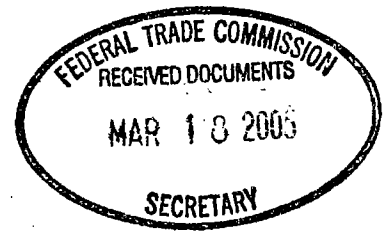


UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION



In the Matter of

UNION OIL COMPANY OF CALIFORNIA,
a corporation.

PUBLIC VERSION

Docket No. 9305

ERRATA SHEET

Certain references contained in Complaint Counsel's Post-Trial Brief and Post-Trial Findings of Fact, the public version, which was filed on March 16, 2005, should be corrected by replacing the originally-submitted pages with the attached corrected pages.

Respectfully submitted,

A handwritten signature in black ink that reads "Sean P. Gates".

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Dated: March 18, 2005

CERTIFICATE OF SERVICE

I, Terri Martin, hereby certify that on March 18, 2005, I caused a copy of the public version of Complaint Counsel's Errata Sheet with corrected pages to be served upon the below listed persons:

VIA HAND DELIVERY & ELECTRONIC MAIL TO:

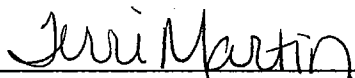
The Honorable D. Michael Chappell
Administrative Law Judge
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600 Pennsylvania Avenue, NW
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Terri Martin

**UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION**

DOCKET NO. 9305

PUBLIC VERSION

**IN THE MATTER OF
UNION OIL COMPANY OF CALIFORNIA**

**COMPLAINT COUNSEL'S PROPOSED
FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER**

(VOLUME I)

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Director

Bernard A. Nigro
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Bureau of Competition
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Dated: March 9, 2005

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percent from motor vehicles” no later than December 31, 2000;

- b. Take actions “to achieve the maximum feasible reduction in particulates, carbon monoxide, and toxic air contaminants from vehicular sources”; and
- c. Adopt standards and regulations that would result in “the most cost-effective combination of control measures on all classes of motor vehicles and motor vehicle fuels” including the “specification of vehicular fuel composition.”

(CCPF ¶¶ 223-245).

- 9. Following the 1988 California Clean Air Act amendments, CARB embarked on two rulemakings relating to low-emissions gasoline. In these proceedings, “Phase 1” and “Phase 2,” CARB prescribed limits on specific gasoline properties. (CCPF ¶¶ 223-450).
- 10. In the Phase 2 reformulated gasoline proceedings, on which this case focuses, CARB developed comprehensive standards for low-emissions gasoline, commonly referred to as “reformulated gasoline” or “RFG.” (CCPF ¶¶ 246-262). Reformulated gasoline is “cleaner burning gasoline that pollutes less” than standard conventional gasoline. (RX 116 at 001). Generally, reformulated gasoline involves limitations on the properties of gasoline intended to be sold in more densely populated areas where ambient conditions don’t disperse pollutants very effectively. (RX 922 at 144-145).
- 11. Beginning in 1990 and continuing throughout the CARB Phase 2 rulemaking second implementation, Unocal provided materially misleading information to CARB for the purpose of obtaining competitive advantage. (CCPF ¶¶ 1030-1435).
- 12. This information was materially misleading in light of Unocal's suppression of facts relating to the Unocal proprietary interests in Unocal’s emissions research results and Unocal's active prosecution and enforcement of patents based on these research results. (CCPF ¶¶ 1030-1435, 3948-4247, 4358-4447).
- 13. Unocal gave CARB this information in private meetings with CARB, through participation in CARB's public workshops and hearings, and through industry groups that also were commenting on the CARB regulations. (CCPF ¶¶ 1030-2038, 2085-2116, 2275-2325).
- 14. On June 11, 1991 CARB held a public workshop regarding the Phase 2 regulations. (CCPF ¶¶ 935-1029).

24. Unocal made numerous subsequent statements and comments to CARB that reinforced the materially false and misleading impression that Unocal had created. (CCPF ¶¶ 1030-1435, 2085-2167).
25. In reasonable reliance on Unocal's representation that the information was no longer proprietary, CARB used Unocal's equations in setting a T50 specification. (CCPF ¶¶ 4063-4247).
26. Subsequently, in October 1991 CARB published Unocal's equations in public documents supporting the proposed Phase 2 regulations. (CX 5).
27. On November 22, 1991, CARB adopted Phase 2 regulations that set standards for the composition of low-emissions Gasoline with specific limits for eight gasoline properties. (CCPF ¶¶ 2117-2167).
28. Unocal's pending patent claims recited limits for five of the eight properties specified in the CARB Phase 2 regulations, including T50. (CX 1709 at 015; RX 1165A at 012).
29. In June 1994, CARB amended the Phase 2 regulations to include, as an alternative method of complying, a predictive model that was intended to provide refiners with additional flexibility. (CCPF ¶¶ 218-221).
30. This "predictive model" permits a refiner to comply with the CARB regulations by producing fuel that – based on the composition and the levels of the eight properties – is predicted to have emissions equivalent to a fuel that meets the strict gasoline property limits set forth in the regulations. (CCPF ¶¶ 218-221).
31. During the development of the predictive model, Unocal submitted comments to CARB touting the predictive model as offering flexibility and furthering CARB's mandate of cost-effective regulations. (CCPF ¶¶ 2275-2325).
32. Unocal's statements were materially false and misleading because Unocal suppressed the material fact that assertion of Unocal's proprietary rights would materially increase the cost and reduce the flexibility of the proposed regulations. (CCPF ¶¶ 3948-4062).
33. Throughout Unocal's communications and interactions with CARB prior to January 31, 1995, Unocal failed to disclose that it had pending patent rights, that Unocal's patent claims overlapped with the proposed regulations, and that Unocal intended to charge royalties. (CCPF ¶¶ 2574-2590).
34. Unocal's misrepresentations and materially false and misleading statements caused CARB to adopt Phase 2 regulations that substantially overlapped with Unocal's concealed patent claims, including CARB's adoption of a specification for T50 in the CARB Phase 2

45. One of the studies submitted by WSPA and used by CARB to determine the cost-effectiveness of the proposed Phase 2 standards, incorporated information relating to royalty rates associated with refiner patents, including Unocal hydrocracking patents, and could have incorporated costs associated with Unocal's pending patents. (CCPF ¶¶ 1934-2038).
46. Unocal's presentation of the 5/14 Project research results to WSPA on September 10, 1991 created the materially false and misleading impression that Unocal's emissions research results, including the data and equations, were nonproprietary and could be used by WSPA or WSPA's individual members without concern for the existence or enforcement of any intellectual property rights. (CCPF ¶¶ 1749-1842).
47. Unocal's interactions with Auto/Oil and WSPA prior to January 31, 1995 failed to disclose Unocal's pending patent rights and Unocal's intention to charge royalties, and included false and misleading statements concerning Unocal's proprietary interests in the results of Unocal's emissions research. (CCPF ¶¶ 1749-1842).
48. None of the participants in the WSPA or Auto/Oil groups knew of the existence of Unocal's proprietary interests and/or pending patent rights at any time prior to the issuance of the patent in February 1994, by which time most, if not all, of the oil company participants to these groups had made substantial progress in their capital investment and refinery modification plans for compliance with the CARB Phase 2 regulations. (CCPF ¶¶ 3803-3948).
49. But-for Unocal's fraud, these participants in the rulemaking process would have taken actions including, but not limited to (a) advocating that CARB adopt regulations that minimized or avoided infringement on Unocal's patent claims; (b) advocating that CARB negotiate, or themselves negotiate, license terms substantially different from those that Unocal was later able to obtain; and/or (c) incorporating knowledge of Unocal's pending patent rights in their capital investment and refinery reconfiguration decisions to avoid and/or minimize potential infringement. (CCPF ¶¶ 4433-4716).
50. The relevant Unocal patent claims all derive from patent application No. 07/628,488, filed on December 13, 1990. (Answer ¶ 15; JX 3A at 003).
51. Following the November 1991 adoption of CARB's Phase 2 specifications, Unocal amended Unocal's patent claims in March 1992 to ensure that the claims more closely matched the CARB Phase 2 regulations. (CCPF ¶¶ 2630-2691).
52. On or about July 1, 1992 Unocal received an office action from the U.S. Patent and Trademark Office ("PTO") indicating that most of Unocal's pending patent claims had been allowed, and in February 1993, after submission of additional amendments, Unocal

CARB-compliant summer-time gasoline in California. (CCPF ¶¶ 2817-2849).

64. The extensive overlap between the CARB reformulated gasoline regulations and the Unocal patent claims makes avoidance of the Unocal patent claims technically and/or economically impossible. (CCPF ¶¶ 3174-3654).
65. Refiners, having invested billions of dollars in sunk capital investments without knowledge of Unocal's patent claims to reconfigure their refineries in order to comply with the CARB Phase 2 regulations cannot produce significant volumes of non-infringing CARB-compliant gasoline without incurring substantial additional costs. (CCPF ¶¶ 3803-3947).
66. CARB cannot now change the CARB reformulated gasoline regulations sufficiently to provide flexibility for refiners and others to avoid Unocal's patent claims. (CCPF ¶¶ 3703-3802).
67. Had Unocal disclosed Unocal's proprietary interests and pending patent rights earlier, CARB would have been able to consider the potential costs imposed by the Unocal patents, and the harm to competition and to consumers would have been avoided. (CCPF ¶¶ 4338-4447).
68. Unocal has exercised, and continues to exercise, market power through business conduct by enforcing the Unocal reformulated gasoline patents through litigation and licensing activities. (CCPF ¶¶ 2692-2757).
69. Unocal's actions have caused harm to competition and substantial consumer injury. (CCPF ¶¶ 4717-4762).

C. Background on Key Players.

1. Union Oil Company of California.

70. Union Oil Company of California is a public corporation organized, existing, and doing business under, and by virtue of, the laws of California. Unocal's office and principal place of business is located at 2141 Rosecrans Avenue, Suite 4000, El Segundo, California 90245. (Answer ¶ 11; JX 3A at 002).
71. Since 1985, Union Oil Company of California has done business under the name "Unocal." (Answer ¶ 11; JX 3A at 002).
72. Unocal is, and at all relevant times has been, a corporation as "corporation" is defined by Section 4 of the Federal Trade Commission Act, 15 U.S.C. § 44; and at all times relevant herein, Unocal has been, and is now, engaged in commerce as "commerce" is defined in

the same provision. (Answer ¶ 12; JX 3A at 001).

73. Prior to 1997, Unocal owned and operated refineries in California as a vertically integrated producer, refiner, and marketer of petroleum products. (Answer ¶ 13; JX 3A at 002).
74. In March 1997, Unocal completed the sale of the Unocal west coast refining, marketing, and transportation assets to Tosco Corporation, but continued to engage in oil and gas exploration and production. (Answer ¶ 13).
75. Unocal is the owner, by assignment, of the following patents relating to low emissions, reformulated gasoline: United States Patent No. 5,288,393 (issued February 22, 1994); United States Patent No. 5,593,567 (issued January 14, 1997); United States Patent No. 5,653,866 (issued August 5, 1997); United States Patent No. 5,837,126 (issued November 17, 1998); United States Patent No. 6,030,521 (issued February 29, 2000). (Answer ¶ 15; JX 3A at 003; Croudace, Tr. 339; Wirzbicki, Tr. 880; CX 617; CX 618; CX 619; CX 620; CX 621).
76. These five patents all share the identical specification. (Answer ¶ 15; JX 3A at 003).
77. These five patents all arise from the same scientific discovery and are related in that they all claim priority based on application number 07/628,488, filed December 13, 1990. (Answer ¶ 15; JX 3A at 003).

Roger Beach

78. Roger Beach became President of Unocal's 76 Division in April 1986. (CX 1578 at 002; Beach, Tr. 1650-1651).
79. Within Unocal, the 76 Division was also referred to as Refining and Marketing. (Beach, Tr. 1676).
80. In 1992, Mr. Beach was appointed COO and President of Unocal Corporation. (Beach, Tr. 1651; CX 593 at 001).
81. In 1994, Mr. Beach was promoted to Chief Executive Officer of Unocal. (Beach, Tr. 1651; CX 1005 at 001; CX 374 at 001).
82. In 1995, one year after being appointed CEO, Mr. Beach became the Chairman of the Board for Unocal. (Beach, Tr. 1651; CX 905 at 001; CX 714 at 001).
83. Mr. Beach served as a member of California's A.B. 234 study panel (the "Leonard Commission") on alternative fuels. (Beach, Tr. 1744; Boyd, Tr. 6693).

189. Gasoline is produced from crude oil. Crude oil is a mixture of many different chemical compounds and is described in terms of the particular crude's gross physical properties. (Eskew, Tr. 2824).
190. Petroleum refining is a complex industrial process. The primary activity is that crude oil is converted and processed into a variety of petroleum products that are used in many different markets. (Eskew, Tr. 2821).
191. Crude oil does not have a distinct boiling point, rather it boils over a wide range of temperatures. The portions of the crude oil that boil at specified temperature ranges are called fractions. Crude oil is described in terms of these fractions. (Eskew, Tr. 2824-2825).
192. To make gasoline, crude oil is brought into the refinery, and then split into different streams depending on the molecular weight of the streams. This is called "fractionation." (Jessup, Tr. 1469-1470). These streams are either blended directly into gasoline, or modified so that the streams are suitable for gasoline blending. Blending is the final process by which these streams are combined to create gasoline. (Jessup, Tr. 1470).

1. **Reformulated Gasoline.**

- a. **What Is Reformulated Gasoline?**

193. Reformulated gasoline is "cleaner burning gasoline that pollutes less." (RX 116 at 001; RX 922 at 144-145). Motor vehicle fuel emissions are a significant source of carbon monoxide ("CO"), volatile organic compounds ("VOC"), and oxides of nitrogen ("NOx"). The latter two pollutants are precursors to ozone formation. (CX 5 at 007).
194. Members of the petroleum industry were among the leaders in developing reformulated gasoline, at least in part because these petroleum industry participants did not want alternative products, such as methanol, mandated for use in automobiles. (Venturini, Tr. 128; CX 1021 at 019).

- b. **How Can Reformulated Gasoline Reduce Pollution?**

195. By the late 1980s and early 1990s regulators, oil industry members and scientists realized that, by regulating the various properties of the gasoline, one could limit the amount of harmful emissions that were produced. (RX 922 at 144-145).
196. One property that is regulated for pollution control purposes is the volatility of the gasoline, or how easily it burns. (CX 5 at 019-021). Volatility is measured by Reid Vapor Pressure ("RVP") and expressed in pounds per square inch (or "psi"). (CX 2149). Generally, a lower RVP indicates better emissions. (CX 5 at 019-021).

as to what properties of gasoline to vary and what compositions to make that to have a fuel with lower emissions. (Jessup, Tr. 1155).

497. In the fall of 1989, Dr. Jessup and Dr. Croudace proposed to their management, including Dr. Alley and Dr. Miller, a research program to measure the effects of gasoline compositions and properties on automotive engine emissions. (CX 142 at 001-002, 007).
498. Drs. Jessup and Croudace in late 1989 sought to figure out how to change gasoline properties to minimize three major categories of automotive engine emissions: carbon monoxide (CO), nitrogen oxide (NOx) and unburned hydrocarbons (HC). (CX 142 at 003, 009). They knew that this research, if successful, could be used to make reduced-emissions reformulated gasoline. (CX 142 at 003-004).
499. Dr. Jessup and Dr. Croudace designed a study to independently isolate the effects of ten gasoline properties and components on these three categories of emissions (CO, NOx, and HC). (CX 142 at 004; CX 186 at 002-005).
500. The ten properties that Unocal's scientists chose to study were the T10 distillation point, T50 distillation point, T90 distillation point, Reid Vapor Pressure, paraffin content, olefin content, aromatics content, MTBE (oxygen) content, Research Octane Number, and Motor Octane Number. (CX 142 at 004; CX 186 at 002-005).
501. The distillation points of gasoline (T10, T50, T90) are the temperatures at which a specified volume of gasoline evaporates. T10 is the temperature at which ten percent of the gasoline will evaporate, T50 the temperature at which 50% will evaporate, and T90 the temperature at which 90% will evaporate. (CX 1709 at 013; CX 617 at 021, col. 18, ll. 29-35 ('393 patent); CX 186 at 009).
502. Reid Vapor Pressure (RVP) refers to the volatility of gasoline (the partial pressure of gasoline when heated to 100° F in a sealed container). (CX 617 at 021, col. 18, ll. 43-54 ('393 patent)).
503. Olefins, paraffins and aromatics are the three hydrocarbon components of gasoline, and are typically measured by their percentage volume. (CX 1709 at 003-004; Wirzbicki, Tr. 964, 1085-1086).
504. Octane is a traditional engine performance specification that measures gasoline's ability to resist auto-ignition or "engine knock" in use. (CX 1709 at 012).
505. Research Octane Number (RON) and Motor Octane Number (MON) are two different components of octane measurements. (CX 1709 at 012-013).
506. MTBE is a component that adds oxygen content to gasolines. (CX 142 at 005; CX 1709

at 015).

507. Although other industry members had studied the impact of varying some of these gasoline properties or components on vehicle emissions, they had not isolated the effect of each individual property or component or studied such a large number of them. (CX 186 at 005-006).

2. Unocal Scientists Performed Experiments to Determine the Effects of Gasoline Properties on Automobile Exhaust Emissions.

508. Unocal pursued a proprietary emissions research project. Beginning in January 1990, Unocal scientists from the company's Science and Technology Division – Peter Jessup and Michael Croudace – conducted the first of three separate test programs to determine the effects of certain gasoline properties on emissions. (CX 585; CX 107; Jessup, Tr. 1154-1155; 1158).

509. The emissions research conducted by Drs. Jessup and Croudace consisted of a one-car test followed by a ten-car test, with additional tests done thereafter. (Jessup, Tr. 1154-1155). This research later became known by the name "5/14 Project," which was shorthand for all of Unocal's emissions research relating to reformulated gasoline. (Croudace, Tr. 526-527).

510. Drs. Jessup and Croudace sought to design their study to independently isolate the effects of ten gasoline properties and components on these three categories of emissions (CO, NOx, and HC). (CX 142 at 004; CX 186 at 002-005).

511. Drs. Jessup and Croudace began conducting the one-car test in January 1990. They substantially completed the one-car study by the end of March 1990, and expected to complete the testing and data analysis by June 1990. (Jessup, Tr. 1154-1155, 1158; CX 163 at 001).

512. This first one-car study tested fifteen test fuels with a wide range of ten fuel properties by combusting them in a 1988 Oldsmobile Regency automobile to determine their emissions outputs. A "check" fuel was used as a control in every fifth run. (CX 186 at 006-007; CX 617 at 016, col. 7, 1.60 - col. 8, 1.68; Jessup, Tr. 1154-1155).

513. Drs. Jessup and Croudace then regressed the emissions outputs for the test fuels against ten gasoline property variables using a commercially-available computer program. (CX 617 at 016, col. 8, ll. 46-57; CX 186 at 009). The computer program produced a set of simple linear equations that show the correlations between the emissions outputs and the property variables. (CX 186 at 002,009; CX 617 at 015, col. 5, ll. 36-37; 016, col. 8, ll. 57-61).

Unocal's Chairman and Chief Executive Officer, Chief Financial Officer, Chief Legal Officer, and four Senior Vice Presidents with responsibilities for the Chemicals, Exploration and Production, Refining and Marketing, and Corporate Development Divisions. (CX 7065 (Stegemeier, Dep. at 025-028, 031-032, 084); CX 179 at 001; CX 614 at 034).

571. Participants to the May 14, 1990 Unocal Executive Committee meeting included, but were not limited to, Richard Stegemeier, Roger Beach, Neil Schmale, Denny Lamb, Wayne Miller, Michael Croudace, Peter Jessup. (CX 175; Lamb, Tr. 1827; CX 7065 (Stegemeier, Dep. at 75); Beach, Tr. 1668; Croudace, Tr. 458-459).
572. The May 14, 1990 meeting was a big event for Dr. Croudace and Dr. Jessup. (Croudace, Tr. 460). In his entire career at Unocal, Dr. Jessup has only made two or three presentations to such a committee. (Jessup, Tr. 1163).
573. In the May 14, 1990 presentation to the management committee, Dr. Jessup explained the inventions that he and Dr. Croudace had discovered from the one-car test data. (CX 171 at 001). Based on that data, Dr. Jessup explained that T50 was the most important variable for HC emissions. (Jessup, Tr. 1164-1165; CX 171 at 042). He also listed T50 first among the most important gasoline factors. (Jessup, Tr. 1165; CX 171 at 043). Further, based on the data from the one-car test, Dr. Jessup told the Unocal management committee that one can "predict emissions through a mathematical equation", i.e., through a predictive model. (Jessup, Tr. 1165-1166).
574. As Dr. Jessup admits, the charts of the one-car data that he showed to the Executive Committee "show what the invention is" and "where the new compositions of gasoline are." (Jessup, Tr. 1170-1172).
575. Drs. Jessup and Croudace recommended the Unocal Executive Committee to "[t]ake the results of this current study" to CARB. (CX 171 at 007; Jessup, Tr. 1162-1164).
576. Mr. Stegemeier, the then Chairman and CEO of Unocal, had a positive reaction to the presentation made by the Science and Technology Division to the Executive Committee regarding the company's emissions research. (CX 7065 (Stegemeier, Dep. at 32, 86)).
577. The 5/14 project generated considerable excitement at Unocal. (Beach, Tr. 1668). 76 Products Company President Beach was "bowled over" and "very excited" by Drs. Jessup and Croudace's presentation. (Beach, Tr. 1668). Denny Lamb thought the May 14, 1990 presentation was "exciting," and believed that Unocal should do more research. (Lamb, Tr. 2179).
578. One of the recommendations presented at the May 14, 1990 Executive Committee meeting was to "[t]ake the results of this current study to the EPA and CARB." (Lamb,

587. Mr. Schmale has experience working for Unocal as both an attorney and as a petroleum engineer. The Research Department of Unocal reported to Mr. Schmale from 1988 to 1991. (CX 7062 (Schmale, Dep. at 6, 8-9)).

4. Unocal's Executive Committee Approved Funding for Further Research in Late May 1990 and Monitored the Progress of the 5/14 Project.

588. The May 14, 1990 presentation to the Executive Committee led to several significant follow-up decisions. First, a patent application would be filed for the results of the 5/14 project. (Beach, Tr. 1753-1754). Second, Unocal authorized Drs. Jessup and Croudace to continue their emissions research, and provided them with an additional \$765,000.00. (CX 176). Third, Unocal decided that the results of the emission research should be kept secret. (Lamb, Tr. 2044).

589. Unocal's Refining and Marketing Division, of which Roger Beach was President, became the corporate sponsor of the 5/14 Project. (Beach, Tr. 1669).

590. At the May 14, 1990 presentation to Mr. Stegemeier, Unocal's then CEO and Chairman of the Board, Mr. Lamb made handwritten notes on an internal Unocal document. (CX 172; Lamb, Tr. 2042-2044). Mr. Lamb's handwritten notes reflect that there was a "presentation to R. Stegemeier 5-14," and that one of the outcomes of this presentation was a decision to "proceed with research, more cars, 750M." (CX 172; Lamb, Tr. 2043). Mr. Lamb understood that "\$750,000" had been approved, as reflected by the handwritten notes he made at the meeting on May 14, 1990. (Lamb, Tr. 2043-2044).

591. Dr. Alley had the role of getting money for the 5/14 Project. He also followed the project "fairly carefully" to see that the researchers kept the goal in mind. (CX 7041 (Alley, Dep. at 19)).

592. Dr. Alley prepared an Authority for Expenditure for the 5/14 Project. A memo dated May 21, 1990, from Dr. Alley to Mr. Lipman states that the "money will be used for an extended reformulated gasoline program" to measure FTP emissions in ten cars using 15 test gasolines. (CX 176 at 001, 002; CX 7041 (Alley, Dep. at 133); CX 7053 (Lipman, Dep. at 19)).

593. Mr. Beach had discretion to authorize a \$765,000 expenditure. Even given Mr. Beach's authority, the Executive Committee of the Board of Directors reviewed all expenditures and as Chief Executive Officer, Mr. Stegemeier had an interest in how the money was being spent. (CX 7065 (Stegemeier, Dep. at 26, 71-72)).

594. Unocal's Chief Executive Officer, Mr. Stegemeier, personally approved additional funding for the 5/14 project: "Mr. Stegemeier approved an expanded test program after a

- royalty stream from licensing the patents from the 5/14 Project. (Jessup, Tr. 1242; CX 2). As Dr. Jessup admitted, the \$1 billion number was put on the poster for management to see. (Jessup, Tr. 1242).
648. The “pot of gold” poster recounts the history of the 5/14 Project. (Jessup, Tr. 1237). It includes graphs from the SwRI emissions test data (the ten-car study). (Jessup, Tr. 1237-1238). It includes frequency charts from the one-car tests. (Jessup, Tr. 1238-1239). It also refers to the results of the Unocal program, which were that it defined key fuel properties that reduce regulated tailpipe emissions, developed a series of equations that predict emissions from key fuel physical properties (one the aspects of the invention), and patent pending formulations (referring to the patent-application). (Jessup, Tr. 1240; CX 2).
649. Jessup created the “pot of gold” poster in or about May 1991, prior to the presentation to CARB of the 5/14 Project. Jessup’s notes relating to a draft outline of the presentation to CARB indicates that the proposed presentation to CARB would include some of the same information detailed on the poster. (CX 245).
650. As Dr. Jessup admitted, the “pot of gold” poster board contains bar charts that he later showed to CARB. (Jessup, Tr. 1239, 1285 (stating that CX 24 at 044-046 “are the same frequency charts that we looked at yesterday at CX 2”)). He also admitted that the poster refers to the possibility of Unocal introducing an interim RFG, which was abandoned prior to June 1991. (Jessup, Tr. 1240-1241). Further, a layout of slides that Dr. Jessup created during preparations for the meeting with CARB, states that the CARB presentation should include “results ala poster,” by which Dr. Jessup was referring to the bar charts on the “pot of gold” poster. (CX 245; Jessup, Tr. 1248-1249).
651. Dr. Jessup put the “pot of gold” image on the poster; he “thought it was a nice touch.” (Jessup, Tr. 1242).
652. Dr. Jessup ensured that his manager, Dr. Miller, reviewed the “pot of gold” poster before it was used. (Jessup, Tr. 1243).
653. Dr. Miller participated in the creation of the “pot of gold” poster board. (Miller, Tr. 1425; CX 2). He was involved in setting the \$1 billion figure on that board, which is based on a 1 cent/gallon royalty. (Miller, Tr. 1427; CX 2). Originally, the figure was higher because of a higher cent/gallon royalty. (Miller, Tr. 1428). Working with the inventors, Dr. Miller (their supervisor at the time) reduce the number to make it “more credible.” (Miller, Tr. 1428).
654. The \$1 billion revenue stream depicted on the “pot of gold” poster board was more than 10% of Unocal’s overall revenues in 1990. (Miller, Tr. 1429).

836. Dr. Croudace sent the November 1990 memorandum advising that "Unocal's Advantage from the 5/14 Project will Be Gone in Six Months," to Mr. Wirzbicki, Unocal's Chief Patent Counsel, Mr. Lamb, and Dr. Alley. (CX 207).
837. In January 1991, Unocal management believed that one way to use 5/14 for competitive advantage was to "influence CARB rules," as this alternative was presented [or was considered as an option to present] to Richard Stegemeier, Unocal's CEO and Chairman of the Board. (CX 219 at 012).

3. Unocal Management Knew That Unocal Could Obtain a "Pot of Gold" From Licensing its Reformulated Gasoline Technology.

838. Dr. Jessup created a 4 foot by 8 foot "pot of gold" poster board (CX 2) for an "in-house poster session." (Jessup, Tr. 1235). The poster was used to show Unocal management the work that Dr. Jessup was doing in the Science and Technology Division. (Jessup, Tr. 1236). Dr. Jessup stood in front of the poster and used it to explain the 5/14 Project. (Jessup, Tr. 1236). At the time, Dr. Jessup expected that the patent from the 5/14 Project would be of some commercial value. (Jessup, Tr. 1236). The board placed that value at \$.01 per gallon or \$1,000,000,000 per year. (CX 2).
839. On the "pot of gold" poster, Dr. Jessup estimated that Unocal could achieve \$100 million a year from introducing reformulated gasoline in the market and cost saving at its Los Angeles refinery. (Jessup, Tr. 1241-1242; CX 2). But he estimated a \$1 billion per year royalty stream from licensing the patents from the 5/14 Project. (Jessup, Tr. 1242; CX 2). As Dr. Jessup admitted, the \$1 billion number was put on the poster for management to see. (Jessup, Tr. 1242).
840. The "pot of gold" poster recounts the history of the 5/14 Project. (Jessup, Tr. 1237). It includes graphs from the SwRI emissions test data (the ten-car study). (Jessup, Tr. 1237-1238). It includes frequency charts from the one-car tests. (Jessup, Tr. 1238-1239). It also refers to the results of the Unocal program, which were that it defined key fuel properties that reduce regulated tailpipe emissions, developed a series of equations that predict emissions from key fuel physical properties (one the aspects of the invention), and patent pending formulations (referring to the patent-application). (Jessup, Tr. 1240; CX 2).
841. Jessup created the "pot of gold" poster in or about May 1991, prior to the presentation to CARB of the 5/14 Project. Jessup's notes relating to a draft outline of the presentation to CARB indicates that the proposed presentation to CARB would include some of the same information detailed on the poster. (CX 245).
842. As Dr. Jessup admitted, the "pot of gold" poster board contains bar charts that he later showed to CARB. (Jessup, Tr. 1239, 1285 (stating that CX24 at 44-46 "are the same

**UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION**

DOCKET NO. 9305

PUBLIC VERSION

**IN THE MATTER OF
UNION OIL COMPANY OF CALIFORNIA**

**COMPLAINT COUNSEL'S PROPOSED
FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER**

(VOLUME II)

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acetaldehyde from gasoline vehicles (CX 5 at 092); determining the proper emissions inventory to gauge the size of potential benefits (CX 5 at 007); determining how use of Phase 2 would affect emissions in mobile sources other than cars. (CX 5 at 068).

951. Between 1991 and 1993, Michael Kulakowski of Unocal met with CARB staff dozens of times. (Kulakowski, Tr. 4398).
952. Unocal itself had numerous written and oral communications with CARB staff regarding Phase 2, both written and oral, including but not limited to those on the following dates – June 20, 1991, October 29, 1991, November 21, 1991, November 22, 1991, June 19, 1992, August 14, 1992, September 4, 1992, June 3, 1994, and June 9, 1994. (CX 24; CX 33; CX 774; CX 39; CX 40; CX 575; CX 42; CX 43; CX 44). Unocal provided specific, detailed and technical comments to CARB relating to the proposed specifications. (Lamb, Tr. 2078, 2292; CX 33 at 003-020).
953. CARB invited the public to participate in workshops during the regulatory process. For the workshops CARB staff provided information to stakeholders and asked the stakeholders to provide feedback. CARB used the workshops as a forum to “openly” discuss the direction staff considered going with the regulations and asked the public to provide comments and suggestions. (Courtis, Tr. 5733).
954. Prior to the August 14, 1991 workshop, CARB provided information to enable the public and stakeholders to participate in the workshop discussion by providing comments, feedback, and recommendations. (RX 184; Courtis, Tr. 5773)
955. CARB's preliminary draft proposal for the August workshop gave industry participants insight into what parameters CARB staff was beginning to believe were significant to control. The preliminary draft proposal told participants "what they're thinking." (Clossey, Tr. 5374; RX 184).
956. After the initial Board approval in November 1991, CARB continued its dialogue with interested parties to determine the workability and details of an innovative “predictive model” method to be used as an alternative means of demonstrating compliance with the rule (CX 53 at 006); and determining how to assure a level playing field among large and small refiners (CX 10 at 015).
957. CARB staff viewed its informational exchange with regulated parties as a very important element in devising sound Phase 2 RFG regulations. The process was an open and dynamic process built on open professional communication of a scientific and technical nature. (Venturini, Tr.123-124).
958. CARB staff made available to WSPA members preliminary rule proposals in an “effort to solicit data and response from industry to better assist CARB in evaluation” of proposed

necessarily have to include parameters. (Lamb, Tr. 2388).

1060. Roger Beach wanted to disclose to CARB whatever it took to get CARB to adopt a predictive model. (Beach, Tr. 1659). He was "hellbent" to do whatever it took to move CARB toward a predictive model. (Beach, Tr. 1659).
1061. Roger Beach did not have any problem with his team showing Unocal's predictive model to CARB. (Beach, Tr. 1786-1787).
1062. Roger Beach testified that he wanted Denny Lamb to tell CARB that if CARB adopted a predictive model, Unocal would provide to CARB both Unocal's data and its equations. (Beach, Tr. 1659).
1063. Denny Lamb kept Roger Beach updated with respect what was going on with CARB. (Beach, Tr. 1659-1660).
1064. In 1991, Unocal was still a refiner operating in California. (Beach, Tr. 1742).
1065. Unocal believed that a predictive model could save the company millions in capital expenses at its California refineries. (CX 39 at 004; Lamb, Tr. 1961-1962).
1066. When he sent Mr. Lamb to meet with CARB, Mr. Beach instructed him that Unocal would provide to CARB Unocal's data and equations if CARB would move toward a predictive model. (Beach, Tr. 1678). This was Mr. Beach's decision. (Beach, Tr. 1678-1679).
1067. Roger Beach understood that T50 was one of the important components of the predictive model that Unocal shared with CARB. (Beach, Tr. 1785-1786).
1068. Dr. Croudace and Dr. Jessup would have "loved" to have the predictive models that they had developed from the 5/14 Project incorporated as CARB's predictive model. (Croudace, Tr. 505-508).

B. Prior to the June 20, 1991 Meeting With Unocal, CARB Had Not Proposed A T50 Specification.

1069. In May 1991, CARB invited industry members to discuss its developing Phase 2 RFG specifications at a June 1991 workshop. CARB stated that distillation properties, including T90, were among the specifications that it was considering. CARB also indicated that it would consider the use of predictive models as an alternative to the fuel parameter specifications. (CX 492 at 003-004; Lamb, Tr. 1965-1966).
1070. On June 11, 1991, Unocal participated in a CARB workshop concerning the proposed

Phase 2 RFG regulations. (CX 492, CX 793, CX 803, RX 757). Michael Kulakowski participated in this workshop on behalf of Unocal. (CX 252).

1071. Mr. Kulakowski attended the June 11-12, 1991 CARB workshops, and he reported back to Unocal that CARB “did not indicate much room for change” in its proposed specifications. (Kulakowski, Tr. 4419-4420; CX 252 at 001). During the workshops, CARB had made it clear that its proposal was “not a trial-balloon proposal but rather it had substance to it and it reflected their best thinking at the time.” (Kulakowski, Tr. 4420). CARB was not proposing a T50 specification at that time. (Kulakowski, Tr. 4420).
1072. Unocal knew that CARB did not have information to justify a T50 specification in early 1991. As of May 10, 1991, Mr. Lamb believed that CARB did not seem to know anything about T50. (Lamb, Tr. 2388; CX 241 at 001).
1073. In early summer 1991 CARB staff focused its attention on two distillation parameters – T90 and driveability index. According to Mr. Fletcher, staff had awareness that T50 might have some benefits, but lacked technical justification for a T50 specification. CARB staff shared with the public its thoughts on distillation parameters in the notice for the June workshop, and then at the workshop itself. (Fletcher, Tr. 6459-6460).
1074. On May 23, 1991, CARB staff disseminated a public notice for a June 11 workshop for Phase 2. This notice listed as distillation properties “under consideration” T90 and driveability index, but did not mention T50 as an independent specification. (Venturini, Tr. 206-208; CX 492 at 004).
1075. CARB staff at the June 11, 1991 workshop similarly did not present T50 as an independent specification under consideration. The slide presentation lists T90 and driveability index as the distillation parameters under consideration, with the levels for these specifications to be determined. (CX 1047 at 014; Venturini, Tr. 208-209).
1076. Unocal’s Mr. Lamb also recognized that CARB as of June 1991 had not included T50 in any proposals for Phase 2. Mr. Lamb understood that presenting the 5/14 research results to CARB would enable CARB to understand that T50 had a significant effect on exhaust emissions. (Lamb, Tr. 1988).
1077. Mr. Wirzbicki in mid-1991 reviewed a draft of the paper before it was published to make sure that Drs. Jessup and Croudace weren’t disclosing something that he hadn’t “already covered in the patent.” (Wirzbicki, Tr. 934-936).
1078. After reviewing the draft SAE paper in mid-1991, Mr. Wirzbicki believed that the invention would have significant commercial value. (Wirzbicki, Tr. 935-936).

pending formulation.”)).

3. Unocal and Other Companies Had Disclosed Patents Pending on Proprietary Information.

1123. The licensing of pending patents is a common practice in the oil and gas industry. (Sarna, Tr. 6431-6432).
1124. In connection with CARB's adoption of diesel fuel regulations, companies sought to license patent pending formulations. For example, Chevron informed others in the industry that it had "several patent applications on file covering CARB certified [diesel] fuels," and it offered to negotiate and grant options "to license at specified terms when the patents issue." (CX 331 at 001). Unocal received such an offer. (CX 331 at 001; Miller, Tr. 1422-1423).
1125. Unocal managers, including Denny Lamb and Dr. Miller, became aware of Chevron's offer to enter into license agreements with respect to its diesel patent applications. (RX 1110 at 001-002; Miller, Tr. 1423).
1126. During his employment at Unocal, there were occasions when Dr. Croudace had been authorized to disclose, and had in fact disclosed, the fact that there was a patent pending on Unocal proprietary information. (Croudace, Tr. 460).
1127. On October 8, 1990, Dr. Croudace had disclosed that there was a patent pending on Unocal proprietary information to the Western Technical Conference. (CX 1191 at 014; Croudace, Tr. 672-674).
1128. Unocal disclosed to CARB in a meeting on August 4, 1989 that Unocal had a patent pending on a detergent additive. (CX 131 at 012; Croudace, Tr. 544-545, 548). The presentation materials for this August 4, 1989 contain a slide referring to a Unocal detergent or additive as "a unique Unocal patent pending development." (CX 131 at 012; Croudace, Tr. 544-545).

E. Unocal Urged CARB at the June 20, 1991 Meeting to Incorporate its Invention in the Regulations.

1. Unocal Presented Information to CARB at the June 20, 1991 Meeting in a Manner Consistent with Unocal's Goal to Achieve Competitive Advantage.

1129. CARB, before Unocal's presentation to CARB of its 5/14 research on June 20, 1991, did not have substantial evidence supporting a T50 specification. (Venturini, Tr. 206-208; CX 492 at 004 (T50 not listed as "under consideration in a May 23, 1991 workshop

- notice); CX 1047 at 014 (staff presentation at June 11, 1991 workshop omits T50 as a "fuel parameter under consideration."); Lamb, Tr. 1988 (Dennis Lamb of Unocal recognizing that CARB had not included T50 in any proposals up to that time)).
1130. On June 20, 1991, Unocal representatives met with CARB staff and presented to them Unocal's 5/14 emissions research results. (CX 23; CX 24). The Unocal employees that went to CARB in June 1991 to present the 5/14 Project results included Dr. Croudace, Dr. Jessup, Denny Lamb, Michael Kulakowski, and Dr. Miller. (Croudace, Tr. 492, 463, 466).
 1131. At the time of Unocal's presentation to CARB in June 1991, Unocal had a pending patent application that was based on and included the same information. (Lamb, Tr. 1832; CX 1788).
 1132. Unocal's pending patent application contained numerous claims that included T50 as a limitation, in addition to other fuel properties that CARB proposed to regulate. (CX 1788). In addition, Unocal's pending patent application described a predictive model of blending gasoline to reduce emissions based on adjusting fuel properties, and thus preserved Unocal's ability to file later patent claims covering the predictive model. (CX 1788 at 013-84).
 1133. Dr. Croudace worked with Denny Lamb when he requested information in connection with the presentations to CARB. (Croudace, Tr. 466). Dr. Croudace had conversations with Denny Lamb concerning the nature of the invention and work that was presented to CARB. (Croudace, Tr. 467).
 1134. At least four of the Unocal representatives who attended the June 1991 meeting knew of the pending patent application: Drs. Jessup and Croudace, the inventors; Dr. Miller, their supervisor; and Lamb, the key Unocal liaison to CARB, who became aware of the patent application shortly after it was filed in December 1990. (Croudace, Tr. 467; Lamb, Tr. 1824-1825).
 1135. During the time that Dr. Croudace was employed at Unocal, he came to the understanding through his interactions with Denny Lamb that Denny Lamb knew that there was a patent application filed on the scientists' emissions research work. (Croudace, Tr. 467 ("Yeah, I'm sure he knew it.")).
 1136. The June 20, 1991 Unocal presentation to CARB only included representatives of Unocal and CARB in a private meeting. Such a private meeting was common practice during the Phase 2 proceedings when a company had issues to discuss with CARB that were related to proprietary issues. (Lamb, Tr. 1983-1984).
 1137. At the June 20, 1991 meeting, Unocal presented its T50 research information and urged

CX 393 at 008).

1346. An internal Unocal memorandum from July 28, 1994 discussed Unocal's "proprietary work" relating to the Auto/Oil program. (CX 2119 at 002).
1347. During the time that Mr. Lamb was employed at Unocal, he understood that Unocal had proprietary gasoline additives. (Lamb, Tr. 2032).
1348. In an internal Q&A document intended to set forth proposed answers to media questions, Unocal used the term "proprietary" to mean something different than "confidential": "Under long-held patent law, all patent applications are confidential to prevent the disclosure of proprietary business secrets." (CX 361 at 003).
1349. RESERVED

X. During the Phase 2 Reformulated Gasoline Development Unocal Knew That CARB Had Concerns About the Costs and Potential Supply of Reformulated Gasoline.

1350. Unocal was well aware that CARB considered both cost and cost-effectiveness in forming the Phase 2 regulations. (Kulakowski, Tr. 4448). CARB itself made it clear that it was under a legislative requirement to determine these factors. (Kulakowski, Tr. 4448). CARB also made it clear during its workshops that staff was working to understand the costs of their proposal. (Kulakowski, Tr. 4448).
1351. Unocal knew that CARB staff discussed the costs of the proposed regulations with industry members. (Kulakowski, Tr. 4448). Unocal was also aware that CARB had staff resources allocated to develop the cost of CARB's proposal. (Kulakowski, Tr. 4448).
1352. During the development of the CARB Phase 2 RFG regulations, CARB and the refiners all were concerned about costs. (Lamb, Tr. 1945-1946).
1353. CARB was concerned about the costs of compliance in developing its Phase 2 RFG regulations. (Lamb, Tr. 1945; Miller, Tr. 1397).
1354. Unocal regulatory staff observed CARB taking specific actions to fulfill the legislative mandate to evaluate the cost and cost-effectiveness of CARB's proposed regulations. (Kulakowski, Tr. 4449). Specifically, Unocal regulatory staff knew that CARB staff retained a consultant to attempt to perform modeling to determine the cost of the

Improvement Research Program (“Auto/Oil” or the “Program”). Unocal did so principally through a September 26, 1991 presentation to Auto/Oil at which Unocal’s scientist and inventor Dr. Jessup represented to the Auto/Oil members that the “data from Unocal’s research has been presented to CARB and is in the **public domain.**” (CX 4027 at 010) (emphasis added).

1437. Given the background and context of Auto/Oil, this misrepresentation was both a necessary predicate to Unocal’s deceit of CARB, as well as an independent source of competitive harm. As to the former, having made the same misrepresentation to CARB that same month, Unocal had to tell a consistently false story to all. (CCPF ¶¶ 1439-1514).

1438. Had members known of Unocal’s fraud, Auto/Oil members would have taken the following actions: (1) Alerted CARB to Unocal’s fraud and, *inter alia*, advocated that CARB adopt regulations that minimized or avoided the costs associated with the infringement of Unocal’s patent claims; (2) negotiated up-front royalty-free or nominal-royalty licenses with Unocal before the refiner members of Auto/Oil were locked in; (3) made modifications to their refineries prior to being locked in; and/or (4) taken other legal, political and commercial actions to minimize or avoid infringement of Unocal’s patent claims. (CCPF ¶¶ 4433-4716).

A. Because of the Scientific Weight Behind Auto/Oil, Unocal Sought to Obtain Auto/Oil’s Support for Unocal’s Research Findings.

1439. Auto/Oil’s primary purpose was to provide scientific research data to regulatory bodies including CARB in order to assist in the development of scientifically sound regulations that were also cost-effective. (Kiskis, Tr. 3831, 3857; CX 4198 at 001 (affirming that purpose of Auto/Oil is to provide scientific data to regulatory officials); CX 140 at 003 (“The program will also evaluate the relative cost-effectiveness of these various alternatives.”); Klein, Tr. 2475-2476, 2534; Ingham, Tr. 2595 (“the whole thrust of Auto/Oil, was to develop [scientific] information and put that in the hands of the regulatory agencies.”); CX 7073 (Wise, Dep. at 8); CX 7049 (Hochhauser, Dep. at 13, 15)).

1440. Mr. Kiskis, a co-chair of the Research Program Committee (“RPC”) stated that it was “critically important” to “make sure that the regulators had available to them all of the best technical data and sound science to which informed the most effective regulations . . .” (Kiskis, Tr. 3831); *see also* (Klein, Tr. 2454-2456).

1441. The main goal of Auto/Oil’s work was to help regulators develop cost effective regulations. (Kiskis, Tr. 3833-3834; CX 4179; CX 4001 at 001-003; CX 140 at 003; Burns, Tr. 2409; CX 7076 (Youngblood, Dep. at 10); CX 7049 (Hochhauser, Dep. at 10, 12-13); Klein, Tr. 2465-2466, 2474-2476).

levels of concern over automobile emissions in California posed a grave threat to their businesses. (Kiskis, Tr. 3820-3822 (Mr. Kiskis stated that California was an extremely important part of Chevron's business operation and so whatever happened with the California regulations would have a substantial impact on the company); Derr, Tr. 5108-5109; CX 7041 (Alley, Dep. at 23); CX 7079 (Zimmerman, Dep. at 6); Jessup, Tr. 1197-1198).

1450. In particular, the California state government was pushing for methanol to replace gasoline. If methanol were to replace gasoline, the oil companies' refineries would become obsolete without substantial modifications, and the automobile companies would have to re-engineer all of their vehicles, which would take several years to accomplish. (Burns, Tr. 2413; Klein, Tr. 2539; CX 7041 (Alley, Dep. at 23); CX 125 at 001; RX 135 at 001; CX 4183 at 002; Jessup, Tr. 1194-1195; Clossey, Tr. 5329-5331; Croudace, Tr. 573, 590-592, 618; CX 493 at 002).
1451. In the late 1980s, as California agencies were looking at developing new regulations, there was "very little technical data that would define how fuels could be altered to improve their ultimate emissions performance and thereby improve air quality" (Kiskis, Tr. 3821); *see also*, (Derr, Tr. 5108-5109; Jessup, Tr. 1197-1198; CX 125 at 002 ("WSPA tried to impress upon them that 'California has an immediate problem of needing data.'")).
1452. In the mid to late 1980s, several companies, including Unocal, tried to form cooperative partnerships in an effort to develop data to support the new regulations that were being developed. (Kiskis, Tr. 3823-3824; Derr, Tr. 5107; CX 125 at 002; CX 110 ("[W]e would like to consider a joint research program between General Motors Research and Unocal Science & Technology to investigate the effects of fuel compositional changes on vehicle emissions.")).
1453. The attempts to form cooperative partnerships in the late 1980s failed because of the "lack of willingness or lack of mechanism to bring in proprietary, advanced, pre-commercial technology into the program that caused that not to go forward." (Kiskis, Tr. 3826-3827).
1454. After a few unsuccessful attempts, the Auto/Oil joint venture was created in 1989 after the CEOs of the member companies had a meeting to reach an agreement so that the automobile companies and the oil companies could find a mechanism to collaborate in research to improve emissions, thereby improving air quality. (Kiskis, Tr. 3828; Derr, Tr. 5128).
1455. Harvey Klein, a former Director of Refining and Marketing Research and Development at Shell, testified that "the Auto/Oil group was designed to look at the best reformulated gasolines combined with auto technology that would lead to lower emissions, with the

idea that regulations were going to be coming soon and we wanted to provide the best possible scientific data that would aid the regulators in what they were doing.” (Klein, Tr. 2465-2466; CX 4198 at 001; CX 140 at 003; CX 4087 at 002; Ingham, Tr. 2595; Doherty, Tr. 2793).

1456. Mr. Zimmerman, one of the attorneys for Auto/Oil, testified that Auto/Oil was a “collaborative joint venture where people were sharing information for purposes of the joint operation.” (CX 7079 (Zimmerman, Dep. at 82)).
1457. The Auto/Oil members had various reasons for participating in Auto/Oil, but they all shared the common goal of developing the best technical information for CARB and the EPA. *See, e.g.*, (Burns, Tr. 2410; Doherty, Tr. 2793).
1458. In a letter to the Department of Justice and the Federal Trade Commission announcing the Auto/Oil joint venture, the members made clear that they “expect the research and testing to provide sound and reliable data with which the federal government as well as various state governments can fairly and accurately compare the costs and benefits of the various alternatives to reducing emissions . . . in order to improve air quality.” (CX 140 at 003-004).
1459. The companies that made up Auto/Oil generally became involved in the program to further the science and efficiency relating to the emissions research and regulations. *See, e.g.*, (Burns, Tr. 2410; Doherty, Tr. 2793; Pahl, Tr. 2766).
1460. Chrysler got involved in Auto/Oil in order to further the science regarding fuel effects on exhaust emissions. (Burns, Tr. 2410). Chrysler understood that new regulations were facing them in the future and was interested in understanding the gasoline effects on vehicle emissions. (Burns, Tr. 2410). As Program Manager of Alternative Fuels at Chrysler, Mr. Burns spent at least 90 percent of his time working with Auto/Oil. (Burns, Tr. 2410).
1461. Sunoco got involved in Auto/Oil because Auto/Oil was developing data that would be given to different government agencies that were developing the regulations and would dictate the type of fuels that Sunoco would have to make. (Doherty, Tr. 2793).
1462. Sunoco’s main Auto/Oil representative, Helen Doherty, is the Manager of Products and Environmental at Sunoco. (Doherty, Tr. 2792). She has a bachelor’s degree in chemical engineering and over 20 years of experience, including experience in blending gasoline. (Doherty, Tr. 2792-2793).
1463. Conoco Phillips got involved with Auto/Oil because the Federal Clean Air Act made it clear that there were going to be changes in the fuels and Conoco Phillips wanted to make the most efficient changes that would serve the customers as well as their company.

a table of Basic Investment Data that depicted the cost of paid-up royalties for various catalysts and gasoline refining processes, including royalties to use Unocal's heavy hydrocracking patent. (Cunningham, Tr. 4158-4163; RX 347 at 001; 005-006).

1961. Turner Mason and the WSPA EIG analyzed the first proposals that CARB laid out for RFG Phase 2 at an initial public consultation meeting on June 11, 1991. (Cunningham, Tr. 4163-4164; 4168).
1962. RESERVED

3. CARB Relied on the Turner Mason Cost Study in the Phase 2 Reformulated Gasoline Rulemaking

1963. WSPA hired Mr. Cunningham to monitor revised CARB proposals for Phase 2 RFG regulations. In August 1991, CARB issued a revised set of proposed RFG Phase 2 regulations. New sets of specifications included a T50 specification, as well as setting specifications for T90 and driveability index. A proposed specification from June 1991, sulfur, had a modification to reduce its levels in August 1991. (Cunningham, Tr. 4168-4170; CX 1160).
1964. On August 6, 1991, the WSPA EIG group met with Mr. Cunningham to discuss the new CARB proposals. While the EIG had concerns about the control of T50 because it is not an independent variable, Mr. Kulakowski indicated that Unocal's research had proven the importance of T50 for emissions control at the August 6, 1991 meeting. (Cunningham, Tr. 4170; CX 1160).
1965. Unocal knew that the Turner Mason study considered the cost of license fees related to patents that would be used to comply with the Phase 2 regulations. (Kulakowski, Tr. 4498).
1966. The August 1991 proposals for CARB Phase 2 RFG, included for the first time a T50 specification of 200 degrees Fahrenheit maximum; a T90 specification of 300 degrees Fahrenheit maximum; and a DI of 1100. The proposals lowered the sulfur from a maximum of 150 parts per million to 30 parts per million. The proposals lowered olefins from 10% volume maximum to 5% volume maximum. The proposals added benzene at an average limit of 0.8% volume, a flat limit of 1 percent maximum, and a cap of 1.2%. Oxygenate specifications were expanded to include a floor of 1.5 and a cap of 2.7 for MTBE and a 2.1% weight maximum was added to the oxygenate specification. (Cunningham, Tr. 4170-4172; CX 1047 at 014; RX 184 at 022-028).
1967. Mr. Cunningham and the EIG group met throughout August 1991, continuing to run cost

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2632. Even after meeting with CARB regarding its first RFG patent, Unocal never informed CARB that Unocal was seeking additional RFG patents. Rather, Unocal made a specific decision to keep its other patent applications secret. (Beach, Tr. 1730).
2633. Unocal did, however, recognize “the potential dilemma we have with CARB by not informing them of future moves regarding the whole Patent issue.” (CX 410 at 001). Internally, Unocal discussed the possibility of briefing CARB “in advance of any future developments in regard to our Patent situation so they are not blindsided.” (CX 410 at 001). But Unocal decided not to brief CARB in advance of any future developments. (Beach, Tr. 1732).
2634. Throughout the CARB Phase 2 rulemaking proceedings, Unocal concealed from CARB (and everyone else outside of Unocal) that Unocal had filed a patent application covering the results of the 5/14 project or that Unocal, upon the issuance of any patents, intended to enforce its patents rights and seek royalties thereunder. (Venturini, Tr. 210-259, CX 22; CX 23).
2635. In Unocal’s own Q-and-A FAQ sheet, the prepared answer to a question regarding CARB’s knowledge of Unocal’s filed patent application was, “The patent office keeps applications secret to protect the inventor and the intellectual property...CARB would not have been aware of our pending patent application.” (CX 462 at 004; CX 599 at 012).

2. Unocal Began Filing for Additional RFG Patents in June 1993.

2636. On June 14, 1993, Unocal filed an a second patent application, No. 08/772,243 on Dr. Jessup and Dr. Croudace’s reformulated gasoline invention. (CX 1790 at 001-006, 009-070; Wirzbicki, Tr. 992-993).
2637. The second application was a “divisional” application, (CX 1790 at 003; Wirzbicki, Tr. 992-993), and was based on the same invention that the ‘393 patent was based upon. (Wirzbicki, Tr. 994).
2638. Like all of the other five patents that Unocal eventually obtained on Dr. Jessup and Croudace’s invention, the disclosure of the patent application was the same as that in the ‘393 patent, except for “minor” correction amendments. (CX 617, CX 618, CX 619, CX 620, CX 621; Wirzbicki, Tr. 994-995).
2639. The June 13, 1993 divisional application, together with a continuation of that application, ultimately resulted in the issuance of U.S. Patent No. 5,593,567 on January 14, 1997. (Wirzbicki, Tr. 992-994; CX 618 at 001).
2640. While the patent applications that lead to the ‘567 patent were pending, the Patent Office did not publish patent applications. (Linck, Tr. 7842-7843).

2664. The gasoline property limits required by claim 1 in the '866 patent cover the gasolines required to be produced under the limits of the CARB Phase 2 regulation:

Parameter	Claim 1	Flat Limit	Averaging Limit	Cap Limit
RVP	<7.5	7.0	--	7.0
Olefins	<10	6.0	4.0	10.0
T50 (°F)	≤210	210	200	220

(CX 1791 at 171; CX 619 at 027).

2665. As discussed in greater detail below, U.S. refiners who produce gasoline know that the vast majority of automobiles on the road today run in accordance with the remaining limitations in claim 1 of the '866 patent.

2666. Unocal has not disclaimed any claims of the '866 patent. (Wirzbicki, Tr. 1020).

c. Unocal Obtained its '126 Patent on November 17, 1998, Which Covers Many of the Gasolines Required to be Made Under the CARB Phase 2 Regulations, and Methods of Making and Delivering Them to Service Stations.

2667. Unocal's fourth reformulated gasoline patent, U.S. Patent No. 5,837,126, issued on Nov. 17, 1998. (CX 620 at 001).

2668. The '126 patent issued from another continuation application that Unocal's Chief Patent Counsel, Mr. Wirzbicki, filed on August 1, 1997. (CX 1796 at 033-100; CX 7001).

2669. The '126 patent contains two types of patent claims: claim to gasoline compositions and claims to methods. (CX 620 at 027-028; Wirzbicki, Tr. 1021-1022).

2670. The composition claims of the '126 patent are the same as those in the '393 patent except for the specific sub-combinations of gasoline property requirements in the claims. (RX 1165A at 015).

2705. After the '393 trial, Unocal believed that the impact of the royalty or licensing fee would impact 100% of gasoline sold in California. In a Q&A document setting forth proposed answers to media questions, a handwritten edit modifies the proposed impact of "2 cents per gallon" with the phrase "*on all gallons sold.*" (CX 361 at 001) (emphasis added).
2706. Unocal's CEO at the time, Mr. Beach, told Unocal's shareholders after the jury ruling in the '393 litigation that Unocal expected to receive a "significant amount of money" from the litigation and was "in great shape" as "more and more gallons are sold every day." (CX 425 at 003; Beach, Tr. 1706).
2707. After the jury verdict in the '393 litigation, Unocal sought to assure Governor Wilson that the "jury award and subsequent licensing fees should not have a significant impact on consumer prices." (CX 905). Unocal stressed to the Governor that the 5.75 cent/gallon jury award only applied to a five month period. (CX 905). But Unocal did not tell Governor Wilson that it was going to attempt to collect 5.75 cent/gallon damages from the end of that five-month period to the time the patent expires. (Beach, Tr. 1726).
2708. The United States Court of Appeals for the Federal Circuit subsequently affirmed the trial court's judgment. The United States Supreme Court denied ARCO, Exxon, Mobil, Chevron, Texaco, and Shell's petition for a writ of certiorari. ARCO, Exxon, Mobil, Chevron, Texaco, and Shell have made payments totaling \$91 million to Unocal for damages, costs, and attorneys' fees. (Answer ¶ 69).
2709. An accounting action is still ongoing in the United States District Court for the Central District of California to determine damages for infringement of the '393 patent by ARCO, Exxon, Mobil, Chevron, Texaco, and Shell for the period from August 1, 1996, through December 31, 2000. (Answer ¶ 70).
2710. The trial judge ruled in August 2002 in the accounting of infringement of the '393 patent by the six refiners for the period from August 1, 1996, through December 31, 2000, that the royalty rate applicable to infringing gasoline produced and/or supplied in California remained 5.75 cents per gallon. (Answer ¶ 70; Teece, Tr. 7630).
2711. Unocal is now seeking between \$250 and \$280 million for infringement between July 1996 and 2000 from the four largest refiners in California in this action. (Strathman, Tr. 3659-3671).
2712. On January 23, 2002 Unocal sued Valero Energy Company in the Central District of California for willful infringement of both the '393 patent and the '126 patent. In its complaint, Unocal seeks damages at the rate of 5.75 cents per gallon for all infringing gallons, and treble damages for willful infringement. (Answer ¶ 71; JX 3A at 004; CX 1337). Unocal is "asking for triple damages for Valero's willful infringement." (CX 703 at 001; Lane, Tr. 3041; CX 1337 at 011).

2713. Unocal further requested in the Valero litigation either an injunction barring future infringement of the '126 and '393 patents or a mandated license to the patents at the rate of 5.75 cents per gallon for all infringing gallons. (CX 1337 at 011).
2714. The allegations in Unocal's complaint against Valero show that Unocal understands that its patent portfolio has a substantial impact in the marketplace. Unocal explicitly incorporated into its complaint this statement from one refiner's CEO: Nobody can blend around all five [RFG] patents; it is just impossible." (CX 1337 at 006).
2715. Unocal' further alleged in its complaint against Valero that Valero disclosed in SEC filings that it might be required to pay royalties for use of Unocal's RFG patents. (CX 1337 at 006).
2716. The refiners (including Valero) sued for patent infringement by Unocal account for approximately three quarters of California's gasoline supply. (CX 1720A at 032 (Shapiro Expert Report)).

B. Unocal Has Enforced its Patents Through Licensing Activities.

2717. {

} (JX 3 at 004, *in camera*; Strathman, Tr. 3701, *in camera*).

1. Unocal Licensed Its Patents and Is Actively Seeking to Sign More Licensees in California.

2718. Unocal recognized as early as 1995 that licensing could be "quite lucrative considering the volume of gasoline sold in California." (Lane, Tr. 3036-3038).
2719. Unocal's patents have created "a new business" for Unocal. (CX 441 at 002; CX 7072 (Williamson, Dep. at 12-13)). Unocal has publicly announced that "pursuing and negotiating licensing agreements for reformulated gasoline patents with refiners, blenders and importers" "strategic focus" of Unocal. (CX 614 at 005; CX 7072 (Williamson, Dep. at 28)).
2720. Unocal has formally announced that it has projected license fee revenues of \$75 to \$150 million dollars per year. (CX 441 at 003; CX 7072 (Williamson, Dep. at 16-17); Strathman, Tr. 3626; CX 610 at 068). Charles Williamson, Unocal's current chairman and CEO, openly discussed this \$75 to \$150 million revenue projection at May 21, 2001 annual shareholders meeting (CX 441 at 002-003; CX 7072 (Williamson, Dep. at 16-17)), and has said that "I think the patent is a piece of intellectual capital property that is

2816. Mr. Derr told two outside directors of Unocal that he believed Unocal had committed unethical conduct regarding its decision to monetize its RFG patents. (Derr, Tr. 5117-5118). It was extremely unusual for Mr. Derr to express his opinions to outside directors of another company, but he “felt so strongly about the issue,” that he felt he needed to inform Unocal’s directors. (Derr, Tr. 5120).

XXIV. Relevant Markets.

2817. In this case, there are two relevant product markets. The first market is a technology market, consisting of the low emission reformulated gasoline technology required to produce gasoline compliant with CARB’s summertime RFG regulations. (CX 1720A at 021 (Shapiro Expert Report); Shapiro, Tr. 7065; CX 1799A at 002 (Shapiro Expert Rebuttal Report); RX 1162A at 047 (Teece Expert Report)).

2818. A second relevant product market consists of CARB-compliant summertime reformulated gasoline made available for sale in California. (CX 1720A at 023 (Shapiro Expert Report)).

A. A Firm That Controls the Technology for Producing Gasoline Compliant with CARB’s Summertime Reformulated Gasoline Regulations Can Profitably Price That Technology above the Competitive Levels.

1. Technology Markets in General.

2819. Patent licensing arrangements are market transactions that occur in what economists call a “technology market.” (Shapiro, Tr. 7065-7066; CX 1720A at 020 (Shapiro Expert Report)).

2820. The idea of a technology market has been well-accepted in the field of economics for many years. (Shapiro, Tr. 7065-7066). Technology markets are “used by economists and are described as well by the Justice Department and the Federal Trade Commission in their intellectual property guidelines.” (Shapiro, Tr. 7066). Unocal’s economic expert Dr. David Teece agrees “that the Joint DOJ/FTC Antitrust Guidelines for the Licensing of Intellectual Property provide useful guidance in identifying the relevant scope of the technology market.” (RX 1162A at 047-048).

2821. Technology markets are an example of an “input market.” Just as an automobile manufacturer uses steel as an input to make cars, a chemical company may use a patented process technology to make its final product. Technology markets are conceptually similar to traditional input markets and are amenable to analysis using familiar analytic concepts. (CX 1720A at 020 (Shapiro Expert Report)).

2822. The “producers” in a technology market possess technology which they provide to consumers who pay for the right to use the relevant technology. An example of a producer in the technology market is a patent-holder. Licensing agreements typically establish the costs and terms governing the use of the relevant technology. (Shapiro, Tr. 7065-7066).
2823. Technology markets focus attention on competition in the provision of technology. As with other inputs, the presence of close substitutes for a given patented technology reduces the market power of the patent holder controlling the patented technology. (CX 1720A at 021 (Shapiro Expert Report)).
2824. To define the scope of a particular technology market, it is necessary to identify the component parts of the market, namely producers, consumers, and the traded commodity or technology. To define the relevant market for antitrust purposes, the constituents of the market must exist in a scope such that collectively, the suppliers of the commodity or technology in the market could profitably raise the price of the commodity or technology significantly above competitive levels. In technology markets, competitive and supra-competitive price levels can be measured according to licensing fees paid for the use of a proprietary technology. (CX 1720A at 021 (Shapiro Expert Report)).

2. The Technology Market in this Case.

2825. The technology market relevant to this case consists of “*low emissions RFG technology required to produce gasoline compliant with CARB’s summertime RFG regulations.*” (CX 1720A at 021 (Shapiro Expert Report)(emphasis in original); Shapiro, Tr. 7065; CX 1799A at 002 (Shapiro Expert Rebuttal Report); RX 1162A at 047 (Teece Expert Report)).
2826. Unocal’s economic expert, Dr. Teece, concurs that the relevant technology market in this case consists of technology required to produce low emissions reformulated gasoline compliant with CARB’s summertime RFG regulations. (RX 1162A at 047). Dr. Teece believes that such a definition of the technology market is reasonable. (Teece, Tr. 7528).
2827. The subject matter of Unocal’s reformulated gasoline patents is technology that exists within the relevant technology market to this case. The unpatented technical know-how used by refiners to blend around Unocal’s RFG patents, to the extent blending around is possible, constitutes another technology within the relevant technology market. (CX 1720A at 021 (Shapiro Expert Report)).
2828. Oil refiners that produce CARB-compliant summertime reformulated gasoline constitute the consumers in the technology market relevant in this case. (CX 1720A at 021 (Shapiro Expert Report); Shapiro, Tr. 7066-7067).

2844. The relevant geographic market for CARB-compliant summertime gasoline is no larger than California. (CX 1720A at 023 (Shapiro Expert Report)).
2845. Although gasoline can be transported considerable distances, it is costly to do so. Refiners and other suppliers located near their customers have lower delivery costs than more distant refiners. Transportation costs limit the ability of distant refiners to constrain prices. (CX 1720A at 23 (Shapiro Expert Report)).
2846. In California, there are product pipelines that leave the state and deliver refined products into Nevada and Arizona. There are not, however, pipelines that deliver refined products from other states into California. The only practical route for moving products into California is by water through the Panama Canal from the Gulf Coast. (Eskew, Tr. 2876).
2847. In his testimony in the case brought by Unocal to enforce its '393 case, Unocal's Dr. Teece testified it would cost refiners 8-10 cents per gallon to import California Phase 2 gasoline from the Gulf Coast. (Teece, Tr. 7654-7655; CX 1332 at 028).
2848. In 1995, Turner Mason, a leading petroleum industry consulting firm, told the California Energy Commission that supplemental sources of CARB Phase 2 RFG "are remote, more costly and require 2-3 weeks response time." (RX 219 at 007). Short-term CARB Phase 2 RFG supply problems resulted from "Rigid CARB 2 specifications – especially for RVP and T50," and the uniqueness of CARB Phase 2 RFG in an isolated region. (RX 219 at 012).
2849. Market participants producing and consuming CARB Phase 2 gasoline view California as a distinct market. For example, in 1995, Turner Mason told the California Energy Commission that supply of CARB Phase 2 gasoline in isolated California was too tight. (RX 219 at 007). Similarly, Exxon has stated that CARB's Phase 2 specifications isolate California as an "island" market. (CX 5067 at 003).

**UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION**

DOCKET NO. 9305

PUBLIC VERSION

**IN THE MATTER OF
UNION OIL COMPANY OF CALIFORNIA**

**COMPLAINT COUNSEL'S PROPOSED
FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER**

(VOLUME IV)

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Dated: March 9, 2005

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2858. Another factor in the reduction of choices for CARB was the “specific investments” made by refiners to implement the CARB Phase 2 rules. (Shapiro, Tr. 7064, as illustrated by CX 7097). The specific investment factor is “very much present here because of the billions of dollars that refineries as a group spent during that period of time between 1991 and 1995 specifically to comply with the CARB Phase 2 rules.” (Shapiro, Tr. 7071-7072, as illustrated by CX 7097).
2859. Dr. Shapiro quantified the incremental market power that Unocal obtained through opportunistic behavior. The calculations “implement the economic theory of opportunism” and “quantify, estimate Unocal’s market power given the actual costs.” (Shapiro, Tr. 7088).
2860. Economic analysis demonstrates that a lower bound on Unocal’s *ex post* monopoly power can be obtained by measuring the sum of the capital costs per gallon already invested by the refineries to comply with CARB’s RFG rules, *k*, and the operating cost savings per gallon associated with CARB gasoline, *b*. (CX 1720A at 27 (Shapiro Expert Report)).
2861. The first factor that Dr. Shapiro considered was specific investments (“*k*”) made by refiners to comply with the CARB Phase 2 regulations that they would not have had to incur had an alternative set of regulations been implemented. (CCPF ¶¶ 3803-3947). These specific investments represent an increment to Unocal’s market power. (Shapiro, Tr. 7082-7083).
2862. Unocal’s expected market power increase in the *ex post* period by an amount that is determined by the level of the expected specific investments as viewed from the *ex ante* period in 1991. This represents the motive for the misrepresentation. (Shapiro, Tr. 7083-7084, as illustrated by CX 7098).
2863. There are several estimates of the specific investments made by California refiners to comply with CARB Phase 2 regulations. Complaint Counsel’s technical expert, Michael E. Sarna, analyzed business documents from eight refiners in California, and conservatively estimated that these eight refiners alone made \$1.528 billion in specific investments to meet the CARB Phase 2 regulations. (RX 1154A at 027; CX 1720A at 039).
2864. Unocal’s economic expert, Dr. Teece, estimated that the same eight refiners spent \$2.714 billion on CARB Phase 2 modifications. (CX 1346 at 061).
2865. Unocal’s technical expert, Mr. Richard Stellman, estimated that all California refiners spent \$2.6 billion on CARB Phase 2 investments. (RX 1165A at 008).
2866. Using the most conservative estimate from Mr. Sarna, Dr. Shapiro concluded that the cost

}. ({ }, *in camera*).

C. Indirect Evidence of Market Power.

1. Refiners are Likely Infringing One or More of the Unocal Patents in Large Numbers.

2968. {
}. (Shapiro, Tr. 7206, *in camera*).

2969. {
}.
(Shapiro, Tr. 7209, *in camera*). Dr. Teece agrees that “one useful guide to estimating Unocal’s market share in the technology market is to determine the percentage of gasoline that falls within the claims of Unocal’s patents.” (RX 1162A at 050).

2970. {
}. (Shapiro, Tr. 7206, *in camera*).

2971. {
}. (Shapiro,
Tr. 7206, *in camera*).

2972. In this case, measuring the portion of the gasoline that falls within the numerical property limitations of Unocal’s RFG patents, as construed by the United States District Court for the Central District of California in the ‘393 trial, will demonstrate likely infringement of all five patents. This is because the facial validity of Unocal’s patents causes producers to assess business risk; {

}; refiners use the numerical property limitations in normal business activities; and any additional, unconstrued claims are extremely unlikely to provide a means of patent avoidance for refiners. (CCPF ¶¶ 2740-2750, 3046-3079).

2. Unocal’s Patents are Valid and Present a Business Risk to Refiners.

2973. United States Patent No. 5,288,393 (issued February 22, 1994) is valid. (JXA 3 at 003).

2974. United States Patent No. 5,593,567 (issued January 14, 1997) is valid. (JX 3A at 003).

2975. United States Patent No. 5,653,866 (issued August 5, 1997) is valid. (JX 3A at 003).
2976. United States Patent No. 5,837,126 (issued November 17, 1998) is valid. (JX 3A at 003).
2977. United States Patent No. 6,030,521 (issued February 29, 2000) is valid. (JX 3A at 003).
2978. Some California refiners have also initiated a reexamination at the Patent Office of Unocal's '393 and '126 patents at the Patent Office. (Strathman, Tr. 3661-3662).
2979. The patent examiner has issued a preliminary rejection of the '393 and '126 patent, and Unocal responded to that rejection. (Strathman, Tr. 3661-3664). There are no statutory deadlines for the PTO to complete the reexamination. 35 U.S.C. §§ 305, 132, and 133.
2980. Unocal may appeal from a final rejection of any claim to the Board of Patent Appeals and Interferences. 35 U.S.C. § 134(b) (2003). Unocal may then appeal a decision by the Board of Patent Appeals and Interferences to the U.S. Court of Appeals for the Federal Circuit. 35 U.S.C. § 141 (2003).
2981. Unocal believes its reformulated gasoline patent portfolio will “prevail” in the reexamination of the patents by the U.S. Patent and Trademark Office. (Strathman, Tr. 3671).
2982. If Unocal believed its patents would not withstand review by the U.S. Patent and Trademark Office, Unocal would have to retract public announcements about projected patent revenue stemming from the licensing of its reformulated gasoline patents. (Strathman, Tr. 3671).
2983. The fact that one or more of Unocal’s patents may ultimately prove to be invalid does not affect the reality of Unocal’s present market power. Unocal is currently seeking royalties based on significant current infringement of its RFG patents. Costs associated with these royalties have been and will continue to be imposed upon refiners who utilize low emissions RFG technology to produce CARB-compliant gasoline. (Shapiro, Tr. 7078).
2984. The mere possibility that one or more of the Unocal patents may be found to be invalid does not imply a lack of monopoly power in the present. (CX 1799A at 027 (Shapiro Expert Rebuttal Report); Shapiro, Tr. 7078).
2985. While the '126 and '393 patents were being reexamined by the U.S. Patent Trademark Office, Unocal declared “Licensing fees and judgements collected during the pendency of the reexaminations are not refundable.” (CX 614 at 026).
2986. The expected costs associated with potential Unocal royalty payments that refiners face

D. No Serious Dispute Exists as to the Meaning of Any Patent Claim That Unocal Contends Must Be Construed.

3080. Many of the relevant portions of the Unocal patents have been previously litigated. In the '393 litigation, the district court construed the disputed limitations of the '393 patent claims. (CX 1796A at 008-019 (Order, *Union Oil Co. Of California*, No. 95-CV-2379 (C.D. Cal. May 19, 1997); CX 1796A at 189, 224 (Court's Jury Instructions, *Union Oil Co. Of California*, No. 95-CV-2379 (C.D. Cal. Sept. 24, 1997))).
3081. In construing the claims, the district court found it appropriate to rely only on the "intrinsic evidence" of the patent record itself, without expert testimony or a hearing on the meaning of the claims. (CX 1796A at 009-010).
3082. The district court held that the "patent is unambiguous." (CX 1796A at 015). It emphasized "that the intrinsic evidence regarding the '393 patent leaves no ambiguity as to the meaning of the patent," (CX 1796A at 018), and "the claims are unambiguous and can be construed by examining the intrinsic evidence...without need for further clarification." (CX 1796A at 010, n.1).
3083. According to the district court, the "'393 patent specification describes with striking clarity the coverage of the claims." (CX 1796A at 011).
3084. The specification of the '393 patent is identical to the specifications of the remaining four Unocal patents." (JX 3A (Joint Stipulation of Law and Fact), ¶ 7 (filed Oct. 12, 2004)).
3085. The construction of the other limitations of the '393 patent was undisputed and formed the basis of the infringement judgment in that litigation. (CX 1796A at 008-019; CX 1796A at 189, 224; CX 1796A at 276-282 (Special Verdict Form); RX 816 at 002 (Judgment)). The jury was able to reach a verdict that the refiners infringed the '393 patent without requiring any additional claim construction. (CX 1796A at 276-282 (Special Verdict Form); CX 1796A at 224 (Jury Instruction on Claims Construction)).
3086. Unocal contended in the '393 accounting action that the district court had decided these claims construction issues, and stated that arguments that the '393 litigation did not do so were incorrect and "disingenuous." (CX 1579 at 007-008).

1. No Dispute Exists As To the Definition of Gasoline.

3087. Part of the preamble to the claims of all five Unocal RFG patents contains the language "an unleaded fuel suitable for combustion in an automotive engine" or "an unleaded gasoline fuel suitable for combustion in a *spark* ignition engine." (CX 617 at 021; CX 618 at 027; CX 619 at 027; CX 620 at 027; CX 621 at 027). (emphasis added).

3168. The method described in claim one is for producing gasoline by blending at least two hydrocarbon-containing streams boiling in the range of 77 F to about 437 F. As stated above, gasoline is typically produced by blending at least two hydrocarbon-containing streams. (CCPF ¶¶ 3134-3139).
3169. Virtually any of the hydrocarbon streams being blended to make gasoline boil in the range of 77 F to 437 F. Similarly, William Leffler's *Petroleum Refining in Nontechnical Language* defines gasoline as "a light petroleum product in the range of approximately 80 to 400 degrees F for use in spark-ignited internal combustion engines." (RX 922 at 247; Eskew, Tr. 2829-2830). The gasoline produced is for an automobile.
3170. Unocal's patent counsel, Mr. Wirzbicki, testified that this claim "covers a method in which a predictive model is used" to produce the gasoline described in the claim. (Wirzbicki, Tr. 1135).
3171. According to Unocal's own technical expert: "The predictive model adopted by CARB in June 1994 ("PM2") is a spreadsheet containing equations showing the effects of oxygen, T-50, T-90, olefins, aromatics, sulfur and benzene using the flat or average limits of the reference fuel in the CARB regulations. It compares the emissions predicted from the reference fuel gasoline parameters . . . to the emissions from the gasoline blended by a refiner. The blended gasoline must produce emissions of NOx, Total Hydrocarbon (THC), and Potency-weighted Toxics (PT) within a tolerance of the reference fuel for each of these types of emissions to pass the emissions reduction requirements." (RX 1165A at 007 (Stellman Expert Report)).
3172. The ASTM defines "predictive model" as "a set of three equations developed by CARB which predicts the change in exhaust hydrocarbon emissions, exhaust emissions or oxides of nitrogen, and the combined exhaust emissions of four toxic air contaminants." The equations are mathematical and emissions are predicted as a function of the properties of gasoline. Properties in the predictive model include RVP, olefins, aromatics, T50, T90, and sulfur. (Eskew, Tr. 2864). Use of the predictive model would satisfy the requirements of the '521 process elements. (CX 621 at 027).
3173. {
}. (Lieder, Tr. 4782, *in camera*; Simonson, Tr. 6049, 6050, *in camera*; Eizember, Tr. 3335, *in camera*).

G. California Refiners as a Whole Cannot Avoid the Unocal Patents.

3174. {
}. (Shapiro, Tr. 7206, *in camera*).

3488. {
}. (Sarna, Tr. 6283; RX 1154 at
009, *in camera* (Sarna Expert Report)).

3489. {
}. (Sarna, Tr. 6255, *in camera*). {
}. (Sarna, Tr. 6258, *in camera*).

3490. {
}. (RX 1154 at 008 (Sarna Expert Report), *in camera*).

3491. {
}. (RX 1154 at 008 (Sarna Expert Report), *in
camera*; Eizember, Tr. 3372-3373, *in camera*). {
}. (Eizember, Tr. 3372-3373).

3492. {
}. (RX 1154
at 007 (Sarna Expert Report), *in camera*). {
}. (RX 1154 at
007 (Sarna Expert Report), *in camera*).

3493. {
}. (RX 1154 at 007-008 (Sarna Expert Report), *in camera*). {
}. (Sarna, Tr. 6254, *in camera*).

3494. {
}. (RX 1154 at 008 (Sarna Expert Report), *in camera*).

3500. {

}. (Sarna, Tr. 6314, *in camera*).

3501. While Unocal's technical expert Mr. Stellman suggests that other refiners could increase avoidance by shipping more product out of California, he did not consider the economics of such a plan. (Stellman, Tr. 7952-7953). The undisputed evidence on this point shows that such a suggestion is not feasible for economic reasons. (CCPF ¶¶ 3497-3509).

3502. In the year 2000, approximately 1,050,000 barrels of gasoline were produced a day in the state of California. Of that, 159,000 barrels a day, about 15 percent or less, were shipped to other states. (Eskew, Tr. 2879).

3503. {

}. (Eskew, Tr. 2973-2974, *in camera*).

3504. {

}. (CX 1798 at 004 (Eskew Expert Rebuttal Report); Stellman, Tr. 8095, *in camera*).

3505. {

}. (Stellman, Tr. 8095, *in camera*).

3506. Unocal's economic expert, Dr. Teece, agrees that refiners cannot avoid Unocal's patents by downgrading CARB Phase 2-compliant gasoline and shipping it to nearby states. Because one batch of gasoline "would amount to between one-third and two-thirds of total Nevada/Arizona daily consumption" (CX 1346 at 021-022), if California refiners exported into those states, the price for gasoline in those markets would collapse. (Teece, Tr. 7650; CX 1332 at 022). There would be a similar price impact if refiners tried to export into the Pacific Northwest. (CX 1332 at 023). Thus, if refiners tried to avoid the patents by exporting to nearby states, it would reduce refinery profits by 58 to 61 cents per gallon. (RX 1162A at 068-069; CX 1346 at 032).

3507. Unocal's economist, Dr. Teece, believes that refiners could downgrade CARB Phase 2-compliant gasolines that fell within the numerical limitations of the patents to

d. { }

3521. {
}. (Sarna, Tr. 6267, *in camera*; RX 1154 at 008 (Sarna
Expert Report), *in camera*). {
}. (Sarna, Tr. 6269, *in camera*; RX 1154 at 008 (Sarna
Expert Report), *in camera*).

3522. {
}. (Sarna, Tr. 6267, *in camera*).

3523. {
}. (Sarna, Tr. 6267, *in camera*). {
}. (RX 1154 at 008 (Sarna Expert
Report), *in camera*).

3524. {
}. (Sarna, Tr. 6267-6268; RX 1154 at 008, *in camera*
(Sarna Expert Report)).

e. { }

3525. {
}. (Sarna, Tr. 6278-6279, *in*
camera; RX 1154 at 009 (Sarna Expert Report), *in camera*).

3526. {
}. (RX 1154 at 009 (Sarna Expert Report), *in camera*). {
}. (RX 1154 at 009 (Sarna Expert
Report), *in camera*).

3527. {
}. (RX 1154 at 009 (Sarna Expert Report), *in*
camera).

- 27).
3644. A refiner producing CARB-compliant gasoline cannot avoid this claim by raising RVP above the claimed level, because the maximum RVP allowed by CARB (7.0) is less than the RVP claimed in the patent. (RX 1154A at 29 (Sarna Expert Report)).
3645. A refiner producing CARB-compliant gasoline cannot avoid this claim by lowering octane below the claimed level, because the minimum octane of gasoline offered for sale in California is 87. (Ingham, Tr. 2709-2710). Avoiding the patents by going to 86 octane gasoline is not a feasible solution because such a gasoline can damage the engines of many cars. (Sarna, Tr. 6432).
3646. A refiner producing CARB-compliant gasoline cannot avoid this claim by lowering aromatics below the claimed limit. {
 }. (Sarna, Tr. 6301, *in camera*, as illustrated in CX 7102).
3647. A refiner producing CARB-compliant gasoline cannot avoid this claim by lowering paraffins below the claimed limit. There are three types of hydrocarbons in gasoline: olefins, aromatics, and paraffins. The total percentage of each of these hydrocarbons in a batch of gasoline must total 100 percent. (RX 1165A at 019). In order to have paraffins less than 65 percent and to avoid claim 4 of the '126 patent, the combination of olefins and aromatics must be greater than 35 percent (*i.e.*, $100\% - 65\% = 35\%$).
3648. The CARB Phase 2 flat limit on aromatics was 25 percent, and the cap limit was 30. The CARB flat limit on olefins was 6 percent, and the cap limit was 10 percent (RX 1154A at 029 (Sarna Expert Report)). To avoid this paraffin claim, a refiner must blend both aromatics and olefins above the flat limit and near the cap limit. (CCPF ¶¶ 2995, 3643, 3647).
3649. For reasons similar to the reason that refiners cannot consistently blend their T50 above 215 degrees, refiners cannot consistently blend their T90 above 315 degrees. (CCPF ¶¶ 3227-3252). The CARB flat limit on T90 is 300 degrees, while the cap is 330 degrees. (RX 1154A at 029 (Sarna Expert Report); Sarna, Tr. 6388). The slope of the T50 and T90 curves are very steep at one end but not steep at the other end. However, the slope of the parameters that need to be adjusted, such as aromatics, are not as steep at the low end. So, in order to offset T50 and T90 temperatures at the high end, a refiner must lower aromatics and sulfur to a much greater extent. (Sarna, Tr. 6388; RX 1154A at 029 (Sarna Expert Report)).
3650. Refiners cannot consistently blend their olefin levels above 8 percent. (CCPF ¶¶ 3240-3242, 3251).

3651. Although refiners may have improved their ability to avoid the Unocal '393 patent, this does not mean that refiners will be able to avoid all five patents easily. (CCPF ¶¶ 3637-3654).
3652. First, the disclaimed version of the '393 patent has fewer broad claims. Mr. Stellman admits that it is a lot easier to blend around the '393 patent than is some of the other claims in the other patents. (Stellman, Tr. 7953).
3653. One of the reasons that the infringement rate decreased for the '393 patent from 1996 to 2002 was because the octane on premium gasoline was reduced from 92 to 91. (Stellman, Tr. 7953). The switch to 91 octane "basically got the refiners away from the more difficult claims to get around in a 92 octane." (Stellman, Tr. 7953-7954).
3654. Another reason that refiners were better able to avoid the '393 patents is because they got better at blending CARB-compliant gasoline. By the third year or so that the refiners were blending CARB-gasoline, they were gaining more experience in blending CARB-compliant gasoline. This additional experience could be a factor in the decreased infringement rate for the Unocal '393 patent. (Stellman, Tr. 7954).

J. Unocal Has a Dangerous Probability of Success in Achieving Monopoly Power in the Market for CARB Phase 2-Compliant Summertime Gasoline.

1. Unocal Intended to Monopolize the Downstream Market.

3655. Starting as early as 1989, and continuing through 1995, Unocal had a plan to obtain licensing fees for its patents by influencing the regulators. (CCPF ¶¶ 463-472).
3656. Prior to 1997, Unocal owned and operated refineries in California as a vertically integrated producer, refiner, and marketer of petroleum products. (Answer ¶ 13; JX 3A at 002). In March 1997, Unocal completed the sale of its west coast refining, marketing, and transportation assets to Tosco Corporation. (Answer ¶ 13).
3657. Therefore, between 1989 and 1995, when Unocal was developing and executing its plan to force its competitors to purchase patent licenses from it, Unocal participated in the downstream California reformulated gasoline market.
3658. Unocal's plan to obtain patent royalties was specifically directed at its competitors at the time, namely other refiners. (CCPF ¶¶ 481-507, 563-607, 623-663).
3659. This point is confirmed in internal Unocal memoranda from December 1990, which tout the benefits using its research to "influence regulators" and tap the "competitive advantage" and "licensing" potential of Unocal's "patent for low emissions fuels, based

3666. {

}. (CX 2015, *in camera*).
3667. {
}. (Hepper, Tr. 4076, *in camera*).
3668. {
}. (Hepper, Tr. 4077, *in camera*).
3669. As Timothy Ling, Unocal's Chief Operating Officer at the time, publicly stated in 2001, "I think there are companies last summer that missed out on significant margin opportunities for fear of producing under the patent." (CX 534 at 002; Strathman, Tr. 3617).
3670. CARB's sister agency, the California Energy Commission ("CEC"), also has publicly expressed concerns about how the Unocal patent may affect competition in the California gasoline market. (CX 1717; CX 1224).
3671. In 2003 the CEC, pursuant to statutory directives, explored the feasibility of a state-sanctioned strategic petroleum reserve for California. CEC held hearings, performed studies, and hired consultants. (Boyd, Tr. 6745).
3672. CEC at a public hearing on a potential California strategic fuel reserve in April 2003 presented the findings of Stillwater Associates, a consulting firm commissioned by CEC to study the issues. One finding of that study presented to the public in slides was that "Unocal's gasoline patents reduce gasoline supply." (Boyd, Tr. 6744 - 6746 (CARB Executive Boyd served as one of the CEC Commissioners who approved the Report)).
3673. CEC presented to the public as CEC's own report a detailed Stillwater Associates study entitled "California Strategic Fuels Reserve" that found, based on interviews with industry participants and other sources, that "[t]he Unocal patents are a significant additional burden on California's ability to meet growing demands for transportation fuels while improving air quality. The licensing fees and punitive damages are such that incidental importers will not dare to attempt to blend finished gasoline, while refineries who blend outside the patent's envelope lose capacity by diverting products from the gasoline pool and in doing so actually increase evaporative emissions." (CX 1717 at 130; Boyd, Tr. 6745-6747, 6841-6844).

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(VOLUME V)

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at 028 (Shapiro Expert Report)).

3713. When asked whether it was a viable alternative for the refiners to go to CARB and seek a change in the regulations after learning of the Unocal patent, Unocal's economic expert Dr. Teece testified, "I don't believe it's viable." (CX 1332 at 032; CX 1720A at 027 (Shapiro Expert Report)).
3714. Dr. Teece testified in this current litigation that he still stands by this earlier testimony, that it was not a viable option for CARB change its regulations *ex post*. (RX 1162A at 096).
3715. Unocal's lawyers in the '393 patent litigation, from the same firm defending the instant FTC action against Unocal, also argued in their closing that CARB was locked in by 1995. Unocal's attorney argued to the jury, "Conclusion. Gee, if you keep these regulations, you'll be forcing the industry to infringe the Unocal patent. Potential significant cost increases resulting. Throwing up all these red herrings to CARB back in 1995. Did CARB relax the regulations? No. You didn't hear one piece of testimony in this case that the regulations were relaxed because they wouldn't. And they won't." (CX 1825 at 089).

B. CARB Knew That Refiners Had Made Billions of Dollars of Specific Investments to Modify Their Refineries.

3716. CARB could not revise the Phase 2 regulations after late 1993 in order to avoid the Unocal patent because CARB had already imposed billions of dollars of modification costs on the refiners and needed to give the refiners assurances that the regulation would be implemented as written. As Dr. Shapiro explained, an important element of lock-in at CARB was the substantial sum that refiners had already invested to comply with the CARB regulations. (CX 1720A at 029 (Shapiro Expert Report)).
3717. Peter Venturini, the lead manager at CARB of the Phase 2 project, testified that CARB recognized the importance of the refiners' investment:

[W]e had adopted a regulation that was imposing costs on the order of, say, \$5 billion on the refineries. They had relied on the action of our agency to commit to those investments.... It was important that there be some certainty, so if – so from our perspective, we were – felt that we had made this major commitment. We had directed the refineries to invest. They were proceeding on that. And if we did not honor our commitment, it wouldn't have been appropriate for us.

(Venturini, Tr. 308-309).

7494).

2. Because of Refiner Sunk Investments, EPA's Approval of the SIP Incorporating Phase 2, and Further California Legislative and Executive Directives, CARB in Phase 3 Could Not Rescind or Reduce the Emissions Benefits of the Phase 2 Rule as a Means of Avoiding the Unocal Patents.

3769. Michael Kenny, as Executive Director of CARB from August 1996 through January 2003, was responsible for proposing the Phase 3 recommendations to the CARB Board and to work with and supervise CARB staff to that end. (Kenny, Tr. 6497-6498, 6535, 6574).
3770. CARB's Phase 3 proceeding was primarily designed to remove the use of MTBE as a way of satisfying CARB Phase 2 requirements. (Kenny, Tr. 6574).
3771. CARB in the Phase 3 proceeding could not rescind or reduce the emissions benefits or Phase 2 as a means of giving relief from the Unocal patent "without significant issues." (Kenny, Tr. 6575-6576). One of the significant issues was that "Phase 2 gasoline regulations had been adopted in 1991. Subsequent to that point in time, the refiners had spent significant amounts of money to comply with Phase 2 requirements." (Kenny, Tr. 6575).
3772. Another "significant issue" that constrained CARB in the Phase 3 proceeding from rescinding or reducing the emissions benefits of the Phase 2 regulation was that Phase 2 was a component of an arduously-negotiated SIP that had been officially approved by the EPA. The EPA had approved that SIP in September 1996. (Kenny, Tr. 6575-6576).
3773. Another reason that CARB in the Phase 3 proceeding could not rescind or reduce the emissions benefits of the Phase 2 regulation was the fact that the California legislature in the so-called "Sher Bill" in 1999 had imposed a statutory prohibition against reducing the emissions reduction benefits of the CARB RFG rule. Governor Davis imposed a similar prohibition by Executive Order in 1999. (Venturini, Tr. 128, 847; CX 55 at 075).
3774. According to Dr. Griffin, the SIP and the Sher Bill limited CARB's options in the Phase 3 proceeding. "It is possible that they may have precluded CARB from changing its regulations *ex post* to allow refiners more flexibility to avoid the patents." (RX 1164A at 053).

3. Due to the Breadth of Unocal's Patent Claims, CARB in Phase 3 Could Not Revise the Phase 2 Rule in a Manner That Avoided Unocal's Patents and Maintained the Necessary Emissions Benefits.

3775. One reason that it was impractical in Phase 3 for CARB to avoid Unocal patents and also maintain emissions benefits was that, just to offset the loss of MTBE, CARB had to exploit pollution-reducing measures that otherwise would have been needed to avoid the Unocal patents. MTBE had the effect of reducing aromatics, benzene, sulfur and olefins because it tended to dilute these hydrocarbons. Steps, like reducing sulfur levels, that would have been needed if CARB was to avoid Unocal patents by substantially raising T50 requirements or taking other patent-relief steps, were required to be used to offset the loss of MTBE. (Sarna, Tr. 6148; CX 1797A at 004-005 (Sarna Expert Rebuttal Report)).
3776. For the Phase 3 regulations CARB staff had the charge for "coming up with specifications that would allow the phaseout of MTBE, that would preserve the benefits of the program and provide additional flexibility to the producers of Phase 3 reformulated gasoline." (Simeroth, Tr. 7493).
3777. CARB staff in the Phase 3 proceeding believed that any substantial upward adjustment to the T50 specification to give patent relief could not be adequately offset by more stringent requirements elsewhere. Therefore, CARB proposed an upward adjustment of the T50 flat limit by only two degrees, from 211 to 213 degrees Fahrenheit and preserved the "cap" of 220 degrees Fahrenheit. (CX 1417 at 001).
3778. Judge Kenny testified that one of CARB's "underlying and overriding concerns was that we not lose emissions reductions. We were under a legislative mandate to not lose emissions reductions. However, we did learn that we could maintain those emissions reductions while providing some flexibility to the refiners which would provide some cost savings, which is what paragraph 2 in this exhibit is referring to." (Kenny, Tr. 6576-6577).
3779. The slight increase in the T50 flat and averaging limits in Phase 3 did not enable refiners additional flexibility to blend around Unocal's patent portfolio on a consistent or significant basis. (CX 1797A at 004-005); CCPF ¶¶ 3793-3860, 3928-3941).
3780. {
 } (Sarna, Tr. 6288-6289, *in camera*). Each refiner has testified that the Phase 3 regulations have not allowed for substantial blend-around. (CCPF ¶¶ 3928-3941).

3919. Prior to Chevron making its refinery modifications, the typical T50 at the Chevron El Segundo refinery was 205 degrees Fahrenheit. (CX 5018 at 006).
3920. After Chevron made its refinery modifications, the average T50 at the Chevron El Segundo refinery was { }degrees. (RX 1165 at 050, *in camera*).
3921. The typical olefin level at the Exxon Benicia refinery prior to the Phase 2 modifications was 13 percent. (Eizember, Tr. 3143).
3922. The typical olefin level at the Exxon Benicia refinery at the time Exxon sold the refinery in 1997 was in the range of about 3-4 percent. (Eizember, Tr. 3143; RX 1165 at 050, *in camera* (average olefin level for Benicia in 1997 was { })).
3923. The typical T50 at the Exxon Benicia refinery prior to the refinery modifications was 220 degrees Fahrenheit. (Eizember, Tr. 3144).
3924. The typical T50 at the Exxon Benicia refinery at the time Exxon sold the refinery in 1997 was about 200 degrees or slightly lower. (Eizember, Tr. 3144; RX 1165 at 050, *in camera* (average T50 level for Benicia in 1997 was { })).

1. There Are No Practical Steps That Refiners Can Take Today to Substantially Decrease the Amount of Likely Infringement.

3925. Engineers at each of the refineries have studied whether the refineries can, through operational steps or capital investment, substantially avoid the Unocal patents. No such steps have been identified. (CCPF ¶¶ 3803-3929, 2326-2470).
3926. The fact that refiners are locked in is underscored by the testimony of Unocal's economic expert, Dr. Griffin. Dr. Griffin testified that in order for the refiners as a whole to reduce their matching rate with the Unocal patents from 88% overlap down to 80% overlap, the refiners would have to spend \$248.5 million in modifications. (Griffin, Tr. 8518-8520; RX 1164A at 058).
3927. Dr. Griffin determined that, assuming a royalty rate of 1.7 cents per gallon, it is uneconomical for the refiners as a whole to spend money on further capital expenditures to reduce the matching rate below 78.7 percent. (Griffin, Tr. 8516, 8518).
3928. {

4369. Chairman Sharpless believed “there was an assumption that when you put information in, label it as non-proprietary, that it is in the public and that you’re not going to be pursuing patents.” She “did not assume that somebody would go and take a regulation and – and start patenting all parts of that regulation to their economic benefit.” (CX 7063 (Sharpless, Dep. at 229-230)).
4370. Chairman Sharpless believes that the CARB Board would not have “marched off that cliff” and have approved a Phase 2 RFG regulation as it did in November 1991 if informed that Unocal had a pending patent. (CX 7063 (Sharpless, Dep. at 198)).
4371. According to Chairman Sharpless, “if it turned out that we had information that this rule would have somehow not been a good rule in terms of other reasons, economic reasons, then I think that that would have definitely have been a major consideration on the part of the board. . . . if something came up that said wait a minute, red flag, there’s a problem here, would we march off the cliff? No. Wouldn’t be responsible.” (CX 7063 (Sharpless, Dep. at 198-199)).
4372. Chairman Sharpless believed that the CARB Board, if learning of the Unocal pending patent “would have been asking a lot of serious questions about how that would affect market and how that would affect the ability of one company to sort of have control of certain aspect of the marketplace . . . that would be a major concern and I think it would have caused the board to want to have further investigations. I don’t think the board would take action that November had they known.” (CX 7063 (Sharpless, Dep. at 226-227)).
4373. Chairman Sharpless believed that the CARB Board, if learning of the Unocal pending patent, would have the option of delaying the proceeding despite the statutory deadline in the California Clean Air Act to issue regulations by January 1992. If the regulation “couldn’t stand up against the measurements of technical feasibility and cost effectiveness, then I did have an option, and that would be that I would go back to the legislature – and I have done that – to say that the deadlines are not achievable, and recommend that there be some relief given.” (CX 7063 (Sharpless, Dep. at 151-152, 226-227)).
4374. Chairman Sharpless did not believe that the Board have been forced to issue the Phase 2 rule as written in order meet California’s Federal Clean Air Act requirements. (CX 7063 (Sharpless, Dep. at 195-196, 198)).

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gouging. Another way of looking at it is because of the unreasonably high royalty, it has restricted supply.” (RX 1054 at 001).

4757. Timothy Ling, Unocal’s Chief Operating Officer at the time, publicly stated in 2001: “I think there are companies last summer that missed out on significant margin opportunities for fear of producing under the patent.” (CX 534 at 002; Strathman, Tr. 3617).
4758. California regulators have taken note of the impact that the Unocal patents could have on supply. CARB believes that the Unocal patents are affecting gasoline supply. (Boyd, Tr. 6752-6753).
4759. CARB’s sister agency, the California Energy Commission, also evinced continued concern about the potential impact of the Unocal patents in different settings, including in hearings on a proposed California Strategic Fuel Reserve, effects of the phase-out of MTBE, and others. The Unocal patents are “of concern to the California Energy Commission.” (Boyd, Tr. 6753-6755).
4760. For example, one CEC report stated: “The Unocal patents are a significant additional burden on California’s ability to meet growing demands for transportation fuels while improving air quality.” (CX 1717 at 130; Boyd, Tr. 6747).
4761. At a public workshop on April 24, 2003, the CEC was informed by Stillwater Associates that “Unocal’s gasoline patents reduce gasoline supply.” (Boyd, Tr. 6746).
4762. At a CEC meeting, the CEC was informed that “the Unocal patents scare blenders to death.” (CX 2150 at 268-269; Boyd, Tr. 6749). Another report identified the Unocal patents as a “significant barrier for imports.” (CX 1224 at 015; Boyd, Tr. 6750-6751).

XXIX. The Proposed Remedy Is Needed to Relieve the Competitive Harm Caused by Unocal’s Conduct.

4763. Complaint Counsel’s proposed remedy restores competition in the technology market by requiring Unocal to make its technology available at the competitive price, which is zero. (Shapiro, Tr. 7101; CX 1720A at 035 (Shapiro Expert Report)). By doing so, the proposed remedy returns the CARB summertime RFG technology market to its competitive baseline. (CX 1799A at 029 (Shapiro Expert Rebuttal Report)).
4764. The proposed remedy merely requires Unocal to make good on the representations it made to CARB during the process by which CARB Phase 2 rules were formulated and prior to the time at which refiners made substantial investments to comply with those regulations. (CX 1799A at 029 (Shapiro Expert Rebuttal Report); Shapiro, Tr. 7100).

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with this problem.

A. Gasoline, Pollution, and Automobile Emissions

Standard automotive gasoline is produced at oil refineries. (CCPF 188-189). Refiners first split and process crude oil into different streams of hydrocarbon mixtures, then blend these streams into gasoline. (CCPF 192). Refineries produce gasoline in “batches,” typically on the order of 50,000 barrels or more. (CCPF 2676).

When used to power automobiles, gasoline produces pollution. (CCPF 193). More specifically, automobile fuel emissions are a significant source of carbon monoxide (“CO”); volatile organic compounds (“VOC”), also known as unburned hydrocarbons (“HC”); and nitrogen oxide (“NO_x”). (CX 5 at 007; CX 142 at 003, 009).

In the late 1980s, the California legislature was seeking ways to combat automotive exhaust pollution. One means under consideration was the replacement of gasoline with a methanol-gasoline mixture called “M85.” (CCPF 234-37). At that time, however, both regulators and oil industry members began to consider whether changing various properties of gasoline would limit the amount of harmful emissions produced by motor vehicles. (RX 922 at 144-145). In other words, they hoped to “reformulate” gasoline to produce fewer polluting emissions. (RX 922 at 144-145).

Reformulated gasoline takes advantage of the fact that there are several properties of gasoline that affect emissions. (CCPF 195). These include the distillation temperatures, Reid Vapor Pressure (“RVP”), olefin content, paraffin content, aromatic content, oxygen content, benzene content and sulfur content. (CCPF 870-71, 198). Distillation temperatures refer to the temperatures at which a certain portions of the gasoline will evaporate. (CX 1709 at 013; CX 617 at 021). Thus, “T10” is the temperature at which 10% of a volume of gasoline will boil off; “T50” the temperature at which 50% of a volume of gasoline will boil off; etc. (RX 922 at 145).

Dr. Peter Jessup and Dr. Michael Croudace, were dissatisfied with the Auto/Oil reformulated gasoline research program. (CX 142 at 001). They proposed to their management, including Dr. Alley and Dr. Miller, an alternative research program to measure the effects of gasoline compositions and properties on automotive engine emissions. (CX 142 at 001-002, 007). This program sought to discover how to change gasoline properties to minimize the three major categories of automotive engine emissions: carbon monoxide (CO), nitrogen oxide (NO_x) and unburned hydrocarbons (HC). (CX 142 at 003, 009). Drs. Jessup and Croudace knew that this research, if successful, could be used to make reduced-emissions reformulated gasoline. (CX 142 at 003-004).

To this end, Drs. Jessup and Croudace designed a study to independently isolate the effects of ten gasoline properties on these emissions. (CX 142 at 004; CX 186 at 002-005). The ten properties they chose to study are the T10 distillation point, T50 distillation point, T90 distillation point, Reid Vapor Pressure, paraffin content, olefin content, aromatics content, MTBE (oxygen) content, Research Octane Number, and Motor Octane Number. (CX 142 at 004; CX 186 at 002-005).¹⁷ Although other industry members had studied the impact of varying some of these gasoline properties on vehicle emissions, they had not isolated the effect of each individual property or component or studied such a large number of them. (*See, e.g.*, CX 186 at 005-006).

¹⁷ The distillation points of gasoline (T10, T50, T90) are the temperatures at which a specified volume of gasoline evaporates, *e.g.*, 10% (T10), 50% (T50) and 90% (T90). (CX 1709 at 013; CX 617 at 021, col. 18, ll. 29-35 ('393 patent); CX 186 at 009). The Reid Vapor Pressure ("RVP") refers to the volatility of gasoline (the partial pressure of gasoline when heated to 100° F in a sealed container). *Union Oil Co. of Cal. v. Atlantic Richfield Co.*, 208 F.3d 989, 992 (Fed. Cir. 2000); CX 617 at 021, col. 18, ll. 43-54 ('393 patent). Olefins, paraffins and aromatics are the three hydrocarbon components of gasoline, and are typically measured by their percentage volume. *Union Oil Co. of Cal.*, 208 F.3d at 992; (CX 1709 at 003-004; Wirzbicki, Tr. 964, 1085-1086). Octane is a traditional engine performance specification that measures gasoline's ability to resist auto-ignition or "engine knock" in use. (CX 1709 at 012; 208 F.3d at 992). Research Octane Number (RON) and Motor Octane Number (MON) are two different components of octane measurements. (CX 1709 at 012-013). Finally, MTBE is a component that adds oxygen content to gasolines. (CX 142 at 005; CX 1709 at 015).

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Co. v. Atlantic Richfield Co., 531 U.S. 1183 (2001).⁴⁵

The refiners in the '393 litigation have made payments totaling \$91 million to Unocal for damages, costs, and attorneys' fees. (Strathman, Tr. 3658; Answer ¶ 69). An accounting action is ongoing to determine the amount of damages for infringement of the '393 patent by the refiners for the period from August 1, 1996, though December 31, 2000. Answer ¶ 70.⁴⁶ The trial judge ruled in August 2002 in the accounting action that the royalty rate applicable to gasoline produced and/or supplied in California during that period would remain 5.75 cents per gallon. *Union Oil Co. of Cal. v. Atlantic Richfield Co.*, No. CV-95-2379-CAS, Order, slip op. at 4-5,13 (C.D. Cal. Aug. 28, 2002).

According to the testimony of Unocal's in-house counsel at trial in this matter, Unocal is seeking between \$250 and \$280 million in the accounting action for infringement damages between July 1996 and 2000. (Strathman, Tr. 3657-3659). {

} (CX 683, *in camera*).

B. The '393 Litigation: Issues Litigated in Other Tribunals

Your Honor has asked the parties to "provide a list of all disputed issues alleged in the Complaint that have been litigated in any other court or forum and the current status thereof." (Trial Tr. 8579; Revised Scheduling Order (Sept. 9, 2004) at 2). As described above, Unocal litigated and

⁴⁵ The refiners have also initiated a reexamination at the Patent Office of Unocal's '393 and '126 patents. (Strathman, Tr. 3661-3662). The patent examiner has issued a preliminary rejection of the '393 and '126 patent, and Unocal responded to that rejection. (Strathman, Tr. 3661-3664; Minute Order, *Union Oil Co. of Cal. v. Valero Energy Corp.*, CX-02-00593, May 16, 2002). There are no statutory deadlines for the PTO to complete the reexamination. 35 U.S.C. §§ 305, 132, and 133. Unocal may appeal from a final rejection of any claim to the Board of Patent Appeals and Interferences. 35 U.S.C. § 134(b) (2003). Unocal may then appeal a decision by the Board of Patent Appeals and Interferences to the U.S. Court of Appeals for the Federal Circuit. 35 U.S.C. § 141 (2003). Unocal believes it will prevail in the reexamination in the patent office. (Strathman, Tr. 3671).

⁴⁶ The district court has declined to stay the accounting action, although it decided not to enter a final judgment in the action until the PTO reexamination proceedings for the '393 patent are finally decided. Minute Order of Court Ruling Defendants' Motion to Stay Proceedings Pending Reexamination, *Union Oil Co. of Cal. v. No. CV-95-2379-CAS*, slip op. at 6 (C.D. Cal. May 16, 2002).

The preface or “preamble” was the primary disputed claim term in the ’393 litigation. The district court concluded that the preamble covered “fuels that will *regularly* be used in autos, not that conceivably could be.” (CX 1796A at 014 (*Union Oil Co. of Cal.*, No. CV-95-2379-KMW, slip op. at 7)); *see also* 208 F.3d at 995. The district court thus construed the claims to cover only “standard automotive gasoline,” as opposed to broader petroleum formulations such as “aviation fuels or racing fuels.” 208 F.3d at 995; (CX 1796A at 015-016). The Federal Circuit affirmed on this basis. 208 F.3d at 995-96.

The district court also construed the language in the numerical property limitations in the claims concerning volume percentages of hydrocarbons (*e.g.*, the “volume percent” for olefins, paraffins and aromatics). (CX 1796A at 224; RX 1165A at 016 note 4 (Stellman Report)). The court construed these references to mean “the percentage that such hydrocarbons bear in relation to the total hydrocarbon content of the fuel – not based upon a percentage of the total fuel mixture – without adjustment for the presence of MTBE or oxygenates.” (CX 1796A at 224). The refiners did not appeal this issue. 208 F.3d at 991.

In construing the patent claims, the district court found it appropriate to rely only on the “intrinsic evidence” of the patent record itself, without expert testimony or a hearing on the meaning of the claims. (CX 1796A at 009-010). Indeed, the district court held that the “patent is unambiguous.” (CX 1796A at 015). It emphasized “that the intrinsic evidence regarding the ’393 patent leaves no ambiguity as to the meaning of the patent,” (CX 1796A at 018), and “the claims are unambiguous and can be construed by examining the intrinsic evidence . . . without need for further

said fuel having a Reid Vapor pressure no greater than 7.0 psi, and a 50% D-86 distillation point no greater than 200° F., and a 90% D-86 distillation point no greater than 300° F., and a paraffin content greater than 85 volume percent, and an olefin content less than 4 volume percent] wherein the maximum 10% distillation point is 158° F (70° C.)

(CX 617 at 024 (’393 patent, col. 24, ll. 24-27)).

Phase 2 regulation and industry-wide lock-in. In response to a declaratory judgment action by ARCO, Exxon Mobil, Chevron, Texaco, and Shell, for example, Unocal filed a counterclaim alleging infringement of its '393 patent. *See Union Oil Co. of Cal.*, 208 F.3d at 994 (Fed. Cir. 2000); (Answer ¶ 68). The refiners in that litigation have now made payments to Unocal totaling \$91 million for damages, costs, and attorneys' fees. (Answer ¶ 69). Unocal subsequently filed patent claims against Valero Energy Company, seeking damages at a rate of 5.75 cents a gallon and treble damages for willful infringement. (CX 1337 at 011; Answer ¶ 71). In addition to its litigation efforts, Unocal has entered into patent licensing arrangements with eight other companies. (Answer ¶ 72). These combined litigation and licensing efforts now encompass refiners that control in excess of 95 percent of the capacity to manufacture and sell CARB-compliant gasoline in California. (CX 1720A at 027). Unocal has also publicly announced that it expects to continue to obtain revenues from licensing of its reformulated gasoline patents. (CX 614 at 026; Answer ¶¶ 14-15).

(3) They were central to the outcome of CARB's rulemaking

The objective of the CARB proceeding was not to adopt any effective pollution-reducing regulations, but to adopt pollution-reducing regulations that were justified in light of the cost of the regulations. As a result, Unocal's communications regarding its patent rights, which had a direct and substantial bearing on the cost of the CARB regulations, were central to the proceeding. (CCPF 963, 987-1014). Compliance costs were not peripheral to CARB's mandated concerns. Under California law, CARB was required not only to consider the potential pollution-control benefits of its regulations, but also to consider their "cost effectiveness" and "effect . . . on the economy of the state." (CX 1665 at 152-154 (Health & Safety Code §§ 43013(a) and (e); 43018(b), (c), and (e))).

Consequently, at the time of the Phase 2 proceeding, it was also CARB's policy to avoid conferring monopolies through its regulations. (Kenny, Tr. 6511-6512). Indeed, CARB

Auto/Oil led him to believe that Unocal had granted a “royalty-free license to anything that resulted from Unocal’s underlying research.” (CX 7073 (Wise, Dep. at 19)).

c. The refiners were precluded from considering alternative technologies to reduce overlap

Unocal’s lies to Auto/Oil and to WSPA prevented refiners from considering alternative technologies that would have reduced their exposure to Unocal’s patents. (CCPF 4606-97). Before the refiners spent billions of dollars and years of work modifying their refineries in ways that (unknown to them at the time) pushed the refineries into the heart of Unocal’s patents (CCPF 2478-95), { }. (Sarna, Tr. 6318, *in camera*; RX 1165 at 039, *in camera*). The options for each refinery are detailed in the record. (CCPF 4606-4697; RX 1154A at 012-023; Hoffman, Tr. 4905-12; Eizember, Tr. 3174-79). But the refiners had no chance to consider these options because Unocal misled them to believe that Unocal’s technology was “in the public domain.”

2. To the Extent that Unocal’s Communications with Auto/Oil and WSPA Were Intended to Influence CARB, They Are Still Not Protected by *Noerr*

Even if Unocal’s misrepresentations to Auto/Oil and WSPA were deemed to be directed at CARB, they nevertheless would not be protected by the *Noerr* doctrine for all of the reasons that Unocal’s misrepresentations to CARB are outside the scope of *Noerr*. Unocal’s misrepresentations to Auto/Oil and EPA are not protected by *Noerr* because: (1) Unocal’s misrepresentations did not constitute *Noerr*-protected petitioning, as CARB did not intend to supplant competition; (2) Unocal’s exclusionary conduct can be remedied without disrupting any government program on communication; (3) Unocal’s misrepresentations do not fall within the zone of protected conduct in the context of the FTC Act; and (4) Unocal’s conduct falls within the misrepresentation exception to *Noerr*.

**UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION**

DOCKET NO. 9305

PUBLIC VERSION

**IN THE MATTER OF
UNION OIL COMPANY OF CALIFORNIA**

COMPLAINT COUNSEL'S POST-TRIAL BRIEF

(VOLUME III)

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Counsel's experts agree that over 92% of CARB Phase 2 summertime gasoline produced by the major California refiners meets the numerical property limitations of the five Unocal patents.⁹²

(Eskew, Tr. 2891, 2965; Stellman, Tr. 8098-8099). Either expert's analysis shows Unocal's substantial market share.

{

}

(Eskew, Tr. 2817, 2955, *in camera*; RX 1165 at 016, *in camera* (Stellman Report)). These twelve refineries represent more than 98% of California gasoline production. (CX 1720A at 027 (Shapiro Expert Report)). The twelve refineries are all of the refineries owned in California by ChevronTexaco, BP, ExxonMobil, Shell, Valero, ConocoPhillips, and Tesoro. (Eskew, Tr. 2891; CX 1709 at 021; RX 1165 at 016, *in camera*).

As Unocal's expert, Mr. Stellman, admitted, he performed his overlap analysis of the numerical property limitations of the Unocal patent claims in accordance with the claims construction and infringement decisions in the '393 patent litigation. (Stellman, Tr. 7945-7946; RX 1165A at 016). {

} (Eskew, Tr. 3014-

3018; CX 1709 at 20, *in camera*; CX 1798 at 003, *in camera*). {

} (CX 1798 at 003,

in camera; CX 1709 at 021, *in camera*; Strathman, Tr. 3717-3721, *in camera*; CX 684 at 001, *in camera*, Jessup, Tr. 1338-1339, 1460-1461 *in camera*). {

⁹² Complaint Counsel's expert, Mr. Eskew, found a 93 percent coverage rate, while Unocal's expert, Mr. Stellman, determined the rate to be 92.7 percent. (Eskew, Tr. 2891, 2965; Stellman, Tr. 8098-8099).

construed any ambiguous limitations of the '393 patent, and have decided what evidence suffices to prove infringement of those claims. (CCPF). As Unocal has acknowledged, the limitations in the first 40 claims in the '126 patent are the same as those already construed in the '393 patent (RX 1165A at 015), and Unocal's expert reached his 50.4% infringement rate for those claims using {
} which the court adopted and relied on for its judgment⁹⁹.

- (3) The evidence shows that the additional limitations in Unocal's claims are met, which, combined with evidence of matching, shows likelihood of infringement

The remaining claims of the '126 patent and all the claims of the '567, '866, and '126 patents are directed to methods of making low-emissions gasoline (*e.g.*, blending hydrocarbon streams in 50,000 gallon batches) or using gasoline (*e.g.*, using gasoline in an automobile), which refiners induce or to which they contribute. (CX 618 at 027-028, CX 619 at 027-028; CX 620 at 027-029, CX 621 at 027-029). The evidence shows that refiners have a likelihood of infringing these claims at a rate of over 92%.

As discussed above, both Unocal's and Complaint Counsel's experts agree that over 92% of CARB Phase 2 gasoline produced in California meets the numerical property limitations of the five Unocal patents. (CCPF 3024-44). Unocal's expert, Mr. Stellman, admittedly performed his overlap analysis of the numerical property limitations of the Unocal patent claims in accordance with the claims construction and infringement decisions in the '393 patent litigation. (Stellman, Tr. 7945-7946; RX 1165A at 016). {
} (Eskew, Tr. 3014-3018; CX 1709 at 20, *in camera*; CX 1798 at 003, *in camera*).

⁹⁹ (Stellman, Tr. 7944-7946; RX 1165 at 012-017, *in camera*; CX 1796A at 189, 224; *Union Oil Co. of California*, No. 95-CV-2379 (C.D. Cal. Sept. 24, 1997); CX 1796A at 276-282 (Special Verdict Form), RX 816 at 002 (Judgment); CX 1579 at 005-009).

regulations, CARB was not motivated by the threat of a Federal Implementation Plan. (Kenny, Tr. 6554-6555; CX 7063 (Sharpless, Dep. 217-218) (“Q: It certainly was something that, based upon the measures available under a FIP, you wanted to avoid. A: Well I don’t think we were motivated at that time by – by a threat of a FIP. Q: You don’t recall – A: I don’t think we were motivated by a threat of a FIP because we had just been working with the U.S. EPA, we’d just gotten reauthorization I believe in that timeframe of the federal Clean Air Act.”)). However, within months after Unocal’s press release, the EPA notified the public of its intent to approve Phase 2 as written as an acceptable control measure in the California SIP. (CX 7035 at 002). CARB was stuck.

2. CARB Knew That Changing the Regulations in 1995 Would Have Caused Massive Disruptions and Involved Substantial Delay for Refiners and Others

Not only did the SIP prevent CARB from changing the Phase 2 regulation, but CARB also could not change the regulation because doing so would have caused severe disruptions in the regulated industries. (CCPF 3716-62). As CARB executive officer James Boyd explained, “the regulation ship had sailed, the train had left the station, a huge investment by the regulated community in California had been made, probably the largest investment for any regulation ever passed in California, it would at that point in time be very difficult to just withdraw the regulation.” (Boyd, Tr. 6741-6742). Similarly, Peter Venturini explained, CARB “had adopted a regulation that was imposing costs on the order of, say, \$5 billion on the refineries. They had relied on the action of our agency to commit to those investments . . . We had directed the refineries to invest. They were proceeding on that.” (Venturini, Tr. 308-309). In fact, CARB knew that these substantial investments began as early as 1993. (Venturini, Tr. 307). In addition, changing the regulations in 1995 would have undermined

California legislature, in the so-called “Sher Bill” passed in 1999, had imposed a statutory prohibition against reducing those emissions benefits.¹⁰⁸ (Venturini, Tr. 128, 847; CX55 at 075).

These factors meant that CARB had little ability to amend the regulations in order to avoid the Unocal patents. (CCPF Section XXVI.A-E). For instance, any substantial upward adjustment to the T50 specification to avoid the patents could not be adequately offset by more stringent requirements elsewhere. (*Id.*) {

} (CX 1797 at 004-005, *in camera*; see also Sarna, Tr. 6288-6289, *in camera*).

C. The Other Refiners Were Already Locked In By The Time They Learned of Unocal’s Plan to Extract Royalties

1. The Refiners Had Already Made Their Specific Investments

Refiners did not learn that Unocal intended to charge a royalty for its ’393 patent until late January 1995. (Ingham, Tr. 2730; Banducci, Tr. 3483-3484; Derr, Tr. 5099; Gyorfi, Tr. 5239-5240; CX 369; CX 374; CX 375). By that point, refiners already had invested hundreds of millions of dollars in Phase 2-related refinery modifications and construction was almost complete for many refineries.

For example, at the time ARCO learned of the ’393 patent and Unocal’s intention to seek royalties, ARCO’s Phase 2 project at Carson was nearly complete. ARCO had almost completed its engineering work, and had in fact finished all procurement. (Hoffman, Tr. 4938; CX 5093 at 019-020). Construction on key projects was between 50 and 100 percent complete. (Hoffman, Tr. 4938; CX 5093 at 006, 019-020). Moreover, by early 1995, ARCO had committed over \$200 million,

¹⁰⁸ Even Unocal’s own expert, Professor Griffin, conceded that the SIP and the Sher Bill limited CARB’s options in the Phase 3 proceeding: “It is possible that they may have precluded CARB from changing its regulations *ex post* to allow refiners more flexibility to avoid the patents.” (RX 1164A at 053).

markets.

The proposed remedy simply makes a reasonable effort to restore the competitive conditions that would have existed had Unocal not been deceitful. As Professor Shapiro explained, there is no straightforward and reliable way to re-create the competitive conditions and royalty rates, if any, that would have existed in the hypothetical world of no deception. Nor is there any legal obligation for the Commission to undertake that difficult and ultimately futile endeavor in order to ensure that it fully protects a wrongdoer's interests. Under these circumstances, it is proper to rely on Unocal's representations that its technology was "non-proprietary" and "available" royalty-free as a reasonable benchmark for the competitive royalty rate at the time in question. (CX 1799A at 016).

Moreover, as Professor Shapiro emphasized, to devise a *post hoc* reasonable royalty would create an incentive for deception. Under such an approach, there would be no downside to engaging in deceptive conduct. Even if caught and prosecuted successfully, the deceiving party at worst would receive the benefits that it would have reaped had it behaved properly. (CX 1799A at 018 (Shapiro Rebuttal Report) ("[f]ollowing this approach would make lying a no-lose proposition in virtually any bidding situation.")). Moreover, the wrongdoer would be able to pocket any supra-competitive royalties collected in the interim.

Complaint Counsel's Proposed Order is narrowly tailored to remedy Unocal's violations of Section 5. Indeed, it is narrower than the provisions of the Notice of Contemplated Relief approved by the Commission on March 4, 2003.

Section I of the Proposed Order lists definitions. The most important of these definitions are I.B. "Action", I.C. "License Agreement", I.E. "Relevant U.S. Patents", and I.F. "Warmer Weather CARB Gasoline."

"Actions" encompass lawsuits or other actions, including legal, equitable, and administrative