PLAIN

California.[23] The principal active and potentially active faults in the region, and their earthquake generating capabilities, are listed in Table 4.2. The earthquake generating capabilities are expressed as the magnitude of the largest earthquake that can reasonably be expected, and also as the level of shaking (ground acceleration) that would be expected in Simi Valley. The approximate probabilities of occurrence that are listed should be considered on a relative scale, with "likely" being a probability of greater than approximately 50 percent and "low" a probability of less than approximately 15 percent.

Table 4.2 shows several interesting items. (1) Earthquakes generated on the Santa Susana-Sierra Madre fault system will result in high ground accelerations because the fault system is close to the City. (2) The earthquake on the San Andreas fault is important because of its high probability of occurrence, and because it will be one of California's "great" earthquakes. However, the ground accelerations in Simi Valley will not be unusually high because the nearest point on the San Andreas is at least 30 miles to the northeast. Strong shaking from this earthquake is expected to last for nearly 60 seconds. (3) The Simi-Santa Rosa fault, although classified as only potentially active, must be considered in light of the fact that it traverses the northern part of the Simi Valley area. The high ground accelerations shown on Table 4.2 must be tempered by the "Very Low" probability of occurrence.

Significant earthquakes can, and probably will, occur on other faults. However, available evidence indicates that their effect in Simi Valley will be significantly less than the effects of the Sierra Madre fault system and the San Andreas and Simi-Santa Rosa faults.

The predictive analysis of events to be expected from the Sierra Madre fault system and the Simi-Santa Rosa and San Andreas faults has defined these events in terms of a magnitude and a recurrence interval. The level of risk associated with each event is indicated by the recurrence interval in much the same manner as the risk from other natural hazards such as flooding is defined by a recurrence interval.

Liquefaction involves a sudden loss in strength of a saturated cohensionless soil caused by several interrelated factors including a high water table, sandy soils, and sudden shock or strain (such as an earthquake). Liquefaction results in temporary transformation of the soil to a fluid mass. The potential for liquefaction depends

Table 4.2

SUMMARY OF KNOWN ACTIVE AND POTENTIALLY ACTIVE FAULTS

AND THEIR EARTHQUAKE GENERATING CAPABILITY

	Distance from Simi Valley (Miles)	Expected Magnitude (Richter)	Maximum Ground Acceleration on Firm Ground (Gravity)	Approximate Probability of Occurrence (100-Year Period)
Active Faults:				
Santa Susana-Sierra Madre	3 - 10	6.5 - 7.5	0.30 - 1.0+	Intermediate
Malibu Coast-Hollywood	15 - 18	5.5 - 6.5	0.10 - 0.20	Intermediate
Newport-Inglewood	22	6.0 - 6.5	0.10 - 0.15	Intermediate
San Andreas	32	8.0 - 8.5	0.20 - 0.30	Likely
Big Pine	38	5.5 - 6.5	0.05 - 0.08	Intermediate
Potentially Active Faults:				
Simi-Santa Rosa	0 - 3	6.0 - 7.0	0.50 - 1.0+	Very Low
Pine Mountain	20	6.0 - 7.0	0.12 - 0.24	Very Low
Santa Ynez	22	6.0 - 7.0	0.10 - 0.20	Low

SOURCE: Envicom Corporation, "Safety and Seismic Safety Elements Comprehensive General Plan City of Simi Valley," October 1974, p.3.

upon many factors, including earthquake intensity and duration, groundwater level, soil permeability and density. The groundshaking levels which could occur are believed high enough to initiate liquefaction anywhere in the Simi Valley vicinity. The risk of liquefaction is greatest in the areas with high groundwater conditions.[24]

For several years, the City of Simi Valley has undertaken a groundwater pumping program near the west end of the City to alleviate the high groundwater situation and reduce the risk of liquefaction. The program, administered by Water Works District 8, consists of pumping three wells at 300 to 600 gallons per minute (gpm). Discharge from these wells is diverted to the Arroyo Simi. The three wells are discussed in Appendix 4.5. A recent report[25] recommends that the groundwater table be maintained at a depth of at least 50 feet to preclude liquefaction problems.

The potentially adverse consequence of these dewatering wells lies in the possibility that contaminated groundwater containing hazardous wastes constituents could be brought to the surface and discharged into Arroyo Simi. During floods, contaminated soil could be distributed over a wider area. No evidence suggests that this is happening at the moment.

4.3 Conclusions

The following conclusions seem justified by this study of the administrative record and investigating conducted to date:

- While the Simi Valley site was operated, in general, according to the professional practices and regulations then extant, these practices and regulations are no longer felt sufficient to provide adequate safeguards;
- The Simi Valley site does not meet recent permeability requirements;
- While there is evidence of local on and off-site groundwater contamination, there is substantial disagreement among hydrologists regarding the magnitude and extent of this impact on the regional groundwater system;
- Further, since the local groundwater isn't used (except for dewatering to reduce liquefaction potential), the value of groundwater lost to contamination is minimal;
- The political climate which has existed among and between the public, the previous operator, the current operator, and the property owner has heightened the controversy at every step of the

way, and has exaggerated and obscured the levels of real or potential damages.

SIMI VALLEY: FOOTNOTES

1. California RWQCB, Los Angeles, Region, "Revised Waste Discharge Requirements for CWM" (File 69-90), May 5, 1983, P. 1.

2. SCS Engineers, "Simi Valley Landfill Hazardous Wste Evaluation", September 8, 1980 and December 15, 1980.

3. Letter from J.A. Lambie, Chief Engineer-General Manager, VRCSD to J.A. Gordon, President, Moreland Investment Company, October 10, 1980.

4. Ventura County Resouce Management Agency, Report Back on the Simi Vally Landfill (CUP-3142) to the County Board of Supervisors, November 23, 1982, P. 3.

5. Ibid, P. 3.

6. Ibid, P. 4.

7. Ibid, P 4.

8. VRCSD, "Closure and Post-closure Plan for the Simi Valley Sanitary Landfill", October 1981, P. II-1.

9. Converse Ward Davis Dixon, "Hydrology and Water Quality Investigation of the Simi Disposal Site", December 1980, P. 12-13.

10. Ibid, P. 14.

11. EMCON Associates, "Environmental Status and Groundwater Protection Plan Simi Valley Disposal Facility", January 14, 1983, P. 4-6.

12. Wadell Engineering Corporation, "Environmental Impact Report/Environmental Assissment for the Simi Valley Airport New Site Master Plan 1980/2000", March 26, 1982, P. 52.

13. PRC Toups, "Environmental Impact Report, Simi Valley West End Industrial Area Specific Plan", March 1983, P. III-92.

14. Wadell Engineering Corporation, "Environmental Impact Report/Environmental Assessment for the Simi Valley Airport New Site Master Plan 1980/2000", March 26, 1982, P. 42.

15. Personal communication, Richard Gurshe, Regional Engineer with Chemical Waste Management, May 11, 1983.

16. EMCON Associates, "Environmental Status and Groundwater Protection Plan Simi Valley Disposal Facility", January 14, 1983, P. 4-6.

17. SWRCB, "Waste Dicharge Requirements for Nonservable Waste Disposal to Land", July 1980.

18. SCS Engineers, "Simi Valley Landfill Hazardous Waste Evaluation", September 8, 1980 and December 15, 1980.

19. LeRoy Crandall and Associates, "Preliminary Geotechnical Evalustion Existing Simi Valley Sanitary Landfill", April 1980, p. 16-17.

20. Converse Ward Davis Dixon, "Hydrogeology and Water Quality Investigation of the Simi Disposal Site - Phase I and Phase II", December 1980 and May 1981, p. 49.

21. VRCSD, "Closure and Post-closure Plan for the Simi Valley Sanitary Landfill", October 1981, p. III-2.

22. Envicom Corporation, "Safety and Seismic Safety Element of the Simi Valley General Plan", 1974.

23. Ibid.

24. PRC Toups, "Environment Impact Report West End Industrial Area Specific Plan", March 1983, p. III-3.

25. Ibid, P. III-32.

[illegible] "[illegible] Environmental Status and Groundwater [illegible] Simi Valley Hazardous Facility", [illegible] 1983, p. [illegible].

[illegible] Discharge Requirements for [illegible]", July 1980.

[illegible] "Simi Valley Landfill Hazardous Waste [illegible]", September 8, 1980 and December 17, 1981.

[illegible] and Associates, "Preliminary [illegible] of Evaluation [illegible] Simi Valley [illegible]", April 1981, p. [illegible].

[illegible] and Davis Dixon, "Hydrogeology [illegible] Investigation of the Simi Canyons, [illegible]", November 1980 and May 1981, p. [illegible].

[illegible] and Post-Closure Plan for the Simi Valley Landfill", October 1981, p. [illegible].

[illegible] Corporation, "Safety and Seismic Safety Element [illegible] Simi Valley General Plan", 1974.

[illegible]

[illegible] "Environmental Impact Report [illegible] Simi Valley [illegible] Plan", March 1983, p. [illegible].

[illegible]

CHAPTER 5 CASMALIA SITE

5.0 CHAPTER SUMMARY

The history of the Casmalia facility is much simpler than that of the Simi Valley facility. The facility has been owned and operated by Casmalia Resources since 1972. It has been operated only as a hazardous waste facility over the entire period of time to the present. Casmalia Resources has successfully met all standards and requirements for operating its facility.

The principal and key issues are two: disposal of PCB's and municipal water contamination. There has been much local controversy over these two issues. The following points summarize the situation surrounding the two key issues:

(1) As to the potential for hazards:

- o The facility is situated on low permeability soils yielding very slow water migration;
- o There is no evidence of incompatible waste mixing or leaking containers;
- o There is no evidence of aquifers, and therefore, of waste constituent contact with the aquifer; in addition, the local water supplies are of very poor quality, insufficient in quality even for stock watering purposes;
- o Site monitoring visits have revealed, over the years, several violations including inadequate security against unauthorized entry and runoff problems, all of which have been corrected;
- o There have been several incidents of waste water spillage/discharge from the site and into the drainage channel leaving the site, especially during or following heavy rainstorms;
- o There is some concern whether, upon closure, the land could revert back to agriculture use under its Agricultural Preserve Status without violating the California Health and Safety Code.

(2) As to the evidence of damage:

- o Local citizens have drawn water samples from local municipal water sources and had them tested; PCB's were found on two occasions, but attempts at replication failed to produce indications of PCB's;

- o California DOHS conducted a special monitoring and sampling for PCB's in 1981, and again in 1982 for 113 organic compounds, of wells throughout the Santa Maria Valley; no evidence of organic constituents was detected at the 1 ppb level;
- o The State RWQCB and DOHS have tested the water in the monitoring wells at the site and have found nothing;
- o Continuing citizen concern has precipitated another round of tests of water supply wells in the vicinity of the site, authorized by the County Board of Supervisors in January of 1983; this testing is still in progress at the time of this writing.

5.1 HISTORY OF FACILITY DEVELOPMENT

The history of the Casmalia Resources facility includes a review of the administrative, physical, and ownership characteristics; permits and regulations for operations and incidents and issues surrounding operation. Abbreviations are identified in Appendix 2.

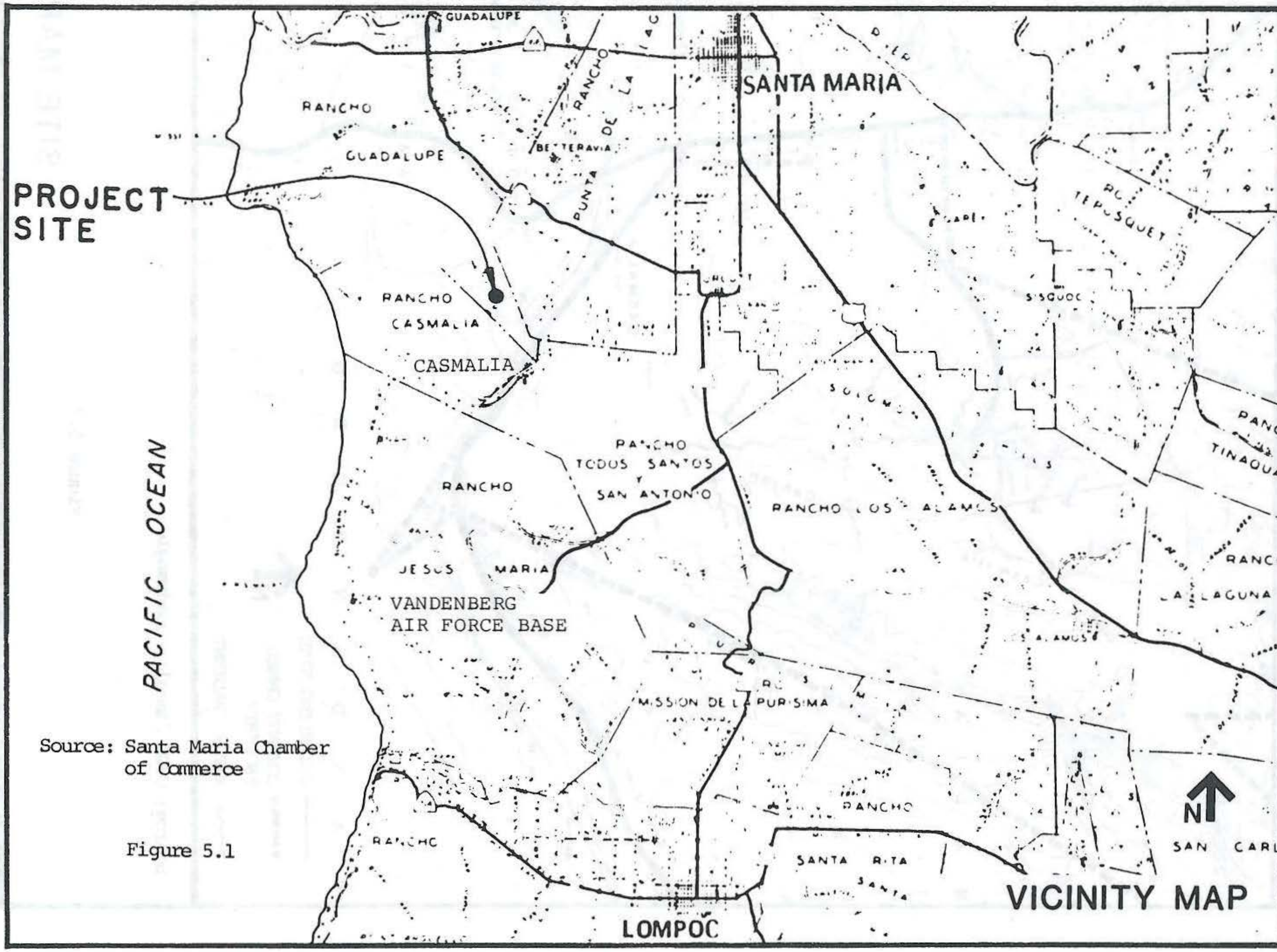
5.1.1 Administrative, Physical, Ownership

Casmalia Resources is located in Northern Santa Barbara County (Figure 5.1). The site is ten miles southwest from the town of Santa Maria (pop. 65,000) and 2.5 miles northeast of the town of Casmalia (pop. 250). Access to the site is via Black Road, a two lane road historically used for access to the Casmalia oil fields, which passes by the small residential area of Tanglewood, with 300 residential units. Black Road connects with the N.T.U. (Nevada, Texas and Utah) Road going into the site. (See Figure 5.2)

Casmalia Resources' operation area is 252.3 acres. The company owns the surrounding 4,047.7 acres, for a total of 4300 acres. Seventeen parcels comprise the property, fifteen of which are zoned agricultural preserve.

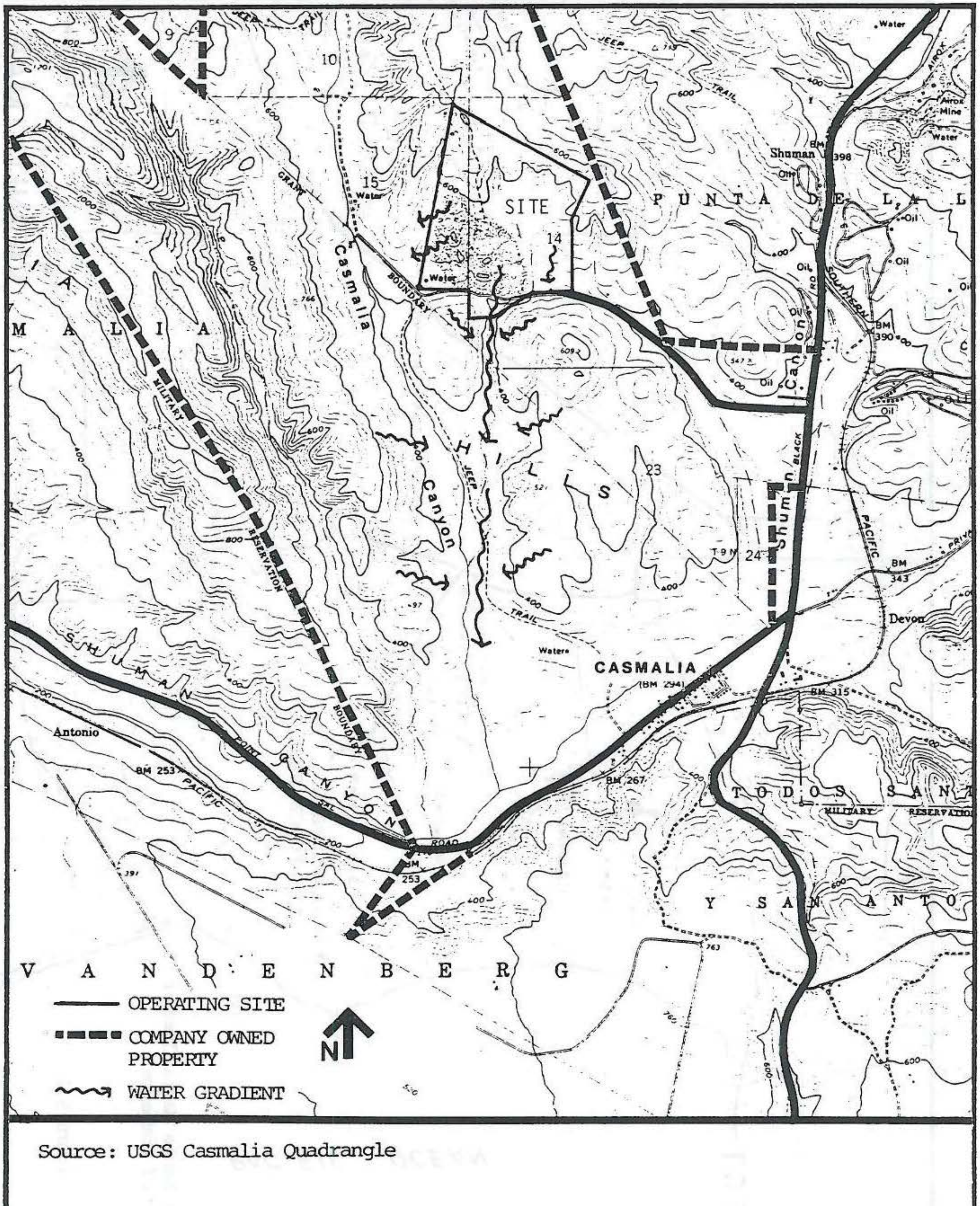
Land surrounding the property is either privately owned agricultural land or involved in the oil industry. Surrounding land use 1000' from the property is cattle ranching. The majority of this land is also designated as agricultural preserve. The land is zoned A-II (40+ acres for agricultural use). The Casmalia Oil fields to the southeast and east of the site are being operated by Arco and Union Oil companies respectively. (See Figure 5.3)

Casmalia Resources is a limited partnership. Hunter Resources, owned by Kenneth Hunter, is the general partner responsible for managing and conducting affairs for Casmalia Resources.



Source: Santa Maria Chamber
of Commerce

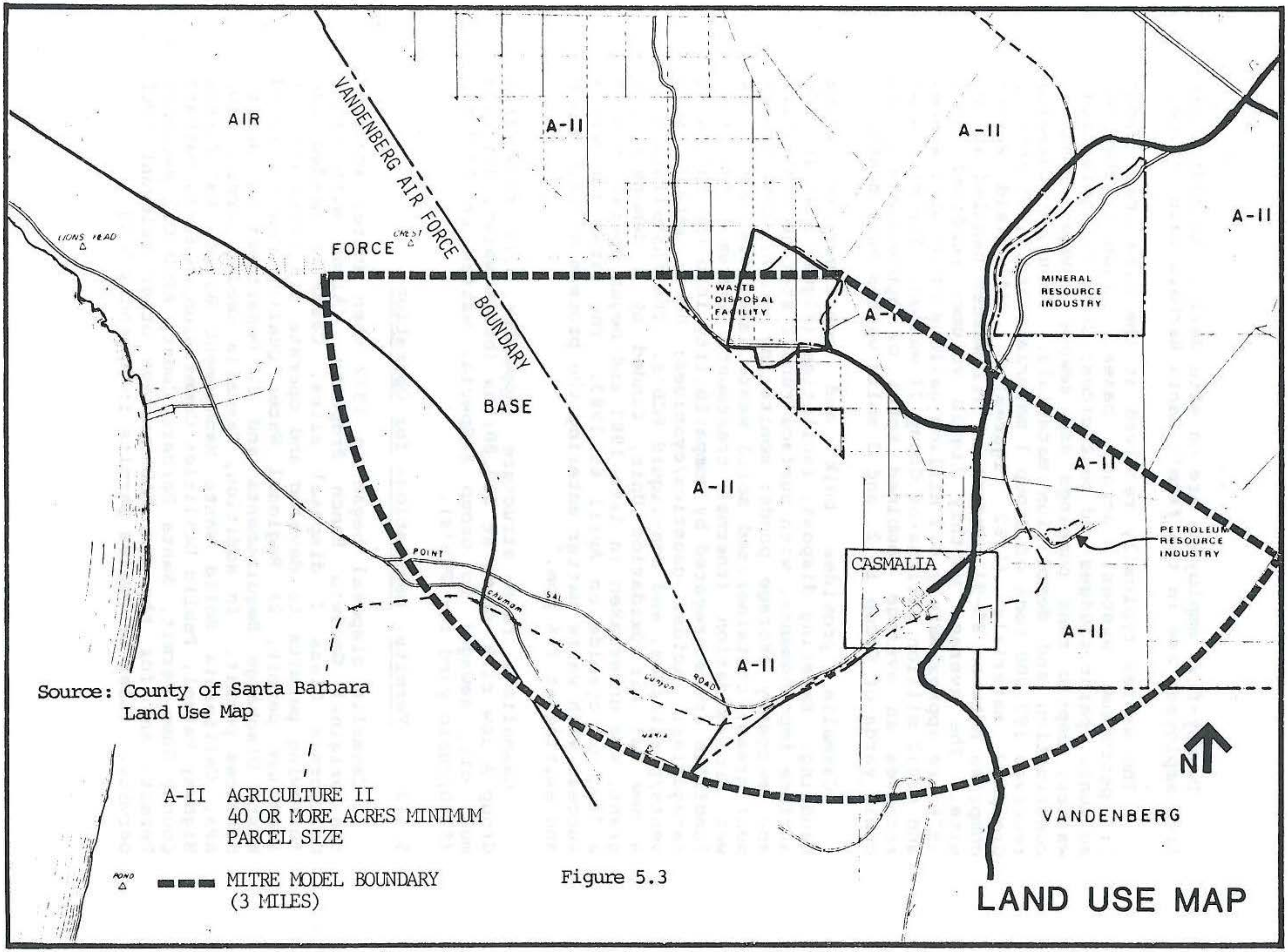
Figure 5.1



Source: USGS Casmalia Quadrangle

Figure 5.2

SITE MAP


AIR
FORCE
BASE
VANDENBERG AIR FORCE BOUNDARY
A-II
A-II
A-II
A-II
A-II
A-II
A-II
WASTE DISPOSAL FACILITY
MINERAL RESOURCE INDUSTRY
PETROLEUM RESOURCE INDUSTRY
CASMALIA
POINT SAL
ROAD
VANDENBERG
N
Source: County of Santa Barbara Land Use Map
A-II AGRICULTURE II
40 OR MORE ACRES MINIMUM PARCEL SIZE
MITRE MODEL BOUNDARY (3 MILES)
LAND USE MAP
Figure 5.3

Twenty-five employees are on site daily. An additional five employees are in the firm's Santa Barbara main office.

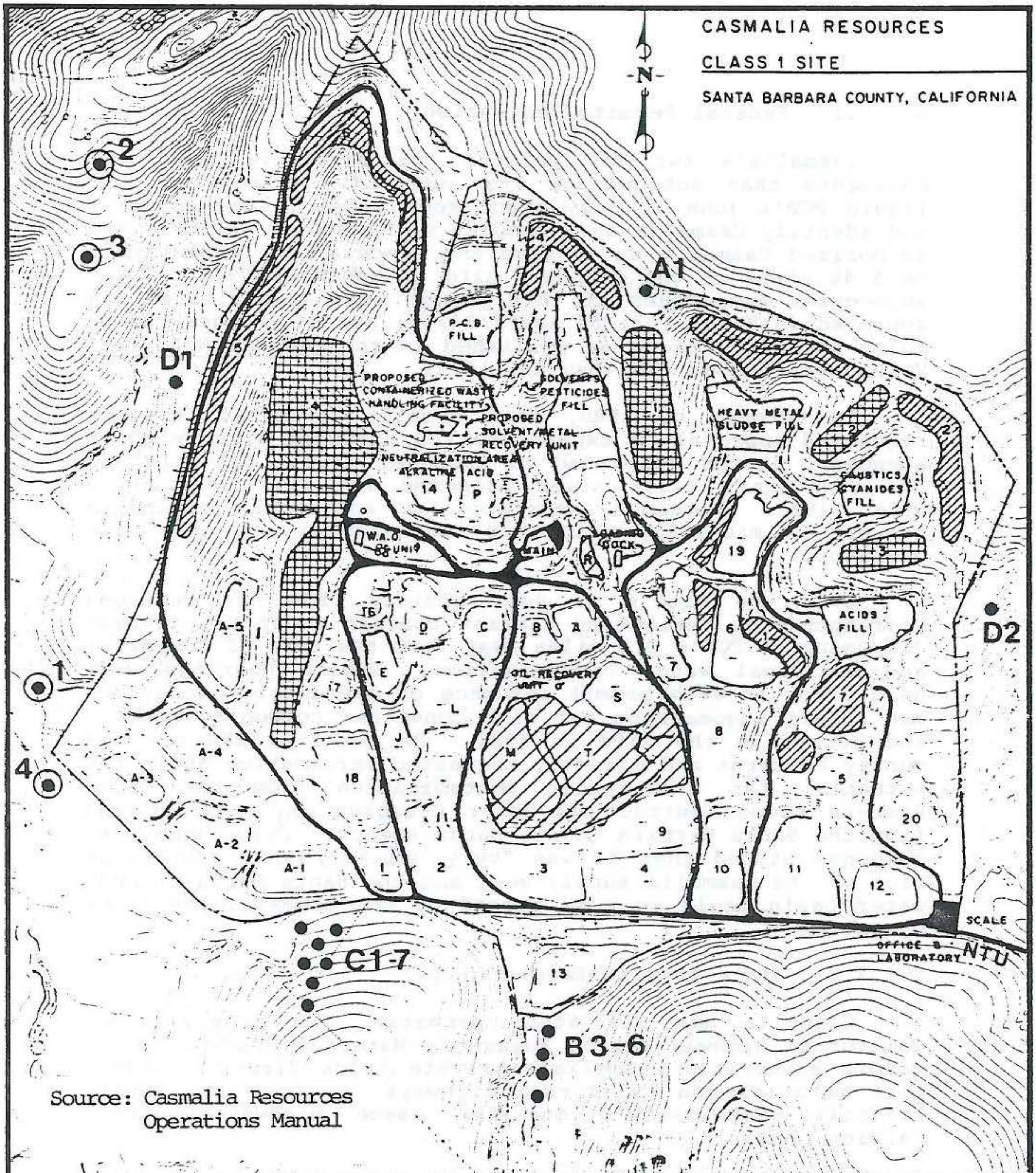
The wastes typically received at the site are: Group 1: petroleum wastes, acids, bases, organic chemical solvents, paint sludges and pesticides; Group 2: infectious wastes, septic tank pumpings and sewage sludge; Group 3: construction and demolition materials. Annually Casmalia receives 192,000 tons of Group 1 materials and 1,175 tons of Group 2 materials (1982 figures).[1] Oil field wastes comprise between 85-91 percent of all wastes handled at the site. The average monthly liquid volumes received since 1976 are approximately 0.5 million gallons of Group 1 wastes and 0.012 million gallons of Group II wastes. The site also receives an average combined total of approximately 180 cubic yards of Group 1, 2, and 3 solid wastes each month.

Casmalia provides bulk and containerized waste handling. Existing disposal facilities (Figure 5.4) include surface impoundments, with surface runoff storage reservoirs and emergency storage ponds; monitoring wells; land treatment areas; containerized solid waste landfills; and a new wet air oxidation (thermal treatment) system. The five landfills are segregated by compatibility into the following categories: acids; caustics/cyanides; heavy metals; solvents/pesticides, and non-liquid PCB's. The installation of a new Wet Air Oxidation Unit, funded by a demonstration grant, was undertaken in late 1982 and began operation with a load of cyanide on April 6, 1983. The first run was a success with waste matter entering the process at 12,000 ppm and exiting at 1-6 ppm.[2]

Casmalia's rate structure (Appendix 5.1) runs from Group A low risk waste at $12.80/ton (brine water, drilling mud, oil, sewage) to Group E/Special wastes at $300/ton ($300/cubic yard for PCB's).

5.1.2 Permits, Regulations for Operation

Casmalia disposal began in 1972 when Hunter acquired the original Goodwin Ranch Property. Along with other California Class I disposal sites, Casmalia needed the following permits to develop and operate its facility: 1) land use permit, 2) Regional Water Quality Control Board Waste Discharge Requirements and 3) Department of Health Services permit. In addition, Casmalia needed permits from EPA, California Solid Waste Management Board, California Highway Patrol, Public Utilities Commission, a Santa Barbara County Dump Permit, Santa Barbara County APCD Oil Recovery Permit, and for the new WAO process other relevant APCD permits. (List of twelve permits in Appendix 5.2)



Source: Casmalia Resources Operations Manual

SPRAYED	# PONDS-LIQUID EVAP
SPREAD	LETTERED PONDS-SOLID
CASMALIA DOMESTIC WELLS	"A-1"-NEW POND
MONITORING WELLS	Figure 5.4

FACILITY MAP

5.1.2.1 Federal Permits/Regulation

Casmalia's two EPA permits are basically pro forma documents that acknowledge its authority to receive non-liquid PCB's (one of only eight such sites in the country) and identify Casmalia as a handler of hazardous wastes. EPA authorized Casmalia to receive and process non-liquid PCB's on 5.46 acres of the disposal site in November 1978. Three subsequent amendments of this permit were necessitated and approved (3/9/79, 1/31/80 and 3/24/80) due to changes in the rules and regulations as published in the Federal Register, Volume 44, Number 106 (May 31, 1979).

In October of 1980, the Casmalia Technical Director requested approval to expand the PCB disposal site, with an amendment letter submitted in December 1980. EPA approved the additional 14.08 acres proposed for PCB landfill in June, 1981. Casmalia submitted an additional expansion request in mid-1981, which was soon withdrawn by the site operator.

Over the site's 11 year history, EPA has received correspondence reflecting citizen concern about two issues: disposing of PCB's 2.5 miles away from the town of Casmalia, and municipal water contamination. Public hearings were held prior to each permit issuance or amendment. Congressman Robert Lagomarsino met with concerned community members and toured in the site in 1981. He notified EPA of community concerns and directly requested information about the potential for groundwater contamination from the Santa Barbara Flood Control and Water Conservation District and from the Santa Barbara County Water Agency. These agencies' response stated that it was "very unlikely that contamination of the Casmalia supply well and the Santa Maria groundwater basin could ever be caused by the Casmalia Resources operation."[3]

5.1.2.2 State Permits/Regulations

Casmalia has six State permits. The yearly-issued California Highway Patrol Hazardous Material Transportation Permit authorizes Casmalia's private truck fleet to transport materials on California highways, as does the Public Utilities Commission's one-time issue Highway Contract Carrier permit.

The Department of Health Services (DOHS) issues Casmalia three permits. Originally issued in 1978 by the California Solid Waste Management Board, the Solid Waste Facility Permit authorizes Casmalia to dispose of hazardous wastes along with municipal solid wastes. Responsibility for this permit was transferred to DOHS in April of 1979. Additionally, the DOHS issues Casmalia a Hazardous Waste Hauler Permit. These DOHS permits are for the most part based on the existence of proper procedures for above-ground handling of chemical wastes, and contain a contingency plan in case of accident or accidental discharge. DOHS's oversight duties are anticipated to change and increase as RCRA is implemented.

The Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements specify what kinds of wastes the facility may receive and what measures must be taken to prevent groundwater pollution. This permit was first issued on April 14, 1972, and has been revised several times.

Contact with and oversight of the operations at Casmalia has originated primarily from DOHS and RWQCB. The major questions focused on the permeability of soils on the site, and the existence and possible contamination of groundwater. From the site's inception State personnel have been encouraging water tests in and around the site. Most tests, other than the self-monitoring required by DOHS and RWQCB, were initiated as a response to citizen concern over the groundwater contamination issue. State Assemblyman Gary Hart requested the Department of Conservation to prepare a report on Casmalia in 1981. In the report, additional laboratory and field permeability tests were recommended.[4] A subsequent site visit in December 1981 was conducted by Gary Hart and DOHS Hazardous Waste Management Chief Peter Weiner.

In late September 1979, RWQCB tested the water in monitoring wells for contaminants, with negative results. Again in June of 1981, RWQCB tested the water; negative results. DOHS tested the water for PCB in December 1981, with negative results. DOHS tested again for 113 organic compounds at the one-part-per-billion level in July 1982, with negative results.

Casmalia has never been denied a State permit, nor has one been rescinded. In December 1973, February and March 1976, and February and March of 1978, wastewater spillage/discharge incidents warranted letters of reprimand from RWQCB to remedy the situations under threat of cease and desist orders or other enforcement action. (See Chapter 5.1.3 for further information.)

5.1.2.3 Santa Barbara County Permits/Regulations

Casmalia obtained a land use permit from Santa Barbara County in August of 1972, which was amended in 1976 to allow for site expansion. These permits certify that the facility does not conflict with existing land use or land use plans. The County also issued a permit authorizing facility operation in 1972. In practice, these permits indicate that the facility has local political support. The Casmalia Resources proposals ran into opposition with the original conditional use and disposal facility permits. The major issue was the compatibility of a Class I site with existing agricultural preserve status of the property. The Planning Commission denied the applicant's requests; the Agricultural Commission wallowed in confusion; the Board of Supervisors, as an appeal body, ordered a change in the definition of Agricultural Preserve and overrode its own Planning Commission's denial.

Three processes produce air emissions on the site: evaporation, neutralization and wet air oxidation. Five permits from the Santa Barbara County Air Pollution Control District regulate these potential emissions. One permit authorizes the oil recovery operations (issued in 1980, for three years.) The remaining four permits are of recent issue (4/83) for the new wet air oxidation unit.

Continued concern about groundwater safety led the County to request the Grand Juries of 1980-81 and 1981-82 to focus upon Casmalia Resources. Many North County citizens felt that the first Grand Jury was too biased to report any conclusive findings. The findings of the 1981-82 Grand Jury led to two major developments in 1983: 1) the initiation of water testing in and around the site by the County Environmental Health Department and 2) a new 7 percent tax on fees for wastes received, intended to help reimburse the County for this testing, as well as for additional road maintenance and patrol near the site.

5.1.3 Incidents/Issues

A continuing issue of concern to citizens, elected officials, and government agencies alike, is the groundwater contamination potential. Though most consultants' reports cite the limited amount of groundwater at very shallow depths (25') and note that aquifer contact is doubtful, the fear continues. A number of monitoring schemes by a variety of site-regulating government entities has attempted to address the issue. Consequently one finds scattered data, each testing for different compounds in different or erratic time frames. Resolving the questions conclusively has eluded the efforts of well-intentioned and alarmed neighboring residents.

Related to the above issue is the topic of permeability of the underlying bedrock. This coupled with the known incidents of waste discharge after heavy rainfall, lead some to question the site's location and capacity to contain waste during a heavy rainfall season, experienced twice in the site's history (1972-73 and 1977-78).

Citizen concern on all these issues remains active, reflecting the inability of current monitoring/regulation activities to allay local concerns.

5.1.3.1 Wastewater Discharge Issue

The major source of violations in Casmalia's 11-year history has been wastewater discharge. The California Regional Water Quality Control Board (RWQCB), Central Coast Region based in San Luis Obispo, has been the regulatory agency in charge of inspecting the facility and documenting reports of violations.

A 1973 wastewater discharge warranted the RWQCB to order immediate action upon threat of "withdrawal of site classification."[5] Staff members of the RWQCB and a geologist from the State Water Resources Control Board made an inspection of the site in September of 1973. The visitors found that a seepage collection gallery contained considerable water. Samples were taken and sent to the State Department of Public Health for analysis. Pending lab results, the general appearance and odor of the sample collected from the seepage collection gallery was highly suspicious.[6] The site owner was notified to pump out the collection gallery and to provide a positive hydraulic barrier between the waste upstream of the dam and water downstream.

Another visit to the site by geologist Alvin Franks of the State Water Resources Control Board in November of 1973 did not discover actual discharge, but cited inadequate discharge prevention measures. Franks specified the following deficiencies that needed correction:

1. Permanent pump installation must be constructed, maintained and operated at both the lowermost reservoir and the infiltration gallery.

2. All wastes discharged into the area to the south of the drainage divide and tributary to Casmalia Creek must be removed and deposited within the authorized place of disposal.

3. All dikes constructed within the Casmalia Creek watershed must be removed and the areas regraded, seeded and returned to as near to pre-disturbed conditions as possible.

4. Levees must be constructed in the disposal area to provide for a minimum of 2 ft. freeboard in all disposal ponds.

5. A full-time operator must be at this site to control, record, and otherwise supervise disposal of the Group I wastes at any time the area is open.

6. Water level recorders or gauges must be installed in the observation well, the lowermost reservoir and the collection gallery to be used in conjunction with a permanently installed pump at the gallery to provide for a positive depression in the water table.[7]

In March of 1975 a site visited was made by a member of the RWQCB staff and the following violations were noted:

1. The site is not adequately protected against unauthorized persons, wildlife, and pets entering and coming into contact with Class I material.

2. The area presently being used for domestic sludge disposal is located on a hillside where runoff can reach the drainageway.

3. The area located just above observation well B-1 appears to have overflowed during the recent rain storms allowing runoff to leave the designated disposal area.[8]

All of these were indirect violations of the Waste Discharge Requirements.

A March 30, 1976, site inspection revealed that Group 1 materials were being used as fill material and being stockpiled. Though this stockpiling did not violate the permit it was felt that "runoff and/or drainage from the dike and the stockpiled material could enter a collection basin... and eventually discharge into Casmalia Creek."[9] Immediate action was requested.

On January 19, 1978, site owner Hunter informed RWQCB that a three inch downpour on January 16, threatened a temporary dam and a permanent one. The site foreman began to pump the water behind the dam to the downstream side. Pumping took place for approximately 24 hours.[10] Subsequent water analysis samples taken by the RWQCB inspector revealed that the discharge contained higher than normal values of sodium, chloride, calcium, and magnesium, but no heavy metals. Discharge again occurred intermittently on February 10-11 and 18-23 and March 11, 1978.

The discharge incidents were attributed to insufficient handling of drainage from the east side of the site (proposed expansion area), due to incomplete embankments. Reports of the discharges were sent to RWQCB and met with considerable concern, especially since the barriers that would normally curtail this discharge had supposedly been constructed 11 months earlier as necessitated by site expansion.[11]

In a report submitted to the RWQCB, Casmalia Resources described reasons for the construction delay and methods being taken to prevent further discharge, and reiterated that no overflow of receiving ponds or toxic materials had occurred; the discharge was "essentially rainwater."

In 1978 the site owner informed the RWQCB that he intended to expand the site to the west. The Board was concerned given the recent discharges at the site and the operator's inability to "adequately contain all water and waste within the designated discharge area," and requested that a "hydrologic balance be completed"[12] (study of water flows entering and leaving the site). The Board's staff recommended no expansion pending the need to address existing site problems. Casmalia was requested to perform a hydrologic balance study and show that the site could contain water and wastes on site during two heavy rainfall years in succession. A revised permit (Order 79-01) required that Casmalia annually demonstrate capacity to contain the wastes during the next rainy season. No expansion was included in this permit.

In 1980 the intent to expand was again expressed by the site owner. The major concern of the RWQCB staff at this time was the permeability of the underlying Sisquoc formation. The site owner responded with supporting consultant reports.[13] Results led to restrictions in areas of waste deposits and strict requirements on construction of the new dam, to prevent impact on groundwater. In November 1980, the RWQCB issued a revised permit (Order 80-43) which includes monthly monitoring of waste discharge, groundwater, pond levels, sedimentation, and climatology. An annual report continues to be required to assure the site's capacity for containment during the on-coming wet winter period. Since the numerous discharges in 1978, no other discharges have been reported.

5.1.3.2 Groundwater Contamination Issue

The issue of groundwater contamination has been of greatest concern to the public and regulating agencies over the 11 years of Casmalia Resource's operation. Private citizens have taken it upon themselves to sample and fund tests of groundwater around the Casmalia site either to substantiate or alleviate their fears of municipal water contamination. (See Chapter 5.2.3.5, Groundwater Monitoring.) Elected officials at all levels have been approached by citizens and have initiated their own investigations into the groundwater contamination issue. To date, there is no hard evidence of groundwater contamination. However, this conclusion exists from an uneven data base over the years with no tests for hazardous work constituents ever conducted for areas outside the subject property before the site's opening, nor, until recent years, after operations began.

Results of the Santa Barbara County Grand Jury of 1981-82 have set the stage for a more comprehensive, local groundwater monitoring system.

5.1.3.3 Agricultural Preserve Issue

Fifteen of the 17 total parcels of land on which the Casmalia site is located maintain agricultural preserve status. Known originally as the Goodwin Agricultural Preserve, the 840 acres are designated 100-AG for open space grazing uses in the Santa Barbara County General Plan, and contracted as an agricultural preserve in a contract dated January 1, 1971. In May of 1972, the County's Agricultural Preserve Advisory Committee heard the preliminary proposal by site owner Kenneth Hunter to use agricultural preserve acreage as a disposal site. The Board of Supervisors amended the Agricultural Preserve rules specifically so that Casmalia could retain its agricultural preserve contract, which reduces property taxes on the site.

The CUP was approved in August of 1972, and the Agricultural Preserve status retained. The key issue was the condition requiring return of the land to normal grazing use. This condition in the permit states:

"The operation of this waste disposal facility shall be conducted so as to comply with the spirit and intent of the California Land Conservation Act and of Article XXVIII of the use for waste disposal purposes of each portion of the site, an overburden of at least three feet in depth shall be placed thereon, the overburden shall be reseeded with pasture grasses suitable for the area, and such procedure shall be performed to assure the return of the land to a normal grazing condition to the satisfaction of the County Agricultural Commissioner and the County Farm Advisor."[13]

To date the question remains as to whether this condition can be met. The most recent inquiry as to compliance with this condition came from Ron Gilman, Assistant Agricultural Comissioner for Santa Barbara County and Chair of the Agricultural Commission. Mr. Gilman requested information from the DOHS about the site's return to grazing as per the conditional use permit. Earl Margitan, Senior Waste Management Engineer with the Hazardous Materials Management Section of DOHS, replied, "Returning the land to a condition suitable for livestock grazing during the post-closure period of the site is a use prohibited under Section 25117.3 of the Health and Safety Code."[14] Margitan added: "We do not believe at this time that the CUP permit condition can be safely met without posing a public health hazard. Our primary rationale for this position is the apparent potential for hazardous constituents to enter the human food chain."[15] He has recently stated that the issue has not been resolved.

5.2 SYSTEMS DEFINED

5.2.1 Physical Site and Geohydrology

5.2.1.1 Physical Description

The Casmalia Resources property consists of 4300 acres (252.3 operational, 4047.7 buffer of company-owned land surrounding the site), 10 miles southwest of the town of Santa Maria. The disposal site is separated from the Santa Maria Basin by the Casmalia Hills which rise 500 feet above the site, 1.2 miles to the north and east. The consolidated rock formations average 3,000 feet in thickness with a topsoil mantle at the site ranging from three feet to 75 feet thick at the deepest point, and averaging 12 feet in thickness.

5.2.1.2 Geohydrology

Permeability studies done in and around the site show the soil to be generally impervious heavy clay which is resistant to groundwater movement. Laboratory permeability testing on unweathered bedrock was conducted in September 1980. Core Laboratories of Bakersfield tested three samples of unweathered bedrock from the 25 to 45 foot depth range, at the base of the containment dam, yielding results of 1 X 10^{-7} cm/sec., 6 X 10^{-8} cm/sec. and 3 X 10^{-9} cm/sec. These ranges are adequate to meet RWQCB guidelines for Class I waste disposal site containment barriers.

The regionally extensive Sisquoc formation underlies the site to a depth of several hundred feet (750-1500' below the Class I area). The formation consists of essentially flat-lying siltstone, silty claystone, claystone, mudstone, and silty and diatomaceous shell. The upper portion of the Sisquoc Formation, ranging to a depth of about 25 feet below the original ground surface and below any alluvium, is weathered bedrock; underlying this weathered zone is fresh, unweathered bedrock. Some of the clays evidently are slightly expansive because of widespread cracking in the weathered zone. These cracks are not through-going fractures; they are only a surface weathering phenomenon. Neither large folds nor faults are in the disposal site area. The expression of the Casmalia anticline is only a slight increase of dip eastward. The only fault mapped is over one-half mile east of the site and is of questionable existence.

Groundwater at the site is present in limited amounts in approximately the uppermost 25 feet of the weathered bedrock, but no aquifers are in the underlying unweathered bedrock. The bedding planes of the Sisquoc formation dip to the south and west, so groundwater movement in the fractures of the formations is away from the Santa Maria Basin, toward the ocean and the town of Casmalia.

A USGS 1976 report entitled "Evaluation of Groundwater Quality in the Santa Maria Valley, California" concludes that the quality of the groundwater throughout the area has deteriorated over the years. The degradation has occurred mostly in the area of confined groundwater, and is most pronounced in shallower perforated wells. Areally, the quality of the groundwater deteriorates from east to west and northward from the southern edge of the groundwater basin. The water degradation is related to an accumulation of water high in dissolved solutes produced by the use and reuse of water for irrigation. Chemical data reveal that chlorides, sulfates and nitrates in the groundwater are increasing in some parts of the basin due to the application of fertilizer to irrigated land and the injection of liquid ammonia into irrigation lines.

The degradation of ground water by point sources of waste discharge has been small when compared to that of other uses in the valley. The report adds that this does not mean that waste discharge from wastewater treatment facilities, solid-waste landfills, sugar-beet refineries, stockyards, oil field wastewater or from specific industries should be ignored. The discharge from these point sources has thus far been acceptable because of the location of the disposal sites with respect to public water supplies.

Populations nearest the site obtain their water from wells upgradient. The town of Casmalia (pop. 250) receives its water from the Casmite Corporation well on Black Road and Highway 1. The Casmite well is at a depth of 159' and pumps 200 gpm. The residential area of Tanglewood on Black Road receives its water from California Cities well #1 in the residential development. The disposal site obtains its water from four shallow wells in the Casmalia Canyon, west of the disposal site, from an alluvial formation adjacent to Casmalia Creek. These wells in the shallow alluvium are bottomed in the Sisquoc formation and have low yields and receive recharge by streamflow. (Well yields from north to west #1 = 10 gpm; #2 = 40 gpm; #3 = 8 gpm; #4 - 4 gpm.) There are no domestic wells to the west, in the direction of water gradient. There are shallow wells used for watering stock and two inactive shallow irrigation wells near the town of Casmalia. The property west of town is owned by Vandenberg Air Force Base, which obtains its water from wells in the San Antonio Creek Valley located south of the Casmalia Hills.

Surface water also flows south and west down the slope of Casmalia Canyon, entering Shuman Canyon about one mile west of the township of Casmalia and then flowing towards the ocean. A study of "Quality of Surface Waters on and near Casmalia and Shuman Creeks, Casmalia, California" (Pomeroy, Johnson and Bailey, 1972) judged the quality of surface water in reference to its potential uses: domestic water supply, irrigation use, and stock watering. All the samples were excessive in total dissolved solids (TDS) and therefore very poor domestic water. For irrigation purposes, all of the water sources tested were found "injurious to unsatisfactory," according to USDA qualitative classification of irrigation water. These waters are generally satisfactory for cattle watering, but questionable for more sensitive animals.

Another 1972 hydrogeological report by consultant Alden Loomis found groundwater to be present at the site in limited amounts in approximately the uppermost 25 feet of weathered bedrock, but no aquifers were reported in the underlying bedrock. It was highly doubtful, according to the consultant, that there existed a potential for waste migration to an aquifer and then from the aquifer to a drinking water supply.

5.2.2 Waste Storage/Treatment/Disposal Operating Units

The Casmalia facility has been set up to dispose of wastes through the following waste storage, treatment and disposal operational units: (1) surface impoundments; (2) containers; (3) landfill; (4) land treatment; and (5) thermal treatment.

An approximate breakdown of the volumes of waste material handled by each of these units is shown in Table 5.1.

TABLE 5.1*

Impoundments	83%
Containers, including PCB	2%
Land Treatment	10%
Landfill (nonliquid)	1%
Thermal Treatment	5%

5.2.2.1 Surface Impoundments

Description of Impoundments

Casmalia Resources has 12 ponds for liquid waste treatment, seven for solid waste treatment, nine rainfall runoff storage ponds on the southern portion of the site, and seven emergency storage ponds (or galleries) on the southwest portion of the site (See Figure 5.4, shown earlier).

Ponds are designed for use in storage, evaporation and waste settling of various liquids (oil wastes, acids, alkalines, waste water and sludges), as well as for containment of on-site runoff. A freeboard of 2' is maintained for each pond.

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* Phone conversation, J. Lachenmaier

Inflow of liquids is managed by the site supervisor. Liquids are distributed to the appropriate operational holding ponds up to the 2' freeboard markers. Upon attainment of 2' freeboard within the operational ponds, incoming liquids are distributed (pumped) to emergency ponds. When freeboard is reached within the operational and emergency ponds, all incoming liquids are directed categorically into waste storage and disposal ponds. Upslope ponds are utilized first. Upon utilization of freeboard capacities within all appropriate storage ponds, no incoming wastes can be accepted by the facility.

Containment

Ponds are lined with soil from the site containing claystone. Storage and handling ponds are constructed via excavation, fill and compaction. Soil analysis confirms a permeability in the range of approximately 1×10^{-8} cm/sec/ to 3×10^{-10} cm/sec.

Leachate Collection

The leachate collection system for the site is constructed upon a 3-10 percent grade. All ponds are situated to allow gravitational feed of any leachate via surface drainage courses into a reservoir situated at the lowest point within the site. Here a leachate collection pond or gallery is established to monitor leachate collection. This gallery is monitored monthly.

5.2.2.2 Containers

There are five fill areas on the site: acids, caustics and cyanides, heavy metal sludge, solvents and pesticides, and PCB. Each fill contains wastes buried in 55-gallon drums. Drum containment areas consistent of burial cells, which are 40' by 40' square cells, 20' deep and separated from the next burial cell by a 3' soil barrier. These cells are constructed in rows and assigned alphabetical designations. All PCB waste burials are additionally identified with a third locational value (depth of burial).

Burial locations are constructed within naturally occurring impermeable soils. A 3' layer of impermeable soil is used as cover. Side slopes are calculated at 1:1 (or 45 degrees). The fill slopes of waste fills and barriers are flatter, 2:1, at the toe of the fills to avoid slumping. Bypass ditches or terraces that divert runoff of rainfall are maintained around all fills. Tail ponds below the solvents and acids fills are retained at low water levels for safety, evaporation and spray disposal. Drum spacing, slope, and tail pond design allow for 10 percent of volume containment capacity if containers leak.

A 3' cover, separated burial cells, and side slopes prevent penetration of run-on into the wastes. Spilled or leaked wastes are removed by a pump to a lower tail pond and then pumped to a spray field.

Incompatible Waste Mixing

Incompatible wastes are not placed in the same container; nor are wastes placed in an unwashed container previously holding an incompatible waste. Incompatible waste mixing is prevented by having burial fills from adjacent, incompatible fills. There has been no evidence of generation of extreme heat (an indication of reaction between incompatible wastes) in the site's operation to date.

Incidents

Leaking containers have not been in evidence. Wastes have not been stored in incompatible containers, nor has there been an evidence of open drums. There is no evidence of contact with the underlying aquifer.

5.2.2.3 Land Treatment

Land treatment consists of spraying or of spreading sewage or other biodegradable sludge. There are nine areas on the site designated for waste spreading and four areas for spraying (See Figure 5.4 shown earlier). Since most of the waste that is spread or sprayed originated from oil recovery and is responsible for air emissions, areas treating these wastes are regulated by the Santa Barbara County Air Pollution Control District's Oil Recovery Permit. There have been citizen complaints of foul odors originating from the site, but these have not been substantiated as emissions from the site's ponding or land treatment activities.

Wastes analysis is performed to assign the waste to the appropriate segregated handling operation. Wastes which are spread in the designated areas are worked with equipment until dry. No runoff generally occurs, and disposal of these wastes is not assumed to affect the hydrologic calculation.

A comprehensive log of waste types, date of land treatment and location is maintained.

Soil core monitoring was conducted prior to site opening in 1972. Since this date, soil core monitoring has occurred on an irregular basis with no evidence of soil contamination.

5.2.2.4 Thermal Treatment

Casmalia installed a 10 gpm wet air oxidation system in 1982. Wet air oxidation (WAO) is a process for destroying organic hazardous materials which are contained in wastewater. The process is most useful for detoxifying liquid wastes that include a high percentage of water. These wastes are too dilute to economically incinerate, yet are too toxic to treat biologically in a municipal wastewater treatment facility.

When an aqueous waste stream containing suspended organic materials is exposed to an oxygen-containing gas such as air at elevated pressures and temperatures, the organics oxidize into H_2O, and CO_2 and various simple acids depending upon the waste being loaded. Water serves to modify the oxidation reactions so that they proceed at low temperatures relative to those in incinerators. Water also provides an excellent heat transfer medium which enables the wet oxidation process to be thermally self-sustaining with low organic feed concentrations.

The residues from WAO remain in liquid form. The liquid effluent from the system can be discharged safely to a holding pond for evaporation. Gas emissions from the system are claimed to contain no nitrogen oxides, sulfer dioxide, or particulates. A water scrubbing system is usually used to control any odors resulting from the organic oxidation.

A 12-month testing and evaluation period is targeted for the system. The first test run, in April 1983, reduced cyanide concentration from 12,000 ppm to 1-6 ppm. Site operators are claiming success and predict the system will continue to achieve these high destruction rates.

The WAO process is regulated by four permits issued by the Santa Barbara County Air Pollution Control District in 1983. It is too early for any evidence of how well emission standards will be met.

5.2.3 Control Functions

5.2.3.1 General Facility Standards

According to its permits, Casmalia is authorized to accept the following wastes: non-liquid PCB's as permitted by the U.S. Environmental Protection Agency; Group A: low risk wastes, including bulk brine water, oil drilling muds, sewage, and tank bottom sediments as permitted by the Santa Barbara County Dump permit and Santa Barbara County Air Pollution Control District (Oil Recovery Permit); Group B: medium risk bulk light industrial wastes including acid/alkaline waste, acid, odorous hard to handle waste (scrubber and sulfer waste); Group C*: high risk wastes; and Group D: extremely high risk waste , (California Department of Health Services Hazardous Waste Facility Operator's

* Specified in Articles 9 and 10 of the California Department of Health Hazardous Waste Regulations.

Permit and California Solid Waste Management Board Solid Waste Facility Permit).

All wastes are analyzed on site and treated on the basis of their constituents. The written Waste Analysis Plan specifies procedures for verifying manifest data; determining the best mode of ultimate storage, disposal, or treatment; maintaining on-site monitoring of processing and disposal operations; and providing technical support for chemical reclamation projects. The plan has been updated regularly to address all the wastes taken to the facility in accordance with the best available methods. Should wastes sampled not accurately reflect their manifests, a Waste Refusal Report is filed and sent to the generator. In addition, if a significant discrepancy between the sample and the manifest is discovered, the generator is called to resolve the discrepancy. After 15 days, unresolved discrepancies are reported to DOHS, Hazardous Waste Management Branch. Casmalia will not accept wastes which cannot ultimately be identified. The waste analysis and screening for treatment process are shown in Appendices 5.3, 5.4 and 5.5

After screening wastes by comparing the trucking manifest with his preliminary screen to insure conformity, the Casmalia Resources field technician runs the following field tests to insure proper compatibility prior to disposal: ph, flammability, water reactivity, solubility, cyanide, heavy metals and cholinesterase inhibitors. Wastes are then sent to the appropriate section for treatment or disposal, keeping incompatible wastes separate. Waste separation minimizes sources of ignition. Acids and bases (alkalines) are neutralized.

None of the facility processes generate uncontrollable toxic or flammable mists, fumes, dusts or gases. Stringent safeguards are taken against damage to the structural integrity of the facility or equipment.

Security for this site consists of a fencing system and a posted security guard/weighmaster. Access to the site is governed by an electrically operated, six-foot high, wire mesh gate.

The fencing consists of four-strand barbed wire fence, which surrounds the entire 4,300 acres. Within this, the site is protected by an additional four-strand barbed wire fence. Within the site, the areas receiving hazardous materials are secured by an additional four-strand barbed wire fence.

Casmalia Resources maintains a written schedule for facility inspection, which covers the following items: a daily inspection of all operations; weekly facility equipment inspection; safety equipment inspection; and extensive weekly facility inspection. Detailed records are kept. The facility inspection record includes all ponds, all landfills, security measures, and key facility improvements such as embankments, barriers, dikes, and disposal wells which have been problems in the past. (See examples of Inspection Logs in Appendices 5.6, 5.7, and 5.8)

Casmalia Resources plans and executes its own employee training program. On-site instructors utilize both on-the-job training and formalized classroom instruction for all personnel.

On-the-job training is handled by the site supervisor, who is responsible for organizing and coordinating on-site training for each new employee. Employees must understand and demonstrate successful performance of the tasks directly related to their job responsibilities. Employees are instructed in the operation of all equipment.

Formalized classroom instruction consists of a sequence of courses offered on-site by designated instructors. Successful completion is expected of all employees; training records are maintained for each individual. The date of completion of each course is recorded, along with dates of subsequent training or instructional review.

Courses cover the following topics: Employee orientation is an introduction to site operations, emergency equipment, traffic patterns, among other topics. Contingency plan covers response to on-site emergencies and includes familiarization with the use, inspection, repair, and replacement of emergency monitoring equipment; use of communications and alarm systems; response to fires and explosions; coordination procedures with fire, sheriff's and health departments; and evacuation plan implementation. Chemistry of hazardous materials establishes procedures for handling corrosives; flammable, reactive and explosive materials; compressed gases; toxic materials; etiologic agents; radioactive materials; and chemical compatibility. Personnel protection covers the use and maintenance of protective gear, precautionary measures to be taken when handling hazardous materials, and response to and effects of inhalation or exposure. In first aid, all employees are instructed in CPR techniques by a representative of the American Heart Association. Transportation of hazardous materials includes the packaging, marking, labeling and placarding of waste shipments; shipping papers; loading and unloading; emergency response to spills; and leaks or accidents in transit. Wet Air Oxidation system describes the complete system operation, controls, startup and shutdown procedures; safety measures; emergency procedures; and routine maintenance.

5.2.3.2 Contingency Plan

Casmalia Resources' contingency plan is implemented for sudden or non-sudden release of hazardous waste constituents, fires, and explosions. The contingency plan includes site emergency coordinator designations and appropriate contacts and information to be given to the following organizations: Santa Barbara County Fire Department, Santa Barbara County Sheriff, Santa Barbara County Health Care Services, Valley Community Hospital, and Marian Hospital. The plan includes the location and description of emergency equipment. Emergency procedures are outlined to provide for immediate response according to on-site capabilities or designate who should be contacted should the emergency be beyond the capability of the available on-site response mechanisms.

The emergency coordinator is provided with specific duties should the site cease operation; and responsibility for treating, storing, or disposing of recovered waste, contaminated soil, surface water, or any other material that results from a release, fire, or explosion at the facility. Should the accident necessitate evacuation, a plan for this also is included. In Casmalia's ten years of operation, the contingency plan has never been activated.

Emergency reporting requirements are specified in the Facility Operations manual in the event of a Wet Air Oxidation breakdown, spill of hazardous waste in transport, sudden release, fire or explosion.

5.2.3.3 Manifest System, Recordkeeping and Reporting

Casmalia Resources complies with an elaborate system of recording and reporting on a daily, monthly, quarterly and annual basis by maintaining a log of wastes received, transported, handled, rejected and monitored, and any of any abnormal or accidental incidents. Special reporting to EPA is conducted for PCB handling.

In the event of a manifest discrepancy following on-site sampling, there is a 15-day period in which the discrepancy must be reconciled. If the discrepancy is not resolved within 15 days, the weighmaster will notify the company business office, who then notifies the California Department of Health Services. In the event a discrepancy arises concerning the chemical composition of a waste, and the facility is unable to accept the waste, the weighmaster must notify the Hazardous Waste Management Branch of the DOHS prior to refusing the waste. This notification is designated to prevent the subsequent mishandling or dumping of wastes.

A copy of all records and reports are kept on file in the business office and made available for inspection to duly authorized representatives of government agencies.

5.2.3.4 Ground-Water Monitoring

Casmalia Resources treats and disposes of wastes via burial, landfill, and ponding operations. All of these elements could potentially lead, if mismanaged, to surface water runoff and potential groundwater contamination. To protect against this development, on/or adjacent to the disposal site water monitoring has been instituted. This water monitoring is mandated and should be distinguished from the privately funded, sporadic testing of water undertaken at other locations at some distance from Casmalia Resources property.

The Casmalia Resources facility is required by the California Regional Water Quality Control Board to monitor the water quality and quantity in monitoring wells which are located on all sides, and especially downstream of the disposal site. (See Figure 5.4.) These wells, varying from 10' deep to 180' deep, are monitored to determine any underflow or contamination seeping underground out of the waste disposal area.

The monitoring of these wells is meant to be an early warning sign for possible groundwater contamination, and consists of daily measurement of water levels, monthly measurement of specific conductance, and analyses during April, May, October and December in varying wells for selected minerals, heavy metals, cyanide, phenols and total identifiable chlorinated hydrocarbons (which includes PCB's and pesticides). Casmalia Resources personnel send these samples to Brown and Caldwell, a state approved testing laboratory certified for complete organic chemical analyses. The daily and monthly measurements of specific conductance (flow of electric current used to measure presence of chemical compounds), water surface elevation and volume are measured and submitted by Casmalia personnel.

Water Quality Control Board personnel have carefully reviewed the data submitted on each of the monitoring wells, and have concluded that there is no contamination of the underground strata as of this writing. The Board has required that more monitoring wells at varying depths and various locations be sampled by the Casmalia personnel. The Board does not take a check or split samples to verify the results submitted by Casmalia.

The State Department of Health Services and Santa Barbara County of Health Services are mandated by State Law (California Safe Drinking Water Act and the California Domestic Water Quality and Monitoring Regulations) to inspect, issue permits and monitor the water quality of all public water supplies. Therefore, numerous wells in the Santa Maria Valley are under surveillance by the State and County Health authorities.

The State inspects the larger public water systems in the valley, including the Tanglewood well three miles north of Casmalia Resources on Black Road. The County inspects water systems having fewer than 200 service connections including the Casmite Well which serves the town of Casmalia. Each of the water purveyors is required to provide water which meets California Drinking Water standards. The monitoring for water quality includes bacteriological analyses as well as chemical analyses for general mineral, physical and inorganic (heavy metals) every three years.

Additionally, special monitoring and sampling was conducted by the State Department of Health Services in 1981 for PCB's and in 1982 for 113 organic compounds (toluene, vinyl chloride, fluorene, phenol, chlordane, toxaphene, PCB's, etc.) This sampling was performed throughout the Santa Maria Valley, including the City of Santa Maria, Orcutt, Tanglewood and Casmalia, in response to citizen concern. In all samples submitted by the State for analysis, none of the organics were detected -- at a detection level of one part per billion. The State does not feel that an on-going monitoring program in the Santa Maria Valley is justified, based on the lack of contamination found in 1981-1982 and based on the improbability of the Casmalia disposal facility being a point source for upstream groundwater contamination.

Citizen concern has led individuals to take the initiative by sampling the water themselves and sending them to labs at their own expense for analysis. Nineteen recorded tests were taken between April, 1978 and February, 1983. The samples were sent to a variety of labs in California, many of which have state and EPA certifications. Citizens requested that the water samples taken from Santa Maria City and environs be tested for PCB's and on three occasions for heavy metals. EPA's Pesticides and Herbicides scan was also performed on one sample.

Three tests revealed PCB levels that led to further investigation (11/17/81, .37 ppb; 11/17/81, .38 ppb; and 12/23/82, .16 ppb). These results led to the State Department of Health Services water testing programs in 1981 and 1982. To date the State has not been able to corroborate the private citizens' test results.

Citizen concern has resulted in two Grand Juries focusing on the Casmalia Resources facility (1980-81 and 1981-82). The latter Grand Jury recommended that the County of Santa Barbara initiate groundwater monitoring on and around the Casmalia Resources site. In early 1983 County Environmental Health Staff were directed by the Board of Supervisors to develop a water monitoring plan for the Casmalia area. As of this report, staff recommended monitoring the following wells in the general direction of the groundwater gradient: 1) one of the monitoring wells

(C1-C6) southwest of the site; 2) Casmalia Resources domestic well #4, west of the site near Casmalia Creek; and 3) the stock watering well on Casmalia property west of the town of Casmalia.

Suggested monitoring points within a five-mile radius of the disposal site (even though the gradient is away from the Santa Maria basin) are: (1) Casmite Corporation well; (2) California Cities Tanglewood Well #1; and (3) Union Sugar's Domestic Well #1. The various tests being considered are a complete organic scan for all possible organic contaminants, a chemical analysis as required by CRWQCB, an analysis for PCB's only, or a minimum chemical scan as recommended by RCRA authorities for groundwater assessment around a hazardous disposal site. Coordination discussions are ongoing with Casmalia Resources personnel, as are deliberations by the County Board of Supervisors as to what analysis plan to follow.

5.2.3.5 Closure and Post-Closure

An earlier version of the Casmalia Operations Manual stated that long term care of the site, as well as details for eventual closure, would comply with eventual RCRA requirements. With reference to the language of RCRA*, Casmalia will carry $5 million sudden/non-sudden event insurance, and must establish a post-closure and monitoring trust fund.

A recent Facility Operation Plan (February 1983) simply states that the long-term care and closure plan is on file in the company business office. The Closure Plan was not available for examination by the authors of the present report.

5.2.4 Physical Pathways or Conduits to Resource Receptors

Casmalia Canyon running south of the site is the major pathway for wastes leaving the site. Casmalia Canyon runs southwest into Shuman Creek which continues west toward the ocean.

There is no evidence of an aquifer in the underlying formation. The geohydrology is discussed in Section 5.2.1.

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* Title 40, Chapter 1, Part 250, Subpart D "Owners and Operators of Hazardous Waste Treatment; Storage and Disposal Facilities", Section 250.46.

5.2.5 Receptors

5.2.5.1 Land Uses

Land surrounding the site is either privately owned agricultural land (mainly grazing) or involved in the oil industry.

5.2.5.2 Population

On site employees number 25. Major population concentrations are 2.5 miles southwest in the township of Casmalia (pop. 250) and 5 miles north on Black Road in Tanglewood with 300 residential units. Oil industry employees number 15 at most.

5.2.5.3 Flood Plain

There is no flood plain in evidence.

5.2.6 Perturbation Dynamics

The Casmalia site is not adjacent to any significant geological fault. A 1972 geological study questioned the existence of one supposed fault one and one-half miles from the site.

The site is victim to heavy rains such as those occurring in the heavy rainfall periods of 1940-41, 1968-69, 1972-73, 1977-78 and the recent rain fall year of 1982-83. (See Appendix 5.9.)

During 1972-73 and 1977-78 Casmalia Resources experienced difficulty with rainfall run-on and waste discharge. As a consequence, Casmalia Resources must annually demonstrate that its site can contain run-on and runoff from a 100 year frequency storm. (See Appendix 5.10.)

5.3 CONCLUSIONS

The following conclusions seem warranted concerning the Casmalia Resources facility:

- o It is highly doubtful that there exists a potential for waste migration to an aquifer and then from the aquifer to a drinking water supply;
- o The collection gallery at the outlet of the facility is monitored monthly; no migration of hazardous waste constituents has ever been recorded;
- o Casmalia Resources' facility seems to have earned its reputation as a "model" facility;
- o Its use of a new Wet Air Oxidation facility will enable oxidation of certain hazardous waste constituents, and anticipates the sunset on landfilling of hazardous waste constituents.

Footnotes

1. Santa Barbara County Emergency Service staff report to the Board of Supervisors, 1/28/83
2. Telephone conversation with Jan Lachenmeier, Casmalia Resources 5/12/83
3. Letter to Congressman Robert Largomarsino from Jim Stubchaer, Flood Control Engineer/Manager, Santa Barbara County Flood Control and Water Conservation District and Santa Barbara County Water Agency
4. Letter of 11/12/81 to Assemblyman Gary Hart from Jan Denton, Director, State Department of Conservation
5. Letter of 12/11/73 to Kenneth Hunter, Casmalia Resources, from Ken Jones, RWQCB
6. Letter to Vernon Bugh, Deputy Director, Santa Barbara County Public Works, from Ken Jones, RWQCB, October 2, 1973
7. Letter to William Leonard, RWQCB from Alvin Franks, Supervising Engineering Geologist, State Water Resources Control Board, November 21, 1973
8. Letter 3/31/75 to Kenneth Hunter from Ken Jones, RWQCB
9. Letter 4/14/76 to K. Hunter from K. Jones, RWQCB
10. Letter 1/19/78 to K. Jones from K, Hunter, Casmalia Resources
11. Letter 2/17/78 to K. Hunter from K. Jones
12. Letter 6/2/78 to K. Hunter from K. Jones, RWQCB
13. Minutes of 7/17/72 Santa Barbara County Board of Supervisors Meeting
14. Letter 9/16/81 to Ron Gilman, Santa Barbara County Agricultural Commission from Earl Margitan, Senior Waste Management Engineer, Hazardous Materials Section, DOHS
15. Ibid.

CHAPTER 6 CALCULATION OF BENEFITS

6.0 CHAPTER SUMMARY

The basic purpose of this study is to asses the magnitude of the benefits of RCRA regulations. In this chapter, the model described in Chapter 3 is applied to the two study sites in an attempt to quantify the benefits. The main results are:

- o The benefits of regulations are substantially higher for Simi Valley than for Casmalia.
- o The levels of benefits are highly sensitive to variation in parameters and scenarios, and less sensitive to any particular regulation.
- o Site selection criteria may be more critical and overriding for these two sites in determining levels of benefits than variation among or within specific regulations themselves.

6.1 APPLYING THE CONCEPTUAL FRAMEWORK

It is important to recall the distinction between the "sudden occurrence" and the "non-sudden occurrence". Sudden occurrences include acts of nature, such as earthquakes and heavy rains, explosions, or other rapid releases of energy, where the effects are concentrated in space and time. Non-sudden occurrences operate slowly in space and time: leachate moving slowly through the alluvium to an underground water supply; incompatible hazardous waste constituents combining and releasing gas; subsidence.

The basic sudden occurrence scenario is a landslide occurring during a major rainstorm in an above-average rainy season, with an accompanying earthquake, and having primarily land-use rather than human health impacts. The basic non-sudden occurrence scenario is a protracted leachate problem primarily affecting human health. Both could conceivably occur at each site. The numbers are intended to provide a rough feel for the sorts of losses which might be generated under unfavorable circumstances.

A precise valuation of the benefits of regulations is not possible because critical data for the factors in the causal chain from the initiating occurrence to the consequence are unavailable or incomplete. Health effects are particularly difficult to trace. A proper epidemiological investigation requires either that the concentration of a specific waste constituent and its pathway to a population at risk be known, so that health effects can be estimated; or that negative health consequences have already appeared in a population, and that the source and pathway be traceable.

The framework for calculating benefits under the "sudden occurrence" scenario is shown in Table 6.1. Parameters refer to the prices used to value resources. "Maximum" refers to "maximum market value" and has been established through rough estimates made by local city planning office staff. "Moderate" and "low" are established at 75 and 50 percent, respectively, of the maximum "high" estimates.

Scenarios range in severity from "low severity" to "moderate" to "worst plausible." As indicated in Chapter 3, expected value is very difficult to establish. A "worst plausible" scenario will occur with a very low probability. Whatever value that is, a "moderate" scenario will be taken to have a combined impact of 10 percent of the "worst plausible" scenario, though its probability will be higher by an order of magnitude. A "low severity" scenario has an impact of 1 percent of the "worst plausible" scenario, though its probability will be higher than the worst by two orders of magnitude. This framework yields nine estimates of benefits.

For calculating benefits under the "non-sudden occurrence" scenarios, the three levels of severity are combined with three cases using assumptions on the percentage of the local population affected by a leachate problem: 10 percent, 5 percent and 2 percent. This yields nine estimates of benefits, measured as a yearly rate (dollars/year). (See Table 6.2.) These estimates can be capitalized at various interest rates; two are used here: 3 percent and 10 percent.

TABLE 6.1

FRAMEWORK FOR BENEFIT CALCULATIONS:
SUDDEN OCCURRENCE

Scenarios	Market Values: Maximum 100%	Market Values: Moderate 75%	Market Values: Low 50%
Worst Plausible Case			
Moderate (10% of worst)			
Low (1% of worst)			

TABLE 6.2

FRAMEWORK FOR BENEFIT CALCULATIONS:

NON-SUDDEN OCCURRENCE

Scenarios	Percentage of Local Population Affected High 10%	 Moderate 5%	 Low 2%
Worst Plausible Case: Total disability; $30,000/yr. 3% interest 10% interest			
Moderate disability; $10,000/yr 3% interest 10% interest			
Low disability; $2,000/yr 3% interest 10% interest			

6.2 BENEFITS OF REGULATIONS AT SIMI VALLEY

Three scenarios are considered for Simi Valley:

1. Earthquake combined with heavy rain leading to landslide and offsite flow of material; nine benefits estimates.

2. Undetected leachate and water contamination; nine benefits estimates.

3. On-site explosion; discussion only.

The earthquake/heavy rain scenario is considered at three levels of intensity and with three variations in the cost parameters, yielding nine estimates of benefits. The undetected leachate and explosion scenarios are considered, individually, at three population-affected rates and three income disability levels, yielding nine estimates of benefits.

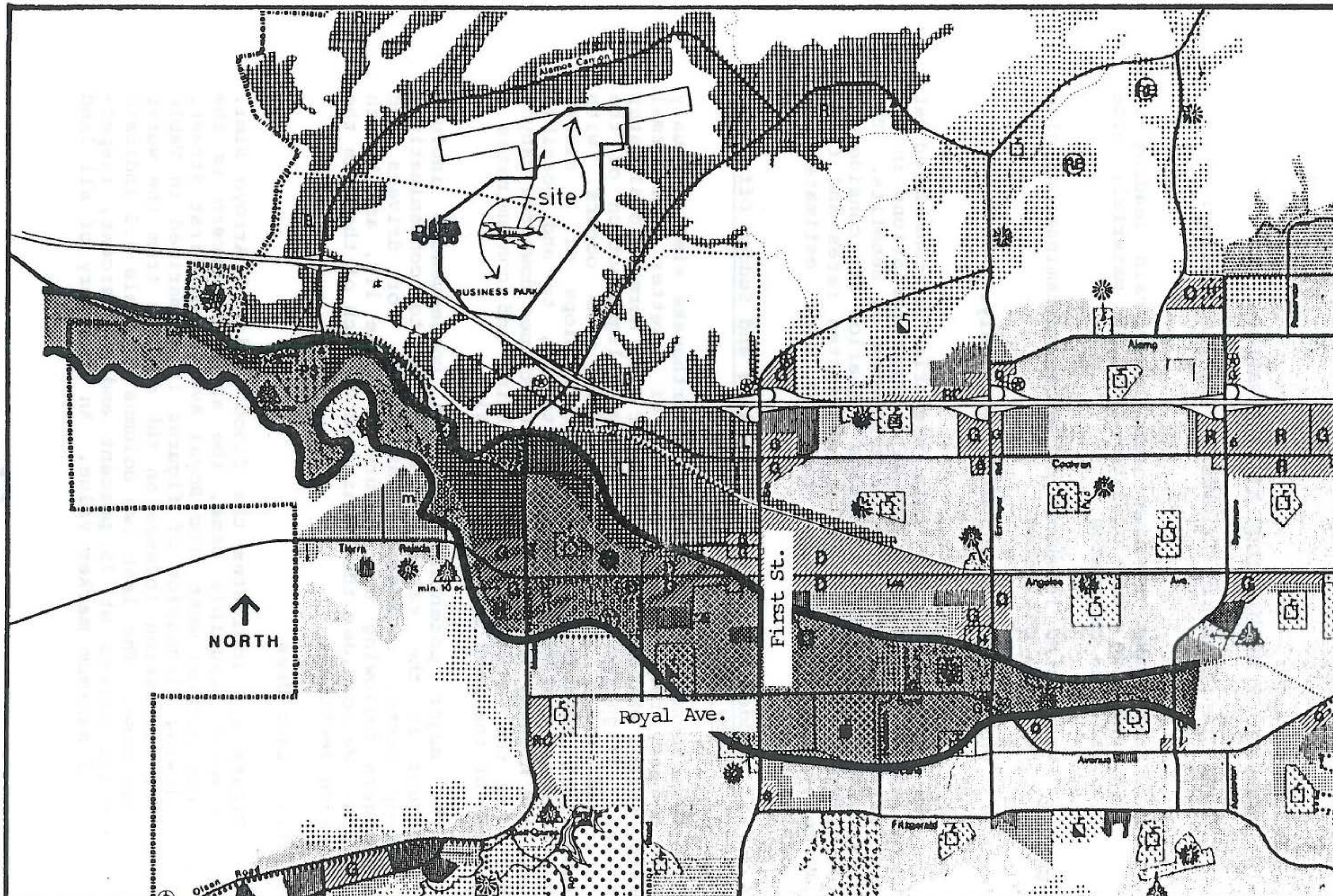
6.2.1 Sudden Occurrence: Landslide and Sudden Off-site Flow of Material

This scenario pairs a strong earthquake simultaneously with a heavy rainstorm at the end of a wetter than normal rainy season which has caused higher than normal local water tables. Triggered by an earthquake, liquefaction of the saturated waste mass at the Simi site occurs, with subsequent movement down the canyon slope of a slurry containing hazardous waste constituents, to and possibly over the highway berm. The slurry continues down the canyon mouth to the Arroyo Simi flood plain, and contaminates a portion of the land in the flood plain.

The major potential economic consequences include reductions in the value of land due to contamination, clean-up costs, increased travel time for drivers and passengers following the closure of Route 118, and health effects. We consider the magnitudes of each of these in the following sections.

6.2.1.1 Land Uses

Figure 6.1 indicates the flood plain of Arroyo Simi. In the worst plausible case, the area of concern is the downstream portion west from Royal Avenue and First Street. The following discussion of figures is summarized in Table 6.3. The discussion focuses on the damages from the worst plausible case. The last two columns in Table 6.3 indicate damages for prices at 75 percent and 50 percent, respectively, of maximum market value. An inventory of all land



Source: City of Simi Valley Community Development Department, Land Use Plan Map.

Figure 6.1

FLOOD PLAIN

uses in the flood plain is given in Appendix 4.7. Land prices, costs of infrastructure, replacement costs of residential, commercial, and industrial structures have been estimated from discussions with staff from the Simi Valley Department of Community Development.

There is no agricultural land in the immediate flood plain. Agricultural land does exist downstream in Moorpark; for the purposes of these rough estimates, impacts on it are neglected.

Residential land is present in the flood plain, however. The worst plausible event is that sufficiently serious to cause the affected land together with all improvements on that land to become economically valueless. A total of 229 acres of land is presently zoned residential in the flood plain portion shown in Figure 6.1. At $100,000 per acre, this would have a value of $22.9 Million. Present zoning allows for 592 medium density homes (3.7 homes/acre), 322 intermediate density homes (seven homes/acre), and 345 high density homes (15 homes/acre). Assuming (1) that the actual number of structures is 95 percent of the maximum number of units allowed by zoning, (2) that replacement building costs are $50 per square foot of structure, and (3) that the average numbers of square feet per unit are 2200, 1700 and 1000 for medium, intermediate, and high density homes, we obtain a total structure value of $127.2 Million

In addition, there are roughly 220 mobile homes in the area under consideration. Assigning a value of $60,000 to each yields another $13.2 Million. Thus, if all of these structures plus the 229 acres needed to be abandoned following a slide, the total losses would be on the order of 22.9 + 127.2 + 13.2 = $163.3 Million.

Turning to <u>industrial</u> land, there are 153 acres zoned for industrial uses, for an approximate land value of $15.3 Million (at $100,000 per acre). Assuming that 40 percent of this land is covered with structures valued at $30 per square foot implies a total value of $80 Million. Thus, an event which resulted in the abandonment of all industrial land and structures would impose losses of 15.3 + 80 = $95.3 Million.

There are also 105 acres of commercially zoned land in the relevant portion of the flood plain. At $100,000/acre, this land is worth $10.5 Million. Assuming 25 percent buildout, and a structure replacement cost of $11 per square foot, we obtain a total structure replacement cost of $12.6 Million. Abandonment of all commercial land and structures would thus result in costs of $23.1 Million.

Similar calculations can also be performed to estimate losses if <u>recreational</u> land in the flood plain must be abandoned. This land includes Oak Park (38 acres), Arroyo

TABLE 6.3

LAND USE DAMAGES

Land Use	Area (acres)	Price	MARKET VALUES Max. 100%	Mod. 75%	Low 50%
			$ Million		
RESIDENTIAL LAND	229	$100,000/ acre	22.9	17.2	11.5
DWELLINGS					
medium density: 592		$50/sq.ft.	61.9	46.4	30.9
intermediate: 322		"	26.0	19.5	13.0
high: 345		"	16.4	12.3	8.2
Mobile homes: 220		$60,000 ea.	13.2	9.9	6.6
SUBTOTAL:			$140.4	105.3	70.2
COMMERCIAL LAND	105	$100,000/ acre	10.5	7.9	5.3
COMMERCIAL STRUCTURES		$11/sq.ft.	12.6	9.4	6.3
INDUSTRIAL LAND	153	$100,000/ acre	15.3	11.4	7.7
INDUSTRIAL STRUCTURES		$30/sq.ft.	80.0	60.0	40.0
PARKS					
Oak Park: land	38	$100,000	3.8	2.9	1.9
improvements			1.2	.9	.6
Arroyo: land	20	$ 80,000	.16	.12	.08
improvements			.19	.14	.10
Strathern: land	5	$ 80,000	.40	.30	.20
improvements			.35	.26	.18
Undeveloped land	150	$ 20,000	3.0	2.3	1.5
	5	80,000	.4	.3	.2
SUBTOTAL:			$9.5	7.2	4.8
INFRASTRUCTURE					
residential	229	$100,000/ acre	22.9	17.2	11.5
commercial/ind.	258	$ 75,000/ acre	19.4	14.5	9.7
GAS, ELECTRIC, CABLE TV	1 sq.mi.		14.3	10.7	7.2
SCHOOLS					
2 elementary		$ 4 mil. ea.	8.0	6.0	4.0
1 junior high		5 mil. ea.	5.0	3.8	2.5
WASTEWATER TREATMENT PLANT		$31 mil.	31.0	23.3	15.5
GRAND TOTAL (Millions)			$368.9	$276.6	$184.7

Park (two acres), and Strathern Historic Park (five acres). As well, there are two undeveloped parcels of park land totaling 155 acres (Tierra Rejada). Estimates of value of this land from local sources are $100,000/acre for Oak Park, $80,000/acre for Arroyo and Strathern. The undeveloped park land is estimated to be worth $20,000/acre for 150 acres and $80,000/acre for the remaining five acres. In total, the value of the recreational land is thus $9.5 Million.

In the event of a serious slide which led to abandonment of these parks, the improvements on the land would also be lost. Replacement costs for park facilities are $1.2 Million for Oak Park, $190,000 for Arroyo, and perhaps $350,000 for Strathern. (This last figure may be a serious underestimate, for Strathern contains unique historic adobe structures.) Total structure replacement costs are thus $1.7 Million, implying a total value for recreational land and structures of 9.5 + 1.7 = $11.2 Million.

For the serious slide being considered, infrastructure would also be lost. To estimate the value of this infrastructure, assume that residential land has a replacement cost for water, sewer, and roads of $100,000/acre, and that industrial and commercially zoned land has a replacement cost of $75,000/acre for these three infrastructure components. This would imply total replacement costs of $42.3 Million for water, sewer and roads. As well, gas, electricity and cable T.V. facilities would be lost in an area about one mile square. Assuming as an approximation that this area contains 11 roads, each one mile long (i.e., with each road about 500 feet from another road), would imply 57,200 linear feet of road, and taking the costs of replacing gas, electricity and cable T.V. to be $250 per linear foot, we would have an additional $14.3 Million of losses. Finally, schools and other infrastructure would be lost. There are two elementary schools (replacement costs approximately $4 Million each) and one junior high school ($5 Million) in the flood plain, as well as a wastewater treatment plan ($31 Million, including land value).

Adding together all infrastructure losses which would occur in a (sufficiently) serious slide then gives total losses of $100.6 Million.

In sum, if all land and improvements on the roughly 700 acres in the immediate flood plain were abandoned following a serious incident, total land and improvements losses would be $368.9 Million.

6.2.1.2 Other Non-human Costs

A host of shorter-run and probably less severe costs would follow a serious landslide. Two examples are clean-up costs and increased travel times on local roads. Table 6.4 summarizes these costs. For clean-up costs, a large

TABLE 6.4

CLEAN-UP AND TRAVEL TIME COSTS

OTHER NON-HUMAN COSTS	Volume (Cu.Yds.)	Price	MARKET VALUES Max. 100%	Mod. 75%	Low 50%
			$ Million		
Cleanup:					
berm	160,000	$400,000/ cu.yd.	$64	$48	$32
flood plain	500	$ 1,000/ cu.yd.	0.5	0.4	0.2
Increased Travel Time			3.3	2.5	1.7
TOTAL			$67.8	$50.9	$34.0

landslide might involve on the the order of 160,000 cubic yards of material being deposited behind the berm of Route 118. At $400 per cubic yard, removal and disposal of this material would cost $64 Million. Also, some material deposited in the flood plain might be removed even if the land and structures are ultimately abandoned. Costs per cubic yard here are roughly $1,000. If only 500 cubic yards were to be removed, the total costs would be $500,000. If a more significant removal were undertaken, these costs would be correspondingly higher.

Shorter-run costs would also result from the closure of Route 118 following a slide. Delays would result both for travelers who normally use Route 118 and for travelers who use nearby roads which would become more congested as a result of the closure of Route 118. A sample calculation illustrates the magnitude of such costs. Suppose Route 118 remains closed for 60 days following a slide. For each of the roughly 13,000 trips made per day on Route 118 (this figure is a slight overestimate relative to 1982 values), suppose that each vehicle trip involves 1.2 individuals and that a 0.35-hour delay results per trip. If traveler time is worth $10 per hour, this would result in total costs of 60 x 13,000 x 1.2 x .35 x 10 = $3.3 Million. Adding in the effects of increased congestion and corresponding increased travel times would raise this figure somewhat, perhaps to $5 Million.

6.2.1.3 Health

It is known that pesticides, oil extraction wastes, PCB's and heavy metals have been disposed here. It is not known in what form these materials were deposited. The pesticides, heavy metal compounds and oil waste were probably in some form of container. The PCB's may be in containers, still in transformers or mixed with another substance or soil.

<u>Exposed Populations and Pathways of Exposure</u>

On-site employees would likely be exposed both during and <u>after the event</u> when the waters have receded and the contaminants remain scattered on the soils surface. Pathways of exposure would be long-term, particularly to the highly persistent PCB's. Cell site employees would receive some exposure but those working in the <u>immediate</u> area, including those working during the emergency event, would receive greater exposure.

The PCB's are of particular concern. There are many forms of PCB's, and the relative toxicity of each is a function of the amount of chlorine contained in each compound. (For example, the federal standard for chlorodiphenyl (42% Cl) is 1 mg/m^3 whereas the state standard chlorodiphenyl (54% Cl) is 0.5 mg/m^3.)

PCB's are extremely persistent and resist chemical and biological breakdown. Only extreme temperatures, not encountered under ambient conditions, will result in their rapid degradation. They are highly absorptive and tend to accumulate in soils and river bottoms. They sink in water unless suspended by binding particles.

Following an event like this, PCB contamination of soils downstream from the site could be expected, as could contamination of groundwater supplies. As the groundwater is not used for drinking, the principal pathways of exposure would be via the food chain, through the use of contaminated water for irrigation of crops which are either forage for cattle or destined for direct human consumption. Irrigation would also result in introducing the contaminant to soils, thereby continually extending the range of impacted area.

<u>Health Effects</u>

PCB's are a logical source of concern. They are strong irritants, and both chronic and acute exposure has been associated with edema, liver damage, jaundice, vomiting, nausea, abdominal pains, and fatigue. Exposure through skin contact has caused the development of subcutaneous cysts. Ingestion has caused birth defects. Certain levels of exposure can cause death, although no definitive studies exist which define a threshold level. The most frequently cited illustration focuses on a disaster in Japan where a bean crop was contaminated with PCB's. Out of 1200 symptomatic individuals, there were 22 fatalities. Individual exposure in this case was in excess of 200 mg/l.

The obstacles to measuring health effects have already been noted. It is difficult to see how this landslide scenario could give rise to health effects of the magnitudes of the land use effects. This is not to say that health effects would not be present, but merely that it is difficult to foresee how a landslide at the Simi site could cause health effects on the order of tens or hundreds of millions of dollars.

6.2.1.4 Summary Sudden Occurrence Scenarios

In summary, and putting aside the highly speculative health costs, a particularly severe landslide of hazardous waste material from the Simi Valley site could cause total damages of \$368.9 Million + \$67.8 Million = \$436.7 Million. It should be emphasized that this is a very low probability event. Additionally, the impact of the regulations in eliminating or reducing the seriousness of the event is difficult to ascertain.

Table 6.5 suggests the range of damages avoided due to regulations. This range is arrived at by varying market values and the degree of severity of the worst plausible sudden occurrence scenario. A log scale was used on the severity scale to parallel the Richter scale of the underlying earthquake forces. The low damage event would occur with a much higher probability than the worst plausible case (two orders of magnitude seems reasonable, though considerable additional research would have to be performed to substantiate this, even weakly). From this table, regulations would prevent damages, from a moderately severe earthquake-rainstorm scenario, evaluated at moderate market values, $32.8 Million.

TABLE 6.5

BENEFITS OF REGULATIONS: DAMAGES AVOIDED

Sudden Occurrence Scenarios

Market Values (Millions of Dollars)

	Maximum 100%	Moderate 75%	Low 50%
Worst Plausible Case	437	328	219
Moderate (0.1 x worst)	43.7	32.8	21.9
Low (.1 x moderate case)	4.37	3.28	2.19

6.2.2 Non-sudden Occurrence: Long-term, Undetected Leachate and Surface-Water Contamination

The landslide scenario discussed above would be relatively short-term and easily observed. As such, it would primarily affect land uses. However, a longer-term undetected series of discharges would be unlikely to cause significant changes in land use but might instead lead to major health effects. The pathways for leachate leaving the site include:

- Surface water: the canyon channel leaving the site and ultimately entering Arroyo Simi;
- Groundwater: the underlying aquifer from which water is pumped into Arroyo Simi to reduce liquefaction potential;
- Possible, though less likely (and undocumented at the moment), intrusion into the drinking water supply by lateral water movement.

While pinning numbers on such an "event" is difficult, it should be emphasized that very significant health consequences could occur. The following sample calculation adequately illustrates this point.

The population of Simi Valley is roughly 80,000. Without any regulation, one can imagine a particularly serious slow-discharge event affecting say 10 percent of this population. Assume that 8,000 individuals are affected for each year in perpetuity, and assume that the effect is a total disability together with requirements for increased medical care. Let us put the number $30,000 per individual per year on this loss, reflecting losses of income, loss of the ability to enjoy leisure, and additional medical expenses. Summarizing, total yearly costs are 8,000 x 30,000 = $240 Million. Calculating the discounted present value of this cost stream using a 3 percent yearly interest rate then implies total costs of $240 Million ÷ .03 = $8 Billion. At an interest rate of 10 percent, total costs are $2.4 Billion. These are the maximum values. For lower percentages of the population affected and less severe scenarios reflecting lower disabilities, eight other values for yearly damages avoided to health can be determined; these are shown in Table 6.6 If 5 percent of the population is affected due to an undetected leachate problem leading to a <u>moderate</u> disability among those affected, the table suggests that regulations have led to the avoidance of $40 million/year of health costs. A low estimate would be $3.2 Million/yr.

These figures are capitalized at 3 and 10 percent, respectively, in Tables 6.7 and 6.8 At these percentage interest rates maximum total damages avoided to health due to regulations would range from \$8 down to \$2.4 Billion Dollars, respectively, for 3 and 10 percent; minimum total damages avoided would range from \$100 down to \$30 Million, respectively, for the same rates.

TABLE 6.6

YEARLY DAMAGES AVOIDED TO HEALTH

Percentage of Local Population Affected

Scenarios	High 10%	Moderate 5%	Low 2%
		$ Million/ year	
Worst Plausible Case			
Total disability: $30,000/yr	240	120	48
Moderate disability: $10,000/yr	80	40	16
Low disability: $2,000/yr	16	8	3.2

TABLE 6.7

TOTAL DAMAGES AVOIDED TO HEALTH
INTEREST RATE = 3%

Percentage of Local Population Affected

Scenarios	High 10%	Moderate 5%	Low 2%
		$ Billions	
Total disability: $30,000/yr	8.0	4.0	1.6
Moderate disability: $10,000/yr	2.7	1.3	.5
Low disability: $2,000/yr	.5	.3	.1

TABLE 6.8

TOTAL DAMAGES AVOIDED TO HEALTH
INTEREST RATE = 10%

Percentage of Local Population Affected

Scenarios	High 10%	Moderate 5%	Low 2%
		$ Billions	
Total disability: $30,000/yr	2.4	1.2	.5
Moderate disability: $10,000/yr	.8	.4	.2
Low disability: $2,000/yr	.2	.1	.03

6.2.3 Sudden Event: Explosion On-site

The two principal scenarios discussed so far constitute the worst plausible cases which could occur. Their potential off-site impacts are the chief consequences RCRA was designed to limit. Some of these regulations suggest events having important on-site as well as off-site consequences. These events are much less important to consider, thought they may occur with higher probabilities. On-site limited events such as explosions and fires will have primary impacts limited ultimately to the number of people, usually employees, on the site. In particular, Subpart C (Preparedness and Prevention) and Subpart D (Contingency Plan and Emergency Procedures) share this dual feature of preventing off-site impacts by focusing on on-site procedures.

Especially at the Simi Valley site, there has been much local concern expressed over the disposal of incompatible wastes next to each other. Most wastes have been characterized and isolated in appropriate cells. Certain assumptions, however, may be made regarding disposal practices which occurred prior to the implementation of RCRA which combine to make an explosion or fire scenario plausible.

Regarding the wastes, it is possible that incompatible hazardous waste constituents could be ignited through spontaneous combustion; alternatively, the initiating occurrence could be an accident in which a bulldozer punctures a drum of flammable materials. An earthquake could rupture cell walls and allow incompatible wastes to commingle and interact. In this event, oxygen and water coming into contact with strong reducing agents or chlorates could react violently or, rainwater entering cells could support the transport of stable heavy metal compounds into pools containing other compounds (e.g., alcohols) resulting in the formation of unstable compounds such as fulminates, leading to an explosion.

If any of these events were to occur, the consequences would be limited primarily to the site. One would expect fires, both localized and spreading from the explosion site, due to the scattering of flaming debris, both solid and liquid. One would also expect that the air on-site would become contaminated, in cloud-like form, with a mixture of chemicals, pesticides, acid fumes. Depending on the events of the initial explosion, other cells might in turn explode. Dangerous substances would also be deposited on the land surface.

The most important consequences of such an event would occur on-site. Workers and visitors may suffer physical injury due to:

- o flying debris and/or fires (the closer to the source, the greater the likelihood of severe injury)
- o inhalation, absorption or ingestion of toxic dusts and/or fumes; this could occur at the time of the event or at a later time
- o dermal reaction with airborne and/or soil-deposited chemicals

Off-site consequences may be encountered as the explosion ruptures containment areas and allows waste streams to migrate off-site. There would also be some "cloud" drift, but the deposition of constituents and dilution of vapors would be rapid and, therefore, of relatively minor significance. Problems, if any, would be traceable to food chain interactions in which substances, like lead or pesticides, were ingested by cattle, for example, and subsequently ingested by man.

Potential health problems would be diverse. Physical injuries would include cuts, burns, broken bones, and possible fatalities in the immediate vicinity of the site. Burns would be due to both fire and contact wtih airborne chemicals, primarily acids. Exposure to airborne and surface-deposited pesticides could result in nervous system disorders ranging from headaches to brain damage. Since the pesticide Malathion was in widespread use in the early 1970's, we shall use it as an example of a pesticide deposited prior to RCRA compound. Existing National Institute of Occupational Safety and Health (NIOSH) permissible limits for Malathion in air, reflecting a time weighted average, are 10 mg/m³ for a 10-hour shift and a 40-hour work week. Should significant amounts of this pesticide become airborne and workers/visitors be nearby, they almost certainly would be exposed to doses greatly exceeding these standards. Symptoms of Malathion poisoning include increased bronchial conditions and excessive salivation, nausea, vomiting, excessive sweating and muscular weakness.

Lead poisoning could occur both immediately and after the event when workers are exposed to lead-contaminated soils. OSHA standards for lead inhalation are 0.1 mg (100 ug)/m³ by 1981 and 0.05 mg (50 ug/m³) by 1988. Acute lead poisoning due to inhalation may occur, as may chronic poisoning associated with long-term exposure to lead-contaminated surfaces. Lead poisoning affects the central nervous system, the brain, and reproductive processes; its effects are cumulative.

Exposure to heavy metals, originally in sludges and drilling wastes, may cause pulmonary edema. Prolonged exposure may result in nasal or lung cancer. Once again, exposure might be ongoing due to surface deposition resulting from explosion.

It should be noted that, as a result of the explosion, not only will a number of dangerous substances be despoited on the surface and present a hazard, but also they will then be subject to environmental migration to off-site areas, thereby increasing the size of the region of influence.

The issue of teratogenic, mutagenic, and carcinogenic impacts is difficult to assess. Undoubtedly, workers would be exposed to substances having the potential for such impacts. Some, as in the case of heavy metals and polyaromatic hydrocarbons, have demonstrated relationship with cancer initiation. However, the dosages associated with an event like this and the existence of many confounding variables combine to prevent us from accurately predicting effects.

6.3 BENEFITS OF REGULATIONS AT CASMALIA

As with Simi, scenarios for both sudden and non-sudden occurrences are considered. The scenarios at Casmalia differ from those for the Simi site only to the extent that local conditions differ at the two sites. Note that as for Simi, these two scenarios appear to constitute the most serious which could occur.

6.3.1 Sudden Off-site Flow of Material

The Casmalia site is much simpler to analyze than Simi since the only economic use of land immediately down-gradient is cattle ranching. No significant land improvements exist. Roughly 640 acres might be involved (i.e., an area roughly one-half mile wide and two miles long). The value of this land is $500-$1,200 per acre based upon discussions with the County Agricultural Agent. If this land were to be abandoned, total losses for the land would thus not exceed 640 x 1,200 = $768,000. In addition, cattle presently grazing on these 640 acres might be affected. Roughly one cow/calf pair per 12 acres is a common grazing density, implying 53 cow/calf pairs could be affected. Each such pair has a market value of $590. An upperbound for losses due to a decreased value of these cattle is thus $31,270.

It is unlikely that any other significant costs would be relevant in the event of a sudden, large-scale off-site flow of material from the Casmalia site. A possible exception is clean-up costs, although even this is questionable. Were a low (50 percent) figure for land values taken, and a "moderate" severity scenario assumed at 10 percent of the worst plausible case scenario, the loss estimate would be $40,000. A still more probable "slight" intensity scenario combined with "low" land values would yield losses of $4,000. Table 6.9 summarizes the estimates for the sudden occurrence scenarios.

6.3.2 Long-term Discharge of Undetected Leachate

There are two possible losses here. First, school children from Casmalia presently play in the streambed down-gradient from the site. In the event of undetected long-term discharges from the site, these children could suffer health effects. At present, there are 47 children in Casmalia. Repeating the (very crude) calculation done for Simi, wherein a 10 percent exposure was assumed, one might postulate that five individuals per year would suffer losses in perpetuity. At $30,000 per year per individual, this would amount ot $150,000 per year, which at 3 percent discount rate has a present value of $5 Million. At 10 percent, the present value is $1.5 Million. Lower disabilities and smaller percentages of the population affected will lead to lower damages avoided; Table 6.10

displays a range of estimates. These estimates can be capitalized at 3 and 10 percent to give a total damages avoided; Table 6.11 and Table 6.12 show these, respectively.

Second, such discharges could be ingested by cattle grazing down-gradient, thus entering the food chain. Assessing the cost of this is difficult given the present state of knowledge.

TABLE 6.9

BENEFITS OF REGULATIONS: DAMAGES AVOIDED AT CASMALIA

Sudden Occurrence Scenarios

	Market Values		
	Maximum 100%	Moderate 75%	Low 50%
Worst Plausible Case	$800,000	$600,000	$400,000
Moderate (0.1 x worst)	80,000	60,000	40,000
Low (0.1 x moderate case)	8,000	6,000	4,000

TABLE 6.10

YEARLY DAMAGES AVOIDED TO HEALTH AT CASMALIA

Non-Sudden Occurrence Scenarios

	Percentage of Local Population Affected		
Scenarios	High 10%	Moderate 5%	Low 2%
Worst Plausible Case Total disability: $30,000/yr	$150,000	$ 75,000	$ 30,000
Moderate disability: $10,000/yr	50,000	20,000	10,000
Low disability: $2,000/yr	10,000	4,000	2,000

TABLE 6.11

TOTAL DAMAGES AVOIDED TO HEALTH
INTEREST RATE = 3%

Scenarios	High 10%	Moderate 5%	Low 2%
		Percentage of Local Population Affected — $ Millions	
Total disability: $30,000/yr	5	2.5	1
Moderate disability: $10,000/yr	1.7	.8	.3
Low disability: $ 2,000/yr	.3	.15	.07

TABLE 6.12

TOTAL DAMAGES AVOIDED TO HEALTH
INTEREST RATE = 10%

Scenarios	High 10%	Moderate 5%	Low 2%
		Percentage of Local Population Affected — $ Millions	
Total disability: $30,000/yr	1.5	.75	.3
Moderate disability: $10,000/yr	.5	.25	.1
Low disability: $ 2,000/yr	.1	.05	.02

6.4 CONCLUSIONS

A more in-depth comparison of Simi Valley with Casmalia is deferred until the next chapter. From the scenarios described in this chapter, the following conclusions can be made:

1. A hazardous waste facility, however well run, exposes an adjacent population and land uses to risks; these risks are substantially higher where

    - the density of population and land uses is high;
    - the pathways are few in number, allowing for concentration rather than diffusion of the waste flow;
    - surface or groundwater is involved;
    - sudden occurrence scenarios involving natural disasters such as floods or earthquakes combine with an important pathway;
    - where leachate enters a groundwater supply and remains undetected for a long period of time;

2. In the absence of a detailed date, the levels of benefits which can be attributed to regulations are highly sensitive to variations in parameters and scenarios;

3. The benefits of regulations are highest for Simi Valley because the facility is located near to and upgradient from an urbanized area, whereas Casmalia is located in a rural area.

CHAPTER 7 DISCUSSION OF RESULTS

7.0 CHAPTER SUMMARY

The objective of this study was to identify and monetize the benefits of hazardous waste regulations on two hazardous waste facilities in Southern California: Simi Valley and Casmalia. The outcome of evolving regulatory programs in California was that the Class I (hazardous waste facility) portion of the Simi Valley facility was closed. This suggested a unique opportunity to study the effects of regulations.

Because of local concern at both facilities, but especially at the Simi Valley facility, a substantial volume of work has been carried out over the years. In addition, the California hazardous waste management regulatory approach has yielded a good administrative record. The combination of these has led to a rich data base, from which this study drew its material.

The following are highlights from the discussion of results:

- There is no evidence that damage has occurred at either facility; therefore, the benefits of regulation lie in the value of damages avoided rather than in resource values restored.
- Two types of scenarios seem applicable to the two study sites: a sudden occurrence scenario impacting on land uses and a non-sudden occurrence scenario impacting on health.
- For the worst plausible case sudden occurrence scenario, the benefits of regulation as measured by damages avoided to land uses range from $219 to 437 Million for Simi Valley, and from $0.4 to 0.8 Million for Casmalia.
- For the worst plausible case non-sudden occurrence scenario, the benefits of regulations as measured by damages avoided to health range from 1,600 to 8,000 million for Simi Valley, and from 1 to 5 million for Casmalia.
- Siting emerges as a critical factor in benefits assessment; if the Casmalia facility had been located near more people, it also would have had higher damage avoided estimates, though not as high as those for Simi Valley.
- The surveillance of local citizens plays a critical role in identifying possible resources which could be damaged.

- o The California and Federal RCRA regulations evolved in close synchrony, making it difficult to apply the methodology and separate their respective impacts.

- o The two study sites have many characteristics which make them representative of other hazardous waste sites across the country reflected in the results of the benefits analysis.

7.1 BENEFITS RESULTS

The data base available for study of each facility both aided the generation of monetized values and influenced the methodological approach. In addition, decisions regarding facility siting, borne not of the regulations under review, but of long standing practice and economic criteria, also were reflected in the results of the benefits analysis.

Table 7.1 compares Simi Valley and Casmalia for the sudden occurrence scenarios. This material is summarized from Chapter 6.2 (Table 6.5 and Table 6.9) where the estimates have been rounded off. Table 7.2 compares the two sites for the non-sudden occurrence scenarios. This material is summarized from Chapter 6.3 (Table 6.6 and Table 6.10).

The sudden occurrence scenarios for Simi Valley are based on an earthquake accompanied by heavy rains which causes soil saturation and liquefaction and consequent movement of saturated wastes down the canyon to populated areas below. For Casmalia, the event consists of heavy rains with overflow onto grazing lands.

The non-sudden occurrence scenarios for both Simi Valley and Casmalia are based on improperly stored wastes producing leachate which contaminates off-site ground or surface water and ultimately impacts on human health. Thus, the sudden occurrence scenarios primarily affect land uses, the non-sudden occurrence scenarios primarily affect health.

In each case, a range of dollar values for damages avoided has been determined based upon a range of market values (sudden occurrence scenarios) or a range in the percentage of the local population affected (non-sudden occurrence scenarios). Ranges are produced for each of three scenarios varying in degrees of severity.

In Table 7.3, the dollar per year figures for the health damages avoided of Table 7.2 are capitalized at two interest rates, 3 and 10 percent, for both sites and for the three non-sudden occurrence scenarios. This material is summarized from Tables 6.7 and 6.8 for Simi Valley, and Tables 6.11 and 6.12 for Casmalia.

TABLE 7.1

COMPARISON OF SIMI VALLEY AND CASMALIA:
DAMAGES AVOIDED TO LAND USES

Sudden Occurrence Scenario

		Low to High Market Values (Millions of Dollars)
Worst Plausible Case:	Simi	$ 220 - 440 Million
	Casmalia	0.4 - 0.8
Moderate (0.1 x worst):	Simi	22 - 44
	Casmalia	0.04 - 0.08
Low (0.1 x moderate):	Simi	2.2 - 4.4
	Casmalia	.004 - .008

TABLE 7.2

COMPARISON OF SIMI VALLEY AND CASMALIA:
DAMAGES AVOIDED TO HEALTH

Non-Sudden Occurrence Scenarios

		Low to High Percentage of Population Affected (millions of dollars/yr)
Worst Plausible Case Total disability ($30,000/yr)	Simi: Casmalia:	$48 - 240 Mil/yr .03 - .15
Moderate Disability ($10,000/yr)	Simi: Casmalia:	16 - 80 .01 - .05
Low Disability ($2,000/yr)	Simi: Casmalia:	3.2 - 16 .002 - .01

TABLE 7.3

TOTAL DAMAGES AVOIDED TO HEALTH:
COMPARISON OF SIMI VALLEY AND CASMALIA
AT TWO INTEREST RATES

		Low to High Percentage of Population Affected (Millions of Dollars) 3%	10%
Worst Plausible Case Total disability ($30,000/yr)	Simi	1,600 - 8,000	500 - 2,400
	Casmalia	1 - 5	0.3 - 1.5
Moderate Disability ($10,000/yr)	Simi	500 - 2,700	200 - 800
	Casmalia	0.3 - 1.7	0.1 - 0.5
Low Disability ($2,000/yr)	Simi	100 - 500	30 - 200
	Casmalia	.07 - 0.3	.02 - 0.1

Substantiation for this material is given in Chapter 4.1 and 4.2 for Simi Valley and Chapter 5.1 and 5.2 for Casmalia. As previously discussed, CFR Title 40, Parts 264 and 265, was used as the regulatory framework in defining and assessing the systems at both facilities.

Though the public record shows citizen interest in activities at both facilities, Simi Valley was better known for its mishaps and generally Casmalia was known as the "industry model." The trend, the sizes and the types of the benefits were very revealing. If the Casmalia facility had been located near more people, it also would have had higher damage estimates, though not as high as at Simi Valley.

More than the effects of RCRA-like regulation are at work at both facilities. That Casmalia was designed to be a hazardous waste facility and its placement was away from urbanized areas, active faults, and water resources are likely the most significant influences contributing to its low benefits values, as calculated in this study. Clearly, there are benefits resulting from siting facilities away from receptors, although this study was not designed to capture these.

Neither California nor EPA regulations provides for a comprehensive siting program. In California it is a matter of local ordinance and planning guidelines as to where any refuse or waste facility would be placed. It was economic incentive largely that directed Hunter Resources to locate the facility in Casmalia. By contrast, the Simi Valley facility was sited as a municipal refuse facility, but also at a relatively rural spot. Owing to the vast, sparsely populated areas within short range of urban centers, both facilities enjoyed the favor of a geographically well chosen site. Over the last decade, the City of Simi Valley has developed out to meet the facility and thus bring its sensitive receptors to the hazards. Despite this growth, both facilities are in rural or semi-rural areas. The benefits data indicate that it does not take much urbanization to generate potentially high benefits. With greater urbanization, it may be reasonable to assume that the benefits would increase as well. Though siting regulations were not tested for, more discussion on siting will be made in following sections of this report.

Five categories of resource values are identified by the study: health, groundwater, surface water, land uses, and air. Among these, and for the scenarios considered to be the "worst plausible scenarios," the prime resource values affected turn out to be land use values. For these, the benefits can be monetized and the amounts based on reasonable assumptions. These assumptions are substantiated by data on the likely pathway of site contaminants, the patterns of sensitive receptors, and general environmental parameters, such as presence of seismic hazard, climatological data, soils, and geologic features. The benefits conferred are a result of all these factors and those scenarios, events, and damages avoided which could be best substantiated.

Health benefits, though the next most plausible, are more speculative. The literature on health effects concludes that these are very difficult to show, as reflected in Chapter 4.3.1.3. However, any study of hazardous waste would have to screen the existing data to check for their existence.

The types of benefits measured in the present study are those that could be monetized and could be based on reasonable assumptions. The assumptions made in the scenarios of this study are based upon "worst plausible scenarios" which could reasonably occur. Benefits of much smaller magnitude could also occur under a number of other, more limited scenarios. For example, one of the benefits of groundwater monitoring regulations under Part 264 and 265 is the protection afforded to upgradient water supplies. There is an upgradient well in the vicinity of the Simi facility which draws water used to blend with delivered State water for domestic use. The benefit of this regulation is at least the value of the domestic water protected from contamination, and the consequent damages to health avoided.

Another example of a smaller magnitude scenario would be a smaller release of hazardous waste during heavy rain which resulted in disruption of the treatment processes at the Simi Valley wastewater treatment plant at Simi Valley, which happens to be located just downstream of the facility. At Times Beach, waste constituents entering the wastewater treatment plant killed the bacteria upon which sewage degradation depends. The cost of starting the system back up was $5,000,000. At Simi Valley, the cost of a similar incident could range from $500,000 to $2,500,000.

It is important to emphasize that the figures in Tables 7.1 and 7.2 are based on "worst plausible case" scenarios. The dollar figures have not been diminished by the probability that the events suggested by these scenarios would take place. As explained in Chapter 3.2, the derivation of probabilistic estimates is fraught with severe methodological problems.

It is also important to underscore the basic fact that nothing has come to light suggesting that damages have actually occurred as a result of operations at either facility. A number of incidents and accidents have occurred. Many local citizens have been concerned, and some have taken an active role in monitoring the activities at both sites.

Perhaps the best that can be said for these two sites is that, in the absence of more detailed information on the probabilities that one or another scenario resulting in damage could occur, people adopt a "worst case" mentality. This would seem to be a reasonable attitude to maintain without this information. A survey based on willingness-to-pay could be done to explore perceptions potentially affected residents have of hazardous wastes. Until this is done, it may be prudent, from a policy standpoint, to assume that hazardous waste is not an issue people are willing to decide on the basis of expected value, particularly when a site is in their backyard.

Since damages have not actually occurred, the basis for monetizing the benefits of regulation lies in the cost of (potential) damage avoided. The language of this study has avoided the phrase, "resource values restored" - resource values were not damaged to begin with. The effects of RCRA on these two facilities and their environs are that they yield benefits due to damages avoided.

It is important to distinguish damages which could still occur on a properly operated facility under RCRA from the damages which could occur on a site now properly operated but formerly <u>not</u> properly operated. Simi Valley is a clear cause of the latter. Any new site which comes on stream will have far lower benefits due to RCRA. Conversely, a site like Simi, in operation prior to RCRA or RCRA-like regulations, will always retain the potential for damage it had earlier, unless corrective steps are taken to remove the source of the hazard. Removal of the hazard could be very expensive, if even possible.

7.2 SITE REVIEW

7.2.1 Site Comparison

A comparison of the calculations for Simi Valley with those for Casmalia reveals one very strong result: given even "worst plausible case" assumptions, the impacts of serious events at Casmalia are orders of magnitude lower than the impacts at Simi. There is a single, simple explanation: Casmalia is better sited. Casmalia is located in an area with low human population, essentially no improvements to the land, and little possibility of contacting groundwater. Even a major event would have little economic consequence since there is relatively little of value which could be affected. Thus, to the extent that regulation has led to careful siting decisions, one might conclude that the regulations have had significant benefits vis-a-vis low probability events.

This comparison of Simi Valley with Casmalia seems to indicate that proper siting is the key; however, the picture is in flux. It is difficult to site new facilities, as no community wants one in its backyard. Further, it is not feasible to expand existing sites, as they are either too close to urban populations which have grown up around them, or simply do not pass muster anymore. Further, few sites are geologically adequate.

7.2.1.1 Simi Valley

Due to the more urban location of the Simi Valley site, the propensity for conflicts and concerns is higher. Consequently, considerably more investigatory work exists for the Simi Valley site than for the Casmalia site. It was, in fact, a perceived conflict between the hazardous waste site and a proposed new airport atop the Class I portion at Simi Valley which brought the entire issue of hazardous waste disposal into public and heated discussion.

It is ironic that the best professional practices of an earlier era -- re-use of a solid waste landfill site -- opened Pandora's box at Simi Valley. But for the airport proposal, VRCSD would still be operating the site. Instead, a new owner was sought to improve operation.

It is also ironic that Environmental Impact Review of the airport project, under the California Environmental Quality Act, triggered the chain of events leading to the change of ownership, not any event or regulation related to site activity or impacts, *per se*.

Had the airport issue not come about, the state's new permeability requirements would have led to closure of the Class I portion anyway -- but without all the fanfare, concern, and investigation which has gone on.

Now that a new operator, CWM, is running the site, the public's concern has subsided considerably. By contrast, the more CWM finds out about the site, the more problems it finds. If one thing has come out of all this controversy, it is the perception that the Simi Valley site may be a time bomb of unknown proportions.

7.2.1.2 Casmalia

During the course of this study Casmalia Resources has been the focus of Santa Barbara County efforts to insure adequate groundwater monitoring and to assess a revenue generating tax for the site.

In the spring of 1983, the Santa Barbara County Supervisors turned their attention to Senate Bill 501 as a means of generating revenue. By 1981 it was recognized by the Legislature that due to the closure of a number of Class I hazardous waste disposal sites, the availability of such sites in California had become limited. Attempts by legislative study groups to determine the availability of potential new sites had proven discouraging. In the meantime, there were continuing pressures at the local level to further restrict or eliminate some of the remaining Class I sites. This was particularly true of the B.K.K. site in West Covina (Los Angeles area). Senate Bill 501 (Boatwright) was drafted to address the concern to maintain the availability of the few remaining Class I disposal sites in California.

The bill severely restricts the ability of local jurisdictions to curtail or eliminate the operation of an existing Class I hazardous waste disposal site. In compensation for the substantial burdens placed on local government by Class I sites, the bill provides taxing authority for cities and counties. The legislation provides for a tax on the gross receipts from all wastes received at the facility. Several jurisdictions have taken advantage of this legislation.

On June 27, 1983, the County Board of Supervisors imposed a seven percent tax. The site operator expressed concerns at the local hearing over loss of market share to other sites not burdened by this tax, and over increased possibility that the necessarily higher rates would lead to an increase in midnight dumping off-site. Sponsors of the tax cited the need for adequate maintenance and patrolling of roads used by waste haulers.

7.2.2 Preliminary Risk at Each Site

Clearly, the wise choice of a site for the Casmalia facility has had an effect on the benefits detected by the methodology employed in this study. In other words, the "preliminary risk" suffered at the Casmalia site was much reduced relative to Simi Valley, hence the orders-of-magnitude higher level of benefits that are found at Simi Valley.

It is self-evident that there is a benefit to siting a facility away from sensitive receptors. This study did not detect such a benefit for two reasons:

- o The benefits assigned are related to damages avoided, so that without the relatively high "urbanized" values attached to resources the potential damages will be small; and

- o The values assigned to resources are based upon conventional values, and do not measure intangibles such as loss of endangered species.

It would appear useful to test for benefits accruing from judicious siting or for reduction in preliminary risk. It is this wisdom that takes waste out from the high risk populated areas and transports them to rural areas. Once these benefits are assessed, a further review might be applied to local treatment facility alternatives where siting criteria identify urban areas proximal to waste generators: Do the benefits of reduced transportation and reduced volume of treated residue outweigh the perceived threat of hazard exposure in the urban setting? Or is it wiser to transport the wastes to more remote sites?

7.3 REGULATORY REVIEW

The regulation reviewed for beneficial effects included a very narrow set, represented by Title 40, Parts 264 and 265. Benefits accrue as these regulations protect against damaging events. Study findings identify clearly the nature of these regulations, as opposed to others that can also provide benefits, and identify influences that could be studied in greater detail for capture of greater benefits.

7.3.1 Types of Regulatory Benefits

In this study the regulations reviewed could be identified as "preemptive." Preemptive regulations are contrasted to "clean-up" regulations in that the goal is to prevent damage from occurring. Damages avoided equal benefits. Clean-up regulations create benefits by restoring values to resources which have already been damaged. These often are more financial and oriented toward determination of who pays the restoration costs. There is also the issue of how clean is clean, regardless of who pays.

Two types of regulations in the preemptive category exist: siting and operating regulations. This distinction is demonstrated by the seemingly lopsided orientation of benefits resulting from operation at the two facilities studied. The supposedly "bad" site produced greater benefits than the "good" site. This result points the way to a field fertile for discovery of benefits as intimated in the previous section. The benefits of siting the Casmalia facility remotely as opposed to the center of an urban area are evident, yet no comprehensive siting regulations exist at the state or federal level. Greater dedication of resources leveled at preemptive regulations would produce larger benefits. Study of siting criteria in environmental urban design, of waste types and generation, and of treatment versus disposal would prove to be highly productive. Given the assembly of data in this study, comparison to other facilities and pilot treatment of facilities would provide for just such an overview.

7.3.2 Administrative and Management Effects of Site Operation

There is a dance between the regulators and the regulated, and this plays an important role in how and when regulations get enforced. Thus, the benefits of regulation are mediated by how well they are enforced. The administrative record of the regulators depends on the integrity of the owner/operator reporting, on which regulators rely. Inspections are infrequent and irregular. There seems to be a tactic understanding that if the operator runs a reasonably clean ship, he won't be bothered too much.

The effect that administration and management have on facility operations is apparent. The effect that good practices have on benefits is not so clear. In terms of benefits that this study reviewed, administrative and management effects were assumed to be insignificant.

No damages have been recorded to date for these facilities and though one facility was known as a model operating facility, the threshold for damages avoided had never actually been exceeded. Good practices must provide beneficial results at the margin, where an event out of control may be leading up to a potentially damaging consequence, but the edge established by good practices prevents the event from ever crossing that damage threshold. Looking at the catastrophic accidents across the nation that are reported nearly monthly, if better practices had been followed, the out-of-control situation would never have occurred. These lessons do not generally include operating facilities, but the insight is nonetheless applicable. Good practices over the long run avoid (accidents) damages and will likely produce benefits. The timely closing of the Simi Valley facility may have prevented such an out-of-control situation.

The light that can be shed by public review of facility operation was illustrated at the Simi Valley facility. While not conclusive, the study indicates that mere regulations by themselves, and their "enforcement" by official regulatory bodies, often do not produce all the benefits intended. The sense of urgency that private citizens' concerns can provide is needed to help re-assert priorities among the regulations. To enforce them all is clearly difficult.

Two factors would help to increase compliance. The first is adequate funding to support increased monitoring and inspecting. Secondly, the enforcement statutes need more "bite." Only recently have penalties been increased to the point where they might have some effect. The first jail sentence against an official of a polluting company was handed down in July of 1983 in Los Angeles against the Culligan Company.

7.3.3 Manifests Before and After RCRA

California Environmental Health regulations, Article 6, provide for management of hazardous waste facilities. Section 66470 sets requirements for use of the manifest recording system. The quality of information provided under these regulations increased steadily as record keeping procedures and technology improved. At this point the manifest system is informative and useful to the public.

The record of manifest information for both sites was difficult to access for years before 1980. At Simi Valley, format and content of manifests were problematic for those that were retrievable. That these records are difficult to obtain, even for an EPA-sponsored study, speaks ill of the "public record" intent of the regulation. In negotiation for sale of the Simi Valley site it was finally accepted that manifest records existed because facility disposal dimensions were produced with types and volumes of wastes, but it was also generally accepted that the records were spotty. Though no benefits could be assigned to the record keeping regulations, RCRA had some positive effect on record keeping.

7.3.4 Use of RCRA-like Regulation

The California regulatory program under the Hazardous Waste Control Law provides an opportunity for viewing the effects of regulation. Because of this regulatory foundation, related environmental regulation, and the interest in environmental quality of the citizenry, a record of facility and site data has been established. The parameters for control as contained in the California program are very close to those in the RCRA program out of Section 3004 (focused to Part 264 and 265) and the study was able to apply the framework for facility owners and operators to each facility operation.

The date record supplied by the history of regulatory control in California, though comprehensive, is not distinctive for the kinds of comparisons initially suggested by this study. With the level of review effort appropriate to this study and the effect of continually evolving regulatory controls, the data record retrieved is not sufficiently sensitive to distinguish the change exerted by RCRA upon the system.

Because of this and the close fit of the California regulatory framework with that of RCRA, an assumption of "RCRA-like" regulation for the whole of the period under review, 1972 to the present, was made. This assumption streamlined the benefits review, eliminated identifying responses in benefits for each regulatory change over time (which could not be substantiated with this level of effort) and allowed the study to distinguish between the effects of larger influences, such as the influence of facility siting.

Therefore, the comparisons between sites can be more clearly stated, i.e. Casmalia was designed to be sited away from sensitive receptors, though specific responses to new regulatory details are not as easily revealed. It is not clear, for instance, that Simi Valley closed because of RCRA; state requirements for soils permeability had been in the wind for some time before RCRA came along. What is more significant is that the state and federal programs have been evolving in close synchrony and that this provides us with the opportunity to project what the benefits of the federal program can be elsewhere.

7.4 REPRESENTATIVENESS

To have general validity, the hazardous waste regulations must yield benefits which are not bound to the peculiar properties of one or another specific site. That is, the sites studied here must be representative of other hazardous waste sites. Several key dimensions exist along which representativeness can be assessed.

7.4.1 Evolving Regulatory Program

The evolving program of regulatory controls is very representative of other states across the country. This makes it difficult to test the sensitivity of regulatory provisions, especially where the benefits of older regulations cannot be segregated from the new regualtions.

7.4.2 Study Approach Representativeness

The regulatory setting provided an excellent opportunity for reviewing the benefits of RCRA. The data record and tailored methodology utilizing the R/P approach would be useful in any regulatory setting that possesses the comprehensive program that California does. Several states do.

The facilities and sites are considered to be representative as well. One facility was public and one is privately run. Both facilities evolved as the regulatory program changed. As is common across the country, one facility could not maintain compliance and ceased operations.

The Simi Valley facility is particularly representative in that it did not initiate operations as a hazardous waste facility. It was sited and designed as a municipal and industrial waste facility, when waste technology was of a different nature. Over time, the demands for disposal of hazardous wastes opened Simi Valley to full operation as a waste facility. Suburban growth nearly overreached the site and the facility's inability to meet regulations became clear. This development in many ways is akin to the problem of disposal sites in older industrialized areas.

7.4.3 Uniqueness of Study

Sites in the industrial northeast and midwest are older than those elsewhere and began collecting wastes under regulations which were far less strict. Urban areas grew up around these sites. For some of them, the damage has already occurred. The benefits of regulations lie not in costs avoided, but in resource values restored (e.g., Love Canal, Times Beach). By contrast, newer facilities have been sited more securely, and with the benefit of better standards.

For many sites, the pathway of waste transport is via water, whether groundwater or surface water. In areas where water supplies are abundant and water transport mechanisms predominate, the benefits of regulations to water supplies may be very high. On the other hand, if water supplies are abundant, substitutes may be more readily available, decreasing the value of preventing contamination to any one water supply.

In areas such as the arid Southwest, affected groundwater may initially be low in quality or quantity; its value as a resource, and hence the benefits attributable to regulations, will be lower.

Each area of the country is exposed to one or more naturally occurring hazards. In southern California, one of these happens to be earthquakes. All facilities and structures need to be designed with that in mind, at least by considering if marginal benefits exceed marginal costs. One section of the regulations, 264.18(a), specifically addresses seismic location standards. One of the two sites studied here, Simi, is representative of sites exposed to these hazards.

California has a long history of professional solid waste and hazardous waste management. The federal regulations were patterned after much of the California experience. The two sites studied here, therefore, are representative of other sites in California and other states having similarly strict regulations. Consequently, for these two sites, the benefits of RCRA, and RCRA-like regulations, will be measured logically as damages avoided rather than as resource values restored.

DATE	TO	FROM	SUBJECT
6/4/81			Advertising order
5/26/81	McBride	Chambers, DHS	Notification of info request about site by third party (unidentified) - opportunity for McBride to protect "trade secrets"
4/29/81	Conrad	Hart	Informing about DHS jurisdiction & information of Assembly Committee on Consumer Protection & Toxic Materials
10/29/80	State Health & Welfare		Quantities & types of wastes disposed Casmalia calendar year 1979
11/10/80	Clark EHS	Eric Workman DHS	Waste received in state & 1979 Casmalia
10/7/80	Baldridge CRWQCB	McBride	Request to construct barrier on west side of existing PCB pit (exhibits missing)
9/26/80	Ken Jones CRWQCB	Ken Hunter	Hunter response to CRWQCB 8/22/80 concerns about proposed westerly expansion of site (re: permeability of Sisquoc Formation)
8/22/80	Hunter	Jones	Questions about westerly expansion of site (rainfall & permeability tests)

DATE	TO / FROM		SUBJECT
6/6/80	Incident Report		Highway 1; crude oil spill
4/5/80	Incident Report		Highway 1; three bags of dusting sulphur dropped on roadway
2/18/80	Incident Report		Highway 166 & Bell Road; tanker truck rollover (oil company; no chemical identified)
2/16/80	Incident Report		Highway 101/Buellton; crude oil from tanker spilled onto drainage systems
2/12/80	Incident Report		Fuel spill 515 Jasmine Lane
1/28/80	Incident Report		101 & Old Coast Highway; mixture of unknown hazardous materials
11/14/79	Nelson Calif. Dept. Health	McBride	1979 Hydrological Balance Report
8/9/79	Nelson Calif. Dept. Health	McBride	Amendments to Casmalia Operational Plan responding to Dept. of Health's 8/6-7/79 evaluation

DATE	TO	/ FROM	SUBJECT
6/2/78	Hunter	CRWQCB Jones	Response to Casmalia 2/78 "Emergency Discharge" Report Request for Remedial Action
2/17/78	Hunter	Jones	Strict letter demanding discharge abatement; request for Casmalia site comprehensive report by 3/10/78
2/17/78	Scherer VanVoris Leonard K. Jones CRWQCB	Jankanski	Internal memo re: discharge into drainageways
2/14/78	Scherer VanVoris Leonard K. Jones CRWQCB	Vern	Internal memo re: pump failure report leading to 2/10/78 spillage into drainageway; recommend enforcement action
2/7/78	Hunter	Jones	Acknowledgement of receipt of 1/19/78 letter and of 1/16 spillage
1/19/78	Jones	Hunter	Report of 1/16/78 emergency situation
2/14/76	Casmalia	Jones	Notification of violation of waste discharge requirements report requested by 5/4/76
10/6/75	Jones CRWQCB	Muscio	Objection to easterly expansion of Casmalia site - dump closure, good chronolgy of incidents 3/15/73-1/25/75

DATE	TO /	FROM	SUBJECT
3/31/75	Hunter	Jones	3/19/75 routine inspection noting waste discharge violations; request immediate action & report by 4/28/75
12/11/73	Hunter	Jones	Record of numerous violations: waste discharge; Casmalia Operating Plan, threaten Cease & Desist Order
11/21/73	Wm. Leonard CRWQCB	Al Franks, Geologist, State Water Resources Control Bd	Memo Re: 11/13/73 site visit; cites many operational problems & recommends correction by operator
10/2/73	Vernon Bush SB Co Pub Works	K. Jones CRWQCB	Notification of wastewater spillage from collection gallery
9/7/73	Jones CRWQB	Franks Geologist	Report on inspection tour to determine progress on "winterizing" site; suggest water tests of collection gallery samples

APPENDIX 5.11

SANTA BARBARA COUNTY
CASMALIA CORRESPONDENCE CHRONICLE

DATE	TO	/ FROM	SUBJECT
2/8/83	Editor	Les Conrad	About success at B of S about H_2O test request
1/31/83	B of S	Larry Hart Health Services	Cost & program to monitor wells surrounding site
1/17/83	B of S	County Counsel	Legal overview of whose jurisdiction it is to test
1/10/83	B of S	Les Conrad	Request for water monitor
11/30/82	Les Conrad	Rita LaVelle	Reassurance letter; reference to other agencies EPA IX & CRQCB
9/21/82	B of S	Larry Parrish A.O.	Response by department to 1981-82 Grand Jury rec's RE: County Jurisdiction over Casmalia
9/16/82	Ron Gilman County Agric. Commission	Earl Margitan Cal DHS Haz. Mat. Mgmt.	Return of Casmalia site to normal grazing
6/82	B of S	GJ Health & Toxic Waste Committee	Study Area - Casmalia preliminary finding (missing pages 92-98)
7/30/81		Les Conrad	Letter to Editor about "negligence" of 1980-81 Grand Jury work on Casmalia
6/30/81	B of S	Al Reynolds Resource Mgmt.	Re: Congruence with General Plan -

DATE	TO /	FROM	RE:
6/23/81	To Whom It May Concern	Wm. Deneen AHC/Biologist	Warn about use of site later for agricultural use
6/81	Haz. Mat. Trans Task Force		Report Rec's
5/4/81	Hunter	Breckenbridge SB Co. Public Works	Request for building permit denied because of use w/i existing disposal site; refer to County Planning (amendment to CUP)
4/1/81	Britt Johnson Planning	Charles King Chief Planning Staff	Internal memo - re: sketchy files kept on Casmalia
3/31/81	Al Reynolds Dept. Resource Mgmt.	Wm. Ellis Grand Jury Chair	Requests for info/files on Casmalia for Grand Jury use; attachment is internal memo chronicling County-Casmalia contact
8/7/79	Hunter	B. Johnson Planning S.B. County	Re: proposed Casmalia expansion will require a new CUP, not an amendment of 76/CP-6
7/19/79	Diane Kobayashi SBC EH	McBride	Inability to inspect Casmalia Resources 7/11/79
7/11/79	B. Johnson	Hunter	Expansion request (w/o enclosures) (westerly)
6/1/79	Minutes Ag. Pres. Comm.		Questioned compatibility of facility with agricultural preserve
6/30/76	B. Johnson	Hunter	Cover letter & copies of 76-CP-6 Permit (dated 6/23/76) (Amended CUP) supercedes 72-CP-67
6/25/76	B of S	B. Johnson	Report of Planning Commission action on Hunter request

DATE	TO	FROM	RE:
6/9/76	Staff Report for Planning Commission		Expansion of CUP 76-CP-6
6/4/76	Agricultural Preserve Advisory Committee		Minutes of meeting; Watson representing Casmalia on expansion request; passes
6/1/76	SBC Planning Commission	Ted Muscio	Objection to facility expansion
4/16/76	Britt Johnson Office of Environmental Quality	Al Reynolds	Attached Negative Declaration (76-ND-18) for Casmalia (ND dated 3/29/76) (after 4/15/76 Planning Commission public hearing)
9/29/75	Short form land conservation contract		Designation of Casmalia as "Casmalia Disposal Agricultural Preserve" (75-AP-2) (75-RZ-2) effective 1/1/76 (good list of past board actions 11/71-10/74)
11/2/72	B. Johnson Planning Director	Norm Caldwell Public Works Director	Support for CUP for Casmalia reference to support letter attached from K. Jones RCWQC (not included)
9/15/72	Jones CRWQCB	Carl Kraemer A. Planning Director	Cover letter to copy of CUP going to Casmalia for RWQCB review/ acceptance condition upon RWQCB certification of Casmalia operating plan as in compliance with RWQCB regulations
8/31/72	CUP 72-CP-30		Permit(s) for Casmalia Disposal Facility
8/14/72	B of S Hunter Appeal		Board minutes; Board overturns Planning Commission Denial; grants CUP 72-CP-30
8/8/72	Staff report for Planning Commission		For 8/2/72 meeting

DATE	TO	FROM	RE:
8/7/72	B of S	Hunter	Appeal letter
7/19/72	B of S	Kraemer Asst. Director Planning	Progress report on GP amendment
7/19/72	Planning Commission public hearing		Minutes of work in progress/ testimony; develop conditions for revised conditional use permit 72-CP-67
7/17/72	B of S minutes		Recommend amendment to Agricultural Preserve Uniform Rule, thereby making Hunter Class I Disposal Facility compatible
7/3/72	Actual Hunter application		
6/19/72	B of S hearing		Minutes: Hunter appeal of Planning Commission's 5/17/72 denial CUP 72-CP-30; B of S grants permit; continuance
6/14/72	B of S	Planning Commission Report of Action	Back up for 5/17 denial; submitted for 6/19 B of S hearing
6/14/72	Announcement of 7/19/72 Planning Commission hearing on 72-CP-67		
5/19/72	B of S	Petitioners	Pro: override of Planning Commission disapproval of CUP 72-CP-67
5/18/72	B of S Clerk of Board	Hunter	Hunter request for appeal of Planning Commission before B of S
5/18/72	Notice of Public Hearing		5/19/72 Public Hearing

DATE	TO	FROM	RE:
5/15/72	Staff Report for Planning Commission		Hunter Waste Disposal Facility Conditional Use Permit 72-CP-30 Rec continuation of hearing until Agric. Preserve meets 6/2 & determines compatibility
5/15/72	Agric. Preserve Committee Meeting		Minutes - continue discussion at 6/2/72 meeting; refer to County Counsel
4/1/72	Britt Johnson	Hunter	Cover letter to 10 copies of application for conditional permit

Appendix 5.12

Casmalia Resources References

Bailey, Harry, Quality of Surface Waters, Casmalia, California, June 1972.

California Air Resources Board, An Assessment of the Volatile and Toxic Organic Emissions from Hazardous Waste Disposal in California, February 11, 1982.

Epstein, M.D., Samuel S., Brown, Lester O., Pope, Carl, Hazardous Wastes in America, Sierra Club Books, 1982.

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Grand Jury of Santa Barbara County 1981-82 Final Report, June 30, 1982.

McBride, James L., Casmalia Resources Facility Operational Plan, February 1983.

Miller, David, Geohydrological Surveys at Chemical Disposal Sites, from Assessment of Health Effects at Chemical Disposal Sites Symposium, Rockefeller University, June 1-2, 1981.

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USGS, Geology and Paleontology of the Santa Maria District, professional paper 222.

[illegible] unpublished statistics, 1980-81.

[illegible] Area Planning Council, Santa [illegible] 1980-2000, Population, Housing, [illegible]

[illegible] Water District, Hydrological [illegible] and Groundwater Monitoring [illegible] January 1983

[illegible] unpublished statistics, 1980-83

[illegible] October 1980 to August [illegible]

[illegible] of Groundwater Quality in the Santa [illegible] California, Water Resources Investigations [illegible]

[illegible] the Santa [illegible]

7.5 METHODOLOGICAL REVIEW

One way to evaluate this study is to check it against the original scope of work to determine how much was possible to accomplish. The following five sections deal with the first five principal tasks of the work program. The questions raised by these tasks served as guides to illuminate, or in some cases to cut, a pathway.

7.5.1 Develop the Methodological Framework

Figures 7.1 and 7.2 duplicate the figures contained in the initial proposal, which suggests a systematic way to look at the two sites. Figure 7.2 suggests three points of contrast:

(1) Casmalia before and after RCRA regulations. Here, the operation of the Class I facility would be examined to determine the benefits of regulation on Casmalia;

(2) Casmalia before with Simi Valley before. The objective here was to establish a baseline for contrasting the two sites before RCRA went into effect. This would help clarify the impacts of regulation and separate variation in risks due to types of hazardous waste or management practices from variation due to the RCRA regulations themselves;

(3) Simi Valley after with Casmalia after. Following implementation of RCRA in 1980, Simi Valley's Class I portion was closed down. Casmalia continued operating. Here, the question of the impact of regulations on operations and benefits could be isolated.

From these, a fourth point of contrast could then be inferred; namely, were Simi Valley to be cleaned up and operated as a Class I facility, what would be the benefits in so doing? This possibility brings into existence a new facility without having to find a new location.

Of all the tasks, this was not only the most important, but also the messiest to face. The biggest hurdle was dealing with the fact that much of RCRA had its basis in California regulations; and once passed, RCRA was mandated only where State regulations were less stringent. California regulations were more stringent, and had been in effect for eight years. It is like saying the child gave birth to its mother. We therefore establish the phrase, "RCRA-like" regulations.

Secondly, the regulations, and the standards under them, evolved over time. New ones were added, old ones modified. Regulations, as a body, did not stand still from

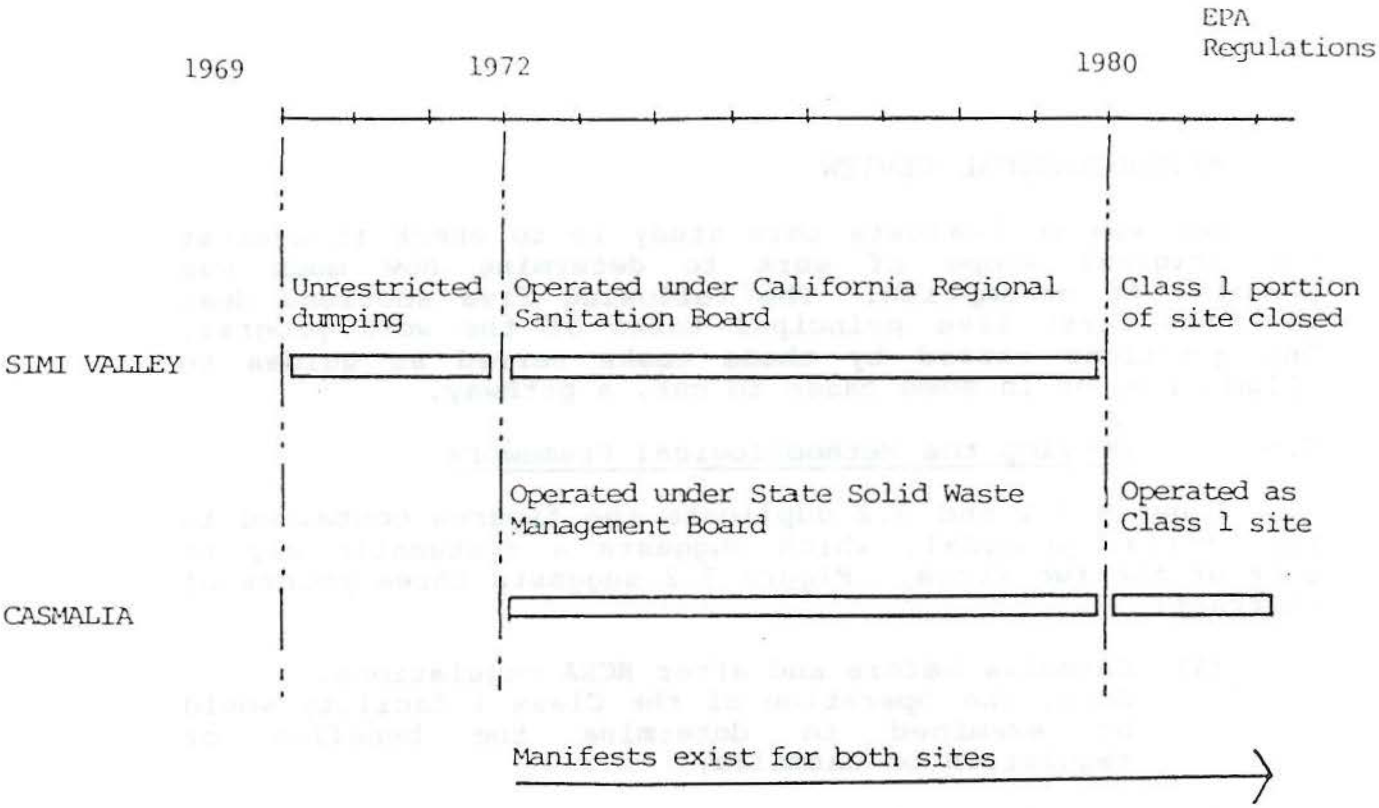


FIGURE 7.1

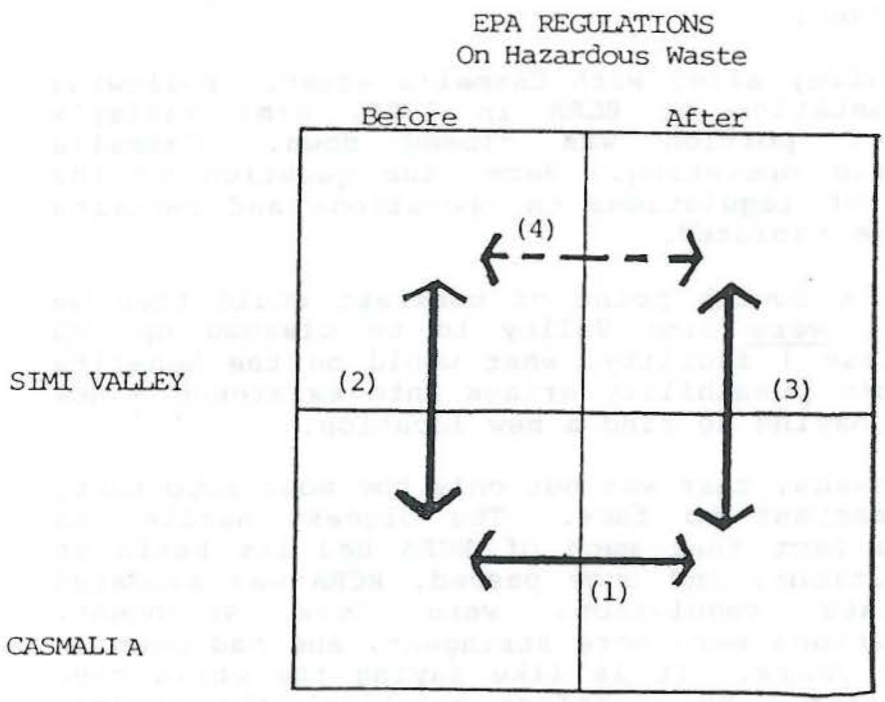


FIGURE 7.2

1972 until 1980. A new soils permeability standard implemented as part of California's RCRA-like regulations for instance, prompted Simi to close.

In general the methodological framework was very useful, but was applied differently than the strictly controlled way suggested in the proposal.

7.5.2 Assemble Available Data

The investigatory work which had been undertaken over the past ten years exceeded our wildest imaginings; therefore, our report is larger than expected. In this regard, Title 40, Parts 264 and 265 were much more useful as an organizing framework for the study than was initially thought.

Of the data and information available, the set we found most difficult to use was the manifest record itself. There is simply too much to deal with. Useful summaries do not exist; where they do, categories vary from one reporting period to another and from site to site; there is a percentage of "unknown" items. To sort through all this amounted to original research, which was beyond the scope of work of this study.

In recent years, and for both sites, the manifest record has become computerized. This has helped the situation immensely. More interesting and useful studies lie waiting to be done with all this information.

7.5.3 Identify the Natural Resource and Human Activity Systems Affected

This task went smoothly, and yielded a clear picture of what was going on. What this investigation revealed was that resources we had been led to believe existed in fact did not. Agriculture, for example, is minimal at both sites, and limited to grazing and small amounts of dry farming. The imaginations of local citizens are prone to exaggerate local incidents and the value of resources threatened. Without underestimating the substantial damage which could occur, local perception plays a larger role in resource value identification. Again, the regulatory framework of Title 40, Parts 264 and 265 was very useful here. It helped frame the questions for which specific answers could be obtained.

7.5.4 Model the Benefits

The model was simplified from its early version. Of the five resource values, only two, land use and health, were necessary to treat seriously, the only land use in detail. By focusing on the "worst plausible case" as the basis for benefits calculations, and separating clearly the event from its probabilities, we were able to (finally) create simplicity in the approach and starkness in the monetized benefits. The benefits data may be overly optimistic on health effects. This has been the case in other studies, and the paucity of detailed health data affects this study as well.

7.5.5 Quantify and Monetize Benefits

In Chapter 3.2.3, the methodology for monetizing benefits was defined, the basis of which is the expected value approach. Three reasons were given why the determination of probabilities for events turned out to be difficult:

(1) A single event is a complicated combination of meteorological, geohydrological, chemical, physical, and biological phenomena which are difficult to define precisely, let alone assign a probability;

(2) The total number of such combinations is enormous;

(3) The probability of any event, given the regulation, depends in a complicated and generally unknown way on the level of enforcement, and the level of enforcement is itself not trivial to ascertain.

Therefore, damages avoided in the calculations of Chapter 6 were not weighted by the probabilities with which these damages would occur. At this point, however, it is useful to consider in a tentative way just how the results would be influenced by inclusion of (very rough) estimates of probabilities. It should be emphasized that the following calculations of expected gains due to RCRA are based on reasonable guesses about probabilities and are hence likely to be accurate only within one or two <u>orders of magnitude</u>.

It should be recalled that the calculations are of dollar losses times probabilities of losses and hence implicitly leave out possible insurance benefits (cf Chapter 3). However, we can see no reason to expect that such insurance benefits would be of particularly great magnitude in a social cost-benefit calculation since individuals who suffer damages can in principle be compensated by the public sector for their losses. Finally it might be argued that RCRA confers additional benefits in the form of reduced anxiety on the part of the public. Such benefits, if they exist, are likely to be quite difficult to measure precisely. As well, it seems unlikely that this sort of benefit could be substantial and long-lived if RCRA had no real benefits in terms of reducing expected damages.

To begin, note that potential benefits of RCRA at Casmalia, even unweighted by probabilities, were relatively small (except in the sense that RCRA may have generated benefits in the form of the dicision to site at Casmalia in the first place). Let us then focus on Simi, where the earlier calculations indicate that a worst-case scenario could lead to damages of $437 million. This scenario involved a major earthquake occuring nearby in combination with a major episode of flooding. It is generally believed that the San Andreas fault, which would certainly be capable of causing such an earthquake, moves perhaps once every 100 years at some point along its range. A movement close to Simi is less likely, but there are other smaller nearby faults which could slip. Assume therefore that the earthquake required by this scenario occurs with probability 10^{-2}. If a major flood as required by the scenario takes place once every fifty years and has a duration of two weeks, then (assuming independence of events) the compound probability of the flood and earthquake accurring simultaneously would be $(2x10^{-2})(2/52)(10^{-2}) = 7.7x10^{-6}$.

Even if both of these events were to occur simultaneously, the worst-case damages of $437 million would still be unlikely. Suppose that the conditional probability of this loss is 10^{-3}, given that the earthquake and flood do occur. Then the probability of the $437 million loss is $7.7x10^{-9}$. Multiplying those two figures together gives an expected loss of $3.36. Of couse, the worst-case event is not the only event which might occur. To take account of the large number of other possible events which RCRA could impinge upon, let us multiply the $3.36 figure by 10^3. (This is rough, but pressnt knowledge doesn't really give us much more to work with.) Resulting expected damages which RCRA <u>could</u> prevent would then be $3,365.

Finally, to convert this into a measure of the benefits of RCRA, one most take account of the fact that RCRA, even given 100 percent enforcement and compliance would not eliminate all damages under all circumstances, but would instead reduce the damages caused by certain initiating factors such as earthquakes and flooding. For the worst case situation, this might result in a halving of the expected damages from $3.36 to $1.68. Similarly, if one assumes that RCRA results in a halving of damages on average, one would conclude, given the other numbers of this exercise, that the expected benefits of RCRA vis-a-vis the Simi site are $1,685. This is a not a large number.

While it would be foolish to maintain that this exercise constitutes a "proof" that RCRA generated exactly $1,685 worth of benefits with respect to the Simi site, the exercise is useful in that it (1) identifies the data which would be needed to calculate accurately expected benefits; and (2) together with our earlier discussion of siting, permits a preliminary judgement that <u>at least for the two</u>

sites covered in this study, siting is likely to be an important area in which regulation can confer benefits, but in-depth regulation of existing sites may not be likely to lead to significant expected benefits.

As regards point (1), the three lacunae in present data are: estimates of the entire set of possible events; estimates of the marginal effect of the regulations at reducing damages (this involves the enforcement and compliance issues, inter alia); and estimates of the probability of any single, well-specified event. As regards point (2) there is an important issue of where the burden of proof lies. While the specific probabilities applied in our exercise may be higher or lower than the true probabilities, it seems unlikely that the expected benefits of RCRA were significant (e.g., in the hundreds or even tens of millions of dollars).

7.[illegible] CONCLUSIONS

The most significant conclusion which can [illegible] study, is that siting criteria can be an important [illegible] in determining the benefits of RCRA regulations. [illegible] California [illegible] EPA regulations provides for a [illegible] siting program. Lengthy siting procedures [illegible] inclined to locate the facility at Casmalia. [illegible] the Kiln Valley facility was sited in a [illegible] facility toward which the [illegible] [illegible] sensitive locations to the Casmalia.

If land purchase costs, waste sites will [illegible] from land uses; more precisely, residential and other [illegible] uses will not be built near waste sites. [illegible] if land purchase costs work, the public [illegible] involved, particularly if public agencies use [illegible] waste facilities.

[illegible] agency operators may [illegible] private sector operators, due to the ability [illegible] waive [illegible] codes, private developers may [illegible] power of private industrial developments, [illegible] the good [illegible] sites. The [illegible] of [illegible] [illegible], may lead to a more optimal location [illegible] within a [illegible]. The Southern California Association of Governments is considering [illegible] investigating several potential waste [illegible] which locate waste processing and [illegible] at [illegible] of within industrial areas.

7.6 CONCLUSIONS

The most significant conclusion which emerges from this study is that siting criteria act as an important variable in determining the benefits of RCRA regulations. Neither California nor EPA regulations provides for a comprehensive siting program. Largely economic incentives directed Hunter Resources to locate the facility at Casmalia. By contrast, the Simi Valley facility was sited at a municipal refuse facility toward which the urban area developed, thus bringing sensitive receptors to the hazards.

If land markets work, waste sites will be located away from land uses; more precisely, residential and other land uses will not be built near waste sites. On the other hand, if land markets don't work, the public sector should get involved, particularly if public agencies are operators of waste facilities.

Public agency operators may not be as efficient as private sector operators, due to the absence of a profit motive. To reduce costs, private operators may locate closer to private industrial developments, which, however, may pose greater risks. The threat of these risks, if internalized, may lead to a more optimal location strategy within a benefit-cost framework. The Southern California Association of Governments is considering this strategy and investigating several technical waste reduction configurations which locate waste processing and reduction facilities adjacent to or within industrial areas.

CHAPTER 8 REINTERPRETING THE IMPACTS OF REGULATION

8.0 SUMMARY

The assessment of regulatory benefits has revealed monetized values at each site. In determining these values, several factors and trends that will influence the future of hazardous waste disposal, and therefore its regulations, have become evident. Reflection upon these factors and trends as they relate to benefits and as they may be manipulated to establish new regulatory programs to enhance benefits follow in this chapter. The following items are considered influential in the context of this study:

- operations regulations and disposal technology have had an indirect effect upon the selection of hazardous waste disposal sites;
- siting influence indicates a preference for centralized, remote sites removed from the presence of valued resources and population centers;
- public controversy and inadequate information bases have increasingly made selection of new disposal sites, as well as operation of existing sites, difficult;
- availability of land, cost of land, cost of waste transport, and other considerations will increasingly make economic review of disposal methods critical; and
- changes in and alternatives to the existing means of hazardous waste disposal are rapidly approaching, and may require dramatic rethinking of, present regulatory frameworks.

8.1 SITING ISSUE

The purpose of establishing hazardous waste facilities is to centralize all waste into regional facilities. The "benefit" of this centralization is the avoided damage which could result from hazardous waste exposure spread indiscriminately throughout the landscape and waterways. Remote facilities, presumably, minimize the exposure pathways and the number of potential sensitive receptors.

Thus, while the prime objective of hazardous waste regulations has been to protect the environment through operating controls rather than siting, the means to achieve this and a principal impact may well have been improvements in siting selection. A good site -- one located away from population, activities, ground and surface water supplies, and other valuable resources -- leads to lower damages, potential or real. In the overview of hazardous waste disposal planning, centralized, remote disposal facilities address the issues of fewer damages and less controversy. Use of centralized, remote facilities is an interim solution to the hazardous waste disposal need only. Few additional opportunities such as Casmalia exist, and this burgeoning volume of the waste load demands a new disposal and regulatory approach.

8.2 POLITICS OF HAZARDOUS WASTE SITING

The politics of hazardous waste siting are complex and frustrating. The situation at Simi Valley has been particularly volatile and serves to illustrate the sensitivity of the process. Ideally, from CWM's point of view, CWM would have been subject to part 264 and 265. Due to the controversy raised by the previous operator, VRCSD, the Ventura County Board of Supervisors would now allow CWM to run a hazardous waste facility. Between Union Oil and CWM, \$1 million has been spent on geohydrological studies. The bottom line of these studies is that the site is not suitable for Class 1 operation under the guidelines for soil permeability.

According to CWM personnel, this does not mean that the site is another "Love Canal." According to one source, "Had the political climate been otherwise, the impact of the RCRA regs could have been very positive." This source maintained that the real opposition of the Board was to making Simi Valley a hazardous waste center for Southern California following closure of two other problematic sites at Calabasas and Palos Verdes. This industry source asserted that state pre-emption of local siting may be required to find places suitable for accepting wastes consistent with regulations and the role of private operators in a free and competitive marketplace. This source further felt that had 264 existed 12 years ago, Simi Valley would have never been allowed to exist. On the other hand, had there then been a need and demand for a site, better technical solutions would have been worked out to meet the 264 limitations.

8.3 PRIVATE VERSUS PUBLIC OPERATOR STATUS

It would be folly to generalize from the two study sites here as to the desirability of public or private ownership and operation of hazardous waste facilities. In an ironic twist of the American system, public agencies often become insulated from their publics. Casmalia Resources is locally owned and operated, and generally enjoys a good press. Staff frequently arrange tours with local officials and groups. Local residents watch things closely, and go to the Board of Supervisors whenever anything untoward occurs. Casmalia Resources keeps, and is kept, on its toes. One view of Casmalia Resources' quick move into WAO is that, politically, it was a good tactic -- even though it may never pay off financially (and it may not if the sunset on California landfills doesn't go into effect).

A confounding factor in VRCSD's case is that it mainly handled ordinary solid wastes. Hazardous wastes were a small part of its operations. It was caught in a transition period. Their recordkeeping left much to be desired, as did a number of their operating practices. They were not, as Casmalia Resources was, dealing exclusively with hazardous wastes.

Further, the urban area grew up to their gates. The agency became protective and gun-shy. Moreover, VRCSD was reluctant to give in to CWM: the Simi Valley site financially carried the Countywide system and made up for deficits at other landfill sites in the County. Public relations, management, and enforcement all contribute to the image a facility operation projects. This study indicates that image is significant to the success and life of the facility.

8.4 REDUCING DAMAGES AVOIDED

The question has been raised, "What could be done to reduce damages avoided from this point in time on?" The answer differs for each site. For Simi Valley, the hazardous waste portion of the site has been closed. Short of either removing the wastes for disposal elsewhere or removing land use and establishing these in new locations, not much could be done that has not already been done. The site is locked into its present set of circumstances, including the risks that it poses to the adjoining area.

By contrast, Casmalia Resources will continue to operate its facility. It started with a good site and buffered it with vacant land. The worst plausible case damages are small compared to those at Simi Valley. Incidents similar to those reported in this study could still occur; facility expansion to handle the need and demand for additional capacity would seem to be appropriate, along with newer technologies to reduce the volumes and hazardous nature of wastes brought to the site. Expansion is currently underway. The <u>minimum</u> damage a worst plausible case scenario would generate would be based on an operating accident, rather than chronic problems associated with site, geological or meterological problems and circumstances.

8.5 ALTERNATIVES TO LANDFILL SITES

Given the technical and political complexities of landfill siting, the initiative for alternative disposal means is strong. The pending executive order in California to establish a sunset on landfills may herald similar actions in other states. In anticipation of this, and to meet the pressing need to find alternate ways to handle hazardous wastes in its region, the Southern California Association of Governments has established a Hazardous Waste Project to document the problem and come up with alternatives. Recommended alternatives rely on advanced technological processing and treatment facilities located where wastes are generated (assumed to be near industrial centers). These alternatives include:

- o waste treatment centers;
- o liquid organic centers;
- o aqueous treatment facilties;
- o incineration facilities;
- o solidification/stabilization facilities; and
- o integrated facilities.

Pursuit of these landfill alternatives would create numerous decentralized sites. The obvious consideration is the risk: what is the degree of exposure and the extent of sensitive receptors with "on-site" treatment facilities? If the risk considerations can be successfully addressed, several advantages over regional centralized facilities might accrue:

1. Transport costs are lower;

2. Hazards of spill and exposure during transit are substantially lower;

3. The volume and hazardous nature of treated residues which may need to be ultimately disposed of are greatly reduced; and

4. The high cost of new land disposal sites is avoided.

If reliable treatment opportunities can be developed, if risk considerations of "on-site" treatment facilities can be addressed, and if some comprehensive approach can be established for creating the incentives to treat wastes at the point of generation, tremendous savings will accrue. Such alternatives would effectively end the debate about whose "back yard" will receive the wastes. The recommendation would be to site the facility in the "front yard" of the industry. With some significant "ifs," these alternatives could create incentives for recovery, treatment, and regulatory compliance.

Casmalia Resources' installation of a WAO unit at its facility reflects the private sector's anticipation of these regulatory changes. Chemical Waste Management personnel emphasize that waste treatment rather than landfill is the way to go. CWM is prepared to spend $50 million to transform its facilities to do more waste treatment. In this regard, the institutional and economic influence of RCRA has been very positive. RCRA's main impact financially to the industry has been to make commingling of hazardous and non-hazardous wastes increasingly difficult. Unless the sunset law goes into effect, private industry capital investments in treatment technologies will be very risky.

8.6 IMPLEMENTING ALTERNATIVES

Two principles seem important for approaching the implementation of alternative siting strategies. Each principle leads to a strategy which must mix economic and regulatory programs to develop desired goals. The principles are:

(1) Trading more flexible operating restrictions for stricter siting regulations; and

(2) Trading risks of remote or centralized landfill facilities with risks of decentralized "high-tech" treatment facilities in industrial or urban settings.

The first principle is based on the premise that siting regulations should be strict, but that regulations dealing with allowable practices at well located sites should be held to a minimum. It could be argued that maximal protection of the environment would occur if well situated hazardous waste disposal facilities were provided with government support or subsidy. This principle might stand better chances of being effective if only remote sites were in question. If decentralized, or industrially oriented sites are considered, operation regulations become critical and no "trade off" between siting and operation regulations can be made.

Subsidy of remote sites, however, could be construed as subsidizing the production of hazardous wastes, and may lead to a net increase in the amount of hazardous wastes eventually entering the environment. As an economic solution, government could simply tax the production of hazardous wastes, then incentives to produce such materials will decrease. The funds generated by this tax could then be used to subsidize disposal, perhaps by paying the disposing firms a certain amount per pound of each waste turned over to well located (perhaps decentralized) treatment facilities. This would discourage generation and further encourage reduction of waste flow to facility.

Such a tax and subsidy scheme is a modification of the basic idea of the Superfund. One aspect of the scheme should be emphasized. That is, it is important to tax only the production of hazardous wastes. If all wastes are taxed, then no differential incentive to avoid producing hazardous wastes would arise, and the plan would amount to no more than a general revenue source for the government. This distinction was the basis of a recent taxing issue in Santa Barbara County directed against Casmalia Resources. No additional tax was levied at the regional municipal refuse facility.

The second principle is structured around recognizing the risk in assembling a decentralized treatment siting near the point of generation. A special district might be created where the risk to properties and businesses in a "treatment zone" around the facility is recognized, though no damage is assumed. Industrial activity which generates the waste would serve as the focal, geographical point for siting -- it is then in their own front yard. Bonding or some form of fund assembly would be established to account for any damage which may occur, but more importantly, it would stabilize land values. This strikes at the heart of siting in urban areas as long as human health is protected.

This stablized value zone establishes the incentive for regulatory compliance. The zone is in industrial (not necessarily populated and certainly not pristine) areas, is responsive to the perception of the hazard, and leaves the details of the system to the conventions of fair market value appraisals and local planning functions. The fund provides for value lost, based on market appraisal, if loss occurs over time and the loss is contrasted to the high value of a well-operating facility -- a very valuable community asset.

8.7 REGULATORY RECOMMENDATIONS

The assessment of benefits accruing from hazardous waste management regulations has revealed that benefits, as damages avoided, exist at each site. Review of issues central to the regulatory framework, the results of its implementation, and its future in California have revealed how siting is a major concern to hazardous waste disposal regulation and the benefits we expect from that regulation. Though this study focuses upon operations regulation, the future of hazardous waste regulation, and benefits that would accrue, may lie within the various siting concerns. Specifically, the following items relate to siting:

- the impetus in hazardous waste regulation has focused efforts to centralized, preferably rural or remote, sites;

- such sites are removed from sensitive receptors (people and valuable resources), and potential for damage by lack of regulation, enforcement or monitoring is much reduced;

- the trend toward centralized, remote sites is by necessity only limited as available land, cost of land, cost of waste transport, public controversy, and other factors mitigate against continued disposal by landfill;

- technological advancement and specialization in waste disposal requires dedication to management of single waste types and may further dictate specialization among hazardous waste types;

- within the confines of this study, it is recognized that the private sector would seem to possess greater flexibility to respond to specialized hazardous waste disposal;

- California, in anticipation of landfill disposal prohibition, has begun to focus upon treatment alternatives which open the door to alternatives to siting;

- study of alternative disposal means and alternative siting means holds potentially great cost savings, effective waste control, and risk reduction; and

- economic incentives may be established to encourage treatment alternatives and siting alternatives which reduce waste stream, increase resource recovery, and reduce risk to the public.

Fertile area for study lies in the progress being made by the public and private sectors in California in pursuit of treatment and siting alternatives. If sufficient authority is placed behind the approved prohibition of hazardous waste disposal by landfill, alternatives will begin to appear as hardware and facilities. Costs, or the political fear of them, are the hurdle to authorities, as well as the momentum of the disposal institutions.

Based upon the benefits conferred to regulation herein, further study should focus upon the benefits of siting. That study would form the basis of investigation into the benefit potential to be found in treatment and siting alternatives. California, as the test case for such investigation, is in the position to be experiencing the increase in costs of land, transport and natural resources that represent nationwide difficulty in providing adequate fiscal or natural resources to attack the hazardous waste disposal problem. California, however, has the flexibility to respond technologically and institutionally to such resource shortages, not facing the acute situations many other states now face. This makes for an excellent opportunity to review the regulatory response in this state.

SIMI VALLEY: APPENDIX

APPENDIX 4.1

SIMI LANDFILL PERMITS

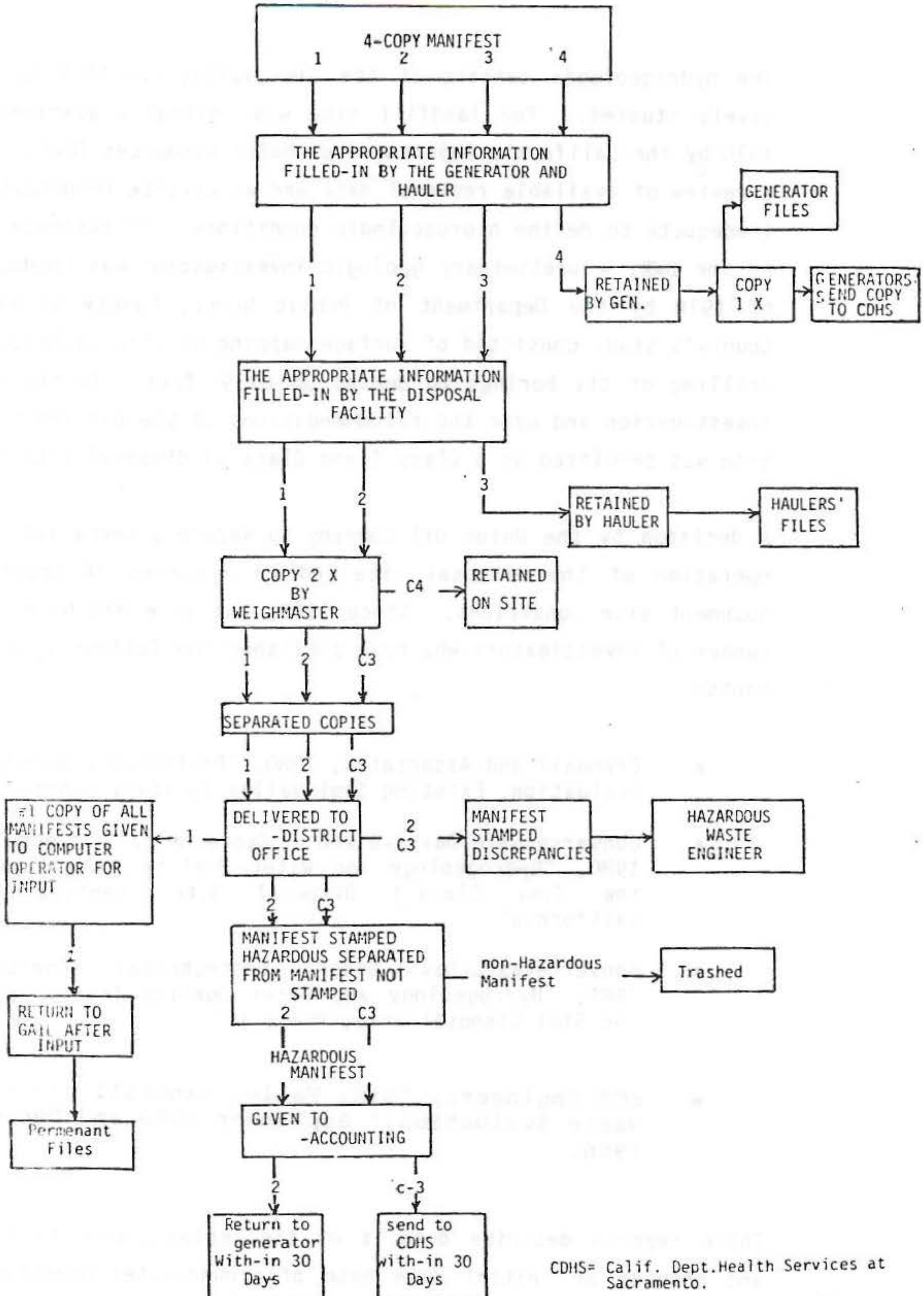
VRCSD Operations

Permit Name	Permit Number	Issuing Agency	Permit Applicant	Date Issued	Expiration Date	Permit Conditions
Conditional Use Permit	CUP #3142 Resolution #75-31	Vta. Co. Planning & Board of Supervisors	VRCSD	5-4-70	Tied to final Elev. of 925'-1,120'	-Until fill elev. 925'-1,020' has been attaine -Minor changes may be approved by Planning Commission -Major changes require filling modified permit -Operable in daylight on
Waste Discharge Permit	LARWQCB Resolution #70-36	LARWQCB	Vta. Co. Dept. of Public Wks/ VRCSD	5-27-70	Indefinite	-Segregate materials to Class 1,2, and 3 sites. -Submit required reports -Prevent groundwater contamination.
Hazardous Waste Permit	S6-0001-78	CDHS	VRCSD	Approval Pending	Indefinite	-Application made.
Rubbish Dump Permit	Calif. Div. of Forestry #6-0098	Calif. Div. of Forestry	VRCSD	Issued Annually	Indefinite	-Provide firebreaks and fire protection.
Solid Waste Facilities	#56-AA-007 #78-240	Vta. Co. Environmental Health Div. & SSWMB	VRCSD	11-4-78	Indefinite	-Compliance with State minimum standards. -References all other permits.
E.P.A. I.D. Number	CAD990658395	Environmental Protection Agency	VRCSD	8-17-80	Indefinite	-Interim Status Requirements.

SOURCE: VRCSD, Simi Valley Disposal Site Hazardous Waste Operation Plan, December 1980, p.viii-4

APPENDIX 4.2

FLOW CHART OF THE 4-COPY HAZARDOUS WASTE MANIFEST



CDHS= Calif. Dept.Health Services at Sacramento.

C3,C4= Zeroxed copy three or four

SOURCE: VRCSD, Simi Valley Hazardous Waste Operation Plan, December 1980, p. viii-5.

APPENDIX 4.3

DESCRIPTION OF SITE INVESTIGATIONS

The hydrogeologic setting of the Simi Valley Landfill has been extensively studied. The landfill site was initially examined in January 1970 by the California Department of Water Resources (DWR); at that time a review of available regional data and an on-site reconnaissance proved inadequate to define hydrogeologic conditions. In response to a request by the DWR, a preliminary geologic investigation was conducted in March of 1970 by the Department of Public Works, County of Ventura. The County's study consisted of surface mapping of site lithologic units and drilling of six borings to depths up to 93 feet. On the basis of this investigation and upon the recommendations of the DWR and the RWQCB, the site was permitted as a Class I and Class II disposal site in 1970.

A decision by the Union Oil Company to secure alternative proposals for operation of the disposal site led to a series of investigations to document site conditions. Since 1980, the site has been explored by a number of investigators who have published the following technical documents:

- Crandall and Associates, 1980, "Preliminary Geotechnical Evaluation, Existing Simi Valley Sanitary Landfill"
- Converse-Ward-Davis-Dixon Geotechnical Consultants, 1980, "Hydrogeology and Water Quality Investigation of the Simi Class I Disposal Site, Ventura County, California"
- Converse-Ward-Davis-Dixon Geotechnical Consultants, 1981, "Hydrogeology and Water Quality Investigation of the Simi Disposal Site, Phase II"
- SCS Engineers, "Simi Valley Landfill Hazardous Waste Evaluation," September 1980 and December 1980.

These reports describe details of the geologic conditions at the site and provide an initial data base of ground-water measurements (levels and quality).

SOURCE: EMCON Associates, Environmental Status and Ground-water Protection Plan Simi Valley Disposal Facility Ventura County California, January 14, 1983, p.11.

APPENDIX 4.4

HAZARDOUS WASTE

INFORMATION RETRIEVAL FROM

VRCSD COMPUTER

VRCSD used a Burroughs Interactive Forecasting and Statistical Analysis Systems/FORECAST Computer for its data management.

The machine has a number of unique features, all of which assure ease of use while providing maximum aid in data management. This machine is primarily designed for access through remote terminals as a conversational system; FORECAST can be used in batch production environment.

Commands in FORECAST language are constructed to be free-form and easy to use. This machine accepts abbreviations down to the first three characters of command keywords.

Utilization of the data processing system in support of landfill operations involves:

a. Daily entry of data from the refuse disposal receipt into the memory system. The following information from the receipt is entered:

    1. Identification of the solid waste hauler
    2. Weight of solid waste disposed of at the site.

3. Category of the waste (seven categories).
4. Type of vehicle.
5. Appropriate date/time group.
6. Fees collected from cash accounts.

b. Retrieval programs extract the data and generate statements for charge customers. Other programs yield quantity, category of waste, type of vehicle, average load size, number of loads, and account status from each customer and grid location for hazardous wastes.

c. Retrieval programs to extract information required for reports to the State WRCB which detail hazardous waste activity.

d. Entry and retrieval programs which detail scheduled and unscheduled maintenance of landfill heavy equipment.

e. The data processing system also fulfills a support role in payroll accounting, budget preparation, contract administration, and a complete double-entry accounting system with a payables subsystem.

SOURCE: VRCSD, Simi Valley Hazardous Waste Operation Plan, December 1980, p. viii-3.

Simi Valley Dewatering Wells Information

WATERWORKS DISTRICT 8
CITY OF SIMI VALLEY
500 W. Los Angeles Avenue
Simi Valley, California 93065

May 12, 1983

Ms. Janice M. Ferrick
Research Associate
Research Interaction & Management Associates
219 Ladera Street, Suite 3
Santa Barbara, California 93101

SUBJECT: CITY WELL INFORMATION AS REQUESTED ON MAY 5, 1983

Dear Ms. Ferrick:

This letter is in response to the questions asked in your letter of May 5, 1983.

1. The City's dewatering well east of the landfill is named the Easy Street Well. The most recent and only water analysis for this well was taken during the drilling of this well in June 1981. This is enclosed as Attachment No. 1.

2. The artesianing well is located on Ward Avenue north of Easy Street. This well is named the Truss Yard Well. Attachment No. 2 is a location map of the Easy Street and Truss Yard Wells. The most recent water analysis for the Truss Yard Well is enclosed as Attachment No. 3. The Truss Yard Well is normally operated on a constant basis except during periods of maintenance. The ground dewatering wells' water quality is analyzed only on a need-to-know basis, since the water is not used for potable or irrigation services.

3. Enclosed as Attachment No. 4 is the water analysis for the Tapo Canyon Well which is named Well No. 31. This analysis is prior to treatment and blending. Calculations based on the treatment plant effluent (analysis and quantity) and the Metropolitan Water District's water analysis give the City a known analysis at any particular time. Since the quantity components vary significantly each day, no analysis is available. However, enclosed is Attachment No. 5 which is the water treatment plant's effluents analysis which meets all of the State's water quality requirements. Well No. 31 is in

Ms. Janice M. Ferrick
May 12, 1983
Page Two

operation daily depending upon demand. The pump is usually operated an average of nine hours daily. This well is tested every four years as required by the State.

4. The Tapo Canyon Well (Well No. 31) water is belended with water from the Feather River Water Project originating in Northern California. The water is treated at Metropolitan Water District's Jensen Treatment Plant before being piped through the San Fernando Valley to Simi Valley. At the particular branch which is utilized for blending purposes with Well No. 31, the total yearly volume for 1982 was 1125 acre feet. The total water volume for Well No. 31 for 1982 was 251 acre feet.

5. The only information pertaining to flood plain flooding is visual. Extremely high water levels exist in the Arroyo (flood plain) during extended periods of rainfall (as the stroms experienced this winter). The high water situations usually do not last over a week after the rainfall ceases. However, there is always a certain amount of run-off present in the Arroyo. For more exact information on this subject, the Ventura County Flood Control District should be contacted.

6. Yes, the City will place RIMA on its distribution list for the Flood Control Prioritization Study.

Should you require additional information, please do not hesitate to contact me at (805) 583-0393, extension 411.

Very truly yours,

John J. Johnson

John J. Johnson
District Engineer

jd

Attachments

cc: Don Busch, Water System Superintendent

V79038

Fruit Growers Laboratory, Inc.

ATTACHMENT 1
FIGURE 3

P. O. BOX 272 – 853 CORPORATION STREET – PHONE (805) 525-2146
659-0910

WATER ANALYSIS REPORT

OWNER – Geotechnical Consultants

SAMPLER – D.G.

LAB. NO. – 43061

DATE SUBMITTED – August 3, 1979

ANALYSIS REPORTED – August 8, 1979

MATERIAL V79038 2N/18W-6R1
Q - 350 GPM Sampled: 8/1/79

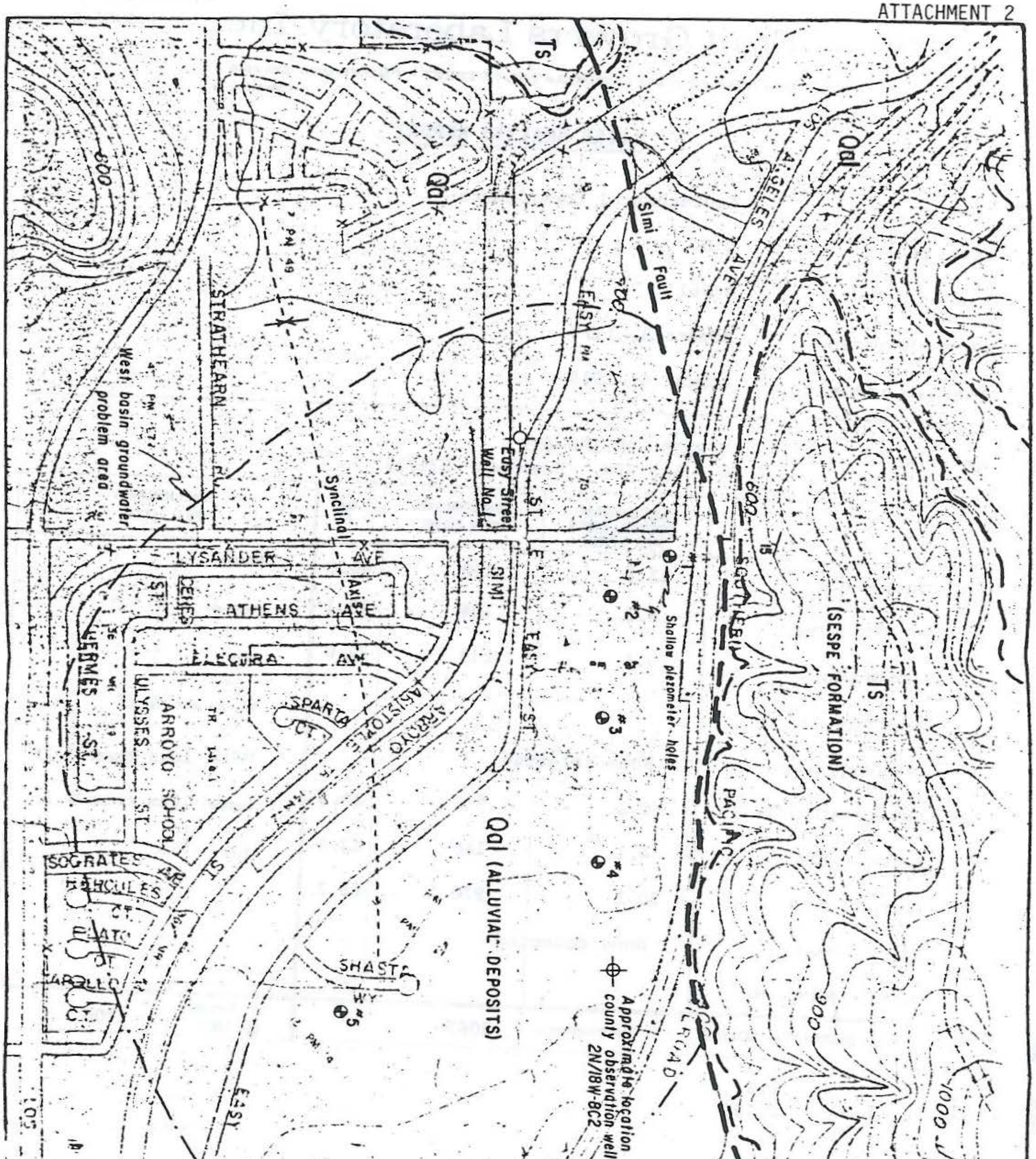
	MILLIGRAM EQUIVALENTS PER LITER	MILLIGRAMS PER LITER	%	MILLIGRAMS PER LITER	
CALCIUM (Ca)	12.5	250	40.8	Boron	
MAGNESIUM (Mg)	8.6	104	28.1	Fluoride	0.4
SODIUM (Na)	9.5	219	31.0	Iron	1.2
POTASSIUM (K)				Manganese	0.27
CARBONATE (CO_3)	None detected			MBAS	less than 0.05
BICARBONATE (HCO_3)	6.2	378	20.3	Copper	less than 0.1
CHLORIDE (Cl)	4.1	146	13.4	Zinc	0.1
SULPHATE (SO_4)	20.2	970	66.2		
NITRATE (NO_3)	None detected				
NITRATE -N (NO_3 -N)					
TOTAL DISSOLVED SOLIDS	1. Summation	2067		2. Residue @ 180°	1700

pH	7.3
EC X 10–6 at 25° C	2280

HARDNESS Grains Per Gallon (as Ca CO_3)	
Calcium	36.5
Magnesium	25.1
Total Hardness	61.6

These results were obtained by following standard laboratory procedures: the liability of the corporation shall not exceed the amount paid for this report.

CHEMIST [illegible]


Ts
Qal
Simi Fault
EASY ST.
Easy Street Well No. 1
Synclinal Axis
STRATHEARN
West basin groundwater problem area
LYSANDER AVE
ATHENS AVE
ELECTRA AVE
HERMES ST.
ULYSSES ST.
ARROYO SCHOOL
SPARTA CT.
ARISTOTLE ST
ARROYO
SIMI
SOCRATES AVE
HERCULES CT.
PLATO CT.
APOLLO CT.
SHASTA WY
Shallow piezometer holes
#2
#3
#4
#5
Qal (ALLUVIAL DEPOSITS)
Approximate location county observation well 2N/18W-8C2
Ts (SESPE FORMATION)
LOS ANGELES AVE
PACIFIC
600
700
900
1000
Truss

ATTACHMENT 3

Fruit Growers Laboratory, Inc.

WATER ANALYSIS REPORT

OWNER – Simi Valley County Sanitation District

SAMPLER –

LAB. NO. – 43077-2

DATE SUBMITTED – August 7, 1979

ANALYSIS REPORTED – August 20, 1979

MATERIAL W8779 T Truss Yard

	MILLIGRAM EQUIVALENTS PER LITER	MILLIGRAMS PER LITER	%	MILLIGRAMS PER LITER
CALCIUM (Ca)	12.3	246	43.9	Boron 0.9
MAGNESIUM (Mg)	7.2	87	25.7	Fluoride 0.5
SODIUM (Na)	8.4	194	30.0	Iron less than 0.1
POTASSIUM (K)	0.1	5.3	0.4	Manganese 0.07
CARBONATE (CO_3)	None detected			MBAS
BICARBONATE (HCO_3)	5.6	342	19.9	Copper less than 0.1
CHLORIDE (Cl)	4.2	150	14.9	Zinc less than 0.1
SULPHATE (SO_4)	18.0	866	63.8	Aluminum less than 1 Arsenic less than 0.05
NITRATE (NO_3)	0.4	23	1.4	Barium less than 1 Beryllium less than 0.1
NITRATE -N (NO_3 -N)				Cadmium less than 0.009 Chromium less than 0.05
TOTAL DISSOLVED SOLIDS	1. Summation	1911		2. Residue @ 180° 1825

pH 7.2

EC X 10^{-6} at 25° C 2220

Lead less than 0.05
Lithium less than 0.1
Mercury less than 0.002
Molybdenum less than 0.5
Nickel less than 0.1
Selenium -0.02
Silver less than 0.05
Turbidity less than 0.5
Silica 31
Total Alkalinity - 300
Free Carbon Dioxide - 39.9

HARDNESS
Grains Per Gallon (as Ca CO_3)

Calcium	35.9
Magnesium	21.0
Total Hardness	56.9

These results were obtained by following standard laboratory procedures; the liability of the corporation shall not exceed the amount paid for this report.

CHEMIST Ming Y. Wang

ATTACHMENT 4

Fruit Growers Laboratory, Inc.

P. O. BOX 272 – 853 CORPORATION STREET – PHONE (805) 525-2146
659-0910

WATER ANALYSIS REPORT

OWNER – City of Simi Valley
DATE SUBMITTED – May 28, 1981

SAMPLER –
ANALYSIS REPORTED – June 3, 1981

LAB. NO. – 50266-1

MATERIAL Well 31

	MILLIGRAM EQUIVALENTS PER LITER	MILLIGRAMS PER LITER	%		MILLIGRAMS PER LITER
Calcium (Ca)	7.0	140	60.3	Boron	
Magnesium (Mg)	2.7	33	23.3	Fluoride	0.4
				Iron	0.2
Sodium (Na)	1.9	44	16.4	Manganese	0.06
Potassium (K)				MBAS	less than 0.05
Carbonate (CO_3)	None Detected			Copper	less than 0.1
				Zinc	less than 0.1
Bicarbonate (HCO_3)	5.3	323	46.1	Arsenic	less than 0.05
Chloride (Cl)	0.6	22	5.2	Barium	less than 1
				Cadmium	less than 0.009
Sulphate (SO_4)	5.6	267	48.7	Chromium	less than 0.05
Nitrate (NO_3)	None Detected			Lead	less than 0.05
				Mercury	less than 0.002
Nitrate-N (NO_3-N)				Selenium	0.01
Total Hardness (as $CaCO_3$)		485		Silver	less than 0.05
Total Dissolved Solids	1. Summation	829		2. Residue @ 180°	625

pH 7.3
EC X 10^{-6} @ 25° C 1050
SAR

These results were obtained by following standard laboratory procedures: the liability of the corporation shall not exceed the amount paid for this report.

Chemist

Ming Y. Wang

ATTACHMENT 5

Fruit Growers Laboratory, Inc.

P. O. BOX 272 – 853 CORPORATION STREET – PHONE (805) 525-2146
659-0910

WATER ANALYSIS REPORT

OWNER – City of Simi Valley

DATE SUBMITTED – May 28, 1981

SAMPLER –

ANALYSIS REPORTED – June 3, 1981

LAB. NO. – 50266-2

MATERIAL

Treatment Plant Effluent

	MILLIGRAM EQUIVALENTS PER LITER	MILLIGRAMS PER LITER	%		MILLIGRAMS PER LITER
Calcium (Ca)	3.1	62	34.1	Boron	
Magnesium (Mg)	2.6	32	28.6	Fluoride	0.4
				Iron	less than 0.1
Sodium (Na)	3.4	79	37.4	Manganese	less than 0.05
Potassium (K)				MBAS	less than 0.05
				Copper	less than 0.1
Carbonate (CO_3)	None Detected			Zinc	less than 0.1
Bicarbonate (HCO_3)	3.1	189	33.0	Arsenic	less than 0.05
				Barium	less than 1
Chloride (Cl)	0.6	20	6.4	Cadmium	less than 0.009
Sulphate (SO_4)	5.7	271	60.6	Chromium	less than 0.05
				Lead	less than 0.05
Nitrate (NO_3)	None Detected			Mercury	less than 0.002
Nitrate-N (NO_3-N)	-			Selenium	0.01
Total Hardness (as $CaCO_3$)		285		Silver	less than 0.05
Total Dissolved Solids	1. Summation	653		2. Residue @ 180°	603

pH 7.9
EC X 10^{-6} @ 25° C 880
SAR

These results were obtained by following standard laboratory procedures: the liability of the corporation shall not exceed the amount paid for this report.

Chemist..........

Ming Y. Wang

13-1

APPENDIX 4.6

LAND USES IN THE SIMI VALLEY FLOODPLAIN

RESIDENTIAL:

mobil homes 14 acres x 8.0 units/ac = 112 units
medium density 410 acres x 3.7 units/ac = 1517 units
intermediate density 46 acres x 7.0 units/ac = 322 acres
high density 26 acres x 15.0 units/ac = 390 units
very high density 17 acres x 25.0 units/ac = 425 units

floodplain built out = 95%
building coverage per acre = 35-45%
infrastructure per acre = 25%
average persons per household = 3.48

COMMERCIAL:

general commercial 138 acres = 6,000,000 sq. ft.
no assumptions for commercial employees in S.V., but Santa Barbara assumption appears reasonable:
1 employee/250 square feet
infrastructure 20-25%; building coverage 25%.

INDUSTRIAL:

light industrial 230 acres = 10,000,000 sq. ft.
employees 15-26 employees/acre
infrastructure 20-25%; building coverage 50%

PARKS:

1. Tierra Rijada Regional Park: 100 ac. 18 hole golf
(undeveloped, not in use) course $3 million

150 ac. undeveloped rugged lands worth $20,000/acre =
$3 million

2. Community Park: (developed, in use) Rancho Simi
replacement costs 35 ac. x $140,000/ac = $5 million
swimming pool $1 million

$6 million

land value 35 ac x $180,000/ac = $6.3 million

3a. Neighborhood Park: (developed, in use) Arroyo Park
replacement costs 2 ac. x $70,000/ac = $140,000
rest rooms, rec center, snack bar + 50,000

$190,000

land value 2 ac. x 70-80,000/ac = $140,000 - $160,000

3b. Neighborhood Park: (developed, in use) Frontier Park
replacement costs 2 ac. x $70,000/ac = $140,000
land value 2 ac. x 70-80,000/ac = $140,000-160,000

3c. Neighborhood Park: (undeveloped, not in use)
1st & Arcane Sts.
replacement costs 5 ac. x $70,000/ac = $350,000
land value 5 ac. x $70-80,000/ac = $350,000-400,000

4. Special Purpose Park: (developed, in use)
Strathern Historic Park
replacement cost 5 ac x 70,000/ac = $350,000
land value 5 ac x 70-80,000/ac = $350,000-400,000

SCHOOLS:

1. Elementary - 3 located in floodplain;
   brand new building would cost approximately $4 million to replace
   3 schools x $4 million = $12 million

2. Junior High - 1 located in floodplain;
   approximately $5 million to replace

3. Senior High - 1 located in floodplain;
   approximately $6 million to replace

PUBLIC SERVICES CENTER:

Estimated cost to replace entire facility would be on the order of $28 million

APPENDIX 4.7

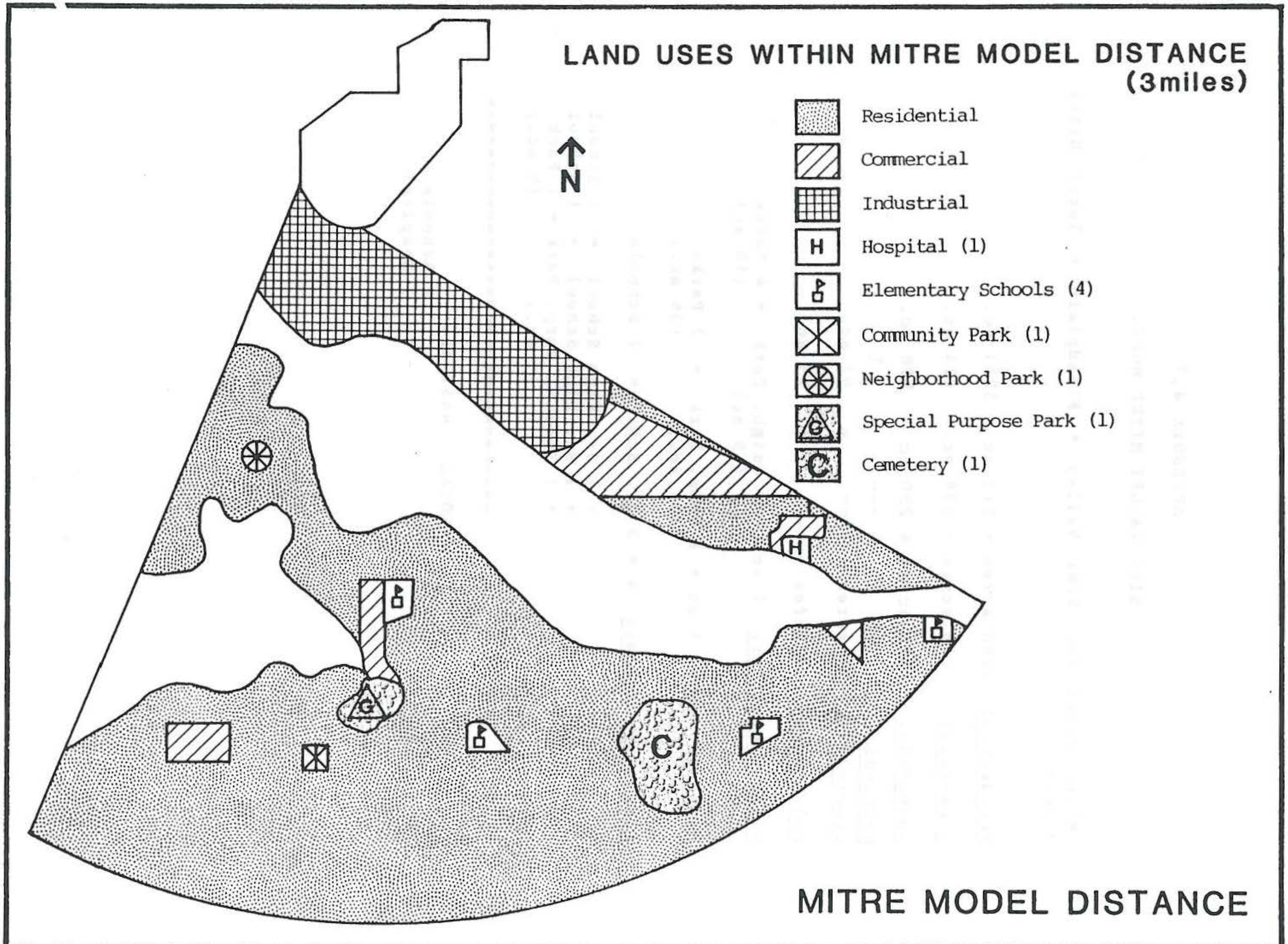
SIMI VALLEY MITRE MODEL

(Mitre Model for Simi Valley + Floodplain = Total Mitre Model)

Residential	2760 acres	+ 513 ac	=	3273 ac.
Commercial	276 acres	+ 138 ac	=	414 ac.
Industrial	368 acres	+ 230 ac	=	598 ac.
Hospital	(1)	+ ---	=	1
Cemetery (1)	92 acres	+ ---	=	92 ac.
Golf Course	23 acres	+ ---	=	23 ac.
Neighborhood Park	1 ac.	+ 3 Neigh. Park (9 ac)	=	4 Parks (10 ac)
Community Park	1 ac	+ 1 Comm. Park (35 ac.)	=	2 Parks (36 ac.)
Elementary Schools	4	+ 3 El. Sch.	=	7 Schools
		+ 1 Jr. High School	=	1 School
		+ 1 Sr. High School	=	1 School
		+ 1 Special Purp. Park (5 ac.)	=	1 Park (5 ac.)

==================================

TOTAL 4451 ac.
9 Schools
1 Hospital


LAND USES WITHIN MITRE MODEL DISTANCE (3miles)
N
Residential
Commercial
Industrial
Hospital (1)
Elementary Schools (4)
Community Park (1)
Neighborhood Park (1)
Special Purpose Park (1)
Cemetery (1)
H
G
C
MITRE MODEL DISTANCE

APPENDIX 4.8

SIMI VALLEY CORRESPONDENCE CHRONICLE
COUNTY

DATE	TO /	FROM	SUBJECT
2-9-83	LAFCO report	Robert Braitman exec.officer LAFCO	Evaluation of VRCSD; makes future recommendations; discusses formation of district etc.
2-8-83	Raymond Hertel RWQCB	M.L. Koester City Manager Simi Valley	City's comments regarding EMCON Report (1-14-83): Environmental Status & Groundwater Protection Plan for Simi Valley Disposal Facility.
1-31-83	Brd.of Directors VRCSD	Robert Braitman exec.officer LAFCO	Cover letter containing staff report re: Status of VRCSD
1-28-83	Hank Yacoub Sr. Engineer L.A. RWQCB	E. Clark Boli Principal Meredith/Boli & Assoc. Inc.	Letter delimits Chemical Waste Managements, Inc. (CWM) position as to its regulatory justification to use non-hazardous waste to improve drainage of Class I area.
11-23-82	Peter Rogers Acting Chief DOHS Hazardous Waste Branch	Maggie Erickson Chairwoman Co.Board of Supervisors	Letter indicating that Board wants DOHS to revoke ISD and no HWFP should be issued.
11-23-82	Betty Werthman Chairwoman RWQCB	Maggie Erickson Chairwoman Co.Board of Supervisors	Letter indicating Board's full support for revisions to Waste Discharge Requirements (prohibit Group 1 wastes, mitigate leachate problem, work plan to define groundwater conditions); make explicit that only "non-hazardous" oilfield wastes be accepted.

11-23-82	Board of Super-visors	Victor Husbands Director Resource Management Agency	Report back on S.V. landfill CUP-3142; contains recommendations to: L.A. RWQCB, DOHS (should revoke ISD & not issue a HWFP).
11-10-82	Terrence Gilday Env. Health Dept.; Resource Management Agency	M.L. Koester City Manager Simi Valley	Letter reviewing Draft of proposed Solid Waste Facilities Permit for Simi Valley Landfill.
10-15-82	Frank R. Krohn Vice-Pres. Chemical Waste Management	Harold Colter Solid Waste Specialist Co.of Ventura Resource Management Agency	Letter indicating CWM's application for a SWFP has been accepted for processing, but additional info is needed.
10-5-82	Betty J. Werthman Chairwoman RWQCB	Elton Gallegly Mayor Simi Valley	Letter expressing health hazards to population of Simi Valley. Wants resolution of past PCB disposals.
9-16-82	VRCSD	Elton Gallegly Mayor Simi Valley	Letter indicating that City strongly opposes condemnation of the landfill site and cannot support acquisition of the landfill; true necessity is to deal with unresolved issues brought out in CWDD report and demonstrate no public health threat.
9-13-82	Peter Rogers DOHS Chief Hazardous Matls Management Section	Victor Husbands Director Vent. Co. Resource Management Agency	Letter expressing concern regarding presence of potentially hazardous conditions at Class I landfill; Board of Sups. instructed RMA to expedite acquisition of info from state agencies having regulatory responsibility.

8-9-82	Ann Rock Council Member Simi Valley	Marjorie Baxter Assistant City Attorney	Memorandum stating storage of PCBs at site without a permit.
8-5-82	Lin Koester City Manager City of Simi Valley	David Long Civil Engineering Assoc. VRCSD	Cover letter sending 2 most recent geologic reports.
7-28-82	Ron Calkins Sr. Sanitary Engineer VRCSD	David Gardner Engineering Geologist	Letter-report of principal findings and conclusions developed during preliminary assessment of the subsurface clay barrier located at the southerly boundary of the site.
7-27-82	Ann Rock Council Member S.V. City Council	John Lambie Chief Engineer VRCSD	Letter responding to requests in 7-20-82 letter for a complete listing of all reports on the site.
7-19-82	City Council Simi Valley	Dept. of Community Development Wayne G. Goldberg Director	Staff report addressing environmental assessment of the administrative action of adoption of the Simi Valley Airport New Site Master Plan
7-9-82	Cody Begley DOHS	Michael B. Kahn City Attorney Simi Valley	Letter discussing report prepared by Moreland Investment Co. which indicated 1 ton of PCB was accepted at site between 1971 and 1980; VRCSD has no permit to store PCB either from state or federal regulators.
7-9-82	Board of Directors VRCSD	John Lambie Chief Engineer VRCSD	Cover letter for Grand Jury Report 1981-82; VRCSD Board too large, aims not reached, substantial monies could be saved, original aims could be satisfied by Joints Powers Agreements.

7-27-81	Raymond Hertel RWQCB	John Lambie VRCSD	Letter indicating their concern for protection of environment & public health; CWDD mitigations should be phased in & disposal of Group 1 wastes should continue; groundwater contamination not conclusively determined.
7-21-81	Ron Calkins Sr. Sanitary Engineer VRCSD	David Gardner Geotechnical Consultants Inc.	Letter-report presenting a review of several reports prepared by CWDD on geologic, hydrogeologic, and water quality conditions at the Simi site.
6-29-81	Andy Holguin VRCSD	Thomas Mikel Laboratory Director Jacobs Environmental	Simi Landfill chemical analysis of one sample received in their lab June 18, 1981.
6-26-81	Raymond Hertel RWQCB	John Lambie VRCSD	Letter submitting: chemical analysis of liquid portion of the evaportation pond and "Operation Plan for spraying of liquid waste".
3-18-81	Elton Gallegly Mayor City of Simi Valley	Andy Holguin Civil Engineer-Associate VRCSD	Cover letter with Feb. 1981 computer printout listing Group 1 wastes accepted at site.
12-18-80	Raymond Hertel RWQCB	John Lambie VRCSD	Cover letter for submission of "Hazardous Waste Operation Plan" developed to satisfy RWQCB and DOHS.
12-15-80	John Lambie VRCSD	Robert P. Stearns President SCS Engineers	Cover letter for "Inventory of Hazardous and Potentially Hazardous Waste Disposed at the Simi Valley Sanitary Landfill" (June 1980), from from 1971 through 1980.

12-5-80	Raymond Hertel RWQCB	Phillip A. Beautrow Principal Civil Engineer VRCSD	Letter asking for special handling plan for disposal of liquid sewage sludges and other bulk liquids; on Nov. 21, 1980 a special handling plan for disposal of Group 1 wastes was asked for.
10-10-80	J. A. Gordon Moreland Investment Co.	John Lambie VRCSD	Cover letter for report addressing concerns in 8-29-80 letter; VRCSD records indicate they have exceeded all regulatory requirements & accepted disposal practices.
8-29-80	John Lambie VRCSD	Jay A. Gordon President Moreland Investment Co.	Letter indicating their concern over proper disposal at site; because of new RCRA 1976 regulations, Moreland has undertaken a comprehensive analysis of VRCSD operations; these studies showed incompatible mixtures of wastes, unstable wastes & potentially leachable wastes. 22 cells may present immediate dangers.
4-2-80	Bob Koch Operations Manager Moreland Investment Co.	Glenn Brown Dir.Geological Services LeRoy Crandall & Assoc.	Cover letter for submittal of the "Preliminary Geotechnical Evaluation, Existing Simi Valley Sanitary Landfill".
11-14-78	VRCSD	Donald W. Koepp V.C. Environmental Health Division	Solid Waste Facilities Permit (SWFP); permit considered consistent w/ V.C. Solid Waste Management Plan (5-18-76).

STATE

10-26-82	Victor Husbands Director Co. RMA	Peter Rogers Acting Chief DOHS Hazardous Waste Management Branch	Letter responding to RMA letter of 9-13-82; no violations of ISD; assumed also in compliance with RCRA; ramifications of withdrawal of RCRA Part A application to EPA and change in ownership is under study by legal staff.
3-22-82	John Lambie VRCSD	Raymond Hertel Executive Officer RWQCB	Directive to immediately cease disposal of all liquid and Group 1 wastes at the site and pond receiving liquid wastes should be back-filled and brought up to grade.
3-11-82	Ray Hertel Exec. Officer RWQCB	Gil Torres, Sr.Engineering Geologist State Water Resources Control Board	Memorandum evaluating CWDD report, also indicating that 3-D mapping of leachate is not possible, and makes recommendations as to further hydrogeologic testing.
2-1-82	Victor R. Husbands Co. RMA	Raymond Hertel Exec. Officer RWQCB	Letter indicating their knowledge of the situation at the site and all the studies performed; RMA has been added to RWQCB's mailing list.
7-16-82	John Lambie Chief Engineer VRCSD	Raymond Hertel Exec. Officer RWQCB	Letter confirming that "Simi Valley Class I Disposal Site Operation Plan for spraying Decanted Liquid Waste" is satisfactory; spraying log should be submitted along with regular monthly monitoring reports.
4-30-81	All Facility Operators	Peter Rogers Chief DOHS Hazardous Materials Management Section	Interim Status Document (ISD) issued by DOHS authorizing continued operation pending issuance of a Hazardous Waste Facility Permit (HWFP) ISD effective date: April 6, 1981

6-29-72	John Lambie Chief Engineer VRCSD	Raymond Hertel Exec. Officer CA RWQCB	Cover letter w/ RWQCB Resolution No. 70-36 containing waste discharge requirements for Simi

FEDERAL

DATE	TO /	FROM	SUBJECT
9-21-82	John Lambie Chief Engineer VRCSD	William D. Wilson US EPA Toxics and Waste Management Division	Letter indicating EPA review of withdrawal of RCRA Part A application and return of documents.

APPENDIX 4.9

SIMI VALLEY LANDFILL: REFERENCES

Converse Ward Davis Dixon Geotechnical Consultants, "Hydrogeology and Water Quality Investigation of the Simi Disposal Site - Phase I and Phase II," December 1980 and May 1981.

EMCON Associates, "Environmental Status and Groundwater Protection Plan Simi Valley Disposal Facility Ventura County, California," January 14, 1983.

Envicom Corporation, "Safety and Seismic Safety Elements Comprehensive General Plan City of Simi Valley," October 1974.

Geotechnical Consultants Incorporated, "Simi Valley Disposal Site Clay Barrier Assessment," July 1982.

LeRoy Crandall and Associates, "Preliminary Geotechnical Evaluation: Existing Simi Valley Landfill," April 1980.

PRC Toups, "Environmental Impact Report, Simi Valley West End Industrial Area Specific Plan," March 1983.

RWQCB, "Revised Waste Discharge Requirements," May 5, 1983.

SCS Engineers, "Simi Valley Landfill Hazardous Waste Evaluation," September 8, 1980 and December 15, 1980.

U.S. Army Corps of Engineers, Los Angeles District, "Floodplain Information Calleguas Creek Vicinity of Moorpark," July 1970.

VRCSD, "Closure and Postclosure Plan for the Simi Valley Sanitary Landfill," October 1981.

VRCSD, "Simi Valley Disposal Site Hazardous Waste Operation Plan," December 1980.

Wadell Engineering Corporation, "Environmental Impact Report/ Environmental Assessment for the Simi Valley Airport New Site Master Plan 1980/2000," November 1980 and revised March 1982.

Wadell Engineering Corporation, "Simi Valley Airport New Site Master Plan 1980/2000," 1980.

CASMALIA RESOURCES: APPENDIX

APPENDIX 5.1 CASMALIA RESOURCES RATE STRUCTURE

Casmalia Resources

TREATMENT AND DISPOSAL RATE SCHEDULE
Effective October 1, 1982

GROUP "A" WASTE - LOW RISK - BULK

Examples: Brine Water
Drilling Mud
Oil
Sewage
Tank Bottom Sediments*

Price: $12.80/ton

GROUP "B" WASTE - MEDIUM RISK - BULK

LIGHT INDUSTRIAL WASTE:

Price: $13.50/ton

ACID/ALKALINE WASTE:
Based on concentration

$<5\%$	$ 13.50/ton
5-10%	$ 30.50/ton
10-25%	$ 48.50/ton
25-40%	$ 55.50/ton
$>40\%$	$120.00/ton

EXCEPTIONS: ACID
Based on concentration

HF $\leq$ 5%	$ 55.50/ton
HF $>$ 5%	$120.00/ton
Nitric $<5\%$	$ 30.50/ton
Nitric 5-10%	$ 55.50/ton
Nitric $>10\%$	$120.00/ton

*There are exceptions to this price. One example is Tetraethyl Lead Sludge. TEL is considered extremely hazardous.

559 San Ysidro Road
P.O. Box 5275
Santa Barbara, CA 93108

Business Office 805/969-5897
Site Office 805/937-8449

ODOROUS/HARD TO HANDLE WASTE:

Examples:	Scrubber Waste Sulfur Waste
Price:	$30.00/ton

GROUP "C" WASTE - HIGH RISK

Includes items listed as hazardous wastes as contained in Article 9 of the California Department of Health "Hazardous Waste Regulations".

Bulk (liquid): $60.00/ton

Containerized and solids: $60.00/cubic yard*

GROUP "D" WASTE - EXTREMELY HIGH RISK

Includes items listed as extremely hazardous wastes as contained in Article 10 of the California Department of Health "Hazardous Waste Regulations".

Bulk (liquid): $120.00/ton

Containerized and solids: $120.00/cubic yard**

GROUP "E" WASTE - SPECIAL WASTES

PCB	$300.00/ton
PCB-contaminated Empty Drums	$300.00/cubic yard
Water Reactive	Subject to quotation

ADDITIONAL CHARGES

Wash-out Fee	$50.00/hour
State Hazardous Waste Fee	$ 4.00/ton

*Conversion factor: four 55-gallon drums per cubic yard.

**These categories generally are only accepted containerized, however, subject to technical review, certain exceptions do exist. For assistance in this matter, contact Jim McBride, Director of Technical Services, at (805) 969-5897.

RULES - INFORMATION

1. Minimum Charge - one ton/yard

2. Hazardous Waste - Group B, C, D and E wastes require 24-hour notice. Contact: Site - Nancy Parson at (805) 937-8449 or Business Office - Jim McBride at (805) 969-5897.

3. Hours - oil field and sewage wastes:

   Monday through Sunday, 24 hours daily

   Chemical wastes: Monday through Friday, 7:00 a.m. until 3:00 p.m.

4. All customers will be billed at the end of the calendar month, and all amounts owed will be due and payable 30 days thereafter.

5. All carriers, by their use of the disposal site, accept full responsibility for representations of the type of material deposited and for payment of the same.

6. Special billing procedures may be arranged. Specific written authorization from third parties must be received and approved by Casmalia Resources and credit established before any statements are sent direct to third parties. OTHERWISE, ALL CHARGES WILL BE SENT TO AND BE THE RESPONSIBILITY OF THE TRUCKER - USER.

7. Unauthorized persons are not permitted at the site.

8. Customers who do not abide by the rules set forth will be barred from further use of the facility.

SITE SUPERVISOR: Clifford Ivey

SITE TELEPHONE: (805) 937-8449

BUSINESS OFFICE: (805) 969-5897
(805) 969-5898

Casmalia Resources

CURRENT OPERATIONAL PERMITS

1) U. S. Environmental Protection Agency; Permit for non-liquid PCB disposal, Region IX, dated November 17, 1978

2) U. S. Environmental Protection Agency; Hazardous Waste Activity Identification No. CAD020748125

3) California Department of Health Services; Hazardous Waste Facility Operator's Permit No. 42-001-78

4) California Solid Waste Management Board; Solid Waste Facility Permit No. 42-AA-004

5) California Water Resources Control Board; Waste Discharge Permit No. 80-43

6) California Department of Health Services; Hazardous Waste Hauler Permit No. 250

7) California Highway Patrol; Hazardous Materials Transportation Permit No. 28901

8) Public Utilities Commission; Highway Contract Carrier Permit No. T-136,885

9) Santa Barbara County; Conditional Use Permit Nos. 76-CP-6; 72-CP-30

10) Santa Barbara County; Dump Permit No. 72-CP-67

11) Santa Barbara County Air Pollution Control District; Oil Recovery Permit No. 4109

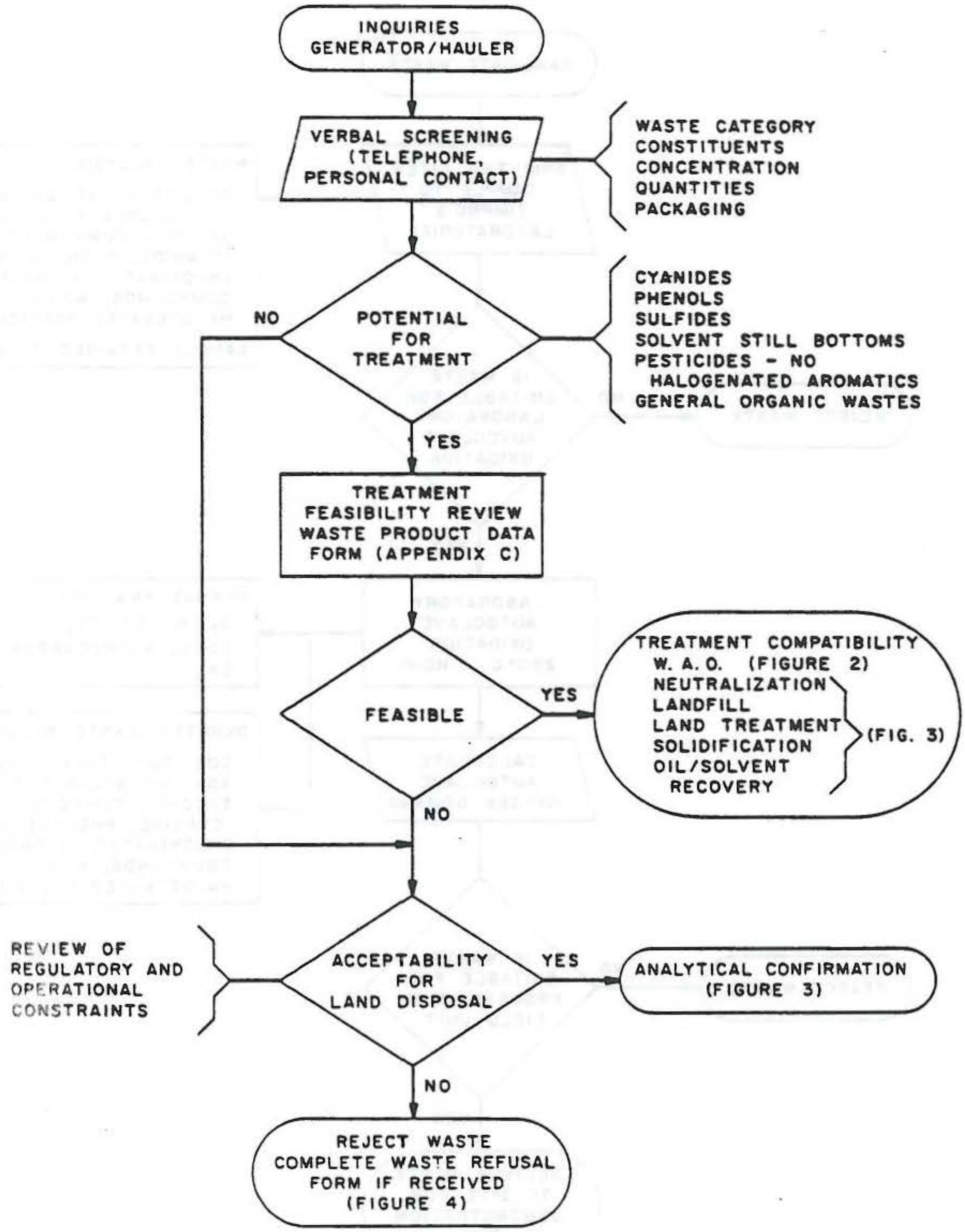
12) Santa Barbara County Air Pollution Control District; Zimpro Wet Air Oxidation Unit Permit Nos. 4693, 4694, 4695, 4696

559 San Ysidro Road
P.O. Box 5275
Santa Barbara, CA 93108

Business Office 805/969-5897
Site Office 805/937-8449

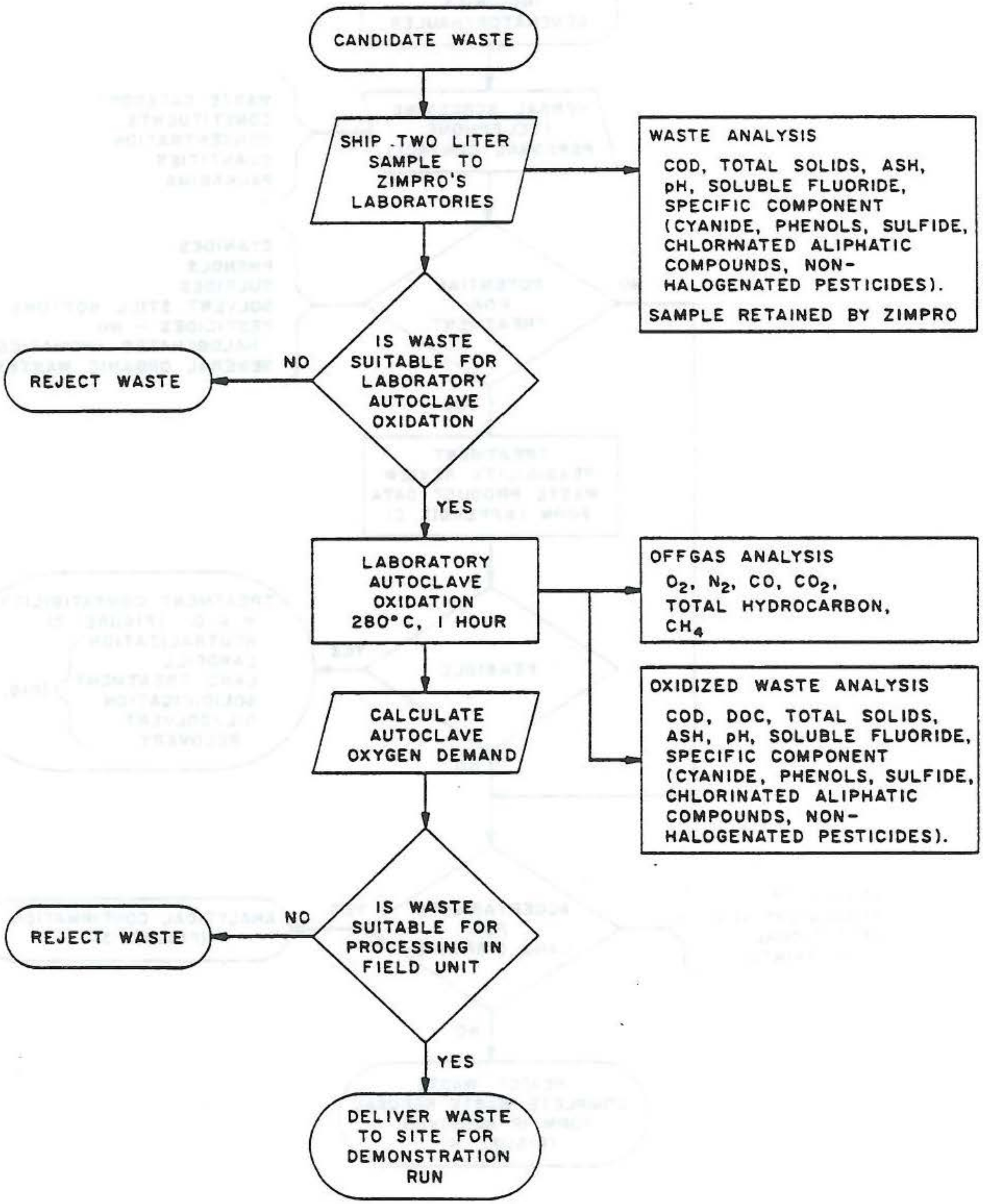
APPENDIX 5.3

WASTE ACCEPTABILITY FLOW CHART



APPENDIX 5.4

SCREENING POTENTIAL WASTES FOR WET AIR OXIDATION FLOW CHART



APPENDIX 5.5

LANDFILL DISPOSAL
ANALYTICAL CONFIRMATION
FLOW CHART

REPRESENTATIVE SAMPLE

↓

QUALITATIVE CHEMICAL SCREEN (APPENDIX A) — FOR PURPOSES OF MANIFEST VERIFICATION

↓

PHASE SEPARATION
CENTRIFUGATION
FILTRATION

GAS PHASE (HEAD SPACE ANALYSIS)	AQUEOUS INSOLUBLE ORGANIC LIQUID PHASE	AQUEOUS PHASE	SOLID/SLUDGE PHASE
GAS DETECTOR TUBES H_2S SO_2 CH_4 R-SH FLAMMABILITY	GENERAL ODOR GENERAL COLOR WATER REACTIVITY CHOLINESTERASE INHIBITORS FLAMMABILITY/FLAME PROPERTIES SPECIFIC GRAVITY HALOGENS SOLUABILITY PEROXIDES RADIOACTIVE PROPERTIES	pH/% CONCENTRATION GENERAL ODOR GENERAL COLOR WATER REACTIVITY CHOLINESTERASE INHIBITORS FLAMMABILITY CYANIDE ARSENIC PEROXIDES HEAVY METALS PHENOLS SPECIFIC GRAVITY TOTAL FILTERABLE RESIDUE SPECIFIC CONDUCTANCE RADIOACTIVE PROPERTIES	pH GENERAL ODOR GENERAL COLOR WATER REACTIVITY CHOLINESTERASE INHIBITORS FLAMMABILITY/FLAME PROPERTIES CYANIDE ARSENIC PEROXIDES HEAVY METALS PHENOLS RADIOACTIVE PROPERTIES

↓

QUANTITATIVE CHEMICAL ANALYSIS (SAMPLE PREPARATION) — SHOULD THE QUALITATIVE SCREEN INDICATE HIGH CONCENTRATIONS OF CONSTITUENTS LISTED ABOVE, THEN A DETAILED ANALYSIS MAY BE REQUIRED. (APPENDIX B)

↓

ATOMIC ABSORBTION/SPECTROPHOTOMETRIC ANALYSIS
GAS CHROMATOGRAPHIC ANALYSIS
SPECTROPHOTOMETRIC ANALYSIS
TITRAMETRIC ANALYSIS
GRAVIMETRIC ANALYSIS
SPECIFIC ION ELECTRODE ANALYSIS

_______________ INSPECTOR

_______________ DATE

APPENDIX 5.6

WEEKLY FACILITY EQUIPMENT INSPECTION RECORD

A check in the status box below indicates that the appropriate piece of equipment is nonoperational. If this is the case, use the remarks column to elaborate further, and if possible, note an approximate date for the equipment's return to service.

EQUIPMENT	STATUS	REMARKS
Caterpillar D8		
Caterpillar D7		
Caterpillar D6		
Caterpillar D6		
Compactor, Cat. 815		
Scraper, Cat. 623		
Loader, Cat. 920		
Loader, Cat. 930		
Grader, John Deere 570		
Backhoe, John Deere JD410		
4X4, Toyota, 1/2 ton		
4X4, Toyota, 3/4 ton		
4X4, Ford, 3/4 ton		
Vacuum Truck, 70 bbl		
Tractor, Peterbilt		
Tractor, Kenworth		
Flatbed, Ford, 2-1/2 ton		
Flatbed, Chevrolet, 1 ton		
Trailer, Flatbed, 30'		
Trailer, Flatbed, 45'		
Van, 45'		
Van, 45'		
Pump, 8X6		
Pump, 4X4 (3)		
Pump, 7-1/2 hp (3)		
Pump, 12-1/2 hp		
Generator, 24 hp		
Generator, 7 hp		
Plow, four bottom		

Figure 1: Weekly Facility Equipment Inspection Record

________________ INSPECTOR

________________ DATE

APPENDIX 5.7

WEEKLY SAFETY EQUIPMENT INSPECTION RECORD

LOCATION	ITEMS	SATISFACTORY (✓)	COMMENTS
Washout #1	Shower		
	Eyewash		
Washout #2	Shower		
	Eyewash		
Shop	J&J First Aid Kit		
	Bullard First Aid Kit		
	Bottle-Eyewash		
	Bottle-Burn Treatment		
	2 Fire Extinguishers		
	10 Vapor Acid/Gas Resp.		
	6 Ammonia/Methyl Resp.		
	2 Bags Dust/Fume Resp.		
	1 Box Pre-filters		
	1 Box Retainers		
	Shower		
Gas Pumps	Fire Extinguisher		
Truck 503	Fire Extinguisher		
Truck 504	Fire Extinguisher		
Truck 507	Fire Extinguisher		
Truck 508	Fire Extinguisher		
Acid/Alk. Ponds	Eyewash		
	Shower		
PCB Pit	Eyewash		
Loading Dock	Eyewash		
	Fire Extinguisher		
Pesticide Pit	Eyewash		
	Fire Extinguisher		
Sludge Pit	Eyewash		
Cyanide Pit	Eyewash		
Acid Pit	Eyewash		
Lab	Fire Extinguisher		
	J&J First Aid Kit		
	Bottle Burn Treatment		
	Shower		

Figure 2: Weekly Safety Equipment Inspection Record

_______________ INSPECTOR

_______________ DATE

APPENDIX 5.8

WEEKLY FACILITY INSPECTION RECORD

A check in the status box below indicates that the appropriate facility item is nonoperational. If this is the case, use the remarks column to elaborate further, and if possible, note an approximate date for the item's return to service.

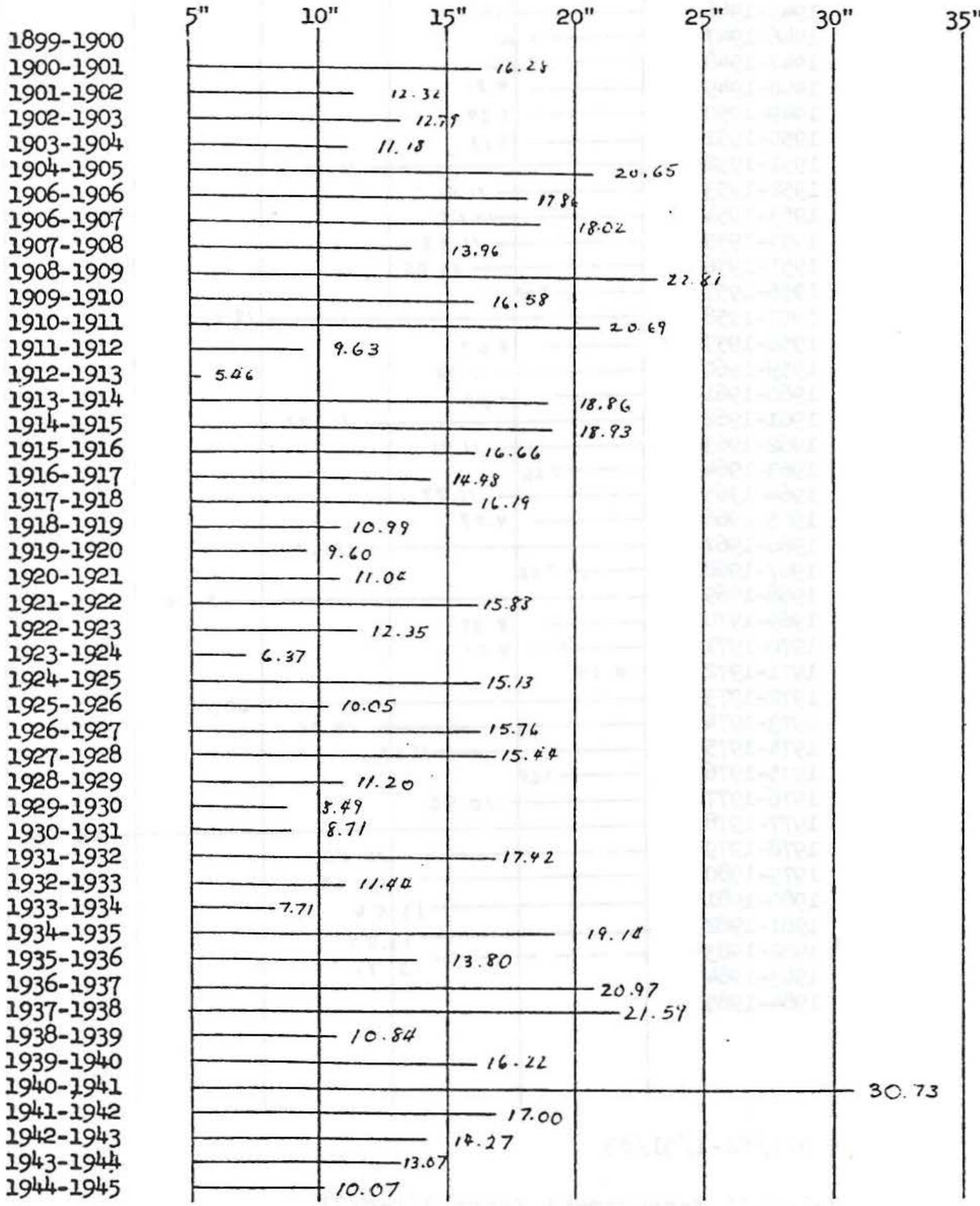
ITEM	STATUS	REMARKS	ITEM	STATUS	REMARKS
PONDS:	/////		LANDFILLS:	/////	
A			PCB's		
B			Solvents/Pesticides		
C			Heavy Metals		
D			Alkaline/Cyanide		
E			Acid		
J			Trench 8		
L					
M					
P					
R					
S					
T			SECURITY:	/////	
V			Perimeter Fencing		
*1			Radio		
2			Telephone		
3			Signs		
4			Lighting		
5					
6					
7					
8					
9			FACILITIES:	/////	
10			Loading Dock		
11			Roads		
12			Embankments		
13			Barriers		
14			Dikes		
*15			Washout Racks		
16			Discharge Ramps		
17			Disposal Wells		
18			Water Tanks		
*19			Oil Recovery		
			Scale		

*Number not allocated

Figure 3: Weekly Facility Inspection Record

APPENDIX 15.9

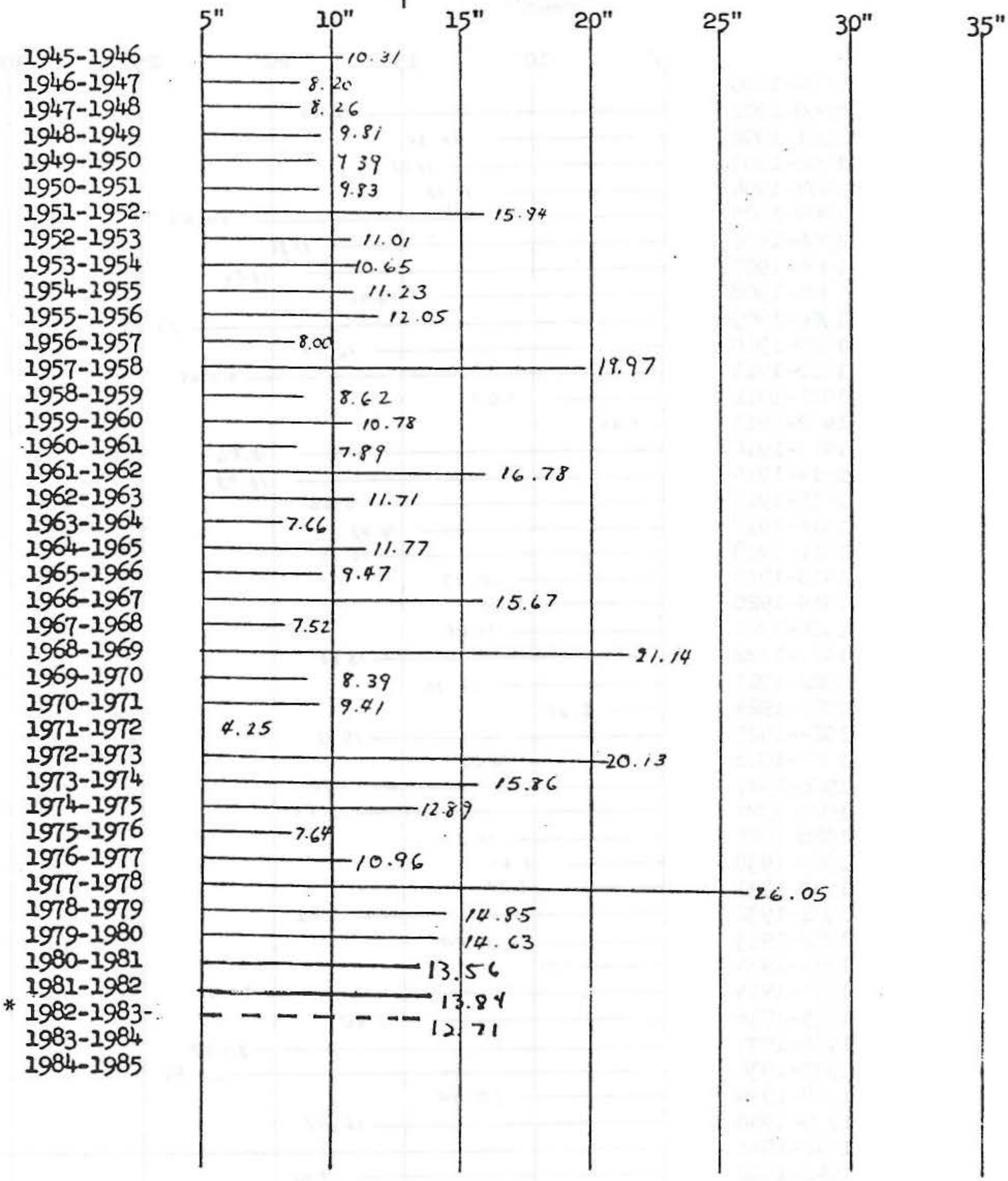
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE



Seasonal Rainfall for Santa Maria
City of Santa Maria Cooperative Station 1906-1943
Weather Bureau Airport Station 1943 on

PAPENDIX 5.9

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE



* 9/1/82-1/31/83

Rainfall Measurement Year= 9/1-8/31

APPENDIX 5.10 : 100 Year Rain Values

Rainfall Data from Phil Holland, Santa Barbara County Flood Control District

Los Alamos side--Las Flores Ranch elev 650'

11 year record Coordinates of Township 0 9'NO

Range 33'W

Latitude 37.83

Longitude 120.33

100 year amounts/values

6 hr.	100 yr	3.07 in
3 hr.	100 yr	2.25 in
2 hr.	100 yr	1.85 in
1 hr.	100 yr	1.33 in
30 min	100 yr	1.01 in

Santa Maria Airport elev 238'

34 year record latitude 34.900

longitude 120.450

100 year amounts/values

6 hr	100 yr	2.9in
3 hr	100 yr	2.11 in
2 hr	100 yr	1.69 in
1 hr	100 yr	1.14 in
30 min	100 yr	.08 in

APPENDIX 5.11

FEDERAL

CASMALIA CORRESPONDENCE CHRONICLE

DATE	TO	/ FR	RE:
11/30/82	Les Conrad	Rita Lavelle EPA, D.C.	Overview of regulatory bodies; assurances of site safety; referred to EPA Region IX for further questions
2/10/82	Wm. Wilson Haz. Mat. Branch EPA, IX	McBride, CR	WAO process proposal
10/2/81	Lew Dunn	Francis Ludwig USAF	Report of negative water tests
8/26/81	Les Conrad	Wm. Pierce Permits EPA, IX	Re: Casmalia disposal withdrawal of expansion request & cancellation of public hearing
7/6/81	Lew Dunn	Congressman Robert Lagomarsino	Re: Largomarsino's meeting with Dunn, Myoshi; Lagomarsino's site tour & assurances of no H_2O contaminants
7/6/81	Les Conrad	Lagomarsino	Follow up letter to meeting
6/1/81	Wm. Pierce EPA, IX	Lew Dunn	Requests no more PCB deposits & airs Casmalia community concerns
6/11/81	Public Notice PCB 003-81 EPA		Request public response for PCB disposal at Casmalia disposal

DATE	TO /	FROM	RE:
6/81	McBride	Sheila Prindiville EPA IX Act. Admin.	Letter of approval for expanded PCB disposal
12/30/80	Clyde Eller EPA, IX	Norman Caldwell Consultant	Support for expanded PCB proposal
11/26/80	EPA Enforcement Division	McBride CR	Revisions to Casmalia operations plan
10/23/80	Raymond Sheid EPA, IX	McBride CR	Request to expand PCB disposal area
3/27/80	McBride CR	EPA, IX Paul DeFalco Region Admin	Approval of amendment (3/24/80) to 1978 approval to accept PCBs
1/31/80	McBride CR	DeFalco EPA, IX	Amendment to operations due to Federal Register changes of 5/31/79
5/31/79	Federal Register Vol. 44 No. 106		Part VI - PCB's Criteria Modification

APPENDIX 5.11

STATE
CASMALIA CORRESPONDENCE CHRONICLE

DATE	TO	FROM	SUBJECT
11/12/81	Gary Hart	Jan Denton Dir. Calif. Dept. of Conservation	Davis (State geologist) review of Casmalia site; recommends additional lab & field tests necessary to conclusively demonstrate acceptable permeability rates.
11/12/81	Jan Denton	James Davis State Geologist	Davis' Report to Denton/later forwarded to Hart (see above)
10/22/81	Pamela Allen	Stahler DHS	Response to concern about sulfides in site (no backup)
10/19/81	Gary Hart	Jan Denton Dept. of Conservation	Update on Gary's request; response in progress
8/14/81	Les Conrad	Bev O'Gorman	Meeting announcement - for 8/21 meeting with Peter Rogers, DHS Chief Hazardous Waste Mgmt
8/14/81	Michael Kiado	Elgar Stephens DOHS Geologist	Report of field trip to Casmalia 8/4/81 to view bottom of trench being excavated for cutoff dam
7/10/81	Jim Stahler DHS	via Peter Rogers Michael Kiado DHS	Rec order to Casmalia to use clayey surface material for daily cover (no attached memo)
7/1/81	Lago-marsino	Ken Jones	Assurances about containment and quality of water in and around Casmalia
6/23/81	To Whom It May Concern	Wm. Deneen AHC/Bio	AHC biologist warns of later use of site for agricultural use & suggests alternative toxic disposal methods

DATE	TO	FROM	SUBJECT
6/4/81			Advertising order
5/26/81	McBride	Chambers, DHS	Notification of info request about site by third party (unidentified) - opportunity for McBride to protect "trade secrets"
4/29/81	Conrad	Hart	Informing about DHS jurisdiction & information of Assembly Committee on Consumer Protection & Toxic Materials
10/29/80	State Health & Welfare		Quantities & types of wastes disposed Casmalia calendar year 1979
11/10/80	Clark EHS	Eric Workman DHS	Waste received in state & 1979 Casmalia
10/7/80	Baldridge CRWQCB	McBride	Request to construct barrier on west side of existing PCB pit (exhibits missing)
9/26/80	Ken Jones CRWQCB	Ken Hunter	Hunter response to CRWQCB 8/22/80 concerns about proposed westerly expansion of site (re: permeability of Sisquoc Formation)
8/22/80	Hunter	Jones	Questions about westerly expansion of site (rainfall & permeability tests)

DATE	TO / FROM		SUBJECT
6/6/80	Incident Report		Highway 1; crude oil spill
4/5/80	Incident Report		Highway 1; three bags of dusting sulphur dropped on roadway
2/18/80	Incident Report		Highway 166 & Bell Road; tanker truck rollover (oil company; no chemical identified)
2/16/80	Incident Report		Highway 101/Buellton; crude oil from tanker spilled onto drainage systems
2/12/80	Incident Report		Fuel spill 515 Jasmine Lane
1/28/80	Incident Report		101 & Old Coast Highway; mixture of unknown hazardous materials
11/14/79	Nelson Calif. Dept. Health	McBride	1979 Hydrological Balance Report
8/9/79	Nelson Calif. Dept. Health	McBride	Amendments to Casmalia Operational Plan responding to Dept. of Health's 8/6-7/79 evaluation

DATE	TO	/ FROM	SUBJECT
6/2/78	Hunter	CRWQCB Jones	Response to Casmalia 2/78 "Emergency Discharge" Report Request for Remedial Action
2/17/78	Hunter	Jones	Strict letter demanding discharge abatement; request for Casmalia site comprehensive report by 3/10/78
2/17/78	Scherer VanVoris Leonard K. Jones CRWQCB	Jankanski	Internal memo re: discharge into drainageways
2/14/78	Scherer VanVoris Leonard K. Jones CRWQCB	Vern	Internal memo re: pump failure report leading to 2/10/78 spillage into drainageway; recommend enforcement action
2/7/78	Hunter	Jones	Acknowledgement of receipt of 1/19/78 letter and of 1/16 spillage
1/19/78	Jones	Hunter	Report of 1/16/78 emergency situation
2/14/76	Casmalia	Jones	Notification of violation of waste discharge requirements report requested by 5/4/76
10/6/75	Jones CRWQCB	Muscio	Objection to easterly expansion of Casmalia site - dump closure, good chronolgy of incidents 3/15/73-1/25/75

DATE	TO /	FROM	SUBJECT
3/31/75	Hunter	Jones	3/19/75 routine inspection noting waste discharge violations; request immediate action & report by 4/28/75
12/11/73	Hunter	Jones	Record of numerous violations: waste discharge; Casmalia Operating Plan, threaten Cease & Desist Order
11/21/73	Wm. Leonard CRWQCB	Al Franks, Geologist, State Water Resources Control Bd	Memo Re: 11/13/73 site visit; cites many operational problems & recommends correction by operator
10/2/73	Vernon Bush SB Co Pub Works	K. Jones CRWQCB	Notification of wastewater spillage from collection gallery
9/7/73	Jones CRWQB	Franks Geologist	Report on inspection tour to determine progress on "winterizing" site; suggest water tests of collection gallery samples

APPENDIX 5.11

SANTA BARBARA COUNTY
CASMALIA CORRESPONDENCE CHRONICLE

DATE	TO	/ FROM	SUBJECT
2/8/83	Editor	Les Conrad	About success at B of S about H_2O test request
1/31/83	B of S	Larry Hart Health Services	Cost & program to monitor wells surrounding site
1/17/83	B of S	County Counsel	Legal overview of whose jurisdiction it is to test
1/10/83	B of S	Les Conrad	Request for water monitor
11/30/82	Les Conrad	Rita LaVelle	Reassurance letter; reference to other agencies EPA IX & CRQCB
9/21/82	B of S	Larry Parrish A.O.	Response by department to 1981-82 Grand Jury rec's RE: County Jurisdiction over Casmalia
9/16/82	Ron Gilman County Agric. Commission	Earl Margitan Cal DHS Haz. Mat. Mgmt.	Return of Casmalia site to normal grazing
6/82	B of S	GJ Health & Toxic Waste Committee	Study Area - Casmalia preliminary finding (missing pages 92-98)
7/30/81		Les Conrad	Letter to Editor about "negligence" of 1980-81 Grand Jury work on Casmalia
6/30/81	B of S	Al Reynolds Resource Mgmt.	Re: Congruence with General Plan -

DATE	TO	/ FROM	RE:
6/23/81	To Whom It May Concern	Wm. Deneen AHC/Biologist	Warn about use of site later for agricultural use
6/81	Haz. Mat. Trans Task Force		Report Rec's
5/4/81	Hunter	Breckenbridge SB Co. Public Works	Request for building permit denied because of use w/i existing disposal site; refer to County Planning (amendment to CUP)
4/1/81	Britt Johnson Planning	Charles King Chief Planning Staff	Internal memo - re: sketchy files kept on Casmalia
3/31/81	Al Reynolds Dept. Resource Mgmt.	Wm. Ellis Grand Jury Chair	Requests for info/files on Casmalia for Grand Jury use; attachment is internal memo chronicling County-Casmalia contact
8/7/79	Hunter	B. Johnson Planning S.B. County	Re: proposed Casmalia expansion will require a new CUP, not an amendment of 76/CP-6
7/19/79	Diane Kobayashi SBC EH	McBride	Inability to inspect Casmalia Resources 7/11/79
7/11/79	B. Johnson	Hunter	Expansion request (w/o enclosures) (westerly)
6/1/79	Minutes Ag. Pres. Comm.		Questioned compatibility of facility with agricultural preserve
6/30/76	B. Johnson	Hunter	Cover letter & copies of 76-CP-6 Permit (dated 6/23/76) (Amended CUP) supercedes 72-CP-67
6/25/76	B of S	B. Johnson	Report of Planning Commission action on Hunter request

DATE	TO	/ FROM	RE:
6/9/76	Staff Report for Planning Commission		Expansion of CUP 76-CP-6
6/4/76	Agricultural Preserve Advisory Committee		Minutes of meeting; Watson representing Casmalia on expansion request; passes
6/1/76	SBC Planning Commission	Ted Muscio	Objection to facility expansion
4/16/76	Britt Johnson Office of Environmental Quality	Al Reynolds	Attached Negative Declaration (76-ND-18) for Casmalia (ND dated 3/29/76) (after 4/15/76 Planning Commission public hearing)
9/29/75	Short form land conservation contract		Designation of Casmalia as "Casmalia Disposal Agricultural Preserve" (75-AP-2) (75-RZ-2) effective 1/1/76 (good list of past board actions 11/71-10/74)
11/2/72	B. Johnson Planning Director	Norm Caldwell Public Works Director	Support for CUP for Casmalia reference to support letter attached from K. Jones RCWQC (not included)
9/15/72	Jones CRWQCB	Carl Kraemer A. Planning Director	Cover letter to copy of CUP going to Casmalia for RWQCB review/ acceptance condition upon RWQCB certification of Casmalia operating plan as in compliance with RWQCB regulations
8/31/72	CUP 72-CP-30		Permit(s) for Casmalia Disposal Facility
8/14/72	B of S Hunter Appeal		Board minutes; Board overturns Planning Commission Denial; grants CUP 72-CP-30
8/8/72	Staff report for Planning Commission		For 8/2/72 meeting

DATE	TO	/ FROM	RE:
8/7/72	B of S	Hunter	Appeal letter
7/19/72	B of S	Kraemer Asst. Director Planning	Progress report on GP amendment
7/19/72	Planning Commission public hearing		Minutes of work in progress/ testimony; develop conditions for revised conditional use permit 72-CP-67
7/17/72	B of S minutes		Recommend amendment to Agricultural Preserve Uniform Rule, thereby making Hunter Class I Disposal Facility compatible
7/3/72	Actual Hunter application		
6/19/72	B of S hearing		Minutes: Hunter appeal of Planning Commission's 5/17/72 denial CUP 72-CP-30; B of S grants permit; continuance
6/14/72	B of S	Planning Commission Report of Action	Back up for 5/17 denial; submitted for 6/19 B of S hearing
6/14/72	Announcement of 7/19/72 Planning Commission hearing on 72-CP-67		
5/19/72	B of S	Petitioners	Pro: override of Planning Commission disapproval of CUP 72-CP-67
5/18/72	B of S Clerk of Board	Hunter	Hunter request for appeal of Planning Commission before B of S
5/18/72	Notice of Public Hearing		5/19/72 Public Hearing

DATE	TO /	FROM	RE:
5/15/72	Staff Report for Planning Commission		Hunter Waste Disposal Facility Conditional Use Permit 72-CP-30 Rec continuation of hearing until Agric. Preserve meets 6/2 & determines compatibility
5/15/72	Agric. Preserve Committee Meeting		Minutes - continue discussion at 6/2/72 meeting; refer to County Counsel
4/1/72	Britt Johnson	Hunter	Cover letter to 10 copies of application for conditional permit

Appendix 5.12

Casmalia Resources References

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Miller, David, Geohydrological Surveys at Chemical Disposal Sites, from Assessment of Health Effects at Chemical Disposal Sites Symposium, Rockefeller University, June 1-2, 1981.

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