PLAINTIFF'S EXHIBIT

UC-2384

Union Carbide Corporation
Metals Division
Niagara Falls, NY 14302
February 27, 1976

M E M O R A N D U M

To: Messrs. G. G. Gabrielson, Jr.
J. Hebb

From: Dr. H. B. Rhodes

Copies: Messrs. R. H. Mereness
W. C. Thurber
File

Subject: Roy F. Weston, Inc. Report of February 3, 1976.

Attached is a detailed commentary on the above noted report for your consideration. In general it appears that Weston has done an outstanding job in collecting the information for the primary industries. The overall organization of the report and the technical feasibility section are clear and well presented. The effect of the time limitations, however, seems to show in the sections on Administrative Factors and Economic Impact. A careful review and rewording of this section is strongly recommended. Also, I do not find any problem with the length and degree of detail in the main parts of the report but do feel that a short summary and conclusions section at the beginning is badly needed.

The main problem areas will be discussed in general terms in this letter. A detailed commentary, by paragraph, is attached. Comments on the Technical Feasibility section have been confined to those industry segments where Union Carbide has a direct, first-hand knowledge of the industry segment. It is important to point out that these suggestions involve questions of clarity in presentation, technical accuracy, and request more detailed data or documentation of assumptions. They are not intended in any way to compromise Weston's independent position. It should be reiterated, also, that they are not meant to be critical of the job Weston has done under severe time restraints but to take advantage of the added time to strengthen the result.

In broad terms, the areas needing review can be summarized as follows. An undefined 1972 report is used to discuss and compare with the economic impact results of this study. This badly obscures the presentation and weakens the report. There are also several serious questions regarding the choice of incremental requirements for the proposed rulemaking vs the present regulations that are used in calculating the cost of Administrative Factors. Finally, the Economic impact calculations omit a great deal of detailed information collected in the survey that is needed to document the calculations and to compare the impact of the industry proposal with that of the proposed rulemaking.

Consider, first, the use of the 1972 report just mentioned. The Technical Feasibility Section, pages 2-87 and 2-88 shows where the primary

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industry stands today on dust control, notes that they are a considerable distance from compliance with a 2-fiber standard, and that 3-5 years will be needed to implement BAT for whatever level it will achieve. In the Economic Impact Section, page 4-15, the costs are not presented in the same format but are compared vaguely with an undefined 1972 report. The basis for this report, who prepared it, and its validity are not defined. If it is the A. D. Little Report done for OSHA it has been severely criticized as both inaccurate and misleading. This presentation needs to be re-examined carefully so that the amount that industry has spent, what this has achieved in both dust control and other aspects of compliance as well, and what it will cost to meet the proposed rulemaking come through clearly and distinctly.

In the calculation of the annual cost for industrial hygiene and medical programs the following questions are raised:

1. Items 1 and 2 show medical examination costs plus lost time costs connected with such examinations. The proposed regulations do not change the requirements as to which employees must have medical examinations but merely add sputum cytology tests for certain employees.

   There may be substantial new costs incurred for such examinations due to non-compliance with the present requirements but it would seem to be incorrect to include the cost of the basic examinations as an increment changeable to the proposed rulemaking.

2. Item 6, Protective Clothing, is calculated at one change per week. The proposed rulemaking requires at least one change a day. This should be corrected or an alternative such as re-usable clothing and laundry should be costed.

3. Item 7, Monitoring, is shown as 25% of employees monitored twice a year. The proposed rulemaking requires monthly monitoring, followed by quarterly monitoring until two successive samples are below the allowable limits. The Weston estimate may be consistent with this, but appears to be quite low. In any case, the basis to relate the estimating procedure to the regulations should be defined clearly for documentation purposes. It should also be noted, that as the study is extended to the secondary and consumer uses, a way is needed to account for the cost of the very large number of locations that will have to be monitored twice to prove there is no significant exposure.

4. The proposed lowering of the allowable limits from 2 to 0.5 fibers results in massive expendures for showers and changerooms. This may already have taken place in the large industries studied but will certainly be relevent in the secondary industries. It is expected that company required showers will have to take place on paid company time. At 15 minutes per day the annual cost will be about $300/year. It would seem that some provision for this should be included in the cost calculations.

In the Economic Impact Section there are a number of places where more detailed information is needed to assess more accurately the consequences

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to both the large and small companies. Although the size range of the firms covered is mentioned, it would be much more useful if both the number and size distribution of the firms in the segment and of the manufacturing locations were given. Similarly, the range of incremental annual costs are mentioned but an average is used to characterize the segment. The range is generally quite wide and the larger burdens fall on the smaller companies. It would be valuable to show the impact related to the size of the firms impacted.

Also, in the calculations, the capital requirement for dust control BAT and, the cost for hygiene facilities are not separated. This should be done and will become particularly important as the secondary industries are considered.

Finally, the only measurement of impact given is expressed in terms of "Increased Annual Cost" as a percentage of sales volume. Asbestos is a relatively inexpensive raw material compared to plastics or metals, for example, that is combined with substantial quantities of other ingredients plus binder into considerably more expensive end products. This tends to give a large denominator for the precent increased cost calculation and obscures the impact of the asbestos. Although the factor used is standard economic terminology it may be instructive and more graphic to relate the incremental cost to that of the asbestos. In effect, if a user is paying $100 per ton for asbestos and is required to spend $50/ton for OSHA compliance, his true raw material cost is up 50%. The incentive to go to substitutes is quite clear.

The foregoing comments relate directly to the report as written. As we know, the industry proposal suggests extensive changes that, if accepted, will greatly reduce the cost impact for compliance. In addition, the question of a 1 fiber level will undoubtedly be raised at the hearings. Although the additional details requested will help, there is still no way to estimate the cost impact of these changes. In order to do this we must have the breakdown, for each industry segment, of the employment figures from questions number 6 and 7 in the questionnaire. This can be combined with the dust count details in the Technical Feasibility Section and the location count requested previously to make a reasonably documentable estimate of the impact for these and any other changes that come up.

To pull this commentary together, it seems to me that we need to have the following information for each industry segment:

1. The structure of the segment including number and size distribution of the locations.

2. The approximate number of people involved at each exposure level.

3. The cost for dust control and what has been achieved. (Capital and annual costs.)

4. The cost for other compliance procedures and the level of compliance achieved.

Item 2, 3, and 4 are needed for the present situation, if the proposed rulemaking goes into effect, and for the industry proposal.

H. B. Rhodes

HBR:dal

Chairman
Standards and Technical Committee

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Page 1-1, 1st paragraph:

Suggest the words "...if not disastrous..." be deleted.

We are trying to avoid the VCM Industry forecast of doom. This starts the report off on the wrong tone.

Page 1-9, Table 1-1:

For each industry segment the following information should be provided:

1. The approximate number and size distribution of the total number of companies making up the segment.

2. The approximate number and size distribution of the total number of asbestos using locations making up the segment. (This can probably be combined with Item 1.)

3. The exposure information, i.e., number of people exposed to various degrees, requested in questions 6 and 7 totalled by industry segment.

This information can be combined with the fiber count results to assess the economic consequences of the changes in the regulations suggested in the industry presentation. The effect of a 1-fiber standard can also be approximated.

This is also extremely valuable information for the AIA/NA to have available and does not appear to compromise the confidentiality of the data. It could be incorporated into Table 1-1 or even be supplied separately.

Page 2-4, 1st paragraph:

BAT was defined in paragraph 3 of page 2-2 to include control equipment, process modifications, work practice changes or combinations thereof. The first paragraph on page 2-4 is either in conflict with this or is not clearly expressed.

Page 2-6, 2nd paragraph, also page 2-9:

Standardized size of bags is suggested as BAT for shipping and warehousing. Although it is theoretically possible to standardize on a single size or even a limited number, this has not been done and its effect on dust control has not been demonstrated commercially. Accordingly, it is not valid to consider this as BAT.

As a matter of fact, asbestos from different sources and even different grades from the same source vary considerably in density. To force all manufacturers to use certain bag sizes would result in a chaotic variety of bag weights and/or a range of partially filled to overfilled bags. It is most likely that this would hurt rather than improve dust control. It is strongly recommended that this erroneous recommendation be deleted.

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Page 2-9, Figure 2-2:

The upper BAT line is for manual bag opening with a hood and the bottom line is for beater bags with a hydropulper. It would aid the reader if this was noted on the diagram.

Page 2-11, 2nd paragraph:

This paragraph discusses bag disposal, all-manual and semiautomatic stations without any background description of the operations. This tends to be very confusing for anyone not familiar with the equipment. Since bag opening is one of the most critical factors in the entire study, it is suggested that a short section on the state-of-the-art in this technology should be included. It may be better to have a separate subsection to cover this.

Page 2-15, last paragraph:

If the water vapor containing the asbestos fibers is released to the outside air without going through a bag filter, it is a violation of EPA regulations. Water vapor is a problem in bag filters and it is suspected that this is not being done. This is a minor point from the OSHA considerations of this report but if the discharge is properly handled it would be a plus to mention it.

Page 2-31, 3rd paragraph:

This paragraph appears to be somewhat garbled. Loose fiber in paper bags may be dumped into a dry blender or into the Banbury depending on the procedure selected by the particular plant. It is our understanding from our customers that direct addition to the Banbury is much more common. With one exception, UCC pelletized asbestos is added to the Banbury. When asbestos is supplied in polyethylene bags, the unopened bags are always added directly to the Banbury. The bags are not "...collected and added to the Banbury mixer."

Page 2-35, 1st paragraph:

The use of pelletized asbestos is a well established practice in this industry and has been for about the last five years. A combination of cost and pellet availability has limited its growth. Classification as "advanced technology" does not appear to be correct.

Page 2-43, last paragraph:

A great variety of asbestos types are used in this industry, ranging from 100-pound compressed blocks to 10-pound bags. The process description implies that only the 100-pound blocks are used.

Page 2-67, 3rd paragraph:

As a technical point, chrysotile asbestos fiber has a tensile strength of 300,000-800,000 psi and a modulus of about 23 $X10^6$ psi. Steel has a tensile strength around 70,000 psi and a modulus around 30 X 10^6 psi. No amount of moderate shear dry blending is going to "break down" the asbestos fibers.

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Page 2-84, 1st paragraph:

Drilling mud is pumped at high pressure down into the well inside of the drill stem. It passes through small holes in a bit that is attached to the bottom of the stem and flows back to the surface through the annular space inside the casing and outside the stem. Earthen pits are used for fracturing fluid but mud pits are almost always portable, oblong metal tanks around 300-500 barrel capacity.

Page 2-84, 4th paragraph:

Use of the word "pelletized" may be misleading. Union Carbide supplies a true pelletized material which has extremely limited use due to technical problems relating to incompatibility with certain commonly used fluid loss control additives. The major share of the market is divided between a wetted granular material supplied by J-M and a coarse ground material supplied by UCC. The latter is more dusty than pellets but much less dusty than dry, loose fiber.

Regarding fiber counts, the maximum ceiling level of 1.9 fibers/cc is incorrect. UCC supplied counts that occasionally were above 5 fibers/cc. The conclusion in the last paragraph seems valid due to the limited exposure each shift.

Page 2-85, 1st paragraph:

The first sentence is inaccurate and partially incorrect. There are two principle types of joint compound. One uses a latex or water soluble glue as a binder and "sets" by evaporation of the water. The other uses dehydrated gypsum as the binder (and principle dry ingredient) and sets by chemical reaction as the gypsum takes up the water of hydration. The first type is mainly limestone with lesser amounts of mica and 3-5% asbestos. This type is used in about 80% of the market and is mostly sold in the ready-mixed, wet form. The gypsum based material, with roughly 20% of the market, also usually contains asbestos and must naturally be sold dry and be mixed just before use.

Page 2-87, 3rd paragraph:

This very important statement does not come through clearly, may be internally inconsistant, and may contradict Item 9 of this section.

According to Figure 2-1 (page 2-3), about half of the work stations are at 2 fibers/cc or below; the other half are above. The first two sentences in the paragraph appear to be trying to say this but, to me, are confusing.

The next part of the paragraph appears to state that where BAT has been implemented, fiber levels are in the 1-2 range except for a good number of places where BAT gives even higher levels. This implies that BAT has been almost universally applied in the primary industries which is inconsistant with Item 9 on page 2-89.

This paragraph, which gives the current status of dust control in the industry, is one of the most important in the entire report. It must be clear and unambiguous.

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Page 2-88, Item 7:

The statement is made that only 17 of 65 identified work stations were projected to be below the 0.5 fiber level. This may be the same sort of problem we had with the 270 data points presented in Figure 2-3, i.e., they are averages of a lot more data. Our data base for this very important conclusion should be quite clear.

Page 2-90, 2nd paragraph, parenthetical expression:

It would be more correct if the expression read..."(including construction activities.)"

Page 3-2, 2nd paragraph:

The number of 74 laboratories accredited for asbestos counting seems very high based on the list in the AIA/NA Journal of June 1975 which shows a total of only 41, many of whom are not certified for asbestos and many of whom are company laboratories that do not provide outside services. It is suggested that this be clarified and it would be extremely useful for Weston to supply AIA/NA with an up-to-date list of these laboratories.

Page 3-2, 3rd paragraph:

The construction costs for hygiene facilities need to be separated out from those for BAT. With the proposed rulemaking, almost every location where raw fiber is used will require regulated areas with the attendant shower, protective clothing, and change room facilities. We need to be able to assess the effects of the changes proposed by industry on cost and this cannot be done with all costs combined.

Page 3-3, 2nd paragraph:

The proposed rulemaking requires pre-employment, annual, and termination physical examinations for all employees exposed to any level of asbestos. Other than temporarily excluding construction, the scope of the regulation, as far as medical examinations are concerned, has not been changed from the present regulations. The only significant incremental change, costwise, is the addition of sputum cytology testing for certain employees.

The subsequent cost calculation in Table 4-2, page 4-3, indicates that this has not been considered in the Weston calculations.

Page 3-3, 3rd paragraph:

Minor point. If their usage is nonexistant, they are correct in that the regulations do not apply.

Page 3-6, 3rd paragraph:

Based on an admittedly limited number of conversations with our customers, I find the conclusions regarding record keeping completely incredible. It is suspected that it may be reasonable for a few of the larger primaries but once past this it becomes a tremendous nuisance if not a large cost. More detailed comments are provided in a subsequent discussion of Table 4-2.

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Page 4-1, 4th paragraph:

It appears that the responses by year were averaged for each company where a worksheet was prepared. These averages were then totaled by industry segment and extrapolated by tons to the entire segment. Item E in Table 4-1 is really the Typical Total Annual Capital Expenditure. This important point could be expressed more clearly.

Page 4-3, Table 4-2, Item 1 and 2:

The question of the incremental costs due to the proposed rulemaking was discussed relative to page 3-3, 2nd paragraph. The calculation used here would appear to be incorrect. The question of availability and incremental cost for sputum cytology may be worth checking.

It may also be useful to know what proportion of each industry segment is now in compliance with the present regulation. It may not be politic to put this in writing but in actual fact there has been a great deal of confusion on which employees are required to have examinations. This has also been cleared by the review commission only very recently so it should not be extremely sensitive information.

Page 4-3, Table 4-2, Item 3:

Costs will be incurred both to prepare records and to store most of them for 40 or more years. It is not clear whether preparation costs have been accounted for under "Records Retention" but in any case the basis for the figure used should be documented. It is also suggested that the "per man" basis used may not be the same for all sizes of employer.

The following comments on the details that go into the preparation of the required records are presented as possibly helpful in defining the costs.

Recordingkeeping. (n) (1) Exposure records. Items A through E will normally be included in any competent report of monitoring. The social security number and official job title are not ordinarily readily available to the man collecting the samples. When the report arrives someone is going to have to look up job titles and S.S. numbers and enter them into the record. The report will then have to be filed.

At a 0.5 fiber level, monthly monitoring is going to be extremely common. The above procedure will have to be repeated each time a report comes in and a substantial file will build rapidly.

The foregoing assumes that the phrase "of all employees monitored" in (n) (1) (i) (f) means only these employees actually tested. Paragraph (e), "Monitoring", however, discusses the use of representative employees and representative levels of exposure to "... to indicate the exposure level of all employees represented." If this means that each dust count must be interpreted in terms of employees not directly monitored and the interpretation entered into the record it is an entirely different problem.

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(n) (2) Medical Records: Time will be needed to file at least one medical report per year.

(n) (3) Mechanical ventilation records: A specific report form must be filled out and filed 4 times a year for each station tested. This must be filed, stored for 3 years, and should be selectively removed. Such reports may be routine for some large companies but are an added time burden to fill out and file for most.

(n) (4) Employee training records: This has the same problem of compiling and entering job titles and social security numbers and filings as the exposure records. This has to be done as often as a new employee is trained.

(n) (5) Rosters: At a 0.5 fiber TWA level it is assumed that regulated areas and consequently rosters will be required at most places where raw fiber is used. In the simplest sense a roster can be kept by posting a form at each entrance to a regulated area. Each employee entering must stop and sign his name. Someone has to be responsible to post the forms each day, and then collect and file them. Since this must be done every work day even small times expended per employee add up to substantial sums. For example, if we assume only one (1) minute per man to stop and sign a roster the total annual cost would be about $20/man.

(f) (7) Written Compliance Program: While not strictly a record-keeping requirement this provision will be widely applicable at a 0.5 allowable level. There will be a considerable engineering cost to put together the program and update it every six months. This cost should be covered somewhere in the calculation of administrative burdens.

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Page 4-3, Table 4-2, Item 6:

The calculation basis used here is incorrect. The proposed rule-making requires changes at least daily, not weekly. The cost of disposable clothing is thus low by a factor of 5 or possibly costs for permanent clothing and laundering might be substituted.

Page 4-3, Table 4-2, Item 7:

The rationale for the 25% of employees, monitored twice annually is not explained. At 0.5 fibers/cc monthly monitoring will be required at some stations in most primary industry locations. The next level possible is four times per year except where two successive tests are below the allowable limit. The Weston procedure looks low but may be a reasonable way to estimate costs. There is no way to tell or to estimate the effect of other allowable levels. As the study is extended to the secondary and consumer uses a way will also be needed to account for the massive sampling program covering obviously very low exposure operations. The basis for the calculation needs to be defined.

The $40 per sample figure seems reasonable for in-house monitoring or that done by local consultants. If significant travel time and expense is incurred it may be considerably too low. With only 71 certified laboratories available it would appear that such expenses may be common. It is suggested that the basis for the $40/sample estimate be stated.

Page 4-3, Table 4-2:

At the 0.5 fiber level, most primary locations will have some proportion of their employees taking a daily shower. Where showers are required by company regulations it follows that in most places they will be taken on company time. At a minimum of 15 minutes per day, $5/hour + 20% overhead, and 200 days per year a cost of $300/employee would be added. This does not include possible overtime where an operation cannot be left unattended. This could be the most expensive item in the hygiene costs and it is suggested that Weston consider if it is appropriate to take it into account.

Page 4-4, 4th paragraph:

As noted previously regarding page 1-9, the size distribution should appear somewhere in the report. The same comment and the next four that follow apply to the discussions of the other primary industry segments in this section of the report.

Page 4-4, 5th paragraph:

BAT as defined covers only dust control measures. The capital cost for showers, changerooms and other hygiene facilities is either in "Typical Annual Industry Capital Expenditure if they are already installed, lumped with BAT, or not included. This needs to be defined for each industry segment and the hygiene capital expenditures separated from dust control expenditure.

Page 4-4, 6th paragraph:

The average additional annual cost and the extremes at the end of the range are not sufficient to define the impact. Some sort of distribution

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curve as a function of size is needed.

Page 4-5, 1st paragraph:

The typical annual industry capital expenditure is shown here as a percentage of BAT. In other sections it is stated directly or omitted (floor tile). This important comparison number should be stated explicitly for each segment and preferably should appear in each summary table.

Page 4-5, summary of impact:

As discussed in the cover letter, the cost of compliance versus the cost of the asbestos used in each industry segment may be a valid and useful measure of impact.

Page 4-15, 1st paragraph:

It is assumed that the first sentence means that the $1 MM investment would be required based on 1975 costs. This should be made clear.

What 1972 report is referred to, on what basis was that study made, i.e. does it include construction, and how much of the money estimated was actually spent? If this is the A.D. Little study, it has been widely criticized as a very poor job. Unless Weston is prepared to stand back of its correctness it should not be dignified in this way as a valid work. Also, what has happened to the information collected on industry compliance measures since 1972?

This entire paragraph, another of the critical statements in the entire report seems to me to be very poorly done and needs critial review by Weston.

Page 4-15, 2nd paragraph:

This paragraph suffers from the same uncertainty as the first, i.e. basis and validity of the 1972 study. The incremental operating cost may or may not be considerably in error as per discussion of Table 4-2.

Page 4-15, last paragraph:

This is an excellent point. Would it not be useful to include this reasoning in a price increment figure in each of the industry segment tables? The factor could be X2 or whatever other information suggests is appropriate for each segment as to them ability to pass on cost increases as price increases.

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