

**APPENDIX G**

**SUMMARY OF  
MISCELLANEOUS METHODOLOGIES FOR  
COST ANALYSIS**

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**A. Costs to ARB**

One-time compliance education and outreach costs are estimated as follows:

|  | <u>Low</u>     | <u>High</u>     |
|--|----------------|-----------------|
| In-House Educational Material Design (8 pages, black-and-white):   | \$1,000        | \$1,000         |
| Printing Cost for Educational Material—<br>8 pages x \$0.05/page x 4,674 – 10,073 stakeholders:                          | \$1,870        | \$4,015         |
| Postage—<br>\$0.60/piece x 4,674 – 10,073 stakeholders:  | \$2,804        | \$6,022         |
| Printing Cost for Educational Material (Trade Show Distribution <sup>1</sup> )—<br>8 pages x \$0.05/page x 2,000 pieces: | \$ 800         | \$ 800          |
| Total:   | \$6,474        | \$11,837        |
| <b>Total (rounded):</b>  | <b>\$6,500</b> | <b>\$12,000</b> |

The proposed ATCM will impose a cost to the ARB for TRU enforcement, for record management, and for issuing ARB identification numbers to operators or owners of TRUs. Initial costs to the ARB primarily involve developing the TRU database for tracking in-use TRUs and facility operations throughout the state. Additional cost will be incurred from enforcement activities through the ARB’s existing Heavy-Duty Vehicle Inspection Program performed at various CHP weigh stations throughout California and at various food distribution or cold storage facilities. The ARB is expected to incur annual costs to implement the TRU ATCM, but anticipates that the costs will be absorbed within existing budgets.

The Executive Officer has also determined that the proposed regulatory action will not create costs or savings in federal funding to the State.

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<sup>1</sup> Trade show distribution is assumed to be through existing ARB Enforcement Division trade show participation; may also include distribution of educational materials to TRU and engine manufacturers and dealers as needed.

## **B. Determination of Number of Affected Businesses, Including the Establishment of a Small Business Definition for the Purposes of This ATCM**

The total number of businesses directly affected by this ATCM consists of those businesses visited by and/or operating TRUs within the State of California. The number of affected businesses differs from the TRU inventory discussed in earlier chapters of this report due to the fact that affected businesses may own or operate more than one TRU, or none at all; some businesses are only visited by TRUs and do not operate any.

A relatively small number (less than 100) of affected businesses are involved in direct TRU-related activities, such as the distribution, sale, and servicing of TRUs.

### **B.1. Number of Businesses Operating TRUs**

Direct information on the number of businesses that operate TRUs is not available. TRUs are not subject to any known registration program, and although Department of Motor Vehicles (DMV) registration records do indicate whether a truck or trailer is refrigerated, it is not possible to determine from the records if the vehicle has a TRU that is subject to this regulation.

For the analysis purposes of this ATCM, the following criteria were used to determine if a business may be classified as meeting the small business definition:

**Table G-1  
Summary of Small Business Determination Criteria**

| Business Type            | Small Business Criteria     | Estimated Percentage of Affected Businesses Meeting Sm. Bus. Criteria |
|--------------------------|-----------------------------|---|
| Facility Visited by TRUs | Has Fewer Than 20 Employees | 81  |
| TRU Operator             | Has 20 or Fewer TRUs        | 66  |

Meeting the small business criteria does not relieve business owners of any obligations under this ATCM. The small business criteria were used for analysis purposes and establishment of the facility reporting requirement threshold.

Typical businesses are considered the remainder of the affected business population; 19 percent of facilities, 34 percent of TRU operators.

#### **B.1.1. Number of TRU Operators**

The number of operators was estimated by examination of the California Highway Patrol (CHP) Biennial Inspection of Terminals (BIT) list and an insurance industry-based list (FleetSeek) of vehicle operators. The examination eliminated from the lists those

businesses whose names obviously indicated that they were unlikely to have TRUs; for example, concrete sales and construction businesses. From these lists, the estimated number of California vehicle operators possibly having TRUs is 1,477 to 5,500. It is estimated that 25% of the total TRUs in California are from out of state; we apply this percentage to estimate the number of out-of-state businesses operating TRUs in California:

$$\text{Lower Limit of Estimated Range (California operators)} \times 0.33 = \text{Estimated Out-of-State Operators}$$

(33% of smaller number equals 25% of total)

$$1,477 \times 0.33 = 492$$

Performing the same calculation on the upper limit of the estimated range (California operators) gives 1,832 out-of-state operators. (ARB, 2003)

To summarize:

**Table G-2**  
**Estimated Number of TRU Operators**

|                 | Low   | High  |
|-----------------|-------|-------|
| California      | 1,477 | 5,500 |
| Out-of-State    | 492   | 1,832 |
| Total           | 1,969 | 7,332 |
| Total (rounded) | 2,000 | 7,300 |

### B.1.2. Number of Facilities Where TRUs Operate

Direct information on the number of California facilities where TRUs operate is not available. The facility requirement of this regulation only applies to facilities located in California. Since most facilities where TRUs operate are subject to state or federal licensing programs, lists of the licensees in the programs that were likely to involve TRUs (wholesale food distribution, dairy products, etc.) were obtained and the number of facilities was tabulated. It is recognized that some facilities may appear on more than one list, due to overlapping licensing requirements and/or business conditions that may require more than one license. This possible duplication will tend to overstate the actual number of facilities; however, the extent of this effect is minor, and may be partially or totally offset by businesses that may not appear on the lists. (DFA, 2002) (DHS, 2003) (USDA, 2003)

**Table G-3  
Facility Count From Licensing Program Lists**

| Name of Licensing Program                            | Number of Facilities | Affected Facilities |
|--|----------------------|---------------------|
| CA Dept of Health Services—Wholesale Food Facilities | 6,413                | 2,164               |
| CA Dept. of Food & Agriculture—Meat & Poultry        | 620                  | 209                 |
| CA Dept. of Food & Agriculture—Milk Plants           | 50                   | 17                  |
| CA Dept. of Food & Agriculture—Egg Handlers          | 350                  | 118                 |
| US Dept. of Agriculture—HACCP Large Facility         | 12                   | 4                   |
| US Dept. of Agriculture—HACCP Small Facility         | 294                  | 99                  |
| US Dept. of Agriculture—HACCP Very Small Facility    | 278                  | 94                  |
| <b>Total</b>   | <b>8,017</b>         | <b>2,705</b>        |

This is the estimated number of California facilities where TRUs operate; however, not all facilities will experience costs associated with the reporting requirement of this regulation. Only facilities meeting certain criteria must report. Due to a lack of data, complete adjustments to the total number of facilities to determine the actual number of facilities that must complete and submit a facility report are not possible. However, for a subset of the DHS licensee list, data on the number of employees per facility are available. This is one of the criteria for determining if a facility must submit a report. Using these data, a percentage of facilities with 20 or more employees was determined, and this percentage was applied to the facility total to provide some adjustment to refine the total number of facilities that must submit a report.

Number of Facilities With 20 or More Employees / Total Number of Facilities Reporting  
Number of Employees Information = Ratio of Facilities With 20 or More Employees

$$635/1882 = 0.3374 \sim 33.74\%$$

Total Number of Facilities x Ratio of Facilities With 20 or More Employees = Adjusted Total Number of Facilities (itemization is shown in the table above)

$$8,017 \times 0.3374 = 2,705 \sim 2,700 \text{ (rounded)}$$

Since data were not available to adjust the total for the other criteria triggering a facility report, the number calculated above is considered the upper bound of the estimated number of facilities that are required to report. This is a conservative estimate, as it assumes that all facilities with 20 or more employees will have to provide a facility report, when it is known that an undetermined number of facilities will be exempted due to other provisions in the regulation. To provide a conservative lower bound, the same number was used for the lower bound. This was done to account for facilities that may not appear in any of the consulted licensee lists.

Adding the number of operators and facilities gives the total number of businesses affected:

**Table G-4  
Total Number of Affected Businesses**

| Category                                    | Low   | High   |
|---|-------|--------|
| Number of Operators                         | 1,969 | 7,332  |
| Number of Facilities (20 or more employees) | 2,705 | 2,705  |
| Total                                       | 4,674 | 10,037 |
| Total (rounded)                             | 4,700 | 10,000 |

B.2 Number of Small Businesses Affected by the Regulation

The determination as to whether a given business can be considered small is typically performed by examining one or more indicators of the business' activity level (revenue, number of employees, etc.) and comparing the indicator(s) against the limits contained in the small business definition. Small business definitions can vary by type of industry and from organization to organization making the definition. Typically, small business definitions are established with a specific objective in mind, such as eligibility for financial assistance or preferential treatment in awarding purchase orders. Based upon the analysis below, small businesses (for the purpose of this analysis) are considered those operating 20 or fewer TRUs; facilities with fewer than 20 employees are also considered small businesses.

B.2.1. Operators (Small Business)

Both California Highway Patrol (CHP) and insurance industry data (FleetSeek) were examined for indicators that could be used to determine appropriate criteria for assessing whether a business could be considered small. Although revenue information is available, it is incomplete and therefore was considered unsuitable for analysis purposes. Other common business activity indicators, such as the number of employees, business physical size, etc., were not readily available for the data set.

Complete information was available on the number of vehicles per business, and though detailed information on the number of vehicles with TRUs for a given business was not available, it is assumed that the number of vehicles per business is an indicator of the volume of business activity of a company. It was also assumed that the number of vehicles was equal to the number of TRUs operated by a business.

Given the range of vehicle fleet sizes (one to over 100 per business), and the assumption that businesses with one to five vehicles could safely be considered small businesses, a chart of the frequency distribution of the number of vehicles (Estimated Fleet Size of Motor Carriers with (or Likely to Have) TRUs) (Chart 2 in this Appendix) was examined for a natural break point in the distribution. Starting from the smallest fleet size (one to five vehicles) and working towards the largest, the number of businesses (carriers) drops quickly, not rising again until the 21 to 25 vehicle point. At this break point in the distribution, 1,084 fleets have 20 or fewer vehicles and are assumed to be small businesses. This is based on examination of a data set consisting

of information for 1,338 fleets. Dividing the total number of operators (total number of businesses analyzed) by the number of small businesses gives a ratio that can be applied to the operator numbers calculated above to give the number of small businesses.

Number of Small Businesses / Total Number of Businesses Analyzed = Ratio of Small Businesses (operators)

$$1,084 / 1,338 = 0.8102$$

Applying this ratio to the operator estimates above gives the following range:

**Table G-5  
Number of Small Businesses (operators)**

|                 | Low   | High  |
|-----------------|-------|-------|
| California      | 1,197 | 4,456 |
| Out-of-State    | 399   | 1,484 |
| Total           | 1,596 | 5,940 |
| Total (rounded) | 1,600 | 6,000 |

### B.2.2 Facilities (Small Business)

The number of employees per facility was the indicator examined to determine appropriate criteria for assessing whether a business could be considered small. Other common business activity indicators, such as annual revenue, business physical size, etc., were not readily available. Number of employees per facility data were available for 1,882 facilities. Examination of a chart of the frequency distribution of the number of employees per facility (Number of Employees per Facility 6 (2/bin)) (Chart 1 in this Appendix) shows that there is a drop in the frequency distribution at the 20 employee point, with a rise in the number of facilities with less than or greater than this quantity. At this break point in the distribution, 1,247 facilities have fewer than 20 employees and are assumed to be small businesses. Using the quantity of facilities with fewer than 20 employees and the total number of facilities for which employee quantity data are available, a ratio can be calculated:

Quantity of Facilities With Fewer Than 20 Employees / Total Number of Facilities With Available Data = Ratio of Small Businesses (facilities)

$$1,247/1882 = 0.6625$$

Applying this ratio to the estimated number of facilities from above gives the following number:

$$8,017 \times 0.6625 = 5,311$$

This is the number of facilities that would be considered small businesses and would not be included in the facility reporting requirements outlined in the ATCM. Therefore, these businesses would not incur any costs associated with facility reporting.

The only small businesses affected by the ATCM would be those operating TRUs. Since none of the facilities classified as a small business under the criteria given above are affected by the facility provisions of this ATCM, their contribution to the total number of affected small businesses is zero.

**Table G-6  
Number of Small Businesses Affected by the Regulation (total)**

|                 | Low   | High  |
|-----------------|-------|-------|
| California      | 1,197 | 4,456 |
| Out-of-State    | 399   | 1,484 |
| Total           | 1,596 | 5,940 |
| Total (rounded) | 1,600 | 6,000 |

ATCM Annual Total Cost Apportionment Between Facilities and TRU Operators

To place the ATCM costs in perspective, the costs attributed to both facilities and operators are expressed below as percentages.

The range of annual (for a 13-year period) operator and facility costs are itemized as follows:

|                         | <u>Low</u>         | <u>High</u>         |
|-------------------------|--------------------|---------------------|
| Operators—              |                    |                     |
| In-Use:                 | \$4,175,634        | \$8,113,805         |
| Reporting:              | <u>\$78,760</u>    | <u>\$2,346,240</u>  |
| Sub-Total:              | \$4,254,394        | \$10,460,045        |
| Percentage of Total:    | 96                 | 67                  |
| <br>Facilities—         |                    |                     |
| Reporting (annualized): | <u>\$198,200</u>   | <u>\$5,145,153</u>  |
| Sub-Total:              | \$198,200          | \$5,145,153         |
| Percentage of Total:    | 4                  | 33                  |
| <br>Total               | <u>\$4,452,594</u> | <u>\$15,605,198</u> |
| Total (rounded):        | \$4,500,000        | \$16,000,000        |



## C. Cost Analysis Matrices and Charts

### Matrix 1

Used to calculate the in-use compliance cost for the low and high ends of the cost range for VDECS Scenario (assumed 100% application of the listed technologies to the in-use fleet at time of compliance) and the two alternatives, Electric Standby Retrofit (Alternative #1) and Cryogenic Technology (Alternative #2). As for the VDECS Scenario, 100% application of the listed technology to the eligible in-use fleet is assumed.)

For each scenario, the TRU engine population for each category is multiplied by the costs for the assumed compliance technology. Costs used are initial and annual, with the initial cost (cost of compliance equipment and installation labor) spread out over an assumed ten-year useful life, taking into account the time value of money. The annual cost includes recurring costs attributable to the compliance technology, over and above those currently experienced by a TRU operator for diesel use. The costs per engine category are then summed for a given year to arrive at an annual cost, for that year.

### Matrix 1a

This matrix is used to calculate the in-use compliance cost for the engine/TRU replacement scenario. Instead of VDECS in-use compliance costs, this matrix uses engine and TRU replacement costs for the calculations. It uses the same methodology as Matrix #1, but apportions an assumed fifteen percent for new TRUs and forty percent for engine replacement to calculate the in-use compliance cost for this scenario.

### Matrix 2

For the VDECS scenario, this matrix is used to calculate the ATCM's annual and total costs, as well as its cost effectiveness.

### Matrix 2a

For the engine/TRU replacement scenario, this matrix is used to calculate the annual and total costs, as well as the cost effectiveness.

### Matrix 3

This matrix is used to calculate the cost effectiveness, as well as the annual and total costs of Alternative #1.

### Matrix 4

This matrix is used to calculate the cost effectiveness, as well as the annual and total costs of Alternative #2.

### Chart 1

Used to examine the distribution of the number of employees per facility and select a threshold for a small business definition for facilities visited by TRUs.

### Chart 2

This chart shows the distribution of fleet sizes for motor carriers with (or likely to have) TRUs. Used to help select a small business threshold for TRU operators.

## References

ARB, 2003. Air Resources Board. Preliminary Draft Summary—California Motor Carriers With (or Likely to Have) TRUs. June 6, 2003

DFA, 2002. California Department of Food and Agriculture, California Department of Food and Agriculture Confidential Databases for Meat and Poultry - April 2002 Floppy Disk, Milk Plants - January 2002, and Egg Handlers - August 2002.

DHS, 2003. California Department of Health Services, California Department of Health Services Database for Wholesale Food Facilities, February 2003.

USDA, 2003. U.S. Department of Agriculture Databases for Hazard Analysis Critical Control Program (HACCP) Large and Small Facilities. Floppy Diskette. June 2003.