Mr. Charles W. Parrot
Associate Deputy Administrator
USDA/AMS
1400 Independence Ave, SW
Room 2077-S, STOP 0235
Washington, DC 20250-0235

Dear Mr. Parrot:

Thank you for providing the opportunity on January 9, 2003 for hop growers to express their concerns regarding a hop marketing order to yourself, Mr. Yates, and the other AMS officials in attendance. The growers felt that it was a productive meeting, and appreciated the attention and hospitality of the group.

You might recall that during this meeting, we were asked to follow-up on two specific issues that we were unable to address with certainty at the meeting: the cost of importing German hops into the US, and estimates of the potential effect of a hop marketing order on total industry revenues. Mr. Kenneth Clayton posed both questions.

Our brief responses to and discussion of these issues is provided below. We hope that you find this information useful, and trust you will pass it along to all parties that attended the January 9 meeting (and other interested parties as you deem appropriate). Please do not hesitate to contact me if you need any additional information.

Thank you again for your time and attention.

Sincerely,

Mark Jekanowski
Vice President
Sparks Companies, Inc

Ex 31

Questions raised by USDA/AMS during January 9, 2003 meeting with hop growers opposed to a marketing order

Question 1: *What is the cost of importing foreign (e.g. German) hops into the United States relative to the price of hops produced domestically?*

Response: The use of hops in beer is related primarily to their **alpha acid** component. All hops contain some quantity of alpha acid, and generally, it is the alpha acid content that provides hops their value in the market. Of course, the characteristics of the various varieties can also be very important for the production of beers of specific tastes and aromas, hence the production of aroma varieties that have various (typically lower) compositions of alpha acid and which might be used in more specific applications. But by and large, alpha acid is a **commodity** that is extracted from hops and has the same value to the brewer regardless of where the hops were produced. This explains the trend worldwide toward the production of hops with higher alpha acid content.

The European Union is the world's largest hops producer, with production in eight member states: Belgium, Germany, Spain, France, Ireland, Austria, Portugal and the United Kingdom. Germany is the EU's largest producer, typically accounting for about 80% the EU's total production. Reflecting trends worldwide, the area under hops in the EU is on the decline, but this reduction is offset by a sharp increase in levels of alpha acid in the hops that are cultivated (reflecting improved varieties). Hence, alpha acid production is increasing despite the decline in growing area.

Traditionally, and increasingly, the EU is a net exporter of hops: 50% of EU hop exports are in the form of extract and pellets (as of 1999). The EU's main trade partner is the United States, but it also exports significant quantities to Japan, Russia and other countries.

Given the commodity nature of alpha acid and the improved methods of extraction and processing into forms that are easily transported and storable for reasonable periods of time, differences in price across countries are mainly a function of transportation costs, customs duties, and exchange rates.

For German hops entering the US, the duties and typical ocean freight charges are as follows:

Customs Duties:
Leaf hops and pellets: 8¢ per pound
Extract: 40¢ per pound

Ocean Freight:
Hamburg, Germany to Pacific Northwest, 40ft container: 10¢ per pound

Therefore, the US price of leaf hops imported from Germany, for example, would be expected on average to include about 18¢ per pound in duties and freight. As a proportion of the total cost of imported hops, the charges for duties and freight clearly decline as the price of hops rises. And, depending on market conditions these costs would be shared in some proportion between the exporting firm and the importing firm.

Question 2: *How might a hop marketing order affect* ***total industry revenues****? Could a decline in hop production lead to such a sharp rise in price that revenues are maximized to the entire industry?*

Response: The objective of the proposed hop marketing order is based almost entirely on the premise that restricting domestic market supply will support prices and result in greater revenues and profits to the hop industry in general. The proponents assert that the hop market suffers from a market supply and a market demand that are both "highly inelastic"; hence modest changes in supply create wide swings in price, so therefore by simply restricting supply by some modest amount, prices will rise considerably and revenues could be maximized. This premise is examined below in detail.

Elasticity and Total Revenue:

Total revenue is defined as price multiplied by quantity. Since these two components are inversely related, it is not always obvious how changes in price will influence total revenue. Economic theory states that if demand is elastic in the relevant range of prices, then price and total revenue vary inversely—a price increase will decrease total revenue and a price decrease will increase total revenue. On the other hand, demand that is inelastic in the relevant range of prices implies that price and total revenue vary directly—a price increase (through restricted output) will increase total revenue and vice-versa. Hence, the success by which volume controls in the hop industry could increase total revenues (ignoring for the moment how the revenues and costs are allocated across producers) depends on the degree to which demand for hops is inelastic.

Generally, products of highly specialized uses for which there are few (if any) substitutes tend to have inelastic demand. Hence, marketing order proponents point to the use of hops almost entirely as an ingredient in beer, and lack of substitutes for this use, as evidence that demand is inelastic. But, in fact, the situation is much more complicated. While overall brewer demand for hops likely is quite inelastic—since it is a necessary product for which there are no real substitutes—brewer demand for *US hops produced in a given growing season* could likely be quite elastic. This follows from the fact that in most cases there are very close substitutes for US hops produced in the current growing season: hops produced overseas, and hops produced in a previous season that remain in storage. Of course, neither one of these might be a "perfect substitute" for fresh, domestic hops, but each is becoming a better substitute as improved processing techniques allow for longer storage with minimal loss of quality, and as expanding global trade makes imports more competitive in US markets. Therefore, it is quite reasonable to expect that over time the demand for domestic hops has become less inelastic than it once was.

It is also important to note that *revenue* maximization does not necessarily imply *profit* maximization. Economic theory states that individual firms maximize profit by producing output at a level where marginal cost of production equals marginal revenue. But for the hop industry as whole (and for many individual producers in particular) the cost of alpha acid production has declined over time as varieties have improved and scale has increased.[1] Hence, the marginal cost curve for alpha acid production (and the industry supply curve) has shifted lower, allowing at least some producers to continue to earn a profit even though marginal revenue (i.e. the price of alpha acid) might be lower than what was once required to cover costs. Thus, even if restricted alpha acid production led to an increase in price sufficient to improve overall industry revenues, the lost production from low cost suppliers could increase the *average cost of production* for the industry as a whole, upsetting the profit maximizing balance that typically governs output decisions. Plus, the value of previous fixed investment in higher-yielding hop varieties is dramatically reduced when output is restricted, potentially threatening the financial viability of some firms—especially those that recently incurred substantial debt to expand production and efficiency. And, this type of quantity restriction clearly decreases future incentive to invest in higher yielding varieties that over the long run could decrease costs (and improve profits) for the entire industry.

Estimating the Effect of Supply Restriction on Hop Industry Revenue

Economists commonly estimate price and demand relationships using use historic data. The typical relationship is that quantity demanded is a function of the price of a product, and an elasticity can be estimated as the degree to which historic changes in price have led to noticeable changes in the quantity demanded (i.e. produced and purchased). However, in many agricultural markets (including hops), supply is generally fixed based on each year's level of production, so the relevant question is not how quantity produced changes with price, but rather, the price that will clear the market of the given level of supply. In other words, in this market price is a function of the available supply, and the relevant relationship to estimate is not the price elasticity, but the price *flexibility*, i.e. the percentage change in price associated with a 1 percent change in quantity, holding all other factors constant. Under most conditions, the price flexibility is approximately equal to the inverse of price elasticity. Therefore, if demand is assumed to be inelastic the estimated price flexibility coefficient will be greater than 1 in absolute value, i.e. the change in price resulting from a 1% increase in supply would be greater than 1%.

Econometric estimates of price flexibility, elasticity, or other economic phenomena are only as useful as the data from which they are estimated is relevant and accurate. It is fortunate that the hop industry and USDA collect and report substantial quantities of market and industry data, since this can be used directly to estimate historic price patterns and relationships. For this analysis, a simple model of price determination can be estimated based on historic prices of alpha acid, and domestic quantities available in the marketplace through either previous year's production or available stocks. The quantity

[1] For instance, since 1982, the US average alpha acid percentage in hops produced domestically has increased from 7.5% to 11.4% in 2001 (Hop Growers of America Statistical Report).

of beer produced by domestic manufacturers is also included to control for the possibility of changes in the demand for hops over the relevant range of time series data.

Model of Price Response

The price flexibility of hops was estimated based on the following model:

Price of Alpha = Quantity of Alpha Harvested, Alpha Stocks Available Sept 1, Beer Production

Where

Price of Alpha is calculated based on the season average (September – August) hop price, adjusted for the average alpha content of hops harvested each season (each reported by USDA). It is adjusted to control for the effect of inflation by dividing by the average GDP price deflator for the relevant four quarters that correspond to the hop marketing season (September to the following August).

Quantity of Alpha Harvested in the United States is reported by the International Hop Growers Association (and reproduced in the Hop Growers of America Statistical Report) for the years 1980 to 2001. The quantity of alpha harvested for earlier years was estimated based on total hop production and an assumed average alpha yield of 7%. In the model above, a negative relationship between the quantity of alpha harvested and the price of alpha is expected.

Alpha Stocks Available Sept. 1 was estimated based on USDA estimates of hop stocks, adjusted for the average alpha content for the previous year (the year the hops in storage were likely harvested). Since stocks on hand can be viewed as a source of supply during the current year, a negative relationship between the level of alpha stocks and alpha prices is expected.

Beer Production is reported annually in the Hop Growers of America Statistical Report. It is included here to account for changes in the demand for hops by domestic brewers, and is expected to have a positive relationship to the price of hops, all else equal.

Data from the years 1977 to 2001 was used to estimate the above model using linear regression techniques. As is standard practice in estimating demand relationships, all data was converted to logarithms, resulting in a constant price flexibility estimate over the range of available data. Therefore, the price flexibility can be interpreted directly from the coefficient estimated for the quantity of alpha.

The coefficient estimates are presented in Table 1.

Table 1. Parameter Estimates for Model of Hop Price Response, 1977-2001

R-Square: 0.52			
Variable	Parameter Estimate	Standard Error	t-value
Intercept	-13.63	27.66	-0.49
Log of Alpha Production	-0.73	0.27	-2.71*
Log of Alpha Stocks	-0.45	0.17	-2.62*
Log of Beer Production	1.40	1.55	0.90

* Statistically significant at the <5% level

Discussion

The estimates in Table 1 report the historic relationship between the quantity of alpha acid available on the market during each market season, and the price of alpha acid in the domestic market.

The proponents of a marketing order intend to restrict the production of alpha acid in order to increase its price in the market, and thereby improve industry revenues. However, the simple model estimated above suggests that this strategy is not likely to result in the desired outcome. Based on the parameter estimate for alpha production in any given year, a 1% decrease in production would likely lead to only a 0.72% increase in the domestic price of alpha acid, i.e., the price of alpha acid is relatively inflexible to the changes in quantity produced over the past 25 years. This implies that while the price of hops will likely rise in response to restricted quantities in the domestic market, total industry revenues are likely to decrease directly as a result. Hence, the mechanism would be self-defeating.

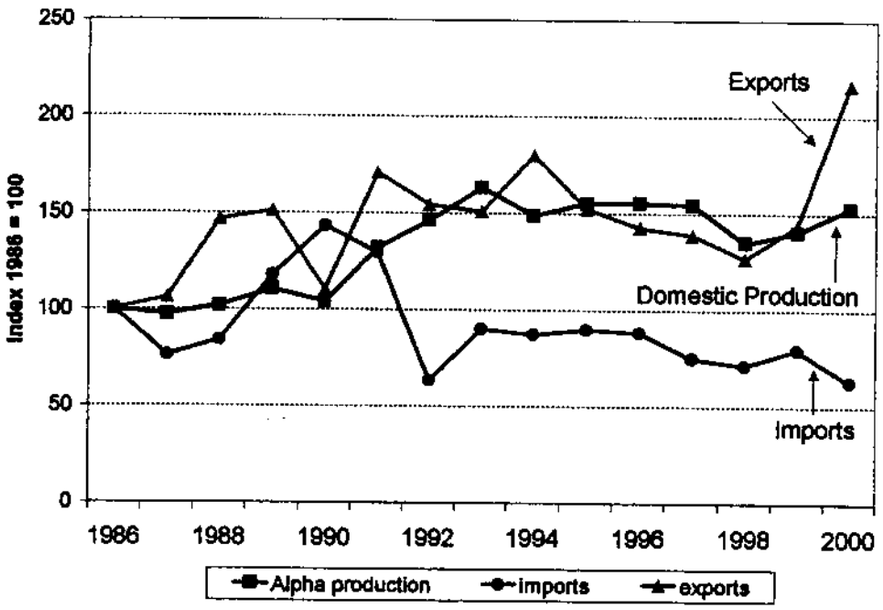
For example, for the year 2001 (the most recent year data is available), the Hop Growers of America report that 7.6 million pounds of alpha acid was produced domestically. Based on an implied alpha acid price of $16.27/lb (based on a season average hop price of $1.85), total industry revenues in 2001 were approximately $123.6 million. The estimates in Table 1 suggest that, for example, a 10% reduction in the quantity of alpha acid produced in a subsequent year would result in a rise in price equal to 7.3%. Hence, the 10% reduction in alpha production would mean 6.84 million pounds harvested, coupled with a 7.3% increase in price to $17.45, resulting in total revenues of $119.4 million—a revenue decrease of about $4 million as a result of the supply restriction.

As is always the case with econometric models, it is problematic to predict results "outside the range" of the data. Over most of the time period examined (with the exception of the period until 1986), the historic data reflects the result of a market operating with little constraint or outside interference. Imposing a marketing order would certainly create a "shock" to the system, the results of which cannot be estimated directly since a similar situation has never before occurred. While there have been marketing

orders imposed in the past, the basic market and industry structural conditions have changed over time, and never has a marketing order been based directly on alpha acid controls. Thus, predicting the effect of this marketing order—over either the short or long term—is subject to considerable uncertainty. Therefore, for gauging the likely impact of a marketing order, basic economic theory is perhaps even more important than empirical models.

Given the basic characteristics of the hop market today—especially the increased ability to store the product and the greater reliance on world markets—it is not surprising that the market price for domestic alpha acid appears by our estimates to be relatively inflexible (i.e. demand is more elastic than might be assumed). And, since domestic buyers will be aware of the intention of a marketing order to restrict supply, it would be rational for them to increase purchases of imported hops, and possibly even carry larger stocks (perhaps in the form of imports) to avoid the necessity of purchasing higher priced hops in a restricted market in the future. At the same time, foreign suppliers, which are also currently facing low prices, would view the increased demand for their hops by US buyers as a signal to increase production—an option unavailable to domestic producers.

Chart 1. Relation Between Hop Imports, Exports, and Domestic Production



The adverse effect of supply restrictions in the US on exports and imports cannot be overstated. Without a coordinated effort to restrict supply worldwide, hop growers outside the jurisdiction of the marketing order will be the primary beneficiaries of market controls in the US. Not only would hop imports be expected to increase as a result of higher domestic prices and restricted local supply, but exports would be less competitive—and less available—as well. Chart 1 illustrates the historic relationship between domestic hop production, hop imports, and hop exports. It is not surprising that

increases in US production are closely correlated with growth in exports, while imports move in the opposite direction. Restricting domestic supply through fiat can only serve to sacrifice a positive and growing trade balance, since supporting domestic prices above world levels makes imports more attractive, and exports less competitive.

And, the empirical discussion above does not even consider the impact on industry-wide costs and efficiency—especially as it relates to the need for some producers (likely the most efficient ones) to incur substantial additional costs in the form of allotment purchases only to maintain their current productive level of output. This adds an additional dead-weight loss to the industry, sacrificing efficiency over the long term and decreasing competitiveness relative to foreign producers.

Appendix: Data Used To Estimate Econometric Model

Sept-Aug.	Beer Prod. barrels	Hop Production 1000 lbs	Alpha Acid 1000 lbs	Avg. Alpha Percent	Hop stocks 1000 lbs	Alpha Stocks 1000 lbs	Price of hops $/lb	Price of Alpha $/lb	GDP deflator Sept-Aug	Real Price
1977	172,228,595	54777	3834	7	50480	3533.60	0.896	12.80	47.34	27.04
1978	171,639,479	55071	3854	7	47540	3327.80	0.898	12.83	51.18	25.07
1979	183,515,187	54929	3845	7	38200	2674.00	0.97	13.86	55.73	24.87
1980	194,086,267	75560	5302	7	32800	2296.00	1.50	21.38	61.13	34.97
1981	193,687,085	79144	5556	7	34430	2410.10	1.51	21.51	65.42	32.88
1982	194,349,406	78550	5893	7.5	47030	3292.10	1.74	23.19	68.30	33.96
1983	195,123,375	68111	5525	8.1	61080	4581.00	1.93	23.79	70.82	33.60
1984	193,021,392	56167	4718	8.4	68096	5515.78	2.10	25.00	73.16	34.17
1985	193,307,822	49713	3926	7.9	70460	5918.64	2.03	25.70	74.91	34.31
1986	196,498,984	49062	4755	9.7	70950	5605.05	1.78	18.37	76.97	23.86
1987	195,420,205	50048	4630	9.3	70630	6851.11	1.51	16.32	79.49	20.53
1988	198,024,766	54696	4850	8.9	60000	5580.00	1.40	15.79	82.55	19.13
1989	200,124,365	59326	5260	8.9	51700	4601.30	1.38	15.56	85.65	18.17
1990	203,658,410	56855	4958	8.7	51890	4618.21	1.48	16.97	88.99	19.07
1991	202,370,518	69155	6277	9.1	54200	4715.40	1.68	18.51	91.32	20.27
1992	202,107,376	74337	6953	9.4	56250	5118.75	1.74	18.60	93.50	19.90
1993	202,638,598	76144	7767	10.2	58060	5457.64	1.76	17.25	95.52	18.06
1994	202,039,109	74560	7086	9.5	63000	6426.00	1.81	19.05	97.59	19.52
1995	199,215,197	78852	7387	9.4	55900	5310.50	1.71	18.25	99.54	18.34
1996	201,050,049	74970	7396	9.9	58700	5517.80	1.65	16.73	101.48	16.48
1997	198,904,373	74872	7352	9.8	62000	6138.00	1.60	16.29	102.91	15.83
1998	198,130,339	59548	6420	10.8	55000	5390.00	1.69	15.68	104.29	15.03
1999	198,192,850	64455	6680	10.4	54000	5832.00	1.69	16.31	106.30	15.34
2000	199,012,104	67576	7283	10.7	48000	4992.00	1.87	17.35	108.90	15.93
2001	198,201,933	66832	7600	11.4	54000	5778.00	1.85	16.27	110.20	14.76

Sources: Beer Production is from US Dept. of Treasury, BATF; GDP deflator is based on Quarterly Estimates by US Dept. of Commerce; Remaining data is from Hop Growers of America, Int'l Hop Growers Association, and USDA