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Working Papers

Final Summary of Results from Phase II
of the M3 Plastics Study

by

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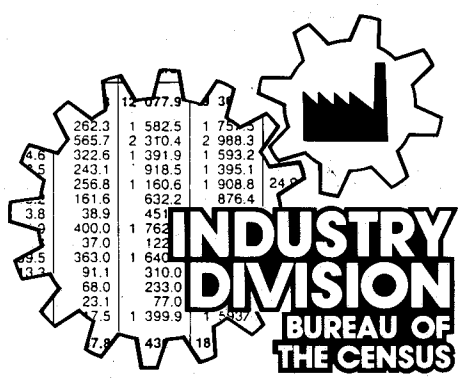
Industrial Statistics



U.S. Department of Commerce
BUREAU OF THE CENSUS

Final Summary of Results from Phase II of the M3 Plastics Study

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A. Background

The current Manufacturers' Shipments, Inventories, and Orders (M3) survey is a monthly voluntary survey which collects data at the company level. The M3 is a nonprobability-based panel that utilizes link estimates which are benchmarked to the annual survey of manufactures (ASM) annually.

Currently, the M3 survey experiences low response rates, especially among small companies which, historically, have been poor reporters. This may be attributed in part to the fact that with limited resources the M3 concentrates follow-up (mail, phone, personal visit, etc.) on the larger companies. In order to evaluate some alternative methods for improving response among the smaller companies, a sample of small companies was selected from the plastics industry group. This group was chosen because it has a large number of small companies, and it has large annual benchmark revisions. The main goal of Phase II was to use this sample of small companies to test various data collection procedures to determine whether the response rate of small companies in the M3 survey could be improved.

B. Design of Study

1. Requirements

Prior to the actual selection of the Phase II sample, some preliminary work was required. We wanted to select several treatment panels with each one employing a different data collection procedure. With current resources, we were limited to a total sample size of around 400 "small" companies. "Small" was defined as those companies with TVS in plastics of no more than five million dollars in 1987. To determine the number and sizes of panels that could be accommodated under the above limitations, a summary table of percentage differences in response rates needed to make resulting differences between panel response rates statistically significant was prepared. This analysis, under the given requirements and resources, determined that four equal panels of 100 companies each would enable us to detect differences in response rates of 9-11 percent at the 90 percent confidence level. Response rate differences of less than 9-11 percent were judged to have little impact on the reliability of the estimates, although this was not demonstrated empirically. Also, the costs associated with attempting to detect differences of less than 9-11 percent appeared to be excessive.

2. **Frame Development**

The next step was to prepare the frame of "small" plastics companies for sampling. A company universe file was obtained by collapsing establishment TVS data in plastics from the 1987 census to a company level (data may not have reflected the most recent company information since the sample was selected in March 1989). Companies whose total TVS in plastics was more than five million dollars were deleted from this universe file. Finally, companies that were either in the Phase I plastics sample (to test the feasibility of initiating a probability sample for the M3) or no longer active in plastics also were deleted from the sampling frame. This activity yielded the final frame from which to select the Phase II plastics sample. This final universe of "small" plastics companies contained 3,282 companies.

3. **Sample Selection**

The universe of 3,282 "small" companies was split randomly into four equal partitions (821 in two and 820 in the other two). From these four partitions, each of the four sample panels was selected independently. The sample was selected using simple random sampling (SRS). We selected 110 companies in each panel (a total of 440) to ensure that we would be able to detect the desired percent differences (9-11 percent) in panel response rates and to allow for attrition over the duration of the 15-month study. Once the sample was selected, it was matched to the company name and address file. This match resulted in three unmatched cases, which were then deleted from the sample file. Therefore, the final sample for the Phase II plastics study consisted of 437 companies.

C. Implementation

1. **Determining Companies Eligible for Inclusion in Response Rates**

As mentioned earlier, we wanted to measure differences in monthly response rates between four panels, each employing a unique data collection procedure. In order to do this, we needed to first develop criteria for determining whether or not to include a company in the response rate calculations. The following summarizes the criteria developed to determine the eligibility status of each company:

Company Status	Eligibility Status
active	eligible
refusal	eligible
death	ineligible
bought/sold	ineligible
out-of-scope (mfg.)	eligible
out-of-scope (nonmfg.)	ineligible

Since this was the first time many of the sample companies had been exposed to the M3 survey, the first 2 months of this study were treated as an initiation period. This initiation period allowed us to verify initial eligibility for each company, and also it allowed companies to become acquainted with the M3 questionnaire. Response rates were still calculated for these 2 months, but low response rates were attributed partially to the fact that this was the companies' first exposure to the M3 survey.

2. Monitoring Response Rates

Once the eligibility criteria were established, monthly response rates could then be calculated for each of the four panels. For this study, response was defined as the receipt of any useful data, either complete or partial. The four data collection procedures were simply various combinations of two primary methods. These methods were (1) imprinting a message on the questionnaire indicating that survey participation was of limited duration and (2) telephone follow-up for delinquent companies. The four data collection procedures by panel were as follows:

panel 91A - control panel, no imprinted message or phone follow-up (108 companies)

panel 92A - imprinted message on questionnaire only (110 companies)

panel 93A - phone follow-up only (110 companies)

panel 94A - both imprinted message on questionnaire and phone follow-up (109 companies)

The imprinted message appeared on the M3 questionnaire for all companies in two of the sample panels (panels 92A and 94A). This message stated that the companies would be in the survey for a period of 15 months. The imprinted message was used to test whether or not sample rotation might be a viable option in a future sample design for the M3 survey.

Telephone follow-up was done for all delinquent companies in two of the sample panels (panels 93A and 94A). The primary intent of phone follow-up was to collect data from delinquent companies each month, while also encouraging timely response in subsequent months. Phone follow-up was not meant to be a conditioning process for future phone reporting. Two phone follow-ups were done each month, the first starting approximately 2 weeks after mailout. A standard phone log for all delinquent companies was developed and a separate log was kept for each company called. Along with the company's census file number (CFN) and panel, this phone log contained such information as the date of each phone call, the day each call was made, the time of each call, the length of each call, and the outcome of each call. A copy of this standard phone log, which summarizes all the possible outcome codes, is Attachment A to this document.

Data was collected for all four sample panels from April 1989 through February 1990. As stated earlier, the study was planned for 15 months, however, results had stabilized, so the study was reduced to 11 months. Monthly records were maintained on file for each company in the sample. Each company record consisted of the eligibility status (indicating whether or not to include the company in response rate calculations), the date the company became ineligible (if ineligible), the response status, the date of response, and various phone call information for the delinquent companies in the two telephone follow-up panels. Response rates were calculated each month for all four sample panels, as well as for the entire sample, and changes in monthly response rates were monitored month to month over the duration of the study. Upon closeout each month, summary reports were prepared showing response rates (including the number of respondents and the number of companies eligible for inclusion in response rates), the number of company refusals, the number of phone calls made, and the average length of phone calls for the entire sample and for each panel. An example of one of the summary reports is Attachment B to this document.

In addition to monitoring the individual panel response rates, additional response rate comparisons were made. Monthly response rates for all companies with the imprinted message (panels 92A and 94A combined) were compared with corresponding response rates for companies without the message (panels 91A and 93A combined). Also, monthly response rates for all companies receiving telephone follow-up (panels 93A and 94A combined) were compared with corresponding response rates for companies not receiving

telephone follow-up (panels 91A and 92A combined). For each response rate calculated for these comparisons, standard errors were developed to determine whether or not observed differences in the comparisons were statistically significant.

D. Results Obtained and Their Interpretations

As stated earlier, the impetus for this study was that the current M3 survey is characterized by low response rates, especially among smaller companies. Results obtained from this study reaffirm this. Response for the entire sample was quite low for the duration of the 11-month study, ranging from 31.2 to 35.0 percent. The highest response rate attained for any panel was only 51.2 percent. Although response rates were not as high as we would like to have seen, some progress was made in improving response in this study. However, more research in this area of response improvement needs to be done.

Comparisons Testing the Effects of the Imprinted Message on Response Rates

The first response rate comparisons test the effects of the imprinted message on the questionnaire. Results from these comparisons provide insight as to whether or not a rotating sample might be a viable option for improving response. Three comparisons were made towards this end. The first was between the monthly response rates over the combined panels with the imprinted message (panels 92A and 94A together) and the corresponding rates over the two panels with no imprinted message (panels 91A and 93A together). Over the duration of the study, the response rate for the "message" panels averaged 34.0 percent, which was slightly, but not significantly higher than the 32.6 percent average seen for the "no-message" panels. Monthly response rates, along with corresponding standard errors, can be seen for this comparison in Attachment C.

The second comparison on the effects of the imprinted message involves panels 91A and 92A. This comparison concentrates solely on the effects of the message without the confounding factor of telephone follow-up. Monthly response rates for panels 91A and 92A were low throughout the study, as seen in Attachment D to this document. Despite the fact that the message was in a prominent place on the front of the questionnaire, it may still have been overlooked by the respondent. Response rates for panel 92A (message) were slightly lower, on average, than those for panel 91A. Therefore, simply imprinting a message on the questionnaire stating that survey participation is of limited duration does not, in itself, seem to improve response.

The final comparison on the effects of the imprinted message involves panels 93A and 94A. In this comparison, the effects of the message on response rates are obscured by the fact that telephone follow-up for nonresponse also was done. It is difficult to determine whether differences in response are attributable to the imprinted message, to the phone follow-up, or to a combination of the two.

Monthly response rates for panel 94A consistently were higher, sometimes significantly higher, than response rates for panel 93A, as seen in Attachment D. Although the message alone did not seem to improve response, when used in conjunction with telephone follow-up it apparently had a positive effect. This can be seen by examining response rates prior to the advent of phone follow-up. Over time, response rates prior to phone follow-up were significantly higher for panel 94A than panel 93A. This may be due to the fact that the respondent initially overlooked the message on the questionnaire. During phone follow-up, however, the message was conveyed to respondents in panel 94A, perhaps providing them an incentive to report prior to phone follow-up in future months.

Therefore, before considering the use of a rotating sample as a means for improving response, it is important to ensure that the respondents actually are aware that their participation is limited. An imprinted message, unless very conspicuous, may not fulfill this obligation. Other means, such as phone follow-up prior to or shortly after mailout, might more fully ensure that the respondent is aware that survey participation is of limited duration.

Comparisons Testing the Effects of Telephone Follow-Up on Response Rates

The next group of response rate comparisons tests the effects of telephone follow-up on response. Again, this involves three separate comparisons. The first comparison was between the monthly response rates for the combined panels in which phone follow-up was done (panels 93A and 94A together) and the corresponding rates for the combined panels where phone follow-up was not done (panels 91A and 92A together). Overall, telephone follow-up for delinquent companies clearly improved response, as seen in Attachment E. On average, the monthly response rate for the "phone" panels was 41.6 percent, while the average monthly response rate for the "no-phone" panels was only 24.9 percent. Over the course of the study, final response rates for the "phone" panels were anywhere from 12 to 21 percent higher each month than corresponding rates for the "no-phone" panels.

Another interesting fact was that as the study progressed, response rates for the "phone" panels prior to phone follow-up were higher than they had been the first couple of months. There were also months in which response rates **prior** to phone follow-up were higher than **final** response rates for the "no-phone" panels. This suggests that the timing of response may be improved by using telephone follow-up procedures when companies are first introduced to the survey. We may be able to directly influence the conditioning that the respondent undergoes.

The second comparison on the effects of telephone follow-up on response involves panels 91A and 93A. This comparison focuses exclusively on the effects of phone follow-up, and involves no other confounding factors. Response rates for panel 93A were significantly higher than those for panel 91A, which can be seen by referring to Attachment D. This result alone cannot be attributed to phone follow-up without first examining response rates prior to phone follow-up for the two panels. These response rates were similar, which suggests that the differences in response rates between the two panels are attributable to phone follow-up. This conclusion is further supported by the fact that for panel 93A alone, response rates increased anywhere from 10 to 23 percent as a result of phone follow-up. These increases are significant. Therefore, initiating telephone follow-up for delinquent companies clearly, and significantly, improves response.

The last comparison made in examining the effects of telephone follow-up involves panels 92A and 94A. In this comparison, both panels have the imprinted message on the questionnaire. Throughout the study, panel 94A showed significantly higher monthly response rates than panel 92A, as seen in Attachment D. In fact, the differences in response rates for this comparison were greater than those for the comparison between panels 91A and 93A.

Response rates prior to phone follow-up for panel 94A were also significantly higher than those for panel 92A, especially in the later months of the study. This could be due to the imprinted message, to phone follow-up, or to a combination of the two. For panel 94A alone, response rates increased anywhere from 6 to 22 percent as a result of phone follow-up. Most of these increases are significant, so part of the differences between response rates for the two panels can be attributed to phone follow-up. Therefore, it is certainly clear that telephone follow-up for delinquents significantly improves response, slightly more so if the phone follow-up is done in conjunction with the message being imprinted on the questionnaire.

While this study shows that telephone follow-up improves response, phone follow-up also provided the opportunity to ascertain reasons why refusal companies would not provide data. The main reason given for nonresponse was that the survey is voluntary. Additional reasons given for not responding were that the data were not available on a monthly basis, the company did not have the time to spend filling out the questionnaire, the company did not have the staff to complete the questionnaire, the company was no longer manufacturing plastics, and the company felt that its data were insignificant. A summary of these reasons given for nonresponse can be seen in Attachment F.

Some Additional Observations from this Study

To augment these results, monthly response rates for all four panels were compared. Over the course of this study, basically the same nucleus of companies reported each month, so monthly response rates within each panel varied minimally (panel 93A showing the largest range of response rates over time of 11.5 percent). This indicates that once respondents are initiated and begin responding, they can be retained for at least several months. Conversely, once companies become delinquents, they remain delinquents for the duration of the survey. Therefore, intensive follow-up resources should be committed when a sample first goes on line so that the number of delinquent companies can be minimized. Monthly response rates for all four panels over the course of the study can be seen graphically in Attachment G.

On average, panel 94A yielded the highest monthly response rate (45.4 percent), while panel 92A showed the lowest average monthly response rate (23.7 percent). A summary of average monthly panel response rates and their standard errors can be seen in Attachment H. The imprinted message on the questionnaire stating the survey was of limited duration was not, in itself, a good means for improving response, as seen in the average response rate for panel 92A. What is not clear is the extent to which the respondents were aware of the message. However, when the message was used in conjunction with telephone follow-up, it seemed to improve response slightly, as seen in the difference between the average response rates for the two "phone" panels (panel 94A being 7 percent higher than panel 93A). It was extremely clear that regular telephone follow-up greatly improved response.

Therefore, based on these findings, while the use of a rotating sample of small companies does not appear to significantly improve response, the use of telephone follow-up does.

E. Response Rate and Variance Estimation

All of the results of this study and the interpretations of these results are based on the various response rates and standard errors on these calculated response rates. Since all sample panels were selected at essentially the same rate using SRS, all sample companies had virtually equal weights, both within panels and across panels. Thus, unweighted counts can be utilized in the computation of response rates. Therefore, all panel response rates were calculated under the general formula:

$$R_i' = X_i'/Y_i'$$

$$= X_i/Y_i$$

where, X_i' = simple weighted estimate of the number of respondents in panel i
Y_i' = simple weighted estimate of the number of eligible companies in panel i
X_i = number of sample respondents in panel i
Y_i = number of eligible sample companies in panel i

For the response rate comparisons of interest, standard errors were calculated on the response rates involved so that we could determine whether or not observed differences were in fact significant. The relative variance on each response rate is the relative variance of a ratio. Linear approximations were used to estimate each of these relative variances. Therefore, relative variances on the panel response rates were estimated by:

$$V^2_{R_i'} \approx V^2_{X_i'} + V^2_{Y_i'} - 2V_{X_i', Y_i'}$$

$$\approx \sigma^2_{X_i'}/(W_iX_i)^2 + \sigma^2_{Y_i'}/(W_iY_i)^2 - 2\sigma_{X_i', Y_i'}/W_i^2(X_iY_i)$$

$$\approx N_i(W_i-1)(X_i/n_i)[1-(X_i/n_i)]/(W_iX_i)^2 +$$

$$N_i(W_i-1)(Y_i/n_i)[1-(Y_i/n_i)]/(W_iY_i)^2 -$$

$$2N_i(W_i-1)[X_i/n_i-(X_i/n_i)(Y_i/n_i)]/W_i^2(X_iY_i)$$

where, n_i = number of companies sampled in panel i
N_i = number of companies in universe from which panel i was sampled
W_i = sample weight for each company in panel i

and X_i and Y_i are defined as before.

The standard error on each monthly panel response rate, R'_i, was then estimated by:

$$\sigma_{R'_i} = \sqrt{V^2_{R'_i}(R'_i)^2}$$

$$= V_{R'_i}(R'_i)$$

where $V_{R'_i}$ and R'_i are defined as before.

In addition to calculating monthly panel response rates and variances, monthly response rates and variances across panels also were calculated (i.e., panels 91A and 92A together, etc.). These rates were calculated using the same general formula seen earlier:

$$R'_{ij} = X'_{ij}/Y'_{ij}$$

$$= X_{ij}/Y_{ij}$$

$$= (X_i+X_j)/(Y_i+Y_j)$$

where, X'_{ij} = simple weighted estimate of the number of respondents across panels i and j

Y'_{ij} = simple weighted estimate of the number of eligible companies across panels i and j

X_{ij} = number of sample respondents across panels i and j

Y_{ij} = number of eligible sample companies across panels i and j

and X_i, X_j, Y_i, and Y_j are defined as before. It should be noted that the unweighted version of this formula is used under the assumption that all weights are equal, which is nearly satisfied since all panels were selected at virtually the same rate.

Relative variances on these combined rates for any two panels i and j were estimated using the following formula:

$$V^2_{R'_{ij}} \approx V^2_{X'_{ij}} + V^2_{Y'_{ij}} - 2V_{X'_{ij}Y'_{ij}}$$

$$\approx (\sigma^2_{X'_i}+\sigma^2_{X'_j})/[(W_iX_i)+(W_jX_j)]^2 +$$

$$(\sigma^2_{Y'_i}+\sigma^2_{Y'_j})/[(W_iY_i)+(W_jY_j)]^2 -$$

$$2(\sigma_{X'_iY'_i}+\sigma_{X'_jY'_j})/[(W_iX_i+W_jX_j)(W_iY_i+W_jY_j)]$$

where, $\sigma^2_{X'_i}$ = variance on weighted estimate of the number of respondents in panel i

$\sigma^2_{X'_j}$ = variance on weighted estimate of the number of respondents in panel j

$\sigma^2_{Y'_i}$ = variance on weighted estimate of the number of eligible companies in panel i

$\sigma^2_{Y'_j}$ = variance on weighted estimate of the number of eligible companies in panel j

$\sigma_{X'_iY'_i}$ = covariance between weighted estimates of the number of respondents and the number of eligible companies in panel i

$\sigma_{X'_jY'_j}$ = covariance between weighted estimates of the number of respondents and the number of eligible companies in panel j

and W_i, W_j, X_i, X_j, Y_i, and Y_j are defined as before.

The standard error on each response rate for combined panels was then estimated by:

$$\sigma_{R'_{ij}} = \sqrt{V^2_{R'_{ij}} (R'_{ij})^2}$$

$$= V_{R'_{ij}} (R'_{ij})$$

where $V_{R'_{ij}}$ and R'_{ij} are defined as before.

One other response rate calculated for this study was an average monthly response rate over the duration of the study. The average response rate was calculated for each of the four sample panels, along with the respective variances on these averages.

In order to obtain these average response rates, several steps were required. First, for each company in the study, counts of the number of months reported and the number of months eligible for inclusion in response rates were developed. Using t_k to represent the number of months company k reported in the survey, and u_k to represent the number of months company k was eligible for inclusion in response rate calculations, the average response rate for each sample panel was defined based upon the following formula:

$$(R'_i)_{avg} = \sum_{k=1}^{ni} t_k \; / \; \sum_{k=1}^{ni} u_k$$

$$= T'_i / U'_i$$

$$= T_i / U_i$$

where, T_i' = simple weighted estimate of the total number of company responses for panel i over entire study

U_i' = simple weighted estimate of the total number of months companies in panel i were eligible for inclusion in response rates over entire study

T_i = total number of sample company responses for panel i over entire study

U_i = total number of months sample companies in panel i were eligible for inclusion in response rates over entire study

Relative variances on these average response rates were estimated using the following formula:

$$V^2_{(R')_{i\,avg}} \approx V^2_{T'_i} + V^2_{U'_i} - 2V_{T'_i U'_i}$$

$$\approx \sigma^2_{T'_i}/(W_iT_i)^2 + \sigma^2_{U'_i}/(W_iU_i)^2 - 2\sigma_{T'_i U'_i}/W_i^2(T_iU_i)$$

$$\approx [N_i^2(1-f_i)S^2_{T_i}/n_i]/(W_iT_i)^2 +$$

$$[N_i^2(1-f_i)S^2_{U_i}/n_i]/(W_iU_i)^2 -$$

$$2[N_i^2(1-f_i)S_{T_i U_i}/n_i]/W_i^2(T_iU_i)$$

where, f_i = sampling fraction for panel i (n_i/N_i)

$S^2_{T_i}$ = sample estimate of population variance on variable T (total number of company responses) for panel i

$S^2_{U_i}$ = sample estimate of population variance on variable U (total number of months companies were eligible for inclusion in response rates) for panel i

$S_{T_i U_i}$ = sample estimate of population covariance between variable T and variable U

and n_i, N_i, W_i, T_i, and U_i are defined as before.

The estimated population variance in the above formula, $S^2_{T_i}$, was derived as follows:

$$S^2_{T_i} = \sum_{k=1}^{ni}(t_k - \bar{t}_i)^2 \;/\; n_i - 1$$

where, $\bar{t}_i = \sum_{k=1}^{ni} t_k / n_i$, the average number of months reported for the companies in panel i

and n_i and t_k are defined as before.

The estimated population variance, $S_{U_i}^2$, was calculated similarly by substituting u for t.

Finally, the population covariance was estimated by the following formula:

$$S_{T_i U_i} = \sum_{k=1}^{ni} (t_k - \bar{t}_i)(u_k - \bar{u}_i) \; / \; n_i - 1$$

where n_i, t_k, $\bar{t}_i$, u_k, and $\bar{u}_i$ are defined as before.

Using the above results, the standard error on each average monthly response rate was estimated by:

$$\sigma_{(R')_{i\,avg}} = \sqrt{V^2_{(R')_{i\,avg}} (R'_i)^2_{avg}}$$

$$= V_{(R')_{i\,avg}} (R'_i)_{avg}$$

where $V_{(R')_{i\,avg}}$ and $(R'_i)_{avg}$ are defined as before.

F. Limitations of the Data

There were several factors involved in this study which may have affected the results and/or the interpretations of these results. The first contributing factor was the limited scope of the study. The study was limited to one industry, the plastics industry, and was further restricted to the small companies of that industry. Therefore, care should be exercised in extrapolating results to other industries and/or company sizes.

Another factor which may have affected our results was the fact that the selected sample, except for deaths, remained fixed throughout the study. Only the original 437 companies sampled were monitored for any company actions. Deaths in the sample were dropped, but births were not identified and, consequently, were not added.

The confounding factor of combining treatments also may have affected our interpretations of the results from this study. For example, panel 94A employed both phone follow-up and the imprinted message on the questionnaire. In this case, when making the response rate comparisons for this study, it was more difficult to assess whether phone follow-up or the imprinted message accounted most for observed differences.

An additional factor which may have affected the results of this study was the work of the unit in Jeffersonville employed to conduct the phone follow-up for the two phone panels. We specified that delinquent companies were to be called each month at the beginning of each follow-up period, and that they should be called throughout the course of the follow-up period. This procedure was to be followed until each delinquent company either reported or gave some definitive reason for not reporting in a given month. However, over the course of the study, due to conflicting priorities, phone calls were not always made on schedule. There were some months in which delinquent companies were contacted at the start of the follow-up period, but were not contacted again that month. There also were months in which delinquent companies were not contacted until the end of the follow-up period. There were even months in which a few of the delinquent companies were not contacted at all. These variations from the specified phone follow-up procedures may have affected the number of delinquent companies which reported during a given month, and thus, may have affected the overall results of the study.

One other factor which affects the results and/or the interpretations of these results is sampling error. All of the estimates are subject to sampling error. The sample selected for this study consisted of only 437 companies, further stratified into four panels, so the number of cases in each panel was rather small compared to the plastics universe total. Also, all significance testing was done at the 90 percent confidence level.

Attachments

ATTACHMENT A

M3 (PLASTICS) --- PHASE II FOLLOW-UP PHONE LOG

Company ID: _____

Industry Category: _____ (93A or 94A)

Log of Calls

Date of Call	Day of Week	Company Contacted (Yes/No)	Outcome of Call (Code & Remarks)	Time of Call (approx.)	Length of Call (approx.)	Suggested Call Back Time & Date

Call Outcome Codes

Company Contacted:
- CCD - Collected Complete Data
- CPD - Collected Partial Data
- FAR - Form Already Returned (mailed or faxed)
- FWR - Form Will be Returned (mailed or faxed)
- CCB - Census will Call Back
- RCB - Respondent will Call Back
- DNA - Data Not Available
- CNF - Company Needs Form (lost or never received first one)
- IEG - Ineligible (death, sold, or out-of-scope: non-mfg.)
- RFV - Refusal because Voluntary
- RFO - Refusal due to Other reasons
- MAM - Message left on Answering Machine
- WCO - Wrong Contact (Obtained new contact)
- WCN - Wrong Contact (No new contact obtained)
- MIS - Miscellaneous

Company Not Contacted:
- NNF - Number Not Found
- WN - Wrong Number
- NA - No Answer
- BS - Busy Signal
- TD - Telephone Disconnected/ out of order

ATTACHMENT B

M3 (PLASTICS) ----- PHASE II

Summary of Results (February '90)

	91A	92A	93A	94A	Total Sample
# Ineligible	20	15	9	24	68
# Nonrespondents	65	70	59	46	240
# Respondents	23	25	42	39	129
# Figuring in Response Rate	88	95	101	85	369
Response Rate (%)	26.1	26.3	41.6	45.9	35
Total # of Phone Calls	N/A	N/A	52	29	81
Total Time of Phone Calls (mins.)	N/A	N/A	100	55	155
Average Time per Call (mins.)	N/A	N/A	1.92	1.9	1.91
# of Calls in which Data was Collected	N/A	N/A	7	4	11
Refusals (Voluntary)	0	5	31	22	58
Refusals (Other)	0	0	18	18	36

ATTACHMENT C

COMPARISON OF RESPONSE RATES (MESSAGE VS. NO MESSAGE)

	MESSAGE				NO MESSAGE			
MONTH	# ELIGIBLE	# RESP.	RATE (%)	S.E. (%)	# ELIGIBLE	# RESP.	RATE (%)	S.E. (%)
APR.'89	199	65	32.7	3.0	204	68	33.3	3.1
MAY '89	196	68	34.7	3.1	200	56	28.0	3.0
JUN.'89	192	65	33.9	3.1	196	69	35.2	3.2
JUL.'89	187	60	32.1	3.1	191	63	33.0	3.2
AUG.'89	186	62	33.3	3.2	191	68	35.6	3.2
SEP.'89	184	67	36.4	3.3	189	59	31.2	3.1
OCT.'89	183	67	36.6	3.2	189	61	32.3	3.1
NOV.'89	183	58	31.7	3.1	189	58	30.7	3.1
DEC.'89	182	65	35.7	3.2	189	61	32.3	3.1
JAN.'90	180	56	31.1	3.1	189	62	32.8	3.2
FEB.'90	180	64	35.6	3.3	189	65	34.4	3.2

ATTACHMENT D

SUMMARY OF MONTHLY RESPONSE RATES

MONTH	PANEL 91A				PANEL 92A				PANEL 93A				PANEL 94A			
	# IN PANEL	# OF RESP	FINAL RESP RATE (%)	S.E. (%)	# IN PANEL	# OF RESP	FINAL RESP RATE (%)	S.E. (%)	# IN PANEL	# OF RESP	FINAL RESP RATE (%)	S.E. (%)	# IN PANEL	# OF RESP	FINAL RESP RATE (%)	S.E. (%)
APR.'89	99	28	28.3	4.2	103	24	23.3	3.9	105	40	38.1	4.4	96	41	42.7	4.7
MAY '89	97	25	25.8	4.1	101	25	24.8	4.0	103	31	30.1	4.2	95	43	45.3	4.8
JUN.'89	94	28	29.8	4.4	100	22	22.0	3.9	102	41	40.2	4.5	92	43	46.7	4.8
JUL.'89	90	25	27.8	4.4	99	23	23.2	3.9	101	38	37.6	4.5	88	37	42.0	4.9
AUG.'89	90	26	28.9	4.4	98	25	25.5	4.1	101	42	41.6	4.6	88	37	42.0	4.9
SEP.'89	88	20	22.7	4.2	98	28	28.6	4.2	101	39	38.6	4.5	86	39	45.3	5.0
OCT.'89	88	21	23.9	4.2	97	23	23.7	4.0	101	40	39.6	4.5	86	44	51.2	5.0
NOV.'89	88	20	22.7	4.2	97	19	19.6	3.7	101	38	37.6	4.5	86	39	45.3	5.0
DEC.'89	88	22	25.0	4.3	97	25	25.8	4.1	101	39	38.6	4.5	85	40	47.1	5.0
JAN.'90	88	23	26.1	4.4	95	17	17.9	3.7	101	39	38.6	4.5	85	39	45.9	5.0
FEB.'90	88	23	26.1	4.4	95	25	26.3	4.2	101	42	41.6	4.6	85	39	45.9	5.0

COMPARISON OF RESPONSE RATES (PHONE FOLLOW-UP VS. NO FOLLOW-UP)

	FOLLOW-UP								NO FOLLOW-UP			
	PRIOR TO				AFTER							
MONTH	# ELIG.	# RESP.	RATE (%)	S.E. (%)	# ELIG.	# RESP.	RATE (%)	S.E. (%)	# ELIG.	# RESP.	RATE (%)	S.E. (%)
APR.'89	201	36	17.9	2.5	201	81	40.3	3.2	202	52	25.7	2.9
MAY '89	198	48	24.2	2.8	198	74	37.4	3.2	198	50	25.3	2.9
JUN.'89	194	51	26.3	2.9	194	84	43.3	3.3	194	50	25.8	2.9
JUL.'89	189	44	23.3	2.8	189	75	39.7	3.3	189	48	25.4	2.9
AUG.'89	189	59	31.2	3.1	189	79	41.8	3.3	188	51	27.1	3.0
SEP.'89	187	62	33.2	3.2	187	78	41.7	3.3	186	48	25.8	3.0
OCT.'89	187	63	33.7	3.2	187	84	44.9	3.4	185	44	23.8	2.9
NOV.'89	187	60	32.1	3.2	187	77	41.2	3.3	185	39	21.1	2.8
DEC.'89	186	56	30.1	3.1	186	79	42.5	3.4	185	47	25.4	3.0
JAN.'90	186	58	31.2	3.1	186	78	41.9	3.4	183	40	21.9	2.8
FEB.'90	186	51	27.4	3.0	186	81	43.5	3.4	183	48	26.2	3.0

ATTACHMENT E

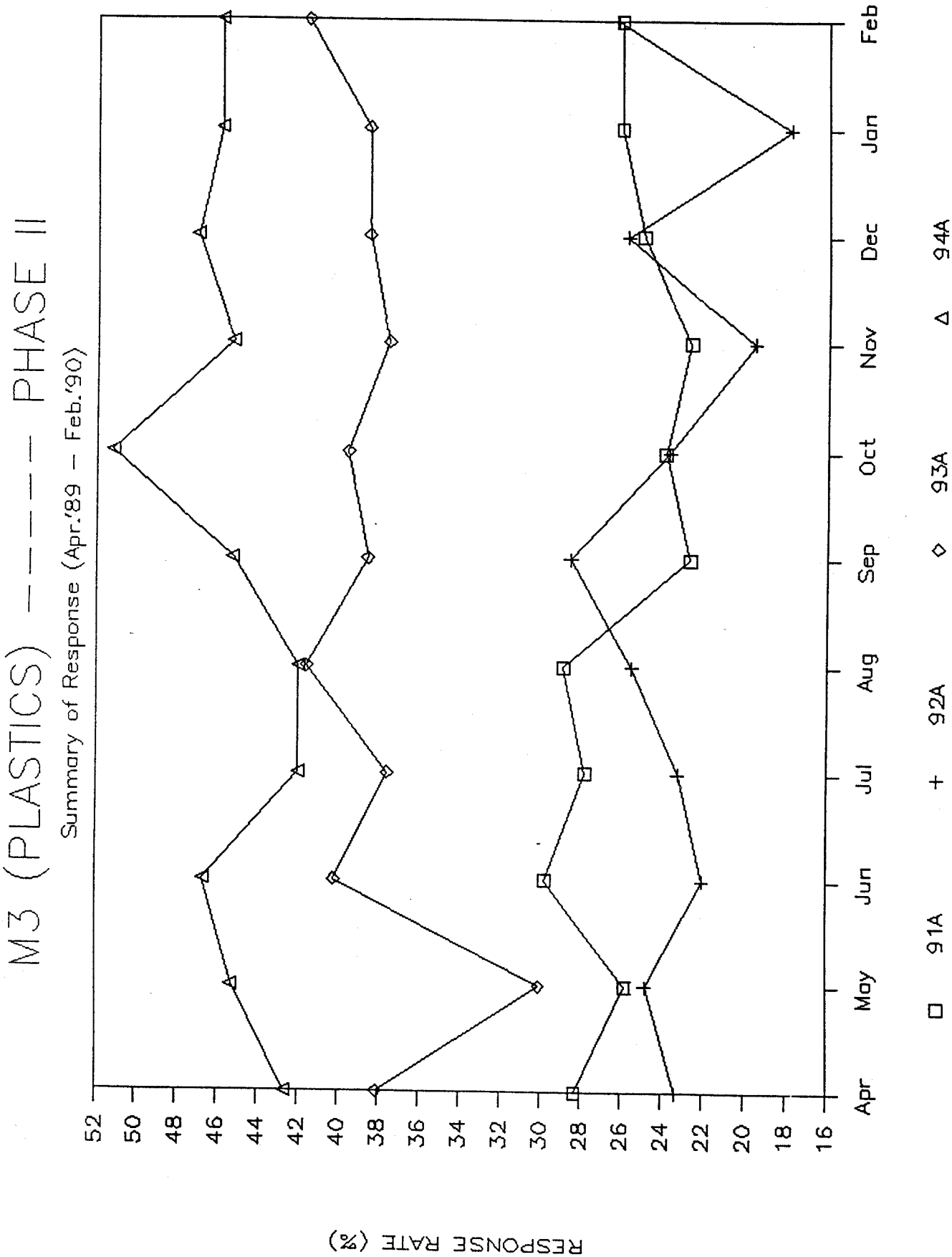
ATTACHMENT F

M3 (PLASTICS) --- PHASE II

SUMMARY OF REASONS FOR NONRESPONSE GIVEN BY REFUSAL COMPANIES

REASON	FREQUENCY
SURVEY IS VOLUNTARY	68
DATA NOT AVAILABLE OR ACCESSIBLE MONTHLY	19
NO TIME TO FILL OUT QUESTIONNAIRE	3
NO STAFF TO COMPLETE QUESTIONNAIRE	2
NO LONGER MANUFACTURING PLASTICS	1
DATA ARE INSIGNIFICANT	1

TOTAL = 94


M3 (PLASTICS) ----- PHASE II
Summary of Response (Apr.'89 - Feb.'90)
RESPONSE RATE (%)
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
□ 91A
+ 92A
◇ 93A
△ 94A

M3 (PLASTICS) --- PHASE II

SUMMARY OF RESPONSE RATES (APR.'89 - FEB.'90)

PANEL	PANEL TREATMENT	# OF CASES IN PANEL	RANGE OF RESPONSE RATES	AVERAGE RESPONSE RATE	S.E. ON AVG. RESPONSE RATE
91A	CONTROL PANEL	108	22.7 - 29.8%	26.2%	3.6%
92A	MESSAGE ONLY	110	17.9 - 28.6%	23.7%	3.3%
93A	PHONE FOLLOW-UP ONLY	110	30.1 - 41.6%	38.4%	3.8%
94A	BOTH MESSAGE AND PHONE FOLLOW-UP	109	42.0 - 51.2%	45.4%	4.2%