Frito-Lay, Inc. and Sam's Club:

The Pick N' Pack Aggregate

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Management Summary

Working with the Frito-Lay Supply Chain Department, our team has found an improved inventory process that will increase in-stock performance at Sam's Clubs. Sam's Club demands a 99.8% in-stock performance. Currently, Frito-Lay is not meeting this demand, therefore improvements must be made.

Analyzing Frito-Lay's current inventory replenishment process, we discovered several problems. Some of these problems included inconsistencies in taking inventory at the clubs, negligence of inventory worksheets, and lack of communication. After further analysis, we discovered that forecasting more accurately would prevent some of these problems. There was a new challenge: finding a method of forecasting the new product line, Pick 'N Pack. With very little historical sales, it was difficult to forecast sales. Another difficulty we encountered was that PNP sales were listed as one UPC, not by individual product. Using various data from field studies, Frito-Lay's Order Management System, and Wal-Mart's Retail Link, we created a forecasting model for PNP using a four week moving average which includes seasonality factors. This model predicts PNP sales for the remainder of 2005. By comparing actual PNP sales with forecasted figures in the past few months, our team's model thus far appears to be more accurate than Frito-Lay's current forecasting model. By implementing this new model, the inventory replenishment process will be improved, resulting in a better in-stock performance.

Background and Problem Description

Frito-Lay is the largest DSD organization the U.S. Recently, their highest volume customer, Sam's Club, requested that they improve their in-stock performance to 99.8%. In response to this Frito-Lay is implementing a new inventory replenishment process in Sam's Club with the aim of achieving the 99.8% in-stock performance goal.

Frito-Lay's Inventory Replenishment Process

Until recently, Frito-Lay did not forecast demand at the store level. Instead, they would forecast demand for the DCs, each of which supplies several stores, and the RSRs would order whatever product they needed in their stores from the DCs. The advantage of this system was that it allowed the RSRs to custom tailor orders to each individual store, thus enabling them to take advantage of store specific sales opportunities. This tied into the RSRs incentive scheme since a portion of their compensation is based on commission. The problem with this system was that for the most part the RSRs were using completely subjective forecasting methods, so the accuracy of these forecasts varied greatly. This resulted in an unsatisfactory level of in-stock performance.

In order to mitigate these in-stock problems, and in response to requests from Sam's Club, Frito-Lay implemented a new replenishment process in January of 2005. The new replenishment process transferred ordering responsibility to the DSLs, who used an Excel spreadsheet application to calculate order sizes. The supposed advantages of this new process were that it would be quantitative and would standardize ordering procedures for all stores. Unfortunately, the new IRP didn't work as well in practice as it did in theory.

The problems with the new IRP spawned from assumptions made in its formulation. First off, the new IRP used average weekly sales to predict future demand. Actual demand, however, often varies greatly from week to week due to the seasonality of Frito-Lay's product lines. Consequently, predicted sales were often inaccurate. Additionally, the new IRP required that the RSRs record and report daily inventories for each store they supplied. However, this proved difficult to implement and if inventories were submitted at all they were usually inaccurate. Lastly, the new IRP allowed for the RSRs to change the orders suggested by the spreadsheet application. Coupled with the inaccuracy of the forecasting method this allowance instilled doubt in the RSRs in regard to the IRP's effectiveness. As a result many RSRs used this opportunity to change the suggested orders and continue the old ordering process, thus negating the new IRP as a whole.

Pick N' Pack

In conjunction with the implementation of the new replenishment process Frito-Lay also launched a new product line in Sam's Club called Pick N' Pack. With PNP consumers could mix and match any two bags of the variety of brands and flavors that Frito-Lay offers, place them in a clear outer bag, and purchase them for one reduced price. However, since Sam's Club limits the number of UPCs that each vendor can stock, in order to provide the consumer with an adequate assortment of products Frito-Lay had to list all of the PNP SKUs under one UPC. This aggregation of the PNP SKUs, while allowing Frito-Lay to include a larger range of products, concealed the sales data for each individual SKU under the blanket PNP UPC. This lack of sales visibility made forecasting PNP sales much more difficult than Frito-Lay's other products.

Additionally, since PNP was a new product, the DSLs and RSRs had no historical sales data or experience to base an estimate of average weekly sales on. Consequently they had to base their estimated average weekly sales on their knowledge of PNP's predecessor, SSZ.

Sam's Club carried SSZ up until January of 2005, when it was replaced by PNP. PNP and SSZ are similar in many ways. Two of the most notable similarities being that both product lines are sold in relatively similar quantities and are marketed to the same customer group. Given these similarities, and lacking a foreseeable alternative, The DSLs used their experience with SSZ to set the average weekly sales for PNP. However, certain dissimilarities between these two products made predicting average PNP sales from SSZ sales more difficult than it appeared.

First of all, although SSZ and PNP were sold in relatively similar quantities on the whole, individual SSZ bags were approximately twice as large as individual PNP bags. The main consequence of this disparity in bag size was that the number of bags per case changed. So, in order to accurately convert SSZ sales to equivalent PNP sales each DSL would have to first approximate what the average number of SSZ cases sold per week should be using either historical data or personal experience, then convert these predicted cases to individual SSZ bags, then convert SSZ bags to PNP bags, and finally PNP bags to PNP cases. Due to the difficulty of this conversion it was not often used in practice, and for the most part DSLs would rely on their own intuition to set average weekly PNP sales.

Secondly, one of the advantages PNP had over SSZ—the increased variety of brand and flavor offerings—further complicated an accurate sales prediction. One of the main motivations behind the switch from SSZ to PNP was that the larger numbers of selections PNP provided would lead to increased sales. However, from a forecasting standpoint, it was difficult to predict to what extent these additional offerings would increase sales. Once again, having no other means at their disposal, DSLs for the large part used their own intuition to predict these added sales.

Analysis of the Situation

In order to facilitate an understanding of the effectiveness of the new IRP, Frito-Lay designated the HW Lay distribution center and its seven associated Sam's Clubs as a "pilot" site. To aid our understanding of the implementation of the replenishment process in the field, our team interviewed and observed each of the RSRs supplying these seven Sam's Clubs. A summary of our findings for each club can be found in Appendix A.

After conducting this hands-on investigation of the replenishment process, we decided to focus in on Frito-Lay's new product line, Pick N' Pack. Specifically, we wanted to address two issues that we found to be the most serious: the treatment of PNP under the new IRP's forecasting model and the aggregation of all PNP SKUs under one UPC.

The Pick N' Pack Forecast

We found that the new IRP forecasting model was particularly ineffective at predicting PNP sales. The problems that the IRP forecast had with PNP were that, as a new product, it was difficult to determine the appropriate level at which to set average weekly sales, and, due to the purchasing patterns of PNP's target customer group, PNP sales were much more susceptible to seasonal variations than Frito-Lay's other products.

We determined that the best way to resolve these two problems was to completely redesign the IRP forecasting model. In developing a new model we decided on two requirements that a model must satisfy to accurately predict PNP sales. One, the model must be dynamic, and two, the model must account for the seasonality of PNP sales.

In order for our model to be dynamic we had to choose a forecasting method that did not require much historical data, and could react quickly to PNP's rising sales. We decided that the best way to fulfill these requirements was to incorporate a moving average into our model. The advantage of the moving average is that its forecast is based on recent sales activity. This feature would allow it to grow with rising PNP sales. We decided to use four weeks for our moving average, as opposed to some other length of time, because we found that four weeks was a short enough period to allow the model to react quickly to increases in sales, while still long enough to offset any irregular weeks that were exceptionally high or low.

The next step in formulating our model was to develop a seasonality factor that would account for variations in sales above and beyond the capabilities of our moving average. In order to accomplish this we recognized that we would need some way of predicting when these variations would occur. The best way, of course, would have been to analyze historical PNP sales; however, since there were no historical PNP sales available, we decided that the next best thing would be historical SSZ sales. We knew that historical SSZ sales were not effective at determining actual PNP sales volume; however, since both products were targeted at the same customer group, we felt that if these customers

consistently purchased relatively more or less SSZ items during certain weeks of the year, which they did, that it would be safe to assume that this trend would carry over to PNP.

To calculate the seasonality factor we analyzed five years of SSZ sales data which we obtained from Wal-Mart's online database, Retail Link. As we hoped, a comparison of weekly sales did in fact confirm that SSZ sales trends were consistent from year to year. To convert these sales trends into a seasonality factor we first had to set a base from which to calculate weekly percent difference. The logical choice for this base was a four week moving average, as this would maintain consistency with our PNP forecasting model. Next we calculated the weekly percent difference between actual SSZ sales and the four week moving average predicted sales for each year. Finally, to get our seasonality factor we calculated the average percent difference for each week across all five years, converted this percentage to a decimal number, and added 1.00 to account for the base sales level.

Together, the four week moving average of PNP sales and the seasonality factor calculated from historical SSZ sales form our PNP forecasting model. To predict the upcoming week's sales, the average sales of the preceding four weeks is calculated and multiplied by the seasonality factor specific to that week.

The Pick N' Pack Aggregate

Since the PNP product is scanned under one UPC, it is difficult to track individual sales going out. Frito Lay's OMS provided backdoor sales for each SKU, but in order for this data to be useful we needed to check its accuracy by selecting an individual Sam's Club, # 4743, and physically count the number of sales for each SKU. At the end of each business day, for two weeks, we counted the inventory after all sales had been made for that day. To find the number of bags sold, we took the beginning inventory minus the ending inventory for each SKU. These counts can be found in Appendix__.

From the individual bags sold, we took each percentage of total PNP sales for each day. We then calculated the average sales per week for each SKU in bags, and also as a percentage of PNP sales. These weekly averages were then compared with the backdoor sales from OMS. By calculating the variance of the two sales numbers for each SKU, they were found to be very similar. We concluded that the backdoor sales were accurate enough to be used in the forecasting model, verified by our findings.

Technical Description of the Model

The two issues that we found to be the most serious were the treatment of PNP under the new IRP's forecasting model and the aggregation of all PNP SKUs under one UPC. Our resolutions of these two issues were the development of a new PNP forecasting model and a process to determine the contribution of each individual PNP SKU to the PNP UPC aggregate, respectively.

The Pick N' Pack Forecasting Model

The forecasting model we developed predicts weekly PNP sales using the relationship

$$ {}_{P}S_{n} = \frac{({}_{A}S_{n-1} + {}_{A}S_{n-2} + {}_{A}S_{n-3} + {}_{A}S_{n-4})}{4} \times K_{n} $$

Where ${}_{P}S_{n}$ = predicted sales for week n, ${}_{A}S_{n-1,2,3,4}$ = actual sales for the four weeks preceding week n, and K_{n} = the seasonality factor for week n. Actual sales in this model are scan sales from Retail Link, and the seasonality factor is calculated from historical SSZ sales.

To predict sales further than one week out, actual sales for the four weeks preceding week n in Equation 1 can be approximated using predicted values. For a forecast three weeks out from the current week, the relationship would be

$$ {}_{P}S_{n} = \frac{({}_{P}S_{n-1} + {}_{P}S_{n-2} + {}_{A}S_{n-3} + {}_{A}S_{n-4})}{4} \times K_{n} $$

Where ${}_{P}S_{n-1,2}$ = predicted sales for the two weeks preceding week n, for which actual data is unavailable.

Analysis and Managerial Interpretation

The Pick N' Pack Forecast

Over a nine week period from Wal-Mart week 200505 to 200513 in Sam's Club #4743 IRP's forecasting model differed from actual sales by an average of 288 bags, or 12% of average sales, while our forecasting model differed by an average of 168 bags, or 7 % of average sales (See Figure 1). Additionally, in week 200509, the seasonality factor that our model incorporates accounted for the drop in sales associated with Easter by reducing our moving average predicted sales by 19%, bringing our model's predicted sales within 163 bags of actual sales for this irregular week. IRP's model, lacking a seasonality factor, predicted sales differing from actual by 348 bags.

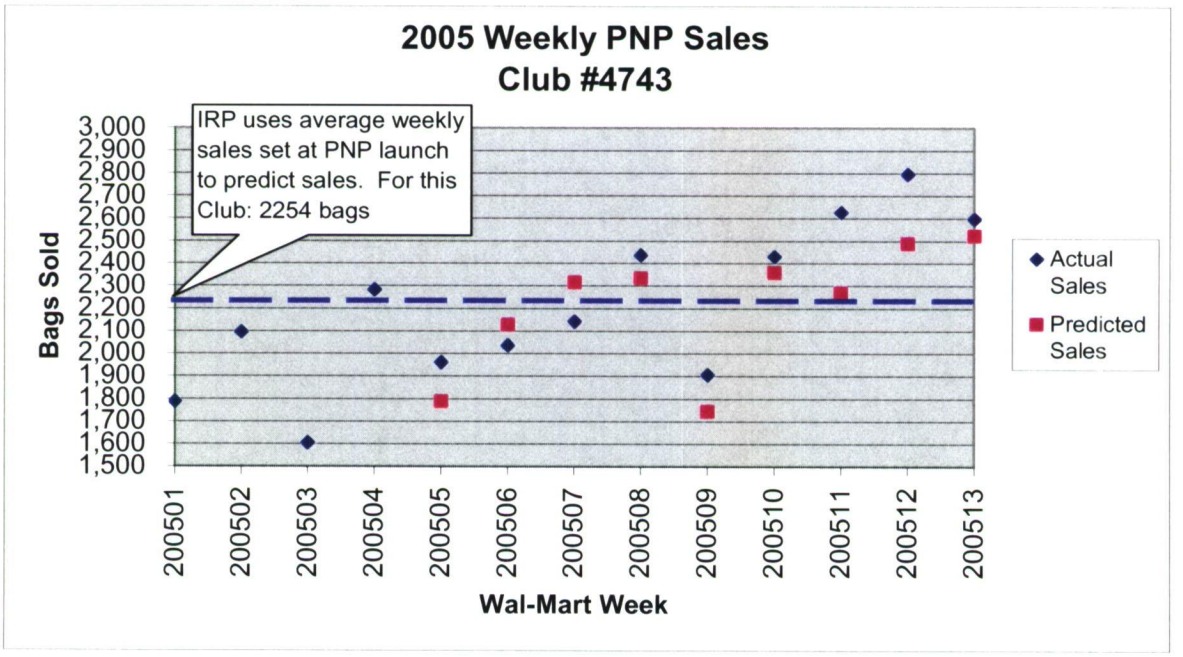


Figure 1 2005 Weekly PNP Sales, Club #4743

Furthermore, the accuracy of the seasonality factor for this often difficult to predict holiday week suggests that the trends we discovered in our analysis of the last five years of historical SSZ sales due indeed carry over to PNP. If this is true, then the difference between actual and IRP predicted sales, already almost twice as large as the error from our model, will continue to rise as the year progresses (See Figure 2 in Appendix B). On the other hand, if the SSZ sales trends continue to carry over to PNP, our model should maintain, if not improve upon, its current level of accuracy as the year progresses and consumers grow more comfortable with PNP.

The Pick N' Pack Aggregate

The results of the analysis we conducted in Sam's Club #4743 are listed in Table 1 below.

PNP Product	Week 1	Week 2	Average	7-Week Data	Difference
Lays Classic	6.46%	7.50%	6.98%	7.96%	-0.98%
Lays KCM	7.38%	5.82%	6.60%	7.18%	-0.58%
Lays SCO	4.02%	4.54%	4.28%	2.13%	2.15%
Lays Wavy	7.27%	7.15%	7.21%	9.04%	-1.83%
Ruffles Regular	6.31%	6.07%	6.19%	8.20%	-2.00%
Nacho Doritos	7.35%	7.86%	7.60%	11.46%	-3.86%
Cooler Ranch Doritos	6.16%	5.93%	6.05%	6.09%	-0.04%
Cheetos	9.23%	9.04%	9.13%	7.96%	1.17%
Fritos	10.59%	9.07%	9.83%	6.84%	2.99%
RSTC Tostitos	13.33%	14.01%	13.67%	13.22%	0.45%
Tostitos Scoops	7.86%	7.93%	7.90%	5.83%	2.07%
Munchies	2.88%	4.00%	3.44%	1.87%	1.57%
Baked Lays	4.80%	4.57%	4.69%	6.41%	-1.72%
Sunchips	6.35%	6.50%	6.43%	5.81%	0.62%

Table 1 PNP Aggregate Study

The average and maximum differences from week one to week two were 0.58% and 1.56% respectively. The average and maximum differences between the two week average and the seven weeks of backdoor sales were 1.57% and 3.86% respectively. The lack of any significant change from week one to week two suggests that these percentages are typical of Sam's Club #4743. Furthermore, the percentages approximated by the 7-week backdoor sales data are accurate enough that whatever small discrepancies they do contain could be accounted for with safety stock. Thus, assuming other clubs show similarly accurate correlations between product coming in and product being sold out, we feel that backdoor sales could be used to effectively break up the PNP aggregate.

Conclusions and Critique

In response to Frito-Lay's need for a more accurate Pick N' Pack forecast, we developed a model that could account for PNP's seasonal variations, while at the same time remaining versatile enough to keep up with PNP's rapidly rising sales. Our model's versatility came from its foundation on a four week moving average, and its ability to deal with seasonal variation from a seasonality factor calculated from historical SSZ sales. Early analysis has shown that it is very probable that the model's main assumption, that seasonal trends in SSZ sales will correlate to PNP, is in fact accurate.

We recommend the inclusion of our forecasting model in the next release of the IRP.

Appendix A: Summary of findings in "pilot" Sam's Clubs

Sam's Club PNP Delivery Evaluations
HW Lay Service Area

- **General Problems**
  - shrink wrap causing glare, difficult to read labels
  - lack of communication between regular RSR and RSR Swing
  - lack of communication between RSRs and DSLs/DC Lead
  - PNP poorly labeled
  - 2-for-1 sale of PNP to Sam's causes confusion- visually looks the same
  - Date management
  - Post weekend planning
  - Odd casing difficult to manage
  - Overweight boxes
  - Shipments coming in at different times
  - Pallets strewn about clubs
  - **Overall-** RSRs are frustrated with the process of taking inventory

- **Possible Solutions**
  - Unique and clear labels that make inventory taking easier- will help to better explain the 2-for-1 system and odd casing
  - More open lines of communication between RSRs and Swing- a weekly meeting to talk about integration may be necessary just between the RSRs for each Sam's Club- will also help with post weekend planning
  - Weekly Checkpoint with all Sam's RSRs and DSLs/DC Lead to discuss changes in inventory, delivery processes, complaint filing. This is all in order to get everyone on the same page about corporate goals related to Sam's Club
  - Incentives could be useful in enticing RSRs to take better inventory and communicate more effectively as a team
  - Pallets should be kept in same place at every Sam's Club
  - Every box/case contains the same amount of inventory as to avoid confusion
  - Designated PNP and 50-ct shipments for every club

- **Overall**
  - The new inventory delivery model developed by the SMU team has been viewed as an excellent solution to the inventory problem by RSRs, making their jobs much easier, and will increase the stock-in rate and save RSRs much time and problems.

Store #4783
5150 N. Garland Ave., Garland, TX

DSL: Keandra Armstrong
RSR: Hurt back. Random RSR there when I visited. New RSR started 3-28
Delivery Days: Tue, Wed, Fri

Potential Problems taking inventory:

1. Glare off wrap on pallets high in the steel make it hard to tell what items the cases are.
2. Products mixed in the steel inventory.

PNP:

- 12SKUs
- Double racks: none
- Split racks: Nacho Cheesier Doritos/Crunchy Cheetos, Cool Ranch Doritos/Munchies, and Tostitos Scoops/restaurant Style

- PNP inventory not marked with which products they contain.

- This store was in general disarray from lack of RSR attention.

Store #4743
1200 E SPRING CREEK PKWY

DSL: Keandra Armstrong
RSR: Bill Thompson (Sun-Thurs)
Delivery Days: M, T—50ct/30ct, W—PNP

Inventory:

- Usually takes 10 mins to take inventory.
- Has been taking inv. About twice a week.
- Most time consuming part is finding Jason to turn in sheet/make corrections to orders.
- Hasn't been relying on system—just tells Jason what he wants ordered.
- Likes the old inv. Process better—likes to order the day before.

- Haven't had any problems with OOSs.

- Has had problem with getting products too close to stale date—loses products to stales.
- Had a communication problem—didn't know 30ct sun chips were going to be a permanent item, so he did not order it.

PNP:

- 12 SKUs
- Double Racks: Restaurant Style Tostitos
- Split Racks: none
- Restaurant Style and Lay's Classic have been best sellers.

Tries not to mix PNP product pallets in the steel inv., if he has to he always marks the bottom case of the top pallet with the product name.

Marks all PNP pallets with product name.

Says his biggest problem has been getting product that he didn't order and not being able to sell it before it goes stale.

Store #6381
751 W. Main St. Lewisville, TX

DSL: Jimmy Perry
RSR: Lost his name…sorry (Sun-Thur)
Delivery Days: T—50ct/30ct, F—PNP

Inventory:

- Does a hard count on Sunday (the first day of the week for him) and then subtracts what has been sold to get the inventories for the rest of the week. Says this makes taking inventory much faster.
- Daily inventory usually takes 10 mins. Hard count on Sundays takes much longer.
- Drops inventory sheets by Jason's office and then talks to Jason before order goes out to adjust the orders.
- Hasn't had a problem with OOSs because he adjusts his orders.
- Have had problems with his swing not taking an inventory on his days off.

PNP:

- 14 SKUs
- Double Racks: Lay's Classic, Tostitos Scoops
- Split Racks: Cool Ranch Doritos/Munchies, Crunchy Cheetos/Fritos Scoops, SCO/Baked Lays
- Says split racks and double racks were decided by corporate.

- Says the added variety that PNP adds over SSZ helps sales.
- Marks PNP cases on bottom row of pallet.

SAM'S CLUB #6255
8621 Ohio

DSL: Michael Threat
RSR: Charles
Delivery Days: Tuesday, Thursday

An appointment was made with Michael to meet with Charles Thursday, March 31st, at 5:00 am. I waited from 5 – 7:15am and Charles had not shown up. I took notes on what I observed from the PNP display and the steel inventory.

Split racks (PNP): Cheetos, Munchies
Baked Lays (new PNP product), Doritos

Cases in steel were not labeled with PNP, just 50 count products:
Ruffles Original
Doritos Cool Ranch
Doritos Nacho
Lays Classic
Crunchy Cheetos Flaming Hot
Fritos Chili Cheese
Fritos Original
Crunchy Cheetos

Steel: 5 ½ pallets of 50 count, mostly had 2 kinds of chips on each pallet
Whole pallets: Lays Classic and Doritos

Inventory looked very low: a shelf not stocked (due to Charles not stocking yet)

1 case Cheetos out of date (use by Mar 29)
All others labeled Apr or May

In summary, the steel inventory looked low. The PNP racks were a little low but not completely out of any product. I took pictures of the PNP display and inventory as well.

Store # 6276

4150 Belt Line Rd

DSL: Victor Aldridge
RSR: Greg (Tues-Sat) and Frank-swing (Sun/Mon)

Delivery Days: Tues-50 ct and Fri- PNP
Layout: 13 SKUs and 11 racks

Full Racks: Doritos, Tostitos- Rest, Lay's, Wavy Lay's, KC BBQ, Ruffles, TostScoop
Split Racks: Ranch Doritos/Munchies, Frito Scoop/Cheetos, Lay'sCh/SourCream

Inventory Taking:

- Marks SKUs and date on the pallets and boxes
- 10 min
- Pallets in inventory kept in same place
- Transition becoming much easier
- Problem with incremental space
- Wrong stock once per month

Store #8299
301 Coit Rd

DSL: Francis
RSR: Byron Horf (Sun-Thurs), swing-Caroline (Fri/Sat), sub→ Jimmie
Delivery Days: Wed- 50 ct and Fri- PNP
Inventory Time- 10-20 minutes

Layout: excellent condition

- Full Racks: Sour Cream, Ruffles, Doritos, Lay's, Wavy Lays
- Split Racks: Baked Lay's/KC BBQ, TostScp/Cheetos, RanchDor/Munchies, Cheetos/FritoScp/TostRest

Inventory Taking:

- 2-for-1 process difficult to adjust to
- Same stock outs as when SSZ
- PNP movers- Doritos/BBQ
- Every other week a wrong order is delivered by roughly a case
- Shrink wrap is a problem
- Excess inventory kept in same place
- Monday planning is more difficult
- Problems: PNP check-in=1.5 hours, overweight boxes, date management

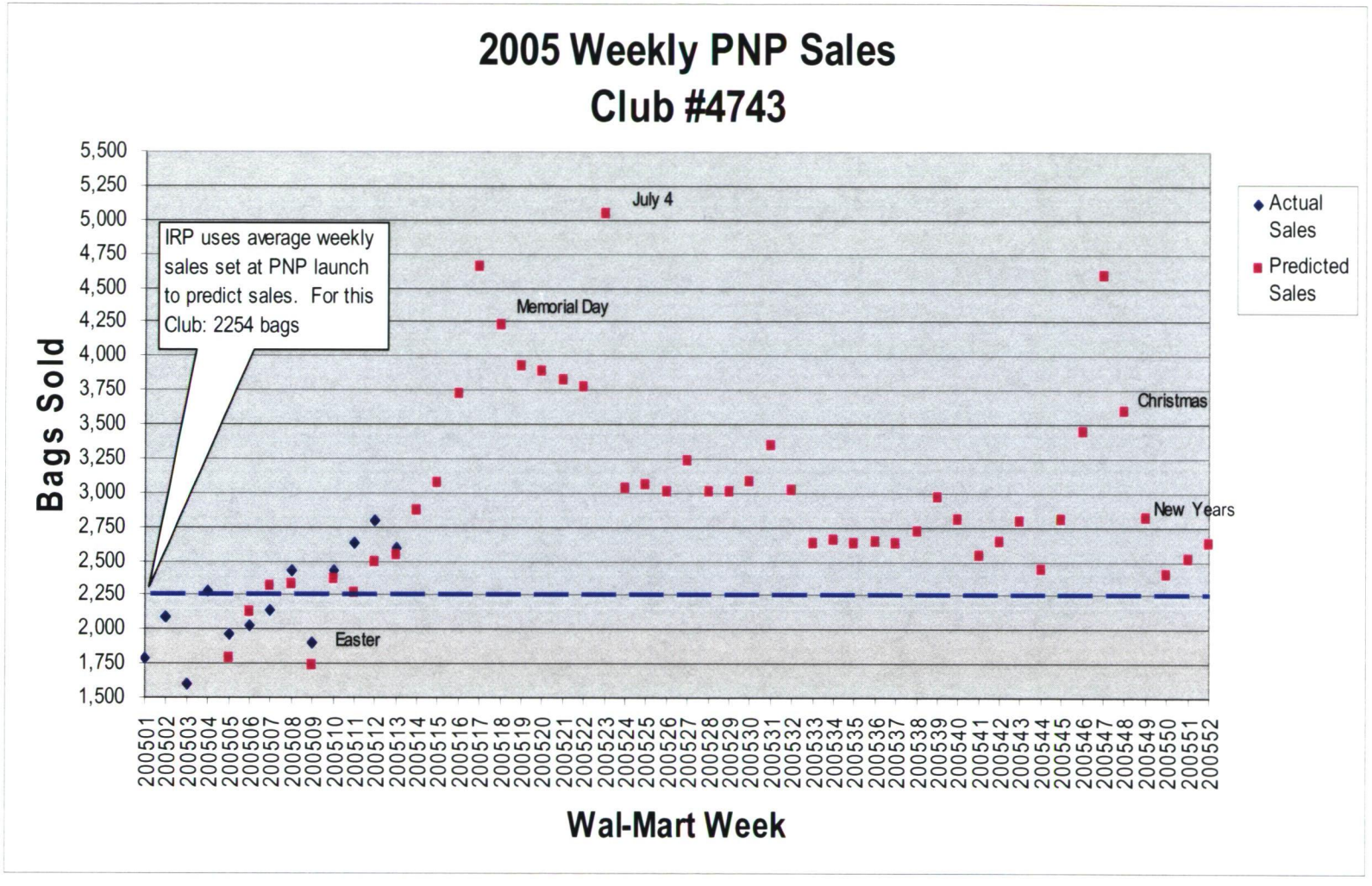
Store # 6265
1213 Market Place

DSL: Victor Aldridge
RSR: Jeff Small, swing- Fri/Sat
Delivery Days: Tues- 50-ct and Fri-PNP
Inventory Time: 20 minutes, 40 min on Mon
Layout:

- Full Racks: Lay's, Doritos, TostRest, SrCrm, Ruffles
- Split Racks: BBQ/SrCrm, TostRest/Ruffles, ScpFrito/Lay's SSZ/ScpTost, RanchDor/Munchies, Cheetos/ScpFrito, SunChip/WavyLay's

Inventory Taking:

- Precise and done daily
- Pallets kept in same area, eyeballs inventory
- Difficult to read labels
- Odd casing is difficult to manage
- Received wrong order the day of my evaluation
- Shipments coming in at different times
- PNP-confusing with 2-for-1-visually looks the same
- Suggestions: better labels, unique looking labels



Appendix B: 2005 Weekly PNP Sales: Club #4743

Appendix C: 2005 PNP Forecast by SKU for Club #4743

SKU	Lays	Lays KCM	Lays SCO	Lays Wavy	Ruffles	Nacho Doritos	CR Doritos	Cheetos	Fritos	RSTC	TC Scoops	Munchies	Baked Lays	Sunchips
WM Week	7.96%	7.18%	2.13%	9.04%	8.20%	11.46%	6.09%	7.96%	6.84%	13.22%	5.83%	1.87%	6.41%	5.81%
200501	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200502	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200503	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200504	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200505	142	128	38	162	147	205	109	142	122	236	104	33	115	104
200506	169	153	45	192	174	244	130	169	146	281	124	40	136	124
200507	184	166	49	209	190	265	141	184	158	306	135	43	148	134
200508	186	168	50	211	191	268	142	186	160	309	136	44	150	136
200509	138	125	37	157	142	199	106	138	119	229	101	33	111	101
200510	188	170	50	214	194	271	144	188	162	312	138	44	151	137
200511	181	163	48	205	186	260	138	181	156	300	132	43	146	132
200512	198	179	53	225	204	286	152	198	170	329	145	47	160	145
200513	202	182	54	229	208	291	155	202	174	335	148	48	163	147
200514	228	206	61	259	235	329	175	228	196	379	167	54	184	167
200515	244	220	65	277	251	351	187	244	210	405	179	57	197	178
200516	297	268	80	337	306	427	227	297	255	493	217	70	239	217
200517	371	335	99	421	382	534	284	371	319	616	272	87	299	271
200518	337	304	90	382	346	484	257	337	289	559	246	79	271	246
200519	313	282	84	355	322	450	239	313	269	519	229	74	252	228
200520	310	279	83	352	319	446	237	310	266	514	227	73	249	226
200521	305	275	82	346	314	439	233	305	262	506	223	72	245	222
200522	300	271	81	341	309	433	230	300	258	499	220	71	242	219
200523	402	363	108	457	414	579	308	402	346	668	294	95	324	293
200524	242	218	65	274	249	348	185	242	208	401	177	57	195	176
200525	244	220	65	277	251	351	187	244	210	405	179	57	196	178
200526	239	216	64	272	247	345	183	239	206	398	175	56	193	175
200527	258	233	69	293	265	371	197	258	222	428	189	61	208	188
200528	240	216	64	272	247	345	183	240	206	398	175	56	193	175
200529	240	216	64	272	247	345	183	240	206	398	175	56	193	175
200530	246	222	66	279	253	354	188	246	211	408	180	58	198	179
200531	266	240	71	302	274	383	204	266	229	442	195	63	214	194
200532	240	217	64	273	247	346	184	240	207	399	176	57	193	175
200533	210	189	56	238	216	302	160	210	180	348	153	49	169	153
200534	212	191	57	240	218	305	162	212	182	351	155	50	170	154
200535	209	189	56	238	215	301	160	209	180	347	153	49	168	153
200536	211	190	56	239	217	303	161	211	181	350	154	50	170	154
200537	209	189	56	237	215	301	160	209	180	347	153	49	168	153
200538	217	196	58	246	223	312	166	217	186	360	159	51	175	158
200539	236	213	63	268	243	340	181	236	203	392	173	56	190	172
200540	223	201	60	254	230	321	171	223	192	371	163	53	180	163
200541	203	183	54	230	209	292	155	203	174	337	149	48	163	148
200542	211	190	56	239	217	304	161	211	181	350	154	50	170	154
200543	223	201	60	253	229	321	170	223	191	370	163	52	179	162
200544	195	176	52	221	201	281	149	195	168	324	143	46	157	142
200545	223	201	60	254	230	322	171	223	192	371	164	53	180	163
200546	275	248	74	312	283	395	210	275	236	456	201	65	221	200
200547	366	330	98	415	376	526	280	366	314	607	268	86	294	267
200548	287	259	77	326	295	413	219	287	247	476	210	68	231	209
200549	225	203	60	255	231	323	172	225	193	373	164	53	181	164
200550	192	173	51	218	198	276	147	192	165	319	141	45	155	140
200551	201	181	54	228	207	289	154	201	173	333	147	47	162	147
200552	209	189	56	238	215	301	160	209	180	347	153	49	168	153

Appendix D: SSZ Actual VS. Predicted: 2004