CALIFORNIA WOOD INDUSTRIES COALITION
Supplementary and Background Information
Air Toxic Control Measure
On
Formaldehyde in Composite Wood Products

The California Wood Industries Coalition ("CWIC" or the "Coalition") submits these background comments in support of its position that the Phase 2 ceiling levels should be slightly increased, that the rule is overly and unreasonably costly and that certain technical changes are needed in the language of the rule. The Coalition has made two previous filings: an April 11, 2007 letter from Venable LLP regarding issues posed by the specific language and drafting of the ATCM. A subsequent filing on April 17 presented CWIC's position on the substance of the rule. The information that follows presents background and supporting information for the underlying positions of the Coalition: the extreme importance of modestly raising the Phase 2 ceiling limits based on the overwhelming costs involved and the unproven nature of the technology that has been suggested.

The comments provide the details of the application of the Department of Commerce's BEA RIM II Regional Impact Analysis which shows a national impact of this proposed rule of $2.55 Billion with annual California impact of $536 Million. There are also discussions of other resin systems that have been suggested as alternatives, the BACT determination, the negative impact that the rule will have on energy consumption and green house gases, and technical comments regarding the ISOR.

I. **The Economic Impact of the ATCM Would Be Staggering**

This ATCM will be incredibly expensive by any measure. The ISOR has some huge figures. Annual costs for Phase 1 -- $19.3 million annually; annual costs for Phase 2 -- $127 million annually; a 64% reduction in return on equity for hardwood plywood manufacturers. These numbers would result in a per pound cost effectiveness of $53 dollars in Phase 1 and $127 per pound reduction in Phase 2.[1] As explained below these are extraordinarily high compared to other regulatory provisions promulgated by CARB that ranged from $2 - $12 per pound.

The actual costs, however will be much higher - the CARB figures are dramatically understated. CWIC submits that the Phase 2 costs would be approximately $536 million annually on the California economy and $2.55 billion a year when considering the all sectors of the economy that would be impacted by this ATCM.[2] The California portion alone would relate to a cost-effectiveness of $536 per pound. This

[1] In earlier versions of the staff report, the cost-benefit was clearly identified. For some reason this discussion was removed from the final version. It can easily be derived, however, from the 500 tons of formaldehyde that is estimated to be removed by the ATCM and the annual costs that the ISOR identifies.
[2] This figure does not include the impacts on the hardwood plywood industry.

magnitude of regulatory burden is both unwarranted and out of line with other CARB regulations. CWIC also estimated the California and national impact of the regulation based on the CARB assumptions of 30% and 40% increased costs of particleboard and MDF. The results were $2.224 billion nationally and $406 million for California.[3]

Why the significant differences between the ARB ISOR and the industries' estimates? There are numerous differences in inputs to the calculations. CARB used very low numbers in some instances, in some instances they simply did not enter any impact for substantial costs that the rule would impose. The following factors will be described in detail below focusing on Phase 2:

	CWIC	CARB
1. Raw material costs	50%	30-40%
2. National impact of the regulation	Yes	No
3. Slow down in throughput because of longer resin cure times	20%	Applied only to labor
4. Impact on down-stream industries	Yes	No
5. Energy requirements for longer and hotter press cycles.	Explained	Ignored
6. Equipment requirements	Explained	No
7. Changing demand patterns for goods that are as much as 50% to 60% more expensive.	Range of Demand Elasticity	Inelastic

A. **The Economic Models**

The ISOR uses a straight-forward, simplified computation to arrive at its economic impact projection. It calculates the increase in a panel cost by factoring in resin cost increases of identified technologies and an assumed labor cost increase. It then distributes that panel cost increase over assumed consumption of panels in California and the assumed percentage of the industry that needs to alter its manufacturing to achieve compliance. There is the assumption of total elasticity of demand in CARB's approach. Using these over-simplified assumptions, the annual impacts are calculated to be:

Hardwood Plywood	$ 16.8 million
Particleboard	$ 61.3 million
MDF	$ 48.5 million

There has been no attempt to create a present value of the stream of costs, but it would obviously be huge.

CWIC took a different approach, utilizing a standard economic model published by the U.S. Commerce Department's Bureau of Economic Analysis – the Regional Input-

[3] Summary spreadsheets are attached as Appendix 1. Detailed runs of the model can be supplied

Output Modeling System ("BEA RIMS II"). This micro economic model is based on expected consumer behavior within the composite panel market (including all products made with composite panels). The model provides two economic values for each change in final demand – (1) the regional economic impacts to secondary manufacturers, wholesale and retail trade, and transportation and (2) the increased costs consumers pay for compliant composite panels. This analysis was done in six scenarios: national and California only and using CWIC's cost assumptions and CARB's

The basic assumption underlying the economic model is that implementation of the ATCM for particleboard and MDF will change consumer behavior. Some portion of the populace will choose to either purchase alternative products to the higher cost goods or simply decide to indefinitely postpone their purchases. In either case, final demand for composite panel based products declines, which in turn reduces economic activity within the composite panel-dependent secondary manufacturing sector. Consumers who do not change their historic purchasing habits are explicitly choosing to pay a premium, which reflects the marginal production costs to composite panel producers and secondary manufacturers (and associated mark-ups in the distribution and fabricating channels) of ensuring that their product meets the Phase 2 levels.

In the CWIC analysis, the range of potential decline in final demand for composite panels was computed using a combination of the following factors: projected range of current composite panel manufacturing capacity that would become Phase 2 compliant, projected rates of substitution to other domestically produced products and projected rates of substitution to imported products. The model produced results based on assumptions regarding change of demand, ranging from no change up to a high of 40%. 2005 was used as a based year.

In addition to the BEA RIMS II multipliers for the state of California, the economic model from which all of the impacts were derived is based on industry cost data. Resin cost estimates were provided by the primary resin suppliers in North America. Mill-level capital improvements to accommodate storage, transportation and implementation of the new resin systems were based on estimates from managers in the PB/MDF industry. The cost contribution of composite panels in the manufacturing of 12 secondary products and estimates of final demand for each product were derived from detailed 2005 CPA data on shipments of composite panels by secondary product and destination as well as the associations and companies that represent each product. The complete analyses with spreadsheets listing all our assumptions are attached to these comments.

B. **Product Costs Are Higher than CARB Estimated**

CWIC assumed that the costs for producing particleboard and MDF rise 50% in phase 2 of the rule, rather than 30% for particleboard and 40% for MDF as used by CARB. This number is very conservative – it easily could be 60-65%. If the implementation of new adhesive technology in composite panel plants is less successful, the cost increases will very likely be higher, by as much as 10%.

Even the reasonable Phase II emission limits advocated by the coalition would have a significant economic impact. Our economic analysis show the national impact from these limits would be $949 million a year, the California portion of which would be $196 million a year. These two analyses assume the costs for producing particleboard and MDF rise approximately 20% in phase 2 of the rule.

The last two economic impact analyses CWIC performed used the CARB staff report cost increase estimates of 30% for particleboard and 40% for MDF. Though we find these estimates unrealistic, even using CARB cost figures the CWIC analysis shows an economic impact of (Insert number) nationally and $405 million per year in California, 3 times the staff report estimate of $127 million.

The staff report does not appear to have any cost comparisons to other ATCM standards. However, a draft version of the staff report CWIC received from CARB staff last month indicated that there would be a $127/pound cost for the formaldehyde eliminated from the atmosphere in California. That estimate is based on the $127 million economic impact estimated in the report, so CWIC believes this number represents a dramatic understatement. But research of recent staff reports on other ATCM indicates that $5/pound has been the standard for acceptable cost value. Most of the recent rules promulgated had a cost of around that limit or less (e.g. PERC: $2.60). Even using the CARB evaluation this rule exceeds the standard CARB ATCM bar by a factor of 25. CWIC believes that the factor is much higher.

C. **The Rule Will Have National Impact.**

CWIC believes the regulation as proposed will have a large and negative effect on California business. However, we believe that it is important for the Board to look at the national impact of this regulation in addition to the California impact. The businesses that depend on composites do not and usually can not separate their California products from their national and often their global products.

Throughout the economic impact analysis section the staff report speaks casually of a '49 state' product and a California-only product. The assumption is that finished products manufacturers dependent upon composites can easily switch back and forth between products intended for California and products that are not. In that way, they can reduce their overall cost since the cost of California compliant composites will be higher. This is simply not the case and other industries that have accommodated the '49 state/California' manufacturing model are different in significant ways.

A typical large manufacturing facility in the furniture or cabinet business will depend on hundreds of component parts, each containing various composite wood products, to produce their products. Not only would the cost of maintaining dual inventories be prohibitive, juggling the flow of separate component parts through the manufacturing process would be an organizational nightmare. In regard to this latter point, concern about mistakes and sending non-compliant products to California alone

would dictate against maintaining dual inventories of compliant and non-compliant component parts. As an additional concern, the cabinet and furniture industries are in fact a "fashion industry" with continuously changing styles. This constant change would also give rise to concern about non-compliance mistakes. Therefore, it will be incumbent upon furniture and cabinet manufacturers to use composite wood products that meet the emission requirements of the ATCM.

To contrast with other industries, in the case of relatively low cost items like paint and other materials with solvents and VOC regulated by CARB, typically there is one formulation change, not a multiplicity of component parts. Since the California market is so large, by targeting manufacturing and distribution to west coast affiliates, companies can minimize product inventory and overlap. In the case of automobiles, the manufacturing complexity is present, but so is the ability to apportion and spread out the cost. The least expensive car is 10-20 times the highest cost piece of furniture and more typically an automobile is a hundred times more expensive or more.

For these reasons, we have prepared economic impact analyses that are national in scope and we believe the Board should consider that impact in addition to the California impact. Consumers everywhere will not care about the reason for the cost increase but will simply react to it by buying less. Those kinds of decisions will impact the whole composite wood industry dependent upon engineered wood products and California manufacturers remain a significant part of that industry.

It is somewhat difficult to predict the national level of compliance to the CARB ATCM, since there will be no data for several years. To be conservative in our estimates, we have not assumed 100% national compliance with the CARB ATCM, though it may well be close to that. Every major furniture manufacturer participates in the California market. Though there are regional kitchen cabinet manufacturers, all the national producers participate in that market as well and similar patterns are likely in other industries that use composites. Finally, composite wood producers feel that the CARB ATCM will dictate the emission standards they will produce too. In this analysis, therefore, we estimate that 75% of composites will be produced to the Composite Wood ATCM and believe that to be a conservative number. We therefore base our national economic impact estimate on an extension of the California regional economic impact to 75% of the national economy for these products.

D. Reasonable Factors and Assumptions Have Been Used.

The predicted impact is based on several factors. The regulation will change the cost structure for composite panels and those costs will be passed along to secondary manufacturers and in turn those costs will be expressed in finished product pricing.[4] The analytical model employed accounts for these changes in 12 different finished product sectors that depend on composite panels and shows the economic impact of the changes in demand for the finished products. Changes in demand are based on estimates of

[4] Each participant in the market will independently decide how to absorb or pass on the costs. However, those costs will be incurred and for purposes of analysis have been captured as described above.

market elasticity. Essentially, the predicted impact is based on rational consumer behavior, i.e. higher regulatory related costs lead to higher prices and reduced demand.

The potential changes in consumer behavior and manufacturing costs principally drive the model. The assumptions regarding consumer behavior reflect the unpredictable nature of consumers and how they could react to increases in the market price of composite panels and finished products made with component parts utilizing composite wood products. To account for the potential changes in consumer behavior, a range of potential impacts were developed and are provided in the attached spreadsheets and the table below. A range of no change to 21% decline in final demand from current consumption levels was applied in the analysis. It is believed this range is sufficiently great to adequately capture all of the potential changes in consumer behavior.

Most importantly, the range in demand impact contained in the spreadsheets shows how the economic impact rises as consumption declines. We emphasize again the conservative nature of the economic predictions we are making based on the proposed CARB emission requirements. In the model used to predict the impact from the rule as it was proposed we only assume a small drop in final demand, 7%, based on the rising costs incurred. If we are wrong in the model we have chosen, most of the risk is on the downside. For instance, if demand drops 12% the predicted $2.55 billion impact becomes a $3.56 billion impact.

In the model used to predict the impact from the emissions limits CWIC recommends we only assume a minimal drop in final demand, 2%, based on the reduced level of rising costs. Since the model we have chosen assumes minimal change, even more of the risk is on the downside. In other words, it is more likely that the economic impact will be greater.

Associated with each decline in final demand is a corresponding decrease in local manufacturing and related sales activity in primary and secondary manufacturing sectors that produce or use PB/MDF in their finished products. This decrease results in layoffs and business closures, which in turn results in diminished demand for other inputs in the production process, transportation of finished products to market, and wholesale and retail activity. Thus, the change in consumer behavior does not simply impact one or two local manufacturers, but instead, an entire web of businesses and employees.

The assumption regarding manufacturing costs was based on cost projection data provided by industry resin suppliers and PB/MDF producers themselves and reflective of actual future conditions should the Phase II ATCM for Composite Wood Products be approved. The economic model assumes that 100% of the cost increases to PB/MDF producers are passed along to secondary manufacturers that use PB/MDF as a core component in their finished products, who in turn pass 100% of the increased costs to the consumer. Since detailed information is available to CWIC on the secondary manufacturers that use PB/MDF in their products, the percent of total manufacturing costs attributed to PB/MDF and the final destination for each finished product, a comprehensive analysis of the potential increased consumer costs in the form of

increased market prices was computed for 12 secondary manufacturing sectors. The increased market prices consumers will have to pay for compliant products combined with the potential decline in final demand, leads to the total economic impact associated with the ATCM and the options being considered.

It is important to keep perspective on the ranges of the potential economic impacts listed in the associated spreadsheets. The low end prediction of the economic impact model actually represents an unlikely economic behavior scenario. The conservative assumption on the low end of the impact range assumes that economic behavior does not change as a result of Phase II; i.e., demand is inelastic or that all consumers simply accept the price changes that are passed along to them by the product manufacturers. The reality is that consumers do react to price changes (i.e., demand is elastic); therefore, the analysis shows that the economic impact increases dramatically as consumers either indefinitely postpone their purchases of composite wood based products or purchase alternative products. With that change in consumer behavior, jobs are lost, businesses close, demand for raw materials declines and overall regional economic activity suffers. The larger the change, the greater the economic impact will be.

The following synopsis focuses on realistic economic estimates that fall within the expected economic impact range and describe the assumptions supporting the estimates and the model used to derive them.

The reader is encouraged to review the attached spreadsheets for specific values applied in the analysis. Most notably, the analysis assumes the ATCM as proposed leads to a 50% total increase in costs to composite panel manufacturers. The estimate is based on a 2005 market price of resin and resin transportation cost and assumes a 20% decrease in average mill productivity due to the extended curing and press times associated with utilization of the new resin systems. The analysis does not include costs for mill trials, certification, certification testing, chain of custody costs in the secondary manufacturing and finished product markets, and any other direct and indirect overhead costs brought on by the regulation.

E. Summary of Impacts

The tables below summarize the range of impacts in the analyses that are attached. As indicated above, three different sets of assumptions are used. The first column represents the impact estimate for the rule using the emission limits proposed by CARB and the cost impact analysis done by CWIC. The second column represents the impact estimate for the rule using the emission limits proposed by CARB as well as the CARB cost impact analysis. The third column represents the impact estimate for the rule using the emission limits recommended by CWIC as well as the cost impact for those limits developed by CWIC.

In the proposed Composite Wood ATCM the changes brought about by the Phase II requirements are estimated to have an economic impact of $2.55 Billion nationally with $536 million impact in California annually. The impact assumes a 7% drop in final

demand. A greater drop in demand would increase the impact. On the other end of the range, assuming the marketplace would accept 100% of the increased cost composite panel production compliant with Phase II levels, the total economic impact would be $1.27 billion nationally, $406 million of which would occur in California. As noted, this analysis assumes that costs will increase 50% compared to today's cost for PB/MDF, the CWIC estimate.

If costs rise 30% for particleboard and 40% for MDF as the staff report estimates, costs would drop to $2.42 billion nationally of which $914 million would come from California. This estimate also assumes a 7% drop in final demand. Again, a greater drop in demand would increase the impact. On the other end of the range, assuming the marketplace would accept 100% of the increased cost composite panel production compliant with Phase II levels, the total annual economic impact would be $914 million nationally, $266 million of which would occur in California.

The table below shows the dramatic decline in expected annual economic impacts if the CWIC recommendation were adopted. If costs rise 20% for particleboard and 18% for MDF as CWIC estimates, costs would drop to $949 million nationally of which $196 million would come from California. Given the lower rise in costs, this estimate only assumes a 2% drop in final demand. As indicated previously, a greater drop in demand would increase the impact. On the other end of the range, assuming the marketplace would accept 100% of the increased cost composite panel production compliant with Phase II levels, the total economic impact would be $604 million nationally, $154 million of which would occur in California.

It is important to note that since the regional economic impacts associated with each proposed ceiling limit are based on current (2005) conditions, this set of impacts remains constant across the limits. The difference, then, in the estimated total annual economic impacts across the limits is directly attributed to increased production costs and subsequent market prices for composite panels and products comprised of composite panels.

Estimated Total Annual Economic Impacts by Proposed Limits in Phase II ATCM for Composite Wood Products* (Predicted Median Values in Bold)			
	Total Annual Economic Impacts for PB/MDF Changes (millions $US dollars, 2005 base year)		
Final Demand Change	**0.09/0.11/0.13 PPM Limit, CWIC Cost Basis for estimate (CA/national)**	**0.09/0.11/0.13 PPM Limit, CARB Cost Basis for Estimate (CA/national)**	**0.10/0.13/0.15 PPM Limit, CWIC Cost Basis for Estimate (CA/national)**
0% decline	$406/1,269	$266/914	$154/604
2% decline	$439/1,601	$302/1,252	$193/949
7% decline	**$536/2,552**	**$406/2,224**	**$301/1,935**
12% decline	$638/3,559	$516/3,252	$417/2,980
21% decline	$800/5,153	$690/4,877	$602/4,633

CWIC believes that a 7% demand change is most probable. The impact is $536 million for California, $2.552 billion for the total economy. Even with no change in demand the impacts are $406 million annually for California and $1.269 billion nationally, plus the impact on the hardwood plywood sector, plus the cost of compliance. Some sense of economic proportion should be considered in establishing the ceiling limits.

F. The Rule Will Also Have Negative Employment Effects

The economic values above represent the cumulative impacts to the California economy from declines in regional economic activity and increased consumer costs. An alternative perspective of the regional economic impacts (holding the consumer cost component of the impact equation constant) is the direct loss in regional employment. The BEA RIMS II model allows for calculation of discrete employment changes and in this analysis, employment loss ranges for California are shown. The basis for the estimates in the following table is identical to the one above and uses the range of 40% decline in final demand to zero (no change in final demand). Naturally, when there is no change in final demand the employment impact is zero in the model. At the predicted median, the employment loss is 1,218. The following schedule of discrete employment loss represents a different perspective to the potentially negative regional economic impacts to the California economy associated with the ATCM. (Note that the employment losses are invariant to the proposed ceiling limit since the final demand change, which is held fixed across the limits, are the basis for calculation of these values.)

Estimated Regional Job Loss in California Due to Enactment of the Phase II ATCM for Composite Wood Products (Predicted Median Values in Bold)	
Final Demand Change	**0.09/0.11/0.13 PPM Limit, CWIC Cost Basis for estimate - 50% Increase**
0% decline	0
2% decline	334
7% decline	**1218**
12% decline	2171
21% decline	3757

Employment impacts cannot be ignored and must be factored in to the potential impact of this rule on the entire market.

II. The Cost of This ATCM is Unprecedented

The Staff Report does not contain even a rudimentary cost/benefit analysis.[5] The numbers based on CARB's analysis can be derived, however. The cost of Phase 1 is $19 million annually to remove 180 tons – the cost effectiveness is $53 per pound. The cost of Phase 2 is $127 million annually to remove 500 tons – the cost-effectiveness is $127 per pound. As described above CWIC believes the impact would be easily four times greater. The following is a description of cost-effectiveness descriptions from other CARB rules:

* ***1997 rule for new certification tests and standards to control exhaust emissions from aggressive driving, and air conditioning usage for passenger cars, light-duty trucks, and medium-duty vehicles under 8,501 pounds.*** According to the staff report, "the cost-effectiveness of the regulation is calculated at $887 per ton or $0.44 per pound with the air-conditioning simulation and $1,200 per ton or $0.60 per pound with the environmental cell test. This compares favorably to $5 per pound, which is the typical cost-effectiveness value for an air pollution control measure."

* ***2000 Gasoline volatility rule.*** Gas volatility, as specified by the Reid vapor pressure (RVP) has a substantial effect on motor vehicle evaporative and exhaust ROG emissions. Since 1971 evaporative and exhaust ROG emissions have been reduced significantly in California by limiting the maximum RVP of motor vehicles to 9.0 PSI during smog season. The regulation lowered that RVP limit to 7.8. The ISOR estimated that the cost-effectiveness of this would be "about $1.10 to $1.90 per pound of VOC reduced in 1990 and about $2.60 to $4.60 per pound of VOC reduced in 2000. The cost-effectiveness is greater in 2000 than in 1992 because the VOC emissions reductions are less in 2000. As noted earlier, the lower VOC emissions reductions in 2000 are attributable to lower baseline emissions because vehicles with better emissions control

[5] For some reason, the cost-effectiveness estimate which had appeared in earlier drafts was removed from the final ISOR.

systems are being incorporated into the fleet and older vehicles are being retired. These cost-effectiveness estimates were within the range of cost-effectiveness estimates of other measures adopted or considered by the ARB.

* ***2003 ATCM for stationary compression-ignition engines for diesel Particulate Matter.*** The ISOR estimated the cost-effectiveness of this ATCM to be "about $15 per pound of diesel PM reduced, considering only the benefits of reducing diesel PM. Because the proposed ATCM will also reduce reactive organic gasses (ROG) and NOx emissions, CARB allocated half of the costs of compliance against these benefits, resulting in cost-effectiveness values of $8/lb of diesel PM and $1/lb of ROG plus NOx reduced."

* ***2003 ATCM for diesel particulate matter emitted by In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities where TRUs operate.*** The October 2003 ISOR estimated the cost-effectiveness of the proposed ATCM to be between $10 and $20 per pound ($/lb) of diesel PM reduced.

* ***2004 proposed revision for 26 new proposed VOC limits for consumer products.*** According to the ISOR, "the cost-effectiveness of the proposed requirements is similar to the cost-effectiveness of other existing ARB regulatory programs. We estimate the total overall cost effectiveness of the initial proposed limits and other requirements to be about $2.00 per pound of VOC reduced. Further when accounting for the proposed second tier Shaving Gel limit, we estimate the overall cost effectiveness to be about $2.40."

* ***2006 Summary of VOC Rule Costs.*** The November 16, 2006 regulatory notice contained a chart summarizing the cost effectiveness of the consumer product VOC regulations adjusted to 2005 dollars. The chart listed the following cost-effectiveness figures. Architectural and Industrial Maintenance coatings net savings to $6.90 per pound of VOC removed; Antiperspirants and deodorants cost $0.54 to $1.30 per pound of VOC removed; Phase 1 Consumer Products Regulation net savings to $1.80 per pound of VOC removed; Phase II Consumer Product Regulation <$0.01 to $1.10; aerosol coating products costs $2.85 to $3.20 per pound of VOC removed; hairsprays $2.10 to $2.50 costs per pound of VOC removed; mid-term measures consumer products costs $0.25 per pound of VOC removed; mid-term measures II consumer products costs $0.40 per pound of VOC removed; 2004 amendments costs $2.01 to $2.34 per pound of VOC removed; and the 2006 amendments cost $2.29 per pound of VOC removed.

* ***2006 regulation on diesel-powered heavy duty trucks.*** The regulation requires engines to be fixed with a label demonstrating compliance with US EPA's requirements. If there is no label drivers would be assessed a $300 penalty. According to the ISOR, "based on calculations, the cost effectiveness is estimated to be $1.09 per pound for the combined NOx and PM for post-2004 HDVCs and $10.62 for pre-1993 HDCVs."

* ***2006 ATCM for emissions of chlorinated toxic air contaminants from automotive maintenance and repair activities.*** According to the ISOR, "the cost-effectiveness of the proposed ATCM ranges from essentially no cost to a high of about

$0.23 per pound of PERC, MeCL, and TCE reduced. The estimated average cost effectiveness of weighted by emissions reductions across all categories is about $0.03 per pound of Perc, MeCl, and TCE reduced."

* ***2007 proposed regulation relating to use of PERC in dry cleaning facilities.*** The regulations require a 300 foot separation between new PERC facilities and a sensitive receptor, phasing out the use of PERC in co-residential facilities, phasing out the use of more emissive PERC technologies in existing facilities, restricting the substitution of other toxic air contaminants, and requiring enhanced ventilation. According to the ISOR "result is about $2.60 per pound of PERC reduced.

When compared to the regulations discussed above, the cost of the Composite Wood ATCM is literally off the chart.

III. Changes are Needed in the Ceiling Limits

CWIC submits that it is absolutely essential to increase by a small amount the ceiling limits that have been proposed. The fo9llowing are the CWIC recommendations:

	Phase 1		Phase 2	
	CARB	CWIC	CARB	CWIC
Particleboard	0.18	0.18	0.09	0.10
MDF	0.21	0.21	0.11	0.13
Thin MDF	0.21	0.21	0.13	0.15
Hardwood Plywood				
Veneer core	0.08	0.08	0.05	0.06
Composite core	0.08	0.08	0.05	0.07

Clearly, the differences in the emissions numbers between the CARB and CWIC proposals are not large. Indeed 1/100th and 2/100ths of a part per million are infinitesimal in the abstract, but the practical implications of these "nano" numbers are immense. When one considers that the variability of the referenced E-1333 test is 0.03 ppm the nature of these numbers becomes even more critical. Every technology employed to achieve a lower emission has its limits. Unfortunately the small difference in emission limits translates into a different level of emission technology and a much higher cost to the consumers of furniture, cabinets and other products integral to the everyday lives of every Californian.

A. Ceilings

The CARB levels are inflexible ceiling levels. If they are exceeded there is a violation. This is very much in contrast to international standards that have a variety of allowances for exceedances for averaging or other applications or covering with laminates or coatings. For instance, in the European E-1 standard, a 10% excursion above the ‘limit’ is acceptable and only 95% of the test values need to meet the ‘limit.’ In Japan, which has lower limits on its building materials, the excursion value ranges

from 33% to 40% above the 'limit' depending on the grade of material. To meet a ceiling, a manufacturer must strive for a level much lower depending on the various variabilities that impact the process. In the production of panel products there are many variable influences.

B. Variability.

CWIC has shared a number of studies with CARB staff as to the nature and magnitude of the expected variability of composite panel performance because of the test methods, production processes, and raw material. In June, 2006, CWIC summarized the variability of particleboard and MDF in a submission to CARB staff. The submission is attached as Appendix C. The submission summarized data from the Composite Panel Association Grademark program over the last 5 years and showed that there was an average of 30% coefficient of variability (COV). This variability was consistent across the range of emissions from the various plants.

Effectively, manufacturers must aim for emission values of roughly one-half the ceiling value in order to assure that the ceiling level is not exceeded. Statistically, the average plus three standard deviations will yield a value that is practically the maximum (99.5% of data will be below the number). A 30% COV means that the standard deviation is 30%, or roughly a third, of the average in a data set. Mathematically, the maximum emission of the typical emission data set is twice the average. That maximum emission value is the value that plants will compare to the ceiling limit proposed in table 1 of the rule.

There are significant differences between plants. Some plants have more emission variability than others and some are more technologically amenable to changes. We submit that the CARB proposal of 0.09 pm for particleboard would reduce average emission levels to the 0.04-0.05 range and the CWIC 0.10 PPM recommendation would reduce average emission levels to the 0.05-0.06 range. The CARB proposal of 0.11 PPM for MDF would reduce average emission levels to the 0.05-0.06 range and the CWIC 0.13 PPM recommendation would reduce average emission levels to the 0.06-0.07 range.

These numbers have very serious implications for panel producers. We submit that, based on years of experience in manufacturing of these products that a production target of 0.04 or even 0.05 will necessitate a fundamental change in the resin technology to ensure consistent compliance with the ATCM. This is essentially a "tipping point" which will cause fundamental technological change and consequently fundamentally different costs. You will note, for instance, that CWIC projects approximately a 20% increase in manufacturing costs at the levels it has proposed. Levels proposed by CARB staff that are 1/100th or 2/100ths lower are estimated at 50% increase. Although the exact formula is unknown, we are confident that this incremental change will result in a change in approach to manufacturing that is very much more costly.[6]

[6] We estimate the manufacturing cost increase to be at least 50% which will be expanded and multiplied as it moves through the fabricating and distribution sectors of the channel. See the comments in Section II.

One of the different resin systems that might be considered in this "tipping" situation is phenol-formaldehyde resins. The staff report indicates that the proposed emissions standards for particleboard for Phase 2 can be met with resin systems which include PF resins. Although PF resins are currently manufactured and sold by our members for niche markets, this technology is not appropriate for general application as BACT across the product lines – it is not commercially feasible for the market.

An initial issue is availability. There simply is not the capacity in the phenol industry to supply the demand for panel products that is now fulfilled by UF resins. While both UF and PF resins use formaldehyde, the manufacture of PF resins requires dedicated phenol storage tanks, piping and safety equipment that is not typically installed in UF reactors. Such modifications would require capital expenditures and environmental permitting which may preclude the conversion of many facilities to the manufacture of PF resins.

Additionally, any conversion to pure PF systems for particleboard and MDF creates several very real production challenges related to adhesive cost, energy cost, productivity cost, quality and capability. The following is a summary list of problems that would have to be addressed:

- A 30% loss of throughput can be expected because of slower cure times in the press
- Phenol adhesive costs would be approximately 2.0 times those of an “E1” UF adhesive, based on today’s phenol price. A major increase in the use of PF resins would likely drive the phenol price significantly higher. Capacity constraints are already a problem.
- Adhesive transportation cost will increase by 20-25% (due to lower solids content of PF adhesive – more water in glue).
- PF resins have little or no "tack" (the stickiness that holds the wood mat together as it proceeds down the line to the press). Caulless type particleboard producers and for caulless mechanical blend MDF producers would have to attempt substantial refitting of their plants.
- Thickness swell properties caused by excess water in the resin are a difficult problem to resolve.
- MDF plants may have issues with plugging in the blow-line.
- Mills would experience higher energy costs. Because of the increased moisture content of low solids adhesives, the wood fiber has to be dried to a lower moisture content to offset the overall moisture content of the materials going to the press. PF resins also require hotter cure temperatures and hence more energy usage. More energy translates to higher CO_2 emissions.
- Supply would have to be dramatically increased. Switching to this adhesive would at a minimum, double the current demand creating a severe shortage. The infrastructure for resin production does not exist to support a two-fold increase. Significant capital investment and plant modifications would be necessary.
- For many, the choice is not compatible with timeline for Phase 2 or for the added capital investment.

We raise these issues, not to disparage the PF alternative that has been used by some companies, but rather to point our that it remains a niche product which is not widely applicable for most commercial applications..

C. General Cost Assumptions.

The cost implications of a major resin change are discussed elsewhere. Suffice it to say that we believe that the CARB proposals would result in a minimum manufacturing cost increase of 50%, which would be magnified as it moved through the distribution chain. This increase is based both on raw material cost differentials and slow down of throughput in the facilities. We do not believe that these increased costs and uncertainty in the supply chain are justifiable. Many facilities simply could not make the transition.

IV. Many Adhesive Systems are Untried and Theoretical at Best

The CARB staff has evaluated a variety of different niche technologies that have been used in limited applications and some more theoretical proposals that have been explored in laboratory or limited production settings. We commend the thoroughness of their inquiry, but we caution about assuming that these alternatives can meet the needs of the market, now or in the foreseeable future. The current product formulations have been proven over years of use and development. Their properties are well known; their manufacturing characteristics are understood. A regulatory-imposed solution without adequate evaluation can be disastrous and examples abound -- MTBE in California, TRIS (imposed by the CPSC to reduce the flammability of children's sleepwear, not realizing it had serious health impacts), and, in the wood products industry, fire retardant plywood (imposed by many building codes not realizing that the retardant caused long term deterioration of the panels).

With the changes that CWIC has proposed to the Phase 2 levels, we believe that modified UF technology with various additives and production variations may be a solution for compliance. There will be substantial costs to reach these limits and much work will be needed to integrate the new materials and processes, but the industries believe that most facilities will be able to comply given enough time. However, there is no margin for error.

The following discussion comments on some of the alternative technologies that have been identified in Chapter 5 of the ISOR. CWIC does not believe any of these technologies are viable as a serious BACT option, either because of their current and anticipated cost, lack of availability or unproven nature.

A. Tannin Adhesives.

There is an extensive discussion of tannin technologies in the staff report. However, the technology is largely theoretical and the raw materials would not be able to satisfy even a small part of the composite panel industry. Dr. Pizzi, one of the proponents of this technology, stated in a 1995 US Patent US Patent 5407980 that only 150,000 pounds of tannins were then available. We do not believe that the supply has meaningfully increased in the intervening period. Compare that to the 1.5 million tons of UF resins that are used in the United States or the 5 million tons of phenol formaldehyde (PF) adhesives that are available. The use of tannin resins for this industry is a totally impractical, if interesting, development.

The staff report notes some of the technical problems regarding tannins. There is a suggestion that one of the problems, substantially increased press times, could be improved through the use of finely powdered silica. Silica cannot be used in the production process – it destroys sanders, saw blades and other production equipment. It could also present a whole range of health issues to employees and users of the products. The courts are jammed with claims of silicosis -- a disabling, nonreversible and sometimes fatal lung disease caused by overexposure to respirable crystalline silica.

Tannin-based resins are considered in the report to be a "No Added Formaldehyde" resin system, but that term must be used with great care. Emissions from tannin-based composite panels are certainly low, but formaldehyde is critical to the adhesive process. The ISOR notes that tannin-based resins are prepared and cross-linked by formaldehyde, although the special nature of the tannin chemistry consumes all the formaldehyde. This sounds much like modern PF resins in which the cross linking consumes virtually all of the formaldehyde or isocyanate (MDI) adhesives in which formaldehyde is a critical co-polymer in the creation of the resin. Regardless, formaldehyde is a critical component.

B. Cashew Nut Oil Adhesives.

Cashew nut oil is another biological approach that has been mentioned in scholarly journals – it is not a realistic candidate for BACT reliance. First, cashews are one of the more expensive items in the grocery store – they are not available in quantity. Cashew nut shell oil is described in the South African Department of Agriculture's website as follows: "Cashew shell oil extracted from the shells is caustic and causes burns on the skin. The mucous membranes of the mouth and throat are severely affected when it comes into contact with shell oil. The cashew nut shell extract is high in cardanol—a known endocrine disruptor." It is also in the same chemical family as the irritant in poison oak (or poison ivy). Furthermore, the ozonolysis process described at page 96 of the ISOR to create an adhesive is only feasible on a laboratory scale. Again, this is more theoretical than realistic for wide-scale use.

C. Soy Based Adhesives.

Columbia Forest Products, a wood product manufacturer with an exclusive license to use a proprietary soy adhesive formulation, has aggressively argued that regulatory limits should be imposed by ARB that would essentially mandate the use of its hardwood plywood product.[7] The reason is transparent – in spite of claims that its PureBond soy product is "cost competitive" and preferable, the market has not warmed to the product. Columbia is reported to have lost significant amounts of money on this product in 2006 and in the first two inventory cycles of 2007.

The 0.05 PPM emission level in Phase 2 BACT for Hardwood Plywood is essentially driven by the soy-based adhesive option. For purely competitive self–interest reasons, it is critical to Columbia that it obtains higher volumes of sales even before the onset of Phase 2. At an ARB work shop in Sacramento, a representative of Hercules which owns the rights to the soy technology explained that it has an exclusive license for the product with Columbia. In response to questioning, he also candidly admitted that the license terminates if certain volume benchmarks were not met at various times.

We submit that even if this product were appropriate for BACT analysis, and there are some questions about that, it is bad public policy to essentially impose monopoly power on a company that already has approximately 40% of the domestic production of hardwood plywood. Commercial disputes, product problems, pricing issues could all lead to an untenable situation in the industry.

Columbia's shift to "formaldehyde free" PureBond hardwood plywood has been widely discussed and scrutinized by its customers and competitors, including a proceeding before the Better Business Bureau's National Advertising Division. A decision from that body admonished Columbia to refrain from using the "formaldehyde free" terminology from its advertising and raised questions as to its claims of cost comparability.

There have been numerous reports of issues and problems. First, the soy system is not a 'drop in' technology. The resin is extremely viscous and difficult to handle. It is reported that the Columbia Klamath Falls plant had to install new holding tanks, pumps, storage tanks and piping. Many of the components had to be replaced with stainless steel because of the corrosiveness of the material. Pipes needed to be larger diameter. The cost is reported to have been near $1,000,000. Additional problems were experienced with the spreader which was replaced at the cost of approximately $150,000.

[7] Although references have been made to trials on particleboard, very limited production has been seen in the market. Columbia Forest Products has announced the availability of a niche particleboard product produced in limited quantities at its only particleboard plant. However, the reported cost substantially exceeded that of PF based particleboard, already a cost premium product, which has similar, negligible emissions.

Other production and cost issues have been reported. Open time for the soy resin is approximately 10 minutes versus 50 minutes with UF, with attendant production challenges from pre-cure. Most importantly, throughput rates are about 15% slower.

Although Columbia claims that its product is "cost competitive," the cost of PureBond is reported to be approximately 2-3% higher than UF and spread rates are higher than with UF. Soy flour is approximately 80% more expensive than wheat flour. In a monopoly position, one would expect that end product prices would jump substantially.

There have been reports of product problems and complaints with the new Purebond products. The soy resin is approximately 40% solids and 60% water – UF resins have just the reverse percentages. The additional water reacts with composite cores that are sensitive to excessive moisture and can swell or decompose. This can cause an uneven substrate surface that can be seen on the face veneer. Delamination can also be a problem. Customers have also reported warping in the PureBond panels, such that they often will not lie flat on cabinetmaker's routing tables that have a negative pressure to ensure trueness. This can cause uneven depth in dados that result in out-of-square products. An industry should not be dependent on a sole source technology -- commercial relationships, pricing issues, varying availability, product quality -- all have the potential to become major problems. The soy product should compete for its customers the way other technologies do.

Any of the issues cited above regarding soy adhesives should be sufficient to lead the Board to avoid a soy-based Phase 2 BACT decision for hardwood plywood. This is particularly compelling when one considers that the modest Phase 2 increases proposed by CWIC and the Hardwood Plywood and Veneer Association -- raising emission limits to 0.06 PPM for veneer core and 0.07 PPM for composite core – would encourage an array of competitive options for achieving compliance.

What is absolutely clear at this time, however, is that the soy technology is completely incompatible with MDF and commercially unproven with particleboard. Even Columbia Forest Products is unable to produce commercial quantities of particleboard using the soy technology. CWIC's position is clear: when discussing the applicability of soy adhesives as BACT, one must be very careful to maintain a bright distinction between the technological feasibility of soy to hardwood plywood production and the feasibility to particleboard and MDF production

As the ISOR notes resin applications and costs for plywood are completely different than for particleboard and MDF. In plywood resin often accounts for 5% of total panel cost as opposed to the other composite panels where resin costs are usually 30%.At these application rates, the soy based resins, even if they were found to be theoretically compatible, would command a process rate and a cost basis higher then PF resins with little additional benefit on lower emissions.

D. Polyvinyl Acetate.

Another no added formaldehyde hardwood plywood adhesive, cross linked polyvinyl acetate (PVA), is currently available. However, it too should not be considered for a BACT determination. Its cost is in the range of 5-6 times that of UF resins. In addition, it cannot be used with certain species of face veneers due to "bleed through" or discoloration. This is particularly true with maple, but can be problem with other species as well.

If the phase 2 limits were raised slightly, to the levels recommended by CWIC, it would create space for a range of options for compliance – soy based adhesives, PVA's if desired and UF systems with other additives. If the hardwood plywood veneer core and composite core limits were raised to 0.06 and 0.07 PPM, respectively, this would create a truly competitive, performance-based, extremely low emission standard that would accomplish the regulatory objectives of the state.

E. **MDI Adhesives.**

CARB staff correctly recognized MDI as an important 'no-added formaldehyde' adhesive system which has been used for a number of years in niche applications and it may be used as an additive in some of the UF-based solutions. However, it should not be the BACT technology for a variety of reasons. First, it is extremely costly (as much as 480 % higher than UF-based resins according to Appendix G of the ISOR). This disparity has the prospect of worsening. In the last year every wood products manufacturer using MDI has been put on allocation. This is ominous both as to availability and cost. There is simply not enough global MDI supply to meet the current worldwide demand. Last year's global consumption changes in China for polyurethane has had a large and ongoing impact on pricing and availability in North America for MDI wood binders.

Second, MDI is an extraordinarily aggressive binder that can stick to presses and other equipment, significant retrofitting costs are required to use the adhesive. Third, MDI has to be handled very carefully because of its health effects. The uncured adhesive must be carefully isolated in the manufacturing process. Fourth, MDI can not be used in hardwood plywood production. It is expected that MDI based products will continue to occupy a niche position in the composite panel industry.

Emissions from MDI-bonded products are negligible and it is therefore appropriate that products using MDI adhesives be included in the 'no-added formaldehyde' list described in section 93120.3(b) of the rule.

F. AKZO 'Catcher' Adhesive.

This is a new, proprietary product developed in Europe which to our knowledge has not been commercialized. While it may have potential in some applications, we submit that it is an inappropriate to rely on it as BACT. The Akzo Nobel literature references a 10.8 sec/mm press time (ISOR, page 76) as much as 50% slower than a well

run continuous line in North America. Laboratory trials are a lot different than production reliability.

We urge CARB not to adopt provisions that are based on speculation and theory. The stakes are simply too high.

V. **There Will Be Significant Adverse Energy Impacts**

This rule will have several important and negative environmental effects in terms of energy usage and attendant higher emissions of carbon dioxide of at least 75,000 metric tons annually. These impacts are driven by the fact that using lower emission adhesives will slow industry production processes by 20% at the proposed levels and could require substantially higher press temperatures. This is a very large unintended consequence of this regulation that has been completely overlooked by the staff report. Second, the ceiling limits proposed in the rule will lead to the increased use of phenol type adhesives which will cause methanol emissions to rise. The staff report does not properly account for either of these deleterious environmental impacts.

Industry Presses are powered by industrial boilers that consume between 10 and 25 million BTU per hour of operation (MMBTU/hr). The range is dependent on the age of the boiler and the fuel source. Additionally, 19 of the facilities in North America have oxidizers on their press vents to reduce factory emissions which consume, on average, nearly 8 MMBTU/hr. CWIC estimates that the CARB proposal will slow industry processes by 20% because the low emission adhesives will require longer press times, which will lead to proportionately greater energy use.

The U.S. Department of Energy has set a conversion factor of 53 metric tons of carbon dioxide produced per billion BTU based on natural gas, the most efficient energy source for conversion purposes and a conservative factor for the estimate. CWIC estimates that 75% of production facilities in North America will have to meet the emission limits proposed by CARB. Together, these factors result in a median prediction of 75,000 metric tons/annually of increase in emissions. Attached as Appendix B are the spreadsheets which contain the details of these calculations.

The "cost" of carbon dioxide emissions can be readily tracked using the Chicago Carbon Exchange. California has set a goal of reducing carbon dioxide emissions by balancing any increased emissions. Using the current factors and recent pricing on the Chicago Exchange, we estimate this rule will increase the carbon deficit from between $300,000 to $400,000.

VI. **Technical Comments on the ISOR**

The following comments are made on technical aspects of the ISOR, which although minor in nature could have inappropriate impacts on the analysis and should be

corrected. One error in Table H-1 is particularly important in that it results in a substantial understatement of the reduction in emissions from hardwood plywood that would result from the ATCM.

A. Appendix B Comments:

1. CARB does not now Fully Recognize that Emission Rates of Composite Wood Products ("CWPs") can be Influenced by Indoor Levels from Outdoor Ambient and non-CWP Formaldehyde Sources

A concentration of 0.004 ppm (4 ppb) is indicated in the assumptions concerning decay for the 11th and last year of emissions for raw PB (Table 1), and the 20th and last year of emissions for one-side laminated PB (Table 3) in Appendix B. The 4 ppb level is mid-range between the 3 and 5 ppb outdoor ambient levels as reported by CARB to the California Legislature (CARB 2005). Because of vapor pressure gradients, emissions from CWP sources will diminish due to concentrations from certain other non-CWP sources. Indeed, CARB alludes to vapor pressure as a suppression-release formaldehyde mechanism (page 28 of the proposed ATCM). In the 6/20/06 Preliminary Risk Characterization Methodology and Estimates (CARB 2006) it is assumed that 75% of total formaldehyde emissions in a new conventional home originate from UF-based products and 25% from other sources. For older homes the contribution would be less for the original new home CWP sources. According to Kelly et al. (1999) there are a number of sources of formaldehyde unrelated to PB, MDF, and HWPW. Some of these other sources are episodic and obviously do not occur in all homes every day. Nevertheless, with the large inventory of homes in California, a number of these homes each day would experience these releases, which in some cases, can be quite high. The contribution of CWP emissions towards formaldehyde levels is overstated.

2. There are no Long Term Decay Studies for Laminated Wood Products

CARB acknowledges that "staff was not able to find any long-term studies on emissions from laminated boards" (page 6, Appendix B) in respect to particleboard. There is also little or no information on the long term decay of MDF of HWPW. This has resulted in several highly speculative assumptions concerning one-side lamination and two-side lamination CWPs, as exemplified in the discussion on PB in pages 2-8 of Appendix B. While not addressed here, similar comments would also likely apply to MDF and HWPW:

A. CARB assumes that the duration of contribution of emissions of raw PB is 11 years based on an initial concentration of 0.18 ppm. Eleven years is very likely an overstatement of emission contribution of inside formaldehyde on ambient levels. The contribution of one-side laminated particleboard is assumed to be 20 years. This is based on the assumption that it takes 20 years for particleboard to off-gas formaldehyde and that "total emissions from laminated boards in 20 years are approximately the same as the total emissions from raw boards over an 11 year period." There is little or no data that would support this assumption. Even the

process of lamination would likely drive off some of the free or loosely bound formaldehyde from the previously manufactured PB. Moreover, there is apparently no recognition by CARB for the long-term effectiveness of formaldehyde scavengers that may be contained in some CWPs.

B. The assumption for two-side PB lamination that an emission rate of about 20 $\mu g/m^2/hr$ is constant for over 20 years is in conflict with reality. An emission rate of 20 $\mu g/m^2/hr$ is associated with an indoor concentration of 0.014 ppm (Table 3 for one-side laminated particleboard). There seems to be little basis for this assumption as it is inconsistent with virtually all studies related to plotting formaldehyde concentration by home age when UF-bonded products are present in homes in these studies. Two-sided laminated PB could emit formaldehyde for a long period of time but the emissions would likely be severely limited because of the barrier effect.

3. Assumptions on Quantities of Laminated Boards Needs Further Review

The assumptions concerning the percentage of raw board and laminated boards for PB, MDF, and HWPW as shown on Table 7 (page 13) of Appendix B is not consistent with current end uses for CWPs. Particleboard flooring products in 2005 represented less than 5% of particleboard shipments (CPA 2006). This flooring material would be covered with vinyl or other finished flooring products most of which, except for carpets, would represent highly effective diffusion retarders. Most of the remaining PB (~ 95% of shipments) would be surface laminated or surface finished on one side or two by fabricators (kitchen cabinet and furniture manufacturers, etc). For MDF it is assumed that only 10% would be raw. This could still be high as almost all of this material would be finished on at least one side. Not only laminates but also overlays and many liquid applied finishes when cured will significantly reduce emissions from underlying UF-bonded wood products (CPA 2003).

For hardwood plywood it is assumed by CARB that all would be raw board. In the 2002 U. S. HWPW consumption figures listed in Table 6 (page 11), it is apparent that wall panels as well as industrial panels are included. In fact, virtually all hardwood plywood wall paneling, representing about 35% of U. S. production, is finished in the U.S., including both domestically produced and those produced with imported platforms. Over 50% of wall panel production is laminated one side with vinyl film, a highly effective formaldehyde diffusion retarder. Of the remaining industrial HWPW (about 65% of total consumption), about 10% is finished or laminated by hardwood plywood producers. Kitchen cabinet manufacturers and other fabricators finish almost all of the remaining industrial HWPW either on one side or two.

4. Adding Concentrations and Emission Rates of CWPs Used in the same Indoor Environment Fails to Recognize Interactions Between Products

The estimate of California 2002 emissions relies on formula (9) on page10 and assumes that emissions of PB, MDF and HWPW are added together. There is little merit in this assumption unless these materials exist in isolation from one another in different

indoor environments. Two or more CWPs are found in most homes and other indoor spaces where they are used. A number of controlled chamber test studies have found that concentrations observed when testing PB and HWPW together is less, sometimes much less, than the addition of the concentrations when the same two products are tested alone (Singh et al. 1982, Godish and Kanter 1985, Newton et al. 1986, Godish and Rouch 1987). Although information is more limited, there is also data that indicates when PB, HWPW and MDF are tested together the concentration is less than adding the three concentrations when the three products are tested separately (Newton et al. 1986, Groah and Gramp 1988). The effect of UF-bonded wood product emission interactions has also been observed in a home study project sponsored by the Composite Panel Association and the U. S. Environmental Protection Agency (Koontz et al. 1996, Groah 2006).

5. The Consumption of Hardwood Plywood is Mis-stated for 2002

On Table 6 (page 11) California consumption of PB, MDF, and HWPW is determined by using the ratio of the California population (~ 12.3%) to that of the U. S. in determining California consumption from U. S. consumption. This is a straightforward method and CARB should be complimented on this approach. The 2002 U. S. consumption figures for PB and MDF look reasonable (CPA 2006); however the figures for HWPW appear to be too high. Over 85% of U. S. wall panel blanks are imported but are subsequent finished (liquid applied finishes, vinyl laminated, paper laminated, or printed) in the U. S. and thus there is a chance of double counting. For industrial hardwood plywood, imported platforms still qualify as plywood as they would be 3 or more ply. Likewise, there is a good chance of over counting in industrial plywood. HPVA records show about 2,180,000 m^3 for 2002 HWPW shipments (HPVA 2006A, HPVA 2006B). Assuming some imported stock not captured in U. S. production it would appear unlikely that U. S. consumption would exceed 2.8 to 2.9 million m^3 in 2002. The overstatement of HWPW consumption, however, is offset by the California consumption figures (m^2) in the last column of Table 6. All extensions in this column are incorrect, as apparently 3/4" was assumed as the base thickness for HWPW, and not the 3/8" base thickness as indicated in footnote "b" to the table. Given the decline in the use of thin hardwood plywood wall paneling relative to hardwood plywood industrial panels in recent years, an average 1/2" base thickness is more appropriate for HWPW than the 3/8" thickness suggested by CARB.

6 Using a Statewide Outside Ambient Level is not Appropriate for the Contribution of Indoor Air to Outdoor Air in Many California Areas

As described earlier in these comments using 0.004 ppm (4 ppb) to represent the total indoor background level ignores the contribution of non-CWP formaldehyde sources and the effects that these sources have on emissions from PB, MDF, and HWPW. Indoor ambient background related to outside ambient formaldehyde levels appear to be associated with population density. For example, CARB reports a mean ambient concentration for Los Angeles of 7.5 $\mu g/m^3$ (6.1 ppb) with a range up to 17.2 $\mu g/m^3$ (14 ppb) on page 25 of the proposed ATCM. The higher formaldehyde ambient level in Los Angeles county as compared to other areas is no doubt due primarily to on-road mobile

sources or automobile exhaust, characteristic of high density urban areas, as well as various "other mobile sources" that could also be related to high density urban areas. The high ambient range for Los Angeles is at the same 17.2 μg/m^3 (14 ppb) level estimated by CARB staff as the average current indoor formaldehyde level in California homes: Table VII-4 of the Preliminary Risk Characterization Methodology and Estimates (CARB 2006).

On Table 13b, residential housing construction (units) by county for 1993 - 2002 is provided. Four of the 58 counties listed (Los Angeles, Riverside, San Diego, and Orange) make up 42% of the total of 2,710,902 housing units for the ten-year period. At least some, if not most, areas of these counties are probably accompanied by high automobile traffic patterns. The profile of urban, semi-urban, and rural areas in each county will likely affect the appropriate ambient levels for various counties or areas of counties. The location of formaldehyde sampling stations relative to urban or more rural areas can also be a factor in characterizing ambient concentrations. High outside ambient formaldehyde levels leading to higher indoor background levels not only has a bearing on the reduction of emission rates of indoor sources of formaldehyde by vapor pressure mechanisms but also to indoor exposures from non-CWP and CWP sources. It would appear that a more complete analysis of urban, semi-urban and rural interface as suggested above is more important, if not more so, than the three bulleted items on page 29 as examples of "information that could support improvements" in the emission methodology described in this appendix.

B. **Appendix D Comments**

1. The 1/4" UF particleboard as the last item in Table D-1 (product 1 in the Battelle study) appears to be an outlier: the typical conditions emission rate of 1580 μg HCHO/m^2-hr is 3 times that of the next highest "typical conditions" value for particleboard: 5/8' particleboard underlayment (product 2) at 508 μg HCHO/m^2-hr.

2. On page 1, the 440 μg HCHO/m^2-hr emission rates for "PB and MDF: E 1333 = 0.30 ppm" is incorrect for MDF. The emission rate for MDF at the E 1333 designated 0.26 m^2/m^3 loading rate is 710 m^2/m^3 loading. Further, on page 1, the emission rate for MDF (2002 average E 1333 = 0.25 ppm) is actually 591 μg HCHO/m^2-hr, not the 367 μg HCHO/m^2-hr as shown.

3. On Table D-2 on page 3 under the "C. Resulting HCHO Emission Rate" the last column emission rate numbers for MDF should be 591 as the 2002 mean, 497 as the Phase 1 standard, and 260 for Phase 2.

4. On page 5 under Particleboard (Battelle, 1996), the last bullet point in the text is reversed as related to the various means. It should read as follows:

Mean of highest 33% (μg /m^2-hr) = 293 (n= 7); mean of middle 33% (μg /m^2-hr) = 159 (n = 8); mean of lowest 33% (μg /m^2-hr) = 119 (n = 7).

C. **Appendix E Comments**

1. The 800 ft^2 "small" home and the 2000 ft^2 "large" home do not appear to be good selections to characterize California new homes. The average size of new one-family houses in the West region of the U. S. in 2005 was 2,434 ft^2 (U. S. Census Bureau, 2006). It is not expected that the size of homes in California would deviate much from the West region average. To characterize 2000 ft^2 as a large home when the average home is over 20% larger in the West region is not appropriate.

While homes as small as 800 ft^2 are constructed, it is likely that this size home represents a fairly small segment of new housing. Some apartments are larger than 800 ft^2. Single section manufactured homes often fulfill the need for smaller homes. The most common and economical unit is the single section 14 feet wide by as much as 80 feet long unit (mHousing.com 2007), a home that can offer about 1,100 ft^2 of living area.

D. **Appendix F Comments**

1. While larger new homes will likely contain greater quantities of UF-bonded cabinet and related materials than smaller homes, the increase in use is not proportional to the size and volume of the homes. This is amply illustrated by the 800 ft^2 small home and the 2000 ft^2 large home examples selected by CARB. In the small home the total loading rate of HWPW, PB and MDF is 0.52 m^2/m^3; in the large home the loading rate is 0.38 m^2/m^3. The average CARB projected concentrations for Phase 1 and Phase 2 for the small home are 182 $\mu g/m^3$ and 96 $\mu g/m^3$, respectively. For the large home the concentrations are 125 $\mu g/m^3$ for Phase 1 and 67 $\mu g/m^3$ for Phase 2.

The average size of California homes is not likely much different than the average size of homes in the West regional area as indicated in a U. S. Census Bureau table (2006). By using the two CARB selected sample homes, both of which are smaller than the 2,434 ft^2 average new one-family homes in the West region, the average loading rates of UF-bonded products and HCHO concentration in new California homes is exaggerated.

2. Formaldehyde emissions for each of the 9 products in the CARB "small" home in Table F-1 are added together to obtain total maximum potential emissions for the home. The same procedure is used for the 10 products in the CARB "large" home. A number of studies have demonstrated that product concentrations, and thus formaldehyde emissions, cannot be added together. Home and space emissions are less than the addition of the individual sources because of interactions among formaldehyde sources. Two mechanisms have been suggested to explain this phenomenon: formaldehyde sinks and suppression due to vapor pressure gradients (Godish and Rouch 1987, and Groah 2006). Indeed a product that is a relatively weak source of formaldehyde can be a sink for emissions from a product with higher source strength.

A number of investigators have observed in dynamic chamber studies that the concentration of two or more UF-bonded wood products tested together is less than the

addition of the concentrations when samples from the same product are tested in separate tests (Singh et al. 1982, Pickrell et al. 1982, Godish and Kanter 1985, Godish and Rouch 1987, Newton et al. 1986, Sundin 1987, and Groah and Gramp 1988). Adding HCHO emissions from products in Table F-1 (small home) and from products in Table F-2 (large home) will result in the total maximum potential emissions to be overstated.

3. In Section C (Change in Daily Time-weighted Average HCHO Concentration) on page 4, it is assumed that HCHO emissions from HWPW, PB, and MDF account for 75% of the measured concentrations in homes for both Phase 1 and Phase 2. Applying the 75% value (we do not concede that this is necessarily the correct percentage) to the 182 $\mu g/m^3$ total emission for Phase 1 in the small home yields 136.5 $\mu g/m^3$ attributed to wood panel products, and 45.5 $\mu g/m^3$ attributed to other sources. Without a concomitant decrease in other sources, not the subject of this CARB initiative, it is highly unlikely that 75% of the projected Phase 2 emissions could be attributed to HWPW, PB, and MDF. Indeed, if no changes were made in reducing emissions from non UF-bonded sources, including that contributed by the outside ambient concentration, the contribution of the three wood products in Phase 2 would be only about 53%: 96 $\mu g/m^3$ (Phase 2 projected contribution) - 45.5 $\mu g/m^3$ (other sources) = 50.5 $\mu g/m^3$ ÷ 96 $\mu g/m^3$ (x 100) = 52.6%. Applying the same logic in the large house example, the contribution of HWPW, PB and MDF could be as low as 53.4% (125 x 0.25 = 31.25; 67 - 31.5 = 35.75; 35.75 ÷ 67 = 0.534 x 100 = 53.4%). Thus, the percentage contribution to home concentrations from the three wood panel products has been overstated for Phase 2.

E. **Appendix H Comments**

1. In Table H-1 on page 3 the information for HWPW is incorrect in two respects. The emission rate shown is 21 mg m^{-2} hr^{-1}. This was derived by dividing L by N, rather than N by L. The formula appearing in ASTM E 1333 is referenced by CARB: $ER = C_s$ x (N ÷ L) in making this calculation. The correct mathematical extension is 0.29 mg m^{-2} hr^{-1}. The second error is more serious: while the test loading rate for hardwood plywood industrial panels is correct at 0.425 m^2/m^3, the HUD Standard value is 0.3 ppm, not 0.2 ppm, as stated in a HUD letter of clarification, dated 1/31/85 (Nistler 1985). If the correct 0.3 ppm limit is used, the emission rate for industrial hardwood plywood would be 0.43 mg m^{-2} hr^{-1}. Using the incorrect HUD level results in a significant understatement of the "% reduction from the 1985 HUD standard" for hardwood plywood. Thus, the burden to this segment of the industry to comply with the proposed Phase 1 and Phase 2 requirements is significantly understated. The % reduction in Table H-1 for HWPW for the 2002 mean is -70%, not -38%. For Phase 1, the correct reduction is -77%, not -53%. The Phase 2 reduction should be -86%, not -71%.

2. On page 3, CARB reports that "the reported range of values for uncoated MDF was 0.210 to 0.385 mg HCHO m^{-2} hr^{-1}, which may in part be due to the lower loading rate specified by ASTM in the E 1333 test protocol (0.26 m^2 m^{-3}) vs. the loading rate used in the Battelle study (0.46 m^2 m^{-3})."

CARB is incorrect; the loading rate in the Battelle study for uncoated MDF was clearly 0.26 m^2 m^{-3} (see product groups 4 and 6 in the Battelle study).

3. It is important to make adjustments in concentrations of formaldehyde when comparisons are made from data derived using different test methods having different loading rates and performed under different conditions. While an attempt to make these adjustments is commendable as shown on page 5, the outcome is highly questionable. This appears to be due, in part, to a shallow reading of the Groah et al. (1991) paper. The experiment described in this paper was a direct comparison of the WKI (EN 717-1) method with the ASTM E 1333 method. Matched samples were tested at the EN 717-1 loading rate and at the specified conditions set forth for that method. The other set of matched samples were tested using the ASTM procedure, which included loading rate, temperature, and relative humidity that was different from EN 717-1. The experiment had nothing to do with edge sealing in isolation. The results of that experiment indicated that at EN 717-1 conditions and loading, testing results were about 20% lower than when using ASTM conditions and when using chromotropic acid analysis in both procedures. Results were given in ppm. In assuming a test result of 0.10 ppm from EN 717-1, one would expect an approximate outcome of ~ 0.13 ppm when using ASTM E 1333.

Appendix A

Economic Impact Summary Spreadsheets

Analysis of Potential Negative Economic Impacts to End-Users of Particleboard and MDF Under Proposed Phase II CARB Ruling
Economic Empact Nationally of a 50% Cost Increase for Particleboard and MDF

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST PARTICLEBOARD SUBSTRATE SHIPMENTS NATIONALLY, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped Nationally that Meet the Phase II Emission Level*										
Particleboard Downstream Applications	**Market Price Effect****	**20%**	**30%**	**40%**	**47%**	**57%**	**67%**	**77%**	**86%**	**92%**	**98%**	**100%**
Cabinets and Vanities	$259,248,518	$986,230,190	$863,564,743	$740,899,297	$648,900,212	$526,234,765	$403,569,319	$280,903,872	$176,638,243	$98,745,684	$20,853,126	$0
Prefinished Paneling	$19,550,094	$160,875,278	$140,865,915	$120,856,552	$105,849,530	$85,840,167	$65,830,804	$45,821,441	$28,813,483	$16,107,537	$3,401,592	$0
Door Components	$50,139,664	$1,169,130,663	$1,023,716,402	$878,302,140	$769,241,444	$623,827,182	$478,412,921	$332,998,659	$209,396,537	$117,058,481	$24,720,424	$0
Household Furniture	$186,689,010	$2,580,923,523	$2,259,913,134	$1,938,902,746	$1,698,144,955	$1,377,134,566	$1,056,124,178	$735,113,789	$462,254,959	$258,413,363	$54,571,766	$0
Shelving	$35,195,237	$341,648,049	$299,154,510	$256,660,972	$224,790,818	$182,297,280	$139,803,741	$97,310,203	$61,190,695	$34,207,298	$7,223,902	$0
Other	$110,054,905	$851,072,617	$745,217,814	$639,363,011	$559,971,908	$454,117,105	$348,262,302	$242,407,499	$152,430,916	$85,213,116	$17,995,317	$0
Underlayment	$19,912,137	$69,632,092	$60,971,384	$52,310,676	$45,815,145	$37,154,437	$28,493,729	$19,833,021	$12,471,419	$6,971,870	$1,472,320	$0
Counter Tops	$38,454,433	$374,925,559	$328,293,027	$281,660,495	$246,686,095	$200,053,563	$153,421,031	$106,788,499	$67,150,846	$37,539,188	$7,927,530	$0
Office Furniture	$79,518,863	$1,775,589,879	$1,554,745,367	$1,333,900,854	$1,168,267,470	$947,422,958	$726,578,445	$505,733,933	$318,016,098	$177,779,832	$37,543,567	$0
Electronic Cabinets	$2,379,344	$19,178,617	$16,793,217	$14,407,817	$12,618,767	$10,233,367	$7,847,967	$5,462,566	$3,434,976	$1,920,247	$405,518	$0
Store Fixtures	$36,628,768	$340,244,913	$297,925,894	$255,606,875	$223,867,611	$181,548,592	$139,229,573	$96,910,554	$60,939,387	$34,066,810	$7,194,233	$0
Moulding	$359,694	$1,187,707	$1,039,982	$892,257	$781,464	$633,739	$486,014	$338,290	$212,724	$118,918	$25,113	$0
Millwork	$12,662,436	$41,811,214	$36,610,814	$31,410,414	$27,510,114	$22,309,715	$17,109,315	$11,908,915	$7,488,576	$4,186,322	$884,068	$0
Retail	$6,022,219	$15,925,816	$13,944,993	$11,964,170	$10,478,553	$8,497,730	$6,516,907	$4,536,084	$2,852,385	$1,594,562	$336,740	$0
IMPORTS	$5,481,507											
Wholesale Trade		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Retail Trade		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Transportation		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Total Regional Economic Impact		$10,483,797,864	$9,179,842,906	$7,875,887,948	$6,897,921,729	$5,593,966,771	$4,290,011,813	$2,986,056,854	$1,877,695,140	$1,049,683,741	$221,672,343	$0
Market Price Effect		$169,010,178	$255,239,861	$341,469,544	$406,141,806	$492,371,489	$578,601,172	$664,830,855	$738,126,086	$792,881,934	$847,637,783	$862,296,829
Total Economic Impact		**$10,652,808,043**	**$9,435,082,767**	**$8,217,357,492**	**$7,304,063,535**	**$6,086,338,260**	**$4,868,612,985**	**$3,650,887,709**	**$2,615,821,225**	**$1,842,565,676**	**$1,069,310,126**	**$862,296,829**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments (including imports) that could be considered in compliance with the Phase 2 limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products**where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the folloiwng variables (each based on 2005 data): shipments by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due strictly to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis.

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*
Rate of Substitution to Imports	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*11%*	*7%*	*0%*

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST MDF SUBSTRATE SHIPMENTS NATIONALLY, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped Nationally that Meet the Phase II Emission Level*										
MDF Downstream Applications	**Market Price Effect****	**24%**	**34%**	**44%**	**52%**	**62%**	**72%**	**80%**	**90%**	**95%**	**98%**	**100%**
Moulding	$69,699,167	$325,834,562	$282,734,752	$239,634,943	$207,310,085	$164,210,275	$121,110,466	$84,475,627	$41,375,817	$23,360,097	$9,654,357	$0
Millwork	$53,405,986	$249,666,057	$216,641,446	$183,616,835	$158,848,377	$125,823,767	$92,799,156	$64,728,237	$31,703,626	$17,899,339	$7,397,513	$0
Cabinets and Vanities	$58,215,735	$313,542,511	$272,068,634	$230,594,757	$199,489,349	$158,015,472	$116,541,595	$81,288,799	$39,814,922	$22,478,841	$9,290,148	$0
Prefinished Paneling	$16,734,697	$194,963,063	$169,174,298	$143,385,533	$124,043,959	$98,255,194	$72,466,429	$50,545,979	$24,757,214	$13,977,511	$5,776,683	$0
Household Furniture	$70,125,469	$1,372,543,755	$1,190,990,349	$1,009,436,942	$873,271,887	$691,718,480	$510,165,073	$355,844,677	$174,291,271	$98,401,946	$40,667,963	$0
Store Fixtures	$19,251,280	$253,176,261	$219,687,337	$186,198,414	$161,081,721	$127,592,798	$94,103,875	$65,638,290	$32,149,366	$18,150,996	$7,501,519	$0
Retail	$13,189,514	$49,381,922	$42,849,922	$36,317,922	$31,418,921	$24,886,921	$18,354,921	$12,802,721	$6,270,720	$3,540,344	$1,463,168	$0
Other	$49,485,767	$541,790,713	$470,125,275	$398,459,836	$344,710,758	$273,045,320	$201,379,881	$140,464,259	$68,798,821	$38,842,668	$16,053,058	$0
Counter Tops	$2,639,854	$36,439,512	$31,619,470	$26,799,429	$23,184,398	$18,364,357	$13,544,316	$9,447,281	$4,627,240	$2,612,462	$1,079,689	$0
Electronic Cabinets	$2,517,818	$28,732,832	$24,932,193	$21,131,554	$18,281,074	$14,480,435	$10,679,796	$7,449,253	$3,648,614	$2,059,946	$851,343	$0
Shelving	$2,800,630	$38,489,723	$33,398,490	$28,307,257	$24,488,832	$19,397,599	$14,306,365	$9,978,817	$4,887,584	$2,759,448	$1,140,436	$0
Underlayment	$244,042	$1,208,232	$1,048,413	$888,594	$768,730	$608,911	$449,092	$313,245	$153,426	$86,622	$35,799	$0
Office Furniture	$9,311,741	$294,372,633	$255,434,454	$216,496,275	$187,292,641	$148,354,462	$109,416,283	$76,318,831	$37,380,652	$21,104,493	$8,722,152	$0
Door Components	$25,217,419	$832,484,760	$722,367,728	$612,250,696	$529,662,923	$419,545,891	$309,428,859	$215,829,382	$105,712,350	$59,683,431	$24,666,215	$0
IMPORTS	$13,526,757											
Wholesale Trade		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Retail Trade		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Transportation		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Total Regional Economic Impact		$4,532,626,536	$3,933,072,761	$3,333,518,987	$2,883,853,656	$2,284,299,881	$1,684,746,107	$1,175,125,398	$575,571,624	$324,958,146	$134,300,046	$0
Market Price Effect		$99,153,274	$139,789,861	$180,426,449	$210,903,890	$251,540,478	$292,177,065	$326,718,165	$367,354,752	$384,340,846	$397,263,281	$406,365,876
Total Economic Impact		**$4,631,779,810**	**$4,072,862,623**	**$3,513,945,436**	**$3,094,757,546**	**$2,535,840,359**	**$1,976,923,172**	**$1,501,843,563**	**$942,926,376**	**$709,298,992**	**$531,563,326**	**$406,365,876**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments (including imports) that could be considered in compliance with the Phase 2 limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products, where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis. The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the folloiwng variables (each based on 2005 data): shipments by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due strictly to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis.

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*	*0%*
Rate of Substitution to Imports	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*14%*	*8%*	*0%*

Combined Estimates of Regional Economic Impacts Associated with the Proposed Phase II CARB Ruling, by End-Use Application and Based on Varying Levels of Compliance

	22%	**32%**	**42%**	**50%**	**60%**	**70%**	**79%**	**88%**	**93%**	**98%**	**100%**
Total Regional Economic Impact	$15,016,424,400	$13,112,915,667	$11,209,406,934	$9,781,775,385	$7,878,266,652	$5,974,757,919	$4,161,182,253	$2,453,266,763	$1,374,641,887	$355,972,388	$0
Market Price Effect	$268,163,452	$395,029,723	$521,895,993	$617,045,696	$743,911,967	$870,778,237	$991,549,020	$1,105,480,838	$1,177,222,780	$1,244,901,064	$1,268,662,705
Total Economic Impact	**$15,284,587,852**	**$13,507,945,390**	**$11,731,302,928**	**$10,398,821,081**	**$8,622,178,619**	**$6,845,536,157**	**$5,152,731,272**	**$3,558,747,601**	**$2,551,864,667**	**$1,600,873,452**	**$1,268,662,705**

Analysis of Potential Negative Economic Impacts to End-Users of Particleboard and MDF Under Proposed Phase II CARB Ruling
Economic Impact in California Based on a 50% Particleboard and MDF Cost Increase

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST PARTICLEBOARD SUBSTRATE SHIPMENTS INTO CALIFORNIA, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped into California that Meet the Phase II Emission Level*										
Particleboard Downstream Applications	**Market Price Effect****	**20%**	**30%**	**40%**	**47%**	**57%**	**67%**	**77%**	**86%**	**92%**	**98%**	**100%**
Cabinets and Vanities	$43,375,272	$263,567,541	$230,785,508	$198,003,476	$173,416,952	$140,634,919	$107,852,887	$75,070,854	$47,206,127	$26,389,536	$5,572,946	$0
Prefinished Paneling	$1,703,986	$128,174,845	$112,232,700	$96,290,555	$84,333,947	$68,391,802	$52,449,657	$36,507,512	$22,956,689	$12,833,427	$2,710,165	$0
Door Components	$8,079,317	$236,729,861	$207,285,848	$177,841,836	$155,758,826	$126,314,814	$96,870,801	$67,426,789	$42,399,378	$23,702,430	$5,005,482	$0
Household Furniture	$93,886,083	$138,525,609	$121,296,055	$104,066,502	$91,144,337	$73,914,784	$56,685,230	$39,455,677	$24,810,557	$13,869,790	$2,929,024	$0
Shelving	$3,951,541	$38,443,802	$33,662,235	$28,880,667	$25,294,492	$20,512,924	$15,731,357	$10,949,789	$6,885,457	$3,849,162	$812,866	$0
Other	$16,753,311	$45,911,303	$40,200,942	$34,490,581	$30,207,810	$24,497,449	$18,787,088	$13,076,727	$8,222,920	$4,596,841	$970,761	$0
Underlayment	$2,043,071	$10,759,283	$9,421,063	$8,082,844	$7,079,180	$5,740,961	$4,402,741	$3,064,522	$1,927,036	$1,077,266	$227,497	$0
Counter Tops	$6,394,381	$20,134,523	$17,630,229	$15,125,935	$13,247,715	$10,743,421	$8,239,127	$5,734,833	$3,606,183	$2,015,957	$425,730	$0
Office Furniture	$18,490,809	$28,840,396	$25,253,282	$21,666,168	$18,975,833	$15,388,719	$11,801,605	$8,214,491	$5,165,444	$2,887,627	$609,809	$0
Electronic Cabinets	$354,689	$10,658,523	$9,332,836	$8,007,149	$7,012,884	$5,687,197	$4,361,510	$3,035,823	$1,908,989	$1,067,178	$225,367	$0
Store Fixtures	$15,790,232	$4,823,208	$4,223,307	$3,623,405	$3,173,479	$2,573,578	$1,973,676	$1,373,775	$863,858	$482,921	$101,983	$0
Moulding	$303,473	$547,324	$479,249	$411,174	$360,118	$292,042	$223,967	$155,892	$98,028	$54,801	$11,573	$0
Millwork	$98,319	$177,322	$155,267	$133,212	$116,671	$94,616	$72,561	$50,506	$31,759	$17,754	$3,749	$0
Retail	$20,078	$36,068	$31,582	$27,096	$23,732	$19,245	$14,759	$10,273	$6,460	$3,611	$763	$0
IMPORTS	$2,185,911											
Wholesale Trade		$77,346,556	$67,726,338	$58,106,119	$50,890,955	$41,270,737	$31,650,519	$22,030,300	$13,853,115	$7,744,276	$1,635,437	$0
Retail Trade		$81,978,472	$71,782,145	$61,585,817	$53,938,572	$43,742,245	$33,545,917	$23,349,590	$14,682,711	$8,208,044	$1,733,376	$0
Transportation		$79,961,405	$70,015,957	$60,070,508	$52,611,422	$42,665,974	$32,720,525	$22,775,077	$14,321,446	$8,006,086	$1,690,726	$0
Total Regional Economic Impact		$1,166,616,042	$1,021,514,544	$876,413,047	$767,586,923	$622,485,425	$477,383,928	$332,282,430	$208,946,157	$116,806,706	$24,667,255	$0
Market Price Effect		$41,832,373	$63,175,420	$84,518,467	$100,525,753	$121,868,800	$143,211,847	$164,554,895	$182,696,485	$196,249,320	$209,802,155	$213,430,473
Total Economic Impact		**$1,208,448,415**	**$1,084,689,964**	**$960,931,514**	**$868,112,676**	**$744,354,226**	**$620,595,775**	**$496,837,325**	**$391,642,642**	**$313,056,026**	**$234,469,410**	**$213,430,473**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments into California (including imports) that could be considered in compliance with the 0.05 ppm cieling, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products**where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the followng variables (each based on 2005 data): shipments into California by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier. Note that we do not assume final regional demand for each finished product decreases with the decline in regional manufacturing, instead, this demand is satisfied through finished products manufactured elsewhere and then shipped into California.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due stricty to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis. Regarding the second aforementioned caveat, if shipments of composite panels to CA based secondary manufacturers decline, as is assumed in the second segment of this analysis (i.e., the results to the

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*
Rate of Substitution to Imports	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*11%*	*7%*	*0%*

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST MDF SUBSTRATE SHIPMENTS INTO CALIFORNIA, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped into California that Meet the Phase II Emission Level*										
MDF Downstream Applications	**Market Price Effect****	**24%**	**34%**	**44%**	**52%**	**62%**	**72%**	**80%**	**90%**	**95%**	**98%**	**100%**
Moulding	$35,289,358	$104,910,108	$91,033,110	$77,156,111	$66,748,363	$52,871,364	$38,994,366	$27,198,917	$13,321,919	$7,521,333	$3,108,448	$0
Millwork	$20,512,887	$60,981,818	$52,915,440	$44,849,062	$38,799,279	$30,732,901	$22,666,522	$15,810,101	$7,743,723	$4,371,977	$1,806,869	$0
Cabinets and Vanities	$14,005,416	$140,279,493	$121,724,004	$103,168,516	$89,251,900	$70,696,411	$52,140,923	$36,368,757	$17,813,269	$10,057,075	$4,156,429	$0
Prefinished Paneling	$533,020	$66,088,912	$57,346,993	$48,605,073	$42,048,633	$33,306,714	$24,564,794	$17,134,162	$8,392,243	$4,738,120	$1,958,190	$0
Household Furniture	$61,107,875	$148,619,058	$128,960,452	$109,301,847	$94,557,893	$74,899,287	$55,240,682	$38,530,867	$18,872,261	$10,654,964	$4,403,528	$0
Store Fixtures	$50,190,563	$25,270,745	$21,928,054	$18,585,363	$16,078,344	$12,735,653	$9,392,962	$6,551,675	$3,208,984	$1,811,739	$748,763	$0
Retail	$2,124,726	$6,291,654	$5,459,425	$4,627,196	$4,003,024	$3,170,794	$2,338,565	$1,631,170	$798,940	$451,068	$186,419	$0
Other	$1,857,110	$8,388,900	$7,279,257	$6,169,614	$5,337,382	$4,227,739	$3,118,096	$2,174,900	$1,065,257	$601,426	$248,560	$0
Counter Tops	$814,812	$4,229,108	$3,669,702	$3,110,297	$2,690,742	$2,131,336	$1,571,930	$1,096,435	$537,030	$303,198	$125,307	$0
Electronic Cabinets	$75,253	$3,727,521	$3,234,463	$2,741,405	$2,371,611	$1,878,552	$1,385,494	$966,394	$473,336	$267,238	$110,445	$0
Shelving	$150,862	$2,419,292	$2,099,280	$1,779,268	$1,539,259	$1,219,246	$899,234	$627,224	$307,212	$173,447	$71,683	$0
Underlayment	$27,444	$238,227	$206,716	$175,204	$151,570	$120,059	$88,547	$61,763	$30,251	$17,079	$7,059	$0
Office Furniture	$152,197	$391,292	$339,534	$287,776	$248,957	$197,199	$145,441	$101,446	$49,688	$28,053	$11,594	$0
Door Components	$2,833	$136,824	$118,725	$100,627	$87,053	$68,955	$50,856	$35,473	$17,374	$9,809	$4,054	$0
IMPORTS	$5,394,190											
Wholesale Trade		$45,598,771	$39,567,187	$33,535,604	$29,011,916	$22,980,333	$16,948,749	$11,821,903	$5,790,320	$3,269,118	$1,351,075	$0
Retail Trade		$48,329,463	$41,936,677	$35,543,891	$30,749,301	$24,356,515	$17,963,729	$12,529,861	$6,137,075	$3,464,890	$1,431,984	$0
Transportation		$47,140,325	$40,904,832	$34,669,339	$29,992,720	$23,757,227	$17,521,734	$12,221,566	$5,986,073	$3,379,637	$1,396,750	$0
Total Regional Economic Impact		$571,972,954	$496,315,156	$420,657,358	$363,914,009	$288,256,211	$212,598,413	$148,289,284	$72,631,486	$41,006,527	$16,947,347	$0
Market Price Effect		$46,906,205	$66,130,060	$85,353,914	$99,771,805	$118,995,659	$138,219,514	$154,559,790	$173,783,645	$181,819,216	$187,932,402	$192,238,545
Total Economic Impact		**$618,879,159**	**$562,445,215**	**$506,011,272**	**$463,685,814**	**$407,251,870**	**$350,817,927**	**$302,849,075**	**$246,415,131**	**$222,825,743**	**$204,879,749**	**$192,238,545**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments into California (including imports) that could be considered in compliance with the Phase 2 limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The de would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products**where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regiona inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the followng variables (each based on 2005 data): shipments into California by secondary manufacturing type, production costs (including MDF sales average of $415/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier. Note that we do not assume final regional demand for each finished product decreases with the decline in regional manufacturing, instead, this demand is satisfied through finished products manufactured elsewhere and then shipped into California.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with MDF. The increased market prices are due stricty to the higher costs MDF manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new MDF production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis. Regarding the second aforementioned caveat, if shipments of composite panels to CA based secondary manufacturers decline, as is assumed in the second segment of this analysis (i.e., the results to the immediate right of the Marke

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*	*0%*
Rate of Substitution to Imports	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*14%*	*8%*	*0%*

Combined Estimates of Regional Economic Impacts Associated with the Proposed Phase II CARB Ruling, by End-Use Application and Based on Varying Levels of Compliance

	22%	**32%**	**42%**	**50%**	**60%**	**70%**	**79%**	**88%**	**93%**	**98%**	**100%**
Total Regional Economic Impact	$1,738,588,996	$1,517,829,700	$1,297,070,404	$1,131,500,932	$910,741,636	$689,982,340	$480,571,714	$281,577,643	$157,813,232	$41,614,601	$0
Market Price Effect	$88,738,578	$129,305,480	$169,872,381	$200,297,558	$240,864,460	$281,431,361	$319,114,685	$356,480,130	$378,068,536	$397,734,557	$405,669,018
Total Economic Impact	**$1,827,327,574**	**$1,647,135,180**	**$1,466,942,786**	**$1,331,798,490**	**$1,151,606,096**	**$971,413,702**	**$799,686,399**	**$638,057,773**	**$535,881,768**	**$439,349,158**	**$405,669,018**

Analysis of Potential Negative Economic Impacts to End-Users of Particleboard and MDF Under Proposed Phase II CARB Ruling
Estimates of Employment Impact in California of 50% Cost Increase for Partcleboard and MDF

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST PARTICLEBOARD SUBSTRATE SHIPMENTS INTO CALIFORNIA, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

	Regional Employment Loss for Each Total Percent of Panels Shipped into California that Meet the Phase II Emission Level*										
Particleboard Downstream Applications	**20%**	**30%**	**40%**	**47%**	**57%**	**67%**	**77%**	**86%**	**92%**	**98%**	**100%**
Cabinets and Vanities	1,863	1,631	1,399	1,226	994	762	531	334	186	39	0
Prefinished Paneling	947	829	711	623	505	387	270	170	95	20	0
Door Components	1,520	1,331	1,142	1,000	811	622	433	272	152	32	0
Household Furniture	1,041	912	782	685	556	426	297	187	104	22	0
Shelving	284	249	213	187	151	116	81	51	28	6	0
Other	339	296	254	223	181	139	96	61	34	7	0
Underlayment	61	54	46	40	33	25	17	11	6	1	0
Counter Tops	142	125	107	94	76	58	41	25	14	3	0
Office Furniture	207	181	155	136	110	85	59	37	21	4	0
Electronic Cabinets	74	65	56	49	40	30	21	13	7	2	0
Store Fixtures	36	31	27	23	19	15	10	6	4	1	0
Moulding	4	4	3	3	2	2	1	1	0	0	0
Millwork	1	1	1	1	1	1	0	0	0	0	0
Retail	0	0	0	0	0	0	0	0	0	0	0
Wholesale Trade	520	456	391	342	278	213	148	93	52	11	0
Retail Trade	814	713	611	535	434	333	232	146	81	17	0
Transportation	513	449	385	337	274	210	146	92	51	11	0
Total Regional Job Loss	8,366	7,325	6,285	5,504	4,464	3,423	2,383	1,498	838	177	0

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments into California (including imports) that could be considered in compliance with the 0.05 ppm cieling, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products **where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regional inter-industry activity and consequntly, regional employment, is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional employment is computed as the product of the folloiwng variables (each based on 2005 data that was deflated to 2003 dollars): shipments into California by secondary manufacturing type, production costs (denominated in millions), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II final demand employment multiplier.

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*3%*	*3%*	*3%*	*3%*	*1%*	*1%*	*1%*	*0%*
Rate of Substitution to Imports	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*11%*	*7%*	*0%*

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST MDF SUBSTRATE SHIPMENTS INTO CALIFORNIA, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

	Regional Employment Loss for Each Total Percent of Panels Shipped into California that Meet the Phase II Emission Level*										
MDF Downstream Applications	**24%**	**34%**	**44%**	**52%**	**62%**	**72%**	**80%**	**90%**	**95%**	**98%**	**100%**
Moulding	774	671	569	492	390	288	201	98	55	23	0
Millwork	450	390	331	286	227	167	117	57	32	13	0
Cabinets and Vanities	991	860	729	631	500	368	257	126	71	29	0
Prefinished Paneling	488	424	359	311	246	181	127	62	35	14	0
Household Furniture	1,117	970	822	711	563	415	290	142	80	33	0
Store Fixtures	187	162	137	119	94	69	48	24	13	6	0
Retail	63	55	46	40	32	23	16	8	5	2	0
Other	62	54	45	39	31	23	16	8	4	2	0
Counter Tops	30	26	22	19	15	11	8	4	2	1	0
Electronic Cabinets	26	23	19	17	13	10	7	3	2	1	0
Shelving	18	16	13	11	9	7	5	2	1	1	0
Underlayment	1	1	1	1	1	1	0	0	0	0	0
Office Furniture	3	2	2	2	1	1	1	0	0	0	0
Door Components	1	1	1	1	0	0	0	0	0	0	0
Wholesale Trade	307	266	226	195	155	114	80	39	22	9	0
Retail Trade	480	416	353	305	242	178	124	61	34	14	0
Transportation	302	262	222	192	152	112	78	38	22	9	0
Total Regional Job Loss	5,299	4,598	3,897	3,372	2,671	1,970	1,374	673	380	157	0

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments into California (including imports) that could be considered in compliance with the phase 2 limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products **where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regional inter-industry activity and consequntly, regional employment, is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional employment is computed as the product of the folloiwng variables (each based on 2005 data that was deflated to 2003 dollars): shipments into California by secondary manufacturing type, production costs (denominated in millions), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II final demand employment multiplier.

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*3%*	*3%*	*3%*	*1%*	*1%*	*1%*	*0%*	*0%*
Rate of Substitution to Imports	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*14%*	*8%*	*0%*

Combined Estimates of Employment Impacts Due to Lost PB & MDF Substrate Shipments into California, by End-Use Application and Based on Varying Levels of Compliance

	22%	**32%**	**42%**	**50%**	**60%**	**70%**	**79%**	**88%**	**93%**	**98%**	**100%**
Total Regional Job Loss	13,665	11,923	10,182	8,876	7,134	5,393	3,757	2,171	1,218	334	0

Analysis of Potential Negative Economic Impacts to End-Users of Particleboard and MDF Under Proposed Phase II CARB Ruling
Economic Impact Nationally for 30% Particleboard, 40% MDF Cost Increase

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST PARTICLEBOARD SUBSTRATE SHIPMENTS NATIONALLY, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped Nationally that Meet the Phase II Emission Level*									
Particleboard Downstream Applications	**Market Price Effect****	**20%**	**30%**	**40%**	**47%**	**57%**	**67%**	**77%**	**86%**	**92%**	**98%**	**100%**
Cabinets and Vanities	$173,237,380	$986,230,190	$863,564,743	$740,899,297	$648,900,212	$526,234,765	$403,569,319	$280,903,872	$176,638,243	$98,745,684	$20,853,126	$0
Prefinished Paneling	$13,063,940	$160,875,278	$140,865,915	$120,856,552	$105,849,530	$85,840,167	$65,830,804	$45,821,441	$28,813,483	$16,107,537	$3,401,592	$0
Door Components	$33,504,778	$1,169,130,663	$1,023,716,402	$878,302,140	$769,241,444	$623,827,182	$478,412,921	$332,998,659	$209,396,537	$117,058,481	$24,720,424	$0
Household Furniture	$124,751,012	$2,580,923,523	$2,259,913,134	$1,938,902,746	$1,698,144,955	$1,377,134,566	$1,056,124,178	$735,113,789	$462,254,959	$258,413,363	$54,571,766	$0
Shelving	$23,518,479	$341,648,049	$299,154,510	$256,660,972	$224,790,818	$182,297,280	$139,803,741	$97,310,203	$61,190,695	$34,207,298	$7,223,902	$0
Other	$73,541,880	$851,072,617	$745,217,814	$639,363,011	$559,971,908	$454,117,105	$348,262,302	$242,407,499	$152,430,916	$85,213,116	$17,995,317	$0
Underlayment	$13,305,868	$69,632,092	$60,971,384	$52,310,676	$45,815,145	$37,154,437	$28,493,729	$19,833,021	$12,471,419	$6,971,870	$1,472,320	$0
Counter Tops	$25,696,368	$374,925,559	$328,293,027	$281,660,495	$246,686,095	$200,053,563	$153,421,031	$106,788,499	$67,150,846	$37,539,188	$7,927,530	$0
Office Furniture	$53,136,811	$1,775,589,879	$1,554,745,367	$1,333,900,854	$1,168,267,470	$947,422,958	$726,578,445	$505,733,933	$318,016,098	$177,779,832	$37,543,567	$0
Electronic Cabinets	$1,589,947	$19,178,617	$16,793,217	$14,407,817	$12,618,767	$10,233,367	$7,847,967	$5,462,566	$3,434,976	$1,920,247	$405,518	$0
Store Fixtures	$24,476,405	$340,244,913	$297,925,894	$255,606,875	$223,867,611	$181,548,592	$139,229,573	$96,910,554	$60,939,387	$34,066,810	$7,194,233	$0
Moulding	$240,358	$1,187,707	$1,039,982	$892,257	$781,464	$633,739	$486,014	$338,290	$212,724	$118,918	$25,113	$0
Millwork	$8,461,407	$41,811,214	$36,610,814	$31,410,414	$27,510,114	$22,309,715	$17,109,315	$11,908,915	$7,488,576	$4,186,322	$884,068	$0
Retail	$4,024,221	$15,925,816	$13,944,993	$11,964,170	$10,478,553	$8,497,730	$6,516,907	$4,536,084	$2,852,385	$1,594,562	$336,740	$0
IMPORTS	$3,662,902											
Wholesale Trade		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Retail Trade		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Transportation		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Total Regional Economic Impact		$10,483,797,864	$9,179,842,906	$7,875,887,948	$6,897,921,729	$5,593,966,771	$4,290,011,813	$2,986,056,854	$1,877,695,140	$1,049,683,741	$221,672,343	$0
Market Price Effect		$112,937,504	$170,558,679	$228,179,855	$271,395,737	$329,016,912	$386,638,088	$444,259,263	$493,237,262	$529,826,709	$566,416,155	$576,211,755
Total Economic Impact		**$10,596,735,368**	**$9,350,401,585**	**$8,104,067,803**	**$7,169,317,466**	**$5,922,983,683**	**$4,676,649,900**	**$3,430,316,117**	**$2,370,932,402**	**$1,579,510,450**	**$788,088,498**	**$576,211,755**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments (including imports) that could be considered in compliance with the Phase 2 limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products, where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis. The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the folloiwng variables (each based on 2005 data): shipments by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due strictly to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis..

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*
Rate of Substitution to Imports	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*11%*	*7%*	*0%*

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST MDF SUBSTRATE SHIPMENTS, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped Nationally that Meet the Phase II Emission Level*									
MDF Downstream Applications	**Market Price Effect****	**24%**	**34%**	**44%**	**52%**	**62%**	**72%**	**80%**	**90%**	**95%**	**98%**	**100%**
Moulding	$57,900,988	$325,834,562	$282,734,752	$239,634,943	$207,310,085	$164,210,275	$121,110,466	$84,475,627	$41,375,817	$23,360,097	$9,654,357	$0
Millwork	$44,365,801	$249,666,057	$216,641,446	$183,616,835	$158,848,377	$125,823,767	$92,799,156	$64,728,237	$31,703,626	$17,899,339	$7,397,513	$0
Cabinets and Vanities	$48,361,390	$313,542,511	$272,068,634	$230,594,757	$199,489,349	$158,015,472	$116,541,595	$81,288,799	$39,814,922	$22,478,841	$9,290,148	$0
Prefinished Paneling	$13,901,966	$194,963,063	$169,174,298	$143,385,533	$124,043,959	$98,255,194	$72,466,429	$50,545,979	$24,757,214	$13,977,511	$5,776,683	$0
Household Furniture	$58,255,129	$1,372,543,755	$1,190,990,349	$1,009,436,942	$873,271,887	$691,718,480	$510,165,073	$355,844,677	$174,291,271	$98,401,946	$40,667,963	$0
Store Fixtures	$15,992,560	$253,176,261	$219,687,337	$186,198,414	$161,081,721	$127,592,798	$94,103,875	$65,638,290	$32,149,366	$18,150,996	$7,501,519	$0
Retail	$10,956,887	$49,381,922	$42,849,922	$36,317,922	$31,418,921	$24,886,921	$18,354,921	$12,802,721	$6,270,720	$3,540,344	$1,463,168	$0
Other	$41,109,169	$541,790,713	$470,125,275	$398,459,836	$344,710,758	$273,045,320	$201,379,881	$140,464,259	$68,798,821	$38,842,668	$16,053,058	$0
Counter Tops	$2,192,998	$36,439,512	$31,619,470	$26,799,429	$23,184,398	$18,364,357	$13,544,316	$9,447,281	$4,627,240	$2,612,462	$1,079,689	$0
Electronic Cabinets	$2,091,620	$28,732,832	$24,932,193	$21,131,554	$18,281,074	$14,480,435	$10,679,796	$7,449,253	$3,648,614	$2,059,946	$851,343	$0
Shelving	$2,326,559	$38,489,723	$33,398,490	$28,307,257	$24,488,832	$19,397,599	$14,306,365	$9,978,817	$4,887,584	$2,759,448	$1,140,436	$0
Underlayment	$202,732	$1,208,232	$1,048,413	$888,594	$768,730	$608,911	$449,092	$313,245	$153,426	$86,622	$35,799	$0
Office Furniture	$7,735,516	$294,372,633	$255,434,454	$216,496,275	$187,292,641	$148,354,462	$109,416,283	$76,318,831	$37,380,652	$21,104,493	$8,722,152	$0
Door Components	$20,948,794	$832,484,760	$722,367,728	$612,250,696	$529,662,923	$419,545,891	$309,428,859	$215,829,382	$105,712,350	$59,683,431	$24,666,215	$0
IMPORTS	$11,237,044											
Wholesale Trade		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Retail Trade		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Transportation		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Total Regional Economic Impact		$4,532,626,536	$3,933,072,761	$3,333,518,987	$2,883,853,656	$2,284,299,881	$1,684,746,107	$1,175,125,398	$575,571,624	$324,958,146	$134,300,046	$0
Market Price Effect		$82,369,314	$116,127,229	$149,885,144	$175,203,581	$208,961,496	$242,719,412	$271,413,640	$305,171,555	$319,282,364	$330,017,381	$337,579,154
Total Economic Impact		**$4,614,995,850**	**$4,049,199,990**	**$3,483,404,131**	**$3,059,057,237**	**$2,493,261,377**	**$1,927,465,518**	**$1,446,539,038**	**$880,743,179**	**$644,240,510**	**$464,317,426**	**$337,579,154**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments (including imports) that could be considered in compliance with the Phase 2 limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products, where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis. The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the folloiwng variables (each based on 2005 data): shipments by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due strictly to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis.

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*	*0%*
Rate of Substitution to Imports	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*14%*	*8%*	*0%*

Combined Estimates of Regional Economic Impacts Associated with the Proposed Phase II CARB Ruling, by End-Use Application and Based on Varying Levels of Compliance

	22%	**32%**	**42%**	**50%**	**60%**	**70%**	**79%**	**88%**	**93%**	**98%**	**100%**
Total Regional Economic Impact	$15,016,424,400	$13,112,915,667	$11,209,406,934	$9,781,775,385	$7,878,266,652	$5,974,757,919	$4,161,182,253	$2,453,266,763	$1,374,641,887	$355,972,388	$0
Market Price Effect	$195,306,818	$286,685,908	$378,064,999	$446,599,317	$537,978,408	$629,357,499	$715,672,903	$798,408,817	$849,109,072	$896,433,536	$913,790,909
Total Economic Impact	**$15,211,731,218**	**$13,399,601,576**	**$11,587,471,934**	**$10,228,374,702**	**$8,416,245,060**	**$6,604,115,418**	**$4,876,855,155**	**$3,251,675,581**	**$2,223,750,960**	**$1,252,405,924**	**$913,790,909**

Analysis of Potential Negative Economic Impacts to End-Users of Particleboard and MDF Under Proposed Phase II CARB Ruling
Impact in California of a 30% Particleboard and 40% MDF Cost Increase

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST PARTICLEBOARD SUBSTRATE SHIPMENTS INTO CALIFORNIA, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped into California that Meet the Phase II Emission Level*										
Particleboard Downstream Applications	**Market Price Effect****	**20%**	**30%**	**40%**	**47%**	**57%**	**67%**	**77%**	**86%**	**92%**	**98%**	**100%**
Cabinets and Vanities	$25,047,618	$263,567,541	$230,785,508	$198,003,476	$173,416,952	$140,634,919	$107,852,887	$75,070,854	$47,206,127	$26,389,536	$5,572,946	$0
Prefinished Paneling	$983,989	$128,174,845	$112,232,700	$96,290,555	$84,333,947	$68,391,802	$52,449,657	$36,507,512	$22,956,689	$12,833,427	$2,710,165	$0
Door Components	$4,665,507	$236,729,861	$207,285,848	$177,841,836	$155,758,826	$126,314,814	$96,870,801	$67,426,789	$42,399,378	$23,702,430	$5,005,482	$0
Household Furniture	$54,215,747	$138,525,609	$121,296,055	$104,066,502	$91,144,337	$73,914,784	$56,685,230	$39,455,677	$24,810,557	$13,869,790	$2,929,024	$0
Shelving	$2,281,869	$38,443,802	$33,662,235	$28,880,667	$25,294,492	$20,512,924	$15,731,357	$10,949,789	$6,885,457	$3,849,162	$812,866	$0
Other	$9,674,418	$45,911,303	$40,200,942	$34,490,581	$30,207,810	$24,497,449	$18,787,088	$13,076,727	$8,222,920	$4,596,841	$970,761	$0
Underlayment	$1,179,798	$10,759,283	$9,421,063	$8,082,844	$7,079,180	$5,740,961	$4,402,741	$3,064,522	$1,927,036	$1,077,266	$227,497	$0
Counter Tops	$3,692,519	$20,134,523	$17,630,229	$15,125,935	$13,247,715	$10,743,421	$8,239,127	$5,734,833	$3,606,183	$2,015,957	$425,730	$0
Office Furniture	$10,677,759	$28,840,396	$25,253,282	$21,666,168	$18,975,833	$15,388,719	$11,801,605	$8,214,491	$5,165,444	$2,887,627	$609,809	$0
Electronic Cabinets	$204,820	$10,658,523	$9,332,836	$8,007,149	$7,012,884	$5,687,197	$4,361,510	$3,035,823	$1,908,989	$1,067,178	$225,367	$0
Store Fixtures	$9,118,276	$4,823,208	$4,223,307	$3,623,405	$3,173,479	$2,573,578	$1,973,676	$1,373,775	$863,858	$482,921	$101,983	$0
Moulding	$175,244	$547,324	$479,249	$411,174	$360,118	$292,042	$223,967	$155,892	$98,028	$54,801	$11,573	$0
Millwork	$56,776	$177,322	$155,267	$133,212	$116,671	$94,616	$72,561	$50,506	$31,759	$17,754	$3,749	$0
Retail	$11,594	$36,068	$31,582	$27,096	$23,732	$19,245	$14,759	$10,273	$6,460	$3,611	$763	$0
IMPORTS	$1,262,283											
Wholesale Trade		$77,346,556	$67,726,338	$58,106,119	$50,890,955	$41,270,737	$31,650,519	$22,030,300	$13,853,115	$7,744,276	$1,635,437	$0
Retail Trade		$81,978,472	$71,782,145	$61,585,817	$53,938,572	$43,742,245	$33,545,917	$23,349,590	$14,682,711	$8,208,044	$1,733,376	$0
Transportation		$79,961,405	$70,015,957	$60,070,508	$52,611,422	$42,665,974	$32,720,525	$22,775,077	$14,321,446	$8,006,086	$1,690,726	$0
Total Regional Economic Impact		$1,166,616,042	$1,021,514,544	$876,413,047	$767,586,923	$622,485,425	$477,383,928	$332,282,430	$208,946,157	$116,806,706	$24,667,255	$0
Market Price Effect		$24,156,651	$36,481,473	$48,806,295	$58,049,911	$70,374,733	$82,699,555	$95,024,377	$105,500,475	$113,326,737	$121,152,999	$123,248,219
Total Economic Impact		**$1,190,772,693**	**$1,057,996,017**	**$925,219,341**	**$825,636,834**	**$692,860,158**	**$560,083,483**	**$427,306,807**	**$314,446,632**	**$230,133,443**	**$145,820,254**	**$123,248,219**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments into California (including imports) that could be considered in compliance with the Phase 2, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products**where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regiona inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the followinq variables (each based on 2005 data): shipments into California by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier. Note that we do not assume final regional demand for each finished product decreases with the decline in regional manufacturing, instead, this demand is satisfied through finished products manufactured elsewhere and then shipped into California.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due strictly to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis. Regarding the second aforementioned caveat, if shipments of composite panels to CA based secondary manufacturers decline, as is assumed in the second segment of this analysis (i.e., the results to the

Assumptions Used to Estimate Values Above												
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*
Rate of Substitution to Imports	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*11%*	*7%*	*0%*

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST MDF SUBSTRATE SHIPMENTS INTO CALIFORNIA, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped into California that Meet the Phase II Emission Level*										
MDF Downstream Applications	**Market Price Effect****	**24%**	**34%**	**44%**	**52%**	**62%**	**72%**	**80%**	**90%**	**95%**	**98%**	**100%**
Moulding	$26,143,797	$104,910,108	$91,033,110	$77,156,111	$66,748,363	$52,871,364	$38,994,366	$27,198,917	$13,321,919	$7,521,333	$3,108,448	$0
Millwork	$15,196,784	$60,981,818	$52,915,440	$44,849,062	$38,799,279	$30,732,901	$22,666,522	$15,810,101	$7,743,723	$4,371,977	$1,806,869	$0
Cabinets and Vanities	$10,375,784	$140,279,493	$121,724,004	$103,168,516	$89,251,900	$70,696,411	$52,140,923	$36,368,757	$17,813,269	$10,057,075	$4,156,429	$0
Prefinished Paneling	$394,883	$66,088,912	$57,346,993	$48,605,073	$42,048,633	$33,306,714	$24,564,794	$17,134,162	$8,392,243	$4,738,120	$1,958,190	$0
Household Furniture	$45,271,209	$148,619,058	$128,960,452	$109,301,847	$94,557,893	$74,899,287	$55,240,682	$38,530,867	$18,872,261	$10,654,964	$4,403,528	$0
Store Fixtures	$37,183,218	$25,270,745	$21,928,054	$18,585,363	$16,078,344	$12,735,653	$9,392,962	$6,551,675	$3,208,984	$1,811,739	$748,763	$0
Retail	$1,574,084	$6,291,654	$5,459,425	$4,627,196	$4,003,024	$3,170,794	$2,338,565	$1,631,170	$798,940	$451,068	$186,419	$0
Other	$1,375,823	$8,388,900	$7,279,257	$6,169,614	$5,337,382	$4,227,739	$3,118,096	$2,174,900	$1,065,257	$601,426	$248,560	$0
Counter Tops	$603,646	$4,229,108	$3,669,702	$3,110,297	$2,690,742	$2,131,336	$1,571,930	$1,096,435	$537,030	$303,198	$125,307	$0
Electronic Cabinets	$55,750	$3,727,521	$3,234,463	$2,741,405	$2,371,611	$1,878,552	$1,385,494	$966,394	$473,336	$267,238	$110,445	$0
Shelving	$111,765	$2,419,292	$2,099,280	$1,779,268	$1,539,259	$1,219,246	$899,234	$627,224	$307,212	$173,447	$71,683	$0
Underlayment	$20,331	$238,227	$206,716	$175,204	$151,570	$120,059	$88,547	$61,763	$30,251	$17,079	$7,059	$0
Office Furniture	$112,754	$391,292	$339,534	$287,776	$248,957	$197,199	$145,441	$101,446	$49,688	$28,053	$11,594	$0
Door Components	$2,099	$136,824	$118,725	$100,627	$87,053	$68,955	$50,856	$35,473	$17,374	$9,809	$4,054	$0
IMPORTS	$3,996,236											
Wholesale Trade		$45,598,771	$39,567,187	$33,535,604	$29,011,916	$22,980,333	$16,948,749	$11,821,903	$5,790,320	$3,269,118	$1,351,075	$0
Retail Trade		$48,329,463	$41,936,677	$35,543,891	$30,749,301	$24,356,515	$17,963,729	$12,529,861	$6,137,075	$3,464,890	$1,431,984	$0
Transportation		$47,140,325	$40,904,832	$34,669,339	$29,992,720	$23,757,227	$17,521,734	$12,221,566	$5,986,073	$3,379,637	$1,396,750	$0
Total Regional Economic Impact		$571,972,954	$496,315,156	$420,657,358	$363,914,009	$288,256,211	$212,598,413	$148,289,284	$72,631,486	$41,006,527	$16,947,347	$0
Market Price Effect		$34,750,032	$48,991,848	$63,233,664	$73,915,027	$88,156,843	$102,398,659	$114,504,203	$128,746,019	$134,699,099	$139,227,996	$142,418,163
Total Economic Impact		**$606,722,986**	**$545,307,004**	**$483,891,022**	**$437,829,036**	**$376,413,054**	**$314,997,072**	**$262,793,487**	**$201,377,506**	**$175,705,625**	**$156,175,343**	**$142,418,163**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments into California (including imports) that could be considered in compliance with the 0.05 ppm ceiling, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products**where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the followinq variables (each based on 2005 data): shipments into California by secondary manufacturing type, production costs (including MDF sales average of $415/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier. Note that we do not assume final regional demand for each finished product decreases with the decline in regional manufacturing, instead, this demand is satisfied through finished products manufactured elsewhere and then shipped into California.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with MDF. The increased market prices are due strictly to the higher costs MDF manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new MDF production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis. Regarding the second aforementioned caveat, if shipments of composite panels to CA based secondary manufacturers decline, as is assumed in the second segment of this analysis (i.e., the results to the immediate right of the Marke

Assumptions Used to Estimate Values Above												
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*	*0%*
Rate of Substitution to Imports	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*14%*	*8%*	*0%*

Combined Estimates of Regional Economic Impacts Associated with the Proposed Phase II CARB Ruling, by End-Use Application and Based on Varying Levels of Compliance

	22%	**32%**	**42%**	**50%**	**60%**	**70%**	**79%**	**88%**	**93%**	**98%**	**100%**
Total Regional Economic Impact	$1,738,588,996	$1,517,829,700	$1,297,070,404	$1,131,500,932	$910,741,636	$689,982,340	$480,571,714	$281,577,643	$157,813,232	$41,614,601	$0
Market Price Effect	$58,906,683	$85,473,321	$112,039,959	$131,964,938	$158,531,576	$185,098,214	$209,528,580	$234,246,495	$248,025,836	$260,380,995	$265,666,382
Total Economic Impact	**$1,797,495,679**	**$1,603,303,021**	**$1,409,110,363**	**$1,263,465,870**	**$1,069,273,212**	**$875,080,554**	**$690,100,294**	**$515,824,138**	**$405,839,068**	**$301,995,597**	**$265,666,382**

Analysis of Potential Negative Economic Impacts to End-Users of Particleboard and MDF Under Proposed Phase II CARB Ruling
Economic Impact Nationally of a 20% Particleboard and an 18% MDF Cost Increase

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST PARTICLEBOARD SUBSTRATE SHIPMENTS NATIONALLY, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped Nationally that Meet the Phase II Emission Level									
Particleboard Downstream Applications	**Market Price Effect****	**20%**	**30%**	**40%**	**47%**	**57%**	**67%**	**77%**	**86%**	**92%**	**98%**	**100%**
Cabinets and Vanities	$126,015,579	$986,230,190	$863,564,743	$740,899,297	$648,900,212	$526,234,765	$403,569,319	$280,903,872	$176,638,243	$98,745,684	$20,853,126	$0
Prefinished Paneling	$9,502,914	$160,875,278	$140,865,915	$120,856,552	$105,849,530	$85,840,167	$65,830,804	$45,821,441	$28,813,483	$16,107,537	$3,401,592	$0
Door Components	$24,371,899	$1,169,130,663	$1,023,716,402	$878,302,140	$769,241,444	$623,827,182	$478,412,921	$332,998,659	$209,396,537	$117,058,481	$24,720,424	$0
Household Furniture	$90,745,837	$2,580,923,523	$2,259,913,134	$1,938,902,746	$1,698,144,955	$1,377,134,566	$1,056,124,178	$735,113,789	$462,254,959	$258,413,363	$54,571,766	$0
Shelving	$17,107,709	$341,648,049	$299,154,510	$256,660,972	$224,790,818	$182,297,280	$139,803,741	$97,310,203	$61,190,695	$34,207,298	$7,223,902	$0
Other	$53,495,513	$851,072,617	$745,217,814	$639,363,011	$559,971,908	$454,117,105	$348,262,302	$242,407,499	$152,430,916	$85,213,116	$17,995,317	$0
Underlayment	$9,678,896	$69,632,092	$60,971,384	$52,310,676	$45,815,145	$37,154,437	$28,493,729	$19,833,021	$12,471,419	$6,971,870	$1,472,320	$0
Counter Tops	$18,691,940	$374,925,559	$328,293,027	$281,660,495	$246,686,095	$200,053,563	$153,421,031	$106,788,499	$67,150,846	$37,539,188	$7,927,530	$0
Office Furniture	$38,652,547	$1,775,589,879	$1,554,745,367	$1,333,900,854	$1,168,267,470	$947,422,958	$726,578,445	$505,733,933	$318,016,098	$177,779,832	$37,543,567	$0
Electronic Cabinets	$1,156,552	$19,178,617	$16,793,217	$14,407,817	$12,618,767	$10,233,367	$7,847,967	$5,462,566	$3,434,976	$1,920,247	$405,518	$0
Store Fixtures	$17,804,520	$340,244,913	$297,925,894	$255,606,875	$223,867,611	$181,548,592	$139,229,573	$96,910,554	$60,939,387	$34,066,810	$7,194,233	$0
Moulding	$174,840	$1,187,707	$1,039,982	$892,257	$781,464	$633,739	$486,014	$338,290	$212,724	$118,918	$25,113	$0
Millwork	$6,154,960	$41,811,214	$36,610,814	$31,410,414	$27,510,114	$22,309,715	$17,109,315	$11,908,915	$7,488,576	$4,186,322	$884,068	$0
Retail	$2,927,281	$15,925,816	$13,944,993	$11,964,170	$10,478,553	$8,497,730	$6,516,907	$4,536,084	$2,852,385	$1,594,562	$336,740	$0
IMPORTS	$2,664,452											
Wholesale Trade		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Retail Trade		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Transportation		$585,140,583	$512,361,903	$439,583,224	$384,999,214	$312,220,535	$239,441,855	$166,663,176	$104,801,298	$58,586,837	$12,372,376	$0
Total Regional Economic Impact		$10,483,797,864	$9,179,842,906	$7,875,887,948	$6,897,921,729	$5,593,966,771	$4,290,011,813	$2,986,056,854	$1,877,695,140	$1,049,683,741	$221,672,343	$0
Market Price Effect		$82,152,506	$124,067,050	$165,981,594	$197,417,502	$239,332,046	$281,246,590	$323,161,134	$358,788,497	$385,404,232	$412,019,967	$419,145,440
Total Economic Impact		**$10,565,950,370**	**$9,303,909,956**	**$8,041,869,542**	**$7,095,339,231**	**$5,833,298,817**	**$4,571,258,403**	**$3,309,217,988**	**$2,236,483,636**	**$1,435,087,973**	**$633,692,310**	**$419,145,440**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments (including imports) that could be considered in compliance with the Phase 2 limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products, where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis. The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the folloiwng variables (each based on 2005 data): shipments by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due strictly to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis.

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*
Rate of Substitution to Imports	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*11%*	*7%*	*0%*

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST MDF SUBSTRATE SHIPMENTS NATIONALLY, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped Nationally that Meet the Phase II Emission Level*									
MDF Downstream Applications	**Market Price Effect****	**24%**	**34%**	**44%**	**52%**	**62%**	**72%**	**80%**	**90%**	**95%**	**98%**	**100%**
Moulding	$31,776,449	$325,834,562	$282,734,752	$239,634,943	$207,310,085	$164,210,275	$121,110,466	$84,475,627	$41,375,817	$23,360,097	$9,654,357	$0
Millwork	$24,348,248	$249,666,057	$216,641,446	$183,616,835	$158,848,377	$125,823,767	$92,799,156	$64,728,237	$31,703,626	$17,899,339	$7,397,513	$0
Cabinets and Vanities	$26,541,054	$313,542,511	$272,068,634	$230,594,757	$199,489,349	$158,015,472	$116,541,595	$81,288,799	$39,814,922	$22,478,841	$9,290,148	$0
Prefinished Paneling	$7,629,492	$194,963,063	$169,174,298	$143,385,533	$124,043,959	$98,255,194	$72,466,429	$50,545,979	$24,757,214	$13,977,511	$5,776,683	$0
Household Furniture	$31,970,804	$1,372,543,755	$1,190,990,349	$1,009,436,942	$873,271,887	$691,718,480	$510,165,073	$355,844,677	$174,291,271	$98,401,946	$40,667,963	$0
Store Fixtures	$8,776,824	$253,176,261	$219,687,337	$186,198,414	$161,081,721	$127,592,798	$94,103,875	$65,638,290	$32,149,366	$18,150,996	$7,501,519	$0
Retail	$6,013,213	$49,381,922	$42,849,922	$36,317,922	$31,418,921	$24,886,921	$18,354,921	$12,802,721	$6,270,720	$3,540,344	$1,463,168	$0
Other	$22,560,987	$541,790,713	$470,125,275	$398,459,836	$344,710,758	$273,045,320	$201,379,881	$140,464,259	$68,798,821	$38,842,668	$16,053,058	$0
Counter Tops	$1,203,532	$36,439,512	$31,619,470	$26,799,429	$23,184,398	$18,364,357	$13,544,316	$9,447,281	$4,627,240	$2,612,462	$1,079,689	$0
Electronic Cabinets	$1,147,895	$28,732,832	$24,932,193	$21,131,554	$18,281,074	$14,480,435	$10,679,796	$7,449,253	$3,648,614	$2,059,946	$851,343	$0
Shelving	$1,276,831	$38,489,723	$33,398,490	$28,307,257	$24,488,832	$19,397,599	$14,306,365	$9,978,817	$4,887,584	$2,759,448	$1,140,436	$0
Underlayment	$111,261	$1,208,232	$1,048,413	$888,594	$768,730	$608,911	$449,092	$313,245	$153,426	$86,622	$35,799	$0
Office Furniture	$4,245,303	$294,372,633	$255,434,454	$216,496,275	$187,292,641	$148,354,462	$109,416,283	$76,318,831	$37,380,652	$21,104,493	$8,722,152	$0
Door Components	$11,496,838	$832,484,760	$722,367,728	$612,250,696	$529,662,923	$419,545,891	$309,428,859	$215,829,382	$105,712,350	$59,683,431	$24,666,215	$0
IMPORTS	$6,166,965											
Wholesale Trade		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Retail Trade		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Transportation		$344,962,886	$299,332,874	$253,702,863	$219,480,355	$173,850,343	$128,220,332	$89,434,822	$43,804,811	$24,731,466	$10,221,123	$0
Total Regional Economic Impact		$4,532,626,536	$3,933,072,761	$3,333,518,987	$2,883,853,656	$2,284,299,881	$1,684,746,107	$1,175,125,398	$575,571,624	$324,958,146	$134,300,046	$0
Market Price Effect		$45,204,830	$63,731,400	$82,257,969	$96,152,897	$114,679,466	$133,206,036	$148,953,620	$167,480,190	$175,224,296	$181,115,745	$185,265,697
Total Economic Impact		**$4,577,831,366**	**$3,996,804,161**	**$3,415,776,956**	**$2,980,006,552**	**$2,398,979,348**	**$1,817,952,143**	**$1,324,079,018**	**$743,051,813**	**$500,182,442**	**$315,415,791**	**$185,265,697**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments (including imports) that could be considered in compliance with the Phase 2 limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products, where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis. The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the folloiwng variables (each based on 2005 data): shipments by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due strictly to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis.

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*	*0%*
Rate of Substitution to Imports	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*14%*	*8%*	*0%*

Combined Estimates of Regional Economic Impacts Associated with the Proposed Phase II CARB Ruling, by End-Use Application and Based on Varying Levels of Compliance

	22%	**32%**	**42%**	**50%**	**60%**	**70%**	**79%**	**88%**	**93%**	**98%**	**100%**
Total Regional Economic Impact	$15,016,424,400	$13,112,915,667	$11,209,406,934	$9,781,775,385	$7,878,266,652	$5,974,757,919	$4,161,182,253	$2,453,266,763	$1,374,641,887	$355,972,388	$0
Market Price Effect	$127,357,336	$187,798,450	$248,239,564	$293,570,399	$354,011,512	$414,452,626	$472,114,754	$526,268,686	$560,628,528	$593,135,712	$604,411,137
Total Economic Impact	**$15,143,781,736**	**$13,300,714,117**	**$11,457,646,498**	**$10,075,345,784**	**$8,232,278,164**	**$6,389,210,545**	**$4,633,297,007**	**$2,979,535,450**	**$1,935,270,415**	**$949,108,101**	**$604,411,137**

Analysis of Potential Negative Economic Impacts to End-Users of Particleboard and MDF Under Proposed Phase II CARB Ruling
Economic Impact in California of a 20% Particleboard and an 18% MDF Cost Increase

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST PARTICLEBOARD SUBSTRATE SHIPMENTS INTO CALIFORNIA, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped into California that Meet the Phase II Emission Level*										
Particleboard Downstream Applications	**Market Price Effect****	**20%**	**30%**	**40%**	**47%**	**57%**	**67%**	**77%**	**86%**	**92%**	**98%**	**100%**
Cabinets and Vanities	$17,127,853	$263,567,541	$230,785,508	$198,003,476	$173,416,952	$140,634,919	$107,852,887	$75,070,854	$47,206,127	$26,389,536	$5,572,946	$0
Prefinished Paneling	$672,863	$128,174,845	$112,232,700	$96,290,555	$84,333,947	$68,391,802	$52,449,657	$36,507,512	$22,956,689	$12,833,427	$2,710,165	$0
Door Components	$3,190,328	$236,729,861	$207,285,848	$177,841,836	$155,758,826	$126,314,814	$96,870,801	$67,426,789	$42,399,378	$23,702,430	$5,005,482	$0
Household Furniture	$37,073,359	$138,525,609	$121,296,055	$104,066,502	$91,144,337	$73,914,784	$56,685,230	$39,455,677	$24,810,557	$13,869,790	$2,929,024	$0
Shelving	$1,560,369	$38,443,802	$33,662,235	$28,880,667	$25,294,492	$20,512,924	$15,731,357	$10,949,789	$6,885,457	$3,849,162	$812,866	$0
Other	$6,615,480	$45,911,303	$40,200,942	$34,490,581	$30,207,810	$24,497,449	$18,787,088	$13,076,727	$8,222,920	$4,596,841	$970,761	$0
Underlayment	$806,760	$10,759,283	$9,421,063	$8,082,844	$7,079,180	$5,740,961	$4,402,741	$3,064,522	$1,927,036	$1,077,266	$227,497	$0
Counter Tops	$2,524,988	$20,134,523	$17,630,229	$15,125,935	$13,247,715	$10,743,421	$8,239,127	$5,734,833	$3,606,183	$2,015,957	$425,730	$0
Office Furniture	$7,301,576	$28,840,396	$25,253,282	$21,666,168	$18,975,833	$15,388,719	$11,801,605	$8,214,491	$5,165,444	$2,887,627	$609,809	$0
Electronic Cabinets	$140,058	$10,658,523	$9,332,836	$8,007,149	$7,012,884	$5,687,197	$4,361,510	$3,035,823	$1,908,989	$1,067,178	$225,367	$0
Store Fixtures	$6,235,183	$4,823,208	$4,223,307	$3,623,405	$3,173,479	$2,573,578	$1,973,676	$1,373,775	$863,858	$482,921	$101,983	$0
Moulding	$119,834	$547,324	$479,249	$411,174	$360,118	$292,042	$223,967	$155,892	$98,028	$54,801	$11,573	$0
Millwork	$38,824	$177,322	$155,267	$133,212	$116,671	$94,616	$72,561	$50,506	$31,759	$17,754	$3,749	$0
Retail	$7,928	$36,068	$31,582	$27,096	$23,732	$19,245	$14,759	$10,273	$6,460	$3,611	$763	$0
IMPORTS	$863,164											
Wholesale Trade		$77,346,556	$67,726,338	$58,106,119	$50,890,955	$41,270,737	$31,650,519	$22,030,300	$13,853,115	$7,744,276	$1,635,437	$0
Retail Trade		$81,978,472	$71,782,145	$61,585,817	$53,938,572	$43,742,245	$33,545,917	$23,349,590	$14,682,711	$8,208,044	$1,733,376	$0
Transportation		$79,961,405	$70,015,957	$60,070,508	$52,611,422	$42,665,974	$32,720,525	$22,775,077	$14,321,446	$8,006,086	$1,690,726	$0
Total Regional Economic Impact		$1,166,616,042	$1,021,514,544	$876,413,047	$767,586,923	$622,485,425	$477,383,928	$332,282,430	$208,946,157	$116,806,706	$24,667,255	$0
Market Price Effect		$16,518,599	$24,946,456	$33,374,312	$39,695,205	$48,123,062	$56,550,918	$64,978,775	$72,142,453	$77,494,142	$82,845,831	$84,278,567
Total Economic Impact		**$1,183,134,641**	**$1,046,461,000**	**$909,787,359**	**$807,282,128**	**$670,608,487**	**$533,934,846**	**$397,261,205**	**$281,088,610**	**$194,300,848**	**$107,513,086**	**$84,278,567**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments into California (including imports) that could be considered in compliance with the 0.05 ppm cieling, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products**where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the followng variables (each based on 2005 data): shipments into California by secondary manufacturing type, production costs (including particleboard sales average of $280/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier. Note that we do not assume final regional demand for each finished product decreases with the decline in regional manufacturing, instead, this demand is satisfied through finished products manufactured elsewhere and then shipped into California.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with particleboard. The increased market prices are due stricty to the higher costs particleboard manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new particleobard production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis. Regarding the second aforementioned caveat, if shipments of composite panels to CA based secondary manufacturers decline, as is assumed in the second segment of this analysis (i.e., the results to the

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*
Rate of Substitution to Imports	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*11%*	*7%*	*0%*

Assumes PHASE II

ESTIMATES OF REGIONAL ECONOMIC IMPACTS OF LOST MDF SUBSTRATE SHIPMENTS INTO CALIFORNIA, BY END-USE APPLICATION AND BASED ON VARYING LEVELS OF COMPLIANCE

		Regional Economic Impact ($) for Each Total Percent of Panels Shipped into California that Meet the Phase II Emission Level*										
MDF Downstream Applications	**Market Price Effect****	**24%**	**34%**	**44%**	**52%**	**62%**	**72%**	**80%**	**90%**	**95%**	**98%**	**100%**
Moulding	$12,828,255	$104,910,108	$91,033,110	$77,156,111	$66,748,363	$52,871,364	$38,994,366	$27,198,917	$13,321,919	$7,521,333	$3,108,448	$0
Millwork	$7,456,768	$60,981,818	$52,915,440	$44,849,062	$38,799,279	$30,732,901	$22,666,522	$15,810,101	$7,743,723	$4,371,977	$1,806,869	$0
Cabinets and Vanities	$5,091,196	$140,279,493	$121,724,004	$103,168,516	$89,251,900	$70,696,411	$52,140,923	$36,368,757	$17,813,269	$10,057,075	$4,156,429	$0
Prefinished Paneling	$193,761	$66,088,912	$57,346,993	$48,605,073	$42,048,633	$33,306,714	$24,564,794	$17,134,162	$8,392,243	$4,738,120	$1,958,190	$0
Household Furniture	$22,213,706	$148,619,058	$128,960,452	$109,301,847	$94,557,893	$74,899,287	$55,240,682	$38,530,867	$18,872,261	$10,654,964	$4,403,528	$0
Store Fixtures	$18,245,086	$25,270,745	$21,928,054	$18,585,363	$16,078,344	$12,735,653	$9,392,962	$6,551,675	$3,208,984	$1,811,739	$748,763	$0
Retail	$772,373	$6,291,654	$5,459,425	$4,627,196	$4,003,024	$3,170,794	$2,338,565	$1,631,170	$798,940	$451,068	$186,419	$0
Other	$675,090	$8,388,900	$7,279,257	$6,169,614	$5,337,382	$4,227,739	$3,118,096	$2,174,900	$1,065,257	$601,426	$248,560	$0
Counter Tops	$296,197	$4,229,108	$3,669,702	$3,110,297	$2,690,742	$2,131,336	$1,571,930	$1,096,435	$537,030	$303,198	$125,307	$0
Electronic Cabinets	$27,356	$3,727,521	$3,234,463	$2,741,405	$2,371,611	$1,878,552	$1,385,494	$966,394	$473,336	$267,238	$110,445	$0
Shelving	$54,841	$2,419,292	$2,099,280	$1,779,268	$1,539,259	$1,219,246	$899,234	$627,224	$307,212	$173,447	$71,683	$0
Underlayment	$9,976	$238,227	$206,716	$175,204	$151,570	$120,059	$88,547	$61,763	$30,251	$17,079	$7,059	$0
Office Furniture	$55,326	$391,292	$339,534	$287,776	$248,957	$197,199	$145,441	$101,446	$49,688	$28,053	$11,594	$0
Door Components	$1,030	$136,824	$118,725	$100,627	$87,053	$68,955	$50,856	$35,473	$17,374	$9,809	$4,054	$0
IMPORTS	$1,960,876											
Wholesale Trade		$45,598,771	$39,567,187	$33,535,604	$29,011,916	$22,980,333	$16,948,749	$11,821,903	$5,790,320	$3,269,118	$1,351,075	$0
Retail Trade		$48,329,463	$41,936,677	$35,543,891	$30,749,301	$24,356,515	$17,963,729	$12,529,861	$6,137,075	$3,464,890	$1,431,984	$0
Transportation		$47,140,325	$40,904,832	$34,669,339	$29,992,720	$23,757,227	$17,521,734	$12,221,566	$5,986,073	$3,379,637	$1,396,750	$0
Total Regional Economic Impact		$571,972,954	$496,315,156	$420,657,358	$363,914,009	$288,256,211	$212,598,413	$148,289,284	$72,631,486	$41,006,527	$16,947,347	$0
Market Price Effect		$17,051,168	$24,039,352	$31,027,535	$36,268,673	$43,256,857	$50,245,040	$56,184,996	$63,173,180	$66,094,241	$68,316,483	$69,881,836
Total Economic Impact		**$589,024,122**	**$520,354,508**	**$451,684,893**	**$400,182,682**	**$331,513,068**	**$262,843,453**	**$204,474,281**	**$135,804,666**	**$107,100,767**	**$85,263,830**	**$69,881,836**

* The primary assumption underlying the above economic values is that for any value less than 100% of current shipments into California (including imports) that could be considered in compliance with the Phase 2 Limit, there is a resultant decline in economic activity of regional secondary manufacturing facilities. The decline would occur because the facilities are not able to procure the raw panels necessary to produce and then sell their finished products**where the term "neccessary" implies that the secondary manufacturer has no other viable alternative already not accounted for in this analysis** The extent of the decline in regional inter-industry activity is captured by decreased production costs. The decline in production costs at the secondary manufacturing facilities and corresponding reduction in regional economic activity is computed as the product of the followng variables (each based on 2005 data): shipments into California by secondary manufacturing type, production costs (including MDF sales average of $415/MSF), total percent value of compliant panel shipments (which includes marginal rates of substitution to imports and alternative substrates) and corresponding RIMS II multiplier. Note that we do not assume final regional demand for each finished product decreases with the decline in regional manufacturing, instead, this demand is satisfied through finished products manufactured elsewhere and then shipped into California.

** The Market Price Effect captures the marginal increase in market price that consumers must pay for finished products made with MDF. The increased market prices are due stricty to the higher costs MDF manufacturers incur in the production of panels that are compliant with the Phase II emission levels. These costs are then passed on to secondary manufacturers, which then pass the costs unto the consumer. Refer to the attached "Primary Cost Table" for the new MDF production cost structure. The estimated market price effect is based on the assumption that demand for each downstream application remains constant between 2005 and implementation of Phase II. This assumption implicitly assumes that consumer purchases of each downstream product does not increase, which is a extremely conservative given the year over year increases recorded by each secondary manufacturer. On the other hand, the assumption implicitly assumes that purchases do not decline due to shortages in the supply of raw PB/MDF and thus shortages in the supply of finished downstream products. Also, the assumption implicitly assumes that purchases do not decline due to higher market prices. However, given the limited number of viable substitutes to these 12 finished products, it is highly unlikely that this last caveat to the assumption of constancy would impact the analysis. Regarding the second aforementioned caveat, if shipments of composite panels to CA based secondary manufacturers decline, as is assumed in the second segment of this analysis (i.e., the results to the immediate right of the Marke

Assumptions Used to Estimate Values Above											
Percent of "Curent Non-Qualifying Member-Produced Panels" that is brought up to the proposed CARB Phase II Emission Levels	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Current Percent of Non-Qualifying Member-Produced Panels (at Phase II Emission Levels)	100%										
Rate of Substitution to other domestically produced products	*5%*	*5%*	*5%*	*2.5%*	*2.5%*	*2.5%*	*1%*	*1%*	*1%*	*0%*	*0%*
Rate of Substitution to Imports	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*14%*	*8%*	*0%*

Combined Estimates of Regional Economic Impacts Associated with the Proposed Phase II CARB Ruling, by End-Use Application and Based on Varying Levels of Compliance

	22%	**32%**	**42%**	**50%**	**60%**	**70%**	**79%**	**88%**	**93%**	**98%**	**100%**
Total Regional Economic Impact	$1,738,588,996	$1,517,829,700	$1,297,070,404	$1,131,500,932	$910,741,636	$689,982,340	$480,571,714	$281,577,643	$157,813,232	$41,614,601	$0
Market Price Effect	$33,569,767	$48,985,807	$64,401,848	$75,963,878	$91,379,918	$106,795,959	$121,163,771	$135,315,633	$143,588,383	$151,162,314	$154,160,403
Total Economic Impact	**$1,772,158,763**	**$1,566,815,508**	**$1,361,472,252**	**$1,207,464,810**	**$1,002,121,555**	**$796,778,299**	**$601,735,486**	**$416,893,276**	**$301,401,615**	**$192,776,916**	**$154,160,403**

Appendix B

Variability Statistics:
Large Chamber Statistics 2001-2006
Coefficient of Variability Numbers

Product	1	2	3	4	5	6	7	8
N	67	50	9	14	52	20	91	30
Average	0.19	0.17	0.23	0.11	0.17	0.04	0.19	0.18
Std. Deviation	0.049	0.046	0.075	0.020	0.056	0.011	0.061	0.054
COV	27%	27%	33%	18%	33%	26%	32%	30%

Note: The chart below consists of Large Char

9	10	11	12	13	14	15	16	17
21	86	42	40	50	37	22	67	16
0.15	0.17	0.17	0.20	0.20	0.20	0.13	0.13	0.19
0.030	0.047	0.039	0.071	0.052	0.073	0.022	0.039	0.049
20%	28%	24%	36%	27%	36%	17%	29%	26%

.mber Variability Statistics from the CPA Grademark Program from 2001 to 2006. The Columns in Red

18	19	20	21	22	23	24	25	26
21	25	27	13	20	12	28	81	75
0.21	0.05	0.15	0.11	0.17	0.19	0.19	0.22	0.18
0.035	0.021	0.068	0.023	0.047	0.032	0.059	0.069	0.083
17%	39%	46%	21%	27%	17%	31%	32%	45%

l are the statistics for laminated products

27	28	29	30	31	32	33	34	35
5	9	19	72	26	27	39	22	36
0.12	0.20	0.04	0.20	0.17	0.18	0.21	0.18	0.19
0.028	0.075	0.008	0.067	0.042	0.057	0.058	0.034	0.060
23%	37%	22%	33%	24%	32%	28%	18%	31%

36	37	38	39	40	41	42	43	44
22	22	38	23	20	23	35	20	43
0.14	0.24	0.15	0.23	0.16	0.16	0.16	0.06	0.18
0.036	0.042	0.043	0.054	0.031	0.047	0.053	0.028	0.061
26%	18%	29%	24%	20%	29%	32%	43%	34%

45	46	47	48	49	50	51	52	53
18	19	43	20	27	5	79	35	39
0.18	0.04	0.16	0.11	0.15	0.04	0.20	0.18	0.15
0.056	0.013	0.073	0.040	0.037	0.019	0.063	0.045	0.034
30%	34%	44%	37%	24%	47%	32%	25%	23%

54	55	56	57	58	59		
59	51	32	48	51	27	2070	Sum
0.19	0.21	0.22	0.22	0.22	0.22	0.17	Average
0.064	0.065	0.074	0.064	0.075	0.087	0.049	Average
34%	31%	33%	29%	35%	40%	30%	Average