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2. Originator Information

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3. Title

Background Document - Financial Test for Liability Coverage

4. Summary of Directive (include brief statement of purpose)

This background document explains EPA's position on use of a financial test to provide liability coverage to meet requirements of 264.147 and 265.147.

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Liability/Insurance/Financial

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No

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Yes

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Yes

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Yes

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This Request Meets OSWER Directives System Format Standards.

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BACKGROUND DOCUMENT

**RESOURCE CONSERVATION AND RECOVERY ACT
SUBTITLE C--HAZARDOUS WASTE MANAGEMENT**

**Section 3004 - Standards Applicable to Owners and Operators
of Hazardous Waste Treatment, Storage and Disposal Facilities**

**Parts 264 and 265, Subpart H
Financial Requirements**

Financial Test for Liability Coverage

April 9, 1982

I. Introduction

Section 1004(6) of the Resource Conservation and Recovery Act (RCRA) of 1976, Pub.L. 94-580 (October 21, 1976), requires the Environmental Protection Agency to promulgate financial responsibility standards applicable to owners and operators of facilities for the treatment, storage, or disposal of hazardous waste as may be necessary or desirable to protect human health and the environment.

The Agency has concluded that liability coverage requirements constitute a desirable part of the RCRA regulatory program, as explained in the preamble to the revised interim final regulations (40 CFR 264.147 and 265.147, promulgated April 1982) which this background document accompanies. The requirements are designed to assure that funds will be available from which third parties can seek compensation for bodily injury and property damage resulting from operations of the facility.

The regulations specify two means by which owners or operators can satisfy the requirement for liability coverage: purchasing liability insurance or passing a financial test. The financial test for liability coverage was developed in conjunction with the financial test for closure and post-closure care. The reader is referred to the preamble and background document accompanying the financial test for assurance of closure and post-closure care (47 FR 15032-74, April 7, 1982) for a detailed description of the rationale and analysis supporting these tests. The present background document supplements the earlier document and is focused on the issues specific to the test for liability coverage. It also includes responses to comments from the public regarding such a mechanism.

A. Description of the Financial Test for Liability Coverage

The regulations require that owners or operators maintain liability

coverage amounting to \$1 million per sudden accidental occurrence with a \$2 million annual aggregate, and, in addition, for surface impoundments, landfills, and treatment facilities, coverage amounting to \$3 million per nonsudden accidental occurrence with an annual aggregate of \$6 million. The regulations allow owners or operators to satisfy the liability coverage requirement by providing evidence of insurance or by passing a financial test. The test may also be used to demonstrate part of the required coverage. In such a case the remainder of the liability coverage requirement must be met by insurance as described in the regulations.

An owner or operator may pass the financial test for liability coverage by demonstrating that he meets either of two sets of criteria.

Alternative I:

- (A) Tangible net worth of at least \$10 million; and
- (B) Net working capital and tangible net worth each at least six times the amount of liability coverage to be demonstrated by this test; and
- (C) Assets in the United States amounting to either: (1) at least 90 percent of total assets, or (2) at least six times the amount of liability coverage to be demonstrated by this test.

Alternative II:

- (A) A current rating for its most recent bond issuance of AAA, AA, A, or BBB as issued by Standard and Poor's, or Aaa, Aa, A, or Baa as issued by Moody's; and
- (B) Tangible net worth of at least \$10 million; and
- (C) Tangible net worth at least six times the amount of liability coverage to be demonstrated by this test; and
- (D) Assets in the United States amounting to either: (1) at least 90 percent of total assets, or (2) at least six times the amount of liability coverage to be demonstrated by this test.

As evidence of satisfying the financial test, an owner or operator must submit:

(1) A letter to the Regional Administrator signed by his chief financial officer that includes the required data from the owner's or operator's independently audited, year-end financial statements, and

(2) A copy of the independent certified public accountant's report on examination of the owner's or operator's financial statements for the latest completed fiscal year; and

(3) A special report from the owner's or operator's independent certified public accountant to the owner or operator stating that the accountant has compared the data which the letter from the chief financial officer specifies as having been derived from the independently audited, year-end financial statements for the latest fiscal year with the amounts in such financial statements and, in connection with this procedure, no matters came to his attention which caused him to believe that the specified data should be adjusted.

As in the case of the financial test for closure and post-closure care, if the auditor's opinion that is included in his report on examination of the owner's or operator's financial statements is an adverse opinion or contains a disclaimer of opinion, the owner or operator may not use the financial test to satisfy the financial requirements.

The Regional Administrator may disallow use of the financial test based on other qualifications expressed in the auditor's opinion of the owner's or operator's financial statements. For example, if the Regional Administrator determines that the opinion raises questions as to whether the owner or operator will continue as a "going concern," the financial test will be disallowed. Other qualified opinions will be evaluated on a case-by-case

basis. The owner or operator must provide evidence of insurance for the entire required amount of coverage within 30 days after disallowance.

After the initial submission of the letter from the chief financial officer and the accountant's reports, a new letter and new reports for each subsequent fiscal year must be submitted to the Regional Administrator within 90 days after the end of the firm's fiscal year. Alternatively, by the end of this 90-day period the owner or operator must provide evidence of third-party liability insurance coverage to the Regional Administrator.

B. Development of the Financial Test for Liability Coverage

The development of the financial test for liability coverage has been influenced by public comments received on two sets of proposals. The first proposal, issued on December 18, 1978, required owners or operators of permitted facilities to establish liability coverage through evidence of insurance, self-insurance for an amount not exceeding 10 percent of the owner's or operator's equity, a combination of the two, or some other evidence of financial responsibility acceptable to the Agency (43 FR 58995, 59007).

In a reproposal published May 19, 1980, on both liability coverage and financial assurance for closure and post-closure care, the liability coverage requirements for facilities in permitted status were not changed, but because the Agency felt that resolution of the issues raised by the proposed requirements would benefit from further public comment the comment period was reopened (45 FR 33260, 33264). In addition, the Agency proposed liability requirements for coverage of sudden accidental occurrences at interim status facilities, but did not permit self-insurance as an alternative to liability insurance during interim status because the Agency believed that owners or operators either already had or could

obtain Liability policies that covered sudden accidental occurrences (45 FR 33273).

The May 19, 1980, reproposal included a financial test for assurance of closure and post-closure costs. To pass this test, an owner or operator had to have the following: (1) at least \$10 million in net worth in the United States; (2) a ratio of total liabilities to net worth of not more than 3; and (3) net working capital in the United States of at least twice the cost estimates for closure and post-closure care. Several commenters suggested that this test could also be used to qualify owners or operators for self-insurance.

The interim final regulation of January 12, 1981 (46 FR 2802 - 2888), required insurance coverage. As the preamble stated, self-insurance, i.e., financial test provisions, were being considered for both interim status and permit standards. The Agency intended to reach and publish its decision prior to the effective date of the regulations.

Since testing the financial strength of an owner or operator with reference to liability coverage is similar in purpose to testing with reference to closure and post-closure costs, the Agency decided to seek development of a test for liability coverage in conjunction with its development of a test for financial assurance of closure and post-closure care.

Out of over 300 candidate sets of test criteria, two were selected for the financial test for closure and post-closure care. One set required certain financial ratios; amounts of net working capital and tangible net worth each at least six times the estimated costs of closure and post-closure care; at least \$10 million in tangible net worth; and U.S. assets

totaling either (1) at least 90 percent of total assets or (2) at least six times the estimated closure and post-closure costs. This set of criteria is considered appropriate for testing owners or operators in manufacturing industries likely to be involved in hazardous waste management. The second set of criteria requires a bond rating in the highest four categories of ratings by Moody's or Standard and Poor's; tangible net worth at least six times the estimated costs of closure and post-closure care; at least \$10 million in tangible net worth; and U.S. assets totaling either (1) at least 90 percent of total assets or (2) at least six times the estimated closure and post-closure costs. This set of criteria was developed for utilities and other industry sectors structured differently from the manufacturing sector for which the first set of criteria was developed.

The Agency concluded from its evaluations that this financial test should be allowed as a means of satisfying the financial requirements for closure and post-closure care because it provides strong assurance of availability of funds and minimizes regulatory costs.

As described in the following section, the results of evaluating candidate tests for assurance of liability coverage were slightly different than for assurance of closure and post-closure costs. A test that did not include financial ratios was judged to be most appropriate (this test was labeled "Ability to Pay test" in the evaluations and is so referred to in subsequent sections of this background document). The ratios add stringency to the test, but analysis indicated that the same level of stringency was not required for a test for liability coverage as for a test for coverage of closure and post-closure costs. Liability for accidents at a hazardous waste management facility is a contingent event, unlike the certain obligation for closure and post-closure care. The

possibility that an owner or operator who passes a financial test for liability coverage cannot pay liability costs is dependent both upon the occurrence of a serious accident and the owner or operator becoming financially unable to pay the required sums. A test minus the ratios was found to provide adequate assurance for liability coverage.

Based on its analyses the Agency concluded that the 10-percent-of-equity measure for self-insurance that was proposed in December 1978 was inappropriate for several reasons: the Agency's analysis found that equity amounting to 6 times the amount of liability covered, rather than 10 times, was sufficient as an indicator of adequacy of total assets; the equity percentage by itself does not measure capability to fund near-term obligations; and this test does not take into account the significantly higher failure rates of smaller firms.

The test proposed on May 19, 1980, was evaluated in comparison with the other candidate tests for liability coverage. It was rejected, however, because the costs associated with this test were higher, without significant added assurance of liability coverage, than those of the Ability to Pay test (Table 1).

Apart from the test criteria, there are four ways in which the requirements for the financial test for liability coverage differ from the test requirements for closure and post-closure care:

The Agency decided to allow use of the financial test for part of the amount of required liability coverage, with insurance for the remainder. Under the insurance requirements of the regulation, the insurer must provide "first-dollar" coverage. The insurer is responsible for payments within any deductible, with right of reimbursement by the owner or operator.

Allowing use of the financial test for part of the required coverage allows the owner or operator to have a deductible for which he takes full responsibility. This should mean savings in insurance costs and additional flexibility in obtaining insurance. For closure or post-closure care, the test must be used to cover the entire amount of one cost estimate. However, the owner or operator may use other mechanisms to cover other closure and post-closure estimates he is required to provide assurance for; the Agency believes this allows flexibility without placing undue administrative burden on the Agency.

(Based on information presented in Appendix B of the background document for the financial test for closure and post-closure care, the Agency concludes that most owners or operators using the financial test will have more than one facility. In the financial test analysis, an average of four facilities is assumed.)

-- Owners or operators may use a parent corporation's guarantee to satisfy the closure or post-closure financial assurance requirements if the parent passes the financial test, but use of a parent's guarantee to satisfy the liability requirements is not allowed. The Agency decided not to allow use of a parent's guarantee for liability coverage because there are major questions concerning the validity and enforceability of such an arrangement, especially as it may be affected by State insurance laws.

-- The financial test provisions for liability coverage require an owner or operator using the test to satisfy the requirements

to establish insurance coverage within 90 days after the end of the fiscal year for which the financial statements show that he no longer passes the test. In contrast, the financial test provisions for closure and post-closure care require that within the 90 days after the end of the fiscal year for which he no longer passes the test the owner or operator must notify EPA of his intent to establish alternate assurance and then, within 120 days after the end of the fiscal year, establish such assurance. Upon reviewing this matter, the Agency has concluded that 90 days is adequate time for an owner or operator to become aware of his failure to pass the test and to establish an alternate financial mechanism for either liability coverage or assurance of closure or post-closure care. The Agency therefore expects at a future date to propose changing the closure and post-closure financial test requirements to also state that the owner or operator must provide alternate financial assurance within 90 days after the end of the fiscal year for which he fails to pass the test.

-- The Regional Administrator may require reports of financial condition at any time from owners or operators using the financial test for closure and post-closure care if the Regional Administrator has a reasonable belief that the owner or operator no longer meets the test criteria. This provision is not included in the requirements for the financial test for liability coverage. The Agency believes that a yearly report from users of the financial test for liability coverage will be sufficient because of the small

likelihood that an owner or operator passing the test will in the following year experience business failure while facing a major liability resulting from an accidental occurrence. In contrast, closure and postclosure care are certain obligations, and the Agency expects that there will be occasions when additional financial reports are justified to verify the continuing ability of owners or operators to satisfy these obligations.

II. ANALYSIS OF TEST CRITERIA

From the comments on the proposed tests and from the research results of previous bankruptcy forecasting, the Agency assembled a list of over 300 candidate financial tests. These were evaluated against a sample consisting of 178 viable firms and 66 bankrupt firms. The bankrupt firms were identified from previous bankruptcy forecasting literature and an independent search; all had filed for bankruptcy between 1966 and 1979. The sample of nonbankrupt firms was designed to represent the expected asset size range and mix of industries likely to seek to use a financial test. Another sample of 26 nonbankrupt utilities was also studied.

For each test evaluated against the sample, the Agency computed two primary measures of effectiveness. One was the number of firms per 10,000 that would pass the test and later go bankrupt without providing insurance coverage. This measure determines the effectiveness of a test in eliminating owners or operators that would be major sources of direct public costs. The other primary measure was the percentage of viable firms that would be able to use the financial test. This factor represents the test's potential for reducing private costs by allowing owners or operators to use the test. Where several tests

attained the same level of effectiveness in eliminating bankrupt firms, the test that simultaneously allowed the greatest number of viable firms to use it was judged a "best test" (these are listed in Table 1 and their components are described in detail in Appendix A of the background document for the closure/post-closure financial test).

A requirement for \$10 million in net worth was included in all these candidate tests. As discussed in the previous background document, firms with less than \$10 million in net worth have a greater failure rate and present a reduced possibility of recovery in bankruptcy. The Agency believes that they may also significantly increase the burden of administering the test because of their greater instability.

The tests identified with numerals in Table 1 are based on financial ratios which function as indicators of viability. To also measure capacity to pay the amounts of liability coverage to be demonstrated by the test, the Agency decided to add to each of these tests, for purposes of the cost analysis, the requirement that the owner or operator must have net working capital and net worth six times the amount of liability coverage to be demonstrated. The Ability to Pay test included only this requirement and the requirement for \$10 million in net worth.

The multiple of 6 was derived in the following manner: The Agency conducted an analysis of firms which had experienced rapid deterioration of their financial condition for 2 to 3 years prior to business failure. This analysis showed that net working capital of these firms fell by an average of 66 percent in 2 years. The Agency believes that in order to ensure that adequate liquid assets, as indicated by net working capital, will be available for liability coverage, net working capital of at

TABLE 1
PERFORMANCE AND DIRECT PUBLIC AND PRIVATE COSTS OF ALTERNATIVE FINANCIAL TESTS FOR LIABILITY REQUIREMENTS FOR OWNERS OR OPERATORS WITH AT LEAST \$10 MILLION IN NET WORTH AND PUBLICLY AUDITED
(in thousands of 1980 dollars per year)

Test Description	Eligibility Requirement (one-year or three-year)	The Number of Firms Per 10,000 that Pass the Test and go Bankrupt without Providing Insurance Coverage (E)	The Percentage of Non-bankrupt Firms that can pass the Test (A _{NS})	Direct Public Costs Due to Failure of Firms Using Financial Test	Direct Public Costs Due to Failure of Firms Using Insurance	Total Direct Public Cost	Private Cost of Liability Coverage with Financial Test ²	Private Cost of Liability Coverage with Insurance ³	Total Private Cost	Sum of Direct Public and Private Costs
Insurance Only	NA	NA	0	0	9	9	0	23,945	23,945	23,954
139	0	0	49	0	9	9	8,306	12,212	20,518	20,527
125	3	1.4	56	2	9	11	9,493	10,536	20,029	20,039
130	3	1.6	64	2	9	11	10,849	9,310	19,409	19,400
127	3	1.9	67	3	8	11	11,350	7,902	19,260	19,271
130	1	2.0	76	4	8	12	12,804	5,747	18,631	18,643
151	1	3.7	77	6	8	14	13,053	5,507	18,560	18,674
134	1	4.6	79	8	8	16	13,392	5,020	18,420	18,436
136	3	5.4	82	9	7	16	13,901	4,310	18,211	18,227
135	1	5.6	83	10	7	17	14,070	4,071	18,141	18,158
149	1	6.0	87	11	7	18	14,748	3,113	17,861	17,879
136	1	7.9	89	15	6	21	15,007	2,634	17,721	17,742
137	1	9.1	92	18	6	24	15,596	1,916	17,512	17,536
98	1	9.3	93	18	5	23	15,765	1,676	17,441	17,467
146	1	9.9	95	20	5	25	16,104	1,197	17,301	17,326
100	1	10.1	96	20	5	25	16,273	950	17,231	17,256
Ability to Pay Test	3	10.4	99	30	2	40	16,702	239	17,021	17,061
Ability to Pay Test May 19, 1980 Test	1	20.2	100	42	1	43	16,952	0	16,952	16,995
1980 Test	1 ¹	15.7	98	33	3	35	16,612	478	17,092	17,127

least six times the estimated costs is an appropriate level. This figure is obtained by multiplying the factor of 2 (safety factor to ensure current ability to pay) times 3 (to ensure against a high rate of deterioration before payment can be brought about). With a multiple of 6, it is likely that even a rapidly deteriorating firm will have net working capital amounting to twice the amount of required coverage 2 years after failing the test.

While it is unusual for firms to have less net worth than net working capital, the possibility does exist, and such a firm would be very weak financially. Therefore a requirement was added for net worth of at least six times the amount of coverage to be demonstrated.

The relative costs to the public and the regulated community associated with allowing use of the candidate tests were estimated. The costs associated with allowing only use of private insurance to demonstrate financial responsibility were also part of the comparison. The test which minimizes the sum of direct public and private costs was identified (the Ability to Pay test). This test provides the lowest sum of all costs to the public because, over the long run, private costs to owners and operators will be passed on to the public through increased costs of goods and services. The cost results were then reviewed in light of the basic consideration of reasonable assurance that funds will be available for compensating third parties for injuries from hazardous waste facility operations; consideration of equity (i.e., owners or operators responsible for damages should pay for them, rather than the injured parties or the general public), and minimization of costs to the regulated community. The Appendix to this background document describes the Agency's determination of costs and provides analytic support for the numerical results reported in the following discussion.

A. Costs Examined

In examining the costs of various alternative financial tests, two types of costs were examined: direct public costs and private costs.

(1) Direct public costs were defined as the sum of costs which ultimately must be borne by the public because of the nonpayment of relief to harmed parties. Two types of direct public costs were analyzed:

(i) The direct public costs due to bankruptcy of owners or operators using insurance. These include liability judgments up to the limits of coverage required by the regulation which cannot be recovered from owners or operators through legal action. Such costs could result from claims filed after the cancellation of an insurance policy.

(ii) The direct public costs due to bankruptcy of owners or operators using the financial test. These include liability judgments up to the limits of coverage required by the regulation which cannot be recovered from the firms through legal action.

Any costs of litigation by third parties associated with the recovery of funds from bankrupt firms were not included in direct public costs. Costs to the Agency of administering the regulation were not included; they are estimated to be comparable between insurance and the financial test.

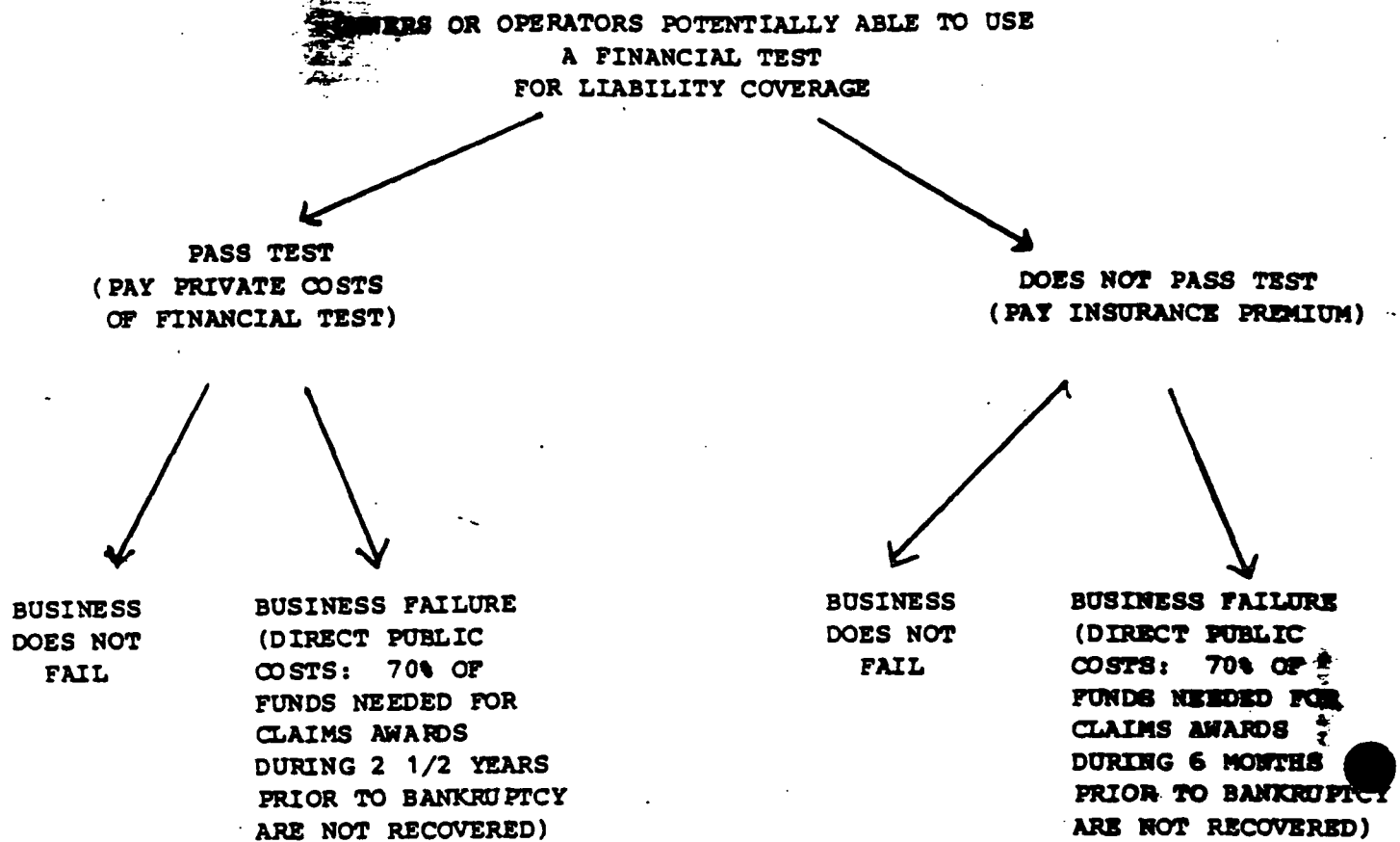
(2) Private costs were defined by the Agency as the costs to the regulated community of satisfying liabilities up to the required amount of coverage and the additional cost of financial mechanisms to serve as assurances of financial responsibility. Certain costs that all financial mechanisms have in common, such as the costs to the owner or operator of routine management associated with maintaining any financial mechanism,

were not included. Two types of private costs were considered in the analysis:

(i) The private costs of insurance. These include the premiums for insurance policies, including coverage for legal defense. Costs of other aspects of the insurance required by the regulation, such as submission of the Hazardous Waste Facility Liability Endorsement or Certificate of Insurance, were assumed to be minimal.

(ii) The private costs of liability coverage evidenced by the financial test. These include the liability judgments, settlements, and legal defense costs incurred by owners or operators which use the test plus the cost of auditors' reports required for use of the financial test.

The model used to analyze the costs of the financial test for liability coverage had a structure parallel to the model for the costs of the financial test for closure and post-closure care. Figure 1 presents the structure used for the liability test. The Agency based its estimate of the direct public costs associated with bankruptcies of owners or operators that pass the test on the assumption that liabilities outstanding 2 1/2 years prior to bankruptcy will have to be recovered in bankruptcy proceedings and that 30 percent of these funds can be recovered from bankrupt owners or operators. For owners or operators that fail the test and use insurance, the Agency assumed that all liability outstanding 6 months prior to bankruptcy will have to be recovered in bankruptcy proceedings due to termination or cancellation of the policy prior to filing of claims. (See section III of Appendix for further discussion of these assumptions about recovery in bankruptcy.)



**FIGURE 1
STRUCTURE OF THE COST MODEL**

B. Regulatory Analysis

The results of the Agency's analysis of the costs associated with candidate tests are presented in Table 1. (It should be noted that the cost data are only for owners or operators of over \$10 million in net worth and independently audited.)

The test found to minimize the sum of public and private costs was the Ability to Pay Test. This test with modifications as described below, was adopted in the regulations. It requires that an owner or operator have net worth and net working capital at least six times greater than the amount of liability coverage to be demonstrated and at least \$10 million in net worth. Two versions of this test were evaluated: one requiring the owner or operator to meet the criteria based on financial statements only for the preceding fiscal year and the other requiring him to meet the criteria for 3 years before being allowed to use the test to satisfy the requirements. The 1-year version, which minimized costs, was selected.

Compared with allowing insurance only, allowing use of the Ability to Pay test results in a saving of about \$200 in private cost for every dollar of added direct public cost (Table 1). Table 2 provides a detailed comparison of private costs associated with allowing insurance only and allowing use of the Ability to Pay Test for firms of ⁰ver \$10 million in net worth. The estimates of private costs are disaggregated according to costs that would be borne by the regulated community regardless of the liability requirement (i.e., costs of liabilities and associated litigation) and the costs specific to a regulation requiring liability coverage (assuming all firms of \$10 million in net worth would self-insure in the absence of a regulatory requirement). If all owners or operators are required to use insurance, the costs of the regulation are the insurance

TABLE 2

Breakdown of Private Costs Into Costs of Liabilities
and Costs of Regulatory Compliance, For Owners and Operators
of at Least \$10 Million in Net Worth
(Thousands of 1980 Dollars)

Cost Component	Insurance Only	Ability to Pay Test
Total private cost	23,945	16,952
Expected value of liabilities and associated litigation	16,761	16,761
Cost attributed to the regulatory requirement, assuming all large firms would self-insure in the absence of a regulatory requirement	7,184	191

premiums minus the liabilities and associated litigation. The costs of a financial statement audit include the costs of submitting an annual auditor's report. As shown in the Table, the private costs of complying with an "Insurance Only" requirement are 38 times greater than those associated with the Ability to Pay Test.

After the cost analysis was completed, the Agency decided that the net worth used for this criterion and for the multiple of 6 should be "tangible" net worth, since good will, patent rights, and other nontangible assets may be difficult to convert into funds for satisfying liabilities. The financial test criteria as promulgated therefore specifies tangible net worth.

The Agency decided furthermore to add two additional criteria whose effects were not incorporated into the cost analysis described above.

These two criteria are:

- (1) Assets in the United States amounting to either: (1) at least 90 percent of total assets or (2) at least six times the amounts of liability coverage to be demonstrated by the test; and
- (2) Submission of an independent auditor's opinion of the owner's or operator's financial statements and footnotes, which must be unqualified in order for use of the financial test to be allowed without further review. Adverse opinions, disclaimers of opinion, and opinions which raise "going concern" questions will disqualify an owner or operator from using the financial test. Owners or operators which receive other types of qualified opinions will be evaluated on a case by case basis.

As in the test for closure and post-closure care, a measure of assets in the United States is included to help ensure accessibility of funds. The Agency considers the auditor's opinion of the financial statements to be an important indicator of the adequacy of the financial data submitted. Independent accountants are guided by standards set by the Securities and

Exchange Commission for auditors within the scope of the Federal securities laws and by the Code of Professional Ethics promulgated by the American Institute of Certified Public Accountants. In addition, the profession is regulated, to differing extents, by State licensing boards and State societies of certified public accountants.

The Ability to Pay test was rejected for assurance of closure and post-closure care on the grounds that it did not meet the goals of protecting human health and the environment, equity, and minimization of costs as well as the test eventually chosen for assuring closure and post-closure costs (Test 100), which included a requirement for financial ratios that made the test more stringent. The Agency examined the question of whether the use of a financial test for liability requirements was sufficiently different from the use of a financial test for closure and post-closure care to justify adopting the Ability to Pay Test.

The Ability to Pay test was rejected for assurance of closure and post-closure care largely because of the expected number of failures each year among owners or operators who would use the test. Each year, on average, 1.3 companies that use this test and that own or operate a total of about five facilities would go bankrupt. However, unlike closure and post-closure costs, which are certain liabilities, major liabilities in the form of damage to third parties caused by accidental occurrences would attach to only a portion of the facilities. Premium estimates used in this document (see section III of the Appendix) would indicate that insurers could not cover costs if major liability events exceeded a probability of about 1 percent a year. This would mean that, among owners or operators using the test and entering bankruptcy, one facility every 20 years would be

involved in accidental occurrences resulting in liabilities. The Agency concluded ~~from~~ the analysis that the Ability to Pay test provided reasonable ~~assurance~~ of owners' or operators' financial capability to satisfy liabilities due to accidental occurrences at their facilities.

With respect to minimizing private costs, the Agency considered the possibility that tests weaker than the Ability to Pay Test might be suitable for liability coverage. This possibility was rejected, however, on the grounds that any test significantly less stringent than the test chosen would present the danger that a major liability event would itself cause bankruptcy. As explained earlier, the requirement for net working capital and net worth amounting to at least 6 times the amount of coverage to be demonstrated is based on analysis of the rate at which ~~net~~ working capital drops among failing companies in the years prior to their bankruptcy. The requirement is designed to assure that funds are available for satisfying liabilities, in the amount of coverage to be demonstrated by the test, prior to bankruptcy. A weaker test would not assure funds in the amount that may be necessary. Thus, with a weaker test, in the event of a liability in the amount of coverage to be demonstrated by the test, sufficient funds may not be available, and bankruptcy may be precipitated. Such a situation would cause public costs associated with use of ~~the~~ test to rise enormously and thus counter potential savings in private ~~costs~~.

As an alternative to the Ability to Pay test for industries such as utilities that typically do not maintain high net working capital, the Agency has decided to include a test based on investment-grade bond ratings, coupled with two tangible net worth requirements (tangible net worth of at least \$10 million and at least 6 times the amount of

liability to be covered by the test) and a requirement that assets in the United States be at least six times greater than the annual aggregate liability to be covered or at least 90 percent of total assets. This test is exactly comparable to the bond rating test for closure and post-closure financial assurance. Analysis of the available data on the performance of the two major bond ratings services indicated that firms receiving any of their four highest ratings (investment-grade bonds) have compiled a record of viability at least equal to the Ability to Pay test. The other criteria, requiring specific amounts of net worth and U.S. assets, are included to help assure adequate financial capacity, stability, and accessibility of funds. The measure of effectiveness in terms of the number of firms that pass this bond rating test that will go bankrupt without providing insurance coverage per 10,000 is at least equal to the effectiveness of the Ability to Pay test, while the percentage of viable firms that pass the bond rating test is slightly lower. (The bond rating test is discussed in Section VII of Appendix A to the background document for a financial test for closure and post-closure care.)

C. Limits to the Analysis

An analysis of the type described in this document incorporates approximately 100 assumptions. As described below, many assumptions had to be made about insurance coverage and about the technical and financial characteristics of the hazardous waste management facilities which will be affected by this regulation. However, the Agency examined the sensitivity of the result that the test adopted in the regulation minimizes the sum of direct public and private costs, and found that this result is highly

insensitive to changes in the cost assumptions. (See Sensitivity Analysis in Section IV of Appendix.)

Because little or no data are available on the precise distribution of facility owners and operators by size, the simplifying assumption was made that all firms with greater than \$10 million in tangible net worth will also meet the multiples requirements of the financial test for the entire amount of required liability coverage. The analysis therefore fails to account for firms with greater than \$10 million in tangible net worth who may not be able to meet the multiples requirement for the entire amount. (For example, to satisfy the liability requirements an owner or operator of a landfill must have \$2 million in annual coverage for sudden accidental occurrences and \$6 million for nonsudden accidental occurrences. To satisfy the requirements entirely through the Ability to Pay test, he would need \$48 million in net working capital and tangible net worth--six times \$6 million for coverage of nonsudden accidental occurrences, plus six times \$2 million for sudden accidental occurrences.) Since the multiples requirements are part of each test, however, this limitation is not significant in determining the relative cost impacts of the various tests.

Certain assumptions were made regarding insurance coverage because of lack of available data; again, the choice of test would not be affected by these assumptions. This analysis assumes that any firm that could use the financial test for liability coverage would do so. The fact that some firms already have insurance and the possibility that others might choose to purchase it voluntarily are not considered. The effect on premiums of owners' or operators' use of the financial test for coverage of the first dollars of liability is not considered. The analysis assumes that, among

those facilities covered by insurance, each facility will be covered by a separate policy. If policies cover more than one facility, the insurance cost per facility would be smaller. Since the costs associated with liability coverage demonstrated by a financial test are assumed to represent a constant share of premiums, these costs would also fall proportionally.

A number of uncertainties relating to a financial test for closure and post-closure care are also relevant to costs of insurance and the test for liability coverage. These uncertainties, however, also would not affect the choice of a test. They include the estimation of the number of owners and operators independently audited, the baseline failure rate, the size distribution of firms, and the absence of consideration of certain possible economic efficiency benefits.

Comparable to the uncertainty in the financial test of the costs of closure and post-closure care is the uncertainty of the expected value of liability judgments. Because of the difficulties involved in performing a formal risk analysis and the lack of adequate data to perform a statistical analysis based on past experience of hazardous waste facilities, the Agency felt that for purposes of this analysis, the best available data on frequency and costs of liabilities were those implied by the premiums that insurers quoted for insuring these facilities. These are analyzed in Section III of the Appendix. It was assumed for this analysis that approximately 70 percent of the value of insurance premiums would be used for payment of liabilities (50 percent) and associated litigation costs (20 percent). As explained in the Appendix, this percentage reflects normal casualty and property insurance ratios with adjustment for the effect of lack of actuarial data and relatively high underwriting costs for non-

sudden accidental coverage. The Agency assumes that the probability of liability judgments and of bankruptcy for firms using the test are not correlated events because the criteria are designed to allow the test to be used only by large companies with sufficient current assets to satisfy liabilities in the amount covered by the test.

The analysis does not consider certain potential economic benefits associated with financial responsibility requirements. To the extent that the requirements result in owners or operators internalizing cost externalities, in the form of insurance premiums, the price of waste management will more accurately reflect its true costs. This higher price will lead to reduced hazardous waste generation and increased recycling.

One important consequence of the above limitations is that the analysis presented here should not be used as a basis for a cost analysis of the liability coverage requirements as a whole, since the methodology is directed toward identifying relative effects of the various test alternatives rather than determining absolute costs.

III. Responses to Comments

Many of the comments pertaining to the use of a financial test for closure and post-closure care were also relevant to the financial test for liability coverage. The reader is referred to the background document for a financial test for closure and post-closure care for an overview of such comments.

Additional comments, directed specifically to the question of self-insurance and a test for liability coverage, were also received by the Agency in response to proposed rules, and the January 12, 1981, interim final regulation, which are described in Section IB above.

Numerous commenters said self-insurance should be allowed. Several noted that self-insurance was a standard practice followed by large companies to avoid unnecessary costs.

By adopting the financial test for liability coverage, the Agency is allowing those owners or operators who can demonstrate financial strength through the test to have the choice of self-insuring or purchasing insurance. The Agency thus achieves the basic objective of demonstrated financial responsibility while allowing the flexibility and cost savings in providing coverage that many commenters listed as valuable features of self-insurance.

Responses to more specific comments are as follows:

1. Use of The Financial Test for Liability Coverage During Interim Status

The May 19, 1980, proposed rule (45 FR 33273) which would impose a requirement for liability coverage for sudden accidental occurrences on interim status facilities but would not allow use of self-insurance to satisfy the requirement (on the basis that owners or operators already had or could readily obtain such coverage as part of general liability policies). Several comments were received recommending that self-insurance be allowed during interim status. One commenter opposed allowing self-insurance for interim status facilities.

- Self-insurance should be allowed during interim status.
- Self-insurance should not be allowed during interim status because there will be little incentive for facilities to be upgraded until Part B of the permit application has been filed, and therefore, there will be a higher risk of liability-creating occurrences during interim status.

The Agency has decided to allow use of the financial test during interim status. The analysis of the financial test indicates that it provides reasonable assurance of financial responsibility and that

allowing its use would lead to a significant savings in the sum of direct public and private costs.

2. Criteria for the Financial Test

Possible criteria for self-insurance were suggested by a number of commenters. Some were included in the 300 combinations of criteria that the Agency evaluated in developing its financial tests.

- The financial test proposed on May 19, 1980, should be used as criteria for self-insurance.

The May 19, 1980, test was among those that were evaluated in developing a financial test for liability coverage. However, the criteria that were finally selected was found more effective in minimizing costs (see Table 1).

- Self-insurance for liability during interim status should be based on a criterion of working capital two times the liability requirement plus the non-working-capital requirements of the financial test proposed on May 19, 1980.
- The level of self-insurance should not exceed 10 percent of net worth for a single occurrence risk and should not exceed 50 percent of net worth with respect to aggregate loss.

As described in the analysis, a multiple of six for working capital and net worth was judged to be most appropriate and was incorporated in the financial test.

- The criteria for self-insurance should follow the industry standards currently in use for conventional liability coverage, such as products liability, medical malpractice and other forms of professional liability.
- Because many large firms are required by their existing insurance contracts to self-insure up to specified limits, the EPA should examine such provisions for guidance on allowable levels of self-insurance.

The suggested criteria are designed for the guidance of firms in determining insurance coverage that is affordable and otherwise appropriate from the viewpoints of individual insureds and insurers. The EPA's

purpose in the financial responsibility regulations is somewhat different. The financial test for liability coverage was designed to be a broadly applicable measure that will provide reasonable assurance that injured parties will be compensated. Therefore, the Agency chose to develop criteria directed to this purpose.

- The programs of the Pension Benefit Guaranty Corporation should be studied as possible self-insurance criteria.

The Pension Benefit Guaranty Corporation has not promulgated self-insurance criteria as of this date (April 1982). The EPA did review self-insurance criteria of several environmentally-related government programs in the course of developing its financial tests (see Introduction to background document for the financial test for assurance of closure and post-closure care).

3. Use of Financial Test for Part of Required Coverage

- The criteria used to establish qualifications for self-insurance should also apply in determining the use of deductibles.

The Agency agrees with this comment. Since the deductible is a form of self-retention, the amount of any deductible that is not covered by the insurer must be covered by the financial test. This provision is included in both the endorsement and certificate of insurance required as evidence of insurance.

- Self-insurers should be required if necessary to obtain excess insurance contract over and above the acceptable level of self-insurance.
- Firms should be allowed to have a combination of purchased insurance and self-insurance.

The Agency agrees with these comments. For reasons given in Section IB, owners or operators are allowed to cover part of the required amount through the financial test and the rest with insurance.

4. Other

Self-insurance is not an option that will be available to small businesses with insufficient equity to pass the test, and should not be allowed.

The financial responsibility regulations have been designed to provide assurance of financial responsibility while avoiding unnecessary costs. One method of reducing such costs is to allow the use of a financial test. The Agency recognizes that small owners or operators will be unable to use the financial test because of the requirement for \$10 million in tangible net worth. For reasons noted in the analysis, the Agency believes that the net worth requirement is necessary for adequate assurance of coverage. However, the Agency will continue to look for other approaches that would allow small owners or operators who are financially strong to self-insure.

- Owners and operators that self-insure should be required to qualify under the insurance laws of the State of their domicile.

The Agency is not aware of any State laws covering self-insurance for accidental occurrences at hazardous waste facilities and therefore does not find the suggestion relevant at this time.

- "Pre-funded" self-insurance generally provides more funds than does "pay as you go" self-insurance. EPA might require "pre-funded" self-insurance.

Self-insurance backed by trust funds or letters of credit should be allowed on an individual or group basis.

The Agency believes that its current test provides adequate assurance. A requirement of pre-funding or backing by financial instruments would significantly reduce the cost advantages of the financial test. Owners or operators may submit petitions to the Agency proposing alternative approaches, however. To enable adequate evaluation, the petitions should be

accompanied by information demonstrating the need for the option in the regulations, a detailed description of how it would work, and information on how it provides adequate assurance of availability of funds for liability coverage as specified by the regulations.

- Uncertainty concerning the availability of liability insurance for nonsudden occurrences compels EPA to allow the regulated community wide flexibility in the form of self-insurance.

EPA has decided to allow a financial test for liability coverage because it believes the test provides adequate assurance of coverage and will lower the costs of the regulation. The considerable recent growth of the pollution liability insurance market has diminished the significance of a possible insurance capacity shortfall as a factor in EPA's decision to allow this financial test.

APPENDIX

**COST ANALYSIS FOR A FINANCIAL TEST
FOR LIABILITY COVERAGE**

I. INTRODUCTION

This document provides further detail on the cost analysis for a financial test for liability coverage. The analysis employed the same methods and many of the same assumptions as those used to analyze the costs of a financial test for closure and post-closure care. The reader is referred to the background document for the financial test for closure and post-closure care (November 1981) for a fuller discussion of the methodology and assumptions.

The types of public and private costs analyzed and the cost model used were presented in the body of this background document.

All costs in this background document are presented as annual costs in real 1980 dollars before taxes. The convention used in measuring private costs is the change in revenue necessary to leave the profits of a firm unchanged, which is the convention usually employed in EPA regulatory analysis. The most commonly used alternative convention is that of decline in profits to the firm if it cannot increase revenues. The disadvantage to this approach is that it would then require a third category of costs to be calculated--costs to States and the Federal government due to losses in corporate profits tax.

II. ~~STRENGTH AND~~ VARIABLES -- THE COST ESTIMATING MODEL

This ~~part~~ includes a discussion of the equations used to estimate public and private costs of insurance, the definitions of the variables employed, and the values of the variables used in the estimates. It is divided into two parts: Part A presents the summary equations for computing the costs of any given financial test and Part B presents the values of variables employed in the equations and provides brief discussions of why these values were assumed. (Section III presents more detailed support for the values of many of the more important variables used in the analysis of the financial test for liability coverage.)

Many of the assumptions are the same as those used in the financial test for closure and post-closure care analysis (e.g., the supporting equations used to compute the value of certain variables used in Part A below). Only assumptions and variables which differ for the analysis of a test for liability coverage are included in this Appendix.

A. Summary Equations for Computing Total Annualized Costs of Alternative Financial Tests for Liability Coverage

Table II-1 presents the formulae used in calculating total annualized direct public and private costs associated with alternative financial tests for liability coverage for firms of greater than \$10 million in net worth ~~and~~ independently audited. The constant terms represent the costs assumed that all firms of over \$10 million in net worth that are independently audited use either the financial test for liability coverage or private insurance and go bankrupt at the failure rate, F . As with the costs of closure and post-closure financial responsibility, to determine the actual costs associated with any given test, the constants were adjusted

to reflect the percentage of viable firms that pass a given test (λ_{NB}) and the number of firms per 10,000 that pass a given test that will go bankrupt without providing insurance coverage (E).

B. Values of Variables Used in the Model

Tables II-2 and II-3 present the values of variables used in estimating the costs discussed in this model. Table II-2 describes the variables that remain constant regardless of the type of hazardous waste facility considered, and Table II-3 shows the variables that do change according to the type of facility.

It is assumed that 30 percent of the funds needed for liability claims can be recovered from bankrupt firms. This means that 70 percent will not be recovered and thus will be left as direct costs to the public. This factor is applied to bankrupt firms that use the test as evidence of financial assurance for liability coverage. The basis for this estimate is given in Section III.

TABLE II-1

FORMULAE FOR CALCULATING TOTAL ANNUALIZED COSTS OF ALTERNATIVE FINANCIAL
MECHANISMS FOR LIABILITY REQUIREMENTS FOR ALL FIRMS WITH GREATER THAN
\$10 MILLION IN NET WORTH AND INDEPENDENTLY AUDITED

Type of Cost	Formula	Value of Constant Term
Public Costs due to Failure of Firms Using Insurance	$9,000 \left(\frac{F - A_{NB}E}{F} \right)$	$\sum_1 N_i \frac{F}{10,000} R_I W_{Ii}$ = Sum of Public Costs if all facilities use insurance
Public Costs due to Failure of Firms Using Financial Test	$45,000 \left(\frac{A_{NB}E}{F} \right)$	$\sum_1 N_i \frac{F}{10,000} R_I W_{SIi}$ = Sum of Public Costs if all facilities were self-insured
Private Costs of Liability Coverage with, Financial Test	$16,952,000 \left(A_{NB} \right)$	$\sum_1 N_i (S_{Ii} + C_A)$ = Sum of Private Costs if all firms self-insure
Private Costs of Insurance	$23,945,000 \left(1 - A_{NB} \right)$	$\sum_1 N_i I_i$ = Sum of Insurance Premiums if all firms use insurance

Note: See next page for definitions of variables

DEFINITIONS OF VARIABLES USED IN TABLE II-1

A_{NB}	= Percentage of viable firms that pass a given financial test
C_A	= Private costs of auditor's special report/facility/year
E	= Number of firms per 10,000 that pass a given financial test that will go bankrupt without providing insurance coverage
F	= Failure rate for all firms to which analysis is applied, measured in number of firms per 10,000
i	= Subscript for facility class (storage, surface impoundment, land disposal, incinerator)
I	= Private costs of insurance (premiums)/facility/year
N	= Number of facilities owned by firms with \$10 million in net worth and independently audited
R_I	= Share of liability judgments not recovered from bankruptcy proceedings
S_I	= Private costs of liability coverage, with financial test/facility/year
W_I	= Liability judgments to be recovered from bankruptcy if a firm fails using insurance/facility
W_{SI}	= Liability judgments to be recovered from bankruptcy if a firm fails using financial test/facility

TABLE II-2

VALUES FOR VARIABLES THAT DO NOT VARY BY FACILITY TYPE

Private costs (thousands of dollars) of auditor's special report/facility/year $(C_A)^1$	= .075
Failure rate for all firms to which analysis is applied $(F)^2$	= .0022
Share of liability judgments not recovered from bankruptcy proceedings $(R_I)^3$	= .7

¹For a more detailed discussion of this variable, see Section III of Appendix B of the Background Document for a financial test for closure and post-closure care.

²For a more detailed discussion of this variable, see Appendix A of the Background Document for a financial test for closure and post-closure care.

³For a more detailed discussion of this variable, see Section III of this Appendix.

TABLE II-3

ASSUMPTIONS WHICH VARY ACCORDING TO TYPE OF FACILITY*
 (measured in thousands of 1980 dollars per year)

Assumptions	Facility Type			
	Storage	Incinerators	Surface Impoundments	Land Disposal
1) Number of facilities (N) (17% of total facilities)	1,292	153	680	425
2) Private costs of insurance (premiums)/facility/year (I)	1.5	3.0	19.5	19.5
3) Private costs, with financial test/facility/ year (SI)	1.05	2.1	13.65	13.65
4) Liability judgments to be recovered from bankruptcy if a firm fails using financial test/facility (W _{SI})	1.875	3.75	24.375	24.375
5) Liability judgments to be recovered from bankruptcy if a firm fails using insurance/facility (W _I)	.375	.75	4.875	4.875

*More detailed discussions on the values of these variables may be found in Section III of this Appendix.

The failure rate for firms of over \$10 million in tangible net worth is estimated to be 22 per 10,000 (see Appendix A of the background document for the financial test for closure and post-closure care). The total number of bankruptcies among this group of firms is assumed to be constant regardless of the financial test used, thus if the failure rate for firms passing a given financial test falls below 22 per 10,000, the failure rate for firms which fail the test will become higher to maintain the same overall result.

The average cost of an auditors special report (required annually for firms using the financial test) is estimated at \$300 per year. Assuming that the average firm has four facilities the per-facility annual cost is \$75. (See Appendix B of previous background document for further discussion of these estimates.)

It has been conservatively estimated that firms of greater than \$10 million in net worth own 50 percent of all hazardous waste facilities. Of the 50 percent of all facilities owned by firms of greater than \$10 million in net worth, 34 percent are independently audited. The total population of facilities evaluated in this cost analysis is assumed to be 2,550, composed of 1,292 storage facilities, 153 incinerators, 680 surface impoundments, and 425 landfills. The basis for these estimates is discussed in Appendix B of the previous background document.

Costs for each type of facility were developed separately for costs of premiums, costs of liability coverage among users of the financial test, and value of judgments to be recovered from owners or operators in bankruptcy. These estimates are discussed in the next section.

III. VALUES OF MAJOR MODEL VARIABLES

This section discusses major model variables specific to the financial test for liability coverage

A. Value for R_L (Share of Liability Judgments not Recovered from Bankruptcy Proceedings)

The Agency reviewed legal steps involved in the two major bankruptcy procedures -- liquidation and reorganization. This section provides an estimate of the rate of recovery likely for claims in bankruptcy proceedings against an owner or operator using the financial test for liability. (For further detail see Appendix B of the background document for the financial test for closure and post-closure care.)

If judgment against an owner or operator is obtained but not satisfied prior to the bankruptcy of the owner or operator, the judgment would represent a claim in the bankruptcy case. Such a claim could be a low-priority unsecured claim, or it could be secured by a lien against property of the owner or operator. The Agency estimates that recovery in liquidation or reorganization proceedings would range from 20 to 50 percent.

However, securing a judgment of liability against an owner or operator who resisted could easily take several years (see paragraph B3 below). It is very likely that if the bankruptcy proceeding were initiated before judgment was obtained, the effort to secure a judgment would be stayed by the bankruptcy court. An attempt to obtain a lien to secure a judgment would also be stayed. In these cases recovery in bankruptcy would be reduced in priority. Although a liability claim, if stayed, could survive the discharge in bankruptcy, it is unlikely that assets would be available at a later date

to satisfy it. The Agency believes a reasonable estimate of the percentage of recovery generally on liabilities of owners or operators using the financial tables who enter bankruptcy is approximately 30 percent. Therefore, the value for R_I (the share of liability judgments not recovered from bankruptcy proceedings) is equal to .7.

B. Liability-Related Costs

1. Value for I (Private costs of insurance premiums/facility/year)

Insurance premiums will vary depending on the type of facility in question, the type and quantity of wastes managed, the design and construction of the facility, the geology of the site, its location (e.g., proximity to aquifers, surface waters, residences), management practices, past operating experience, and amount of the deductible. The Agency developed estimated premium costs for required coverages as shown in Table III-1. To check on the current adequacy of the estimates, the Agency reviewed them with several insurance industry representatives in April 1982. All agreed they were adequate as representative premium costs, although, as noted above, numerous factors affect the level of any specific premium. (These reviewers, were: Kenneth Goldstein of Swett and Crawford, Peter Gerken of Johnson and Higgins (brokers), and James Macdonald of Munich American Reinsurance Company.)

Typically insurance for sudden accidental occurrences is part of general liability insurance and its cost is not identified separately. To estimate the cost of insurance specifically for sudden accidental occurrences at hazardous waste facilities, the estimated premium cost of adding such coverage to gradual pollution coverage was used.

For a firm with several facilities, per-facility premium costs would be less if a single policy covered all facilities. Because of the difficulty of determining to what extent separate facilities owned by the same firm will be included on one policy, estimates of premiums are based on the assumption that separate policies would be used for each facility.

2. Value for S_7 (Private costs of the financial test for liability coverage)

The costs of satisfying the liability requirements through the financial test are dependent upon what portion of the costs of insurance premiums would be spent by the firm whether or not it purchased insurance. The basic elements in premium costs and the estimated percentages of premium costs for each of these elements are shown in Table III-2.

These estimates are extremely uncertain due to the almost complete absence of actuarial data or claims history for pollution insurance policies. For normal property and liability insurance, payment of claims represents from 60 to 70 percent of premium costs (A.M. Best Company data, 1974-80). The percentage of premium costs used for the payment of claims arising from accidents at hazardous waste facilities was estimated by EPA at 50 percent because pollution insurance has unusually high underwriting costs, and in the absence of data is perceived as risky. About 20 percent of premiums is estimated for legal defense and claims adjustment and another 30 percent for profit and administrative costs.

TABLE III-1

ESTIMATED PREMIUMS FOR MEETING LIABILITY REQUIREMENTS
(thousands of 1980 dollars per year)

Facility Type	Sudden Accidental Coverage	Nonsudden Accidental Coverage	Total Premiums Required by Regulation
Storage	1.5	0 ¹	1.5
Surface Impoundment	3.0	16.5	19.5
Landfill	3.0	16.5	19.5
Incinerator	3.0	0 ¹	3.0

¹The regulations do not require storage and incinerator facilities to carry nonsudden accidental coverage.

TABLE III-2
ELEMENTS OF INSURANCE COSTS

Elements	Estimated Percentage of Premiums
Claims Paid	50%
Legal Defense and Claims Adjustment	20%
Underwriting and Inspections	
Other Administration Sales	
Profit >	30%
Risk Premiums	

A firm that chose to use the financial test would have to bear the costs associated with paying liability claims and with legal defense and claims adjustment. It would not have to bear the costs associated with the remainder of the cost elements. Thus, the cost of satisfying liabilities among users of the financial test would be 70 percent of insurance premiums. Table III-3 provides estimates of the costs of the financial test based on the estimates of premiums shown in Table III-1 and the assumption that 70 percent of these costs must be borne by the firm if it uses the financial test for liability coverage.

3. Values for W_{GI} (Liability judgments to be recovered from bankruptcy proceedings if a firm fails using financial test/facility/year) and W_I (Liability judgments to be recovered from bankruptcy proceedings if a firm fails using insurance/facility/year)

In order to quantify potential public costs, it was assumed that, for firms using the financial test, all liabilities over a period of 2 1/2 years prior to bankruptcy would be dealt with in bankruptcy proceedings. The Agency believes 2 1/2 years is a reasonable estimate of the average time elapsed before liabilities are satisfied. The average time from initiation of a case to judgment in U.S. district courts is about 20 months for cases that go to trial (e.g., data for year ending June 1981). Two and a half years allows a further margin of 10 months for collection and possible appeals and for variation in State courts. Since amounts of liabilities are assumed to be one-half of premium values, the liabilities to be covered are calculated as 2.5 multiplied by one-half of annual premium values. The results of this calculation are shown in Table III-4.

TABLE III-3

ESTIMATED COSTS OF LIABILITY COVERAGE WITH FINANCIAL TEST
(in thousands of 1980 dollars per year)

Type of Facility	Per-Facility Costs for \$1M/2M in Sudden Accidental Coverage and \$3M/6M for Nonsudden Accidental Coverage
Storage	1.05
Surface Impoundment	13.65
Land Disposal	13.65
Incinerator	2.10

For owners or operators using conventional insurance, it was assumed that all judgments outstanding up to 6 months of bankruptcy would be paid. Coverage all the way up to bankruptcy was not assumed for the following reasons. As bankruptcy becomes imminent, the quality of operation and maintenance of facilities may deteriorate. Insurance may be cancelled or not renewed because of such deterioration or in anticipation of it. The owner or operator himself may not continue insurance coverage due to lack of funds as he nears bankruptcy. Assuming again that judgments are one-half of premiums, the estimates of public costs with insurance are .5 multiplied by one-half of the yearly premium values. This result is also shown in Table III-4.

TABLE III-⁴₈

LIABILITY JUDGMENTS TO BE RECOVERED IF A FIRM FAILS
(in thousands of 1980 dollars per year)

Type of Facility	If Firm Fails Using Financial Test	If Firm Fails Using Insurance
Storage	1.875	.375
Surface Impoundment	24.375	4.875
Land Disposal	24.375	4.875
Incinerator	3.750	.750

IV. RESULTS OF THE COST MODEL FOR LIABILITY REQUIREMENTS

A. Direct Public and Private Costs

Table IV-1 lists the annual public and private costs associated with selected financial tests derived by applying the values of the variables to the cost model described in Sections II and III. The tests either have a one-year or a three-year eligibility requirement as indicated in the Table.

Table IV-1 shows that not allowing a financial test for liability coverage or choosing the most stringent test, Test 139 (one-year), will minimize direct public costs. These two options result in direct public costs of \$9,000 as compared with \$25,000 in direct public costs for Test 100 (one-year) and \$40,000 and \$43,000 for the Ability to Pay Test with a three-year and one-year eligibility requirement, respectively.

However, direct public costs are dwarfed by the private costs associated with the various alternatives. The Ability to Pay Test minimizes the sum of direct public and private costs, whether a one or three-year eligibility requirement is imposed. The Ability to Pay Test with a one-year requirement is somewhat less costly than the Ability to Pay Test with the three-year eligibility requirement (a difference of \$66,000).

The Ability to Pay Test (one-year) is significantly less costly than any other test in terms of the sum of direct public and private costs, saving \$132,000 annually over the May 19, 1980 Test (one-year) and \$6,959,000 over the Insurance Only option. If Test 100 (one-year) is adopted rather than the Ability to Pay Test (one-year), \$18,000 per year in annual direct public costs will be saved at a cost to the regulated community of \$279,000.

TABLE IV-1
PERFORMANCE AND DIRECT PUBLIC AND PRIVATE COSTS OF ALTERNATIVE FINANCIAL TESTS FOR LIABILITY REQUIREMENTS FOR OWNERS OR OPERATORS WITH AT LEAST \$10 MILLION IN NET WORTH AND PUBLICLY AUDITED
(in thousands of 1980 dollars per year)

Test Description	Eligibility Requirement (one-year or three-year)	The Number of Firms Per 10,000 that Pass the Test and go Bankrupt Providing Insurance Coverage (E)	The Percentage of Non-bankrupt Firms that can pass the Test (A _{ND})	Direct Public Costs Due to Failure of Firms Using Financial Test	Direct Public Costs Due to Failure of Firms Using Insurance	Total Direct Public Cost	Private Cost of Liability Coverage with Financial Test ²	Private Cost of Liability Coverage with Insurance ³	Total Private Cost	Sum of Direct and Private Costs
Insurance Only	NA	NA	0	0	9	9	0	23,945	23,945	23,954
139	0	0	49	0	9	9	8,306	12,212	20,518	20,527
125	3	1.4	56	2	9	11	9,493	10,536	20,029	20,039
138	3	1.6	64	2	9	11	10,849	9,310	19,489	19,400
127	3	1.9	67	3	8	11	11,358	7,902	19,260	19,271
138	1	2.8	76	4	8	12	12,884	5,747	18,631	18,643
151	1	3.7	77	6	8	14	13,053	5,507	18,560	18,674
134	1	4.6	79	8	8	16	13,392	5,028	18,420	18,436
136	3	5.4	82	9	7	16	13,901	4,310	18,211	18,227
135	1	5.6	83	10	7	17	14,070	4,071	18,141	18,158
149	1	6.0	87	11	7	18	14,748	3,113	17,861	17,879
136	1	7.9	89	15	6	21	15,087	2,634	17,721	17,742
137	1	9.1	92	18	6	24	15,596	1,916	17,512	17,536
98	1	9.3	93	18	5	23	15,765	1,676	17,441	17,467
145	1	9.9	95	20	5	25	16,104	1,197	17,301	17,326
145	1	10.1	96	20	5	25	16,275	958	17,231	17,256
May 19, 1980 Test	3	18.4	99	38	2	40	16,744	239	17,021	17,061
May 19, 1980 Test	1	20.2	100	42	1	43	16,952	0	16,952	16,995
1980 Test	1 ¹	15.7	90	32	3	35	16,612	478	17,092	17,127

¹ The May 19, 1980 proposed test had a one-year eligibility requirement.

² Cost includes liability judgments, settlements, legal defense and accountants' reports.

³ Cost refers to premiums which cover liability judgments, settlements and legal defense.

B. Sensitivity

A sensitivity analysis was performed to determine how sensitive the results for the Ability to Pay Test (one-year) were to the assumptions of the model. The results of this analysis are shown in Table IV-2. Like the sensitivity analyses in Section IV.B. and IV.C. of the Background Document for a financial test for closure and post-closure care, the Table records for each major cost element and for total direct public and private costs of various tests, the percentage change in costs required to make a given test dominant over the Ability to Pay Test (one-year), that is, to make it the test that minimizes the sum of direct public and private costs. The three alternative tests examined are "Insurance Only," Test 100 (one-year) with a \$10 million net worth requirement, and the Ability to Pay Test (three-year).

These results show that the finding that the Ability to Pay Test (one-year), is the test which minimizes the sum of public and private costs, is remarkably insensitive to changes in most cost assumptions. Only a marked increase in the private costs associated with the use of the financial test or a decrease in the private costs of insurance could seriously affect this result. However, the magnitude of the changes required makes such an effect unlikely.

TABLE IV-2

**SENSITIVITY OF THE ABILITY TO PAY TEST (ONE-YEAR) AS THE TEST
THAT MINIMIZES THE SUM OF DIRECT PUBLIC AND PRIVATE COSTS OF
LIABILITY REQUIREMENTS TO ASSUMPTIONS OF THE COST MODEL**

Test Description	Percentage Change ¹ Required in Direct Public Costs Due to Failure of Firms Using Finan- cial Test	Percentage Change Required in Direct Public Costs Due to Failure of Firms Using Insurance	Percentage Change Required in Total Direct Public Costs	Percentage Change Required in Private Costs of Liability Cover- age with Finan- cial Test	Percentage Change Re- quired in Private Costs of Insurance	Percentage Change Re- quired in Total Pri- vate Costs
Insurance Only	16,569	Completely Insensitive	20,467	41	-29	-99
Test 100 (\$10 million in net worth, one- year)	1,186	Completely Insensitive	1,450	38	-27	-94
Ability to Pay Test (three- year)	1,650	Completely Insensitive	2,200	39	-28	-96

¹The percentage change required for any given cost element represents the percentage change in costs required for all tests to change the choice of test which minimizes the sum of direct public and private costs.

C. Limits to Analysis

The estimates do not take into account the effect of the required multiples on working capital and net worth in reducing the number of firms greater than \$10 million in tangible net worth and independently audited that could pass a given financial test. (The effect of the multiples is also not considered in the analysis of the test for closure and post-closure care.) These multiples can be expected to reduce significantly the number of firms which can pass a test for the entire amount of required coverage. However, the relative positions of the tests with respect to reducing costs would not be affected since the multiples are incorporated in all the tests.

The analysis of this section has been conducted on the assumption that firms will always choose the least expensive alternative. However, many firms that could use the financial test may choose to buy insurance for the advantages of avoiding risks and uneven cash flows. Such choices might greatly change the estimates of costs associated with using the test. Like the multiples requirements, however, they would not affect the relative standing of the tests in minimizing costs.