WAGE RATES FOR ECONOMIC ANALYSES OF

THE TOXICS RELEASE INVENTORY PROGRAM

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Introduction

The Office of Environmental Information administers the Toxics Release Inventory (TRI) program. This program requires annual reporting from facilities in manufacturing and certain other industry sectors, as well as federal facilities. Using readily available information and reasonable estimates, facilities must complete TRI reports on toxic chemical releases and other waste management activities.

The wage rates of personnel at reporting facilities are used to quantify the cost of the time spent gathering information, making estimates, and completing the TRI reports. Base hourly wages for relevant labor categories are loaded with factors for benefits and overhead to derive a loaded hourly rate. Historically, the derivation of these loaded hourly rates has been based on a method developed for EPA's Comprehensive Assessment Information Rule (CAIR) in the mid-1980s. This memo has the following objectives: 1) to describe the CAIR-based method, 2) to discuss certain problems of data availability and extreme assumptions that are associated with this method, and 3) to develop a revised method for deriving loaded hourly wage rates appropriate for TRI and other information collection programs.

CAIR-Based Method

This section describes the CAIR-based method. In this method, labor devoted to completing the TRI reporting forms is divided into three categories: managerial, technical, and clerical. Wage data for these categories are obtained from the Occupational Compensation Survey (OCS) conducted by the Bureau of Labor Statistics (BLS) for all goods-producing, private industries.[1]

Managerial and technical level wage rates are constructed as composites of the BLS wage rates for several higher-level occupational categories and levels. Managerial labor is assumed to be composed of plant or facility research managers, legal managers, and financial managers. The managerial wage rate is derived as a weighted composite of the wage rates of Engineers (OCS levels VI-VIII), Accountants (OCS levels V-VI), and Attorneys (OCS levels IV-VIII). Technical labor is assumed to be composed of operational labor equivalent to head process or project engineers, and financial labor, such as accountants. The technical wage rate is derived as a weighted composite of the wage rates of Engineers (OCS levels III-VIII) and Accountants (OCS levels III-VI). The clerical wage rate is an average of all the clerical wage levels (OCS levels I-V).[2] The derivation of 1996

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[1] U.S. Department of Labor, Bureau of Labor Statistics. *Occupational Compensation Survey, National Summary*, Bulletin 2458, Tables D-1 and D-3.

[2] The method used for the original CAIR analysis also used wage information for chemists in estimating the managerial and technical wage rates. A revised version of the method used engineer salary data in lieu of chemists because updated information on wage levels for chemists was not available from BLS at the time of revision. The engineer salary information was expected to be similar to chemist salary information.

composite wages is shown in the table below. This is the last year for which OCS data are available.

CAIR-based Composite Wages (Dollars per Hour)

Labor Category	Occupation (levels)	June 1996 Average Wages	Weighting Factor	1996 Composite Wages
Managerial	Engineer (VI-VIII)	$50.47	10/17	
	Attorney (IV-VI)	$55.89	5/17	
	Accountant (V-VI)	$39.44	2/17	
	Composite			**$50.77**
Technical	Engineer (III-VIII)	$40.02	5/6	
	Accountant (III-VI)	$31.63	1/6	
	Composite			**$38.62**
Clerical	Secretarial (I-V)	$15.15	1/1	
	Composite			**$15.15**

The additional cost of benefits, such as paid leave and insurance, is obtained from data for white-collar occupations in private, goods-producing industries. A loading factor for benefits is calculated separately for the managerial, technical, and clerical labor categories. These data are obtained from the Employer Costs for Employee Compensation (ECEC) report by the BLS.[3] In the past, this loading factor has been between 40 and 45 percent of wages.

An additional loading factor of 17 percent of wages for relevant overhead is based on information provided by the chemical industry and chemical industry trade associations.[4] This loading factor is added to the benefits loading factor, then applied to the base wage (*e.g.*, $25/hr x [1 + (0.4 + 0.17)] = $39.25/hr). The results of this method–updated to March 2001 dollars using the Employment Cost Index–are shown in the following table.[5]

CAIR-based Composite Wages: Updated to 2001

Labor Category	1996 Composite Wages	ECI Ratio (Wages) 6/96:3/01	2001 Composite Wages	2001 Benefits and Overhead Loading Factor	2001 Loaded Hourly Rate
Managerial	$50.77	1.22	$61.94	1.574	$97.49
Technical	$38.62	1.18	$45.57	1.599	$72.87

[3] U.S. Department of Labor, Bureau of Labor Statistics. *Employer Costs for Employee Compensation.*

[4] Heiden Associates, *Final Report: A Study of Industry Compliance Costs Under the Final Comprehensive Assessment Information Rule*, Prepared for the Chemical Manufacturers Association, December 14, 1989.

[5] U.S. Department of Labor, Bureau of Labor Statistics. *Employment Cost Index, Historical Listing.*

Clerical	$15.15	1.20	$18.18	1.605	$29.18

One problem with this method is that the CAIR-based composite wage rates reflect an extreme assumption that TRI reporting responsibilities are heavily weighted toward top-level personnel.[6] As seen in the table below, the composite wage rates constructed using the CAIR-based method result in hourly wage rates that are actually *higher* than the 90th percentile wages for the managerial and technical labor categories, and close to the 90th percentile wages for the clerical labor category.

CAIR-based Composite Wages vs. 90th Percentile BLS Wages

Labor Category	2001 Composite Wages	2001 90th Percentile BLS Wages[7]
Managerial	$61.94	$48.78
Technical	$45.47	$40.16
Clerical	$18.18	$19.26

These composite wage rates imply that only personnel who rank in the top 10 percent of the most highly paid workers in private industry complete TRI reports. While this may or may not have been the case as industry first responded to TRI reporting requirements fifteen years ago, it is not the case today. Over the years, TRI reporting has become more routine as industry has gained experience with the regulatory requirements. EPA has eliminated many areas of uncertainty through the promulgation of additional regulatory notices and the development of detailed guidance documents. With years of experience, industry has developed standard methods (including automated reporting systems) for obtaining relevant data and completing the forms. It is unrealistic to assume that routine reporting requirements continue to be handled entirely by the staff at the highest compensation levels. Based on the experience of the TRI Program, a more representative mix of personnel at reporting facilities is now responsible for TRI reporting.

Another problem with the CAIR-based method is the continued availability of updated wage data for the relevant occupational groups and levels. The OCS data were last available for 1996. BLS has replaced OCS with the National Compensation Survey (NCS). While NCS addresses many of the same topics, methodological changes have eliminated the specific OCS occupational levels that were previously used to generate the composite wages. As a result, since 1996 the composite annual salary estimates have been inflated using the Employment Cost Index (ECI) for the relevant

[6] Memorandum from J. Karnes to Brian Muehling (EPA/OTS) on Updating of Unit Labor Costs to Reflect Inflation and Industry Comments for CAIR, Centaur Associates Inc. May 28, 1987.

[7] National Compensation Survey, NCS: Occupational Wages in the United States, 2000, Supplemental Tables, Table 2.1 (Private Industry, all workers). Inflated to Mar 2001 using Employment Cost Index, Historical Listing (Wages and Salaries Only), Private Industry Workers.

occupational categories in private industries.[8] It would be preferable to have updated compensation rates for the relevant labor categories that reflect the latest BLS methods rather than continuing to inflate the results of a discontinued survey.

Revised Method

Given the issues with the CAIR-based method, it is appropriate to develop a revised method to characterize the cost of time that facilities expend to complete the TRI reports. This method should use loaded hourly labor rates for a more representative mix of facility personnel and be straightforward to replicate and update.

An important step in revising the wage rate method is determining what type of personnel are involved in reporting. The skills required to comply with the reporting requirements will vary from facility to facility depending upon factors such as the complexity of the facility's processes, the type of use and disposition of chemicals at the facility, and transfers from the facility. Those responsible for reporting may often have engineering, scientific, or technical backgrounds. Compliance does not, however, necessarily require an engineering or other similar degree. At a minimum, an understanding of the facility's chemical purchases and production processes is required. Necessary skills may include the ability to evaluate and interpret records, understand material safety data sheets, and determine throughput or production volumes. Depending on the facility, estimates may be calculated using existing data collected under federal, state, or local regulations; emissions factors; design data supplied by the equipment manufacturer; mass balance techniques; or engineering calculations. Each technique requires varying skills and levels of sophistication to complete. In some instances, EPA guidance documents may supplant the need for a particular skill.

While personnel that contribute to TRI reporting may fall into a number of different disciplines, they can still be classified into one of three broad labor categories: managerial, technical, and clerical. This approach, like the CAIR-based method, assumes that the tasks involved in determining reporting obligations, making release and transfer estimates, maintaining records, and mailing reports is divided among staff at the managerial, technical, and clerical levels. Given the diversity of TRI reporting facilities, it is likely that personnel with a variety of job titles are involved in TRI reporting. Thus, it is appropriate to use average wages and salaries for major occupational groups rather than specific occupations since TRI does not require that reporting be completed by any specific discipline or occupation.

Average wage data for the relevant major occupational groups are available in the Employer Costs for Employee Compensation (ECEC) report from the Bureau of Labor Statistics (BLS) for all

[8] U.S. Department of Labor, Bureau of Labor Statistics. *Employment Cost Index, Historical Listing*.

goods-producing, private industries.[9] The managerial labor rate is defined as the average hourly wages and salaries for the "Executive, administrative, and managerial" major occupational group. This group includes occupations such as chief executives, financial managers, purchasing managers, and accountants. The technical labor rate is defined as the average hourly wages and salaries for the "Professional specialty and technical" major occupational group. This group includes occupations such as engineers, scientists, lawyers, and technicians. The clerical labor rate is defined as the average hourly wages and salaries for the "Administrative support, including clerical" major occupational group. This group includes occupations such as secretaries, clerical support, mail room personnel, and other administrative support occupations.[10]

The additional cost of benefits, such as paid leave and insurance, is also derived from information provided in the ECEC report. Loading factors for benefits are calculated separately for managerial, technical, and clerical labor by dividing the benefits percentage of total compensation by the wage percentage of total compensation for each major occupational group (*e.g.*, 0.285 / 0.715 = 0.40).

As in the CAIR-based method, an additional loading factor of 17 percent is applied for overhead. This loading factor is added to the benefits loading factor, then applied to the base wage (e.g., $25/hr x [1 + (0.4 + 0.17)] = $39.25/hr). The total loading for indirect costs is within the range of 50 to 70 percent suggested in EPA guidance.[11] The results of this method are shown in the following table.

Derivation of Loaded Hourly Rates for TRI Form Completion

Labor Category	March 2001 Average Wages	2001 Benefits and Overhead Loading Factor	2001 Loaded Hourly Rate
Managerial	$32.31	1.574	$50.86
Technical	$25.85	1.599	$41.33
Clerical	$13.97	1.605	$22.42

The ECEC report is updated on annual basis, so wage rates and benefits loading factors can be

[9] Employer Costs for Employee Compensation, Private industry workers, Goods-producing industries, white-collar occupations, as published by the U.S. Department of Labor, Bureau of Labor Statistics. The March 2001 values for these series are listed in Table 11 of the *Employer Costs for Employee Compensation Summary,* released June 29, 2001.

[10] Definitions of major occupational groups are available from the Bureau of Labor Statistics at http://www.bls.gov/ncs/ocs/ocsm/comMOGADEF.htm#mogaanchor

[11] U.S. Environmental Protection Agency, *EPA Air Pollution Control Cost Manual, Sixth Edition*, EPA-452-02-001, January 2002, pg. 2-34.

updated as needed. The ECEC is usually released each summer with a reference month of March. If updating is required before the next ECEC is available, average wages can be updated using the Employment Cost Index (ECI) for white-collar occupations in goods-producing, private industries.[12]

An advantage to using BLS average wages is that cross-industry and cross-discipline variation is captured in the BLS data. The BLS data are generated through statistical sampling of thousands of facilities in goods-producing private industry. The 2001 ECEC report relied on a probability sample of about 32,200 occupations within approximately 7,500 sample establishments in private industry.[13] As a result, the BLS data yields a reliable cross-industry average that is appropriate for programs like TRI that span a broad spectrum of industries.

Conclusion

The revised method produces a realistic cross-industry accounting of the wage rates of personnel whose efforts feed into the completion and submission of a TRI report. At the same time, the revised method is relatively straightforward to derive, replicate, and update. This method uses wage and benefit statistics that are readily available and updated by the Bureau of Labor Statistics. This method should be generally applicable to any information collection activity that requires some mix of management, technical, and clerical time.

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[12] Employment Cost Index (ECI), Wages and salaries only, Private industry workers, Goods-producing industries, white-collar occupations, Not seasonally adjusted, (June 1989 = 100), as published by the U.S. Department of Labor, Bureau of Labor Statistics. The March 2002 value for this series was 155.0 as listed in Table 6 (page 103), of the *Employment Cost Index, Historical Listing (June 1989 = 100)*, dated April 25, 2002.

[13] U.S. Department of Labor, Bureau of Labor Statistics. *Employer Costs for Employee Compensation*, Explanatory Notes, released June 29, 2001.