*Appendix G: O*NET Data Collection Program: The Effect on O*NET Response Rates and Costs of Offering a Monetary Incentive to the POC*

The Effect on O*NET Response Rates and Costs of Offering a Monetary Incentive to the POC

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Contents

Exhibits

Executive Summary

The Occupational Information Network (O*NET) program is a comprehensive system for collecting, organizing, describing, and disseminating information on occupational requirements and worker attributes. The O*NET database is designed to be the most comprehensive standard source of occupational information in the United States. The O*NET Data Collection Program is an ongoing effort to populate and maintain the O*NET database with valid, reliable, and current occupation data. O*NET data are used by a wide range of audiences, including individuals making career decisions, the public workforce investment system and schools making training investment decisions, educational institutions preparing the future workforce, and employers making staffing, economic development, and training decisions.

As part of O*NET's effort for continuous improvement, an experiment was initiated to evaluate the effect on response rates and costs of offering a $20 prepaid incentive to the points of contact (POCs) who work with us to coordinate O*NET data collection activities among sampled employees at their establishment. This report describes the design and implementation of the incentive experiment and provides results showing the effect of the incentive on establishment and employee response rates.

Experimental Design

A split ballot design was implemented with two treatment groups in which sampled establishments were randomly assigned to either the $20 incentive treatment or the control, non-incentive treatment. Approximately 75% of eligible sampled establishments were assigned to the $20 incentive treatment, and approximately 25% of eligible sampled establishments were assigned to the non-incentive control. There were 7,874 establishments in the $20 incentive group and 2,624 establishments in the non-incentive group. Those establishments excluded from the analysis include federal agencies because their employees are not allowed to accept incentives, businesses that had no occupations of interest, and businesses ineligible to participate in the O*NET main study.

Analysis and Results

After completing the analysis, we found no evidence that the additional $20 incentive had a significant effect, positive or negative, on establishment response rates. In two small portions of the population, there is evidence to say the incentive had a significant effect on employee response rates. Employees working in rural areas in management, business, mathematical, and engineering occupations responded at a significantly higher rate in the $20 incentive group than in the control group. This positive effect was offset by employees in large, rural establishments (with 250+ employees) who responded at a significantly *lower* rate in the $20 incentive group than in the control group. The latter finding is unreliable due to the very small sample size for that group. Nevertheless, both subpopulations are quite small and contribute inappreciably to the overall response rate.

Additionally, we found no evidence that the $20 incentive offered any savings in cost after looking at a number of factors, including the number of follow-up calls made to establishments, the number of replacement questionnaires sent to employees, and the speed with which employees responded.

Conclusions and Outcomes

In early December 2004, a summary of these results was presented to DOL. Given the considerable cost of providing monetary incentives to the POC and the experimental results that indicate no significant increase in response rates or cost savings, DOL decided that the experiment should be discontinued and that no newly recruited POCs should be offered the monetary incentive. That decision was implemented in mid-December 2004. The O*NET Operations Center staff continues to closely monitor the post-experiment response rates for any changes that could be attributed to the termination of the experiment.

1. Introduction

In December 1997, the National Center for O*NET Development contracted with RTI International to provide sampling, data collection, data processing, and data analysis services for the O*NET Data Collection Program. In July 2002, the U.S. Department of Labor submitted to OMB a request for an extension of approval for the O*NET Data Collection Program which was granted in September 2002 (OMB control number 1205-0421). OMB also approved a proposal for an experiment to evaluate the effect on response rates and costs of offering a $20 prepaid incentive to the points of contact (POCs) who coordinate O*NET data collection activities among sampled employees at their establishment. This experiment was initiated as part of the ongoing effort for continuous improvement of the O*NET Data Collection Program. As part of OMB's approval for an extension, OMB requested a report on the results of this experiment. This report was prepared in response to OMB's request and documents the analyses completed for the POC incentive experiment.

1.1 Background

The Occupational Information Network (O*NET) is a comprehensive system for collecting, organizing, describing, and disseminating information on occupational requirements and worker attributes. The O*NET database is designed to be the most comprehensive standard source of occupational information in the United States.

The National Center for O*NET Development (Center) provides core staff with acknowledged expertise in the areas of occupational analysis and assessment research and development. The Center manages projects and contracts and provides technical support and customer service to users of O*NET data and related products.

The O*NET Data Collection Program is a cooperative effort involving several organizations. Under the overall direction of the Center, RTI is responsible for data collection, data processing, data cleaning, and some of the data analyses. The Human Resources Research Organization (HumRRO) and North Carolina State University also conduct data analyses for the Center, and MCNC, Inc. is responsible for publication of the data.

The O*NET Data Collection Program is an ongoing effort to populate and maintain the O*NET database with valid, reliable, and current occupation and skills data. O*NET data are used by a wide range of audiences, including individuals making career decisions, the public workforce investment system and schools making training investment decisions, educational institutions preparing the future workforce, and employers making staffing, economic development, and training decisions. The O*NET program provides a common language and framework of occupational and skill requirements to meet the needs of various federal programs, including workforce investment and training programs of the Departments of Labor (DOL) and Education (ED). The O*NET database and companion O*NET Career Exploration Tools are used by many private companies and public organizations to develop applications tailored to meet their needs and the needs of their customers. Further information about the O*NET program can be found at the National Center for O*NET Development's Web site, www.onetcenter.org, and at the U.S. Department of Labor, Employment and Training Administration's Web site, www.doleta.gov/programs/onet.

The primary method for collecting this information is the Establishment method, a survey of establishments and workers within those establishments. This is a two-stage design that uses (1) a statistical sample of establishments expected to employ workers in each specific occupation and (2) a sample of workers in the occupations within each sampled establishment. The sampled workers are asked to complete the survey questionnaires.

Four domain questionnaires are used to collect data from sampled workers: Skills, Knowledge (including Education and Training, and Work Styles), Generalized Work Activities, and Work Context. Sampled workers are asked to complete one randomly assigned domain questionnaire, a basic demographic questionnaire, and a brief, occupation-specific task inventory. Workers may either complete the paper questionnaire and return it via mail or complete an online questionnaire at the project Web site.

Data collection operations for the main study began in June 2001 and are ongoing. Analysis activities are conducted in overlapping cycles. Analysis Cycle 2 began in July 2003. RTI completed its analyses in February 2004, and the data were published in July 2004. Beginning with Analysis Cycle 3, the data are scheduled to be published twice each year.

Data collection operations are divided into "waves," with each wave further divided into sub-waves (numbered X.1, X.2, etc.). Sub-waves generally require about 7 months to complete data collection, although this varies somewhat depending on the size of the sub-wave and the difficulty of finding establishments that contain the targeted occupations. The sub-waves are also interwoven across primary waves. This approach produces a longer time interval between related sub-waves, resulting in more efficient sampling, reduced respondent burden, and a higher yield of completed occupations.

1.2 Purpose

This document describes the design and implementation of the incentive experiment and provides results showing the effect of the incentive on establishment and employee response rates. The results presented here are based on data from 14 data collection waves, which included about 25,000 establishments.

Prior to conducting this experiment, the following incentives were offered to the POCs and selected employees in the O*NET sample establishments:

- For employers who agree to participate: the O*NET Toolkit for Business (a packet of information about the O*NET Program that managers can use for human resource planning, including a guide for writing job descriptions)
- For POCs: a desk clock with the introductory mailing, and a framed Certificate of Appreciation to those who agree to participate (combined cost of both is less than $10)
- For employees: a $10 prepaid cash incentive.

The purpose of the POC experiment was to examine the effects of offering POCs who agree to participate a prepaid $20 incentive, in addition to the clock and certificate. The survey methods literature (see, for example, the OMB Supporting Statement No. 1205-0421 dated July 26, 2002, page A-41) suggests that this additional incentive had the potential to significantly and

positively affect both the establishment and employee response rates. It was thought that the POC would find the incentive appealing given the burden on him/her, the need for sustained cooperation over an extended period of time (several weeks), and the absence of strong positive forces of direct benefit to the establishments and employees to participate in the study. Since employees are offered a $10 payment for completing their questionnaires, POCs might also expect some kind of remuneration in addition to the usual O*NET incentives for completing their tasks.

It is recognized, however, that the two-stage sample design of this establishment survey is rather uncommon and no literature directly speaks to the effects of incentives in surveys with designs and target populations that are similar to the O*NET data collection program. Moreover, the literature on the use of incentives in establishment surveys is rather sparse and inconclusive regarding the effectiveness of incentives for general employee populations. Thus, it was decided to test the effectiveness of the $20 incentive by conducting an experiment.

The experiment is described in some detail in ***Section 2***. Briefly, with each new wave, approximately 75% of sampled establishments (those eligible for the experiment) were randomly assigned to either a treatment ($20 incentive) group or a control (no $20 incentive) group. The incentive was sent to the POCs after they agreed to participate. The incentive was paid in the form of a U.S. Postal Service money order. The "Pay to" line on the money order was blank, which allowed the POC to enter the establishment's name instead of his/her own name when appropriate. Alternatively, POCs could enter the name of a charity and forward it as a gift from themselves or from their establishment.

Because many federal agencies do not allow employees to accept monetary incentives, federal agencies were excluded from the experiment. For this report, the results of the experiment were analyzed to examine the effect of the incentive on both the establishment and employee response rates. In addition, the relative cost of the two protocols was examined, since the monetary incentive has the potential to at least partially offset its inherent cost through greater efficiencies in the data collection process and higher response rates.

The following section provides details of the methodology employed in conducting the incentive experiment, including the research objectives, the experimental design, and the data collection protocol. ***Section 3*** presents the results of the analysis of establishment and employee response rates and costs. Finally, ***Section 4*** contains a discussion of these results and outcomes.

2. Summary of Sample Design and Data Collection Methods

2.1 Research Objectives

The primary objective of the POC incentive experiment was to determine the effect on response rates of offering the POC a monetary incentive of $20 at the recruitment stage of the O*NET data collection process. It was hypothesized that this incentive would significantly increase the establishment response rate relative to the control (non-incentive) treatment. It was further hypothesized that the incentive would increase employee response rates slightly due to its potential motivating effects on the POC during the follow-up stages of the process.

An additional anticipated effect of the incentive was the speed with which the POC distributed the O*NET questionnaires to the employees; it was hypothesized that POCs given the incentive would be more motivated to complete their work. It was believed that this higher level of motivation would translate into the POCs' completing their work at a faster pace. Further, it was thought that the speed with which employees returned their questionnaires might increase, potentially decreasing the number of follow-up calls to the POCs asking them to prompt employees to return their questionnaires. Thus, cost variables were examined to test the above hypotheses.

2.2 Sample Design

The design for testing the incentive was a split ballot design with two treatments: the $20 incentive and a control, $0 incentive treatment. The two treatment conditions were identical except for the incentive and a few changes in the survey procedures that were necessary to implement the incentive condition. There were two experimental units under study: the establishments and the employees within the establishments. Our experimental design randomly assigned establishments to the treatment and control groups, and thus employees were randomly assigned to each group in approximately the same proportions. Note, however, that once an establishment was assigned to a condition, all employees within that establishment received the same treatment. This type of random assignment induces so-called clustering effects in the employee outcomes, which are taken into account in the subsequent analysis. In addition, the interactions of the RTI Business Liaisons (BLs) with the POCs were carefully monitored to ensure equal levels of effort across both case types.

Another choice in the design was the proportion of sample establishments to allocate to each experimental condition. While an even split of half of the cases going to the incentive treatment and half to the control may be optimal for maximizing the power of significance tests, it is not optimal for maximizing the response rates for the data collection if the hypotheses regarding the incentive effects are supported. Therefore, expecting incentives to increase response rates, the use of incentives was maximized while achieving the objectives of the experiment by allocating approximately 75% of establishments to the incentive condition, with the remainder assigned to the control group.

Since federal agencies do not allow their employees to accept any form of incentive, including monetary payments, they were excluded from the experiment. In addition, SOC-ineligibles and business-ineligibles were not included in the analysis. SOC-ineligibles are those businesses that did not have at least one of the occupations of interest. Business-ineligibles are

typically those establishments that were not at the sampled location or not in the sampled industry.

The sample sizes for the waves and the number of cases randomly assigned to the incentive treatment and the control are provided in ***Exhibit 1***. The data in the table reflect the actual number of establishments that met the criteria for inclusion in the experiment.

Exhibit 1. Establishment Allocations to the Control and Incentive Groups

Start Date	Wave	Number Assigned to the Control Group	Number Assigned to the Incentive Group
6-6-03	3.3	219	632
6-20-03	1.5	24	67
6-24-03	3.4	5	29
7-18-03	4.3	136	398
7-31-03	4.4	4	6
8-11-03	5.2	217	684
8-27-03	6.11	30	89
9-2-03	6.1	703	2,003
9-29-03	1.7	61	210
10-13-03	1.6	211	599
12-19-03	2.4	371	1,140
1-7-04	5.3	278	866
1-21-04	3.5	124	365
2-2-04	1.8	241	786
	Total	2,624	7,874

2.3 Data Collection Protocol

The data collection portion of the experiment closely followed the protocol of the main data collection program, which is described in detail in Section B.2 of the OMB Supporting Statement. The following modifications were made to support the experiment.

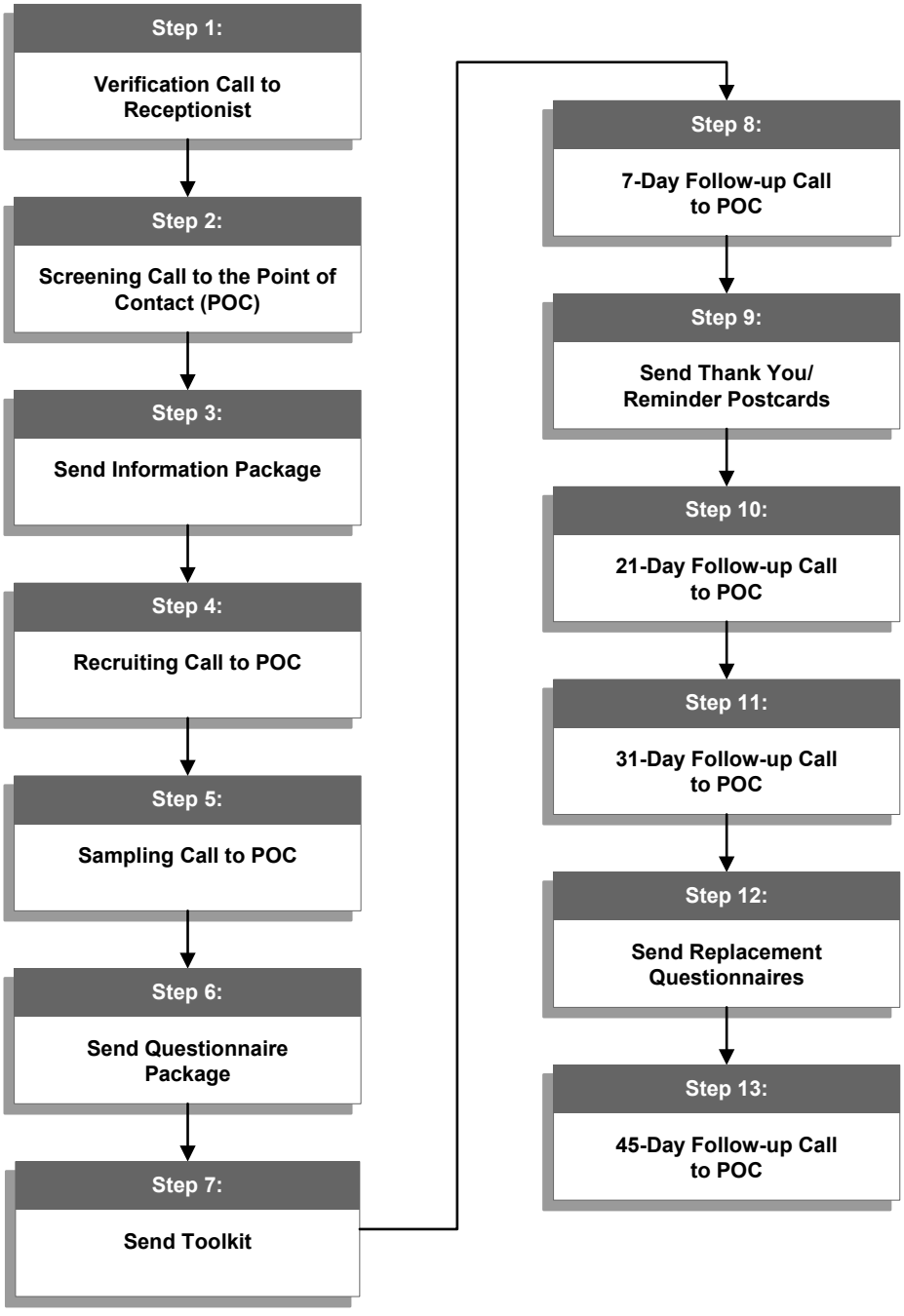
POC Incentive. The $20 monetary incentive was provided to the POC in the form of a money order. Money orders were used for several reasons. First, because the POC mailing may be opened by persons other than the POC, a money order was thought to be less likely than cash to be misplaced before reaching the POC. Further, noting that some POCs might want to donate the money to charity, a money order facilitated the forwarding of the payment to a charity and provided a record of the transaction for the POC. Therefore, blank money orders were purchased in bulk, which was easier, quicker, and less expensive than using checks. Money orders are more secure than cash but offer all of the advantages of checks. Money orders offer the additional benefits of credibility, ease of transfer, and cost savings, compared to checks.

Assignment of Cases to BLs. As a wave was introduced, cases were randomly assigned to BLs. This random assignment process ensured that BLs were working multiple Standard Industrial Classifications (SICs), that any given SIC had two or more BLs working its cases, and that each BL had a combination of incentive and control group cases. Approximately 75% of each BL's assignment for a wave consisted of incentive cases, and 25% were control cases, although this was allowed to vary across BLs.

Data Collection Procedures. The data collection procedures for the experiment remained the same as those described in Sections B.2.2 through B.2.9 of the OMB Supporting Statement, with a few exceptions. The standard protocol is shown in ***Exhibit 2***. The ways in which the experiment differed from this protocol are described below:

- The Information Package, which is sent to the POC prior to the Recruitment Call, contained a newly developed brochure that described the program's various POC-, company-, and employee-level incentives. For the incentive treatment group, two versions of this brochure were used: one that referenced the $20 POC incentive (which was distributed to the POCs in the incentive group) and another (for the control group) that did not mention the $20 money order. Additionally, the "Who, What and How" brochure containing frequently asked questions regarding the O*NET Data Collection Program was revised for the treatment group to reflect the additional POC incentive.
- During the Recruiting Call, the BL explained the various program incentives to the POC. This explanation was expanded for the cases in the incentive group to include the $20 money order.
- Near the end of the Sampling Call, the BL informed the POC of the forthcoming shipment of questionnaires. For the incentive group, the BL reminded the POC that the shipment would include the previously mentioned $20 money order.
- The questionnaire shipment to the POC for cases in the incentive group contained the money order. It was enclosed in an envelope with the message "Your Special Gift Enclosed" printed on the outside. The payee line on the money order was left blank so that the POC could specify the desired payee (i.e., the POC, the company, or a charity of his/her choice). We also enclosed a one-page instructional sheet to help the POC complete the money order.

Exhibit 2. Overview of Data Collection Protocol



3. Analysis and Results

In this section, three key areas of analysis are addressed: establishment response rates, employee response rates, and costs—or, more specifically, the effect of the incentive on the nonresponse follow-up effort. All analyses were conducted using unweighted data to determine how the POC incentive affected the reported O*NET response rates, which are also unweighted.

All data available at the time of the analysis are from the 14 waves shown in ***Exhibit 1***. ***Exhibit 3*** shows the number of establishments and employees involved in these waves and their allocation to incentive and control, as well as those excluded from the experiment (i.e., the non-experimental group). Below, the results for establishments are discussed, followed by a discussion of the effects on employee response rates.

Exhibit 3. Number of Establishments and Employees in the Experimental Waves

	Incentive	No Incentive	Non-Experimental	Total
Establishments	7,874	2,624	90	10,588
Employees	22,309	7,694	129	30,132
Total	30,183	10,318	219	40,720

Establishment Response Rate Analysis. For the analysis of establishment response rates, the hypothesis stated in ***Section 2.1*** was tested using the usual normal approximation to the t-test for two means. A two-tailed test was used to permit the unexpected, yet possible, outcome of a reduction in response rate due to the incentive. For this test, the absolute difference between the control group and incentive group response rates was computed as follows:

$$|d_{C\text{-}I}| = |p_C - p_I| \quad (1)$$

where p_C is the estimated response rate for the control group and p_I is the estimated response rate for the incentive group. If the absolute difference was greater than $1.96 \times s.e.(d_{C\text{-}I})$, where $s.e.(d_{C\text{-}I})$ is the standard error of the difference, then the hypothesis that the two response rates are equal at the 5% level of significance (i.e., $\alpha = 0.05$) was rejected.

The response rate for this analysis was computed by dividing the total number of establishments that participated by all known eligible establishments. Thus, the numerator of the establishment response rate is the total number of establishments that successfully completed the sampling stage, and the denominator is the total number of establishments in the sample minus business- and SOC-ineligible establishments.

It is possible that establishment size and other characteristics of establishments interacted with the incentive treatment. For example, POCs at smaller establishments may have had a different reaction to the monetary incentive than did POCs at larger establishments. The industry associated with an establishment could also play a role in the overall effectiveness of the incentive. For example, POCs in industries that mainly employ office workers may react differently to the incentive than those in industries where non–office workers predominate.

Therefore, estimating the effect of the incentive on groups of establishments with common characteristics was of interest in our analysis. However, our ability to evaluate the effectiveness of the incentive on various types of establishments was limited to just a few variables that are available from the sampling frame. These variables are defined in ***Exhibit 4***.

Exhibit 4. Independent Variables in the Analysis of Establishment Response Rates

Variable	Definition
Group	1 = Control 2 = Treatment
Industry	1 = Agriculture, Mining, Construction, Manufacturing 2 = Transportation, Wholesale trade, Retail Trade, Finance, Services, Government
Size	1 = 1 to 24 2 = 25 to 249 3 = 250 or more
Urban/Rural	1 = Urban 2 = Rural
SOCs Listed on Selected Occupation List (SOL)	1 = 1 2 = 2 or 3 3 = 4 or more

Exhibit 5 shows the results of the comparison of response rates for establishments defined by the characteristics in ***Exhibit 4***. The first column of the table shows the variable being tested, and the second and third columns report the response rates for the control and treatment groups, respectively. The column labeled "Diff" is the difference between the response rates; i.e., $d_{C\text{-}I}$ in (1). The next column reports the standard error of $d_{C\text{-}I}$, and the p-value for the hypothesis test of no difference (i.e., $|d_{C\text{-}I}| = 0$) is reported in the last column. A p-value less than 0.05 indicates the control and treatment response rates are significantly different at the $\alpha = 0.05$ level.

Overall, the control group had a response rate that is about 1.7 percentage points greater than the incentive group—62.0% for the control group compared with 60.3% for the incentive group. The difference is not significant, although it portends what is seen in the subgroup analysis: for 9 of the 10 subgroups compared, the control group has a higher response rate than the incentive group. Note further that none of the differences in ***Exhibit 5*** are statistically significant at the $\alpha = 0.05$ level, indicating that there is insufficient evidence to conclude that treatment and control group response rates differ apart from sampling variation.

Exhibit 5. Comparison of Establishment Response Rates (in Percent) by Treatment for the Independent Variables

Category	Control	Treatment	Diff	SE of Diff	P-Value
Total	61.97	60.27	1.69	1.10	0.12
Industry					
Agriculture, Mining, Construction, Manufacturing	48.90	48.42	0.48	2.70	0.86
Transportation, Wholesale/Retail Trade, Finance, Services, Government	64.71	62.82	1.89	1.19	0.11
Establishment size					
1-24 employees	57.86	56.93	0.92	1.79	0.61
25-249 employees	68.85	66.19	2.67	1.51	0.08
250+ employees	47.69	48.79	-1.10	3.18	0.73
Urban status					
Urban	59.40	57.94	1.46	1.24	0.24
Rural	71.64	69.75	1.89	2.25	0.41
Number SOCs on SOL					
1 SOC	61.31	59.46	1.84	1.48	0.21
2-3 SOCs	57.69	56.74	0.95	2.32	0.68
4+ SOCs	68.26	66.23	2.03	2.28	0.37

These data suggest that the incentive had no effect on response rates for groups of establishments defined by the variables in ***Exhibit 4***. Although the main effects in the exhibit are not significant, there still may be significant interaction effects. That is, response rates for the control and incentive may differ for various combinations of the independent variables. To explore this possibility, a logistic regression model was fitted to the establishment data and all pairwise combinations of the independent variables were simultaneously entered into the model in the form of a three-way interaction with the grouping variable.

To further explain the model, consider the model for a single pair of variables, say establishment size (*S*) and industry (*I*). The basic model for these two variables is as follows:

$$\log\left(\frac{p_{ijk}}{1-p_{ijk}}\right) = u + u_i^G + u_j^I + u_k^S + u_{ij}^{GI} + u_{ik}^{GS} + u_{ijk}^{GIS} \qquad (2)$$

where p_{ijk} denotes the response rate for the subgroup defined by the i^{th} treatment condition (G), j^{th} industry category (I), and k^{th} size category (S) and the u-variables denote the model effects associated with the variables in the superscript labels. Of particular interest is the three-way interaction term in this model, u_{ijk}^{GIS}. This term is used to determine whether the effect of the incentive condition varies by the six combinations of industry and size. If the interaction term *GIS* differs significantly from 0, then the response rates differ between control and incentive for

at least one combination of the categories of *S* and *I*. Otherwise, there is no evidence of a difference for any combination of these two variables.

The models that were actually fitted were more complex than (2) since all pairwise combinations of the independent variables interacting with the treatment group, *G*, were simultaneously entered into the model. In addition, since only hierarchical models were considered (for ease of interpretability), all second-order interactions and main effects made up of variables contained in the three-way interactions were also entered into the model.

Such a large model is over-specified and contains many terms that are not statistically significant. A more parsimonious model is required to strengthen the relationships between the variables in the model and to improve the precision of the statistical tests. To obtain an optimum model, a stepwise elimination model selection process was implemented that deleted the highest-order interaction term in the model whose p-value most exceeded 0.10. After deleting this term, the model was rerun and the elimination process was repeated in a stepwise fashion until either all terms in the model were significant at $\alpha = 0.10$ or only main effect terms remained in the model.

This model selection process produced a model with only main effect terms and a few interaction terms that did not involve *G*. This analysis found that no pairwise combinations of the independent variables produced a difference between the treatment and control response rates that were significant at the 0.10 level or lower. Thus, there is no evidence of any incentive effect for any pairwise combination of the variables in ***Exhibit 4***. To confirm this result, the selection process was reversed. A forward stepwise selection process was implemented which added each three-way interaction involving *G* to the model, including all lower order terms derived from this interaction. Again, only those terms that were significant at $\alpha = 0.10$ were retained. The process continued until all three-way interactions containing *G* had been considered. As in the backward stepwise elimination approach, no interaction terms involving *G* were retained in the model, confirming the earlier finding of no incentive effects for combinations of explanatory variables.

Employee Response Rate Analysis. The analysis of employee response rates mirrored the approach taken for the establishment response rates. The employee response rate, for this analysis, was defined as the ratio of the number of returned questionnaires to the number of questionnaires sent out. As for the establishment survey analysis, the incentive effects at the main effect level (marginals for each dependent variable) were first examined, and then logistic regression was employed to assess the interaction effects.

Exhibit 6 displays the independent variables used in the employee analysis. Note that, except for one variable, Occupation, the variables correspond to those in ***Exhibit 4*** defined for establishments. The categories of Occupation conform to SIC codes that share the same leading digits. Note that POCs may work with employees in several occupations within an establishment, which could attenuate the differences of the incentive effect across occupations. Our analysis made no attempt to account for this form of clustering, however.

Exhibit 6. Independent Variables in the Analysis of Establishment Response Rates

Variable	Definition
Group	1 = Control 2 = Treatment
Industry	1 = Agriculture, Mining, Construction, Manufacturing 2 = Transportation, Wholesale Trade, Retail Trade, Finance, Services, Government
Size	1 = 1 to 24 2 = 25 to 249 3 = 250 or more
Urban/Rural	1 = Urban 2 = Rural
SOCs Listed	1 = 1 2 = 2 or 3 3 = 4 or more
Occupation	1 = Management Occupations, Business and Financial Operations Occupations, Computer and Mathematical Occupations, Architecture and Engineering Occupations 2 = Community and Social Services Occupations, Food Preparation and Serving Related Occupations, Building and Grounds Cleaning and Maintenance Occupations, Personal Care and Service Occupations, Sales and Related Occupations, Office and Administrative Support Occupations, Farming, Fishing, and Forestry Occupations, Construction and Extraction Occupations, Installation, Maintenance, and Repair Occupations, Production Occupations, Transportation and Material Moving Occupations 3 = Healthcare Practitioners and Technical Occupations, Healthcare Support Occupations, Protective Service Occupations 4 = Life, Physical, and Social Science Occupations, Legal Occupations, Education, Training, and Library Occupations, Arts, Design, Entertainment, Sports, and Media Occupations

The effects of the incentive for each independent variable are shown in ***Exhibit 7***. As for the establishment-level analysis, there is no evidence that the incentive improved response rates for any subgroup defined by a single independent variable. The overall difference, which is not significant, is less than one percentage point in favor of the control group. Of the 13 subgroup comparisons in the exhibit, 9 favor the control group and only 4 are in the direction of higher response rates for the incentive group.

To evaluate the effects of the incentive on employees with characteristics defined by combinations of the independent variables, a logistic regression model like that in (2) was fitted consisting of three-way interaction effects defined by the two independent variables and the treatment variable, G. As described for the establishment-level analysis, a stepwise elimination process was conducted starting with a highly parameterized model containing all three-way interactions of the independent variables with G. Working backward, the highest-order term with a p-value exceeding 0.10 was eliminated, the reduced model was refitted, and the process repeated until all remaining terms in the model had p-values of 0.10 or smaller. All models were

hierarchical in that all lower-order interaction terms and main effects that could be derived from the significant higher-order interaction terms were kept in the model.

Exhibit 7. Comparison of Employee Response Rates (in Percent) by Treatment for the Independent Variables

Category	Control	Treatment	Difference	SE of Diff	P-Value
Total	73.55	72.72	0.83	1.0914	0.45
Industry					
Agriculture, Mining, Const, Manufacturing	64.58	69.57	-4.99	4.53	0.27
Transportation, Wholesale/Retail Trade, Finance, Services, Government	74.13	72.95	1.18	1.12	0.29
Establishment size					
1-24 employees	71.46	71.38	0.07	2.55	0.98
25-249 employees	74.29	73.52	0.78	1.24	0.53
250+ employees	68.03	65.92	2.12	4.49	0.64
Urban Status					
Urban	72.17	71.19	0.98	1.30	0.45
Rural	77.22	77.31	-0.09	1.98	0.96
Number SOCs on SOL					
1 SOC	72.02	69.86	2.16	1.68	0.20
2-3 SOCs	72.31	71.75	0.56	2.54	0.82
4+ SOCs	74.92	74.78	0.14	1.65	0.93
Occupation Group					
Management, Business, Mathematics, Engineer	79.83	80.83	-1.00	2.41	0.68
Social Services, Food, Maintenance, etc	70.17	71.3	-1.13	2.22	0.61
Healthcare, Protective Services	59.81	59.49	0.32	4.12	0.94
Social Science, Legal, Education, Arts	74.58	73.01	1.58	1.31	0.23

One difference in the employee level analysis is that the clustering of employees within establishments was explicitly accounted for in the model estimation process by treating the establishment as a primary sampling stage. SUDAAN® software was used to appropriately account for the sample clustering effects. As described for the establishment analysis, the model obtained by the backward stepwise elimination approach was confirmed using a forward stepwise selection process. The final model selected for the subsequent interaction effects analysis, shown in ***Exhibit 8***, is the best model in terms of fit and parsimony obtained by the forward and backward selection processes.

As shown in ***Exhibit 8***, two 3-way interactions are significant—Group × Size × Urban and Group × Urban × Occupation. These results indicate that differences between response rates for incentive and control groups were detected for several groups defined by combinations of Size and Urbanicity and Urbanicity and Occupation. To determine which combinations are

significant and the directions of the differences, response rates predicted by the final model were estimated, as shown in ***Exhibit 9***.

Exhibit 8. Final Model for Estimating Incentive Effects for Three-way Interactions

Term	DF	F	P-Value
Group	n/a*	n/a*	n/a*
Industry	n/a*	n/a*	n/a*
Size	n/a*	n/a*	n/a*
Urbanicity	n/a*	n/a*	n/a*
Occupation	n/a*	n/a*	n/a*
Group × Size	n/a*	n/a*	n/a*
Group × Urban	n/a*	n/a*	n/a*
Group × Occupation	n/a*	n/a*	n/a*
Industry × Size	2	2.75	0.0637
Industry × Occupation	1	14.06	0.0002
Size × Urban	n/a*	n/a*	n/a*
Size × Occupation	6	4.49	0.0002
Urban × Occupation	n/a*	n/a*	n/a*
Group × Size × Urban	2	3.02	0.0490
Group × Urban × Occupation	3	2.96	0.0311

[1] Note: Fit statistics for a specific variable are reported only for the highest-order term involving the variable.

Exhibit 9 contains three sections that are best viewed simultaneously. The first section of the table, labeled Model-Based Estimates, provides the predicted response rates from the model in ***Exhibit 8*** for control and incentive groups defined by combinations of variables contained in the two significant three-way interactions. The differences in these response rates, the standard error of the differences, and the p-values associated with the test of "no difference" are also included in the table.

Also contained in the table are the corresponding estimates produced from a purely design-based inference (i.e., no explicit model was used to compute the estimates). These estimates are included in the table for comparison with the model-based estimates in order to help interpret and verify the differences in response rates estimated by the model. The designed-based estimates have the advantage that they are not subject to any bias associated with model misspecification since they are not based upon a model. However, the standard errors of the design-based estimates usually exceed those of the model-based estimates, which tend to be more efficient. By comparing both sets of estimates, we can take advantage of the strengths of both estimation approaches.

Finally, the last column of the table contains our best estimate of the proportion of the total population of establishments represented by the row characteristics in the table. This is used to gauge the importance of an observed incentive effect. For example, an effect on response rates

Exhibit 9. Comparison of Model-Based and Design-Based Estimates of Employee Response Rates

Category	Model-based Estimates					Design-Based Estimates					
	Control	Treatment	Diff	SE of Diff	P-Value	Control	Treatment	Diff	SE of Diff	P-Value	Percent of Population
Size by Urbanicity											
Size (1-24)											
Urban	75.10	74.30	0.80	2.75%	0.77	72.54	70.01	2.53	2.81	0.37	21.97
Rural	79.24	77.40	1.84	4.76%	0.70	67.45	75.73	-8.28	5.86	0.16	7.38
Size (25-249)											
Urban	72.73	72.49	0.24	1.42%	0.87	72.89	72.01	0.88	1.49	0.55	29.76
Rural	75.99	79.30	-3.31	2.14%	0.12	77.78	77.95	-0.17	2.18	0.94	12.07
Size (250+)											
Urban	63.99	68.55	-4.56	4.66%	0.33	62.53	64.08	-1.55	5.19	0.77	23.08
Rural	91.17	74.44	16.73	6.22%	0.01	88.00	72.21	15.79	6.54	0.02	5.74
Urbanicity by Occupation											
Urban											
Management, Business, Mathematics, Engineer	80.37	80.16	0.21	2.26	0.93	80.82	79.76	1.06	2.89	0.71	11.40
Social Services., Food, Maintenance, etc.	73.12	74.61	-1.50	2.14	0.48	68.56	69.56	-1.00	2.71	0.71	47.12
Healthcare, Protective Services	56.09	55.54	0.55	4.72	0.91	62.14	58.84	3.30	4.41	0.46	8.15
Social Science, Legal, Education, Arts	73.36	72.93	0.43	1.40	0.76	72.46	71.55	0.91	1.54	0.56	8.14
Rural											
Management, Business, Mathematics, Engineer	77.18	85.65	-8.47	3.28	0.01	76.72	84.04	-7.31	4.12	0.08	3.28
Social Services., Food, Maintenance, etc.	77.18	80.90	-3.72	3.12	0.23	73.68	75.22	-1.53	3.82	0.69	19.16
Healthcare, Protective Services	46.44	60.11	-13.67	10.21	0.18	47.76	64.46	-16.70	10.08	0.10	1.20
Social Science, Legal, Education, Arts	81.50	79.31	2.19	2.16	0.31	80.15	77.47	2.68	2.44	0.27	1.55

for a population subgroup that represents 20% of all employees may be considered more important than an effect on a 5% population subgroup.

First consider the top half of the table, which summarizes the effects for establishments defined by Urbanicity and Size. Both the model-based and design-based estimates indicate that one subgroup has a significant difference between incentive and control—establishments with 250 or more employees in rural areas of the country. Surprisingly, the difference is 16 to17 percentage points in favor of the *control* group, which is consistent for both the model-based and design-based estimates. As indicated in the last column, this is a relatively small group of employees, constituting about 6% of the total population. Still, the result is surprising since it suggests that the incentive had a negative effect on response rates for the employees in these establishments.

The only other group within the Urbanicity × Size interaction that approaches significance is employees in establishments with 25 to 249 employees in rural areas. However, for this group the model-based estimate shows a difference of about 3 percentage points in favor of the incentive (p-value of 0.12). Note, however, that this difference disappears in the design-based table. Note also that employees in establishments with 25 to 249 employees in rural areas constitute about 12% of the employee population.

Next, consider the subgroups defined by Urbanicity and Occupation at the lower half of ***Exhibit 9***. Here the results of the model- and design-based analyses are fairly consistent. The model-based analysis clearly indicates that employees in rural areas in Management, Business and Financial Operations, Computer and Mathematical Occupations, and Architecture and Engineering Occupations were positively affected by the incentive, responding almost 8.5 percentage points higher than their counterparts in the control group. This result is consistent with the design-based analysis, although there the p-value is larger due to the inefficiency of the design-based approach. This group of employees represents only about 3.3% of the O*NET employee population. The design-based analysis also suggests that employees in Healthcare Practitioners and Technical Occupations, Healthcare Support Occupations, and Protective Service Occupations may also have responded at a higher rate with the incentive than without (significant at $\alpha = 0.10$). Note that this effect is not supported by the model-based analysis, which indicates that the difference, although considerable at approximately 13.7 percentage points, is not significant. Although a relatively small part of the employee population (about 1%), healthcare professionals are often surveyed and have historically responded at low rates. Thus, the fact that incentives may improve response rates for this group may have general survey methodological importance.

Cost Analysis. In other studies (for example, the National Survey on Drug Use and Health, or NSDUH), the use of incentives has reduced costs by reducing the number of follow-up attempts needed to obtain an interview. It is conceivable that the same phenomenon could operate for the O*NET data collection; i.e., the number of follow-up attempts required per completed employee questionnaire could be less for the incentive group than for the non-incentive group.

However, the O*NET data collection protocol design makes it highly unlikely that there could be any real savings of effort even if response rates were substantially improved under the incentive condition. This is because every establishment receives a minimum of four follow-up calls as long as the number of nonresponding employees is one or more. The only scenario

wherein these calls could be truncated early is if all sampled employees in the establishment respond prior to completing the fourth follow-up call. Given the very small percentage of establishments that actually achieve that level of participation, it is not surprising that there was essentially no meaningful difference in the number of calls per POC for the two treatments.

Two additional cost measures that were examined include the rate of increase within the cumulative employee response rate and the number of replacement questionnaire packages ordered. If, for example, the incentive group's cumulative employee response rate climbed at a more rapid pace than the control group's, then it follows that BLs spent less time on the phone discussing pending employee responses. Additionally, fewer orders for replacement questionnaires would represent a considerable cost savings in the categories of support labor, printing, materials, and postage.

Exhibit 10 shows a comparison of sample completion rates for the treatment and control groups as a function of the week of data collection. Note that the completion rate curves for the two experimental conditions are essentially the same. This suggests that the incentive payment did not increase the speed with which a wave was completed.

Exhibit 10. Cumulative Employee Response Rates for Incentive and Control Groups, by Week of Data Collection

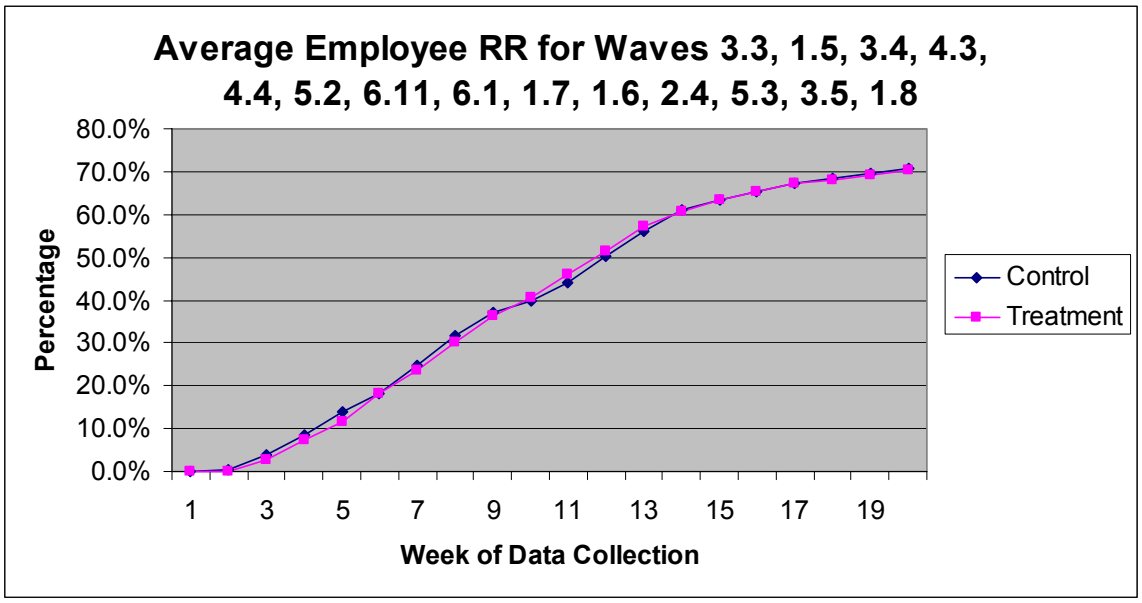
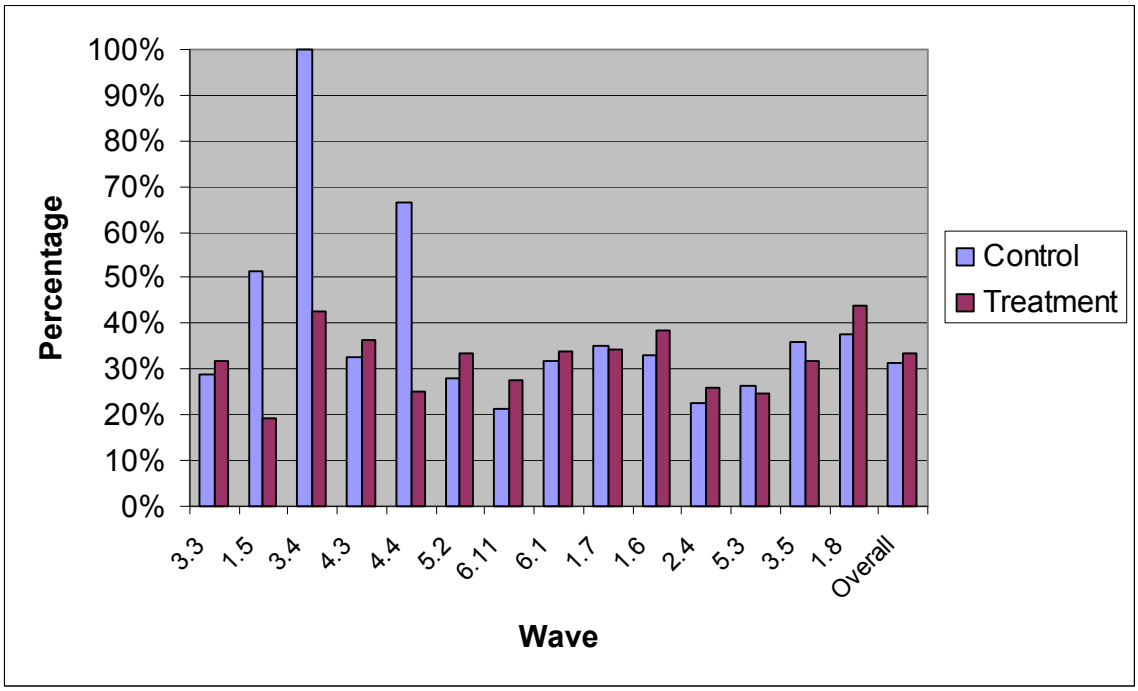


Exhibit 11 shows a comparison of the rates of ordering replacement questionnaires among the treatment and control groups across all sample waves. For a few waves, the control group required considerably more replacements than the incentive group. However, these were balanced out by the remaining waves, which generally show an opposite effect. Overall, however, the two groups performed similarly, and any differences between experimental groups in the exhibit can be explained by sampling variation. Thus, the incentive offered no savings in reducing the number of questionnaires that needed to be replaced in the process.

Exhibit 11. Percent of Original Questionnaires Replaced for Control and Incentive Groups, by Wave



4. Conclusions and Outcomes

This experiment considered the effects on establishment and employee response rates of offering the POC a $20 incentive, in addition to the other incentives that the POC receives for O*NET participation. It was hypothesized that this monetary incentive would add to the benefits perceived by the POC for participating in the O*NET program. Since POCs may not fully understand all the requirements of O*NET participation when they are recruited, their commitment might decline as data collection progresses. If they are given a $20 incentive, they might be more committed to the O*NET program and be more motivated to follow up employee nonresponse. It also seemed logical that since employees are offered a $10 payment for completing their questionnaires, POCs might also expect some kind of payment in addition to the usual O*NET incentives for completing their tasks.

The experimental results provide no evidence that the incentive had any effects on establishment cooperation rates. The POC appeared just as likely to initially agree to participate in the O*NET data collection with the $20 incentive as without it. There are several possible explanations for this. POCs are initially presented with a fairly extensive array of motivating materials and gifts in the early stages of the recruitment process. It is conceivable that the $20 incentive seems a small incremental benefit compared with all the other benefits that are part of participating in the survey. Also, since most POCs conduct their O*NET work with the approval of their supervisors and, presumably, on company time, any additional monetary gift may be viewed as unnecessary or even unwanted by the POCs and their employers. Further, O*NET establishment response rates are already high compared to other establishment surveys, which indicates that the O*NET data collection protocol without incentives may be adequate for maximizing response rates.

Although the POC monetary incentive may not affect cooperation at the establishment level, it could still have an effect on the employee response rate. During the recruitment stage, POCs may not be fully aware of what O*NET participation involves. But as data collection progresses, they may be unpleasantly surprised to learn of the time commitment required for generating the sample lists of employees, distributing questionnaires, recontacting nonresponding employees, and so on. If, by accepting the $20, the POC feels more obliged to reciprocate by carrying out his/her duties in the later stages of the process, particularly during the nonresponse follow-up stage, employee response rates could be positively affected even though initial response rates are not.

Again, evidence of any benefit for employee response rates is weak. In general, subgroups that showed a tendency toward a positive incentive effect (such as a few occupations in rural areas) were relatively small compared to groups showing no effect. An inexplicable and pronounced negative effect was also found for employees in large rural establishments—about 6% of all employees. However, in debriefing sessions, BL reports of negative reactions by the POC to the incentive offer were rare and BLs were unaware of any systematically negative effects of the POC monetary incentive. Thus the negative effect is inexplicable and may be regarded as spurious.

Taken as a whole, the employee analysis results suggest weak evidence at best of any possible effect of the monetary incentive on employee response rates. This finding, combined

with the lack of evidence of any cost advantage using the incentive, leads to the conclusion that the $20 incentive, as implemented, offered no important benefits to the O*NET data collection.

In interpreting these findings, it is important to note the limitations of the experiment. One limitation is the randomization process used in the study. As previously noted, BL assignments comprised both control and incentive cases, with the latter type making up the majority of a BL's assignment. Such a design is not ideal since it introduces the potential for BL-induced cross-treatment contamination of effects. As an example, if the POC monetary incentive tended to motivate the BLs to improve response rates, then response rates for both the incentive and control groups could improve thereby attenuating the estimated effect of the incentive. This possibility was considered during the design phase of the experiment, but the solution—to randomize the assignment of BLs rather than establishments (i.e., POCs) to treatment and control groups—was deemed operationally infeasible.

A second consideration is the fact that the SOCs in the analysis represent a non-random sample of approximately 15% of all the SOCs that will ultimately be surveyed. Thus, while these results reflect the performance of the incentive on response rates to date, they may not predict the performance of the POC incentive on the more than 600 other SOCs that are not represented in the waves analyzed.

These limitations suggest there could be a small risk that the experiment results do not accurately predict the performance of the incentive in a non-experimental situation. That risk must be weighed against the cost of providing the POC incentive in the remaining waves of the O*NET data collection—estimated at over $400,000. In discussing these findings with the BLs, no concerns were identified with regard to discontinuing the incentive.

In early December 2004, a summary of these results was presented to DOL. Given the considerable cost of providing monetary incentives to the POC and the experiment results that suggest no significant increase in response rates or cost savings, DOL decided that the experiment should be discontinued and that all newly recruited POCs should not be offered the monetary incentive. That decision was implemented in mid-December 2004. To mitigate the aforementioned risk of discontinuing the use of POC incentives, the O*NET Operations Center staff continues to closely monitor the post-experiment response rates for any changes that could be attributed to the termination of the experiment.