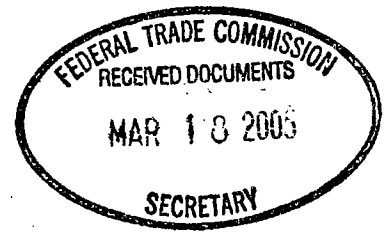


UNITED STATES OF AMERICA
BEFORE THE FEDERAL TRADE COMMISSION



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:

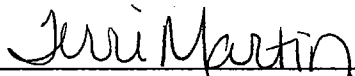
The Honorable D. Michael Chappell
Administrative Law Judge
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600 Pennsylvania Avenue, NW
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Terri Martin

**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)

Susan A. Creighton
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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Deputy Director

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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

