

REVISED WORK PLAN/METHODOLOGY

1. TASK 1: FINALIZE DETAILED WORK PLAN FOR TASKS 2-4

ICF revised its proposed work plan for Tasks 2-4 by combining, separating, and reorganizing some of the steps in response to questions, information, and directions from the CIWMB Contract Manager. For Task 1, ICF accessed and reviewed key background documents recommended by the CIWMB Contract Manager including:

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- Landfill Compliance Study (LCS)
- CIWMB Workshop Materials (e.g., December 2004 workshop Appendix 4)
- Draft *Day of Reckoning* Report
- ITRC/EREF reports on potential methods for ending PCM, including comments and responses to comments
- Legislative Analysts Office report on financial assurance (April 2006)
- U.S. EPA, Response to Recommendation 4.1 of the September 26, 2005 Office of Inspector General Evaluation Report entitled *Continued EPA Leadership Will Support State Needs for Information and Guidance on RCRA Financial Assurance* (October 20, 2006).
- U.S. EPA, Environmental Financial Advisory Board, *The Use of Captive Insurance as a Financial Assurance Tool in Office of Solid Waste and Emergency Response Programs* (March 2007) and *EFAB Initial Findings Concerning Use of the Financial Test and Corporate Guarantees to Meet Financial Assurance Requirements under RCRA Programs* (January 11, 2006).
- American Chemistry Council, *American Chemistry Council's Comments to the California DTSC on Financial Assurance* (November 14, 2005).
- Example Corrective Action Financial Assurance documents

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ICF also explored the following:

- CIWMB documents addressing such topics as landfill gas, revegetation, post-closure land use, remaining capacity of landfills, solid waste cleanup program, and landfill closure loan program
- Documents and data prepared by California air and water agencies with authority over MSW LFs

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## 2. TASK 2: REVIEW AND EVALUATE FINANCIAL DEMONSTRATIONS

For Task 2, ICF understands that CIWMB is looking for a succinct overview of existing mechanisms and a discussion of new or alternative mechanisms, or ways that the current mechanisms can be modified to make the assurance last longer.

**Deleted:** For the past two years, ICF has been performing a similar task for the U.S. Nuclear Regulatory Commission (NRC) by reevaluating, in light of recent developments in bankruptcy, accounting, and commercial/legal practices, the adequacy and effectiveness of the financial assurance mechanisms adopted in 1988 by the NRC for use by its licensees in providing decommissioning financial assurance. ICF's work has provided the technical basis for a forthcoming proposed rulemaking by the NRC affecting all licensees.

### Task 2, Step 1: Agree on Criteria to Use for Evaluation

The effectiveness of financial assurance demonstrations stems from the effectiveness of their terms and conditions. ICF has developed and/or applied for federal, state, and foreign agencies a variety of specific criteria for assessing the effectiveness of financial assurance mechanisms. A core set of effectiveness criteria would include the following:

- Certainty that assured funds will be available --certainty of assurance requires that demonstrations contain no provisions that would impair the availability of required funds, such as unacceptable cancellation, termination, or other conditions, and overly broad exclusions. Certainty also is affected by the criteria used to determine who is eligible to offer assurance mechanisms (e.g., such as pure captives).
- Adequacy of value (i.e., amount) of funds assured -- adequacy of value refers to potential limits to the full amount of coverage provided by a demonstration, which could result from exclusions, sublimits, and other conditions.
- Liquidity of funds -- liquidity refers to the degree to which the demonstration can be readily converted to cash or otherwise made to fulfill obligations on a timely basis.
- Administrative burden and cost on regulated parties, issuers, and administering agencies -- these burdens and costs may be inherent to a demonstration (e.g., collateral requirements for a surety bond) or may be influenced by how the financial assurance program is designed (e.g., required use of standardized wording for a mechanism reduces burdens, the nature and extent of filing/notice requirements can raise or lower burdens).

Alternatively, we can use as our criteria safety, security, and timely availability of funds, as noted in the RFP, after agreeing on definitions for safety and security.

The deliverable for this step will be the agreed list of evaluative criteria and their definitions.

### Task 2, Step 2: Agree on List of Demonstrations to be Evaluated

ICF's analysis can include all the options for financial demonstrations found in Title 27, California Code of Regulations, Division 2, Subdivision 1, Chapter 6.

**Deleted:** ICF brings prior knowledge of these mechanisms, having been involved in their development at the federal and state levels.

We can add to the existing list any new or alternative demonstrations of interest to CIWMB, such as annuities (another form of insurance) and guaranteed investment contracts (GICs), another insurance product. ICF is not aware of any additional form of financial demonstration (e.g., catastrophe bonds) we would recommend as appropriate for solid waste landfills.

Problems with previously rejected mechanisms (e.g., escrows, security interests) have not changed; they continue to lack important security/certainty/ liquidity protections. ICF will provide a table summarizing reasons why other mechanisms have been rejected.

We will include some variations of existing demonstrations in our analysis. For example, the "funding demonstrations" (trust funds, enterprise funds, cash value insurance) can be reconfigured purely as assurance mechanisms that would provide funding only in the event of default by the responsible owner/operator.

At the conclusion of this step, the CIWMB Contract Manager and ICF will agree on the list of demonstrations to be evaluated.

### Task 2, Step 3: Perform Evaluation and Prepare the Task 2 Report

Using the agreed criteria (Step 1) and list of demonstrations (Step 2), ICF will prepare the draft Task 2 report following an outline and format approved by the CIWMB Contract Manager. We typically conduct this type of assignment in tabular format, which makes it easier to compare and contrast. ICF envisions summary tables with our ratings on the demonstrations and our rationales. Ratings can be numerical, H/M/L, or other indications. Rationales and assumptions for the ratings usually are offered in bullet form. To tailor ICF's assessment to the focus of this effort, we will specifically address the use of the demonstrations for long-term obligations such as Post 30-PCM and CA, at both active and closed facilities.

ICF understands that the draft Task 2 report is to be submitted in both hard and electronic copies using a software format acceptable to the CIWMB Contract Manager. ICF is prepared to answer any questions and clarify the draft as needed to secure the Contract Manager's approval.

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### 3. TASK 3: WORKING MODEL OF A STATEWIDE POOLED FUND

Task 3 is a critical aspect of the project because a government fund may be the ultimate fallback option in the absence of private market solutions. Our goal is to model how a statewide pooled fund would work that is intended to cover the costs of Post 30-PCM and CA for some extended period of time. The model can incorporate uncertainty through Monte Carlo simulation, because many parameters (e.g., timing, probability, and amount of CA) are uncertain. The model would represent something akin to how one would model an insurance pool. The model's output would tell CIWMB about how much of the costs the fund would cover or not (key performance metric) and allow some measure(s) of how "equitable" the fund would be. Ideally, the model will allow California to change/adjust inputs, rules, and other parameters.

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We will endeavor to design the model to incorporate a small number of key landfill risk factors (similar or identical to some of the key factors to be identified in Task 6) that might be expected to affect frequency, timing, and amount of Post 30-PCM and CA costs.

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As background and context for the working fund model, ICF will first perform the following two tasks:

(1) describe conceptually key design options for a Post 30-PCM and CA fund and then evaluate – also conceptually – a number of funds that combine different design options (including the fund design that is to be the basis for the working model), and

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(2) describe experiences with actual funds relevant to this study.

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**Task 3, Step 1: Conceptual Fund Models for Assurance of Post 30-PCM and CA**

ICF will access from the Contract Manager the list of 282 landfills covered by this contract with their SWIS numbers and LF name(s). The landfills included on the list are those currently subject to financial assurance requirements found in Title 27, California Code of Regulations, Division 2, Subdivision 1, Chapter 6.

Deleted: For Task 3 to be most useful to CIWMB and doable within the resources available under the contract, ICF and CIWMB need to be very precise about such key fund design questions as: which solid waste landfills will be covered – active, closed, or both? privately-owned, publicly owned, or both? and so on.

For Task 3 to be most useful to CIWMB and doable within the resources available under the contract, ICF and CIWMB need to be very precise about such key fund design questions as:

- which of the 282 solid waste landfills will be covered – active, closed, or both? privately-owned, publicly owned, or both? and so on. Based on directions from the CIWMB Contract Manager, ICF understands that the fund will cover all 282 landfills, including both currently active and currently closed landfills, and both privately- and publicly-owned landfills.
- does the scope of coverage include – All PCM or only PCM beyond initial 30 years (i.e., “Post 30-PCM”)? All Post 30-PCM or only Post 30-PCM for defaults? All CA or only CA beyond the initial 30-year PCM period? All CA or only CA for defaults? Based on directions from the CIWMB Contract Manager and consistent with AB 2296, ICF understands that the desired scope of coverage includes only defaults of Post 30-PCM and defaults of all CA for all covered landfills.

In this step of the analysis, ICF will identify several conceptual fund models for assurance of Post 30-PCM and CA, such as those illustrated by the following matrix:

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	Active Landfills Only	Closed Landfills Only	Both Active and Closed	Other
Pay All Costs	Model 1	Model 2	Model 3	TBD
Cover Defaults Only	Model 4	Model 5	Model 6	TBD
Post 30-PCM Only	Model 7	Model 8	Model 9	TBD
CA Only	Model 10	Model 11	Model 12	TBD
Post 30-PCM and CA	Model 13	Model 14	Model 15	TBD

ICF will analyze the advantages and disadvantages of different types of conceptual fund designs including separate and combined funds for Post30-PCM and CA. In doing so, ICF will consider such design issues as equity, efficiency, incentives (e.g., adverse selection<sup>1</sup> and moral hazard<sup>2</sup>), and relation to existing programs for assuring PCM and CA. ICF will include in this analysis up to 10 different alternate fund concepts that cover a range of relevant designs and experience, as agreed with the CIWMB Contract Manager. This conceptual overview will provide context for the subsequent review of actual fund experience and the development of a working pooled fund model.

### Task 3, Step 2: Review Pooled Funds Experience

Many states, including California, have developed state funds as financial assurance mechanisms and/or funding mechanisms to deal with various categories of environmental problems. ICF will draw from this experience a cross-section of different types of funds (e.g., orphan site funds, assurance funds, insurance funds, payment funds, loan funds), including funds used in California (e.g., State Compensation Insurance Fund) as well as lessons learned from ICF's Report to Congress on a federal post-closure liability trust fund. Based on discussions with the CIWMB Contract Manager, ICF may include state funds such as those in Connecticut and Minnesota where laws provide for the state to take over facilities following closure and establish a Trust Fund for that purpose. For this task, ICF can draw upon excellent documentation we have collected (including some audit reports) regarding the ups and downs of state UST funds; a number of states are in the process of sunsetting their state funds and relying instead on private mechanisms such as insurance. Some of these states have delayed the sunsetting process due to various concerns. ICF also will review our internal library of financial responsibility documents and our research for Environment Canada<sup>3</sup> for other pertinent experience (e.g., *Financial Responsibility Long Term Study*, State Water Resources Control Board (Jan. 1995)). ICF will prepare a list of funds (or types of funds) to be covered, for review and approval of the CIWMB Contract Manager.

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Because of the different ways we can present this material, ICF will first develop an outline for discussion with the CIWMB Contract Manager. We anticipate including such information as types of facilities and costs covered, source(s) of funds, conditions or limits on payments (e.g., compliance with financial assurance rules), and how funds are prioritized when needs are greater than current balances. To make experience with pooled funds more useful for CIWMB, ICF will relate lessons learned to type (e.g., mandatory or voluntary) and size of fund. We believe the size of the fund is important because fewer than 300 landfills make up the universe of concern for this project, whereas many pooled funds for USTs cover thousands of locations. A mandatory participation feature is an uncommon feature of most state funds.

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Some ICF Pooled Fund Experience. [3]

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<sup>1</sup> "Adverse selection" refers to the greater interest in being insured shown by those with greater risks; those with less interest in insurance tend to have lesser risks.

<sup>2</sup> "Moral hazard" refers to the incentive to take less care by those who are covered by insurance.

<sup>3</sup> *A Fact-Finding Analysis of the Liability and Compensation Regimes for Hazardous Wastes and Hazardous Recyclables Management in Canada, the United States, and Mexico, Final Report*, prepared for Environment Canada by ICF Consulting, October 24, 2003

### Task 3, Step 3: Identify Data Needs and Data Sources for Working Model of Fund

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In this step, ICF will assess readily available data that can be used in the pooled fund working model (e.g., as a basis for estimates of timing, likelihood, and/or costs for Post 30-PCM and CA for 282 specified LFs). Potential data sources include:

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- SWIS
- LCS data
- CIWMB Waste Stream Profiles for LF facilities
- Data collected, developed, and/or compiled by CIWMB staff
- Data available from air and water agencies with authority over MSW LFs.

ICF will assess the data sources and identify the data we recommend using for Task 3. ICF will send a short description of our recommendations and rationales for approval by the CIWMB Contract Manager.

### Task 3, Step 4: Estimate Costs of Post 30-PCM and CA Default Fund

With respect to the demand side of the pooled fund, our working model will address the key cash flows: (1) need for funds for defaults of Post 30-PCM, (2) need for funds for defaults of CA, and (3) need for funds to set-up and administer the pooled fund. Cash flows will be presented in current-year dollars, regardless of when they might occur, unless CIWMB requests a different approach. ICF will assume – as a simplifying assumption – there will be no new landfills at new locations joining the fund.

Landfill Owner/Operator Costs. Costs to operators will vary greatly depending on who and what is covered. ICF will develop estimates of owner/operator costs based on mandatory participation of about 282 currently closed and active solid waste landfills subject to financial assurance, for coverage of Post 30-PCM (just defaults) and CA (just defaults), which is the agreed upon fund design.

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Estimate Timing and Amounts of Post 30-PCM Cash Flows. In order to estimate the timing of Post 30-PCM expenditures for both active and closed LFs, we need to know (for closed LFs) and estimate (for active LFs) when the Post 30-PCM period begins. For this step, ICF will build on prior work by CIWMB staff, notably the analysis referenced in Appendix 4 of the December 2004 workshop materials. That work addressed most if not all of the LFs of concern in this study. That work developed potential closure dates for currently active LFs. In addition to using those estimated closure dates, ICF can perform a sensitivity analysis to estimate the implications if active LFs in the cohort were to close later or earlier than the estimates.

In order to estimate the amounts of Post 30-PCM, we will use the latest PCM cost estimates readily available for LFs in the study: the cost estimates used to calculate the amount of PCM FA that must be demonstrated. ICF will discuss with CIWMB the desirability of making some further adjustments to these PCM cost estimates to reflect potential shortcomings of the currently effective rules for PCM cost estimation. The adjustments will generically address the use of third party “prevailing wages” costs, appropriate contingency factors, and repair/replacement of

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PCM capital assets. By making such an adjustment, ICF will have a better basis for estimating full costs of PCM in the future.

Estimate Occurrence, Timing, and Amount of CA Expenditures. Very little data are available for this step and opinions vary greatly about future performance of solid waste LFs, which means that ICF will need to make various assumptions and perform bounding analyses. To ensure clear communication with CIWMB, ICF anticipates producing a series of short “white papers” for the major modeling decisions, including issues, options, recommendations, and rationales. The white papers will form sections of the model report/documentation. At a minimum, ICF will develop white papers on occurrence, timing, and amount of CA.

At the start, ICF will identify different types of CA that may be required at MSW LFs, such as:

- installation and operation of groundwater monitoring wells
- groundwater extraction, treatment, and disposal
- installation of prescribed cover
- installation and operation of gas control/extraction system
- installation and operation of leachate collection system
- installation of clay barrier layer on side slopes

ICF’s white paper will address options to model CAs and potential simplifying assumptions. ICF also will address potential issues, such as characterization of activities as CAs or as closure/PCM activities.

ICF’s white paper on modeling CA occurrence at MSW LFs will include the prospect of more than one CA per LF. The paper may address options for linking CA occurrence to one or more LF characteristics (e.g., from Task 6). Because definitive data are lacking and opinions vary diametrically regarding the probability of needing corrective action at the cohort of landfills in this study, the paper will address the bounding concept that most, if not all, LFs will require CA eventually.

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ICF will prepare a white paper on timing of CAs. The paper will address the lengthy time periods that may pass before problems become manifest and options for addressing this in the model (including any simplifying assumptions).

ICF will prepare a white paper on the potential costs of CAs for MSW LFs. The paper will consider how certain LF characteristics can affect costs, available data on CA costs, modeling options, and potential simplifying/bounding assumptions.

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<sup>4</sup> CIWMB informed ICF that based on California’s Solid Waste Assessment Test conducted during the late 1980s and early 1990s, 80% of unlined and clay-lined landfills, which still comprise about 50% of California landfills in operation, release contaminants to groundwater. In addition, not only have composite-lined landfills released contaminants to groundwater, but most operating composite-lined landfills have closed units that are either unlined or clay-lined. These facts coupled with the time it will take in-place waste to degrade to a point where it is no longer a threat to the environment (centuries in many cases) means that most, if not all, landfills will eventually require corrective action.

To address uncertainty, ICF will perform Monte Carlo simulations (or equivalent) for a limited number of uncertain parameters.

Simulate Defaults. ICF will prepare one or more white papers on how to simulate defaults in the working model. We may design both “random” defaults and “event-driven” defaults for the model. Random defaults are considered to be independent of events simulated in the model; event-driven defaults likely will be linked to the simulated occurrence of releases requiring corrective action. Thus, for some landfills in the working model, the occurrence of releases will lead to defaults with respect to CA; other landfill owners/operators will be simulated to randomly experience defaults affecting their payments for both Post30-PCM and CA (if relevant). ICF will work with CIWMB regarding the application of default simulation methods to public sector owners/operators. ICF will consider designing the model to include simulated defaults affecting commonly owned landfills and/or landfills in a common area that might all be affected by earthquakes.

QA/QC. ICF will perform certain QA/QC activities. For example, we will see whether we can replicate prior CIWMB studies using the same or similar datasets. We will spot check data items randomly.

Fund Administrative Costs. Fund administrative costs include the upfront costs of setting up the fund and its rules as well as the ongoing costs of administering the fund after it has been established. The upfront, one-time costs to CIWMB of establishing the fund initially depends less on fund design than the fund’s annual administrative costs. We propose researching California fund experience as the basis for those estimates.

Presentation of Results. ICF will present results in tables and graphically (e.g., showing cash flow needs over time, as done by CIWMB for the December 2004 workshop (see App. 4)). ICF proposes to bound the potential need for funding, both magnitude and timing with a “base case” representing our best initial judgments concerning amounts and occurrence and a “reasonable worst case” (to be defined), for the universe of 282 landfills, active and closed, to be covered by the pool. ICF will share proposed table shells with the CIWMB Contract Manager.

In addition to aggregate cash flow needs, ICF will disaggregate our funding estimates for Post 30-PCM and for CA separately. The relative size of the two different issues may have implications for a potential insurance program. ICF also will disaggregate results by certain groupings of landfill characteristics such as size, age, location, and other features. A goal of the disaggregation is to provide potential bases for assessing equity and for insurance underwriting.

### **Task 3, Step 5: Model Pay-Ins and Identify Earnings Potential of the Fund**

In modeling and evaluating pooled funds, it is useful to distinguish the supply-side – which is money entering the fund, from the demand side, the money leaving the fund for its chartered purposes. These two cash flows need to complement each other, with the supply-side adequate to meet the needs of the demand side. The supply of funds has two major components: (1) pay-ins by participants and (2) earnings on unexpended balances. Our working model will address both of these key cash flows.



Supply Side Pay-Ins. ICF will prepare a white paper on options for owners/operators providing the funds needed for defaults of Post 30-PCM and CA, as estimated above. ICF will focus on ways of assigning payments into the fund by basic LF characteristics (e.g., age, size, location, operating status).

Fund Earnings. In comparing the fund's supply and demand cash flows, it can be material to assess potential earnings on monies in the fund that are not yet required for disbursements. CIWMB has prepared illustrative graphs showing fund earnings for discussion at stakeholder workshops on long-term PCM and CA. In calculating fund earnings, the drivers are the likely rate of return and duration time before disbursements. The earnings of a pooled fund depend on expected real, after-tax rates of return. Because of the long time periods potentially involved, the accumulation of money in the fund may well be sensitive to different assumptions about expected real after-tax rates of return. That is something ICF can readily test and demonstrate, using the model we create.

ICF notes that several states which had accumulated significant sums in environmental funds actually had those dollars re-programmed by their legislatures.<sup>5</sup> Therefore, we encourage CIWMB to consider that risk in reviewing the cash flows, earnings, and net fund values we calculate.

### **Task 3, Step 6: Assess Fund Coverage, Equity (in Contributions, Payouts), and Risk**

Fund Coverage. Coverage of defaulted long-term PCM and CA costs will be a key metric for assessing any pooled fund. ICF will "test" a variety of scenarios and measure coverage as one metric of fund adequacy. ICF's working model will enable CIWMB to evaluate different scenarios and adjust key parameters. We will model how different rules for paying into the fund result in sufficient (or insufficient) cash to meet the expected draws on the fund. Comparing fund supply to demand for funds over time is how we propose to assess fund adequacy.

Equity. An important issue in fund design is equity, which is crucial for political support: equity (or fairness) in how/who pays into the fund and in access to fund coverage. Of course, the point of a pooled fund may be risk sharing, which means some degree of unavoidable cross-subsidization. Equity will need to be operationalized so that the model can calculate it for different scenarios.

ICF will prepare a white paper on equity. Some aspects of equity are purely a function of the rules of a fund – do those who pay into the fund have a call on the fund? Must those who can call on the fund, also contribute to the fund? Will those who withdraw more than their contributions be assessed retrospective "true-up" payments?

Other aspects of equity can be assessed quantitatively by comparing pay-in and pay-out amounts (adjusted for real fund growth due to the passage of time) for categories of LFs such as active vs.

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<sup>5</sup> Similarly, some in the private sector have eyed the monies deposited into nuclear reactor decommissioning trust funds and proposed insurance pools instead.

closed, large vs. small, and private vs. public. In order to conduct these quantitative equity assessments, ICF must access appropriate data.

Equity concerns are exacerbated when both active and inactive facilities are covered by a fund – inactive facilities may claim to not have direct revenue streams (tip fees) to provide money for the fund, and inactive facilities may be further along in developing needs to access the fund for CA or to repair/replace aging capital goods such as leachate collection systems and covers. The RFP states that the modeled funds will not receive contributions from closed landfills. Thus, equitable procedures for pay-ins will depend on other factors. ICF will identify the advantages and disadvantages of this type of fund design.

Risk. In order for the results of the model to be most useful to insurers who may be interested in the program (see Task 4), we will want to evaluate fund performance in view of the “10-10 rule.” That rule of thumb is used to demonstrate that a program actually qualifies as insurance. It means that an insurer will want to be able to demonstrate that there is at least a 10% probability that the insurer will lose 10% on the liability. (FASB may revise this rule.)

Simplifying Assumptions. ICF will document all simplifying assumptions. For example, ICF’s working model will not be considering replacement of closed landfills by active ones at new sites. The model will apply at the level of an entire landfill facility, not at the level of individual units. And so on.

### Task 3, Step 7: Prepare Task 3 Report

ICF understands that the draft report is to be submitted in both hard and electronic copies using a software format acceptable to the CIWMB, Contract Manager. Key to our approach is not to wait until all the research and analysis are complete and final before we start writing. Instead, pieces of the report will be drafted early as “white papers” on key components of the task. Also, to facilitate model design, we will draft example formats of tables that will show model inputs or outputs. The white papers and table formats will be provided to the CIWMB Contract Manager. The goals are to develop key pieces of the report early and secure CIWMB comments early. We also will prepare a draft report outline early in this task, recognizing that the outline will likely change from month to month. Through these means, the CIWMB Contract Manager should not be surprised by the contents and presentation of our draft report. ICF is prepared to answer any questions and clarify the draft as needed to secure the Contract Manager’s approval.

## 4. TASK 4: COMMERCIAL INSURANCE PRODUCT

ICF understands that this task involves assessing the interest of commercial insurers in offering an “umbrella” insurance product covering defaulted Post 30-PCM and CA costs at active and closed landfills. ICF notes that the RFP states that the product must be purchased by all landfill operators (to avoid adverse selection).

Our overall project manager **Paul Bailey** would lead this task. He has extensive experience with environmental insurance products and insurers. Mr. Bailey also will use the services of our

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subcontractor American Risk Management Resources network, which specializes in environmental insurance placement issues.

#### **Task 4, Step 1: Define the Coverage**

For this step, ICF will prepare a short white paper addressing options and issues with respect to the scope of coverage. ICF may address the mandatory nature of the coverage in contrast with having the insurance be an option (e.g., alternative to participating in a statewide pooled fund). ICF also may address the coordination of coverage between the umbrella insurance and other FA. Based on feedback from CIWMB on the white paper, ICF will prepare a draft endorsement that would give certainty of coverage to CIWMB. ICF recommends an endorsement over a certificate because an endorsement actually modifies any policy to which it is attached; a certificate has inferior legal standing only as evidence of coverage. Such endorsements require experience in the use of specific terms and conditions, and care and precision in the definitions of coverage. We will provide the draft endorsement for review and approval by the CIWMB Contract Manager.

#### **Task 4, Step 2: Consult with Insurance Industry Representatives**

Given approved endorsement language, we will then consult with insurance industry representatives of firms known to be or have been active in the environmental insurance market. Although Mr. Bailey has personal contacts with key staff in these companies, our expert subcontractor ARMR.net will play a key role in this. The market players currently include AIG, Zurich, Ace, XL, Evanston/Essex, and Greenwich. We will assess their interest in the proposed mandatory insurance program which would consist of close to 300 landfills (active and closed) and the terms of coverage included in the draft endorsement. If an insurer demurs, we will enquire what changes (if any) would make the program more attractive.

#### **Task 4, Step 3: Estimate Pricing**

Many factors conceivably could be important in deciding on the pricing of the desired product. ICF will prepare a laundry list of potential factors (organized into logical categories) for reactions from the insurance industry. Ideally, ICF will have ready the results from our Task 3 simulations to share with the industry. Disaggregated results may shed light on key factors for pricing.

ICF proposes to estimate average anticipated premium cost by providing the CIWMB Contract Manager with estimates of the burden -- above the "actuarially fair" rate -- that insurers may require to cover their costs, earn acceptable returns, and manage uncertainty. Then, ICF can apply that burden to our estimate(s) of what an actuarially fair pay-in rate would be for individual landfills as an illustration, using the model developed in Task 3.

#### **Task 4, Step 4: Deliverables**

ICF will submit draft and final endorsements to the CIWMB Contract Manager in both hard copy and electronic format acceptable to the CIWMB Contract Manager. ICF will submit the

anticipated pricing structure with the final endorsement. ICF will submit a report describing the results of consultations with insurance industry representatives about their interest in the program. Note that desired insurance coverage may not be available from the insurance market. All deliverables will be reviewed and approved by the CIWMB Contract Manager.

## 5. TASK 5: FINALIZE WORK PLAN FOR TASK 6

ICF revised its proposed work plan for Task 6 in response to questions, issues, and directions from the CIWMB Contract Manager. We have budgeted for input from team members responsible for the task.

## 6. TASK 6: RISK SCREENING METHODOLOGY

Task 6 has a prominent place in CIWMB's RFP. ICF notes that the CIWMB Contract Manager plans to be closely involved in all steps of the task. Therefore, ICF plans to use our small business partner CalRecovery, located only an hour away from CIWMB, to facilitate close working relations. CalRecovery has an excellent record of performance for CIWMB and other clients; ICF and CalRecovery have teamed together for many years.

ICF understands that the goal of Task 6 is to develop a method that can be applied to any individual landfill to determine whether its risk factors for PCM and/or CA are high, medium, or low. Such a method could have many different applications in FA programs (or mechanisms) for PCM and CA. However, the goal of Task 6 is to develop such a method but not to apply that method to the 282 LFs that are the focus of Tasks 1-4.

The method could be used by anyone to rationally triage covered landfills into clearly and objectively defined H/M/L subsets using the factors/criteria for screening that we will define.

Our proposed approach includes both bottom-up and top-down components:

- The bottom-up approach involves developing the screening method by looking at a variety of individual factors and setting benchmarks for the factors that should clearly differentiate exceptional facilities. The approach includes integrating a number of these factors so that H/M/L benchmarks will reflect a range of relevant factors that work together as a triage mechanism.
- The top-down approach involves anecdotally identifying clearly exceptional landfills, such as landfills in very arid, undeveloped areas as well as problematic landfills located close to fault lines, high density population, etc. The key is to have a reference set of active/closed landfills that appear to pose very little risk or an unmistakably high risk due to the threat(s) posed. This set of actual landfills can serve as a "reality check" for the bottom-up approach. In developing the factors and benchmarks, coverage of the reality check landfills will be an indicator of success.

~~Deleted: Task 4~~ ... [5]

~~Deleted: Task 5~~ ... [6]

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~~<#>Inventory of Solid Waste Facilities That Violate State Minimum Standards and Outstanding Enforcement Orders~~ [7]

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A key initial step in identifying useful factors relevant to long-term PCM and/or CA is to determine data availability (and quality) for the covered landfill population. This will require working with SWIS data as well as the data set developed for the Landfill Facility Compliance Study. For each factor of potential interest represented or indicated in the databases, we will determine data availability (completeness), for both active and closed landfills.

### **Task 6, Step 2: Identify Key Factors**

CIWMB's RFP divides potential factors of interest into 3 groups:

- (1) site geo-technical factors (e.g., depth to groundwater, earthquake fault lines, annual rainfall),
- (2) factors relating to receptors of concern outside of the facility (e.g., human populations, endangered or sensitive habitats), and
- (3) factors related to landfill design, construction, maintenance, and compliance.

ICF believes this is an excellent typology that can be used as a starting point.

ICF envisions CalRecovery working with the CIWMB Contract Manager to develop candidate lists of specific factors that can materially exacerbate or mitigate risk. Once these factor lists are complete, we will assess data availability for each (see Step 1 above) as a first screen. Then we recommend the following exercise to narrow the list further:

- For each factor, discuss whether it can materially (i.e., substantially, significantly, an order of magnitude) alter (a) the probability of needing long-term PCM and/or CA and/or (b) the cost of long-term PCM and/or CA. We recommend using forms to organize the information and analysis. An example form appears below:

**EXHIBIT A  
Example Form**

Potential Factor	Material Impact on Probability? (Y/N)	Why?	Material Impact as Costs? (Y/N)	Why?
1				
2				
3				
.				
.				
.				

Deleted: Costs  
Deleted: Probability

For those factors believed to have a material effect, the team will develop benchmark values that would clearly and objectively identify exceptionally high or exceptionally low risk. We believe that the goal should not be to identify all potentially relevant factors (as one might do in a site-specific risk assessment) but to drive to a very short list of triage factors instead. We will work closely with the CIWMB Contract Manager to go through the lists.

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At the end of this process, we expect to have a relatively short list of dominant (material) factors with benchmark values identifying very high and very low risk. We will complete this process for all three categories of potential factors described in the RFP and above.

**Task 6, Step 3: Reality Check of Factors and Benchmark Values**

We propose to “check” the results of Step 2 above against a sample of landfills previously identified as High or Low risk in Step 1. This requires determining whether the benchmark values for the factors would classify such landfills according to our prior judgments. We will document the results and present them to the CIWMB Contract Manager for discussion.

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Working in consultation with the CIWMB Contract Manager, we will determine whether benchmark values need to be changed for the factors to achieve a better classification of facility risk, or whether any of the factors can be dropped from consideration.

ICF believes this approach, albeit largely qualitative, constitutes a rational analysis. We are open to changes in our proposed approach, however.

**Task 6, Step 4: Temporal Issues**

CIWMB points out that some of the factors are likely to change over time, particularly given the long time-frames under consideration. This is an issue for a factor such as proximity to human populations, given continued population growth in California, as well as factor(s) reflecting future land use patterns and changes in waste quantum and composition entering LFs in California due to the state’s goal of zero waste. Of course, data availability, quality, and

certainty decline for descriptions of the future. However, our team has the expertise to estimate future conditions in the state through access to population projections, waste stream data, etc., if necessary.

We will document our discussions on this topic, focusing on the availability of reliable data that could form the basis of judgments of the future. It may be that the method developed under Task 6 must be reapplied periodically (e.g., every 3-5 years) to capture changes in the factors. If the method ends up being relatively simply to apply, such an approach of periodic re-assessments may be more acceptable and efficient than an approach which requires controversial projections of the future. However, the data and analysis will drive our conclusions on this topic, as will consultations with the CIWMB Contract Manager.

### Task 6, Step 5: Weighting of Factors

If the top-down “reality check” (see Step 3 above) shows that equal weighting of the factors does not produce useful results, we will weight the factors differently to see whether the method then produces more useful triage results. We will pursue this in consultation with the CIWMB Contract Manager and write up our results.

### Task 6, Step 6: Finalize Method

Based on the results of the preceding Steps, we will finalize the method, including:

- selecting the minimum number of required factors and describing the rationales for selecting them;
- describing their weighting, if necessary, with rationales for the weighting factors selected;
- establishing the benchmark values for each factor associated with high, medium, or low risk, and rationales for their selection;
- assessing data availability and quality for each factor indicator;
- describing the performance of the bottom-up method vis-à-vis the site sample (top-down review); and
- evaluating the method’s robustness.

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ICF understands that the draft report is to be submitted in both hard and electronic copies using a software format acceptable to the CIWMB Contract Manager. ICF is prepared to answer any questions and clarify the draft as needed to secure the Contract Manager’s approval.

The deliverable for this task will include both a written report and a method that anyone can use to determine whether a given active or closed landfill has indicators of exceptional risk or lack thereof.

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<u>Task 1</u>	
<u>Person</u>	<u>Estimated Hours</u>
Jeff Archibald	6
Paul Bailey	24
Arun Varghese	4

<u>Task 2</u>		
<u>Person</u>	<u>Estimated Hours</u>	<u>Rationale</u>
Paul Bailey	40	Has completed several of these assessments recently
Michael Berg	4	Supported CIWMB financial assurance rules
John Collier	4	Developed local government tests
Craig Dean	40	Developed EPA and NRC mechanisms, supported Subtitle D criteria and CIWMB rules for financial responsibility
Associate	10	Support to above staff

### Some ICF Pooled Fund Experience

Prepared report on closure/post-closure fund for CIWMB  
 Developed *Handbook on Designing UST State Funds*  
 Performed actuarial studies for numerous UST funds  
 Profiled U.S. liability and compensation funds related to hazardous wastes and recyclables  
 Developed indicators of UST state fund distress  
 Third-party administrator for Pennsylvania UST fund  
 ICF collected available audit reports on state UST funds as part of our work helping EPA develop indicators for the viability of state funds

<u>Task 3</u>		
<u>Person</u>	<u>Estimated Hours</u>	<u>Rationale</u>
Paul Bailey	100	Helped develop UST fund design handbook
Jeff Archibald	200	Experienced technical-financial modeler
Arun Varghese	400	Experienced technical-financial modeler
Research Assistant	160	Support to above staff

<u>Task 4</u>

<u>Person</u>	<u>Estimated Hours</u>	<u>Rationale</u>
Paul Bailey	50	Insurance expert
Robert Rosenfeld	40	Insurance market expert
David Dybdahl	16	Insurance market expert

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<u>Task 5</u>	
<u>Person</u>	<u>Estimate Hours</u>
Paul Bailey	24
George Savage	18
Luis Diaz	14
Technical Support	3

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<u>Task 6</u>		
<u>Person</u>	<u>Estimated Hours</u>	<u>Rationale</u>
Paul Bailey	40	Experienced analyst of decision factors
Luis Diaz	180	Leads CalRecovery assignments, familiar with landfill design and performance issues
George Savage	232	Leads CalRecovery assignments
Linda Eggerth	TBD	CalRecovery
Research Assistant	60	Support to above staff
Associate	40	Support to above staff
Ralph Grismala	40	Geotechnical engineering resource
Ken Haskell	TBD	Landfill engineering resource
Kris Johnson	TBD	Landfill engineering resource