Remarks by the Non-Binding Price Formula Arbitrator and the Market Analyst

March 16, 2007

The following comments have been submitted by John Sackton, the Non-Binding Price Formula Arbitrator and Crab Market Analyst. This position was created as part of the binding arbitration system for crab rationalization. The Non-binding Price Formula Arbitrator and the Market Analyst is selected jointly by Harvester and Processor arbitration associations representing a majority of all quota share holders in the crab fishery.

My name is John Sackton. I have spent 30 years in the seafood industry, the last 13 as a market analyst and writer. Nine years ago I founded Seafood.com News, which is one of the most widely read daily industry news services.

I have been involved in price arbitration and market reporting for the Canadian snow crab fishery since 1998, and in 2005 I was selected by the two arbitration organizations as the first Market Analyst and Non-Binding Price Formula Arbitrator for the Bering Sea king crab, opilio, and Bairdi fisheries. In 2006, I was also selected as market analyst and non-binding price formula arbitrator for Golden king crab as well.

I have two years of experience in producing the market analyst and the non-binding price formula reports, and I would like to report to the council on some of my experience producing these reports.

There are seven specific items I would like to speak to, some of which may require council action. Not being totally familiar with the council process, I will leave it up to others to determine whether the actions requested are reasonable or not within the existing regulatory frameworks.

The seven items I want to discuss are:

1) The definition of historical share of revenue.

2) The use of data sets to determine historical share of revenue.

3) The use of simple linear regressions to produce a price table based on the historical record.

4) The interpretation of contract arbitration results by the Non-binding Price Formula arbitrator

5) The issue of creating incentives to increase the total value of crab products, through innovation, new products, market timing and inventory management.

6) A proposed procedure for soliciting more formal input from the parties into the pricing formulas.

7) Changes in the timing of the market report, especially for Opilio crab.

1. Definition of Historical Share of Revenue

The regulations governing the non-binding price formula state that the formula shall:

(A) Be based on the historical distribution of first wholesale revenues between fishermen and processors in the aggregate based on arm's length first wholesale prices and ex-vessel prices, taking into consideration the size of the harvest in each year; and

(B) Establish a price that preserves the historical division of revenues in the fishery

Although much of the task of the Non-Binding Price Formula Arbitrator is based on interpreting "historical share of revenues", the council never provided guidance as to how the historical share of revenue was to be determined.

As a result, I attempted, during the first two years of Non-binding Price arbitration reports, to address this issue.

The first year, in the summer of 2005, I determined that the COAR data available from the Alaska Dept. of Fish and Game was the best standardized public data available, and I looked at several methods of using COAR data to determine historical revenue share.

In the 2005-06 report, I used all the years for which COAR data was available, and consistent, which represented the years from 1986 to 2005 for Opilio, and from 1986 to 2004 for red king crab.

For the 2006-07 report, I received a comment from the harvesters that use of data prior to 1990, when there was an open crab fishery, was not really comparable with the historical fishery once there were license limitations. I agreed with this comment, and for the 2006-07 report I suggested the use of the years from 1990 to 2005.

This was generally acceptable to both harvesters and processors.

Subsequently, I have learned that in the discussions of the arbitration committee prior to the adoption of the rationalization program, the minutes show that in 2003, the committee provisionally agreed on the years 1994 to 2002 as "candidate" years for Opilio and BBRKC.

However, there was no further analysis done.

My recommendation is that the years 1990 to 2004 be adopted as the standard years for determining historical share of revenue, as was used in the 2006 Non-Binding Price Formula Arbitrators Report.

The reasons for adopting these years, in my view, are:

1) the years cover both high harvest and low harvest years for the major crab species.

2) the range is generally acceptable to both harvesters and processors, as evidenced by comments I have received in preparing the report.

3) In 2006 I adopted a regression analysis for determining historical share of revenue based on COAR data, and this analysis is much more robust when there are a larger, rather than smaller number of data points.

4) There is an advantage to using the same historical range for all crab species. Given the closures of BBRKC in 1994 and 1995, and the long term closure for Bering Sea Bairdi, using the range from 1990 to 2004 provides meaningful data for all species. Using a shorter time period, as looked at by the arbitration committee, provides only 8 years of BBRKC data, and only 2 years of Bering Sea Bairdi data. Further, it skews the Opilio data more towards the high harvest years.

5) Although I did reference 2005 and 2006 data, to the extent it was available in calculating historical share of revenue, in 2006, I now feel that is incorrect, since the historical share of revenue should not

include the history that has subsequently come about after rationalization. Specifically, the BBRKC fishery in the fall of 2005 was under the new system, and therefore I do not feel the year 2005 should be included in the historical data set.

It is important to remove discussion of the historical range of years used for determining revenue share from the annual battle over crab prices. As a result, I would recommend that the Council adopt the years 1990 to 2004 as the years that are to be used in determining historical share of revenue.

Recommendation: That the council provide guidance to the Non-Binding Price Formula Arbitrator and the Contract Arbitrators that for the purposes of calculating historical revenue shares, the years 1990 to 2004 should be used to most closely represent the Council's intent.

2. Use of Data Sets to determine Historical Share of Revenue

The council provided no guidance to the Non-binding price formula arbitrator as to what data set to use in determining historical shares of revenue.

The data problem was that the regulations required that the ex-vessel price paid to fishermen be calculated as a percentage of the wholesale FOB Alaska selling price.

In 2005, I set the following criteria for the data set:

1) It must be public and available to all parties for review.
2) It must be collected in a standardized manner.

The data that initially fit these criteria were fish ticket sales data, and the Commercial Operators Annual Report (COAR). The COAR report is an annual report legally required of all processors by the State of Alaska in which they document the price and volume of round pounds purchased by species, the product forms into which these are made, and the price and volume of wholesale sales.

Fish Ticket data reports ex-vessel prices paid at the time of landing only, and does not report wholesale sales prices or product form.

I was advised by the statisticians at the ADF&G that it was not good practice to mix Fish Ticket Data and COAR data. Accordingly, I elected to rely on the COAR report exclusively as the data set for determining historical share of revenue.

Problems with the COAR data

There are several specific problems with the COAR data set. They are:

1) There is no standardized procedure among companies in terms of filling out the COAR report, so the quality of the data varies from company to company. The COAR report does not have the same consistency and accuracy as a tax return document, for example.

2) COAR data is reported annually based on the calendar year, yet the fisheries operate across a fishing season, for example July 1st to June 31st, not consistent with a calendar year.

For BBRKC, this means that the COAR report captures ex-vessel prices correctly in the fall of the year, but captures wholesale sales for a 12 month period which includes crab caught in two different seasons. For the period January to September, sales reflect crab purchased from harvesters the prior year, and for the period October to December, they generally reflect sales from crab purchased that same year.

For Opilio the same problem exists, but due to the timing of the fishery historically in January, there is less of a mismatch than there is on king crab.

Brown or golden king crab has the same issue, as there is crab caught both in the summer and the following spring, and sold throughout the year.

There are also some advantages with COAR data. One is that product sales are broken down by product form. I found that using the product form for frozen sections provided a better and more reliable data set than using all products combined. Frozen sections make up more than 90% of all crab product forms.

Secondly, COAR data can be localized in a way that excludes crab fisheries in Norton Sound and Southeast Alaska that are not included in the rationalization program. As a result, the prices and volumes in these fisheries can be excluded from the data set.

Finally, COAR data can be manipulated to reflect the Northern and Southern District management requirements of the rationalization plan.

On balance, I have found no other data set that can surpass COAR for the purposes of determining historical revenue, with one exception.

Due to the nature of the king crab fishery, with prices set and subsequent sales to Japan within the October-December time frame, I found that using Japanese import values for king crab sections from Alaska, subtracting freight costs, provided a slightly better statistical fit for the relationship of ex-vessel price and wholesale price than did COAR data by itself. In the 2006 report, I used the Japanese import values for king crab (less a freight allowance) as the best statistical measure of wholesale prices for the crab being purchased that season.

Recommendation: That the Non-binding Price Formula Arbitrator continue using the COAR data set as the best record available of the historical distribution of revenue, supplementing it only with other publicly available statistical data when doing so can increase the accuracy of the historical division of revenues.

3. Using simple linear regressions to produce a price table

The 2005 report and the 2006 Golden King crab report did not have a satisfactory method of deriving the percentage of wholesale price that a price formula would return to the Harvester. Although it appeared that the percentage paid to the harvester varied based on the absolute wholesale price, and this was born out in qualitative interviews with both harvesters and processors.

One result was that for Opilio in 2005-2006, the percentage formula that was valid at the price projected six months before the season was not valid when the actual wholesale price proved to be unexpectedly lower. The Non-binding Price Formula Arbitrator report did not provide sufficient guidance for calculating the historical percentage of revenues over a range of wholesale prices, and the contract arbitrators did not have the benefit of a clear non-binding price formula accurate over a range of wholesale prices.

To correct this problem, I took a different approach to calculating historical share of revenues for the BBRKC, Opilio, and Bairdi reports that were completed in August, 2006.

I feel that harvesters and processors have accepted this methodology, which is based on simple linear regression formulas, as a reasonable approximation of historical revenue shares.

The figures below show the regression formulas, and an historical test of the predicted and actual prices, using this methodology.

Red King Crab Harv ex vessel vs fob japan

$$y = 0.536x - 0.1313$$
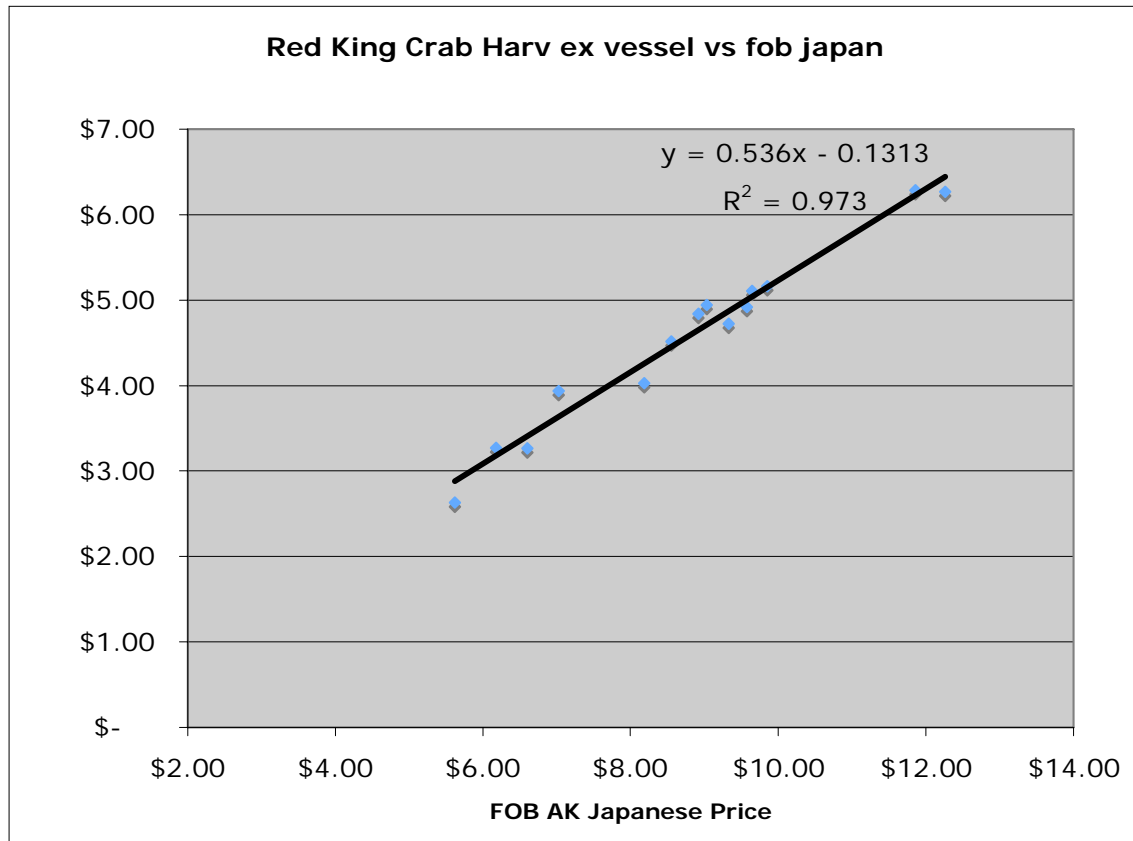$$R^2 = 0.973$$

FOB AK Japanese Price

Figure 1: Regression formula for the years 1990-2005 for red king crab, based on Japanese import pricing in Nov and Dec, and ex vessel values from COAR for those years. The Correlation Coefficient is 0.973 which means that there is an almost perfect correlation between these two data sets, i.e. one is totally dependent on the other.

Year	Actual FOB Price	Actual Ex Vessel Price	Predicted Ex Vessel Price Based on Formula	Variance
1990	$9.65	$5.11	$5.04	$0.07
1991	$6.60	$3.26	$3.40	-$0.14
1992	$9.04	$4.95	$4.71	$0.23
1993	$7.02	$3.94	$3.63	$0.31
1996	$8.18	$4.03	$4.26	-$0.23
1997	$6.17	$3.27	$3.18	$0.10
1998	$5.61	$2.63	$2.88	-$0.24
1999	$12.26	$6.27	$6.44	-$0.18
2000	$8.92	$4.84	$4.65	$0.19
2001	$9.58	$4.92	$5.00	-$0.08
2002	$11.86	$6.28	$6.22	$0.06
2003	$9.85	$5.16	$5.15	$0.01
2004	$9.33	$4.73	$4.87	-$0.15
2005	$8.55	$4.51	$4.45	$0.06
			Stand dev	$0.17
			Total Variance	$0.00

Figure 2: Historical test of Red King Crab regression formula, showing Actual ex-vessel price between 1990 and 2005 and predicted ex-vessel price for those years, based on the formula. The standard deviation was 17 cents, and the total variance, by definition, is zero, meaning that the formula is neutral and has no bias towards harvesters or processors.
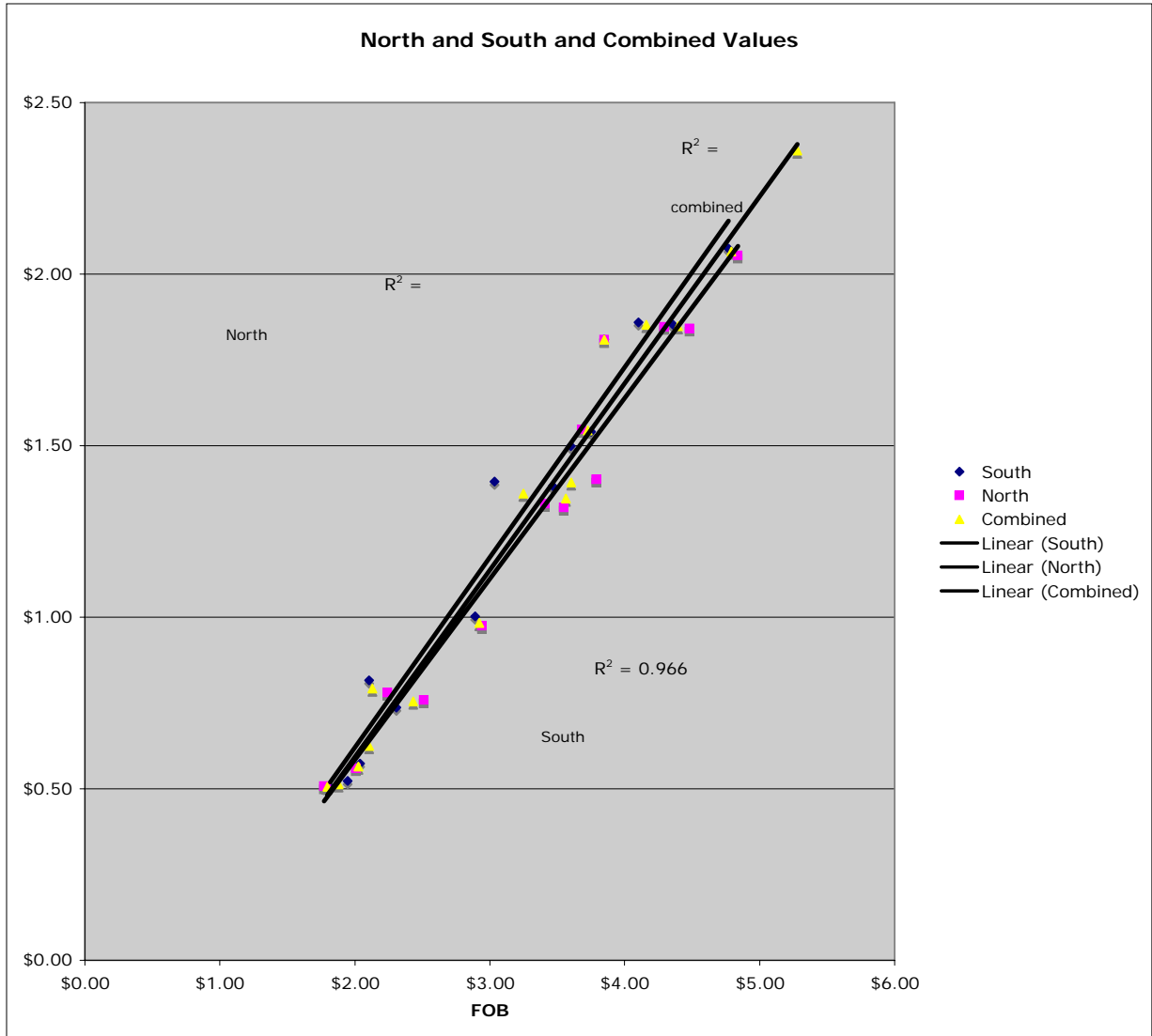
Figure 3: Regression formula for Opilio, showing Northern, Southern, and Combined formulas. In all cases, correlations are extremely high. The combined correlation coefficient is 0.979, meaning an almost perfect dependence of ex-vessel price (Y axis) on Wholesale price (x axis).

Year	FOB ALL	Ex Vessel	Predict Ex Vessel	Variance	Proc Rev
Inputs:	COMBINED				
YIELD	FOB X 0.5391	-0.4859	0.541	0.476	
0.6434					
1990	$2.11	$0.62	$0.66	-$0.04	$1.14
1991	$1.80	$0.51	$0.50	$0.01	$1.01
1992	$1.88	$0.51	$0.54	-$0.03	$1.08
1993	$2.43	$0.75	$0.84	-$0.09	$1.26
1994	$3.56	$1.35	$1.45	-$0.10	$1.47
1995	$5.28	$2.36	$2.38	-$0.02	$1.61
1996	$3.25	$1.36	$1.28	$0.08	$1.13
1997	$2.13	$0.79	$0.68	$0.12	$0.90
1998	$2.03	$0.57	$0.62	-$0.05	$1.15
1999	$2.92	$0.98	$1.10	-$0.12	$1.39
2000	$4.16	$1.85	$1.78	$0.08	$1.28
2001	$3.73	$1.54	$1.54	$0.00	$1.33
2002	$3.60	$1.39	$1.47	-$0.08	$1.44
2003	$4.40	$1.85	$1.90	-$0.05	$1.52
2004	$4.79	$2.07	$2.12	-$0.05	$1.58
2005	$3.85	$1.81	$1.61	$0.20	$1.03
2006	$2.76	1.16	$1.02	$0.14	$0.96
			STD DEV	$0.09	
			Total	$0.00	

Figure 4: Test of historical data based on the combined regression formula, showing a standard deviation of $.09, and that the formula is by definition neutral in distributing the deviation equally among harvesters and processors.

It is my belief that this is a very robust and practical way to calculate the actual historical division of revenues for all the crab fisheries.

Recommendation: That the Non-Binding Price Formula Arbitrator continue to use regression formulas based on COAR data and other data sets, as appropriate, to produce the basic non-binding price formula ex-vessel price as a percentage of revenue, from historical data.

4. Use of Contract Arbitration Results by the Non-Binding Price Formula Arbitrator

There were two opilio arbitrations in June of 2006 and one Bairdi arbitration, covering the 2005-2006 season.   Incorporating the results of these arbitrations into the Non-Binding Price Formula was very difficult and unsatisfactory, and I am recommending major changes in how arbitration results are communicated to the Non-Binding Price Formula Arbitrator.

The biggest problem is that due to the current regulations on confidentiality of arbitrations, the Non-Binding Price Formula Arbitrator was not permitted to receive any information concerning arbitrations except for the final result, which included the arbitrators decision only, and the last best offer from both the processor parties.

Without any knowledge of the presentations by both parties to the arbitrator, it was difficult to determine the weight to give the arbitration results, which must be considered under the regulations in establishing the non-binding price formula, when the arbitration results appeared to conflict with the historical revenue shares as calculated by regression formulas.

A simple glance at the Opilio table showing the historical test of the regression formula shows that the arbitration results in 2006 represented the second greatest deviation over the 17 year period being considered. While the standard deviation was plus/minus 9 cents, the 2006 arbitration results were 14 cents above the predicted formula.

This does not mean that the arbitrated price was incorrect, simply that there must have been factors other than historical share of revenue that suggested to the arbitrator which offer to choose. These factors could have included what other companies had paid for snow crab, whether there were specific costs or efficiencies that justified a deviation from the historical price, or other arguments made by the parties. The results could simply have come about because of the structure of the final offer selection, where one party or the other tacked on "punitive pricing" to increase the risk to the other party of going to arbitration.

For the coming upcoming arbitrations, if any, I would recommend that the following changes be adopted. Some of these

changes can be done by the parties themselves, and others may require review by NMFS or the Council.

Recommendations:

1) That both parties modify the confidentiality agreements they sign concerning arbitration to allow each party to provide the Non-Binding Price Formula Arbitrator with a copy of their written submission to the Contract arbitrator.

2) That the contract arbitrator be allowed to ask clarification questions of the Non-Binding Price Formula arbitrator, so long as both parties to the arbitration proceeding agree. The questions and responses to the questions should only cover written material that is already in the non-binding price formula report.

5. **The Issue of Incentives**

The current pricing structure used in the crab rationalization program has no incentives for sellers to increase the value of crab. The reason is that the definition of the FOB price discourages processors from taking any risk to raise the value of their product.

Crab markets are volatile and risky. Before rationalization, fishermen have not participated in that risk once they had landed their crab. They were paid a fixed price, and the processor took on the risk of selling the crab at a level that would correlate to what they had paid for their raw material, and the potential rewards in the market.

This is very evident from COAR data on sales of red king crab, for example. There are some years when the raw material cost represented 93% of the total FOB sales value of crab, and other years in which the raw material cost represented 44% of the cost of the finished product. The reason is that in one case, the market collapsed after the crab had been purchased, and processors ended up selling at a loss, and in the other case, the market strengthened after crab had been purchased, and processors made a windfall.

Often the ability to time sales of crab, whether holding back supply in a rising market, or making large volume contracts as early as possible in a falling market have been keys to a profitable crab industry.

Under rationalization, these incentives have been turned upside down.

Here is a numerical example to illustrate the point. A crab processor buys crab at 4.50, and has the opportunity to sell it to Japan at a price of $8.25, FOB Dutch Harbor. Taking yield into account, the processors cost is $7.03, and he makes $1.22 in gross profit. But if he has a sense that the U.S. market is strengthening, and calculates that if he holds his crab until March, he is likely to see a price of $8.65, he will not take the risk.

The reason is that his costs increase due to finance and storage charges, approximately 4 cents per month. So holding crab until March will add 24 cents to his costs. But he should gain 40 cents, so it would normally be a good deal. But under rationalization, he is paying the fishermen a percentage of FOB cost that has been interpreted by arbitrators to include actual freight only. In this example, harvesters are paid at a rate of 54.5%. So the new value to a harvester for the higher sales price is 54.5% X $8.65, or $4.71.

This means the raw material cost has now risen to $7.36, and the processor is left with $1.29, and when he subtracts his holding costs of 24 cents, he is left with $1.05. So even though he was correct in being able to get a higher price, he actually ends up losing 17 cents a pound for taking that risk.

This is creating pressure to sell product quickly, and it certainly resulted in selling Opilio crab at a lower than necessary price in 2006.

The risk incentive would be different if the harvester and processor divided the actual additional profit (or loss). In our example, the processor sold crab 40 cents higher, but had 24 cents in costs, so he ended up selling crab for 16 cents higher than in October. If the pricing formulas were applied to this amount, harvesters would receive 54.5% of $8.41 or $4.58 a pound, and processors would receive $1.50 less 24 cents of additional costs, or $1.26, a real gain of 3.2%.

That may or may not be enough in this example to take on additional risk, but it is clear that incentives have to be constructed so that processors are not pushed to sell crab as quickly and cheaply as necessary. That type of incentive lowers the value of the fishery unnecessarily.

These same incentives are necessary for any type of value added product, because there is an additional cost to create the value added product. Unless that cost is recognized in the price formulas and by contract arbitrators, there will be no further development of value added crab.

Recommendation: The definition of FOB Price be adjusted to take into consideration direct costs of holding or adding value to a product.

This is something that can be incorporated into reports directly by the Non-Binding Price Formula Arbitrator.

6. **Procedure for comments and revisions to the Non-Binding Price Formula Report**

In 2006 I put our a draft price formula to solicit comments about the range of years being used, and the fact that I broke out North and South district Opilio data separately.

This was partially successful, in that it established consensus on the range of years among harvesters and processors, and also gave the opportunity for harvesters to comment on incorporating a north vs. south split for Opilio, which was controversial as well.

However, the way in which comments were received was not transparent.

One possible change in 2007 would be to publish a preliminary price formula two weeks before the statutory deadline, and give a one week period for written comments. That way a record could be developed by the Non-Binding Price Formula Arbitrator that could be useful to the parties in understanding the choices and rationale used in constructing the Non-Binding Price formula.

Recommendation: The Non-Binding Price formula Arbitrator has asked the arbitration associations if they want to incorporate such a comment period into the process of creating the Non-Binding Price Formula Report.

7. **The Market Report should allow for updates to reflect current market conditions when requested by the arbitration organizations**

One of the problems with the current regulations regarding the market analyst report for king crab and opilio is only a single market report can be produced, and that market report must rely on data that is at least 90 days old from the date of the report.

This makes the market report less useful for fisheries that take place months after the report is produced, which is especially the case with Opilio crab.

The purpose of the market report is to provide an independent, non-biased, discussion of the crab markets prior to negotiations on pricing. The principle data the report can provide, aside from descriptive information about customers and market trends for crab, is whether the markets are stronger or weaker than the previous year, and the reasons for that.

The timing of the market report for red king crab, 50 days before the start of the season, is suitable for providing an update on the current red king crab market.

But the market report is far less useful for Opilio, since it is completed four months before the start of the main fishing season, and uses data that was three months old at the time of the report. So, it is not nearly as useful providing a analysis of the Opilio market as for the red king crab market.

This could be remedied by allowing for updates on market conditions prior to the Opilio season. Because there are expectations that future Opilio harvests may increase significantly from year to year, a more accurate and timely market report could become an important factor in successful price negotiations.

Recommendation: That regulations governing the market analyst report be amended to allow for the provision of updated supplemental reports, when requested by the arbitration organizations.