Outline of Comments

1. Applicability of the LCFS

1.a Obligated Parties

UCS supports an LCFS that includes the broadest possible suite of low carbon fuels, and our preference is thus to include hydrogen from the outset. However, we recognize that, for fuels used in low volumes, it may be appropriate to establish a threshold amount that would trigger the requirement to report and comply with the LCFS.

The GHG accounting for hydrogen under the LCFS should be harmonized with SB 1505 (Lowenthal, 2006), which establishes environmental standards for hydrogen production.

1.b Definition of Transportation Fuels

The scope of the standard should be as broad as possible to encourage investment and innovation in reducing GHG from all transportation fuels. We support the staff recommendation that in the near term, the LCFS should apply only to on-road and off-road vehicles, off-road equipment and rail. Lower carbon alternatives to conventional gasoline and diesel currently exist, and the LCFS would simultaneously stimulate demand for these fuels and instill competition between them for least-cost carbon reduction.

1.c Exclusions

Once the LCFS program has been established and is running smoothly, the program should expand its coverage to include fuels used for marine vessels and aviation. Given the anticipated growth in emissions from aviation fuels,[1] CARB should explore whether in-state standards would be legally defensible and effective in reducing jet fuel emissions, and whether other strategies, either complementary or in lieu of the LCFS, should be employed.

1.d Exemptions

UCS does not have a comment at this time on whether small producers should be excluded from the requirements of the LCFS. We would need more information about the size and distribution of fuel sales to be able to judge whether an exemption is appropriate.

2. Fuel Standards

2.a Overarching Goal

UCS supports the general goal that the standards reduce emissions from transportation fuels by at least 10 percent by 2020.

[1] According to the California Energy Commission, jet fuel use is projected to double between 2002 and 2020, from 3.3 billion gallons in 2002 to 6.6 billion gallons in 2020. Source: Transportation Fuels, Technologies, and Infrastructure Assessment Report (December 2003).

As CARB explores the technical and economic opportunity to de-carbonize transportation fuels, UCS recommends that, in light of new data emerging on the indirect emissions from certain biofuels and other uncertainties in life cycle analysis, CARB evaluate the potential for the state to achieve carbon intensity reduction goals without the use of any fuels that may exacerbate global warming (see 5.3.5 for our comments on indirect land use).

2.b–c Average Carbon Intensity

UCS supports the staff recommendation that diesel and gasoline should be treated separately with two separate goals, at minimum requiring a reduction of ten percent or greater relative to the baseline fuel. Given that CARB is proposing separate standards for gasoline and diesel, we do not see the need to use a diesel efficiency factor. Rather, the standard for gasoline and diesel should be based upon the carbon intensity of each fuel, or well to tank carbon content. Each alternative fuels/drive train would then have two vehicle efficiency adjustment factors – one compared to gasoline and the other to diesel. Applying a vehicle adjustment factor to diesel falsely implies that diesel is inherently less carbon-intensive than gasoline. As we discuss below, there is no guarantee of reduced global warming pollution by switching from a light duty gasoline vehicle to a diesel version.

While diesel engines can provide superior fuel efficiency over gasoline engines, that gap is expected to diminish as gasoline engines improve in efficiency. Gasoline vehicles may even be able to achieve diesel-like fuel economy at a lower price. Further, just because a vehicle uses a diesel engine does not mean it has superior global warming pollution performance. Current and emerging technologies, such as hybridization, high-strength materials, homogeneous charge compression ignition, and improved aerodynamics can lead to a gasoline vehicle achieving equal or superior greenhouse gas performance. The current market already has examples of this phenomenon. The Mercedes E-320 Blutech diesel vehicle provides minimal global warming pollution benefits compared to its competitor, the Lexus E 350 gasoline vehicle. And the 3 liter, four wheel drive, diesel Jeep Grand Cherokee actually produces more global warming pollution than the 3.7 liter, four wheel drive, gasoline version.

Complicating all this is the fact that diesel has a market advantage over gasoline because of a loophole in the federal fuel economy standards (Corporate Average Fuel Economy or CAFE). CAFE standards set limits on miles per gallon, rather than miles per energy-equivalent gallon or GHG per mile, and allow diesel to capitalize on its higher energy content relative to gasoline. Since diesel is more carbon intensive on a per gallon basis than gasoline, the use of diesel to comply with CAFE has the perverse impact of actually increasing GHG from cars and trucks.

UCS strongly agrees with CARB that an increase in diesel fuel usage should not be credited towards compliance with the gasoline standard. As we already discussed, usage of diesel in the light duty sector may not provide any additional GHG benefits. In the heavy-duty sector, there is no reason in provide additional incentives to utilize diesel fuel. Heavy duty vehicles are nearly wholly reliant on diesel fuel due to the inherent performance advantages of compression-ignition. The California Energy Commission (CEC) expects diesel fuel use to grow significantly between 2005 and 2025, and giving refineries credit for this market-driven increase undermines the efficacy of the LCFS. In its “Forecasts of California Transportation Energy Demand, 2005 –

2025, the California Energy Commission (CEC) estimated fuel usage for the next 20 years, assuming California's GHG standards (Pavley or AB 1493) were implemented. The analysis projected that diesel fuel use will increase by an average of 2.9 percent annually over the next 20 years. Gasoline demand is projected to remain nearly flat, with an annual growth rate of just 0.13 percent. Thus, even in the absence of the LCFS, diesel use will continue to grow due to increased goods movement and use in the light duty sector. Based upon CEC's projections, we estimate that business as usual diesel usage will reduce overall (gasoline plus diesel) carbon intensity by 1.5 percent.

In addition, increased dieselization of the fleet could result in higher emissions of particulate matter, smog-forming nitrogen oxides, and air toxics. Even though new vehicle standards for heavy and light duty engines are finally requiring diesel engines to meet the same rigorous standards as gasoline engines, these standards do not address older, in use engines. Since diesel engines have historically been under-regulated, increases in diesel fuel use can lead to higher pollutant emissions. CARB has an ambitious plan underway to reduce diesel pollution from the existing fleet of heavy duty vehicles, but it will take decades before older vehicles and equipment are replaced or retrofitted. CARB has no plans to mandate the cleanup of older light duty cars and trucks. Under CA's Global Warming Solutions Act, CARB is under legislative mandate to ensure that communities are not disproportionately impacted from strategies to reach our 2020 emissions reduction goal.

2.d Alternative Fuel Compliance

UCS agrees with the staff recommendation that compliance for alternative fuels should be based upon the conventional fuel that is replaced, either gasoline or diesel.

2.e Vehicle Efficiency Adjustment

We support the use of vehicle efficiency adjustment factors other than for diesel (see 2.b-c for our discussion of the diesel adjustment factor).

2.f Baseline AFCI Values

UCS agrees with the staff recommendation that the baseline gasoline and diesel values should be determined from CARB lifecycle analysis. The analysis should include emissions from direct and indirect land conversion (see our comments under 5.3.5 for a discussion of indirect land conversion).

2.1 Standards for Gasoline

At this time, UCS does not have a recommendation for the appropriate compliance schedule, and we recommend that discussions of the appropriate compliance path wait until preliminary lifecycle assessments for biofuels are complete. If indirect land use changes suggest that presently available ethanol sources do not offer significant carbon intensity (CI) reductions, a slower compliance schedule may be necessary to allow for the development of lower CI fuel production capacity. If on the other hand, sugar cane ethanol has a CI substantially lower than

corn ethanol, there may be opportunities for more aggressive reductions in the early years or to stay on a linear compliance curve.

2.2 Standards for Diesel

UCS does not have a recommendation at this time for the appropriate compliance schedule for diesel. See our comments in 2.1.

2.3 – 2.8 Volume Obligations for Alternative Fuels

In general, we agree with the staff recommendations. The final regulations will need to lay out a process for bringing additional fuels into the mix.

We do not have a position on whether CARB should assign medium duty applications to gasoline or diesel.

2.9 Volume Obligation for Ultra Low Carbon Fuels

We would support an obligation and incentives to use ultra low carbon fuels. This obligation should supplement, rather than supplant, the overall AFCI standard.

CARB needs to establish a definition for ultra low carbon fuels that clearly encourages the lowest carbon and most sustainable fuels, such as renewable electricity and hydrogen or cellulosic biofuels. CARB should consider a stronger definition than the requirements for cellulosic ethanol in the federal RFS.

We do not, at this time, have a specific recommendation on the form of such an obligation, and are willing to explore several possible structures, including the following:

- Volume requirement, as outlined in the concept paper. The volume requirement for ultra low carbon fuels would need to exceed the requirements of the federal RFS and California's ZEV mandate.
- Percent requirement, whereby a certain share of the reduction in the volume averaged fuel carbon intensity (AFCI) must be met through ultra low carbon fuels.

In order to ensure consumer access to fuels with high barriers to entry, such as hydrogen and electricity, CARB should consider whether there should also be incentives or requirements for infrastructure.

3. Compliance and Enforcement

3.1 Compliance Requirements

3.1.a–d Obligated Party, Options for Compliance, Variance Provision

No comments at this time.

3.1.e Deficit Allowance

We are very concerned that the proposed deficit allowance would encourage regulated entities to consistently fail to meet the standard. We propose that:

- The maximum deficit is capped. For example, only 10 percent of the reduction could be deferred until the next year
- A financial penalty for deficits is applied and is scaled according to the amount of the deficit and a fixed carbon interest rate.
- The deficit is reconciled by the end of the first quarter.

3.1.f-g Compliance through Fees and Compliance Period

No comments at this time.

3.2 Point of Regulation

No comments at this time.

3.3 Tracking and Reporting

3.3.1 Reporting Requirements

No comment at this time.

3.3.2 Procedure for Using Default Values

It is important that the default values are sufficiently conservative to prevent providers of higher CI fuels not to get inaccurate assessment by utilizing this provision. For this reason the default CI should be at least equal to the CI of the highest CI fuel that could potentially qualify for the default value. In addition, to ensure that CI is as accurate as possible, we would support a provision to discourage or phase out use of low accuracy level defaults over time and move to a system based as much as possible on real data. CARB should update these default values on a regular schedule to update with new information.

WSPA has suggested that "Investment decisions made in reliance upon state-established default values should be protected until fully depreciated." This could mean 20-30 years of built in inaccuracy. UCS believes that the LCFS must be built upon the best scientifically achievable carbon measurements. Allowing grandfathering of known inaccurate carbon intensity numbers would fundamentally undermine the LCFS. If investors need emissions numbers that can be guaranteed for decades into the future, these values must be very conservative "worst case" estimates to ensure that incorrect incentives are not frozen into the system. Without grandfathering, a best estimate approach is possible.

3.3.3 Procedure for Using Real Data

As long as there is sufficient oversight to ensure no gaming or data manipulation, we strongly support the use of real data to calculate emissions. The "real data" will need to be verified by CARB or an independent third party that is certified by the state. The real data should be open for public comment and review.

3.3.4 Tracking Biofuels

Interaction with the Federal RFS

UCS strongly urges CARB to go beyond the federal RFS in establishing carbon reduction goals. We recommend three key strategies to achieve this:

1) ***CARB should ensure that the LCFS achieves emission reductions beyond those anticipated by the RFS.*** The goal of the LCFS is to transform California's fuel use, not merely to move low carbon biofuels from one part of the country to another. We recommend limiting the amount of fuels from the RFS that can be used for compliance with the LCFS.
2) ***CARB should develop its own estimates of the direct and indirect emissions from biofuels, rather than relying upon federal RFS rulemakings.*** There are several reasons for the state to utilize its own data, rather than relying upon federal data. First, the RFS grandfathers in ethanol facilities that are planned but not yet under construction, which accounts for most of the 16 billion gallons of corn ethanol in the RFS. EPA will only be estimating emissions for future corn ethanol plants, which will have higher efficiencies than today's conventional ethanol facility. Second, the federal government may face more intense pressure to ensure that estimated emissions from biofuels meet the targets specified in the RFS (20% for corn ethanol; 50% for advanced biofuels; 60% for cellulosic ethanol). CARB can provide an unbiased evaluation of whether those targets are being met and whether federal data accurately accounts for all lifecycle emissions.
3) ***CARB should promote fuel diversification and encourage a wide variety of low carbon alternatives, not just biofuels.***

The interactions between the California LCFS and the Federal Renewable Fuel Standard (RFS) create several potential complexities. If the Federal RFS meets its objectives, and all the fuels used for compliance meet the target emissions reductions, total greenhouse gas emissions from light vehicle motor fuel will be reduced by about 4.5% in 2020. It is important to note that about 12 billion gallons of the corn ethanol in the RFS is exempt from GHG emissions requirements. Excluding the grandfathered/exempt ethanol, the total reductions from the remaining fuels in the RFS are about 4%. However, the unregulated emissions of the ethanol grandfathered into the RFS may reduce or entirely eliminate the emissions reductions of the other fuels. If recent estimates of emissions from corn ethanol are accurate and emissions for corn ethanol are 93% higher than gasoline,[2] the extra emissions associated with the 12 billion gallons of exempt corn ethanol would increase annual emissions by 5%, leading to a net increase in emissions of 1% from RFS fuels in 2020.

[2] Searchinger et al., Science 2008

Because the corn ethanol mandates start sooner than cellulosic ethanol, the cumulative effect from the unregulated RFS fuel between now and 2020 would be more than three times higher than the avoided emissions from the regulated fuels in the RFS.

If California were to comply with the LCFS by preferentially buying the regulated RFS fuels it would be possible to technically achieve compliance without any overall reduction in greenhouse gas emissions globally. In fact, extra transportation of fuel associated with the shuffling could increase emissions compared with abandoning the LCFS. This bad outcome should be avoided.

To avoid rationalization of low CI RFS fuels, we suggest that CARB limit the use of each category of RFS mandated fuels for both federal and California compliance to the fraction of the overall fuel supply consumed in California. For example, in 2015 the Federal RFS will mandate 3 billion gallons of cellulosic ethanol. Assuming California share of national light vehicle fuel consumption in 2015 is 10%, than no more than 300 million gallons of RFS cellulosic ethanol could be counted for compliance in both the Federal RFS and the California LCFS. Any cellulosic ethanol used for LCFS compliance in CA beyond 300 million gallons could not be used for Federal RFS compliance.

3.3.5 Recordkeeping

No comments at this time.

3.3.4 Certification and Auditing

No comments at this time.

3.5 Violations and Penalty

No comments at this time.

4. LCFS Credits

4.1 Credit Calculation

UCS recommends a minor revision of the LCFS credit calculation. The current version allocates credits by heavy and light duty application. Since the AFCI values are based upon fuel (gasoline or diesel) rather than application, the credits should be allocated by fuel.

4.2 Credit Generation and Banking

UCS cautiously supports unlimited banking, as long as the credits are publicly accessible, and based upon the actual reductions in carbon, with no additional credits for early or alternative compliance pathways..

4.3 Credit Acquisition and Trading

UCS supports the use of unlimited banking and trading, as long as the market is restricted to entities regulated under the LCFS. We agree with CARB staff that borrowing should not be allowed. We strongly oppose trading credits between an economy-wide trading market set up under AB 32 and that set up under the LCFS. Since transportation should already be included in an economy-wide market trading between the two would amount to double-counting. Each market should have separate accounting both to avoid both double-counting and perverse incentives from mixing an intensity-based requirement (LCFS) with an absolute requirement (economy-wide cap).

Specifically, we oppose allowing the export of credits from the LCFS to an economy-wide AB 32 market. If the LCFS market develops such that one entity, such as an electricity producer, cannot sell credits to another fuel provider, that would be an indication that the LCFS has not been set with sufficient stringency. Allowing an entity with credits under the LCFS to sell those credits into an economy-wide market would lead to double counting since all the emissions from the transportation sector would already be accounted for on separate books under the economy-wide market.

We also strongly oppose allowing the import of credits from the general AB32 market into the LCFS. Doing so could completely undermine the goals of the LCFS. As research by Dr. Sperling indicates, transportation fuel use is relatively inelastic to price, particularly in the short term.[3] If the LCFS market could import credits, the fuels industry could just purchase credits to pollute and pass the costs onto the consumer. The LCFS is needed policy to drive GHG reductions in transportation fuels, just as California's renewable energy standard and other policies will drive GHG reductions from the electricity sector. A well-functioning market that is restricted to regulated entities of the LCFS will allow fuel providers flexibility to invest in lowest-cost carbon reduction while fostering investment in advanced fuels.

UCS supports the potential for 3rd party entities to be allowed to purchase and retire LCFS credits as one possible opportunity to accelerate innovation. We would be open to the ability for those 3rd party entities to trade purchased credits within the LCFS, but would like CARB to share additional information on how this might be used and monitored.

4.4 Borrowing of Credit

UCS supports the staff recommendation that borrowing of credits from future carbon intensity reductions should not be allowed.

4.5 Offset Credits

UCS is not opposed to allowing temporary use of limited offset credits for transportation fuels in sectors not regulated by the LCFS, such as aviation and marine fuels. We strongly support early investment in low carbon fuels for aviation and marine, with the goal of expanding the LCFS to

[3] Hughes, J, C.R. Knittel, and D. Sperling, "Evidence of a Shift in the Short-Run Price Elasticity of Gasoline Demand" (February 14, 2007). Center for the Study of Energy Markets. Paper CSEMWP-159. http://repositories.cdlib.org/ucei/csem/CSEMWP-159

include these transportation sectors by 2015 at the latest. Offsets should not replace the inclusion of these sectors.

5. Determination of Carbon Intensity Values

As we discuss in 2.b-c, we do not support the use of vehicle efficiency factors that distinguish between gasoline and diesel. The two should be treated separately on a well to tank basis, and the vehicle efficiencies of alternative fuels should be compared to conventional spark ignited gasoline or compression ignition diesel.

5.1 GREET Model

UCS supports the use of the GREET model, modified to reflect best available data, including CA-specific conditions and indirect land use (see 5.3.5).

5.2 Calculation of Average Fuel Carbon Intensity

ARB should provide justification for the vehicle efficiency values for each of the alternative fuels/drive trains, and update on the same schedule as the fuel carbon intensity.

Diesel vehicle efficiency should not be included on the list, since the fuel is regulated separately from gasoline (see comments in 2.b-c).

5.3. Default Value Approach

5.3.1 Crude Oil

UCS does not have comments at this time.

5.3.2 Refinery Efficiency

UCS supports the use of a fixed average refinery value, which would prevent gaming opportunities. If refineries are included in a cap and trade or other stationary source control program, they should not receive credit under the LCFS for efficiency improvements.

5.3.3 Input Values

UCS does not have comments at this time.

5.3.4 Co-products

UCS supports CARB analysis of co-products to establish the AFCI baseline and default values. However, we would strongly oppose allowing refineries to receive credit for shifting their mix of co-products as a mechanism for complying with the LCFS. In other words, the carbon intensity of gasoline or diesel utilized by individual refineries for complying with the LCFS should not

vary with the co-product mix. As we discuss below, co-products analysis may not provide an accurate representation of the carbon emissions associated with different co-product mixes.

To establish the state-wide AFCI baseline, UCS strongly supports the use of the displacement or substitution method for calculating the GHG emissions from co-products. We have significant concerns about using an allocation method based upon attributes such as the value of the product, economic value, or energy content. For refineries, there will likely be co-products for which there are no ready substitutes and that CARB may be forced to utilize an allocation method to set the baseline.

5.3.5 Land Use Change

We support the inclusion in lifecycle assessments of emissions associated with direct and indirect land use changes. While the determination of indirect changes in land use is an emerging field, we believe that there is a substantial body of evidence in the peer reviewed scientific literature that land use changes are a very significant source of emissions associated with biofuels production, particularly current biofuels produced from food crops like corn or soybeans. It is thus essential that a non-zero estimate of indirect land use emissions be included in life cycle accounting. To estimate these emissions, we support the approach being developed at U.S. EPA and at CARB, which is broadly similar to the treatment of indirect land use in the recent Searchinger et al. paper in Science Magazine. Key elements of this treatment include:

- The use of global agricultural economic models (such as FASOM, FAPRI, GTAP) to project the effect of biofuels consumption on global agricultural markets.
- The use of ecosystem databases to project what ecosystems will be converted because of biofuels consumption.
- The use of greenhouse gas emissions databases to estimate the global warming emissions associated with conversion of each ecosystem type.
- The inclusion of secondary agricultural impacts resulting from changes in the agricultural markets, such as changes in crop choices, irrigation and fertilizer use, and etc.

The model should be as detailed as practical, and should evolve to include more detailed data as it becomes available. Several areas we think are of special importance are listed below.

- We support the use of spatially explicit models based on remote sensing, such as those developed at Woods Hole Research Center and described at the recent UNFCCC conference in Bali. The use of objective and uniform data source such as this will allow a consistent approach that can be updated over time.
- With respect the N_2O emissions; we note the current debate in the scientific literature on the magnitude of N_2O emissions from fertilizer. While the IPCC numbers used in GREET are a reasonable starting point, these numbers may need to be adjusted upon further study.
- We do not think a consensus has developed as to the appropriate amortization period for land use changes. We recommend that CARB present data for 10, 20 and 30 years to allow discussion and debate over the implications of each time period. CARB should also

explore an interest rate for carbon that recognizes emissions today have greater impact than future emissions on our climate.

We acknowledge that the analysis of emissions associated with indirect land use and secondary impacts in the agricultural sector are relatively immature, and much debate and improvement in models and relevant databases can be anticipated. In spite of the uncertainty, UCS feels strongly that to send the right market signals, it is critical to assign a value to indirect land use emissions. Based on the developing consensus in the peer-reviewed literature, the emissions associated with indirect land use changes could be one of the larger components of emissions for crop-based biofuels. In light of the likelihood that the scientific basis for these estimates will change over time, it is especially important that an open and public process be established, based on the best available science, to update the models and underlying databases. Given the challenge of characterizing land conversion (direct and indirect) and fertilizer emissions, we recommend that there be a technical advisory committee consisting of scientists with expertise in the area that can help guide CARB.

5.3.6 Sustainability

In addition to the sustainability criteria passed by Congress in the federal RFS, we recommend that CARB expand the criteria to ensure our state resources are sufficiently protected, safeguard public health and the environment, and where possible, mitigate harmful impacts that may result from the LCFS.

We recommend that the state adopt provisions similar to SB 210 (Kehoe), the Low Carbon Fuel Standard Bill, which passed the legislature in 2007 but was not signed by the Governor due to concerns about the bill's treatment of markets. A new bill, SB 1240, that addresses the Governor's concerns and maintains the sustainability and air quality protections from SB 210, has been introduced by Senator Kehoe, and UCS strongly supports the bill. To protect California's air quality and promote sustainable fuel production, the LCFS should:

1) Ensure no backsliding in California's air quality and that low carbon fuels either match or improve upon the emissions performance for criteria pollutants and toxics of conventional gasoline or diesel.
2) Ensure that a report is conducted no less than every three years that evaluates the impact of the LCFS in California, the US and internationally on food access, water and air quality, biodiversity and other important indicators of ecosystem and human health
3) Mitigate, to the maximum extent practical, harmful impacts identified in the report.

5.4 Custom Value Approach

We support CARB's draft concept that obligated parties must receive approval from CARB before utilizing custom values. CARB's approval process should include opportunity for public review and comment.

6.0 Program Review

We support periodic reviews every three years starting in 2012.