COMPLAINT COUNSEL'S
PROPOSED FINDINGS OF FACT,
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VOLUME II

COMPLAINT COUNSEL'S PROPOSED FINDINGS OF FACT:

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

(VOLUME II)

VII. Unocal's Patent Application on the Invention from the 5/14 Project.

864. As required, the patent application contained a "specification" containing a "written description" of the invention. (CX 1788 at 014-050, 065-073; Wirzbicki, Tr. 908-909). The specification also contained a number of graphs and tables, (CX 1788 at 065-073; Wirzbicki, Tr. 909), and subsections including a "Summary of the Invention,""Brief Description of the Drawing," "Detailed Description of the Invention," and "Examples." (CX 1788 at 014, 019, 021, 027, 035).

865. The first patent that Unocal obtained, U.S. Patent No. 5,288,393 ('393 patent), contained the same specification as in the original patent application. (CX 1788 at 014-050, 065-073 ('393 patent file history); RX 795 at 005-022 ('393 patent)).

866. The patent application Mr. Wirzbicki filed also contained a number of "claims," which define the bounds of the requested patent coverage. (CX 1788 at 051-063 (claims); Wirzbicki, Tr. 910).

867. Any claims in a patent application must be disclosed in the specification (written description) of the original patent application in order to meet the requirements for patentability. (Linck, Tr. 7761-7762, 7819-7820).

868. The claims in the patent application included "independent" and "dependent" claims.

Independent claims stand on their own, while dependent claims incorporate by reference independent claims. (Wirzbicki, Tr. 925).

A. Summary of the Invention: '393 Patent Application.

869. The Summary of the Invention section of Unocal's original patent application describes the main features of Dr. Croudace and Dr. Jessup's invention. (CX 1788 at 013-086).

870. The Summary of the Invention explains:

> "The present invention, in its broadest aspect, is founded on the discovery that, when gasoline fuels are produced . . . improvements in emissions of one or more pollutants selected from the group consisting of CO, NOx, and hydrocarbons . . . can be obtained be controlling certain chemical and/or physical properties of said gasoline product."

(CX 1788 at 015 (emphasis added); Wirzbicki, Tr. 911).

871. The Summary then explains how to adjust the chemical and/or physical properties of gasoline to reduce emissions:

(1) decrease the 50% D-86 Distillation Point;
(2) decrease the olefin content;
(3) increase the paraffin content;
(4) declare the Reid Vapor pressure;
(5) increase the Research Octane Number;
(6) decrease the 10% D-86 Distillation Point;
(7) decrease the 90% D-86 Distillation Point; and
(8) increase the aromatic content

The greater the increase or decrease of these properties, the greater the resulting benefits in reducing emissions. (CX 1788 at 015-016).

872. The 50% D-86 Distillation point, T50, is "the principal factor influencing" hydrocarbon and CO emissions, according to the Summary of the Invention. (CX 1788 at 016).

873. Similarly, for fuels in which one desires to reduce emissions of NOx, the Summary explains that the "principal factor influencing such emissions is Reid Vapor pressure." (CX 1788 at 016). The T10 level and the percentage of olefins are of secondary importance with respect to NOx emissions. (CX 1788 at 016). "[A]s a practical matter," olefin content is the "secondary variable providing the most flexibility to an oil refiner on altering the gasoline properties to reduce NOx emissions." (CX 1788 at 017).

874. The Summary of the Invention teaches that by adjusting these gasoline properties, one can reduce automotive emissions – *e.g.*, as compared to the emissions levels of a "typical" unleaded gasoline fuel at the time of the patent application (such as the Auto/Oil average fuel), (CX 1788 at 049), or as compared to the results achievable with other fuels, (CX 1788 at 019).

875. The specification of Unocal's patent applications reports the Fuel A/O Ave properties in two locations: table 2 and table 5. In table 5 the Fuel A/O Ave is reported as fuel Q. (CX 1788 at 028, 036).

876. Mr. Wirzbicki explained to the patent office that "A person of ordinary skill in this art would understand that 'A/O AVE' and 'Auto/Oil Average' are of identical meaning, the first simply being an abbreviation for the latter." (CX 1795 at 251). Mr. Wirzbicki made this statement in remarks to an amendment he filed on June 13, 1996 in the continuation patent application that lead to the '866 patent. (CX 1795 at 249-261).

877. For example, the patent application sets forth the T50 of a "typical" unleaded gasoline fuel at the time of the patent application, as measured by the Auto/Oil consortium: 218º-220ºF. (In one location, the patent application reports the typical T50 as 218ºF, (CX 1788 at 028 (Table 2, "A/O AVE")), while in another, it reports the typical T50 as 220ºF. (CX 1788 at 036 (Table 5, fuel Q)). The temperature range is due to the "normal tolerance variations" in measurement of T50. (CX 1788 at 049).

878. Similarly, the average Reid Vapor Pressure of a "typical" unleaded gasoline fuel at the time of the patent application, as measured by the Auto/Oil consortium was 8.31-8.70 psi. (In one location, the patent application reports the typical RVP as 8.70 psi, (CX 1788 at 028 (Table 2, "A/O AVE")), while in another, it reports the typical RVP as 8.31 psi. (CX 1788 at 036(Table 5, fuel Q); CX 1788 at 049)). The temperature range is due to the "normal tolerance variations" in measurement of T50. (CX 1788 at 049).

879. By varying the properties of gasoline according to the directions in the invention (using an average fuel or other fuel as a baseline), the Summary of Invention states that one may produce "gasoline fuels" that "minimize[] or reduce[]...emissions." (CX 1788 at 016, 025-028).

880. The Summary of Invention makes clear that "many modifications of the invention are possible, depending on which of the three pollutants on one desires to reduce and the degree of reduction desired." (CX 1788 at 017).

881. The Summary of Invention discusses the various practical applications of the invention, including:

a. gasoline fuels from which a relatively low amount of gaseous pollutants . . . is produced during combustion in an automotive engine . . .

b. methods for producing gasoline fuels having such desirable properties . . .

c. methods of combusting such fuels . . . which provides a method for reducing air pollution . . .” (CX 1788 at 014-015).

B. The Patent Application Included a Drawing Section with Graphs and Tables.

882. To illustrate the directional relationships that Drs. Jessup and Croudace discovered, the patent application included a drawing section with graphs and tables. (CX 1788 at 019-020, 065-073).

883. The patent application explains that the figures in the drawing section “provide graphical or tabular data derived from the experiments . . .” that Dr. Jessup and Dr. Croudace performed. (CX 1788 at 019; Wirzbicki, Tr. 912-913).

884. The Brief Description of the Drawing section of the patent application admits that “[t]he invention can best be understood with reference to the drawing . . . .” . (CX 1788 at 019; Wirzbicki, Tr. 912-913).

885. For example, the patent application includes “Figure 7 ,” which the application states is a table based on “data derived from the experiments in Examples 2 and 3, which identifies the most significant variables which increase emissions of CO when the variable is increased . . . or which decrease emissions of CO when the variable is decreased.” (CX 1788 at 071, 020). Mr. Wirzbicki testified that the patent provided “accurate” descriptions of the figures. (Wirzbicki, Tr. 911-913).

886. The patent application includes similar “Figure 8 ” and “Figure 9 ,” which contain the same types of data as Figure 7, respectively for NOx and HC emissions. (CX 1788 at 072-073; 021).

887. The patent application includes other graphs and charts, including figure 1, which is “graphical data from emissions test data regarding CO,” from Unocal’s 10-car study. (Wirzbicki, Tr. 909-910; CX 1788 at 065).

C. The Patent Application Contained Equations That Embodied the Directional Relationships Between Emissions and Gasoline Properties.

888. The Detailed Description of the Invention section of the patent application discusses the

equations Dr. Jessup and Croudace developed concerning the relationships between emissions and gasoline properties. As the Detailed Description states, "it has been discovered in the present invention, for many automotive engines, that the amount of pollutants emitted upon combustion is closely in accord with the following equations:"

Equation 1
CO (gm per mile) = K_1 x (D-86 Dist. 50% Point in º F.)
+ K_2 x (D-86 Dist. 90% Point in º F.)
- K_3 x (Vol. % Paraffins)

Equation 2
NOx (gm per mile) = K_4 x (Vol. % Olefins)
- K_5 x (Vol. % Paraffins)
+ K_6 x (D-86 Dist. 10% Point in º F.)
- K_7 x (RVP in psi)

Equation 3
HC (gm per mile) = K_8 x (Vol. % Olefins)
- K_9 x (Research Octane Number)
+ K_{10} x (D-86 Dist. 50% Point in º F.)

(CX 1788 at 023).

889. The "K" variables in the equations are numbers that are fixed depending on the particular automobile engine in the particular car that is combusting the gasoline. The Detailed Description makes clear that these values "can be readily determined." (CX 1788 at 023-024).

890. For example, the Detailed Description in Equations 4, 5 and 6 supplies the equations containing K values for a 1988 Oldsmobile Regency 98 equipped with a 3.8 liter V-6 engine. (CX 1788 at 024).

891. "From the foregoing equations" and values, the Detailed Description in the patent application states that the following conclusions can be obtained:

a. to reduce CO emissions, reducing the T50 or increasing paraffin content provide the most dramatic effects, although decreasing the T90 also has some impact;

b. to decrease NOx emissions, RVP and olefin content are the most influential, although decreasing T10 and increasing paraffins also has an effect; and

c. to decrease HC emissions, the "most practical way to significantly lower the hydrocarbon emissions" is to lower the T50 and/or olefin content, although changing the Research Octane Number also has an effect.

(CX 1788 at 024-029).

892. The equations also demonstrate whether, and how much, of an effect the other properties have on emissions. (CX 1788 at 026-027).

893. As the Detailed Description in the patent application admits, the equations "provide those skilled in the art, again as to a 1988 Oldsmobile Regency 98 and similar automobiles, with information as to how to lower the reductions of not just CO, NOx, or hydrocarbons, but also of any combination thereof." (CX 1788 at 025).

894. According to Dr. Jessup, Unocal did not put the actual ten-car equations in its patent application because "we thought it would be cumbersome. I think we thought the figures would be good enough . . . . [W]e thought that it would have been a little overwhelming and unnecessary." (Jessup, Tr. 1185-1186).

D. The Patent Application Contained Illustrative Examples Demonstrating How Drs. Jessup and Croudace Developed Their Invention.

895. The Examples section of the patent application provide illustrative examples of "what the inventors have done to come up with the invention." (Wirzbicki, Tr. 913). The Examples describe the "one-car" and "ten-car" studies that Dr. Jessup and Dr. Croudace performed to generate the equations and determine the relationships between the properties of gasoline and emissions reduction. (CX 1788 at 027-040; Wirzbicki, Tr. 913-914).

896. Example 1 in the patent application describes Dr. Jessup and Dr. Croudace's experiment of running 15 test fuels through a 1988 Oldsmobile Regency 98, with a control fuel run interspersely to evaluate systemic error. (CX 1788 at 027- 029). It explains that after measuring the emissions of the 15 test fuels, Drs. Jessup and Croudace then analyzed the data "by computer program using the SAS system commercially available from SAS Institute Inc." (CX 1788 at 029). The computer program regressed the results of the runs with the 15 different fuels against the 10 gasoline property variables (shown in Table 2 of the patent). (CX 1788 at 029). It produced the equations set forth in the patent. (CX 1788 at 029). Drs. Jessup and Croudace then ran check fuels tests to check the accuracy of the equations. (CX 1788 at 029-035).

897. Examples 2 and 3 in the patent application describe the confirmatory ten-car study that Drs. Jessup and Croudace performed. (CX 1788 at 035-038; Wirzbicki, Tr. 913-914).

898. Example 2 describes Dr. Jessup and Croudace's test of running 15 test fuels, one control fuel, and six check fuels in six different automobiles. (CX 1788 at 035). The fuels were tested in the same way as in Example 1, except that the control fuel was used in every sixth run and the standardized Federal Test Procedures were followed exactly. (CX 1788 at 037). In Example 3, the inventors repeated Example 2 on four additional post 1980 / pre-1990 cars. (CX 1788 at 037-038).

899. The patent application explains that the data derived from Examples 2 and 3 "were analyzed by the same computer program described in Example 1, searching, as in Example 1, for an equation for each automobile which would provide a value for NOx, CO and hydrocarbon emissions as a function of the minimum number of fuel properties." (CX 1788 at 038). The equations derived had some differences, but "many of the equations did fit the generalized equation set forth" in Equations 1-3 of the patent application. (CX 1788 at 038-039).

900. As the patent application states, the data from the 10-car study described in Examples 2 and 3 in the patent application "validated the fact that the most important factors as shown in the generalized Equations 1 to 3 [in the patent application] proved almost universally most significant for each automobile." (CX 1788 at 038-039).

901. The data from the 10-car study provided the basis for the directional relationship between aromatics and emissions reductions, as the one-car study was inconclusive for this property. (Croudace, Tr. 446, 451-452).

E. The Patent Application Contained a Detailed Description of the Invention.

902. In latter half of the Detailed Description of the Invention, the patent application explains that from the "*data"* in the patent application, one can appreciate that blending gasoline in a refinery by adjusting the key properties in gasoline can reduce emissions for any large population of automobiles. The remainder of the Detailed Description also discloses the details of the method and process limitations of the patent claims that Unocal would later obtain. (CX 1788 at 040-050) (emphasis added).

903. The Detailed Description recognizes that when the "*data* of Examples 2 and 3 are analyzed as shown in Figures 7 to 9", the facts that reducing T50, olefins, T10 and RVP reduce CO, hydrocarbon and NOx emissions "stand out as most significant." (CX 1788 at 040) (emphasis added).

904. Each of Figures 7 to 9 of the patent application is a "table" that is "based on data derived from the experiments in Examples 2 and 3, which identifies the most significant variables which increase emissions . . . or which decrease emissions." (CX 1788 at 020-021, 071-073; Wirzbicki, Tr. 912-913). The tables provide this information for each category of emission, fuel property. and car analyzed. (CX 1788 at 071-073).

905. The Detailed Description of the patent application admits that "from the *data* in Figures 7 to 9, it can be seen that for automobiles in general that decreasing any of the variables 1 to 4 above [T50, olefins, RVP or T10] will have a positive effect, especially for any large population of automobiles." (CX 1788 at 040) (emphasis added). "In turn," the Detailed Description continues, "[I]t can be appreciated that the preferred fuels of the invention will be prepared (e.g., by appropriate blending in a refinery) so as to decrease each of [T50, olefins, RVP or T10] . . .." (CX 1788 at 040-041).

906. The patent application thus makes clear that by looking at the data in Figures 7-9, one could understand that (i) decreasing these properties in gasoline can reduce emissions for any large population of automobiles (ii) one could blend fuels in a refinery to decrease those properties. (CX 1788 at 040-041).

F. The Patent Application's Detailed Description Discloses Limitations of the '126, '567, '866 and '521 Patents.

907. The patent application, particularly in the remainder of the Detailed Description of the Invention section, also discloses the method and process limitations of the patents that Unocal would later obtain. (CX 1788 at 043-049; Wirzbicki, Tr. 917-918).

908. As Mr. Wirzbicki, Unocal's Chief Patent Counsel admits, Unocal's additional patent applications were for "methods that were described in this [original] patent application." (Wirzbicki, Tr. 917-918).

909. For example, the patent application discloses limitations of the '126 and '521 and patent claims by stating that, "[i]n view of the information presented above, a petroleum refiner may take advantage of the invention by blending hydrocarbon streams boiling in the gasoline range of 77º F. (22º C.) To about 437º F. (225º C.) so as to affect at least one (and preferably more than one) of the properties of one of the streams as follows:

> (1) decrease the 50% D-86 Distillation Point;
> (2) decrease the olefin content;
> (3) increase the paraffin content;
> (4) declare the Reid Vapor pressure;
> (5) increase the Research Octane Number;
> (6) decrease the 10% D-86 Distillation Point;
> (7) decrease the 90% D-86 Distillation Point; and
> (8) increase the aromatic content."

(CX 1788 at 043).

910. Unocal then admits in its own patent application that "[i]n such case, the petroleum refiner is, in essence, using the information provided by the present invention so as to concert a given gasoline stream into another with better properties with respect to CO, NOx, and/or hydrocarbon emissions." (CX 1788 at 043).

911. The patent application further teaches that it "also follow[s]" that "one can increase or decrease any combination of the eight properties . . ." in making gasoline fuels. (CX 1788 at 043).

912. Mr. Wirzbicki also acknowledges that, to the best of his knowledge, he drafted the

specification of the application that lead to the '393 patent to include "enough information that would enable a person skilled in the art to practice the invention." (Wirzbicki, Tr. 919).

G. The Patent Application Contains Original Claims.

913. The original claims filed in the application contained both "composition" claims to gasoline having various properties and claims to "methods" of blending and using that gasoline. (Wirzbicki, Tr. 917-918; CX 1788 at 051-063).

914. The claims set forth a series of subcombinations of the properties and practical applications discussed in the specification of the patent application. (CX 1788 at 051-063).

915. For example, claim 1 in the original application was a composition claim that covered:

> 1. An unleaded gasoline fuel, suitable for combustion in an automotive engine having the following properties:
>
> (1) a 50% D-86 distillation point no greater than 215º F. (101.7º C.); and
> (2) a Reid Vapor Pressure no greater than 8.0 psi (0.54 atm).

(CX 1788 at 051 ('393 patent file history)).

916. Months prior to the filing of the patent application, Unocal understood that CARB was implementing Phase 1 RFG regulations that would require a reduction in RVP limits to 8.0 psi. (CX 165 at 001 (March 12, 1990 internal memo from L.M. Tack to J.W. Miller)).

917. Claims 60-62 were some of the claims in the patent application directed to methods or processes of making gasoline in accordance with the directional relationships taught in the specification. (CX 1788 at 058). The terms "method" and "process" are used interchangeably. (Wirzbicki, Tr. 1026).

918. For example, Claim 60 is a claim to an improvement on a product or process that already exists. The first portion of claim 60 recited a method that existed prior to the invention at hand: "In a method for producing a gasoline fuel comprising blending a plurality hydrocarbon-containing streams together so as to produce a gasoline product suitable for combustion in an automotive spark-induced internal combustion engine," (CX 1788 at 058).

919. The second portion of claim 60 recited the improvement that the invention provided to the process: "the improvement comprising adjusting the rates at which such hydrocarbon-containing streams are blended so to produce a gasoline fuel as defined in claim 17," *e.g.* a gasoline with a reduced T50 and RVP. (CX 1788 at 0518, 058).

920. Claims 63-64 were claims to methods of using gasoline fuel made in accordance with the directional relationships taught in the specification to power an engine to reduce emissions. (CX 1788 at 059).

921. Claims 65-80 were various methods for reducing air pollution by making gasoline, using gasoline and delivering gasoline to service stations in accordance with the directional relationships taught in the specification. (CX 1788 at 060-062).

922. Although these method claims were later cancelled ("taken out") of the patent application, Unocal then applied for additional patents on "methods that were described in this patent application." (Wirzbicki, Tr. 917-918).

H. Drs. Jessup and Croudace Monitored the Status of the Patent Application.

923. From December 1990 to May 1991, Mr. Wirzbicki continued the patent prosecution process that led to the '393 patent. (CX 1788 at 088-231). Drs. Jessup and Croudace participated in key stages of the process. (CX 1788 at 088-231; Wirzbicki, Tr. 937-939).

924. For example, Mr. Wirzbicki filed numerous "Information Disclosure Statements" that provided the patent examiner with either prior art or information related to the invention. These types of filings did not change the specification or the claims in the application (CX 1788 at 089-098 (IDS 1, signed 2/14/91); CX 1788 at 100-108 (IDS 2, signed 3/7/91); CX 1788 at 114-134 (IDS 3, signed 3/21/91); CX 1788 at 136-138 (IDS 4, signed 3/22/91); CX 1788 at 140-180 (IDS 5, signed 5/22/91); CX 1788 at 182-187 (IDS 6, signed 5/16/91)).

925. On May 22, 1991, Mr. Wirzbicki also filed a "Preliminary Amendment" with the Patent and Trademark Office. (CX 1788 at 189-201). This type of amendment is made before the patent examiner even sees the application. (Wirzbicki, Tr. 937).

926. Mr. Wirzbicki filed an affidavit from Drs. Jessup and Croudace on May 22, 1991 to accompany the Preliminary Amendment. (CX 1788 at 189-201 (preliminary amendment), CX 1788 at 203-207 (Jessup & Croudace affidavit), Wirzbicki, Tr. 937-938).

927. The Preliminary Amendment was the first time that Mr. Wirzbicki actually changed the claims in the '393 patent application. (CX 1788; Wirzbicki, Tr. 937).

928. In the Preliminary Amendment, Mr. Wirzbicki added a number of additional claims to gasolines with properties disclosed in the specification. (CX 1788 at 189-201 (adding claims 83-124 at 190-196); Wirzbicki, Tr. 937).

929. For example, Mr. Wirzbicki in the 1991 Preliminary Amendment added claim 90: "An

unleaded gasoline fuel suitable for combustion in an automotive engine, said fuel having a Reid Vapor pressure no greater than 7.5 psi, and a 50% D-86 distillation point no greater than 210º F." (CX 1788 at 191).

930. Mr. Wirzbicki also cancelled two claims (46 and 47) in the 1991 preliminary amendment and made minor amendments to a few others (39, 41, 45, 49, 54). (CX 1788 at 196 (remarks); CX 1788 at 189-190 (amendments)).

931. Drs. Jessup and Croudace were still working with Mr. Wirzbicki in May 1991 to prosecute the '393 patent. (Wirzbicki, Tr. 939).

932. Drs. Jessup and Croudace declared under oath in the May 21, 1991 affidavit that "we are the applicants of the above-identified patent application and are the inventors of the subject matter therein described and claimed." (CX 1788 at 203). In order for Drs. Jessup and Croudace to truthfully make such a declaration, they must have had knowledge of the pending claims.

933. Dr. Jessup and Croudace's affidavit stated that it was filed under "37 CFR 1.131 and 1.32." (CX 1788 at 203). This type of affidavit shows that the inventors invented the subject matter of patent claim(s) before the date of prior art that would otherwise render the claim(s) unpatentable. (37 CFR § 1.131; Wirzbicki, Tr. 937-938). Drs. Jessup and Croudace thus declared that they made two fuels (fuel 15 and 15P2) covered by their patent application before February 28, 1990 and June 30, 1990, respectively. (Wirzbicki, Tr. 937-939; CX 1788 at 203-204).

934. For example, Drs. Jessup and Croudace declared that they were "convinced" that they conceived and reduced to practice "embodiments of [their]invention . . . ." (CX 1788 at 204). In order to make this declaration truthfully, Drs. Jessup and Croudace had to have knowledge of the claimed embodiments of their invention.

VIII. CARB's Initiation of the Phase 2 Reformulated Gasoline Rulemaking.

A. CARB Staff Engaged in an Intensive Collaborative Dialogue With the Refining and Automobile Industries in Order to Obtain the Necessary Technical Information to Develop the Regulations.

935. The California Clean Air Act added a section to the Health and Safety Code directing CARB to conduct workshops on clean fuel. (CX 1665 (Cal. Health & Safety Code § 43018(d)(3) (1991))).

936. The California Clean Air Act also required the CARB Board to hold a public hearing in the Phase 2 proceeding. (CX 1665 (Cal. Health & Safety Code § 43018(d)(3) (1991))

("Hearings of the state board to consider adoption of proposed regulations pursuant to this subdivision shall be held not later than November 15, 1991.")).

937. CARB staff viewed its informational exchanges with regulated parties as a very important element in devising a sound Phase 2 rule. The process was "open" and "dynamic," built on open "professional communication of a scientific and technical" nature. (Venturini, Tr. 123-124).

938. CARB staff held over 85 meetings and technical discussions with interested parties during the reformulated gasoline regulations. (CX 1267 at 003-008; Venturini, Tr. 194-195).

939. The sheer technical complexity of Phase 2 led to intense interaction with the refining community. CARB's Phase 2 lead manager, Peter Venturini, viewed Phase 2 as a "kind of a technical and scientific tour de force." He believed that "the people we worked with and the technical people in the oil industry and the automotive industry felt that, too. It was a very exciting time for these engineers and scientists, because we were on the cutting edge." (Venturini, Tr. 126-127).

940. CARB covered "very new ground" in the Phase 2 development, in part because of the sheer number of fuel property specifications. As stated by Robert Fletcher, a CARB staff engineer and manager, "[p]reviously we had looked at one or two specifications at a time and dealt with those specifications, like RVP or sulfur." Here, CARB was asking the refiners to manufacture a new "comprehensive fuel," making Phase 2 "much more complicated" than Phase 1. (Fletcher, Tr. 6452-6453, 6462-6463).

941. In January 1991 CARB staff planned to go beyond the limited requirements of the Phase 1 regulations, which set standards for RVP, lead content, and deposit control additives. CARB's early 1991 work plan identified that it would address in Phase 2 "oxygen content, type of oxygenate, olefin content, aromatic hydrocarbon content, distillation temperature distribution, RVP, sulfur, benzene, and potential precursors to 1, 3-butadiene." (CX 785 at 001).

942. CARB staff anticipated in a 1991 work plan that the results of outside studies being conducted principally by the oil and automobile companies would impact any proposal regulating the properties identified in the Plan. (CX 785 at 001).

943. CARB staff viewed the Phase 2 rule development as an "iterative process" where CARB, industry, and other groups worked out problems together. (Fletcher, Tr. 6448-6449).

944. CARB, to obtain focused technical input, made materials available to the public identifying technical issues for debate. See, e.g., (CX 274; CX 492; RX 184; CX 803; CX 767; CX 876; CX 984; CX 984A-CX 984C; CX 1000; CX1000A - CX 1000H).

945. A Unocal scientist explained in late 1990 to Wayne Miller, supervisor of the 5/14 project, that in instances where "CARB admitted they do not have sufficient technical data to support" a particular specification, "CARB will hold off on this issue pending new compelling data." (CX 165 at 004).

946. The Technical Support Document, Staff Reports, and Final Statements of Reasons accompanying CARB's Phase 2 proposals contain hundreds of pages of highly technical scientific and economic analysis. (CX 5 (Technical Support Document); CX 52 (Staff Report for mandatory specifications); CX 10 (Staff Report); CX 53 (Predictive Model Staff Report); CX 54 (Predictive Model Final Statement of Reasons)).

947. CARB staff, in developing a proposal for Phase 2, had to address numerous highly technical subjects, including but not limited to, determining the independent benefits of regulating T50, T90, aromatics, RVP, olefins, sulfur, oxygen, and benzene (CX 5 at 019-045); determining the net benefits where those properties were simultaneously regulated as part of a comprehensive fuel system (CX 5 at 046); determining the costs of manufacturing gasoline if such properties were regulated at various levels (CX 5 at 129); determining risks of cancer of various benzene levels (CX 5 at 086).

948. To fulfill his job duties as part of Unocal's regulatory group, Mr. Kulakowski became very familiar with CARB's regulations and procedures. (Kulakowski, Tr. 4397-4398).

949. During the time he was at Unocal, Mr. Kulakowski attended all of the public workshops concerning the Phase 2 regulations. (Kulakowski, Tr. 4402). It was important for him to be at those public workshops to represent Unocal's interests, to support the trade association's interest, and to hear what other interested parties were saying about the regulations. (Kulakowski, Tr. 4402).

950. After the initial Board approval in November 1991, CARB continued its dialogue with interested parties regarding determining adverse effects of butadiene, formaldehyde and 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 parameters. (RX 680 at 002).

959. Michael Kulakowski of Unocal met with CARB staff dozens of times between 1991 and 1993. (Kulakowski, Tr. 4398). He attended all of the public workshops with regard to the Phase 2 regulations. (Kulakowski, Tr. 4402). Unocal also provided specific, detailed and technical comments to CARB relating to the proposed specifications. (Lamb, Tr. 2078, 2292; CX 33 at 003-020).

960. Refiners, auto companies, and other outside parties, by the time of the Phase 2 approval in November 1991, had contributed some $30 million worth of testing to support the Phase 2 development. (CX 773 at 014-015; CX 388 at 024).

961. As Unocal pointed out in the '393 patent trial: "In arriving at its regulations, CARB had not conducted studies of its own, but relied on the industry to provide the needed research and resulting knowledge." (CX 432 at 010). Indeed, Unocal argued to the Federal

Circuit that " CARB did not undertake any independent studies; rather, it used the industry to provide it with research and information." (CX 1341 at 016-017 (Unocal Federal Circuit Brief)).

B. CARB Depended Heavily on Industry Sources to Provide Accurate Cost Information.

962. The need for accurate technical assessment was especially acute given the potential huge cost of the Phase 2 regulation. CARB was "embarking at this time on probably one of the most significant efforts that I had every dealt with at the Air Resources Board. We were talking about a measure that could impact California's refineries to the tune of maybe $5 billion or more, a regulation that could impact the consumer of ten or more cents per gallon... That is why we had so many meetings, so many discussions with not only the oil industry but the auto industry and others, because we knew basically we had one shot to get this right." (Venturini, Tr. 108-109).

963. CARB staff relied for its cost estimates on information that was submitted to CARB by the oil refiners. (Venturini, Tr. 162-163). The issues of costs associated with proposing standards "was a major issue" that CARB staff discussed "many, many times" in workshops and discussions with individual companies and organizations. (Courtis, Tr. 5751).

964. 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 parameters. (RX 680 at 002 (WSPA review); RX 184 (draft preliminary regulations distributed in advance of August 14, 1991 workshop)).

965. CARB staff testified at the November 21-22, 1991, hearing where the Board approved Phase 2 that outside groups had contributed some $30 million worth of testing to support the Phase 2 rule. (CX 773 at 014-015 (Robert Fletcher stating that "over 3500 vehicle emission tests which were conducted on several hundred vehicles . . . amounted to over $30 million worth of testing"); CX 388 at 024 (presentation slide listing the Auto/Oil AQIRP, GM/WSPA/CARB Volatility Study, ARCO Clean Fuels Program, GM/CARB EC-X Test Program, Unocal Fuels Study, Chevron Fuels Study, and API RVP/ Oxygenates Study)).

966. The Technical Support Document for Phase 2 cited reliance on over 70 different studies or articles authored by outside parties. (CX 5 at 168-173).

967. As stated by CARB 's General Counsel, CARB was "working on the development of a regulation which was at the cutting edge of emission reductions. Consequently, even though we had a substantial amount of expertise, we also needed input from the public and the affected industry to ensure that in fact we were doing an appropriate thing consistent with the statutes that provided direction to us." (Kenny, Tr. 6530-6531).

968. It was important to CARB staff in drafting the Phase 2 regulation that the cost information received from the oil refiners was truthful. (Venturini, Tr. 163; Courtis, Tr. 5731-5732 ("very important" that the oil companies submit truthful cost information)).

969. CARB used cost information both to set the specification levels and also to inform the public of the potential cost to them of the Phase 2 rule. (Venturini, Tr. 163).

970. CARB staff depended on industry input for its cost analysis. (CX 7040 (Aguila, Dep. at 87-88)). A CARB staff person assigned to analyze costs for Phase 2 recognized "a number of possible cost implications that would be germane to the operations of a refiner, and we don't purport to know what all those are." (CX 7040 (Aguila, Dep. at 134-135)). Robert Fletcher, a CARB supervisor, similarly viewed the task as "finding out as much about refinery operations and the impact of changes in fuels specifications on those refinery operations" to determine the cost of Phase 2 regulations. (Fletcher, Tr. 6447; Courtis, Tr. 5720-5721, 5787).

971. CARB staff's cost evaluation included "look[ing] at different options and different scenarios, and also we evaluated the cost to the refineries by getting information on the costs from a number of refineries that they operated in California, and then using normal methodologies we estimated from those costs what the cost to the consumers would be." (Courtis, Tr. 5721-5722).

972. Staff in summer of 1991 also regularly met with WSPA to talk about issues such as costs, proposed or expected emissions reductions, technology, research, and enforcement. (CX 7040 (Aguila, Dep. at 90-91)). CARB staff also had numerous meetings with individual oil companies. (Courtis, Tr. 5733).

973. In response to CARB staff's requests, ARCO gave information, on a confidential basis, to show the cost to operate a refinery at a given set of specifications. (CX 1623; Clossey, Tr. 5391-5392). ARCO made estimates based on the historical information of its facility and the technologies that the company believed would be used to produce RFG of the severity described in the October 1991 CARB staff proposal. (CX 1623; Clossey, Tr. 5391-5392).

974. CARB staff ultimately was not able to use the linear programming model as a basis for Phase 2 cost estimates. (CX 10 at 125). Staff made direct requests to all refiners in California for cost information. (CX 10 at 082-083). CARB staff "received information from six refineries, cost information, and they used that information as a basis for doing their analysis of the costs to the refiners." (Venturini, Tr. 269-270).

975. CARB staff in the October 1991 Staff Report stated that "In developing the cost estimates for this chapter, staff has generally relied on information presented to us by the refiners." (CX 52 at 070). CARB used information provided by six representative six

refiners to estimate the potential costs of complying with the proposed regulations. (CX 5 at 131, 137, 156). The six refiners that provided responsive cost information to CARB included large refiners, independent refiners, and small refiners, and three of the refiners which submitted data were large complex refineries. (CX 5 at 137).

976. CARB stated in its October 1991 Technical Support Document that CARB staff "utilized data submitted from refiners, in addition to other sources of data, to estimate the fiscal impact on the refining industry." (CX 5 at 137, 151).

977. Mr. Fletcher believed that CARB staff had enough actual information from refiners to make a cost estimate in the development of the reformulated gasoline regulations. (Fletcher, Tr. 5374, 7015; RX 184).

978. CARB staff also received information on the cost of producing fuel from a study by Turner Mason, commissioned by WSPA. (Fletcher, Tr. 7005).

979. In response to CARB staff's requests, ARCO gave information, on a confidential basis, to show the cost to operate a refinery at a given set of specifications. (CX 1623; Clossey, Tr. 5391-5392). ARCO made estimates based on the historical information of its facility and the technologies that the company believed would be used to produce RFG of the severity described in the October 1991 CARB staff proposal. (CX 1623; Clossey, Tr. 5391-5392).

C. CARB Staff Repeatedly Requested Actual Cost Information from Refiners, Including Unocal.

980. CARB staff in a May 23, 1991 notice of a June 11 Phase 2 workshop explicitly told the public that CARB would estimate cost by using both a "linear programming model" if possible and also by requesting and analyzing direct cost information from refiners. CARB wrote in the notice, "We expect to receive additional cost data from affected industries." (Venturini, Tr. 262; CX 492 at 005).

981. CARB staff in proposing the Phase 2 regulation relied for its cost estimates on information submitted to CARB by the oil refiners. (Venturini, Tr. 162-163).

982. CARB staff obtained cost information from six refineries and used that to estimate the costs of Phase 2. (Venturini, Tr. 269-270).

983. CARB staff's set forth its analysis estimating costs for the proposed regulation in the October 4, 1991 Staff Report and Technical Support Document. (Venturini, Tr. 270; CX 52 at 070-074; CX 5 at 129, 137-143).

984. CARB staff discussed with the refining industry the progress of developing a linear programming model to evaluate the projected costs of Phase 2. CARB staff shared with industry the approach, the selection of refineries to model, and the issues confronted during the process. CARB informed the public in the October 1991 staff report that "LP models are not yet sufficiently developed to produce an accurate assessment of costs." Therefore, the staff proposal estimated the impact of the proposed regulations on the refining industry using "data submitted from refiners, in addition to other sources of data." Ultimately, CARB built the models with the information received, but it did not receive adequate information from refiners, despite CARB's efforts to get the necessary information. CARB staff continued to attempt to resolve the issues with the linear programming model up until the November board meeting. (Courtis, Tr. 5795, 5806, 5813, 5815, 5947-5949; CX 52 at 079).

985. It was important to CARB staff in drafting the Phase 2 regulation that the cost information received from the oil refiners was truthful. (Venturini, Tr. 163).

986. It was important to CARB staff in drafting the Phase 2 regulation that the cost information received from the oil refiners be truthful because it was used to set the specifications and this information was the basis for CARB's assessment of the cost to the regulated community and the public of the Phase 2 regulation. (Venturini, Tr. 163).

D. CARB Expected That Refiners, in Making Assertions About Cost Generally, Would Incorporate Any Information That Could Significantly Affect Costs.

987. James Aguila conducted much of the detail work on the cost analysis for Phase 2. He viewed his responsibility "to determine what the actual cost to the refining industry would have been." (CX 7040 (Aguila, Dep. at 87-88)).

988. Mr. Kulakowski believes that refiners should have informed CARB of expected costs of compliance with Phase 2. (Kulakowski, Tr. 4494-4495).

989. Michael Kulakowski, one of Unocal's key representatives to CARB on Phase 2, testified that CARB, during that rulemaking, would have viewed patent information as pertinent to its deliberations. (Kulakowski, Tr. 4586-4587).

990. Patents could impose costs like any other cost factor, and there was no CARB guideline or customs at CARB that would have suggested that patent costs were somehow immaterial. (Kenny, Tr. 6514).

991. In fact, companies before the time of the Phase 2 rulemaking had informed CARB of

pending patents. (Venturini, Tr. 187).

992. Unocal itself had informed CARB about a pending detergent additive patent in 1989 during the Phase 1 proceeding. (Venturini, Tr. 187-189; CX 1093 at 027).

993. Unocal in 1989 during the Phase 1 proceedings had told CARB staff that Unocal had a pending patent on a deposit control additive. (Venturini, Tr. 187-189; Croudace, Tr. 544-545, 548, CX 1093 at 027; CX 131 at 012).

994. The Auto/Oil Group's explicit policy of dedicating intellectual property rights to the public reflected the fact that such rights were common in the oil and automotive industries, and that knowledge of pending patents could be material to CARB rulemakings. (CX 4001; CCPF ¶ ¶ 1575-1589, 1609-1664).

995. Mr. Aguila, who studied the market for deposit control additives for the Phase 1 RFG regulation, was "aware of patents" and that some companies marketed patented additives at the time. (CX 7040 (Aguila, Dep. at 8-11)).

996. CARB acknowledged the active market for additives and accounted for the market price in the Technical Support Document for the Phase 1 regulation. (CX 840 at 152).

997. The Turner Mason Report commissioned by WSPA analyzed in detail potential costs of Phase 2. That report included a line item for patent royalties. (CX 1106 at 098-099; Cunningham, Tr. 4218-4220).

998. According to James Aguila, who authored much of the Phase 2 cost analysis, the task was "to have a realistic idea of incremental operating costs, which could be construed to mean that could be an overall cost for that company." (CX 7040 (Aguila, Dep. at 88-89, 141)). He "would have expected to receive all relevant information on costs." (CX 7040 (Aguila, Dep. at 123)).

999. CARB staff, when asking about cost information for Phase 2, would not expect a company to hide significant patent information on the grounds that such information would not construe a "cost." Mr. Aguila, who authored much of the Phase 2 cost analysis, understood that "patent costs and royalty costs are . . . part and parcel of doing business within the refining industry." When asking refiners about costs of a regulation, he "was assuming they would have disclosed any patent costs that they knew about." It was a common sense request "to obtain all actual costs from refiners. Basically they were supposed to tell us what they felt they were going to spend to meet the reg." (CX 7040 (Aguila, Dep. at 129-132)).

1000. Similarly, Mr. Aguila recognized that a person who owns a patent could incur a benefit from it. Therefore, "if they felt they could be getting a benefit as a result of owning a patent, then we would have expected them to include that in the costs." "[I]f a company

owned a patent and if that company was disclosing cost information to us, then any effect of owning that patent should have been included in the cost information that they sent. At least we were assuming that all costs were being included." (CX 7040 (Aguila, Dep. at 133-134)).

1001. CARB staff essentially asked refiners to "do their own independent analysis and tell us...their bottom-line costs." Staff recognized that "there's a number of possible cost implications that would be germane to the operations of a refiner, and we don't purport to know what all those are." (CX 7040 (Aguila, Dep. at 134-135)).

1002. The information provided to refiners from CARB staff informed them that CARB staff was "exploring the costs associated with the regulation, which could be portrayed in many different lights." (CX 7040 (Aguila, Dep. at 193)).

1003. Mr. Aguila, if he had known about a patent cost associated with an upcoming regulation he "would have added the cost of a potential patent as a factor in my final cost estimate." To know where, specifically he would "put" the cost (as asked on examination by Unocal's counsel), Mr. Aguila would have to understand more about how the patent cost applied – for example, whether to the operation of a piece of equipment, or for producing a certain formula. (CX 7040 (Aguila, Dep. at 196-197)).

1004. Unocal itself had submitted information about process royalties, including royalties from patents, to Turner Mason in connection with the preparation of WSPA's report. (Cunningham, Tr. 4126-4131).

1005. Unocal, however, never told Turner Mason or WSPA about its pending '393 patent and how that patent might affect the cost to other refiners, and to the public, of the Phase 2 regulation. (Jessup, Tr. 1303, 1612-1613).

1006. There were no CARB guidelines or directives that would suggest to refiners, including Unocal, that CARB would view patent costs as somehow immaterial. (Kenny, Tr. 6514).

1007. In fact, there had been past instances where companies had informed CARB staff that the company had pending patents. (Venturini, Tr. 187).

1008. One example of a company previously disclosing the existence of pending patents was Unocal itself. Unocal in 1989 during the Phase 1 proceeding had told CARB staff that it had a pending patent on a detergent control additive. (Venturini, Tr. 187-189; CX 1093 at 027 (Unocal presentation slides entitled "Unocal Gasoline Additive Technology" stating that Unocal would be introducing in summer 1989 an intake system detergent as to which Unocal had a "Unique Unocal Patent Pending Development.")).

1009. CARB staff expected that companies participating in the Phase 1 and Phase 2

rulemakings would inform CARB of a proprietary interest in a development if they planned to charge for it and that charge had a significant cost implication. (Venturini, Tr. 189).

1010. The CARB rulemaking model of intensive, trusting information-sharing with stakeholders would collapse if it was assumed that participants could engage in patent ambush. "We operate under the expectation – and it's the only way our system can operate, your Honor, is to operate on the expectation that people will be truthful in dealing with us. Our whole system, the whole integrity of our regulatory process would just collapse if it were okay for people to use our regulatory process to gain unfair competitive advantage. It just wouldn't work." (Venturini, Tr. 862-863).

1011. CARB's former General Counsel and Executive Director explains why it was neither necessary nor appropriate for CARB to issue written prohibitions against affirmative lies about patent rights. Such "do not lie" requirements would have been obvious to participants in CARB proceedings. The practice of the board and the history of the board had been one in which the parties had dealt with one another in good faith, in an honest and reliable fashion." (Kenny, Tr. 6519-6520).

1012. Michael Kenny, General Counsel and then Executive Director of CARB from 1990 through 2002, could recall no instance other than the Unocal patent example where a party had misrepresented important facts to CARB and CARB had relied on those facts. (Kenny, Tr. 6522).

1013. Peter Venturini was aware of no instance before the Phase 2 proceeding where a company had stated to CARB personnel that CARB could use the company's research and then, only later, told CARB that there would be a charge for using that research. (Venturini, Tr. 191).

1014. An added reason that CARB would expect disclosure of relevant patents was the central role that the Auto/Oil group played in the Phase 2 development process. That Group had an explicit policy that information that Auto/Oil gave to CARB should be free of intellectual property right claims. *See, e.g.,* (CX 4001; Kiskis, Tr. 3830-3834; CX 7076 (Youngblood, Dep. at 10-11); CX 4179 at 001).

E. Industry Members Collaborated Throughout the Phase 2 Reformulated Gasoline Rulemaking to Assist CARB in the Regulatory Development.

1. Auto/Oil Developed Data and Information for CARB.

1015. Auto/Oil was comprised of Unocal and 13 of the other largest domestic oil companies and the traditional "big three" domestic automobile manufacturers. (CX 4001 at 001-002; CX 140; CX 4016 at 004).

1016. Auto/Oil was created to take advantage of Congress' desire under the National Cooperative Research Act of 1984, 15 U.S.C. § 4301 *et seq.*, to permit and encourage cooperative research. (CX 4001 at 002; CX 7079 (Zimmerman, Dep. at 23); CX 140).

1017. Auto/Oil's primary purpose was to provide scientific research data to 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)).

1018. 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).

1019. Throughout its existence, Auto/Oil provided emissions research to regulators, including CARB and the public through numerous newsletters, publications and data disks. *See, e.g.*, (CX 4016 at 026; Klein, Tr. 2465-2466).

2. WSPA Developed Data and Information for CARB.

1020. The Western States Petroleum Association ("WSPA"), is a trade organization representing oil producers as well as refiners and marketers in five western United States. (CX 7059 (Moyer, Dep. at 10-11)).

1021. WSPA's primary purpose is to represent the interests of the industry, and "be a conduit of communication to the California Air Resources Board and to provide technical information to the Air Resources Board that would hopefully be utilized by the agency in crafting their fuels regulations." (CX 7059 (Moyer, Dep. at 10-11)).

1022. WSPA members to respond to CARB's requests for information by collectively discussing it by call or e-mail, thus letting others in the group know of the request. When CARB made a request for information to Clossey, he discussed it with members of WSPA and shared the request with the other members. (Clossey, Tr. 5391).

1023. WSPA members testified that CARB was interested in receiving technical information, and credible evaluations of that technical information from WSPA. (CX 7059 (Moyer, Dep. at 84-85)).

1024. CARB told WSPA what types of information it was interested in receiving. (RX 680). For example, Mr. Venturini of CARB, elicited data and responses from WSPA regarding sulfur and distillation parameters, including T50, to better assist CARB in the evaluation of these parameters. (RX 680 at 002).

1025. At the August 15, 1991 workshop, CARB indicated that it was interested in having a predictive model workshop. (CX 266 at 004). Unocal recommended that WSPA experts develop a draft predictive model, which those experts later did. (CX 266 at 004; Kulakowski, Tr. 4532).

1026. WSPA met with CARB numerous times regarding the WSPA predictive model, and ultimately gave CARB a disk containing the WSPA combined data set which included data from all of the WSPA members. *See, e.g.*, (CX 277 at 003; CX 1563 at 003, CX 1246).

1027. CARB in the period from 1992 to1994 subsequently developed a Predictive Model that permitted refiners to demonstrate compliance with the mandatory specifications using equivalent fuel formulas. (CX 53).

1028. Unocal in a letter to CARB in April 1994 affirmed that "[Unocal] actively participated in the rulemaking process" and has continued to work directly and through WSPA to "ensure smooth implementation of the program." (CX 393 at 001).

1029. CARB's Predictive Model carried forward the requirement in the mandatory specifications that RFG not exceed a "cap" of 220 degrees for T50. (CX 53 at 022).

IX. Unocal Management Decided by May 1991 to Seek Competitive Advantage Through Use of the 5/14 Project Results to Influence the CARB Phase 2 Reformulated Gasoline Regulations.

1030. In early 1991, Unocal management still sought to preserve the secrecy of the 5/14 Project in order to keep open the company's options concerning the use of the results for competitive advantage. (CCPF ¶ ¶ 765-782).

1031. In a February 12, 1991 memorandum concerning a Ford/Unocal proposed research agreement, Denny Lamb recognized that the purpose for releasing any test results would be to influence CARB or the EPA. (Lamb, Tr. 1878-1879; CX 1537 at 001 ("It seems to me that the only purpose for releasing data to CARB and EPA would be to influence fuel regulations.")). Recipients of this memorandum included senior Unocal management such as S.K. Alley, Roger Beach, and Steve Lipman. (Lamb, Tr. 1876; CX 1537 at 001). At this time, Denny Lamb recommended Unocal keep its options open concerning how best to use the 5/14 Project results for competitive advantage. (Lamb, Tr. 1877; CX 1537 at 001 ("We are not yet sure what CARB will propose for Phase II gasoline. Without

knowing that, we don't know how 5-14 concepts may benefit us. As you know our strategy is to maintain a choice of compliance options to improve opportunity for cost effectiveness and competitive advantage.")).

1032. Earlier in 1991, Unocal had explored obtaining competitive advantage through the commercial use of the 5/14 Project results by introducing an interim RFG premium fuel in the marketplace. (CCPF ¶ ¶ 765-788). However, by May 1991, the interim RFG project had been abandoned and "put on the shelf." (CX 3054 at 002-003; Miller, Tr. 1391-1392).

1033. In 1991 or 1992, Unocal personnel (including Roger Beach) had internal discussions regarding the effect that CARB regulations might have upon the possible royalty stream for the '393 patent. (Beach, Tr. 1790).

1034. With Unocal's plans for an interim clean gasoline "on the shelf," Unocal re-evaluated its "ongoing use" of the 5/14 Project research. Unocal elected to use its research for a presentation to influence CARB's developing Phase 2 rules. (Lamb, Tr. 2147; Kulakowski, Tr. 4414; CX 3054).

1035. In May 1991, Unocal management, including Roger Beach understood that Unocal's 5/14 Project results had "huge licencing potential," and potential royalty income estimates of $1 billion a year were presented to senior Unocal management. (CCPF ¶ ¶ 644-666).

1036. In May 1991, Unocal's Chief Patent Counsel, Gregory Wirzbicki, placed renewed focus on the prosecution of Unocal's RFG patent application by filing the first amendment to this application with the assistance of Dr. Croudace and Dr. Jessup. (CCPF ¶ ¶ 925-934).

1037. In May 1991, Unocal knew that CARB understood that emissions research provided to the agency relating to the Phase 2 regulations would be "non-proprietary" and placed in the "public domain." On or about May 1, 1991, Don signed the GM/WSPA/ARB research agreement on behalf of Unocal. (CX 1711; Lamb, Tr. 2040). Mr. Lamb reviewed this agreement for accuracy prior to Mr. D'Zurilla's signing of the agreement on behalf of Unocal. (Lamb, Tr. 2039-2040). Paragraph D of the GM/WSPA/ARB research agreement states: "The results of research and testing of the program shall be disclosed to the members and otherwise placed in the public domain." (CX 1711 at 003; Lamb, Tr. 2040). The GM/WSPA/ARB research agreement further provides the following: "No proprietary rights shall be sought nor patent applications prosecuted on the basis of the work of the program unless required for the purpose of ensuring that the results of the research by the program shall be freely available, without royalty, in the public domain." (CX 1711 at 003; Lamb, Tr. 2040-2041).

1038. In May 1991, Denny Lamb informed the Fuels Issues Team that the "ongoing use for 5/14" research results would be in connection with a "CARB consultation/presentation to

influence regs." (CX 3054 at 003; Lamb, Tr. 2145-2147).

A. Unocal Requested a Meeting With CARB in May 1991.

1039. On May 8, 1991, Denny Lamb advised Peter Venturini at CARB he would call to set up a time to meet. (CX 241).

1040. Unocal's Fuels Team met on May 1, 1991, to decide how to use the 5/14 research to gain competitive advantage. (CX 239). At or immediately following this meeting, Beach authorized Lamb to go to CARB and present some of the 5/14 Project results, including the "underlying emissions data from Unocal's research." (Beach, Tr. 1764, 1766). At the CARB meeting, Unocal hoped to persuade the agency to adopt a predictive model and to establish fuels standards that accounted for the relationship between T50 and emissions. (CX 239 at 008). Unocal management discussed the importance of persuading CARB to adopt T50 as a parameter in its regulations. (Beach, Tr. 1671-1672; CX 240).

1041. In a May 10, 1991 memo, Denny Lamb advised Wayne Miller that Unocal had requested a meeting with CARB. Recipients of this memo also included upper level Unocal managers Steven Lipman, Roger Beach, Don D'Zurilla, Neil Schmale, S.K. Alley, and Bill Mallet, as well as researchers Dr. Jessup and Dr. Croudace. (CX 241 at 002; Lamb, Tr. 1962-1963, 1969).

1042. In the May 10, 1991 memorandum, Mr. Lamb set forth the priorities for Unocal's upcoming presentation to CARB: (1) "convince CARB staff that predictive equations or vehicle testing in particular should not include unnecessary minimums or maximums on fuel parameters" and (2) "convince CARB of the importance of T50." (CX 240 at 001; Beach, Tr. 1669-1671).

1043. The May 10, 1991 memo from Denny Lamb also stated that "[w]e [Unocal] will now be saying T50 is relatively more important than D.I." (CX 241 at 001; Lamb, Tr. 1967). Additionally, this memo notes that "[Unocal] will need to be ready to comment on the effect of substituting T50 for T90 or D.I. will have on the effect of other parameters." (CX 241 at 001; Lamb, Tr. 1967).

1044. Roger Beach instructed the Unocal employees who met with CARB. (Beach, Tr. 1658). Mr. Beach directed Unocal's efforts to influence CARB during the Phase 2 process. (Beach, Tr. 1658-1659). He was the top person giving directions as to Unocal's involvement in the Phase 2 regulations. (Beach, Tr. 1658).

1045. Unocal management authorized the presentation to CARB in June 1991. (Croudace, Tr. 464). Mr. Beach assigned Denny Lamb and others to meet with CARB, assigning Mr. Lamb as the lead. (Beach, Tr. 1659). Dr. Croudace believes that either Roger Beach or Richard Stegemeier was involved in the decision to authorize the presentation to CARB

in June 1991. Dr. Croudace testified that "Somebody at that level was involved....They wanted that presentation to be given." (Croudace, Tr. 464-465). Dr. Croudace understood that such a decision would have had to come from the highest levels of Unocal. (Croudace, Tr. 465-466).

1046. Roger Beach, Don D'Zurilla (then Vice President of Refining and Marketing), Michael Kulakowski, and Dr. Miller were all part of the team within Unocal that made decisions concerning what to do with the emissions results that Dr. Croudace and Dr. Jessup had developed. (Croudace, Tr. 496-497).

1. Unocal Wanted to Convince CARB to Adopt a T50 Specification.

1047. As of May 10, 1991, Denny Lamb believed that it was a priority to convince CARB of the importance of T50. (Lamb, Tr. 1966).

1048. Roger Beach was himself involved in a discussion that it was important to try to get CARB to adopt T50 as a parameter. (Beach, Tr. 1671-1672).

1049. In 1990 and 1991, Dr. Miller understood that T50 was a key variable in the disclosure in Unocal's patent application. (Miller, Tr. 1415-1416).

1050. By conveying the importance of T50, Unocal sought to have T50 included in any regulations promulgated by CARB or the EPA. (Miller, Tr. 1413-1414).

1051. Dr. Croudace and Dr. Jessup wanted CARB "to adopt a T50 and T50 alone" as a specification in the CARB RFG regulations. (Croudace, Tr. 489-491).

1052. Denny Lamb outlined in the May 10, 1991 memorandum what should go into the presentation to CARB. (Jessup, Tr. 1244-1245; CX 241). Dr. Jessup testified that he drafted the CARB presentation with the intention of following Mr. Lamb's directions. (Jessup, Tr. 1246-1247). He took the information that Mr. Lamb had given and did his best to prepare a presentation for use with CARB in accordance with Mr. Lamb's instructions. (Jessup, Tr. 1247).

1053. Unocal knew that presenting its 5/14 research to CARB would enable CARB to understand that T50's significant effect on controlling emissions. (Lamb, Tr. 1983).

1054. Before attending the meeting, Unocal officials discussed the possibility that providing CARB with the 5/14 research results "might give them a basis to regulate [T50]." (Kulakowski, Tr. 4422).

1055. Kulakowski believed that the likelihood of CARB using Unocal's information to regulate T50 was "very high." (Kulakowski, Tr. 4422). Kulakowski shared that view with Lamb and others at Unocal during preparations for the June 1991 meeting with CARB.

(Kulakowski, Tr. 4422).

1056. Unocal knew that once CARB had Unocal's research information and approval to use it in developing its Phase 2 regulations, the information could be used by CARB not only to design a predictive model but also to set a T50 specification. (Lamb, Tr. 1994-1995). Unocal knew that CARB might well pick T50 as a specification when "we went up there and exposed our data because it was obvious that T50 was very important." (Beach, Tr. 1792).

2. Unocal Wanted to Convince CARB to Adopt a Predictive Model.

1057. Mr. Lamb acknowledges that CARB notified the public in the notice for the June 1991 workshop that it was considering a predictive model. (Lamb, Tr. 2347-2348; CX 492 at 003).

1058. Mr. Lamb understands that a predictive model by definition includes parameters. The entire value of a predictive model comes from being able to estimate emissions by figuring out which gasoline properties generate the emissions. (Lamb, Tr. 2348-2349).

1059. Mr. Lamb understood that any predictive model proposed or developed by CARB would 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).

1079. Before the June 11-12, 1991 CARB workshops, Toyota's John Haines had discussed Toyota's T50 research with Dr. Jessup. (Kulakowski, Tr. 4420-4421; CX 252 at 003).

1080. At the June 11-12, 1991 CARB workshops, CARB staff stated that they would be interested in data to support a T50 specification. (Kulakowski, Tr. 4421). Mr. Kulakowski reported this back to Unocal. (CX 252 at 003).

1081. Prior to the June 20, 1991 Unocal presentation to CARB, Denny Lamb learned from Michael Kulakowski that CARB was interested in information to support a T50 specification. (Lamb, Tr. 1983).

1082. Toyota suggested at the June 1991 workshop changes to the driveability index to more heavily weight T50 in order to more accurately represent the distillation effect of gasoline on emissions. Mr. Kulakowski reported to others at Unocal this issue, noting, "CARB was interested in data to support T50." (CX 793 at 002; CX 252 at 003; Kulakowski, Tr. 4421).

C. Prior to the June 20, 1991 CARB Meeting, Unocal Employees Discussed What Information Should Be Disclosed to CARB.

1083. Prior to the June 20, 1991 presentation to CARB, Unocal had internal meetings concerning what would, and would not, be presented to CARB. (Croudace, Tr. 464, 471-472, 484-485; Lamb, Tr. 1964; CX 4002 at 002).

1084. Prior to the June 20, 1991 presentation to CARB, Dr. Croudace had meetings with Denny Lamb. (Croudace, Tr. 466).

1085. Mr. Kulakowski was one of the Unocal representatives at the June 1991 presentation to CARB of Unocal's 5/14 Project. (Kulakowski, Tr. 4411). He was also involved in the preparations for that meeting. (Kulakowski, Tr. 4411).

1086. During the meeting to prepare for the June 1991 presentation to CARB, as well as in discussions with Mr. Lamb, Mr. Kulakowski learned the reasons why Unocal was going to present the 5/14 Project to CARB. (Kulakowski, Tr. 4414-4415). He also discussed the manner in which Unocal would make its presentation and the purpose of the presentation. (Kulakowski, Tr. 4415).

1087. Prior to the June 20, 1991 presentation to CARB, internal Unocal meetings took place where Unocal personnel reviewed the materials to be presented to CARB. (Croudace, Tr. 468).

1088. According to Dr. Croudace, there were many drafts of the presentation materials for the Unocal June 20, 1991 presentation to CARB. (Croudace, Tr. 484).

1089. Prior to the presentation to CARB, Denny Lamb knew that a patent application had been filed on the results of the 5/14 Project. (Lamb, Tr. 1832).

1090. In the spring of 1991, Dr. Croudace informed Unocal's Chief Patent Counsel, Mr. Wirzbicki that the research data that formed the basis for the patent application was going to be disclosed to regulators at CARB. (Wirzbicki, Tr. 936).

1091. Mr. Wirzbicki knew that the information to be disclosed to CARB related to the invention for which Unocal had already filed a patent application. (Wirzbicki, Tr. 936-937).

1092. Mr. Wirzbicki in 1991 assumed that "there was a good reason to disclose the research data to CARB." (Wirzbicki, Tr. 953).

D. Unocal Management Decided to Conceal From CARB Unocal's Pending Patent Application Relating to the 5/14 Project Results.

1093. During the Phase 2 rulemaking, Unocal was "certainly pursuing self-interest" and not all activities were designed to promote the common good. (Lamb, Tr. 2352).

1094. At the June 1991 presentation, no one from Unocal told CARB that Unocal had filed a patent application on the teachings of the 5/14 Project that were presented at the meeting. (Jessup, Tr. 1293).

1095. Prior to Unocal's June 20, 1991 presentation to CARB, Unocal management decided not to disclose Unocal's pending '393 patent application to CARB staff. In connection with

the ARCO v. Unocal private patent litigation, the defendant refiners included the following statement in their Plaintiffs' Proposed Statement of Uncontroverted Facts and Conclusions of Law in Support of Motion for Summary Judgement on Affirmative Defenses of Implied License, Equitable Estoppel, and Unclean Hands: "Prior to the presentation to CARB, Unocal management decided not to disclose Unocal's pending '393 patent application to CARB staff." (CX 1822 at 007).

1096. In Unocal's responsive pleading, which was filed by Robins, Kaplan, Miller & Ciresi (including the same counsel representing Unocal in this action), Unocal admitted: "Unocal does not contest the facts in this paragraph." (CX 1308 at 054 (Defendants' Statement of Genuine Issues of Material Fact in Opposition to Plaintiffs' Motion for Summary Judgement on Affirmative Defenses of Implied License, Equitable Estoppel and Unclean Hands)).

1097. Dr. Croudace testified that he participated in meetings at Unocal prior to the CARB presentation concerning Unocal management's intent to use its research results to influence CARB. (Croudace, Tr. 464-465, 470-471).

1098. Prior to the June 20, 1991 presentation to CARB, Dr. Croudace understood that specific Unocal management authorization was required to make the presentation. He explains that "we would not do that without being asked and our presentation gone over as you were talking about." (Croudace, Tr. 464).

1099. Dr. Jessup admitted that he would not have told the truth if anyone from CARB, WSPA, or Auto/Oil had asked whether Unocal had a pending patent application. (Jessup, Tr. 1597). He testified that he would have said nothing and refused to answer the question. (Jessup, Tr. 1599).

1100. Unocal management authorized the June 1991 presentation by Unocal personnel to CARB. (Croudace, Tr. 464).

1101. Dr. Croudace understood that the decision to authorize the June 1991 Unocal presentation to CARB would have had to come from the highest levels of Unocal. (Croudace, Tr. 465-466). Dr. Croudace believes that either Mr. Beach or Mr. Stegemeier was involved in the management decision to authorize the June 1991 Unocal presentation to CARB. (Croudace, Tr. 464-465 ("I believe they were involved. Somebody at that level was involved, yeah. They wanted that presentation to be given.")).

1102. According to Dr. Croudace, there were discussions at Unocal prior to the CARB presentation concerning not disclosing information about the patent application. He knew "that Unocal did not want to share the information that we had a patent." (Croudace, Tr. 660). In addition, Dr. Croudace testified "[i]n those specific meetings I'm not sure, but I do recall us talking about not talking to them about the patent." (Croudace, Tr. 470-471).

1103. Dr. Croudace gave sworn testimony in 1996 that he knows there were discussions concerning whether to disclose the patent application to CARB and "our intent was not to disclose the application to CARB." (Croudace, Tr. 473-474).

1104. Roger Beach admitted in his 1996 deposition that discussions occurred within Unocal about whether to disclose the existence of Unocal's patent application to CARB. (Beach, Tr. 1660-1662). Mr. Beach admitted at trial that he could no longer remember these discussions. (Beach, Tr. 1662-1663).

1105. Mr. Beach was given the opportunity to read and make any changes or corrections to his 1996 deposition testimony. (Beach, Tr. 1701-1702). In fact, Mr. Beach signed an acknowledgment that he had "read the foregoing deposition and having made such changes and corrections as I desire." (Beach, Tr. 1702).

1106. Although Unocal's policy at the time of the June 1991 CARB presentation provided that employees could not disclose internal company secret information without permission to do so, Roger Beach admitted that there were reasons other than Unocal's standard policy for keeping the Unocal patent application secret. (Beach, Tr. 1664).

1107. 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. *See, e.g.,* (Venturini, Tr. at 275; CX 22; CX 23; Jessup, Tr. 1597, 1612-1613; Derr, Tr. 5097-5097).

1108. Mr. Lamb and the other Unocal personnel involved in disclosing the 5/14 project research results to CARB knew that Unocal had filed a patent application regarding the 5/14 research project. (Wirzbicki, Tr. 936-937; Croudace, Tr. 467 ("Yeah, I'm sure he knew it.")).

1. No Absolute Unocal Policy Prohibited Disclosure of the Pending Patent Application to CARB.

1109. While the patents at issue were pending, the U.S. Patent and Trademark Office did not publish patent applications, and kept their existence confidential. (Wirzbicki, Tr. 1060)

1110. Unocal's Chief Patent Counsel understood that the law in existence while the patents at issue in this case were pending did not prohibit firms from telling individuals about their pending patents. (Wirzbicki, Tr. 1138-39). He understood that Unocal could tell anyone it wanted to about its pending patents if it chose to do so. (Wirzbicki, Tr. 1139).

1111. The management of Unocal's business units could have made the decision to disclose the existence of the patent application, the patent application itself, and Unocal's intent to

enforce any resulting patent. (Wirzbicki, Tr. 953-954).

1112. Unocal's "Policies and Procedures Relative to Intellectual Property" published in 1989 merely required employees who proposed talks or publications dealing with Unocal's technology to receive approval from President of Unocal's Science and Technology Division. (CX 460 at 007-008 (10/1/89 "Policies and Procedures Relative to Intellectual Property)).

1113. Unocal's "Policies and Procedures Relative to Intellectual Property" published in 1989 explicitly provided that an "appropriate operating division" could authorize a decision to no longer maintain exclusivity from Unocal's patent or other intellectual property rights. (CX 460 at 008).

1114. Unocal had in place a process that had to be completed before disclosure of the fact of a pending patent application. (Miller, Tr. 1423). A specific decision to disclose or not to disclose information about a pending patent application to CARB would need to go through this process. (Miller, Tr. 1424).

1115. According to Mr. Wirzbicki, Unocal's Chief Patent Counsel in 1991, Unocal had the same process for releasing information about pending patents as for releasing technical information in 1991. (Wirzbicki, Tr. 953-954).

1116. Mr. Wirzbicki testified that at Unocal in 1991, "management at the appropriate level of a business group at Unocal could decide whether to release information to the public about pending patents." (Wirzbicki, Tr. 953-954).

1117. Management at the appropriate level of an individual business group at Unocal in 1991 could also "decide to authorize the disclosure of technical information." (Wirzbicki, Tr. 953-954).

1118. Drs. Jessup and Croudace were not at the "appropriate level of the management group" that could make a decision concerning disclosure of pending patent or technical information, but were "way down on the food chain" of "the people who make that decision." (Wirzbicki, Tr. 954).

1119. Unocal's standard employee Patent and Secrecy agreement also provided that employees may disclose a company invention when required by employment (e.g., by management), by law, or where the disclosure is would be in the best interest of the company. (RX 837 at 001; Wirzbicki, Tr. 953-954).

1120. Denny Lamb testified that they withheld information about the pending patent application from CARB because of a specific decision, not because of any corporate policy. (Lamb, Tr. 1833-1835).

2. Unocal Had Earlier Considered Disclosing the RFG Patent Application to the Public.

1121. A few months prior to the June 1991 presentation to CARB, in connection with Unocal's consideration of the interim RFG project, there had been discussions within Unocal about making potential marketing claims to the public relating to "unique patent pending gasolines.' (CX 222; CX 228; Croudace, Tr. 546-549).

1122. High level Unocal management participated in discussions concerning the marketing of interim RFG. In February 1991, a Unocal memorandum to Mr. Beach from Dr. Miller discussed the possibility (ultimately rejected) of a marketing claim for a reformulated gasoline that would describe the fuel was a "Patent pending product." (CX 228; CX 222 (listing as a potential claim for Unocal's new reformulated gasolines, "Unique Patent Pending gasolines"); CX 214 (referring to a low emission gasoline with "unique, patent 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 CARB to provide flexibility within the regulations to allow refiners to meet emissions criteria – the "predictive model" – rather than requiring refiners to make "formula" fuel in accordance with certain specifications. (CX 23; CX 24 at 039).

1138. Dr. Miller was involved in the preparations for Unocal's June 1991 meeting with CARB, and he worked with Dr. Jessup to prepare the slides for that meeting. (Miller, Tr. 1400-1401).

1139. Unocal tried to show CARB, through presentation slides, "which parameters had the greatest effect on emissions." (Miller, Tr. 1401) The message that T50 was one of the most prominent factors affecting emissions was conveyed to everyone who looked at those slides, including Mr. Lamb. (Miller, Tr. 1402-1403).

1140. In creating the presentation, Unocal scientists sought to simplify the complex science. (Jessup, Tr. 1297-1298; Miller, Tr. 1401). Dr. Jessup, in the assessment of his supervisor, Dr. Miller, created a very straightforward and clear way to visually represent which parameters had the greatest effect on emissions. (Miller, Tr. 1401).

1141. Through these slides and the presentation, Unocal gave to CARB information that had never been shared outside of Unocal. (Miller, Tr. 1403).

1142. According to Roger Beach, he and Mr. Lamb "collectively agreed that [Mr. Lamb] should make the basic data, emissions data, and if [CARB] wanted the equations, we would give them that and make both public." (Beach, Tr. 1768).

1143. Dr. Jessup testified that he made sure that the importance of T50 was clear in the presentation given to CARB. (Jessup, Tr. 1246).

1144. Other than the first page of Unocal's presentation to CARB, Dr. Jessup presented the entire slide set to CARB at the June 1991 meeting. (Jessup, Tr. 1255-1256; CX 24).

1145. Unocal's presentation to CARB was a comprehensive discussion of the 5/14 Project. The

presentation included a discussion of the design of Unocal's one-car, ten-car, and thirteen-car tests, including the fact that Unocal's studies were unique in that they examined ten variable independently. (CX 24 at 004, 007; Jessup, Tr. 1258). The presentation identified the variables in Unocal's tests and the ranges for those variables. (CX 24 at 005-006; Jessup, Tr. 1258). The presentation discusses the one-car test, including how the test was conducted. (CX 24 at 006-014; Jessup, Tr. 1258-1259). The presentation shows some of the results from the ten-car tests. (CX 24 at 015-021; Jessup, Tr. 1263).

1146. In its presentation, Unocal gave CARB the information it needed to choose regulatory specifications that would require refiners to make fuels falling within Unocal's pending patent coverage. (CCPF ¶ ¶ 1174-1201).

1147. Unocal's presentation paralleled the disclosure of Unocal's patent application. (CX 24 at, e.g., 003-009, 013-015, 035, 039; CX 1788 at 013-073; Jessup, Tr. 1255-1258).

1148. Unocal's presentation taught CARB the critical aspects of Unocal's 5/14 Project inventions, including (1) the relationships between gasoline properties and emissions; (2) the fact that equations expressing those relationships can be used to predict emissions; and (3) the practical applications of these inventions to make low emissions gasoline compositions. (CX 24; Jessup, Tr. 1255-1286, 1291-1292).

1149. As Unocal stated in the conclusion of its June 1991 presentation to CARB, its presentation showed that it "can make real world low emissions gasoline using our predictive models." (CX 24 at 039).

2. Unocal Showed CARB its 5/14 Test Design and Experiments.

1150. Unocal explained to CARB the test design of its 5/14 Project experiments. (CX 24 at 004-009).

1151. Unocal's presentation showed CARB the ten gasoline properties and components that it studied, and explained that its research was unique because it examined the ten variables independently. (CX 24 at 004-005). The presentation then discussed the details of one-car test study and its confirmatory ten-car tests. (CX 24 at 003-009).

1152. For example, Unocal explained to CARB that its tests used 15 test fuels with a wide range of property variables. (CX 24 at 006-009, 015). Unocal showed that it ran its one-car test in a 1988 Oldsmobile Regency, with a "check" fuel as a control, (CX 24 at 007, 009), and that it ran its 10-car experiments at the SwRI center in essentially the same way that it ran its one-car study, but in six recent-model cars, and four post-1980 / pre-1990 cars. (CX 24 at 015).

1153. As Unocal explained, the ten-car test confirmed the single car results in a large fleet.

(CX 24 at 035).

1154. Unocal also mentioned the 13-car commercial validation study conducted after its patent application had been filed. (CX 24 at 036).

1155. The experiments described to CARB in this meeting are the same experiments discussed in the Examples section of Unocal's pending patent application, and in Unocal's later issued patents. (CX 24 at 003-009; CX 1788 at 027-039; CX 617 at 016, col. 7, l. 59 - 019, col. 13, l.15; Wirzbicki, Tr. 913-914).

3. Unocal Showed CARB the Directional Relationships the Scientists Discovered Between Properties and Emissions.

1156. Unocal's presentation then identified for CARB the specific relationships it discovered from its one-car and ten-car tests between properties of gasoline and emissions. (Jessup, Tr. 1291; CX 24 at 013-014, 022, 035, 039, 043; CX 617 at 015-019).

1157. The presentation to CARB included charts (CX 24 at 023-034), forms of equations (CX 24 at 022), and written conclusions (CX 24 at 013-014, 035, 038), all demonstrating the effects of individual gasoline properties on the three major categories of emissions: hydrocarbons (HC), carbon monoxide (CO) and nitrogen oxide (NOx). (CX 24 at 013-014, 022-024, 035, 038).

1158. As it explained in its patents, Unocal explained to CARB that T50 is the gasoline property that most affects both HC and CO emissions. (CX 24 at 013, 014, 026, 028, 035, 039; Jessup, Tr. 1262, 1281, 1292; CX 617 at 015, col. 5, l. 31 - col. 6, l. 50). Indeed, in the presentation's conclusions, Unocal placed T50 at the top of the list of "important gasoline properties to reduce to lower emissions." (Jessup, Tr. 1281-1282; CX 24 at 039).

1159. Unocal's presentation also showed CARB the remainder of the relationships it discovered from its one-car and ten-car tests, including which properties affected each category of emissions, how to adjust the properties to reduce emissions, and the general magnitude of the effect of a given property on a given category of emissions. (CX 24 at 013, 022; CX 617 at 015-019; Jessup, Tr. 1292).

1160. For example, Unocal's presentation slides showed CARB that T50 and olefin content have the greatest effect on hydrocarbon emissions, followed to a lesser extent by RON, (CX 24 at 013), and that to reduce hydrocarbon emissions, one should decrease olefins, and increase RON -- with greater increases or decreases having greater effects. (CX 24 at 022; 024-026). These are the same relationships disclosed in the specification of its pending patent application and the patents it eventually obtained. (CX 1788 at 035; CX 617 at 015, col. 6, ll. 12-28, 46-50; Jessup, Tr. 1292).

1161. Similarly, as described in its patent specification, Unocal's presentation showed CARB that decreasing T50 and increasing paraffin content and are most effective for reducing CO emissions, and decreasing T90 has a lesser impact on reducing those emissions. (CX 24 at 013, 022, 027-029, 035; CX 617 at 015, col. 6, ll. 12-28; Jessup, Tr. 1292).

1162. For reducing NOx emissions, Unocal's presentation showed CARB that, as described in its patent, decreasing RVP, olefin content and T10 are effective, and that increasing paraffin content also reduces NOx emissions to a lesser extent. (CX 24 at 013-014, 022, 030-035; CX 617 at 015, col. 6, ll. 28-31; Jessup, Tr. 1292).

4. Unocal's Presentation to CARB Taught CARB the Importance of T50.

1163. Unocal's presentation to CARB clearly taught that T50 is the gasoline property that most affects both HC and CO emissions. (CX 24 at 013-014, 026, 028, 035, 039; Jessup, Tr. 1262, 1281).

1164. Unocal's presentation listed T50 as the only major gasoline factor that affected CO emissions. (Jessup, Tr. 1281; CX 24 at 035).

1165. The graphs presenting the Unocal data clearly depict T50 as the dominant factor affecting emissions. (CX 24 at 026, 028; CX 477 at 017 (SAE paper that includes same graphs and stating "By far, the property with the largest effect is distillation T50 point"); CX 477 at 018 (describing same graphs and stating "Figure 24 shows the effect of distillation T50 point which, as in the case for HC emissions described above, accounts for about 75% of the observed variance in emissions.")).

1166. In the overall conclusions listed in the presentation, Unocal placed T50 at the top of the list of "important gasoline properties to reduce to lower emissions." (Jessup, Tr. 1281-1282; CX 24 at 039).

1167. At the June 20, 1991 presentation, Unocal stated that T50 was one of the important properties to reduce emissions. (CX 24 at 039; Croudace, Tr. 488). Dr. Croudace agreed with this conclusion at the time. (Croudace, Tr. 488).

1168. Dr. Croudace and Dr. Jessup wanted CARB "to adopt a T50 and T50 alone" as a specification in the CARB RFG regulations. (Croudace, Tr. 489-491).

5. Unocal Showed CARB that Mathematical Equations Expressed the Directional Relationships Between Gasoline Properties and Automobile Emissions.

1169. Unocal's presentation gave CARB the mathematical equations that Drs. Jessup and Croudace developed in the 5/14 Project to demonstrate the relationships between fuel

properties and emissions. (CX 24 at 022, 039; Lamb, Tr. 1998-1999). These equations were set forth in Unocal's pending patent application as Equations 1-3 (as they are in Unocal's issued patents). (CX 24 at 022; CX 1788 at 023; CX 617 at 015, col. 5, ll. 35-67).

1170. The only difference between the equations in the CARB presentation and Equations 1-3 in the patent is that in the CARB presentation, Unocal added one additional equation showing that an additional property, aromatics, had a small effect on HC emissions. (CX 24 at 022; CX 1788 at 023).

1171. At this initial presentation to CARB, Unocal did not give CARB any numeric coefficients for the equations because, as Dr. Jessup admitted, at that time Unocal considered them to be "proprietary." (Jessup, Tr. 1267-1269).

1172. Even without numeric coefficients, as Dr. Jessup testified and Unocal stated in its patent application and patents, the equations still show the directional relationships between gasoline properties and emissions. (Jessup, Tr. 1267; CX 1788 at 023 at ll. 5-33; CX 617 at 015, col. 5., ll. 31-50).

1173. Drs. Jessup and Croudace explained to CARB that to minimize a given type of emissions, one should minimize fuel variables with positive coefficients, and maximize fuel variables with negative coefficients. (CX 24 at 022 (showing Croudace handwritten notes from presentation). Although the numerical coefficients show the magnitude of the impact of the property on emissions, Unocal had already explained those magnitudes to CARB in its other presentation slides. (CX 24 at 013, 023-034; Jessup, Tr. 1270-1272).

6. Unocal's Presentation Taught CARB How to Identify Gasoline Compositions with Reduced Emissions (Many of Which Were Covered By Unocal's Pending Patent Claims).

1174. Contrary to Unocal's current assertions, Unocal's presentation taught CARB how to identify gasoline fuel compositions reduce emissions, and how to predict emissions using equations. The conclusions in Unocal's presentation explicitly explain to CARB that "very simple linear equations can be used to predict emissions reductions," and that "we can make *real world low emission gasoline* using our predictive models." (CX 24 at 039; Jessup, Tr. 1282) (emphasis added). Dr. Jessup admits that these sentences refer to the use of mathematical equations such as those that they provided to CARB in the presentation. (Jessup, Tr. 1282-1283).

1175. Dr. Croudace admits in Unocal's June 1991 CARB presentation that "[w]e can make real-world low emissions gasoline using our predictive models." This statement refers to the one-car and ten-car equations. (Croudace, Tr. 491; CX 24 at 039).

1176. The sentences used in Unocal's presentation to CARB are consistent with Drs. Jessup

and Croudace's representations in their patents and invention disclosure on the 5/14 Project research. As Drs. Jessup and Croudace explained in their June 1990 invention disclosure, their "*equation allows one to determine how to make low emission gasoline*." (CX 186 at 002-003) (emphasis added). They stated that there are a "multitude" of uses for their equations, including identifying gasoline blends where "all fuel would have low emissions," allowing a refinery to make "low emitting fuels," and predicting "the emission characteristics of any gasoline formulation." (CX 186 at 002-003).

1177. Similarly, Unocal's patents state "from the data in" Unocal's ten-car study " it can be appreciated that the preferred fuels of the invention [in the patent] will be prepared (e.g., by appropriate blending in a refinery) so as to decrease each of [T50, olefins, RVP or T10]…." (CX 617 at 019, col. 13, l. 62 - col. 14, l. 2). All the patents claims that Unocal eventually obtained on the 5/14 Project invention are simply sub-combinations of these properties in gasoline, and these methods of making and using them. (CX 617 at 021-025; CX 618 at 027-028; CX 619 at 027-028; CX 620 at 027-029; CX 621 at 027-029).

1178. The graphs, relationships and equations that Unocal provided to CARB teach anyone of ordinary skill how identify, make and use reduced emissions gasolines. As Dr. Jessup admitted at trial, to get to "the new compositions of gasoline," one adjusts the properties "against any starting point you want" – such as the then-average gasoline fuel (the "Auto/Oil average fuel") – in accordance with the directional relationships that Drs. Jessup and Croudace discovered. (Jessup, Tr. 1171-1172, 1164, 1166-1167; CX 171 at 050-056). Dr. Jessup concedes, "[T]hat's the forerunner to many of the [patent] claims." (Jessup, Tr. 1171-1172, 1164, 1166-1167; CX 171 at 050-056).

1179. Using Unocal's teachings, CARB could and did make adjustments to gasoline properties to reach new fuel compositions that Unocal knew at the time were covered by its pending patent application. For example, Unocal understood that if CARB sought to reduce emissions below the average fuel at the time, and thus would likely use the property values of that fuel as its starting point. The charts that Unocal provided to CARB showing the relationships between emissions and gasoline properties provide the range of values (within normal testing sensitivities) of the Auto/Oil Average fuel for each property. (CX 24 at 023-034; Jessup, Tr. at 1271-1272).

1180. For instance, in Unocal's graph showing the relationship between T50 and hydrocarbon emissions, the percent change in hydrocarbon emissions from the Auto/Oil average fuel is plotted against the temperature change in T50. (CX 24 at 026; Jessup, Tr. 1271-1272). The x-axis of graph is a black line indicating the range of normal T50s for the Auto/Oil average fuel. (CX 24 at 026). It intersects at it mean with a T50 of about 218º F – the T50 of the Auto/Oil Average fuel at that time. (CX 24 at 026; CX 617 at 016, Table 2). To reduce hydrocarbon emissions below that average, one would thus want to decrease T50 below the then-current average gasoline T50 of about 218º F.

1181. To achieve a 10% reduction in hydrocarbon emissions, the graph for HC emissions in

Unocal's presentation to CARB shows that one would reduce the T50 to about 210º F. (CX 24 at 026).

1182. To achieve a 5% reduction in hydrocarbon emissions, the graph for HC emissions in Unocal's presentation to CARB shows that one would reduce the T50 to about 215º F. (CX 24 at 026).

1183. Not surprisingly, Unocal's pending patent application at the time of its presentation to CARB had claims to gasolines with T50s of less than or equal to 215º F and less than or equal to 210º F. (CX 1788 at 051, 191).

1184. Similarly, the Auto/Oil Average RVP at the time of Unocal's presentation to CARB was about 8.7 psi. (CX 24 at 034; CX 617 at 016, table 2).

1185. The chart Unocal showed CARB in its June presentation concerning the effects of RVP and T10 on NOx emissions shows that a 10% reduction of NOx emissions could be obtained by reducing RVP to about 7 psi, and a 5% reduction of NOx emissions could be obtained by reducing RVP to about 8 psi. (CX 24 at 034).

1186. Again, not surprisingly, Unocal's pending patent application at the time of its presentation to CARB had claims to RVPs of no greater that 8 psi, and no greater than 7.5 psi. (CX 1788 at 051, 191).

1187. The same types of graphical information concerning directional property limitations and the average value of these fuels are shown in the charts Unocal provided to CARB for the remainder of the gasoline property / emissions relationships. (CX 24 at 023-034).

1188. Unocal presented to CARB at the June 20, 1991 meeting the conclusion that, in addition to T50, olefins had a significant impact on tailpipe emissions. (Lamb, Tr. 1989). Unocal's emissions research data confirmed CARB's understanding on the importance of controlling other gasoline properties such as olefins. (CX 5 at 042).

1189. Unocal's presentation to CARB clearly taught that CARB could use mathematical equations to predict emissions. (Jessup, Tr. 1282; Lamb, Tr. 1998). Included in the presentation to CARB were the Unocal predictive model equations developed from the one-car ten-car tests, but without coefficients. (CX 24 at 022; Jessup, Tr. 1267; CX 617 at 015-019). Even without the coefficients, however, one can still see the directional relationship between each fuel parameter and emissions. (CX 24 at 022; Jessup, Tr. 1267; Croudace, Tr. 487).

1190. At the June 20, 1991 Unocal presentation to CARB, Unocal informed CARB that "Very simple linear equations can be used to predict emissions reductions." (Croudace, Tr. 491; CX 24 at 039). This statement referred to equations derived from the one-car and ten-car equations. (Croudace, Tr. 491). Denny Lamb understood that this statement further

referred to what the inventors and other at Unocal referred to as "our [Unocal's] predictive models." (Lamb, Tr. 1995-1996; CX 24 at 039).

1191. The Unocal slides presented to CARB on June 20, 1991, contain the statement that "[w]e can make real-world low emissions gasoline using our predictive models." (CX 24 at 039; Croudace, Tr. 491). This statement refers to the one-car and ten-car equations. (Croudace, Tr. 491).

1192. Unocal referred to the one-car and ten-car equations as "our predictive model" because these mathematical equations predict resulting emissions output (Croudace, Tr. 491-492; Lamb, Tr. 1995-1996; CX 24 at 039).

1193. Subsequently, in February 1992, Dr. Jessup presented a paper, which he co-authored with Dr. Croudace and Mr. Wusz, to the SAE describing the 5/14 Project. (Jessup, Tr. 1287-1288; CX 477). The SAE paper was very similar to the presentation given to CARB. (Jessup, Tr. 1322). The SAE paper contained almost all of the information, charts, and graphs that Unocal had provided to CARB. (Jessup, Tr. 1322-1324; *compare* CX 477 at 008-009 *with* CX 24 at 010-014; *compare* CX 477 at 013-016 *with* CX 24 at 015-021; *compare* CX 477 at 018-020 *with* CX 24 at 023-027, 029-034). A comparison of the SAE paper and Unocal's patent specification also shows that they are very similar. (*Compare* CX 477 at 011 (fig. 7) *with* CX 617 at 006 (fig. 3); *compare* CX 477 at 012 (fig. 8) *with* CX 617 at 009 (fig. 6); *compare* CX 477 at 012 (fig. 9) *with* CX 617 at 004 (fig. 1); *compare* CX 477 at 012 (fig. 10) *with* CX 617 at 007 (fig. 4); *compare* CX 477 at 012 (fig. 11) *with* CX 617 at 005 (fig. 2); *compare* CX 477 at 016 (table 11) *with* CX 617 at 010 (fig. 7); *compare* CX 477 at 016 (table 12) *with* CX 617 at 011 (fig. 8); *compare* CX 477 at 016 (table 10) *with* CX 617 at 012 (fig. 9); *compare* CX 477 at 013 (fig. 12) *with* CX 617 at 008 (fig. 5)). The SAE paper also contains Unocal's one-car and its ten-car equations. (CX 477 at 009, 017; Jessup, Tr. 1325). Unocal provided this SAE paper to the EPA in January 1992, and to CARB in February 1992. (CX 1735 at 001; CX 1424).

1194. Denny Lamb knew about the SAE paper, and that the paper related to the results of the 5/14 Project. (Lamb, Tr. 1992).

1195. Dr. Jessup and Dr. Croudace authored a presentation entitled "An Overview of Unocal's Low-Emissions Gasoline Research Program" for a national meeting of the American Institute of Chemical Engineers (AICE). (CX 476 at 001; Croudace, Tr. 511). This presentation is substantially similar in content to the SAE paper authored by Dr. Jessup and Dr. Croudace. *See* (CX 1424 and CX 476).

1196. Dr. Jessup left out of the presentation to CARB certain data that reduced the consistency of Unocal's results. In the 5/14 Project, Unocal used seven check fuels to verify the predictive power of its mathematical equations. (Jessup, Tr. 1289). A check fuel is used "to ascertain the predictability you're getting out of the regression model from the

regression analysis." (Jessup, Tr. 1253). To compare the difference between the actual and predicted values, one uses a standard deviation, which is a measure of the spread of the data. (Jessup, Tr. 1253-1254). In the presentation to CARB, Dr. Jessup included only four of the seven check fuels. (CX 24 at 047; Jessup, Tr. 1285-1286, 1288-1289).

1197. The three check fuels that Dr. Jessup left out of the CARB presentation showed substantially worse results than the four he chose to include. The predicted emissions for the four check fuels that Dr. Jessup included in the CARB presentation were within two standard deviations of the actual measured emissions. (Jessup, Tr. 1288 (four check fuels in CARB presentation); CX 24 at 047 (same as those in SAE paper); CX 477 at 010; CX 477 at 009 ("for these four fuels, the predicted emissions are always within two standard deviations")). But the predicted emissions from the three fuels that Dr. Jessup omitted from the CARB presentation varied from the actual emissions by ranges of over four to nearly six times the standard deviation. (Jessup, Tr. 1289-1290).

1198. At the June 1991 presentation, no one from Unocal told CARB that Unocal had filed a patent application on the teachings of the 5/14 Project that were presented at the meeting. (Jessup, Tr. 1293).

1199. As Mr. Lamb, Unocal's point person to CARB, admitted at trial, nothing relating to the 5/14 Project was kept from CARB at the presentation of June 1991 apart from the fact that there was a pending patent application. (Lamb, Tr. 1944-1955).

1200. As Dr. Jessup admitted, other than the raw data, the results from the three check fuels, and specific fuel compositions, Unocal did not withhold from CARB at the June 1991 presentation any "data or conclusions" from the 5/14 Project. (Jessup, Tr. 1291-1292).

1201. Omitting any information on Unocal's pending patent application at the presentation to CARB was intentional. The Unocal employees involved in making the presentation knew that Unocal had applied for a patent on these same research results. Indeed, just one month earlier, Drs. Jessup and Croudace had signed an affidavit filed with Unocal's amendment to its patent application indicating that they knew of the pending claims. (CX 1788 at 203; Wirzbicki, Tr. 936-937).

7. Unocal Knew That CARB's Use of its 5/14 Project Results Would Lead to Regulations That Intersected Unocal's Pending Patent Rights.

1202. Unocal used the 5/14 data to influence the proposed Phase 2 specification proposals. (Lamb, Tr. 1988).

1203. Unocal's presentation to CARB of its 5/14 Project information influenced the CARB regulations. (Croudace, Tr. 495 ("I think ultimately, I mean, Unocal was – we did present our data and it did influence the CARB regs. Absolutely. It was very strong data that showed it")).

1204. In the presentation to CARB on June 20, 1991, the Unocal scientists presented and disclosed the particulars of one its invented fuel compositions – Fuel 15 – to CARB as an actual gasoline check fuel composition as part of the 5/14 data. (CX 24 at 043). In an affidavit filed in May 1991, Drs. Jessup and Croudace had declared that they had made Fuel 15, which was covered by their patent application before February 28, 1990. (Wirzbicki, Tr. 937-939; CX 1788 at 203-204).

1205. During the Unocal presentation to CARB in June 1991, there was a great deal of discussion about the information and data in the slides. (Jessup, Tr. 1291). In that discussion, Dr. Jessup told CARB exactly what the fuel properties Unocal had found to effect emissions and the dependence of emissions on those fuel properties. (Jessup, Tr. 1291).

1206. At the time of its presentation to CARB, Unocal knew that it had a pending patent application with a specification containing very broad disclosure of the 5/14 Project research results. (CX 1788 at 014-050, 088-231; Wirzbicki, Tr. 937-941).

1207. In the spring of 1991, Dr. Croudace informed Unocal's Chief Patent Counsel, Mr. Wirzbicki, that the research data that formed the basis for the patent application was going to be disclosed to regulators at CARB. (Wirzbicki, Tr. 936).

1208. Mr. Wirzbicki knew that the information to be disclosed to CARB related to the invention for which he had already supplied a patent application. (Wirzbicki, Tr. 936-937).

1209. Unocal also knew at the time of its presentation to CARB that its disclosure in the specification would support any number of specific patent claims to gasoline fuel compositions, methods of making those gasoline fuels, and methods of using such fuels. (CX 1788 at 014-050, 088-231; Wirzbicki, Tr. 937-939).

1210. Unocal also knew at the time of its presentation to CARB that it had patent claims pending in its application that would cover almost any fuel compositions that CARB would choose to regulate. (CX 1788 at 014-051, 088-231; Wirzbicki, Tr. 937-941). For example, claim 1 pending in Unocal's application at the time covered any standard unleaded gasoline fuel with a T50 no greater than 215° and a Reid Vapor Pressure no greater than 8.0 psi. Claim 90 covered any such gasoline with a T50 no greater than 210° and a Reid Vapor Pressure no greater than 7.5 psi. (CX 1788 at 051, 191 ('393 patent file history)).

1211. Moreover, based on the broad disclosure of the specification of its patent application, Unocal could amend its application to include claims with any additional sub-combinations of these properties and methods, as long as they were supported by the disclosure and not present in or obvious in light of the prior art. (CX 1788 at 015-051,

088-231; Wirzbicki, Tr. 881, 919).

1212. On May 22, 1991, Mr. Wirzbicki also filed a "Preliminary Amendment" with the Patent and Trademark Office. (CX 1788 at 189-201).

1213. In the Preliminary Amendment, Mr. Wirzbicki added a number of additional claims to gasolines with properties disclosed in the specification. (CX 1788 at 189-201 (adding claims 83-124 at 190-196), Wirzbicki, Tr. 937).

1214. Mr. Wirzbicki filed an affidavit from Drs. Jessup and Croudace on May 22, 1991 to accompany the Preliminary Amendment. (CX 1788 at 189-201 (preliminary amendment), CX 1788 at 203-207 (Jessup & Croudace affidavit), Wirzbicki, Tr. 937-938).

1215. Drs. Jessup and Croudace declared under oath in the May 21, 1991 affidavit that "we are the applicants of the above-identified patent application and are the inventors of the subject matter therein described and claimed." (CX 1788 at 203). In order for Drs. Jessup and Croudace to truthfully make such a declaration, they must have had knowledge of the pending claims.

1216. Drs. Jessup and Croudace were still working with Mr. Wirzbicki in May 1991 to prosecute the '393 patent. (Wirzbicki, Tr. 939).

1217. As of May 22, 1991, Mr. Wirzbicki had not heard anything back from the Patent Office concerning the patent application. (Wirzbicki, Tr. 939-940).

1218. During the period from May 23, 1991 to November 19, 1991, there were no changes in the status of Unocal's patent application. (CX 1788 at 209-231). Mr. Wirzbicki did not make any filings, and the Patent Office did not issue any actions. (CX 1788 at 209-231).

1219. Even through the December of 1991, the claims in the '393 patent were the same ones that had last been changed in May 1991. (Wirzbicki, Tr. 964).

1220. What Mr. Wirzbicki knew in the spring of 1991 and what Unocal knew, to Mr. Wirzbicki's knowledge, was that it had a patent application with claims that were amended one time. (Wirzbicki, Tr. 940-941).

8. Unocal "Got What it Wanted" At the June 20, 1991 CARB Meeting.

1221. According to Denny Lamb, Unocal's chief liaison with CARB, Unocal "got what it wanted" at the June 20, 1991 meeting with CARB. (Lamb, Tr. 1993-1995).

1222. At the June 20, 1991 Unocal meeting with CARB, Unocal wanted to show CARB the value of the particular mathematical equations developed by Unocal. (Lamb, Tr. 1997-

1998).

1223. Unocal wanted to show CARB that the mathematical equations actually did what the scientists represented that the equations did. (Lamb, Tr. 1998).

1224. At the June 1991 presentation, no one from Unocal told CARB that Unocal had filed a patent application on the teachings of the 5/14 Project that were presented at the meeting. (Jessup, Tr. 1293).

1225. Prior to Unocal's presentation to CARB on June 20, 1991, CARB had not included proposed a T50 specification for its Phase 2 RFG regulations. (Lamb, Tr. 1988).

1226. Unocal used the 5/14 data to influence the proposed Phase 2 specification proposals. (Lamb, Tr. 1988).

1227. Unocal personnel that participated in the June 20, 1991 CARB presentation, including Denny Lamb, had no objections to T50 being one of the parameters in CARB predictive model. (Lamb, Tr. 1988-1989).

1228. Unocal made the 5/14 Project results equally available for CARB to use in CARB's specifications as well as a predictive model. (Lamb, Tr. 1993-1994).

1229. Unocal took steps to ensure that CARB could not use the Unocal 5/14 information to include T50 in the specifications unless CARB proposed a predictive model. (Lamb, Tr. 1994).

1230. At the June 20, 1991 Unocal presentation to CARB, Unocal wanted to give CARB an example that in fact Unocal had actually produced low emissions gasoline using Unocal's predictive equations. (Lamb, Tr. 1989).

1231. Unocal presented to CARB at the June 20, 1991 meeting the conclusion that, in addition to T50, olefins had a significant impact on tailpipe emissions. (Lamb, Tr. 1989).

1232. At the June 20, 1991 Unocal meeting with CARB, Unocal wanted to show CARB the value of the particular mathematical equations developed by Unocal. (Lamb, Tr. 1997-1998). Unocal wanted to show CARB that the mathematical equations actually did what the scientists represented that the equations did – i.e., that these equations actually predicted emissions as a result of controlling the particular parameters Unocal believed to be important. (Lamb, Tr. 1998).

1233. One of the lessons of the 5/14 Project was that one could directionally predict emissions based on controlling gasoline properties such as T50. (Lamb, Tr. 1998). These directional relationships were embodied and reflected in mathematical equations developed from the 5/14 Project. (Lamb, Tr. 1998-1999).

1234. At the June 20, 1991 Unocal meeting with CARB, CARB was extremely interested in the 5/14 research results. (Lamb, Tr. 1984).

1235. At the June 1991 meeting with CARB, Unocal offered to give to CARB the data and results of the 5/14 Project. (Kulakowski, Tr. 4423). In Unocal's offer, there was no limitation placed on CARB's use of the data and results from the 5/14 project. (Kulakowski, Tr. 4423-4424).

1236. CARB staff asked for further information to evaluate the regression equations. Dr. Jessup of Unocal gave CARB a computer disk fully describing details of Unocal's 10-car study. (CX 1247 (photocopy of disk and printout of content); Courtis, Tr. 5745-5746 (CARB staff checked the disk information against the regression equations); Jessup, Tr. 1331-1332 (Dr. Jessup prepared the disk on July 25, 1991)).

1237. Unocal knew that its presentation to CARB was effective. (Jessup, Tr. 1292-1293). According to Dr. Jessup, CARB staff were stunned and extremely surprised by the information that Unocal presented. (Jessup, Tr. 1292-1293).

1238. One of the main messages that Peter Venturini took from Unocal's June 20, 1991 presentation was that T50 was an important property to reduce emissions and that CARB ought to consider a separate T50 specification. (Venturini, Tr. 224-225, 228). Robert Fletcher similarly viewed the importance of T50 as a main message. (Fletcher, Tr. 6467-6468).

1239. Unocal's presentation to CARB of its 5/14 Project information did influence the CARB regulations. (Croudace, Tr. 495 ("I think ultimately, I mean, Unocal was – we did present our data and it did influence the CARB regs. Absolutely. It was very strong data that showed it.")).

1240. According to Denny Lamb, Unocal's chief liaison with CARB, Unocal "got what it wanted" at the June 20, 1991 meeting with CARB. (Lamb, Tr. 1993-1995).

1241. Peter Venturini viewed the Unocal presentation as involving a "very well-done" and "robust" study that "provided to us probably for the first time a focused study that looked at the T50 by itself to look at its relationship to vehicle exhaust emissions." He viewed it as "important" to the extent that he believed "we ought to be looking at a T50 specification because we can gain emissions reductions from it." (Venturini, Tr. 228).

F. Following the June 20, 1991 CARB Presentation, Unocal Provided CARB All

of its 5/14 Data and Represented That These Data, Including the Presentation Slides, Equations, and Underlying Database, Were "Non-proprietary."

1242. After Unocal's June 20, 1991 presentation to CARB, Lamb received the message that CARB would like to have all of the data presented at the June 20, 1991 meeting, including the database and the equations. (Lamb, Tr. 1984, 2019 (CARB asked Unocal to provide CARB with its research results)).

1243. CARB informed Mr. Lamb that CARB could only use the data if it was not confidential and proprietary to Unocal. (Lamb, Tr. 2019-2020).

1244. John Courtis testified that CARB asked Unocal "to allow us to go ahead and use it [5/14 research], to release the proprietariness and confidentiality of the [5/14] data." (Courtis, Tr. 5743-5744).

1. Unocal Provided CARB With the Complete Mathematical Equations in a July 1, 1991 Letter.

1245. Unocal at the June 1991 meeting had requested that CARB treat its presentation as confidential. (Venturini, Tr. 232).

1246. CARB staff requested more information, and Unocal in a letter dated July 1, 1991 provided to CARB staff the numerical coefficient values for its regression equations. (Lamb, Tr. 2366; Venturini, Tr. 233-234; CX 25). Michael Kulakowski sent the July 1, 1991 letter to CARB attaching coefficients in the equations from Unocal's 10-car study pursuant to Dennis Lamb's instructions. (Kulakowski, Tr. 4424-4425; CX 25).

1247. In a July 1, 1991, letter that Kulakowski sent to CARB on behalf of Lamb, Unocal provided the regulators with the complete 10-car equations with coefficients. (CX 386). The letter stated, "Unocal requests that CARB hold these equations confidential, as we feel that they may represent a competitive advantage in the production of reformulated gasoline." (CX 386; Kulakowski, Tr. 4424-4425; CX 25; Answer ¶ 39). Mr. Kulakowski explained that his letter was intended "to make it clear to CARB" that Unocal was claiming that the attached predictive equations were "business confidential information," because business confidential information received "different treatment" under the California Public Records Act. (Kulakowski, Tr. 4425).

1248. Unocal advised CARB in the July 1, 1991 letter that the equations "may represent a competitive advantage," because, according to Mr. Lamb, Unocal wanted to use the equations in Unocal's refineries for its own purposes. Mr. Lamb explains that Unocal felt that "we might lose any advantage we have if our refining competitors got ahold of them." (Lamb, Tr. 2227-2228; CX 25).

1249. Mr. Kulakowski had authority to send the July 1 letter on behalf of Unocal. (Lamb, Tr. 1836).

1250. Unocal's use of the term "competitive advantage" was a conscious one to emphasis to CARB the need to keep those equations confidential. (Kulakowski, Tr. 4425-4526).

1251. Peter Venturini understood the July 1, 1991 letter as stating that Unocal, by keeping its regression equations confidential, would retain a competitive advantage in the manufacture of reformulated gasoline. (Venturini, Tr. 233-234, 237 (" they wanted us to not release this information, keep it confidential, because they felt they could gain – they – it represented a competitive advantage for them in the production of gasoline); CX 25).

1252. Unocal in its July 1, 1991 letter stated to CARB that "if CARB pursues a meaningful dialogue on a predictive model approach to Phase 2 gasoline, Unocal will consider making the equations and underlying data public as required to assist in the development of a predictive model." (CX 25).

1253. Mr. Lamb took every effort to give CARB the impression that he spoke on behalf of Unocal. (Lamb, Tr. 2360)

1254. Mr. Lamb tried to be clear when communicating with CARB on Unocal's behalf. He did not try to deliberately mislead or confuse CARB by his words. (Lamb, Tr. 2360).

1255. When Mr. Lamb spoke on Unocal's behalf to industry groups and his colleagues at other oil companies he similarly found it important to communicate clearly. (Lamb, Tr. 2360).

1256. When Mr. Lamb spoke with CARB, he understood that certain terms had a common understanding by the people participating in the process. (Lamb, Tr. 2363).

1257. In sending the July 1, 1991 letter to CARB, Mr. Lamb and Unocal were being careful about what information to give to CARB. (Lamb, Tr. 2365; CX 25).

1258. Unocal sent the July 1, 1991 letter to CARB in response to CARB's request. (Lamb, Tr. 2366; CX 25).

1259. Mr. Lamb sought to be clear in the July 1, 1991 letter that Unocal's equations may have represented a competitive advantage. (Lamb, Tr. 2366; CX 25).

1260. Mr. Lamb understood while he worked at Unocal that having a patent covering reformulated gasoline had the potential to represent a competitive advantage for Unocal. (Lamb, Tr. 2367).

1261. Peter Venturini understood Unocal's offer in its July 1, 1991 letter to mean that if CARB agreed to the dialogue about a predictive model and "that if they release this information

that they were no longer maintaining the competitive advantage." (Venturini, Tr. 239-240).

1262. After the July 1, 1991 letter transmitting Unocal's 10-car equations to CARB, CARB requested permission from Unocal to use the equations in CARB's technical support document. (Kulakowski, Tr. 4430). As Mr. Kulakowski testified, "I do recall a request from CARB to put the equations into their technical support document." (Kulakowski, Tr. 4430).

1263. In response to the request from CARB to include Unocal's equations in the CARB technical support document, "Unocal did grant permission for those equations to be in the technical support document." (Kulakowski, Tr. 4432).

1264. Dr. Jessup was aware that CARB eventually used Unocal's ten-car equations in the CARB technical support document. (Jessup, Tr. 1293).

1265. Roger Beach was copied on the letter transmitting Unocal's equations to CARB and was made aware of the fact that Unocal had provided the equations to CARB. (CX 386 at 001).

1266. Roger Beach, Don D'Zurilla (then Vice President of Refining and Marketing), Michael Kulakowski, and Dr. Miller were all part of the team within Unocal that was deciding what to do with the emissions results that Dr. Croudace and Dr. Jessup had developed. (Croudace, Tr. 496-497).

1267. Mr. Beach wanted to give to CARB Unocal's equations and let CARB use the equations so long as CARB pursued a meaningful dialogue on a predictive model approach for Phase 2 gasoline. (Beach, Tr. 1666).

1268. Roger Beach thought that Unocal was the initial driving force to push CARB to adopt a predictive model. (Beach, Tr. 1667).

1269. As he admitted on cross-examination, Roger Beach's goal was that CARB would use the scientific information provided by Unocal to develop a predictive model – which is precisely what CARB ended up doing. (Beach, Tr. 1788).

2. Unocal Provided CARB with a Computer Disk Containing Information from Unocal's Research.

1270. After receiving Unocal's regression equations, CARB staff requested detailed data behind the regression equations "so we'd be able to evaluate that data." Mr. Courtis used the background data to see if the regression equations matched the results. Mr. Courtis traditionally conducted such an analysis when he received regression equations – "I always do myself check regression equations against background data, so I did that."

(Courtis, Tr. 5745-5746).

1271. Unocal provided CARB with a computer disk containing data from Unocal's 10-car program on or within a few days of July 25, 1991. (CX 1247; Jessup, Tr. 1538-1539; 1540-1541).

1272. Mr. Courtis personally used data provided by Unocal to put together the October 1991 CARB staff proposal. Data housed by CARB at the Teale Data Center includes data from Unocal that Mr. Courtis "used to verify the regression equations that were provided to us by Unocal." (Courtis, Tr. 5777-5779; CX 1810 at 005).

1273. Mr. Courtis used data from Unocal prior to the November 1991 board hearing "because we had to look at the background information behind all the regression equations that we had, and that's what we did." (Courtis, Tr. 5941).

1274. One of the files housed at the Teale Data Center with UNOCAL in the title has a creation date listed as August 2, 1991. (CX 7045 (Cleary, Dep. at 78-79); RX 122 at 005 (used as CX 1810 at trial)).

1275. CARB staff concluded that Unocal's research was sound and sufficient basis for a T50 specification. (Venturini, Tr. 224-226, 230-231, 142).

1276. CARB as of August 1991 still did not have sufficient basis for proposing a T50 specification, absent permission to use Unocal's 5/14 research. (Fletcher, Tr. 6486; Courtis, Tr. 5764).

3. CARB Requested Unocal's Research Information for Use in the Phase 2 Reformulated Gasoline Rulemaking.

1277. Peter Venturini on June 20, 1991, agreed with Unocal's assertion in its presentation that Unocal's 5/14 research was unique in that it examined ten variables, including T50, independently. (Venturini, Tr. 224-225, 230-231).

1278. CARB staff wanted to use the research that Unocal presented at the June 20, 1991 meeting because it was the first time that CARB had received a comprehensive assessment of emission-reducing effects of T50 in isolation. (Venturini, Tr. 141-142).

1279. Unocal also knew that CARB would need Unocal's permission if CARB was to use the 5/14 research as a basis for any specification. Mr. Lamb knew "in order for it to be used in rulemaking that we would have to lift the confidentiality." (Lamb, Tr. 2226).

1280. Mr. Courtis knew that he "could not use the information [from Unocal] unless we received clearance from Unocal to be able to do so." Mr. Courtis recalls that he called Denny Lamb, "explained to him what we're planning to do." Mr. Courtis "asked them to

release this information to us so we'd be able to use that information for the development of the regulation." Subsequent to this conversation, CARB received the August 27, 1991 letter from Unocal, and, according to Mr. Courtis "we went ahead and we used the information." (Courtis, Tr. 5743).

1281. Prior to receiving permission from Unocal to use its information, Mr. Courtis explained to Mr. Lamb how CARB planned to use the information. Mr. Courtis "told him that we planned indeed to finalize the regulations and the standards that we were ready to propose." Mr. Courtis recognized at the time he had the conversation with Mr. Lamb that Unocal considered the information "confidential and proprietary to Unocal." Mr. Courtis "asked them to allow us to go ahead and use it, to release the proprietariness and confidentiality of the data." The objective of the conversation was to use "the information . . . for analyzing the standards." On cross-examination, when asked about this testimony, Mr. Courtis clarified that his discussion with Mr. Lamb referred to "the information." (Courtis, Tr. 5743-5744, 5935).

1282. CARB staff asked Unocal to allow CARB to "use that information for the development of the regulation." (Courtis, Tr. 5743; 5769-5770). Mr. Courtis "asked them to allow us to go ahead and use it, to release the proprietariness and confidentiality of the data." The objective of the conversation was to use "the information . . . for analyzing the standards." (Courtis, Tr. 5743-5744, 5935-5937, 5961-5962).

1283. Pending Unocal's answer, CARB went ahead with an August 14, 1991 workshop and, in response to prior requests, circulated a preliminary specification to spark discussion. Although that draft had a T50 specification in it, CARB staff viewed it as a mere talking piece and knew they needed permission to use Unocal's research if they were to propose a T50 specification in an actual rule. (Venturini, Tr. 248-251; CX 803 at 001 (August 8, 1991 status paper noting that some distillation parameters may be deleted and "all data not yet available"); Fletcher, Tr. 6486; Courtis, Tr. 5764 (not enough basis for a T50 specification)).

1284. Mr. Courtis recalled that Mr. Lamb's response to the request to "allow us to go ahead and use" Unocal's information indicated the Mr. Lamb would "check with his management." After this conversation between Mr. Courtis and Mr. Lamb, CARB received the August 27, 1991 letter, and, according to Mr. Courtis, "we went ahead and we used the information." (Courtis, Tr. 5743-5744).

4. In an August 27, 1991 Letter Unocal Represented to CARB that Its Data Were "Non-Proprietary" and "Available."

1285. The draft regulations disseminated by CARB before an August 14, 1991, workshop, and discussed at that workshop, included a T50 specification, (Fletcher, Tr. 6921, 6977-6778; RX 184 at 028), and expressed CARB's intention to develop predictive models as a

method for certifying gasoline formulations. (RX 184). Unocal attended the August 1991 workshop. (Lamb, Tr. 2229).

1286. Mr. Lamb received CARB staff's announcement for the August 14, 1991 public consultation meeting. (Lamb, Tr. 2229; RX 184).

1287. Mr. Lamb attended the August 14, 1991 CARB public workshop. (Lamb, Tr. 2229).

1288. Lamb and Unocal understood by August 1991 that CARB intended to include minimums and caps in any predictive model. (Lamb, Tr. 2231).

1289. Unocal's Fuels Issues Team discussed on August 22, 1991 that Unocal would "send CARB a waiver to release the 514 Project's emissions data." (Lamb, Tr. 2232; CX 266 at 004).

1290. On August 27, 1991, Unocal sent CARB a letter representing that Unocal's emissions research results were "nonproprietary" and "available" to CARB for use in the Phase 2 proceeding:

> On June 20, 1991, certain Unocal representatives met with Peter Venturini and other members of his staff. During that meeting, we presented the results of three phases in Unocal's Vehicle/Fuels testing program. We subsequently made the data base available to the staff and agreed to make the data public if necessary in the development of a predictive model for use in the certification of reformulated gasoline. The staff has now proposed to develop such a predictive model and requested that we make the data public. Please be advised that Unocal now considers this data to be non-proprietary and available to CARB, environmental interest groups, other members of the petroleum industry, and the general public upon request."

(CX 29).

1291. Mr. Lamb tried to be clear and accurate in the August 27, 1991 letter to CARB, and did not try to confuse issues.(Lamb, Tr. 2367).

1292. In dealings with CARB, particularly those that could potentially impact Unocal's competitive advantage, Mr. Lamb sought to communicate clearly. (Lamb, Tr. 2367-2368).

1293. Mr. Lamb did not even mention the term "confidential" in the August 27, 1991 letter to CARB. He also never informed CARB that they had no permission to use the presentation slides. Instead, he used the word "nonproprietary." (Lamb, Tr. 2368-2369,

2371-2372).

1294. Mr. Lamb sent the August 27, 1991 letter to CARB because he had gotten what he wanted by CARB proposing a predictive model. (Lamb, Tr. 2370; CX 29).

1295. Mr. Lamb used both the term "data" and the term "database" in the August 27, 1991 letter to CARB. (Lamb, Tr. 2369-2370; CX 29).

1296. Roger Beach understood that Denny Lamb was sending CARB the August 27, 1991 letter. (CX 29; Lamb, Tr. 1839-1840). Denny Lamb reported directly to Don D'Zurilla, who is copied on the letter. (Lamb, Tr. 1840; CX 29 at 001).

G. Unocal Conveyed the Deceptive Message That CARB Could Freely Use Unocal's 5/14 Research Without Any Cost or Economic Consequences.

1297. Peter Venturini, the lead manager who proposed Phase 2, construed Unocal's August 27, 1991 letter as saying that the information presented to CARB by Unocal regarding its 5/14 research was "nonproprietary" and could be used in the Phase 2 proceeding "with no strings attached." (Venturini, Tr. 143, 240-243).

1298. Peter Venturini also viewed Unocal as "removing their claim of competitive advantage" asserted in the July 1, 1991 letter. (Venturini, Tr. 243; CX 25; CX 29).

1299. Though addressed to Mr. Boyd, Mr. Venturini received the letter from Mr. Boyd's office and forwarded it others at CARB, including Mr. Simeroth. (Venturini, Tr. 159-160; Boyd, Tr. 6709).

1300. Other CARB staff who participated at the June 1991 presentation also viewed Unocal's August 27, 1991 letter as meaning that Unocal was making its research available with no associated costs. Robert Fletcher believed that making the research "available" meant that there were "no restrictions on its use." (Fletcher, Tr. 6480).

1301. The August 27, 1991 letter from Unocal to CARB gave Mr. Courtis the understanding that "the whole information" was "nonproprietary and nonconfidential and it was available to us to use it." At the time Mr. Courtis understood "nonproprietary" to mean "not owned by Unocal, available to the public." (Courtis, Tr. 5746; CX 29).

1302. CARB Executive Officer Boyd, based on staff's briefing, also understood that Unocal had given CARB permission to use its research without retaining any property rights. (Boyd, Tr. 6710-6712). At the time CARB received the August 27, 1991 letter, Mr. Boyd "was very familiar with the issues addressed." (Boyd, Tr. 6714-6715).

1303. CARB Chairman Sharpless, based on staff's briefing, similarly believed that Unocal was giving CARB its research without asserting any property rights. (CX 7063 (Sharpless,

Dep. at 229-230)).

1304. CARB personnel had no reason to assume that Unocal's affirmative statements in 1991 were lies or deceptive half-truths. Peter Venturini was unaware of any instance in his 30-year career at CARB where any company, other than Unocal, had told CARB that it could use the company's research and then, only later, told CARB "by the way, there's a charge for that." (Venturini, Tr. 191).

1305. Michael Kenny, CARB's General Counsel and Executive Director from 1990 through 2002, could recall no instance other than the Unocal patent episode where CARB had been led to rely on significant misrepresentations. (Kenny, Tr. 6522). In his words, the "practice of the board had been one in which the parties had dealt with one another in good faith, in an honest and reliable fashion." (Kenny, Tr. 6519-6520).

1306. No CARB staff personnel knew at the time that Unocal had a plan to charge money for use of the information. (Venturini, Tr. 243; Fletcher, Tr. 6472, 6476-6477; Courtis, Tr. 5747, 5750-5751, 5770-5771, 5784-5785).

1307. Unocal during the development of the Phase 2 mandatory specifications and predictive model never informed CARB of its pending patent and plan to charge royalties. (Venturini, Tr. 168, 319; Kenny, Tr. 6589-6590, 6671). Instead, Unocal repeatedly urged CARB to lower cost and maintain competition in other respects. (CX 39; CX 40; CX 42; CX 43; CX 311; CX 393; CX 769).

1308. Dr. Jessup admitted that Unocal showed CARB that T50 is an important variable that can have a large effect on emissions. (Jessup, Tr. 1293). He also knew that CARB included this teaching in the Phase 2 regulations, indicating that CARB recognized the importance of T50. (Jessup, Tr. 1294, 1296).

1309. Read separately or in conjunction with Unocal's July 1, 1991, letter, the August 27, 1991, letter created the materially false and misleading impression that Unocal had agreed to give up any "competitive advantage" it may have had relating to its invention and arising out of its emissions research results. (Venturini, Tr. 239-240, 243, 829-830; CX 29; CX 25; CX 33; CX 774 at 010-048).

1. The Reference to "Data" in the August 27, 1991 Letter Meant All of Unocal's Research Information, Including the Presentation Slides, Equations, and Database.

1310. After Unocal's June 20, 1991 presentation to CARB, Lamb received the message that CARB would like to have all of the data presented at the June 20, 1991 meeting, including the database and the equations. (Lamb, Tr. 2019).

1311. Lamb's statement that Unocal "considers this data to be nonproprietary" referred to the

data in the presentation of June 20, 1991. (Lamb, Tr. 2021-2022; CX 29). Lamb personally referred to Unocal's emissions equations as "data" in a draft of comments to WSPA. (CX 285; CX 1628; Lamb, Tr. 1927-1934). Similarly, the Memorandum and Contentions of Fact and Law filed by Unocal in June 1997, just before the start of the '393 trial, Unocal states that the term "data" in the letter applies to the equations as well: "the August 1991 letter making the data publicly available meant that the data and the equations, previously marked as confidential, were no longer marked that way." (CX 1323 at 048).

1312. According to Denny Lamb, Unocal's "data" specifically included the equations. In October 1991, Denny Lamb was asked by Gina Nelhams of WSPA to review the accuracy of Appendices 10-13 of CARB's technical support document. (CX 302 at 002-003; Lamb, Tr. 1928-1929). Appendix 11 of the technical support document set forth the Unocal predictive equations that Unocal had given to CARB. (CX 5 at 299-300). After his review, Mr. Lamb reported back in a memo, dated November 6, 1991, that the Unocal predictive equations set forth in Appendix 11 were "correct versions of *data* provided to CARB from Unocal." (CX 285 at 003 (emphasis added); *see also* CX 1628 at 003; Lamb, Tr. 1934).

1313. According to Denny Lamb, when Unocal subsequently submitted to EPA the same information provided to CARB, it provided the EPA all the information relating to the 5/14 Project including "the slides, the equations, and the database." (Lamb, Tr. 1989-1991).

1314. Mr. Courtis requested from Unocal permission to "use the information." The "information" referred to the "whole thing, the regression equations, the presentation that was provided to us, the details, some of the background, detailed data, the whole thing." (Courtis, Tr. 5744-5745). In the phrase of the August 27, 1991 letter: "Unocal now considers this data to be nonproprietary and available," Mr. Courtis understood at the time he received this letter that "data" meant, "the whole package of information." At that time, Unocal had provided the regression equations, detailed data behind the regression equations, and presentation materials. (Courtis, Tr. 5745-5746; CX 29).

2. Unocal's Use of the Term "Non-Proprietary" in the August 27, 1991 Letter Was Consistent With Its Use of the Term "Proprietary" As Referring to Ownership and Property Rights.

1315. Unocal's Chairman of the Board and CEO during the Phase 2 CARB rulemaking, Richard Stegemeier, testified that "by definition, proprietary means patent or trademark or copyright or something like that." (CX 7065 (Stegemeier, Dep. at 13)).

1316. Mr. Stegemeier also testified that, "by definition proprietary means holding a patent." (CX 7065 (Stegemeier, Dep. at 13)).

1317. According to Mr. Stegemeier, Unocal considered its patented hydrocracking technology to be "proprietary" technology. (CX 7065 (Stegemeier, Dep. at 12-13)).

1318. Mr. Stegemeier testified that the words "proprietary" and "secret" are not synonymous. (CX 7065 (Stegemeier, Dep. at 143)).

1319. During the CARB Phase 2 RFG proceedings, Denny Lamb specifically used the term "non-proprietary" again, in comments submitted to CARB by Unocal on April 7, 1994. Lamb used the phrase "non-proprietary terminals" to refer to terminals not owned by oil companies. (Lamb, Tr. 2029; CX 393 at 008).

a. Prior to August 27, 1991, Unocal Employees Understood the Term "Proprietary" to Mean Possessing a Property Interest in a Product or Technology.

1320. In the 1990-91 time frame, people within Unocal referred to the 5/14 Project as "proprietary." (Miller, Tr. 1370). In this context, Dr. Miller understood the term "proprietary" to convey the fact of an ownership interest. (Miller, Tr. 1370).

1321. Similarly, Mr. Lamb understood that the patent application represented a "proprietary opportunity." (Lamb, Tr. 1825).

1322. During the time that Mr. Lamb was employed at Unocal, he understood that Unocal's "proprietary pipelines" were pipelines owned by Unocal, and that proprietary terminals were terminals owned by Unocal. (Lamb, Tr. 1798-1799).

1323. In the January 1989 time frame, Unocal had "a patent pending on a combination of additives that were specifically effective for port fuel injectors." (Miller, Tr. 1397). When Unocal sent a sample of this combination of additives for testing by The Lubrizol Corporation, Unocal referred to the additives as a "proprietary" gasoline detergent and insisted that the parties enter into a secrecy and non-analysis agreement. (CX 108; Miller, Tr. 1396-1397).

1324. On January 13, 1989, Dr. Miller sent a letter to Fred Ruhland of Lubrizol Corporation concerning the shipment to Lubrizol of Unocal's "proprietary gasoline detergent." (CX 108). This memo was copied to Unocal management, including Dr. Alley, the Vice President of Products, Processes, and Materials Research. (CX 109).

1325. On January 24, 1989, Dr. Croudace sent another letter to Fred Ruhland of Lubrizol Corporation concerning a shipment of Unocal's "proprietary" gasoline detergent. (CX 109; Croudace, Tr. 570).

1326. On October 3, 1989, Dr. Croudace sent a memo to his supervisor, Dr. Mallet, in which he

stated that "Unoclean is proprietary to Unocal." (CX 136; Croudace, Tr. 571). Dr. Croudace understood that there was a patent pending on Unoclean in approximately 1989. (Croudace, Tr. 571-572).

1327. In October 1989, Unocal considered embarking on an "aggressive program for the development of a proprietary reformulated gasoline." (CX 139). In an internal Unocal memorandum dated October 20, 1989, a Unocal employee informed Unocal management the following: "Unocal should take this indirect endorsement of gasoline as a cue for starting an aggressive program for the development of a proprietary reformulated gasoline. The resources allocated for a proprietary program should be greater than a combined auto/oil investigation. Our influence in a combined study is quite diluted and is not geared to meet our unique requirements." (CX 139 at 001, 003).

1328. Unocal's own October 1, 1989 Policies and Procedures Relative to Intellectual Property uses the uses the word "proprietary" in its ordinary sense as conveying property rights in discussing the tax treatment of intangible property. Unocal's policy stated:

> The Internal Revenue Code contains numerous provisions dealing with the transfer of "property" from a U.S. corporation to a related foreign corporation. **The term "property" is defined broadly and includes such items as intangible assets. The term "intangibles" is also broadly defined to include patents, trademarks, copyrights and various types of proprietary information.**

(CX 460 at 009 (10/1/89, Policies and Procedures Relative to Intellectual Property)) (emphasis added).

1329. Unocal's 1989 Intellectual Property Policy also uses the terms "confidential" and "proprietary" disjunctively as expressing different types of materials. One section of the policy is entitled "Other Receipt of Confidential Information and/or Proprietary Materials," and discusses "[w]hen it is appropriate to receive confidential or proprietary materials from other parties . . . ." (CX 460 at 010 (10/1/89, Policies and Procedures Relative to Intellectual Property)).

1330. Unocal's own Intellectual Property Policy – which went out under the signature of Roger Beach as Chairman of the Board and Chief Executive Officer – states that intellectual property "is proprietary business or technical information of value protected by patent, trademark, copyright, or trade secret laws." (CX 714 at 001; Beach, Tr. 1656-1657).

1331. Roger Beach signed the Auto/Oil Agreement on behalf of Unocal in 1989. (CX 4001 at 026; Beach, Tr. 1694).

1332. The Auto/Oil Agreement stated that "to the extent that proprietary technology and/or other proprietary information is reasonably required to conduct such research and testing, certain limitations on disclosure may be required to ensure compliance with applicable

law and to protect individually owned proprietary information supplied to the Program by companies whether or not Members of this Program." (CX 4001 at 014 (¶ 6 A)).

1333. In furtherance of the "full disclosure" principle, Unocal and the other Auto/Oil members agreed as follows: "No proprietary rights will be sought nor patent applications prosecuted on the basis of the work of the Program unless required for the purpose of ensuring that the results of the research by the Program will be freely available, without royalty, in the public domain." (CX 4001 at 007 (¶ 2 E)).

1334. In early 1991, Unocal management considered entering into a joint research agreement with Ford, and on February 12, 1991, Unocal management received a draft agreement from the office of Ford's general counsel. (CX 1537; Lamb, Tr. 1876). Mr. Lamb reviewed this agreement, and authored an internal Unocal memorandum that was copied to senior Unocal management including Dr. Alley, Mr. Beach, and Mr. Lipman. (CX 1537 at 001; Lamb, Tr. 1876). The draft Unocal/Ford research agreement provided that: "Ford and Unocal will utilize certain proprietary technical information and data which is the property of the other party while participating in the test program." (CX 1537 at 004; Lamb, Tr. 1880). In the agreement, the term "proprietary" is defined to mean the property of one of the parties. (Lamb, Tr. 1880).

1335. The draft Unocal/Ford research agreement reviewed by Mr. Lamb in February 1991 also contained a provision that "Ford and Unocal each desire to have its proprietary technical information and data maintained in confidence." (CX 1537 at 004; Lamb, Tr. 1880-1881). This language reflected a desire of the companies to have their respective property maintained as confidential. (Lamb, Tr. 1881).

1336. Don D'Zurilla signed the General Motors/Western States Petroleum Association/Air Resource Board research agreement on behalf of Unocal. (CX 1711 at 022; Lamb, Tr. 2040).

1337. Mr. Lamb reviewed the GM/WSPA/ARB research agreement for Don D'Zurilla prior to Mr. D'Zurilla's signing of the agreement on behalf of Unocal. (Lamb, Tr. 2040).

1338. Paragraph D of the GM/WSPA/ARB research agreement states: "The results of research and testing of the program shall be disclosed to the members and otherwise placed in the public domain." (CX 1711 at 003; Lamb, Tr. 2040).

1339. The GM/WSPA/ARB research agreement provides the following: "No proprietary rights shall be sought nor patent applications prosecuted on the basis of the work of the program unless required for the purpose of ensuring that the results of the research by the program shall be freely available, without royalty, in the public domain." (CX 1711 at 003; Lamb, Tr. 2040-2041).

b. After August 27, 1991, Unocal Employees Continued to Use the

Term "Proprietary" to Mean Possessing a Property Interest in a Product or Technology.

1340. In an October 17, 1991 letter, Unocal released its research results to the Environmental Protection Agency. Dr. Miller sent Rick Rykowski of the United States Environmental Protection Agency a letter enclosing a copy of the slides Unocal used in it presentation to CARB in June 1991. (CX 297; Lamb, Tr. 2030). This letter and a copy of the slides were sent by Dr. Miller to Rick Rykowski pursuant to a request made by Denny Lamb, and Mr. Lamb received a copy. (CX 297; Lamb, Tr. 2030).

1341. The October 17, 1991 Unocal letter from Dr. Miller to Rick Rykowski of the US EPA states: "The work covered in the slides represent our proprietary effort over several years." (CX 297). This sentence referred to Unocal's 5/14 Project. (Lamb, Tr. 2030-2031).

1342. In his written and oral remarks to CARB in November 1991, Mr. Lamb admitted that Unocal had provided CARB its "proprietary" information concerning its emissions research. (CX 774 at 021; Lamb, Tr. 2087; CX 34 at 003).

1343. The slides presented by Mr. Lamb at the CARB hearing in November 1991 included a slide addressing the predictive model. Under the heading "Unocal History," a bullet point states that Unocal "Developed Proprietary Model." (CX 33 at 028).

1344. In the April 7, 1994 Unocal comments to CARB, Mr. Lamb stated that Unocal was "concerned that CARB does not allow test reproducibility for proprietary terminals because this decision effectively requires us to impose additional product safety margins at the refinery." (CX 393 at 008).

1345. In the April 7, 1994 comments submitted to CARB by Unocal, Mr. Lamb's reference to "proprietary terminals" referred to terminals owned by oil companies. (Lamb, Tr. 2029; 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 proposed regulation. (Kulakowski, Tr. 4449). In addition, Unocal regulatory staff knew that CARB staff worked to develop an estimate of the efficient emissions reductions associated with the proposed regulations in order to determine cost-effectiveness. (Kulakowski, Tr. 4449).

1355. Unocal's chief liaison to CARB, Denny Lamb, knew that CARB was concerned about costs and the economic impact that the regulations would have on consumer prices. (Lamb, Tr. 1945). Denny Lamb also understood that CARB was undertaking an economic evaluation of the costs for producers of gasoline to comply with the Phase 2 regulations. (Lamb, Tr. 1945).

1356. During the development of the CARB Phase 2 RFG regulations, CARB and the refiners all were concerned about costs. (Lamb, Tr. 1946).

1357. Mr. Kulakowski, one of the two employees in Unocal's regulatory group that dealt with CARB regarding the Phase 2 regulations, testified that when he was working at Unocal in 1991 on the CARB Phase 2 regulations, CARB should have been informed of costs the industry would incur to comply with the regulations. (Kulakowski, Tr. 4494-4495).

1358. During the development of the Phase 2 RFG regulations, Denny Lamb understood that CARB was quite concerned about the potential supply of reformulated gasolines. (Lamb, Tr. 1917-1918). CARB's concerns over the supply of reformulated gasoline "grew over time," and CARB expressed "big-time" concerns as to whether there would an adequate supply of gasoline upon the roll-out of the regulations in 1996. (Lamb, Tr. 1918).

1359. Dr. Jessup was aware of the fact that CARB was concerned about the supply of gasoline in California. (Jessup, Tr. 1297).

1360. During the Phase 2 modification process, CARB requested periodic compliance reports from refiners because CARB was very interested in ensuring that there was an adequate supply of reformulated gasoline as of the effective date of the regulations in 1996. (Lamb, Tr. 1923).

1361. On behalf of Unocal, Denny Lamb approved of, and coordinated, the Unocal compliance reports submitted to CARB. Lamb would be generally aware of the content of the submissions to CARB concerning Unocal's compliance with the Phase 2 regulations. (Lamb, Tr. 1935-1936).

1362. Following the adoption of the Phase 2 specifications, Unocal submitted numerous compliance reports on a periodic basis to CARB. *See* (CX 322 (February 26, 1993); CX 1054 (November 5, 1993); CX 941 (March 1, 1994); CX 978 (March 31, 1994); CX 986 (September 1, 1994); CX 1005 (November 1, 1994); CX 995 (November 29, 1994); CX 1011 (February 28, 1995); CX 411 (May 30, 1995); CX 413 (August 28, 1995); CX 1048 (September 26, 1995); CX 1052 (November 3, 1995); CX 2122 (January 2, 1996)).

1363. At the March 1995 meeting with Unocal that followed Unocal's public announcement of the issuance of the '393 patent, CARB officials expressed concern about how the '393 patent might affect the supply of gasoline. (Lamb, Tr. 2046-2047).

A. Unocal Knew That CARB Was Actively Seeking Cost Information.

1. CARB Actively Sought This Information.

1364. CARB staff relied for its cost estimates on information that was submitted to CARB by the oil refiners. (Venturini, Tr. 163). The issues of costs associated with proposing standards "was a major issue" that CARB staff discussed "many, many times" in workshops and discussions with individual companies and organizations. (Courtis, Tr. 5751).

1365. It was important to CARB staff in drafting the Phase 2 regulations that the cost information received from the oil refiners was truthful. (Venturini, Tr. 163; Courtis, Tr. 5731-5732 ("very important" that the oil companies submit truthful cost information).

1366. Refiners' cost information was used to set the specification levels and also to inform the public of the potential cost to them of the Phase 2 rule. (Venturini, Tr. 163).

1367. James Aguila, a CARB staff person assigned to analyze costs in Phase 2, depended on industry input on cost because "we don't expect to be the experts in the refining industry." (CX 7040 (Aguila, Dep. at 87-88)). He recognized that there were "a number of possible cost implications that would be germane to the operations of a refiner, and we don't purport to know what all those are." (CX 7040 (Aguila, Dep. at 134-135)). Robert Fletcher, a CARB supervisor, similarly viewed the task as "finding out as much about refinery operations and the impact of changes in fuels specifications on those operations" to determine the cost of Phase 2 regulations. (Fletcher, Tr. 6447; Courtis, Tr. 5720-5721).

1368. Staff in summer of 1991 also regularly met with WSPA to talk about issues such as costs, proposed or expected emissions reductions, technology, research, and enforcement. (CX 7040 (Aguila, Dep. at 90-91)). CARB staff also had numerous meetings with individual oil companies. (Courtis, Tr. 5733).

1369. CARB staff in the October 1991 Staff Report stated that "In developing the cost estimates for this chapter, staff has generally relied on information presented to us by the refiners." (CX 52 at 070). CARB used information provided by six representative refiners to estimate the potential costs of complying with the proposed regulations. (CX 52 at 016, 070-071; CX 5 at 129-130, 155-156). The six refiners that provided responsive cost information to CARB included large refiners, independent refiners, and small refiners, and three of the refiners which submitted data were large complex refineries. (CX 5 at 137; CX 52 at 071).

1370. CARB stated in its October 1991 Technical Support Document that CARB staff "utilized data submitted from refiners, in addition to other sources of data, to estimate the fiscal impact on the refining industry." (CX 5 at 129-130, 137, 155-156).

2. Unocal Representatives Were Aware of CARB's Requests for Cost Information.

1371. Unocal regulatory staff knew that CARB was concerned about the cost-effectiveness of the Phase 2 regulations because CARB staff had indicated this concern. (Kulakowski, Tr. 4451).

1372. Dr. Jessup was aware of the fact that CARB was concerned about the supply of gasoline

in California. (Jessup, Tr. 1297).

1373. Through his dealings with CARB, Dr. Miller understood in the 1990-1991 time frame that CARB was interested in information about potential compliance costs. (Miller, Tr. 1397).

1374. Unocal regulatory staff knew that the Clean Air Act specifically required CARB to evaluate the cost and cost-effectiveness of its proposed rules. (Kulakowski, Tr. 4449). According to Unocal regulatory staff, the "cost" that CARB sought to determine was the total cost of its proposed regulation, expressed in terms of cents-per-gallon. (Kulakowski, Tr. 4450). The "cost-effectiveness" that CARB sought to determine was the cost to reduce a ton of emissions, expressed in terms of dollars per ton of a given emission. (Kulakowski, Tr. 4450).

1375. By mid-1991, Unocal regulatory staff also knew that CARB staff was concerned about the additional costs that would be incurred by refiners to produce CARB Phase 2 reformulated gasoline. (Kulakowski, Tr. 4451-4453). Specifically, Mr. Kulakowski learned of this through conversations with CARB staff members Richard Vincent, Dean Simeroth, and Peter Venturni. (Kulakowski, Tr. 4452). All three of these CARB staff members indicated to Mr. Kulakowski that CARB wanted an accurate estimate of the costs related to the proposed regulations. (Kulakowski, Tr. 4452). Mr. Simeroth also told Mr. Kulakowski that CARB needed to obtain an accurate estimate of costs because of the legislative requirement to determine the cost and cost-effectiveness of the proposed Phase 2 rule. (Kulakowski, Tr. 4453).

1376. During the Phase 2 proceedings, Unocal regulatory staff compared the cost-effectiveness of CARB's proposed regulations against other regulations promulgated by CARB and other agencies. (Kulakowski, Tr. 4450). Unocal's comparison showed that the proposed Phase 2 regulations "were at or beyond the cost-effectiveness, that is, less cost-effective than other regulations that had been proposed and promulgated by the Air Resources Board." (Kulakowski, Tr. 4450-4451).

1377. Unocal regulatory staff knew that CARB was serious about obtaining accurate cost estimates. (Kulakowski, Tr. 4468-4469). This was evident by the steps Unocal regulatory staff observed CARB taking to evaluate cost. (Kulakowski, Tr. 4469). These steps included CARB using a methodology to convert capital investment costs into cents-per-gallon cost and CARB using consumers costs in the form of a mileage penalty. (Kulakowski, Tr. 4469). The consumer cost piece of the capital investment conversion is not a straight-forward methodology, and CARB had taken the time to understand how to make the calculation. (Kulakowski, Tr. 4469). Including the consumer costs was an "extra step" to get an accurate estimate. (Kulakowski, Tr. 4469).

1378. Unocal regulatory staff were required to understand CARB's cost estimation methodology to "assure that CARB was doing an adequate job of estimating the cost to

make sure that they were following their legislative requirement." (Kulakowski, Tr. 4471).

1379. Mr. Kulakowski and Mr. Lamb discussed CARB's efforts to determine the cost of the Phase 2 proposal (Kulakowski, Tr. 4473).

B. Unocal Knew That the Industry Was Submitting Economic Studies to CARB.

1. Auto/Oil Submitted Economic Studies to CARB.

1380. The whole point of Auto/Oil's work was to develop cost effective regulations. (Kiskis, Tr. 3833-3834; CX 4001 at 001-003; CX 140; Burns, Tr. 2409; Ingham, Tr. 3822-3833; CX 7076 (Youngblood, Dep. at 10); CX 7049 (Hochhauser, Dep. at 10, 12-13); Klein, Tr. 2465-2466, 2474-2476).

1381. Auto/Oil formed an Economics Committee to study the cost-effectiveness of various options. (CX 4001 at 028).

1382. Auto/Oil selected Turner Mason in 1989 to conduct a study to determine the refining cost of gasoline reformulations for different geographic regions of the United States. (Cunningham, Tr. 4134-4135).

1383. The Auto/Oil study focused on examining certain properties of gasoline, known as AMOT. AMOT includes aromatics, MTBE, olefins, T90, and sulfur levels. (Cunningham, Tr. 4138).

1384. In order to conduct the study for Auto/Oil, Turner Mason asked the oil company members of Auto/Oil to review and update their costs. (Cunningham, Tr. 4134-4135; 4138). This meant that oil company participants would provide investment, catalyst, and royalty costs, as well as reviewing the raw material, product, and operating costs to generate the study. (Cunningham, Tr. 4134-4135; 4138).

1385. Mr. Motte of Unocal validated the estimated costs of the Unocal process technologies, including the estimated royalty figures used for the patented Unocal heavy gasoline hydrocracking technology. (Cunningham, Tr. 4136-4138).

1386. Turner Mason aggregated the costs associated with the patented Unocal heavy gasoline hydrocracking technology. (Cunningham, Tr. 4137-4138).

1387. Although Mr. Motte expressed his opinion of the validity of the heavy gasoline hydrocracking technology costs, Mr. Motte noted that the remaining 30 to 40 process units in the model understated investment costs by about 10 percent. (Cunningham, Tr. 4136-4137).

1388. Approximately 20 other representatives of oil companies met with Turner Mason to review and comment on the details of the Auto/Oil study to satisfy themselves or to suggest changes in the model. (Cunningham, Tr. 4136, 4146; RX 343).

1389. "Cost estimates were based on the use of presently available refinery technology and therefore do not include provisions for potential technological improvements." (RX 342 at 006).

1390. In connection with the Auto/Oil study, the information presented by Mr. Motte on the patented heavy gasoline hydrocracking technology indicated that Unocal had applications to reduce T90, but had not yet licensed its technology . (Cunningham, Tr. 4144-4146).

1391. Auto/Oil submitted the Turner/Mason study to CARB. (Cunningham, Tr. 4147, 4368-4369, 4371).

1392. When Auto/Oil published the study, it did not include the table that depicts royalty costs. (Cunningham, Tr. 4147, 4368-4369, 4371-4372). The Auto/Oil group did not request Turner Mason to include that level of detail in the study. (Cunningham, Tr. 4147, 4368-4369).

1393. Mr. Motte of Unocal and representatives of Shell, Texaco, Chevron, and other members of the Auto/Oil economics committee reviewed the investment cost information, which included royalty costs, and Turner Mason used it later with its WSPA cost study, which was also submitted to CARB. (Cunningham, Tr. 4370-4372).

2. WSPA Commissioned Economic Studies for CARB.

1394. Unocal participated in an industry effort, though the Western States Petroleum Association, to estimate the cost impact of CARB's Phase 2 regulations. (Kulakowski, Tr. 4472).

1395. WSPA commissioned several economic studies that were ultimately submitted to CARB. *See, e.g.*, (CX 801 (DRI/McGraw-Hill Study); RX 273 (Sierra Research Study); CX 1106 (Turner/Mason Study)).

1396. Turner Mason proposed a study comprising of a model of a single California refinery that would evaluate the cost of compliance with proposed CARB Phase 2 RFG regulations compared to other possible alternatives. (CX 1151 at 002; CX 1152; Cunningham, Tr. 4150-4154).

1397. Unocal knew that the purpose of the Turner Mason report was to develop an industry assessment of the costs of the CARB Phase 2 proposal. (Kulakowski, Tr. 4498).

1398. Unocal, through Mr. Kulakowski, reviewed the results of the Turner Mason study, set premises for the study, and directed the actions of Turner Mason in conducting the study. (Kulakowski, Tr. 4497-4498).

1399. 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).

1400. Unocal knew that the Turner Mason study was an effort to quantify all known costs that would be incurred to comply with the CARB Phase 2 regulations. (Kulakowski, Tr. 4499).

1401. WSPA developed the Turner Mason study under the supposition that each of the companies involved in the project would submit the appropriate data and that it would be accurate. Participants expected that all members of WSPA would submit data in order to complete the study. (CX 7070 (Wang, Dep. at 56)).

1402. Unocal knew that the Turner Mason report was intended for submission to CARB and that it was in fact submitted to CARB. (Kulakowski, Tr. 4500).

1403. Mr. Kulakowski testified that had he known of Unocal's patent application after he had reviewed CARB's technical support document in 1991 and that the patent application might add potential costs to the production of reformulated gasoline, he would have sought permission from Mr. Lamb to disclose those facts to CARB. (Kulakowski, Tr. 4500, 4506).

1404. Neither Mr. Kulakowski nor anybody else from Unocal told Mr. Cunningham that it had a patent pending related to RFG when Mr. Cunningham sought cost information from the WSPA EIG. (Cunningham, Tr. 4252-4257).

1405. The DRI/McGraw-Hill study took the costs from the Turner Mason study and applied them on a macroeconomic basis. (Kulakowski, Tr. 4114). In other words, the study "evaluated the economic impacts on the California economy of several alternative options for regulating Phase 2 reformulated gasoline." (CX 801 at 003).

1406. Unocal's regulatory staff knew that any compliance costs added to the Phase 2 regulations would be passed through and would adversely affect California consumers. (Kulakowski, Tr. 4514-4517).

1407. As part of his duties at Unocal, Mr. Kulakowski was the leader within WSPA of the DRI/McGraw-Hill study. (Kulakowski, Tr. 4514).

1408. Unocal approved the DRI/McGraw-Hill study, and with the approval of the WSPA trade association, the study was submitted to CARB. (Kulakowski, Tr. 4514-4515, 4518).

1409. Sierra Research conducted a study on behalf of WSPA, detailing the cost-effectiveness of the Phase 2 regulations. (Kulakowski, Tr. 4517).

1410. On behalf of Unocal, Mr. Kulakowski participated in the WSPA committee that managed the Sierra Research study. (Kulakowski, Tr. 4517-4518).

1411. Unocal approved the Sierra Research study, and with the approval of the WSPA trade association, the study was submitted to CARB. (Kulakowski, Tr. 4518).

C. Unocal's Complaints to CARB About the Costs of CARB's Regulations Demonstrate that Unocal Knew CARB was Concerned About Cost.

1412. In a November 21, 1991 letter to CARB Chairwoman Sharpless, Mr. Beach emphasized the cost of the Phase 2 regulations. (CX 33 at 001; Beach, Tr. 1681-1682). He described the Phase 2 regulations as "the most costly regulation proposed to date by any California regulatory body." (CX 33 at 001; Beach, Tr. 1682). He went on to emphasize that the estimates "of the cost of compliance are as high as $10 billion for our industry" and that Unocal was "strongly opposed to the imposition of measures that are not cost effective." (CX 33 at 001; Beach, Tr. 1682).

1. Unocal Submitted Testimony and Comments About the Cost-Effectiveness of CARB Regulations.

1413. Unocal in a June 19, 1992 comment stated that "Unocal is strongly opposed to differential treatment for any segment of the refining industry." (CX 39 at 001).

1414. Unocal representative Michael Kulakowski at a CARB hearing on certification fuels for LEV vehicles in August 1992 urged CARB to adhere to the principle of a "level playing field." (CX 40 at 006 ("Now, Unocal wants to believe that the terms 'fuel neutral' and 'level playing field' are more than just buzzwords and requests that the Board only approve certification specifications that completely support these concepts.")).

1415. Kulakowski's testimony at the August 14, 1992 LEV hearing also reiterated the Unocal position that its potential cost savings of $10 million annually should be material in CARB's decisionmaking. (CX 40 at 008).

1416. Unocal in written comments on the predictive model on June 3, 1994 continued to argue for more flexibility to enable additional cost savings. (CX 43).

1417. Unocal, in comments submitted to CARB relating to CARB's development of a predictive model, cast itself as having taken a position on the predictive model keyed to

the "cost effectiveness" of the regulations. Unocal stated: "We are pleased that most of the model decisions have been based on sound science and have observed our basic criteria of necessity and cost effectiveness." (CX 43 at 005).

2. Unocal Played a Role in Formulating WSPA's Cost-Effectiveness Position.

1418. During the CARB Phase 2 rulemaking process, Unocal participated in the WSPA economic working group and reviewed the Turner Mason report. (Kulakowski, Tr. 4497-4498). Unocal knew that the purpose of the Turner Mason report was to develop an industry assessment of the costs of the Phase 2 proposal. (Kulakowski, Tr. 4498). Unocal, through Mr. Kulakowski, reviewed the results of the Turner Mason study, set premises for the study, and directed the actions of Turner Mason in conducting the study. (Kulakowski, Tr. 4498).

1419. 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). In fact, as part of that study, Mr. Cunningham asked Mr. Kulakowski for an update of Unocal's technology licensing fees. (Kulakowski, Tr. 4500).

1420. Unocal knew that the Turner Mason study was an effort to quantify all known costs that would be incurred to comply with the CARB Phase 2 regulations. (Kulakowski, Tr. 4499).

1421. It was in Unocal's interest that the Turner Mason study show higher costs on a per-gallon basis because poorer cost-effectiveness ratios would lead to less stringent regulations. (Kulakowski, Tr. 4500).

1422. Unocal knew that the Turner Mason report was intended for submission to CARB and that it was in fact submitted to CARB. (Kulakowski, Tr. 4500).

3. Unocal Railed Against the Small Refiner and Independent Refiner Exemptions Because Unocal Claimed that Those Exemptions Would Tilt the Playing Field.

1423. Unocal expected that CARB should be concerned about any aspects of its Phase 2 regulations that might cause refiners to produce less Phase 2 gasoline. (Kulakowski, Tr. 4485-4489). In opposing a small refiner exception to CARB's Phase 2 rules, Unocal argued that the small refiners exception "could affect the decisions of other refiners on how to invest to make CARB gasoline. It could affect the volume that they decided to try to produce and the extent to which they modified their refineries to produce that gasoline." (Kulakowski, Tr. 4489).

1424. According to Unocal, anything that could affect the volume of Phase 2 gasoline produced

"should have concerned CARB to assure a successful implementation of the program." (Kulakowski, Tr. 4489).

1425. While CARB ultimately enacted a small refiner exception, in doing so it did not believe that the exception would affect the investment decisions of the other refiners. (CX 10 at 135-138). Specifically, CARB staff found that because the regulations would limit the volume of gasoline subject to the exemption, "there is no incentive for the small refiners to undercut market prices with the accompanying adverse impact on the ability of large refiners to recover costs." (CX 10 at 138).

1426. Unocal also knew that CARB would be concerned about any provisions of the Phase 2 regulations that would interfere with the refiners' ability to recover their capital investments costs or that would impose costs on some refiners but not others. (Kulakowski, Tr. 4489-4492).

1427. Unocal argued against a proposed "independent" refiner exemption on the basis that the independent refiners would be able to cut prices, which would cause other refiners to have a more difficult time recovering the capital investments required to comply with the Phase 2 regulations. (CX 311 at 001; Kulakowski, Tr. 4491).

1428. In effect, Unocal argued that CARB should not adopt the independent refiner exemption because it would impose costs on some refiners but not others. (Kulakowski, Tr. 4492-4493).

1429. On June 19, 1992, Denny Lamb submitted comments to CARB on behalf of Unocal that strongly opposed the small refiner exemption. (CX 39; Lamb, Tr. 1956-1957). In these comments, Unocal took great exception to the small refiner exemption and discussed that "market dislocations" could result from implementation of this exemption. (CX 39 at 002; Lamb, Tr. 1957).

1430. As set forth in Unocal's June 19, 1992 comments to CARB, Unocal opposed the small refiner exemption in part because Unocal believed that the implementation of this exemption could severely hamper the cost recovery of capital by major refiners. (CX 39 at 002; Lamb, Tr. 1957-1958).

1431. In Unocal's June 19, 1992 comments to CARB, Unocal told CARB that Unocal and the other major refiners would be competitively disadvantaged by the small refiner exemption. (Lamb, Tr. 1958).

1432. In Unocal's June 19, 1992 comments to CARB, Unocal stated that the small refiners could receive an "economic windfall" as a result of implementation of the small refiner exemption. (CX 39 at 002; Lamb, Tr. 1958-1959). In these June 19, 1992 comments, Denny Lamb, on behalf of Unocal, took exception to the economic windfall that could potentially result. (Lamb, Tr. 1959).

1433. In the June 19, 1992 comments to CARB, Unocal discussed a potential windfall to small refiners that could result in additional costs of approximately six cents per gallon. (CX 39 at 002-003; Lamb, Tr. 1959-1960).

1434. At the time that Denny Lamb submitted Unocal's June 19, 1992 comments to CARB, he believed that CARB should pay attention to potential cost impacts of six cents per gallon, and that this was material information that CARB should know. (Lamb, Tr. 1960).

1435. In the June 19, 1992 Unocal comments to CARB, Unocal stated that the implementation of a predictive model "could save Unocal at least $10 million in investment." (CX 39 at 004; Lamb, Tr. 1961-1962). Denny Lamb believed that this was an important fact that CARB should consider, and he believed that $10 million was significant to Unocal. (Lamb, Tr. 1962).

XI. Unocal Viewed its Participation in Auto/Oil as an Integral Part of its Overall Strategy to Gain Competitive Advantage.

1436. At the same time it was deceiving CARB, Unocal extended its scheme to include misrepresentations to a private industry group known as the Auto/Oil Air Quality 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).

1442. Auto/Oil wanted to develop a recommendation based upon data that was public, so that there was no need to use a more expensive, patented process. (Kiskis, Tr. 3830-3834; CX 7076 (Youngblood, Dep. at 10-11)).

1443. As Research Program Committee ("RPC") co-chair Mr. Kiskis testified, "the overall driver [of Auto/Oil] was to find a solution that was the lowest cost to society and still being effective [on lowering emissions], so cost-effectiveness was as important as just technical effectiveness." (Kiskis, Tr. 3833-3834).

1. Auto/Oil Established a Formal Working Framework to Facilitate Collaboration In Order to Give Regulators Sound Technical and Scientific Information.

1444. On October 16, 1989, Unocal and 13 of the other largest domestic oil companies joined the traditional "big three" domestic automobile manufacturers in creating the Auto/Oil joint venture. (CX 4001 at 001-002; Burns, Tr. 2409; CX 140; CX 4016 at 004).

1445. The member companies of Auto/Oil included Amoco Oil Company, ARCO Products Company, Ashland Oil, Inc., BP Oil Company, Chevron USA, Inc., Chrysler Motors Corporation, Conoco, Inc., Exxon Research and Engineering Company, Ford Motor Company, General Motors Research Labs, Marathon Oil Company, Mobil Research and Development Corporation, Phillips Petroleum Company, Shell Development Company, Sun Refining and Marketing Company, Texaco, Inc., and Union Oil Company of California. (CX 4001 at 029-030).

1446. The Auto/Oil members spent a substantial amount of money to make sure the joint venture would be successful. (Burns, Tr. 2409-2410). The total budget was $40 million, with the three automobile companies combining to pay $20 million and the fourteen oil companies paying a total of $20 million. (Burns, Tr. 2409-2410).

1447. Auto/Oil was created under the auspices of the federal National Cooperative Research Act of 1984, 15 U.S.C. § 4301 *et seq*., to permit and encourage cooperative research. (CX 4001 at 002; CX 7079 (Zimmerman, Dep. at 23); CX 140).

1448. The National Cooperative Research Act of 1984 permits competitors to engage in collective research, but prohibits other conduct traditionally deemed anticompetitive, such as agreements to exchange competitively sensitive information or to restrict output. (15 U.S.C. § 4301 (a)-(b)). The Act provides that in any action under the antitrust laws, the joint venture shall not be deemed illegal *per se*, but rather shall be judged on the basis of the rule of reason. (15 U.S.C. § 4302).

1449. At the time Auto/Oil was formed, the Auto/Oil members perceived that unprecedented 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. (Pahl, Tr. 2766).

1464. Conoco Phillips' main Auto/Oil representative, Robert Pahl, was the Manager of Product Stewardship and Technical Support. (Pahl, Tr. 2763-2764). He has a Bachelor's degree in chemical engineering, a master's degree in chemical engineering, and a Ph.D. in chemical engineering. (Pahl, Tr. 2763).

1465. Chevron got involved with Auto/Oil because "Chevron was very interested in developing information on the impacts of fuel property changes on vehicle emissions and the impacts of changes in vehicle emissions on air quality and developing information as well on the costs associated with reformulating fuels in different ways." (Ingham, Tr. 2595).

1466. Chevron had two main Auto/Oil representatives: Ronald Kiskis and Michael Ingham. (Ingham, Tr. 2593-2594 (Mr. Ingham took over for Mr. Kiskis as Chevron's main Auto/Oil representative after Mr. Kiskis was promoted)). Mr. Ingham is the Manager of State Fuels Regulations, and has a bachelor's, master's, and Ph.D. in chemical engineering. (Ingham, Tr. 2591-2592). Mr. Kiskis is the President of Chevron Oronite Company and has a bachelor's in chemistry and Ph.D. in organic chemistry. (Kiskis, Tr. 3816).

1467. Auto/Oil's objective was to plan and carry out research and tests designed to measure and evaluate automobile emissions and the potential improvements in air quality, particularly through RFG and alternative fuels, and provide the research results to state and federal regulators. (CX 4001 at 003; CX 7049 (Hochhauser, Dep. at 10, 13)).

1468. Dr. Starling Kess Alley, Unocal's senior representative to Auto/Oil, specifically testified that it was **not** Auto/Oil's objective to give one refiner a competitive advantage against other members. (CX 7041 (Alley, Dep. at 25)) (emphasis added).

1469. The Auto/Oil research involved testing fuels with different combinations of properties in different car engines, and tabulating the resulting emissions, in order to "evolve a fuel composition that was economical and gave minimal pollutants." (CX 7041 (Alley, Dep. at 23)).

1470. In order to meet its objectives and execute the Auto/Oil Program, the members set up several committees and developed research plans, divided up responsibilities to each member company, and set up a time line for when project results were going to be shared with all of the members. (Kiskis, Tr. 3819; CX 7041 (Alley, Dep. at 12); CX 4001 at 028).

1471. The Research Planning Task Force ("RPTF") oversaw the entire Auto/Oil joint venture and was in charge of publishing the program's results. (CX 7073 (Wise, Dep. at 33-34, 37-38); CX 7041 (Alley, Dep. at 12); CX 4001 at 007, 028; CX 4179 at 008).

1472. At the time Auto/Oil was formed, the Auto/Oil members "recognized that if and when a research project was agreed to that it would be made public, that its operations would be conducted 'in the sunshine,' and that its results would be made publicly available." (CX 4179 at 001; Kiskis, Tr. 3830-3831).

1473. The Research Program Committee ("RPC"), made up of representatives from each of the members, oversaw the on-going research of the Auto/Oil program. (Kiskis, Tr. 3819).

1474. The RPC had two co-chairs that were responsible for leading the "group in defining, developing and conducting the research that that committee was charged with." (Kiskis, Tr. 3819).

1475. The Auto/Oil members regularly attended monthly RPC meetings to discuss on-going research and to exchange ideas on new research. *See, e.g.*, (CX 7041 (Alley, Dep. at 14); Burns, Tr. 2414; Klein, Tr. 2465; CX 4027).

1476. Auto/Oil members routinely pooled their independent research through presentations to the Program. (CX 7073 (Wise, Dep. at 18-19); Derr, Tr. 5126).

1477. After deciding what research programs should be executed, the RPC then reported to the Research Planning Task Force, for approval to carry out the desired research project. (Burns, Tr. 2414).

1478. Bill Mallett and Wayne Miller were Unocal's representative members on the RPC and Peter Jessup attended many of the RPC meetings as well. *See, e.g.*, (CX 7041 (Alley, Dep. at 13); CX 4027 at 001; CX 4023 at 001). Other Unocal employees attended RPC meetings on occasion. *See, e.g.*, (CX 4027 at 001; Jessup, Tr. 1312).

1479. The Program Design and Testing subcommittee reported to the Research Program Committee. (CX 4001 at 028). This subcommittee designed the experiments in Auto/Oil to ensure that Auto/Oil experiments were robust enough in their design to deliver statistically significant results. (Burns, Tr. 2414).

1480. The Data Analysis Research Writing subcommittee reported to the Research Program Committee. (CX 4001 at 028). This subcommittee obtained the data that was given to or produced by Auto/Oil, analyzed that data and reported the results. (Burns, Tr. 2414-2415).

1481. The Speciation Procedure Development subcommittee reported to the Program Design/ Testing Committee, which in turn, reported to the Research Program Committee. (CX 4001 at 028). The Speciation subcommittee developed procedures for identifying the individual hydrocarbons that made up the total hydrocarbons, which was the typical way to measure exhaust emissions. (Doherty, Tr. 2793).

1482. Robert Pahl was the Chairman of the Fuels Blending Subcommittee. (Pahl, Tr. 2765). This subcommittee designed the fuels, oversaw the manufacturing of the fuels, and tested the fuels to make sure they met the requirements that were set up in the Auto/Oil program. (Pahl, Tr. 2765).

1483. The Auto/Oil research program had two phases. (CX 4001 at 003-005; CX 7049 (Hochhauser, Dep. at 11)). The initial phase sought to determine the emissions, air quality effects and cost/benefit relationships of various methanol fuels and reformulated gasolines used in 1989 as well as in 1983-1985 vehicles. (CX 4001 at 003-004; RX 424 at 010; CX 7049 (Hochhauser, Dep. at 11)). The second phase of the Auto/Oil program focused more on advanced technology alternative fuels. (CX 4001 at 004-005; RX 424 at 010).

1484. Upon its formation in 1989, Auto/Oil had to decide which gasoline properties it would focus on for the emissions research. (CX 4016 at 008).

1485. Auto/Oil decided to limit the Phase 1 compositional fuel set research to four fuel properties: aromatics, methyl tertiary butyl ether (MTBE), olefins and T90 (the temperature at which 90% of a fuel evaporates) (collectively, "AMOT"). (CX 4016 at 009; CX 4031; CX 7049 (Hochhauser, Dep. at 133)).

1486. Auto/Oil's decision on what parameters to focus on was clearly influenced by what information CARB and the EPA deemed to be helpful. *See, e.g.,* (CX 4001 at 005; CX 4024 at 007-008).

1487. The Auto/Oil Agreement states: "The Program will, to the extent possible, prioritize testing in light of data which may be required for EPA and CARB rulemaking proceedings." (CX 4001 at 005).

1488. While Auto/Oil pursued AMOT, Unocal conducted its own research on the impact of a larger group of fuel composition variables on exhaust emissions, including T50. (CX 142 at 007; CX 181).

1489. Although Unocal chose to conduct its own research, it remained an active member of Auto/Oil, because Unocal "wanted to follow what they were doing. We wanted to be aware of what they were doing." (CX 7041 (Alley, Dep. at 48)).

1490. Dr. Alley testified that Unocal remained a member of Auto/Oil in order to know what Auto/Oil was doing and to try and influence the group: "Unocal was a member of the Auto/Oil program. If we didn't believe in it, why didn't we pull out. And the reason was, we wanted to know what they were doing, so we went ahead and paid our dues and listened and tried to influence." (CX 7041 (Alley, Dep. at 112-113)).

1491. Dr. Alley further testified that Unocal wanted to remain a member of Auto/Oil in order to know "what was going on, what the results were, what they might do with them, how we might influence legislation." (CX 7041 (Alley, Dep. at 153)).

1492. Unocal made its presentation to Auto/Oil in part to get the industry members to think about T50 as a parameter and to realize that T50 was an important independent parameter in reducing emissions. (CX 7041 (Alley, Dep. at 59-60, 159); Jessup, Tr. 1313).

1493. Unocal wanted Auto/Oil to look at T50, but realized that Auto/Oil would only consider it if Unocal presented research data to support their view. (CX 7041 (Alley, Dep. at 62); Jessup, Tr. 1313).

1494. In early 1990, Auto/Oil's Phase 1 research drew to a close and its members began to consider what areas to focus on for the Phase 2 research. (CX 4057 at 001; CX 4001 at 003-004). At the same time, CARB was working with outside participants to develop Phase 2 regulations for RFG. (CCPF ¶ ¶ 248-256).

2. Unocal Manipulated Auto/Oil In Order to Gain Competitive Advantage.

1495. On December 13, 1990 Unocal filed a patent application for its emissions research from the 5/14 project. The patent application contained numerous claims that included T50 as a limitation. (CX 1788 at 051).

1496. Roger Beach, the President and eventually CEO of Unocal, made it clear that he was "in favor of getting all the [patent] coverage we can on this work." (CX 193).

1497. Even before the patent was filed, by October 2, 1990 suggestions had been made within Unocal "that the information from 5/14 should be taken immediately upon confirmation

to both EPA and CARB in an effort to have the specifications adopted reflect the 5/14 conclusions." (CX 194 at 002).

1498. By December 1990, Unocal inventors Drs. Jessup and Croudace were "adamant that once the patent [application] has been filed (this was done in early December), that Unocal should go public with its results to influence future decisions by the regulators." (CX 3004).

1499. By late 1990, Unocal viewed its participation in Auto/Oil as an integral part of its overall strategy to gain a competitive advantage through the manipulation of the reformulated gasoline ("RFG") regulatory process. (CX 3004; CX 2; CX 207 at 001 (("These [license] agreements are only possible if the other companies know about our low emission gasoline products. We must publish to influence regulators and advertise the Unocal advantage.")). The Auto/Oil research consortium brought to bear unprecedented scientific talent. (CX 4001 at 001).

1500. Unocal itself recognized that the Auto/Oil effort was bound to have some impact upon the regulatory environment in California. (CX 210 at 003).

1501. Unocal made strategic choices in determining what groups should be given the 5/14 presentation. (CX 7041 (Alley, Dep. at 131)).

1502. Unocal only wanted to present its research information to groups that had influence over regulatory bodies. (CX 7041 (Alley, Dep. at 131)).

1503. Dr. Alley testified that Unocal was not willing to present its 5/14 research information at a Department of Energy meeting because it contained people that were outside the Auto/Oil group: "there was no reason to try to influence bodies that had no relevance." (CX 7041 (Alley, Dep. at 131-132)).

1504. In December 1990, Drs. Jessup and Croudace told Unocal management that **"If we [Unocal] intend to influence the regulators we could do it through Auto/Oil . . . .** If the A/O committee endorse our findings and presents our analysis to the EPA there is a far better likelihood that regulations will be more palatable to us. **If we have to fight the battle without the weight of the A/O group it will be a long up hill struggle which may ultimately be unwinable."** (CX 3005 at 002) (emphasis added).

1505. Drs. Jessup and Croudace explained their strategy to influence CARB via Auto/Oil in a December 11, 1990 memorandum to their manager, J.Wayne Miller:

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

convince the regulatory bodies that the results are in error.

* * *

[The A/O data will cause] EPA and the CARB [to] **falsely** believe that T90 ASTM D-86 Distillation is the main gasoline property influencing CO and HC exhaust emissions.

* * *

Our regression analysis on the A/O data . . . shows that T50 is the main factor influencing CO and HC emissions.

* * *

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

(CX 210 at 002-003 (emphasis added); *see also* CX 297 (Unocal letter to EPA dated October 17, 1991 noting that "The Unocal program was designed so the results could be meshed with Auto/Oil data."); CX 3004 (Unocal memo noting that Dr. Croudace and Dr. Jessup's analysis of A/O data "may represent one of the most lucrative licensing opportunities this company has ever seen.").

1506. On August 27, 1991 Unocal represented to CARB that its emissions research results were "publicly available" and "non-proprietary." (CX 29).

1507. Unocal then made the same presentation to Auto/Oil one month later and again stated that the data was in the public domain. (Jessup, Tr. 1300; CX 4027 at 010; CX 4028; Klein, Tr. 2502; CX 210).

1508. Nothing Dr. Jessup presented to Auto/Oil from the 5/14 Project contradicted anything he presented to CARB. (Jessup, Tr. 1313). As he did to CARB, Dr. Jessup showed Auto/Oil the importance of T50. (Jessup, Tr. 1313).

1509. Unocal knew that CARB would listen to and rely on information from Auto/Oil. Auto/Oil's influence was a factor in why Unocal presented its research to Auto/Oil. (CX 210 at 003; CX 4025 at 004; CX 3005 at 003).

1510. Mr. Beach, the CEO of Unocal was not interested in Auto/Oil until Unocal made its 5/14 presentation. (CX 7041 (Alley, Dep. at 197)).

1511. Before, during, and after the September 26, 1991 presentation, the Unocal representatives to Auto/Oil kept their management and colleagues abreast of the happenings in Auto/Oil. (CX 7055 (Mallett, Dep. at 13)). After each Auto/Oil meeting that he attended, Unocal RPC representative, Bill Mallett wrote a memo and gathered all of the handouts together in order to tell his colleagues at Unocal what he observed during the Auto/Oil meetings. (CX 7055 (Mallett, Dep. at 13)). For example, Mr. Mallett specifically included Drs. Jessup and Croudace in his March 13, 1991 memo, because they were interested in what was going on at Auto/Oil. (CX 7055 (Mallett, Dep. at 13-14; CX 232)).

1512. In October 1991, Unocal recognized Auto/Oil's influence on CARB. In a letter to Senior Unocal management, including Roger Beach, Dr. Alley stated "The [Auto/Oil] program has produced a lot of good technical data **which most assuredly has had an influence on legislation at both the Federal and state levels**, **and will continue to do so . . . .** The Auto/Oil program represents a remarkable cooperative achievement." (CX 4025 at 004) (emphasis added).

1513. Unocal also recognized that it could influence refiners through Auto/Oil. In a December 11, 1990 memo to their management, Drs. Jessup and Croudace made it clear that they needed to share their research with Auto/Oil in order to influence the regulators and reap licensing fees: "Once the patent is issued then Unocal can seek licensing agreements with our competitors. **These agreements are only possible if the other companies know about our low emission gasoline products. We must publish to influence regulators and advertise the Unocal advantage.** These licensing agreements could be worth 10's of millions of dollars every year, far more than any other competitive advantage it could yield." (CX 210 at 004) (emphasis added).

1514. Not only did Unocal use Auto/Oil to influence the regulators and the refiners, but Unocal also used the information presented to Auto/Oil in its 5/14 research. (CX 201 at 002). "An important point is that the 5/14 project was designed to mesh and extend the Auto/Oil work. For example, we used vehicles similar to those in the Auto/Oil program and tested some of the Auto/Oil fuels . . . ." (CX 201 at 002).

B. Through its Express Statements and Conduct, Unocal Represented it Would Grant to Auto/Oil Members and the Public Full and Free Rights to Unocal's 5/14 Project Results.

1515. On September 26, 1991, Unocal's scientist and inventor Dr. Jessup gave a slide presentation that included test results, equations and corresponding directional relationships between changes in fuel properties and emissions derived from its "5/14" project, to Auto/Oil's Research Program Committee meeting. (CX 4027 at 10; CX 1678; Segal, Tr. 5622; CX 292 at 002).

1516. Bill Mallett, a regular attendee of the RPC meetings who was aware of the Auto/Oil course of dealing, introduced Dr. Jessup to the group prior to his presentation. (CX 7055

(Mallett, Dep. at 28); CX 292 at 002; Jessup, Tr. 1312).

1517. Unocal's slide presentation was 58 pages long and contained very detailed slides, tables and graphs discussing Unocal's three vehicle tests. (CX 1678).

1518. Unocal's presentation highlighted T50, olefins, oxygen content and RVP as "important gasoline properties to reduce lower emissions." (CX 4028 at 058; Jessup, Tr. 1313).

1519. Dr. Jessup also shared with Auto/Oil the full ten-car equations with coefficients. (Jessup, Tr. 1313, 1545; CX 248 at 032).

1520. Dr. Jessup testified that he had authority to share these equations with Auto/Oil in September 1991. (Jessup, Tr. 1313, 1544-1545).

1521. Many of the slides that Unocal presented to Auto/Oil are identical to the slides that CARB relied on its Technical Support Document. Compare (CX 4028 at 036, with CX 5 at 031 (The charts labeled "Hydrocarbon Emissions Effects of Distillation T50" are identical); Klein, Tr. 2513); compare (CX 4028 at 038, with CX 5 at 032 The charts labeled "CO Emissions Effects of Distillation T50""are identical); Klein, Tr. 2513-2514); compare (CX 4028 at 032, with CX 5 at 298 (The equations for HC, CO and NOx are identical); Klein, Tr. 2514).

1522. Unocal's presentation represented to Auto/Oil that the Unocal information was freely available for all to use. (CX 4027 at 010).

1523. Dr. Jessup expressly represented that the Unocal research was in the "public domain," and Unocal in fact offered to give the data to anyone who wanted it. (CX 4027 at 010; CX 293; Jessup, Tr. 1313-14, 1547).

1524. Dr. Jessup's statement and actions had particular force because he had initially told Auto/Oil that he was not allowed to present the research, then represented that he had obtained management's consent to make the presentation and place the research in the public domain. (CX 4173 at 003; Ingham, Tr. 2603; Jessup, Tr. 1313, 1544-45).

1525. Bill Mallett took notes during the September 26, 1991 meeting. (CX 293).

1526. According to Mr. Mallett's notes, at the meeting, he "offered our data to Auto/Oil and to all members. Peter will send data disk to those who gave him business cards." (CX 293 at 001).

1527. Mr. Mallett testified that he intended his statements to mean that all of Unocal's results would be given to everybody. (CX 7055 (Mallett, Dep. at 35); CX 293 at 001).

1528. The information Unocal presented to Auto/Oil and CARB, identified the same properties

of gasoline as claimed in the Unocal patents. (Klein, Tr. 2564-2565; Segal, Tr. 5637-5638; CX 272; CX 4028).

1. Dr. Jessup Expressly Represented that the Data Presented, Which Included the Teachings in the Presentation Slides and the Data Disk, Were in the Public Domain.

a. Direct Evidence Demonstrates That Dr. Jessup Said the Data Were in the Public Domain and That He Gave the Data Away.

1529. Auto/Oil members testified that they remember Dr. Jessup specifically stating that the presentation was in the public domain. (Klein, Tr. 2502; CX 7049 (Hochhauser, Dep. at 65-66)).

1530. Mr. Klein, an Auto/Oil member from Shell, testified that he remembers Dr. Jessup stating "that the information he was about to present was – had been given to CARB and was in the public domain . . . ." (Klein, Tr. 2502).

1531. Unocal's chief patent counsel, Greg Wirzbicki, testified that during his 1991 presentation to Auto/Oil, Dr. Jessup had told Auto/Oil that Unocal's research was non-proprietary. (Wirzbicki, Tr. 981).

1532. Dr. Jessup testified that he remembers having conversations with colleagues at Unocal regarding the release of the 5/14 research into the public domain. (Jessup, Tr. 1439).

1533. The fact that Dr. Jessup told the Auto/Oil members that the Unocal presentation was "presented to CARB and in the public domain" is un-rebutted by Unocal.

1534. Unocal's slide presentation on its 5/14 Project research results, among other things, explained the directional relationships between certain gasoline properties, most notably T50, and their impact on emissions. (CX 4027 at 010; Jessup, Tr. 1313; Klein, Tr. 2503 ("The Unocal work emphasized T50 and T10, as well as the T90 that the Auto/Oil was looking at at the time.")).

1535. Copies of the slide presentation, titled "Unocal Reformulated Fuels Technology: A Truly Innovative Approach," were in fact given to the members at the meeting. (CX 4028; 4027 at 010 (the slide presentation was marked as Exhibit 11); CX 461 at 001, 056-147; Doherty, Tr. 2797; Klein, Tr. 2503; Ingham, Tr. 2605).

1536. Floppy disks containing Unocal's data were even given out to any Auto/Oil member that requested it. (CX 4027 at 010; Klein, Tr. 2509; Ingham, Tr. 2606; CX 293 at 001; CX 7055 (Mallett, Dep. at 35)).

1537. The Auto/Oil members understood from Dr. Jessup's statements that the information contained on Unocal's data disk, which contained all the data that was generated in Unocal's studies, and the information and conclusions in the slide presentation, were all in the public domain. (Klein, Tr. 2509; Ingham, Tr. 2607; Segal, Tr. 5631 (confirming that "everything, both the presentation as well as the data disk and what was on it" was in the public domain.)).

1538. Most of the member companies in fact took Dr. Jessup's presentation and research results and, understanding that they were permitted to do so, freely used this data and the data disks however they saw fit, with no expectation of paying either for the data, or the right to use any process or technology developed therefrom. (Klein, Tr. 2508-2509; Ingham, Tr. 2604-2605; CX 4027 at 010; CX 7049 (Hochhauser, Dep. at 66, 69-70, 74)).

1539. Mr. Robert Pahl, an Auto/Oil member from Conoco Phillips, went out to dinner with Dr. Jessup and Dr. Croudace and a few other Auto/Oil members in September 1991. (Pahl, Tr. 2770).

1540. At the September 1991 Auto/Oil dinner, Drs. Jessup and Croudace reiterated that Unocal had given the same presentation to CARB and therefore Mr. Pahl further believed that Unocal's information was publicly available: "We thought, since they had presented it to CARB and to the Auto/Oil, the RPC, and it wasn't marked 'confidential,' it was public domain knowledge unencumbered." (Pahl, Tr. 2769-2770).

1541. At the September 1991 dinner with Drs. Jessup and Croudace, there was a discussion regarding the fact that Auto/Oil should address the areas that Unocal thought were of interest, including T50. During these Auto/Oil dinners, there was almost always a lawyer present. (Pahl, Tr. 2771-2772; Klein, Tr. 2521; Ingham, Tr. 2735).

1542. Unocal never retracted its statements that the research material was in the public domain or otherwise suggested to Auto/Oil that the research material was not in the public domain. (CX 4027 at 010; CX 4014; Jessup, Tr. 1313-1314, 1547).

b. Contemporaneous Meeting Minutes Confirm that Dr. Jessup Stated That the Data Were in the Public Domain.

1543. The contemporaneous meeting minutes, which confirm the live testimony of Mr. Klein and other Auto/Oil members, and the notes of Mr. Mallett, state that Unocal's presentation is in the public domain. (CX 4027 at 010; CX 293; Klein, Tr. 2507-2508).

1544. The minutes of the meeting state that "Mr. Jessup explained that the data from Unocal's

research has been provided to CARB and is in the **public domain**." (CX 4027 at 010) (emphasis added).

1545. Mr. Klein understood the term "data" to mean "all the data that was generated in their studies. . . ." (Klein, Tr. 2509).

1546. David L. Meyer, antitrust counsel from the law firm of Covington & Burling, recorded the minutes for almost all of the Auto/Oil RPC meetings. *See, e.g.*, (Pahl, Tr. 2766-2767; CX 4014 at 012; CX 4027 at 015).

1547. Mr. Meyer's participation and accurate recording of the minutes was essential to the success of Auto/Oil because, as a consortium of competitors, the organization had to operate within parameters strictly prescribed by the National Cooperative Research Act of 1984 ("NCRA"). (15 U.S.C. § 4301 *et seq*.).

1548. Mr. Meyer's minutes for the Auto/Oil RPC meeting on September 25 and September 26, 1991 accurately reflect the events of the Auto/Oil meeting and Unocal's presentation. (Pahl, Tr. 2776; Klein, Tr. 2510-2512).

1549. Mr. Meyer was meticulous and his Auto/Oil RPC meeting minutes were always accurate. (Pahl, Tr. 2767).

1550. Auto/Oil members believed that "the minutes were excellent. He did a very good job of capturing all of the proceedings that went on in the meeting itself." (Pahl, Tr. 2767; Ingham, Tr. 2598 (confirming that "David was extremely good at capturing the discussion that went on in his minutes.")).

1551. The September 1991 minutes not only listed the attendees of the meeting, but detailed which members attended the first day only, the second day only, or both days. (CX 4027 at 001).

1552. As was customary, Mr. Meyer circulated the draft minutes at the beginning of the next meeting which took place on October 29, 1991. (Pahl, Tr. 2767; Klein, Tr. 2510-2512; Ingham, Tr. 2597-2598; CX 4014 at 001).

1553. Mr. Meyer provided every member the chance to make any changes or corrections to the minutes before they became final. *See, e.g.*, (Pahl, Tr. 2767-2768; Klein, Tr. 2510-2512; CX 4014 at 001; CX 4023 at 001; CX 4027 at 001).

1554. Mr. Ingham testified that "every member company would have an opportunity to review those minutes and comment and offer editorial input if they felt that that was appropriate. They sent that back to David and then David issued the final set of minutes." (Ingham, Tr. 2597-2598).

1555. The September 26, 1991 minutes were sent to Unocal and Unocal never changed or corrected them. (Klein, Tr. 2510-2512).

1556. At the October 1991 RPC meeting, members reviewed the September 26, 1991 minutes and made corrections. (Klein, Tr. 2510-2512).

1557. There were no changes to the portion of the September RPC meeting minutes relating to Unocal's presentation. *See, e.g.*, (Klein, Tr. 2510-2512; CX 4014; CX 4027 at 010).

1558. Bill Mallett of Unocal was present at the October 1991 meeting and had an opportunity to correct the September meeting minutes, but did not. (Klein, Tr. 2510-2512; CX 4014 at 001).

1559. There is no better record as to what Unocal said during the September 26, 1991 RPC meeting, than the minutes drafted by David Meyer. (Klein, Tr. 2512; Pahl, Tr. 2776).

c. Unocal Understood That It Would Waive Any Proprietary Rights to the Data or Its Use by Presenting the Information to Auto/Oil.

1560. Dr. Jessup's statement that the data was in the "public domain" had particular force because it followed a series of conversations in which Unocal had initially refused to provide the data pending management approval of the resulting secrecy waiver, then agreed to do so. (CCPF ¶ ¶ 1561-1574).

1561. Prior to September 1991, Unocal management deliberately chose to withhold its research data from Auto/Oil because Unocal knew that presenting its data to Auto/Oil would waive any proprietary status. (CX 4031 at 001).

1562. In their December 11, 1990 memorandum to Unocal's Dr. Wayne Miller, Dr. Jessup and Dr. Croudace initially proposed convincing Auto/Oil of the importance of T50 by "only disclos[ing] our distillation information in form on a Driveability Index. . . rather than T50 so that we . . .retain secrecy of our data [regarding T50]." (CX 3005 at 002).

1563. On December 12, 1990, Unocal attended a meeting of Auto/Oil's Data Analysis and Report Writing Subcommittee ("DARWS") and reported to DARWS that Unocal would, for the time being, keep its data secret. (CX 4031 at 001 (Memo from Hochhauser to Harting Re: Auto/Oil Meetings)).

1564. At the DARWS meeting, Unocal indicated that "they have carried out internal analyses and have made some interesting and useful conclusions from the data, but were unwilling to present these results to AQIRP." (CX 4031 at 001).

1565. In June 1991, Unocal's Bill Mallett sought approval from management to disclose the

5/14 research to the Auto/Oil Group. (CX 7055 (Mallett, Dep. at 29, 38)).

1566. On June 10, 1991, Bill Mallett recommended to Drs. Alley, Croudace, Jessup and Miller that Unocal present the results from its 5/14 project at the next Auto/Oil RPC meeting held on July 25-26, 1991. (CX 4010 at 003-004; CX 7055 (Mallett, Dep. at 21-22)).

1567. It was a Unocal group management decision to make the 5/14 research presentation to the RPC. (CX 7055 (Mallett, Dep. at 38)).

1568. The minutes of Auto/Oil's July 1991 meeting reflect (and thus everyone in Auto/Oil was aware) that Dr. Jessup was scheduled to give his presentation on Unocal's 5/14 research data at that meeting. (CX 4173 at 003; Ingham, Tr. 2603).

1569. Because Drs. Jessup, Croudace and Mr. Mallett had not been given permission by Unocal management to release the research information in July 1991, Unocal postponed its presentation until the Unocal presenters obtained management's approval. (CX 4173 at 003; Ingham, Tr. 2603).

1570. Mike Ingham wrote down on his July 1991 agenda that "Presentation to Auto/Oil not approved, however, Unocal was reported to have given their data to CARB recently." (CX 4173 at 003; Ingham, Tr. 2603).

1571. Dr. Alley, the senior Unocal representative to Auto/Oil who was also a member of the 5/14 patent conception committee and approved the filing of a patent, was part of the management chain that approved Dr. Jessup's presentation to Auto/Oil. (CX 7041 (Alley, Dep. at 53)).

1572. In September,1991, just a few weeks after Unocal had advised CARB that its research information was "non-proprietary" and publicly available, Unocal management authorized Dr. Jessup and Mr. Mallett to present the same emissions research provided to CARB at the next Auto/Oil RPC meeting. (CX 7041 (Alley, Dep at 53); CX 29; Jessup, Tr. 1313, 1544-1545).

1573. Mr. Beach authorized Dr. Jessup and Mr. Mallet to make the September 26, 1991 presentation of Unocal's 5/14 Project information to Auto/Oil. (Beach, Tr. 1694-1695).

1574. Exxon's Mr. Hochhauser testified about Unocal's initial reluctance to share its research and Unocal's subsequent disclosure: "I think that bolsters my – the feeling that I had back then and certainly that I still have that when Unocal did present this information that it was free for everybody to use. When they had information that they didn't want everybody to use they wouldn't present it as happened in December of 1990." (CX 7049 (Hochhauser, Dep. at 138)).

2. Dr. Jessup's Presentation of the 5/14 Research Data to Auto/Oil Amounted to a Representation That the Data Were in the Public Domain.

1575. Dr. Jessup's express statement that the data presented was in the public domain was consistent with, and followed from, the very purpose of Auto/Oil, the agreement creating that body and the members' understanding and course of dealing. (CCPF ¶ ¶ 1576-1664).

1576. All of the Auto/Oil members understood that, against the backdrop of the spirit and purpose of Auto/Oil, the established course of dealing, and the contract governing Auto/Oil's operation, the mere fact of Dr. Jessup's presentation amounted to a donation of the data to Auto/Oil. (Kiskis, Tr. 3836; Burns, Tr. 2417; Klein, Tr. 2490 ("any materials that were presented will become part of the program and be in the public domain."); Doherty, Tr. 2799 (confirming that there were no limitations on the use of information that was presented to Auto/Oil); CX 7073 (Wise, Dep. at 18-19)).

1577. Ron Kiskis, co-chair of the RPC, testified that "we were advised, the whole [RPC] committee in the presence, by the attorney [from Covington & Burling] **that any information that was brought into the program and shared with the participants would become part of the program itself** and becoming part of the program, based on the way Auto/Oil was set up, **would become part of the public domain**, contributed to the public domain and free for anyone to use." (Kiskis, Tr. 3836) (emphasis added). This was **"repeated at every [RPC] meeting**." (Kiskis, Tr. 3836-3837) (emphasis added).

1578. Harvey Klein confirmed the view of the Auto/Oil members stating that the members were repeatedly told that "any materials that were presented will become part of the program and be in the public domain." (Klein, Tr. 2489-2491; Ingham, Tr. 2614-2617; CX 233; Doherty, Tr. 2795-2797; CX 4089 at 003; Kiskis, Tr. 3843 (confirming that any information that was brought into the program would become part of the program and in becoming part of the program would in fact be contributed to the public domain.")).

1579. According to the Auto/Oil members, a Unocal representative attended all of the RPC meetings, and therefore was present to hear the reminders from counsel, that any materials presented to Auto/Oil became part of the program and became part of the public domain. (Klein, Tr. 2491-2492); *see also* (CX 4027 at 001; CX 4014 at 001; CX 4023 at 001).

1580. Auto/Oil members understood that they could use the data that was presented to Auto/Oil in any manner that they saw fit, including sharing it within their company or discussing it among themselves within the Auto/Oil group. (Burns, Tr. 2417; Doherty, Tr. 2799-

2800).

1581. The data that was presented to Auto/Oil became part of the public record at the time it was presented. (Burns, Tr. 2417).

1582. Auto/Oil members testified that there were no limitations on the use of the information that was presented to Auto/Oil. (Burns, Tr. 2417; Doherty, Tr. 2799; Pahl, Tr. 2772-2773).

1583. Auto/Oil members testified that there were no limitations as to whom the Auto/Oil members could share information presented to Auto/Oil. (Burns, Tr. 2417; Doherty, Tr. 2800; Pahl, Tr. 2773).

1584. Auto/Oil members understood that the Auto/Oil agreement followed the long standing practice of research organizations, by "not accept[ing] proprietary information from a third party without an agreement, a legal agreement on how to accept that . . . . That's why we put in the Auto/Oil agreement that we wouldn't accept proprietary information except under special arrangement." (CX 7073 (Wise, Dep. at 40-41)).

1585. Auto/Oil members believed that Unocal's research material that was presented at the September 25, 1991 meeting "was public domain information, it wasn't proprietary or confidential, and so we were free to use it in any way we thought was appropriate. (Pahl, Tr. 2772; Klein, Tr. 2490-2492; Kiskis, Tr. 3843).

1586. The basis for the Auto/Oil members' understanding that Unocal's research material was in the public domain, was that the documents were not marked "proprietary" and "we believed that since it was already presented to CARB in an open forum, public forum, and was presented to the RPC in a public forum, that it was public information." (Pahl, Tr. 2772; Klein, Tr. 2490-2492; Kiskis, Tr. 3843).

1587. It is not surprising that Auto/Oil members believed that they were free to use Unocal's presentation and data. As reflected in a November 8, 1990 memorandum by Dr. Miller, the 5/14 Project was "designed to mesh with and extend the Auto/Oil work," which was referred to as "the AMOT work." (CX 201 at 002; Miller, Tr. 1377-1379).

1588. In its 5/14 research, Unocal "used vehicles similar to those in the Auto/Oil program and tested some of the Auto/Oil fuels." (CX 201 at 002).

1589. Unocal used the Auto/Oil industry average fuel as the reference fuel in its presentation to CARB because it was becoming the "baseline" to determine whether emissions would be reduced. (Jessup, Tr. 1518).

a. The Underlying Purpose of Auto/Oil, and The Agreement Creating That Body, Made Clear That Any Data Presented to Auto/Oil Became the Work of the Program and Placed in the Public Domain.

1590. The purpose of Auto/Oil was to pool the scientific talent of two of the largest industries in America, oil and automobile, to address a perceived threat to the business of each posed by unprecedented levels of concern with automobile emissions, and to provide this scientific data to CARB. (Klein, Tr. 2465-2466; CX 4198 at 001).

1591. Mike Ingham testified that "the whole thrust of Auto/Oil was to develop [scientific] information and put that in the hands of the regulatory agencies." (Ingham, Tr. 2595).

1592. The Auto/Oil members were competitors, and they had to be sure that their actions did not give rise to actual or alleged antitrust violations. (15 U.S.C. § 4301 *et seq*.). Accordingly, they carefully circumscribed their actions under the antitrust exemptions of the NCRA and provided that they would exchange research data for the benefit of all. (15 U.S.C. § 4301 *et seq*.).

1593. Throughout its existence, Auto/Oil provided emissions research to regulators, including CARB and the public through numerous newsletters, publications and data disks. *See, e.g.*, (CX 4016 at 026; Klein, Tr. 2465-2466).

1594. The Auto/Oil members created an Agreement to further their purpose. (CX 4001).

1595. The Auto/Oil Agreement, which was signed by all of the members including Unocal, clearly states in several places that the members intended to make all of the Auto/Oil information public. *See, e.g.*, (CX 4001 at 007, 014).

1596. Roger Beach signed the Auto/Oil Agreement on behalf of Unocal. (CX 4001 at 26; Beach, Tr. 1694).

1597. The Auto/Oil Agreement sought to provide "data that allows for a comprehensive, reasonable, fair, and accurate comparison of the benefits and costs of the various alternatives to improving air quality," including RFG. (CX 4001 at 001).

1598. The Agreement added that members agree to engage in "cooperative research." (CX 4001 at 002).

1599. The Agreement further provided that the members could engage in "the collection, **exchange**, or analysis of research information." (CX 4001 at 002 (¶ 1); 006 (¶ 2(D)(iv)). (emphasis added).

1600. The Auto/Oil Agreement stated that it is the "objective of this Program that the principles of full disclosure to government agencies, the Congress and the public will apply as to the research and writing . . . ." (CX 4001 at 007 (¶ 2 E)).

1601. The Agreement further stated that the research would be donated without any charge to CARB or the public the "results of research and testing of the Program will be disclosed to government agencies, the Congress and the public, and otherwise placed in the public domain." (CX 4001 at 007 (¶ 2 E); Kiskis, Tr. 3831; Derr, Tr. 5126; CX 7076 (Youngblood, Dep. at 10-11)).

1602. The Auto/Oil Agreement stated: "It is contemplated that all of the research and testing to be carried out in the Phase I Program will be disclosed in the final report in regard to such research and otherwise dedicated to the public domain. The same principles of full disclosure and dedication to the public domain shall apply in regard to Phase II research." (CX 4001 at 014 (¶ 6A)).

1603. The parties agreed that "production or marketing of proprietary information is, however, not contemplated, except to assure that the results of the research will be freely available, in the public domain . . . ." (CX 4001 at 008-009 (¶ 3 B)).

1604. The Auto/Oil Agreement stated that "to the extent that proprietary technology and/or other proprietary information is reasonably required to conduct such research and testing, certain limitations on disclosure may be required to ensure compliance with applicable law and to protect individually owned proprietary information supplied to the Program by companies whether or not Members of this Program." (CX 4001 at 014 (¶ 6 A)).

1605. In furtherance of the "full disclosure" principle, Unocal and the other members agreed as follows: "No proprietary rights will be sought **nor patent applications prosecuted on the basis of the work of the Program** unless required for the purpose of ensuring that the results of the research by the Program will be freely available, without royalty, in the public domain." (CX 4001 at 007 (¶ 2 E)) (emphasis added)).

1606. Auto/Oil members testified that they understood in accordance with the Agreement, that once a company presented information to Auto/Oil, it became part of the Program, and in the public domain. (CX 7073 (Wise, Dep. at 18); Kiskis, Tr. at 3836; Burns, Tr. at 2417; Klein, Tr. at 2490).

1607. Mr. Wise, the co-chair of the RPTF testified that "it's my belief that the information presented by Unocal to Auto/Oil under the terms of the agreement became in effect a donation to the program." (CX 7073 (Wise, Dep. at 18)).

1608. Auto/Oil members applied the teachings in the Agreement. For example, in August, 1991, Ford expressed concern that a "third-party might make slight alterations to the [Ford speciation technology] technique and then attempt to patent it." (CX 4023 at 7;

Klein, Tr. 2495-2496; Ingham, Tr. 2600-2601). Under the Agreement, the Auto/Oil members were then able to consider whether it was in their best interest to file a defensive patent to protect the work of the Program. (CX 4001 at 007).

b. The Conduct and Course of Dealing of Auto/Oil and Its Members Made Clear That, Absent Special Measures Not Taken for Unocal's Presentation, Any Data Presented to Auto/Oil Were in the Public Domain.

1609. The mere presentation of research to Auto/Oil put the presentation material in the public domain, at which point Auto/Oil members did not have to worry that if the members used the research, the members might later be sued for patent infringement or face a demand for royalties. *See, e.g.*, (Burns, Tr. 2417; Segal, Tr. 5601; CX 7073 (Wise, Dep. at 18, 42-3, 49-50, 52) (confirming that "it was the operating assumption that any data presented to the committee was a donation to the program.")).

1610. Auto/Oil members knew that they would forego their potential proprietary rights from independent research when they presented their research to Auto/Oil. (Burns, Tr. 2417; Segal, Tr. 5601; CX 7073 (Wise, Dep. at 18, 42-43, 52)).

1611. Auto/Oil members testified that the information presented to Auto/Oil became "the work of the Program" and part of the public domain once the information was presented. (Klein, Tr. 2544, 2578-2580 ("My understanding would be that once it was presented, it became part of the program."); CX 4001 at 007).

1612. Starling K. Alley, Unocal's senior representative to Auto/Oil, admitted that research presented to Auto/Oil is properly considered the "work of the program," and therefore, freely available to all members. (CX 7041 (Alley, Dep. at 40)).[1]

1613. A member was not obliged to disclose to the Program the nature or results of an independent project it chose to conduct, because the research from an independent project would "not be deemed to be undertaken by the Program," and Auto/Oil would not have any "rights or obligations relating thereto [research] by reason of this Agreement." (CX 4001 at 014-015 (¶ 6 B); CX 7041 (Alley, Dep. at 33-34)). The Agreement adds that nothing in it "shall be deemed to constitute a waiver of existing or future proprietary rights that a Member may otherwise possess." (CX 4001 at 015 (¶ 6 B)).

1614. Unocal and other Auto/Oil members understood that while each member retained the right to engage in independent research resulting in proprietary rights, the member could

[1] After a break in the deposition, Dr. Alley changed his answer. When asked if his answer was discussed with his attorney during the break, Dr. Alley was instructed not to answer the question and chose to follow his counsel's advice. (CX 7041 (Alley, Dep. at 54-56)).

also forego those rights. (Burns, Tr. 2417; CX 4001).

1615. Consistent with the Auto/Oil rules, it was not uncommon for Auto/Oil members to present the results of their independent research. *See, e.g.*, (Segal, Tr. 5597-5599 (ARCO presented its EC-P and EC-X research to Auto/Oil)).

1616. Each Auto/Oil member understood that, as the Auto/Oil Agreement makes clear, the research exchanged at Auto/Oil meetings was in the public domain. (Burns, Tr. 2417; Segal, Tr. 5601; CX 4023 at 007; CX 7073 (Wise, Dep. at 18, 42-3, 52)).

1617. In November of 1990, ARCO presented information about their EC-Premium (EC-P) at an Auto/Oil RPC meeting. (Segal, Tr. 5598). ARCO subsequently presented ARCO's EC-X research to Auto/Oil. (Segal, Tr. 5599; CX 4011 at 008-009).

1618. Mr. Segal testified that ARCO "basically gave them the total program, what we tested, the fuels we tested, the results of the testing, the vehicles. Anyone receiving those reports could have duplicated the program from the information we gave them." (Segal, Tr. 5600).

1619. ARCO's policy regarding its reformulated fuels research was to "give that information, all our information, to the public free of charge." (Segal, Tr. 5607).

1620. ARCO clearly followed its policy, and the Auto/Oil Agreement and course of dealing, in not seeking money from anyone for its EC-P or EC-X research. (Segal, Tr. 5607).

1621. Unocal tested and used the ARCO research results itself and even gave this data to CARB. (CX 220; CX 231; CX 256; CX 571; CX 709).

1622. Unocal understood that it could use information presented to Auto/Oil by ARCO to help in its own research. (CX 571 at 001; CX 709 at 001 ("ARCO presented some information about their EC-Premium (EC-P) at the recent Auto/Oil meeting. . . . We need to follow ARCO's trend of lowering sulfur levels. . . .").

1623. Unocal even contacted scientists at ARCO to discuss ARCO's EC fuels. (CX 571 at 001).

1624. Following the execution of the Auto/Oil Agreement, ARCO never demanded any sort of payment from Unocal or any other refiner, because ARCO 's "understanding was that by presenting this information at Auto/Oil we were giving it to the public." (Segal, Tr. 5601).

1625. ARCO based its understanding on the fact that "legal counsel for Auto/Oil, who was there at all of the meetings, [stated] that anything presented at Auto/Oil meetings, especially the RPC committee, was to be considered nonproprietary and was going to be

put in the public domain." (Segal, Tr. 5601).

1626. Unocal did not expect that it had to pay ARCO for the research results and ARCO never had any plan to charge money for use of its EC-P and EC-X information. (Segal, Tr. 5602; CX 571 at 001; CX 709 at 001).

c. Auto/Oil Members Had a Mechanism for Dealing with Proprietary Information.

1627. Auto/Oil members knew how to deal with proprietary information through the Auto/Oil Agreement and the procedure used when members had proprietary information. (Doherty, Tr. 2794-2795; Klein, Tr. 2522; Burns, Tr. 2417-2418).

1628. Unocal understood the definition of proprietary information. In the 1990-91 time frame, people within Unocal referred to the 5/14 Project as "proprietary." (Miller Tr. 1370). In this context, Dr. Miller understood the term "proprietary" to convey the fact of an ownership interest. (Miller, Tr. 1370).

1629. Unocal's Chairman of the Board and CEO during the Phase 2 CARB rulemaking, Richard Stegemeier, believes that by definition the word "proprietary" refers to a "patent or trademark or copyright." (CX 7065 (Stegemeier, Dep. at 13)).

1630. Unocal's own Intellectual Property Policy – which went out under the signature of Roger Beach as Chairman of the Board and Chief Executive Officer – states that intellectual property "is proprietary business or technical information of value protected by patent, trademark, copyright, or trade secret laws." (CX 714 at 001; Beach, Tr. 1656-1657).

1631. The Auto/Oil Group had a procedure in place to deal with proprietary information. (Klein, Tr. 2522). "There was a procedure in place that if a company felt they had material information, technology that would be useful and relevant to the Auto/Oil program, but they wanted it or they were concerned about the proprietary nature of their rights to that information, there was a mechanism by which they could confer with counsel to see if there was a way to structure the release of that information that would preserve the rights to that technology that they wished to preserve." (Klein, Tr. 2522; Ingham, Tr. 2733-2734 (confirming that Dr. Jessup should have made Auto/Oil counsel aware of the pending patent prior to presenting the information to Auto/Oil)).

1632. Auto/Oil members believed that "when people make presentations to the committee without any restrictions of having been proprietary, without asking for any proprietary information protection, that it's says that it's in the public domain, that that material is freely available, it has no restriction it. That's the ongoing assumption. That's what I call the base case scenario." (CX 7073 (Wise, Dep. at 51)).

1633. Auto/Oil's antitrust counsel from Covington & Burling, David Meyer, made it clear at

the beginning of almost every RPC meeting, that all of the information shared at the meetings was to be non-proprietary information and in the public domain. (Kiskis, Tr. 3836-3837).

1634. Auto/Oil members had the opportunity to discuss with Auto/Oil's antitrust counsel, any questions regarding the proper way to deal with proprietary information. (Ingham, Tr. 2733-2735; Klein, Tr. 2522).

1635. Bill Mallett, one of Unocal's Auto/Oil representatives, believed that part of Mr. Meyer's job was to make sure that none of the Auto/Oil members violated the Auto/Oil Agreement. (CX 7055 (Mallett, Dep. at 17-18)).

1636. At the beginning of several different workshops involving Auto/Oil members, Mr. Meyer gave a handout to each member regarding the rules of the workshop. (CX 233; CX 4022; CX 4089). For example, the handout from a Coordinated Research Council ("CRC") workshop stated that: "This is an open meeting designed to help advance basic research on the relationship of reformulated gasolines to emissions. Materials you present here will be in the public domain." (CX 233).

1637. Unocal's Auto/Oil representatives were clearly aware of the rules governing Auto/Oil. (CX 232 at 003). For example, in a memo to his colleagues at Unocal, Bill Mallett attached the "rules of the workshop" and stated "Then we had a whole lot of discussion by David Meyer on 'rules of conduct' for the Workshop (see attached)." (CX 232 at 003).

1638. On several occasions, the Auto/Oil members followed the procedure on dealing with proprietary material, to ensure that member companies did not waive their proprietary interests or violate the antitrust laws. (CX 4027 at 007-008; CX 4023 at 007; Doherty, Tr. 2795; Klein, Tr. 2522-2523 (Members had discussions with the Auto/Oil counsel regarding the procedure to protect proprietary information.)).

1639. The automobile companies made the Auto/Oil members aware of their concerns regarding catalyst testing "in light of the proprietary development activities underway at the auto manufacturers." (CX 4014 at 004).

1640. In August, 1990, Ford told the other Auto/Oil members that it had developed an engine-out speciation technology. (CX 4023 at 007; Klein, Tr. 2495-2496). Ford then stated that it was "willing to have its technique become part of the Program and be available in the public domain," but requested that the Program ensure that its donated information remained in the public domain. (CX 4023 at 007; Klein, Tr. 2495-2496; Ingham, Tr. 2596-2597).

1641. In addition to freely presenting and using information that was presented, Auto/Oil's members demonstrated that if they wanted to protect their information, special measures were necessary. (Burns, Tr. at 2418-2419, 2421-2423, 2433).

1642. According to notes taken at the December 12, 1990 DARWS meeting, Amoco did not attend the meeting because it did not want to release its data and relinquish its proprietary interests. (CX 4031).

1643. In September, 1991, at the very same meeting that Unocal made its presentation, the automobile members of Auto/Oil were willing to share research results regarding the effect of the Auto/Oil Reformulated gasoline on the Advanced Technology Vehicles, but wanted to protect their individual proprietary interests in their low emission engine technology. (Burns, Tr. at 2418-2419, 2421-2423, 2433; CX 4027 at 008).

1644. The Advanced Technology Vehicles were cars that would satisfy the emissions regulations in California when the CARB regulations went into effect in March, 1996. (Burns, Tr. at 2419-2420, 2428-2429).

1645. Auto/Oil members wanted to be sure that the gasoline effects that were demonstrated to apply to the current and older technology vehicles were getting carried over to the advanced technologies in equivalent magnitudes and significance. (Burns, Tr. 2419-2420).

1646. The automobile companies did not want to disclose their individual proprietary advanced technologies for future vehicles because of competitive and cost reasons. (Burns, Tr. 2419).

1647. The automobile companies were specifically trying to protect proprietary information relating to technology and any other sensors, the location of the catalyst and the volume of the catalyst. (Burns, Tr. 2419).

1648. Auto/Oil members did not engage in specific or even generic discussions of the details of each automobile company's advanced technology vehicle program. (Burns, Tr. 2433).

1649. The automobile members of Auto/Oil "rejected a proposal to allow [advanced technology] vehicles to be inspected by an independent consultant retained by the Oil Side members on the ground that the technology incorporated in such vehicles would be highly proprietary in nature." (CX 4011 at 012-013).

1650. In order to protect their proprietary interests in their future products, the automobile companies told Auto/Oil that each company wanted to protect their low emission engine technologies. (Burns, Tr. at 2419).

1651. The oil members of Auto/Oil did not care about the automobile companies' specific technology. (Burns, Tr. at 2418-2419, 2422).

1652. The oil companies cared about the emissions results of the Auto/Oil Reformulated

gasoline when used in the Advanced Technology Vehicles. (Burns, Tr. at 2418-2419, 2422).

1653. Over the course of several months, all of the Auto/Oil members signed off on the program to protect the proprietary information relating to the advanced technology vehicles. (Burns, Tr. 2419).

1654. It took several months for the Advanced Technology Vehicle program to be agreed upon because the automobile companies were very concerned about maintaining the proprietary nature of this technology. (Burns, Tr. 2419).

1655. The program developed by the Auto/Oil members enabled the Auto/Oil members to benefit from the emissions results, but also enabled the automobile companies to protect their proprietary interests by doing all of the testing at their own facilities, only testing vehicles that they manufactured themselves and limiting the description of the vehicles used in the testing to the vehicle model type, engine size and vehicle transmission type. (Burns, Tr. 2418-2419, 2421-2423, 2433; CX 4027 at 008).

1656. The minutes from the June 4-5, 1991 RPC meeting state: "[A]ny [Advanced Technology] vehicles tested would have 'black box' technology, i.e., technology that would not be disclosed other than with regard to its emissions performance, and would only be made available for testing at the manufacturers' own facilities." (CX 4050 at 012-013).

1657. The automobile companies never stated to the Auto/Oil members that their low emission engine technology was in the public domain, because they wanted to protect their proprietary interests in this technology. (CX 4027 at 007-008).

1658. The automobile companies never presented any information to Auto/Oil regarding the details of their Advanced Technology Vehicles, because they wanted to protect their proprietary interests in these future products. (Burns, Tr. 2421-2423).

1659. Unlike Unocal's presentation, Auto/Oil members could not replicate the automobile companies' studies of the Advanced Technology Vehicles from what was presented at the RPC meetings. (Burns, Tr. 2426).

1660. Unlike Unocal's presentation, Auto/Oil members could not test the automobile companies' emission results of the Advanced Technology Vehicles from what was presented at the RPC meetings. (Burns, Tr. 2426-2427).

1661. The proprietary advanced vehicle technology was so important to Chrysler, that Chrysler would not have done any testing on its advanced technology vehicles for Auto/Oil without the black box procedure to protect Chevron's proprietary information. (Burns, Tr. 2427).

1662. Auto/Oil members, (except of course, Unocal) in this case, took caution to explicitly state and identify that certain technology was proprietary. Auto/Oil would then apply special procedures for the handling of that technology. (Burns, Tr. 2418, 2422, 2433; Doherty, Tr. 2795; Klein, Tr. 2495-2500; CX 4027 at 008; CX 7073 (Wise, Dep. at 21, 40-41, 45-46)).

1663. Auto/Oil members testified that they do not believe Unocal ever followed the procedure regarding proprietary information and never spoke with the Auto/Oil counsel in order to try and protect their proprietary information. (Klein, Tr. 2523).

1664. Auto/Oil members did not expect that Unocal would obtain a patent on information it presented to Auto/Oil because "they had not told us they were doing that and had presented this information to us without any warnings or any limitations on its use." (Doherty, Tr. 2801).

3. Unocal's Representation That the 5/14 Research Was in the Public Domain Amounted to a Representation that Anything Derived From Unocal's Slides, Equations, Directional Relationships, and Data Disk Were Not Subject to Any Patent or Other Intellectual Property Protection.

1665. Based on the definition from Black's Law dictionary, "Public domain" means the "realm of publications, inventions, and processes that are not protected by copyright or patent. Things in the public domain can be appropriated by anyone without liability for infringement." (Black's Law dictionary (7th ed. 1999)).

1666. According to Webster's Third New International dictionary, "public domain" means "2: the realm embracing property rights belonging to the community at large, subject to appropriation by anyone; specif.: status unprotected by copyright or patent[.]" (Webster's Unabridged Third New Int'l Dictionary 1836 (1971)).

1667. Auto/Oil members, including Unocal, understood "public domain" to mean that Unocal's emissions research was free, had no strings attached, and could be used by anyone without having to compensate any third party. (Klein, Tr. 2500-2501; Ingham, Tr. 2604 (Confirming that "public domain" means "is available to any and all to utilize in whatever way they see fit with no strings attached.."); Segal, Tr. 5631; CX 7079 (Zimmerman, Dep. at 82); CX 7076 (Youngblood, Dep. at 78)).

1668. Jack Segal, an Auto/Oil member from BP, defined "public domain" as meaning "non-proprietary, you're not going to own it anymore, it was being freely given to the public." (Segal, Tr. 5631).

1669. The Auto/Oil members' definition of "public domain" is consistent with Unocal's definition and the definition as provided in the Agreement. (Klein, Tr. 2500-2501; Segal,

Tr. 5631; CX 7073 (Wise, Dep. 42-43); CX 4001 at 007).

1670. Unocal's senior representative to Auto/Oil (and the manager of Unocal emissions research scientists and inventors Jessup, Croudace and Mallett), defines "public domain" to mean that the research material is "freely available," *i.e.*, "anybody can use it, run with it, do whatever they want to with it;" the research material would be "free of charge." (CX 7041 (Alley, Dep. at 38)).

1671. Unocal's own economic expert, Dr. Teece (whom Unocal offered for his "experience as a scholar in the field of innovation" (Teece, Tr. 7531), defined technology in the "public domain" as "non-patented, nonproprietary information or technology." (Teece, Tr. 7628).

1672. The Auto/Oil Agreement, and the definition of "public domain" are consistent with the purpose of Auto/Oil, to reach a cost effective solution to the emissions problem. (CX 7041 (Alley, Dep. at 34-35); CX 4001).

1673. Auto/Oil members testified that they understood that "everything, both the presentation as well as the data disk and what was on it" was in the public domain. (Segal, Tr. 5631; Klein, Tr. 2509; Ingham, Tr. 2607).

1674. Harvey Klein testified that he understood Unocal's use of the term "data" to mean "all the data that was generated in their studies. . . ." (Klein, Tr. 2509).

1675. The explicit language of the Auto/Oil Agreement, the plain meaning of Dr. Jessup's own words, the contemporaneous understanding of Auto/Oil's members and the purpose of Auto/Oil, made it clear, that once Unocal presented its data to Auto/Oil, it was in the public domain. (CX 4001; CX 4027 at 010; CX 293; CX 7073 (Wise, Dep. at 18); Burns, Tr. 2417; Segal, Tr. 5601; Klein, Tr. 2544, 2578-2580).

1676. The Auto/Oil agreement provides that "No proprietary rights will be sought **nor patent applications prosecuted on the basis of the work of the Program** unless required for the purpose of ensuring that the results of the research by the Program will be freely available, without royalty, in the public domain." (CX 4001 at 007 (¶ 2 E) (emphasis added)).

1677. A representation that the data was part of the public domain was one and the same as a representation that there would be no "patent applications prosecuted" on the basis of that work. (Klein, Tr. 2500-2501).

1678. In August 1990, Auto/Oil applied the language in the Agreement providing that everything from Auto/Oil would be put into the public, making clear that Unocal's position is inconsistent with Auto/Oil's own interpretation of the Agreement and course of dealing. (CX 4023 at 007).

1679. The minutes from the August 23, 1990 Auto/Oil RPC meeting reflect that Ford was willing to present certain engine speciation technology to Auto/Oil, thereby placing it in the "public domain." (CX 4023 at 007).

1680. Auto/Oil was concerned, not only with the public availability of the data but also with a third party slightly altering the technique and then patenting it. (CX 4023 at 007).

1681. Auto/Oil representatives inquired of legal counsel how to prevent the patenting by a third party of information presented to Auto/Oil in order to "ensure that, once disclosed, the technique remains in the public domain." (CX 4023 at 007).

1682. Jack Wise, one of the co-chairs of the Research Planning Task Force, stated that he understood Unocal's presentation was in effect the granting of a royalty free license to all of the members of Auto/Oil. (CX 7073 (Wise, Dep. at 19)).

1683. Mr. Wise based his understanding that Unocal granted Auto/Oil a royalty free license, on three factors: "One is the general understanding that goes back to the formulation of the program that there would be a – that this was a research program designed to develop data for regulators to use and that all the participants would pitch in without any –and that all the information that was donated to the program would become part of the program . . . . The second point was that Union [Unocal] said that the information was in the public domain." (CX 7073 (Wise, Dep. at 19-20)). Third, "under the terms of the agreement and then the practice, long-standing practice in research organizations is that you don't accept proprietary information from a third party without an agreement, a legal agreement on how to accept that." (CX 7073 (Wise, Dep. at 40)).

1684. Mr. Wise believes that the Auto/Oil members obtained a royalty-free license to anything that resulted from Unocal's underlying research on reformulated gasoline and emissions. (CX 7073 (Wise, Dep. at 19)).

1685. Unocal clearly understood that by presenting its research, it was essentially granting the Auto/Oil members a royalty free license:

> Q: Would the elements of cost-effectiveness include intellectual property or patent royalties?
>
> A: No

Q: Why would it not include that?

A: Are you talking about the Auto/Oil Program itself?

Q: Members of Auto/Oil. What was that thinking?

A: Well, it was agreed in the beginning that everybody – whatever the results that issued from this belonged to everybody in the group. So on that sense, you couldn't patent it.

(CX 7041 (Alley, Dep. at 37)).

1686. The slide presentation, titled "Unocal Reformulated Fuels Technology: A Truly Innovative Approach," contained information from which a person of ordinary skill in the art could derive the invention claimed in Unocal's then pending patent application that resulted in the '393 patent. (CX 4028; Segal, Tr. 5636-5637).

1687. Unocal's slide presentation contained a series of graphs showing the relationship between hydrocarbon, CO and NOx emissions and T50 and other gasoline properties (the others were aromatics, olefins, research octane number, paraffins, T90, RVP and T10). (CX 4028 at 033-044).

1688. By far the strongest correlations were between T50 and reduced hydrocarbon and CO emissions. (CX 4028 at 033-44; Jessup, Tr. 1313, 1545).

1689. Mr. Segal, who looked in depth at Unocal's patents in 1995 after first learning about them, concluded that "those relationships that were presented at the meetings, Auto/Oil and WSPA, were also put into the patent in words." (Segal, Tr. 5636-5637; CX 272; CX 4028).

1690. Unocal's presentation and the patent were "very similar in that the graphs, the relationships that were shown in the charts and graphs at the presentations appeared in the patent in word form." (Segal, Tr. 5637-5638; CX 272; CX 4028).

C. Unocal's Misrepresentations to Auto/Oil Caused Competitive Harm.

1. Unocal's Misrepresentations to Auto/Oil Are an Independent Source of Harm Because the Auto/Oil Member Refiners Made Their Investment and Refinery Modification Choices Without Knowledge of Unocal's Intent to Charge Royalties For Use of Unocal's Reformulated Gasoline Technology.

1691. Dr. Alley, the senior Unocal representative to Auto/Oil, knew about Unocal's patent plan.

Dr. Alley was a member of 5/14 patent conception committee. (CX 7041 (Alley, Dep. at 49-50)).

1692. In fact, Dr. Alley gave the patent conception an "A" grade, which is the highest grade that a potential patent conception can get and ensures that a patent application will be filed immediately. (CX 661 at 003; CX 7053 (Lipman, Dep. at 13-14).

1693. Dr. Jessup admitted that he did not inform anyone at the September 1991 Auto/Oil presentation of Unocal's pending patent application or its desire to obtain royalties. (Jessup, Tr. 1313-1314, 1547). Dr. Alley admitted that no one at Unocal ever told Auto/Oil that it had a pending patent on its 5/14 research. (CX 7041 (Alley, Dep. at 66)).

a. Auto/Oil Members Relied on Unocal's Statements and Conduct in Using Unocal's Research.

1694. Following Dr. Jessup's presentation, the Auto/Oil members all believed they had the right to use Unocal's research data without having to worry about any restrictions, including royalty payments. (Doherty, Tr. 2798-2799, 2801; Pahl, Tr. 2772; Ingham, Tr. 2604, 2607; Klein, Tr. 2509; Segal, Tr. 5631; CX 7073 (Wise, Dep. at 19-20)).

1695. Auto/Oil representatives did not know that Unocal had filed a patent application and that Unocal intended to extract royalties from licensing fees. (Doherty, Tr. 2801; Pahl, Tr. 2773; Jessup, Tr. 1313-1314, 1547).

1696. Auto/Oil members took Unocal's statements at face value – the research, including the data about T50 – was in the public domain, i.e., freely available to be used in any manner and without any strings attached. *See, e.g.*, (Pahl, Tr. 2772; Ingham, Tr. 2604; CX 7049 (Hochhauser, Dep. at 138)).

1697. During the course of the Auto/Oil research, the members believed that it was important to know the potential costs of the various emissions improvements in order to develop the most cost-effective means of satisfying the new emissions goals. *See, e.g.*, (Klein, Tr. 2475-2476, 2534; CX 140 at 003; CX 4026 at 011).

1698. Unocal clearly understood that cost was an important and relevant factor to the Auto/Oil members: "There was a group within Auto/Oil that looked at cost constantly, potential costs." (CX 7041 (Alley, Dep. at 35-36)).

1699. Unocal's patent application has added to the cost of the T50 solution suggested by Unocal's data. *See, e.g.*, (CX 1337 at 008 (Unocal is suing Valero for treble damages of 5.75 cents/gallon.)).

1700. It was essential to Auto/Oil's mission to know of the added cost of Unocal's research, and the absence of any notification of the cost was a factor that led Auto/Oil's members

to the conclusion that the data was public and that there was no additional cost attached to using Unocal's data. *See, e.g.*, (CX 140 at 003; CX 4001 at 001; Kiskis, Tr. 3833-3834; Ingham, Tr. 2595).

1701. Unocal's data provided useful information regarding T50. (Segal, Tr. 5624; Jessup, Tr. 1313). The Unocal "graph basically says that as you lower T50 below the industry average point, which is somewhere between 215 and 220 degrees, as you take T50 lower, hydrocarbon emissions are reduced proportionally." (Segal, Tr. 5624; CX 1678 at 036; Jessup, Tr. 1313).

1702. Unocal's pending patent application at the time it made its presentation to Auto/Oil, contained a claim covering T50 under 215 degrees Fahrenheit. (CX 2024 at 001 ("Claim 1 in the application of the '393 patent had a T50 of no more than 215 and an RVP of no more than 8.0."); CX 1788 at 051).

1703. Most of the member companies in fact took Dr. Jessup's presentation and research results and, understanding that they were permitted to do so, freely used this data and the data disks however they saw fit, with no expectation of paying either for the data, or the right to use any process or technology developed therefrom. (Klein, Tr. 2508-2510; Ingham, Tr. 2604-2605; CX 7049 (Hochhauser, Dep. at 66, 69-70, 74)).

1704. Mr. Pahl shared the Unocal research materials with his coworkers, manager, and other people within Phillips Petroleum Company that had an interest in fuel compositions because the data showed a relationship on T50 and other variables. (Pahl, Tr. 2773).

1705. Mr. Pahl believed he could share the information with his coworkers because his "understanding was that [Unocal's data] was public domain information, it wasn't proprietary or confidential, and so we were free to use it in any way we thought was appropriate." (Pahl, Tr. 2772).

1706. ARCO and Chevron made extensive use of the data in their own research efforts, understanding that the data itself, and any processes derived therefrom, to be available to all at no cost. (Ingham, Tr. 2607-2609; Segal, Tr.5627-5628).

1707. Prior to the Auto/Oil meeting, ARCO had already obtained a copy of Unocal's data disk from Unocal's prior presentation to the Western States Petroleum Association ("WSPA").. (Segal, Tr. 5629-5630).

1708. Jack Segal, who attended Unocal's presentation to Auto/Oil and its prior presentation to WSPA, circulated the Unocal slides from the Auto/Oil presentation to ARCO's Clean Fuels Task Force and to his management. (Segal, Tr. 5627-5628; CX 272; CX 1678).

1709. At the time Mr. Segal circulated Unocal's slides from the Auto/Oil presentation to his management and colleagues, he had no idea that Unocal had filed a patent application or

that Unocal had a plan to charge money for using this information. (Segal, Tr. 5628).

1710. Jack Segal testified that there was enough information on Unocal's data disk to replicate Unocal's tests. (Segal, Tr. 5617).

1711. ARCO ran regressions on Unocal's data and came to the same conclusion that "a decrease in T50 would cause a proportional decrease in carbon monoxide." (Segal, Tr. 5617-5620; CX 1592; CX 1593).

1712. At the time ARCO ran these regressions, ARCO believed that Unocal's information was in the public domain and free to use. (Segal, Tr. 5613-5614, 5629-5631).

1713. Mr. Segal understood from Unocal's presentation that "as T50 is being decreased . . . emissions are also going down." (Segal, Tr. 5610, 5626-5627; CX 1678 at 038).

1714. Mr. Segal also understood from Unocal's presentation that "as you reduce T50 below 220, carbon monoxide emissions are also reduced." (Segal, Tr. 5627; CX 1678 at 038).

1715. Mr. Segal was responsible for reporting back to his management and colleagues what was going on at Auto/Oil and WSPA. (Segal, Tr. 5611, 5628).

1716. ARCO had a strict policy regarding proprietary information from third parties: "The policy was not to take in that information at all. The minute one either was told it was proprietary or any indication at all of it being proprietary, we were to not listen or not take it in anymore . . . . Also, to make a note of such either correspondence or verbal transaction and to notify our legal people." (Segal, Tr. 5612).

1717. Mr. Segal had no way of knowing that Unocal planned to charge money for its research data because "this was presented in an open forum at Auto/Oil and we believed that presentations in Auto/Oil were in the public domain." (Segal, Tr. 5628).

1718. Mr. Ingham, an Auto/Oil member from Chevron, sent around a memo to numerous colleagues discussing Peter Jessup's presentation and attaching a copy of the Unocal slides. (Ingham, Tr. 2607-2610; CX 461 at 001, 056-113).

1719. At the time that Mr. Ingham sent around the Unocal data to his colleagues, he believed that Unocal's reformulated gasoline research was in the public domain, and believed that Chevron could use Unocal's research information without having to worry about Unocal's assertion of any proprietary interests in the information. (Ingham, Tr. 2604, 2610-2612, 2617-2618).

1720. Chevron had in place a policy that any solicitations from people outside the company containing markings that they were considered to be proprietary, had to be forwarded to a company lawyer to determine if the information could be passed around the company.

(Ingham, Tr. 2610-2612).

1721. Mr. Ingham followed Chevron's procedure regarding proprietary information on several occasions, but had no reason to follow the procedure with regards to the Unocal presentation because there were "no proprietary markings" on the Unocal data. (Ingham, Tr. 2612-2613).

1722. Mr. Ingham's job responsibilities would have required him to report back to his management the existence of a pending patent application. (Ingham, Tr. 2619).

1723. Mr. Klein, an Auto/Oil member from Shell, made overhead transparencies of the Unocal slides and conducted a presentation to his colleagues at Shell, with the understanding that Unocal's information was in the public domain and not subject to any intellectual property protection, because Mr. Klein "believed that it was part of the Auto/Oil program." (Klein, Tr. 2503-2504, 2507).

1724. Mr. Klein's company, Shell Oil, had a policy prohibiting the use of proprietary information from another company without their permission. (Klein, Tr. 2514-2515).

1725. Mr. Klein did not believe he was violating Shell's policy when he presented Unocal's research to his colleagues at Shell, because he understood Unocal's research to be "non-proprietary information that I was allowed to share." (Klein, Tr. 2515-2517).

1726. Mobil representatives took careful notes during Unocal's presentation of its 5/14 research. (RX 701 at 004-005).

1727. After receiving Unocal's research data at its presentation to Auto/Oil, and after finding out that the research data had been presented to CARB and was in the public domain, Mobil representatives in Auto/Oil compiled a memorandum to several people in Mobil's research department, detailing Unocal's findings, and running tests to see if Unocal's conclusions were correct. (CX 1693).

1728. Mobil compared Unocal's results with the Auto/Oil results. (CX 1693).

1729. Not only was Unocal's emissions research used by individual Auto/Oil members, but it was also used in Auto/Oil studies. (Pahl, Tr. 2772).

1730. Unocal's presentation had an effect on the research work being done at Auto/Oil. (Ingham, Tr. 2618).

1731. Unocal's presentation "accelerated the conduct of the experiment that Auto/Oil had been planning to conduct to look at the independent effects of T50 and T90." (Ingham, Tr. 2618).

1732. Unocal's research helped Auto/Oil determine "the width of the T50 variable, the T90 variable the T50/T90 study." (Pahl, Tr, 2772; CX 748 at 037-038).

1733. Unocal's research material was specifically used in Auto/Oil's T50/T90 study. (Pahl, Tr. 2775; CX 748 at 037-038).

1734. GM discussed Unocal's T50 research at an Auto/Oil RPC meeting. (CX 748 at 003).

1735. Mr. Pahl testified that Unocal's research "helped guide the deliberations of the research program committee in deciding which parameters of the gasoline that we would study in the future from that point on." (Pahl, Tr. 2775).

b. Auto/Oil Members Did Not Find Out About Unocal's Patents Until it Was Too Late.

1736. Most of the Auto/Oil members did not find out that Unocal had a patent relating to the material it presented to Auto/Oil, until early 1995, when Unocal issued a press release announcing that it had been awarded a patent for reformulated gasoline. *See, e.g.,* (CX 375; CX 369; CX 372; Doherty, Tr. 2801; Klein, Tr. 2517-2518).

1737. Dr. Jessup admitted that he would not have told the truth if anyone from CARB, WSPA, or Auto/Oil had asked whether Unocal had a pending patent application. (Jessup, Tr. 1597). He testified that he would have said nothing and refused to answer the question. (Jessup, Tr. 1599).

1738. The Unocal press release stated that "Unocal's patent covers many of the possible fuel compositions that refiners would find practical to manufacture and still comply with the strict California Air Resources Board (CARB) Phase 2 requirements in 1996." (CX 375 at 001).

1739. When the refiners finally found out about Unocal's patent, the refiner members of Auto/Oil had already spent billions of dollars on refinery modifications in order to comply with the CARB regulations. (CCPF ¶ ¶ 3803-3947). As Dr. Shapiro explained, the large, specific investments made by refiners to comply with the CARB RFG rules promulgated after Unocal's misrepresentations are reliance because the investments could confidently be expected to shift economic power to Unocal. (CX 1799A at 021) (Shapiro Expert Rebuttal Report).

1740. The Auto/Oil members testified that they were very suprised that Unocal applied for patents on information that was presented to CARB, Auto/Oil and WSPA with no strings attached. (Derr, Tr. 5096-5097).

1741. Mr. Derr, former CEO of Chevron, stated: "[W]here we had a major joint research project between the major oil companies and the automobile industry where we were

trying to pool all the research to come out with some good data to use for regulatory agencies, and we also were working together in California, all the oil companies working with the Air Resources Board, providing them with data to help them in their promulgation of gasoline specifications, it seemed incongruous to me that... during that environment that one company would go off and apply for patents on the subject matter that we were all working collaboratively with." (Derr, Tr. 5097).

1742. Unocal now has five RFG patents. (CX 617; CX 618; CX 619; CX 620; CX 621).

1743. Unocal's patents cover the majority of the space allowed in the CARB regulations. (CCPF ¶ ¶ 2168-2245, 2993-3016, 3905-3941).

1744. The refiner members of Auto/Oil are unable to blend around the five Unocal patents. (CCPF ¶ ¶ 3174-3496, 3925-3941).

c. Several Options Were Available to the Auto/Oil Members if Unocal Had Not Made its Misrepresentations to Auto/Oil.

1745. Had Auto/Oil members known of Unocal's fraud in 1991, Auto/Oil members would have taken alternative measures that likely would have resulted in a competitive landscape dramatically different than the monopoly held by Unocal today. (CCPF ¶ ¶ 4248-4265, 4458-4573).

1746. If Unocal had not lied to Auto/Oil about its data being in the public domain, CARB would have found out that Unocal had lied about it having "no-proprietary interest in the data." (CCPF ¶ ¶ 4581-4594).

1747. Auto/Oil members would have reported back to their company's management regarding any indication that Unocal's research was proprietary. (Doherty, Tr. 2801; Ingham, Tr. 2619).

1748. Had members known of Unocal's fraud, Auto/Oil 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 ¶ ¶ 4458-4716).

XII. Unocal Viewed its Participation in WSPA as an Integral Part of its Overall Strategy to Gain a Competitive Advantage.

1749. The Western States Petroleum Association ("WSPA"), is a trade organization

representing oil producers as well as refiners and marketers in five western United states. (CX 7059 (Moyer, Dep. at 10-11)).

1750. WSPA's primary purpose is to represent the interests of the industry, including "be a conduit of communication to the California Air Resources Board and to provide technical information to the Air Resources Board that would hopefully be utilized by the agency in crafting their fuels regulations." (CX 7059 (Moyer, Dep. at 10-11)).

1751. A memo forwarded to WSPA's legal committee stated that "a careful effort should always be maintained to provide the best data available. This is undoubtedly an admonition which is unnecessary; certainly it has been our observation that that is what is done." (RX 672 at 008).

1752. WSPA members were advised by their legal counsel that "the industry, and the public, have a legitimate concern that agency-imposed regulations be technically sound . . . One of the more valuable functions WSPA has always performed for its members is to assure that costly environmental regulations are based on good science." (RX 523 at 005).

1753. WSPA developed committees to carry out research and to develop positions grounded in science and technical data. (CX 7046 (Grey, Dep. at 9)).

1754. One such effort involved the development in the early 1990s of a CARB predictive model: "The predictive model working group is a subcommittee of the gasoline issues group." (Lieder, Tr. 4676).

1755. Shell's Dr. Charles Lieder was chair of the emissions working group, which became the predictive model group, "in the 1990 to 1993 time frame." (Lieder, Tr. 4676-4677).

1756. Dr. Lieder has served on working groups for both federal and state governments, including the then recent involvements with a federal regulatory negotiation group that aided in the implementation of the 1990 Clean Air Act and as a member of the National Petroleum Council's Year 2000 Study of Fuels for the Next Decade. (Lieder, Tr. 4674).

1757. Dr. Lieder's experience with the California state government includes participation in joint recognized committees established by the state to study future fuels. (Lieder, Tr. 4674).

1758. Dr. Lieder has extensive experience working with industry and trade association groups, including the Western States Petroleum Association's Emissions Issues Predictive Model Working Group, the Western States Petroleum Association's Gasoline Issues Group, the American Petroleum Institute's Fuels Committee, the American Petroleum Institute's Economics Working Group, and the National Petrochemicals and Refiners Association Fuels Subcommittee. (Lieder, Tr. 4674).

1759. Dr. Lieder testified that the gasoline issues group and the predictive model group were not engaged in political activity. (Lieder, Tr. 4680).

A. Unocal Highlighted the Effects of T50 Through Its September 1991 Presentation of Its 5/14 Research to WSPA.

1760. On December 13, 1990 Unocal filed a patent application for its emissions research results, which contained numerous claims that included T50 as a critical limitation. *See, e.g.*, (CX 1788 at 051).

1761. During the summer of 1991, Unocal employees, including Denny Lamb, Peter Jessup, Al Hirata, Michael Croudace and Dave Plumbley, indicated to Predictive Model Working Group members that Unocal was conducting emissions research that would provide valuable information for WSPA's database. (Lieder, Tr. 4684-46). Individual WSPA companies were interested in obtaining Unocal's emissions research; ARCO made repeated requests for Unocal's information. (Clossey, Tr. 5380-5381).

1762. Prior to September 1991, Unocal representatives told Dr. Lieder that T50 was a property to reduce emissions: "Unocal representatives indicated that they had some information that they thought would be very valuable to add to the database" that was being assembled by the WSPA committee. (Lieder, Tr. 4730, 4684).

1763. Drs. Lieder and Wayne Miller of Unocal had discussions about T50 when Dr. Lieder was preparing a paper at Dr. Miller's request for a National Petroleum Refiners Association meeting in November 1990. (Lieder, Tr. 4730).

1764. Upon reviewing Dr. Lieder's draft paper, Dr. Miller indicated that he thought Dr. Lieder should insert T50 into his presentation to make it "more all-encompassing of industry views." (Lieder, Tr. 4730).

1765. After finding out that Unocal had actual research data regarding T50, Dr. Lieder tried to get the research information from Unocal. (Lieder, Tr. 4684).

1766. Dr. Lieder spoke to Denny Lamb of Unocal "about obtaining the Unocal data." (Lieder, Tr. 4684).

1767. The topic of obtaining the Unocal data was raised during a WSPA meeting. (Lieder, Tr. 4685). Mr. Lamb stated that he "had to go through the proper management procedures within Unocal before he could **give** [our] WSPA predictive model working group that data that we hoped to assemble and then give to CARB." (Lieder, Tr. 4685) (emphasis added).

1768. In September 1991, after making its presentation to CARB and well after it had filed a patent application, Unocal finally made a presentation of its RFG research to WSPA.

(Segal, Tr. 5608-5609; CX 272; CX 456; CX 271; Lieder, Tr. 4688).

1769. On September 10, 1991, Drs. Jessup and Croudace presented Unocal's 5/14 Project research to WSPA's Predictive Model Working Group. (Lieder, Tr. 4683; Clossey, Tr. 5380-81; CX 7049 (Hochhauser, Dep. at 61, 63); CX 271; CX 272).

1770. Unocal's presentation to WSPA was substantially similar to the Unocal presentation to CARB in June 1991. (Jessup, Tr. 1300).

1771. At the September 10, 1991 presentation to WSPA, Dr. Jessup gave copies of the slide presentation and copies of the data disk "with all the program information on it" to anyone that wanted it. (Jessup, Tr. 1307; Segal, Tr. 5616-5617; Lieder, Tr. 4683; CX 456).

1772. At the September 1991 presentation to WSPA, Dr. Jessup gave copies of the data set from Unocal's ten-car study to at least two oil companies. (Jessup, Tr. 1307).

1773. In addition, Unocal's Michael Kulakowski at Unocal transmitted Unocal's research results to ARCO's Tim Clossey in response to ARCO's request. (CX 1625; CX 1681; Clossey, Tr. 5381, 5383, 5442-5443). Mr. Kulakowski sent Mr. Clossey a note and a data disk. The data disk included a "readme.doc" file explaining the disk contents. (CX 1625; CX 1681; Clossey, Tr. 5381, 5383, 5442-5443).

1774. Though Mr. Clossey did not open the files on the disk personally, he knew that the disk had "a whole bunch of data," including raw emissions data, fuel recipes, and formulas. (CX 1625; CX 1681; Clossey, Tr. 5381, 5383, 5442-5443).

1775. The Unocal data disk contained information regarding "the fuels that were used in the [Unocal] program, the vehicles that were tested, the results of the testing, and also some instructions on how to run regression analysis on the data." (Segal, Tr. 5617).

1776. WSPA members understood from Unocal that "The Unocal data has been presented to CARB and is one of the data sets being used in separate emission modeling efforts being conducted by WSPA." (CX 1693 at 001).

1777. Mr. Clossey explained that he requested Unocal's research data because "we were managing the data pool for WSPA, so we wanted to get the data and then get it into the broader analysis." (Clossey, Tr. 5381, 5445-5447). Larry Rapp, who worked for Mr. Clossey on the Clean Fuels Task Force, helped manage "broader database" being compiled for WSPA and Auto/Oil. (Clossey, Tr. 5381, 5445-5447).

1778. ARCO also requested research information from Unocal because Mr. Clossey understood that Unocal's data "was being referred to as the scientific data source that had caused or allowed CARB to begin to talk about setting specific specifications for T50."(Clossey,

Tr. 5381). ARCO requested "to see the data so that we could understand it scientifically." (Clossey, Tr. 5381).

1779. Like Auto/Oil, the specific objective of Unocal's manipulation of WSPA was to move the industry toward an RFG standard based on T50. (Jessup, Tr. 1313; CX 1788 at 051; CX 240 at 001).

1780. In his presentation to WSPA, Dr. Jessup told the other WSPA members that reducing T50 would reduce both HC and CO emissions. (Jessup, Tr. 1302).

1781. Dr. Lieder testified that during the presentation Unocal "indicated that their research indicated a strong impact of T50 on vehicle emissions." (Lieder, Tr. 4683).

1782. Jack Segal, who attended Unocal's presentation to WSPA, took copious notes during Unocal's presentation. (Segal, Tr. 5608-5611; CX 272 at 004).

1783. Mr. Segal wrote down the variables that Unocal focused on, the effects of those variables on emissions, and the overall effect of the variables. (Segal, Tr. 5609-5610; CX 272 at 004).

1784. Mr. Segal understood from Unocal's presentation that "when T50 goes down, emissions goes down, the effect is in the same direction." (Segal, Tr. 5610; CX 272 at 004).

1785. Dr. Lieder took notes during Unocal's September 10, 1991 presentation. (Lieder, Tr. 4691; CX 1748 at 002). The notes emphasized that "the presentation was highlighting that hydrocarbon emissions had a strong relationship to the T50 property and the olefins property of fuel." (Lieder, Tr. 4691; CX 1748 at 002).

1786. Dr. Lieder's notes from Unocal's presentation emphasize that the presentation highlighted that "carbon monoxide, CO, [had] a strong relationship to T50." (Lieder, Tr. 4691).

1787. WSPA members testified that Unocal advocated T50 as a significant parameter affecting emissions, and that WSPA should recommend that T50 be included in the predictive model, and as a separate fuel specification. (CX 7059 (Moyer, Dep. at 101); CX 7060 (Moyer, Dep. at 7); CX 7046 (Grey, Dep. at 36, 39-41)).

1788. Neil Moyer, a WSPA member from Texaco, testified that "Unocal presented information and argued very strongly that they believed that T50 was a strongly influential parameter on emissions performance." (CX 7059 (Moyer, Dep. at 101)).

1789. Mr. Lamb of Unocal, consistently told WSPA that T50 was an important parameter in reducing emissions. (CX 7046 (Grey, Dep. at 36, 38, 39)).

B. WSPA Members Understood that Unocal's Research Was Non-Proprietary.

1. WSPA Members Based Their Belief That Unocal's Research was Non-proprietary on the Course of Dealing at WSPA.

1790. WSPA members understood that once a member presented its research to WSPA, the information was free to use and in the public domain. (CX 7049 (Hochhauser, Dep. at 58-59); CX 7042 (Bea, Dep. at 43, 46); CX 7064 (Sinclair, Dep. at 60-61)).

1791. Diane Sinclair, a WSPA member from Ultramar, testified that "once data goes to WSPA, then it is the public domain." (CX 7064 (Sinclair, Dep. at 60-61).

1792. In Dr. Lieder's experience as chair of the WSPA predictive model group and a member of the WSPA fuels group, his understanding of the practice with respect to members sharing proprietary information at these meetings is "that proprietary information would not be shared at WSPA meetings." (Lieder, Tr. 4716).

1793. Dr. Lieder defines the term proprietary as "information that one is going to seek economic benefit from." (Lieder, Tr. 4720).

1794. As the head of the WSPA predictive model working group, Dr. Lieder's understanding was "that the technical information presented to the group was free" for the group to use. (Lieder, Tr. 4722-4723).

1795. Dr. Lieder's understanding "as I led and directed the predictive model working group, is that the technical information presented to the group was free for us to use – and we would progress to share that with CARB for the building of a predictive model that would go on to how we make gasoline in California." (Lieder, Tr. 4723-4724).

1796. Dr. Lieder testified that he had no reason to believe that Unocal's research was proprietary because "the data was presented orally with no restrictions or comments by Unocal. . . . We quickly started that process [of combining the data into one data base], and Unocal became a full partner, a full leader in getting us moving forward, [and] never expressed any restrictions on how we were working with that information that presented on September 10." (Lieder, Tr. 4726).

1797. WSPA members' understanding that presented research was in the public domain, is un-rebutted by Unocal.

1798. Up until 1995, Dr. Miller, Mr. Lamb and Dr. Jessup gave no "indication of any kind that any of their work related to the 5/14 Project was proprietary." (Lieder, Tr. 4733).

1799. In the context of the WSPA Predictive Model Working Group in 1991, if a company was thinking about revealing proprietary information at a WSPA meeting, Dr. Lieder

expected them "to clearly state [the restrictions and] their plan with respect to deriving no or providing some economic benefit" from the information. This should be clear so "members of the meeting know whether they've been contaminated or not." (Lieder, Tr. 4772).

1800. The GM/WSPA/ARB study underscored the WSPA members' understanding that once a company presented information, it was in the public domain. In the CARB/GM/WSPA study, CARB approached the auto industry and the Western States Petroleum Association to "have a technical conversation with them" and see if "the two industries and one regulatory body could come to agreement on pursuing a technical testing program." (Lieder, Tr. 4682).

1801. The CARB/GM/WSPA study was "a scientifically designed study of the effect of RVP and driveability index on vehicle emissions for a typical California vehicle fleet." (Lieder, Tr. 4683).

1802. On November 12, 1990, Mr. Lamb sent an internal Unocal memorandum to Roger Beach and Don D'Zurilla concerning the GM/WSPA/ARB test program. (CX 1630; Lamb, Tr. 2035).

1803. Roger Beach wrote a note in his handwriting on the upper right hand corner of a copy of Mr. Lamb's November 12, 1990 memorandum (CX 1630) that read: "DWL, We should participate." (Lamb, Tr. 2035-2036; CX 1630). Mr. Lamb understood this as a directive that Unocal should participate in the GM/WSPA/ARB test program. In fact, Unocal did participate in the GM/WSPA/ARB test program. (Lamb, Tr. 2036).

1804. The GM/WSPA/ARB test program referred to in Mr. Lamb's November 12, 1990 memorandum (CX 1630) is the test program referred to in the GM/WSPA/ARB research agreement (CX 1711). (Lamb, Tr. 2036, 2040).

1805. Don D'Zurilla signed the GM/WSPA/ARB research agreement on behalf of Unocal. (CX 1711; Lamb, Tr. 2040). The agreement was signed by Mr. D'Zurilla and was executed on May 1, 1991. (CX 1711 at 012, 022).

1806. Unocal "signed on to fund a Unocal share" of the GM/WSPA/CARB study. Unocal, as an individual company, signed on to the agreement for this study. (Lamb, Tr. 2319, 2376-2377).

1807. Mr. Lamb reviewed the GM/WSPA/ARB research agreement for Don D'Zurilla prior to Mr. D'Zurilla's signing of the agreement on behalf of Unocal. (Lamb, Tr. 2006, 2040).

1808. Paragraph D of the GM/WSPA/ARB research agreement states: "The results of research and testing of the Program shall be disclosed to the Members, and otherwise placed in the public domain." (CX 1711 at 003; Lamb, Tr. 2040).

1809. The GM/WSPA/ARB research agreement provides the following: "No proprietary rights shall be sought nor patent applications prosecuted on the basis of the work of the Program unless required for the purpose of ensuring that the results of the research by the Program shall be freely available, without royalty, in the public domain." (CX 1711 at 003-004; Lamb, Tr. 2040-2041).

1810. CARB staff used some of the results of the GM/WSPA/ARB study in some of the analysis done for the Phase 2 technical support document, though the study had not completed prior to the technical support document's release. (Courtis, Tr. 5757; CX 5).

1811. There was at least one instance in WSPA where a company chose not to present its research because it did not want to relinquish its proprietary rights. (CX 7049 (Hochhauser, Dep. at 59)).

1812. Mobil did not release its emissions research to WSPA – in fact, Mobil wasn't even willing to describe its research to WSPA because the WSPA members understood that presented information was free to use. (CX 7049 (Hochhauser, Dep. at 59)).

2. WSPA Members Used Unocal's Data Because They Believed the Data Were Non-proprietary.

1813. Dr. Jessup admitted that he would not have told the truth if anyone from CARB, WSPA, or Auto/Oil had asked whether Unocal had a pending patent application. (Jessup, Tr. 1597). He testified that he would have said nothing and refused to answer the question. (Jessup, Tr. 1599).

1814. Dr. Jessup testified that he "wouldn't be surprised if they [WSPA members] took my data and did their own analysis." (Jessup, Tr. 1311). Nor would he be surprised if ARCO did the same. (Jessup, Tr. 1311).

1815. Unocal's data provided useful information regarding T50. (Segal, Tr. 5620; Lieder, Tr. 4683). "The industry average T50 at that point in time was around 215 to 220 degrees Fahrenheit. This [Unocal] graph definitely showed a very beneficial relationship to decreasing the T50 below that range in order to reduce CO emissions." (Segal, Tr. 5620).

1816. Unocal's pending patent application at the time it made this presentation to WSPA contained a claim covering T50 under 215 degrees Fahrenheit. (CX 2024 at 001 ("Claim 1 in the application of the '393 patent had a T50 of no more than 215 and an RVP of no more than 8.0."); CX 1788 at 051).

1817. ARCO concluded that Unocal's research data had practical application in the formulation of clean fuels. (Segal, Tr. 5620).

1818. ARCO took Unocal up on its offer and received a copy of the Unocal data disk after the WSPA meeting. (Segal, Tr. 5617).

1819. There was enough information on Unocal's data disk to replicate Unocal's tests. (Segal, Tr. 5617).

1820. In fact, ARCO ran regressions on Unocal's data and came to the same conclusion that "a decrease in T50 would cause a proportional decrease in carbon monoxide." (Segal, Tr. 5617-5620; CX 1592; CX 1593).

1821. Having no reason to believe that he was not complying with ARCO's internal policy on receiving proprietary information, Mr. Segal circulated the Unocal slides from the WSPA presentation to ARCO's Clean Fuels Task Force and to ARCO's vice president of engineering and technology. (Segal, Tr. 5613).

1822. At the time Mr. Segal circulated Unocal's slide presentation to his management and colleagues, he had no idea that Unocal had a plan to charge money for using this information. (Segal, Tr. 5614).

1823. Mr. Segal had no way of knowing that Unocal planned to charge money for its research data because "the information was presented in an open forum, WSPA. There was no caveats on it that it was of a proprietary nature." (Segal, Tr. 5613-5614).

1824. Mr. Clossey determined that ARCO could use Unocal's research because he had requested that Mr. Kulakowski provide ARCO with the information and the data, "so that we can look at it, analyze it, provide a peer-reviewed, scientific, technical analysis and so that we can quickly get it rolled into . . . the broader database, make the database as robust as possible so that we get the best answer possible, CARB could get the best possible [answer] when they went to set regulations." (Clossey, Tr. 5385).

1825. Mr. Clossey did not expect that there would be any costs associated with using the information provided by Mr. Kulakowski from Unocal. (Clossey, Tr. 5385).

1826. Mr. Clossey called Mr. Kulakowski to provide feedback based on ARCO's initial analysis of Unocal's data in September 1991. (Clossey, Tr. 5386). Mr. Clossey also communicated with Mr. Kulakowski about fuels issues, including the Unocal data and T50, at a number of WSPA and CARB forums. (Clossey, Tr. 5386).

1827. Nothing during the development of the RFG regulations called into question Mr. Clossey's expectation that ARCO's use of the information from Unocal would not have an associated cost. (Clossey, Tr. 5386).

1828. Shell used Unocal's data. As chair of the predictive model working group, Dr. Lieder was given Unocal's data disks to "quickly look at the data and start the combination of

that with the existing data" the group already had. (Lieder, Tr. 4726).

1829. Dr. Lieder gave Unocal's data to Shell enabling them to review Unocal's data set, look at trends made evident by the Unocal data, and run "regressions on the data to see which kind of predictive models would represent just that sole data sheet." (Lieder, Tr. 4707).

1830. Dr. Lieder did regressions with the Unocal data presented at the September 10, 1991 meeting. (Lieder, Tr. 4771).

1831. After running regressions of Unocal's data, Shell confirmed the key factors of the oral presentation given by Unocal. (Lieder, Tr. 4707).

1832. Mobil believed it was free to use the data and information; it conducted a preliminary analysis of that data set and included Unocal slides in an internal memorandum. (CX 1693 at 001, 004; Jessup, Tr. 1309-1311).

3. WSPA Members Would Have Violated Their Respective Corporate Policies Had They Accepted Proprietary Information.

1833. WSPA members testified that they would not have accepted Unocal's data if they knew that it was proprietary. (Lieder, Tr. 4727-4728; Segal, Tr. 5612).

1834. In the Fall of 1991, as a Shell employee, Dr. Lieder understood that he "could not receive any proprietary information without there being a legal agreement reached" before the receipt of such information. (Lieder, Tr. 4727-4728).

1835. There are practical reasons that Dr. Lieder and Shell did not want to receive proprietary information from other companies. (Lieder, Tr. 4734). Receiving proprietary information without a proper legal agreement could cause Shell "to become under duress or, effectively, economic obligations." (Lieder, Tr. 4734).

1836. If Dr. Lieder received proprietary information, "the owner of that proprietary information would come to Shell and ask for economic benefit from it" because Dr. Lieder "had it and used it and worked with it." (Lieder, Tr. 4734).

1837. ARCO ran regressions on Unocal's data. (Segal, Tr. 5617-5619). At the time ARCO ran these regressions, it believed that Unocal's information was in the public domain and free to use. (Segal, Tr. 5613-5614; 5617-5619; 5629-5631).

1838. Mr. Segal was responsible for reporting back to his management and colleagues what was going on at WSPA. (Segal, Tr. 5611).

1839. ARCO had a strict policy regarding proprietary information from third parties: "The policy was not to take in that information at all. The minute one either was told it was

proprietary or any indication at all of it being proprietary, we were to not listen or not take it in anymore . . . . Also, to make a note of such either correspondence or verbal transaction and to notify our legal people." (Segal, Tr. 5612).

1840. Mr. Clossey confirmed Mr. Segals's testimony and testified that ARCO implemented its guidelines in the following way: "[i]f information was provided to us, a proposal was provided to us, as soon as you could get to the point where you could understand that that information was proprietary, then the direction was, at the moment you can understand that, you no longer look at the information, you don't use the information, you package the information up and forward it to legal." (Clossey, Tr. 5378-5379).

1841. Mr. Segal followed ARCO's policy regarding proprietary information from third parties. (Segal, Tr. 5615-5616).

1842. Mr. Segal testified about a specific example regarding fuel additives, where he quickly followed the policy upon realizing that the information he received was proprietary. (Segal, Tr. 5615-5616).

C. Unocal Used WSPA to Advocate to CARB That There Should be a Predictive Model Containing T50.

1843. A goal of WSPA was to present accurate scientific information to CARB. (Lieder, Tr. 4675-4676; CX 7059 (Moyer, Dep. at 10-11)). Dr. Lieder cared that the information WSPA "gave CARB was accurate and true." (Lieder, Tr. 4732-4733).

1844. WSPA members testified that CARB was interested in receiving technical information, and credible evaluations of that technical information. (CX 7059 (Moyer, Dep. at 84-85)).

1845. CARB told WSPA what types of information it was interested in receiving. (RX 680). For example, Mr. Venturini of CARB, elicited data and responses from WSPA regarding sulfur and distillation parameters, including T50, to better assist CARB in the evaluation of these parameters. (RX 680 at 002).

1846. CARB also indicated to WSPA members that room remained for the specifications in the current proposal to be modified. (RX 680 at 002).

1847. Dr. Lieder, the chair of the predictive model group, took steps to ensure that the information he gave CARB was accurate. (Lieder, Tr. 4733).

1848. It was the practice of Mr. Clossey and members of WSPA to respond to CARB's requests for information by collectively discussing it by call or e-mail, thus letting others in the

group know of the request. (Clossey, Tr. 5391). When CARB made a request for information to Mr. Clossey, he discussed it with members of WSPA and shared the request with the other members. (Clossey, Tr. 5391).

1. Unocal Became Very Involved in the WSPA Predictive Model Group In Order to Influence CARB.

1849. Unocal believed it was critical to participate in the CARB decision making process. (CX 137 at 001).

1850. Unocal believed that working within WSPA was one of the best ways to be involved in the CARB decision making process: **"It is important that Unocal provide WSPA with our best experts in Fuel technology to assure maximum benefit from this alliance, particularly when we must challenge unreasonable fuel mandates."** (CX 137 at 002).

1851. Unocal provided input throughout the development of the CARB Phase 2 regulations within the context of WSPA. (CX 7046 (Grey, Dep. at 40)).

1852. Unocal deployed its resources to insure that it could influence the WSPA predictive model. For instance, it had three representatives – Drs. Jessup and Croudace as well as Mr. Kulakowski – attending the predictive model technical committee. (CX 294 at 001; Kulakowski, Tr. 4536-4537).

1853. At the August 15, 1991 workshop, CARB indicated that it was interested in having a predictive model workshop. (CX 266 at 004). Unocal recommended that WSPA experts develop a draft predictive model, which those experts later did. (CX 266 at 004; Kulakowski, Tr. 4532).

1854. **{**

} (CX 100 at 033, *in camera*).

1855. In a letter dated August 27, 1991, Mr. Lamb told CARB that Unocal "agreed to make the [5/14] data public if necessary in the development of a predictive model for use in the certification of reformulated gasoline. The staff has now proposed to develop such a predictive model and requested that we make the data public. **Please be advised that Unocal now considers this data to be non-proprietary and available to CARB. . . ."** (CX 29) (emphasis added).

1856. **{**

} (CX 100 at 033, *in camera*).

1857. **{**

} (CX 100 at 033, *in camera*).

1858. Mr. Lamb and the other Unocal representatives were very prominent in all of the WSPA committee discussions. (CX 7046 (Grey, Dep. at 35-36)).

1859. WSPA Executive Gina Grey testified that Denny Lamb of Unocal was one of the key players in the WSPA process. (CX 7046 (Grey, Dep. at 35-36)).

1860. Mr. Kulakowski was the chairman of WSPA's predictive model policy group, and Dr. Jessup combined Unocal's 5/14 Project data with data sets from other programs. (Kulakowski, Tr. 4532-4533, 4536-4537; CX 702 at 004).

1861. Between late 1990 and 1993, Unocal's Peter Jessup, Michael Croudace, Michael Kulakowski, and Denny Lamb had "high attendance" and "high input" in the predictive model working group. (Lieder, Tr. 4680).

1862. Unocal inventor Dr. Jessup, himself participated in WSPA's efforts in 1991 and 1992 to develop a predictive model and information to be provided to CARB. (Jessup, Tr. 1301, 1304).

1863. Unocal inventor Dr. Jessup explained that he participated in the WSPA predictive model working group because it was his "opportunity to include the kinds of variables and modeling techniques that I believed were appropriate." (Jessup, Tr. 1521).

2. WSPA Developed a Predictive Model Heavily Influenced By Unocal's Research.

1864. WSPA wanted to develop a predictive model in order to show CARB its benefits and to try and convince CARB to adopt a predictive model, after CARB indicated their intent to provide flexibility through the inclusion of the predictive model and vehicle testing options. (RX 680 at 002; CX 7049 (Hochhauser, Dep. at 41)).

1865. WSPA formed two committees to work on a draft predictive model for the Phase 2 regulations. (Kulakowski, Tr. 4532). The first was the predictive model technical group; the second was the predictive model policy group. (Kulakowski, Tr. 4532). The predictive model technical group focused on issues concerning data, the WSPA database, and statistical methods to produce a predictive model. (Kulakowski, Tr. 4533).

1866. The predictive model policy group worked on how the predictive model would be integrated into the regulatory scheme. (Kulakowski, Tr. 4533).

1867. The predicative model working group wanted to work with CARB "in the final development of the predictive model that CARB had always spoken about." (Lieder, Tr.

4676). This predictive model could be used to make gasoline under CARB Phase 2 regulations in the state of California. (Lieder, Tr. 4676).

1868. Dr. Lieder testified that the Predictive Model Working Group's focus was to assemble scientific and technical data that we could share with CARB and the public in the development of the regulations that were being considered there in the early 90's in California." (Lieder, Tr. 4677).

1869. Unocal was heavily involved in both the predictive model technical group and the predictive model policy group. (Kulakowski, Tr. 4532-4533; Jessup, Tr. 1301, 1304, 1521).

1870. In a June 27, 1991 WSPA memorandum copied to Mr. Lamb, Unocal's Mr. Kulakowski reported to WSPA that "CARB's main concern in the use of a predictive model is enforcement. CARB does not believe they can enforce at the retail level if models are used. A possibility is a 'mixed mode' enforcement where certain key fuel parameters are capped by CARB, with retail enforcement begin conducted against those caps." (CX 253 at 001, 003).

1871. In a July 16, 1991 draft approach submitted to WSPA, Mr. Lamb proposed that CARB regulate gasoline through a "simple" model from 1995 through 1998 then a "complex" model after 1998. (RX 678 at 002-003). Under the heading "REFORMULATED GASOLINE ENFORCEMENT," Mr. Lamb proposed that a number of parameters in the models be subject to caps, including RVP, oxygen, and benzene. (RX 678 at 006-007; Kulakowski, Tr. 4525-4526).

1872. On September 10, 1991, Unocal gave the predictive model working group, of which Dr. Lieder was chair, the Unocal data files. (Lieder, Tr. 4692; CX 7049 (Hochhauser, Dep. at 57); CX 271 at 002-004).

1873. WSPA members used Unocal's research to help develop their proposed predictive model. (CX 7049 (Hochhauser, Dep. at 76)).

1874. After presenting the Unocal research to WSPA, Dr. Jessup drafted preliminary predictive model information for WSPA. (CX 1669 at 001; Jessup, Tr. 1303-1304). In that effort, Dr. Jessup stated that "DI and distillation T50 are also highly correlated," and he recommended using a single variable. (CX 1669 at 002).

1875. WSPA Executive, Gina Nelhams Grey, specifically thanked Peter Jessup for his work in putting together the preliminary predictive model information. (CX 1669 at 001).

1876. In the preliminary predictive model information that Dr. Jessup gave to WSPA, he also highlighted T50 as a dominant variable with respect to HC, CO, and NOx. (CX 1669 at 003).

1877. Although Dr. Jessup highlighted the effects of T50 on NOx in the data disk that it gave to WSPA regarding the predictive model, Unocal's slide presentation to WSPA actually showed that lowering T50 had no beneficial effect on NOx emissions. (*Compare* CX 1669 at 003, *with* CX 456 at 002).

1878. Dr. Jessup made a recommendation regarding T50 to the WSPA predictive model group: "DI and distillation T50 are highly correlated. These could also be combined in a single variable. I recommend not attempting to build models containing DI." (CX 1669 at 002; Lieder, Tr. 4700; Jessup, Tr. 1305-1306).

1879. After Unocal's presentation and after the WSPA predictive model group received Dr. Jessup's preliminary predictive model, the group "start[ed] to review them [Unocal's data set] with the purpose of combining them [Unocal's data set] into the WSPA combined database" that would be shared with CARB. (Lieder, Tr. 4692).

1880. As chair of the group, Dr. Lieder assigned "the action item" to Unocal, after Dr. Jessup volunteered, to take the information from Unocal that had been presented and combine it with information already collected by WSPA in the summer of 1991. (Lieder, Tr. 4693-4604).

1881. Unocal was assigned to "attempt to put that together as a combined data set" to be reviewed by the whole group at the next meeting. (Lieder, Tr. 4693-4694, 4702-4703; CX 296).

1882. Besides the fact that Dr. Jessup volunteered, Unocal was chosen to combine the data into one data set because they had the most emissions data and the largest data set, so "they felt that the technically sound approach was for them to take the smaller data sets and combine them." (Lieder, Tr. 4694, 4696-4697).

1883. During discussions with Dr. Lieder, Unocal "indicated that now that they were able to present and share with us their data, they actually had the most emissions data, the largest data set, and so they felt that the technically sound approach was for them to take the smaller data sets and combine them, and Dr. Jessup volunteered, and I took that and made that into an action item." (Lieder, Tr. 4694).

1884. The combined data set that Dr. Jessup put together for WSPA, included information from the "Unocal 10 car study at SwRI, Auto/Oil phase 1, new and older cars, GM/CARB/WSPA RVP/DI study, Auto/Oil initial current car Sulfur study, [and the] ARCO study." (CX 1669 at 004; CX 7049 (Hochhauser, Dep. at 57-58)).

1885. The goal of the WSPA predictive model derived from the combined data set was to "achieve a technically-valid model." (CX 278 at 002).

1886. The process of combining data was "quickly started," and "Unocal became a full partner" and "a full leader" in getting the group "moving forward." (Lieder, Tr. 4726).

1887. Shell statistician Mike Rozum worked with Peter Jessup and Unocal to put together the database for the WSPA predictive model: "Peter Jessup and Mike Rozum were really the dynamos who were making the process go." (Lieder, Tr. 4710). They helped the group move forward by "scrutinizing the data and building models." (Lieder, Tr. 4705, 4710; CX 294).

1888. To keep the group's progress on track, "there were frequent phone conversations of great length between Peter Jessup and Mike Rozum." (Lieder, Tr. 4710-4711).

1889. On October 4, 1991, Dr. Jessup had the combined data set in an acceptable format to present to the WSPA Predictive Model Group. (CX 1761; Lieder, Tr. 4706-4707; CX 1563 at 001).

1890. Dr. Jessup's attempt at creating a predictive model from the combined data set only identified T50, not DI, as a dominant variable. (CX 1669 at 003; Jessup, Tr. 1306-1307).

1891. WSPA had several different options in how to develop its proposed predictive model. (CX 296 at 002). WSPA could have started with the EPA's simple model, or with the API's complex model, or start with its own "proposed" model. (CX 296 at 002).

1892. WSPA had a huge "universe of data" from which to pick fuel parameters, prior to obtaining the information from Unocal. (CX 296 at 003).

1893. WSPA was clearly concerned with the cost-effectiveness of the predictive model that it proposed to CARB. (CX 296 at 007).

1894. WSPA met with CARB in October, 1991 to discuss the status of the predictive model and to make a presentation to CARB. (CX 277 at 003; CX 1563 at 003). Seven people from WSPA attended this meeting, and 3 of those people were from Unocal. (CX 277 at 004).

1895. On October 25, 1991, Dr. Jessup, on behalf of WSPA, gave CARB a disk containing the WSPA combined data set. (CX 1246).

1896. The data sets regarding the predictive model provided to CARB by the WSPA predictive model group were used by CARB: "They would document in their technical support documents that they would issue to the public." (Lieder, Tr. 4715-4716).

1897. The results from a regression on the data set that Dr. Jessup created for WSPA by combining the 5/14 Project data with other data sets were "similar to those that Unocal discovered." (CX 300 at 001).

1898. As an internal Unocal October 1991 memorandum reveals, Unocal knew that WSPA's predictive model efforts were headed directly into the same results that Unocal discovered (and later patented) from its 5/14 Project. (CX 300 at 001).

3. While Participating in the WSPA Predictive Model Group, Unocal Continued to Work Directly with CARB.

1899. Mr. Lamb stated to CARB: "[W]e have continued to work with staff both directly and through the Western States Petroleum Association (WSPA) to expedite [predictive] model development and to ensure smooth implementation of the regulation." (CX 43 at 001).

1900. Though he insisted at trial that he and Unocal adamantly opposed any CARB model that contained caps, at the time of CARB's Phase 2 rulemaking, Denny Lamb authored a proposed alternative approach to CARB's Phase 2 regulation that included a model with caps. (RX 678; Kulakowski, Tr. 4524-4526).

1901. At an August 22, 1991 meeting of the Fuels Issues Team, Mr. Kulakowski reported on CARB's August 15 Phase 2 workshop. (Kulakowski, Tr. 4527; CX 266 at 003). As the minutes of the meeting reflect, Unocal wanted "to make sure that CARB understands that the proposed form of the predictive model does not truly give the industry 'flexibility' in the certification process." (CX 266 at 004).

1902. According to Mr. Kulakowski, the issue regarding the proposed predictive model was that "CARB was proposing a statistical treatment of the data and the form of the predictive model that would essentially require the fuel to be cleaner than their specifications in order to be certified." (Kulakowski, Tr. 4528).

1903. Mr. Kulakowski recalls no discussion at the August 15, 1991 meeting about any problem associated with CARB applying caps to the predictive model. (Kulakowski, Tr. 4528).

1904. Despite the fact that Unocal knew that CARB intended to include caps in any predictive model, when Unocal employees met on August 30, 1991 to discuss all of their concerns about CARB's proposed predictive model, there was no mention of any concern about caps. (CX 264). Specifically, on August 29, 1991, Denny Lamb called for a meeting the next day to "formalize our thoughts and position regarding a CARB predictive model." (CX 264 at 001). A September 5, 1991 memorandum from Dr. Jessup to Mr. Lamb "outlines the conclusions we reached in the meeting on August 30, 1991 . . . regarding our input to the California Air Resources Board development of a predictive model for gasoline emissions." (CX 264 at 003).

1905. Although Dr. Jessup's memorandum – which was copied to Drs. Alley and Miller as well as Messrs. Kulakowski and Schwedock – identifies a number of concerns, nowhere does it mention any concern about caps or limits on the predictive model. (CX 264 at 003-

005).

1906. At a September 27, 1991 meeting, the Fuel Issues Team again discussed the fact that the CARB Phase 2 regulations would include caps, which applied to all of the regulations including the predictive model. (Kulakowski, Tr. 4535-4536). The minutes of that meeting read, "The Retail Caps CARB has imposed essentially mandate the endpoints of a fuel certified equivalent to the formula. The retail caps also serve as per gallon limits on averaged parameters. The specs will be enforced at the service stations." (CX 702 at 003-004; Kulakowski, Tr. 4535). These retail caps would apply to the predictive model. (Kulakowski, Tr. 4535-4536).

1907. Despite the fact that Mr. Kulakowski was involved in every step of Unocal's dealings with CARB on the Phase 2 regulations and attended the September 27, 1991 meeting, he did not recall any discussion in the September 1991 time frame of Unocal opposing the application of caps to CARB's predictive model. (Kulakowski, Tr. 4536).

1908. Most importantly, the results showed that "T50, not T90 as is predicted by the Auto/Oil Study, is the major distillation property affecting hydrocarbon, carbon monoxide, or nitrogen oxide tailpipe emissions." (CX 300 at 001).

1909. An internal Unocal document drafted after the November 1991 Board hearing confirms that Unocal knew that any CARB predictive model would likely be bounded by the caps in the CARB regulations. (CX 1192). As that document states, "CARB . . . will develop a 'predictive model' option by the Spring of 1992. This model is likely to incorporate the cap values listed above as upper bounds." (CX 1192; Kulakowski, Tr. 4539-4540).

1910. In public and in its dealings with CARB, Unocal took positions with regard to the Phase 2 regulations that sought "the playing field to be level among all competitors." (Kulakowski, Tr. 4542).

1911. For instance, Unocal strongly opposed waivers that would allow individual refiners to avoid compliance with the Phase 2 regulations due to lack of supply of oxygenates, arguing that such waivers might "result in an imbalance in the marketplace and an unenforceable regulation." (Kulakowski, Tr. 4541-4542; CX 38 at 002-003).

1912. Similarly, with regard to the predictive model, Unocal told CARB that the model should result in "parity in the treatment of parties." (Kulakowski, Tr. 4542-4543; CX 38 at 003).

1913. Unocal, like the other refiners, made its plans to comply with the Phase 2 regulations based on CARB's specifications, not the predictive model. (CX 40 at 008).

1914. At the August 14, 1992 CARB workshop, Mr. Kulakowski testified on behalf of Unocal – giving testimony that had been reviewed by Mr. Lamb – that because the CARB predictive model was not completed, Unocal was "forced to plan its capital investments

to produce Phase 2 gasoline at CARB's prescribed specifications." (Kulakowski, Tr. 4543-4544; CX 40 at 008; CX 575).

1915. Similarly, in August 1992, WSPA took the position that the delay in the predictive model forced refiners to forego any flexibility benefits from the model and plan their modifications based on the CARB specifications. (Kulakowski, Tr. 4544-4546; CX 315 at 002).

1916. Unocal thought that CARB would take notice of impacts from the regulatory process that resulted in costs as little as $10 million. (CX 40 at 008).

1917. Mr. Kulakowski testified to CARB on behalf of Unocal that the lack of a predictive model in 1992 would "cost Unocal more than $10 million in capital for Phase 2 compliance." (Kulakowski, Tr. 4544; CX 40 at 008).

1918. In January 1993, Mr. Kulakowski made comments on a draft letter from WSPA to CARB, which outlined various issues with developing the predictive model. (Kulakowski, Tr. 4545-4546; CX 319).

1919. Although Mr. Kulakowski was giving comments with Unocal's interests in mind, nowhere did he mention caps or limits on the predictive model as a concern. (Kulakowski, Tr. 4546; CX 319).

1920. At the time, Mr. Kulakowski made notes on Dr. Jessup's May 19, 1994 presentation to WSPA concerning the CARB predictive model. (CX 1762; Kulakowski, Tr. 4546-4547) *see also* (RX 159 (same document as CX 1762 but with handwritten notes)).

1921. As Mr. Kulakowski's notes indicate, parts of Dr. Jessup's presentation were nothing more than unrealistic technical pipe dreams. (CX 1762 at 002; Kulakowski, Tr. 4548-4549).

1922. For instance, despite the fact that Dr. Jessup's presentation stated that Unocal desired a model with "no random balance," based on his observations of Unocal as chair of the predictive model policy group, Mr. Kulakowski determined that Unocal would not oppose a compromise model that incorporated that statistical treatment. (Kulakowski, Tr. 4548).

1923. Similarly, Mr. Kulakowski recognized that Dr. Jessup's suggestion that the CARB predictive model contain no caps on fuel parameters was so impracticable that it should be dismissed as an "R&D wish." (CX 1762 at 002).

1924. As Mr. Kulakowski explained at trial, "Discussions with CARB on the enforcement scheme for Phase 2 gasoline indicated that the caps were the primary retail enforcement tool. Elimination of the caps would call into question CARB's ability to enforce the

regulation at retail. . . . It was my view that eliminating the caps from the predictive model was just that, a wish expressed by technical people that weren't well-equipped to handle policy issues." (Kulakowski, Tr. 4549).

1925. WSPA members, including Unocal's representative to the predictive model policy group, agreed that it was impossible to eliminate the caps on the predictive model. (Kulakowski, Tr. 4549-4550; CX 1762 at 002). As Mr. Kulakowski's notes reflect, the "policy folks realize it's impractical," by which Mr. Kulakowski was referring to the predictive model policy group, on which either Mr. Lamb or Mr. Economides was the Unocal representative at the time. (Kulakowski, Tr. 4549-4550; CX 1762 at 002).

1926. As Mr. Kulakowski, the chairman of the WSPA predictive model policy committee testified, WSPA had good reasons for never suggesting to CARB that the predictive model should not have caps or limits: "The cap limits were CARB's primary retail enforcement tool. We didn't have a better option that we could propose and we did not want to reopen the rule." (Kulakowski, Tr. 4551).

1927. Mr. Kulakowski, who worked day to day with Mr. Lamb on CARB Phase 2 issues and who chaired, as a representative of Unocal, the WSPA predictive model policy committee, never heard anybody at Unocal use the term "a pure predictive model." (Kulakowski, Tr. 4551). Nor had he heard anyone at Unocal use the term "an unbounded predictive model." (Kulakowski, Tr. 4551). In fact, the first time he ever heard those terms was when Unocal's counsel – Mr. Lueck and Mr. Beehler – used those terms in Mr. Kulakowski's deposition. (Kulakowski, Tr. 4552).

1928. Mr. Kulakowski, who worked day-to-day with Mr. Lamb on CARB Phase 2 issues and who chaired, as a representative of Unocal, the WSPA predictive model policy committee, could not recall any discussions about Unocal recommending to CARB that CARB use a predictive model without any caps or limits. (Kulakowski, Tr. 4552).

1929. In a later dated June 3, 1994, Mr. Lamb told CARB that "We endorse the WSPA comments on the predictive model and the averaging provisions of the Phase 2 regulation. We are pleased that the most of the model decisions have been based on sound science and have observed our basic criteria of necessity and cost effectiveness." (CX 43 at 005).

1930. In its June 9, 1994 hearing notice, CARB made it clear that the predictive model it proposed to adopt at that hearing would contain cap limits. (CX 876 at 001, 004; Kulakowski, Tr. 4552-4553). That notice stated, "In order to evaluate a candidate set of alternative specifications under the predictive model, a producer will identify specifications for each of the eight properties subject to the Phase 2 RFG regulations. Each of the eight specifications must meet the cap limit applicable to the property." (CX 876 at 004).

1931. At that June 9, 1994 CARB hearing on the predictive model, Mr. Kulakowski testified on behalf of WSPA's members, including Unocal. (Kulakowski, Tr. 4554). With respect to the proposed CARB predictive model, which included caps, Mr. Kulakowski explained, "WSPA's approach in the development of the predictive model has been that the final model must address three issues to be acceptable. First, it could not reduce the enforceability of the regulations. Second, it had to ensure the emissions benefits of the Phase 2 program. And finally, it had to provide flexibility to gasoline producers. We believe the model being proposed by the staff today addresses these three issues, with positive results." (CX 2128 at 078; Kulakowski, Tr. 4554, 4557).

1932. In its written comments to CARB at this hearing, Unocal stated that it "endorse[d] the WSPA comments on the predictive model." (CX 2128 at 036). In his testimony, Mr. Lamb stated that Unocal "concur[red] with the written and oral comments provided here today by WSPA." (CX 2128 at 047).

1933. Mr. Kulakowski further testified that "WSPA has reached a consensus that we can support the model being proposed today," but added that "some individual companies still believe there should be additional minor changes to improve flexibility." (CX 2128 at 079; Kulakowski, Tr. 4555).

D. Unocal Continued to Conceal its Plan to Charge Royalties for its RFG Technology as it Worked With WSPA on Several Studies to Prepare Cost Information for CARB.

1934. To respond to cost concerns, CARB asked WSPA to conduct cost studies on behalf of CARB. (CCPF ¶ ¶ 969-972, 1368). For this task, WSPA selected the consulting firm of Turner Mason to create a model to determine the likely compliance costs for potential CARB Phase 2 RFG regulations. (CX 1150; Cunningham, Tr. 4154-4155; 4148-4150).

1935. During the CARB Phase 2 rulemaking process, Unocal participated in the WSPA economic working group, which reviewed the results of the Turner Mason study, set premises for the study, and directed the actions of Turner Mason in conducting the study. (Kulakowski, Tr. 4497-4498).

1936. Mike Kulakowski was Unocal's main contact regarding the Turner Mason study. (Kulakowski, Tr. 4497-4498).

1937. Mr. Kulakowski's supervisor in the regulatory group was Dennis Lamb. (Kulakowski, Tr. 4393). He remained in that regulatory position until he left Unocal in 1993. (Kulakowski, Tr. 4393).

1938. Mr. Lamb and Mr. Kulakowski were the only ones who interacted with CARB on the Phase 2 rulemaking. (Kulakowski, Tr. 4474).

1939. During the CARB Phase 2 rulemaking, Mr. Kulakowski interacted with Mr. Lamb on a day-to-day basis. (Kulakowski, Tr. 4474).

1940. Unocal, of course, knew that the Turner Mason report was intended for submission to CARB and that it was in fact submitted to CARB. (Kulakowski, Tr. 4500).

1941. Although Turner Mason specifically asked for cost information regarding licensing fees, no one from Unocal informed Mr. Cunningham that Unocal had a patent pending related to RFG. (Cunningham, Tr. 4252-4257).

1. Unocal Knew From Prior Studies that Submitting Information on Royalties Was Important.

1942. Turner Mason does consulting and engineering services. It provides consulting in chemical engineering, works for financial institutions, including stints as expert witnesses, process engineering, project management, and refining industry studies. The company has also worked for publishers and for governments at the state and national level. (Cunningham, Tr. 4111-4112).

1943. Robert Cunningham is a licensed professional engineer in the state of Texas and received a Bachelor of Arts and a Bachelor of Science in chemical engineering from Rice University of Houston. (Cunningham, Tr. 4118).

1944. Mr. Cunningham serves as Senior Vice President of Turner Mason & Company ("Turner Mason"), and has served in this position for about 13 years of his 31 years at the company. (Cunningham, Tr. 4111-4112).

1945. Mr. Cunningham's major responsibilities as Senior Vice President include supervision of refinery linear programming studies for evaluation of environmental regulations, support work for sales and acquisitions and independent engineering roles. Mr. Cunningham has also supervised project management roles. (Cunningham, Tr. 4112, 4117).

1946. The American Petroleum Institute ("API") hired Turner Mason in 1989 to conduct a "screening study." API wanted to demonstrate the feasibility of making cleaner burning RFG in the refining industry and secondarily to determine cost. (Cunningham, Tr. 4123-4124).

1947. Turner Mason collected publicly available information about costs and technologies, and obtained non-public information from Unocal, Chevron, UOP, and Amoco among others. (RX 340 at 002-003 (Turner Mason/API letter agreement); Cunningham, Tr. 4124-4126).

1948. Turner Mason aggregated the non-public information received from companies and reported it in aggregate form. The API letter agreement with Turner Mason required these procedures. (RX 340 at 002-003 (Turner Mason/API letter agreement); Cunningham, Tr. 4124-4126).

1949. Gene Motte, head of Unocal's Planning Department and Chairman of the API Task Force, provided cost information about Unocal technologies for the screening study. (Cunningham, Tr. 4126-4131).

1950. Mr. Motte provided royalty cost information on hydrocracking technology that Unocal already licensed and was in the process of licensing. (Cunningham, Tr. 4126-4131).

1951. Mr. Motte indicated to Mr. Cunningham that Unocal had patented the heavy gasoline hydrocracking technology and had run the technology on a pilot plant. (Cunningham, Tr. 4126-4131).

1952. The participants in the API screening study reviewed the cost and technology information, including the royalty cost information obtained for the API study. (Cunningham, Tr. 4368-4370; RX 341).

2. WSPA Selected Turner Mason to Help With Its Cost Studies for CARB.

1953. WSPA selected Turner Mason in June 1991, to create its Linear Programming ("LP") model to determine the likely costs for potential CARB Phase 2 RFG regulations under consideration for the late fall of 1991. (CX 1150; Cunningham, Tr. 4154-4155; 4148-4150; Venturini, Tr. 270-271; CX 1106).

1954. Turner Mason supplied a technical and cost-study proposal for WSPA to evaluate before selecting a contractor that included a proposal to use much of the Auto/Oil study as a baseline for the study. (CX 1151 at 002; CX 1152; RX 347; Cunningham, Tr. 4149-4154).

1955. Turner Mason sent a synopsis of the Auto/Oil study for WSPA to evaluate, including the royalty information supplied by the oil companies, including Unocal's, in its June 1991 work plan proposal. (RX 347 at 005-006; Cunningham, Tr. 4157-4163).

1956. Turner Mason proposed to create an LP model of a single California refinery that would evaluate the cost of compliance with proposed CARB Phase 2 RFG regulations compared to other possible alternatives. (CX 1151 at 002; CX 1152; Cunningham, Tr. 4150-4154).

1957. Turner Mason attended meetings of the WSPA Economics Issues Group ("EIG"). California's largest refiners attended these meetings and Mr. Kulakowski served as Unocal's representative to the EIG. (Cunningham, Tr. 4165-4168; CX 1155).

1958. During the CARB Phase 2 rulemaking process, Unocal participated in the WSPA economic working group and reviewed the Turner Mason report. (Kulakowski, Tr. 4497-4498).

1959. Unocal knew that the purpose of the Turner Mason report was to develop an industry assessment of the costs of the Phase 2 proposal. (Kulakowski, Tr. 4498).

1960. Turner Mason submitted portions of the study it had done for Auto/Oil as a basis to study the likely costs of CARB proposed regulations because it would save time and utilize completed work. (Cunningham, Tr. 4158-4163; RX 347 at 001; 005-006). The study had 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 scenarios, while trying to determine the likely costs of the CARB Phase 2 RFG proposals of August 1991. (Cunningham, Tr. 4172 - 4179; CX 1163 at 006-007).

1968. Mr. Cunningham compared the costs of the August 1991 CARB Phase 2 RFG proposals to the "base case" or the cost of making CARB Phase 1 RFG. The cost increases for making CARB Phase 2 RFG based on the August 1991 proposals varied from 11.7 cents per gallon to 18.1 cents per gallon, with a likely average of 14.3 cents per gallon compared to the "base case." Factors that accounted for the potential variations included the costs of purchasing MTBE as well as increased capital and fixed costs associated with refinery raw material costs. (Cunningham, Tr. 4172 - 4179; CX 1163 at 006-007).

1969. CARB revised its Phase 2 RFG proposal on October 4, 1991, eliminating DI and adding an averaging limit to the existing flat limit proposals that emerged from the August 1991 Phase 2 proposal. The cap limits applied anywhere in the gasoline distribution system, while the flat and average limits applied at the refinery for shipments out of the refinery. (Cunningham Tr. 4182-4183).

1970. The October 4, 1991 proposals promulgated by CARB for RFG Phase 2 reflect the Turner Mason studies. Members of WSPA's EIG met with CARB between the promulgation of the August 5, 1991 Phase 2 RFG proposal and the October 4, 1991 Phase 2 RFG proposal. (Cunningham, Tr. 4183-4185).

1971. The WSPA EIG met to consider and evaluate the CARB RFG Phase 2 proposals of October 4, 1991, and to prepare for a meeting with CARB staff on November 1, 1991, about the Phase 2 proposals. Specifically, the EIG wanted to detail the materials prepared for CARB staff, and to go over the results generated by cases reflecting the October 4 proposals. (Cunningham, Tr. 4185-4190; CX 1164; CX 1165). The EIG compared costs based on flat limit proposals of October 4 versus the costs if CARB converted the flat limits to average limits. The results demonstrated that the cost for a single refinery would increase the cost of making Phase 2 RFG by 13 cents per gallon instead of the projected 23 cents per gallon if CARB changed the flat limits to averages. (Cunningham, Tr. 4185-4190; CX 1164; CX 1165).

1972. It was in Unocal's interests that the Turner Mason study show higher costs on a per-

gallon basis because poorer cost-effectiveness ratios would lead to less stringent regulations. (Kulakowski, Tr. 4500).

1973. Mr. Cunningham and the WSPA EIG met with staff of CARB on November 1, 1991; November 7 or 8, 1991, and November 18, 1991, about the proposed CARB Phase 2 RFG regulations. (Cunningham, Tr. 4190-4192).

1974. Dr. Jessup of Unocal attended the November 1 meeting between WSPA EIG and CARB. (Cunningham, Tr. 4190-4192).

1975. The November 1, 1991 meeting between CARB staff and the WSPA EIG concerned proposed CARB Phase 2 regulations published on October 4, 1991. Mr. Cunningham described the methodology of the cost study conducted for the LP model. Mr. Cunningham explained that refiners anticipated a 15% return on investment, that costs for MTBE would increase because of the need to have Middle East investment, that a single LP model could overoptimize for the 17 different refineries in California because each refinery does not have all of the same equipment, and that no single company had provided total cost information for the model. (Cunningham, Tr. 4193-4195; CX 1517 at 004).

1976. Mr. Cunningham showed CARB staff at the November 1 meeting, the costs based on CARB's proposal of October 4, 1991, for which the model showed an increased cost of 23 cents per gallon compared to making the flat limits of the October 4 proposal into average limits with compliance margins, which would have increased the cost by only 13 cents per gallon. (CX 1517 at 013; Cunningham, Tr. 4207).

1977. Mr. Cunningham discussed the information needed from each company representative for the cost study in order to give CARB a complete picture of the costs. (Cunningham, Tr. 4195-4200).

1978. Mr. Cunningham asked and received from the refiners a validation of all costs presented for the Auto/Oil study plus any cost unique to California not picked up previously. (Cunningham, Tr. 4195-4200).

1979. Unocal knew that the Turner Mason study was an effort to quantify all known costs that would be incurred to comply with the CARB Phase 2 regulations. (Kulakowski, Tr. 4499).

1980. As part of that study, Mr. Cunningham of Turner Mason asked Mr. Kulakowski for an update of Unocal's technology licensing fees. (Kulakowski, Tr. 4500).

1981. Mr. Cunningham explained that its study used an LP model and the model could generate between 30 and 40 gasoline components, while in a real world refinery only 13 gasoline components exist. Therefore, in order to avoid gasoline overoptimization, the model

used lab and blend compliance margins so as not to overutilize or overoptimize the number of components. Turner Mason ran a separate LP on its blend compliance margins to ensure that the results mirrored real world use of gasoline components. (Cunningham, Tr. 4201-4202; CX 1517 at 005).

1982. Mr. Cunningham explained that an LP model attempts to measure the costs and processes at an average refinery, and hence a higher cost or marginal refinery would not have its costs and processes reflected in the LP model. Therefore, lower costs would occur in the LP model than in a higher cost marginal refinery, usually owned by a smaller refiner. (Cunningham, Tr. 4202-4203; CX 1517 at 005).

1983. The Turner Mason study was conservative in its estimated costs, in order to give CARB as accurate a picture as possible. (Cunningham, Tr. 4202-4203; CX 1517 at 005).

1984. WSPA hired Turner Mason to compute the total cost of potential CARB Phase 2 RFG, including obtaining operating costs, capital costs, and both running royalty and paid-up-royalty costs. (Cunningham, Tr. 4206; 4215-4216; 4245-4251).

1985. The Turner Mason study included royalty costs related to all intellectual property, not just patents. The study sought costs for both present and future technology. (Cunningham, Tr. 4206; 4215-4216; 4245-4251).

1986. Mr. Cunningham needed to have building block costs, including intellectual property costs, to determine the cost for an average refiner to make reformulated gasoline. (Cunningham, Tr. 4204; 4215-4216; 4250).

1987. WSPA developed the Turner Mason study under the supposition that each of the companies involved in the project would submit all of the appropriate data and that it would be accurate. Participants expected that all members of WSPA would submit data in order to complete the study. (CX 7070 (Wang, Dep. at 56)).

1988. Many questions remained from the first meeting with CARB staff on November 1, 1991. (Venturini, Tr. 272; CX 1517). On November 8, 1991, the WSPA EIG and Mr. Cunningham met with CARB staff a second time in reference to the CARB RFG Phase 2 proposals of October 4, 1991. (Cunningham, Tr. 4209-4213; CX 280 at 012, 015, 016, 017, 022).

1989. Mr. Cunningham prepared an updated handout for CARB staff, including several new cases analyzed and Vu-Graphs for the November 8, 1991 meeting. (Cunningham, Tr. 4210-4213; CX 280 at 015, 022).

1990. Mr. Cunningham gave CARB information from his LP model, including costs under the "KNEES" case, a case that represented obtaining 80 percent of the emissions benefits at 50 percent of the cost of the October 4, 1991 proposal. In each of the "KNEES" case

diagrams, the "bend" in the KNEES depicted the most cost-effective measure. For instance, the "KNEES" case shows a bend at about 305 degrees for T90, leading WSPA to recommend a 310 degree measure for T90. (Cunningham, Tr. 4209 - 4213; CX 280 at 015, 022). The total increased cost for an average refiner to make gasoline with the properties recommended by CARB on October 4 came to 11 cents per gallon for an average refiner, compared to the CARB proposal's increased cost per gallon of 23.1 cents per gallon, the average cost in a cost range of 20 to 28 cents per gallon, as compared to the increase of 13 cents per gallon setting the averages at the proposed flat limits of the October 4 CARB RFG Phase 2 proposal. (Cunningham, Tr. 4209 - 4213; CX 280 at 015, 022).

1991. CARB staff, WSPA EIG, and Mr. Cunningham held a third and final meeting on November 18, 1991. At that time, Mr. Cunningham presented the completed WSPA LP Model and Cost Study for the proposed CARB Phase 2 RFG regulations, based on the October 4, 1991 CARB proposal. (Cunningham, Tr. 4217-4218; CX 1106 (Turner Mason Cost Study)).

1992. Mr. Cunningham gave CARB a completed a table of processes that showed the Paid-Up Royalties ("PDR") for the final version. (CX 1106 at 099). Mr. Cunningham showed CARB pages and points of the study that amounted to "major cost components of the total cost." Because the paid-up royalties for all processes came to about 1/10 cent per gallon, Mr. Cunningham did not show CARB staff that page. Costs highlighted to CARB included those costs deemed "significant"; namely a cost of ½ cents per gallon or larger. Such costs involved some basic investment and operating cost data, such as the raw material cost for MTBE that had a running royalty associated with it. Mr. Cunningham also showed a page that summarized all investment costs. (Cunningham, Tr. 4219-4221; 4378-4382; CX 1106 at 098-099, 104, 155,164).

1993. CARB was active in its meeting with WSPA and Turner Mason. John Courtis of CARB staff asked questions about the capital cost and capital charge and the basis for developing it. (Cunningham, Tr. 4217-4224; 4378-4382; CX 1106 at 098-099, 104, 155,164).

1994. On November 18, 1991, CARB staff revised its earlier proposals of October 4, 1991, for CARB Phase 2 RFG. The Board held hearings for two days, November 21 and November 22, 1991, and considered the two proposals outlined by staff. (CX 1516 at 001; CX 1192 at 001; Cunningham, Tr. 4225-4227). The November 18, 1991 staff proposal followed in the direction of many of the proposals made by WSPA for regulating various properties of gasoline in the Phase 2 RFG proceedings. For instance, CARB staff added averaging specifications in its November 18 proposal for olefins, T90, and T50, while WSPA advocated averaging for those first two properties. (CX 1516 at 001; CX 1192 at 001; Cunningham, Tr. 4225-4227). Second, staff recommended moving the aromatics specifications to a flat limit of 28%, an average of 25%, and keeping the cap at 30%, the same recommendation made by WSPA. Third, CARB staff proposed

relaxing the olefins proposal by adding an average of 5%, increasing the flat limit to 7%, and keeping the cap at 10%, in line with the WSPA recommendations. Fourth, in line with WSPA recommendations, CARB staff recommended an average limit of 300 degrees for T90, raised the flat limit recommendation to 310 degrees, and kept the cap at 330 degrees in line with the WSPA recommendation. (CX 1516 at 001; CX 1192 at 001; Cunningham, Tr. 4225-4227).

1995. The CARB staff proposal for RFG Phase 2 specifications of October 4, 1991, would have raised the cost to make gasoline by 23 cents per gallon at the average refinery. The CARB staff proposal of November 18, 1991, would have raised the cost to make Phase 2 RFG by only 13 cents per gallon. (Cunningham, Tr. 4227-4228).

1996. The CARB Board held public testimony on November 21 and 22, 1991, to consider the two CARB staff proposals for Phase 2 RFG. At the conclusion of the testimony, the Board modified the October 4, 1991 staff proposal in the directions advocated by WSPA and reflected by the staff November 18, 1991 proposal. (Cunningham, Tr. 4228-4231; 4366-4368; CX 1516 at 001; CX 1192 at 001). Specifically, the Board adopted averaging for the olefin, T90, and T50 specification. Moreover, the Board relaxed the averaging recommendation for olefins from the staff proposal of October 4, 1991, of 20% to a 22% average. The Board also relaxed the flat limit on olefins from the staff proposal of October 4, 1991, of 5% to 6%. (Cunningham, Tr. 4228-4231; 4366-4368; CX 1516 at 001; CX 1192 at 001). The modifications adopted by the Board to the Phase 2 RFG proposal of October 4, 1991, lowered the cost of making Phase 2 RFG by about 30%, because the average refinery would have had to absorb a 23 cent per gallon increase under the October 4 proposal, and only absorbed a 17.4 cent per gallon increase under the Board's adoption of the November 22 standards. The LP model designed for WSPA predicted the 30% cost-savings. (Cunningham, Tr. 4228-4231; 4366-4368; CX 1516 at 001; CX 1192 at 001).

1997. The Turner Mason LP model proposed rejection of a T50 standard because the refiners could not control the T50 as an independent variable. When Mr. Cunningham testified in front of CARB on November 21, 1991, Chairman Jan Sharpless confronted Mr. Cunningham with the results of the Unocal data that showed T50 made an important contribution towards emissions control, leading him to believe that Unocal believed its T50 data valid as presented. (Cunningham, Tr. 4232-4236; CX 773 at 205 to 235; CX 1103).

1998. Mr. Cunningham also testified in front of the Board about the components of major items of cost anticipated for making CARB Phase 2 RFG on November 21, 1991 including the cost-savings and emissions benefits achieved by adopting the CARB staff proposal of November 18, 1991, as opposed to the CARB staff proposal of October 4, 1991. Mr. Cunningham also explained the "KNEES" analysis of cost. (Cunningham, Tr. 4231-4232; CX 1103).

1999. Mr. Cunningham did not discuss paid-up royalties with CARB during the November 21, 1991 CARB hearing, because with the information that was disclosed to him, paid-up royalties comprised of a very small cost for making CARB Phase 2 RFG under the LP model, so Mr. Cunningham did not discuss that aspect of cost at his Board testimony. (Cunningham, Tr. 4231-4232; CX 1103).

2000. Unocal knew that the Turner Mason report was intended for submission to CARB and that it was in fact submitted to CARB. (Kulakowski, Tr. 4500).

2001. Mr. Kulakowski testified that had he known of Unocal's patent application after he had reviewed CARB's technical support document in 1991 and that the patent application might add potential costs to the production of reformulated gasoline, he would have sought permission from Mr. Lamb to disclose those facts to CARB. (Kulakowski, Tr. 4500, 4505-4506).

2002. Unocal employees with knowledge of the patent application and Unocal's intent to enforce the patent, never informed Mr. Cunningham that it had a patent pending related to RFG when Mr. Cunningham sought cost information from the WSPA EIG. (Cunningham, Tr. 4252-4257).

2003. Unocal employee Peter Jessup attended the Turner Mason presentation to CARB and never informed anyone at CARB about the pending patent application. (Cunningham, Tr. 4190-4192).

2004. Unocal's Denny Lamb and Drs. Jessup and Croudace attended a presentation at WSPA regarding the Turner Mason study and never informed anyone about Unocal's pending patent. (CX 271 at 002-003).

2005. The Turner Mason Report did not contain any information suggesting that Unocal had a plan to charge money for use of their 5/14 research. (Venturini, Tr. 275-275) ("Q: Sir, was there anything inn the Western States Petroleum economic study or the briefing that they gave you and your staff that included a plan by Unocal to charge money for the use of their information? A: No.")).

2006. Mr. Cunningham did not learn about the Unocal '393 patent until 1995. (Cunningham, Tr. 4252).

2007. Had Mr. Cunningham known about the pending patent when he wrote the WSPA Cost Study, he had several options to account for such a patent in the cost study. For example, Mr. Cunningham could have included a cost with a footnote stating an unknown cost for a pending patent existed. (Cunningham, Tr. 4252-4257).

2008. Because Mr. Cunningham lacked the information about a Unocal pending patent, it made the study's total cost incomplete by not including a potential additional cost, and

therefore CARB and the refiners were not able to look at the real costs associated with producing CARB Phase 2 RFG. (Cunningham, Tr. 4252-4257).

2009. CARB staff relied on the Turner Mason Report in fashioning its proposed Phase 2 regulation. (Venturini, Tr. 270-271; CX 1106).

2010. One of the points in the Turner Mason Report valued by CARB staff was the analysis that the addition of averaging provisions to staff's October 4, 1991 proposed rule would add manufacturing flexibility for refiners and lower cost. (Venturini, Tr. 270-271 ("A: . . . And what that – the key thing, from my perspective, from that presentation was they showed us that if we added additional averaging provisions into the proposed regulation that that would provide additional flexibility and that in turn, that additional flexibility, can reduce costs.")).

2011. CARB staff relied on the Turner Mason Study's recommendations in deciding to add averaging provisions to its October 4, 1991 proposed Phase 2 rule. (Venturini, Tr. 272-273 ("Q: And in fact did you and your staff recommend that averaging be included in the Phase 2 regulation? A: Yes, we did. Q: And why did you do that, sir? A: We - we included provisions for averaging to provide additional flexibility to the refiners to produce gasoline, and that flexibility, in our view, would provide the refiners the ability to reduce their costs and to maximize their production.")).

2012. CARB staff further relied on refiners' cost information, received during the 45-day comment period after the October 4 proposal, in deciding to amend the proposed Phase 2 rule in a way that would retain a high percentage of the benefits at substantially reduced cost. (Venturini, Tr. 108-110).

2013. CARB viewed the Turner Mason study as an important contribution and significantly revised its October 4th proposal to reduce costs and add flexibility. Staff, among other things, also relied on the Turner Mason study as an important check on the completeness and logic of its own cost estimates. (CX 10 at 082-084).

4. The DRI/McGraw-Hill Study Conducted for WSPA Used the Cost Information From the Turner Mason Study and Was Submitted to CARB.

2014. The DRI/McGraw-Hill study took the costs from the Turner Mason study and applied them on a macroeconomic basis. (Kulakowski, Tr. 4514). In other words, the study "evaluated the economic impacts on the California economy of several alternative options for regulating Phase 2 reformulated gasoline." (CX 801 at 003).

2015. Unocal regulatory staff knew that any compliance costs added to the Phase 2 regulations would adversely affect California consumers. As part of his duties at Unocal, Mr. Kulakowski was the leader within WSPA of the DRI/McGraw-Hill study. (Kulakowski,

Tr. 4514).

2016. As recognized in the DRI/McGraw-Hill study, which was managed by Mr. Kulakowski, refiners "will have to recover investment costs and higher operating costs to produce Phase 2 reformulated gasoline through higher prices." (CX 801 at 013; Kulakowski, Tr. 4516).

2017. The DRI/McGraw-Hill study predicted that these increased prices would lead to consumer harm, including job losses and decreased state and local revenues. (CX 801 at 004-005).

2018. The DRI/McGraw-Hill study assumed a pass-through rate of 100% for the costs incurred by refiners to comply with the Phase 2 regulations. (Kulakowski, Tr. 4517).

2019. Unocal approved the DRI/McGraw-Hill study and with the approval of the oil companies, the study was submitted to CARB. (Kulakowski, Tr. 4514-4515, 4518).

5. Sierra Research Conducted a Study on Behalf of WSPA That Was Submitted to CARB.

2020. Like the DRI McGraw-Hill study, the Sierra Research study was based on the refiner costs provided by Turner Mason. (RX 273 at 006).

2021. Sierra Research conducted a study on behalf of WSPA, detailing the cost-effectiveness of the Phase 2 regulations. (Kulakowski, Tr. 4517).

2022. On behalf of Unocal, Mr. Kulakowski participated in the WSPA committee that managed the Sierra Research study. (Kulakowski, Tr. 4517-4518).

2023. Unocal approved the Sierra Research study and with the approval of the oil companies, the study was submitted to CARB. (Kulakowski, Tr. 4518).

E. WSPA Members Suffered Harm From Unocal's Conduct Because the Refiners Made Their Investment and Refinery Modification Choices Without Knowledge of Unocal's Intent to Charge Royalties for Use of Unocal's Reformulated Gasoline Technology.

1. WSPA Members Did Not Find Out About Unocal's Patent Until It Was Too Late.

2024. Dr. Jessup did not tell WSPA of Unocal's pending patent or its desire to obtain royalties. (Jessup, Tr. 1303).

2025. Dr. Jessup admitted that he had not told anyone at WSPA about Unocal's pending patent

application, even by May 19, 1994 (which is after the '393 patent issued). (Jessup, Tr. 1480-1481).

2026. Even though he gave a presentation to WSPA regarding the CARB Phase 2 predictive model on May 19, 1994, Dr. Jessup did not disclose the fact that Unocal now had an issued RFG patent. (Jessup, Tr. 1612-1613). Nor did he inform CARB of this issued patent. (Jessup, Tr. 1613).

2027. Most of the WSPA members, such as ARCO, Chevron, Exxon, Shell and Texaco, did not find out that Unocal had a patent relating to the material it presented to Auto/Oil, until it was too late. (CCPF ¶ ¶ 2543-2573, 3803-3904).

2028. Dr. Jessup admitted that he would not have told the truth if anyone from CARB, WSPA, or Auto/Oil had asked whether Unocal had a pending patent application. (Jessup, Tr. 1597). He testified that he would have said nothing and refused to answer the question. (Jessup, Tr. 1599).

2029. The Unocal press release stated that "Unocal's patent covers many of the possible fuel compositions that refiners would find practical to manufacture and still comply with the strict California Air Resources Board (CARB) Phase 2 requirements in 1996." (CX 375 at 001).

2030. When the refiners finally found out about Unocal's patent, the refiner members of WSPA had already spent billions of dollars on refinery modifications in order to comply with the CARB regulations. (CCPF ¶ ¶ 2325-2378, 2543-2573, 3716-3717). As Dr. Shapiro explained, the large, specific investments made by refiners to comply with the CARB RFG rules promulgated after Unocal's misrepresentations are reliance because the investments could confidently be expected to shift economic power to Unocal. (CX 1799A at 021) (Shapiro Expert Rebuttal Report).

2031. Unocal now has five RFG patents. (CX 617; CX 618; CX 619; CX 620; CX 621).

2032. Unocal's patents cover the majority of the space allowed in the CARB regulations. (CCPF ¶ ¶ 2993-3044, 3152).

2033. The refiner members of WSPA are unable to blend around the five Unocal patents. (CCPF ¶ ¶ 3140-3654).

2. Several Options Were Available to WSPA Members If Unocal Had Not Misled WSPA.

2034. Not knowing that Unocal's research was not actually in the public domain, and not knowing that Unocal intended to enforce its patent rights, WSPA members in California invested in modifications to their refineries to comply with CARB's Phase 2 regulations.

(CCPF ¶ ¶ 2326-2477, 2543-2573, 3803-3904).

2035. Had WSPA members known of Unocal's fraud in 1991, WSPA members would have taken alternative measures that likely would have resulted in a competitive landscape dramatically different than the monopoly held by Unocal today. (CCPF ¶ ¶ 4433-4716).

2036. If Unocal had not lied to WSPA about its data being in the public domain, CARB would have found out that Unocal had lied about it having "no-proprietary interest in the data." (CCPF ¶ ¶ 4581-4594).

2037. WSPA members would have reported back to their company's management regarding any indication that Unocal's research was proprietary. (Doherty, Tr. 2801; Ingham, Tr. 2619).

2038. Had members known of Unocal's fraud, WSPA 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 WSPA 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).