UNITED STATES OF AMERICA
BEFORE FEDERAL TRADE COMMISSION

In the Matter of UNION OIL COMPANY OF CALIFORNIA, a corporation.	)	Docket No. 9305 Public Version

COMPLAINT COUNSEL'S OPPOSITION TO UNOCAL'S MOTION TO COMPEL AMENDED INTERROGATORY RESPONSES

I. Background 2

II. Complaint Counsel's Responses To Unocal's First and Second Set of Interrogatories Remain Complete and Correct. 5

A. Complaint Counsel's Interrogatory Responses, Consistent With Complaint Allegations, Maintain That CARB Would Have Taken Action To Avoid Handing Unocal Monopoly Power. 5

B. Testimony By CARB Witnesses Demonstrates That CARB Would Not Have Adopted Current Regulations Giving Unocal Monopoly Power 7

C. The Interrogatory Responses And The CARB Testimony Are Consistent And Accurate. 9

1. The U.S. EPA's Specifications Would Likely Govern in California. 10

2. CARB Would Have Adopted Regulations Without a T50 Specification. 11

3. CARB Would Have Altered the Specifications Rather Than Grant Unocal Unrestricted Monopoly Power. 12

III. Unocal's Motion Is A Disguised Motion for Summary Decision That Should Be Denied 16

IV. Conclusion 18

Unocal's "Motion to Compel Amended Responses to Interrogatories" ("Respondent's Mot.") is a real head-scratcher. Unocal wants this Tribunal to force Complaint Counsel to change our interrogatory answers, which we believe are already correct and complete. Unocal's motion makes no sense.

The crux of the interrogatories at issue is what would have happened "but for Unocal's fraud" during the California Air Resource Board's ("CARB") efforts to create cost-effective regulations governing the production of reformulated gasoline ("RFG"). The Complaint answers the question:

> But for Unocal's fraud, CARB would not have adopted regulations that substantially overlapped with Unocal's concealed patent claims; the terms on which Unocal was later able to enforce its proprietary interests would have been substantially different; or both. (Complaint, ¶¶ 5, 80)

Complaint Counsel's interrogatory responses provide additional detail, laying out various scenarios that CARB had available had Unocal not committed the fraud. CARB's response would necessarily have differed depending upon how Unocal "cured" this anticompetitive conduct. For example, if Unocal had simply disclosed its pending patent, as it had done on another occasion, CARB might have chosen not to regulate at all, and thereby default to RFG regulations promulgated by the Environmental Protection Agency. CARB would not have incorporated specifications providing Unocal with "an extreme opportunity to increase their profits and jeopardize the recovery of other – the cost to other refiners and also impose that cost on the consumers of California." Venturini Dep. 516:4-15.[1] Alternatively, had Unocal disclosed its patent application and dedicated any rights flowing from it to the public, the regulations likely

---

[1] Venturini Dep. Attached as Appendix 1.

would be the same as today. Finally, had Unocal simply remained silent about its "proprietary" technology, CARB would have remained blissfully ignorant, or at least unconvinced, of the merits of Unocal's proposal. CARB simply would not have incorporated the T-50 specifications that provide Unocal with its leverage over the rest of the refiners and California consumers.

These responses, and related permutations, are provided in Complaint Counsel's responses to Unocal's interrogatories. Unocal's motion contends that Mr. Peter Venturini, Chief of the Stationary Source Division of the California Air Resources Board, testified contrary to these responses. A comparison of Mr. Venturini's testimony and the interrogatory responses demonstrates that this motion is totally without foundation, and as such, can only be viewed as a transparent effort to distract this Tribunal's attention from the substance of Mr. Venturini's testimony. Indeed, Mr. Venturini testifies, in no uncertain terms, that "but for" Unocal's fraud, "the critical thing is that there wouldn't have been this -- this regulation." Venturini Dep. at 515:21-25.

In short, Unocal's motion has no basis in law or fact. Unocal cannot seek to have interrogatory responses amended simply because they are not to Unocal's liking. The administrative hearing scheduled to take place before this Tribunal is the appropriate place to raise and resolve factual and legal disputes. Unocal cannot attempt to shortcut this process in the guise of a discovery dispute. Accordingly, as set forth more fully below, Unocal's motion should be denied.

I. Background

This motion revolves around interrogatories asking what CARB would have done had Unocal not engaged in fraudulent conduct during the CARB RFG proceeding. In other words,

these interrogatories concern what the "but for" world look like. In order to understand the "but for" world, it is necessary to have some background about the actual world.

It became clear in the late 1980s that environmental regulations were coming that would require refiners to make substantial changes to how gasoline was formulated. In analyzing the direction of these potential regulatory changes, Unocal performed research that concluded that certain gasoline properties are particularly important in reducing certain types of emissions. According to this research, one of the key properties was T50, the temperature at which 50% of a batch of gasoline evaporates.

Unocal saw an opportunity to profit from these results. According to Unocal documents written at the time, Unocal developed a plan to "force all other gasoline marketers to license our technology." CX 493 at p. 2.[2] To implement this strategy, these documents propose that Unocal "Show emissions work to regulators, make Unocal specifications required in the industry." CX 203 at p. 12.[3] If Unocal were able to obtain both a patent and influence the regulations, it could make lucrative licensing agreements: "Potential royalties from such agreements are as high as $114,000,000/year ($0.001/gallon) in the United States alone. This is far more than could be gained from any other competitive advantage. To this end we have applied for a patent based on the 5/14 results, and have a good chance of getting it." CX 210 at p. 2.[4]

As part of its action plan, in May 1991, Unocal arranged a presentation to CARB to present its research results: "The purpose of the presentation should be to convince CARB staff

---

[2] CX493 Attached as Appendix 2.

[3] CX203 Attached as Appendix 3.

[4] CX210 Attached as Appendix 4.

that the predictive equations or vehicle testing in particular should not include unnecessary minimums or maximums on fuel parameters.... The second priority is to convince CARB of the importance of T50." CX 241 at p. 1.[5] CARB found the presentation from Unocal helpful, and requested that it be able to use the Unocal information in formulating its regulations.

Unocal did not tell CARB that it had any patent applications but did ask that CARB "hold these equations confidential, as we [Unocal] feel that they may represent ***a competitive advantage*** in the production of gasoline." (Emphasis added.) CX 386 at p. 2.[6] Following CARB's agreement to consider some modifications in the regulations (the adoption of a "predictive model"), "Unocal unequivocally stated to CARB that its emissions research data were non-proprietary," available to the public and cost-effective (Compl., ¶¶ 41, 48). CARB incorporated Unocal's invention into its regulations.

see also CX371 at p. 1 (Unocal's "formulations probably cover over 95% of CARB spec fuels.").[7] Ultimately, and contrary to its statements to CARB, Unocal subsequently claimed that the information was proprietary and carried with it a steep cost. Indeed, Unocal established a program to license refiners now bound by CARB's regulations to practice Unocal's

---

5 CX241 Attached as Appendix 5.

6 CX386 Attached as Appendix 6.

7 Attached as Appendix 7, CX371 Attached as Appendix 8.

patent. The result of this fraud has allowed Unocal to acquire undue competitive advantage in the form of a royalty boon that will yield hundreds of millions of dollars per year.

That is the real world. In the "but for" world, how Unocal determined to act is material to what CARB likely would have done. For example, Unocal could have informed CARB that Unocal had a patent pending on its RFG technology. In other words, one question is what would CARB have done if Unocal had disclosed in 1992 what its internal documents reflected: to wit,

Alternatively, Unocal could have dedicated its invention to the public - made it "non-proprietary" in reality, not fiction. As yet another alternative, had Unocal never presented any data to CARB, there would have been no fraud. As discussed below, the but-for world significantly varies depending upon Unocal's hypothesized conduct. As discussed below, the interrogatory responses reflect the various possible responses in response to the various "but for" worlds. And as demonstrated below, Mr. Venturini's deposition testimony is consistent with those responses.

II. Complaint Counsel's Responses To Unocal's First and Second Set of Interrogatories Remain Complete and Correct.

A. Complaint Counsel's Interrogatory Responses, Consistent With Complaint Allegations, Maintain That CARB Would Have Taken Action To Avoid Handing Unocal Monopoly Power.

This dispute emanates from a series of dense, multi-part contention interrogatories, propounded before Unocal even answered the Complaint, asking what CARB would have done if Unocal had not deceived CARB. Although it objected to the fact that Unocal had misconstrued

the Complaint,[8] Complaint Counsel timely responded to these interrogatories, identifying a series of options available to CARB that were available to CARB that CARB would have chosen before it would have passed regulations that overlapped with Unocal's patent. Summarizing the detailed responses in Complaint Counsel's Responses to Unocal's First and Second Set of Interrogatories ("Resp. to First Set" and "Resp. to Second Set,"respectively), these alternatives available to CARB could be divided into five broad categories:

1. CARB could have reconsidered whether to regulate gasoline composition, and could have decided not to do so at all. (Resp. to First Set at p. 4)

2. CARB could have adopted regulations similar to those adopted by the U.S. EPA. (Resp. to First Set at p. 4; Resp. to Second Set at p. 3)

3. CARB could have regulated gasoline composition, but without including T50. (Resp. to First Set at p. 4; Resp. to Second Set at p. 3)

4. CARB could have adopted regulations with higher flat limits and caps for T50 and/or

---

[8] The Complaint contains the following allegations:

> "But for Unocal's fraud, CARB would not have adopted RFG regulations that substantially overlapped with Unocal's concealed patent claims; the terms on which Unocal was later able to enforce its proprietary interest would have been substantially different; or both." Complaint ¶¶ 5, 80.
>
> "CARB cannot now change its RFG regulations sufficiently to provide flexibility for refiners and others to avoid Unocal's patent claims. Had Unocal disclosed its proprietary interests and pending patent rights to CARB earlier, CARB would have been able to consider the potential costs of the Unocal patents in establishing its regulations, and the harm to competition and to consumers, as described in this Complaint, would have been avoided." Complaint ¶ 94.

In its interrogatories, Unocal misstated the allegations of the Complaint by contending that the Complaint alleges that CARB would have adopted "alternative regulations" if Unocal had disclosed its patent. The Complaint alleges instead that CARB would not have adopted the same regulations had Unocal not deceived it. As set forth herein, this is significant, because Unocal could have avoided fraudulent conduct either by fully disclosing, dedicating its invention to the public, or not speaking at all.

other parameters, including limits for sulfur or Reid Vapor Pressure. (Resp. to First Set at p. 4; Resp. to Second Set at p. 3)

5. CARB could have adopted similar regulations, but could have taken steps to reduce the impact of the patent. (Resp. to First Set at p. 7-8; Resp. to Second Set at p. 3)

Complaint Counsel also emphasized in its response that CARB witnesses were best suited to address what alternatives were ***most likely*** to have been selected. (Resp. To Second Set at p.3).

Mr. Venturini, designated along with former CARB Executive Officer Michael Kenny, to testify on these points, provided testimony that supports Complaint Counsel's contention that CARB would never have made the findings it did that resulted in the regulations ultimately adopted if Unocal had not deceived CARB. In fact, Mr. Venturini explains, Unocal's fraud was so significant that it would have derailed the entire fact-finding process if Unocal had been forthcoming about its pending patent rights. From this testimony, Unocal tries to argue that the derailment of the rulemaking process is the only alternative that was available to CARB, and that Complaint Counsel's response that there were other alternatives less drastic than the destruction of the entire process is "materially incorrect" and must be "withdrawn." A review of the CARB testimony to-date shows that Unocal's argument is without merit.

B. Testimony By CARB Witnesses Demonstrates That CARB Would Not Have Adopted Current Regulations Giving Unocal Monopoly Power

Mr. Venturini's testimony supports Complaint Counsel's position that CARB would not have adopted the current standards but for Unocal's fraud. Mr. Venturini testified that he expects people providing factual information to CARB staff to inform CARB staff if there is anything that "would have a significant impact on a regulation that we're considering." Venturini Dep. 137:23-138:9. This clearly includes patent applications containing

Venturini Dep. 138:10-139:3. Indeed, Unocal itself had disclosed a pending patent in a different fact-finding and rulemaking effort. Venturini Dep. 138:10-139:3; U0170616-U0170648.[9]

Mr. Venturini was crystal clear that Unocal's fraudulent acts were so significant that CARB would have shut down the entire regulatory process before adopting the regulations that it ultimately did. Mr. Venturini was equally clear that Unocal was the cause of its inclusion of a 50 percent distillation temperature ("T50") specification – which is a specification whose presence in almost all of Unocal's patent claims is a chief reason why it is extremely difficult, if not impossible, for refiners to employ technology that does not infringe on the patent claims contained in Unocal's five reformulated gasoline patents. What Mr. Venturini was most clear about was that CARB would not have adopted "this regulation" had Unocal not been deceptive. All of this is consistent with Complaint Counsel's responses.

Misconstruing Mr. Venturini's testimony, Unocal demands that Complaint Counsel state that it is "incorrect" to assert that CARB had any options other than to shut down the regulations. Review of the deposition testimony, evidence and information obtained by Complaint Counsel compels the conclusion that the interrogatory responses at issue here remain correct.

Mr. Venturini was clear in his deposition; CARB was deceived:[10]

> I think the core of the the deception, the -- the fraud, if you will, was Unocal's

---

9 U0170616-U0170648 Attached as Appendix 9.

10 Mr. Venturini defined "deception" as follows:

> What I mean by deception is misrepresentation, deceiving, hood-winking, pulling the wool over the eyes, telling half of the story, part of the story, not giving the full picture. Venturini Dep. 19:10-13.

> failure to inform us in mid-1991 that they had a patent pending on -- on gasoline, and provided us with -- with information and data, encouraged us to use this information. They subsequently made this information -- represented to us that it was in the public domain, it was available, there were no strings attached to this information. We relied upon that information. We subsequently adopted regulations, and for three and a half years engaged in numerous activities to make Phase 2 gasoline happen in California, numerous meetings, numerous discussions with all the -- all the parties, particularly Unocal, which was extremely active. Throughout all of this period they never once mentioned to us about the patent, and then in early 1995 we find out that they have a -- a patent. And, you know, the fact that -- learning of the patent was extremely disruptive in our -- in our organization; we were all just shocked, panicked. It -- you know, it's very hard to describe the -- the emotions that -- that went on, there was hurt, there was anger. You know, why didn't they tell us this? This had a material effect on our action, and quite frankly we as an organization felt we had been used, our regulatory process had been used, and it was not pleasant.

Venturini Dep. 20:6-21:9.

As Mr. Venturini explained, it was Unocal's deceptive acts that caused CARB to adopt the regulations that it did, particularly the T50 specification:

> Unocal basically told us that this information is now publicly available, it's in the sunshine and we could share it with anybody, and from our perspective looking at the letter, it's ours to do with that as we wished and there were basically no strings attached to this information. And as a result we did share it. We incorporated a T50 specification in our regulation. We used their information to help develop the predictive model. In fact, you know, we referenced the -- the presentation material in our staff report; it's part of the record of the hearing. We used some of the charts in our staff report and technical support document to support the T50 specification.

Venturini Dep. 26:12-27:1.

Based on this testimony, Unocal wrongly maintains that the interrogatory responses are no longer accurate. A comparison of the testimony and the interrogatories shows that it is Unocal that again is inaccurate.

C. The Interrogatory Responses And The CARB Testimony Are Consistent And Accurate.

1. The U.S. EPA's Specifications Would Likely Govern in California.

The most likely scenario that would have occurred, had Unocal provided its information to CARB, informed CARB that it had a pending patent, but not dedicated it to the public, would have been for CARB to have abandoned its fact-finding process and proposed no regulation at all. As a result, the EPA Regulations would have taken effect in California. (Some areas of California would not have been covered by the EPA regulations; as a result, CARB may have adopted the EPA regulations to cover those areas). This is what Complaint Counsel described in Scenarios 1 and 2, listed above.

In Scenario 1, Complaint Counsel stated that "CARB could have incorporated Unocal's proprietary rights into its cost-effectiveness analysis. The added cost would have altered the cost-effectiveness analysis, possibly the point that the regulations would no longer be cost-effective." (Resp. to First Set at p. 3). Mr. Venturini testified: "If Unocal had told us there was a pending patent application, I think the outcome would have been no regulation." Venturini Dep. 514:14-16. These are indistinguishable statements.

In Scenario 2, Complaint Counsel suggested that "CARB could have adopted regulations similar to those adopted by the U.S. EPA." (Resp. to First Set at p. 4; Resp. to Second Set at p. 3). As Mr. Venturini explained, if CARB had decided to have no regulations, "EPA would have happened automatically because it's a federal law. The only option we would have had was extend EPA statewide." Venturini Dep. 515:12-25. Thus, CARB would have adopted rules that would be similar to the EPA rules, in that CARB would have applied the EPA rules statewide rather than just to selected areas. Because Unocal's patent would have derailed the

fact-finding process and resulted in no rule, CARB "would have had to look elsewhere for the emission reductions needed to achieve our air quality goals." Venturini Dep. 507:14-17. Nonetheless, Complaint Counsel's alternative and Mr. Venturini's contentions are virtually identical.

Since Unocal maintains there is a "complete dissonance between Mr. Venturini's testimony on the one hand and [Complaint Counsel's] interrogatory responses on the other," Unocal may be suggesting that the answer is "incorrect" because Mr. Venturini testified that there would be no regulation. As explained above, no regulation means an EPA regulation, since federal law would take over if there is no state law. If this is Unocal's argument, it is at best a weak semantic game not worthy of this Tribunal's time.

2. CARB Would Have Adopted Regulations Without a T50 Specification.

Paragraphs 5 and 80 of the Complaint allege that "But for Unocal's fraud, CARB would not have adopted RFG regulations that substantially overlapped with Unocal's concealed patent claims...." Complaint ¶¶ 5, 80. There are at least two ways that Unocal could have avoided fraud. The first way is to have corrected its incorrect statement that its data was "non-proprietary," and disclose that it had proprietary claims on the data through a patent application. This is the scenario discussed in Part 1, above, and Part 3, below. The second way Unocal could have avoided fraud would have been not to speak at all and not to provide any data to CARB.

In this second but for world, the result is clear: no T50 specification. As Mr. Venturini explained: "Oh, we basically used this [Unocal] letter as basis to go ahead and propose a T50 specification which ultimately went into our regulation, was adopted, and to use the information

in our predictive model, and we shared all of that with everybody." Venturini Dep. 45:10-14. Later, he reaffirmed that it was the Unocal information that caused the T50 specification to be adopted: "I know we relied on the Unocal information for the T50 specification." Venturini Dep. 207:19-25.

In Scenario 3 described above, Complaint Counsel identified the possibility that "CARB could have regulated gasoline composition, but without including T50." (Resp. to First Set at p. 4; *see also* Resp. to Second Set at p.3). If Unocal's information was not available to be relied upon, there would be no T50 specification. Thus, this answer is undeniably correct.

3. CARB Would Have Altered the Specifications Rather Than Grant Unocal Unrestricted Monopoly Power.

Finally, Mr. Venturini was very clear that, under no circumstances would CARB have adopted the regulations it did had it known of Unocal's patent. As Mr. Venturini explained:

> We would not have taken that risk that we were adopting a regulation that covered the same space as a patent application and by doing that would have provided one company with -- with an extreme opportunity to -- an extreme opportunity to increase their profits and jeopardize the recovery of other -- the cost to other refineries and also impose that cost on the consumers of California.

Venturini Dep. 516:4-15.

Unocal is attempting to set up a false dichotomy before this Tribunal. It argues that CARB had a choice of either: (1) the present regulation, *i.e.*, "adopting a regulation that covered the same space as a patent application;" or (2) no regulation. CARB had many more options than that. That is what the remaining scenarios described above demonstrate. If Unocal did not commit fraud, and if it were not an option to adopt the EPA Regulations (i.e., no regulation), then CARB would have chosen not to regulate T50, to modify the caps, or other specifications such as

RVP. This is what is described in Scenario No. 4, above. *See* Resp. to First Set at p. 4 ("CARB could have regulated gasoline composition, but without including T50 . . .CARB could have adopted regulations with higher flat limits and caps for T50 and/or other parameters."); Resp. to Second Set at p. 3 ("CARB would have adopted regulations with higher flat limits and caps for T50 and/or other parameters. Among the potential modifications would have been to raise the T50 flat limit and/or to raise the olefin flat and cap limit. In addition, given the relationship between T50 and T90, CARB may have also relaxed the caps and flat limits for T90. Other parameters, such as sulfur, could have been more tightly regulated as well in order to achieve equivalent or similar emissions reductions. In any case, CARB would not have knowingly adopted any regulation that gave Unocal the power to raise its rivals' costs . . . [or] CARB would have modified the Reid Vapor Pressure parameters to allow refiners to increase these levels above 7.5 psi.").

In addition, rather than simply allowing the industry to be locked in, if the EPA Regulations were not an option, CARB could have been a conduit for dialogue among the industry. For example, if Unocal had informed CARB of its patent, CARB would have the leverage to limit Unocal's market power. Therefore, CARB could have requested that Unocal dedicate its patent to the public, as ARCO did. CARB also could have requested Unocal to enter into a covenant not to sue to ensure a smooth roll-out of the RFG regulations. CARB also could have facilitated licensing negotiations, or obtained a commitment from Unocal as to the precise royalty rate that would be charged so as to assess the cost-effectiveness of its regulations. These are part and parcel of Scenario No. 5, above. *See* Resp. to First Set at pp.7-8 ("Had CARB known of Unocal's proprietary rights, CARB would not have permitted to the regulation to

become a law that would subject California consumers to Unocal's monopoly. As a result, CARB could have taken the following action: (i) requested that Unocal dedicate its patent rights to the public; (ii) request that Unocal enter into a covenant not to sue; (iii) enter into discussions with Unocal and other refiners to assist in aiding coming to terms of licensing agreements; or (iv) obtain commitments from Unocal of a reasonable, non-discriminatory royalty amount determined before the industry had become "locked in" to the regulations and/or before the regulations went into effect."); Resp. to Second Set at p. 3 ("CARB would have adopted the same or similar regulations that it ended up adopting, if Unocal had dedicated its technology to the public as it had stated in its August 27, 1991 letter.").

Mr. Venturini's testimony does not contradict, let alone "repudiate," any of these possibilities. Mr. Venturini's testimony is that it is difficult to process all of the different possibilities:

> You know, it's really difficult to speculate where we would have gone, what discussions, what would have occurred, but I think the critical thing is that there wouldn't have been this -- this regulation.

Venturini Dep. 515:21-25.

Unocal never asked Mr. Venturini the question of what CARB would have done if having no regulation was ***not*** an option. Unocal also chose not to ask any questions of former CARB Executive Officer Michael P. Kenny on these points, despite the fact that Mr. Kenny was designated and prepared to speak regarding the topics at issue in its motion. Kenny Dep. 6:17-7:6, 140:13-23.[11] Unocal cites to no testimony excluding these options and, as such, Unocal's

---

[11] Kenny Dep. Attached as Appendix 10.

position is untenable.

Unocal strains to find support for its position in Mr. Venturini's testimony that CARB did not consider the patent while deliberating on the Phase 3 RFG regulations. Unocal suggests that uncertainty regarding the scope of the Unocal patent application would have precluded any attempt to modify the regulations. Resp. Mot. at 10-11. The citations to Mr. Venturini's deposition do not support Unocal's position. Contrary to Unocal's assertion (Respondent's Mot. at 10), Mr. Venturini never testified that "the uncertainty associated with the scope of Unocal's patent was too great for the patent to be meaningfully analyzed in its Phase 3" fact-finding and rulemaking process. In fact, nowhere was Mr. Venturini ever asked, and nowhere did he testify, about his assessment regarding the scope of the patent. What Mr. Venturini actually testified was that "we believed that there were concerns with the validity of the patent" during the Phase 3 fact-finding and rulemaking. Venturini Dep. 403:11-19.

That CARB did not design its Phase 3 regulations with an eye towards Unocal's patent is best understood in light of the fact that those knowledgeable about the refining industry in California, including CARB and Unocal, had recognized that CARB and the refiners were locked into the CARB regulations. Indeed, Unocal itself argued that this lock-in justified its demand for a royalty rate of 5.75 cents per gallon. Specifically, as to just one of the five Unocal patents, Unocal's damages expert, David Teece, testified that complying with the regulations but avoiding Unocal's '393 patent claims was not "an economically viable alternative" for the refiners for significant volumes of reformulated gasoline. *Arco v. Unocal*, Trial Transcript (Teece Testimony) 5637:17-19 ("Trial Transcript").[12] Dr. Teece testified in this regard that

---

12 *Arco v. Unocal* Trial Transcript (Teece Testimony) Attached as Appendix 11.

"[i]t's very difficult to get inside the CARB specs, and even more difficult to be inside the CARB specs and outside the '393 patent." Id. Dr. Teece provided clear testimony during the private patent trial that the reason for this was because refiners had been locked into the regulations: "[Refiners] have made billions of dollars of upgrades, but they haven't taken into account the fact that the '393 patent is out there. So they are stuck, and they're going to have to take the license." Trial Transcript 5723-24. On the other hand, had CARB been faced with the patent in the early 1990s, before everyone was locked-in, the cost of avoiding the patent would have been significantly lower.

III. Unocal's Motion Is A Disguised Motion for Summary Decision That Should Be Denied

Respondent has chosen to style what is in essence a Motion for Partial Summary Decision as a discovery dispute. This approach is both substantively and procedurally flawed.

Based on the foregoing, it is clear that there is a dispute between Complaint Counsel and Unocal as to whether Complaint Counsel's answers are "materially incorrect." Commission case law clearly states that, where a Court must decide a disputed issue of fact prior to trial, "a court must accept the non-movant's evidence as true . . . A court must also draw all reasonable inferences in favor of the non-movant and may not make credibility determinations or weigh the evidence." *In the Matter of Rambus Inc.*, Docket No. 9302, Order Denying Respondent's Motion for Summary Decision, 2003 WL 21008620 (April 14, 2003) (McGuire, Chief A.L.J.) (citations omitted).[13] Thus, before ruling that Complaint Counsel's theories are materially incorrect, the

---

[13] Unocal has provided this Tribunal with no case law that sets forth the standards or burdens a party faces when it seeks to compel its opponent to amend the opponent's interrogatory answers because the moving party contends that the answers are incorrect. Indeed, Complaint Counsel has searched and found no case where a Court actually compelled a party to amend an

Tribunal must consider all evidence and construe every inference in favor of Complaint Counsel. Under such a standard, it is plain that Unocal is not entitled to the relief it seeks.

The cases cited by Respondents do not support their position. In one case, Complaint Counsel had answered interrogatories with qualifying language that implied that there was information being withheld. The Court ordered that any such information be supplied within seven (7) days (not the three days demanded by Respondent). *In the Matter of MSC.Software Corporation,* Docket No. 9299, Order on Respondent MSC.Software Corporation's Motion to Compel Responses to Written Discovery , 2002 WL 31433929 (February 21, 2002) (Chappell, A.L.J.) at p. 2. In the other case cited by Unocal, Complaint Counsel was ordered to supplement its responses to contention interrogatories within six weeks of the Order. The Court made no finding that Complaint Counsel's interrogatories were "incorrect." *In the Matter of Hoeschst Marion Roussel, Inc., et al.*, Docket No. 9293, Order on Respondent Andrx's Motion to Compel Complaint Counsel to Respond to Interrogatories, 2000 F.T.C. Lexis 133 (August 18, 2000).

Needless to say, the record in this case is far from complete. Unocal has taken two depositions of CARB witnesses, but has itself scheduled four more CARB witnesses[14] and no fewer than eight additional witnesses. In addition, Respondent contends that expert discovery will play a key role in determining the validity of Complaint Counsel's "theories." Complaint

---

interrogatory because its opponent insisted the answer was "materially incorrect" (as opposed to incomplete).

[14] It should be noted that Unocal issued subpoenas signed by the Secretary's Office to these four witnesses, without seeking the permission of the Tribunal as required by Rule 3.36. Attached as Appendix 12, supra. Complaint Counsel has no objection to the taking of these depositions, and the California Attorney General's Office has agreed to make these witnesses available. Nonetheless, the flouting of the rules in this manner should not be tolerated.

Counsel's expert reports are not due for two more months, and Complaint Counsel should be allowed to have its experts speak on these issues. A host of cases hold that the entry of summary adjudication is inappropriate when – as in this case – discovery on issues relevant to the motion seeking summary disposition are not complete. *E.g., Snook v. Trust Co. of Georgia Bank of Savannah, N.A.*, 859 F.2d 865, 870 (11th Cir. 1988) ("This court has often noted that summary judgment should not be granted until the party opposing the motion has had an adequate opportunity for discovery."); *Tarleton v. Meharry Medical College*, 717 F.2d 1523, 1535 (6th Cir. 1983) ("[s]ummary judgment should not ordinarily be granted before discovery has been completed."); *Fernandez v. Bankers Nat. Life Ins. Co.*, 906 F.2d 559, 570 (11th Cir. 1990) ("This court previously has reviewed the Supreme Court's direction for ruling on summary judgment motions found in [the Supreme Court cases] *Celotex*, *Anderson* and *Matsushita* and concluded that the common denominator of those cases is 'that summary judgment may only be decided upon an adequate record.'") (citations omitted).

IV. Conclusion

For the foregoing reasons, Respondent's motion should be denied.

Respectfully Submitted,

J. Robert Robertson
Chong S. Park
John Roberti
Peggy D. Bayer

Harry Schwirck
Counsel Supporting the Complaint

Bureau of Competition
Federal Trade Commission
Washington, D.C. 20580
cpark@ftc.gov
(202) 326-2372
Facsimile (202) 326-3496

Dated: June 20, 2003

CERTIFICATE OF SERVICE

I, Paige Pidano, hereby certify that on June 26, 2003, I caused to be served on the below-listed persons a copy of Complaint Counsel's Complaint Counsel's Opposition to Unocal's Motion to Compel Amended Interrogatory Responses.

.

The Honorable D. Michael Chappell (BY HAND)
Administrative Law Judge
The Federal Trade Commission
600 Pennsylvania Avenue, N.W.
Washington, DC 20580

Joseph Kattan, Esq. (BY HAND)
Gibson, Dunn & Crutcher LLP
1050 Connecticut Avenue, N.W.
Washington, DC 20036-5306

David W. Beehler, Esq. (VIA OVERNIGHT DELIVERY)
Robins, Kaplan, Miller & Ciresi LLP
2800 LaSalle Plaza
800 LaSalle Avenue
Minneapolis, MN 55402-2015

Paige Pidano

fair to say that is the definition that you used?

A. Basically.

Q. Do you believe that that has to be intentional on -- on the part of the person who is defrauding?

A. I think that that bears into it.

Q. Okay. And when you say "engaging in deception," do you mean something different there than lying or misrepresenting?

A. What I mean by deception is misrepresentation, deceiving, hood-winking, pulling the wool over the eyes, telling half of the story, part of the story, not giving the full picture.

Q. Do you think that it is misrepresentation, then, if someone doesn't tell all facts?

A. Yes.

Q. And so in terms of the misrepresentation that -- that you're here to discuss, it's all of those various matters that you described, deceiving, hood-winking, pulling the wool over the eyes, telling half of the story or part of the story, not giving the full picture.

A. Correct.

Q. Using that understanding, then, sir, would you tell me what are the facts which evidence or

reflect that Unocal committed fraud upon the California Air Resources Board or its staff before the adoption of the CARB Phase 2 rulemaking.

MR. GOLDMAN: Calls for a narrative, but answer.

A. Okay. Well I -- I think I can answer initially fairly briefly. I think the core of the -- the deception, the -- the fraud, if you will, was Unocal's failure to inform us in mid-1991 that they had a patent pending on -- on gasoline, and provided us with -- with information and data, encouraged us to use this information. They subsequently made this information -- represented to us that it was in the public domain, it was available, there were no springs attached to this information. We relied upon that information. We subsequently adopted regulations, and for three and a half years engaged in numerous activities to make Phase 2 gasoline happen in California, numerous meetings, numerous discussions with all the -- all the parties, particularly Unocal, which was extremely active. Throughout all of this period they never once mentioned to us about the patent, and then in early 1995 we find out that they have a -- a patent. And, you know, the fact that -- learning of the patent was

extremely disruptive in our -- in our organization; we were all just shocked, panicked. It -- you know, it's very hard to describe the -- the emotions that -- that went on, there was hurt, there was anger. You know, why didn't they tell us this? This had a material effect on our action, and quite frankly we as an organization felt we had been used, our regulatory process had been used, and it was not pleasant.

Q. Now my question asked for the fraud that would have occurred before the regulations, and given your answer, I just want to make sure: Is the description that you just provided, is that the fraud as you understand it that occurred on -- on CARB or its staff before, during, or after the passage of the regulations?

A. Yeah. As I -- as I said, the basic fraud occurred by not disclosing to us the fact that they had sought a patent and that they were going to basically require licensing for anyone that made fuels that infringed on that patent, and that had a -- and that fact would have had a material effect on what the ARB had done in terms of its Phase 2 regulations. So by not disclosing that, we feel that, yeah, was deceitful, was misrepresentation and

review the information to see if they, too, felt that this was a credible study and we can rely upon the results and people could rely upon this information to basically make gasoline.

So to make a long story short, in some discussions that occurred with Unocal, they were very interested in the predictive model and we had committed -- we saw the benefits of preparing a predictive model. So basically what that letter indicated, because of our commitment to developing a predictive model, we received a letter in August, I believe it was August 27th of 1991, in which Unocal basically told us that this information is now publicly available, it's in the sunshine and we could share it with anybody, and from our perspective looking at the letter, it's ours to do with that as we wished and there were basically no strings attached to this information. And as a result we did share it. We incorporated a T50 specification in our regulation. We used their information to help develop the predictive model. In fact, you know, we referenced the -- the presentation material in our staff report; it's part of the record of the hearing. We used some of the charts in our staff report and technical support document to support the T50

specification.

Q. All right. Let's go back and follow up on some of the things --

A. Sure.

Q. -- that you testified about.

First of all, who was at this meeting between Unocal and the CARB staff in -- I believe you said June of 1991?

A. June of 1991.

Q. Okay. Who was there?

A. I'm not sure I remember everybody. Let me -- I --

I was there, I'm sure Dean Simeroth was there, Bob Fletcher. There may -- there were probably others from the staff I'm just not remembering.

Q. I just need what you can do --

A. Okay.

Q. -- under oath, the very best, sir.

A. Okay. That's what I'm doing.

Q. I don't want you to speculate. I just want you to tell me --

A. Okay.

Q. -- who was there.

A. Okay. Dean, myself, Bob Fletcher. I'll

A. No, no specific recollection of a discussion.

Q. Okay.

A. But I can say I'm pretty certain I did, but no specific recollections.

Q. Do you have any understanding of any action they took based on that letter?

A. Yeah.

Q. What did they do?

A. Oh, we basically used this letter as basis to go ahead and propose a T50 specification which ultimately went into our regulation, was adopted, and to use the information in our predictive model, and we shared all of that with everybody.

Q. Looking at this letter, sir, Respondent's Exhibit 3, it first says in the re line there, "Public Availability of Unocal Research Data;" correct?

A. Correct.

Q. In fact, sir, does this document use the word "equations" anywhere?

A. Well let me take a minute to --

MR. ROBERTSON: Just objection, form, misleading.

A. And the question again was?

information or the words that were used; right?

A. That's correct.

Q. Okay. Did you ever ask any member of the oil industry prior to the 1991 regulations whether they had any patents or pending patents that could impact on the regulations?

A. I don't recall specifically asking a company about patents.

Q. Did you ever do that prior to the 1994 predictive model being put into place?

A. No. It's -- it's not our practice as a routine matter of business to ask people whether or not they have a patent. We rely on the people that we deal with, that we regulate, to share with us all the information that's pertinent to a regulation we're considering.

Q. Since 1994 have you ever asked anyone if they have any patents or pending applications -- pending patent applications that could impact your regulations?

A. No. Once again, as -- as I said, we expect people to advise us.

Q. You expect people to advise you what, to tell them about pending patent applications?

A. If we would --

We expect people to tell us of anything that would have a significant impact on a regulation that we're considering. And if someone had a patent, and the fact of having that patent -- or a patent pending, and that the fact of having a patent pending and, if it were granted, that it was going to be, I guess, enforced or there would be licensing fees associated with that, we would have expected that company to tell us.

Q. Has anyone ever told you about a pending patent application as part of your regulations?

A. Actually I recall Unocal in another regulatory matter informing us of a patent -- pending patent application.

Q. Related to diesel?

A. No, it was related to deposit-control additives.

Q. And when was this?

A. Well let's see, the board considered that in 1990, so it would have to have been before then.

Q. And what did they disclose to you?

A. That they had a --

As I recall they basically informed us -- gave us their perspective on what we were developing as an additive regulation and I believe some work

that they were doing or had done, and they informed us at that time that they had a patent pending application.

Q. And who was that?

A. It was Unocal. I don't recall the people that were at the meeting.

Q. Who from staff heard this then?

A. Oh, I'd have to go back to see if I can recall who was at the meeting. I -- I may have been at the meeting, I just don't -- don't recall at this point.

Q. Was this in some written document --

A. Yes.

Q. -- or oral?

A. Yes.

Q. Do you have that document?

A. I can go back and check. I don't have it right here. I can go back and see.

Q. And do you understand -- what were --

Can you tell me, what were the circumstances of the deposit-control additive regulation, what -- what was going on there?

A. Well it was part of our Phase 1 regulation. As part of that proposal we were incorporating specifications for deposit-control additives for

reductions in order to do your cost-effectiveness analysis.

A. Yes.

Q. And you did two things there. You looked at -- you used the Auto/Oil regression analysis; correct?

A. Correct.

Q. That did not have a T50 term in it; did it?

A. No.

Q. And the second thing you did was to use ARCO test fuels and a CARB/GM study and a Ford study; correct?

A. Those I'd have to refresh my memory on.

Q. Okay. You know what, when we get to the documents --

A. Sure.

Q. -- we'll --

A. Go through those.

Q. Right now as we sit, you don't remember whether you used Unocal at all for determining cost effectiveness.

A. I don't recall specifically.

Q. Okay.

A. I know we relied on the Unocal information for the T50 specification.

of the Phase 3 regulations?

A. No.

Q. Okay.

A. Can I explain --

Q. With the -- with the finding of infringement and a royalty amount, you didn't consider it. Why?

A. Basically because it was still in our view in a state of flux; there was continuing litigation and -- and issues.

Q. When you said it's in a state of flux, in fact CARB took the position that the patent was not valid; didn't they?

A. Yeah, we -- we believed that there were concerns with the validity of the patent.

Q. Right. In fact you came to testify in connection with the refiners as a witness to convince the jury that the patent was not valid; didn't you?

A. Yes.

Q. And CARB itself, through its counsel, including outside counsel, took positions before the United States Supreme Court attempting to convince them to hold the patent invalid; correct?

MR. ROBERTSON: Objection, foundation.

Q. Correct?

EPA regulations.

A. That is correct. That's what we said in the absence of the knowledge that Unocal had a patent.

Q. What you said is that the EPA regulations will not get the benefits that your RFG 2 benefits would achieve; right?

A. Oh, that -- that is correct.

Q. You would have accepted dirtier air rather than accept a patent that you had not seen as a cost; is that --

A. What we would have --

Q. I'm sorry. Can you answer that?

A. Let me finish. Yes. What we would have done is we had -- would have had to look elsewhere for the emission reductions needed to achieve our air quality goals.

Q. Well my question right now, though, is in reference to your comment that you would have gone to the EPA regulations, and I've just showed you a statement by your agency as to why those regulations were rejected, so I'm asking you: Given your statement there, you're saying that EPA will not clean up the air as much as California's Clean Air Act requires; right?

at that point in time, and so just in order to clarify let me suggest to you that if Unocal said we're not going to discuss licensing, we don't even have any claims allowed, the patent hasn't issued, just to -- for you to understand why they might not discuss licensing, okay, so here they've given you the patent application to review and they said you can share it with others but we -- we're not going to discuss licensing. Okay. What would CARB have done?

MR. ROBERTSON: Just objection to the extent it's an incomplete hypothetical.

A. You know, you can speculate about this, you can speculate about that, you can speculate about what if and this. The one thing that is certain, that if Unocal had disclosed to us that they had a patent that had been applied for -- and by the way, there were other patents that were applied for, and in 1995 when they met with us and discussed the first patent they didn't tell us there were other patents in the -- in the process. So I'm very comfortable, once again, in saying if they had told us there is a patent applied for, there would not have been a regulation in 1991.

Q. And just to make clear the hypothetical that I'm talking about right now, if Unocal would

have disclosed the application and allowed you to show it to others but would not discuss licensing, you're saying there would not have been a regulation in 1991; right?

A. There would not --

If they had disclosed to us there is a patent, there would not have been a regulation. You can talk about all sorts of hypotheticals and what if's and you get into speculation real fast.

Q. What would have happened in '92?

A. What, if they disclosed to us in '92?

Q. Under the same hypothetical, if they would have disclosed to you --

You said there wouldn't be a regulation in '91. What would CARB staff have done, never adopted a regulation? Or would they have gone to EPA's? Is that your --

A. Well EPA would have happened automatically because it's a federal law. The only option we would have had was extend EPA statewide. I --

You know, it's really difficult to speculate where we would have gone, what discussions, what would have occurred, but I think the critical thing is that there wouldn't have been this -- this regulation.

Q. Just because of a pending patent application.

A. Absolutely.

Q. You would have assumed that it was valid even if it was still pending.

A. Well we don't know if it's going to be valid or not, but we would not have done the regulation. We would not have taken that risk that we were adopting a regulation that covered the same space as a patent application and by doing that would have provided one company with -- with an extreme opportunity to -- an extreme opportunity to increase their profits and jeopardize the recovery of other -- the cost to other refineries and also impose that cost on the consumers of California.

Q. You said you would have not taken the risk that you were adopting a regulation that covered the same space as the patent application. Does that mean you would have looked at the patent application to its broadest claim and said whatever that broadest claim is, we can't adopt a regulation within it?

A. At what time?

Q. In 1991, in 1992, in 1993 or in 1994.

A. By the time we heard about the patent --

Q. Okay, you're -- I'm sorry.

testing of a hundred vehicles at a million dollars, you get to use the fuel for seven years, the cost would be .02 cents per gallon; right?

A. Yes.

Q. And the characterization then is that this figure should be minor compared to the financial benefit of producing gasoline to alternative standards which is apt to be measured in pennies per gallon. Do you see that?

A. Yes.

Q. I had promised you that I would get that back to you, --

A. Okay.

Q. -- so I wanted to make reference to it.

A. Yeah. I have to say a million-dollar test program is not an inexpensive program.

Q. No. But your staff translated it to .02 cents a gallon; is that right?

A. That's correct.

MR. BEEHLER: You know what, I could start on the topic four, but it's 10 to 5:00, and I will finish with you, so why don't we break for the day.

THE WITNESS: That works.

MR. BEEHLER: Thank you.

MR. GOLDMAN: Tomorrow at 9:00.

THE REPORTER: Off the record, please.

(Deposition recessed.)

C E R T I F I C A T E

I, Richard G. Stirewalt, hereby certify that I am qualified as a verbatim shorthand reporter, that I took in stenographic shorthand the deposition of PETER D. VENTURINI at the time and place aforesaid, and that the foregoing transcript is a true and correct, full and complete transcription of said shorthand notes, to the best of my ability.

Dated at Minneapolis, Minnesota, this 16th day of May, 2003.

RICHARD G. STIREWALT
Registered Professional Reporter
Notary Public

couple points. I'm trying to get my mind going here.

Q. Had you been aware during the process of promulgating the Phase 2 specifications that Unocal had a patent application pending that covered gasolines with certain of the properties that you were considering regulating, would that knowledge have been relevant to your ultimate considerations and proposals regarding the Phase 2 specifications?

A. Had we been aware in what timeframe? At any time frame? I'm --

Q. Sure.

A. I'm not clear.

Q. During -- let me ask you again.

A. Sure.

Q. Had you been aware during the process of promulgating the Phase 2 --

A. Okay.

Q. -- specifications that Unocal had a patent application pending that covered gasoline with certain of the properties that you were considering regulating, would that knowledge have been relevant to your ultimate considerations and proposals regarding the Phase 2 specifications?

MR. PARK: Objection, form, vague as to time.

A. I think I -- I addressed this question yesterday and I indicated yesterday -- and my response is the same today -- that if we had been informed that Unocal had a patent that was applied for, that we would not have taken the proposed regulation to the board in November of 1991.

Q. So the question that I asked you, does that require you to speculate?

MR. PARK: Objection, form.

A. I'm not speculating. As I said yesterday, I don't have to speculate at all on the fact that we would not have taken the regulation to the board. I'm very confident that that's the action that we would have taken.

Q. Would you pick up your deposition, sir, and turn to page 145, and if you would look at page 145 beginning at line nine, did you give the following answer to the following question:

"Now, had you been aware during the process of promulgating the Phase 2 fuel specifications that Unocal had a patent application pending that covered gasoline with certain of the properties that you were considering regulating, would that knowledge have been relevant to your ultimate considerations and proposals regarding the

Phase 2 specifications?"

I object. And then the answer, your answer:

"It would require me to speculate. However, I feel comfortable in saying that had I known, I would have taken it in consideration and would have asked my staff to take it into consideration what -- basically ask ourselves the question what do we do now."

Is that the answer you gave?

MR. PARK: Objection, form, and misleading.

A. That's absolutely the answer I gave, and basically --

Q. That's the only question I had.

A. Well I -- I think I -- I need to complete that because I don't want my answer to be misinterpreted.

Q. Okay. Let me -- let me get an answer to the question and then I will -- I will follow up with you.

MR. PARK: Objection.

Q. Is that the answer you gave?

MR. PARK: Objection. You've cut the witness off. Allow the witness to answer his question first before you interpose another question,

counsel.

Q. Is that the answer you gave?

MR. PARK: Objection, form. Allow the witness to answer the question first. Object -- same objections, form, misleading. And you have omitted the substance of your objection, counsel, from the transcript.

A. I'm more than happy to answer the question, but I need to answer it -- you need to allow me to answer it so it's not misconstrued.

Q. Sir, let -- let me -- let me just go through this again. It's clear to me you want to say something more, but I'm entitled to an answer to this question first. I will then follow up with you.

Is that the answer you gave in your 1996 deposition?

MR. PARK: Objection, asked and answered. Same objections, form, misleading.

A. I think the same --

I'm more than happy to answer your question, but to make sure my answer is not misconstrued I have to say more than just "yes" or "no."

Q. Can you answer the question, "yes" or "no," whether those are the words that you used and

testified to in your deposition in response to that question?

MR. PARK: Objection, argumentative.

A. I think I've -- I've -- I've responded to your question. I am more than pleased to answer your question, Mr. Beehler, but it wouldn't be truthful of me to just say "yes" or "no," and I don't want my answer to be misconstrued.

Q. Now then let's move on.

We've been discussing various reasons through this deposition for the proposals and the board's adoption of the various regulations, and I just want to direct your attention now to occurred -- to what occurred just before and during the 1991 meeting where -- where the regulations were adopted. So to provide a little bit of context, permit me, please, to just ask a couple of background questions.

A. Certainly.

MR. PARK: Well I want to interpose an objection. I don't believe the witness actually provided an answer that he was going to provide before you cut him off, counsel.

Q. CARB had initially estimated the cost of the Phase 2 regulations at 14 to 20 cents per gallon at the retail level, if you included the fuel

witness's testimony, lacks foundation, calls for speculation.

A. Yes, we should have been informed.

Q. What if anything would CARB have done if it had been informed of this development in 1992?

MR. BEEHLER: Objection. Based on the witness's testimony, lacks foundation, calls for speculation.

A. We would not have finalized the regulation.

Q. Do you know at what point in time, if any, that it became too late for CARB to rescind or revoke the Phase 2 regulations?

MR. BEEHLER: Objection, calls for speculation, lacks foundation.

A. That probably would have been the late --

By late 1993 we were locked in.

Q. Mr. Venturini, do you recall earlier today that Mr. Beehler asked you some questions concerning your deposition testimony in the prior private litigation? Do you recall that, sir?

A. Yes, I do.

Q. I'd like to refer you to the portion of the deposition transcript that he questioned you about. I'd like to refer you to page 145 of your prior deposition transcript, Volume I, dated June 18th,

1996. Do you see page 145, sir?

A. Yes, I do.

Q. As I recall, Mr. Beehler asked you whether or not the question and answer that you had stated on page 145 starting at line nine and ending at line 24 was in fact your testimony during your prior deposition. Do you recall that?

A. Yes.

Q. As I recall you answered that, yes, it was your testimony; is that correct?

A. That is correct.

Q. I believe that you indicated in response to Mr. Beehler's questioning that you wanted to complete your answer. Would that be fair?

MR. BEEHLER: Objection, misleading.

A. Well that is correct.

Q. Would you like to complete your answer now?

A. Yes, I would.

Q. Please do so.

A. Basically what -- what my testimony at that time described is a process, and what I wanted to explain to Mr. Beehler is that I'm very comfortable in saying the result of that process would have been we would not have gone forward with the regulation.

MR. PARK: Thank you. I have no further

Technical Memorandum
Unocal Science & Technology
Brea, California

UNOCAL

To: William R. Mallett

From: Michael C. Croudace

Department: Products, Processes & Materials Research

Subject: PROPOSED JOINT RESEARCH EFFORT BETWEEN UNOCAL AND GENERAL MOTORS RESEARCH TO STUDY VERY LOW EMISSIONS AUTOMOBILES

Memo: PROD-89-09M

Date: January 23, 1980

Project: 720-51310

Supervisor: W. R. Mallett

cc: Library (2)
Patent
S. K. Alley
R. Y. Iwamoto, A-115
P. J. Jessup, C-102
J. W. Miller
A. L. Shugarman, I-127
L. M. Tack, M1-501
S. R. Tarbox, I-187
G. A. Wessler, A-116

SUMMARY:

The following is a proposal to conduct a joint research effort between Unocal and General Motors to develop very low emission automobiles. The purpose of this effort is to develop a fuel/emission system that will allow automobiles to meet future emission requirements without a drastic change in fuel or engine design.

In this effort we will study the interaction between fuel components and state-of-the-art emission control systems. To support this effort we will need to dedicate scientists, part time to the project and supply the effort with experimental fuels.

The major benefit to Unocal would be that we can continue to sell petroleum based fuels versus switching to the sale of alternative fuels like methanol to meet future emission requirements. Further, we may be able to patent unique gasoline blends discovered during this research that would enable us to make profits from other oil companies legislated to use our formulas. Profits as high as $1 billion per year might be realized. Finally, if we expand this effort to include refining research, new and profitable refining technology could be developed.

The drawback to this joint research effort is that all results would be public and would be available for government agencies to use to implicate components of gasoline as polluting. This may cause these agencies to legislate new limitations on how we refine our product.

DISCUSSION:

Recently we have had discussions with staff from the General Motors Research Laboratories on the feasibility of producing a very low emissions gasoline powered automobile. It became clear during these discussions that to produce a very low emissions spark ignition engine both the catalyst and fuel may need to be modified. From these discussions a proposal was made to initiate a joint research project between General Motors and Unocal to study the interaction between fuel and catalytic converters for very low emissions. It is our opinion that participation in this joint effort would be in Unocal's best interest.

The proposed joint research effort would included Unocal supplying scientists part time for approximately a year, pure refinery streams, pure components, and selected blends of these pure materials. General Motors would test our products in current and state-of-the-art emission systems. The results would be jointly evaluated, followed with a paper documenting our findings.

The benefit of this joint study to Unocal would be two fold. First, it would allow us to continue to produce petroleum based gasolines in the future that would compete in the marketplace with alternative fuels like methanol. Second, it would allow Unocal to be the first to develop a low emission petroleum based fuel which could allow us to patent these products and force all other gasoline marketers to license our technology. If all gasoline produced currently in the United States were made via a Unocal formulation, under a licensing agreement that netted $.0001 per gallon of gasoline sold, Unocal would realize $1 billion per year in revenue.

Another benefit that could come from a joint effort with General Motors would be the development of new refinery processes from our refinery group. Presumably, in our research with General Motors we will find that only certain refinery streams are desirable for blending in gasoline. We also suspect that some new types of refinery streams will become important to refining gasoline. This will cause a major change in the way we currently refine our product. Change is opportunity. Our refining research group could know what future gasoline blends will be before the rest of the catalyst community. Unocal will be able to get a jump on the competition to produce any new refinery technology.

Prompt development of new refinery technology would allow Unocal to have the only refinery technology able to meet the demands of the new gasoline blends.

The downside to a joint General Motors/Unocal research effort studying the effect of fuel/catalyst performance on emissions is that gasoline or components of gasoline will be implicated as contributing to pollution. In any type of joint research project General Motors will insist that the results become public. Thus, if the testing goes as we suspect, certain refinery streams will show a high tendency towards forming emissions. The EPA or other government agencies may find these results evidence for banning the use of certain components in our fuels.

Michael C. Croudace

Michael C. Croudace

MCC/ljg

HIGHLY CONFIDENTIAL

U 0001726

Confidential

Product Specifications For Low Emissions Gasolines

Results From The 5/14 Project
November 16, 1990

HIGHLY CONFIDENTIAL

U 0057134

GOAL:

To Meet Or Exceed The
Clean Air Act Amendment VOC Standards
In Most Or All Unocal Gasolines In 1991.

U 0057135

Key Gasoline Variables

CO	NOx	HC
50% Point Temp.	Reid Vapor Pressure	50% Point Temp.
Paraffins	Olefins	Olefins
		Aromatics

Confidential

U 0057136

Proposed Specifications

50% Point Temperature	≤ 205°F ≥ 180°F
Olefins	0% Volume
RVP	7.5 PSI

Confidential

U 0057137

Premium Compositions
Average Results For 9 RVP Season

Producer	RVP PSI	Olefin Vol %	T/50 °F
SFR	8.4	0-1	227-237
LAR	8.4	8-10	224-230
ARCO* - South	8.2 (7.9)	8-10 (12.3)	228
North	8.4	5-10 (7.9)	230
BP Oil** - North	8.0	8-9 (8.3)	221
Chevron* - South	8.4 (8.0)	5-14 (8.8)	226 (204)
North	8.5	8-15 (13.3)	224
Exxon* - South	8.5 (8.1)	4-6 (5.5)	234
North	8.4 (8.0)	6-13 (9.0)	224
Mobil* - South	8.5	1-6 (3.4)	225
Shell* - South	8.0	5-14 (13.5)	224
North	8.4	3-8 (5.3)	227
Texaco* - South	8.4	3-13 (7.8)	236

* Averages Based On SWRI Survey

U 0057139

Regular Grade - 87 - 9.0 RVP Season
A Comparison of PFI to (All) Vehicles.

Blend	CO gm./mile	NOx gm./mile	HC gm./mile
Auto/Oil Ind. Ave.	2.79 (4.57)	.483 (.807)	.265 (.429)
Unocal Average	2.58 (4.17)	.469 (.780)	.231 (.383)
Calif. Summer Weighted Ave.	2.81 (4.44)	.473 (.800)	.258 (.413)
Unocal Low Emis. 7.5 RVP/ 10% Olef. 205° F T/50	2.57 (4.44)	.459 (.751)	.241 (.409)
Unocal Low Emis. 7.5 RVP/ 0% Olef. 205° F T/50	2.49 (4.25)	.400 (.709)	.215 (.348)
Unocal Low Emis. 7.5 RVP/ 0% Olef. 180° F T/50	2.17 (3.68)	.400 (.681)	.163 (.306)
Reduction From Ind. Ave.	22% (19%)	17% (16%)	39% (29%)

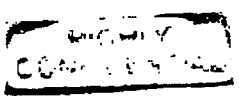
Confidential

U 0057140

Regular Compositions
Average Results For 9 RVP Season

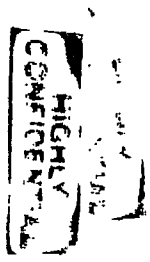
Producer	RVP PSI	Olefin Vol %	T/50 °F
SFR	8.4	0-1	209
LAR	8.4	5-8	201
ARCO* - South	8.5	8-14 (15+)	217
North	8.5	2-12 (7.0)	216
BP Oil* North	8.4	8-9 (8.4)	213
Chevron* South	8.6	6-15 (6.4)	215
North	8.6	8-14 (10.8)	213
Exxon* - South	8.5	5-15 (15+)	215
North	8.4	8-15 (14)	208
Mobil* - South	8.5 (8.0)	4-13 (11.3)	221
Shell* - South	8.1	9-15 (15+)	220
North	8.3	12->15 (15+)	218
Texaco* - South	8.3	3->15 (14.8)	217

* Averages Based On SWRI Survey



U 0057141

Competitor's Products - 9.0 RVP Season
A Comparison of PFI to (All) Vehicles.



Blend	CO gm./mile	NOx gm./mile	HC gm./mile
EC-1	2.71 (4.32)	.456 (.749)	.254 (.444)
EC-Premium	2.97 (4.75)	.491 (.813)	.278 (.466)
Shell SU-2000E	2.95 (4.77)	.485 (.831)	.260 (.415)
Chevron Low Emis. Premium	2.77 (4.44)	.485 (.811)	.233 (.381)
Unocal Low Emis. Premium	2.60 (4.25)	.408 (.709)	.197 (.348)
Unocal Low Emis. Regular	2.17 (3.68)	.400 (.681)	.163 (.306)

Confidential

Blending Components To Lower T/50

Component	Boiling Range °F	Octane		RVP PSI
		Research	Motor	
TAME	185-200	105	95	5.5
MTBE	131	117	98	7.8
ETBE	158	117	103	4.4
Ethanol	172	111	92	*
Isomerate	103-146	88	-	11.0
LUK	102-193	83	81	12.5
C5C6	107-168	76	75	11.1
Lite Alkylate	161-241	92	91	4.9

* Does Not Blend Linearly.

Sources Of Olefins

	Volume % Olefin
Lt. Cat. Gasoline	38
Offshore Gasolines	Varies
Exchange Gasolines	Varies

The Next Steps

- Work With The Planning Group And The Refineries To Develop Commercial Gasoline Blends
- Determine Costs And Necessary Equipment Changes To Produce New Unocal Low Emissions Gasolines
- Blend And Test New Unocal Low Emissions Gasolines
- Show Emissions Work To Regulators - Make Unocal Specifications Required In The Industry

HIGHLY CONFIDENTIAL

U 0057145

5/14 issues :

1. Confirmation tests w/Production gasoline (?)
   ?Include random model yrs.
2. Economic vs Regulatory Spec
3. Competitive Advantage

Statistical treatment ? What is used now ?

Technical Memorandum
Unocal Science & Technology Division
Brea, California

D.W. LAMB
DEC 18 1990

UNOCAL 76

To:	**J. W. Miller**	**Memo:**	**PROD-90-118M**
From:	**Michael C. Croudace** **Peter J. Jessup**	**Date:**	**December 11, 1990**
Department:	**Products, Processes & Materials Research**	**Project:**	**720-17350**
Subject:	**Discussions Of Unocal's Regression Of The Auto/Oil Data With A/O Before December 17, 1990**	**Supervisor:**	**J. W. Miller**
cc:	**Library (2)** **Patent** **S. K. Alley** **Dennis Lamb, 911 Building** **Dave Plumbley, 911 Building**		

SUMMARY

It would be in the best interest of Unocal to input into and help shape regulations made by the EPA and the CARB by December 17, 1990, or we will be stuck with a costly and unnecessary T90 specification for our gasolines. We propose showing the Auto/Oil analysis committee our analysis of their data which concludes that drivability index (DI), not T90, is the key variable influencing CO and HC exhaust emissions. Regulations based on drivability index will leave the door open for Unocal to use our results from the 5/14 project, that is, that T50 is the true key variable for exhaust CO and HC emissions reductions. This would also keep our NOx knowledge under wraps for the moment.

Setting a regulation based on driveability index rather than T90 leaves the door open for other oil companies to use our gasoline formulas through licensing agreements. Potential royalties from such agreements are as high as $114,000,000/year ($0.001/gallon) in the United States alone. This is far more than could gained from any other competitive advantage. To this end we have applied for a patent based on the 5/14 results, and have a good chance of getting it.

We must make a presentation to the Auto/Oil analysis committee by December 17, 1990, which is when the Auto/Oil committees are scheduled to release to the CARB and the EPA their mistaken analysis of the data that implicates T90's importance. Once the results are presented it will be a long uphill struggle to convince the regulatory bodies that the results are in error.

HIGHLY CONFIDENTIAL

BACKGROUND

On December 6, 1990, we traveled to San Francisco to attend the Auto/Oil meeting on use of the A/O block 1 Working Data Set for current cars. It was made clear to all those attending that, although the data from block 1 was freely distributed to the members of A/O, only the equations and conclusions developed by the analysis committee of A/O would be allowed to be published. This means that the EPA and the CARB will **falsely** believe that T90 ASTM D-86 Distillation is the main gasoline property influencing CO and HC exhaust emissions. Once these two regulatory agencies see this data (scheduled disclosure is December 17, 1990) they have said that they will regulate based on the results. Thus, if Unocal does not intercede we could be stuck with a costly T90 specification for our product or a lengthy and costly certification process.

Our regression analysis on the A/O data, shown in the first six attached tables, shows that, as was indicated by the 5/14 work, T50 is the main factor influencing CO and HC emissions. A strong RVP effect on NOx (seen in 5/14 data) was not seen in the A/O data because RVP only varied by 0.5 psi in the A/O fuels.

If we intend to influence the regulators we could do it through Auto/Oil this week, prior to their disclosure to the EPA, by presenting our analysis to the Analysis Committee. The Auto/Oil Analysis Committee is looking for a new way to evaluate the data because T90 is such an expensive variable to reduce in a refinery. We suggest that we only disclose our distillation information in the form of a driveability index (equation shown below) rather than T50 so that we retain secrecy of our data. Further, the results will be more persuasive to the A/O Committee since they already know that the distillation variables are highly convoluted. Thus we will allow the regulators to regulate the distillation of gasoline and still leave the door open for using our findings about T50 for optimum emissions reductions.

$$DI = 1.5 * T10 + 3.0 * T50 + T90$$

An analysis of A/O data, based on drivability index is also attached (last two tables). The fit is quite good for both the CO and HC. A similar analysis on 5/14 data is not nearly as good a fit. This is because many of the A/O fuels' distillation parameters are confounded while they are not in the 5/14 fuels. This means that the T50 variable is masked in its true importance in the A/O analysis as part of the DI equation.

If the A/O committee endorse our findings and presents our analysis to the EPA there is a far better likelihood that regulations will be more palatable to us. If we have to fight the battle without the weight of the A/O group it will be a long up hill struggle which may ultimately be unwinable.

Why publish our results in any form?

At your request, we have examined reasons for publishing Unocal's 5/14 results. Bear in mind the the patent for low emissions fuels, based on the 5/14 project, will be sent to the patent office on 12/12/1990, thus the basic ideas will be protected. Also we are looking for a competitive advantage.

1. Unocal will be able to help define the EPA's low emissions equivalency formula and thus eliminate, or greatly reduce, any need for expensive and time consuming equivalency testing in cars. If we do not take the opportunity to influence the EPA now we will be stuck with formulas based

HIGHLY CONFIDENTIAL

on the flawed Auto/Oil work and data analysis. An equivalency test based on our equations would give maximum flexibility on gasoline production during unit shut downs, using offshore gasoline, shipping stocks between refineries, etc. while equivalency testing in cars for all these circumstances would be prohibitive.

2. Once the patent is issued then Unocal can seek licensing agreements with our competitors. These agreements are only possible if the other companies know about our low emission gasoline products. We must publish to influence regulators and advertise the Unocal advantage. These licensing agreements could be worth 10's of millions of dollars every year, far more than any other competitive advantage could yield.

For example, 114,000,000,000 gallons of gasoline were sold in the United States in 1988. A $0.001/gallon royalty on all that product would yield $114,000,000 per year in fees.

3. Mr. Stegemeier could become a hero in the oil industry. He has been telling the news media that we will have a uniquely Unocal low emissions product when the data warrants it; when it can be shown scientifically that the fuels make a difference in automobile emissions. Now is an opportunity for him to prove that this was more than just talk.

4. Unocal could push other companies into olefin reductions which Unocal would not have to do. This will give us a competitive edge by making our competitor's product more costly.

Michael C. Croudace

Peter J. Jessup

MCC/PJJ:bf

A/O Data Individual Car (1-5) Effects - HC
Current Cars and Block 1 Fuels Only.

Car	Fuel Variable										R^2
	Arom	Olef	Para	MTBE	RON	MON	T10	T50	T90	RVP	
1A Chrysler P-4								.000585			.996
1B Chrysler P-4								.000671			.963
2A Chrysler P-2					.00169						.996
2B Chrysler P-2					.000825			.000474			.993
3A Ford Mustang	-.00215	-.00185			.00377						.987
3B Ford Mustang								.00105			.981
4A Ford Taurus								.000982			.966
4B Ford Taurus		-.00155						.000111			.984
5A Ford Aerostar					.00145			.00091			.996
5B Ford Aerostar					.00134			.00064			.976

A/O Data Individual Car (6-10) Effects - HC
Current Cars and Block 1 Fuels Only.

Car	Fuel Variable										R^2
	Arom	Olef	Para	MTBE	RON	MON	T10	T50	T90	RVP	
6A GM N-2								.00078			.989
6B GM N-2								.00072			.987
7A GM C/H								.00081			.984
7B GM C/H					.00153						.989
8A GM C-10		-.00323						.00268			.988
8B GM C - 10								.00237			.982
9A Toyota Camry								.00079			.985
9B Toyota Camry					-.0031			.00241			.938
10A Honda Accord								.000623			.987
10B Honda Accord	.000803							.000599			.99

A/O Data Individual Car (1-5) Effects - NOx
Current Cars and Block 1 Fuels Only.

Car	Fuel Variable										R^2
	Arom	Olef	Para	MTBE	RON	MON	T10	T50	T90	RVP	
1A Chrysler P-4							.00499				.976
1B Chrysler P-4		.00188					.00431				.991
2A Chrysler P-2			-.00113							.0415	.99
2B Chrysler P-2		.0198									.707
3A Ford Mustang										.103	.991
3B Ford Mustang		.00322					.00845				.999
4A Ford Taurus		.0131	.0088								.974
4B Ford Taurus		.0226	.0135								.969
5A Ford Aerostar		.0216	.0118								.972
5B Ford Aerostar			.0024							.0459	.98

A/O Data Individual Car (6-10) Effects - NOx
Current Cars and Block 1 Fuels Only.

Car	Fuel Variable										R^2
	Arom	Olef	Para	MTBE	RON	MON	T10	T50	T90	RVP	
6A GM N-2							.000963				.985
6B GM N-2		.00154								.0183	.988
7A GM C/H			-.00385							.098	.98
7B GM C/H			-.00323							.0956	.996
8A GM C-10		.004								.0746	.995
8B GM C - 10		.00229					.00534				.996
9A Toyota Camry		.0185	.0078								.911
9B Toyota Camry		.0105	.0066								.938
10A Honda Accord		.0102	.0065								.959
10B Honda Accord		.00856	.0051								.956

A/O Data Individual Car (1-5) Effects - CO
Current Cars and Block 1 Fuels Only.

Car	Fuel Variable										R^2
	Arom	Olef	Para	MTBE	RON	MON	T10	T50	T90	RVP	
1A Chrysler P-4			-.031					.021			.958
1B Chrysler P-4								.017			.943
2A Chrysler P-2								.0136			.98
2B Chrysler P-2								.0126			.992
3A Ford Mustang	.0176		.0191								.945
3B Ford Mustang								.00375			.931
4A Ford Taurus								.0135			.971
4B Ford Taurus			.016					.00813			.968
5A Ford Aerostar								.0338			.971
5B Ford Aerostar								.0197			.933

A/O Data Individual Car (6-10) Effects - CO
Current Cars and Block 1 Fuels Only.

Car	Fuel Variable										R^2
	Arom	Olef	Para	MTBE	RON	MON	T10	T50	T90	RVP	
6A GM N-2								.00562			.97
6B GM N-2	.0162							.00281			.98
7A GM C/H			.0244					.0248	-.0132		.949
7B GM C/H			.0124					.0045			.927
8A GM C-10								.0267			.986
8B GM C - 10								.0254			.993
9A Toyota Camry								.0057			.957
9B Toyota Camry								.0071			.971
10A Honda Accord								.00995			.952
10B Honda Accord								.0118			.971

A/O Data Individual Car Effects - HC Current Cars and Block 1 Fuels Only. Drivability Index Analysis.

Car #	Car A			Car B		
	DI coeff	# residuals > 3σ	R^2	DI coeff	# residuals > 3σ	R^2
1 Chrysler P-4	.000107	2	0.968	.000123	1	0.963
2 Chrysler P-2	.000144	3	0.993	.000156	0	0.994
3 Ford Mustang	.000244	10	0.981	.000192	4	0.985
4 Ford Taurus	.00018	6	0.969	.000189	2	0.983
5 Ford Aerostar	.00029	0	0.995	.00023	3	0.977
6 GM N-2	.000143	0	0.991	.000132	1	0.985
7 GM C/H	.000148	1	0.986	.000129	0	0.983
8 GM C-10	.000460	7	0.988	.000435	7	0.985
9 Toyota Camry	.000145	3	0.984	.000184	24	0.916
10 Honda Accord	.000114	2	0.987	.000132	10	0.986

A/O Data Individual Car Effects - CO
Current Cars and Block 1 Fuels Only.
Drivability Index Analysis.

Car #	Car A			Car B		
	DI coeff	# residuals > 3σ	R^2	DI coeff	# residuals > 3σ	R^2
1 Chrysler P-4	.00249	2	0.920	.00311	0	0.939
2 Chrysler P-2	.00250	13	0.984	.00230	2	0.991
3 Ford Mustang	.00134	5	0.929	.000684	2	0.929
4 Ford Taurus	.00247	0	0.971	.00219	1	0.959
5 Ford Aerostar	.0062	0	0.972	.00361	3	0.939
6 GM N-2	.00103	0	0.973	.000978	10	0.954
7 GM C/H	.00191	0	0.890	.00137	0	0.912
8 GM C-10	.00488	3	0.982	.00466	0	0.994
9 Toyota Camry	.00105	0	0.956	.0013	0	0.973
10 Honda Accord	.00182	1	0.952	.00215	5	0.967

CC Steve Lipman
P Jessup
M Cronidace
W R Mailbat

Memorandum

UNOCAL 76

May 10, 1990

To: J.W. Miller

From: D.W. Lamb

UNOCAL/CARB CONSULTATION
514 PRESENTATION

On May 8th I advised Peter Vinturini I would call within a few days to set up a meeting date. I have not yet advised him what the subject would be.

Prior to the actual presentation we obviously need to prepare and undergo internal review. The purpose of this memo is to request a draft be prepared no later than May 17. I hope to schedule our private consultation prior to CARB's first public workshop on Phase II gasoline regulations. The anticipated workshop date is June 11.

In developing the presentation I would request we consider the following:

o The purpose of the presentation should be to convince CARB staff that predictive equations or vehicle testing in particular should not include unnecessary minimums or maximums on fuel parameters (e.g. oxygen). Including such factors as minimum 2.0% oxygen could be less cost effective. If performance standards are met or exceeded the fuel parameters should be allowed to float to represent the individually optimized refinery . Even _if_ this could not be done under the CAAA it can be done within California regulations.

  The second priority is to convince CARB of the importance of T50. (We have been willing to support the relative importance of D.I. over T90 in the past. We will now be saying T50 is relatively more important than D.I.) We will need to be ready to comment on the effect substituting T50 for T90 or D.I. will have on the effect of other parameters. (See the attached effect on A/O slopes when D.I. is substituted for T90.)

o We should be ready to comment on the ways distillation temperatures can be lowered and what is the most cost effective approach.

o We should focus on fuel parameter effects and attempt to follow the Auto/Oil presentation graphics including the error bars.

HIGHLY CONFIDENTIAL

- We need to think through the implications of presenting data on Octane and paraffins. These parameters are not under discussion by any control agency. Do we run the risk of having any negative controls being imposed?

- We should convert all HC to NMOG for discussion in California.

- We must present the toxic data and some analysis or we will have an incomplete and ineffective presentation. Toxics should be potency weighted by the factors shown in CARB's recent "Substitute Fuel Certification" proposal.

- We must be ready to define and defend our statistical treatment of the data remembering that CARB has not been willing to accept any level of NOx increase even if statistically insignificant.

- We should be ready to comment on the fact that sulfur was not included in our study and how our conclusions may have been effected if it had been.

- We should be ready to comment on the role of heavy aromatics (C-9+) and "heavy" olefins.

- We should be ready to comment on the opposite effects seen for olefins between Auto/Oil and 514 on HC.

- We should be ready to comment on the predicted versus the observed "fit" for our equations in each series of tests.

- We should consider dividing our "new car" and "old car" data into the latest categories identified by EPA and CARB. There is general agreement at Reg-Neg that 1990 technology can be represented by model years 1989, 1990, and 1991.

  CARB has just identified four current classes of LDV, including :

non-catalyst	catalyst 1980-87
catalyst 1975-79	catalyst 1988+

- We should also consider weighting our results by the tehnology represented in the "in-use" fleet. EPA's latest data is attached.

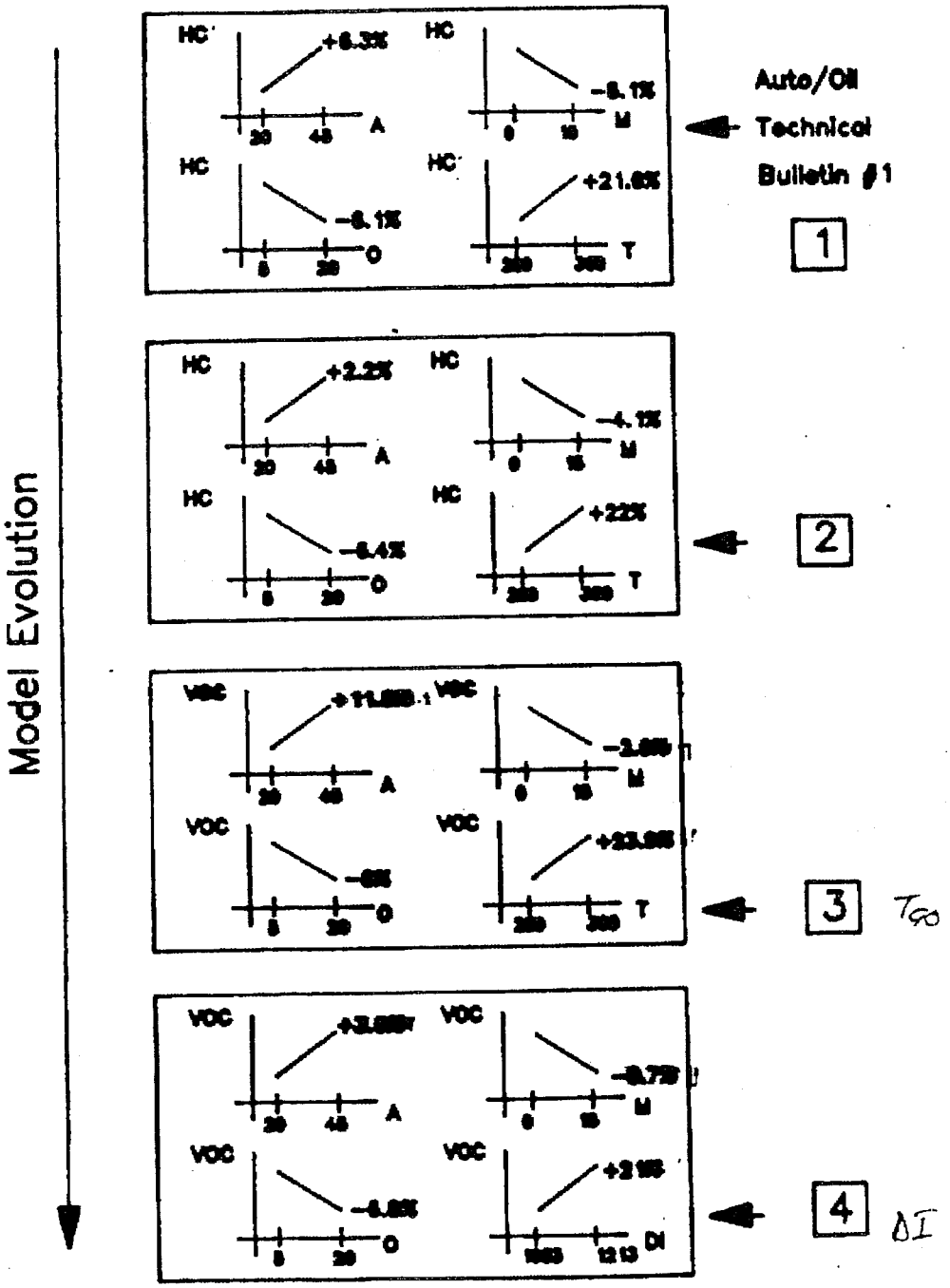
- The presentation should not be over an hour in length. Additional time would be allowed for questions.

Lets discuss any questions regarding this list or other suggestions at the earliest opportunity.

attachment
cc: S.K. Alley D.E. D'Zurilla
R.C. Beach N.E.Schmale

HIGHLY CONFIDENTIAL

U 0088624



- The direction and magnitude of the effects of Olefins and T90/DI on HC/VOC is essentially the same across all models.
- The direction of the effects of Aromatics and MTBE on HC/VOC is the same across all models.

HIGHLY CONFIDENTIAL

U 0088625

2 HC Emissions Equation (Aromatics, MTBE, Olefins, T90)

$$\hat{HC} = EXP\{-1.86481746 - 0.002496434*\Delta M - 0.004161665*\Delta O + 0.003403325*\Delta T + 0.00007 1975*\Delta AT - 0.000062945*\Delta OT + \text{Engine Family Adjustment Below}\}$$

Engine Family Adjustments:

Chrysler Sundance	01	−0.22695147 + 0.000126393*AT + 0.00002061 1*MOT
Chrysler Shadow	02	0.07759602 − 0.001906039*T
Ford Mustang	03	0.49209158 − 0.003756796*A
Ford Taurus	04	0.29795709 + 0.000104035*AT
Ford Aerostar	05	0.60444265 + 0.003448222*A − 0.001603988*T
Toyota Camry	06	0.005338120*A
Honda Accord	07	− 0.006203201*M − 0.003590078*T − 0.000116653*AT
GM Suburban	08	1.20585321
GM Grand Am	09	0.13528745 + 0.008633064*A + 0.002555204*T
GM Delta 88/Bonneville	10	−0.07762449 + 0.006831667*A

RSquare = 0.94

Root MSE = 0.109

Observations (2 or 3) were averaged at each of the 20x16=320 vehicle x fuel combinations.

CONFIDENTIAL

U 0088626

4 VOC Emissions Equation (Aromatics, MTBE, Olefins, Driveability Index)

$$\hat{VOC} = EXP\{-2.03509587 + 0.002147749^{*}\hat{A} - 0.004367854^{*}\hat{O} + 0.001677463^{*}\hat{D} + 0.000069000^{*}\hat{AD} + \text{Engine Family Adjustment Below}\}$$

Engine Family Adjustments:

Chrysler Sundance	01	−0.32710420
Chrysler Shadow	02	− 0.001245981*D − 0.000044115*AD
Ford Mustang	03	0.23544285 − 0.006747443*A
Ford Taurus	04	0.26114806
Ford Aerostar	05	0.53211311 − 0.000576763*D
Toyota Camry	06	
Honda Accord	07	− 0.010286285 − 0.009997714*M − 0.001800487*D − 0.000096366*AD
GM Suburban	08	1.20170430
GM Grand Am	09	0.13525216 + 0.001069153*D
GM Delta 88/Bonneville	10	−0.12306147

RSquare = 0.94

Root MSE = 0.116

Block Effect for Engine Family 10: 0.10741343

Observations (2 or 3) were averaged at each of the 20x16=320 vehicle x fuel combinations.

HIGHLY CONFIDENTIAL

U 0088627

Table: 1
PROJECTED SALES FRACTION BY TECHNOLOGY GROUP,
MY-90 LIGHT DUTY VEHICLES & ALL LIGHT DUTY TRUCKS (CLASS 1 & 2)

Tech Group	Fuel System	Catalyst	Fuel/Air System	EGR	Sales %
1	Multi	3-Way	CLL/No Air	EGR	32.030
2	Multi	3-Way	CLL/No Air	No EGR	20.842
3	TBI	3-Way	CLL/No Air	EGR	20.721
4	Multi	3-Way + OX	CLL/Air	EGR	10.416
5	Multi	3-Way	CLL/Air	EGR	7.650
6	TBI	3-Way	CLL/Air	EGR	2.283
7	TBI	3-Way + OX	CLL/Air	EGR	2.086
8	TBI	3-Way	CLL/No Air	No EGR	1.662
9	Carb	3-Way + OX	CLL/Air	EGR	1.548
10	Carb	Oxidation	OPL/Air	EGR	0.230
11	TBI	3-Way + OX	CLL/No Air	EGR	0.136
12	Multi	3-Way + OX	CLL/Air	No EGR	0.136
13	Carb	3-Way	CLL/Air	EGR	0.106
14	Multi	3-Way	CLL/Air	No EGR	0.067
15	Carb	3-Way	OPL/Air	EGR	0.057
16	Carb	3-Way + OX	OPL/Air	EGR	0.040
17	TBI	None	OPL/Air	EGR	0.028
18	Multi	None	OPL/No Air	No EGR	0.020

Passenger car sales = 11,914,485
LDT 1 sales = 1,873178
LDT 2 sales = 3,859,264
Total vehicle sales (Passenger cars & all LDT) = 17,646,924

Ad Hoc Group -
Information from EPA FYI.
Jeff Trunk 4/17/91

HIGHLY CONFIDENTIAL

U 0088628

Table: 2
PROJECTED MANUFACTURER BREAKDOWN OF TECHNOLOGY GROUPS
MY-90 LIGHT DUTY VEHICLES & ALL LIGHT DUTY TRUCKS (CLASS 1 & 2)

Table: 2.1

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
1	Multi	3-Way	CLL/No Air	EGR

Manufacturer	Sales (%)
All	32.030
General Motors	12.193
Ford	5.218
Toyota	2.929
Honda	2.519
Hyundai	1.829
American Motors	1.324
New United Motor	1.145
Nissan	0.990
Mazda Motor Corp.	0.928
Diamond Star Motor	0.866
Isuzu	0.689
Mitsubishi	0.549
Diahatsu Motor	0.232
Volvo	0.186
Chrysler	0.136
Audi	0.109
ASC Inc.	0.100
SAAB	0.072
Maserati	0.014
Volkswagen	0.000

HIGHLY CONFIDENTIAL

U 0088629

Table: 2.2

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
2	Multi	3-Way	CLL/No Air	No EGR

Manufacturer	Sales (%)
All	20.842
Ford	4.851
Chrysler	4.643
General Motors	2.953
Toyota	1.474
Mazda Motor	1.424
Fuji Heavy Ind.	1.278
Honda	1.117
Mitsubishi	0.934
Volkswagen	0.829
Volvo	0.687
BMW	0.287
Audi	0.119
SAAB	0.083
Porsche	0.053
Yugo America Inc.	0.049
Peugeot	0.029
Land Rover Ltd.	0.028
Suzuki	0.016
Alfa-Lancia	0.008
Maserati	0.004
Lotus	0.002
Consulier Industries Inc.	0.002
Lamborghini	0.001

HIGHLY CONFIDENTIAL

U 0088630

Table: 2.3

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
3	TBI	3-Way	CLL/No Air	EGR

Manufacturer	Sales (%)
All	20.721
General Motors	16.385
Chrysler	2.426
Ford	0.982
Suzuki	0.593
American Motors	0.238
Grumman Allied	0.096

Table: 2.4

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
4	Multi	3-Way + OX	CLL/Air	EGR

Manufacturer	Sales (%)
All	10.416
Ford	8.752
General Motors	1.662
# 472	0.001
# 143	0.000

HIGHLY CONFIDENTIAL

U 0088631

Table: 2.5

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
5	Multi	3-Way	CLL/Air	EGR

Manufacturer	Sales (%)
All	7.650
Ford	2.858
Toyota	2.085
Nissan	1.390
Honda	0.445
Mercedes Benz	0.368
Isuzu	0.336
General Motors	0.333
Jaguar Cars Inc.	0.136
Evans Automobiles	0.000

Table: 2.6

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
6	TBI	3-Way	CLL/Air	EGR

Manufacturer	Sales (%)
All	2.253
General Motors	1.278
Nissan	0.896
Isuzu	0.082

HIGHLY CONFIDENTIAL

U 0088632

Table: 2.7

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
7	TBI	3-Way + OX	CLL/Air	EGR

Manufacturer	Sales (%)
All	2.056
Chrysler	1.460
General Motors	0.367
Ford	0.172
Nissan	0.057

Table: 2.8

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
8	TBI	3-Way	CLL/No Air	No EGR

Manufacturer	Sales (%)
All	1.662
Honda	1.189
Suzuki	0.474

HIGHLY CONFIDENTIAL

U 0088633

Table: 2.9

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
9	Carb	3-Way + OX	CLL/Air	EGR

Manufacturer	Sales (%)
All	1.548
Toyota	0.870
General Motors	0.360
Mazda Motor Corp.	0.316
American Motors	0.181
Ford	0.091
Fuji Heavy Ind.	0.031

Table: 2.10

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
10	Carb	Oxidation	OPL/Air	EGR

Manufacturer	Sales (%)
Toyota	0.230

Table: 2.11

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
11	TBI	3-Way + OX	CLL/No Air	EGR

Manufacturer	Sales (%)
Fuji Heavy Ind.	0.136

HIGHLY CONFIDENTIAL

U 0088634

Table: 2.12

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
12	Multi	3-Way + OX	CLL/Air	No EGR

Manufacturer	Sales (%)
Mazda Motor Corp.	0.136

Table: 2.13

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
13	Carb	3-Way	CLL/Air	EGR

Manufacturer	Sales (%)
All	0.106
Honda	0.061
Isuzu	0.025
Mitsubishi	0.020

Table: 2.14

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
14	Multi	3-Way	CLL/Air	No EGR

Manufacturer	Sales (%)
All	0.067
Jaguar Cars Inc.	0.028
General Motors	0.023
Rolls-Royce Motor	0.008
Ferrari	0.006
Porsche	0.003
Lamborghini	0.000

HIGHLY CONFIDENTIAL

U 0088635

Table: 2.15

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
15	Carb	3-Way	OPL/Air	EGR

Manufacturer	Sales (%)
American Motors	0.057

Table: 2.16

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
16	Carb	3-Way + OX	OPL/Air	EGR

Manufacturer	Sales (%)
Yugo America Inc.	0.040

Table: 2.17

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
17	TBI	None	OPL/Air	EGR

Manufacturer	Sales (%)
General Motors	0.028

Table: 2.18

Group Ranking	Fuel System	Catalyst	Fuel/Air System	EGR
18	Multi	None	OPL/No Air	No EGR

Manufacturer	Sales (%)
# 343	0.020

HIGHLY CONFIDENTIAL

U 0088636

Table: 3
PROJECTED TECHNOLOGY DISTRIBUTION,
MY-90 LIGHT DUTY VEHICLES AND ALL LIGHT DUTY TRUCKS (CLASS 1 & 2)

FUEL SYSTEM		
Carbureted	Throttle Body Injection	Multi-Point Injection
2.0 %	26.9 %	71.2 %

CATALYST			
None	Oxidation	3-Way	3-Way + Oxidation
0.05 %	0.2 %	85.4 %	14.3 %

FUEL/AIR SYSTEM			
Open Loop		Closed Loop	
Without Air Injection	With Air Injection	Without Air Injection	With Air Injection
0.0 %	0.4 %	75.4 %	24.2 %

EXHAUST GAS RECIRCULATION	
With EGR	Without EGR
77.3 %	22.7 %

NUMBER OF CYLINDERS						
2	3	4	5	6	8	12
0.1 %	0.7%	42.1 %	0.2 %	42.2 %	14.6 %	0.05 %

TURBOCHARGING	
With Turbocharging	Without Turbocharging
1.4 %	98.6 %

HIGHLY CONFIDENTIAL

U 0088637

Table: 4
PROJECTED REPRESENTATION OF VEHICLE MANUFACTURERS,
MY-90 LIGHT DUTY VEHICLES AND ALL LIGHT DUTY TRUCKS (CLASS 1 & 2)

Manufacturer	Percentage of Fleet
General Motors	38.6
Ford	22.6
Chrysler	8.7
Toyota	7.3
Honda	5.3
Nissan	3.3
Mazda Motor Corp.	2.8
American Motors	1.8
Hyundai	1.8
Mitsubishi	1.8
Fuji Heavy Ind.	1.4
Suziki	1.1
New United Motor Mfg.Inc.	1.1
Isuzu	1.1
Diamond Star Motors	0.9
Volkswagen	0.8
Volvo	0.8
Mercedes Benz	0.4
BMW	0.3
Daihatsu Motor Co. Ltd.	0.2
Jaguar Cars Inc.	0.2
SAAB	0.2
Audi	0.2
Grumman Allied Industries	0.1
Yugo America Inc.	0.1
Asc Inc.	0.1
Porsche	0.1

HIGHLY
CONFIDENTIAL

U 0088638

Unocal Refining & Marketing Division
Unocal Corporation
911 Wilshire Blvd., P.O. Box 7600
Los Angeles, California 90051
Telephone (213) 977-5974

D. W. Lamb

UNOCAL 76

July 1, 1991

Dennis W. Lamb
Manager of Planning
Planning and Services

Mr. Peter Venturini, Chief
Stationary Sources Division
California Air Resources Board
P. O. Box 2815
Sacramento, CA 95812

Dear Mr. Venturini:

The attached page shows the equations developed in Unocal's research program that we presented to you and your staff on June 20, 1991. The equations presented are based on the ten car program run at Southwest Research Institute.

As we discussed in the meeting, Unocal requests that CARB hold these equations confidential, as we feel that they may represent a competitive advantage in the production of reformulated gasoline.

If CARB pursues a meaningful dialogue on a predictive model approach to Phase 2 gasoline, Unocal will consider making the equations and underlying data public as required to assist in the development of a predictive model.

If there are any questions regarding these equations or any of our presentation, please call me at (213) 977-5974.

Sincerely,

for DWL

MJK:jd
Attachment

bcc: R. C. Beach
D. E. D'Zurilla
J. M. Kulakowski
J. W. Miller

U 0073024

Unocal Emission Equations

(Confidential)

Hydrocarbon = (gm/mi)	-0.000474 * Aromatics (vol%) +0.00248 * Olefins (vol%) -0.00212 * Research Octane Number +0.00207 * T50 Distillation Point (deg F)
Carbon Monoxide = (gm/mi)	-0.00682 * Paraffin (vol%) +0.0128 * T50 Distillation Point (deg F) +0.00123 * T90 Distillation Point (deg F)
NOx = (gm/mi)	+0.005595 * Olefin (vol%) -0.000283 * Paraffin (vol%) +0.002715 * T10 Distillation Point (deg F) +0.02765 * Reid Vapor Pressure (psi)

U 0073025

Unocal Corporation
376 South Valencia Avenue
Brea, California 92621
Telephone (714) 577-1581
Telex 277744 UOPS UR
Facsimile (714) 528-5343

UNOCAL

Stephen C. Lippman
President

August 3, 1992

Mr. Roger C. Beach
President and Chief Operating Officer
Unocal Corporation
Los Angeles, California

SCIENCE & TECHNOLOGY DIVISION
July 1992

Dear Mr. Beach:

The following is a summary of activity of the Unocal Science & Technology Division for the month of July 1992.

SAFETY AND ENVIRONMENTAL

No Science & Technology employees suffered injuries resulting in lost workdays (LWC) or restricted workdays (RWC) during July. The year-to-date on-the-job LWC frequency rate for Science & Technology employees is 0.00 days lost per 200,000 man-hours, the LWC + RWC is 0.00 and the total recordable injury/illness frequency is 3.44.

The off-the-job lost work day accident frequency rate is 3.18. There were no contractor lost-time injuries during July. Contractor statistics are: LWC=2.71, LWC + RWC=5.41 and the total recordable injury frequency is 6.76.

EXPLORATION RESEARCH

Identifying Faults as Seals or Conduits

The fundamental concept involved in chemically distinguishing sealing from leaking faults is that the chemistry of fluids on either side of a fault can differ only if the fault acts as a barrier to fluid movement.

The Pt. Pedernales A-8 well was chosen as a test case to determine if Monterey faults can act as seals, since this well penetrated a major fault, juxtaposing brittle lithologies. Cuttings were available from the well, and fluids produced from above and below this fault were collected.

Oil chemistry from the two production samples was significantly different due to biodegradation. This result is ambiguous with regard to the role of the fault, since biodegradation can differ gradationally within a single reservoir compartment.

However, from analysis of the cuttings, it was determined that adsorbed oil composition changed gradually as the fault was approached from above. At the fault, oil chemistry changed abruptly and remained constant with increased depth in the well. These data clearly demonstrate the sealing nature of this fault and provide some guidance for field development.

PRODUCTION & DEVELOPMENT RESEARCH

Removing Mercury from Unocal Thailand Waste Sludge

The gas condensate produced in the Gulf of Thailand contains about 1 ppm of mercury. Some mercury settles in storage tanks along with naturally produced solids. To date, 175 tons of sludge have been recovered and another 20 tons of sludge will accumulate in 1992. The mercury in the sludge averages about 2 percent and is elemental.

A research engineer traveled to Thailand and conducted on-site lab tests which show that thermal treatment can strip the mercury from the sludge. Samples of the sludge are being shipped to Science & Technology for process development. We anticipate that the treated solids can be mixed with cement to render the small amount of remaining mercury non-leachable. The treated sludge should be safe for disposal according to both United States EPA and Thai regulations.

AGRICULTURAL CHEMICALS

Final Outstanding Enzone Study Submitted to EPA

In support of our application for federal pesticide registration of Enzone™ (aka GY-81), a study entitled "The Recovery of Carbon Disulfide From Potassium Ethyl Xanthate Crop Matrices - A Model For Bound Carbon Disulfide Residues" was completed July 15, 1992. Conducted at the request of the United States EPA, the study was completed in just over three months under the EPA's "Good Laboratory Practices" regulations.

These data show that potassium ethyl xanthate can be used as a model compound for bound CS_2, and that the analytical method for bound CS_2 can be used to recover CS_2 from crop matrices spiked with potassium ethyl xanthate. This reinforces the conclusion from previous residue studies that the application of Enzone does not result in detectable residues in agricultural commodities, of either free or bound CS_2 residues.

SEISMIC RESEARCH & APPLICATIONS (SRA)

SRA is active in three of the ten studies initiated as part of Unocal's South Caspian Sea project:

- Overpressure estimation: analyses of 16 wells show an increase in overpressure from Gunashli to Azeri and from the northeastern flank to the southeastern flank of the Azeri field.
- Structural cross-sections across the Bakhar Field.
- Lithology and overpressure: software has been generated to predict lithology and overpressure from drill bit penetration rates.

In addition, three seismic processing projects are under way in Anaheim that cover both detail in the South Caspian and Regional evaluations.

SRA continues to host parties of Azerbaijani scientists. The current group are from IDOGD and the Geophysical Trust.

PATENT DEPARTMENT

Unocal received an informal notice from the U.S. Patent & Trademark Office that it would allow claims to Unocal's reformulated gasoline.

REDACTED

Also, on appeal by Unocal, the Federal Circuit Court of Appeals reversed a U.S. Patent & Trademark Office decision and granted Unocal a patent to the use of ammonium foliar fertilizers containing magnesium in a normally phytotoxic concentration.

PROCESS TECHNOLOGY & LICENSING

Process Technology & Licensing completed a license with Saudi Arabian Oil Company for diesel Unionfining capacity of 100,000 bpd during July. The objective of the Unionfiners is to reduce the sulfur in diesel from 2.1 wt.% to 500 wppm. The Unionfiners will be located at Aramco's Ras Tanura refinery and are expected to be on stream in 1995. Unocal will receive over $2.1 million in revenue from this sale.

Very truly yours,

Stephen C. Lipman, President
Science & Technology Division

SCL:mlb

Calculation Record

UNOCAL 76

PREPARED BY	CHECKED BY	DATE	PAGE
			OF

SUBJECT

W O/A.F.E. NO.

MICHAEL W. THACHER
JAN 26 1995

Patent on a gasoline composition
can be obtained on new, unobvious gasoline
property of reducing key tailpipe emissions

made invention + applied for patent long before CARB published

gasoline is a complex, manufactured product
formulations one varied;
specialized composition different than other
I invented a specialized gasoline

our formulation publicly covers 95% of CARB specifications
we have a fuel that meets CARB specification
not coincident
while don't cover every possible formulation under Carb specs,
does cover a large proportion of practical formulations
lot of gasoline formulations that are practical make

no licensing in place, no impact on financial performance

invention made ~~before~~ early in '90 ?

we gave our info to CARB after filing
in 1991, as other oil cos. did
gave all info we had

patent under statute not disclosed, protect interests of our stockholders

(1) gasoline patents precedented

(2)

UFTC 000802

FORM 1-2C50 (REV. 2-87) PRINTED IN U.S.A.

CX371

Calculation Record

UNOCAL 76

PREPARED BY	CHECKED BY	DATE	PAGE
			2 OF

SUBJECT

W.O./A.F.E. NO.

why did we wait till now (from Feb)

licensing and legal considerations

studying that's needed

analyzing full scope of patent

review to ~~ensure~~ evaluate our position

public document when patent issued

EC-1 not patentable

UFTC 000803

FORM 1-2C50 (REV. 2-87) PRINTED IN U.S.A.

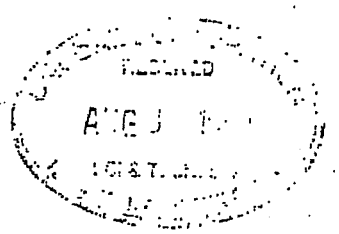
CX371-002

Technical Memorandum
Unocal Science & Technology Division
Brea, California

UNOCAL

To:	W. R. Mallett	**Memo:**	PROD-89-139M
From:	M. C. Croudace	**Date:**	August 4, 1989
Department:	Products, Processes & Materials Research	**Project:**	720-60010
Subject:	**CARB MEETING ON GASOLINE ADDITIVES**	**Supervisor:**	W. R. Mallett

cc: **Library (2)**
Patent
S. K. Alley
J. W. Miller
A. L. Shugarman, I-127
S. R. Tarbox, I-187
G. A. Wessler, A-116



On July 28, 1989 Unocal Science and Technology staff presented a talk to the California Air Resources Board (CARB) outlining Unocal's position on the need for detergent additives in gasoline. Attending the meeting were S. K. Alley, J. W. Miller, W. R. Mallett and M. C. Croudace for Unocal and P. D. Venturini, D. Simeroff and K. Cleary for CARB. Slides for this talk are attached. The talk was well received.

The three goals Unocal set out to achieve by presenting CARB with this talk were obtained. First, we were able to establish contacts with CARB's senior staff members. Second, we impressed CARB with Unocal's technical expertise in the area of gasoline additives as well as our belief in the use of additive for the improvement of fuel properties and our outstanding technical developments in the area of gasoline detergents. Finally, we discussed at length Unocal's ideas for the proposed additive regulation.

We found the board members very receptive to Unocal's presentation. The following are key points made by the CARB staff members during our discussions:

1. CARB is thinking of writing their additives regulation in much the same way Unocal presented.

   A. An acceptable additive will first need to prove its value for deposit control in performance tests. We did not specify which performance tests to be used in the accreditation of an additive because Unocal feels none of the current industry tests are precise enough to specify. Further, new tests are under development.

   B. The test results proving performance will be reviewed by a government agency.

   C. CARB is considering maintaining emission control by monitoring each companies gasoline and detergent throughput.

2. CARB also presented Unocal with some of their ideas for this regulation.

   A. They would like to write into the regulation a set of specific established deposit control tests and performance specifications that each company use to validate the performance of their additives.

   B. Each additive will need to be tested for their effect on vehicle emissions. Further, emission tests will include several toxic compounds not currently controlled by the EPA. These include 1,3-butadiene, benzene, formaldehyde and acetaldehyde.

   C. CARB would like a method that they could evaluate for the presence of a gasoline additive at appropriate dosages in gasolines.

Michael C. Croudace

MCC/ljg
Attachment

HIGHLY
CONFIDENTIAL

U 0170617

UNOCAL GASOLINE ADDITIVE TECHNOLOGY

Presentation to the
California Air Resources Board
July 28, 1989

U0170618

PURPOSE:

1. **To demonstrate the long term commitment Unocal has had to the use of gasoline additives to improve the quality of our gasolines.**

2. **To present Unocal's ideas for future gasoline detergent additive regulation.**

U0170619

CARBURETORS

Unocal was one of the first oil companies to use a carburetor detergent in their gasolines starting in 1956.

HIGHLY CONFIDENTIAL

U 0170620

CARBURETOR DETERGENT PERFORMANCE FEATURES

- **Maintain Driveability**
- **Maintain Power Output**
- **Maintain Fuel Economy**
- **Maintain Exhaust Emissions**

CLASSIFICATION OF GASOLINE DETERGENT ADDITIVE TYPES BY AREA OF FUNCTION

- **Carburetors**
- **Port Fuel Injectors**
- **Intake Valves**

HIGHLY CONFIDENTIAL

U 0170622

SUMMARY

- Unocal gasolines were one of the first to contain detergent additives with introduction 1956
- Unocal has kept up with the changing market place, introducing the gasoline with best port fuel injector detergent in 1986 and now introducing a complete fuel system cleanliness detergent
- Future regulations for additives in gasolines should be based on performance tests of additives/gasoline combinations
- Monitoring for additive in gasoline via additive/gasoline throughput

SUGGESTED GASOLINE DETERGENT ADDITIVE REGULATION

- **Use deposit control performance tests as the basis for gasiline detergent additive regulation**
- **Have results reviewed by a government agency**
  - **FTC-Substantiate advertised claims**
  - **CARB-Performance test results**
- **Maintain emisson control by monitoring each company's gasoline and additive throughput**
- **Obtain estimates of improvement to air quality from automobile manufacturers**

U0170624

FUTURE GASOLINE ADDITIVE REGULATION

HIGHLY
CONFIDENTIAL

U 0170625

CONCLUSIONS

1. **Unocal's intake valve system detergent has demonstrated BMW category I deposits control performance**

2. **Intake valve deposits adversely affect exhaust emissions**

3. **Currently there is no standard test for exhaust emissons versus intake valve deposits cleanliness**

4. **Quantifying emissions improvement for the California fleet would be difficult**

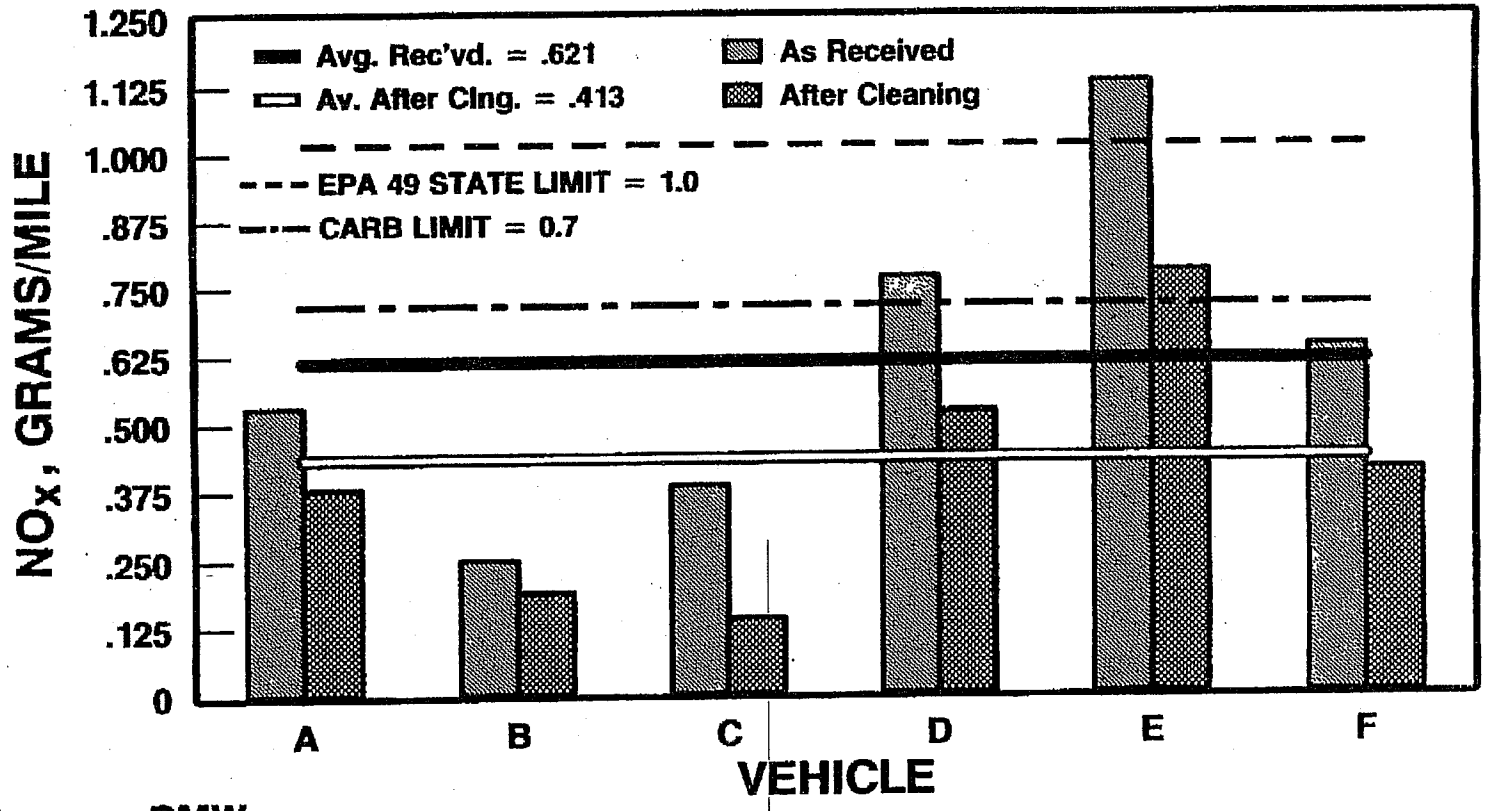
U0170626

UNOCAL'S NEW INTAKE SYSTEM DETERGENT

- **Meets BMW Category I Performance**
- **Maintains Unocal's High Standards for Carburetor and Injector Detergency**
- **Introduction This Summer**
- **A Unique Unocal Patent Pending Development**

U0170627

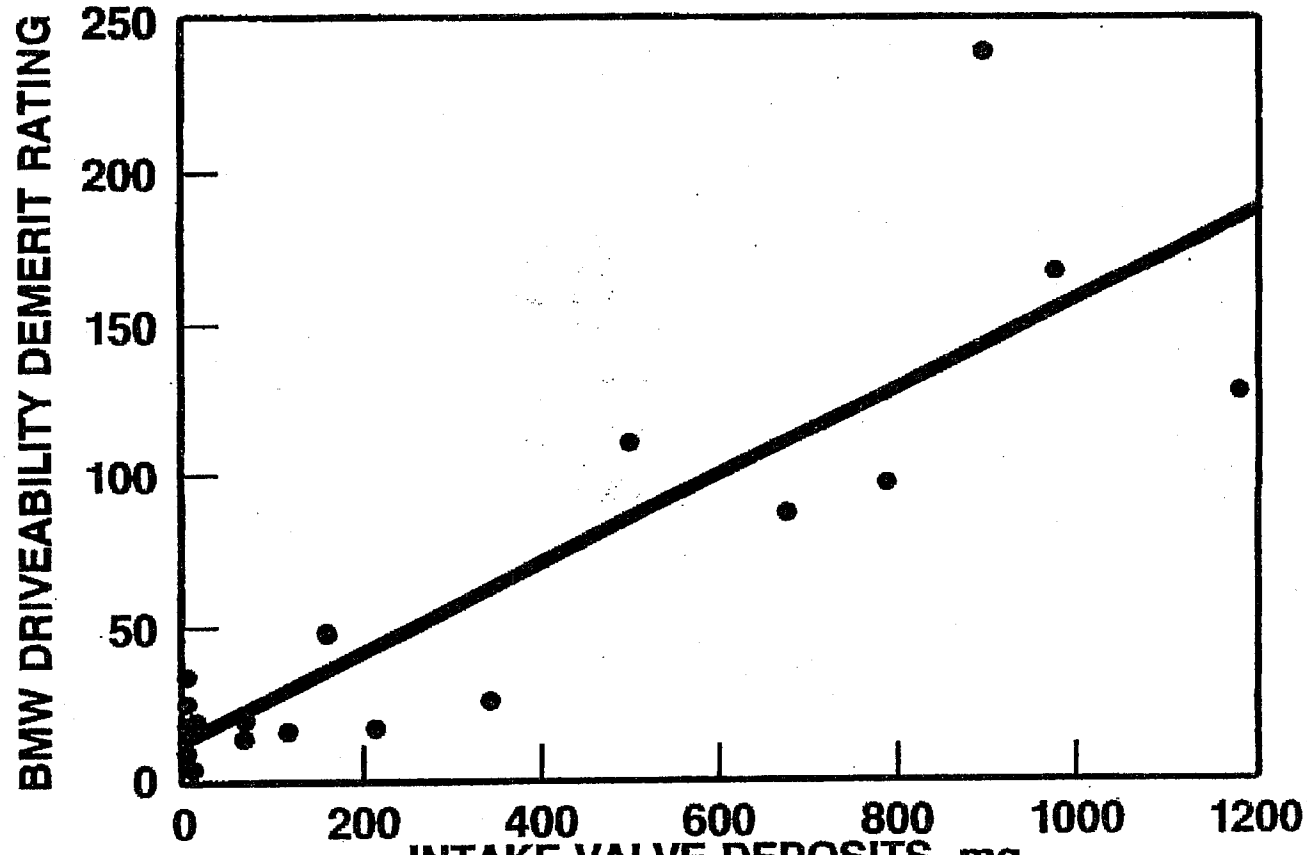
TYPICAL NO_X EMISSION REDUCTION DUE TO INTAKE SYSTEM CLEANING



Source: BMW

DRIVEABILITY VERSUS VALVE DEPOSIT WEIGHT

SIX COMMERCIAL FUELS - BMW 1.8L 4 CYL. PFI ENGINE



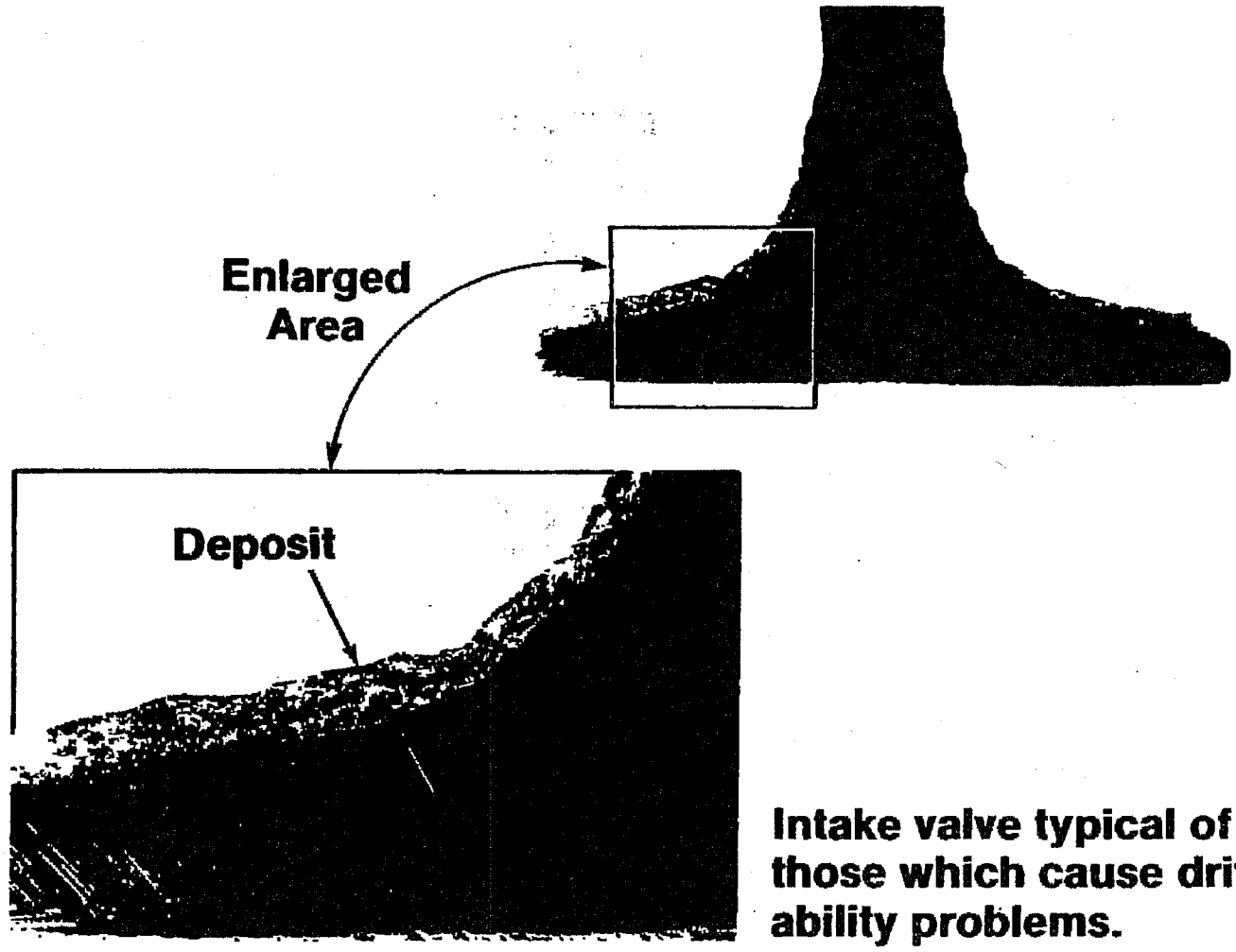
Source: SAE Paper 872117

BMW INTAKE VALVE QUALIFICATION TEST

- 1-2 Years of test development
- Engine - 318i PFI 4 Cylinder
- Test Protocol -
  - 10,000 Miles (70% Highway, 20% Secondary, 10% City) at SwRI
- Test Fuel - Manufacturer's typical gasoline with additive
- Status - CRC will review this August
- A deposit control test, not an emissions test

U0170630

CROSS-SECTIONED INTAKE VALVE WITH DEPOSITS

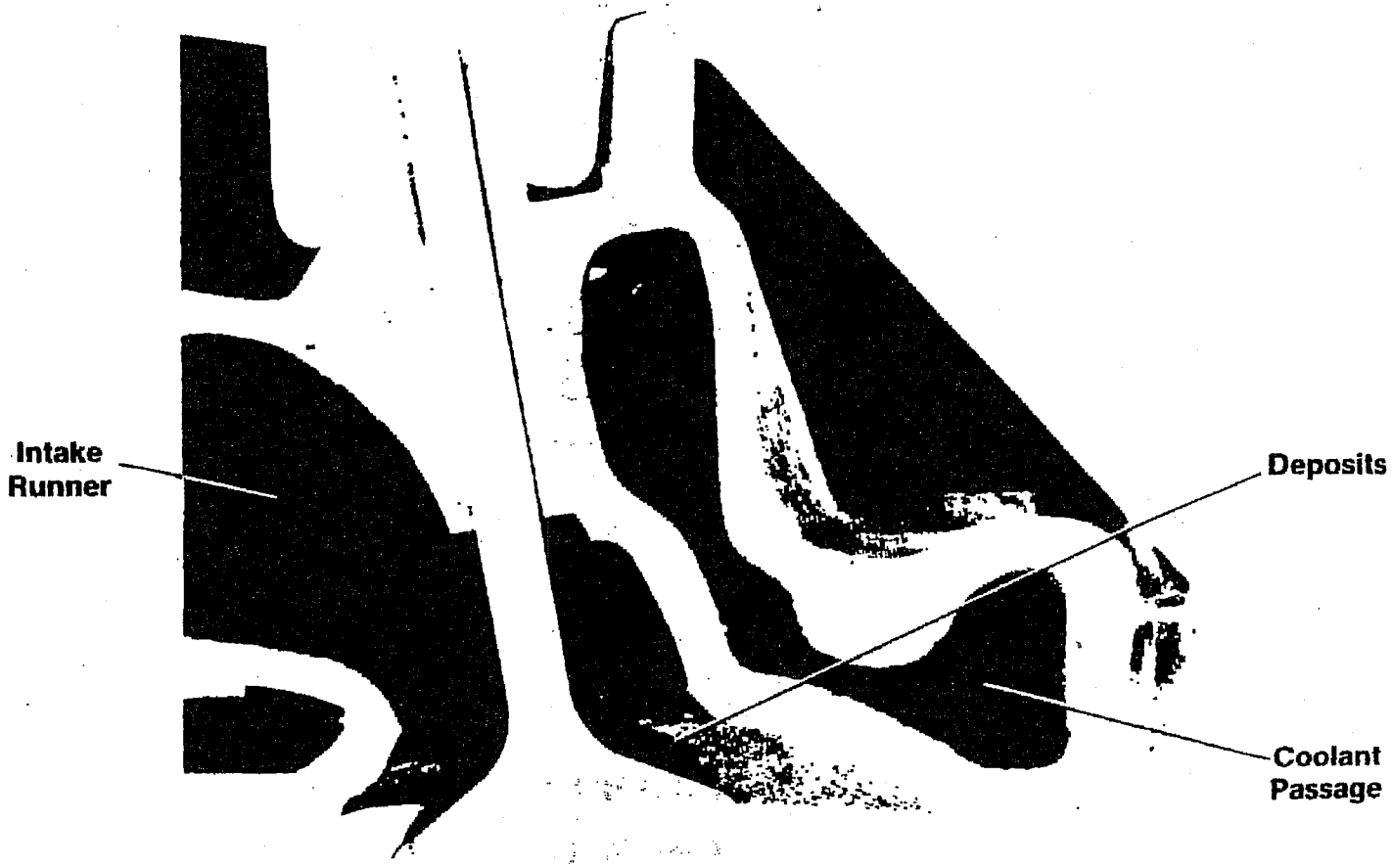


Intake valve typical of those which cause drive-ability problems.

U0170631

INTAKE VALVE AND PORT DEPOSITS RESTRICT BREATHING

80000 km (50000 miles) Without Additive
3.8 Liter V-6 (2 Bbl)



U 0170632

U0170632

INTAKE VALVES

Unocal will introduce a newly developed gasoline additive this summer. The additive will keep intake valves clean while maintaining Unocal's high standards for carburetor and fuel injector detergency.

HIGHLY CONFIDENTIAL

U 0170633

CONCLUSIONS

1. **Unocal's Port Fuel Injector Detergent has Demonstrated Superior Detergency**

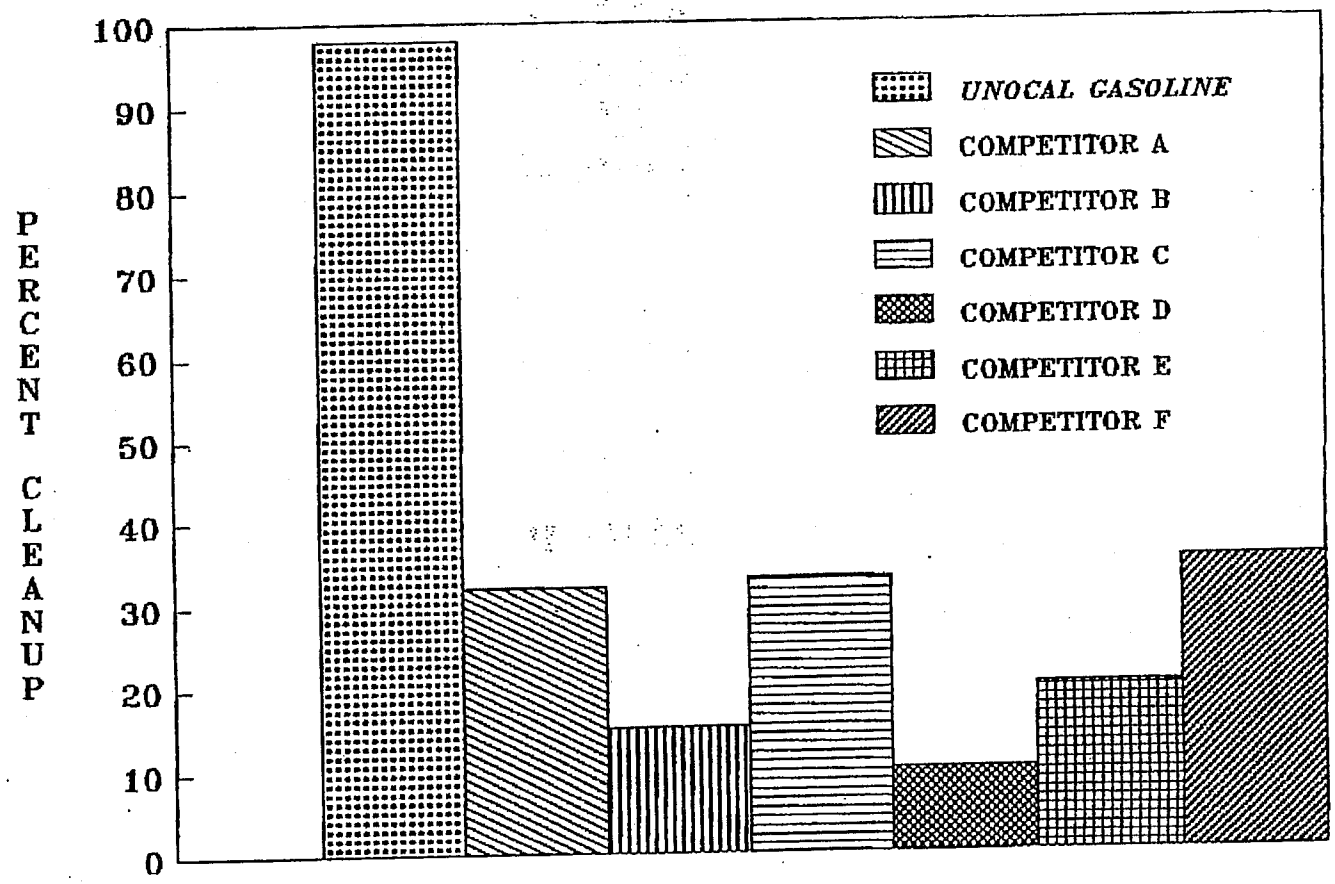
2. **Port Fuel Injector Deposits Adversely Affect Exhaust Emissions**

3. **Currently There is No Standard Test for Exhaust Emissions versus Port Fuel Injector Cleanlinesss**

4. **Quantifying Emission Improvements for the California Fleet Would be Difficult**

U0170634

PERCENT CLEAN–UP AFTER 3 TANKFULS



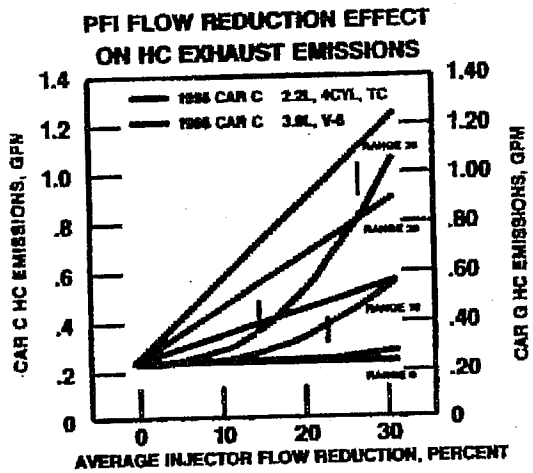
CRC PORT FUEL INJECTOR TEST
(Has not Received ASTM Approved)

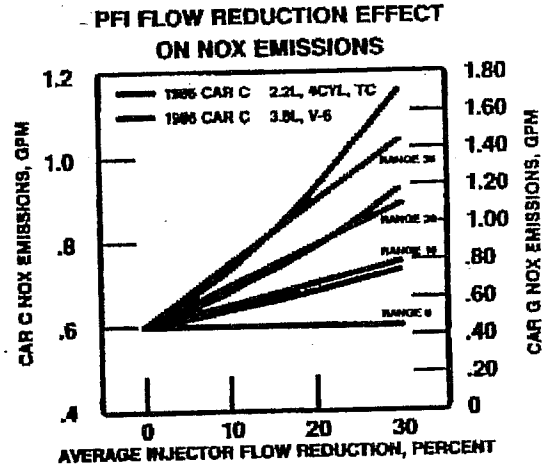
- **Three Years of Development and Continuing**
- **Engine - 2.2 liter Chrysler or liter 3.8 G.M.**
- **Test Protocol:**
  - **15 Minutes at 55 MPH Road Load**
  - **45 Minutes Hot Soak**
- **No Standard Injector Depositing Fuel**
- **Major Problems:**
  - **Problem Injectors no Longer Available**
  - **Large Lab to Lab Variability**
  - **1 to 2 Week Test**
- **A Deposit Control Test, Not An Emission Test**

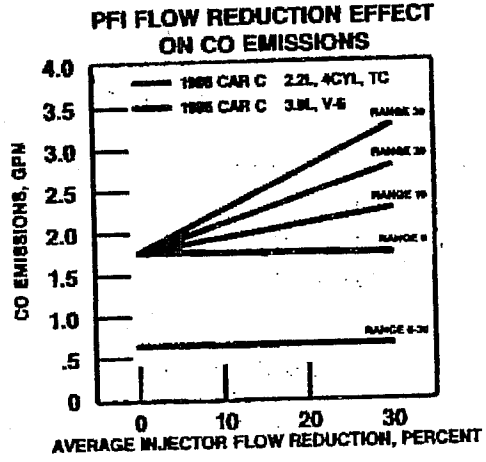
HIGHLY
CONFIDENTIAL

U 0170636

EMISSIONS VS PFI FLOW REDUCTION







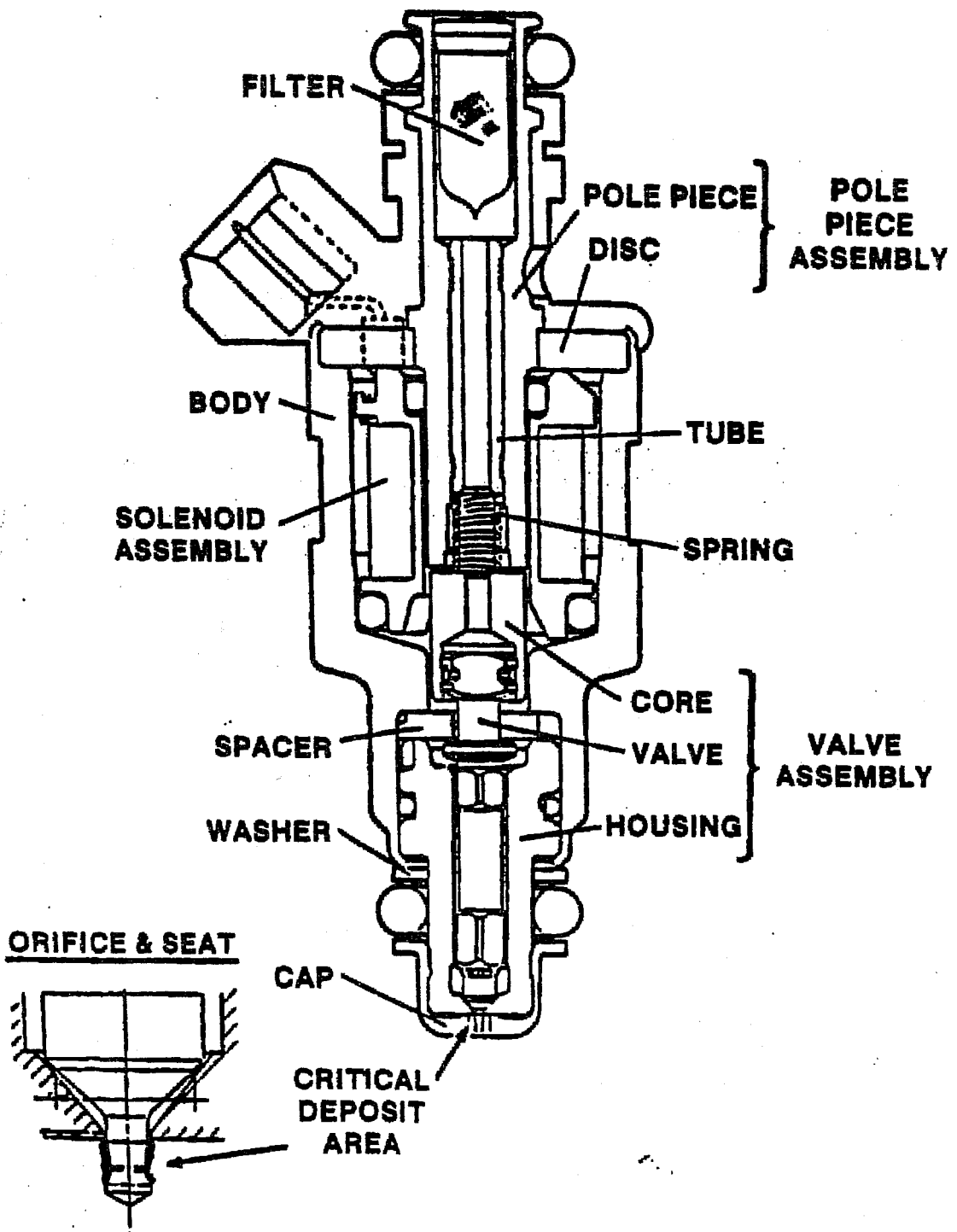
Source: SAE Paper 872113

ADDITIVE EFFECTS ON PFI DEPOSIT CONTROL

- **Detergents Control PFI Deposits Formation**
- **Effectiveness Dependent on Additive Dosage, Gasoline Properties, and Driving Patterns**
- **Ethanol May Reduce Additive Effectiveness**

U0170638

BOSCH PORT INJECTOR



MODERN ENGINES ARE SENSITIVE TO DEPOSITS

Injector Pintle Deposits

Driveability
Power Loss
Fuel Economy
Exhaust Emissions

HIGHLY
CONFIDENTIAL

U 0170640

HISTORY OF PORT FUEL INJECTOR PROBLEM

- Initial Concerns Fall, 1984
- Problem Confined to Specific Areas
- California Not a Problem Area
- Numerous Warranty Claims Were Not PFI Related
- Cooperative Effort Between Auto and Oil Industries Resolved the Problem
- Oil Company Solution - Additives; Auto Company Solution - Redesign Injectors

HIGHLY CONFIDENTIAL

U 0170641

FUEL INJECTORS

A KEY ELEMENT IN THE EMISSION SYSTEM OF THE MODERN SPARK IGNITION ENGINE.

HIGHLY CONFIDENTIAL

U 0170642

CONCLUSIONS

1. Unocal's Carburetor Detergent has Demonstrated Superior Carburetor Detergency for Thirty Years

2. Carburetor Deposits Adversely Affect Exhaust Emissions

3. Currently There is No Standard Test For Exhaust Emissions versus Carburetor Cleanliness

4. Quantifying Emission Improvements for the California Fleet Would be Difficult

U0170643

CRC CARBURETOR DETERGENCY RESULTS
UNOCAL VERSUS COMPETITORS

HIGHLY CONFIDENTIAL

U 0170644

UNOCAL'S CARBURETOR DETERGENT

- **Developed and Patented by Unocal in the 1950's**
- **Used in Our Fuels through the Late 1980's**
- **30 Years of Commercial Experience Proved Unocal's Carburetor Detergent to be Unsurpassed for keeping Carburetors Clean**

HIGHLY CONFIDENTIAL

U 0170645

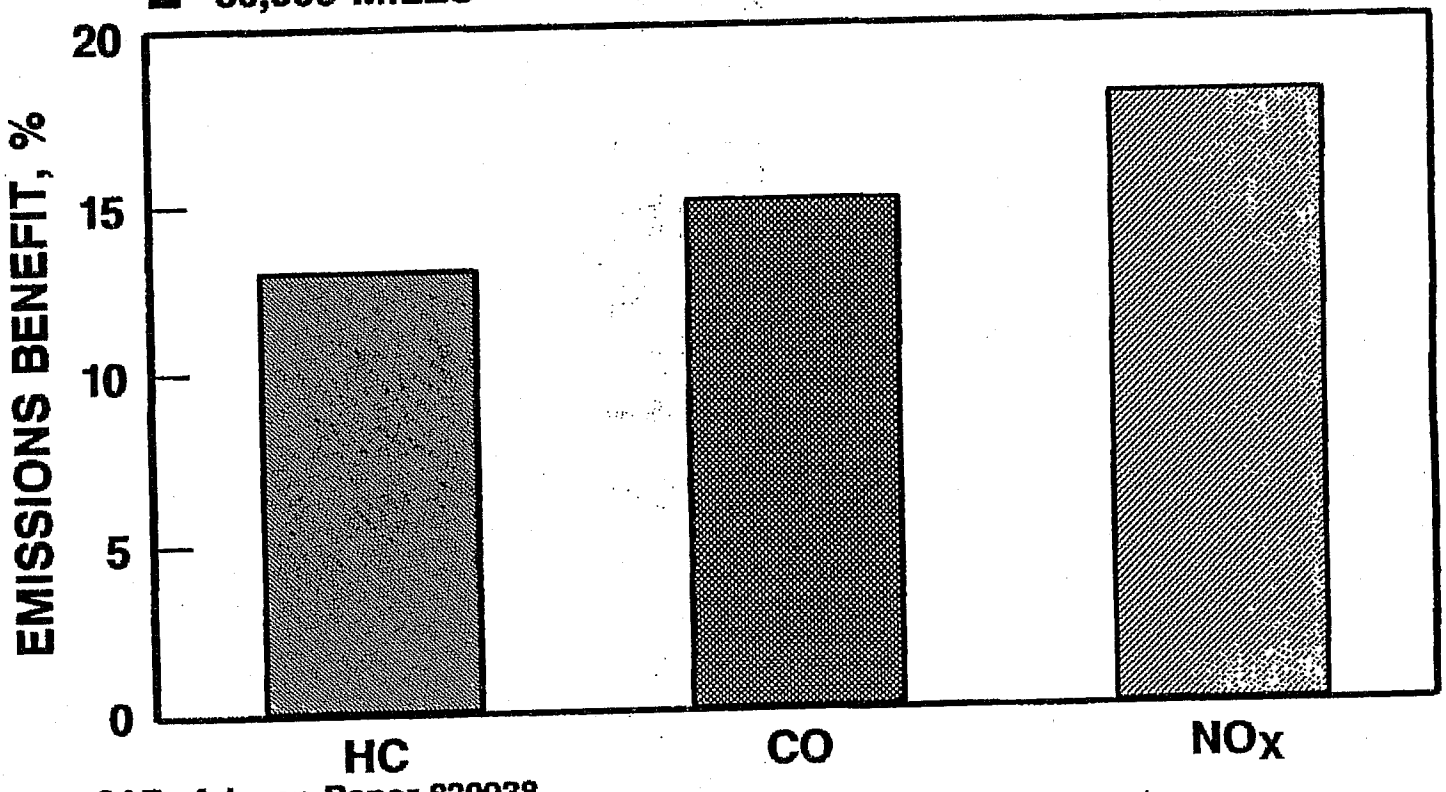
CRC CARBURETOR CLEANLINESS TEST PROCEDURE
(Never Approved as an ASTM Test Procedure)

- **Nine Years of Inter-Industry Development**
- **Engine -- 240 - or 300 - CID Ford 6 Cylinder with Removable Throttle Bore Sleeve**
- **Test Protocol:**
  - **Cycle 20 Hours Between Idle and Medium Cruise Speed**
  - **Weigh Sleeve**
- **Phillips J Test Fuel**
- **Major Problem -- Large Lab to Lab Variability**
- **A Deposit Control Test, Not An Emission Test**

U0170646

EMISSIONS DURABILITY PROGRAM

- UNLEADED GASOLINE WITH AND WITHOUT ADDITIVE E
- TEN 1978 AND 1979 VEHICLES PER FUEL
- 50,000 MILES



Source: SAE of Japan Paper 830938

HIGHLY CONFIDENTIAL
U0170647

OUTLINE OF DISCUSSION

- Carburetor Detergents
- Port Fuel Injector Detergents
- Intake Valve Deposit Control Detergents
- Additive Regulation

HIGHLY
CONFIDENTIAL

U 0170648

A. I was the executive officer of the Air Resources Board.

Q. Is that a position formerly held at one time by Mr. Jim Boyd?

A. Yes, it is.

Q. And after Mr. Boyd, could you give me the progression of executive officers. I think I've also heard it referred to as executive director, but could you give me the progression of Mr. Boyd up to your reign.

A. Mr. Boyd and then myself.

Q. Sir, if you would take a look at what's previously been marked as Respondent's Exhibit 1, it's the notice of the deposition in this case, and I simply ask you if you are the designee with respect to topic two.

A. Yes, I am.

Q. Okay. You can set that aside.

MR. GOLDMAN: If I may clarify, counsel, my understanding in correspondence that I've sent to you is that we also indicated that Judge Kenny would be in a position to answer questions with respect to topic three as well.

MR. BEEHLER: Right, if that's necessary. Just for the record, counsel has accurately

communicated what he told me. We'll see if that's necessary given the fact that the witness before you said he was prepared to testify as to all aspects. So it may not be necessary.

THE WITNESS: All right.

BY MR. BEEHLER:

Q. Okay. Then with respect to topic two, the statutory or regulatory basis used by CARB or its staff to propose and adopt Phase 2 regulations in 1991 and any later-adopted amendments, I'd like to ask you a series of questions, sir. First of all, in preparing for this deposition have you met with anyone in the room?

A. Yes, I have.

Q. Have you met with Federal Trade Commission counsel?

A. Yes, I have.

Q. Would you identify them.

A. I met with Chong Park and I have also met with --

Forgot your name.

Q. Lisa Fialco?

A. I had -- I have met with Lisa and I have also met with --

Q. Mr. Graybill?

MR. BEEHLER: Do you want me to just step outside for a couple minutes --

MR. PARK: No. I actually need a bathroom break, so --

MR. BEEHLER: Okay.

THE REPORTER: Off the record.

(Recess taken.)

EXAMINATION

BY MR. PARK:

Q. Your Honor, I'd like to hand to you what's been marked as RX 1. Do you see that, sir?

A. I do.

Q. Is it your understanding that you are prepared to testify on behalf of CARB as to the matter in topics set forth in item number three in this deposition notice?

A. Yes.

Q. And have you come here prepared to testify as to such matters?

A. I have.

Q. And would you be prepared to testify as to such matters at trial?

A. I am. Or I would be.

Q. Your Honor, as you sit here today, do you have any opinion as to whether or not Unocal

patent. So if it was easy to do, one must ask why didn't they do it? I think you get the clue as to why they didn't do it in the documents. Because in the documents, there's considerable discussion in the context of CARB of how easy it is to blend to the CARB specs, and as was pointed out earlier, the '393 patent lies inside the CARB specs; so it's an even narrower band or range within which to blend, and there were quite a number of documents that pointed out that it was very difficult and costly to blend inside the CARB specs, and by implication, it would also be very difficult and much more difficult to blend inside the CARB specs but avoid the '393 patent.

Q. I think you may have misspoke at the outset. Because --

A. I said inside the '393 --

Q. No, at the very outset you said how easy it was to get within the CARB specs.

A. Excuse me. It's very difficult to get inside the CARB specs, and even more difficult to be inside the CARB specs and outside the '393 patent. So excuse me if I misspoke.

Q. Okay. And was there a reflection of that in the defendants' documents as you've said?

A. Yes.

Q. Now, we've already looked at exhibit 1360; correct?

A. Yes.

Q. I'd like you to take a look now at exhibit 2539.

CARB regulations as compared to investing in the refineries in California.

This is not blue sky stuff. This is precisely the methodology that these defendants, potential licensees of the negotiation, used two years or so earlier when they were confronting a similar circumstance.

Q. And in the real world, every single one of the companies rejected that alternative; correct?

A. They rejected it as they would here, and they would take the license.

Q. And what the companies did is they rejected and spent the money to change their refineries so that they could comply with the regulations; correct? That's the sunk money you're talking about.

A. And the analogue here is that they would take the lower cost alternative, which is the license.

Q. But here in this case, by the time of the hypothetical, the defendants have spent all this sunk money, the billions of dollars. They have made the very choice they already said. We'll invest the money so we can control T50 and T90, and it's all in there. It's all in place, and we've spent the money.

A. You're absolutely right, because they have made billions of dollars of upgrades, but they haven't taken into account the fact that the '393 patent is out there. So they are

stuck, and they're going to have to take the license. Precisely my point, Mr. Gould.

Q. You say they are stuck. But the real issue here is are they really stuck that all they can do is export and import, or is it really possible that a much lower cost than 35 cents to do things in the refinery using what they had available in place to make CARB gas and use that equipment to also avoid the patent? Isn't that the real issue here, sir?

A. They will use that to the maximum extent they can. And this royalty is set up so that to the extent to which they can do it that way, they don't have to pay.

It's a running royalty only on the infringing gallons. So if they are able to work down the amount of infringement, as some of them might be able to through blend-around, they get the benefit. They don't have to pay the royalty on those gallons, but at the end of the day, there's going to be significant volumes left that are infringing, and they are going to have to pay the royalty on that.

Q. And you say at the end of the day, there would be significant volumes of infringement no matter what they did; correct? Is that your opinion as an economist or as a refinery expert?

A. That's not what I said. Because no matter what they did, if they exported it out, there wouldn't be significant

SUBPOENA AD TESTIFICANDUM

Issued Pursuant to Rule 3.34(a)(1), 16 C.F.R. § 3.34(a)(1) (1997)

1. TO
Jananne Sharpless
c/o Matthew Goldman
DEputy Attorney General
State of California
Department of Justice
1300 I Street, Suite 125
Sacramento, CA 94244-2550

2. FROM
UNITED STATES OF AMERICA
FEDERAL TRADE COMMISSION

This subpoena requires you to appear and give testimony, at the date and time specified in Item 5, at the request of Counsel listed in Item 8, in the proceeding described in Item 6.

3. PLACE OF HEARING
Hyatt Regency
1209 L Street
Sacramento, CA 95814

4. YOUR APPEARANCE WILL BE BEFORE
Union Oil Company of California

5. DATE AND TIME OF HEARING OR DEPOSITION
July 10, 2003 9:00 a.m.

6. SUBJECT OF PROCEEDING
In the Matter of Union Oil Company of California, Docket No. 9305

7. ADMINISTRATIVE LAW JUDGE
The Honorable D. Michael Chappell

Federal Trade Commission
Washington, D.C. 20580

8. COUNSEL REQUESTING SUBPOENA
Diane L. Simerson, Esq.
Robins, Kaplan, Miller & Ciresi L.L.P.
800 LaSalle Ave., #2800
Minneapolis, MN 55402
(612) 349-8500

DATE ISSUED
MAY 2 7 2003

SECRETARY'S SIGNATURE
Donald S. Clark

GENERAL INSTRUCTIONS

APPEARANCE

The delivery of this subpoena to you by any method prescribed by the Commission's Rules of Practice is legal service and may subject you to a penalty imposed by law for failure to comply.

MOTION TO LIMIT OR QUASH

The Commission's Rules of Practice require that any motion to limit or quash this subpoena be filed within the earlier of 10 days after service or the time for compliance. The original and ten copies of the petition must be filed with the Secretary of the Federal Trade Commission, accompanied by an affidavit of service of the document upon counsel listed in Item 8, and upon all other parties prescribed by the Rules of Practice.

TRAVEL EXPENSES

The Commission's Rules of Practice require that fees and mileage be paid by the party that requested your appearance. You should present your claim to Counsel listed in Item 8 for payment. If you are permanently or temporarily living somewhere other than the address on this subpoena and it would require excessive travel for you to appear, you must get prior approval from Counsel listed in Item 8.

This subpoena does not require approval by OMB under the Paperwork Reduction Act of 1980.

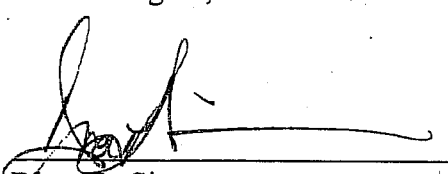
CERTIFICATE OF SERVICE

I hereby certify that on June 3, 2003, I caused a copy of the Notice of Videotaped Deposition and Subpoena Ad Testificandum directed to Jananne Sharpless and the Protective Order Governing Discovery Material to be served upon the below listed persons via Federal Express:

Jananne Sharpless
c/o Matthew Goldman
Deputy Attorney General
State of California
Department of Justice
1300 I Street, Suite 125
Sacramento, CA 94244-2550

J. Robert Robertson, Esq.
Senior Litigation Counsel
Federal Trade Commission
600 Pennsylvania Avenue NW, Drop 374
Washington, DC 20580

Richard B. Dagen, Esq. through service upon
Chong S. Park, Esq.
Bureau of Competition
Federal Trade Commission
601 New Jersey Avenue NW, Drop 6264
Washington, DC 20001



Diane L. Simerson

SUBPOENA AD TESTIFICANDUM

Issued Pursuant to Rule 3.34(a)(1), 16 C.F.R. § 3.34(a)(1) (1997)

1. TO Dean Simeroth
c/o Matthew Goldman
Deputy Attorney General
State of California
Department of Justice
1300 I Street, Suite 125
Sacramento, CA 94244-2550

2. FROM

UNITED STATES OF AMERICA
FEDERAL TRADE COMMISSION

This subpoena requires you to appear and give testimony, at the date and time specified in Item 5, at the request of Counsel listed in Item 8, in the proceeding described in Item 6.

3. PLACE OF HEARING

Hyatt Regency
1209 L Street
Sacramento, CA 95814

4. YOUR APPEARANCE WILL BE BEFORE

Union Oil Company of California

5. DATE AND TIME OF HEARING OR DEPOSITION

July 9, 2003 9:00 a.m.

6. SUBJECT OF PROCEEDING

In the Matter of Union Oil Company of California, Docket No. 9305

7. ADMINISTRATIVE LAW JUDGE

The Honorable D. Michael Chappell

Federal Trade Commission
Washington, D.C. 20580

8. COUNSEL REQUESTING SUBPOENA

Diane L. Simerson, Esq.
Robins, Kaplan, Miller & Ciresi L.L.P.
800 LaSalle Ave., #2800
Minneapolis, MN 55402
(612) 349-8500

DATE ISSUED

MAY 27 2003

SECRETARY'S SIGNATURE

Donald S. Clark

GENERAL INSTRUCTIONS

APPEARANCE

The delivery of this subpoena to you by any method prescribed by the Commission's Rules of Practice is legal service and may subject you to a penalty imposed by law for failure to comply.

MOTION TO LIMIT OR QUASH

The Commission's Rules of Practice require that any motion to limit or quash this subpoena be filed within the earlier of 10 days after service or the time for compliance. The original and ten copies of the petition must be filed with the Secretary of the Federal Trade Commission, accompanied by an affidavit of service of the document upon counsel listed in Item 8, and upon all other parties prescribed by the Rules of Practice.

TRAVEL EXPENSES

The Commission's Rules of Practice require that fees and mileage be paid by the party that requested your appearance. You should present your claim to Counsel listed in Item 8 for payment. If you are permanently or temporarily living somewhere other than the address on this subpoena and it would require excessive travel for you to appear, you must get prior approval from Counsel listed in Item 8.

This subpoena does not require approval by OMB under the Paperwork Reduction Act of 1980.

CERTIFICATE OF SERVICE

I hereby certify that on June 3, 2003, I caused a copy of the Notice of Videotaped Deposition and Subpoena Ad Testificandum directed to Dean Simeroth and the Protective Order Governing Discovery Material to be served upon the below listed persons via Federal Express:

Dean Simeroth
c/o Matthew Goldman
Deputy Attorney General
State of California
Department of Justice
1300 I Street, Suite 125
Sacramento, CA 94244-2550

J. Robert Robertson, Esq.
Senior Litigation Counsel
Federal Trade Commission
600 Pennsylvania Avenue NW, Drop 374
Washington, DC 20580

Richard B. Dagen, Esq. through service upon
Chong S. Park, Esq.
Bureau of Competition
Federal Trade Commission
601 New Jersey Avenue NW, Drop 6264
Washington, DC 20001

Diane L. Simerson

SUBPOENA AD TESTIFICANDUM

Issued Pursuant to Rule 3.34(a)(1), 16 C.F.R. § 3.34(a)(1) (1997)

1. TO Harold Holmes
c/o Matthew Goldman
Deputy Attorney General
State of California
Department of Justice
1300 I Street, Suite 125
Sacramento, CA 94244-2550

2. FROM

UNITED STATES OF AMERICA
FEDERAL TRADE COMMISSION

This subpoena requires you to appear and give testimony, at the date and time specified in Item 5, at the request of Counsel listed in Item 8, in the proceeding described in Item 6.

3. PLACE OF HEARING

Hyatt Regency
1209 L Street
Sacramento, CA 95814

4. YOUR APPEARANCE WILL BE BEFORE

Union Oil Company of California

5. DATE AND TIME OF HEARING OR DEPOSITION

June 26, 2003 10:00 a.m.

6. SUBJECT OF PROCEEDING

In the Matter of Union Oil Company of California, Docket No. 9305

7. ADMINISTRATIVE LAW JUDGE

The Honorable D. Michael Chappell

Federal Trade Commission
Washington, D.C. 20580

8. COUNSEL REQUESTING SUBPOENA

Diane L. Simerson, Esq.
Robins, Kaplan, Miller & Ciresi L.L.P.
800 LaSalle Avenue, #2800
Minneapolis, MN 55402
(612) 349-8500

DATE ISSUED

MAY 27 2003

SECRETARY'S SIGNATURE

Donald S. Clark

GENERAL INSTRUCTIONS

APPEARANCE

The delivery of this subpoena to you by any method prescribed by the Commission's Rules of Practice is legal service and may subject you to a penalty imposed by law for failure to comply.

MOTION TO LIMIT OR QUASH

The Commission's Rules of Practice require that any motion to limit or quash this subpoena be filed within the earlier of 10 days after service or the time for compliance. The original and ten copies of the petition must be filed with the Secretary of the Federal Trade Commission, accompanied by an affidavit of service of the document upon counsel listed in Item 8, and upon all other parties prescribed by the Rules of Practice.

TRAVEL EXPENSES

The Commission's Rules of Practice require that fees and mileage be paid by the party that requested your appearance. You should present your claim to Counsel listed in Item 8 for payment. If you are permanently or temporarily living somewhere other than the address on this subpoena and it would require excessive travel for you to appear, you must get prior approval from Counsel listed in Item 8.

This subpoena does not require approval by OMB under the Paperwork Reduction Act of 1980.

CERTIFICATE OF SERVICE

I hereby certify that on June 4, 2003, I caused a copy of the Subpoena Ad Testificandum directed to Harold Holmes and the Protective Order Governing Discovery Material to be served upon the below listed persons via Federal Express:

Harold Holmes
c/o Matthew Goldman
Deputy Attorney General
State of California
Department of Justice
1300 I Street, Suite 125
Sacramento, CA 94244-2550

J. Robert Robertson, Esq.
Senior Litigation Counsel
Federal Trade Commission
600 Pennsylvania Avenue NW, Drop 374
Washington, DC 20580

Richard B. Dagen, Esq. through service upon
Chong S. Park, Esq.
Bureau of Competition
Federal Trade Commission
601 New Jersey Avenue NW, Drop 6264
Washington, DC 20001

Diane L. Simerson

SUBPOENA AD TESTIFICANDUM

Issued Pursuant to Rule 3.34(a)(1), 16 C.F.R. § 3.34(a)(1) (1997)

1. TO Bob Fletcher
c/o Matthew Goldman, Deputy Attorney General
State of California
Department of Justice
1300 I Street, Suite 125
Sacramento, CA 94244-2550

2. FROM

UNITED STATES OF AMERICA
FEDERAL TRADE COMMISSION

This subpoena requires you to appear and give testimony, at the date and time specified in Item 5, at the request of Counsel listed in Item 8, in the proceeding described in Item 6.

3. PLACE OF HEARING
Hyatt Regency
1209 L Street
Sacramento, CA 95814

4. YOUR APPEARANCE WILL BE BEFORE

Union Oil Company of California

5. DATE AND TIME OF HEARING OR DEPOSITION

July 8, 2003 9:00 a.m.

6. SUBJECT OF PROCEEDING

In the Matter of Union Oil Company of California, Docket No. 9305

7. ADMINISTRATIVE LAW JUDGE

The Honorable D. Michael Chappell

Federal Trade Commission
Washington, D.C. 20580

8. COUNSEL REQUESTING SUBPOENA
Diane L. Simerson, Esq.
Robins, Kaplan, Miller & Ciresi L.L.P.
800 LaSalle Ave., #2800
Minneapolis, MN 55402
(612) 349-8500

DATE ISSUED

MAY 27 2003

SECRETARY'S SIGNATURE

Donald S. Clark

GENERAL INSTRUCTIONS

APPEARANCE

The delivery of this subpoena to you by any method prescribed by the Commission's Rules of Practice is legal service and may subject you to a penalty imposed by law for failure to comply.

MOTION TO LIMIT OR QUASH

The Commission's Rules of Practice require that any motion to limit or quash this subpoena be filed within the earlier of 10 days after service or the time for compliance. The original and ten copies of the petition must be filed with the Secretary of the Federal Trade Commission, accompanied by an affidavit of service of the document upon counsel listed in Item 8, and upon all other parties prescribed by the Rules of Practice.

TRAVEL EXPENSES

The Commission's Rules of Practice require that fees and mileage be paid by the party that requested your appearance. You should present your claim to Counsel listed in Item 8 for payment. If you are permanently or temporarily living somewhere other than the address on this subpoena and it would require excessive travel for you to appear, you must get prior approval from Counsel listed in Item 8.

This subpoena does not require approval by OMB under the Paperwork Reduction Act of 1980.

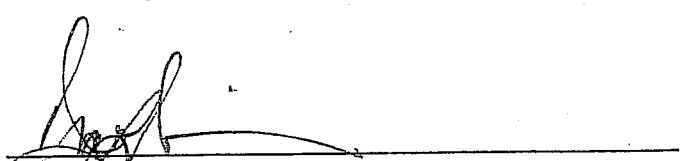
CERTIFICATE OF SERVICE

I hereby certify that on June 3, 2003, I caused a copy of the Notice of Videotaped Deposition and Subpoena Ad Testificandum directed to Bob Fletcher and the Protective Order Governing Discovery Material to be served upon the below listed persons via Federal Express:

Bob Fletcher
c/o Matthew Goldman
Deputy Attorney General
State of California
Department of Justice
1300 I Street, Suite 125
Sacramento, CA 94244-2550

J. Robert Robertson, Esq.
Senior Litigation Counsel
Federal Trade Commission
600 Pennsylvania Avenue NW, Drop 374
Washington, DC 20580

Richard B. Dagen, Esq. through service upon
Chong S. Park, Esq.
Bureau of Competition
Federal Trade Commission
601 New Jersey Avenue NW, Drop 6264
Washington, DC 20001



Diane L. Simerson