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1 CHAIRMAN JACKSON: If you are ready, Mr. Austin, we
2 are ready.
3 MR. AUSTIN: Thank you.
4 This next portion of my prepared statement deals with
5 the exhaust emission standards for 1979 and subsequent model
6 year passenger cars, light-duty trucks and medium-duty
7 vehicles.
8 The primary purpose in implementing the 1979 and
9 subsequent model-year standards for passenger cars, light-duty
10 trucks, and medium-duty vehicles is to impose the maximum
11 feasible control of hydrocarbon and NO_x emissions upon these
12 lighter-duty vehicles so long as such control continues to be
13 cost-effective. CO standards were based on the level of
14 vehicular CO control we estimate will result in the eventual
15 attainment of the Ambient Air Quality Standard for CO. This
16 level is not, in our opinion, the lowest technologically
17 feasible CO standard. Our proposed standards for 1979-1982 can
18 be found in Table III of the prepared statement.
19 In making our waiver request on this item, we are
20 acting under the assumption that Congress will amend the Clean
21 Air Act so as to require less stringent standards than those
22 adopted by the Air Resources Board. Because of lead time
23 considerations, however, it is necessary for EPA to consider
24 our waiver request now, even though current federal statutory
25 standards are more stringent than the standards the ARB has
26 adopted for 1978 and subsequent model years.
27 If California is ever to achieve and maintain the
28 Ambient Air Quality Standards for oxidant, nitrogen dioxide and

1 particulate matter, we will need to require all hydrocarbon
2 and NO_x reductions from motor vehicles that are technologically
3 feasible and economically reasonable. We do not believe,
4 however, that the maximum feasible control over CO is either
5 necessary or reasonable in California. Control of CO beyond
6 that level required to meet the Ambient Air Quality Standards
7 will probably increase the costs of compliance and may reduce
8 the feasibility of achieving the lowest possible NO_x standards.
9 Compromises in three-way catalyst system design to achieve a
10 3.4 grams per mile CO standard may very well increase NO_x
11 emissions. This may occur due to either oxidation of ammonia
12 generated over the three-way catalyst bed to NO in a clean-up
13 oxidation catalyst for CO control, or it may be caused by
14 changes in the air/fuel ratio schedule to provide improved CO
15 control at the expense of NO_x. Cost increases could be caused
16 by the addition of secondary air injection and oxidation
17 catalysts needed for CO control at the 3.4 grams per mile
18 level but unnecessary at the 9.0 grams per mile level.
19 If Congress decides to carry over the 1977 federal
20 standards of 1.5 hydrocarbon, 15 CO and 2.0 grams NO_x to 1979
21 and later years, then it is obvious that California's 1979
22 and subsequent emissions standards are more stringent. If,
23 however, Congress mandates a .41 hydrocarbon, 3.4 CO and 2.0
24 grams NO_x standard, we believe that our package is still more
25 stringent overall, even though the California CO standard is
26 numerically higher.
27 Although the ARB is convinced that a 0.41/3.4/1.0
28 grams standard for HC/CO/NO_x is feasible by 1980 and 1981, we

1 do not believe that this low CO standard will be necessary for
2 California. We believe that the Administrator should consider
3 California's emission standards as a total package, one that
4 is in fact more stringent than any federal package being con-
5 sidered for the same time period.
6 At this point, I would like to mention an error made
7 in adopting our hydrocarbon standards for 1980 and subsequent
8 model years. It was our intention to adopt hydrocarbon
9 standards that, for 1970-type emission control systems, were
10 the equivalent of 0.41 grams per mile total hydrocarbon
11 content. The 1980 HC standard is a non-methane standard, and
12 should be 0.39 grams per mile in order to properly reflect
13 the 90% control required by the Clean Air Act. In addition,
14 we understand that if EPA adopts a non-methane hydrocarbon
15 standard, it may be at the 0.39 grams per mile level. In an
16 April 25, 1977 letter to EPA, I requested that this issue be
17 considered at the present waiver hearing, since it constitutes
18 the correction of an error in drafting rather than a
19 tightening of the standard from its current 1977 level. Were
20 we to actually enforce a 0.41 non-methane hydrocarbon standard
21 in 1980, this would constitute a relaxation of the current
22 requirement and would undoubtedly be less stringent than the
23 hydrocarbon standard which Congress will require EPA to enforce
24 for 1980 and subsequent model years.
25 Parenthetically, I might add that as a practical
26 matter this point may be irrelevant, since there's some
27 likelihood that the .41 total hydrocarbon standard will be
28 mandated by Congress for the 1980 model year, in which case

1 California would be ineligible for a waiver of a .41 non-
2 methane standard. We have to have the federal standard
3 enforced on California cars.
4 In summary, we believe that the California standards,
5 as a package, not only represent a needed step in improving
6 California's ambient air quality, but are more stringent
7 overall than standards presently under consideration by
8 Congress for the same time period.
9 For passenger cars, the 1979 exhaust emissions
10 standards will be carried over from 1978; they will remain at
11 0.41 hydrocarbon/9.0 CO/1.5 NO_x. But for 1980, the NO_x
12 standard will drop to 1.0 grams per mile, and these standards
13 will be carried over to 1981. As Table IV illustrates,
14 American Motors, Audi, BMW, British Leyland, Chrysler, Ford,
15 General Motors, Nissan, Isuzu, Maserati, Mazda, Porsche, Saab,
16 Toyota, Volkswagen, and Volvo have certified vehicles at or
17 below 1.0 grams per mile NO_x for 1977. Saab and Volvo are not
18 only below 1.0 grams per mile, but are well below 0.4 grams
19 per mile NO_x due to their use of three-way catalyst systems.
20 The fact that nearly all major manufacturers have
21 already certified passenger cars at levels well within the
22 1980 standards, in itself, indicates that neither technologi-
23 cal feasibility nor lead time problems are involved with meet-
24 ing these standards. However, we do not expect manufacturers
25 to use current systems to meet the 1980 and later standards.
26 At the November 1976 Board meeting, most manufacturers indi-
27 cated that they would rely on three-way catalysts as a more
28 fuel efficient approach to achieving low NO_x levels. ARB

1 Staff Report 76-22-2(a) details why we believe that sufficient
2 time exists to allow the introduction of three-way catalyst
3 systems in California by 1980.
4 Although it was not raised as a significant issue
5 at our November 1976 Board meeting, there have been questions
6 raised regarding the feasibility of three-way catalysts due to
7 the rhodium supply issue. We have thoroughly investigated
8 this question, and have concluded that there is sufficient
9 rhodium available to supply not only all California vehicles,
10 but all vehicles nationwide.
11 We will be happy to supply additional information
12 for the record on this subject if any manufacturer argues
13 that rhodium availability creates a feasibility problem with
14 respect to any standard for which we are requesting a waiver.
15 At the November 23, 1976 Board meeting on these
16 standards, Ford Motor Company clearly indicated its belief
17 that the standards were feasible for the 1980 model year.
18 Other manufacturers were less positive regarding their
19 capability; however, most did not claim the standards are
20 infeasible for 1980.
21 Projected hardware costs, including first costs of
22 research, development, and tooling, which would lessen or
23 disappear entirely when systems went into large-scale pro-
24 duction, ranged from $0 for those manufacturers whose existing
25 systems needed only slight modification to meet the standards,
26 to a high of $506, British Leyland's upper limit.
27 Analysis of the manufacturers' estimates led the
28 ARB staff to conclude that the 1.0 grams per mile NO_x standard

1 would cost an average of $75 per car. This is due in part to
2 a cost savings associated with the use of three-way catalyst
3 systems, since air injection systems may no longer be required.
4 Many manufacturers believed that there could be a consumer
5 gain in fuel economy associated with the use of three-way
6 catalyst systems.
7 For 1979, light-duty trucks will be split into two
8 weight classes on the basis of inertia weight: 0-3999 lbs.
9 and 4000-5999 lbs. In 1981, medium-duty vehicles of similar
10 inertia weights will be combined with these light duty truck
11 classes, since the ARB staff believes that emissions control
12 capability depends on inertia weight rather than on rated
13 gross vehicle weight.
14 The lighter classes of light duty trucks and medium-
15 duty vehicles are almost identical to passenger cars in design
16 and weight, and, therefore, these vehicles should be able to
17 meet the passenger car standards with the application of
18 existing technology already being used on passenger cars, such
19 as three-way or oxidation catalysts, exhaust gas recirculation,
20 and air injection.
21 The ARB contends that there is no technological
22 feasibility or lead time problem; the systems exist and are
23 already successfully in use. In order to avoid excess certifi-
24 cation costs, however, light duty trucks will not be required
25 to drop the 1.0 grams per mile standard for NO_x until 1981.
26 Otherwise, they will have to comply with the same standards
27 as passenger cars.
28 The heavier classes of light duty trucks, those with

1 inertia weights ranging from 4000-5999 pounds, will be
2 required to meet standards of 0.50 grams per mile hydrocarbon,
3 9.0 CO and 2.0 NO_x in 1979 and 1980, and standards of 0.50
4 hydrocarbon, 9.0 CO and 1.5 NO_x in 1981.
5 At the October workshop, all manufacturers expressed
6 the belief that they would be able to comply with the light
7 duty truck standards for 1979 except that American Motors
8 expressed concern that it might not be able to comply with a
9 0.41 hydrocarbon standard. A look at Table IV will show
10 that American Motors has actually certified models in the I-TC
11 engine family at 0.41 grams per mile HC for 1977.
12 The 1981 standards for all light duty trucks could be
13 met with further development and application of existing
14 technology. American Motors said that it could use air
15 injection, EGR, and a warm-up oxidation catalyst at a hardware
16 cost of $80, and $0 projected maintenance cost. Ford would
17 use a combination of air injection, exhaust gas recirculation,
18 an oxidation catalyst and a three-way catalyst at a cost of
19 $250 and a maintenance cost in the range of $30-50 for replac-
20 ing oxygen sensors. Toyota projected no additional costs to
21 make its air injection, EGR, oxidation catalyst system comply
22 with the 1981 standards.
23 Medium-duty vehicle standards will be carried over
24 from 1978 to 1980 to avoid excessive certification costs,
25 since these vehicles have been forced to comply with new
26 standards every year for the past three years. For the same
27 reason, ARB has decided to delay for two years the plan of
28 breaking down medium-duty vehicles by inertia weights and

1 combining them with light duty trucks. For 1979 and 1980, we
2 used a hybrid system, so that light-duty trucks are broken
3 down into classes by inertia weight, but medium-duty vehicles
4 are still rated by gross vehicle weight. In 1981, however,
5 medium-duty vehicles of 0-3999 lbs. and 4000-5999 lbs. inertia
6 weight will be combined with the corresponding classes of
7 light-duty trucks and will have to meet the same standards.
8 Medium-duty vehicles of 6000 lbs. or greater will still have
9 separate standards. In 1981, these standards will be
10 0.60 hydrocarbon/9.0 CO grams per mile and 2.0 grams per
11 mile NO_x.
12 Manufacturers suggested the use of systems similar
13 to those they would use to meet the passenger car and light duty
14 truck standards to meet the standards on medium-duty vehicles.
15 In fact, we believe that the same technology which has been
16 successfully applied to passenger cars can be applied, with
17 little further development, to light duty trucks and medium-
18 duty vehicles, especially to those of the same inertia weights.
19 Passenger cars in the same weight class as the lighter light-
20 duty trucks and medium-duty vehicles are currently meeting much
21 lower standards than those the latter vehicles will have to
22 meet in the future. Therefore, the Air Resources Board staff
23 believes that there are no problems of either lead time or
24 technological feasibility involved with meeting these standards.
25 The ARB staff's cost/effectiveness estimates for the
26 1979-1981 standards based on manufacturers' cost estimates
27 are presented for your information. For passenger cars, we
28 estimate that the 1980 reduction to 1.0 grams per mile NO_x

1 will cost about $0.73 per pound of NO_x control, with a fuel
2 economy benefit of 5%. The estimated costs for trucks are
3 somewhat higher, both because the manufacturers' cost estimates
4 included the cost of possible chassis redesigns to accommodate
5 the new catalyst systems, a cost which should quickly be
6 amortized, and because the staff's estimates of possible fuel
7 economy penalties for light-duty trucks and medium-duty
8 vehicles are probably exaggerated. We have hopes that these
9 manufacturer anticipated fuel penalties will disappear prior
10 to the 1979 model year. For light-duty trucks the staff
11 believes the 1979 split standard of 0.41 grams per mile and
12 0.50 grams per mile will cost $2.86 per pound of hydrocarbon
13 reduced, with a possible fuel economy penalty of 5%. Elimi-
14 nation of the fuel penalty reduces this to $1.07 per pound of
15 hydrocarbon contro. The 1981 light-duty truck and medium-
16 duty vehicle standards should cost about $0.75 per pound NO_x
17 reduced and $0.70 per pound of hydrocarbon plus NO_x reduced
18 over the 1979 levels, with a possible fuel economy penalty of
19 5%. These costs are well within the range of other ARB
20 programs.
21 That concludes my prepared statement. I am assuming,
22 Mr. Jackson, that you do not want me to get into the testimony
23 we prepared on the issue of idle mixture adjustability.
24 Do you wish me to cover that now, or are we going to
25 wait on that until this afternoon?
26 CHAIRMAN JACKSON: I think we ought to go ahead and
27 hear your testimony on the maintenance.
28 MR. AUSTIN: Okay. Fine.

1 Commencing with 1980 model passenger cars and 1981
2 model light-duty trucks and medium-duty vehicles, the Air
3 Resources Board will require manufacturers to design the idle
4 mixture adjustment mechanisms on their vehicles, if any, to be
5 either essentially non-adjustable or limited in adjustability
6 so that the vehicle will meet the required emission standards
7 at any adjustment possible. The precise language for the
8 regulation was developed in consultation with vehicle manu-
9 facturers, especially Ford, as a response to the tampering
10 problem recognized by the Environmental Protection Agency,
11 ARB, and the manufacturers. At the ARB's December 1976 meeting,
12 when the adjustability requirement was adopted, no manu-
13 facturer indicated its opposition to the regulation. Although
14 some manufacturers indicated that they would prefer to volun-
15 tarily develop tamper-resistant designs, no manufacturer
16 indicated an inability to comply with the proposed regulations.
17 The only potential issue we see was raised by
18 American Motors last October, dealing with American Motors
19 dependency on vendors for carburetion. However, the Board
20 adopted Ford's proposed language regarding nonadjustability
21 with the intent of alleviating lead time problems such as those
22 raised by American Motors. Since American Motors did not
23 comment on the revised regulation, we can only assume that its
24 lead time problem has been resolved.
25 General Motors and Ford both have indicated that they
26 would comply with the ARB's nonadjustability regulation by
27 1980. As a matter of fact, both manufacturers have indicated
28 that they will voluntarily incorporate tamper-resistant designs

1 on their vehicles prior to 1980.

2 One other potential issue is the question of whether
3 ARB's regulation is inconsistent with Section 202(a) of the
4 Clean Air Act because it incorporates a design standard.

5 In the first place, we do not believe that this is
6 an appropriate issue for discussion at a waiver hearing. The
7 Administrator has pointed out many times in the past that his
8 discretion regarding consistency is limited to an analysis of
9 whether California's regulations require duplicate testing by
10 the vehicle manufacturers. Clearly, California's non-
11 adjustability regulations do not require duplicate testing,
12 since any system designed to meet California's requirements
13 will also meet all applicable federal requirements, of which
14 there are none.

15 Even if the Administrator does believe that this
16 issue should be considered, we disagree with the contention
17 that the ARB's regulation is a design standard. The non-
18 adjustability regulation established performance requirements,
19 such as: "the idle mixture adjustment mechanism must not be
20 visible, even with the air cleaner removed." Manufacturers
21 can comply with these requirements in any number of ways, and
22 are not confined to specific designs by the ARB's regulations.
23 Furthermore, one method of complying with the nonadjustability
24 requirement is to design an idle mixture adjustment mechanism
25 with a range that allows the vehicle to meet the emission
26 standards at any setting. This concept is identical to the one
27 EPA is applying to 1980 model motorcycles, and we fail to see
28 how it could be construed as inconsistent with the Clean Air

1 Act.

2 In summary, the ARB's regulations regarding non-
3 adjustability of the idle mixture were adopted after consulta-
4 tion with the vehicle manufacturers, and were not opposed by
5 any manufacturer when adopted by the Board. We believe them
6 to be technologically feasible within the lead time remaining
7 and consistent with the federal regulations.

8 I might offer a brief amount of additional testimony
9 on this item.

10 Based on our discussions with the vehicle manu-
11 facturers recently and a review of some of the statements that
12 have been prepared, there's still some confusion regarding
13 the basis for the standards which were established, par-
14 ticularly for light-duty trucks and medium-duty vehicles. I'd
15 like to have Gary Rubenstein just briefly clarify our basis
16 for the standards, since that, we think, is something you are
17 going to hear about later today.

18 MR. RUBENSTEIN: One of the major complaints,
19 apparently, by some of the vehicle manufacturers deals with
20 the ARB's distinction of light-duty trucks and medium-duty
21 vehicles on the basis of inertia weight rather than on the
22 basis of gross vehicle weight rating. These vehicles are in
23 fact emissions tested and must demonstrate compliance with
24 the emission standards at their inertia weight and not on
25 the gross weight rating.

26 The inertia weight is determined based on loading
27 the vehicle to 300 pounds over its curb weight in the same
28 manner as passenger cars are. The higher horsepower values

1 reflect a real difference in frontal area, not because of
2 structure designs or any particular purpose. So, we see no
3 real justification for establishing different emission
4 standards within this class of vehicles based on gross weight
5 rating rather than inertia weight.
6 The objective of the Board's position was to develop
7 standards that would require essentially the same emission
8 control technology that is used on passenger cars but which
9 when applied to light-duty trucks, because of their higher
10 inertia weight can't be reduced that significantly because of
11 the purpose they are designed to serve, would still comply
12 with the emission standards. And the standards were upgraded
13 in that manner.
14 MR. AUSTIN: Our position on this is it makes no
15 more sense to test trucks at their gross vehicle weight than
16 it does to test passenger cars at their gross vehicle weight.
17 Since the inertia weight, based on the studies that the
18 Department of Transportation has done and EPA has done, the
19 inertia weight is more representative of the actual loading
20 conditions the vehicles can experience in typical customer
21 use. And, therefore, it's the emission control during those
22 conditions that we are most interested in.
23 MR. RUBENSTEIN: One source of information that we
24 used in developing those standards was data presented to us by
25 General Motors where they tested several light-duty trucks or
26 medium-duty vehicles on both 4,000 pounds and 6,000 pounds
27 inertia weight with no distinction between changes to engine
28 calibration.

1 The average ratio of the 6,000 pound emissions to
2 the 4,000 pound emissions for those vehicles tested were
3 1.24 for hydrocarbons, 1.54 carbon monoxide, and 1.21 for
4 NO_x. The 1.24 ratio that GM found for hydrocarbons compares
5 with the ratios of our standards which range from 1.20 to
6 1.28 for the different classes.
7 The 1.21 ratio for NO_x compares with the ratios of
8 1.33 all the way up to 2.5 in applying our standards.
9 It is obvious that the hydrocarbon and NO_x standards
10 are, if anything, more generously ratioed in the ARB regula-
11 tion than is demonstrated by GM's test data. The carbon
12 monoxide standard is not ratioed because we did not believe
13 that a .41 or comparable hydrocarbon level that there would be
14 in fact any problem in terms of CO emissions because they will
15 be well below the nine gram standard.
16 Some of the manufacturers have -- Again reading
17 testimony that will apparently be presented later today --
18 questioned some of these assumptions, and the basis for some
19 of their questions are, in our opinion, frequently invalid and
20 sometimes misleading. In particular, a statement that
21 General Motors is apparently planning on presenting later
22 today indicates that a comparison of assembly-line test data
23 for 1977 light-duty trucks and passenger cars which are
24 identical engines and, as they stated, have identical emissions
25 control hardware, have a hydrocarbon ratio at a projected
26 50,000 miles of 2.08 as compared to the calculation of 1.22
27 for a California standard. They suggest that instead of
28 having a truck standard of .5 or .6 grams per mile compared to

1 .4 hydrocarbon standard it should be as high as .85.
2 The basis for their statement appears to be very
3 wrong. First of all, the 1977 trucks and cars were obviously
4 designed to meet two different emissions standards. Although
5 they have the same emission control hardware, it's obvious
6 that General Motors air injection EGR oxidation catalyst
7 system has two distinct levels of control, since those same
8 systems were used for all passenger cars to comply with a
9 .9 hydrocarbon standard in 1976, and then with minimum modi-
10 fications allowed to meet a .4100 carbon standard in 1977.
11 It appears to us that the 1977 trucks are using the configura-
12 tion that was comparable for the 1976 passenger cars.
13 The second problem we have with that assumption that
14 they made is that they projected those emissions to 50,000
15 miles, using certification deterioration factors. This is a
16 point we raised with General Motors before, but apparently
17 they ignored us.
18 The 1977 light-duty truck certification data was
19 based on durability tests and run on 1976 model light-duty
20 trucks which used certification fuel with a higher lead con-
21 tent. The 1977 passenger cars' deterioration factors were
22 based on using a 1977 certification fuel. A more correct
23 analysis of the effects of the difference between passenger
24 cars and light-duty trucks on deterioration can be obtained by
25 looking at comparable truck families and passenger cars in
26 1976 when the same certification fuel was used. That analysis
27 indicates that there is no significant difference between the
28 truck and passenger car deterioration factors. As a matter of

1 fact, if anything, the truck factors are slightly lower than
2 the car factors.
3 We questioned, I guess, General Motors' intent in
4 continuing to raise this issue after we brought it to their
5 attention and after we explained to them why we have such
6 problems with it.
7 A third item in that paragraph -- Which, by the way,
8 this entire paragraph deals with hydrocarbon emissions
9 primarily, ratio of hydrocarbon emissions -- GM contends that
10 this could be affected by a 50 percent increase in the horse-
11 power. We question this assumption, again based on data
12 GM presented to us, which indicates that the increase in
13 horsepower between the 1977 and 1978 truck procedures affects
14 carbon monoxide and NO_x emissions but has no significant
15 effect on hydrocarbon emissions. We again question their
16 statements on the establishment of our standards and on the
17 appropriate level for those standards.
18 MR. AUSTIN: We would be happy to answer any
19 questions you might have on our testimony.
20 MR. GRAY: In your testimony this morning, you did
21 not mention specifically your requirement that vehicles
22 certified must make the same percent emission control at
23 sea level as compared to 6,000 feet altitude.
24 Could you elaborate upon your requirement there, and
25 in particular -- perhaps it's just an updating. There has
26 been mention in the Ford testimony to be presented later
27 that CARB has presented a public notice of its intent to amend
28 this part of the regulations. It's a point of confusion, at

1 least on my part right now, and could you give us an update on
2 the situation there, and perhaps more specific questions could
3 be directed.
4 MR. AUSTIN: I believe we already have sent out the
5 staff report on the proposed change.
6 MR. RUBENSTEIN: That's right.
7 MR. AUSTIN: The earlier language was of some con-
8 cern to a number of manufacturers because it appeared to be
9 very broad and could have been construed to have required
10 altitude compensation systems on exhaust gas recirculation
11 valves, on spark advance, on all systems which affect
12 emissions.
13 We decided that we didn't have any justification
14 for asking for that degree of altitude compensation; that it
15 appeared to us that the basic problem that we found with
16 vehicles operating at high altitude has to do with the mixture
17 enrichment that occurs as the air density drops at altitude
18 and then the carburetor continues to meter fuel based on the
19 velocity of the air rather than the mass of the air. We felt
20 that we were going to get the CO control we need only by
21 making sure that enough compensation was built into the
22 vehicle to maintain lean enough bare fuel ratios at high
23 altitudes for CO oxidation to occur, both within the engine
24 and within the exhaust system if it was being controlled in
25 the exhaust system. Our principal problem at altitude is
26 CO; therefore, it was CO control we were interested in.
27 We have come up with some new language which now
28 replaces the old language, with the old language reading:

1 "Evidence must be supplied that the emission control systems
2 on certified vehicles provide approximately the same percen-
3 tage control of emissions at altitudes of up to 6,000 feet as
4 these systems provide at sea level." We are replacing that
5 language with the following language: "Evidence shall be
6 supplied that the air fuel metering system, or secondary air
7 injection system, is capable of providing sufficient oxygen
8 to theoretically allow enough oxidation to attain the CO
9 standard at barometric pressure equivalent to those expected
10 at altitudes ranging from sea level to 6,000 feet elevation."
11 That language may, on the surface, sound somewhat
12 complicated. When you think about it, basically all we are
13 asking the manufacturers to do is demonstrate to us that with
14 the air densities that will occur at 6,000 feet they are still
15 going to end up with a stoichiometric exhaust mixture, or
16 leaner, ahead of the oxidation catalyst for a catalyst-type
17 system; or, if they are talking about a thermo reactor
18 system, they are going to have to show us that the air pump
19 is going to deliver sufficient oxygen to get the exhaust
20 leaner than stoichiometric at altitudes of 6,000 feet so that
21 there will be a potential for CO control.
22 MR. HELLMAN: Will this requirement require addi-
23 tional testing by the manufacturers?
24 MR. AUSTIN: No. We are only asking for evidence to
25 be supplied, and in the new language we talk about demonstrating
26 that there is theoretically enough oxygen to do the job. As
27 far as we are concerned, that will be sufficient. We don't
28 think this is a complicated enough issue to require any

special testing.

If we can just look at the air injection rates or look at the kind of compensation systems that are built into the vehicles, we should be able to make a good judgment based on a paper analysis. We don't think testing is required.

We have done a little bit of our own testing. We took our Volvo to Denver and ran some tests on it, and we found that with the typical kind of three-way catalyst system that's at least being used by Volvo the system continues to be self-compensating, up to 5,000 feet at least, and we understand that that particular system is self-compensating up to 14,000. We don't see any particular problem in being able to make those kind of judgmentswithout test data on other systems.

MR. GRAY: If you published a notice to change your regulation, and as I understand it from Ford's testimony you're actually planning to consider what specific wording would be used to replace the current wording at your June Board meeting, do you think it's reasonable that, considering the potential for change here, that this is a topic we can thoroughly explore at this hearing?

MR. AUSTIN: Yes, because the new language is nothing more than a clarification of the way we interpreted the old language. Transcripts of our Board meeting where we adopted the language, I think, will bear that fact out. We made numerous statements on the record that we weren't expecting absolute compensation of all systems, and we stated our intent very clearly to concentrate on the air-fuel ratio issue.

1 We continued to have -- We tried to modify the
2 language at the last Board meeting. That still presented a
3 problem for some of the manufacturers. Their basic concern
4 was: we understand the way you are going to interpret this,
5 we have heard what you said, but this is something we are
6 going to have to live with for a long time and we may not be
7 dealing with the same people three or four years from now.
8 They requested that we modify the language so it becomes more
9 apparent that we are only talking about the systems which
10 affect CO emissions and in fact only those systems which
11 significantly affect CO emissions. And that's basically what
12 we have done.
13 MR. GRAY: But you haven't yet adopted that new
14 specific language yet? The true situation that you have just
15 described hasn't changed yet; has it?
16 MR. AUSTIN: No, it hasn't changed yet, but the new
17 specific language right now is our interpretation of the
18 existing language.
19 MR. GRAY: Have any of the manufacturers had an
20 opportunity to review and comment upon that new language?
21 MR. RUBENSTEIN: It was sent to them several weeks
22 ago. I don't know whether or not they have reviewed it in
23 that time.
24 MR. AUSTIN: Mr. Gray, I should point out to you that
25 the public hearing at which this new language will be con-
26 sidered has been noticed for June 6th, prior to the closing
27 date of this hearing's record. Therefore, we will be able to
28 submit to you prior to the closing date for the record of this

1 hearing the final version of the language on altitude compen-
2 sation. We are not expecting any significant opposition to
3 this. The Board has delegated the authority to conduct this
4 hearing to the Executive Office. I'll be conducting the
5 hearing, and I -- Oh, the Board's indicated that they will
6 consider delegation, in which case I will be conducting the
7 hearing.
8 We talked to a couple of auto manufacturers who told
9 us they have no problems with any of the items on the agenda,
10 but you may want to get into that with the manufacturers later
11 today.
12 MR. HELLMAN: Mr. Austin, you indicated in your
13 testimony that there were a large number of vehicles today
14 which met the proposed passenger car standards, including the
15 1.0 NO_x level. However, in your testimony, you indicated that
16 it was ARB's opinion that the same systems that were used on
17 the vehicles that you indicate currently meet those levels
18 would not be used in the future period.
19 Is it your contention that there is something that
20 prohibits a manufacturer from using the types of systems that
21 already meet the standards for the future?
22 MR. AUSTIN: No, there's nothing that prohibits a
23 manufacturer from using current systems. It's just that the
24 current systems don't allow achievement of the one gram NO_x
25 standard with as high a level of fuel economy as more advanced
26 systems will, such as the use of three-way catalyst. There's
27 going to be a lot of incentive for the manufacturer to go to
28 more sophisticated systems for that very reason, since fuel

1 economy penalties associated with the current systems are
2 going to make it tougher for them to meet the federal fuel
3 economy standards and they end up restricting the model mix
4 they are able to offer. Because of that incentive, we
5 expect them to move into the direction of going with three-way
6 catalysts for one gram NO_x level, and essentially most of the
7 manufacturers indicated they planned to do that at our Board
8 meeting in November.
9 MR. HELLMAN: Yes, but just to clarify it: you
10 would agree there is nothing prohibiting this technology from
11 being considered available to meet those standards?
12 MR. AUSTIN: I would agree with that.
13 MR. RUBENSTEIN: I think we should also add, while
14 we are on the subject, that two manufacturers that are omitted
15 from the list, both Honda and Subaru, although neither of
16 them have certified vehicles for local standards to date, have
17 indicated to us that they could in fact comply with the .41,
18 .9, and one gram standard by 1980.
19 MR. HELLMAN: The technology that you indicated
20 that would more probably be used in today's technology includes
21 systems that you refer to as three-way catalyst systems.
22 Could you describe for the record what goes into
23 making up one of these systems?
24 MR. AUSTIN: The three-way catalyst system used
25 by Saab and Volvo, for example, on current 1977 California
26 production vehicles looks identical to the 1976 system which
27 these manufacturers use, in that they are still using a
28 monolithic underfloor catalyst. There has been a change in

1 the composition of the noble metal that's deposited on the
2 surface of the catalyst, a change that probably has a lead
3 time of at least several days associated with it.
4 Other than that, they have had to install an oxygen
5 sensor in the exhaust system and equip the fuel metering
6 system with a feedback mechanism to respond to inputs from
7 the oxygen sensor to continually adjust the air/fuel ratio
8 back and forth so that the average is very close to stoichio-
9 metric.
10 Similar systems to the Volvo and Saab system are
11 undergoing certification right now on 1978 cars. Some of
12 these systems are using carburetors which incorporate an
13 oxygen sensor, feeding back a signal to a controller, which
14 then modulates a metering rod in the carburetor to raise and
15 lower a metering jet to modulate the air/fuel ratio that way.
16 The basic catalyst is indistinguishable externally
17 from the current generation catalyst. The only difference
18 being the bath that the wash coated substrate or the alumina
19 pellets are put through.
20 Other three-way catalyst systems will incorporate
21 clean-up oxidation catalysts, and in that case there will be a
22 more significant change in the configuration of the system;
23 in that an air pump will still be required and more than one
24 catalyst required in the system, with the first catalyst
25 operating in the three-way mode, working to reduce both
26 hydrocarbon, CO, and oxides of nitrogen, and a clean-up
27 catalyst following that catalyst to do additional oxidation
28 on hydrocarbons and CO.

1 MR. HELLMAN: The basic three-way catalyst that you
2 see for this system is quite similar to catalysts that are in
3 use today?
4 MR. AUSTIN: Similar in that --
5 MR. HELLMAN: Let me clarify my question.
6 In terms of size and shape and the overall manu-
7 facturing catalyst and adopting it and putting it on a vehicle,
8 it's not three times bigger or anything like that?
9 MR. AUSTIN: That's correct. There is no signifi-
10 cant difference in the size or shape. In fact, in most cases
11 the three-way catalyst will be identical to the oxidation
12 catalyst in most respects. It will quite often be in the same
13 container, the container will be manufactured out of the same
14 materials on the same assembly line.
15 In the case of pelletized converters, very likely
16 we will see the same pellets being used, manufactured out of
17 the same materials, using the same manufacturing process, and
18 the only change will be the treatment that these pellets
19 receive when they are coated with the active ingredients in
20 the catalyst. There will be some change in that composition.
21 MR. HELLMAN: In terms of the fuel metering systems
22 that you feel will be used in these future systems, would you
23 classify them as modifications to the conventional carburetor
24 or totally new carburetors?
25 MR. AUSTIN: Well, we are seeing both types of
26 systems being developed, modifications to conventional
27 carburetors and new fuel metering systems.
28 For 1978 when we will start to see some carbureted

1 three-way catalyst systems being sold in California, the type
2 of fuel metering system would be most accurately described as
3 a modification to the conventional carburetor. The carburetor
4 will come down the same assembly line and will be manufactured
5 using most of the same tooling. There will be some modifica-
6 tions to the manufacturing process to incorporate the changes
7 that are necessary to operate the carburetor with feedback
8 control. There will be, in addition, in some carburetors you
9 will see an additional diaphragm being added to the carburetor
10 which will be connected to a metering rod and a vacuum can be
11 put on top of the diaphragm to cause the rod to be raised or
12 lowered into a jet. That is kind of like a subsystem that is
13 being added onto a conventional carburetor, and the basic
14 manufacturing process will remain unchanged.
15 We are expecting to see some new fuel metering
16 systems by 1980, though, at least from some manufacturers,
17 since starting from scratch many of the manufacturers may
18 end up with a fuel metering system that is less expensive than
19 a fuel metering system that results from modification of a
20 conventional carburetor or it may also have some improved
21 characteristics from the drivability or fuel economy or even
22 emission control standpoint. So, it can be done in a number of
23 ways.
24 MR. HELLMAN: These modifications to the carburetor
25 and the new carburetor, do you understand that that work is
26 development work, is going on right now in the manufacturers'
27 facilities?
28 MR. AUSTIN: For the 1978 three-way catalyst cars, we

are expecting to see in California, the development work is complete. For three-way catalyst cars which are not expected to be offered for sale until 1979-1980 model years, the development work is continuing.

MR. HELLMAN: It's underway at the present time?

MR. AUSTIN: Yes.

MR. HELLMAN: And that is part of the reason you feel that there is sufficient time available to complete this already ongoing development program that in your opinion seems to be industry-wide in order to meet the standards that you propose?

MR. AUSTIN: I think that's a fair statement.

MR. HELLMAN: Thank you.

MR. GRAY: I have a follow-up question upon the basis of your adjustment ratio between passenger cars and light-duty trucks and medium-duty vehicles.

As I understand your intent, the standards for light-duty trucks and medium-duty vehicles are essentially those levels which you feel would result with the application of the technology necessary to meet the passenger car standards; is that correct?

MR. RUBENSTEIN: That's correct.

MR. GRAY: Do you have any other data, other than the GM data that you referenced, that you were able to use to make this judgment as to the appropriate factor?

MR. RUBENSTEIN: Data submitted to us by Ford, which in turn I believe referenced some EPA documents for at least hydrocarbons at any rate, came to the same general

1 conclusions. The methodology was somewhat different, because
2 if you looked at the distinction between medium-duty vehicles
3 and light-duty vehicles and passenger cars as opposed to
4 looking at the difference solely of inertia weight, I believe
5 you can analyze the same data looking for just the effect of
6 inertia weight, you come to the same conclusion.
7 MR. AUSTIN: I think we probably should clarify,
8 though, the statement which Mr. Rubenstein made earlier in our
9 testimony, that being: if we looked at the GM data, for
10 example, it appears as though we have set standards which are
11 going to be less stringent for the heavier weight classes of
12 light-and medium-duty trucks. When we started working on the
13 package, it wasn't our intention to do that. But it became
14 apparent to us that, at least in terms of the support or lack
15 of opposition that we'd see at the Board meeting when we went
16 to adopt these standards, and for other reasons, the schedule
17 that we ended up adopting was reasonable.
18 But we are not saying today that we believe the two
19 gram level of NO_x control, for example, on a 6,000 test weight
20 truck is equivalent to a one gram level of NO_x control on a
21 3500 pound truck. The truck meeting the two gram standard
22 probably is going to require less emission control than the
23 truck meeting the more stringent standard, and I think there
24 is data from both truck experience and passenger car
25 experience that would support that.
26 I think that right now, for the standards that we
27 are adopting for 1981 and subsequent model years, we are
28 probably still going somewhat easier on the heavier truck

1 classes than we are on the lighter truck classes.
2 One of the concerns we had in setting these
3 standards had to do with applying the light-duty-type
4 emission control to the heavier classes of vehicles for the
5 first time. There were arguments made by International
6 Harvester and others that there may be problems associated
7 with the use of catalysts, for example, on some of the heavier
8 categories of trucks which may not exist on some of the
9 lighter categories.
10 International Harvester, for example, was concerned
11 that the use of catalysts on the heavier classes of trucks
12 would probably result in more severe thermal problems, more
13 severe temperature problems than on lighter trucks.
14 Because of those problems, they felt they'd have to
15 choose a different catalyst location. They may have to
16 locate the catalyst more rearward in the vehicle, and since
17 the emission test is a cold start emission test that more
18 rearward catalyst location could very well reduce the amount
19 of control they could get from that catalyst by increasing
20 the time between the start of the test and the catalyst light
21 off when it starts to work efficiently on hydrocarbon and
22 carbon monoxide.
23 That was one of the considerations that went into
24 our establishment of the standards. International Harvester
25 didn't argue that it was impossible to use catalysts on the
26 heavier vehicles. They were just arguing that it may be more
27 difficult to use catalysts and, therefore, the geometry of
28 the exhaust system may have to be somewhat different and that

1 geometry may result in a more difficult job of meeting emission
2 standards than on lighter vehicles.
3 I think there's probably somewhat greater of a
4 problem for the heavier classes of vehicles, and the schedule
5 of standards that we've put together does give the heavier
6 vehicles somewhat more cushion. It appears to not push the
7 heavier vehicles quite as hard, but in fact it may be much
8 closer to equal emission control than would be apparent just
9 from a superficial evaluation of some of the data that's
10 available.
11 It's our intention to monitor how well the heavier
12 classes do in meeting these new standards and make adjustments
13 in the future if we find that in fact we can achieve sub-
14 stantially more control on the heavier classes of light and
15 medium-duty vehicles.
16 MR. GRAY: Okay. I guess what I am really pushing
17 for is any additional specifics relative to the determination
18 of the appropriate adjustment factor. As I understand it,
19 the data that you referred to that was at least considered in
20 your judgment as to the adjustment factor represented several
21 light-duty GM trucks.
22 MR. RUBENSTEIN: Yes.
23 MR. GRAY: Can you tell me how many?
24 While you are looking for that, may I ask: Is that
25 information included in one of your staff reports that's been
26 submitted to the record? If not, would you try to put it in
27 a form such that you can submit it to the record?
28 MR. DRACHAND: Sure. We can give you all the

1 support data relative to the standard setting at the Ford
2 meeting, the way it was proposed.
3 MR. RUBENSTEIN: What I am reading from is a presen-
4 tation which, I guess, was a slide presentation given to us by
5 Chevrolet Motor Division in November of 1976, and I can just
6 give you a copy of that.
7 MR. AUSTIN: We'll submit it for the record. I do
8 not believe it's in the record either of our own hearing on
9 this or the record of this hearing yet.
10 MR. RUBENSTEIN: This was based on tests of three
11 trucks, three different configurations, and each data point
12 was in fact an average between two and five tests.
13 MR. GRAY: As I understand the description of the
14 test program, there was a baseline test for each of the trucks
15 running, 4,000 pound inertia weight, no adjustments were made
16 to the vehicle, the vehicle again was tested at 6,000 pounds.
17 MR. RUBENSTEIN: That's correct. I don't know which
18 inertia weight those vehicles were in fact certified to. They
19 may have been certified to 4,000 or to 5,000 or to 4500.
20 MR. GRAY: Okay.
21 Do you have information as to whether or not the
22 road load was changed on these vehicles from the 4,000 to the
23 6,000 pound test point?
24 MR. RUBENSTEIN: It's not on this piece of paper,
25 but I believe when we discussed it with General Motors, it
26 was strictly an inertia weight change and there was no change
27 in -- although there was a change in horsepower -- I guess I
28 can't answer the question. I believe that they used the

1 horsepower correspondent to the inertia weight.

2 MR. GRAY: Okay.

3 To what extent, if at all, were you able to consider
4 the effect of different N/V -- that's gearing -- of passenger
5 cars as compared to trucks?

6 MR. RUBENSTEIN: We've had some amount of trouble
7 dealing with those comments from manufacturers, since we find
8 ourselves on one end of the spectrum hearing criticisms that
9 trucks have higher N/V's and consequently can't meet these
10 kinds of emission standards and the other end of the spectrum
11 that good fuel economy axle ratios are too low to meet
12 California's emission standards. We are not really sure how
13 the N/V ratio really comes into play. It appears to be very
14 much model specific and configuration specific, and we were
15 more concerned with what we thought was a more significant
16 factor, which was the inertia weight.

17 MR. AUSTIN: We considered N/V in developing our
18 standards, and part of that consideration consisted of a
19 review of some EPA publications that attempted to find and
20 quantify the effect of N/V on emissions. In particular,
21 that's been addressed in several technical appendices which
22 the Administrator has made on passenger car standards, since
23 that was an issue at several suspension hearings in the past.
24 It appeared to us, based on both EPA's own analysis and data
25 which we had reviewed independently, that if there is an
26 effect, it's not a substantial effect. In fact, it's very,
27 very difficult to find.

28 We saw no reason to give special consideration to

1 the relatively small differences in N/V ratio between typical
2 trucks and passenger cars that exist today. And, so, we did
3 not make any specific numerical adjustment to any passenger
4 emission standards based on different N/V's.
5 MR. GRAY: If you are assuming that same technology
6 which would be applied on light-duty trucks as would be used
7 on passenger cars, why do you concede there will be an
8 expected fuel economy penalty on light-duty trucks?
9 MR. AUSTIN: Fuel economy penalty compared to the
10 current light-duty trucks. We are talking about a different
11 baseline. That's why we are talking about a difference in
12 fuel economy, I believe.
13 MR. GRAY: I realize that.
14 Does that mean that you anticipate that a fuel
15 economy penalty will continue to be in effect for California
16 passenger cars by that time frame?
17 MR. AUSTIN: By which time frame, 1981?
18 MR. GRAY: 1980-81.
19 MR. AUSTIN: No, because by 1981 we are anticipating
20 a substantial change in the systems used to meet the passenger
21 car standards. The analysis we did for trucks was based on
22 the assumption that the current passenger car emission control
23 systems would be used on trucks in that time frame.
24 MR. RUBENSTEIN: We did not project that three-way
25 catalyst would be used on trucks until 1981.
26 MR. AUSTIN: We are assuming that the trucks won't
27 go to the more sophisticated control systems until sometime
28 after 1981. That may not be a valid assumption. If there's

1 adequate pressure to maximize the fuel economy of trucks as
2 well as cars, we may end up seeing three-way catalysts, for
3 example, used on trucks much earlier than we anticipated.
4 MR. GRAY: Does that mean to say that with the use of
5 three-way catalyst technology that you would not expect a
6 penalty for the imposition of these standards as compared to
7 no standards at all on those trucks?
8 MR. AUSTIN: I believe that the standards that we've
9 adopted for trucks can be met without any fuel penalty beyond
10 that fuel penalty which may be caused by the compression
11 ratio necessary to run on unleaded fuel. That's a few percent.
12 So compared to a vehicle that's absolutely optimized for fuel
13 economy and nothing else and may have exhaust emissions that
14 are 20 times higher than we are talking about, yes, there may
15 be a penalty. Maybe it's five percent.
16 As a practical matter, we expect the penalty to be
17 somewhat lower than that in the initial years of certification
18 when heavy trucks use catalysts for the first time, but we
19 see the potential for that penalty to be reduced or eliminated
20 as more sophisticated systems are applied.
21 MR. HELLMAN: Your proposed adopted light-duty truck
22 standards, do they have any special clauses in them for
23 vehicles that have four-wheel drive?
24 MR. AUSTIN: No.
25 MR. RUBENSTEIN: There is the same language that
26 EPA has in their truck regulations regarding testing of four-
27 wheel drive vehicles.
28 MR. AUSTIN: There is no relaxation of the standards

1 for four-wheel drive vehicles.

2 MR. HELLMAN: The difference is in drive line,

3 gear ratio, and possibly power-to-weight ratio for these types

4 of vehicles which can potentially be used both on and off road

5 have been suggested as a reason why these vehicles should have

6 more lenient standards.

7 How do you approach that issue within your proposal?

8 MR. AUSTIN: The differences in power-to-weight

9 ratio between the vehicles we are talking about here and

10 typical passenger cars is certainly not greater than the

11 difference in power-to-weight ratios between passenger cars

12 which are all required to meet the same standards, and all

13 different types and categories of passenger cars have in fact

14 been certified at California 1977 standards. We are talking

15 about power-to-weight ratios that vary all over the place;

16 from very, very low power-to-weight ratios to very, very high.

17 The difference between the typical power-to-weightratios of

18 these trucks and cars is not substantial compared to the

19 difference that exists between passenger cars.

20 MR. HELLMAN: It has been mentioned that the transfer

21 case mechanism and the transmissions used in some four-wheel

22 drive vehicles may require shifts to be much longer in dura-

23 tion with the manual transmission vehicle on the test than

24 would be the case for a passenger car; therefore, hydrocarbon

25 spiking is a much more severe problem for these vehicles.

26 Did you consider that?

27 MR. AUSTIN: We didn't specifically consider that

28 issue. However, hydrocarbon spiking is -- the degree of

1 hydrocarbon spiking, the problem it gives you, is a function
2 of the type of fuel metering system, the type of emission
3 control system that you are using on the vehicle. If you
4 have an uncontrolled vehicle and you shift it rapidly and
5 shift it slowly, you may very well see higher hydrocarbon
6 emissions associated with a slow shift. I think I could
7 quite easily generate some data to show that inherent penalty
8 associated with shifting slowly.
9 However, if I was interested in solving the problem,
10 I would not run an essentially uncontrolled fuel metering
11 system and emission control system that wasn't designed to
12 accommodate hydrocarbon spikes. I would use some kind of
13 mechanism to hold the throttle partially open on shifts or
14 allow it to close slowly, and I'd be looking for ways to reduce
15 the amount of accelerator pump shock that was necessary on the
16 axle after the shift and the working on ways to solve the
17 problem that way.
18 A number of manufacturers have indicated that
19 because of hydrocarbon spiking, they have not been able to
20 offer cars with manual transmissions. But other manu-
21 facturers -- Volvo, for instance, who is meeting the statutory
22 emission standards in 1977, markets a vehicle with a manual
23 transmission and has no problem in meeting the standards by
24 a wide margin.
25 So I think it's a problem that theoretically could
26 be argued to exist for heavy vehicles, but as a practical
27 matter, can be easily controlled.
28 MR. RUBENSTEIN: There's also another point along

1 this same subject, which is that there are a number of manu-
2 facturers in California who have only introduced manual
3 transmission models on some of these vehicles and have not
4 introduced automatics because they see certifying an automatic
5 transmission model in California standards being higher than
6 a manual transmission.
7 So, again, the problem seems to be manufacturer
8 specific and not necessarily due to any lack of technology.
9 MR. GRAY: Okay. I have one last question regarding
10 the potential -- regarding the concern for potential different
11 interpretations under your adjustability regulation.
12 There has been some concern that the Board or the
13 Executive Officer may be able to interpret in different ways
14 what special tools are and has other flexibilities for judg-
15 ment. In regard to how the CARB might interpret those
16 requirements, I'd like to read a short portion of the Ford
17 testimony and ask your response to it.
18 "At the December 14, 1976 hearing, CARB staff
19 offered the interpretation that, if the recommended
20 idle air/fuel mixture service procedure called for
21 removal of the carburetor to perform the adjustment, the
22 'special procedures' provision would be satisfied.
23 Ford believes that the 'special tools' provision is
24 satisfied by a design which permits adjustment only with
25 a tool not manufactured as a standard hardware item
26 and not likely to be available to most car owners."
27 Do you agree that those would be appropriate
28 interpretations of those provisions, and would they satisfy

1 this CARB requirement?

2 MR. AUSTIN: We'd have some problem with the

3 carburetor that could be adjusted with a special tool if the

4 special tool was readily available to franchise dealers. If

5 all that stood between a vehicle being maladjusted was the --

6 if the only thing preventing the maladjustment was the avail-

7 ability of a special tool and the special tool was readily

8 available to a franchise dealer, we'd have a problem with

9 that.

10 MR. GRAY: If it also required removal of the

11 carburetor, then both conditions must be satisfied? The

12 removal of the carburetor and then a special tool, would that

13 satisfy --

14 MR. AUSTIN: If it requires removal of the

15 carburetor to do the adjustment, and not just if the manual

16 says removal of the carburetor but if it really requires

17 removal of the carburetor to do the adjustment, and it

18 requires a special tool, we'll buy that.

19 MR. RUBENSTEIN: I'm not sure if it in fact requires

20 removal of the carburetor that a special tool would be needed

21 in addition to that. The procedure says special tools and/or

22 procedures.

23 MR. GRAY: So you are saying that if it actually

24 required the removal of the carburetor to perform the adjust-

25 ment, in those plain terms, it would satisfy your requirement?

26 MR. AUSTIN: That's one of the situations that would

27 satisfy our requirement. That's not the only situation.

28 That's one of them.

1 MR. GRAY: I understand that, but I wanted to get
2 nailed down at least one specific solution that would defi-
3 nitely satisfy the requirement.
4 MR. AUSTIN: That would definitely satisfy the
5 requirement. In fact, I'm not sure if we have stated this
6 clearly in the past. But if to adjust the carburetor, one
7 was required to remove it, we wouldn't be particularly con-
8 cerned that a special tool was required after that point. As
9 long as it required carburetor removal to adjust it, it's
10 fine if a number two Phillips head screwdriver could do the
11 job as far as we are concerned.
12 MR. GRAY: Okay. I think that clarifies the special
13 procedures, at least to the extent that example can.
14 Let me just ask: What would be your interpretation
15 of "special tools"? What would satisfy that particular
16 provision of the regulation? It essentially says --
17 MR. AUSTIN: Special tools -- special tools by
18 themselves aren't particularly significant. You have to read
19 the sentence in its entirety.
20 We are not interested in seeing carburetors that
21 can be adjusted by just taking a screwdriver and popping off
22 a little plug and turning a screw. We want to see a procedure
23 that's going to be time consuming and expensive in order to
24 accomplish the adjustment. Special tools may be one of the
25 things that makes the procedure difficult, time consuming,
26 and expensive.
27 That's basically what we are looking for. We don't
28 want people to be able to adjust these carburetors with or

1 without special tools in two minutes and undo a hundred dollars
2 of CO emission control that was designed into the vehicle.
3 MR. RUBENSTEIN: I'd also like to clarify that the
4 difficulty is not related to the manufacturers' instructions
5 for setting the carburetor mixture, but it's related to what
6 is in fact necessary to adjust the mixture. A manufacturer
7 can have a very complicated procedure that will take at least
8 45 minutes to an hour to do it and require a special tool and
9 all sorts of work, but if you can adjust the carburetor
10 incorrectly with a screwdriver in five minutes, that's not
11 acceptable.
12 MR. GRAY: I think you have seen some of the Ford
13 designs that they would be considering offering to meet these
14 requirements. Do you consider any of those approaches
15 satisfactory?
16 MR. AUSTIN: From what I have personally seen of
17 Ford's designs -- and I'm not sure I have seen all of them, but
18 I saw several concepts that they were working on. Of the ones
19 I saw, I considered all of them to be satisfactory.
20 But I'm not sure I've seen everything, and I
21 certainly haven't reviewed the detailed instructions that they
22 give for adjusting these. But what they are working on, it
23 looks good to me.
24 MR. GRAY: So you would think, though, in terms of
25 the interpretation of this language that -- where you say the
26 mixture adjustment mechanism requires special tools and/or
27 procedures to make the adjustments, it will not suffice only
28 if special tools are required to make the adjustment; is that

1 correct?

2 MR. AUSTIN: That's correct. That in itself will

3 not be sufficient for ARB approval.

4 MR. RUBENSTEIN: One possibly absurd case would be

5 if there was a special tool that was only available at a

6 district zone office and was not for sale and was checked out

7 every time it was signed out or something like that --

8 MR. AUSTIN: But that is absurd.

9 MR. GRAY: So you don't feel that special tools is

10 something you can define, because it may vary with the specific

11 situation?

12 MR. AUSTIN: That's right. Basically, what we are

13 looking for is to see procedures for adjusting idle that are

14 sufficiently complicated that they are unlikely to be used by

15 dealers or owners on a fairly routine basis; they are unlikely

16 to be used by mechanics who are trying to respond to someone's

17 drivability complaint which may have nothing to do with the

18 idle air/fuel ratio. But with current systems, it takes him

19 one or two minutes to see if he can do something with the

20 idle. Even if special tools are required, we don't want to see

21 carburetors that can be maladjusted in one or two minutes in

22 the future. And, so, special tools will be something we look

23 at, but they've got to be part of an overall procedure which

24 is difficult and time consuming and unlikely to be done as

25 frequently as idle air/fuel ratio adjustments are done today.

26 MR. GRAY: Do you agree that the way this part of

27 the regulation is worded that the final judge would be the

28 alternative; that is, a test conducted by the Executive Officer?

1 The way this is read, if the adjustment can be made
2 with special tools or special procedures, it seems like it
3 would be easy to argue that a different type tool or a
4 different type procedure satisfies that requirement literally.
5 If it did not satisfy the Board's interpretation or intent,
6 then essentially you would be compelled to follow up in the
7 alternative?
8 MR. AUSTIN: This is responding to a somewhat
9 different situation. We are allowing an option. If the
10 manufacturer can either design a carburetor that's very
11 difficult to adjust, very difficult to maladjust; or he can
12 design a carburetor that is easy to adjust but when it's
13 adjusted can only be adjusted within a range that will not
14 result in violations of the CBS emission standards.
15 This Item 2 refers to manufacturers taking that
16 latter approach. If the manufacturer has not attempted to
17 make the carburetor difficult to adjust, then we are saying
18 the Executive Officer should have the right to require a
19 special emissions test of that vehicle with the carburetor
20 adjusted anywhere the Executive Officer thinks it should be
21 adjusted, at the rich extreme, at the lean extreme or whatever,
22 and the test results should be below the standards in order
23 for that approach to be acceptable. It's an alternative to
24 the approach of making the carburetor difficult to adjust.
25 CHAIRMAN JACKSON: Before we leave this subject of
26 adjustability, Mr. Austin, I'd like to ask a broader
27 philosophical question about it.
28 Have you made any attempt to try to analyze the

1 potential backlash associated with this kind of an approach
2 to emission control; in that you are not, in my judgment,
3 doing anything to what causes misadjustment, and that's
4 drivability? If we still continue to have the standards
5 changed and fuel economy standards are implemented, significant
6 problems with drivability, then we have taken away the
7 potential for any kind of reasonable adjustment.
8 You made the point in your testimony that you are
9 talking about adjustments that will be expensive and time
10 consuming. Do you foresee any problem with the public
11 reacting with cars that have poor drivability which we are
12 not trying to control and for which there is no ready means
13 for adjustment to accommodate their problems?
14 MR. AUSTIN: In one sense, we hope there are some
15 problems. In another sense, we hope there are not.
16 We hope there are problems at the dealership level,
17 and we hope that a number of the dealerships start writing
18 some very nasty letters to the manufacturers saying that the
19 vehicles that are being delivered to them to sell to the
20 customers are very difficult to sell now, that they can't be
21 tampered with and adjusted to provide the idle quality and
22 drivability that the customers would prefer. That would be
23 something that would be very beneficial. It puts some
24 additional pressure on certain manufacturers who have been
25 having an extremely difficult time in building commercially
26 acceptable products in the last few years, at least on certain
27 of their models.
28 There may be some members of the public who are

1 frustrated by the lack of a nob to twiddle with. We just
2 made the judgment that there wouldn't be so much adverse
3 reaction that it would create any real political problem for
4 the air pollution control program in California, principally
5 because of the fact this is going to come in on brand new
6 vehicles. It's going to come in slowly. Not all vehicles
7 are going to be changed overnight to this type of adjustment
8 mechanism. And, therefore, we hope it's something that the
9 public will gradually be exposed to and gradually learn to
10 live with. It won't be such a disruptive change as other
11 programs which have affected vehicles owned by the public
12 in the past. It will be something that's phased in very
13 slowly. And, therefore, we are not anticipating any substantial
14 amount of pressure from the public.
15 CHAIRMAN JACKSON: Have you rejected out of hand the
16 concept of regulating drivability?
17 MR. AUSTIN: No. In fact, we are now in the process
18 of putting together a case against one particular manu-
19 facturer in this area. We've had some discussions internally
20 on the concept of regulating drivability. We are not anxious
21 to get into it. It's going to mean new test procedures. It's
22 going to complicate the certification process. It's going to
23 add cost to the certification process. And, therefore, it's
24 going to add cost to the vehicle. Therefore, we'd like to
25 avoid it if at all possible.
26 In general, we have been very satisfied with the
27 1977 cars in particular. I think that most of the cars
28 being offered in California drive significantly better than

1 cars that were available in previous model years. By and
2 large, the manufacturers have done a good job.
3 But there are a few glaring examples of vehicles
4 that are just totally unacceptable, in my personal opinion
5 not even safe for operation, and when we look at vehicles on
6 dealership lots, look for tampering, we find very strong
7 correlations between incidents of tampering and the particular
8 engine family and different engine families. Some engine
9 families have very, very little tampering being done on them;
10 other engine families have extraordinary rates of tampering.
11 If you procure some of these vehicles that are
12 being tampered with so frequently and use them and drive them,
13 it doesn't take any kind of expert to see why the tampering
14 is going on. The tampering is clearly a function of the
15 drivability of the vehicle.
16 For that reason, we think there may be justification
17 for taking enforcement action against manufacturers who have
18 provided vehicles to the public which are just not acceptable.
19 CHAIRMAN JACKSON: The other part of the backlash
20 I was talking about is if you make a vehicle virtually
21 unadjustable and you still have this drivability problem, the
22 level of tampering you see may be more egregious in terms of
23 attempts to try to make the vehicle perform. It's unlikely in
24 my mind if someone is going to pay $6,000 or more for an
25 automobile that won't perform without trying to do everything
26 humanly possible to get it to where it's acceptable in terms
27 of its performance, even if that includes removing parts of
28 the emission control that haven't got anything to do with

1 drivability but nevertheless in the minds of the consumer it
2 may have something to do with a drivability problem.
3 MR. DRACHAND: I think one thing you have to keep in
4 mind here in the regulations we are proposing is that limiting
5 or not allowing adjustment of the carburetor is not solely to
6 prevent tampering. We found in the field in California that
7 maladjustment could be because of ignorance on the part of
8 the service industry and malfunctioning in some vehicles.
9 So, maladjustment could be unintentional.
10 We also found that certain people believe that
11 by tampering with the carburetor they can improve drivability,
12 although this is not entirely true.
13 Most of the tampering found in recent years is on
14 EGR systems. We can clearly say that the tampering found on
15 carburetors is purely due to poor drivability.
16 Because of the new procedures that manufacturers are
17 coming out with, Ford with the propane and possibly General
18 Motors in the future, the service industry is not sophisticated
19 enough to know how to adjust carburetors correctly. But they
20 feel that they should, even though the manufacturers say don't
21 touch it for 50,000 miles. As long as there is a screw
22 there, the guy is tempted to keep adjusting it.
23 So, one of the things we are trying to do is prevent
24 that adjustment.
25 CHAIRMAN JACKSON: I agree with your observation.
26 I do think, at least my own personal opinion of some of this
27 is on the part of the service industry being unable to respond
28 to the more sophisticated setup techniques.

1 I have several other questions, Mr. Austin. One is:
2 What position would you take, to the extent that you speak
3 for the CARB, if the Administration's position is adopted by
4 amendment to the Clean Air Act? On the emissions standards --
5 the Administration's position on the emissions standards.
6 MR. AUSTIN: I addressed that in my prepared
7 statement.
8 To some extent, there are, I guess, two issues
9 there. Maybe I should ask you to clarify your question.
10 One issue has to do with the Administration's
11 recommendation for a carbon monoxide standard which is sub-
12 stantially lower than the carbon monoxide standard for which
13 we are seeking a waiver. The 1981 model year, I guess,
14 would be the year of conflict.
15 I'm not sure, though, whether there's not something
16 more to your question than that.
17 CHAIRMAN JACKSON: What I was suggesting was: Would
18 the CARB, as in the case of motorcycles, be willing to accept
19 a federal program for vehicle control in California if the
20 Administration's position is adopted in Clean Air Act amend-
21 ments?
22 MR. AUSTIN: There were discussions at the staff
23 level and with the Board members on that specific question.
24 It was our original understanding that the Administration was
25 going to recommend a .4 gram per mile NO_x standard for the
26 1981 model year. Had that recommendation actually been made,
27 we were going to consider just going with the federal program
28 for the 1982 and subsequent model years and not having our own

1 separate standard for 1982 when we are considering dropping
2 the NO_x from the one gram level.
3 However, the Administration did not recommend
4 establishment of a .4 NO_x standard in 1983 and instead
5 recommended that the EPA study the need for a .4 NO_x standard
6 and make a decision as to the actual standard for 1983 at
7 some later point in time.
8 As far as we are concerned, that's just too vague
9 and ambiguous a situation for us to sign onto at this time.
10 And, therefore, we intend to pursue our own separate program
11 for the 1982 and subsequent model years.
12 CHAIRMAN JACKSON: With the assumption that you
13 will adopt a lower NO_x standard in some future year?
14 MR. AUSTIN: We believe we need far more than one
15 gram per mile for vehicle NO_x control. We need something
16 lower than that if we are going to continue to work as best we
17 can toward the achievement of the ambient air quality standards
18 for oxidant, NO_2 and for particulate matter.
19 CHAIRMAN JACKSON: Just for my own information, why
20 did you throw in particulate matter?
21 MR. AUSTIN: In Southern California, our people
22 believe that approximately 70 percent of our particulate
23 problem is photochemically generated particulate and that the
24 two principal constituents of that particulate are sulfates
25 and nitrates, and of the particulate which creates the bulk of
26 visibility problem possibly nitrates are the most significant
27 particulate. Nitrates emanate from NO_x emissions from motor
28 vehicles and stationary sources. And, therefore, we think in

1 order to achieve the federal total spent particulate standard
2 and the state visibility standard we are going to need to
3 pursue NO_x control in addition to control of directly emitted
4 particulate matter and sulfur dioxide emissions which end up
5 being part of the particulate problem.
6 CHAIRMAN JACKSON: You mentioned in your testimony
7 a report on the availability of rhodium and suggested that you
8 would provide that report for the record if so requested,
9 and I would like to request --
10 MR. AUSTIN: I didn't mean to imply that there was
11 a report. What I was saying is that if this is still an issue
12 based on the testimony that you receive today from the auto
13 manufacturers, we will put together a supplemental submission
14 on this issue. We have some additional information on rhodium
15 availability that we haven't released publicly before. We
16 are not anxious to put together a report on this, but if we
17 need to, we will.
18 CHAIRMAN JACKSON: Then I assume you are going to
19 attend the balance of these hearings and astutely listen to
20 the manufacturers, and if they bring up the point, you will
21 supply us with that information?
22 MR. AUSTIN: That's correct.
23 CHAIRMAN JACKSON: Good enough.
24 MR. RUBENSTEIN: In a November 23rd staff report
25 from last year, there was a brief analysis of the rhodium
26 situation which stated our position.
27 CHAIRMAN JACKSON: I assume you are going beyond
28 that with this language in your testimony?

1 MR. AUSTIN: That's correct.

2 CHAIRMAN JACKSON: You also mentioned that you were
3 going to consider at a Ford meeting this issue about the
4 amended language with regard to altitude compensation and
5 that you thought the adoption of that language would be
6 affected before we could make a determination on this waiver
7 request before us.

8 MR. AUSTIN: Yes.

9 CHAIRMAN JACKSON: Our silence on that point does
10 not mean our guarantee that that will be considered as a part
11 of these proceedings. If you have any documents which support
12 your lead time contentions about the standards which you are
13 requesting waived, we'd like to see those submitted to the
14 record?

15 MR. AUSTIN: Anything in addition to the lead time
16 discussion that appeared in the staff report, I am assuming
17 you are asking for.

18 CHAIRMAN JACKSON: That's correct. Anything that
19 has not been provided for the record which would support your
20 position with regard to the availability of lead time.

21 Finally, something that you did not mention in your
22 testimony but which I think will be mentioned before the day
23 is out, and that's the effect of MMT on your proposal.

24 MR. AUSTIN: I think you are probably right, that
25 very likely will be mentioned before the day is out.

26 Let me give you a summary of what the Air Resources
27 Board is doing on the subject of MMT at the present time.

28 We have had one meeting at which the Board was

1 presented a report from the staff on the status of the
2 MMT issue. We summarized the effect on vehicle emissions,
3 summarized the effect on refineries of using MMT or not using
4 MMT, we did some analysis of the potential adverse health
5 effects associated with manganese oxides increasing in the
6 atmosphere, including not only the direct health effects but
7 the expanded effects that manganese oxide will have on ambient
8 sulfate concentrations.
9 We believe that expanded use of MMT in motor vehicle
10 fuels will result in additional catalysis of sulfur dioxide
11 emissions into sulfate. Our preliminary analysis suggests
12 that in one day in the South Coast Air Basin if we have
13 sufficient humidity, which quite frequently occurs when we
14 have high sulfate levels in the first place, the additional
15 MMT, the additional manganese oxides in the atmosphere caused
16 by use of MMT in gasoline could increase our atmospheric
17 sulfate levels by ten percent.
18 There is no federal standard for sulfate at this
19 time. California has established a standard of 25 micrograms
20 per cubic meter. We have reviewed some data from EPA programs
21 which has indicated to us that that's probably a level in
22 excess of what a federal standard will end up being. At
23 the present time, we are more than double that standard in
24 the South Coast Air Basin. And, therefore, use of MMT we
25 see as something that will aggravate an already dangerous
26 situation. So for that reason alone, we are very, very
27 concerned about the use of MMT.
28 We also summarized all of the data on the effects

1 of MMT on exhaust emissions and came to the conclusion that
2 MMT significantly affects hydrocarbon emissions. The reasons
3 for that effect are fairly obvious. Vehicles have been
4 run with MMT and without MMT, engines have been torn down,
5 and it's clear that MMT is causing a substantial amount of
6 deposit formation in combustion chambers. This deposit
7 formation is having a similar effect on the deposits that
8 lead additives used to cause. Hydrocarbon emissions are
9 increasing because of the entrapment that occurs of the
10 mixture in this deposit. When the deposit is removed, the
11 hydrocarbon emissions go back down. We are not aware of any
12 tests that have shown that engines can be run without this
13 deposit formation if MMT is used in the fuel. There are
14 appparently no scavengers that work well with MMT.
15 It's a situation that's happening now in use, and
16 it's going to get worse as more MMT is used. Those increased
17 deposits are increasing engine hydrocarbon emissions. There
18 has been some argument, primarily made by manufacturers of the
19 additive or potential manufacturers of the additive, that the
20 additive beneficially affects the catalyst to the extent that
21 there is no net effect on tailpipe emissions levels.
22 We have analyzed the data available in that area and
23 disagree with those kinds of conclusions. It appears to us
24 there is going to be a clear tailpipe effect, and we are
25 therefore very sympathetic with the manufacturers' concerns
26 that the use of MMT is going to change to some extent the
27 situation with respect to feasibility of meeting certain
28 emission standards in the future with acceptable levels of

1 fuel economy.

2 The staff is right now working on a report which
3 will be presented to the Board at a public hearing which has
4 been scheduled for July 6, 1977, and we expect to have that
5 report out approximately 30 days in advance of the hearing.
6 I think it's very likely that the staff will be recommending
7 to the Board that regulations be adopted to regulate, probably
8 eliminate, the use of MMT in motor vehicle fuels sold in the
9 State of California -- in unleaded fuels sold in the State of
10 California.

11 We've shared this information with the Environmental
12 Protection Agency. We have done an analysis of what we see as
13 the agency's burden under Section 211 of the Clean Air Act to
14 regulate additives in motor vehicle fuels. We are now in the
15 process of finalizing that analysis which we are going to
16 submit to EPA. Our initial impression is that sufficient
17 data now exists for EPA to ban the use of MMT under Section
18 211 of the Clean Air Act, and we will be supplying more
19 information to EPA regarding that analysis in the future and
20 will be encouraging the agency to step up its program to
21 regulate MMT.

22 CHAIRMAN JACKSON: Then we can assume that the
23 standards for which you are predicting lead time and available
24 technology are based on non-MMT fuel?

25 MR. AUSTIN: The analysis that we've done in our
26 staff reports and the analysis we talked about today, yes,
27 was based on the assumption that sterile fuel would be used
28 to certify these vehicles.

1 I'm not sure how our conclusions are modified if
2 the situation changes and we are forced to certify vehicles on
3 fuel containing one-eighth gram per gallon of MMT. I suspect
4 that we'll still conclude that improvements in the degree of
5 emission control achievable from trucks are feasible. I
6 believe we'll probably conclude that our current standards
7 are feasible. I suspect that the most significant change will
8 be our estimate of the fuel economy penalty associated with
9 any of these emission standards.
10 However, we haven't done that analysis. It may
11 very well be that as more data becomes available, we would
12 have some question regarding the feasibility of some of the
13 longer range standards we've adopted, particularly the one
14 gram per mile NO_x standard that we see as resulting from the
15 use of three-way catalysts for passenger cars. Again, there
16 may be ways to meet the standard with the use of MMT, but
17 there may be a very significant difference in the level of
18 fuel economy associated with meeting those standards if MMT
19 is in the fuel.
20 CHAIRMAN JACKSON: We are ready to change witnesses,
21 and we will take a five-minute break.
22 Thank you, Mr. Austin.
23 MR. AUSTIN: Thank you.
24 (Short recess.)
25 CHAIRMAN JACKSON: Good morning, Mr. Jensen. Are
26 you ready?
27 MR. JENSEN: Yes.
28 CHAIRMAN JACKSON: We are ready.

1 MR. JENSEN: Okay.

2 Mr. Chairman, before I read portions of my statement,
3 I'd like to indicate and collaborate with what Mr. Austin
4 said concerning the November hearing in respect to the
5 standards under consideration today in this waiver.

6 I testified in Los Angeles at the November Board
7 meeting and did support the standards, said they were feasible,
8 and today as I read this statement, you will see that this
9 has changed somewhat, primarily because of the MMT issue
10 which we will get to in a minute.

11 I wanted to make it clear that a lot of the
12 developments on MMT have occurred after the November hearing.
13 We started a three-way catalyst fleet just about that time I
14 reported to the Board meeting in November, and we also started
15 a truck fleet with MMT on durability and have data which we'll
16 cover today. But I do want to verify what Mr. Austin said,
17 that without MMT, we had indicated feasibility and supported
18 the California Board proposal.

19 With that introductory remark, the first page of
20 the written statement covers the four separate changes in
21 passenger car standards. At the bottom of the page, we
22 start talking about the '79 standards of .41, 9.0, and 1.5
23 grams per mile HC, CO, and NO_x, a waiver may be granted if,
24 and only if, EPA at the same time eliminates its requirement
25 that one-eighth gram per gallon manganese be included in the
26 certification mileage accumulation fuel.

27 The Ford Motor Company position on MMT is indicated
28 for emphasis in italic type.

1 MMT has long been recognized as a very effective
2 anti-knock agent for gasoline. However, its use in the past
3 has been limited because of low availability, high cost,
4 and the indication of possible problems, such as spark plug
5 fouling.
6 With the growing required use of unleaded fuel for
7 practically all emission control systems on cars since 1975
8 models, the use of MMT has become more attractive. At the
9 maximum dosage of 0.125 grams manganese per gallon recom-
10 mended by Ethyl Corporation, it could provide an octane gain
11 on the order of two numbers, that is, 89 octane to 91 octane
12 gasoline. According to Ethyl Corporation, this gain would
13 result in a one percent crude oil saving if MMT were used
14 nationally at their recommended level. After several years
15 of litigation, EPA is now mandating a phase-down of the lead
16 content in gasoline used by pre-1975 cars and most trucks of
17 whatever vintage. The use of MMT in conjunction with the EPA
18 regulation calling for lead phase-down which began in 1976
19 and goes to .5 grams per gallon in 1979 is also expected to
20 aid in the production of sufficient lead-free gasoline to meet
21 demand during the next few years when a shortage is possible.
22 Current use is only about an average of 0.01 grams
23 manganese per gallon because most of the major oil companies
24 today are not using this additive; however, some refiners are
25 using as much as 0.125 grams manganese per gallon.
26 Based on the projected increased use of MMT by oil
27 companies by 1979, EPA has established a requirement that
28 1979 certification fuel include 0.125 grams per gallon of

1 manganese.

2 Because the use of MMT is increasing and because
3 there are many different engines and emission control systems
4 to evaluate, it is not possible to define accurately all of
5 the adverse effects of MMT or to predict the degree to which
6 those effects can be eliminated by other additives or by
7 changes in the engine or emission controls. At this time,
8 however, some very important conclusions can be made with
9 respect to MMT use with the 1979-1980 emission control
10 systems:

11 First, the addition of MMT at the 0.125 grams of
12 manganese per gallon level will cause a significant increase
13 in hydrocarbon emissions on many engines. This occurs
14 because of engine deposits of manganese oxides, as Mr. Austin
15 mentioned. It can also foul spark plugs and can seriously
16 increase hydrocarbon emissions. In fact, as shown in our
17 statement here, a Ford three-way catalyst test fleet had
18 tailpipe hydrocarbon increases that doubled the .41 hydrocarbon
19 standard in less than 20,000 miles.

20 At this time, we do not know of scavengers or other
21 design changes that could be made to eliminate this problem.
22 We have no reason to believe solutions could be discovered in
23 time for the 1979 and 1980 model year.

24 The effects of hydrocarbon emissions increases that
25 have been observed to date would preclude Ford from certifying
26 vehicles at the .41 grams per mile hydrocarbon standard for
27 50,000 miles as recommended by EPA for 1979 models nationwide
28 and currently in force in California for 1977 and 1978 models.

1 This inability to certify stems from the very low probability
2 that certification vehicles could be run for 50,000 miles
3 without experiencing a prohibitively high deterioration in
4 control effectiveness for hydrocarbons.
5 Ford believes that there have been sufficient data
6 generated to date that warrant elimination of MMT from lead-
7 free gasoline until offsetting additives or new technology
8 has been developed. Ford's recommendations are, therefore,
9 as follows:
10 First, if a hydrocarbon standard of .41 grams per
11 mile is required for 1979 or 1980, there has been sufficient
12 data generated that shows that MMT cannot be required in the
13 certification fuel as specified by the existing EPA Advisory
14 Circular on this subject.
15 Secondly, EPA should pursue the possibility of vol-
16 untary action by oil companies or by Ethyl Corporation to
17 eliminate MMT to the degree necessary to permit its exclusion
18 from certification fuel. Further, consideration should be
19 given to revisions in the EPA lead phase-down program in order
20 that elimination of MMT can be effected without a serious
21 loss in gasoline production.
22 Next, the EPA waiver to California for 1979 standards
23 of .41 grams per mile hydrocarbon must be denied or condi-
24 tioned upon the elimination of the requirement to use MMT in
25 1979 certification fuel.
26 EPA should initiate proceedings under Section 211
27 of the Clean Air Act to determine whether or not use of MMT
28 should be prohibited or restricted. Mr. Austin, as you know,
also made this comment.

1 Finally, if EPA determines that it does not have
2 sufficient authority to take timely action, the fuel additive
3 provisions similar to Senate Bill 252 should be enacted by
4 Congress.
5 These are serious conclusions and recommendations.
6 They are based in part on the following Ford data:
7 On a development fleet of three-way catalyst
8 equipped vehicles, average hydrocarbon feedgas has increased
9 37 percent in the 0-15,000 mileage interval with MMT fuel,
10 compared to a seven percent decrease in the case of companion
11 vehicles running without MMT in the fuel. Later data on one
12 pair of these same vehicles show that the engine hydrocarbon
13 increase is continuing at the 25,000-mile point with the MMT
14 vehicle exhibiting an hydrocarbon emissions increase of 2.12
15 grams per mile, compared to a slight decrease for the non-MMT
16 vehicle.
17 On the same vehicles at 15,000 miles, average
18 tailpipe hydrocarbon increased 118 percent, .31 grams per
19 mile, for the MMT vehicles, compared to 61 percent, or .20
20 grams per mile, for the non-MMT vehicles.
21 In a certification fleet of 12 trucks using con-
22 ventional oxidation catalysts, ten vehicles showed a large
23 tailpipe hydrocarbon increase of 102 percent at 15,000 miles,
24 or about three times what would have been expected in the
25 absence of MMT.
26 Heavy deposits of manganese oxides on spark plugs,
27 combustion chambers, oxygen sensors, and catalysts have been
28 found at the 1/8 gram manganese per gallon level of MMT usage.

1 Ford's data, which are supported by data generated
2 by others, show that for vehicles required to meet a .41 gram
3 per mile hydrocarbon standard, the magnitude of the hydro-
4 carbon emissions increase associated with 1/8 gram per gallon
5 level of manganese can be greater than the total standard --
6 that is, greater than .4 grams per mile -- thereby precluding
7 successful certification. It has been postulated that by
8 using three spark plug changes during certification, the
9 resulting "sawtooth" data points would permit development of
10 an acceptable deterioration factor. This is not accurate.
11 Ford's data demonstrate that the effects of MMT are so pro-
12 nounced that only a small percentage of durability vehicles
13 which start with hydrocarbon levels below .1 grams per mile
14 would finish durability without exceeding the .41 grams per
15 mile level; and those that did would have deterioration factors
16 in the 3-4 range, which would preclude a successful 4,000
17 mile certification program.
18 At this point, there is an attachment which I'll
19 have Dr. Weaver read when I finish the statement -- not read,
20 but explain, and rather than interrupt here, let me finish
21 the statement and then go to Dr. Weaver's explanation of the
22 attachment if I may.
23 We go on here to indicate the second passenger
24 car issue is the California request for waiver for its 1980
25 standards. As Mr. Austin mentioned, to meet this standard
26 by 1980, Ford is planning to use three-way catalysts with
27 electronic engine controls. This system is similar to that
28 used in the three-way catalyst development fleet which I just

1 got through talking about, which I indicated was adversely
2 affected by MMT. We recommend that California's request
3 for waiver of its 1980 standards be denied or conditioned on
4 elimination of the use of MMT during certification.
5 With regard to the restrictions on adjustment of idle
6 air/fuel mixture, you've covered that with Mr. Austin. Ford
7 believes the effort to limit such adjustments is appropriate
8 because it should minimize a major portion of tampering and/or
9 maladjustment of current emission control systems. We did
10 support this when it was considered by the Board.
11 The question of requirement for special tools and/or
12 procedures is the key issue you have already discussed with
13 Mr. Austin, and we think it should be clarified with respect
14 to the waiver.
15 The last new passenger car requirement is that
16 "evidence must be supplied that emission control systems
17 on certified vehicles provide approximately the same percentage
18 of control of emissions at altitudes of up to 6,000 feet as
19 these systems provide at sea level".
20 We agree with the intent that Mr. Austin expressed.
21 We are just waiting, as you know from the prior discussion,
22 to see what language is put in the record to clarify the
23 issue.
24 Ford believes that requirements must be
25 sufficiently specific to enable manufacturers to determine
26 if its vehicles are in compliance. At the same time, the
27 manner in which compliance is to be demonstrated should be
28 flexible. As Mr. Austin indicated, this flexibility is

1 required because of the many different control systems and
2 the impracticability of a full-scale altitude test program
3 at 6,000 feet.
4 In any case, Ford believes that the new California
5 proposal must be evaluated, amended as may be appropriate, and,
6 of course, considered at a public hearing by CARB, which has
7 been indicated will be held on June 6, 1977. Until CARB
8 takes final action, any consideration of this item by EPA
9 at a waiver hearing is meaningless and should be deferred
10 until CARB adopts final requirements.
11 On light-duty trucks and medium-duty vehicles, we
12 run into the same situation we discussed earlier. We
13 recommend that California's request for a waiver of preemption
14 be denied or conditioned on elimination of the use of MMT in
15 certification fuel. The basic reasons for this position are
16 the same as in the case of passenger cars.
17 If MMT is eliminated from certification fuel, Ford
18 believes that it can certify to the new 1979-1980 light-duty
19 truck standards with current emission control technology and
20 some potential compromise in fuel economy and model avail-
21 ability. At this time, we cannot quantify these compromises,
22 because they are a function of many variables, including the
23 availability of manpower and resources that can be applied.
24 At this time, Mr. Chairman, I would like to leave
25 the remainder of ten, 11 and 12 in the record without reading
26 it.
27 We believe both EPA and CARB should be aware that,
28 at the present time, it appears that the potential workload to

1 meet requirements for federal passenger car emissions and
2 fuel economy, 1979 federal light truck emissions and fuel
3 economy, 1978 California medium-duty vehicle emissions, 1980
4 California SHED standards, and the new federal heavy duty
5 emission standards and test procedures will force an alloca-
6 tion of resources at Ford that will result in compromises in
7 California truck fuel economy and model availability. It was
8 this consideration that led Ford to recommend that California
9 carry over its truck standards in 1979 and make the changes in
10 1980 concurrent with its changes in SHED evaporative emissions
11 standards.
12 In addition to lead time and workload problems,
13 another consideration raised by Ford at the November 23, 1976
14 CARB hearing was the objection to an inertia weight break
15 point and support for a GVW break point concept for emissions
16 standards. Ford continues to support break points based on
17 GVW's of 4,000#, 6,000#, and 8500#. The California break
18 points and standards proposed require unique certification to
19 cover differences in California and 49 state standards. While
20 this situation has existed for a number of years, the 1979-
21 80-81 California proposals will require incremental workload
22 for California much higher than in the past. The light-duty
23 truck task becomes much more difficult if the 1979 light-duty
24 truck 0-3999# inertia weight proposal is adopted; for example,
25 a full size pickup truck falling in the 3500# inertia weight
26 class would be required to certify at .41/9.0/1.5 ($HC/CO/NO_x$)
27 at an EPA test procedure power absorber setting of approxi-
28 mately 19 horsepower, or 7.8 horsepower higher than a car at

1 11.2 horsepower. This proposal results in a certification
2 task more difficult than the passenger car task.
3 This example illustrates why the inertia weight
4 classification break point proposed by California would
5 restrict a manufacturer's incentive to reduce vehicle weight
6 if the weight reduction causes the vehicle to fall into a
7 lower inertia weight class with a more stringent emission
8 standard. Going further, this could result in federal
9 vehicles not subject to the inertia weight classification
10 break points being manufactured and sold at a lower weight
11 than similar vehicles sold in California. If this occurs,
12 the fuel economy of California vehicles would be penalized
13 not only by more restrictive emissions standards, but also
14 by heavier weight.
15 The inertia weight break points are not consistent
16 with the Federal Clean Air Act and the Energy Policy and
17 Conservation Act, both of which deal in GVW break points and
18 federal emissions and fuel economy regulations which also
19 specify GVW break points. In addition to the inconsistency
20 of the IW class approach, the California proposal clearly
21 imposes additional incremental workload by requiring the
22 manufacturer to deal with inertia weight break points on top
23 of the federal practice of imposing GVW break points.
24 The CARB IW break point plan for 1981 does not
25 reflect vehicle function as it should, making proper allowance
26 for heavier GVW's as does the current CARB and federal
27 standards. It proposes placing all vehicles in the 6000-
28 8500# GVW group into a light duty truck category defined by the

1 4000-5999# IW span. The 5999# break point is set so high that
2 it encompasses all vehicles below 8500# GVW and does not make
3 proper allowance for the heavier weight and larger engines
4 needed in this weight group for adequate fully loaded vehicle
5 performance. These vehicles are not light-duty vehicles in
6 the sense that they function similar to passenger cars.
7 Equally disturbing is the lower IW break point of
8 3999# below which light duty trucks will be required to meet
9 car level standards at EPA test conditions more stringent
10 than the car procedure (PAU settings 70% higher than a 3500#
11 IW car). Manufacturers striving to reduce weight from the
12 current 4000 IWC to 3500 IWC will be faced with a near
13 impossible emissions certification task.
14 In summary, the CARB inertia weight class proposal
15 for emissions break points and the break point levels are not
16 needed to improve air quality and, if adopted, would impose
17 considerable additional burden on manufacturers of light- and
18 medium-duty trucks.
19 We would hope that CARB would not treat these
20 concerns as a closed issue but would provide further oppor-
21 tunity to consider them.
22 In conclusion, Ford believes that the waivers
23 requested by California for its 1979-80-81 passenger car and
24 truck emission standards can be granted only if there is a
25 satisfactory resolution to the problem. A waiver for idle
26 air/fuel mixture adjustment requirements is appropriate if
27 properly clarified. A decision as to altitude requirement
28 must be deferred until final action is taken.

1 At this point, I'd like to have Dr. Weaver explain
2 the tables that are included in the attachment.
3 Gene, would you take over, please.
4 DR. WEAVER: I think most of you have copies of
5 the statement in front of you. I will not read the page and
6 a quarter that's there, but I would like to go through it
7 informally.
8 I'd like to start off by describing the three-way
9 catalyst fleet, which we refer to as the source of the data.
10 The three-way catalyst development fleet consisted
11 of systems which had a three-way catalyst for removal of
12 oxides and nitrogen first, followed by an air introduction
13 from an air prop, and finally a cleanup oxidation catalyst.
14 Not all of the systems were like this, but this was the major
15 system described. The data we will refer to here will be
16 entirely of this type of a system.
17 There were a total of 14 vehicles, with six of
18 these vehicles operating with MMT and the remaining eight
19 without MMT.
20 Since these vehicles are at different mileage points
21 at this point, we've selected four matched pairs of vehicles,
22 one of each pair on each of the two fuels which were at
23 20,000 miles or above, and this is the data which then has
24 been summarized in this attachment.
25 The fuels for the base fuel is the 1977 certifica-
26 tion fuel. The fuel containing MMT was the 1977 base fuel
27 plus an eighth of a gram manganese as MMT and sulfur compounds
28 bring the sulfur level up to that specified in the Advisor's

1 Circular 26(b), .03 percent sulfur.

2 The engines included in these four matched pairs are
3 the 250 CID engines, the 302 V8, and the 400 CID V8. Main-
4 tenance on these vehicles was at 30,000 miles for the 250 and
5 302 and 50,000 miles for the 400.

6 The data obtained on the fleet includes the CVS
7 tailpipe results, and we also had facilities to simultaneously
8 measure the emissions coming from the engine. That is, the
9 engine out or feed gas to the catalyst. These measurements
10 were made at each 5,000 mile interval, beginning at zero
11 miles. Also at these mileage intervals, an examination was
12 made of the catalyst for any possible plugging. The spark
13 plugs were examined for deposits, and sensors, which are
14 a part of the system, also were examined. I think I neglected
15 to mention when I described the system initially that a sensor
16 is a very important part of this system, and the cars were
17 equipped with feedback carburetors.

18 Table 1 indicates a tabulation of the hydrocarbon
19 data for base fuel and MMT fuel, from zero to 35,000 miles
20 in the case of the base fuel because that's as far as those
21 vehicles have gone. Each of these columns correspond to
22 four vehicles on MMT fuel and four vehicles on the base fuel.
23 The data only goes to 20,000 miles on the MMT fuel because
24 that's as far as we have data at this point.

25 At the bottom, there is a summary of the increases,
26 and I'd like for you to note the increase between zero and
27 5,000 miles for the MMT fuel is .23 grams per mile hydro-
28 carbons and for the interval, 5,000 to 20,000 miles, is

1 .55. That's actual data from these matched pairs.

2 Tables 2 and 3 correspond to the data after a least
3 square fit, Table 2 for the tailpipe data and Table 3 for the
4 engine out data.

5 I think that's all I need to say about those two
6 tables.

7 Figures 1 and 2 will be a graphical presentation of
8 the data which is contained in Tables 2 and 3.

9 Now if we look at Figure 1 -- I'll hold this up so
10 you know what I'm talking about, and I can point it out a
11 little better.

12 This is identical to Figure 1 that you have in your
13 handout.

14 This axis here is hydrocarbon tailpipe emissions
15 at grams per mile, and mileage is across the bottom (indicat-
16 ing). The least square fit, of course, goes from 4,000 miles.
17 And we've only drawn the curve as far as we have data and have
18 not extrapolated any further. The same with the base fuel,
19 which is lower. The actual data at zero miles is indicated,
20 so that you get some feel for where we are starting from.

21 Now this increase which you see here to the MMT
22 fleet relates back, as has already been described, to the
23 deposit effect of the manganese oxides and the increased
24 engine out emissions from the engines. The catalyst
25 efficiency has not changed, and so the increase which we see
26 here can almost entirely be explained by the deposit effect
27 and the subsequent increased hydrocarbon emissions from the
28 engine. So this demonstrates the data that we are working

1 with.

2 And I think I need not say more at this time to save
3 time about the data in Table 2, except just to note that there
4 is practically a flat line for the base fuel but there is an
5 immediate increase from zero miles for engine out on Figure 2
6 with the MMT fuel. The only reason we need this information
7 here is so it's clear the source of the problem. The source
8 of the problem is the deposits in the engine.

9 Now let's see what effect this has on our ability
10 to certify, and to do that I'd like to look at Figure 3.

11 In a normal certification, when we are trying to
12 meet a standard of .41 and we are going to put out a fleet of
13 durability vehicles, we'd like to have them at 50,000 miles
14 meet an objective of about .35 grams per mile and would like
15 to have a DF of about 1.5. This, then, defines an engineering
16 objective at 4,000 miles of .23 grams per mile.

17 Now we are not smart enough to take a green engine
18 and run it for 4,000 miles and measure emissions and have it
19 come at exactly .23, so we expect a scatter of the data as
20 sort of indicated by the dashed lines. Of course, we are not
21 smart enough to predict exactly what the DF is going to be
22 either, so there will be more variation as we get out to
23 50,000 miles. We have demonstrated that we can certify
24 without MMT under these conditions.

25 Now just to show -- and this is purely a mathe-
26 matical exercise now. To demonstrate what the effect of the
27 increase in hydrocarbon emissions between 4,000 and 50,000,
28 what this means in terms of DF and our problem of certification.

1 Let's just assume -- And I am not basing this on any data.
2 I am just assuming we have a rather moderate increase in
3 hydrocarbon emissions between 4,000 and 50,000 miles of .25.
4 That's only roughly twice what we expect to get without MMT.
5 Now you see that that would define our 4K objective, then,
6 as .1 grams per mile hydrocarbon, and this would then define
7 a DF of three and a half, 3.5. And this is a rather diffi-
8 cult job, then, if we have only a moderate increase between
9 4,000 and 50,000 miles, .25 grams per mile. The certifica-
10 tion procedure becomes very difficult.
11 Now let's look at some of the data we got from the
12 three-way catalyst fleet and see how it fits into this general
13 plan.
14 Look now at Figure 4. We again have the same
15 format of hydrocarbon and plotted against 50,000 miles. I
16 have plotted actual data which we got on the four pairs of
17 cars from the three-way catalyst fleet, starting at zero miles
18 at .33, and now this dashed line corresponds to the data which
19 has been fitted, at least square fit, and the 4K intercept is
20 .61. At 20,000 miles, you will note we are at the point of
21 20K intercept of 1.02 grams per mile.
22 Now let's assume that we are smarter now than we
23 were when we started this fleet in December and through
24 some improvements which we haven't defined yet, we could make
25 this 1.02 the 50K value. That would give us the solid line
26 going from .61 grams per mile at 4K, out to 1.02 grams per
27 mile at 50,000.
28 Now that brings the DF down to 1.67, which sounds

1 pretty reasonable. But we still have the problem that we are
2 way above the standard. So let's move that down, keep the
3 same slope, and move it down so it will just intercept with
4 the standard at 50,000 miles. Unfortunately, you see that we
5 are practically at zero at 4,000 miles, which gives you DF
6 approaching infinity.
7 My point here is: even if we have a reasonable
8 slope of 1.67 and if through some, again, undefined improve-
9 ments can keep the increase between zero and 4,000 miles to
10 a minimum, we still are in an impossible situation.
11 Finally, in Figure 5, I have reproduced the normal
12 situation in the solid line at the top, going from .23 grams
13 per mile at 4,000 miles, out to .35, which we know we can do
14 that. I have indicated the zero mile value would be about
15 .21 for zero mile vehicles.
16 Let's just assume for the purpose of an example
17 that we could get by with a DF of two or we could achieve
18 a DF of two with MMT. That would then define a 4K value of
19 4.175 for a 4K objective. That seems rather reasonable
20 until you compare it with what we see in the way of actual
21 data of increments between zero and 4,000 miles. With the
22 data which we presently have from these four vehicles which
23 operated with MMT, where we saw over the interval of zero to
24 5,000 miles roughly .2 grams per mile, and I have rounded that
25 off -- or estimated for 4,000 miles that might be .18, you
26 see the increment which we observed between zero and 4,000
27 miles is bigger than our objective at 4,000 miles. So, we
28 have to end up with a negative value at zero miles in order to

1 meet this objective.

2 To me, it looks pretty impossible to certify if the
3 data which we have from the three-way catalyst fleet really
4 represents the situation, both for the increases between zero
5 and 4,000 miles and the increases between four and 50,000 miles.
6 Remember, there's two portions we have to work in order to
7 certify. It seems to be impossible that we'd be able to
8 certify using an eighth of a gram of manganese in the certi-
9 fication fuel.

10 MR. JENSEN: That concludes our statement, Mr.
11 Chairman.

12 To sum it up, we did testify to California we can
13 make the standards. We have the technology, and all those
14 statements in November were based on clear fuel.

15 Now we've had to indicate here today that we don't
16 think it's possible with MMT in the fuel and specified by
17 EPA.

18 We would be glad to answer any questions.

19 Oh, one other thing on MMT. We have been meeting
20 with both Ethyl Corporation and individual oil companies, and
21 we do have a presentation here of the status that we gave to
22 the oil companies and to Ethyl Corporation which we can make
23 a part of the hearing record.

24 We'd be glad to answer any questions at this point.

25 CHAIRMAN JACKSON: You made quite a point out of
26 the MMT thing. In fact, convinced me there is a problem.

27 Have you or do you plan to take any action to
28 advise Ford owners not to use gasoline with MMT in it for

1 '75 and later model year cars?

2 MR. JENSEN: We haven't taken such action. As I
3 indicated, we are learning a lot, almost on a daily basis.

4 Last November we had some evidence, particularly in
5 that truck fleet that catalysts were being plugged up with
6 MMT. We thought this was the problem. Now, as we have run
7 these other fleets, we have seen the increase in hydrocarbon
8 without the catalyst plugging. We are not sure what's
9 happening to the '75 and '76 models. I don't think we have
10 data on that.

11 Have we, Gene?

12 DR. WEAVER: No.

13 MR. JENSEN: We just haven't got that kind of
14 information so we could advise the owners to take any par-
15 ticular action yet.

16 Of course, with .01 grams in the field at the
17 present time, it isn't the problem that would come along in
18 1979 when, presumably, it would be much higher.

19 CHAIRMAN JACKSON: That's .01 with regard to the
20 average, I guess; is that right?

21 MR. JENSEN: Yes.

22 CHAIRMAN JACKSON: It could be locally very much
23 higher than that?

24 DR. WEAVER: That's right.

25 MR. JENSEN: That's right.

26 CHAIRMAN JACKSON: But your answer is you don't
27 think you have sufficient basis for advising your owners not
28 to use gasoline with MMT?

1 MR. JENSEN: Have you got any data at all, Dr.
2 Weaver?
3 DR. WEAVER: No.
4 MR. JENSEN: No, sir.
5 CHAIRMAN JACKSON: And you are convinced now that
6 it's a hydrocarbon as opposed to a plugging problem?
7 MR. JENSEN: Gene?
8 DR. WEAVER: There are four problems, and we have
9 demonstrated all of these. They are described in detail in
10 this status report which we prepared for the oil companies.
11 There is a problem of catalyst plugging, which we
12 have documented two cases. The most recent case is not in
13 this book, but I will leave a photograph here -- it came from
14 the three-way catalyst fleet -- where the catalyst is
15 partially plugged and plugged sufficiently so that it's
16 affecting the performance of the catalyst.
17 CHAIRMAN JACKSON: What mileage?
18 DR. WEAVER: At 20,000 miles.
19 CHAIRMAN JACKSON: So you have not eliminated
20 plugging?
21 DR. WEAVER: It is a problem, but we have hopes
22 that we can understand it and live with it.
23 There is a problem of spark plugs, and there again
24 we hope that we can learn to live with that. We can always
25 increase the maintenance schedule.
26 Thirdly, there is a potential problem with sensors.
27 Sensors are a very important part of the three-way catalyst
28 system, and there are louvers in the sensor which permits the

1 exhaust gas to communicate with the electrodes which are the
2 heart of the sensor. If the manganese oxides completely plug
3 these louvers as they have in this case -- this is the first
4 case where we actually have an example of the oxides com-
5 pletely plugging the louver so that the sensor no longer
6 functions. This also we observed very recently, since the
7 status report was written, and this sensor no longer operates
8 because of MMT.
9 CHAIRMAN JACKSON: At what mileage?
10 DR. WEAVER: 20,000 miles.
11 So, I have mentioned those three problems which we
12 think maybe we can live with. But we know no way how to
13 approach or how to live with the increase in hydrocarbons due
14 to deposits in the combustion chambers.
15 MR. JENSEN: That's why most of our testimony today
16 is addressed to hydrocarbon increased problems rather than
17 these other things.
18 As Gene said, we are trying to develop programs
19 which, hopefully, can work around the others.
20 MR. GRAY: While we are still on the subject of
21 MMT test fleet, the figures that you presented in your
22 attachment with three-way catalyst results, I believe each
23 of those tables carries the MMT fleet to 20,000 miles.
24 DR. WEAVER: That's right.
25 MR. GRAY: I am referring, again, to the attachment
26 that Ford submitted regarding the three-way catalyst fleet,
27 and the question deals with the MMT fleet that has accumulated
28 20,000 miles.

1 I believe the statement was made that this dif-
2 ference is due, in your opinion, entirely to engine out
3 emission change; is that correct?
4 DR. WEAVER: Primarily. There could be an effect
5 due to spark plug deposits, deposits of manganese oxide on
6 spark plugs, which could affect combustion. But we have not
7 seen this to any major effect on this fleet. We have seen
8 this on the medium-duty truck certification fleet where we've
9 got major differences in hydrocarbon emissions when we changed
10 spark plugs but did not otherwise disturb the deposits.
11 It's impossible for us to be really positive that removing
12 the spark plugs affect the deposits around the spark plugs
13 sufficiently to show this decrease in hydrocarbon emissions.
14 That's why I'm a little bit reluctant to be all that positive.
15 MR. GRAY: I would group spark plug effects with
16 engine out emissions.
17 DR. WEAVER: Okay.
18 MR. GRAY: That's why I wanted to separate that
19 from the plugging issue.
20 DR. WEAVER: Yes, sir.
21 MR. GRAY: Have you had an opportunity to inspect
22 any of these catalysts to see if there is a deposit formation,
23 and have you likewise been able to inspect any of the oxygen
24 sensors on these vehicles?
25 DR. WEAVER: Yes. That's a regular procedure each
26 5,000 miles. We have photographs -- the best that we can
27 do without destroying the converter at every 5,000 mile
28 interval, and that catalyst at 10,000 miles showed some smaller

1 deposits which you could see increased to what you see there
2 at 20,000 miles. We have photographs on all the vehicles in
3 the fleet.
4 MR. GRAY: This is the 20,000 mile catalyst that's
5 part of this fleet (indicating)?
6 DR. WEAVER: Yes.
7 MR. GRAY: And yet you are not seeing any decrease in
8 conversion efficiency even with this amount of plugging?
9 DR. WEAVER: I have to qualify that because that
10 amount of deposit does affect the catalyst efficiency of that
11 particular vehicle. I also need to say that that vehicle was
12 on a 250 CID engine, and the 250 CID engine shows a lesser
13 effect on engine out hydrocarbon increases than the others
14 which are in the fleet, the 302 and the 400, but the data
15 which I presented averaged all across those engine families.
16 MR. JENSEN: For some reason that we don't know,
17 different engine families react differently in the hydro-
18 carbon buildup.
19 You might want to talk about that.
20 DR. WEAVER: I really can't explain it. It
21 apparently has something to do with the combustion chamber
22 design.
23 In the medium-duty truck official certification, we
24 see a lesser effect as far as deposit formation on the spark
25 plugs, and presumably in the combustion chamber, although we
26 have not had a chance to examine these engines yet.
27 On the 351 W engine, for example, it appears as if
28 the effect is less on that than it is on the other engines

1 which are in that certification, which are the 300 and the
2 351 M, and the 460 engines.
3 MR. GRAY: Have you carried any of your three-way
4 catalysts beyond 20,000 miles with MMT?
5 DR. WEAVER: No. That's the maximum that this
6 fleet is at now. No individual is above that.
7 MR. GRAY: This fleet is continuing at the present
8 time?
9 DR. WEAVER: Yes.
10 MR. GRAY: You plan to run it the full 50,000 miles?
11 DR. WEAVER: I can't guarantee that. Because the
12 results are so discouraging, we may terminate the fleet at
13 some point and start another fleet.
14 I should add at this point that we are starting a
15 fleet -- this fleet was not designed to look at MMT. It was
16 a development fleet for a 1979 certification process, and
17 because it's not giving us the complete answer we want on
18 that, we want to design and do a test fleet specifically for
19 MMT. And this fleet will have in it ten identical vehicles,
20 two on each of four different levels of MMT, including zero,
21 .03 grams of manganese per gallon, .06, and an eighth of a
22 gram. Those will all be identical with three-way catalysts.
23 There will be an additional three-way catalyst
24 system which will run on the highest level of an eighth of a
25 gram. There is a total of ten vehicles in that fleet. That
26 test has just begun. We hope to use that fleet to answer some
27 of the type of questions we are asking, too.
28 MR. GRAY: So is it fair to conclude that while with

1 the current three-way catalyst fleet that you have you feel
2 the difference in emissions between the MMT fueled vehicles
3 and clear fueled vehicles at least through the 20,000 mile
4 test point is due primarily to engine out emissions but that
5 the plugging effect catalyst activity effect may come into
6 play or may not, you just can't make a technical judgment at
7 this point?
8 DR. WEAVER: That's correct.
9 MR. GRAY: This is a broader question. Have you
10 seen any technology that will allow or has the potential for
11 allowing certification to the levels that we have been
12 talking about today with MMT in the fuel?
13 DR. WEAVER: No, sir. I know of no technology
14 which would permit that.
15 CHAIRMAN JACKSON: One other question before we
16 leave the MMT issue.
17 On Page 5 of your statement, you are referencing
18 a possible voluntary action by the oil companies or by Ethyl
19 to eliminate MMT to the degree necessary to permit its
20 exclusion from certification fuel. That's sort of an
21 interesting and intriguing choice of words. What is the
22 degree necessary?
23 MR. JENSEN: When I don't know the answer, I always
24 ask Dr. Weaver to respond.
25 DR. WEAVER: I think we worded it that way because
26 we don't know what that level is. If we knew that it was
27 1/32 of a gram, why, we would say that. But we don't know.
28 That's one of the reasons we are running this fleet, is to try

1 to answer that specifically. We realize that's an important
2 question to answer.
3 I might add that there is also a CRC fleet which
4 will be, hopefully, funded and started shortly which will
5 attempt to answer some of these questions also.
6 MR. HELLMAN: Dr. Weaver, you mentioned scavengers,
7 none of them defined. Wasn't ethyl citrate considered at
8 one time to be a scavenger?
9 DR. WEAVER: I don't believe it's properly called
10 a scavenger. We have discussed this with the people who
11 discovered this -- this is Ohio Oil Company -- and they
12 describe it as a modifier of the deposit. They believe it
13 affects the form of the deposit on the spark plugs. They
14 have no information that has any effect on the deposits in
15 the combustion chamber or that it might affect the hydro-
16 carbon emissions.
17 MR. HELLMAN: So that to reinforce what you said,
18 there isn't any additive that you are aware of that could be
19 added to the additive package that includes MMT to alleviate
20 the combustion chamber process?
21 DR. WEAVER: That's right. I'm not aware of any
22 additive.
23 MR. HELLMAN: You mentioned that some of the
24 difference in the deposit formation in the engines could be
25 due to the combustion chamber design.
26 Do you know what causes that, or you weren't sure?
27 DR. WEAVER: Ethyl Corporation has suggested
28 squish, and I don't even know what squish is. You probably

1 know, and I'm sorry that's not very helpful.

2 MR. HELLMAN: Suppose there were a combustion

3 chamber that was found to result in less adverse effect from

4 MMT. Would there be sufficient time for Ford to introduce

5 such a chamber for the years we are talking about?

6 DR. WEAVER: No, there would not.

7 First of all, we have not identified exactly what

8 changes would have to be made in order to achieve the result

9 you suggested. Since we don't know what that change is, it's

10 very difficult to put a time on how long it will take to put

11 that into effect. But it doesn't look like it's possible

12 for the time that you are talking about.

13 MR. HELLMAN: Is it possible that the combustion

14 chamber could be coated with something that would reduce the

15 buildup?

16 DR. WEAVER: I guess that's possible, but I have no

17 information.

18 MR. HELLMAN: Again, it would be a lead time problem;

19 is that right?

20 DR. WEAVER: Yes. Again, we'd have to demonstrate

21 that such a thing would work, and there's not enough time to

22 do it. We need to start certification very shortly now.

23 MR. HELLMAN: Were the exhaust temperatures on these

24 vehicles that were run typical?

25 DR. WEAVER: They are typical of that kind of system.

26 They are lower than many of the systems which we have built

27 previously.

28 MR. HELLMAN: There has been mention in the past of

1 a threshold for plugging in MMT.

2 DR. WEAVER: Yes.

3 MR. HELLMAN: These were below?

4 DR. WEAVER: Well below the threshold of 1500

5 degrees, yes.

6 MR. HELLMAN: California will give a credit for

7 methane in the exhaust. Were the results that you mentioned

8 total hydrocarbons?

9 DR. WEAVER: This analysis was strictly on the basis

10 of total hydrocarbons, but if you wanted to look at any of

11 these graphs, if you merely replace .41 with 3.9, then you

12 would have objectives which would be non-methane. It

13 certainly would be easier to meet non-methane objectives of

14 4,000 miles than total hydrocarbons. But in my opinion, it

15 still doesn't make the problem go away.

16 MR. HELLMAN: Does MMT change the percentage of the

17 exhaust of catalyst carbons in methane?

18 DR. WEAVER: No, it does not.

19 MR. HELLMAN: It's the same?

20 DR. WEAVER: Yes.

21 MR. HELLMAN: So there is no beneficial impact on

22 the credit for methane in the exhaust?

23 DR. WEAVER: No effect that I have been able to

24 see.

25 MR. HELLMAN: If you redid your analysis based on

26 non-methane hydrocarbon, assuming that California would allow

27 procedures for computing it or measuring it, would that change

28 your conclusions about the ability to meet the .41 standard?

1 DR. WEAVER: No, it would not be changed.

2 MR. GRAY: Just to clarify the data you presented,
3 the data that you have collected thus far comparing MMT to
4 clear fuel was at the 1/8 of a gram level of MMT?

5 DR. WEAVER: Yes, it was.

6 MR. GRAY: You have not investigated other levels?

7 DR. WEAVER: We are starting such a fleet now.

8 MR. GRAY: I just wanted to be sure that was clear.

9 Okay. While you've the same qualification to your
10 support of the California waiver for light- and medium-duty
11 trucks that you made for passenger cars -- That is, the need
12 to remove MMT from the fuel -- can you provide a technical
13 judgment as to the appropriateness of those levels as compared
14 to the passenger car levels with regards to the differences
15 between these vehicles?

16 In other words, if you installed the same basic
17 technology that you are using for passenger cars on the light-
18 and medium-duty trucks, do you think that those adjusted levels
19 are reasonable? They are reasonably adjusted to account for
20 whatever differences there are between these types of vehicles?

21 DR. WEAVER: I guess I don't get your question yet.

22 MR. GRAY: As I understand your statement, you have
23 provided general support to that waiver request with the
24 qualification that MMT should be taken out of the fuel?

25 DR. WEAVER: Yes.

26 MR. GRAY: I want to pursue that and ask: Do you
27 think that those levels, light-duty truck and medium-duty
28 truck levels, as compared to the passenger car levels are

1 technically reasonable from an adjustment standpoint?

2 MS. PETRAUSKAS: I'm sorry, Mr. Gray, but what do you

3 mean by "from an adjustment standpoint"?

4 MR. GRAY: The levels are different. As the CARB

5 mentioned earlier, their intent was to establish levels for

6 those vehicles that would be essentially equivalent to the

7 levels that those vehicles would have with the passenger car

8 technology.

9 In other words, if you took your passenger car

10 technology and applied it to the light-duty and medium-duty

11 vehicles, in their judgment those were the levels that you

12 would achieve. I am asking if that seems to be a reasonable

13 technical adjustment to account for the differences among

14 those vehicles.

15 MR. JENSEN: We didn't analyze it that way, but we

16 didn't argue about the levels that are here. Our truck people

17 and our truck engineers looked at it and said we could meet it

18 with three-way catalysts as we could with the -- probably with

19 three-way catalysts because of the fuel economy benefit that

20 Mr. Austin mentioned earlier.

21 MR. GRAY: Okay. So a general answer would be that

22 the same basic technology could allow you to achieve those

23 levels as well as the passenger car levels?

24 DR. WEAVER: Yes, sir.

25 MR. HELLMAN: I'd like to ask you to clarify the

26 statement you made about the three-way catalyst.

27 On Page 10 of your prepared statement, the third

28 line, you indicate if MMT is eliminated from the fuel, you can

1 meet the 1979-80 light-duty truck standards with current
2 emission control technology.
3 Do I take what you just said about the three-way
4 to mean you feel you could do it with either system?
5 MR. JENSEN: Yes. One of the reasons we are speaking
6 of current technology is we do know what the fuel economy
7 requirements are going to be in the energy act for passenger
8 cars. As you know, the DOT has set them for '79 model trucks,
9 but we don't know what's going to be set beyond that.
10 President Carter has indicated in his energy message
11 that he is going to crack down on fuel economy standards for
12 trucks too. As Mr. Austin mentioned, there are benefits in
13 three-way catalyst technology with respect to fuel economy
14 that we have to consider if you are going to squeeze down
15 on trucks. We don't know what it is yet.
16 MR. HELLMAN: Okay. If I were to say as far as
17 only the emission controls go, you feel that with the current
18 oxidation-type system you could meet these levels and you
19 could also meet them with the three-way system but the choice
20 of the system may depend on things that are not directly
21 related to the emission standards, such as fuel economy
22 standards?
23 MR. JENSEN: At the Air Resources Board hearing, we
24 submitted some materials on this. If you want, we can submit
25 that for the record. It agrees with what I've said, but you
26 may want this in the written record.
27 MS. PETRAUSKAS: What it does is it provides an
28 assessment of the likelihood of knowledge that we think would

1 be used at various levels and the recommendations we would make
2 with respect to standards.
3 It was Attachment C to Mr. Jensen's statement of
4 November 23rd. We'd like to submit it for the record at this
5 hearing.
6 MR. GRAY: Okay. I have one more question regarding
7 the light-duty truck area.
8 You mentioned a concern regarding the grouping that
9 California has established for trucks, and you indicated that
10 at least at this time you do not have any vehicles in the
11 zero to 3,999 pound test weight category.
12 The question is: Do you expect that situation to
13 continue? Do you anticipate that Ford will in the future offer
14 a vehicle in that grouping?
15 MR. JENSEN: We don't think so. We think everything
16 would fall in the middle group there, 4,000 to 5,999.
17 The incentive for going down to the lower level
18 you'd lose with the difference in the hydrocarbon standards.
19 Our truck people tell me that the way this stands
20 now we'd all be in the middle group.
21 MR. GRAY: Is there any way that these graduated
22 standards would discourage you from going to a lighter truck?
23 Would that influence your decision?
24 MR. JENSEN: I think so. If you have to meet a
25 .41 grams of hydrocarbon rather than .5, you'd probably -- if
26 you were on a borderline, you'd stay with the .5 rather than
27 go down to a lighter truck.
28 MR. HELLMAN: Let me clarify something for the

1 record.

2 Ford markets a vehicle called the Courrier which is

3 a lightweight pickup truck.

4 MR. JENSEN: Yes.

5 MR. HELLMAN: Your statements don't refer to that

6 vehicle, do they, since the vehicle is apparently certified

7 by another manufacturer?

8 MS. PETRAUSKAS: The importer of that vehicle, but

9 the contractual relationship between us and Toyo Kogyo is

10 such that Toyo obtains all of its required certification for

11 the importers and marketers of the vehicle.

12 MR. GRAY: The next question I have is related to

13 the adjustability issue.

14 You made the statement that if the recommended idle

15 air/fuel mixture service procedure called for the removal of

16 the carburetor in the qualifications that you provided for

17 your support of that regulation, would you think it equally

18 appropriate to say if the recommended idle air/fuel mixture

19 actually requires the removal of the carburetor? Is that

20 what was intended, or am I reading too much into it?

21 MS. PETRAUSKAS: It's not clear whether you are

22 characterizing our testimony or CARB's.

23 MR. GRAY: I'm trying to relate the two, so perhaps

24 we can resolve some of the confusion that exists now.

25 California made some specific statements regarding

26 what they would accept, and the purpose of that question was

27 to see if indeed your qualifications on your support are now

28 satisfied. I think California said that it would not

1 necessarily suffice that the service procedure called for the
2 removal of the carburetor if in fact the carburetor was not
3 necessarily removed during servicing. In other words, if it
4 did not actually require the carburetor to be removed, even
5 though the service instructions said remove it.
6 MS. PETRAUSKAS: Mr. Gray, I think the concern we
7 had was what alternate demonstration of compliance would be
8 acceptable other than demonstration that the carburetor would
9 have to be removed. That's why we questioned the manner in
10 which the special tool or special procedure matter would be
11 implemented.
12 MR. GRAY: Let me ask it this way, then --
13 MS. PETRAUSKAS: If I understood what was said this
14 morning -- Well, maybe I'll let you characterize it.
15 MR. JENSEN: The intent that Mr. Austin expressed
16 verbally as he answered your questions seemed to satisfy our
17 problem. It clarified it.
18 MR. GRAY: Okay. Well, that gets to the heart of
19 the question.
20 MR. JENSEN: Yes.
21 CHAIRMAN JACKSON: One final question, Mr. Jensen.
22 Did you follow the question I was asking Mr. Austin
23 about the potential backlash associated with the adjustability
24 regulations?
25 MR. JENSEN: Yes.
26 CHAIRMAN JACKSON: Do you have a view on that?
27 MR. JENSEN: We think it's our responsibility to
28 build cars that are competitive and drivable, and we think we

1 are doing it with '77 models.

2 As a matter of courtesy, we know that they are look-
3 ing at this in California. We have offered to work with them
4 and have our drivability experts show them at least how we
5 determine whats drivable, what's good performance for the
6 customer. We think it's our responsibility no matter what
7 they do.

8 We've supported the idea of restricting maintenance,
9 because we want to get away from this in-use tampering and
10 so forth. We think we can do that and give a good, drivable
11 automobile to the customer so there is no backlash. That's
12 our job, and we will do it.

13 CHAIRMAN JACKSON: Will the corporation take the
14 position that in the event that you did have a customer that
15 did have a problem that you, as opposed to the dealer, will
16 cover that problem?

17 MS. PETRAUSKAS: I don't understand your question,
18 Mr. Jackson.

19 CHAIRMAN JACKSON: If you do by chance produce a
20 car that does not have adjustable parameters on it and it
21 doesn't perform acceptably, a reasonable man would agree that
22 it doesn't perform acceptably, would the corporation --
23 company in your case -- take the responsibility of making that
24 right to the consumer or would you leave it up to the dealer
25 or just exactly what position would you take?

26 MS. PETRAUSKAS: We fix some of those problems
27 today under our 12-month or 12,000-mile warranty.

28 CHAIRMAN JACKSON: I'm talking about all of those

1 kinds of problems.

2 MR. HENSEN: We refer people initially to the
3 dealers. If the dealers can't take care of it, then we have
4 a district man who works for the company who goes out and
5 works with the customer and the dealer. We try to go through
6 the dealer, but we also have an appeal procedure where you
7 can get all the way to the Dearborn office.

8 But it's our job to keep those customers happy one
9 way or another, but the first step is usually with the dealer
10 and then we follow it up with the district service representa-
11 tive who goes out and works first with the dealer and then
12 with the customer so we end up with a satisfied customer.

13 CHAIRMAN JACKSON: Your answer is, then, the
14 company will take that responsibility?

15 MR. JENSEN: They do now, and they will continue to
16 do so.

17 CHAIRMAN JACKSON: Mr. Jensen, thank you very much.

18 MR. JENSEN: Thank you.

19 CHAIRMAN JACKSON: I think it's time to take the
20 noon recess, and we will reconvene at 1:15.

21 (Noon recess.)

22 MR. NELSON: Good afternoon. My name is Ed Nelson.
23 I am Assistant Director of Automotive Emission Control,
24 General Motors Environmental Activity Staff.

25 This afternoon I have three other members of
26 General Motors with me to help answer your questions.

27 These gentlemen are Mr. Hanson at the end of the
28 table, Mr. Schwochert. Mr. Hanson is a staff engineer from

1 Chevrolet Motor Division, and Mr. Schwochert is also a staff
2 engineer with the Environmental Activity Staff.
3 On my left is Mr. Petersen, an attorney with General
4 Motors legal staff.
5 At this time, I'd like to ask which of the subjects
6 you'd like to consider first. Is there any particular order
7 that you desire us to discuss these items?
8 CHAIRMAN JACKSON: I think so. I have mine ordered
9 in the following order: 1980 and subsequent model year exhaust
10 emissions standards for passenger cars, 1979 and subsequent
11 model year exhaust emissions standards for light-duty truck
12 and medium-duty vehicles, and adjustability of idle mixture
13 mechanism.
14 MR. NELSON: Okay. At this time, I'd like to ask
15 Mr. Schwochert to present the General Motors statement on
16 1980 and subsequent standards.
17 MR. SCHOWCHERT: General Motors offers the following
18 comments regarding EPA's consideration of granting California
19 a waiver which would implement an NO_x passenger car standard of
20 1.0 grams per mile for 1980 and subsequent model years. This
21 waiver, if granted, would continue the present HC and CO
22 standards of 0.41 and 9.0 grams per mile respectively.
23 New emission standards usually require the intro-
24 duction of new or improved emission control hardware. To this
25 end, GM has told both California and federal officials of our
26 plans to inroduce in California starting with the 1978 model
27 year, two engine families using Phase II catalyst systems.
28 That is, systems with three-way catalysts and

1 closed-loop fuel metering. This introduction is dependent
2 upon successful completion of the certification requirements
3 which are presently underway.
4 The limited volume introduction technique is an
5 effective and, we believe, a prudent way of doing business.
6 The introduction of this new emission control hardware two
7 years prior to the 1980 model year will allow GM to gain
8 production and field experience prior to mass introduction when
9 this hardware may be required to meet more stringent emission
10 standards. Both EPA and ARB recognize that bringing on line
11 "New Technology" is what allows more stringent standards to
12 be met.
13 Assuming success of 1978 and 1979 introductory three-
14 way programs, General Motors plans to offer for sale in the
15 1980 model year in California vehicles with three-way catalysts
16 and closed-loop fuel metering in as many sizes and weight
17 categories as can be certified to meet the emission standards.
18 At this time, we cannot predict if this emission control
19 hardware, as applied to a full product line-up, will result
20 in certification of all models currently offered for sale in
21 California. Considerably fewer model-engine-transmission-
22 carburetor combinations are presently available in California
23 compared to the remaining 49 states. It is too early to pre-
24 dict if the California model availability will diminish even
25 further in 1980.
26 The present Clean Air Act Amendment considerations
27 have resulted in considerable discussion of more stringent
28 federal exhaust emission standards and associated fuel economy

1 levels. Using the 1977 federal vehicle as a baseline, GM
2 has estimated from the available data that the fuel economy
3 penalty associated with standards of 0.41, 9.0 and 1.0 grams
4 per mile hydrocarbon, CO and NO_x respectively will be in the
5 range of 0-20%. 1977 model GM vehicles for California
6 presently experience an average of 11% fuel economy less
7 compared to 1977 model federal vehicles. The present experi-
8 mental data are too inconclusive to predict whether 1980
9 model California vehicles will show an additional penalty or a
10 gain over 1977 model experience.
11 The use of three-way catalysts and closed-looped
12 fuel metering will increase the emission control system hard-
13 ware first cost. Using the 1977 federal vehicle as the base,
14 the cost increase range is estimated to be $110 to $130.
15 Several unknowns greatly increase the complexity of
16 this subject of future exhaust emission standards and may have
17 large impacts on technological feasibility, fuel economy,
18 model availability and emission control hardware costs. The
19 major unknowns at this time are (1) Will future engines and
20 emission control systems be subjected to the fuel additive
21 MMT or similar outside influences which could make emission
22 control more difficult? (2) Will California restrict the
23 allowable maintenance on future emission systems? (3) Will
24 federal legislation establish the CO standard at 3.4 grams per
25 mile or some other level more stringent than the California
26 standard of 9.0 grams per mile? General Motors contends that
27 these questions are important considerations and could have a
28 major influence on the technological feasibility of meeting

1 this standard.

2 With respect to the applicatin of the proposed
3 standards for diesel-powered passenger cars based on the data
4 available to GM today, it is very likely that the one gram per
5 mile NO_x standard, in combination with the .41 gram per mile
6 hydrocarbon standard, will remove the present GM diesel
7 engines as alternative power plants for the 1980 model year
8 passenger cars. We continue to have serious reservations
9 about the ability to achieve one gram per mile NO_x with diesel
10 engines.

11 These reservations stem from the limited experience
12 with emission control diesels compared to the vast amount of
13 experience of gasoline engines. Additional time is required
14 to fully assess the emission control capability of diesel
15 engines, including the effects of EGR which may be required to
16 obtain lower NO_x levels on engine durability.

17 The effects of future diesel emission control
18 concepts on gaseous hydrocarbon emissions, particulates, smoke,
19 noise and odor are also required. We recently recognized
20 that tests on certain of the hydrocarbon measures increases
21 the reservations about the ability of diesel engines to meet
22 more stringent standards.

23 General Motors also believes the issues concerning
24 the need for this NO_x standard are considerably more complex
25 than the issues surrounding the need for HC and CO control.
26 It is generally agreed that reduced NO_x will increase formation
27 of photochemical oxidant near the emission source which
28 generally is also the area of greatest population density.

However, the effect of reduced NO_x on immediate downwind areas which also have their own emission sources is not at all clear. A question that exists is how will the levels of both NO_2 and oxidant be affected in all portions of the Los Angeles Basin and other areas of the state. Will the control of one air pollutant, oxidant, be traded off for control of another, NO_2, and is this a good trade-off?

The questions are extremely complex and neither GM nor anyone else has all the answers at this time. General Motors suggests that prior to granting the waiver, EPA should be convinced that this is the correct control strategy for California. GM is concerned that this NO_x standard may result in a net trade-off which will aggravate oxidant concentrations in some California locations which already have oxidant problems, while reducing the NO_2 concentrations in these same areas which presently do not exceed the NO_2 Air Quality Standard.

That completes this statement on the 1980 passenger car standards. Would you like to go into the next statement?

CHAIRMAN JACKSON: Yes.

MR. SCHWOCHERT: With respect to California's request for a waiver to require light-duty trucks and medium duty vehicles to effectively meet passenger car exhaust standards, General Motors offers the following comments.

The HC and CO standards would become effective with the 1979 model year for light-duty trucks and all three exhaust constituent standards would be effective for both classes of vehicles in 1981. Furthermore, if the waiver is

1 granted, essentially all GM 1981 model year medium-duty
2 vehicles would be required to meet the same exhaust standards
3 as light-duty trucks.
4 General Motors certainly acknowledges that
5 California has special air pollution problems which require
6 emission control strategies different from the remaining 49
7 states. We have always recognized the need for additional
8 hydrocarbon control and do not question that this condition
9 continues to exist.
10 The question which we believe is pertinent to this
11 issue of more stringent truck standards is technological
12 feasibility. Based on GM development test results at this
13 time, we have not to our satisfaction demonstrated the ability
14 to meet the required hydrocarbon levels. We believe it is
15 our responsibility to report our data as it exists at any
16 given time. A summary of hydrocarbon development test data on
17 our 350 cubic inch displacement V-8 and 250 cubic inch displace-
18 ment six cylinder engines with both automatic and manual
19 transmissions is shown on the figure attached to the statement
20 that we have provided to the panel. As is noted on the figure,
21 this data is predicated on fuel without MMT.
22 Our development work has not gone far enough to
23 positively identify the truck models which will be available
24 in California if the waiver is not granted. Based on present
25 development work and past experience, it is quite likely that
26 our manual transmission offerings will be reduced, if not
27 eliminated, because of their greater difficulty of meeting
28 the more stringent hydrocarbon standards. If manual

1 transmissions cannot be offered in California, granting this
2 waiver for more stringent emission standards will be incon-
3 sistent with the energy conservation measures we are being
4 encouraged to make by other regulatory agencies. NHTSA is
5 encouraging GM to increase the usage of manual transmission
6 vehicles by offering sales incentives. This encouragement
7 is of little value if these veihcles are removed from the
8 marketplace by overly stringent emission standards.
9 For informational reasons, it may be appropriate to
10 review the engine and transmission restrictions that already
11 exist in California due to different emission standards. For
12 the 1977 model year, only two engine displacements are offered
13 in California light-duty trucks compared to four-engine
14 displacements in federal vehicles. Four-speed manual
15 transmissions are not offered in California at all and even
16 manual three-speed transmissions are not available in some
17 models.
18 For 1978, we plan to offer only three engine
19 displacements in California for medium-duty trucks compared to
20 six of the comparable federal vehicles.
21 We also cannot accurately quantify the fuel economy
22 penalty associated with these more stringent standards because
23 our development work has not yet progressed far enough to
24 identify the emission control system calibrations that can be
25 used to meet the standards. Since present passenger car
26 control systems and calibrations do not provide the required
27 degree of control especially for hydrocarbons, the engine
28 calibration changes that are required to decrease engine

1 hydrocarbon emissions have historically shown associated fuel
2 economy penalties. If the waiver is granted, we believe,
3 DOT will have to account for the fuel economy loss associated
4 with more stringent exhaust emission standards when
5 establishing the maximum feasible fuel economy level for this
6 type of vehicle.
7 The present development test results reflect the
8 inherent differences between the emission levels achievable
9 by trucks compared to passenger cars. On numerous occasions,
10 GM has testified to both EPA and ARB that we do not support the
11 concept that light-duty and medium-duty trucks can or should
12 be regulated to the same emissions levels as passenger cars.
13 Customers purchase trucks in preference to passenger
14 cars either because they intend to use them as commercial
15 vehicles, or because they require special utilitarian features.
16 Some of these utilitarian features are the ability to carry
17 cargo or passengers or both, the ability to be used for off-
18 highway operation, the abililty to be used as a tow vehicle,
19 and many other features. Light-duty trucks are designed to
20 be versatile and to carry heavy loads as well as bulky cargo.
21 They are used in agriculture, construction, wholesale and
22 retail trade, and for personal and recreational purposes.
23 Light-duty trucks are designed and developed in
24 order to be capable of serving a commercial purpose. These
25 trucks do not and cannot use passenger car drive trains except
26 in rare caess. Even when passenger car drive trains are used,
27 trucks are tested at higher dynamometer horsepower loadings.
28 Further, the differences from passenger cars occur because
trucks must use higher transmission and axle ratios to perform

1 their designed vocational functions, with a high percentage
2 incorporating manual transmissions. This limits their emission
3 control capability compared to passenger cars.
4 Even the passenger carrying derivatives of trucks --
5 the vans, truck station wagons, and the Blazer off-road-type
6 vehicles, are designed to retain the cargo and load carrying
7 capabilities of the parent work-oriented vehicle. These
8 trucks, which are modified to carry passengers, are still
9 fundamentally trucks and are capable of the same duty cycle as
10 the basic commercial vehicle. Their design, development and
11 production are totally integrated with trucks and they probably
12 would not exist at all as a primary vehicle.
13 Some of our passenger car lines have been downsized
14 and others are currently being downsized primarily for fuel
15 economy considerations. On the other hand, the light-duty
16 truck category has been extended from 6000 to 8500 pounds GVWR
17 by regulatory action. Downsizing is not an option in dealing
18 with trucks if they are to continue to retain their vocational
19 capability. In the near future, most of our lightest trucks
20 will equal or exceed the weight of our heaviest cars. When
21 this is considered along with the higher dynamometer horse-
22 power settings and higher N/V ratios of trucks, we believe
23 that trucks, even when using similar emission control systems,
24 cannot have the same ultimate emission control capabilities
25 as passenger cars. Therefore, we must conclude that there is
26 a definite difference between passenger cars and trucks which
27 we believe should be appropriately recognized.
28 Accordingly, we find the exhaust emission standards

1 established by the ARB for light-duty trucks and medium-duty
2 vehicles which are keyed to passenger car levels as not tech-
3 nically justified or properly proportioned. Although we agree
4 with the ARB staff's concept of attempting to adjust the
5 emission standards as a function of test weight so that the
6 emission standards can be met with similar emission control
7 hardware, we do not believe the proposal has accomplished
8 this objective with respect to the hydrocarbon standard.
9 Based on General Motors development work to date, our data
10 indicate that the hydrocarbon standard has not been generally
11 adjusted for vehicle size so that similar passenger car
12 control systems, when applied to trucks, do not achieve the
13 required emission levels.
14 A review of present model year assembly line test
15 data supports our questioning of the ratio of trucks to
16 passenger car standards, but we do not believe that this is
17 sufficient evidence in itself to establish the proper
18 relationship. GM 1977 model year passenger cars and light-
19 duty trucks with 350 cubic inch displacement engines --
20 these vehicles are from engine families 710J45 and 712J4 --
21 have essentially the same emission control hardware. A
22 comparison of the ratio of truck to car hydrocarbon emissions
23 based on 1977 GM assembly line test data through March 31
24 projected to 50,000 miles and adjusted for methane is 2.08
25 compared to 1.22 for the standards established by California.
26 This morning there was some discussion regarding the use of
27 DF. If one looks at the data without the application of
28 DF, the ratio of cars to trucks becomes 1.59 to 1.77, depending

on whether or not you adjust the trucks hydrocarbon emission for methane. If these data alone were used to establish the truck hydrocarbon standard which would be equivalent to 0.41 grams per mile for passenger cars, the standard would be 0.85 grams per mile for trucks. These data are based on comparable dynamometer road load horsepower settings for light-duty trucks and passenger cars. The new test procedure for 1978 and subsequent model year trucks increases the dynamometer horsepower setting by as much as 50%. GM does not propose that the standards be increased by this amount in the above example, but we have used the example to demonstrate that the standard established by California does not account for the actual difference between truck and passenger car emissions.

Additionally, the ARB's categorization of trucks by test weight has not, in our opinion, accomplished the objective of adjusting the standards upward for larger trucks. Almost all of General Motors trucks fall within the 4000-5999 pound inertia weight category although they span a gross vehicle weight range of about 3500 pounds. Our present diesel engine, based on the data available to GM today, is likely to be removed from California trucks in 1979 because of the .5 gram per mile hydrocarbon standards. This condition is further complicated by the recently recognized test uncertainties of hydrocarbon measurement.

In conclusion, for these reasons, General Motors recommends that the EPA delay the waiver for the proposed California standards and require manufacturers to work with

1 the Air Resources Board in establishing the truck standards
2 which will accomp ish the Board's objective regarding the
3 use of the best available emission control hardware on
4 passenger cars and trucks.
5 It is General Motors position that a temporary delay
6 in implementation of more stringent truck standards is in the
7 public interest. This delay will provide time for proper
8 adjustment of the test categories and allow establishing the
9 correct relationship between passenger car and truck standards
10 within the categories of various truck weights.
11 A slight delay of one of two years will not have a
12 significant impact on California's air quality. Information
13 presented by the ARB staff shows that hydrocarbon emissions
14 are projected to be reduced by eight tons per day in 1990 as a
15 result of the truck hydrocarbon exhaust emission standards
16 under consideration today. This reduction should be viewed
17 in light of the ARB staff's overall projection of 1273 tons
18 per day of hydrocarbons in 1990. Using these projections,
19 the reduction achieved by the proposed truck exhaust hydro-
20 carbon standards amounts to only six tenths of one percent if
21 implemented as adopted. A delay of one to two years will only
22 reduce the eight tons per day projected benefit by only a
23 small fraction of the eight tons per day in 1990.
24 MR. NELSON: Mr. Jackson, we have some additional
25 comments that we would like to make to help clarify some of
26 the issues that were brought up this morning. We'd just as
27 soon do that before you get into the question-and-answer
28 session with regard to this issue.

1 We've got one more statement that we'd like to
2 continue to read at this time.
3 MR. SCHWOCHERT: General Motors offers the following
4 comments regarding EPA's consideration of granting California
5 a waiver for requiring that idle mixture mechanisms on 1980
6 and subsequent model year passenger cars and 1981 and subse-
7 quent model year trucks be designed so that maladjustment is
8 discouraged or difficult to perform.
9 The EPA hearing announcement which noticed this
10 subject referred to the regulation as ". . . imposing a
11 restriction on allowable maintenance." To General Motors'
12 knowledge, California has not adopted any regulations which
13 restrict allowable maintenance and we therefore conclude that
14 idle air/fuel mixture adjustability is the subject which is
15 being considered.
16 The issue of idle air/fuel mixture adjustability is
17 addressed in Section 5.e of "California Exhaust Emission
18 Standards and Test Procedures for 1980 and Subsequent Model
19 Passenger Cars, Light-duty Trucks and Medium-duty Vehicles"
20 as amended December 14, 1976. Our interpretation of the
21 requirement set forth in this section is that if the adjust-
22 ment mechanism were hidden from view such as would occur if
23 the idle mixture screw were located in a counterbore in
24 the throttle body and the cavity were covered with a metal
25 plug or if the carburetor had to be removed from the vehicle
26 to provide access to the idle mixture mechanism, then the
27 California regulation will be met.
28 General Motors currently is engaged in a program

1 which will result in carburetor idle mixture adjustment
2 mechanism design changes that we believe will accomplish the
3 objective of the California regulation. Earlier this year, GM
4 produced about 5,000 production vehicles with sealed idle
5 mixture screws. This limited production program should
6 provide the field experience required to implement the design
7 changes across all GM product lines. We currently plan to
8 implement the covered idle mixture screws carburetor design
9 for most GM carburetors by the 1979 model year.
10 This California requirement is not objectional to
11 General Motors as long as the rulemaking does not nullify the
12 programs at GM that have been underway well in advance of the
13 ARB's consideration of this subject. We assume our current
14 designs, such as used in the 5,000 car program, do meet the
15 California regulation.
16 MR. NELSON: Thank you. We have several comments
17 that we would like to make on the issues that were brought up
18 this morning that were either quite confusing and/or mislead-
19 ing.
20 Number one, we want to answer questions on the
21 General Motors' program that was designed to determine the
22 emission characteristics as a function of inertia weight.
23 Number two, we would like to explain for the record
24 the situation where GM was accused of misleading the staff last
25 November on deterioration factors and the charge that we were
26 continuing to use the same information in a GM statement that
27 was presented today.
28 As number three, I'd like to object to the ARB

1 staff statement this morning that implied that GM made a
2 recommendation in an oral statement as to the specific hydro-
3 carbon standards for California. The General Motors'
4 statement did not include a specific recommendation, but
5 instead an illustration of one of the problems with the
6 car and truck relationship.
7 Now at this time I'd like to ask Ken Hanson to answer
8 the questions on the program that was designed to evaluate
9 emissions as a function of inertia weight.
10 MR. HANSON: If you don't mind, Ed, I'd like to take
11 the deterioration factors up first. There seems to be some
12 confusion on that as to what are comparable deterioration
13 factors as compared to the emission characteristics of trucks
14 and cars.
15 As the ARB pointed out, if you compare the cars and
16 trucks for 1977 that have comparable engines, the deteriora-
17 tion factors are not comparable because most of the trucks
18 were carried over from 1976 when the certification fuel was
19 different. I recognize that fact, and the ARB also suggested
20 that a comparison of 1976 deterioration factors between cars
21 and trucks shows there is relatively little difference in the
22 hydrocarbon deterioration.
23 Well, I have a problem with that comparison in that
24 most of the cars for '76 were carried over from '75, and they
25 did not have the benefit of the 1976 knowledge.
26 I think it's also significant that in those early
27 days of catalyst technology, 1975 and 1976, we were on a
28 fairly steep learning curve, not only with the catalysts, but

1 the associated systems that went along with it. Just as an
2 example, our catalyst supplier has informed me that the
3 catalysts that eventually were put into production in 1975
4 were quite a bit better than the prototypes we actually
5 certified with. This was strictly due to the technology
6 developed in the manufacturing process.
7 I think the best possible comparison that you can
8 make between car and truck deterioration factors, considering
9 all this, would be for 1975. During the 1975 model year, all
10 of the trucks and all of the cars were recertified. They
11 all used the same fuel and they all used the same generation
12 of catalysts. If this deterioration issue is so important,
13 I'd like to read these numbers into the record.
14 This is a comparison of cars versus trucks using the
15 same engines and the same catalytic converter control systems
16 run on the same fuels and the same catalysts. The average
17 numbers for the federal cars was 1.51 hydrocarbon deteriora-
18 tion. The comparable number for trucks was 2.09. For the
19 California vehicles, the hydrocarbon deterioration factor for
20 cars averaged 1.38, and the factor for trucks averaged 1.84.
21 I think this information continues to make us believe that
22 there is difference in deterioration between cars and trucks,
23 and we think there are probably some inherent reasons for
24 those differences.
25 Also, I'd like to point out that in the graph
26 attached to our statement, we tried to describe the state of
27 development of our trucks targeted at the California 1979
28 standards, and we assumed some deterioration factors to project

1 the data at 50,000 miles. The deterioration factors we
2 assumed were 1.15 for V-8 engines and 1.30 for six-cylinder
3 engines. These factors are very optimistic and considerably
4 lower than any factors discussed thus far. In the case of
5 the six-cylinder, it is considerably lower than the existing
6 passenger car deterioration factor.
7 I'd also like to point out that these factors are
8 based on clear fuel tests for 50,000 miles.
9 Some other General Motors' data that was quoted was
10 relative to the effect of the new truck test procedure on
11 hydrocarbon emissions, and we did present some data last
12 November on that subject.
13 As you know, we worked with the EPA to develop a new
14 dynamometer horsepower factor for trucks. When that factor
15 was eventually promulgated and accepted, we just went to work
16 using that particular factor. We really didn't make any
17 attempt to evaluate that new dynamometer horsepower setting to
18 the old one. So, we went back through our development work
19 to see if we could find any back-to-back tests, and we did
20 find this one. I believe the ARB quoted the results this
21 morning, that for the 50 percent increase in dynamometer
22 horsepower on 250 automatic transmission vehicles, there was
23 no change in hydrocarbons, an 18 percent change in CO, and a
24 16 percent change in oxides of nitrogen, higher of course.
25 We don't know what the effect would be on other
26 vehicles, and it was really of little concern to us because
27 we hadn't used the new factors, so we have gone to work using
28 those. What our truck development people have told me lately

1 is that we have underestimated the effect of that dynamometer
2 horsepower setting, and it's causing a great deal of problems
3 we are having with hydrocarbons.
4 I think it must be recognized that the increases in
5 CO and oxide of nitrogen have to be dealt with within the
6 calibrations. Generally, as oxides of nitrogen are reduced
7 through EGR and other methods, there is an interaction with
8 hydrocarbons.
9 The other General Motors' data that was referred to
10 was a specific test program that was run on a number of trucks,
11 three different models, comparing the emissions at 4,000
12 pounds inertia weight and 6,000 pounds inertia weight. For
13 the record, I would like to say that those were all run at
14 constant horsepower, because horsepower is no longer a function
15 of inertia weight. Also, this particular program was not
16 run to make any comparison between truck and car capability.
17 The object of the program was to try to compare the range of
18 values that we might expect within one class that the ARB has
19 established.
20 As you know, they have established break points of
21 4,000 pounds GVW and 6,000 pounds GVW initially for the three
22 different classes of trucks and the three different levels of
23 emissions.
24 To repeat the data that the ARB quoted, we found
25 an increase of 23 percent in hydrocarbons, 44 percent in
26 CO, and 21 percent in oxides of nitrogen. This would be with
27 the same systems, same calibrations, just changing the inertia
28 weight from the lower extreme of 4,000 to the upper extreme of

1 6,000 pounds. The way the regulations are working out,
2 essentially all of our vehicles are in that middle range,
3 so the graduated emission standards essentially do not affect
4 us at all.
5 I would expect the increase in hydrocarbon, the
6 23 percent increase, to become greater as the oxides of
7 nitrogen and the CO is brought under greater control.
8 That's all the comments I have about that.
9 MR. NELSON: Thank you for allowing us to make the
10 additional statements. We are now ready to answer questions.
11 CHAIRMAN JACKSON: With regard to your statement on
12 1980 and subsequent model year exhaust emission standards,
13 I think the record will reflect that on Page 2, in the last
14 paragraph of your item listed No. 1, you inserted the word
15 "could" in the sentence, "Will future engines and emission
16 control systems be subjected to the fuel additives MMT or
17 similar outside influences which could make emission control
18 more difficult?"
19 By inserting that word, did you intend to infer
20 that you are not sure that MMT will make the meeting of
21 emission standards more difficult?
22 MR. NELSON: We are definitely sure that MMT will
23 make emission control more difficult. We pretty much agree
24 with the statements that were made this morning on the
25 hydrocarbon increases and the effect it would have or
26 potential effect it could have on emission control systems.
27 CHAIRMAN JACKSON: Do you believe it would be
28 appropriate to say "will make"?

1 MR. NELSON: Well, we were talking about general
2 unknowns in the future, and it wouldn't have to be MMT. It
3 could be one that has a similar problem.
4 CHAIRMAN JACKSON: Well, with regard to MMT, is it
5 correct to say "will make"?
6 MR. NELSON: Yes, sir.
7 MR. GRAY: Are you aware of any technology that
8 can meet these levels with MMT in the fuel or has the potential
9 even?
10 MR. NELSON: The problem that we visualize today
11 with today's technology is that we would have to change the
12 calibration to a point where we might lose fuel economy, and
13 we have not run across a technology which would allow us to
14 do the same job without loss in fuel economy. So, no, we
15 do not have the technology that would allow us to get there.
16 MR. GRAY: Without fuel economy penalty or at all?
17 MR. NELSON: With today's experience, without a
18 fuel economy penalty.
19 MR. HELLMAN: My understanding of what Ford mentioned
20 earlier this morning was that they thought with MMT fuel they
21 could not make the emission standards at all, and you are
22 saying that -- do I interpret correctly that what you are
23 saying is that you could meet the standards with MMT in the
24 fuel; however, the fuel economy performance for vehicles
25 calibrated in that manner would be unacceptable?
26 MR. NELSON: We have presented some information
27 here that would allow one to believe that if progress occurs,
28 we might be able to certify one engine without MMT in the fuel,

1 and I am suggesting that if we had to certify with MMT, we
2 would have to recalibrate to include the hydrocarbon increase
3 and thereby have a fuel economy loss.
4 MR. SCHWOCHERT: Mr. Chairman, I don't think we are
5 trying to say that based on what we know today, we can certify
6 with MMT in the fuel. We don't know. We can't make the
7 judgment today whether we could or could not certify with MMT
8 in the fuel.
9 As a matter of fact, we can't even make the judgment
10 today whether we can certify in all of our product lines
11 without MMT in the fuel. We don't have that particular
12 information that says we can certify today with MMT in the
13 fuel. But it would be more difficult, certainly, because of
14 the hydrocarbon increases if you were able to certify to the
15 1980 standards.
16 CHAIRMAN JACKSON: Do you have enough information to
17 say whether technology is available to meet the standards for
18 which a waiver is requested if MMT is not in the fuel?
19 MR. HANSON: If MMT is not used in the certification
20 fuel, based on these results that we have shown thus far, we
21 think that we can probably certify one engine/transmission
22 combination. I'm talking about trucks.
23 Are we getting confused here between trucks and
24 cars?
25 CHAIRMAN JACKSON: I was asking the question with
26 regard to both.
27 MR. HANSON: Well, my response would be for trucks.
28 Now with MMT in the fuel, we have very little experience on

1 trucks. I would have to believe that they would behave
2 similar to what passenger cars have shown today.
3 CHAIRMAN JACKSON: How about with passenger cars,
4 the same question?
5 MR. SCHWOCHERT: As we have pointed out, we are
6 going to offer a couple of engine families in 1978. Our
7 programs are geared toward certification with the same types
8 of systems in 1980 that we are presently certifying for a
9 couple of engine families in 1978.
10 Right now we don't have any information that says
11 that at least on some vehicles we will not be able to certify
12 at these levels. As we pointed out in our statement, we
13 don't know. We can't say at this time whether we can certify
14 across all model lines, but we are heading in that direction
15 or working toward that end.
16 CHAIRMAN JACKSON: Then it's fair to conclude that
17 the technology to certify at the levels contained in the
18 application for waiver is available?
19 MR. SCHWOCHERT: We don't have any information
20 that we can say it's not available.
21 MR. PETERSEN: What are we talking about again, cars
22 or trucks? Are we talking about manuals or automatics?
23 CHAIRMAN JACKSON: We are talking about passenger
24 cars. We know that you've got one truck line that you can
25 certify, at least.
26 MR. HANSON: Out of the four present combinations
27 that are available in California, it looks like one will make
28 it. I guess what disturbs us is that the one that shows the

1 best promise is the least fuel efficient. It's the biggest
2 engine, automatic transmission.
3 CHAIRMAN JACKSON: I have submitted here from the
4 CARB a couple question that I'd like to go ahead and ask
5 because of the broad scope of the inquiry.
6 General Motors has made several statements regarding
7 air quality. Does GM believe that CARB has not considered
8 the questions raised by GM on Page 3 of their statement, and
9 I presume that is in reference to Page 3 of the statement on
10 passenger cars?
11 MR. SCHWOCHERT: Is that the question?
12 CHAIRMAN JACKSON: That's the question.
13 MR. SCHWOCHERT: As I understand the question, do
14 we believe that ARB has not considered these items that we
15 presented?
16 CHAIRMAN JACKSON: That's correct.
17 MR. SCHWOCHERT: What we are concerned about is
18 what is known about these issues and the possible trade-offs
19 that could result in oxidant and NO_2.
20 I'm not suggesting -- we haven't suggested, I
21 don't think that we have not considered these issues. We
22 believe that based on the information that's available to us
23 from our own studies and from an interchange that occurred at
24 a seminar sponsored by the Air Resources Board in early
25 January in Los Angeles that the answers to the questions are
26 not at all clear at this time. What we are suggesting by our
27 comments on Page 3 is that the EPA ought to be convinced that
28 this is the correct control strategy. We are not yet

1 convinced, based on the information that we have seen from
2 the Air Resources Board that we saw presented at the seminar
3 held in January and the work that we have done, that this is
4 the correct control strategy. And what we are suggesting is
5 that before you grant this waiver, you ought to be also
6 convinced this is the correct control strategy.
7 It appears ARB is convinced, because they have gone
8 ahead and adopted the standards.
9 CHAIRMAN JACKSON: I presume you are familiar with
10 the position we have taken over and over again about public
11 policy matters as they relate to waivers. We usually defer
12 to California's judgment on things that do not relate to
13 technology and lead time.
14 MR. SCHOWCHERT: This issue, in our judgment,
15 borders on the one of compelling and extraordinary circum-
16 stances. If you trade off one compelling and extraordinary
17 condition that aggravates another compelling and extraordinary
18 condition -- one, if there is such a trade-off, and we believe
19 there is such a trade-off, then we think this is something that
20 has to be evaluated under those provisions of the statute.
21 CHAIRMAN JACKSON: Either way, will it cause the
22 compelling and extraordinary conditions to go away?
23 MR. SCHWOCHERT: I don't think that -- by "going
24 away," are you saying will they meet the oxidant and NO_2 air
25 quality standard?
26 CHAIRMAN JACKSON: By either of the two strategies.
27 MR. SCHWOCHERT: I don't believe the ARB is pro-
28 jecting that they would not meet the --

1 CHAIRMAN JACKSON: No. I am asking you. You are
2 making the point about the review of the strategy because of
3 the trade-off having some effect on the compelling and
4 extraordinary conditions, and I'm suggesting is the trade-off
5 you are advocating also going to make the compelling and
6 extraordinary conditions go away?
7 MR. SCHWOCHERT: I don't think we would say they
8 will go away. It will perhaps affect the various distribu-
9 tions of the two primary constituents, oxidant and NO_2, that
10 we are concerned with.
11 CHAIRMAN JACKSON: The second question by the CARB:
12 GM contends that the present experimental data are too
13 inclusive to predict whether 1980 California model vehicles
14 will show an additional fuel penalty or gain over 1977
15 California models.
16 Can you report on the fuel economy levels of your
17 1978 certification durabilty vehicles which use three-way
18 catalysts and how these results affect your above statement?
19 MR. NELSON: I appreciate the interest shown by
20 ARB. It's the first time to my knowledge they have ever
21 asked us for a fuel economy estimate. It's a new turn of
22 events.
23 We already made an estimate in our report that the
24 gain in fuel economy could be up to 20 percent, but based on
25 some other data, it could actually be down to no different
26 than where we are today. So, we don't have enough information
27 to make a precise evaluation of where it will end up.
28 CHAIRMAN JACKSON: Gain could be up to 20 percent?

1 MR. NELSON: Up to 20 percent.
2 MR. SCHWOCHERT: Penalty.
3 MR. NELSON: Oh, is it penalty?
4 MR. HANSON: On federal.
5 MR. NELSON: That's comparing it to the '77 federal.
6 MR. HELLMAN: A gain?
7 MR. NELSON: No. I said it backwards. It's a
8 penalty.
9 CHAIRMAN JACKSON: That's too bad.
10 MR. SCHWOCHERT: Mr. Jackson, we'd just as soon not
11 use the '78 durability data right now to make an estimate on
12 what the penalties or gains would be. We think that a better
13 estimate will be able to be made once the data cars are
14 certified, and they will have to comprehend the deterioration
15 factors that are going to be generated from the durability
16 cars. We think an appropriate evaluation can be made once
17 the data cars have been certified, which will be soon.
18 MR. GRAY: But at the present time you can't make
19 a judgment any more closely than a 20 percent range? Current
20 models that you say experience 11 percent fuel economy penalty
21 as compared to the '77 federal models, and the next statement
22 that was quoted then really refers to that statement in that
23 you are not sure whether you will get an improvement relative
24 to that current loss or have additional losses.
25 Can you not say that you think the '80 system
26 which you have mentioned should give you more fuel economy,
27 at least in a general context, won't be better than the
28 California 1977 vehicles? It seems to imply that the three-way

1 catalyst system in your best judgment may not give you an
2 improved fuel economy situation over your current 1977
3 California vehicles.
4 Is this a correct impression to leave the record
5 with?
6 MR. SCHWOCHERT: We are talking about different
7 emission standards in 1980 than we have in 1977, so with that
8 in mind, we don't feel confident that we can predict that the
9 average fuel economy in 1980 will be greater than 1977. We
10 don't feel that we can predict at this time where we will
11 stand relative to the present penalty range that we are
12 quoting when we refer to the 1977 federal vehicles.
13 MR. GRAY: Is that saying with the current '77
14 GM system on California passenger cars that experiences an
15 11 percent fuel economy penalty as compared to federal
16 vehicles may be your optimum system?
17 MR. SCHWOCHERT: For what year?
18 MR. GRAY: For 1980, as we were talking about.
19 MR. SCHWOCHERT: I don't think we are suggesting
20 that at all, Mr. Gray.
21 MR. GRAY: Well, let me put it a different way.
22 It seems like the answer is still nebulous, of sorts.
23 The only change from 1978 to 1980 in the passenger
24 car area is a change in the oxide of nitrogen standard from
25 1.5 to 1. For that change, you are going to introduce the
26 three-way catalyst, I think you said elsewhere in your
27 statement.
28 It was my impression that one of the main reasons

1 you were going to introduce that system wasn't to get the
2 extra gram of NO_x control because it's a more costly system
3 as compared to '77 systems.
4 I believe you also mentioned that the main reason
5 was to get a fuel economy gain as compared to the '77 systems.
6 So this seems almost to be inconsistent with that kind of
7 reasoning.
8 MR. HANSON: Let me try to answer your question,
9 Mr. Gray.
10 On average, the 1977 California vehicles suffer a
11 penalty of about 11 percent compared to comparable federal
12 vehicles, and our development fleet right now on three-way
13 catalyst systems comparing it to 1977 vehicles shows either
14 no change with three-way catalysts, meaning lower emission
15 levels, to a 20 percent penalty.
16 So if you try to project how that is going to turn
17 out in California in 1980, it could be a plus or a minus.
18 And I think it will be both ways. It will depend on the
19 particular model that you are talking about. I imagine some
20 models would have better fuel economy; some may have worse.
21 This is at the present state of the art.
22 MR. GRAY: What do you think the main advantage of
23 the three-way catalyst system is and why make the commitment
24 to change if you can meet one gram per mile without a three-
25 way catalyst system?
26 MR. SCHWOCHERT: I think that's your conclusion.
27 MR. GRAY: Can you --
28 MR. SCHWOCHERT: We didn't state that in our statement.

1 MR. GRAY: Let me ask you directly, then.

2 Can you meet a one-gram NO_x level without a three-way

3 catalyst?

4 MR. SCHWOCHERT: Right now, we think that the most

5 desirable system to meet this more stringent NO_x standard is

6 a three-way system.

7 Can we meet it? Perhaps we can meet it on some

8 engine families, but we think there are penalties associated

9 with meeting it. Larger engines and smaller vehicles is

10 a direction that we think one would have to go if you are

11 trying to meet a one-gram standard, meet it in all respects,

12 not just certify it at one gram per mile or slightly lower,

13 but meet it on an assembly line testing and Title 13 testing.

14 So our first choice system, if you will, to meet

15 the one-gram NO_x standard is a three-way catalyst system. We

16 think that's the principal reason for going to a three-way

17 catalyst in 1980 with a one-gram NO_x standard is because of

18 the exhaust emission standard change, not because of fuel

19 economy considerations, although that's certainly a benefit or

20 consideration that influences you. The primary reason is

21 the more stringent NO_x standard.

22 MR. HANSON: I don't think there is anything inherent

23 in a three-way system that ought to give you better fuel

24 economy. As a matter of fact, it has some inherent things

25 that should give you lower fuel economy. But I think at very

26 low emission standards, it will give you better fuel economy

27 than possibly some of the alternatives.

28 MR. HELLMAN: Let me try to discuss this issue.

1 Have you ever had a vehicle in 1977 certification,
2 for example, that when the DF was multiplied by the 4,000 mile
3 emission values, the resultswere less than the standards
4 proposed by California for 1980?
5 MR. SCHOWCHERT; Yes, we have. As you heard this
6 morning from the ARB testimony, they listed a group of
7 vehicles for various manufacturers that showed NO_x lower than
8 one gram per mile.
9 MR. HELLMAN: And CO less than nine and hydrocarbon
10 less than 0.41?
11 MR. SCHWOCHERT: They were California vehicles.
12 So, since the present standards are less than .41 and nine,
13 the answer would be yes.
14 MR. HELLMAN: So that there have been instances in
15 which your current systems have met those levels?
16 MR. SCHWOCHERT: That's right, for certification
17 purposes. We don't believe that the NO_x levels are in most
18 cases enough below the standard to give us confidence that
19 we could certify and produce and continue to meet all of the
20 assembly-line test requirements, the Title 13 test requirements,
21 and the end-use requirements with these vehicles.
22 Generally speaking, the NO_x levels are not suf-
23 ficiently below the standards.
24 MR. HELLMAN: How much below do they have to be?
25 MR. HANSON: Well, those vehicles that you are
26 quoting were designed to comply with a one and a half standard.
27 You can see some of these are drifting down to the below one.
28 I am sure that you will find others as high as 1.4. If you

1 look at the distribution of certification values, you may
2 get targeted at one standard, you may find some as low as
3 .4. I think this always happens in a certification program.
4 CHAIRMAN JACKSON: Does that mean that you would
5 not attempt to sell vehicles who are a half gram or less than
6 a half gram from the standard after you apply the deteriora-
7 tion factor?
8 MR. NELSON: I don't understand what you mean by
9 you wouldn't attempt to sell.
10 MR. HELLMAN: Let me see if I can clarify the
11 question.
12 You said that just because a vehicle's projected
13 emissions were less than the numerical value of 1.0, doesn't
14 mean you wouldn't go ahead and sell it because it might be
15 too low.
16 A minute later Mr. Hansen said that there were
17 vehicles certified, and I assume sold, at 1.4 NO_x.
18 So it seems on the one hand you are saying that
19 just because it's a little below the standard, doesn't mean
20 we can feel we are confident enough to go through Title 13 and
21 assembly-line testing, and on the other hand, there may very
22 well be vehicles that you are selling now that are certified
23 very, very close to the standard.
24 Do you think those statements are consistent?
25 MR. HANSON: I was using 1.4 as an example. What
26 we typically tried to do is not overcontrol or undercontrol
27 the vehicles. We want them to pass on assembly-line testing
28 and Title 13 testing. On the other hand, we don't want them

1 to be considerably below the standard either, because if they
2 are, they have been compromised in some way and paying a
3 penalty relative to the other vehicles they are competing
4 with.
5 MR. HELLMAN: Where is the design target set for a
6 given standard? One is the design target for 1.5?
7 MR. HANSON: I'd say for 1.5, after the deteriora-
8 tion factors are known, the design target would probably be
9 in the range of 1.1 to 1.2.
10 MR. HELLMAN: Is that after 50,000 miles?
11 MR. HANSON: No. After the deterioration factor is
12 known and assumes there is no NO_x deterioration. I think it
13 averages out to about zero.
14 MR. HELLMAN: So no cars would be sold by GM if it's
15 over 1.2 at the 1.5 standard?
16 MR. HANSON: No, I wouldn't say that. We would make
17 a judgment as to what percentage of the cars would be in com-
18 pliance and so on, but you can't --
19 MR. HELLMAN: So it's possible you could sell one
20 very close to standard?
21 MR. HANSON: It's possible we could, sure.
22 MR. HELLMAN: And, therefore, the arguments that you
23 use to indicate that California's selective picking of some
24 cars that just happened to be a little bit below one NO_x
25 wasn't any good, actually could be used?
26 MR. HANSON: No. I think the point I was trying to
27 make is that if you have a target -- Let's take a number, say
28 1.2, and you design all of your vehicles and all of your

1 combinations to achieve that target. By the time the actual
2 certification results get in, there will be quite a range of
3 those numbers because you just can't dial in exactly the
4 number that you anticipate.
5 So the certification values may fluctuate quite a
6 bit and may even be different than production values. These
7 are all values that we have to consider in our program.
8 MR. SCHWOCHERT: Dr. Hellman, I don't recall anyone
9 saying that the ARB data -- Challenging ARB's listing of the
10 vehicles, and you seem to suggest that somebody was challenging
11 the listing of vehicles.
12 MR. HELLMAN: No. If you remember Mr. Gray's
13 question, he asked if your current system could meet one NO_x.
14 I don't think he felt and I don't feel he got a direct
15 answer.
16 MR. SCHWOCHERT: We don't think that our current
17 systems in general are at a low enough level that we would
18 have confidence in certifying those systems at one gram
19 NO_x.
20 MR. HELLMAN: Certifying for the future?
21 MR. SCHWOCHERT: Yes.
22 MR. HELLMAN: But you did say it would be possible
23 that if a vehicle in certification would just squeak by, you
24 would think seriously about selling?
25 MR. PETERSEN: I don't think we said that. I think
26 the statement was made that we have other concerns besides
27 just certification, assembly-line testing and in-use com-
28 pliance and so on and so forth. I think you are putting words

1 in our mouths up there.

2 MR. HELLMAN: Maybe you can generate some words when

3 I ask you the question what the design targets are for a

4 given standard. You said 1.2 or 1.5 standard, assuming

5 DF was close to one. What about the standard for 1.0 NO_x?

6 MR. HANSON: Just making a judgment on what kind of

7 design target there would be for a certification standard for

8 1.0, I would say in the .6-.7 range.

9 MR. HELLMAN: Does that include DF?

10 MR. HANSON: No, of course not. It would have to

11 be adjusted if the DF was greater than one.

12 MR. HELLMAN: Well, what level does the car have to

13 be at 50,000 miles? That's my question.

14 MR. HANSON: Projected at 50,000 miles?

15 MR. HELLMAN: Yes.

16 MR. HANSON: To be certifiable, it has to be just

17 under standard, of course.

18 MR. HELLMAN: But I mean your design target for your

19 engineering.

20 MR. HANSON: .6 to .7.

21 MR. HELLMAN: At 50,000 miles?

22 MR. HANSON: Yes. This is because of the variability

23 that might be expected, both in certification and production.

24 MR. HELLMAN: Okay. So that if, therefore, the

25 vehicles that were below 1.0 but above .6 or .7 would be too

26 close to the standards for you to have high confidence that

27 you could certify?

28 MR. HANSON: Yes. It would be higher than the

1 design target.

2 MR. HELLMAN: I think there is a parallel issue
3 here in terms of the fuel economy range, that the fuel economy
4 could be better than, equal to, or worse than California as
5 an unknown area.

6 At the top of Page 2 of your statement, you mention
7 something about model availability, and you term it "Model-
8 Engine-Transmission-Carburetor Combinations." At the end of
9 the paragraph, you say, "It is too early to predict if the
10 California model availability will diminish even further in
11 1980."

12 Is there parallel here so that I can say it's too
13 early to predict that it will not be the same or greater than
14 or less than it is now?

15 MR. SCHWOCHERT: I think to some degree that will
16 depend upon where the federal standards are and what type of
17 systems will be used to meet the federal standards in 1980.

18 But if you want to assume that there will be similar
19 differences between federal and California standards in 1980
20 as presently exist, then I don't think there's any real
21 reason why we predict that the model availability will be
22 any greater in California in 1980. We would hope that we
23 can hold the same type of model availability situation in
24 1980 as presently exists in California.

25 MR. HELLMAN: Which has diminished from the federal?

26 MR. SCHWOCHERT: Which has diminished, yes.

27 MR. HELLMAN: You can make the prediction that the
28 model availability won't increase?

1 MR. SCHWOCHERT: If there is a continuing difference
2 in federal versus California standards, I think that's a fair
3 statement.
4 MR. GRAY: In a general sense, to be sure that we
5 haven't muddied the waters with respect to your testimony and
6 with the qualification known as MMT in particular, you don't
7 see any doubt that you will be able to certify for the changed
8 standards for passenger cars; is that correct?
9 MR. SCHWOCHERT: Right. Now, we would certainly
10 estimate that we will be able to certify some vehicles in
11 1980.
12 MR. GRAY: Let me change the question area to light
13 trucks and medium-duty vehicles. I'll try it from a broader
14 perspective first, and if I can satisfy the concerns, I won't
15 need to go into the specifics that you have mentioned in your
16 testimony.
17 On the one chart that you presented with your
18 testimony, you show a range for light-duty trucks representing
19 your current status of development efforts. Let me ask a
20 broader question: What's the best you can do with three-way
21 catalyst technology in this time frame?
22 MR. HANSON: As applied to light-duty trucks?
23 MR. GRAY: Yes.
24 MR. HANSON: Well, the data that you are looking at
25 here is with two-way catalyst technology. Are you suggesting
26 that we might improve the hydrocarbons by using three-way
27 catalyst technology?
28 MR. GRAY: I am asking what levels you can achieve

1 with the best technology you have available.

2 MR. HANSON: Okay. Three-way catalyst technology

3 has not been expanded to trucks yet. I would speculate that

4 we would have a tougher time with the hydrocarbons used in

5 a three-way catalyst as compared to a two-way catalyst.

6 As you know, there is some compromise in the three-

7 way catalyst for oxidation efficiency, and also the engine

8 hydrocarbons will probably be higher as a result of running

9 a fuel ratio of 14 and a half instead of 17. So, I would

10 anticipate that the hydrocarbon job would be tougher with a

11 three-way catalyst.

12 MR. GRAY: You can meet 1.5 grams per mile with the

13 current oxidation catalyst system on light-duty trucks and

14 medium-duty vehicles?

15 MR. HANSON: Certainly.

16 MR. GRAY: Okay.

17 MR. HANSON: The standard we are addressing here is

18 .5.

19 MR. GRAY: Not for NO_x.

20 MR. HANSON: Oh. This is hydrocarbon data that we

21 are talking about.

22 MR. GRAY: The question was -- You said you planned

23 to use only the current oxidation catalyst systems.

24 MR. HANSON: Yes.

25 MR. GRAY: Since in 1981 the standard for light-duty

26 trucks for NO_x is one and a half grams per mile, I'm saying that

27 means that you plan to use that system and achieve that level

28 of NO_x control.

1 MR. HANSON: Okay. I didn't realize you were talking
2 about 1981 and oxides of nitrogen.
3 In that event, I am sure we would consider three-way
4 catalyst technology on the trucks. We have no quarrel with
5 the 1979 oxides of nitrogen standard or CO. It's only the
6 hydrocarbons that we are having the problem with, and this is
7 what we are attempting to report right here.
8 MR. GRAY: I guess I am a bit confused. Can you
9 meet a 1.5 grams per mile NO_x standard?
10 MR. HANSON: In 1981?
11 MR. GRAY: In 1981.
12 MR. HANSON: I'd have to say we probably will, yes.
13 MR. GRAY: With the current system you are working
14 with?
15 MR. HANSON: We are meeting two with it now. I
16 think it may have capability of getting to one and a half.
17 MR. GRAY: So you do not have any plans to initiate
18 a program in light-duty and medium-duty trucks to apply three-
19 way catalyst technology?
20 MR. HANSON: We have no plans at this time. As you
21 know, we are trying to develop this technology on passenger
22 cars and introduce it on passenger cars, we certainly would
23 address that subject sometime in the future as to whether or
24 not this technology ought to be applied on trucks or not.
25 MR. GRAY: Okay. Then from your perspective, the
26 hydrocarbon control is the limiting factor that you are
27 dealing with now?
28 MR. HANSON: At this point in time, this is the one

1 we are having the problem with, yes.

2 MR. GRAY: And what are the lowest levels that you

3 feel you could achieve by 1979 on light-duty trucks and

4 medium-duty vehicles?

5 MR. HANSON: Hydrocarbon?

6 MR. GRAY: Yes.

7 MR. HANSON: Well, as you can see by the bar here,

8 our best effort, the range seems to be right around the

9 standard, .5. We show what our target is there. It's a

10 level of about .32, and I'd say that job would be finished

11 when that bar would surround that target.

12 Now we have some more time to continue to develop

13 these. As I mentioned, I feel confident that that one

14 particular engine/transmission combination will achieve a

15 certifiable level eventually. The other three are more

16 difficult, as you can see.

17 MR. GRAY: What's your projection of the best that

18 you can achieve with a manual 350 cubic inch displacement

19 engine system?

20 MR. HANSON: I don't know. It's difficult to try to

21 project that. The way I see it right now, we would have

22 trouble getting it far enough below the standard to consider

23 it certifiable. Manual transmission V-8.

24 MR. GRAY: Right, but I am just asking for your

25 best judgment based upon your experience, since 1979 is

26 increasingly near. What's the level you think you can

27 achieve with your technology? I assume you've got some feel

28 for it. You have been looking at it.

MR. HANSON: I think it may get down close to the standard. But as I mentioned we have to be better than the standard to have confidence in our ability to certify them and produce them to the standard.

MR. GRAY: Let me ask you, if that's a specific answer, do you feel that within this time frame that for these two-engine families and transmissions combinations that you feel reasonably confident that you can reach about the standard; it's just you are not comfortable that you can get sufficiently below it?

MR. HANSON: Yes, I'd say that's true.

I kind of base that on, too -- When you asked about the manual transmission -- even for the 1977 model year we have some V-8 light-duty trucks with a manual transmission that's not available in California because of emission reasons. The manual is currently available in lower inertia weight vehicles.

MR. GRAY: I understand.

MR. HANSON: We cancelled the higher inertia weight vehicles.

MR. GRAY: Okay. Now I want to add another dimension to the question. What percent of the hydrocarbons will be methane at these levels with those systems?

MR. HANSON: What percentage of hydrocarbons will be methane?

MR. GRAY: Yes, at the .5 hydrocarbon level.

MR. HANSON: Well, I don't know. I would guess that it would be around ten percent or so.

1 MR. GRAY: Ten percent methane at a .5 gram per
2 mile hydrocarbon level with an oxidation catalyst?
3 MR. HANSON: I would guess possibly 15. We have
4 recently applied for a methane adjustment factor for our
5 trucks, and we applied for a factor of .91.
6 MR. GRAY: What is it for passenger cars?
7 MR. HANSON: .82, as I recall. .81.
8 MR. GRAY: Why do you think they are different?
9 The same systems; aren't they?
10 MR. HANSON: Yes.
11 MR. GRAY: Isn't it because -- I mean could it be
12 because the current light-duty truck standards are higher
13 than the passenger car standards?
14 MR. HANSON: Yes, that may have something to do with
15 it. Also, the levels achievable might be slightly different,
16 too. I am sure that you know that a lot of these passenger
17 cars are running in the .2 to .4 gram per mile range on
18 hydrocarbons. I doubt if we can get these trucks down that
19 low.
20 MR. GRAY: At least the data that I am aware of
21 from General Motors and other manufacturers of these systems
22 show at these levels a very high percent methane, more like
23 at least the 19 percent that you mentioned for your light-duty
24 vehicles.
25 MR. HANSON: These systems that you are referring to
26 are the systems that are currently in production out here,
27 and we have just applied for a .91 factor.
28 MR. GRAY: At the .41 grams per mile level?

1 MR. HANSON: No, that's at a .9 grams per mile.
2 MR. GRAY: I know. That's why I wanted to direct
3 the question at a .5, because it has a great impact on the
4 percent methane from all the data that we've seen, a lot of
5 which is GM data.
6 MR. HANSON: Okay. I guess the best answer I can
7 give to your question is that I would expect it to be somewhere
8 between .81 and .91 adjustment.
9 MR. GRAY: Don't you think that that would give you
10 sufficient margin if you can get .5 grams per mile total
11 hydrocarbons?
12 MR. HANSON: It would help, yes. I doubt if that
13 margin will be sufficient.
14 MR. GRAY: Twenty percent margin, you don't feel
15 that's sufficient, 19, 18?
16 MR. HANSON: No, I wouldn't say so, not if --
17 MR. GRAY: You wouldn't introduce a vehicle in
18 California that had 19 percent --
19 MR. PETERSEN: Mr. Gray, will you give Mr. Hanson an
20 opportunity to answer your questions? They are coming so
21 fast that I don't think he's really getting an opportunity --
22 MR. GRAY: I'd be glad to give full opportunity for
23 a very specific answer, yes.
24 MR. HANSON: I guess I can't tell you exactly what
25 this design target has to be, and it depends quite a bit on
26 the distribution of emissions that you are going to get. We
27 tried to show the distributions that we are getting currently
28 by giving you a range, and I guess I wouldn't feel comfortable

1 until the top of that block was at least below that standard.
2 In answer to your question about methane, yes, it
3 is going to help.
4 MR. GRAY: You are saying with all these things
5 together you don't know what you are going to be able to do
6 in 1979 for the California market?
7 MR. HANSON: I think I already answered that
8 question. I said at this point in time, I would predict that
9 we will have one engine/one transmission combination that
10 will be certifiable. It depends on what we learn over the
11 next several months whether these other three will be or not.
12 MR. GRAY: Well, I thought I had gotten answers in
13 your discussion here that you felt reasonably confident you
14 could get the other systems to a .5 gram per mile level, and
15 with the methane adjustment factor that would bring you to
16 15 to 20 percent below that level. I'm just asking for your
17 technical judgment. Isn't that sufficient to give you
18 confidence that you could sell those vehicles in California?
19 MR. HANSON: No, I don't think 20 percent would be
20 adequate.
21 MR. GRAY: With a 20 percent margin, you would not
22 plan on introducing those vehicles?
23 MR. HANSON: I don't think that would assure me I
24 would certify them. In other words, you are saying that if
25 I could average .5, the adjustment, if it were as high as
26 20 percent, would allow me to average .4. You have to do a
27 little better than average. Every certification vehicle
28 has to pass. Ninety percent of the assembly-line vehicles

1 have to pass.

2 MR. GRAY: What makes your vehicles different from

3 Ford systems? Do you think there are any basic differences?

4 MR. HANSON: No, I don't think so.

5 MR. PETERSEN: I'm not sure we are qualified to

6 answer that question, Mr. Gray.

7 MR. GRAY: I think that your technical people

8 probably have a pretty good feel for the basics of the Ford

9 emission control system from the literature.

10 MR. PETERSEN: I think that's an assumption, and I

11 think that emission control development technology is replete

12 with trade secret information and restrictions and --

13 MR. GRAY: Mr. Petersen, if your technical people

14 would care to give that answer, I think we would be glad to

15 hear it. I would just be surprised if the technical experts

16 you bring with you weren't familiar with the other manu-

17 facturers' basic emission control systems to the extent they

18 would know the general differences. Certainly, there are

19 different calibration concerns, but you can't say you can't

20 even address that question.

21 MR. PETERSEN: Are you talking about future emission

22 control hardware, Mr. Gray?

23 MR. GRAY: I am talking about the technology

24 required to meet these standards, the basic systems.

25 MR. PETERSEN: I can assure you that we are not

26 knowledgeable of Ford Motor Company's future emission control

27 hardware, and I would certainly hope that they are not

28 knowledgeable of our future emission control hardware.

1 CHAIRMAN JACKSON: Your point's noted.
2 MR. GRAY: My only problem is: are you
3 knowledgeable of your own? From what we have been hearing
4 today --
5 MR. SCHWOCHERT: I think, Mr. Gray, as far as I am
6 concerned, the important thing that we can do is we can
7 submit the information we have from our development to you and
8 you ask other manufacturers to submit their information and --
9 MR. GRAY: I guess the perplexity of this is that,
10 you know, at least from what we can see on the face of it,
11 is that the system that GM would use and the other manu-
12 facturers would use would be basically the same. That makes
13 sense with respect to the optimum control strategy. On the
14 one hand to see one manufacturer not having the same types of
15 problems that General Motors is having, at least raises some
16 concern as to why. And that's the reason for the probing
17 here.
18 MR. HANSON: I don't know as we are having different
19 types of problems. You didn't really have a technical dis-
20 cussion with Ford, but you are having one with us now. I
21 think that --
22 MR. GRAY: Well, certainly -- I mean Ford said that
23 if MMT was not in the certification fuel they could certify
24 at least at these levels the light-duty trucks and medium-
25 duty vehicles.
26 GM claims that at this point they only feel
27 reasonably confident that they could introduce one engine
28 family with one transmission.

1 MR. HANSON: Mr. Gray, I read in the Ford statement
2 that that was qualified. They said there was potentially some
3 loss in fuel economy and model availability. I'm not saying
4 anything different than that.
5 MR. GRAY: I think we had a very direct answer to
6 that during the question period, and that terminated the
7 questioning.
8 MR. HANSON: I think I am saying the same thing.
9 Model availability is certainly a concern here.
10 MR. GRAY: But you have only said specifically that
11 you can offer reasonable confidence that there will be one
12 engine family and one transmission for sale in California.
13 MR. HANSON: I have reasonable confidence I will
14 certify that one. How many more I will certify I don't have
15 reasonable confidence. Maybe you misunderstood. I didn't
16 say I had reasonable confidence there would only be one. I
17 said I had reasonable confidence that I would have this one.
18 MR. GRAY: Okay. I guess I am. I don't really
19 see the significance of the difference there, but I'll accept
20 it anyway.
21 CHAIRMAN JACKSON: I have a question from the CARB.
22 Is it correct to conclude from Mr. Schwochert's
23 earlier testimony model availability -- that is, model
24 availability in California in 1980 -- will depend on the level
25 of federal standards, that the model availability in
26 California is at least to some extent a function of marketing
27 decisions as opposed to technological feasibility?
28 MR. SCHWOCHERT: Certainly, Mr. Jackson, other

1 considerations besides emission standards themselves enter into
2 the decision regarding what models will be offered for
3 California. Emission standards is one of the considerations.
4 CHAIRMAN JACKSON: So we can assume, then, that your
5 answer is in the affirmative, that marketing decisions do
6 indeed affect model availability?
7 MR. SCHWOCHERT: That's certainly one of the factors.
8 MR. HELLMAN: With respect to the differences in
9 emission control technology that might be used in the future,
10 the catalysts that you ran on these trucks, were they of
11 the pelleted underfloor oxidation catalyst-type that is
12 commonly used on many GM cars?
13 MR. HANSON: Yes, it is exactly the same catalyst.
14 MR. HELLMAN: It's 260 cubic inch catalyst?
15 MR. HANSON: Yes.
16 MR. HELLMAN: Do you know what kind of loading that
17 catalyst has?
18 MR. HANSON: It's the same as the passenger car. I
19 think it's a five-to-two ratio.
20 MR. HELLMAN: Same kind as the passenger cars?
21 MR. HANSON: Yes.
22 MR. SCHWOCHERT: Yes.
23 MR. HELLMAN: Other manufacturers use other kinds
24 of catalysts. Do you know what a monolithic catalyst is?
25 MR. HANSON: What was your question?
26 MR. HELLMAN: Do you know what a monolithic catalyst
27 is?
28 MR. HANSON: Yes. We have one in production in

1 California.

2 MR. HELLMAN: On a truck?

3 MR. HANSON: No. It's on a passenger car.

4 MR. HELLMAN: Is there any difference in the way

5 that this type of catalyst works on the emission tests?

6 MR. HANSON: This particular catalyst I am referring

7 to was introduced as an experiment. It's a dual catalyst

8 system. We use a monolith close coupled to the engine and

9 the reconverter underflooring.

10 One thing that we had noticed about that type of

11 system, it has substantially higher deterioration than just

12 the underfloor only. It does achieve lower levels, but

13 projected to 50,000 miles the levels are about the same.

14 MR. HELLMAN: In terms of considering only a single

15 catalyst on a vehicle, does a monolithic catalyst warm up

16 faster than a pellet in your opinion?

17 MR. HANSON: If they were both located at the

18 same distance from the exhaust manifold, I would say that it

19 would, yes.

20 MR. HELLMAN: Is the cold start portion of the

21 test a very significant part of overall emission results you

22 get?

23 MR. HANSON: I think it is in some vehicles. It

24 varies as to how big a problem it is. There are various

25 solutions for that problem.

26 MR. HELLMAN: So would you project any emission

27 control improvements to your trucks for 1979 if you used the

28 monolithic catalyst versus a pellet?

1 MR. HANSON: I couldn't project that at this point
2 in time. We do have programs comparing monolith and
3 pellet catalysts. We are trying to sort out the differences,
4 the advantages and disadvantages.
5 MR. HELLMAN: Could you introduce such a catalyst
6 which might be a big change from your current approach for
7 '79 on trucks?
8 MR. HANSON: I really can't answer your question.
9 If we got it from an outside supplier, it's a possibility.
10 The one that we are using on passenger cars is not large
11 enough, I know that.
12 MR. HELLMAN: Thank you.
13 MR. GRAY: I have one last clarification, I guess,
14 question on light-duty trucks and medium-duty vehicles.
15 You made the statement on numerous occasions
16 GM has testified to both EPA and ARB that we do not support
17 the concept of light-duty and medium-duty trucks can or should
18 be regulated to the same emission levels as passenger cars.
19 And I'm not really sure the point that you were trying to
20 make there for these trucks. The levels aren't the same,
21 and in fact the ARB stated specifically that their objective
22 was not to impose the same standards but to simply ensure
23 that the same types of technology were introduced in these
24 vehicles so that the amount of emission control that's
25 available with that kind of technology would be forthcoming
26 from that type of vehicle.
27 So, is there something behind this statement that's
28 not apparent to us?

1 MR. NELSON: Mr. Gray, I am a little bit confused
2 by the question, because we think that the truck has a
3 tendency for higher emissions than the passenger car. If
4 you put the same control system on the truck as you do on
5 the car, it won't necessarily give you the same answer. In
6 fact, it probably won't.
7 We have an illustration in here that illustrates in
8 one case we take a comparable engine in both a truck and a
9 car and we find an appreciable difference, as we pointed out
10 in the statement, in the hydrocarbon emission characteristics.
11 MR. GRAY: I think that's the whole point that the
12 ARB was making, that they do have different levels of the
13 standards based upon inertia weight and that in their best
14 judgment from the data available to them at least it was
15 their argument that those different levels corresponded to
16 the adjustments that would be appropriate because of those
17 differences that you pointed out in your testimony. If it's
18 an issue that those adjustments are not technically
19 appropriate, I think technical information presented by GM
20 could have constructively been used in that regard. But if
21 there is a basic opposition from GM for the utilization of
22 that type of technology on light-duty trucks, then that's
23 a matter beyond the technological feasibility issue.
24 I'm hoping to get a simple answer as to the purpose
25 of that statement in your testimony.
26 MR. HANSON: Mr. Gray, we agree completely with what
27 the ARB is trying to do. We tried to work with them on this
28 particular matter. Historically, we have always used the

1 same emission control hardware on the trucks as the cars.
2 We think that's very cost beneficial.
3 I guess what we are saying is that we liked the
4 way they adjusted the adjustments for oxides of nitrogen.
5 Even though they didn't make an adjustment for CO, we agree
6 with it technically that it's achievable, and I guess what we
7 are talking about is that the relationship between cars and
8 trucks as far as hydrocarbons are concerned may not be the
9 correct relationship.
10 MR. GRAY: But you can't offer any additional
11 information as to what relationship would be more technically
12 correct?
13 MR. HANSON: No, we can't, and we thought about how
14 we might gather that information. It may be possible to find
15 some. We just used the assembly-line test data through
16 March 31st as an example. That is one source of information
17 that's available in large volume.
18 MR. GRAY: I guess those data are available, but
19 those were to different levels as I recall, and it becomes
20 at least uncertain as to how directly you can apply such
21 information. It's information you can consider, definitely.
22 MR. HANSON: Yes.
23 MR. GRAY: But the applicability is not, I don't
24 think, straightforward.
25 MR. HANSON: That's true. We recognize those
26 problems, but we were trying to keep as many things constant
27 as possible. We are talking about the same engine, the same
28 transmission, the same emission control systems, and a large

1 volume sample of cars and trucks.

2 MR. GRAY: There seems to be two extremes here,

3 one a level that the ARB made as a judgment as to what, from

4 the data they had available, was the most appropriate adjust-

5 ment factor, and then the other extreme which I think in your

6 testimony you qualified in that context about .8-.5.

7 MR. HANSON: We said we weren't recommending that

8 standard, but that was another one you could arrive at from

9 using data like this.

10 MR. GRAY: Do you think the adjustment is somewhere

11 between .5 and .8 --

12 MR. HANSON: Yes, I do.

13 MR. GRAY: -- or do you very well think it could be

14 .5 or .45 or --

15 MR. HANSON: No. I think the proper adjustment is

16 somewhere in that range, and I think the ARB probably recog-

17 nizes that. They have a standard of .9 for 6,000 pounds

18 GVW and up and a standard of .5 for 6,000 down. Eventually,

19 all the trucks get to .5. For a comparable standard on

20 passenger cars, it is .41.

21 I guess what we are saying is there are reasons why

22 trucks have emission characteristics. There are reasons why

23 they are different than cars, and these reasons are probably

24 going to expand in the future. Cars will be down sized.

25 Trucks will not be down sized to any appreciable extent.

26 MR. HELLMAN: Aside from weight, I think on Page 3

27 of your statement on trucks you indicated that dynamometer

28 horsepower setting is higher and the transmission and axle

1 ratios were higher --
2 MR. HANSON: Yes.
3 MR. HELLMAN: -- and that a high percentage of
4 trucks incorporate manual transmissions.
5 MR. HANSON: Yes.
6 MR. HELLMAN: Do a high percentage of trucks
7 incorporate manual transmissions because of their utility?
8 I think you called it vocational use.
9 MR. HANSON: Yes. I have a figure I got from our
10 Marketing Department. It's for all classes of trucks. Thirty-
11 four percent are manual transmissions. I'm sure that's a ratio
12 considerably higher than passenger cars.
13 MR. HELLMAN: And because of the vocational nature?
14 MR. HANSON: That's for the job they have to do,
15 yes.
16 MR. HELLMAN: Could you explain why?
17 MR. HANSON: One reason is for gradability purposes.
18 MR. HELLMAN: An automatic transmission will not
19 provide the same gradability as a manual will?
20 MR. HANSON: I think it can be made to, but
21 generally manual transmissions and trucks tend to have more
22 forward gears.
23 MR. HELLMAN: Yes?
24 MR. HANSON: Fuel economy is important to truck
25 operations. A lot of trucks are operated by fleets. Manual
26 transmissions do get better fuel economy.
27 MR. HELLMAN: When calibrated to the same emission
28 level?

1 MR. HANSON: Yes. That's our experience today.
2 MR. HELLMAN: The need for an automatic -- the need
3 for a manual transmission in a truck, if an automatic trans-
4 mission which may have some advantages for emission control
5 could be used, it would only seem to make the reason to use it
6 based on fuel economy and not necessarily on emissions; isn't
7 that right?
8 MR. HANSON: I'm not sure I understand your question.
9 The 34 percent figure I am quoting to you is based
10 on marketing information. Both manual and automatics are
11 offered. Thirty-four percent by manuals for all classes of
12 trucks.
13 MR. HELLMAN: I guess I am asking a question which is
14 different from a consumer preference question or consumer
15 sales question.
16 You indicated on your chart that the manual trans-
17 mission vehicles appeared to have a tougher time meeting the
18 emission standards; is that correct?
19 MR. HANSON: From a hydrocarbon standpoint, yes.
20 MR. HELLMAN: From a hydrocarbon standpoint, which
21 you indicated was your basic single problem?
22 MR. HANSON: Yes.
23 MR. HELLMAN: What I am trying to get at, is there a
24 real reason because of a truck's utility or its need for them
25 to have a manual transmission? You indicated that you thought
26 an automatic transmission could give you the same gradability
27 as a manual, so you don't really need it in terms of meeting
28 emission standards?

1 MR. HANSON: In other words, we don't need a manual
2 transmission for meeting emission standards. No. I'll
3 agree.
4 MR. HELLMAN: The other one is drive ratio, or
5 overall N/V?
6 MR. HANSON: Yes.
7 MR. HELLMAN: Why is that higher on a truck than
8 on a car?
9 MR. HANSON: Primarily for the reasons of gradability,
10 the truck has to operate to a certain GVW which is generally
11 higher than a car, all of our trucks are designed for offroad
12 operation at full rated load.
13 MR. HELLMAN: And that is because you want a lot of
14 torque at low speed; is that it?
15 MR. HANSON: Torque multiplication, yes.
16 MR. HELLMAN: Doesn't an automatic transmission
17 torque converter do that?
18 MR. HANSON: Yes, but not to the same degree that a
19 manual does.
20 MR. HELLMAN: The current ones don't do it to the
21 same degree that some current, say, four-speed manuals do?
22 MR. HANSON: Uh-huh (affirmative).
23 MR. HELLMAN: But it's not impossible that advanced
24 transmissions such as might even be in development that might
25 have more gears --
26 MR. HANSON: More torque multiplication?
27 MR. HELLMAN: -- might do the same?
28 MR. HANSON: I think in the extreme case you are

1 talking about an awful lot. Our manual four-speed trans-
2 missions, for instance, have first gear ratios up in the range
3 of five- and six-to-one. With an axle, it might be another
4 three and a half or four. That's a lot of multiplication.
5 MR. HELLMAN: Do you shift gears on the emission
6 test if the first gear ratio is five-to-one?
7 MR. HANSON: No, we don't. We drive it in the
8 upper three gears. We have a problem with that. That is
9 tougher to certify than a manual three speed because of the
10 gear spacing.
11 MR. HELLMAN: The ratio of the ratio, so to speak?
12 MR. HANSON: Yes, the ratios that are left after you
13 take the first gear out of the four-speed manual truck
14 transmission. That's one of the reasons why we don't offer
15 a four-speed in light-duty trucks in California, whereas we
16 do federally.
17 MR. GRAY: I was going to introduce this question by
18 saying I think it's a pretty straightforward question, but
19 I'll hold off on that. It does relate to the adjustability
20 issue.
21 On the first page of your testimony, third paragraph,
22 you make the statement, "Our interpretation of the requirement
23 set forth in this section" -- referring to California
24 regulations -- "is that if the adjustment mechanism were
25 hidden from view such as would occur if the idle mixture screw
26 were located in a counterbore in the throttle body and the
27 cavity were covered with a metal plug or" -- and I want to
28 come back to the word "or" in a minute -- "if the carburetor

1 had to be removed from the vehicle to provide access to the
2 idle mixture mechanism, then the California regulation will be
3 met."
4 Is it your interpretation that the California
5 regulation would be met if the adjustment can be made when
6 the carburetor is on the vehicle, or should that "or" be
7 "and"?
8 MR. SCHWOCHERT: The California procedure, the
9 1980 and subsequent model year certification procedure,
10 Section 5e(i) says, "The mixture adjustment mechanism is
11 not visible, even with the air cleaner removed."
12 That would seem to suggest that if you can't see
13 the mixture adjustment screw that that satisfies that
14 requirement. So that would be the first condition we are
15 talking about.
16 And the second condition is related to the
17 difficulty of making the adjustment. If you have to take
18 it off the car, that's certainly -- as we heard this morning,
19 I think that satisfies the ARB requirement, if the carburetor
20 had to be removed from the car to do whatever you had to do to
21 make the mixture adjustable.
22 MR. GRAY: Let me ask it a different way, maybe
23 more specifically.
24 Do you expect the carburetors that you have made
25 commitments to introduce for most GM carburetors in the
26 1979 model year to require removal of those carburetors
27 before they can be adjusted?
28 MR. SCHWOCHERT: We haven't committed a specific

1 design for model years beyond what we have introduced this
2 year, and we are looking at designs that range from a plug
3 like is on the present 1977 model years that perhaps can be
4 removed without removing the carburetor, to some type of
5 cap or covering that we think would definitely require removal
6 of the carburetor.
7 So we are looking at a range of designs. Our
8 objective would, I think, be headed toward making or coming
9 up with a design that would require removal. So, we are
10 looking at a range of possible --
11 MR. GRAY: Within that range, though, you do plan to
12 require that carburetor be removed before it can be adjusted?
13 That's a criterion that you have in your choice of the means
14 of complying with this regulation?
15 MR. SCHWOCHERT: That's right. In our judgment at
16 least, it would require removal of the carburetor to make
17 that adjustment. You can be fairly destructive, perhaps,
18 and access the idle adjustment screw. But in our judgment,
19 we are looking at ranges that would cover that possibility or
20 that consideration of removing the carburetor.
21 CHAIRMAN JACKSON: I have a final question, I
22 believe.
23 I have been intrigued by the statement that Mr.
24 Hanson made about the GM plans not to down size trucks. Is
25 that firm? In other words, you don't think fuel economy
26 considerations will cause you to down size trucks?
27 MR. HANSON: Since trucks are performing a little
28 different job than passenger cars, they are designed to haul

1 bulky cargo and/or heavy loads, and that is their primary
2 purpose. We don't see that down sizing a good alternative.
3 Should the market indicate to us that it is, I am certain we
4 would consider it.
5 CHAIRMAN JACKSON: How about the fuel economy
6 standards?
7 MR. HANSON: It will be met with whatever it takes.
8 I guess what I am referring to is we currently offer a down
9 size model truck. There is a growth trend in trucks right
10 now in every segment of the business except in mini trucks.
11 If there was an indication there was a real need for that
12 type of trucks, perhaps we would consider a new smaller truck
13 than we have right now.
14 The small truck I was referring to that we offer is
15 an imported model.
16 CHAIRMAN JACKSON: Yes. I am familiar with it.
17 MR. GRAY: Could you address that from the context
18 of not compromising the capacity aspect, the GVW for example,
19 the cargo volume aspect of the vehicle, say more specifically
20 reducing the frontal area of the vehicle? In particular,
21 for pickups I think a large portion of that frontal area is
22 due just to the way you package your occupant, the hat
23 clearance room, and the way the person sits as compared to an
24 automobile for example.
25 MR. HANSON: What are you suggesting, we package it
26 for a smaller person?
27 MR. GRAY: No. Without a ten-gallon hat. No, I
28 am not suggesting anything here. I am asking.

1 You had mentioned the significant impact of frontal
2 area road load on NO_x emissions in particular and also con-
3 sidering the influence of frontal area on fuel economy, and
4 since a reduction in the frontal area in particular of pickup
5 trucks would not necessarily compromise the utility of that
6 vehicle, I would just like you to address why that wouldn't be
7 a very real consideration in your plan.
8 MR. HANSON: In other words, what you are saying is
9 to make the seats shorter and bring the top of the cab down?
10 MR. GRAY: That would be a very straightforward way
11 of reducing frontal area.
12 MR. HANSON: Yes, I think that might get considered
13 in a new vehicle design program. Certainly, we would be
14 considering changes that would either reduce the frontal area
15 or make it more aerodynamically efficient than it is now.
16 It does take a new vehicle program, as you might
17 well realize.
18 MR. GRAY: So that is a consideration in terms of
19 that aspect of down sizing? That's very real in GM's mind?
20 MR. HANSON: Smaller frontal area is as long as it
21 doesn't interfere with the cargo area that the truck is designed
22 to carry, yes, I think that's a possiblity.
23 CHAIRMAN JACKSON: Thank you, Mr. Nelson.
24 MR. PETERSEN: Mr. Jackson, we have a couple more
25 minor points.
26 This morning in response to some questioning from
27 Mr. Hellman, I believe regarding hydrocarbon spiking with
28 manual transmission vehicles, Mr. Austin stated that Volvo has

1 a 1977 vehicle which meets the statutory standards and it's
2 equipped with a manual transmission.
3 Did I understand that correctly?
4 CHAIRMAN JACKSON: You have to ask him.
5 MR. PETERSEN: Is that correct?
6 MR. AUSTIN: Yes.
7 MR. PETERSEN: It's common knowledge that California
8 owns ten of these vehicles, and we assume that the CARB has
9 performed a number of emission tests on these vehicles.
10 If the hearing officer agrees, we believe it might
11 be appropriate to have CARB submit for the record all data
12 derived from the testing of these vehicles in order to support
13 the implied contention that hydrocarbon control with -- or
14 the manual transmission per se was not a problem in hydrocarbon
15 control.
16 CHAIRMAN JACKSON: Would that in your mind satisfy
17 the question?
18 MR. PETERSEN: Well, I don't think it would satisfy
19 the question, but it would certainly shed some light on the
20 question.
21 MR. AUSTIN: Mr. Jackson, the State of California
22 does not own any manual transmission Volvos. All our Volvos
23 are automatic transmission vehicles.
24 MR. PETERSEN: Has the State of California emission
25 tested any manual transmission Volvos?
26 MR. AUSTIN: No.
27 MR. PETERSEN: The second item Mr. Austin agreed to
28 provide a report on rhodium availability for the record. I

1 think he qualified that with if the manufacturers make an
2 issue of that.
3 We are certainly not making an issue of that.
4 However, we believe that such a report is appropriate, in
5 that it is relevant to supporting the CARB's contentions that
6 future standards they have adopted are technologically
7 feasible. We would respectfully request the hearing officer
8 to request California to submit this report for the record.
9 CHAIRMAN JACKSON: Are you arguing that there isn't
10 any rhodium problem?
11 MR. PETERSEN: No. I stated we are not raising that
12 issue. However, we think it is relevant to the issue of
13 technological feasibility and relevant to the hearing record.
14 CHAIRMAN JACKSON: But you are not contending that
15 it's a problem?
16 MR. PETERSEN: We are not contending that it is a
17 problem.
18 CHAIRMAN JACKSON: What else are you not contending
19 that is a problem you think we ought to consider?
20 MR. PETERSEN: I've got several more --
21 CHAIRMAN JACKSON: Get the point?
22 MR. PETERSEN: I've got several more things.
23 Lastly, there is some question regarding a hydro-
24 carbon standard which is the subject of this waiver for
25 1980 and subsequent model years. It is my understanding that
26 the regulation adopted by California, which is the subject of
27 this discussion, specifies a .41 gram per mile hydrocarbon
28 exhaust emission standard and that the EPA notice in the

1 Federal Register was based on the regulation adopted by
2 California.
3 If California has failed to reflect their true
4 intent in the adoption of the regulation specifying .41 grams
5 per mile, then they should be directed to amend this regula-
6 tion and request another waiver. Only then can proper notice,
7 meeting the requirements of due process, be given and
8 interested parties be accorded the right to respond accord-
9 ingly.
10 I might add that EPA cannot grant a waiver for a
11 standard which California has not adopted. Therefore, if
12 the purpose of this hearing is to consider a .39 per gram
13 (sic) hydrocarbon standard, then it is out of order since
14 no such standard has yet been adopted by the State of
15 California.
16 CHAIRMAN JACKSON: You wouldn't accept a clarifica-
17 tion offered by Mr. Austin with regard to that matter?
18 MR. PETERSEN: Yes, I think we are objecting to
19 that.
20 CHAIRMAN JACKSON: Excuse me?
21 MR. PETERSEN: I think we are objecting to --
22 CHAIRMAN JACKSON: You mean object because he did
23 it?
24 MR. PETERSEN: The eleventh hour clarification for
25 the record on a standard which has not been adopted, I think,
26 is objectionable, yes.
27 CHAIRMAN JACKSON: I think he didn't say that it
28 had been adopted. He said it was an error of some sort

1 resulting in not being accurately reflected in the corres-
2 pondence. And you are not accepting that as a matter of
3 fact, that it was an error? I am certain that you are not
4 contending that you were not on notice that this matter would
5 be before us at this proceeding.
6 MR. PETERSEN: We are not contending that General
7 Motors was not on notice. However, we think that the pro-
8 cedures which have been followed here violate fundamental
9 principles of fairness in regard to due process. I certainly
10 have no way of knowing how many other interested parties were
11 misled.
12 CHAIRMAN JACKSON: You are suggesting that you are
13 unwilling to accept a clarification offered by Mr. Austin,
14 that you do not believe what he is saying. Is that what you
15 are saying to me?
16 MR. PETERSEN: It is our understanding that the
17 hydrocarbon standard which was adopted by the Board was a
18 .41 per gram (sic) hydrocarbon standard. Is that incorrect?
19 Gram per mile, I am sorry.
20 MR. AUSTIN: We currently have a waiver for a
21 .41 gram per mile total hydrocarbon standard. It was our
22 intention to adopt a standard for 1980 that was the equivalent
23 of a .41 gram per mile total hydrocarbon standard, but on a
24 non-methane basis.
25 Due to an error in drafting, it appeared in the
26 regulations as a .41 gram per mile non-methane hydrocarbon
27 standard. That would have constituted a relaxation from the
28 standard for which we already have a waiver. We did not

1 intend to relax the standard. We intended for it to be the
2 non-methane equivalent of .41 total.
3 Perhaps the hearing officer should ask General
4 Motors if they would object to merely having our present
5 waiver for a .41 total hydrocarbon standard continued into
6 1980, or perhaps if GM feels they are being prejudiced in any
7 way by the clarification that we are offering at this
8 hearing.
9 MR. NELSON: Mr. Jackson, I'd like to comment.
10 One of the problems we have had is trying to make
11 an evaluation of the effect of the change, and until we have
12 an opportunity to make that evaluation, I don't think it's
13 appropriate to make a change in the standards.
14 At first glance at least, it appears that the
15 diesel hydrocarbon standard would be changed without any
16 compensation necessarily due to the hydrocarbon correction.
17 On the surface, it appears as though the correction process
18 that was described this morning by Mr. Austin is totally
19 acceptable. But we haven't had a chance to evaluate in a
20 thorough fashion the implications that such a change may
21 have. It's affecting more, as I see it, than just the
22 hydrocarbon standard on gasoline vehicles. It may affect
23 diesel technology also, because it does change the standard.
24 It isn't a big change, I admit that. I think the adjustment
25 appears to be correct, but we haven't had an opportunity to
26 review that thoroughly and present our comments. So it
27 seems like the cart came before the horse.
28 CHAIRMAN JACKSON: Well, then, it's not to say that

1 you weren't on notice and that you do accept the statements
2 that Mr. Austin has made as fact, and that what you are
3 saying is that you need more time to evaluate the appropriate
4 response for consideration?
5 MR. NELSON: It's very possible that if we had more
6 time that we would say it's a fine idea and go ahead and do
7 it, but we haven't been able to make that assessment.
8 CHAIRMAN JACKSON: Well, the record will be open
9 for a considerable period of time after the hearing, and I
10 presume that will be sufficient time for you to respond.
11 MR. SCHWENTKER: Didn't you say the record was only
12 open until the 10th?
13 MR. STEINWAY: June 10th.
14 MR. GRAY: What I understood Mr. Petersen to say
15 was that GM was misled in the deliberations that the ARB
16 had, the workshops, the public hearings, the Board action
17 with respect to what was being considered; is that correct?
18 MR. PETERSEN: I never used the word "misled." I
19 stated that the Board adopted a .41 grams per mile standard,
20 that the notice for the hearing was based on that regulation,
21 and that now we are told that really the regulation adopted
22 by the Board does not reflect their true intent and that
23 the true intent was .39 grams per mile and that they, of
24 course, will amend their regulations and are asking EPA to
25 grant a waiver, a type of a blank check in allowing ARB to
26 amend their regulations after the fact. I think that's got
27 due process problems. I think it's got Section 209 problems
28 in that I don't believe EPA is authorized to grant a waiver on

1 on regulations which have not been adopted by the State of
2 California. Certainly this is an argument that you are going to
3 tomorrow in regard to the general waiver provision, and that's
4 the extent of my comment, Mr. Gray.
5 MR. GRAY: Let me ask one specific question to
6 clarify that.
7 Was GM aware of California's intent to that whole
8 hearing process? Were they commenting on a .41 non-methane
9 equivalent or a .41 non-methane total?
10 MR. NELSON: We were commenting on the standard that
11 was in the regulation that was before this hearing. We did
12 receive late in April an announcement that ARB intended to
13 take action. Now we have not formulated a position and have
14 not made a judgment as to whether that change is appropriate
15 or not. So it doesn't appear proper to have a hearing before
16 we have had an opportunity to comment to ARB on the supposition
17 that future action may be taken. And I would suggest if you
18 want to consider this that there may be future statements that
19 will be pertinent to the subject at hand.
20 MR. GRAY: Is that to say that you were not aware of
21 the .41 equivalent?
22 MR. PETERSEN: I believe Mr. Nelson just made a
23 statement that we effectively were denied the opportunity to
24 submit meaningful comments on the .39 standard.
25 MR. GRAY: I think he effectively didn't answer the
26 question, and that's just what I am asking. Is that your
27 position? You do not want to answer the question?
28 MR. NELSON: Mr. Gray, I would like to state again

1 that, yes, General Motors did receive late in April an
2 announcement of the intended ARB action, which we have not had
3 an opportunity to evaluate or discuss with ARB. So, we have
4 not been given an opportunity to present comments that we
5 have.
6 MR. GRAY: I understand that, Mr. Nelson.
7 Prior to that process, that April notice, are you
8 saying that GM was unaware of the intent of this standard's
9 adoption that it be a .41 non-methane equivalent, "yes" or
10 "no"?
11 MR. NELSON: It's my understanding that there was
12 some verbal communication in the past of an intent to change
13 the standard, but I don't think verbal communication should
14 be the signal to make a change. We just received in April
15 the first official notification of a change.
16 MR. PETERSEN: Verbal communication doesn't provide
17 a very sound basis for meeting the requirements of due process
18 of law.
19 CHAIRMAN JACKSON: Then, Mr. Nelson, we can be
20 assured that whatever comments you have on this will be
21 submitted to the record?
22 MR. PETERSEN: I don't think we can be assured that
23 we have had adequate time, Mr. Jackson.
24 CHAIRMAN JACKSON: You don't have adequate time?
25 This is a technical matter. You might want to ask your
26 engineers.
27 MR. NELSON: It could have some technical ramifica-
28 tions that we haven't had an opportunity to evaluate, and we

1 would intend to provide ARB at the appropriate time comments
2 we have. If we can get those comments formulated in time
3 for the hearing, we would be happy to do that.
4 CHAIRMAN JACKSON: In time for the record?
5 MR. NELSON: In time for the record, yes.
6 CHAIRMAN JACKSON: Thank you.
7 We will take a five minute break, and then we will
8 hear from American Motors Corporation.
9 (Short recess.)
10 CHAIRMAN JACKSON: If you are ready, Mr. Jones?
11 MR. JONES: Yes, I am ready.
12 Before I get into the main body of my presentation,
13 I would like to acknowledge the fact that there are many
14 issues today and I'll touch on some of the primary issues
15 and only one of the secondary issues. A lot of issues
16 deserve and need further comment on, but there are limitations
17 right now.
18 You indicated a preference for order with GM. I'm
19 set up to start with '79. I've got a chronological order,
20 but I'll be just as happy if you want me to go to passenger
21 car '80 and then go back.
22 CHAIRMAN JACKSON: We'll accept your orientation.
23 We are the ones that have to live with the record, and we
24 can do it.
25 MR. JONES: Okay. Then starting with 1979 light-
26 duty truck exhaust emissions standards and test procedures,
27 specifically the .41 hydrocarbon, the nine CO, and the
28 1.5 NO_x.

1 There seems to be a little confusion today on where
2 everybody is falling with respect to the .41 hydrocarbon
3 standard. We are under 4,000 pounds inertia weight. There-
4 for, everything that I talk about will refer to the .41
5 hydrocarbon standard that is proposed for under 4,000 pounds
6 inertia weight.
7 In the following statement, American Motors will
8 address the proposed 1979-model light-duty truck regulations
9 and the need for the regulation to recognize that four-wheel
10 drive vehicles designed primarily for off-highway operation
11 have inherent limitations with respect to hydrocarbon control
12 when they drive the federal test procedure.
13 We recognize that the proposed California light-duty
14 truck standards for the 1979 model year are more stringent
15 than the federal standards of 1.7 hydrocarbon, 18 CO and 2.3
16 NO_x. In fact, due to the hydrocarbon stringency there will
17 be no manual transmission options in our Jeep CJ vehicles in
18 1979 if the waiver passes. In our automatic transmission Jeep
19 CJ vehicles, we expect a fuel economy loss of about two miles
20 per gallon.
21 In 1978 we will drop manual transmission options
22 from our heavier Jeep Cherokee and truck models due to the
23 0.9 hydrocarbon standard. We are not threatening this. This
24 is fact. I think we testified -- in fact, I know we testi-
25 fied to this at the waiver hearing last August that this
26 would happen, and it has happened. We are able to certify
27 the lighter Jeep CJ vehicles at the 1978 hydrocarbon standard of
28 0.9 but the resulting model availability is considered

1 incomplete when compared to the 49-state availability.
2 Our current passenger-car technology lets us comply
3 with the 1977 and 1978 0.41 non-methane hydrocarbon standard
4 but cannot be readily adopted for our Jeep four-wheel drive
5 CJ vehicles. Mechanical and physical differences between
6 our Jeep CJ vehicles and our cars prohibits the carry-across
7 of current passenger car emission control systems. Completely
8 different drivelines, transmissions, power-to-weight ratios
9 and axle ratios are used on our four-wheel drive vehicles.
10 Equating, as the proposed 1979 California standards do, all
11 light-duty trucks under 4,000 pounds inertia weight to
12 passenger cars is not realistic with respect to our Jeep
13 vehicles that are designed primarily for off-road operation.
14 This point is recognized by other governmental agencies. In
15 fact, the NHTSA has created a separate classification for
16 four-wheel drive vehicles up to 6,000 pounds GVWR which is
17 distinct from two-wheel drive trucks and vans, which are
18 distinct from passenger automobiles. This separate classifi-
19 cation recognizes that off-road vehicles are designed for a
20 different use than cars and should have a separate and less
21 stringent standard.
22 To design and develop different emission control
23 systems capable of meeting the 1979 proposed light-duty truck
24 emission levels will take more lead time than we have available.
25 These vehicles have the following two major challenges that
26 require technological solutions before we can meet the
27 proposed standards:
28 1. The transfer case mechanism for the four-wheel

1 drive system restricts the packaging of most of the larger
2 commercially available catalytic converter candidates that
3 would be required to meet the 0.41 HC standard.
4 2. The four-wheel drive system's frictional
5 characteristics coupled with a manual shift transmission
6 present a hydrocarbon spiking problem whenever the gears are
7 shifted, which amounts to seventy-one times for our three-
8 speed and seventy-three times for our four-speed during the
9 FTP. It takes approximately three times longer to complete a
10 shift on a manual shift transmission Jeep vehicle than it does
11 for an AMC passenger car.
12 These two factors constitute the primary tech-
13 nological challenge. We contend that we do not possess nor
14 can we be expected to achieve the technological feasibility
15 in the lead time remaining to meet the 1979 California
16 standards for light-duty trucks. We believe that the 0.41
17 hydrocarbon standard for light-duty trucks designed primarily
18 with four-wheel drive is not supported by current technology
19 or the lead time remaining. Therefore, we request that EPA
20 deny this portion of the waiver for four-wheel drive vehicles
21 designed primarily for off-highway operation.
22 The next issue that we would like to take is the
23 consistency issue. The consistency issue concerns the inertia
24 weight divisions proposed for the light-duty truck and medium-
25 duty vehicle classifications are considered inconsistent with
26 the federal regulations. The proposed classification system
27 based on inertia weight should and could be consistent with
28 the comparable federal classification which is based on the

1 traditional gross vehicle weight. Therefore, the waiver
2 should not be granted in this arbitrary and inconsistent form.
3 That concludes my 1979 light-duty truck comments.
4 The next comments will pertain to the 1980 passenger car
5 exhaust emissions standards.
6 Under the stringency comment, American Motors
7 suggests that it may be premature for the Environmental
8 Protection Agency to waive federal preemption to allow
9 California to enforce standards that by law must be more
10 stringent than applicable federal standards. We do not know
11 what Congress will establish as the 1980 emission standards
12 at this date and we therefore do not know how the stringency
13 issue of Section 209(b) can be applied at this time.
14 The next consideration is lead time. Introduction
15 of technology, even on a limited basis, capable of meeting
16 the 1.0 gram per mile NO_x standard has not been demonstrated
17 on any of our vehicles.
18 The proposed standard of 1.0 represents the level
19 that presumably will require American Motors to commit to
20 closed-loop feedback carburetors and three-way catalytic
21 converter systems which, from our standpoint, are unproven.
22 Other technical paths, while potentially offering superior fuel
23 economy at today's emission levels, cannot meet the level of
24 1.0 grams per mile NO_x with its associated NO_x engineering
25 target of 1/2 a gram.
26 Three-way catalyst technology creates an inherent
27 fuel penalty since it requires the engine to turn at a richer
28 air/fuel ratio than is best for fuel economy. We recognize

1 that the potential of negating this effect may exist through
2 intensive optimization of the engine and its control system,
3 but this in turn adds to the lead time requirement.
4 Effective utilization of three-way catalyst
5 control systems on our future engines will require reliable
6 electronic engine control. We were only recently able to
7 obtain complete workable automotive electronic emission
8 control systems for our advance test and development programs.
9 At this time the lack of availability of an adequate number
10 of these systems hinders our development programs. As a
11 result we cannot state our specific lead time requirements
12 today. We are finding many unresolved three-way catalyst
13 system questions that dictate a degree of caution should be
14 taken in approaching this new technology.
15 An overview of the facts leads us to conclude that
16 we could not achieve sufficient experience and confidence in
17 our four-, six-, and eight-cylinder California engine families
18 by August of 1978 -- which is our Part I submission time for
19 1970 -- to allow reasonable certification success. If we
20 could concentrate on one-engine family we might somehow succeed,
21 but a one-engine family Calfifornia product line is not
22 viable from a marketing standpoint.
23 Some specific questions involving the status of
24 three-way catalyst systems that should cause concern for the
25 motor vehicle industry, the ARB and the EPA are:
26 1. What are the durability characteristics of the
27 various microprocessors, oxygen sensors, feedback carburetors
28 and other system components? Are they adequate to support
extended maintenance intervals?

2. What are the certification and actual use impacts the fuel additive MMT may have on these systems?

3. How will these all-new engine control systems affect the service industry?

4. Do three-way catalytic converter systems permit unregulated pollutants at a level that may necessitate future regulatory standards?

5. What are the emissions and fuel economy trade-offs? Will three-way catalyst systems restrict progress toward better fuel economy?

Regulations that require an industry to adopt a specific type of technology should be approached with caution. Regulators should obtain answers to questions of this type before emissions standards are enacted. Also, proper concern for our national commitment to conserve fuel should be given top priority; and regulations that do not allow this should not be permitted.

I have some consistency issues, consistency being consistent not only with federal but consistent within themselves. I have a mixed bag.

We find four inconsistencies within the proposed 1980 regulations:

1. Passenger cars equipped with an oxidation catalyst are permitted an 0.89 methane correction factor. Light-duty trucks required to meet the same hydrocarbon standard and equipped with an oxidation catalyst are denied this consideration.

2. Equivalent inertia weights are referenced to a

1 proposed federal regulation, Section 86.129-79. Our concern
2 is based on the legality of this issue. California should
3 await finalization of the EPA requirements and then adopt
4 them. This has not been adopted. This section is strictly
5 proposed right now.
6 The California regulation clearly states that it is
7 based on Part 86, Title 40, CFR, as they existed on November
8 23, 1976; therefore, the adopted section that I just mentioned
9 in this regulation is inconsistent with the current federal
10 regulation and is consequently not proper for waiver. The
11 consistency requirement of Section 209 of the Clean Air Act
12 precludes waiver of a California regulation that needlessly
13 requires different testing from the EPA requirements such as
14 here where the test procedures do not necessarily correlate
15 or measure relative stringency.
16 I refer you to your own waiver decision of July 11,
17 1975.
18 3. The inertia weight divisions for light-duty
19 truck and medium-duty vehicle classifications are inconsistent
20 with the federal regulations. This classification system
21 based on inertia weight should and could be consistent with the
22 comparable federal classification which is based on the
23 traditional gross vehicle weight.
24 4. The last inconsistency is Section 5(d) of the
25 proposed regulation which relates to an altitude performance
26 standard on emission control systems equating their sea-level
27 performance to their altitude performance up to 6,000 feet.
28 It is an unqualified and arbitrary regulation. Numerous

1 questions are triggered by this kind of regulatory language
2 and could be avoided if proper time and effort were taken to
3 consider the real issues and attempts were made to be con-
4 sistent.
5 We did receive notice. We received a one sentence
6 explanation of California's intent on May 2nd of this month.
7 We still have questions.
8 Under the allowable maintenance issue, our comment
9 is very brief.
10 The only issue involving this subject is more
11 properly referred to as an anti-tampering measure, Section
12 5e, involving the mechanism for adjusting the idle air/fuel
13 ratio. We did not oppose this issue when it was adopted at
14 the December 14, 1976 ARB meeting.
15 Now to address the 1981 medium-duty vehicle exhaust
16 emissions standards. The principal concern we have with
17 the 1981 standards are the 0.5 hydrocarbon, 9.0 CO and 1.5 NO_x
18 proposed for the medium-duty vehicle class. This would be the
19 class under 6,000 pounds, where all of our vehicles would lie.
20 As a result of the EPA waiver, January 11, 1977, granting
21 California permission to enforce new 1978-model medium-duty
22 vehicle exhaust emission standards and test procedures, we
23 were forced to drop our 1978 California Jeep manual trans-
24 mission Cherokee and truck models, which I referred to very
25 early in the presentation, because of the 0.9 hydrocarbon
26 emission standard. What was not mentioned is the fact that
27 even concentrating on our automatic transmission vehicle,
28 having a one-engine/transmission combination available in these

1 vehicles, has not caused us to be able to certify in 1978 in
2 an orderly and timely fashion. We are running extremely
3 late. In 1978, to certify to the point nine hydrocarbon
4 standard, we do not expect certification to be completed
5 until late October, which is going to put a hardship on our
6 dealers in California who are already very, very sensitive to
7 the fact that we are no longer offering the manual trans-
8 mission vehicles.
9 Unless we can make some significant technological
10 progress between now and 1981 on the hydrocarbon control
11 problem in four-wheel drive vehicles, we will be forced to
12 withdraw completely from this segment of the California market
13 if this waiver is granted.
14 We do not require these more stringent standards
15 to continue our efforts at reducing the emissions from these
16 off-highway vehicles. We are working diligently at American
17 Motors to find ways to market these excluded vehicles right
18 now. Additional regulatory incentive is not necessary. What
19 is necessary is regulatory recognition that these vehicles as
20 well as our light-duty CJ vehicles represent a distinct
21 class -- four-wheel drive vehicles -- that justifies separate
22 and less stringent emissions standards.
23 We will refrain from commenting on the 1.0 grams
24 per mile NO_x for light-duty trucks under 4,000 pounds inertia
25 weight until we have the hydrocarbon problem solved or
26 resolved. We hope that adequate consideration of our sugges-
27 tions for separate classification would address this issue
28 also.

1 I have, as a result of the California report this
2 morning, a correction to make.
3 On Page 23, Table 4 of the California report, you
4 gave some values for our '77 vehicles. You erroneously
5 placed them in an inertia weight class of 4,000 to 5,999.
6 They don't belong there. They are 3500 pound vehicles.
7 Therefore, it looks like we can make -- you know,
8 your table says it looks like we can make the .5 standard
9 when, in effect, we are talking about a .41 standard.
10 Also, I'd like to mention that I think the data in
11 that table is going to be scrutinized quite thoroughly by
12 our EPA, and I would like to comment further on that data now
13 that I hope I have cleared up the inertia weight error.
14 The hydrocarbon data that you see there represents
15 deterioration factors. I am told the deterioration factors
16 are applied to the 4,000 mile data, as you see in that table.
17 The deterioration factors for those three vehicles were one
18 per hydrocarbon. This is about as good as you can be. You
19 can't be any better than one.
20 We are going to have to recertify those vehicles
21 against a lower standard. We don't expect nor would we
22 have even the remotest expectation to be able to generate
23 another one DF. We are very fortunate to have those one's
24 today. We have no magic, no ability to reproduce a one
25 DF, so please consider that when looking at those hydrocarbon
26 values against a .41 hydrocarbon standard.
27 Okay. That finishes my comments, with one other
28 comment. I guess maybe it's a question that will come up.

1 But our CJ vehicles, our manual transmission
2 vehicles, constitute 80 percent of our market in California.
3 Our automatic transmission CJ vehicles constitute 20 percent.
4 It's a piece of data that I didn't know where it fit in my
5 presentation so I threw it in at the end. But I think it's
6 very relevant. It is to us.
7 That concludes my comments, and I'll be happy to
8 answer any questions.
9 CHAIRMAN JACKSON: I'd like the record to reflect
10 the correction you were referring to was to a table in the
11 CARB testimony; isn't that correct?
12 MR. JONES: That's correct, Table 4, Page 23.
13 CHAIRMAN JACKSON: You were addressing your comments
14 to the CARB when you were remarking about the correction?
15 MR. JONES: Correct.
16 CHAIRMAN JACKSON: I have one question to start
17 with, Mr. Jones.
18 On Page 2 of your statement, you indicate that the
19 1978 .41 is a non-methane hydrocarbon standard. What led you
20 to believe that it was a non-methane hydrocarbon standard?
21 MR. JONES: The California proposal. It was written
22 up as a .41 according to my recollection.
23 MR. GRAY: I think on Page 2 of your testimony,
24 if you can refer to the specific statement --
25 MR. JONES: Yes, I see the statement.
26 MR. GRAY: For the 1977 and '78 model years which
27 California is currently implementing, you had referred to a
28 .41 non-methane hydrocarbon standard. You said that's what

1 you understand it to be.

2 MR. JONES: I am sorry, it's a total hydrocarbon

3 standard right now of .41. Is that any different than saying

4 a non-methane hydrocarbon standard of .41?

5 MR. GRAY: Essentially, you are implying that .41

6 non-methane hydrocarbon standard was the same as the .41 non-

7 methane equivalent standard. Is that the context in which you

8 were using it?

9 MR. JONES: I believe so, yes.

10 MR. HELLMAN: You corrected the table that was put

11 together by the California Air Resources Board based on

12 information that you have that certain vehicles in there were

13 in a different inertia weight class than were apparently

14 considered by California. There are two vehicles -- I'll give

15 you the ID numbers. D6U-38K and D6U-41K in your family

16 I -- Roman Numeral I, I believe -- TC at 3500 IW. I

17 believe certified results for those two vehicles -- for the

18 first vehicle, D6U-38K, is 0.41 hydrocarbon, 6.5 CO,

19 1.2 NO_x; and for D6U-41K, 0.36 hydrocarbon, 3.9 CO, and

20 1.3 NO_x.

21 There is another vehicle at 4,000 which is D --

22 Oh, PO77-5K, which is 0.5 hydrocarbon, 7.7 CO, and 1.6 NO_x.

23 But since I don't believe you have the details of

24 the information with you here, I'd like to ask you if you

25 could check back with your own records and find out whether or

26 not those vehicles, which apparently have had those numbers

27 like that, are correct as I read them into the record. Would

28 it be possible for you to do that, Mr. Jones?

1 MR. JONES: Sure.

2 MR. HELLMAN: On Page 2 of your statement, you said
3 that there are "completely different drivelines, transmissions,
4 power-to-weight ratios and axle ratios are used on our" --
5 "our" meaning AMC's -- "four-wheel drive vehicles."

6 Does the power-to-weight ratio used in the four-
7 wheel drive vehicles match in any way a power-to-weight
8 ratio that you market in passenger cars?

9 MR. JONES: There's some overlapping today. There
10 won't be any overlapping in the 1980 and beyond time frame.

11 MR. HELLMAN: On Page 3, you said that "The
12 transfer case mechanism for the four-wheel-drive system
13 restricts the packaging of most of the larger commercially
14 available catalytic converter candidates that would be
15 required. . ."

16 I have two questions here. Does this imply that
17 there are some that will fit; and, number two, which catalysts
18 are these that you feel may be necessary to meet the 0.41
19 hydrocarbon standard?

20 MR. JONES: Okay. The very first question, no.
21 It means that we are limited in testing all of the available
22 candidates, but all of the available candidates that we have
23 tested or looked at or talked to manufacturers about,
24 catalyst suppliers about, won't fit. I left myself open
25 there because I -- We didn't talk to everybody, and there
26 may be one out there. I just didn't want to exclude the
27 whole realm of possibilities, but we are looking very hard.
28 We are in the process now of looking very hard at anybody that

1 has a catalytic converter with enough volume to handle the job
2 and that we can package.
3 MR. HELLMAN: What volume is it that you need to
4 handle the job?
5 MR. JONES: Well, it certainly is greater than our
6 current volume of 175 cubic inches. We haven't got a magic
7 number. It would certainly be in the range of 260. But as
8 you know, I think you know, the 260 GM pelletized converter
9 will not fit under our CJ. When we put a V-8 engine in a
10 CJ vehicle, we are required to use the 160's.
11 MR. HELLMAN: Let me clarify something. This
12 space problem, is it common to all of the engines that you use
13 in the CJ or just the V-8's?
14 MR. JONES: No. The space problem is common to all
15 the engines that we use. The larger the engine, the larger
16 the throughput or the output, the larger the catalytic con-
17 verter needs to be . So a V-8 engine represents a large
18 engine. Therefore, it needs more cleanup.
19 MR. HELLMAN: And the 260 cubic inch nominal size
20 that you mentioned was for a V-8; is that right?
21 MR. JONES: Yes. That would be in about the range
22 of it. If we could package it, we might stand a chance of
23 being able -- Let's say we would like the luxury of being
24 able to look at it. Right now, since we can't package it, we
25 don't test it to the point where we would be a viable candi-
26 date.
27 MR. HELLMAN: Can you tell me exactly where the
28 interference between the transfer case and the catalyst?

1 MR. JONES: Yes. It's about as direct of an inter-
2 ference as it can be.
3 The transfer case occupies the ideal location. If
4 you could just eliminate it, you could put in the catalytic
5 converter. Just trying to move the catalytic converter a
6 little bit further downstream or a little bit further to the
7 front, that option does not exist. You have to move it a
8 bunch, and we just don't have a bunch under there to move.
9 MR. HELLMAN: It's your position, then, that even
10 though it might be technologically feasible to move one or the
11 other that it would take you more time than you have left?
12 MR. JONES: Oh, definitely.
13 MR. HELLMAN: The second part of this statement
14 that you made had to do with the shifting of the four-wheel
15 drive vehicles.
16 Can you explain for the record why it takes three
17 times longer to shift?
18 MR. JONES: I really wish I could give an elaborate
19 description of a CJ vehicle. I contemplated having one here
20 to demonstrate it. I anticipated this question.
21 I am not a transmission expert. I have some limi-
22 tations in this area.
23 The four-wheel drive manual shift transmission,
24 again because of the power train, requires the gear mechanism
25 for the engagement of the gears to be a tower rather than a
26 side. By doing so, it requires a little more driver effort to
27 shift the gears.
28 It has served us well. This transmission that we

1 currently have, it's a heavy duty transmission. It is not
2 similar in any respect to a passenger car manual transmission.
3 It has pleased our customers who purchased this type of
4 vehicle, especially in the State of California, since eight out
5 of ten of them buy it. It is a major task. It's not a very
6 comfortable thing. I personally find it a very difficult
7 thing to shift on a regular basis, but the people that buy
8 these vehicles for the purposes that they buy these vehicles
9 enjoy the effort. They don't complain about it. Therefore,
10 we are not -- We don't have the incentive to go out, and we
11 have never had the incentive before, let me put it this way,
12 to go out and change the effort that it requires. The time
13 it requires, of course, is three times longer to complete
14 the shift on an average than a comparable passenger car
15 transmission.
16 That should kind of explain, if I put it in terms
17 that you can understand, the problems of feedback to the
18 carburetor and the accelerator pump and the power piston in
19 the carburetor.
20 I have to profess that I am not an expert in this
21 area, and I can only talk in generalities. I hope I gave
22 you a feel for it.
23 MR. HELLMAN: Okay. The number of times a vehicle
24 is shifted causing hydrocarbon spikes -- you mentioned 71
25 and 73 times during the test -- is that comparable to passenger
26 car number of shifts during the test?
27 MR. JONES: It's a little higher. A little higher.
28 Some additional shifting that goes on.

1 MR. HELLMAN: But the major reason for the hydro-
2 carbon problem would be the length of time of the shift?
3 MR. JONES: Correct. Correct. We have means, as
4 everybody does in the industry, of compensating for a small
5 shift spike, keeping the throttle cracked or allowing it to
6 close gradually. These devices have been used successfully
7 by all manufacturers in the industry for a long time, and
8 the fact that ARB made such a point about it this morning
9 causes me to make the point that these are not adequate. We
10 can only go so far with these devices, and when the time
11 element is three times greater than a passenger car, these
12 devices fall off. They don't work. Believe me, if they
13 worked, we wouldn't be here complaining about it today. We
14 would be using them and be selling our manual shift trans-
15 mission in 1978 in our senior vehicles, in our Jeeps, trucks,
16 and pickup trucks, and our Cherokee vehicles. They just
17 don't work.
18 MR. HELLMAN: Does anything happen to the air
19 injection on your CJ vehicles when you shift?
20 MR. JONES: Yes.
21 MR. HELLMAN: What happens to it?
22 MR. JONES: There is a diverter valve on the system.
23 It's a common type of valve that is vacuum operated.
24 A diverter valve serves many functions -- or
25 several functions. One of those is to protect against
26 backfire. So when it sees a high vacuum spike, which is
27 indicative of a closed throttle -- a person takes his foot off
28 the throttle to engage the clutch, it sends and diverts the

1 air from the exhaust manifold to the outside ambient condition
2 so that a backfire will not occur in the exhaust manifold and
3 cause damage to the exhaust system.
4 MR. HELLMAN: Would it be possible to instead of
5 diverting that air to the atmosphere to divert it to right in
6 front of the catalyst instead to provide the air that might
7 be necessary to oxidize the extra HC that might be caused
8 during this spiking?
9 MR. JONES: Certainly. That's certainly possible.
10 We've thought about that. We've -- I don't know if we have
11 any data. I don't even know if we've tried it. We've dis-
12 cussed it many times over the past couple years, and we've
13 come to the conclusion, rightfully or wrongfully, that there
14 is not enough potential there to pay the price, the plumbing
15 price, to do it. We just don't see it being a big enough
16 gain.
17 I don't know if we have data to substantiate that
18 opinion or not, but that is our judgment.
19 MR. HELLMAN: So using that approach would not allow
20 you to alleviate this hydrocarbon problem caused by the
21 spiking which is due to the longer shift time and allow you
22 to meet the standard in your opinion?
23 MR. JONES: No. It's not -- Right now we don't
24 consider it significant enough to help. Certainly we are
25 going to continue looking at it as other schemes and other
26 potential means open up.
27 If for some reason in a year or two from now we
28 have a line that is already going to and from the oxidizing

1 converter for another reason, then we have already paid the
2 cost and possibly we can tap into that line. Then it might
3 be to advantage, but just to go ahead and spend the money on
4 that small of a gain is not feasible to us in our estimation.
5 MR. GRAY: With regard to your 1979 light-duty
6 trucks, could you give us a very specific answer to what you
7 would anticipate being able to offer in California if you have
8 to comply with these standards?
9 MR. JONES: I'd be delighted to give specifics. I
10 try to be specific.
11 Before I give my specific answer, which I intend to
12 do, I have not, in my specific answer, qualified it for three
13 conditions: the first condition I have not qualified it for
14 is the fact that there is no automatic methane correction
15 factor. In other words, right now the only -- trucks are
16 not allowed a .89. That is the way the current regulation is
17 written, and that is the way my comment will reflect.
18 Second, I do not have a total handle on the increased
19 road load horsepower. Therefore, I will say that it does not
20 have any -- It is not sensitive at this point to the road load
21 horsepower increases that we are going to see in the 1979
22 model year.
23 Third, we are talking for all practical purposes
24 as far as I can tell against a .39 non-methane hydrocarbon
25 standard.
26 There is a time element there. I recognize that.
27 I am stretching my model year over to another year, but those
28 are the three points that I want to qualify and be very precise

on when I give you my estimate.

For our CJ vehicles -- I have a fourth qualifier, I am sorry. This does not consider what our DF is. I told you before we will never, to our fondest expectations, hit a one again as the standards come down as low as they are now.

A 4,000 mile vehicle will -- We can achieve, we believe, .5 hydrocarbon on our CJ vehicles. It does not consider the DF.

Our senior vehicles, which are our Cherokees, Wagoneers, pickup trucks, .6 hydrocarbon, the same qualifiers, looks achievable.

Is that specific enough. Are any of my qualifiers clouding the issue?

MR. GRAY: No. I think that's specific enough. Maybe my follow-up questions will tell how well I understood it.

Looking at the CARB data that you referred to earlier, I think those four tests were from a CJ --

MR. JONES: Yes.

MR. GRAY: -- vehicle of 3500 pounds inertia weight?

MR. JONES: I believe so. I don't have the exact numbers in front of me, but I'll accept that.

MR. GRAY: I thought that was a clarification that you made to the record.

MR. JONES: I'm saying that we don't have any 4,000 pound CJ's, so I was correcting the inertia weight.

MR. GRAY: It's less than 4,000 pounds?

MR. JONES: Correct.

1 MR. GRAY: Is there any possibility of increasing
2 the weight of that vehicle such that it would fall within the
3 4,000 pound inertia weight category? How close are you?
4 MR. JONES: We are not very close at all. In fact,
5 nationwide some of our CJ vehicles tip the scale at 3,000.
6 We qualify for the 3,000 pounds in California because of the
7 high usage of certain optional equipment and because of
8 additional emission control equipment. We fall now into the
9 3500 pound class, but nationwide those vehicles are certified --
10 many of our CJ vehicles are certified at 3,000 pounds.
11 MR. GRAY: As far as you can see, there aren't
12 additions like heavier rollbars and stronger protective
13 devices for the front, bumpers if you will, extra fuel tank
14 capacity that would raise your vehicle weight even though
15 that full capacity might not at all times be necessary? You
16 don't think those kind of things are practical relative to
17 where you stand now in order to meet the 4,000 pound inertia
18 weight grouping?
19 MR. JONES: Not only are they not practical, but
20 they are very unreasonable. We have a higher commitment
21 called fuel economy nationwide in the 1979 and beyond model
22 year. We wouldn't be throwing weight into a vehicle in that
23 indiscriminate fashion just to certify in the State of
24 California. We wouldn't even conceive this. At least I
25 wouldn't conceive this. I can't speak for everybody.
26 MR. GRAY: I don't mean to imply that these are
27 indiscriminate areas. I mean they are areas that might make
28 the vehicle more attractive and would still allow you to

1 certify in the State of California. Those are the types of
2 areas that I was asking about.
3 If you can answer with confidence that those are
4 not practical approaches, then that's sufficient.
5 MR. JONES: Not when you are talking 500 pounds on
6 a 3,000 pound vehicle. That's incredible.
7 MR. GRAY: I guess you have one V-8, the CJ?
8 MR. JONES: Yes.
9 MR. GRAY: It's a V-8 which is probably the heaviest
10 vehicle configuration --
11 MR. JONES: Okay. Okay. Let me rephrase your
12 question.
13 If we made every optional equipment item standard
14 in California and got full use of all the optional weights,
15 could we achieve a 4,000 pound vehicle, therefore getting the
16 benefit of the higher hydrocarbon standard? I guess that's
17 possible. I just don't see us doing that.
18 MR. GRAY: Well, with the seriousness with which
19 you raise the issue, I'm just trying to explore --
20 MR. JONES: Yes. I hadn't even -- Up until now,
21 I hadn't even considered the question. You brought in a new
22 aspect, and I think it is possible if we wanted to take a
23 market strategy of that type.
24 MR. GRAY: If we are addressing the issue of whether
25 or not that type vehicle can be sold, I think that probably
26 any strategy that has any possibility of --
27 MR. JONES: I finally understood your question.
28 MR. GRAY: I am just trying to pursue are there any

1 other approaches if you aren't able to better your best
2 estimates as to the emission levels.
3 Do you feel that a non-methane provision for light-
4 duty trucks would be enough to let you get under?
5 MR. JONES: I'd like to answer that question not
6 as directly as I have answered some of the other questions.
7 I think it's -- If you are going to have a methane
8 correction factor in a regulation like the ARB's proposal,
9 they ought to be at least consistent in their own regulation.
10 They shouldn't discriminate on a basis that I can't under-
11 stand between passenger car measurements, test procedures,
12 and light-duty trucks in this case. I do wish them to make
13 a distinction about four-wheel drives, and I don't want to get
14 into that aspect of it because that wasn't part of your
15 question. But I think a reasonable regulation does not make
16 arbitrary differences like they've set up in this regulation.
17 MR. GRAY: I guess the reason I asked that is it
18 seems that it's at least an appropriate consideration, and
19 yet if it will not give you the extra capacity that you need
20 to certify, additional consideration of it is a moot point.
21 So, therefore, I would ask if you could be more
22 specific in response to the extent that you can regarding what
23 a non-methane allowance will do for you relative to compliance.
24 MR. JONES: By itself, we do not consider a non-
25 methane allowance a saving regulation.
26 MR. GRAY: From the test results that the CARB did
27 include, it appears that you certified at least that one
28 engine family with those three test vehicles, one at .41, one

1 at .36, and the third at .47.

2 I am pursuing this line of questioning because it

3 appears that even today you would be quite close with respect

4 to at least that one engine family.

5 MR. JONES: It intrigues me how you can take data

6 that averages out to the standard being discussed, which is

7 .41 hydrocarbon, and say that that's good enough to indicate

8 that we have the potential to meet that standard. To me,

9 that data indicates that we do not have the potential, that

10 we could not in good judgment go out and certify those

11 vehicles if that were their value under the 1979 test pro-

12 cedure.

13 MR. GRAY: For 1977, you were shooting for a --

14 MR. JONES: .9.

15 MR. GRAY: Right, .9 hydrocarbon.

16 MR. JONES: We roughly engineered our target at

17 about half the standard, so those happened to hit half the

18 standard.

19 MR. GRAY: I only reference these numbers because

20 they represent three different vehicles, two of which barely

21 comply with the .41 number. Nonetheless, it would have

22 certified you in California to sell those configurations

23 no matter how close. With these other considerations, in

24 addition to the fact that you were trying to achieve a

25 different level, there may be some potential for a little

26 extra optimization at the expense of fuel economy or what

27 have you. It appears, at least on the surface, that to some

28 extent you may be close, so close that such things as a

1 non-methane allowance factor might be very important to you.
2 So, that's the reason I am trying to get a better handle on it.
3 MR. JONES: By itself, a non-methane hydrocarbon
4 allowance is not going to make it -- I can't offer anymore
5 insight into our capability of meeting a .41 hydrocarbon
6 standard than I think I have already indicated for the record.
7 MR. GRAY: Okay. Just in a summary sense, you
8 would try to meet '79 light-duty truck standards, but at this
9 point you do not know how many vehicles or model types you
10 would be able to certify in California; is that -- Where do
11 you come out in that net effect sort of situation?
12 MR. JONES: The net effect is we do not have -- As
13 the statement I read indicated, we do not expect at this point --
14 at this point when we are actually getting ready to start our
15 1979 certification, within a few months anyway, for all
16 practical purposes we are done with our development, we know
17 sitting here today that we cannot certify our manual trans-
18 mission vehicles, which constitutes 80 percent of our CJ
19 vehicles sold here in California, which is 80 percent of our
20 family I-TC.
21 MR. GRAY: Does that mean to say you feel reasonably
22 confident you could certify the automatic?
23 MR. JONES: Doing everything in our power on the
24 automatic transmission vehicle and accepting a two mile per
25 gram loss, it is possible to certify the automatic transmission
26 CJ vehicle in California in 1979. Possible. We won't really
27 know for a few more months.
28 CHAIRMAN JACKSON: Is this .41 data that we were

1 referring to, is that for an automatic or a manual?

2 MR. JONES: I'm afraid I can't -- I didn't come

3 prepared with the '77 cert data, so I don't even know anything

4 about that data other than I accept it. I'm not challenging

5 it. It looks reasonable.

6 CHAIRMAN JACKSON: What we were mulling over here is

7 whether or not if it was an automatic, could you have it

8 carried over for subsequent model year certification?

9 MR. JONES: Well, I believe our '77 cert data

10 for family I-TC already carried over from '76. I'm not sure

11 of that. And I believe we are asking for a carryover until

12 '78.

13 CHAIRMAN JACKSON: I was just talking about '79.

14 MR. JONES: So you are saying -- I don't think the

15 test procedure changes and everything will allow that. I

16 think in '79 you start with a clean sheet of paper.

17 Can you carry '78 over into '79 in California?

18 MR. RUBENSTEIN: As far as I know. The problem you

19 run into is the federal horsepower schedule change.

20 MR. JONES: That's one of the things I thought would

21 disqualify any '78 information, but I can --

22 CHAIRMAN JACKSON: We may work this out here and

23 have you certified already.

24 MR. JONES: Hey, if you can come up with a way,

25 great.

26 I'm not an expert in all the finesse of the regula-

27 tions.

28 MR. GRAY: A permanent boat trailer attached to the

1 CJ5.

2 MR. JONES: A 500 pound boat trailer. I understand.

3 MR. GRAY: That's all the questions I had on light-

4 duty trucks.

5 MR. HELLMAN: You indicated that the approaches that

6 Mr. Austin discussed, which tend to reduce the hydrocarbon

7 spikes, are not effective on the manual transmission CJ

8 vehicles. Is that because the shift takes so long?

9 MR. JONES: Primarily.

10 MR. HELLMAN: You couldn't recalibrate those throttle

11 crackers, or whatever terminology you want to use to describe

12 those, to stay on longer when you shift?

13 MR. JONES: Well, it's not just a problem of the

14 throttle cracker by itself or the delay solenoid by itself.

15 It's the total time event. The throttle cracker and the

16 solenoid delay helps if you are going to be going back in

17 relatively quick. What happens is there is enough of a RPM

18 during that time interval where you beyond the accelerator

19 pump. Most of the time you end up getting back in the power

20 valve or power enrichment circuit of the carburetor, and when

21 you do that, you've got big problems. And that's the problem

22 that we see.

23 So, we've gone beyond in time the accelerator

24 function. We did use and we currently use throttle crackers

25 and delay valves at hydrocarbon standards less stringent than

26 this because they do help to a degree. But the degree that we

27 are looking for now is just too great for these devices to

28 bear.

1 MR. HELLMAN: If you could conceptually divide up
2 the test into the hydrocarbon spiking modes and other modes,
3 would it appear to be a possibility to exist to get more
4 hydrocarbon control on the other modes which are not spiking
5 modes to offset the spiking modes? Have you considered that
6 approach?
7 MR. JONES: Karl, I don't know of any of the modes
8 when you are shifting 73 times on the cycle that are spike
9 free. There's a few, and certainly that's the kind of
10 optimization we just haven't had the luxury to work on.
11 MR. HELLMAN: So that a device like an extra catalyst
12 downstream, to go to that extreme, of the current catalyst is
13 not considered feasible or practicable by AMC?
14 MR. JONES: A downstream device for hydrocarbon
15 control would not have the operating temperature sufficient to
16 oxidize hydrocarbon. It would be great for CO, but it wouldn't
17 help the hydrocarbon problem. You need hot feed gas, hot feed
18 temperature to oxidize hydrocarbons. You need something close
19 coupled ahead of the current, not behind.
20 MR. HELLMAN: Okay. Thank you.
21 Let's switch the subject and talk about your remarks
22 on the 1980 passenger car exhaust emissions standards.
23 Your lead time discussion says, "Introduction of
24 technology, even on a limited basis, capable of meeting the
25 1.0 gram per mile NO_x standard has not been demonstrated on any
26 of our vehicles."
27 Does that mean that you are maintaining that you
28 have not the technology in production today?

1 MR. JONES: No. That means that our advanced
2 development has not matured -- I think I will put a "period"
3 right there.
4 MR. HELLMAN: Did you run a fleet of a small number
5 of cars, approximately four, that you call the Ohio fleet?
6 MR. JONES: Correct.
7 MR. HELLMAN: Do you remember what the NO_x numbers
8 were on those cars?
9 MR. JONES: Yes. They started out below one gram.
10 We did not have sophisticated feedback means for the carbure-
11 tion in those four cars, and they -- I think one of them went
12 rich and did stay below the one gram NO_x; went out of bed on
13 CO and hydrocarbon; another one went lean and immediately went
14 beyond the one gram NO_x.
15 The purpose of those vehicles run on this Ohio fleet
16 were kind of a crude test gained at answering primarily the
17 durability. Will these things, these new devices, live on
18 a vehicle that goes 50,000 miles on a very high mileage
19 schedule? It was a way of gaining durability more than it was
20 of gaining emissions performance.
21 MR. HELLMAN: Nevertheless, even though the vehicles
22 were not equipped with feedback carburetion and you were
23 trying to find out whether or not the systems were physically
24 durable enough, some of them did either come very close or
25 some were below one point on NO_x.
26 MR. JONES: Oh, yes, I am sorry. One of the vehicles
27 was extremely low. I'd almost forgotten.
28 On the Gould unit, we had a reducing catalyst. In

1 fact, everything looked really great on that vehicle. We were
2 out to 25, 30,000 miles, I believe, on that vehicle when we
3 ran into a durability problem. A couple years ago -- In fact,
4 up until about a year ago, we were very high on a reducing
5 catalyst for standards below one gram NO_x. We felt the best
6 path was not three-way catalyst technology, but separate
7 oxidizing, separate reducing converter technology. We thought
8 a base metal catalyst that Gould Corporation was telling us
9 about and telling the world about as the solution to the .4
10 NO_x was worthwhile to look at. We invested considerable time.
11 We put the catalyst on as many cars as we could.
12 This Ohio fleet that you are talking about, Karl, had
13 one or two of them on, I can't remember specifically. It turns
14 out -- I think everybody realizes what happens with a base
15 metal catalyst in today's sulfur-sulfate situation. They
16 deteriorate rather rapidly after a given point in time.
17 MR. HELLMAN: The four cars I am talking about, two
18 were Engelhard/Walker and two were Engelhard/Maremont. Those
19 are the four I am talking about.
20 MR. JONES: I am sorry, the fleet I am referring to
21 was the previous year. You are referring to the latest Ohio
22 fleet?
23 MR. HELLMAN: Right.
24 MR. JONES: I am sorry.
25 MR. HELLMAN: What's your conclusion based on the
26 durability results? Did the vehicles run through with no
27 major problems to the emission control system?
28 MR. JONES: The conclusion I can't address. I don't

1 know the specifics of the latest Ohio fleet as far as -- to
2 answer your question directly.
3 It was, again, a durability exercise. We were
4 satisfied with the overall durability performance. It was
5 not an emission exercise.
6 MR. HELLMAN: This line of questioning bears on the
7 fact that you stated later on that the three-way catalytic
8 converter is not proven, and I just wanted to, for the record,
9 indicate that you have run cars with three-way catalysts on
10 them and they did run for 50,000 miles and the problems that
11 you experienced during the tests were strictly fresh air
12 opening ducts in the air cleaner snorkles, burned out choke
13 gaskets, throttle cable sticking, and cracked manifold on two
14 of the vehicles. None of those problems appear to be directly
15 related to the fact that there was a three-way catalyst on the
16 vehicle.
17 MR. JONES: That's correct.
18 MR. HELLMAN: So for the physical durabilty of
19 catalysts, AMC does have information that appears to indicate
20 that the physical durability does not seem to be an insur-
21 mountable obstacle.
22 MR. JONES: The physical durability is not insur-
23 mountable, no. We ran that test to, again, prove out -- it's
24 just one form of proving out whether we've designed the thing
25 with enough structure and enough durability to go 50,000 miles.
26 It's a quick way of getting 50,000 miles. It has no -- We
27 take emission -- I should say Ohio takes emission measurements
28 for us on these vehicles. We are very happy to look at

1 emission performance, but the main purpose is stricly an
2 accelerated durability test. We were pleased with the
3 durability of the three-way catalyst containers and the two-
4 way catalyst internal working as a result of this test. It
5 told us things we have to know before we can market the device,
6 but it did not tell us about the emission performance.
7 MR. HELLMAN: Would the emission performance with
8 continued development be worse than it was on the Ohio fleet?
9 MR. JONES: No. They were not representative
10 systems of what we would envision marketing as far as the
11 sophistication of the engine controls.
12 MR. HELLMAN: With the closed loop control of the
13 fuel metering, you would expect the results to be somewhat
14 better?
15 MR. JONES: Certainly.
16 MR. HELLMAN: I come back to the "Introduction of
17 technology, even on a limited basis, capable of meeting the
18 1.0 gram per mile NO_x standard has not been demonstrated on
19 any of our vehicles."
20 Does that introduction mean that introduction into
21 commerce that you have not yet certified such configuration?
22 MR. JONES: Again, it gets back to where we were
23 five or ten minutes ago. It gets back to the fact that our
24 advanced engineering programs have not matured to the level
25 that we have any confidence or have demonstrated any confidence
26 or any data that we could share with you that would say yes,
27 it looks like we can do it.
28 MR. HELLMAN: And this is primarily because of the

1 inability for you to have run vehicles with closed loop fuel
2 metering and the electronic control unit in conjunction with
3 the three-way catalyst yet?
4 MR. JONES: Yes.
5 MR. HELLMAN: Okay. But the results are likely to
6 be better than what you ran before?
7 MR. JONES: We would anticipate and hope they would
8 be better.
9 MR. HELLMAN: On Page 5 of this statement, you say,
10 "Other technical paths, while potentially offering superior
11 fuel economy at today's emission levels, cannot meet the
12 NO_x level of 1.0 gram per mile with its associated NO_x engi-
13 neering target of 0.5 gram per mile."
14 What other technical paths are you talking about?
15 MR. JONES: I'm specifically referencing lean burn
16 technology that has, in our judgment, a more conducive fuel
17 economy reward but inherent, unfortunately, minimal NO_x
18 potential around the one gram level. A standard that hits
19 one gram does not make what we know about lean burn technology
20 applicable.
21 MR. HELLMAN: Is it the 1.0 level or the 0.5 level?
22 MR. JONES: The 1.0 is the standard. When I talk
23 about the standard, I infer an engineering target of .5.
24 MR. HELLMAN: So that your lean burn technology
25 doesn't incorporate devices or technical approaches like the
26 Nisson NAPS-Z approach or the Mitsubishi MCA-JET approach?
27 MR. JONES: No. Unfortunately, our vehicles are
28 heavier than those, and we've not seen that technology carried

1 into, say, our six cylinder vehicles of three to 3500 pound
2 inertia weight class.
3 MR. HELLMAN: Your statement about "Three-way-
4 catalyst technology creates an inherent fuel penalty since it
5 requires the engine to run at a richer air/fuel ratio than is
6 best for fuel economy," what are you comparing this to? Are
7 you comparing it to an engine map with some idealized con-
8 dition, or would you compare the three-way to an oxidation
9 catalyst system calibrated for the same emission level?
10 Would you say that the three-way still has an inherent fuel
11 economy problem?
12 MR. JONES: That's a very difficult subject to give
13 a nice, clean concise answer to. I am going to try anyway.
14 The fact that our current engines have evolved over
15 a long process, we know where they achieve the best fuel
16 economy as far as the air/fuel ratio. We know this is to be
17 at least two air/fuel ratios leaner than three-way catalyst
18 technology says we must calibrate to.
19 We also know, due to recent engine mapping, which is
20 still in its infancy in our engine dynamometer rooms, that
21 optimization under a described set of standards does not allow
22 for some trade-offs. We haven't had the opportunity, nor do
23 we conceive that we will have the opportunity by 1980, to
24 take advantage of this trade-off.
25 MR. HELLMAN: Okay. So this is based on what you
26 understand about the way your engine performs now? It's not
27 based on a comparision of a vehicle calibrated to these
28 standards with three-way system and another system?

1 MR. JONES: Correct.
2 MR. HELLMAN: Okay.
3 CHAIRMAN JACKSON: Thank you, Mr. Jones.
4 MR. JONES: Thank you.
5 CHAIRMAN JACKSON: Mr. Martin, we are ready.
6 MR. MARTIN: All right.
7 My name is William J. Martin, staff engineer,
8 vehicle emissions for the International Harvester Company. I
9 have a statement to read into the record at this time.
10 International Harvester Company has reached a
11 critical point in its business of engineering and producing
12 medium-duty vehicles, the only offering to be produced by IH in
13 the 0-8500 pound GVW 1979 and subsequent model year emission
14 class of vehicles.
15 These vehicles are our Scout line of sport/utility
16 light trucks produced in four models: Scout II, Terra,
17 Traveler and SS-II manufactured for the sport/utility market.
18 The vehicles rated at 6200 pounds GVWR use 4-196, 304 and 345
19 CID engines and are available in both two-wheel and four-wheel
20 drive versions. One three-speed and two four-speed manual
21 transmissions, as well as an automatic transmission are
22 available. The V-304 is a federal engine only and was elimi-
23 nated from California production in 1977. On four-wheel
24 drive models, an IH single-speed transfer case is standard
25 with an optional two-speed Dana Model 20 available. The Dana
26 Model 44 rear axle is used and is available with 3.07, 3.54,
27 3.73 and 4.09 ratios.
28 IH, as a manufacturer of heavy-duty trucks, designs

1 and builds its own gasoline engines for use in its gasoline-
2 powered truck models. IH does not build passenger car
3 engines. Gasoline engines available in International Scouts
4 are heavy-duty engines designed for truck-tractor operation,
5 or are derivatives thereof. For example, the V-345 engine
6 is the standard engine in our Loadstar and Cargostar models
7 with GVW ranges of 14,800 to 30,200 pounds. The V-304, once
8 standard in these truck models, has been replaced by the
9 higher horsepower V-345. Heavy-duty engines such as the V-304
10 and V-345 are qualified by operation at full rated power and
11 speed for 1000 continuous dynamometer hours.
12 The V-304 and V-345 engines are a family of engines
13 which include a 392 cubic inch displacement. IH's four-
14 cylinder engine, the 4-196, is actually half of the V-392. It
15 is this derivative with only minor modification to the tooling
16 which makes the four-cylinder engine feasible. All four dis-
17 placements are built over the same machine tool line. Thus,
18 it is presently feasible for IH to produce the displacements
19 noted due to the economics of the total volume produced.
20 One of the selling features for which IH's Scouts
21 are designed is to pull trailers. Certainly, cars pull
22 trailers, but they do not offer the flexibility of off-highway
23 recreational use once the destination is reached and the trailer
24 is parked. Scouts are designed to perform a variety of work
25 functions which include construction, agriculture, wholesale
26 and retail trade, as well as recreational and personal
27 transportation. Also, multi-purpose vehicles such as the
28 IH Scout are designed for uses which require the capability of

1 not only leaving the roadway, but of climbing steep hills,
2 fording streams and operating in extreme weather conditions.
3 MPV's also perform a series of specialized work applications
4 such as snow plowing, winching, and other related uses.
5 On November 23, 1976, the CARB adopted standards of
6 0.50/9.0/1.5 grams per mile for 1981 models which will be
7 applicable to IH's line of Scout vehicles. Emission control
8 technology required or under consideration applicable to the
9 stringent 1981 standards is: three-way catalyts, closed loop
10 fuel system, EGR, air injection, electronic spark timing
11 control, modulated air inlet control, fast choke, etc.
12 Although IH has much concern as to the successful
13 application of the available technology to its line of
14 Scout vehicles, we believe that the Board's scheduled imple-
15 mentation date with the more stringent standards would possibly
16 allow for the orderly development and phase-in of this
17 technology on our vehicles, assuming that the technology can
18 be applied to this class of vehicles with no durability issues
19 surfacing.
20 With the requirements defined and the implementation
21 schedule known, IH has estimated the cost effects associated
22 with these requirements. For the 1981 model year, product
23 cost increase due to hardware has been estimated at $316 per
24 unit. Although such a product cost increase is significant,
25 IH believes that its pricing would be competitive since other
26 manufacturers would incur similar penalties. However, IH's
27 product tooling and development costs are estimated at approxi-
28 mately $7.4 million. At a sales forecast of 2593 units per

1 year in 1981 and 3121 units in 1982, this represents over
2 $1,294 per unit over the applicable two-year life of the 1981
3 standards. Clearly, the product cannot support such expendi-
4 tures. Should EPA grant California the waiver to enforce
5 their 1981 standards of 0.5/9.0/1.5 grams per mile hydrocarbon,
6 CO and NO_x respectively, IH's costs will be excessive and IH
7 can only conclude that it will be forced out of the California
8 marketplace.
9 As a small-volume manufacturer, development and
10 tooling costs are outstripping our ability to remain competi-
11 tive in the marketplace. Until this time, differences in
12 California emission standards versus federal requirements
13 have not presented such a wide disparity in development costs,
14 although certain engine options have had to be dropped from
15 the California market.
16 As stated earlier, IH does not build passenger cars.
17 We do not have the large volumes to spread the high develop-
18 ment and tooling costs associated with the advance technology
19 required for accelerated scheduled reductions in emission
20 standards for medium-duty vehicles. Historically, truck
21 emission standards have followed passenger cars. For those
22 truck manufacturers who are also high volume passenger car
23 manufacturers, technology is a hand-me-down situation. Tooling
24 and development costs benefit from the economics of high vol-
25 ume operations.
26 Attachment 1 lists IH sales of Scout vehicles in the
27 State of California from 1970 through 1977 model year.
28 Federal 49-State volumes are shown for comparison purposes.

1 Additionally, we have included sales volumes for our light
2 line of pickups and Travelalls produced during the 1970-75
3 model years. Production of these models was discontinued in
4 1975. Regulatory requirements as well as competitive
5 pressures dictated that these models be discontinued.
6 As contained in California's 1978 Exhaust Emission
7 Standards and Test Procedures, IH has received the waiver for
8 its 1978 medium-duty models, our Scouts. With both California
9 and federal standards being essentially the same for the 1979
10 model year, IH is developing catalytic control systems to be
11 used nationwide. As a result, IH's development costs of
12 $3,950,000 for the 1979 models will be spread over 31,900
13 units per year instead of 2,516 units per year for California
14 only. Although future federal action is unknown, California,
15 by virtue of its more stringent standards, is apparently
16 preceding federal requirements by an estimated two years,
17 which results in the use of highly complex and costly tech-
18 nology attributable to California production only. An
19 expenditure of $7.4 million would be in addition to the
20 $3.9 million invested for the 1979-80 models.
21 Faced with the above situation, IH has considered
22 purchasing available technology. Purchase of a competitor's
23 engines and control technology, as well as the use of
24 identical transmissions and axles, would first appear to
25 indicate that IH's development costs could be substantially
26 reduced. However, exhaust emission certification of vehicles
27 in the 0-8500 pound class is a complete vehicle certification
28 program which ultimately rests with the vehicle manufacturer.

1 Component installation costs as well as development of emission
2 control hardware in our application would be involved. While
3 the specific economics are unknown at this time, initial
4 estimates suggest that the development costs may be 15% less;
5 installation, tooling and plant rearrangement costs will be
6 higher. Therefore, we believe that the net costs will be
7 greater than that incurred in using our own engines.
8 At this time we have had difficulties establishing
9 an appropriate family of purchased engines that could be
10 available. IH has initiated studies with a number of
11 potential suppliers. Many aspects of such a joint venture
12 must be considered which must lead to a stable position
13 through the 1980's.
14 Any plan such as this would place IH with a single
15 source for its gasoline engines. Under normal business
16 conditions, acceptable working relations exist; but under
17 other conditions such as rapid market expansion, IH's produc-
18 tion would be jeopardized. For example, IH had, prior to the
19 1973-74 oil embargo, purchased six-cylinder engines from an
20 automotive manufacturer to supplement its line of eight-
21 cylinder engines. When the oil embargo hit, IH was unable to
22 purchase the volume of six-cylinder engines it needed due to
23 the demand upon its engine supplier for six-cylinder engines
24 in its own vehicles. The supplier's capacity to produce
25 such engines was outstripped. This situation ultimately led
26 to their refusal to continue sales to IH.
27 Any decision to purchase engines for our Scout line
28 of vehicles would dictate that these engines be used nationwide

1 in 1981. This action would trigger the end of production
2 at Indianapolis of our four-cylinder and small V-8 engines.
3 Loss of this production in a plant presently operating at less
4 than acceptable volume would cause extreme economic disrup-
5 tions due to lack of sufficient time to prepare for work
6 replacement in a coordinated manner. Seventy-five percent of
7 the plant is devoted to a 4-196 and small V-8 production.
8 Thus, IH concludes that it would be no better off in
9 considering the purchasing of technology than to pursue the
10 continued development on its own engines. In fact, purchasing
11 engines from a competitor would hasten the end of production
12 of its highest volume small V-8 engines as used in its heavier
13 duty truck applications.
14 In summary, International Harvester Company requests
15 of EPA to deny California the waiver requested. The cost of
16 the technology required is such that it effectively precludes
17 IH from its use.
18 The situation noted is a result of California's earlier
19 implementation of more stringent medium-duty vehicle emission
20 standards than the federal government, which requires tech-
21 nology that is more sophisticated and costly in the 1981-82
22 time frame.
23 IH's low volume prevents spreading major development
24 and tooling costs over its vehicle production as can be done by
25 large volume passenger car manufacturers working to an
26 earlier schedule.
27 International Harvester Company requests of EPA to
28 weight the benefits to the State of California against the

1 difficulties and the economics faced by the low volume manu-
2 facturer. IH's forced withdrawal from the California market-
3 place would have a threefold effect on all parties concerned.
4 First, IH would not be in the California market-
5 place and would lose our projected 2600 annual sales. On the
6 surface this appears to be a detriment to IH only. However,
7 removing a competitor form an active marketplace gives an
8 entry to the remaining competitors for more active penetration
9 in the same market with a different price/demand relationship.
10 In effect, the California consumer could be paying more for
11 a similar product in the same marketplace.
12 Second, IH has approximately 50 dealers in the State
13 of California whose only IH product line is Scouts. I'll add
14 at this point we have another 50 dealers that are not exclusive
15 IH dealers. In the event IH was forced to discontinue the
16 sale of Scouts in California, one of two circumstances would
17 occur with these dealers.
18 Due to the overhead and related costs associated
19 with their sale of Scouts, they would either attempt to
20 overcome those costs by acquiring a similar or related
21 product line, or eliminate those costs by cutbacks of
22 employees and expenditures. Even if they chose the prior,
23 there would be a time delay in setting up a new line of
24 merchandise. In effect, there would be loss of gross income,
25 expenditures, and their related benefits to the people of
26 California.
27 In addition, there are approximately 20 IH dealers
28 who sell Scouts as their main association with IH trucks but

1 do sell, in lesser volumes, large IH trucks. If these dealers
2 lost the Scout, a large percentage of their business, it would
3 probably, due to lack of volume on larger models, force
4 termination of their business ties with IH trucks.
5 Third, if IH were forced to stop selling Scouts in
6 the California market for a period of two years or until
7 certification became practical and economical with our sales
8 in the remaining 48 states, re-entry into the California
9 sport/utility market would be difficult, costly, and in all
10 probability would never reach the levels of market penetration
11 that IH would have attained if continued sales had been
12 allowed. Our dealership organization would disintegrate. IH
13 could not maintain a dormant marketing force in California
14 for two years. Thus, once out of the California market,
15 IH does not anticipate re-entry at a future date.
16 In closing, IH urges EPA to deny California a waiver
17 for its 1981 and later model year medium-duty vehicle emission
18 standards until such time as federal requirements require
19 similar technology.
20 That's the end of my written statement.
21 CHAIRMAN JACKSON: Mr. Martin, is it fair to
22 conclude from the statement that you have made that in your
23 judgment it is technologically feasible to meet the standards
24 applicable to IH's product line that are proposed by the
25 CARB but for reasons of cost it's not a practical thing for
26 IH to do?
27 MR. MARTIN: Yes, with one clarification.
28 We think maybe the numbers can be reached. We still

1 hold reservations about the durability issue on this line of
2 vehicles, and until --
3 CHAIRMAN JACKSON: Not durability in terms of
4 certification, though?
5 MR. MARTIN: Well, we have reservations there, too.
6 The deterioration factors, we have concerns over those, but
7 the deterioration and the durability and customer use is a big
8 item to us.
9 CHAIRMAN JACKSON: Have you run any of these vehicles
10 with this hardware on them that gives data to justify your
11 concern?
12 MR. MARTIN: We have not run this kind of hardware
13 vehicle applications at this point in time. We are only
14 basing it on our knowledge of two-way converters, of that
15 experience we have to date and in the past, and we know from
16 the public record.
17 MR. GRAY: Mr. Martin, just to follow up that
18 general area regarding costs.
19 It appears that the big problem in terms of cost
20 impact is the area of tooling and development costs --
21 MR. MARTIN: That's correct.
22 MR. GRAY: -- as compared to your current medium-
23 duty vehicles.
24 What additional systems would have to be added to
25 the vehicles to meet the '81 standards?
26 MR. MARTIN: We are talking about the three-way
27 converter?
28 MR. GRAY: Yes.

1 MR. MARTIN: We have plans for the probable need of
2 a warm-up model of some sort, exhaust system rearrangements.
3 We have some combustion chamber work to do; that's because of
4 the ORI problem. We anticipate some changes there. The
5 electronic spark control, some of the items I mentioned on
6 the one page.
7 MR. GRAY: Okay. Looking at those items, I guess the
8 concern that I still have is that it appears that many of
9 these things are the type of components that you could purchase
10 from a vendor, certainly the three-way catalyst and probably
11 even the closed loop fuel control system and the electronics
12 associated with that, the electronic spark control system
13 rather than to purchase another manufacturer's engine as you
14 discussed in your statement.
15 Do you not consider it practical to purchase these
16 components so that you would not have to incur the tooling
17 costs and extensive development costs that you have indicated
18 here?
19 MR. MARTIN: Oh, we don't do any development of,
20 say, the three-way converter itself. We buy that. We buy
21 the closed loop fuel system, the carburetor. But the
22 development cost is the application in the vehicle; does it
23 meet the standard? All of the vehicles that we have to use
24 in the fleet, we have something like 50 vehicles we are talking
25 about. All of that and the rework, the tooling. We have to
26 buy into the tooling to be able to buy any of these components
27 from another manufacturer. We would share in that tooling
28 cost. So, that's part of what we mean by tooling costs.

1 MR. GRAY: Would you give us a better segmentation
2 of the tooling costs versus development costs that make up the
3 $7.4 million?
4 MR. MARTIN: Okay. $4.9 million is the development
5 cost; $2.5 million roughly is tooling. That's product tooling
6 cost. We don't have a firm estimate yet on what plant or
7 facility cost would be involved. There could be some there
8 very well. We know there will be, but how much we don't know
9 at this time.
10 MR. GRAY: In calculating your $4.9 million for
11 development, you assumed you would have to run 50 different
12 vehicles through a development program?
13 MR. MARTIN: Right, development and certification
14 program.
15 MR. GRAY: Explain why you would need that many
16 vehicles.
17 MR. MARTIN: Well, I don't know if I can do it
18 adequate enough, because I don't have that detail.
19 There is a development fleet that is first run of --
20 and I don't remember how many vehicles are in it, six or eight
21 vehicles. Then there is a pre-certification fleet that
22 would then be run of that many more vehicles, and then a
23 certification fleet itself would be planned.
24 Then there are some other vehicles for other uses
25 that have to be taken care of other than just on "evap"
26 systems and things like that.
27 MR. GRAY: This would cover the costs associated with
28 developing and recertifying all the current versions that you

1 offer in California? This wouldn't reflect any IH decisions
2 regarding concentrating on a limited number of engine/vehicle
3 combinations?
4 MR. MARTIN: It's already limited. There's only
5 two engines, the 4-196 and the 345 is what we are speaking of.
6 MR. GRAY: And these 50 vehicles would be to develop
7 and certify those two engine families in California?
8 MR. MARTIN: That's correct. There's four models
9 involved.
10 We didn't discuss anything in this testimony about
11 the diesel engine. We kept that a separate subject.
12 MR. HELLMAN: You indicated that the cost for the
13 1981 system would be $316 per unit. That's retail price
14 equivalent?
15 MR. MARTIN: That's a sticker price increase.
16 MR. HELLMAN: Sticker price increase. What is that
17 compared to today's truck?
18 MR. MARTIN: That's over a '79 system.
19 MR. HELLMAN: That's over a '79 system which does,
20 as you indicated before, include a converter?
21 MR. MARTIN: A two-way converter.
22 MR. HELLMAN: That's in addition to this 1979
23 system?
24 MR. MARTIN: That's right.
25 CHAIRMAN JACKSON: Mr. Martin, you have rejected the
26 idea of using diesel engines?
27 MR. MARTIN: We have a diesel engine right today,
28 and we are hoping that it will still be in our marketing plans

1 for 1979. At least we are working with the supplier of that
2 engine in hopes that it will still be in there, but if we lose
3 V-8 engines or four-cylinder gasoline engines, there's not
4 going to be too much left over for diesel. The sales volumes
5 of the diesel have been going down ever since we first intro-
6 duced it. It's not really an acceptable engine for the
7 vehicle in the amount of horsepower that's available. It
8 doesn't have the power that a gasoline engine does that the
9 market expects.
10 MR. GRAY: Do you know how your sales split between
11 two-and four-wheel drive vehicles?
12 MR. MARTIN: We are at about 80 percent four-wheel
13 drive, 80 to 85 percent. The last I heard, Mr. Gray, that
14 was a year or so ago. It stays right there pretty constantly.
15 CHAIRMAN JACKSON: Thank you, Mr. Martin.
16 MR. MARTIN: Thank you.
17 CHAIRMAN JACKSON: We will take a five-minute break.
18 (Short recess.)
19 CHAIRMAN JACKSON: Mr. Schwentker, we are ready for
20 you.
21 MR. SCHWENTKER: Good. I'll only take a couple
22 minutes.
23 My name is Don Schwentker. I am with the Washington/
24 New York law firm of Rivkin, Sherman and Levy, and we are
25 general counsel for the Automobile Importers of America.
26 I think that consideration of the waiver of
27 requirements that are not formally adopted by the ARB is
28 premature. I agree with some of my colleagues that spoke on

1 this point earlier today, specifically the high altitude
2 amendment that's expected to be considered at a public hearing
3 on the 6th of June. We were just notified of this recently.
4 The record closing on the 10th of June is hardly sufficient to
5 comment on a regulation that's to be adopted on the 6th of
6 June.
7 The same thing is true of the non-methane hydrocarbon
8 standard of .39. That has not yet been adopted. We received
9 notification by telephone of the hearing to adopt the .39
10 hydrocarbon standard not from the California Air Resources
11 Board but from John Rugge who works for you, Ben, which is a
12 rather unusual way to learn of a public hearing on a California
13 standard. To say that that kind of rule making is sloppy, I
14 think is an understatement.
15 California rule making does proceed in a rather
16 informal way, to use a charitable expression, and I have been
17 involved with it for nine years. It is not unusual to have
18 a notice of a public hearing for a hearing that's to take
19 place in 30 days with the test procedure to be available only
20 to find that the test procedure is not available and there is
21 not sufficient time to comment on it before the hearing.
22 So to consider it a waiver hearing of a regulation
23 that has not yet been adopted, I think, is indeed premature.
24 Adding material for the record, if requested by the hearing
25 officer, is an entirely different situation than being
26 expected to comment for the record on something that is
27 adopted after the close of the public hearing. I don't
28 think that is what is meant by a public hearing. I think that

1 adding material for the record is fine if you ask for addi-
2 tional data to be submitted or if a witness realizes during
3 his testimony that he has something he would like to add
4 later on, but I don't think it's appropriate for us to be
5 limited in our comments on a particular regulation by adding
6 something for the record.
7 I'd like to comment also on the question that was
8 asked of General Motors earlier on model availability and
9 whether or not marketing considerations were an additional
10 factor considered.
11 Marketing considerations are indeed important in
12 California, but these decisions are, in most cases -- and I'm
13 sure I am right with respect to other than imported automobile
14 manufacturers. Marketing decisions are based on the cost of
15 compliance with California standards, drivability and fuel
16 economy considerations that are, among other things, related
17 to meeting these California standards. They are only
18 marketing and commercial decisions to the extent that decisions
19 are made that it is not practical to offer a particular con-
20 figuration in California due to the high cost of meeting the
21 California standards or due to drivability problems with a
22 particular configuration or fuel economy problems. So, it's
23 not really fair to say that this is just purely a marketing
24 decision not to offer a particular configuration in
25 California. A purely marketing decision, presumably, would
26 be based on a decision not to offer a particular configuration
27 in California if California's emission standards were the same
28 as the federal standards. That's just simply not the case.

1 There are many configurations that are not offered in
2 California because of the California standards. Some of
3 them are directly related to not being able to meet the
4 standards with the particular configuration, and in other
5 cases, there are these side effects that I am talking about.
6 I also would like to see clarification of this
7 air/fuel ratio anti-tampering provision. I listened to all
8 of the discussion today, and I still don't understand where
9 we are with respect to whether the carburetor has to be
10 removed or whether it need not be removed or whether the tool
11 that's to be used must not be available from Pep Boys or it
12 must only be available in the zone office or whatever. I
13 think that clearly needs to be cleared up.
14 When you read the requirement literally, there are
15 two alternatives: one, that the executive officer may ask
16 that the emissions test be done at any particular setting
17 within the range and the vehicle must meet the standard; or,
18 in the alternative, that the mixture adjustment mechanism is
19 not visible even with the air cleaner removed. And special
20 tools and/or procedures are required to make adjustments.
21 If I understand what that means, I think it means
22 that, number one, the mixture adjustment mechanism must not
23 be visible; and, number two, a special tool must be required
24 to make the adjustment, or a special procedure -- whatever
25 that is -- must be required to make the adjustment. And I
26 sure would appreciate some clarification on that.
27 Also in the ARB testimony this morning, Gary
28 Rubenstein said that Honda and Subaru said they could meet the

1 .41, 9.0 and 1.0 standard. I don't think he said all of it.
2 I think Honda and Subaru also said that the standards create
3 drivability and fuel economy problems, and that was not
4 mentioned by ARB. The implication was that Honda and Subaru
5 endorsed the .41, 9.0 and 1.0 standard.
6 With respect to the vehicles that meet the
7 California 1980 numbers today, not only must we consider the
8 engineering target criteria and the uncertainties resulting
9 from future use of MMT that were described earlier today, but
10 the fact that federal fuel economy standards that become more
11 stringent in the years to come and as well weight increases
12 that may result from meeting more stringent federal safety
13 standards for bumper protection and occupant crash protection,
14 to name a couple.
15 Also I'd like to mention that Table 4 in the ARB
16 presentation that lists the 1977 certification vehicles that
17 meet the '79 standards is an impressive list, but it could be
18 a lot longer, because it's my understanding that all of the
19 vehicles that are sold in California this year met the 1979
20 California standard.
21 That's a poke. They meant 1980, but the graph
22 says 1979.
23 CHAIRMAN JACKSON: I'm glad you added that little
24 bit on the end there.
25 MR. SCHWENTKER: We've got to have some fun; don't
26 we?
27 CHAIRMAN JACKSON: Mr. Schwentker, when did you
28 first learn of the fact that the .41 standard was to be a

1 non-methane equivalent?
2 MR. SCHWENTKER: You mean that the .41 standard was
3 to be changed to .39?
4 CHAIRMAN JACKSON: That it was to be a non-methane
5 equivalent.
6 MR. SCHWENTKER: Well, I guess I learned that it
7 was to be a non-methane equivalent at the time I received the
8 California test procedure that proposed to authorize the
9 Executive Officer to hold a hearing to consider adoption of
10 the standard as .39, and that was about the sixth of May.
11 CHAIRMAN JACKSON: But you were never under the
12 impression that the .41 was a non-methane equivalent or that
13 it was intended to be a non-methane hydrocarbon standard, the
14 equivalent of .41 non-methane?
15 MR. SCHWENTKER: Well, I didn't understand that,
16 that's for sure.
17 CHAIRMAN JACKSON: You never knew that before
18 John Rugge called you and informed you that --
19 MR. SCHWENTKER: John Rugge called me to inform me
20 of the date of the hearing, and I got the call from John Rugge
21 the same day that I got the mail from the California ARB
22 containing the staff report that's to be presented to the
23 Board at its next meeting that discusses this problem and the
24 high altitude problem and "evap" problem and there's about
25 five problems considered by that one staff report that I
26 received, I think, on the 6th of May.
27 My complaint is really a procedural one. With
28 respect to the .39, no one has had an opportunity to comment

1 whether .39 is an appropriate number. I don't know whether it
2 is or not. I am not arguing that. I am arguing from a pro-
3 cedural point of view I think it's inappropriate to consider
4 granting a waiver on a standard that's not yet been adopted.
5 If the California Administrative Procedure Act is
6 to be followed, they are to give notice of a public hearing
7 and they are to take testimony and they are to consider that
8 testimony. If you today can grant a waiver for a .39
9 standard, it would appear that the decision has already been
10 made. I don't know whether the number is right or not. I
11 just think that the people ought to be given an opportunity to
12 comment on it and consider it first, of course.
13 CHAIRMAN JACKSON: I have two questions here sub-
14 mitted by the CARB for you, Mr. Schwentker.
15 The first one is: Are you stating that the
16 proposed regulations requiring the .39 gram per mile standard
17 and high altitude regulations were not available at least
18 30 days prior to the June 6th public hearing which ARB has
19 scheduled?
20 MR. SCHWENTKER: I didn't say that those were not
21 available. I am saying that I received them in the mail, I
22 think, about the 6th of May. I can't tell you exactly, but I
23 think it was the 6th of May. And, yes, that would be just
24 exactly 30 days or 31 days from June 6th.
25 What I said was I received notification of the date
26 of the hearing from John Rugge on the telephone and that
27 notification I think I received on the 7th of May. I could
28 check my telephone diary and confirm that. But I think I

1 received it on the 7th, and it was either the same day or the
2 day after that I received the staff report in the mail.
3 Now the staff report, and I have a copy with me,
4 only says that it is making a recommendation to the Board
5 that the Board authorize the Executive Officer to hold a
6 hearing. Now that thing is dated May 26th, because that's
7 the date that it's to be presented to the Board.
8 CHAIRMAN JACKSON: Will AIA members be submitting
9 comments on the .39 gram per mile standard and high altitude
10 regulations to CARB at the June 6th hearing?
11 MR. SCHWENTKER: I don't know.
12 CHAIRMAN JACKSON: And the follow-up to that:
13 Can't these comments also be supplied to EPA for consideration
14 in the waiver deliberations?
15 MR. SCHWENTKER: Well, I'm sure that can be done.
16 You know, any comment that is furnished to the ARB certainly
17 can be furnished to EPA, but that's not the point I was trying
18 to make. The point I was trying to make is that normally in
19 a waiver hearing, one discusses regulations that are adopted
20 and are on the table before us. Right now the ARB is pro-
21 posing to adopt the .39 non-methane hydrocarbon standard on
22 June 6th. What if they don't? What if they adopt something
23 else? Maybe the comments will be so persuasive that ARB will
24 adopt something different than what they propose, God forbid.
25 Then where are we?
26 CHAIRMAN JACKSON: Who do you know that has that
27 persuasive power?
28 MR. SCHWENTKER: I keep looking for somebody.

1 There's bound to be somebody somewhere.

2 CHAIRMAN JACKSON: There is a fact included along

3 with these two questions that I thought I would read into the

4 record, which is the .39 gram per mile standard and high

5 altitude regulations were available at ARB and mailed to

6 manufacturers on April 27, 1977.

7 MR. SCHWENTKER: The fact that they are available is

8 lovely. If one knows that they are available, then he can go

9 by there and pick them up.

10 The point I am trying to make is that I got them

11 out of my mailbox on about the 6th of May or the 7th of May,

12 and I'll have to check if you really want to know which day

13 it was, whether it was the 6th or 7th.

14 What I mentioned earlier was, when I talked about

15 sloppy rule making, the fact that frequently notification is

16 sent out of a public hearing that is to be held 30 days in the

17 future to satisfy the requirements of the California Adminis-

18 trative Procedure Act, but the regulations that we are to

19 discuss are not available at that time. And that happens

20 more than just occasionally. That happens all too frequently.

21 In this particular instance, I did have the staff

22 report about 30 or 31 days before the June 6th hearing. I'm

23 sure that's why the June 6th date was picked.

24 I'm just complaining about the way we find out about

25 things, and I'm complaining about having to consider something

26 at a waiver hearing before it's formally adopted. I just

27 think that's inappropriate.

28 CHAIRMAN JACKSON: Thank you very much.

1 MR. SCHWENTKER: Thank you.
2 CHAIRMAN JACKSON: Your comments are duly noted.
3 MR. FLEISCHAKER: I think I am the wayward son at
4 this hearing, because I am going to discuss a little different
5 issue than has been discussed but which I think is important
6 and I appreciate the opportunity to do it today.
7 CHAIRMAN JACKSON: Is it on the agenda?
8 MR. FLEISCHAKER: In my opinion, it is.
9 CHAIRMAN JACKSON: Then you may proceed.
10 MR. FLEISCHAKER: My name is Marc L. Fleischaker,
11 and I am an attorney with the Washington, D.C. law firm of
12 Arent, Fox, Kintner, Plotkin & Kahn. I am appearing today
13 on behalf of the Motor and Equipment Manufacturers Associa-
14 tion, MEMA, a national trade association representing
15 approximately 750 manufacturers of automotive parts. The MEMA
16 member manufacturers produce vehicle equipment both for use
17 as original equipment by the automobile manufacturers, and
18 for sale to vehicle owners through the automotive aftermarket.
19 MEMA opposes granting California a waiver to
20 implement yet unadopted certification test procedures
21 applicable to 1980 and subsequent model year passenger cars,
22 light-duty trucks and medium-duty vehicles imposing a
23 restriction on allowable maintenance. I might just add here
24 I am not talking about the anti-tampering regulation which has
25 been discussed by several other witnesses, but it will be
26 clear in a minute what I am talking about. MEMA opposes
27 the grant of this waiver because (1) it is premature, (2) it
28 fails to meet the prerequisites for a waiver under Section

1 209(b) of the Clean Air Act, (3) it would be severely
2 anticompetitive in its effect, and (4) it will have a detri-
3 mental effect on vehicle emissions in the State of California.
4 With respect to the timing of the proposal,
5 California Air Resources Board Resolution No. 77-16, upon
6 which the request for a waiver is based, has not been approved
7 by the California Air Resources Board, and will not be
8 approved at least until the May 26 meeting of the Board in
9 San Diego. Consequently, if the EPA were to grant a waiver
10 at the current time, it would be doing so blindly, since it is
11 not yet known what the regulations adopted by the Board will
12 contain. As will be discussed more fully below, MEMA believes
13 that the EPA should not grant the State of California a waiver
14 from federal preemption to implement regulations unless the
15 EPA knows precisely what those state regulations contain.
16 Since there is no way at the current time for the EPA to know
17 this, it would be premature for the waiver to be granted.
18 I gather that there's some agreement with this
19 particular point since it's not, apparently, up for a waiver
20 today. However, I think it's appropriate to discuss the merits
21 of it, not only because it appeared to be on the published
22 agenda for this hearing. I might note in that regard that
23 this regulation has the exact same title and was considered
24 on the same dates as the regulation on the anti-tampering
25 proposal, but also because --
26 CHAIRMAN JACKSON: Excuse me, Mr. Fleischaker.
27 MR. AUSTIN: If I might clarify, Mr. Jackson, we
28 have not applied for a waiver for the regulations which this

1 gentleman is discussing. You noticed our regulations
2 regarding anti-tampering and described them in a manner that
3 I think has led him to conclude that you are considering here
4 regulations which we have yet to adopt and yet to request
5 a waiver from EPA on.
6 MR. FLEISCHAKER: I think that is an accurate
7 statement of the facts, but I would think it's not inappro-
8 priate to proceed for the reason that it did appear to be
9 on the agenda, number one; and, number two, that is being
10 considered again by the Air Resources Board at the May 26th
11 Board meeting.
12 CHAIRMAN JACKSON: I think I can clear up the issue.
13 You are right, the notice may be somewhat misleading. The
14 reason is we quoted in the notice -- or paraphrased, I should
15 say, in the notice language from a document which was read into
16 the record on the first day of this hearing, which is a letter
17 to the Administrator from the California Air Resources Board
18 dated January 20th, 1977 in which on Page 3 the California
19 Air Resources Board said under Heading 3, "Allowable
20 maintenance. In another action taken after a duly noticed
21 public hearing in its December 14, 1976, meeting, the Air
22 Resources Board amended the certification test procedures
23 applicable to passenger cars, light-duty trucks, and medium-
24 duty vehicles to impose a restriction on allowable maintenance.
25 In essence, the test procedures now require a sealing or
26 redesign of carburetors so that they cannot easily be mis-
27 adjusted."
28 The restriction on allowable maintenance language

1 picked up in our notice, and I think that it's probably
2 appropriate to say that that was improper on our part, one,
3 and probably not an entirely appropriate phrase to be used in
4 this particular letter.
5 MR. FLEISCHAKER: I just might note that the
6 California proposal, I suppose you would call it, on this
7 is entitled "California Exhaust Emissions Standards and Test
8 Procedures for 1980 and Subsequent Model Passenger Cars,
9 Light-Duty Trucks, and Medium-Duty Vehicles." It states
10 on this, "Adopted November 23, 1976, amended December 14,
11 1976."
12 It's precise with what was in the Federal Register.
13 CHAIRMAN JACKSON: And the only amendments they
14 adopted were the anti-tampering amendments; is that right?
15 MR. AUSTIN: That's correct.
16 CHAIRMAN JACKSON: I think that effectively precludes
17 the relevance of the testimony that you are offering before us,
18 in that it relates to a matter that's not before the
19 Administrator for decision.
20 Is there any argument about that?
21 MR. AUSTIN: Not from the Air Resources Board.
22 MR. FLEISCHAKER: I would agree it's not before the
23 Administrator apparently for decision. I'd like to submit it
24 for the record if I might, nevertheless, and make some comments
25 on the general waiver which clearly is --
26 CHAIRMAN JACKSON: A topic for discussion tomorrow.
27 MR. FLEISCHAKER: A topic for discussion.
28 CHAIRMAN JACKSON: Do you plan to be here tomorrow?

1 MR. FLEISCHAKER: No, I don't.
2 CHAIRMAN JACKSON: I will accept your comments on
3 the general waiver. I would respectfully request that you
4 withdraw the request to include in the record the comments on
5 the matter that's not before us. That falls in the category
6 of other things that don't affect us that we should consider.
7 So if we could move to your comments on the general
8 waiver.
9 MR. FLEISCHAKER: Did you want my concurrence to
10 that or not?
11 CHAIRMAN JACKSON: That would be nice.
12 MR. FLEISCHAKER: But you are going to do it in any
13 event, exclude it?
14 CHAIRMAN JACKSON: That is correct.
15 MR. FLEISCHAKER: Then you don't need my con-
16 currence.
17 CHAIRMAN JACKSON: We like to be as amicable about
18 these things as we can.
19 MR. FLEISCHAKER: MEMA wishes to state its opposition
20 to granting California a general waiver of federal preemption
21 for all standards and test procedures, including accompanying
22 enforcement procedures adopted by the California Air Resources
23 Board in the future that relate to the control of emissions
24 from new motor vehicles or new motor vehicle engines. We
25 are concerned that California, as we believe it has in the case
26 of the proposed regulation which I am not discussing, will
27 interpret the phrase "related to the control of emissions from
28 new motor vehicles" broadly so that it encompasses numerous

matters not primarily designed to control emissions from new motor vehicles. In this case, I am specifically referring to matters which are more closely allied to maintenance practices than to certification practices.

Furthermore, in adopting the Clean Air Act Congress intended that a specific showing should be made by California that its standard is stricter than the federal standard, that it is technologically feasible, that extraordinary conditions exist in California, and that the California rules are consistent with Section 202(a) of the Clean Air Act. Otherwise the Congress itself could have granted a blanket waiver, rather than setting forth specific criteria, and noting that the waiver should be granted only after notice and opportunity for public hearing, and in general requiring the state to prove that a more stringent standard is necessary than the federal standard.

That's my summary comment on the general waiver.

CHAIRMAN JACKSON: Thank you very much, sir.

We will reconvene at 9:00 a.m. in this room tomorrow morning and take up the matter of the general waiver.

(Whereupon, the proceedings adjourned at the hour of 5:44 o'clock p.m., to be reconvened at the hour of 9:00 o'clock a.m., Thursday, May 19, 1977.)

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