

SOLID WASTE ASSESSMENT TEST
SWAT
GUIDANCE

OCTOBER 1986

PREPARED BY
STATE WATER RESOURCES CONTROL BOARD

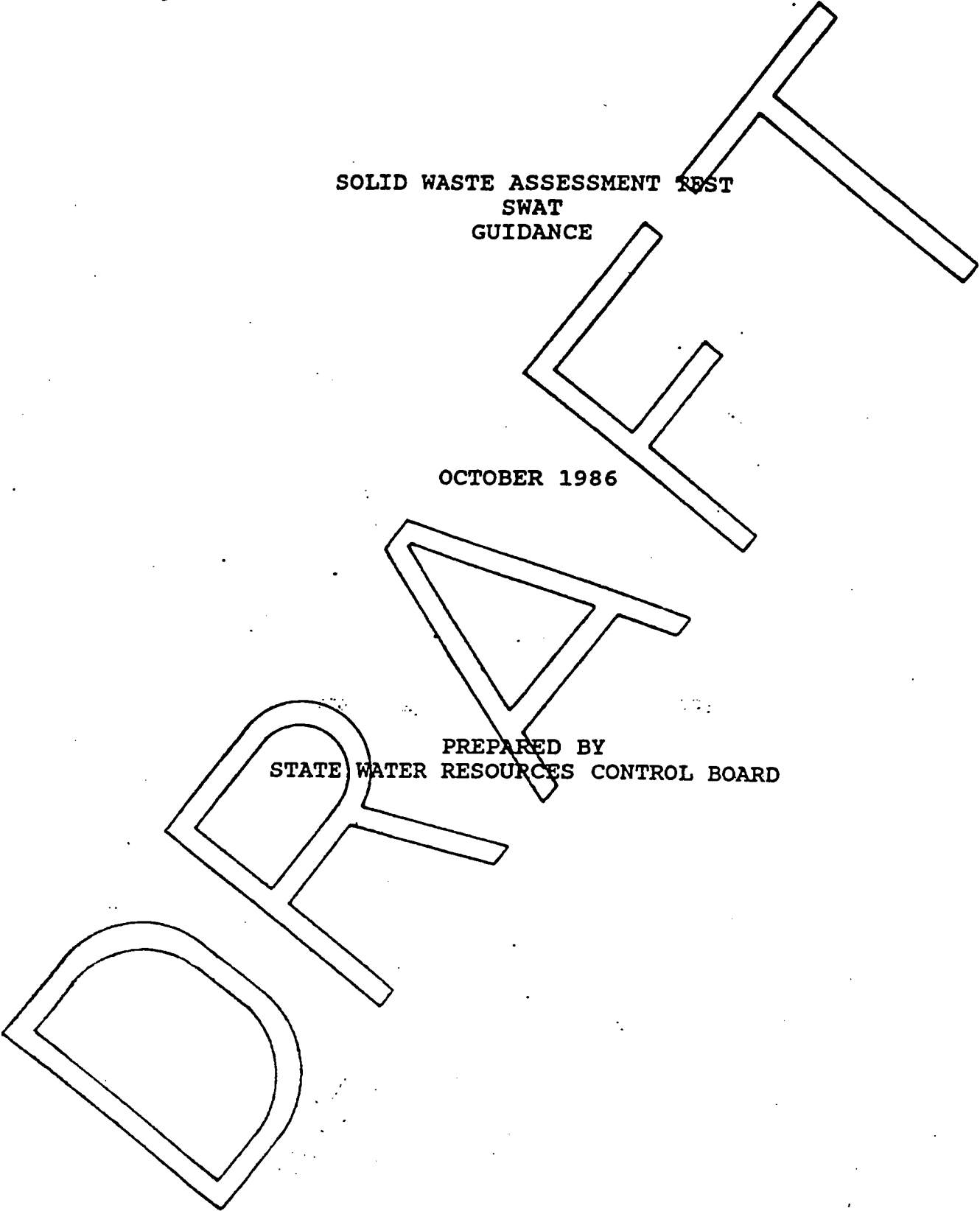


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INTRODUCTION

In 1984, Section 13273 was added to the Water Code by Assembly Bill (AB) 3525. This section required the State Water Resources Control Board (State Board) to rank the approximately 2,100 active and inactive solid waste disposal sites throughout the state on the basis of the potential threat they may pose to water quality. The State Board approved a ranked list of solid waste disposal sites in December 1985 and revised it in September 1986. Annual revisions are anticipated to occur every September for the duration of this list. The list contains 13 ranks with 150 sites per rank, and an incomplete Rank 14. Revisions to the original December 19, 1985 list were necessary to meet Regional Water Quality Control Board (Regional Board) water quality objectives.

The purpose of this guidance document is to explain and summarize how to combine relevant sections of the Administrative Code, Title 23, Subchapter 15 and/or the Water Code necessary to comply with Water Code Section 13273. No new regulatory authority is necessary for the Solid Waste Assessment Test (SWAT) Program. Existing Water code and Subchapter 15 sections provide the prerequisite authority for the State Board to implement the SWAT Program. The major difference between the SWAT Program and Subchapter 15 is that once a SWAT report is completed by the disposal site operator and reviewed and accepted by the appropriate Regional Board, the requirements of Water Code Section 13273 have been met (i.e., identification of hazardous waste migration into water or soil) in contrast to Subchapter 15 which requires continuous monitoring. If a disposal site is found to be polluting surface or ground water through a SWAT investigation, enforcement action will be undertaken pursuant to existing authority within the Water Code and Subchapter 15.

The operators of the 150 disposal sites in Rank 2 are required to submit a SWAT report to the appropriate Regional Board on or before July 1, 1988. Section 13273 of the Water Code requires that the SWAT report contain:

- o an analysis of the surface and ground water, on and under, within one mile of a solid waste disposal site to provide a reliable indication whether there is any leakage of hazardous waste, and
- o a chemical characterization of the soil-pore liquid in those areas which are likely to be affected if the solid waste disposal site is leaking as compared to geologically similar areas near the solid waste disposal site which have not been affected by the leakage or waste discharge.



Hazardous Waste Testing
Laboratory

The SWAT report is required to be certified by either a registered Civil Engineer, a registered Geologist, or a certified Engineering Geologist pursuant to Sections 6762, 7842, and 7850 of the Business and Profession Code. The certifier is additionally required to have a minimum of five years experience in ground water hydrology. The analytical laboratory performing the chemical analysis must be a Hazardous Materials Laboratory certified by the California Department of Health Services to perform hazardous waste analysis.

Disposal site operators with active sites on the State Board's ranked list may also wish at this time to comply with the State Board's regulations "Discharge of Waste to Land," found in California's Administrative Code, Title 23, Chapter 3, Subchapter 15. In such cases, they should comply with relevant sections of Subchapter 15 in addition to the material required under this guidance. Disposal site operators should contact their Regional Boards for specific information on Subchapter 15 compliance. Disposal site operators in the process of implementing Subchapter 15 requirements will find that most of their SWAT Program requirements will have been satisfied with their Subchapter 15 efforts. In these cases, the required SWAT will summarize the ongoing Subchapter 15 efforts and report on the specific hazardous waste test results required by the Regional Board.

Section 13273(d) of the Water Code reads as follows:

"The regional board shall examine the report submitted pursuant to subdivision (b) and determine whether the number, location, and design of the wells and the soil testing could detect any leachate buildup, leachate migration, or hazardous waste migration. If the regional board determines that the monitoring program could detect the leachate and hazardous waste, the regional board shall take the action specified in subdivision (e). If the Regional Board determines that the monitoring program was inadequate, the Regional Board shall require the solid waste disposal site to correct the monitoring program and resubmit the solid waste assessment test based upon the results from the corrected monitoring program (underlined for emphasis)."

In order to minimize the necessity of repeating a SWAT test, the SWAT consists of two phases, a SWAT proposal and a SWAT report. The initial SWAT submittal should be made to the appropriate Regional Board on or before the proposal deadline corresponding to the ranking of the site as shown on Table 1. The initial submittal shall consist of the SWAT proposal outlined in this guidance. The schedule depicted in Table 1 is intended to

prescribe sufficient time for completion of the entire SWAT effort. Two key elements are included in this consideration. First is adequate time for Regional Board review and concurrence with the initial SWAT proposal (about 60 days), including our allowance for any necessary revision to the initial SWAT proposal. Second is actual implementation of an accepted SWAT proposal to meet the appropriate July 1 deadline, established by Water Code Section 13273, for the SWAT report.

Table 1

SCHEDULE FOR SOLID WASTE DISPOSAL SITE
SOLID WASTE SWAT ASSESSMENT TESTS

RANK	ASSESSMENT PERIOD	PROPOSAL DEADLINE	REPORT DEADLINE
1	1986	July 1, 1986	July 1, 1987
2	1987	April 1, 1987	" 1988
3	1988	" 1988	" 1989
4	1989	" 1989	" 1990
5	1990	" 1990	" 1991
6	1991	" 1991	" 1992
7	1992	" 1992	" 1993
8	1993	" 1993	" 1994
9	1994	" 1994	" 1995
10	1995	" 1995	" 1996
11	1996	" 1996	" 1997
12	1997	" 1997	" 1998

Information required to be contained in both the SWAT proposal and the SWAT report is outlined starting on page 5 of this guidance material. All references contained in this guidance, unless otherwise noted, refer to code sections found in Title 23, Subchapter 15 of the Administrative Code.

Information contained in the SWAT proposal and SWAT report is desired in clearly written, tabular, and graphic formats as appropriate. Plans, diagrams, and other illustrations should be prepared to convenient, readable scale. Maps and sections should all be at the same scale where possible for easy cross reference. If a report submitted by an operator refers to another source, the relevant information from that source shall be referenced (Section 2595(b)).

For those sites where hazardous wastes are known to be leaking because of existing monitoring programs or other available information, the operator may apply to the appropriate Regional Board for a waiver to the SWAT requirements. The request for a waiver should include all the information in Section I of the SWAT proposal of this guidance, and Section V of the SWAT report of this guidance.

The Water Code provides for the assessment of penalties if either the SWAT proposal or SWAT report are submitted to the Regional Board after their due date. Sections 13267 and 13268 of the Water Code will be used to enforce compliance of the SWAT Program. Civil liabilities will be assessed site operators at the rate of up to \$5,000 per day if hazardous waste is not leaking from the disposal site, and up to \$25,000 per day if hazardous waste is leaking from the disposal site for each day the SWAT reports are late. Since the Legislature enacted the SWAT Program and specified the SWAT due date by law, the State Board is powerless to grant time extensions. Therefore, we recommend timely submittal of SWAT proposals and SWAT reports to avoid substantial penalties.

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SWAT PROPOSAL

I. Introductory Data

- A. Site Name (including previous names and aliases).
- B. Operator and Owner (including previous operators and owners names, mailing addresses, and telephone numbers).
- ITEM 1 → C. Site location. Include map showing relationship to highways and nearby communities which specifies:
 - 1. Street address if available, or general location.
 - 2. Township, range, section, and fractional section.
 - 3. County Assessor's parcel number(s).
- D. Describe whether the site is/was open to the public, or is/was for private use only.
- ITEM 2 → E. Explain any present enforcement orders or administrative civil liability complaints.
- F. The following information shall be included for closed sites:
 - 1. Date closed.
 - 2. Description of final treatment closure procedures which were used for the wastes in the waste site.
 - 3. Description of final cover and other closure related improvements.
- ITEM 3 → G. Provide certification by a qualified person as to accuracy and completeness of the SWAT proposal, report, or waiver together with a statement of their qualifications, including certifier's signature and Registration(s) or Certificate Number(s) (Water Code Section 13273(b)).

II. Site Information

- ITEM 4 → A. Operators who operate classified waste sites pursuant to Section 2596(a)(1) shall submit detailed construction and as-built plans, specifications, and descriptions for all liners, containment structures, leachate collection

and removal system components, leak detection system components, precipitation and drainage control facilities, and interim covers which have been installed or used at each site. Operators shall submit a description of and location for ancillary facilities including roads, waste handling areas, buildings, and equipment cleaning facilities.

- B. For any site having a leachate collection and removal system, recent analyses, pursuant to Section 2557, shall be submitted with the SWAT proposal. In addition to standard physical and chemical parameters (i.e., pH, Temp, E.C.), a pollutant scan using EPA methods 601 and 602 or EPA methods 624 and 625, ICP metals, and AA should be included. The Regional Board will specify which EPA methods are to be utilized. For EPA methods 601 and 602, laboratory orders should request that all peaks be reported. If unidentified peaks are present, EPA test method 624 should be run to identify the peaks. As a minimum, the following substances should be reported from ICP metals procedure: Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, K, Ag, Se, Na, Tl, V, and Zn. Due to the limited detection limits of the ICP metals method for Hg and Se, it is preferred the AA method be used to analyse for Hg and Se. If deemed appropriate, analysis for acetone and methyl ethyl ketone should also be made. Any other chemical data required by the Regional Board should be included.

ITEM 5 → III. Solid Waste Assessment Monitoring Proposal

All monitoring wells shall be constructed in a manner that maintains the integrity of the drill hole and prevents cross-contamination of saturated zones. The monitoring wells shall be in full compliance with Section 2555(c & d).

- A. Operators shall submit to the Regional Board detailed plans and equipment specifications for compliance with the surface water, ground water, and unsaturated zone monitoring requirements with their proposal. When leachate analyses are not available from a leachate collection and removal system, the SWAT proposal shall provide a means for leachate sampling and analysis. Site operators shall provide technical support which includes rationale for the spatial distribution and depth of ground water and unsaturated zone monitoring facilities and for the design of monitoring equipment (Section 2596(a)). Where justified by a qualified opinion and the concurrence of the local Regional Board,

the possible waiver of some monitoring requirements (i.e., no vadose zone, ground water at excessive depths) and monitoring facilities will be considered. This report shall be accompanied by:

1. a map showing the locations of proposed monitoring facilities.
2. drawings and data showing construction details of proposed monitoring facilities. These data shall include:
- a. casing and test hole diameter.
 - b. casing materials (PVC, stainless steel, etc.).
 - c. depth of each test hole.
 - d. size and position of perforations or screens.
 - e. method and joining sections of casing.
 - f. nature of filter material.
 - g. depth and composition of seals.
 - h. method and length of time of development.
3. specifications, drawings, and dates for location and installation of unsaturated zone monitoring equipment.

B. The detection monitoring program shall be designed to detect the presence of waste constituents in surface water or ground water immediately outside of or under the waste site (Section 2556(a), and Water Code Section 13273(b)).

C. The water quality monitoring program shall include consistent and appropriate sampling and analytical procedures that accurately measure the chemical characterization of background water quality and waste constituents to provide a reliable indication of the impact of the disposal site on water quality (Section 2555(e)). As a minimum, the program shall include procedures and techniques for:

- 1. sample collections.
- 2. sample preservation and shipment.
- 3. chain of custody control.
- 4. analytical procedures. The program shall include a pollutant scan including EPA methods 601 and 602 and/or 624 and 625. ICP metals, and, if deemed appropriate, analyses for acetone and methyl ethyl ketone. The Regional Board will specify which EPA methods are to be utilized. Laboratory orders should request that all peaks be reported. If

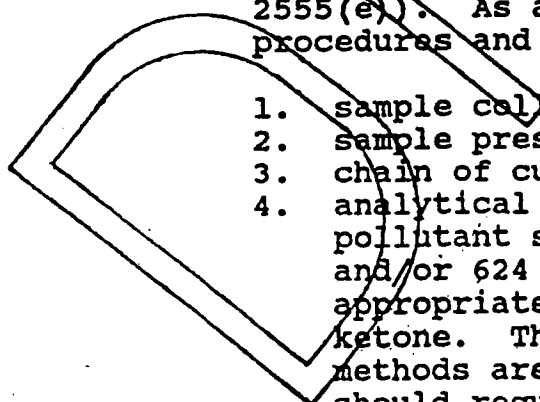
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unidentified peaks are present with EPA methods 601 and 602, EPA method 624 should be run for identifying the unknown peaks. As a minimum, the following substances should be reported from the ICP metals procedures: Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, K, Ag, Se, Na, Tl, V, and Zn. Due to the limited detection limits of the ICP metals method for Hg and Se, it is preferred the AA method be used to analyse for Hg and Se. Standard physical and chemical parameters (i.e., pH, Temp, E.C.) should be included as well as tests for TDS (105°C), COD, Cl_2 , and NO_3 . Any other chemical data required by the Regional Board should be included.

D. Procedures for obtaining background water quality are outlined below:

1. Background water quality shall be based on data from quarterly sampling upgradient from the waste disposal facility for one year, if available. These analyses shall (Section 2595(g)(7)):
 - a. account for measurement errors in sampling and analyses.
 - b. account for seasonal fluctuations in background water quality, if such fluctuations are expected to affect the concentration of hazardous constituents.
2. Background water quality may be based on appropriate water quality data that are available in lieu of one-year analyses (Section 2595(g)(7)).
3. Background water quality of ground water may be based on sampling of wells that are not upgradient from the waste management unit where (Section 2595(g)(7)):
 - a. hydrogeologic conditions do not allow for sampling in the upgradient direction.
 - b. sampling at other wells will provide a representative indication of background water quality.
4. In developing the data base used to determine a background value in ground water, the site operator shall take a minimum of one sample from each well used to determine background. A minimum of four samples shall be taken from the entire system used

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to determine background water quality, each time the system is sampled. Should there be only one background well, the four consecutive samples shall be obtained from the one well and separate analyses for each sample shall be conducted (Section 2595(g)(7)).

The unsaturated zone monitoring program shall be designed to detect waste constituents which may escape from waste sites before such constituents reach ground water (Section 2559(a)).

The unsaturated zone monitoring system shall include a sufficient number of monitoring points at appropriate locations and depths to represent the background soil-pore liquid quality that has not been affected by leakage from the disposal site, as well as soil-pore liquid in locations that are most likely to have been affected by seepage from waste disposal facilities (Section 2559(b)).

Item 10 → (F)
Item 11 → (G)

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SWAT REPORT

I. Site Characteristics

- A. Provide in the report an analysis describing how the ground and surface water have affected or may affect the waste site, and how the site has or may affect ground and surface water (Section 2595(a)).
- B. Provide a topographical map of the disposal site and its surrounding region within one mile of the site showing elevation contours, natural ground slopes, drainage patterns, and other topographic features (before and after disposal site construction, if possible) (Section 2595(d)).
- C. Geology
 1. Provide a geologic map and geologic cross-sections of the waste disposal site showing lithology and structural features. Cross-sections shall be indexed to the geologic map and shall be located to best portray geologic features relevant to the discharged waste. Scales should be consistent with other site cross sections for purposes of comparisons (Section 2595(f)(1)).
 2. Describe the natural geologic materials beneath the waste site and its surroundings, including identification of rock types, nature of alteration depth and nature of weathering, compatibility of wastes and geologic materials, continuity and lateral extent of formations, and all other pertinent lithologic data (Section 2595(f)(2)).
 3. Describe the geologic structure of the waste site including the attitude (strike and dip) of bedding (if any); thickness of beds (if any); the location, attitude, and condition (tight, open, clay or gypsum filled, etc.) of any fractures; the nature, type (anticlinal, synclinal, etc.), and orientation of any folds; the location, attitude and nature (tight, gouge-filled, etc.) of any faults; and all other pertinent structural data (Section 2595(f)(3)).

D. Hydrology

1. Evaluate the water-bearing characteristics of the natural geologic materials identified under subsection (C)(2) of this section including delineation of all ground water zones and basic data used to determine the above (Section 2595(g)(1)).
2. Evaluate the on-site permeability of soils immediately underlying the disposal site in accordance with Section 2595(g)(2).
3. Evaluate the perennial direction(s) of ground water movement within the uppermost ground water zone(s) within one mile of the disposal site perimeter. Include a ground water table map clearly delineating the ground water flow regime (Section 2595(g)(3)).
4. Provide a map showing the location of all springs in the disposal site and within one mile of the perimeter. The map shall be accompanied by tabular data indicating the flow and the mineral quality of the water from each spring (Section 2595(g)(5)).

E. Land and Water Use

1. Provide a map showing the locations of all monitoring wells, water wells, oil/gas wells, geophysical exploration wells, and geothermal wells in the disposal site or within one mile of its perimeter (Section 2595(h)(1)).
2. List the name and address of the owner of each well located in subsection (E)(1) (Section 2595(h)(2)).
3. Provide well information where available for each well indicated in subsection (E)(1) of this section including, but not limited to (Section 2595(h)(3)):
 - a. total depth of well.
 - b. diameter of casing at ground surface and at total depth.
 - c. type of well construction (cable-tool, rotary, etc.).
 - d. depth and type of perforations.
 - e. name and address of well driller.
 - f. year of well construction.
 - g. use of well (agricultural, domestic, stock watering, etc.).

- h. depth and type of seals.
 - i. lithologic, geophysical, and other types of well logs, if available.
 - j. water levels, pump tests, water quality, and other well data, if available.
 - k. annular packing materials and intervals.
 - l. abandonment methods, if applicable.
4. Describe the current land use within one mile of the perimeter of the disposal site (e.g., residential, commercial, industrial, agricultural, recreational, etc.) (Section 2595(h)(4)).
 5. Describe the current and anticipated future use of ground water within one mile of the perimeter of the waste site (Section 2595(h)(5)).

II. Waste Characteristics

A. For the entire history of the site and insofar as data are available:

1. List the types, quantities, physical state (e.g., solid, liquid) and concentrations of wastes discharged at the site. Wastes and known waste constituents shall be specifically identified according to the most descriptive nomenclature. A listing of hazardous waste constituents shall include reference numbers for listings established by Department of Health Services in Section 66680 of Title 22 of the Administrative Code (Section 2594(a)).
2. Provide a description of disposal methods; including waste mixing, operating procedures, and management practices (Section 2594(a)).

B. Characterize and locate, vertically and horizontally, the hazardous or potentially hazardous materials already in the site. Also, include a list of waste generators for each type of hazardous or potentially hazardous waste (Water Code Section 13273).

III. Solid Waste Assessment Test Summary

The SWAT report summary shall include all of the results and conclusions of the monitoring program conducted during the twelve months in which the site was assessed. The SWAT summary shall include:



- A. An evaluation, supported by water quality analyses, of the quality of water known to exist under or within one mile of the disposal site perimeter including all data necessary to establish background water quality (Section 2595(g)(6)).
- B. The report shall include the results of any on-site leachate monitoring required. It shall also include the results of any additional analyses required by the respective Regional Board.
- C. The report shall also include the location and description (as outlined in Section III, A, of the SWAT proposal) of all monitoring wells required by the respective Regional Board.

IV. Air Quality Solid Waste Assessment Test

- A. Summarize the findings of the Air Quality SWAT.
- B. Discuss the implications of such findings relative to potential degradation of water quality as a result of gas migration.

V. Conclusions

- A. Provide a full description of any hazardous materials in the disposal site regardless of concentration or quantity of the substances.
- B. Provide a full description of any leakage of hazardous materials from the site.
- C. Describe any threats to water quality as a result of migrating gases from the site.
- D. Describe any remedial measures required/implemented to mitigate any threat to water quality.

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