### DNAP: DENHAM NASH ALLOCATION AND PLANNING

### THE REQUIREMENT

Circulation Management has at its core the need to answer three key questions on each issue of its newspaper or magazine.

- How many should we be printing?
- Where should we send them in order to maximize our sale?
- How well did I do with the last issue?

HOW MANY? The first question is almost certainly a joint decision of the distributor and the publisher and will depend on a number of factors including an analysis of recent demand, planned promotions, editorial content, and seasonal fluctuations. The relative weight of these factors will depend on the type of publication but there is an increasing trend for publishers to take a more marketing led stance. This has then led to a 'top down' rather than a 'bottom up' requirement for everybody in the supply chain. The time when publishers just added up orders from their outlets has practically vanished.

DNAP provides key decision support in terms of demonstrating relationship between supply and sales, in analyzing results of promotions/seasons, and enabling allocation to be based on the optimum distribution of a fixed amount of copy.

WHERE SHOULD THEY GO? A traditional approach would involve measuring sales from each outlet and allocating a quantity equal to expected sales+ a percentage allowance for waste. This is, of course, hopelessly simplistic and the requirement is now to

- Allow for historic stock-outs
- Measure and allow for different levels of variability in demand

- Meet for differing availability requirements for key customers
- Handle specific promotions in selected outlets.

All of this is impossible without a sophisticated computer system that takes account of all these, often conflicting, requirements. DNAP handles all this by virtue of its detailed outlet level model that enables availability and variability to be blended with a wide range of user inputs to obtain the optimum allocation from the copy available.

HOW WELL DID I DO? There is a seeming insatiable demand for statistics on availability and waste from the retail outlets- all analyzed by any criteria available. DNAP provides these in a simple form that enables the overall picture to be gained with the minimum of effort. What it does provide in addition is the ability to calculate the probable 'lost sales' from any distribution'. DNAP is able to calculate for each outlet that sold out, what would have been the likely sales if it had been given more supply. This lost sales analysis is an important indicator and can show management the results of under and over supply in easily understood terms. It nearly always shows how overall availabilities over 80% are unnecessary!

(What the system does <u>not</u> provide is the frequently found reports that show outlets that sellout at a given frequency. These reports are almost always unhelpful and lead to poor decision making as staff react blindly to the random cases of apparent 'undersupply').

## **DNAP METHODOLOGY**

The core of the unique DNAP methodology is a set of agent-level statistical models identifying the average level and pattern of variation of demand. DNAP uses a specially developed mathematical technique to build these models from recent agent-level supply and sales history, taking proper account of sold-out issues for which the true demand is not known precisely.

These models, used within a specialised search algorithm, are the key to developing optimised retail allocations of copy to maximise the total sales achieved by an issue from the total copies supplied. DNAP produces these allocations 'top down' for a given total supply quantity, or 'bottom up' to a given target availability or waste level.

The models also allow potential sales levels and availability for a range of total supply volumes to be modeled with considerable precision. This provides powerful tools for use in commercial and marketing policy formulation, and allocation performance measurement.

### **DNAP SETUP**

DNAP is a mathematical model of the distribution chain and as such has to be set up in such a way that it accurately reflects 'reality' and produces forecasts and allocations that reflect user requirements.

It does this by getting the user to maintain general system parameters (which tend to be locked once set) and constraints (which are constantly changing).

Examples of parameters are:

- The criteria for considering a sale to be out of pattern
- When to stop supply to an agent
- What weight to put on recent as distinct to old sales

Examples of constraints are:

- Minimum target availabilities for selected agents
- Restriction of supply to small volume agents
- Ring-fencing supply to specific agents
- Applying uplifts to support promotions
- Adjustments for seasonality

Constraints can be

- Globally specific (always applied)
- Title specific (always applied to a title)
- Temporary (just applied to an issue)

There is no limit to the number of these constraints that can be applied. Care must be taken however to maintain a sense of balance especially where supply is fixed. For example, high availability for a particular set of outlets can lead to starvation of others.

# THE PLANNING TABLE (FIG1)

#### **Planning Table**

| Title       | Evening Star |                     |     |             |     |
|-------------|--------------|---------------------|-----|-------------|-----|
| Cover Price | £0.45        | Wholesaler          | All | TVRegion    | All |
| Discount    | 30%          | House/Depot         | All | ANMW        | All |
| Run On Cost | £0.12        | Rep                 | All | Post Code   | All |
| Num. Boxes  | 1,437(1,421) | <b>Retail Group</b> | All | Action Code | All |
| Edition     | All          | Store Grade         | All | Class       | All |

#### Selected Issues:

| 16-Dec | 30-Dec | 13-Jan |
|--------|--------|--------|
| 20-Jan | 27-Jan | 03-Feb |

| Supply  | Predicted<br>Sales | Sales (%)<br>Maximum | Contribution<br>Predicted | Contribution<br>(%) Maximum | Efficiency (%) | Predicted<br>Availability (%) |
|---------|--------------------|----------------------|---------------------------|-----------------------------|----------------|-------------------------------|
| 77,001  | 72,927             | 98                   | 13,732                    | 100                         | 95(95)         | 52(52)                        |
| 77,847  | 73,213             | 98                   | 13,720                    | 100                         | 94(94)         | 59(59)                        |
| 78,854  | 73,499             | 99                   | 13,690                    | 100                         | 93(93)         | 67(68)                        |
| 80,001  | 73,759             | 99                   | 13,634                    | 99                          | 92(92)         | 76(77)                        |
| 81,475  | 74,006             | 99                   | 13,535                    | 99                          | 91(91)         | 86(86)                        |
| 81,833  | 74,054             | 99                   | 13,507                    | 98                          | 90(90)         | 87(88)                        |
| 82,214  | 74,099             | 99                   | 13,476                    | 98                          | 90(90)         | 88(89)                        |
| 82,673  | 74,148             | 100                  | 13,436                    | 98                          | 90(90)         | 91(91)                        |
| 83,142  | 74,194             | 100                  | 13,394                    | 98                          | 89(89)         | 92(93)                        |
| 83,703  | 74,240             | 100                  | 13,341                    | 97                          | 89(89)         | 93(94)                        |
| 84,364  | 74,287             | 100                  | 13,277                    | 97                          | 88(88)         | 95(95)                        |
| 84,730  | 74,310             | 100                  | 13,240                    | 96                          | 88(88)         | 95(96)                        |
| 85,197  | 74,335             | 100                  | 13,192                    | 96                          | 87(87)         | 96(97)                        |
| 85,687  | 74,356             | 100                  | 13,140                    | 96                          | 87(87)         | 97(97)                        |
| 86,269  | 74,378             | 100                  | 13,077                    | 95                          | 86(86)         | 97(98)                        |
| History |                    |                      |                           |                             |                |                               |
| 16-Dec  |                    | 79,711               | 72,568                    | 91(91)                      | 71(71)         |                               |
| 30-Dec  |                    | 80,939               | 70,060                    | 87(87)                      | 66(66)         |                               |
| 13-Jan  |                    | 81,619               | 74,402                    | 91(91)                      | 68(68)         |                               |
| 20-Jan  |                    | 80,936               | 73,931                    | 91(91)                      | 66(66)         |                               |
| 27-Jan  |                    | 79,568               | 72,756                    | 91(91)                      | 68(68)         |                               |
| 03-Feb  |                    | 79,528               | 72,918                    | 92(92)                      | 68(68)         |                               |
| Average |                    | 80,383               | 72,772                    | 91(90)                      | 68(68)         |                               |
|         |                    |                      |                           |                             |                |                               |

NB: Figures in brackets refer to unconstrained boxes only

Page 1 of 2

12 February 2007

Planning tables are a key feature of the system and show management the relationship between:

- Supply
- Sales
- Availability
- Efficiency
- Circulation contribution

They are designed to enable management to choose a supply level that will meet their chosen circulation objectives. This may be availability, efficiency, or circulation profitability. For the first time they can clearly see the relationship between supply and sales and know what is likely to happen if they increase or decrease the print order. In general we choose the quantity based on being able to achieve a given availability objective which we know will produce near to maximum circulation contribution. The actual DNAP allocations are then based on the optimal distribution of this chosen print order.

# Method of calculation:

- The tables are calculated by looking at what has happened over selected historical issues and building up a pattern of demand for each agent. This pattern is defined by a mathematical function that takes account of sell-outs, firm sales, casual sales and volatility in demand. The system filters out results which are out of pattern before calculating the parameters.
- The table is a calculated <u>average</u> that can be expected. Individual results will vary around this figure but in all our work we have observed a close correlation between the predictions of the table and actual results.

# THE PERFORMANCE TABLE (FIG 2)

#### Allocation Performance Report - Target Availability 75%

| Cover Price     £0.45     Wholesaler     All     TVRegion       Discount     30%     House/Depot     All     ANMW       Run On Cost     £0.12     Rep     All     Post Code       Num. Boxes     1,437(1,427)     Retail Group     All     Action Code       Edition     All     Store Grade     All     Class | 03-Feb |
|--|--------|
| Discount     30%     House/Depot     All     ANMW       Run On Cost     £0.12     Rep     All     Post Code       Num. Boxes     1,437(1,427)     Retail Group     All     Action Code       Edition     All     Store Grade     All     Class   | All    |
| Run On Cost     £0.12     Rep     All     Post Code       Num. Boxes     1,437(1,427)     Retail Group     All     Action Code       Edition     All     Store Grade     All     Class   | All    |
| Num. Boxes         1,437(1,427)         Retail Group         All         Action Code           Edition         All         Store Grade         All         Class           Selected Issues:         Store Grade         All         Class  | All    |
| Edition All Store Grade All Class Selected Issues:   | All    |
| Selected Issues:   | All    |
|  |        |
| 16-Dec 30-Dec 13-Jan   |        |
| 20-Jan 03-Feb  |        |

|                      | Target<br>Supply | Sales  | Efficiency | Availability | Contribution |
|----------------------|------------------|--------|------------|--------------|--------------|
| Actual Performance   | 79,528           | 72,918 | 92(92)     | 68(68)       | 13,426       |
| Target Performance   | 79,233           | 73,561 | 93(93)     | 74(75)       | 13,664       |
| Actual/Target (%)    | 100              | 99     | 99(99)     | 92(91)       | 98           |
| Expected Performance | 79,528           | 73,616 | 93(93)     | 77(78)       | 13,646       |
| Actual/Expected (%)  | 100              | 99     | 99(99)     | 88(88)       | 98           |
| History              |                  |        |            |              |              |
| 16-Dec               | 79,711           | 72,568 | 91(91)     | 71(71)       | 13,294       |
| 30-Dec               | 80,939           | 70,060 | 87(87)     | 66(66)       | 12,356       |
| 13-Jan               | 81,619           | 74,402 | 91(91)     | 68(68)       | 13,642       |
| 20-Jan               | 80,936           | 73,931 | 91(91)     | 66(66)       | 13,576       |
| 27-Jan               | 79,568           | 72,756 | 91(91)     | 68(68)       | 13,370       |
| 03-Feb               | 79,528           | 72,918 | 92(92)     | 68(68)       | 13,426       |
| Average              | 80,383           | 72,772 | 91(91)     | 68(68)       | 13,277       |

NB: Figures in brackets refer to unconstrained boxes only

Page 1 of 1

12 February 2007

The standard system performance report shows, for a particular issue;

- How the quantity actually distributed compares to either the quantity that will maximise contribution, or the quantity necessary to achieve a given level of availability (Target)
- How the sales actually achieved compare to the sales that would be achieved with optimum allocation. (Expected)

These figures are all derived from the planning tables that show the relationship between supply and sales and contribution. As such they are averages calculated from the base issues and sometimes a particular issue can sell more than average. Also it is useful to know where any sales shortfalls are occurring in a particular issue. A more detailed analysis is provided by the SALESEST report as shown below

# SALESEST REPORT (Fig 3)

| Name                        | House/Depot | Issue 09-Dec<br>Supply/Sale<br>s | Issue 16-Dec<br>Supply/Sales | Issue 30-Dec<br>Supply/Sales | Issue 13-Jan<br>Supply/Sales | Issue 20-Jan<br>Supply/Sales | Issue 27-Jan<br>Supply/Sales | Actual<br>Supply | Actual<br>Sales | Estimated Box<br>Demand | Estimated Lost<br>Sales | Sellouts | System<br>Recommended<br>Supply | Supply Difference<br>(Rec'd minus Actual) | Estimated<br>System Sales | Estimated<br>System Sales<br>Benefit | Predicted<br>Sellouts |
|-----------------------------|-------------|----------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------|-----------------|-------------------------|-------------------------|----------|---------------------------------|---|---------------------------|--------------------------------------|-----------------------|
| WHS RETAIL CLEVELEYS        | Coventry    | 277/261                          | 179/178                      | 179/154                      | 265/222                      | 238/197                      | 181/180                      | 172              | 172             | 205.52                  | 33.52                   | 1        | 219                             | 47  | 204.19                    | 32.19                                | 0                     |
| WHS RETAIL HARBOURNE        | Birmingham  | 301/233                          | 160/160                      | 189/179                      | 172/172                      | 293/193                      | 155/144                      | 170              | 170             | 185.56                  | 15.56                   | 1        | 193                             | 23  | 183.82                    | 13.82                                | 0                     |
| WAITROSE AMPTHILL 722       | Bedford     | 180/179                          | 185/157                      | 235/182                      | 180/179                      | 190/188                      | 190/167                      | 169              | 169             | 183.71                  | 14.71                   | 1        | 191                             | 22  | 182.02                    | 13.02                                | 0                     |
| MRS TRIPTA CHADHA (COLLECT) | Birmingham  | 94/79                            | 81/38                        | 49/45                        | 81/48                        | 57/19*                       | 51/38                        | 39               | 39              | 48.66                   | 9.66                    | 1        | 54                              | 15  | 47.93                     | 8.93                                 | 0                     |
| HILTON HOTEL                | Birmingham  | 6/6                              | 5/5                          | 8/8                          | 9/9                          | 9/9                          | 12/12                        | 4                | 4               | 12.99                   | 8.99                    | 1        | 14                              | 10  | 12.78                     | 8.78                                 | 0                     |
| TESCO QUINTON 5325          | Birmingham  | 150/103                          | 106/105                      | 204/129                      | 120/120                      | 140/131                      | 140/110                      | 117              | 117             | 127.29                  | 10.29                   | 1        | 131                             | 14  | 125.52                    | 8.52                                 | 0                     |
| PEDMORE LONDIS STORES       | Birmingham  | 45/38                            | 43/43                        | 73/73                        | 46/42                        | 52/36                        | 41/41                        | 43               | 43              | 50.44                   | 7.44                    | 1        | 54                              | 11  | 49.49                     | 6.49                                 | 0                     |
| MARTINS 176                 | Bedford     | 143/126                          | 132/132                      | 137/114                      | 138/137                      | 140/139                      | 136/135                      | 139              | 139             | 147.49                  | 8.49                    | 1        | 148                             | 9   | 144.92                    | 5.92                                 | 0                     |
| AS & JK SURA                | Birmingham  | 86/86                            | 89/75                        | 104/88                       | 88/88                        | 92/90                        | 94/79                        | 83               | 83              | 89.66                   | 6.66                    | 1        | 92                              | 9   | 88.45                     | 5.45                                 | 0                     |
| CHOHAN MR                   | Birmingham  | 224/190                          | 203/202                      | 228/209                      | 219/210                      | 216/203                      | 210/193                      | 202              | 202             | 208.46                  | 6.46                    | 1        | 210                             | 8   | 206.92                    | 4.92                                 | 0                     |
| MARKS & SPENCER 5351        | Birmingham  | 57/29                            | 59/36                        | 71/23*                       | 53/53                        | 58/44                        | 57/57                        | 62               | 62              | 64.25                   | 2.25                    | 1        | 53                              | -9  | 53                        | -9                                   | 1                     |
| Marks & Spencer 602         | Bedford     | 145/126                          | 140/140                      | 150/109                      | 135/129                      | 150/135                      | 150/111                      | 144              | 144             | 148.32                  | 4.32                    | 1        | 134                             | -10                                       | 134                       | -10                                  | 1                     |
| KWIKSAVE                    | Birmingham  | 28/20                            | 26/24                        | 28/22                        | 42/42                        | 47/47                        | 51/0*                        | 49               | 49              | 50.74                   | 1.74                    | 1        | 39                              | -10                                       | 39                        | -10                                  | 1                     |
| WHS BIRMINGHAM INT STATION  | Birmingham  | 93/30                            | 75/22                        | 21/16                        | 66/18                        | 66/10                        | 62/14                        | 32               | 30              | 30                      | 0                       | 0        | 20                              | -12                                       | 20                        | -10                                  | 1                     |
| FORBOUYS 6890               | Birmingham  | 259/256                          | 262/254                      | 223/223                      | 305/270                      | 297/238                      | 270/270                      | 290              | 289             | 289                     | 0                       | 0        | 278                             | -12                                       | 278                       | -11                                  | 1                     |
| SAINSBURYS MAYPOLE 545      | Birmingham  | 296/278                          | 299/272                      | 321/274                      | 318/286                      | 298/267                      | 291/260                      | 295              | 293             | 293                     | 0                       | 0        | 279                             | -16                                       | 279                       | -14                                  | 1                     |
| MR MOHAMMED RAFIQ           | Birmingham  | 93/74                            | 84/73                        | 73/73                        | 85/79                        | 110/108                      | 120/118                      | 136              | 120             | 120                     | 0                       | 0        | 106                             | -30                                       | 106                       | -14                                  | 1                     |
| ONE STOP CONVENIENCE STORES | Birmingham  | 88/84                            | 88/83                        | 80/67                        | 92/78                        | 91/71                        | 105/99                       | 104              | 103             | 103                     | 0                       | 0        | 89                              | -15                                       | 89                        | -14                                  | 1                     |
| ASDA - MINWORTH 012091-030  | Birmingham  | 329/315                          | 339/283                      | 335/310                      | 336/291                      | 314/314                      | 335/310                      | 338              | 338             | 342.89                  | 4.89                    | 1        | 320                             | -18                                       | 320                       | -18                                  | 1                     |
| ONE STOP CONV               | Birmingham  | 305/278                          | 294/278                      | 296/267                      | 295/295                      | 310/309                      | 330/330                      | 350              | 350             | 355.22                  | 5.22                    | 1        | 320                             | -30                                       | 320                       | -30                                  | 1                     |
| DILLONS 6133                | Birmingham  | 25/23                            | 0/0*                         | 0/0*                         | 50/35                        | 60/39                        | 10/7*                        | 100              | 84              | 84                      | 0                       | 0        | 38                              | -62                                       | 38                        | -46                                  | 1                     |
|                             |             |                                  |                              |                              |                              |                              |                              | 79,528           | 72,918          | 74,081                  | 1,163                   | 452      | 79,528                          | 0   | 73,036                    | 118                                  | 433                   |
|                             |             | -                                |                              |                              |                              |                              |                              |                  |                 | % sold out in r         | eference issue          | 31.70%   |                                 | % selling out follow                      | ing recommend             | ed allocation                        | 30.30%                |

This report is a detailed agent by agent report on a historical issue. The output is produced in the form of an EXCEL spreadsheet with a row for every box in the selection, and main columns as follows:

- Box /Agent Description
- Depot/Edition
- Sales History
- IN GREEN-
- Actual supply for the issue
- Actual sales for the issue

- Expected box demand This is the actual sale, if system did not sell out. or the calculated demand based on both history and the reference issue
- Estimated lost sales In sold-out boxes this is the expected demand minus the actual supply and gives an estimate of the sales lost due to stock-outs.
- Number of stock-outs
- IN YELLOW-
- What the system would have supplied for that issue
- Supply difference with actual
- Estimated sales that would have been made by the system
- Difference between actual and theoretical
- Estimated stock-outs for theoretical allocation

The report shows us the important figure for estimated lost sales in each box (this can be totaled for any criteria) and also how the actual allocation would compare to the system allocation. As an extension to this, we can test the effect of different supply quantities on both waste and availability.

# **ALLOCATION REPORTS**

The system enables the user to allocate in one of three ways:

- A given quantity (the most common method)
- To meet a given level of availability
- To meet a given level of waste

In each case the system will distribute copy amongst outlets so that sales will be maximized, taking into account all the numerous constraints that need to be applied. The output from this process is presented to the user in the form of a 'live report' which can be reviewed and if necessary modified before the plan is committed to dispatch. The system can display the results of the allocation process in a variety of ways. The examples shown here are first a simple allocation by retail outlet and then a summarized allocation where the quantities are defined at an intermediate depot level.

The allocation reports are designed to be easy to use. The sort order shown reflects descending change since a defined reference point, and stockouts and unusual historic sales figures are highlighted. In practice a user would examine just large changes to check that there had not been any changes of circumstances that warranted a manual over-ride to be applied.

# AGENT LEVEL ALLOCATION REPORT (Fig 4)

| Anocution by  | Agem                                   |               | -    |         |         |         |          |         |         |        |       |        | 10000 |            |           |        |         |
|---------------|--|---------------|------|---------|---------|---------|----------|---------|---------|--------|-------|--------|-------|------------|-----------|--------|---------|
| 7141          | Energian Ohne                          |               |      |         |         |         |          |         | EDITION |        |       | WAS    | EDITS | NOW        |           |        |         |
| ntie:         | Evening star                           |               |      |         |         |         |          |         | TOTAL   | 1      | 1     | /9,/49 | 0     | /9,/49     |           |        |         |
| Target Issue: | 10th Feb                               |               |      |         |         |         |          |         |         |        |       |        |       |            |           |        |         |
| Date:         | Monday 12 February 2007                |               |      |         |         |         |          |         |         |        |       |        |       |            |           |        | -       |
| Reference     | 03-Feb                                 |               |      |         |         |         |          |         |         |        |       |        |       |            |           |        |         |
| Agent         | Agent Description                      | House / Depot | ANMW | 16-Dec  | 30-Dec  | 13-Jan  | 20-Jan   | 27-Jan  | 03-Feb  | Supply | Avail | Adjust | so    | Ref Supply | New Alloc | Change | Edition |
| 201191        | TESCO KNOWLE METRO 2785                | Birmingham    | CCC  | 318/267 | 315/280 | 0/0     | 0/0      | 0/0     | 0/0     | n/a    | n/a   | n/a    | 302   | 0          | 302       | 302    | TOTAL   |
| 231557        | Marks & Spencer 2969                   | Birmingham    | MSN  | 550/550 | 462/462 | 620/620 | 670/138* | 400/400 | 420/420 | n/a    | n/a   | n/a    | 420   | 420        | 644       | 224    | TOTAL   |
| 207647        | WHS RETAIL CLEVELEYS                   | Coventry      | MSN  | 179/178 | 179/154 | 265/222 | 238/197  | 181/180 | 172/172 | n/a    | n/a   | n/a    | 229   | 172        | 209       | 37     | TOTAL   |
| 216044        | WHS RETAIL SOLIHULL                    | Birmingham    | MSN  | 300/300 | 345/240 | 360/344 | 423/422  | 300/299 | 315/299 | n/a    | n/a   | n/a    | 320   | 315        | 347       | 32     | TOTAL   |
| 201244        | FORBUOYS 6913                          | Coventry      | CTN  | 264/264 | 245/245 | 330/286 | 306/279  | 267/266 | 255/253 | n/a    | n/a   | n/a    | 282   | 255        | 285       | 30     | TOTAL   |
| 207744        | MORRISONS PLC THORNTON 218             | Coventry      | SUP  | 253/221 | 276/275 | 225/224 | 242/242  | 265/242 | 241/237 | n/a    | n/a   | n/a    | 250   | 241        | 267       | 26     | TOTAL   |
| 233724        | WAITROSE AMPTHILL 722                  | Bedford       | SUP  | 185/157 | 235/182 | 180/179 | 190/188  | 190/167 | 169/169 | n/a    | n/a   | n/a    | 169   | 169        | 191       | 22     | TOTAL   |
| 200863        | WHS RETAIL HALESOWEN                   | Birmingham    | MSN  | 135/135 | 150/136 | 165/164 | 223/193  | 150/150 | 150/136 | n/a    | n/a   | n/a    | 163   | 150        | 172       | 22     | TOTAL   |
| 216054        | WHS RETAIL POULTON                     | Coventry      | MSN  | 139/139 | 144/118 | 191/173 | 187/158  | 146/138 | 132/122 | n/a    | n/a   | n/a    | 151   | 132        | 153       | 21     | TOTAL   |
| 203522        | MARTINS196                             | Bedford       | CTN  | 229/214 | 244/231 | 229/229 | 232/230  | 226/225 | 227/226 | n/a    | n/a   | n/a    | 227   | 227        | 248       | 21     | TOTAL   |
| 200922        | WHS RETAIL HARBOURNE                   | Birmingham    | MSN  | 160/160 | 189/179 | 172/172 | 293/193  | 155/144 | 170/170 | n/a    | n/a   | n/a    | 170   | 170        | 189       | 19     | TOTAL   |
| 219322        | MR FRANCIS JEEVARATNAM                 | Coventry      | CON  | 55/45   | 51/44   | 48/36   | 71/71    | 76/47   | 71/44   | n/a    | n/a   | n/a    | 57    | 71         | 55        | -16    | TOTAL   |
| 200892        | MORRISONS PFS RUBERY 259               | Birmingham    | PFC  | 58/58   | 53/42   | 63/31   | 54/35    | 36/26   | 58/20*  | n/a    | n/a   | n/a    | 58    | 58         | 42        | -16    | TOTAL   |
| 206734        | ASDA BROMSGROVE 012091-030             | Birmingham    | SUP  | 260/260 | 307/259 | 304/281 | 294/263  | 285/220 | 289/261 | n/a    | n/a   | n/a    | 289   | 289        | 272       | -17    | TOTAL   |
| 201195        | MIDLANDS COOP LTD (CWS) 0730           | Birmingham    | CON  | 118/90  | 112/79  | 114/114 | 119/119  | 127/127 | 139/109 | n/a    | n/a   | n/a    | 139   | 139        | 121       | -18    | TOTAL   |
| 201089        | FIRST CHOICE NEWS * CONV STORE L03-Feb | Birmingham    | CON  | 338/306 | 330/302 | 328/305 | 316/304  | 333/303 | 323/297 | n/a    | n/a   | n/a    | 311   | 323        | 305       | -18    | TOTAL   |
| 226331        | MR MOHAMMED RAFIQ                      | Birmingham    | GRO  | 84/73   | 73/73   | 85/79   | 110/108  | 120/118 | 136/120 | n/a    | n/a   | n/a    | 121   | 136        | 117       | -19    | TOTAL   |
| 228778        | SAINSBURYS NORTHFIELD 2220             | Birmingham    | SUP  | 275/232 | 274/262 | 271/253 | 264/236  | 257/187 | 261/217 | n/a    | n/a   | n/a    | 261   | 261        | 241       | -20    | TOTAL   |
| 200893        | MORRISONS SUPERMARKETS RUBERY 2503-Feb | Birmingham    | SUP  | 266/255 | 301/246 | 298/269 | 281/281  | 300/245 | 289/232 | n/a    | n/a   | n/a    | 289   | 289        | 268       | -21    | TOTAL   |
| 200919        | SOMERFIELD STORES LTD HARBOURNE 03-Feb | Birmingham    | SUP  | 137/127 | 150/102 | 149/149 | 156/156  | 166/136 | 164/114 | n/a    | n/a   | n/a    | 164   | 164        | 142       | -22    | TOTAL   |
| 201257        | TESCO (MU) Coventry                    | Coventry      | SUP  | 342/259 | 267/266 | 305/242 | 306/288  | 299/194 | 293/269 | n/a    | n/a   | n/a    | 348   | 293        | 268       | -25    | TOTAL   |
| 207640        | PAUL & VIVIEN BONSOR                   | Coventry      | SEA  | 214/190 | 338/296 | 261/253 | 286/226  | 280/239 | 284/242 | n/a    | n/a   | n/a    | 308   | 284        | 256       | -28    | TOTAL   |
| 207547        | WHS NEW STREET STATION 2619            | Birmingham    | TRA  | 260/256 | 302/216 | 285/221 | 343/221  | 251/225 | 266/221 | n/a    | n/a   | n/a    | 266   | 266        | 237       | -29    | TOTAL   |
| 200879        | SAINSBURYS SELLY OAK 865               | Birmingham    | SUP  | 285/201 | 246/242 | 299/258 | 269/267  | 285/284 | 310/269 | n/a    | n/a   | n/a    | 310   | 310        | 280       | -30    | TOTAL   |
| 221016        | SAINSBURYS CASTLE VALE 2106            | Birmingham    | SUP  | 319/319 | 373/252 | 370/284 | 318/243  | 289/273 | 322/284 | n/a    | n/a   | n/a    | 322   | 322        | 290       | -32    | TOTAL   |
| 201181        | SAINSBURYS SOLIHULL 805                | Birmingham    | SUP  | 304/279 | 330/278 | 326/313 | 327/320  | 341/325 | 354/277 | n/a    | n/a   | n/a    | 354   | 354        | 318       | -36    | TOTAL   |
| 229437        | M & S BIRMINGHAM 7600                  | Birmingham    | MSN  | 160/160 | 189/130 | 187/187 | 195/193  | 206/127 | 201/123 | n/a    | n/a   | n/a    | 201   | 201        | 163       | -38    | TOTAL   |

This report shows the supply and sales history for each agent -identifying where it has sold out or where the sales are out of pattern. It shows if any constraints have been applied to that agent, the current supply figure and the suggested supply for the planned issue. This suggested supply can be amended by user modification of the figures, details of these changes are shown in a counter at the top of the report. When the allocation has been checked it is then posted off to update the main dispatch system.

# **DEPOT LEVEL ALLOCATION REPORT (Fig 5)**

This works in the same way as the previous report but produces as output total figures for a depot or wholesale House.

| Allocation By Houses |                 |               |               |               |               |               |           |        |                     |        |
|----------------------|-----------------|---------------|---------------|---------------|---------------|---------------|-----------|--------|---------------------|--------|
|                      |                 |               |               | EDITION       |               |               | WAS EDITS |        | NOW                 |        |
| Title:               | Evening Star    | 8             |               | All           |               | 79,749        | 0         | 79,749 |                     |        |
| Target Issue:        | 10th Feb        |               |               |               |               |               |           |        |                     |        |
| Date                 | Mon 12 Feb 2007 |               |               |               |               |               |           |        |                     |        |
| Reference            | 03-Feb          |               |               |               |               |               |           |        |                     |        |
| Edition              | 16-Dec          | 30-Dec        | 13-Jan        | 20-Jan        | 27-Jan        | 03-Feb        | SO        | REF    | New Alloc.          | Change |
| Birmingham           | 44,808/40,430   | 46,032/38,859 | 46,785/41,716 | 46,010/41,114 | 44,838/40,414 | 44,775/40,627 | 45,252    | 44,775 | 44,996              | 221    |
| Bedford              | 16,069/15,037   | 16,209/14,405 | 16,156/15,364 | 16,222/15,518 | 16,214/15,222 | 16,220/15,225 | 16,245    | 16,220 | 16,365              | 145    |
| Coventry             | 18,834/17,101   | 18,698/16,796 | 18,678/17,322 | 18,704/17,299 | 18,516/17,120 | 18,533/17,066 | 20,970    | 18,533 | <mark>18,388</mark> | -145   |
| Totals               | 79,711/72,568   | 80,939/70,060 | 81,619/74,402 | 80,936/73,931 | 79,568/72,756 | 79,528/72,918 | 82,467    | 79,528 | 79,749              | 221    |

In this case changes would be applied to a depot supply. It would be used in cases where the initial allocation is made to a house/ depot and where the depot then handles the detailed retail allocations.

# **KEY PERFORMANCE INDICATOR (KPI) REPORTS (Fig 6, Fig 7)**

#### Percentage Waste by ANMW

Title: Evening Star

|           | Number | of Agents | 16-   | Dec   | 30-   | Dec   | 13-   | Jan   | 20-   | Jan   | 27-   | Jan   | 03-   | Feb   |    | Aver | age   |
|-----------|--------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|------|-------|
| ANMW      | Total  | Free      | All   | Free  | All   | Free  | All   | Free  | All   | Free  | All   | Free  | All   | Free  |    | All  | Free  |
| CON       | 423    | 423       | 8.8%  | 8.8%  | 13.9% | 13.9% | 7.8%  | 7.8%  | 6.4%  | 6.4%  | 7.2%  | 7.2%  | 8.5%  | 8.5%  | 8  | .8%  | 8.8%  |
| MSN       | 41     | 41        | 7.3%  | 7.3%  | 22.6% | 22.6% | 9.5%  | 9.5%  | 23.2% | 23.2% | 7.6%  | 7.6%  | 12.2% | 12.2% | 14 | 4.0% | 14.0% |
| CTN       | 560    | 560       | 6.6%  | 6.6%  | 9.5%  | 9.5%  | 8.0%  | 8.0%  | 7.2%  | 7.2%  | 7.1%  | 7.1%  | 6.0%  | 6.0%  | 7  | .4%  | 7.4%  |
| CFC       | 39     | 39        | 22.5% | 22.5% | 23.6% | 23.6% | 11.1% | 11.1% | 12.1% | 12.1% | 11.9% | 11.9% | 14.6% | 14.6% | 16 | 5.0% | 16.0% |
| SUP       | 70     | 70        | 11.9% | 11.9% | 15.1% | 15.1% | 9.0%  | 9.0%  | 8.1%  | 8.1%  | 11.9% | 11.9% | 9.4%  | 9.4%  | 1( | 0.9% | 10.9% |
| SER       | 4      | 4         | 26.4% | 26.4% | 14.3% | 14.3% | 53.7% | 53.7% | 20.9% | 20.9% | 42.5% | 42.5% | 23.4% | 23.4% | 31 | 1.9% | 31.9% |
| PFC       | 73     | 73        | 11.9% | 11.9% | 12.6% | 12.6% | 11.3% | 11.3% | 7.9%  | 7.9%  | 10.6% | 10.6% | 14.4% | 14.4% | 11 | 1.5% | 11.5% |
| CCC       | 35     | 35        | 11.2% | 11.2% | 22.8% | 22.8% | 15.2% | 15.2% | 10.8% | 10.8% | 13.6% | 13.6% | 10.4% | 10.4% | 14 | 4.2% | 14.2% |
| TRA       | 6      | 6         | 21.0% | 21.0% | 16.1% | 16.1% | 25.5% | 25.5% | 35.9% | 35.9% | 21.5% | 21.5% | 12.6% | 12.6% | 22 | 2.6% | 22.6% |
| CAP       | 10     | 10        | 19.5% | 19.5% | 4.8%  | 4.8%  | 22.3% | 22.3% | 8.0%  | 8.0%  | 6.2%  | 6.2%  | 6.0%  | 6.0%  | 11 | 1.4% | 11.4% |
| ITP       | 3      | 3         | 3.5%  | 3.5%  | 15.6% | 15.6% | 29.1% | 29.1% | 13.5% | 13.5% | 24.0% | 24.0% | 16.0% | 16.0% | 17 | 7.4% | 17.4% |
| SEA       | 29     | 29        | 16.3% | 16.3% | 21.3% | 21.3% | 11.0% | 11.0% | 11.6% | 11.6% | 10.3% | 10.3% | 11.9% | 11.9% | 14 | 4.0% | 14.0% |
| ROU       | 10     | 0         | 3.3%  | n/a   | 7.6%  | n/a   | 5.2%  | n/a   | 2.3%  | n/a   | 5.0%  | n/a   | 4.1%  | n/a   | 4  | .6%  | n/a   |
| GRO       | 98     | 98        | 8.1%  | 8.1%  | 10.9% | 10.9% | 6.8%  | 6.8%  | 5.3%  | 5.3%  | 7.6%  | 7.6%  | 8.3%  | 8.3%  | 7  | .8%  | 7.8%  |
| MIS       | 8      | 8         | 9.0%  | 9.0%  | 12.7% | 12.7% | 9.1%  | 9.1%  | 5.9%  | 5.9%  | 17.4% | 17.4% | 5.2%  | 5.2%  | 9  | .8%  | 9.8%  |
| STR       | 3      | 3         | 26.2% | 26.2% | 30.8% | 30.8% | 13.2% | 13.2% | 18.4% | 18.4% | 2.8%  | 2.8%  | 20.5% | 20.5% | 18 | 8.3% | 18.3% |
| UNI       | 1      | 1         | 66.7% | 66.7% | n/a   | n/a   | 43.8% | 43.8% | 56.2% | 56.2% | 47.1% | 47.1% | 10.5% | 10.5% | 4( | 0.5% | 40.5% |
| <u>(4</u> |        |           |       |       |       |       |       |       |       |       |       |       |       |       |    |      |       |
| Total     | 1,420  | 1,410     | 9.0%  | 9.0%  | 13.4% | 13.5% | 8.8%  | 8.9%  | 8.7%  | 8.7%  | 8.6%  | 8.6%  | 8.3%  | 8.4%  | 9  | .5%  | 9.5%  |

(Note: The free and all columns on this report enable the user to distinguish between all the agents and those with constraints on them)

#### Potential Extra Sales by House Depot

Title: Evening Star

| 1          | Number | of Agents | 16-E   | Dec   | 30-E   | Dec   | 13-    | Jan      | 20-    | Jan   | 27-    | Jan   | 03-F   | eb    | Ave    | age   |
|------------|--------|-----------|--------|-------|--------|-------|--------|----------|--------|-------|--------|-------|--------|-------|--------|-------|
| House Dep  | Total  | Free      | Copies | Sales | Copies | Sales | Copies | es Sales | Copies | Sales | Copies | Sales | Copies | Sales | Copies | Sales |
| Birmingham | 980    | 977       | 972    | 2.4%  | 1,488  | 3.8%  | 778    | 1.9%     | 725    | 1.8%  | 972    | 2.4%  | 931    | 2.3%  | 978    | 2.4%  |
| Coventry   | 247    | 246       | 189    | 1.1%  | 366    | 2.2%  | 275    | 1.6%     | 248    | 1.4%  | 181    | 1.1%  | 170    | 1.0%  | 238    | 1.4%  |
| Bedford    | 193    | 187       | 229    | 1.5%  | 279    | 1.9%  | 270    | 1.8%     | 237    | 1.5%  | 182    | 1.2%  | 206    | 1.4%  | 234    | 1.5%  |
| Total      | 1,420  | 1,410     | 1,390  | 1.9%  | 2,133  | 3.0%  | 1,323  | 1.8%     | 1,209  | 1.6%  | 1,334  | 1.8%  | 1,306  | 1.8%  | 1,449  | 2.0%  |

These reports provide performance information for each title in terms of Availability, waste, waste % and estimated sales potential. These reports can be produced for any of the criteria specified in the data. Output is to an EXCEL spreadsheet which can then be used to produce tuned reports and /or graphs as required.

# PROFILE REPORT (Fig8, Fig 9, Fig 10)

This report presents the sales history in forms designed to help to identify trends and seasonal factors which may apply. The system will show for any combination of Agents:

- Graphs showing total supply, total sales, total waste, % waste, and availability.
- Moving averages of sales covering a user-specified set of data point counts This smoothes out the effects of short term fluctuations allowing trends to be seen more easily. In particular, for seasonal sales patterns, the moving averages over a data point count equal to the seasonal cycle will show the underlying trend with seasonal variations removed.
- Profile factors of sales covering each of the data point counts set by the user when running the report. For each issue these are the ratio of that issue sales to the moving average for the immediately preceding issues, e.g. for a data point count of 5 issues the value shown in the row for issue 6 will be the ratio of issue 6 sales to the average sales for issues 1, 2, 3, 4, and 5. These factors are helpful in forecasting the sales of the forthcoming issue taking account of recent issue sales and seasonal patterns.



----- Actual Waste

•





----- Actual Availability

•

Actual % Waste





# **BENEFITS OF USING DNAP**

The benefits that can be derived from the system are usually easy to quantify.

Most commonly they can from one or all of:

- Reduced waste
- Reduced clerical effort
- Increased sales

WASTE The major factor in the generation of waste is the setting of excessive print quantities. Not clearly understanding the realtionship between supply sales and circulation profit leads to unneccessary supply. DNAP provides the information to ensure print orders are set correctly. The other factor is the quality of the allocation. Flooding some areas and starving others (comparatively) is a poor way to use the available copy. Again DNAP ensures the distribution is made in an optimal way. It should be pointed out that the importance of allocation increases as supply is reduced. The only reason that poor allocation systems are commonly used is that there is so much copy available that nobody goes short!

REDUCED CLERICAL EFFORT The daily checking of thousands sof outlet/title combinations is impossible without a formal computer system. By producing high quality allocations that can be trusted, along with exception reporting for manual checking of 'out of pattern' results, DNAP enables this work to be carried out in a fast and efficient way. Clerical savings are the easiest benefit to show from the system.

INCREASED SALES. The efficient allocation of copy will lead to reduced stockouts and the chance to increase sales. In practice this is the least likely quantifiable benefit as publishers often run at very high levels of waste and opportunies for extra sales are limited. Benefits only arise when allocations are seriously out of order.

DNAP is always implemented on the basis of being able to achieve hard financial benefits. Payback on investment is usually within a year or less.

# **TECHNICAL BASICS**

LANGUAGE The core algorithms in the system are written in C. The PC shell has traditionally used a MS Access database with major routines written in VB with a mixture of custom and EXCEL outputs. The current version is written in VB.net running within the .NET environment. The database is Microsoft SQL Server Desktop Engine (MSDE).

DESKTOP. Desktop systems can be run on any normal modern PC with MS Windows 2000 and MS Office 2000 or later. (Including MS Vista and Office 2007). Allocation speed is dependant on processor performance and the more powerfull the processor the better especially in cases where allocations are required on more than 10,000 agents. A typical allocation is performed at the rate of 300 Agents/sec on a good office PC.

INTERFACES The system gets its data from the main customer database that holds detailed sales history and outlet details. It will import thios data in flat files and then, after allocation runs, return results to the main system in a similar way.