NOTE ON THE BLOCKING FLOW SHOP PROBLEM

Ramon Companys

Departament d'Organització d'Empreses. Escola Tècnica Superior d'Enginyeria de Barcelona. Universitat Politècnica de Catalunya. Av. Diagonal, 647, 08028. Barcelona. ramón.companys@upc.edu

Abstract: We present some results attained with different algorithms for the Fm|block|C_{max} problem using as experimental data the well-known Taillard instances.

Keywords: Scheduling, heuristic algorithms, blocking flow shop.

1. **Introduction**.

This work deals with the permutation flow-shop scheduling problem without storage space between stages. If there is enough storage space between machine j and machine j+1, the job i can wait there for the next operation, machine j is released and can work on another job. But, if there is no storage space between stages, then intermediate queues of jobs waiting in the system for their next operation are not allowed. If operation on machine j for a job i is finished and the next machine, j+1, is still busy on the previous job, the completed job i has to be blocked into machine j. For simplicity purposes we call BFSP (blocking flow shop problem) the problem considered and PFSP (permutation flow shop problem) the equivalent case with unlimited storage space.

The most common criterion, here considered, is the minimization of the makespan or maximum completion time. Using notation of proposed by Graham et al. (1979) the problem is denoted by Fm|block|C_{max} (and Fm|prmu|C_{max} the PFSP).

Hall and Sriskandarajah (1996) published a review on flow shop with blocking and no-wait in-process. If the number of machines is two, Reddi and Ramamoorthy (1972) showed there exists a polynomial algorithm, which gives an exact solution for the BFSP. The problem F2|block|C_{max} can be reduced to a travelling salesman problem (TSP) with n+1 towns (0, 1, 2, ..., n). The sequence of towns in an optimal path corresponds to an optimal permutation for the original problem. Gilmore and Gomory (1964) proposed a polynomial algorithm to solve this problem that is $O(n \log n)$ time (Gilmore *et al.* (1985)). Hall and Sriskandarajah (1996) showed, using a result from Papadimitriou and Kanellakis (1980), that Fm|block|C_{max} problem for $m \geq 3$ machines is strongly NP-hard. Débora P. Ronconi (2004) proposes several heuristics for Fm|block|C_{max}, two of them based on NEH. Using an elaborated lower bound Ronconi (2005) presents a branch-and-bound algorithm; this algorithm becomes a heuristic because the CPU time of a run is limited. Józef Grabowski and Jaroslaw Pempera (2.007) develop a tabu search algorithm. A more detailed state of the art can be found in Companys et al. (to be published).

1.1 Problem description.

At time zero, n jobs must be processed, in the same order, on each of m machines. Each job goes from machine 1 to machine m. The processing time for each operation is $p_{j,i}$, where $j \in \{1, 2, \ldots, m\}$ denotes a machine and $i \in \{1, 2, \ldots, n\}$ a job. Setup times are included in processing times. These times are fixed, known in advance and positive. The objective function considered is the minimization of the makespan.

Given a permutation, **P**, of the n jobs, [k] indicates the job that occupies position k in the sequence. For example, in **P** = (3, 1, 2) [1] = 3, [2] = 1, [3] = 2. For this permutation, in every machine, job 2 occupies position 3. In a feasible schedule associated to a permutation, let $e_{j,k}$ be the beginning of the time destined in machine j to job that occupies position k and $f_{j,k}$ the time of the job that occupies position k releases machine j. The Fm|prmu|C_{max} problem can be formalized as follows:

$$e_{j,k} + p_{j,[k]} \leq f_{j,k} \qquad j=1,2,...,m \qquad k=1,2,...,n \qquad (1)$$

$$e_{j,k} \geq f_{j,k-1} \qquad j=1,2,...,m \qquad k=1,2,...,n \qquad (2)$$

$$e_{j,k} \geq f_{j-1,k} \qquad j=1,2,...,m \qquad k=1,2,...,n \qquad (3)$$

$$C_{max}=f_{m,n} \qquad (4)$$

Being, $f_{j,0} = 0 \quad \forall j \quad , \quad f_{0,k} = 0 \quad \forall k$, the initial conditions.

The schedule is semi-active if equation (1) is written as $e_{j,k} + p_{j,[k]} = f_{j,k}$ and equations (2) and (3) are summarized as $e_{jk} = \max\{f_{j,k-1}; f_{j-1,k}\}$.

When there is no storage space between stages, Fm|block|C_{max} problem, if a job i finishes its operation on a machine j and if the next machine, j+1, is still busy on the previous job, the completed job i has to remain on the machine j blocking it. This condition requires an additional equation (5) in the formulation of the problem.

$$f_{j,k} \geq f_{j+1,k-1} \qquad j=1,2,...,m \qquad k=1,2,...,n \qquad (5)$$

The initial condition $f_{m+1,k} = 0 \quad k=1,2,...,n$ must be added.

The schedule obtained is semi-active if equation (1) and (5) is summarized as (5'):

$$f_{j,k} = \min\{e_{j,k} + p_{j,[k]}, f_{j+1,k-1}\} \qquad (5`)$$

Consequently, the Fm|prmu|C_{max} problem can be seen as a relaxation of the Fm|block|C_{max} problem.

1.2. Reversibility for the permutation and blocking flow shop problems.

Given an instance ***I*,** of the Fm│prmu│C_{max} problem or the Fm│block│C_{max} problem. with processing times $p_{j,i}$ one can determine another instance ***I'***, with processing times $p'_{j,i}$ calculated as (6) :

$$p'_{j,i} = p_{m-j+1,i} \qquad j = 1, 2, ..., m \quad i = 1, 2, ..., n \qquad (6)$$

For a permutation **P,** the value C_{max} in ***I*** is the same as the one given in ***I'*** for the inverse permutation **P'**. So, the minimum of maximum completion time is the same for ***I*** and ***I'***, and the permutations associated to both instances are inverse one each other. It does not matter to solve ***I*** or to solve *I'*. ***I*** an**d** ***I'*** can be seen as two views of the same instance. We call them the direct view and the inverse view, direct and inverse being relative. Some authors, as Brown and Lomnick (1966) and McMahon and Burton (1967), have found from computational results that the inverse view was sometimes solved more efficiently than the direct one when Branch and Bound procedures were used. The author has observed that sometimes the direct view behaves better for solutions, whereas the inverse view behaves better for bounds. Pinedo (1995) formalizes the relationship between direct and inverse views in two lemmas, one for each of the problems Fm│prmu│C_{max} and Fm│block│C_{max}.

2. Heuristic procedures.

The complexity of the Fm│prmu│C_{max} problem and the Fm│block│C_{max} problem does not allow to obtain efficiently the optimal solution using exacts methods for instances of more than few jobs and/or machines. This is the main reason for the different heuristics proposed in the literature. The heuristics can be divided in constructive heuristics, which build a feasible schedule progressively and the improvement heuristics, which try to improve an initial schedule, generated exploring its neighborhood. Obviously most effective heuristics are the melting of a (or several) constructive heuristic and a (or several) improvement heuristic.

The heuristic procedures here proposed are applied to the direct and inverse views of each instance retaining the best of the two solutions. These procedures are composed for three steps (see Figure 1). The two first steps, based on the NEH heuristic, construct an initial solution and then in step 3 an attempt to improve it is made through a iterative local search procedure which we have called Soft Simulated Annealing (SSA).

Different authors have observed that the NEH procedure, as proposed by Nawaz, Enscore and Ham (1983), can be considered to be made up of two phases: (1) the creation of the initial sequence of the jobs, (2) and the procedure of iterative insertion in accordance with the initial sequence obtained in step 1. Given the eficiency of this procedure, authors contributing to the literature on the subject have proposed different variants, the majority based on the way in which the jobs are ordered initially. In this article we have compared the performance of heuristics resulting from the implementation of 7 initial ordering procedures (LPT, NM, MM, PF, TR, PO, KK).

In step 2 of the NEH heuristic no explicit tie-breaking criterion is specified for when two different positions give the same makespan, as is stated for various authors, as

Kalczynski and Kamburowski (2008). We have used the minimization of the machine idle times as the principal tie-breaking criterion.

Step 3 consists of a iterative local improvement procedure by interchanging jobs not necessarily adjacent, working with tie-breaking, solutions with the same makespan, and random paths.

In the following sections each of the three steps are described.

2.1. **The First Step: initial ordering phase.**

Firstly we have considered 7 initial sequencing rules for the jobs. Each rule defines a variant of the procedure proposed. The rules considered are: the NEH proposal (LPT), the Nagano and Moccellin (NM), the ordering rule proposed by Ronconi (MM), the obtained by the *Profile Fitting heuristic* (PF) proposed by McCormick *et al.*, the sequence obtained through the Trapezium procedure (TR), the ordering proposed by Pour (PO). and the order proposed by Kalczynski and Kamburowski (KK). The MM and PF heuristics were designed for the $Fm|block|C_{max}$ problem. Both can be used in the permutation case without significant modifications but taking into account that the machines are never blocked. Ronconi has already proposed using MM and PF heuristics as the first step of the NEH heuristic but adapting them to the blocking case.

- LPT: Order the *n* jobs in descending order $P_i = \sum_{j=1}^{m} p_{ji}$;
- NM (Nagano and Moccellin, 2002): For each job *i* calculate $\overline{P}_i = P_i - \max_h \{BT_{hi}\}$, being BT_{hi} the lower bound for the waiting time for job *i* from the completion time of its operations in each machine to the beginning of the operation in the following machine, when job *h* immediately proceeds job *i* (and only jobs *h* and *i* are being considered). Order the *n* jobs in decreasing order $\overline{P}_i$;

- MM (Ronconi, 2004): Place those jobs with the lowest processing times in the first and last positions of the first and last machines respectively. Let k = 2. Select from among the unplaced jobs the one which gives the lowest value to the expression:

$$\alpha \cdot \sum_{j=1}^{m} | p_{j,i} - p_{j+1,h} | + (1-\alpha) \cdot \sum_{j=1}^{m} p_{j,i} \tag{6}$$

  where *i* is the candidate job and *h* is the last job placed. Place this job in *k*. Let $k = k + 1$. If $k = n$, stop.
  In our implementation α = 0.75 as was proposed in [17].

- PF (McCormick *et al.*, 1989): Place any job in first position. Let k=2. Select from among the unplaced jobs the one which gives the lowest value to the expression (7):

$$\sum_{j=1}^{m} w_j \cdot [\lambda \cdot it_j(i) + (1-\lambda) \cdot bt_j(i)] \tag{7}$$

Where i is the candidate job, w_j is a weight associated to the machine j (j = 1, 2, ..., m), $it_j(i)$ is machine j's idle time generated by the candidate job i when it is placed in the last position of the partial sequence generated, $bt_j(i)$ is the blocking time in the same conditions and λ a balance weight. If there is a tie between two candidate jobs, priority is given to the one which minimizes the expression (8):

$$\frac{\sum_{j=1}^{m}(it_j(i)+bt_j(i))}{P_i} \quad (8)$$

If the numerator is null, priority is given to the job with the highest P_i. Place the candidate job in position k. Let k=k+1. If k=n+1, stop.

As there exists no efficient criterion for determining which the most suitable first job is, each one of the n jobs is tried successively. From all the permutations the one which gives the lowest value for the weighted idle time calculated as in (9) is selected.

$$\sum_{j=1}^{m}\sum_{i=1}^{n} w_j \cdot (it_j(i)+bt_j(i)) \quad (9)$$

If there is a tie, the sequence with the lower C_{max} is chosen.

Two variants of PF, less time consuming, are considered: PL, on first position is selected the job with longest total processing time, and PS, on first position is selected the job with shortest total processing time.

- TR (Companys, 1966): $S_{1i} = \sum_{j=1}^{m}(m-j)\cdot p_{j,i}$ and $S_{2i} = \sum_{j=1}^{m}(j-1)\cdot p_{j,i}$ are calculated and Johnson's algorithm [3] is applied to the values given in order to obtain a sequence. If there is a tie, priority is given to the job with the lowest $S_{1i} - S_{2i}$ value. If the tie persists, priority is given to the job with the lowest p_{1i}. This heuristic is inspired by the idea of Palmer's slope [8].

- PO (Pour, 2001): the Pour heuristic was proposed by Pour (2001) and it creates a schedule that progressively tests each possible job in each position of the permutation, and can be summarized as follows:
  Step 1: Let r = 0 and σ void.
  Step 2: Be σ the partial schedule of r jobs already constructed, J the set of the jobs already scheduled in σ and $\overline{J}$ the set of the jobs not scheduled. For each $i \in \overline{J}$

  Step 2.1: Order operations on all jobs h, $h \in \overline{J} - \{i\}$ by increasing $p_{j,h}$ independently in each machine. Compute an instant $\overline{c_{j,h}}$ (totally fictitious) at which each job $h \in \overline{J} - \{i\}$ would finish its operation in machine j in the established operations order, beginning the first operation of the $n-r-1$ in the machine at instant 0. Compute $\overline{C_h} = \sum_{j=1}^{m}\overline{c_{j,h}}$ for $h \in \overline{J} - \{i\}$

  Step 2.2: Complete the partial schedule σ by placing i on the position r+1 followed by the jobs $h \in \overline{J} - \{i\}$ ordered by creasing $\overline{C_h}$. Determine $C_{max.}$

Step 2.3: The job $i \in \bar{J}$ that provides the smaller C_{max} value is assigned to the position r+1 definitively.

Step 3: Do r=r+1 and add i at the end of the partial schedule σ. If $r < n$ go to step 2, else end.

- KK (Kalczynski and Kamburowski, 2008) : For each job i calculate $a_i = \sum_{j=1}^{m} (\frac{(m-1)\cdot(m-2)}{2} + m - j)\cdot p_{j,i}$ and $b_i = \sum_{j=1}^{m} (\frac{(m-1)\cdot(m-2)}{2} + j - 1)\cdot p_{j,i}$. The jobs are sequenced according to the increasing order of $c_i = \min(a_i; b_i)$.

2.2. The Second Step: insertion phase.

In step 2 we have implemented a new strategy which consists of two tie-breaking methods for when two different positions give the same makespan. The first method aims at minimizing the total idle time of machines (TIT), and the second method is the one proposed in Kalczynski and Kamburowski (2008).

Method TIT: The total idle time $\sum_{j=1}^{m} IT(j)$ is calculated for each possible inserting position, where $IT(j) = f_{j,n} - e_{j,1} - \sum_{i=1}^{n} p_{j,i}$.

If there is a tie between two positions the job is inserted in the position which has associated less total idle time.

- Method KK1: Let i be the job to be inserted, if there is a tie between two positions the position chosen is the one nearest to the first position if $a_i \le b_i$ and the nearest to the last one if $a_i > b_i$. Where a_i and b_i are calculated as is indicated in the KK rule of step 1.

As a consequence, step 2 is as follows:

- Step 2: in accordance with the order established in step 1, take the first two jobs and schedule them in such a way that they minimize the partial makespan, considering an instance with only two jobs. Then for k=3 up to n, insert the k-th job into one of the possible k positions of the partial sequence. The objective is to minimize the C_{max} of the Fm|block|C_{max} problem with k jobs. To break the tie, choose the sequence with the lowest idle time for the machines (method TIT). If there is still a tie, use the procedure defined in *loc. cit.* for NEHKK1 (method KK1).

2.3. **The Third Step**: **improvement phase**.

The improvement phase consists in three modules and we call it Soft Simulated Annealing (SSA).

The first module applies a local search on the incumbent solution (initially the incumbent solution is the obtained after the steps 1 and 2). The local search implemented is a variant of the non exhaustive descent algorithm (NEDA).

NEDA tries to improve the solution by swapping any two positions in the sequence. This procedure can, potentially, generate $\frac{n \cdot (n-1)}{2}$ neighbors. If during the process a new permutation improves the value of the objective function, it becomes the new current solution and the process continues until all the positions have been permuted without improvement. In this procedure the exploration of the neighborhood is always made in the same order. The SSA algorithm uses an auxiliary vector, called revolver, which allows exploring the neighborhood randomly. The revolver is a pointer vector whose components are initialized with the different positions that a job can have in the sequence. Next, the components are randomly mixed and used to codify the searching positions in the solution's neighborhood. Given two pointers to positions *i, j* in the job sequence, their equivalent i_{rev} and j_{rev} are searched in the revolver vector *rev*, being $i_{rev} = rev(i)$ and $j_{rev} = rev(j)$. These new positions are used when the non-exhaustive descents search is applied. In addition, during the procedure, solutions with the same value of the objective function (ties) are accepted with certain probability. When all the neighborhood of the current solution has been explored without improving the solution, the process restarts again accepting ties with a certain probability, γ. The improvement phase finishes when the number of ties reaches a predefined number Γ or there is no change in the incumbent solution. If after accepting ties the solution improves, the number of ties is initialized and the process continues without accepting ties. In our implementation γ=0.5 and $\Gamma = \frac{n \cdot (n-1)}{2}$.

2.4. **The algorithm.**

When the algorithm runs are limited in CPU time it is possible that the local search can be applied more than one time. In this case between two runs of module one, the sequence obtained at the end of the precedent run is submitted to a perturbation by means of a deconstruction module and a construction module before it be taken as incumbent solution for the next run of first module.

Deconstruction Module:
Input, the incumbent sequence π
For i =1 to d
    remove one job of π randomly and insert it in π'' (in the remove order)
Next i
Output, π (original sequence without d jobs) and π''.

Construction Module:
Input, π and π''.
For i = 1 to d
    insert π''(i) in π according to the insertion procedure used in step 2.
Next i
Output**,** π **(**new incumbent solution**)**

To summarize, the complete algorithm has the following scheme

1. Initial ordering phase (first step)
2. Insertion phase. Evaluation.
3. Inversion (inverse view)
4. Initial ordering phase (first step)
5. Insertion phase. Evaluation.
6. Selection of the best solution as incumbent solution.
7. Iterative local search: Repeat until the end condition is met
    - Local Search
    - Acceptance criterion (optional)
    - Deconstruction Module
    - Construction Module

In the coded versions of the algorithm there is no any acceptance criterion.

3. Computational results

Various tests were carried out with the objective of analyzing the behavior of the proposed procedures. They are described in other papers. For the tests we used, usually, the 120 Taillard instances (1990) which combined 20, 50, 100, 200 and 500 jobs with 5, 10 and 20 machines. We obtain without tightness on time of the algorithm runs, solutions as good as the better known solutions.

The algorithms were implemented in Quick Basic and the experiments were run on an Intel Core 2 Duo E8400 CPU, 3GHz and 2GB of RAM memory.

The special algorithm to find good solutions has the following scheme:

1. Selection of the view.
2. Selection of the initial ordering
3. Initial ordering phase (first step)
4. Insertion phase. Evaluation.
5. Iterative local search: Repeat until the end condition (iteration limit) is met
    - Local Search
    - Acceptance criterion
    - Deconstruction Module
    - Construction Module

The acceptance criterion is: if the incumbent solution is worse that the best solution attained, then with probability θ, it is substituted by then best solution in the deconstruction module. A greater value of d, d-max, is used in this case. If the substitution is not made a normal value of d, d-min, is used. In the implementation θ = 0,1; d-max = 6 and d-min = 4.

We are considering three features to explore:

- Relationship between d and n. Perform experiments with d-max = $\lceil \sqrt{n} \rceil$ and d-min = $\lfloor 0.8\times\sqrt{n} \rfloor$
- Sophistication of the acceptance criterion
- Addition of a perturbation between the Deconstruction Module and the Construction Module, especially in the case of incumbent solution substitution, to explore more extensively de solution space.

In annex I there is a list of the best solutions known for the 120 Taillard instances ($Fm|block|C_{max}$ case) and in Annex II the corresponding sequences. The solutions for then instances 1, 2, 4, 5, 6, 7 and 9 correspond to the optimum value (Alemán, 2004).

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ANNEX I: BEST SOLUTIONS KNOWN (13-07-09)

Taillard instances, Fm|block|C_{max}

	#	BEST	source		#	BEST	source		#	BEST	source
20×5	1	1374	1,4	50×5	31	3002	4	100×5	61	6221	4
	2	1408	1,4		32	3201	4		62	6082	4
	3	1280	1,4		33	3011	4		63	5985	4
	4	1448	1,2,4		34	3131	4		64	5800	4
	5	1341	1,4		35	3166	4		65	5960	4
	6	1363	1,2,4		36	3169	4		66	5911	4
	7	1381	1,2,4		37	3013	4		67	6004	4
	8	1379	1,4		38	3073	4		68	5968	4
	9	1373	1,4		39	2912	4		69	6177	4
	10	1283	1,2,4		40	3120	4		70	6192	4
20×10	11	1698	3,4	50×10	41	3638	4	100×10	71	7077	4
	12	1833	1,4		42	3507	4		72	6833	4
	13	1659	1,4		43	3488	4		73	6985	4
	14	1535	1,4		44	3670	4		74	7209	4
	15	1617	1,4		45	3629	4		75	6852	4
	16	1590	1.4		46	3621	4		76	6684	4
	17	1622	1,4		47	3696	4		77	6857	4
	18	1731	1,4		48	3572	4		78	6942	4
	19	1747	1,4		49	3532	4		79	7104	4
	20	1782	1,3,4		50	3624	4		80	6983	4
20×20	21	2436	1,4	50×20	51	4500	4	100×20	81	7889	4
	22	2234	4		52	4302	4		82	7938	4
	23	2479	1,4		53	4301	4		83	7883	4
	24	2348	1,3,4		54	4377	4		84	7930	4
	25	2435	4		55	4286	4		85	7906	4
	26	2383	4		56	4302	4		86	7946	4
	27	2390	1,4		57	4319	4		87	7975	4
	28	2328	1,4		58	4326	4		88	8022	4
	29	2363	1,3,4		59	4328	4		89	7981	4
	30	2323	4		60	4428	4		90	8023	4
200×10	91	13532	4	200×20	101	15002	4	500×20	111	36790	4
	92	13394	4		102	15237	4		112	37236	4
	93	13592	4		103	15207	4		113	37024	4
	94	13460	4		104	15244	4		114	37183	4
	95	13471	4		105	15123	4		115	36833	4
	96	13253	4		106	15304	4		116	37195	4
	97	13698	4		107	15263	4		117	36944	4
	98	13519	4		108	15310	4		118	37238	4
	99	13403	4		109	15175	4		119	36938	4
	100	13566	4		110	15234	4		120	37314	4

The four sources considered are:

1. R. Companys and M. Mateo (2.007). The solutions were obtained by A. Alemán with the LOMPEN algorithm (CPU time limit 20 minutes on a Pentium IV with 2.8 GHz PC).

2. Débora P. Ronconi (2.005). She uses a new bound (time limit 3600 seconds on a Pentium IV with 1,4 GHz PC).
3. J. Grabowski and J. Pempera (2.007). They use a Tabu Search (Iterations limit 30000 on Pentium IV with 1 GHz PC)
4. By means of the described algorithms without time limit.

ANNEX II: SEQUENCES (Taillard instances, $Fm|block|C_{max}$)

TA0001: 20×5

```
1  1374  06-16-2009  MME  DIR
    3  17   9  14  11   6   5  18   4  10   7  12  19  15   8  16   1   2  13  20

2  1408  06-16-2009  MME  DIR
   15  12   2  17  10   6  20  11  19   5   3  16   7   9   1  13   4   8  18  14

3  1280  06-16-2009  MME  DIR
    3  15  14  10  19  11   6   8   4  16  18  12   7   5   9  13   1  20  17   2

4  1448  06-16-2009  MME  DIR
   13   9  16  14   3  20  17  19  15  10   2   5  12  11   7   1   8   6   4  18

5  1341  06-16-2009  MME  DIR
    3  10  12  19  18   4  14   7  15  13   9  17   2  16   6  11   1   8  20   5

6  1363  06-16-2009  MME  DIR
   14  20  17  13  12   7  16   8   4  11  10   6  19  15   9   1  18   5   3   2

7  1381  06-17-2009  NYM  INV
    5  11   3   8   6   9   7   4  20  13  12   2  15  16  17  18   1  19  10  14

8  1379  06-16-2009  MME  DIR
   12  17  16   9  18  19  15   8   7  13   5   3   2  14   4  20  11  10   6   1

9  1373  06-16-2009  MME  DIR
    4  10   7   8  18  17  14  13  15  12  16   2  20  11   1   6  19   3   9   5

10  1283  06-16-2009  MME  DIR
    5  12  11   4  16   1   2  18  13   6  10   8   3  14  20  17   7  19  15   9
```

TA0011: 20×10

```
11  1698  03-30-2009  MME  INV
   18   5   9   3  17  19  14  12  15  10  13   7   6   8   2  20  11   4   1  16

12  1833  06-16-2009  MME  DIR
   12  13  17  15   9   7   2   1   5   3   8  19  20  16  11  10  14   4   6  18

13  1659  06-16-2009  MME  DIR
    4   3   1  19   6  17   7   9  11  15  13  20  16  12  10   5   2  14  18   8

14  1535  06-16-2009  MME  DIR
   18  11  13   4  20   2   7   6  10   3  12  16   1  15   9  14  17  19   8   5

15  1617  06-16-2009  MME  DIR
   16   8   4   6  14  18  13  12  19   1  20   2  15   7   5   3  10  11   9  17

16  1590  06-16-2009  MME  DIR
   18   8   3  16  13  19   7   6   9  17  14   1  10   5  11   4   2  12  20  15

17  1622  06-16-2009  MME  DIR
   19   4   7  17   3  16  20  18   1   6  12   5  13  11   9   2  10  14   8  15

18  1731  06-16-2009  PFE  INV
    7  17  14   5   8   3  15   4  19  16  18   2   9   6  11  12   1  13  20  10
```

```
19  1747  06-16-2009  MME  INV
     14  12   8  11  18  17   4   2  20  19   5  15  16   6   7   1   3  13  10   9

20  1782  06-16-2009  MME  DIR
      5  16  17  14  13  19   6   4   7  10   2   8  15  18  20   1   9   3  11  12
```

TA0021: 20×20

```
21  2436  06-16-2009  MME  DIR
     16  18  15  20   1  12  10  14   7  13   8   9  11   5   2   6  17   4   3  19

22  2234  05-05-2009  MME  DIR
  18  11  10   4  20  12  13  16  15   1   7  19   5   6  14   3   8  17   9   2

23  2479  06-16-2009  MME  DIR
      4  14  16  15   1  13   5   9  18  10  11  12  20  17  19   6   8   3   2   7

24  2348  06-16-2009  MME  DIR
     14   3   4  20   8  13   6   2  15  18   1  12   7   5  19  16  10   9  17  11

25  2435  11-13-2008  PFE  DIR
      9  18  14   2  19   1  20  17  10  15   3  16  13   4   5  11  12   7   8   6

26  2383  06-05-2009  MME  DIR
      6  14  13   1   2   5  20  17  15  18  12   9   8   7   3  11  10   4  19  16

27  2390  06-16-2009  MME  DIR
     17  10  12   9   4  11   8  14  18  16  19   2   1   5  20   6  15   7   3  13

28  2328  06-16-2009  MME  DIR
      4  20   5  16  10  14   7  11   2  17   8  18  19  13   3   6  15  12   1   9

29  2363  06-16-2009  MME  DIR
      1   8   7   6   2  14  13  11  18  17   4   3   9  12  20  10  15  16  19   5

30  2323  11-06-2008  PFE  INV
   3   7  17  19   6  18   1  15  12   2   9  10   8   5   4  11  16  13  20  14
```

TA0031: 50×5

```
31  3002  06-07-2009  MME  DIR
     10  31  30  36   7  46   3  12   6  18   5  21  25  47   8  42  16  23  50  11
      9  44  48  38  37  17  24  40  13  19  39  49   2  34  41   4  29  27  28  45
     14  15  20   1  32  26  22  43  33  35

32  3201  06-16-2009  MME  DIR
     50  49  18  47   5   2   6  22  25  26  48  13  30  27  35  39   1  31  20  33
      7  11  23  32  45   9  17  41  21  37  24   4  43  19  40  46  28  12  16   3
     42  38  10  15  14   8  44  29  34  36

33  3011  06-08-2009  MME  DIR
     22  15  37  21  36  49   2  16   4  17  43   7  14  34   1   3  48  28  31  41
     23  10  11  46  19  35  45   9  40  38  47  32  30  12  26  18  27  24   5  44
     33  20  29  13  50  42  25   6  39   8

34  3131  06-29-2009  MME  INV
     42  26  12  43  50  25  41  15  38  14  47   5  34  39  28  49  22  24  20  19
     11  29  10   7  48   8  17  33   6  13  27  37  44   9  46   3  36  21  35  18
      4   1  45  40  32   2  16  23  31  30
```

35 3166 06-08-2009 MME INV

46 48 29 31 16 36 17 45 20 19 3 34 13 27 39 18 40 30 35 12
25 50 23 14 1 2 47 43 24 33 32 28 5 4 11 15 26 22 37 6
10 38 7 44 41 21 8 49 9 42

36 3169 06-08-2009 MME DIR

4 21 1 33 40 29 22 28 47 11 41 38 3 37 48 42 24 39 10 13
17 45 7 49 44 15 23 18 2 14 27 46 9 5 25 30 6 50 35 26
8 32 19 34 20 36 43 16 12 31

37 3013 07-06-2009 MME DIR

19 41 22 13 18 12 17 26 47 43 21 20 32 24 48 29 39 35 6 46
33 11 31 3 7 2 49 9 10 15 44 23 1 27 34 30 40 5 4 50
37 14 8 36 45 42 38 16 25 28

38 3073 06-08-2009 MME DIR

34 17 1 20 46 24 29 43 3 15 26 9 47 30 22 21 7 10 18 37
32 4 5 8 31 39 42 36 50 14 25 6 28 44 11 45 48 33 19 16
12 41 49 27 23 35 2 13 38 40

39 2912 06-27-2009 MME INV

10 12 7 44 47 4 21 27 3 36 48 30 49 25 2 5 35 18 43 15
23 33 19 42 11 20 38 39 6 26 34 32 16 45 9 24 50 8 46 29
1 40 37 22 41 31 28 13 17 14

40 3120 06-27-2009 MME INV

50 6 48 8 4 24 39 18 40 41 11 5 15 38 9 22 31 44 30 20
43 34 37 29 28 2 42 14 12 45 33 49 10 46 7 19 36 23 1 27
35 16 47 13 17 3 26 21 25 32

TA0041: 50×10

41 3638 06-08-2009 NEH DIR

42 44 33 18 37 34 19 2 30 36 21 22 32 13 8 35 10 24 20 7
49 26 14 31 29 46 15 9 40 12 38 3 5 11 4 28 23 17 25 16
45 6 43 50 41 47 1 48 39 27

42 3507 06-19-2009 RAE INV

35 22 50 11 18 1 32 23 31 33 37 20 7 36 44 49 45 4 2 19
6 39 12 43 41 27 34 21 8 25 29 16 15 9 40 5 30 10 38 14
28 42 47 46 17 26 13 3 24 48

43 3488 07-06-2009 MME INV

24 4 28 19 46 39 2 45 31 16 40 9 10 50 33 38 42 20 29 13
47 1 48 44 34 6 41 5 43 35 17 25 7 21 23 36 49 15 37 32
11 12 14 18 27 3 30 26 22 8

44 3670 06-19-2009 RAE DIR

20 5 37 8 22 17 10 14 1 43 24 40 38 12 21 11 2 41 6 23
47 15 26 49 32 30 50 4 16 29 39 33 31 18 25 36 35 45 46 48
3 27 7 44 34 13 28 19 9 42

45 3629 06-28-2009 MME INV

6 10 42 1 48 36 31 3 49 12 45 29 27 39 23 21 43 34 35 33
11 5 9 46 40 22 41 37 19 28 24 2 15 14 4 13 47 26 16 38
7 17 8 32 20 18 44 30 50 25

46 3621 06-15-2009 MME DIR

3 24 38 5 11 14 39 29 9 36 8 48 13 43 7 19 47 49 33 20
40 45 17 31 44 37 15 28 27 26 35 42 25 34 6 22 10 21 30 46
1 18 2 50 4 16 41 32 23 12

47 3696 06-15-2009 MME INV

41 48 49 32 16 12 25 30 15 8 10 9 50 37 5 14 19 43 7 45
47 29 39 4 28 22 6 3 23 42 44 20 34 2 46 1 24 11 35 13
31 38 27 36 33 17 40 18 21 26

48 3572 06-15-2009 MME DIR
21 26 9 3 44 14 25 8 17 48 2 47 22 19 1 6 50 18 27 46
10 16 42 23 4 31 30 5 38 41 20 32 11 29 37 45 33 34 49 43
13 15 36 35 12 24 7 40 39 28

49 3532 06-20-2009 RAE INV
33 44 47 36 49 32 40 26 21 18 37 5 6 42 31 39 8 46 30 22
4 3 48 17 14 43 24 7 50 20 9 45 1 16 27 34 11 41 10 2
28 23 35 19 12 15 13 38 25 29

50 3624 06-28-2009 MME INV
49 38 10 27 15 28 8 44 42 4 39 6 1 48 16 34 11 3 47 20
31 25 35 5 7 50 36 30 22 18 9 43 17 46 32 23 26 24 29 40
33 13 37 45 2 12 14 41 21 19

TA0051: 50×20

51 4500 06-12-2009 PFE DIR
20 15 44 43 8 45 27 37 29 11 39 12 5 24 36 14 38 17 50 49
34 2 41 35 31 32 47 48 7 22 30 10 18 25 6 40 23 28 42 46
1 16 13 33 19 9 26 4 21 3

52 4302 06-25-2009 PFE INV
32 43 49 20 41 31 40 6 29 14 47 48 2 12 45 18 36 1 25 9
15 21 37 28 16 26 11 44 23 24 27 4 38 50 17 10 13 35 5 3
42 39 46 34 33 30 22 7 19 8

53 4301 06-25-2009 PFE INV
24 4 28 11 49 36 15 8 37 16 27 12 25 2 1 3 30 31 10 26
39 22 33 43 48 19 32 45 9 41 5 46 50 44 34 29 42 20 35 13
17 18 40 47 23 14 38 21 6 7

54 4377 07-03-2009 MME DIR
14 19 30 20 13 49 47 12 7 40 39 48 43 23 45 3 21 31 11 32
35 33 17 29 22 18 24 28 5 26 16 9 6 41 46 2 10 38 44 50
15 4 25 37 42 8 36 1 34 27

55 4286 06-12-2009 PFE DIR
40 31 25 23 4 28 48 24 26 36 20 19 49 22 32 47 39 43 6 42
16 45 21 3 14 41 12 50 33 27 10 38 8 18 7 44 2 13 34 9
5 1 15 17 30 46 37 29 35 11

56 4302 06-26-2009 MME INV
14 5 18 49 50 21 24 42 33 11 37 46 30 7 19 4 20 45 43 32
48 40 8 25 10 41 16 44 23 27 36 34 9 22 15 28 31 1 2 13
17 35 29 39 12 47 26 6 3 38

57 4319 07-13-2009 PFE INV
4 12 10 23 32 35 40 48 47 17 9 21 39 11 13 20 15 2 31 41
19 24 3 36 46 50 30 8 33 37 22 38 34 14 49 29 28 1 45 44
7 27 6 25 42 5 18 26 43 16

58 4326 06-14-2009 MME INV
32 33 39 30 31 42 15 7 27 5 37 36 19 38 29 6 8 26 35 9
41 49 3 4 21 14 47 17 48 44 24 20 46 34 18 11 16 25 40 45
10 1 13 43 12 22 28 2 50 23

59 4328 07-07-2009 MME DIR
35 37 14 50 16 9 11 27 43 1 3 38 32 28 8 22 13 34 41 17
7 2 46 18 26 4 24 49 33 36 40 10 19 30 5 21 45 6 12 48
31 42 23 47 25 39 20 29 15 44

60 4428 06-29-2009 MME INV
33 12 22 18 14 8 31 21 11 16 3 2 40 7 38 39 41 19 1 42
47 50 32 9 15 23 27 37 5 46 13 44 36 34 24 35 25 28 26 20
29 17 45 10 30 48 49 6 43 4

TA0061: 100×5

61 6221 06-17-2009 MME DIR

10	93	12	49	9	41	27	43	100	73	45	28	48	86	8	50	54	87	24	85
11	63	21	18	30	84	29	82	19	59	74	22	25	67	70	57	89	4	2	15
69	42	51	95	68	35	96	16	13	53	98	76	23	26	20	39	78	6	47	94
31	81	79	36	75	33	34	44	99	90	17	52	91	88	5	1	58	38	37	3
32	46	56	62	7	14	77	97	65	72	64	40	80	92	61	83	71	60	66	55

62 6082 06-17-2009 MME DIR

46	90	61	98	68	1	97	96	39	86	75	56	26	15	83	16	67	92	35	30
21	74	87	2	32	72	17	42	54	12	11	4	49	44	57	28	71	48	24	64
36	41	13	81	59	7	22	18	70	91	43	100	63	84	23	95	25	9	50	51
82	27	3	55	38	47	33	76	66	40	14	85	73	93	34	45	99	89	5	80
60	19	77	65	8	58	88	6	20	78	94	62	52	10	29	31	37	53	79	69

63 5985 06-17-2009 MME DIR

43	1	6	25	53	17	2	96	60	68	89	14	70	79	88	31	97	54	73	42
35	18	9	90	34	40	75	45	64	11	82	30	10	7	39	38	12	23	41	58
59	93	52	48	86	71	16	13	57	95	67	19	46	37	3	29	81	84	72	8
87	92	47	66	63	21	78	27	50	36	94	91	61	76	77	85	65	100	62	44
24	83	33	22	56	49	80	99	4	32	98	15	20	69	74	5	26	51	28	55

64 5800 06-17-2009 MME DIR

67	20	69	19	3	54	31	88	83	56	71	43	14	80	60	59	73	58	85	37
55	49	7	23	11	99	64	33	4	39	6	97	84	61	40	2	92	27	25	1
90	94	41	36	13	50	17	28	38	77	82	32	10	76	62	16	44	47	72	98
8	86	5	74	75	48	24	30	53	68	46	100	87	15	12	29	34	63	42	35
79	70	9	66	26	78	81	89	91	57	52	45	96	18	22	95	65	93	51	21

65 5960 06-25-2009 PFE DIR

74	68	10	16	12	33	77	82	86	54	60	40	71	6	32	39	56	4	52	75
93	14	88	90	76	5	94	96	55	59	35	34	19	61	3	84	89	48	9	65
31	36	25	20	26	13	85	29	99	15	69	62	81	46	97	8	70	47	53	23
73	30	28	87	41	51	21	80	42	43	27	17	95	78	7	37	44	66	100	58
18	24	72	11	50	98	2	57	64	91	22	92	38	67	45	49	83	63	79	1

66 5911 06-17-2009 MME DIR

61	57	1	92	21	80	47	22	34	23	37	32	7	74	89	68	48	58	78	85
88	14	17	59	43	25	55	2	16	33	82	24	63	66	41	10	60	28	84	64
38	44	40	95	50	100	53	91	86	8	72	69	27	90	20	3	97	35	15	71
87	77	94	56	98	73	76	81	13	62	30	18	46	26	51	54	83	70	6	5
93	75	52	12	11	31	39	67	9	49	19	42	79	45	96	99	65	36	29	4

67 6004 06-25-2009 PFE DIR

79	35	89	2	37	87	43	47	82	95	66	90	59	83	39	73	61	81	98	42
8	20	80	30	86	26	34	25	74	65	53	69	38	100	85	94	75	4	6	55
50	27	64	14	7	13	96	18	63	51	58	15	40	76	62	92	10	60	48	93
11	23	21	72	99	29	77	68	70	5	12	19	41	52	88	31	44	56	9	84
46	57	17	1	49	24	16	71	3	67	91	32	45	36	78	33	54	97	22	28

68 5968 06-17-2009 MME DIR

42	56	2	96	22	73	9	59	72	41	14	53	29	74	98	52	1	6	46	97
30	35	36	21	12	32	77	5	89	64	70	67	20	92	3	34	68	80	93	24
88	44	60	66	33	100	54	69	51	4	7	45	18	86	49	19	37	62	23	84
94	16	11	58	78	71	57	38	63	28	10	48	13	81	61	31	75	65	47	91
43	39	55	99	15	85	79	76	8	50	17	82	25	90	87	83	26	27	40	95

69 6197 06-17-2009 MME DIR

70	9	29	59	35	23	67	42	86	62	93	68	69	55	16	5	71	38	94	79
78	98	18	39	82	34	99	85	60	36	83	54	80	17	48	73	44	75	51	27
66	87	12	37	30	76	25	74	15	41	7	31	13	26	14	3	88	91	64	77
89	46	8	63	19	96	33	81	45	52	92	43	28	61	100	95	1	32	20	50
22	56	49	97	4	40	21	84	57	2	53	10	11	6	58	65	90	24	72	47

70 6192 06-17-2009 PFE INV

20	2	55	93	40	41	6	36	30	52	5	96	33	84	99	66	67	35	47	10
70	32	50	88	57	49	94	63	77	21	53	3	59	78	86	89	85	82	25	73
54	76	100	26	62	74	90	15	24	19	8	81	48	43	45	95	56	14	39	91
13	42	83	31	68	80	1	75	18	79	23	51	28	69	4	61	11	98	46	37
44	27	72	17	71	34	87	97	60	64	22	16	38	7	92	29	58	9	12	65

TA0071: 100×10

71 7077 06-04-2009 MME DIR

58	70	21	15	80	53	54	47	98	29	27	93	7	83	2	61	79	84	39	60
35	6	23	85	3	51	18	77	8	16	20	9	25	24	73	38	81	62	76	41
97	1	52	48	42	63	49	66	100	67	10	92	19	33	75	78	82	88	14	95
55	65	34	50	57	68	22	32	71	4	30	26	69	13	74	37	64	5	72	91
36	59	87	11	17	96	31	44	56	94	46	90	86	89	43	99	28	45	40	12

72 6833 06-04-2009 MME DIR

69	49	46	65	39	68	11	15	80	16	95	40	78	74	36	72	31	26	66	51
85	2	56	43	89	35	58	87	60	22	90	27	47	84	14	38	97	13	71	1
37	8	81	73	75	20	57	91	67	3	54	98	18	32	17	59	96	92	93	33
45	100	94	70	30	34	52	61	53	62	76	12	82	88	48	5	44	29	63	10
42	41	55	83	19	50	7	79	25	21	77	9	28	6	86	4	23	64	24	99

73 6985 06-04-2009 MME DIR

45	94	42	58	96	56	54	88	2	79	77	60	7	78	95	19	30	20	8	90
91	26	43	67	86	14	92	24	34	31	49	71	70	44	65	47	32	53	68	50
40	100	1	10	3	84	33	36	69	46	82	17	35	75	25	87	72	37	59	22
11	76	98	18	28	5	89	61	27	51	64	4	13	62	93	52	80	85	15	41
48	63	81	38	83	16	73	23	66	97	29	9	55	21	74	6	99	12	39	57

74 7209 06-04-2009 MME DIR

24	76	90	5	28	56	47	53	92	42	82	71	10	1	15	62	30	64	83	19
14	77	78	33	55	22	20	38	2	93	32	59	43	17	9	34	87	49	54	18
69	29	94	75	70	79	21	7	48	84	25	100	13	66	88	91	57	4	98	45
44	73	27	41	51	36	89	11	86	31	96	67	58	35	16	26	50	37	8	80
12	63	81	40	74	99	60	52	3	65	6	72	68	23	97	95	61	39	46	85

75 6852 06-05-2009 MME DIR

83	79	65	33	20	5	56	57	58	87	1	44	89	68	37	3	64	86	17	29
95	76	28	42	97	10	81	30	27	53	45	67	92	98	15	71	60	9	18	85
77	69	7	73	96	4	23	61	34	54	41	74	16	43	93	12	48	31	70	24
19	62	21	8	22	2	14	32	40	94	88	36	49	38	39	6	35	59	47	26
100	84	99	75	90	55	80	51	82	13	72	11	78	63	46	66	25	52	91	50

76 6684 06-17-2009 PFE DIR

53	86	20	4	95	64	12	67	39	40	77	43	32	9	54	18	52	5	14	98
93	85	88	55	25	59	61	11	58	24	42	76	15	3	19	72	60	99	63	69
96	66	31	82	73	17	89	84	56	21	13	83	79	48	74	78	81	57	6	90
68	2	62	27	71	16	51	91	65	26	7	94	8	36	38	46	41	47	49	70
97	22	100	23	50	35	1	80	10	37	30	33	87	34	75	29	92	44	28	45

77 6857 06-25-2009 PFE DIR

99	83	39	48	29	9	35	56	92	55	97	71	34	81	7	52	5	69	14	25
80	86	27	89	32	59	24	15	4	50	70	46	51	57	66	19	17	31	54	68
18	43	62	90	72	84	77	58	21	42	8	37	91	40	20	95	6	73	41	45
96	63	100	23	94	11	78	10	30	44	93	82	36	98	60	2	3	61	75	85
38	33	64	16	26	28	49	88	74	87	1	13	79	47	22	65	67	53	76	12

78 6942 06-05-2009 PFE DIR

48	70	31	63	6	78	15	93	46	20	55	71	9	22	54	94	21	68	34	26
52	30	62	32	27	37	88	60	43	58	49	42	99	23	8	29	64	7	51	2
74	95	4	85	3	25	65	83	40	38	66	28	91	57	59	14	76	50	47	10
67	17	56	97	92	81	18	36	69	19	87	61	89	98	100	5	16	86	75	1
44	73	11	33	41	90	39	80	35	45	13	72	77	12	82	24	79	84	53	96

79 7104 06-05-2009 PFE DIR

54	23	43	29	1	95	99	42	34	97	73	4	48	49	75	45	12	27	26	85
74	51	98	10	16	86	79	100	69	7	71	20	56	15	35	22	13	83	41	87
89	5	52	93	50	88	57	78	70	81	94	14	63	77	31	37	84	30	82	8
28	47	90	55	44	96	32	80	39	18	24	72	17	33	60	38	53	19	67	40
21	68	61	59	58	65	76	6	92	2	66	36	11	25	3	62	46	64	91	9

80 6983 06-05-2009 PFE DIR

63	84	71	7	16	88	54	97	76	22	96	1	42	80	25	37	44	43	65	38
5	79	74	21	49	45	41	35	53	73	19	78	47	13	56	89	28	82	29	24
57	15	81	52	2	99	95	4	33	58	12	50	51	11	26	27	77	93	90	18
23	36	46	86	59	39	70	69	68	32	64	8	87	48	100	17	9	94	75	14
40	6	20	66	30	60	92	83	91	98	61	72	85	31	3	67	55	10	62	34

TA0081: 100×20

81 7889 06-05-2009 PFE DIR

54	1	78	59	80	41	9	89	68	40	21	61	4	39	57	65	85	81	79	45
53	55	91	99	87	3	16	32	33	76	67	22	23	10	100	35	29	72	56	48
52	70	96	64	24	34	18	15	93	90	83	49	2	62	6	31	26	63	73	46
66	71	75	17	88	30	37	92	60	12	51	82	7	14	11	94	27	5	28	25
77	84	74	86	42	20	44	43	19	58	97	95	47	98	8	13	36	38	50	69

82 7938 06-05-2009 PFE DIR

50	49	100	69	76	43	82	72	5	95	15	20	40	4	42	27	88	86	22	47
91	35	68	32	2	71	30	54	11	85	17	51	6	55	13	16	56	31	59	89
19	45	73	28	37	48	26	33	10	90	3	9	14	65	87	74	7	93	80	58
98	34	84	46	25	24	64	1	23	77	66	44	62	92	29	38	67	53	8	52
97	83	79	36	75	18	61	96	78	60	70	41	81	21	63	12	99	94	57	39

83 7883 06-09-2009 PFE DIR

11	92	28	87	41	61	40	76	45	19	37	74	94	96	20	66	98	67	54	80
56	93	81	15	24	4	62	44	42	75	2	10	22	23	53	57	89	51	25	59
33	7	34	85	47	17	29	70	50	88	5	16	35	36	73	55	68	1	6	13
69	84	82	72	79	52	32	26	49	71	12	60	77	58	27	99	78	31	90	97
83	46	91	8	64	43	63	39	3	9	86	48	18	30	38	14	21	65	95	100

84 7930 06-06-2009 MME INV

5	44	45	57	49	51	89	43	29	67	86	98	25	26	63	41	72	23	37	36
82	1	69	66	93	47	71	14	78	10	75	54	42	3	9	73	24	58	96	59
2	35	94	12	74	21	56	84	18	52	92	64	88	60	20	97	70	61	79	15
22	39	34	99	87	11	38	46	91	62	28	65	32	16	19	77	50	8	13	55
95	31	83	76	100	68	7	4	85	17	30	27	81	48	90	6	40	53	80	33

85 7906 06-09-2009 NYM DIR

98	33	64	71	54	2	97	87	17	22	27	59	28	44	32	48	24	56	74	41
84	3	70	16	9	6	57	65	4	66	14	35	26	46	52	37	21	11	40	90
82	1	53	39	88	94	42	69	92	89	18	85	83	20	58	29	93	55	34	19
96	12	100	47	81	10	45	72	7	76	8	99	80	15	50	38	91	36	61	62
68	79	86	73	31	95	43	13	23	75	60	5	49	67	78	30	77	63	25	51

86 7946 06-07-2009 MME INV

83	39	23	12	45	82	2	37	80	58	76	72	63	88	31	24	4	33	89	66
55	7	94	100	84	5	19	69	78	27	59	21	65	57	30	86	70	46	13	71
29	10	28	92	97	48	77	98	1	20	52	64	14	81	34	61	49	8	99	53
95	6	40	41	35	91	26	9	36	67	74	68	22	17	56	25	54	73	51	38
96	79	60	16	62	75	85	87	32	50	11	3	47	42	44	93	43	18	15	90

87 7975 06-09-2009 PFE DIR

95	27	88	85	62	93	30	41	96	72	33	51	80	60	28	2	13	50	1	91
43	92	61	35	25	15	64	5	6	67	45	19	21	73	16	77	29	14	99	31
7	70	39	98	48	4	63	23	97	8	65	18	56	12	69	82	84	90	40	44
11	52	89	57	59	32	49	10	20	17	94	54	55	36	34	87	46	58	3	100
47	42	74	68	66	81	71	53	22	79	26	24	9	37	78	38	83	86	76	75

88 8022 06-09-2009 NYM DIR

22	71	5	87	70	59	4	18	72	78	31	43	77	52	57	81	17	44	66	83
80	58	11	74	67	60	38	39	100	35	93	15	53	23	29	65	94	61	42	16
95	1	3	33	37	6	54	55	28	49	82	48	9	88	27	56	30	46	69	76
86	62	24	98	10	25	14	41	2	7	91	51	68	85	20	36	75	63	40	84
64	47	73	45	50	19	79	12	90	89	8	26	96	97	32	13	21	99	34	92

89 7981 06-09-2009 NYM DIR

42	24	44	74	2	58	7	75	68	41	60	80	16	10	51	22	50	15	78	5
61	45	95	86	84	97	30	1	29	69	4	39	65	82	25	96	53	46	62	76
71	81	20	33	70	57	59	73	17	37	79	6	27	87	19	67	89	38	99	94
77	47	21	63	9	64	23	54	8	32	100	92	85	98	40	26	36	11	14	93
88	28	12	43	18	90	34	31	83	56	72	48	13	55	52	49	91	3	35	66

90 8023 06-09-2009 NYM DIR

11	1	90	46	48	18	35	15	96	6	24	54	51	27	98	62	25	87	14	34
43	31	29	99	69	9	3	73	82	45	67	91	95	71	22	13	16	64	52	77
56	76	21	37	38	60	84	74	92	78	40	4	36	65	19	10	68	41	97	33
2	50	59	23	42	58	70	47	5	83	86	49	12	75	100	80	20	32	26	72
61	88	94	63	7	8	57	79	89	44	39	30	17	81	55	85	28	53	66	93

TA0091: 200×10

91 13532 06-18-2009 MME DIR

73	156	28	94	191	190	103	155	124	42	71	17	195	72	34	3	99	183	85	151
127	6	146	96	87	81	180	136	55	76	67	164	120	125	74	132	129	182	113	9
102	22	19	200	163	150	97	162	86	91	98	47	184	176	1	161	117	140	106	77
147	35	39	168	93	30	23	170	15	188	197	133	33	90	160	29	172	134	196	63
189	48	181	179	141	116	145	138	56	185	119	62	10	108	131	153	4	177	126	193
82	88	123	135	18	167	37	25	83	75	13	112	115	64	11	44	122	144	89	21
171	105	50	154	70	26	143	58	32	31	54	84	114	199	159	137	165	149	100	57
45	198	38	46	128	66	40	95	51	68	158	142	152	7	92	27	109	187	36	192
107	43	101	41	12	194	130	111	157	53	169	175	173	49	2	186	20	121	16	80
166	8	174	69	139	24	118	5	104	14	59	110	79	178	78	60	52	65	61	148

92 13394 06-18-2009 MME INV

31	27	166	88	65	155	63	96	19	119	33	158	182	13	68	15	107	26	32	22
7	70	115	47	71	177	170	112	161	137	148	123	181	74	144	92	55	145	185	157
97	122	183	81	83	184	39	141	24	73	103	190	21	111	28	89	171	162	178	139
191	179	4	72	43	95	151	135	23	142	199	172	80	52	110	165	108	176	6	193
136	189	120	128	169	35	53	196	37	82	163	160	14	130	29	44	40	54	69	140
109	50	77	87	129	192	20	60	75	56	66	159	106	127	116	124	195	175	143	125
94	200	174	104	114	59	51	61	9	98	46	164	150	34	17	48	25	76	5	156
132	198	168	154	12	16	146	118	147	180	131	167	49	153	117	138	30	149	90	134
194	2	64	105	152	41	93	36	86	78	101	186	18	57	91	188	121	85	11	99
187	38	133	173	1	197	113	84	3	58	102	67	79	126	62	45	42	100	8	10

93 13592 06-17-2009 MME DIR

83	95	97	119	39	44	133	128	4	159	147	102	51	50	2	134	20	187	57	129
91	92	84	166	15	85	104	66	68	86	21	70	172	196	90	93	115	169	61	136
35	29	60	10	27	174	123	100	33	42	77	59	176	69	103	58	18	180	140	125
141	157	7	14	161	41	16	121	192	164	5	114	63	48	75	186	138	185	178	64
13	148	150	126	49	36	173	88	131	25	22	31	151	124	145	177	106	76	45	130
79	167	117	80	55	155	67	168	122	6	56	197	107	158	11	127	81	71	144	193
113	190	149	105	37	23	17	118	181	132	53	188	12	165	152	137	110	195	94	98
175	8	46	34	199	153	82	183	108	38	182	162	143	26	139	179	156	171	19	43
135	3	72	184	74	99	146	96	163	101	191	28	112	111	73	194	54	109	87	142
65	47	40	116	200	30	9	160	120	189	62	170	89	1	198	154	78	24	32	52

94 13460 06-24-2009 PFE DIR

90	160	196	14	102	25	20	66	143	51	200	98	13	67	5	126	173	10	136	24
30	132	87	147	32	103	151	189	159	128	137	35	108	19	21	44	43	26	81	72
125	40	2	60	95	166	127	129	171	135	89	182	77	6	107	118	42	104	9	156
54	174	111	195	59	163	65	91	146	88	110	150	170	120	183	3	164	140	165	45
41	47	192	121	168	68	198	96	117	180	185	73	154	191	93	84	175	33	70	16
123	186	141	109	48	69	49	148	157	167	18	193	4	177	79	179	113	7	138	37
190	85	31	100	1	46	152	172	162	169	114	101	34	22	52	53	28	94	78	112
181	55	63	139	12	155	122	75	130	142	187	23	82	8	178	119	83	115	197	39
149	97	27	176	194	38	133	99	71	11	15	188	153	29	124	64	58	86	74	161
106	80	184	61	158	62	145	57	144	131	116	105	36	56	92	76	50	134	17	199

95 13471 06-19-2009 MME DIR

198	154	105	185	72	114	130	5	170	82	3	160	182	93	66	73	18	127	10	178
123	38	84	42	70	175	63	27	121	187	20	43	16	41	31	56	173	176	62	26
120	111	180	102	1	151	169	155	113	36	4	152	54	163	15	191	166	179	91	141
195	60	192	165	58	168	132	126	2	14	61	37	171	74	181	29	95	108	59	106
189	196	98	107	81	48	194	35	64	110	22	131	11	7	96	51	12	109	33	117
92	144	79	135	193	125	188	172	46	101	32	124	149	89	40	164	157	45	99	147
150	142	134	94	197	122	161	100	55	52	34	112	136	115	153	140	57	138	23	76
19	156	75	145	44	116	87	128	65	103	139	190	67	8	137	184	80	200	77	162
9	49	104	133	47	39	24	50	28	177	119	53	129	85	183	158	78	97	118	146
68	17	143	21	25	71	199	88	148	83	167	13	6	69	159	30	90	86	186	174

96 13253 06-24-2009 PFE DIR

100	85	9	13	47	70	108	180	107	109	57	78	181	39	168	76	92	193	74	8
43	173	60	187	126	67	79	134	132	80	20	44	58	75	1	84	38	12	145	127
28	10	135	131	138	178	36	25	99	152	198	66	197	89	62	195	73	143	18	23
190	164	55	136	72	192	61	177	90	153	170	125	82	93	119	46	189	15	140	27
30	6	83	65	171	183	21	162	45	31	97	104	34	196	185	87	50	148	175	33
149	182	146	130	139	49	19	4	133	24	155	154	144	106	14	52	98	112	54	115
120	184	110	35	157	121	163	116	150	22	7	105	86	191	5	113	188	129	194	32
56	88	151	124	199	161	167	128	26	11	122	141	41	96	186	16	166	174	176	123
17	159	64	179	158	94	42	111	63	172	3	53	69	29	169	95	200	59	165	81
142	137	156	101	117	77	160	114	118	48	2	102	91	71	103	37	68	51	40	147

97 13698 06-23-2009 PFE INV

198	147	165	60	112	101	34	4	119	162	25	100	167	199	14	178	27	89	137	86
74	3	37	64	9	58	188	7	55	189	146	150	113	120	149	92	22	95	127	32
133	106	158	1	48	185	85	47	44	163	164	131	13	193	79	69	50	16	5	180
20	166	12	118	140	66	83	156	136	82	99	30	125	128	65	200	171	68	138	59
54	111	153	96	2	81	152	190	183	8	157	33	19	105	42	56	23	187	31	161
154	169	108	148	53	24	40	134	102	186	174	175	28	103	87	21	121	129	172	49
109	15	194	110	93	72	29	38	179	116	177	35	173	176	6	76	107	46	104	170
75	45	142	94	10	91	84	62	61	17	43	124	70	130	132	67	184	78	160	195
141	39	192	145	123	182	11	88	126	73	18	159	114	90	117	71	41	197	36	77
57	98	151	52	51	191	155	144	181	63	122	139	80	143	168	135	196	115	26	97

98 13519 06-19-2009 RAE INV

112	131	58	7	163	63	90	147	175	134	56	108	66	45	197	166	180	93	176	70
170	181	75	76	178	25	60	10	191	141	4	183	2	185	44	135	118	55	26	168
69	68	125	179	194	128	110	94	67	146	3	46	79	49	165	152	143	83	167	34
23	47	91	137	115	12	27	50	195	136	145	109	73	116	177	184	64	72	159	190
61	39	198	148	188	28	38	80	150	21	92	126	138	133	77	78	15	140	104	164
13	196	127	17	161	173	88	14	57	98	99	102	52	8	24	200	130	65	33	121
6	172	162	96	74	193	111	132	11	114	82	43	154	19	101	186	54	129	189	155
53	35	107	9	100	139	48	32	36	123	40	41	124	187	81	18	113	171	174	59
160	95	151	62	199	149	86	37	182	71	142	51	117	157	158	30	97	89	122	119
20	169	16	29	5	31	42	22	106	103	144	85	192	120	156	105	1	87	84	153

99 13403 06-18-2009 RAE DIR

97	199	62	78	26	149	126	28	121	46	129	176	178	11	159	123	190	142	86	107
58	166	82	118	94	160	51	73	77	54	90	152	6	13	133	71	57	192	69	88
186	20	68	109	148	80	60	8	85	32	48	52	66	117	131	41	75	36	173	1
114	170	185	193	143	120	87	183	103	99	102	167	93	50	181	124	134	182	43	10
7	63	14	153	139	27	79	96	150	95	31	163	194	2	38	108	136	23	162	179
47	128	130	147	33	115	35	116	83	119	64	138	92	29	146	113	84	5	25	197
89	49	112	30	106	200	172	141	187	151	189	132	22	72	127	165	24	158	44	104
70	65	55	171	45	81	122	56	40	74	144	161	91	39	12	175	37	111	34	67
9	4	196	105	180	168	19	145	3	110	137	198	21	164	140	100	59	154	177	101
61	16	135	169	53	18	17	15	184	125	98	76	195	188	191	157	156	174	42	155

100 13566 06-18-2009 MME DIR
148 138 177 127 65 87 60 38 103 2 62 24 179 105 175 152 130 124 191 78
189 156 10 112 131 195 15 116 169 47 61 137 115 17 26 100 59 82 34 183
114 187 33 159 173 144 45 70 122 190 161 90 9 158 54 126 88 3 69 193
170 110 181 163 6 13 77 146 72 102 49 35 96 71 99 162 98 120 153 136
174 40 31 21 145 18 50 117 113 44 186 93 192 91 125 167 7 194 176 109
12 197 43 151 134 106 29 67 80 63 86 74 178 165 32 68 147 51 154 53
41 141 81 94 8 46 28 22 1 95 64 166 4 171 20 16 75 42 118 129
160 30 37 27 56 19 79 89 52 128 36 58 84 48 66 11 132 150 200 92
25 172 23 107 133 57 185 55 198 119 142 5 184 101 155 157 143 111 168 135
76 104 139 196 85 149 188 39 182 123 83 199 180 121 97 14 108 164 140 73

TA0101: 200×20

101 15002 01-15-2009
83 151 198 93 94 95 178 76 170 120 109 88 64 165 38 190 63 180 99 116 153
15 132 158 30 159 185 115 113 29 162 14 87 89 48 117 19 140 126 90 196 69
61 60 28 44 3 24 49 56 9 79 184 2 32 121 66 112 124 194 191 183 154
160 195 131 20 26 200 128 65 145 155 163 138 192 42 97 91 164 144 175 188 111
47 67 81 12 34 101 150 157 85 25 73 148 177 169 22 31 50 13 41 143 37
53 52 68 10 167 17 129 51 187 105 7 147 57 72 133 35 36 173 168 182 98
134 4 27 118 127 136 146 70 189 1 156 110 104 161 18 5 125 106 58 135 100
16 171 96 39 139 197 54 8 141 80 119 123 46 6 59 186 84 114 33 172 103
77 130 102 71 74 199 149 78 11 75 45 23 108 181 62 92 21 166 55 107 43
40 152 122 142 174 193 179 176 137 86 82

102 15237 02-09-2009 NEH DIR
56 52 11 91 74 37 184 149 136 132 191 163 159 70 2 131 77 147 103 119 197
156 107 15 162 137 17 27 105 196 33 32 93 111 34 145 82 81 97 142 152 172
89 5 151 57 118 160 127 29 24 94 48 21 135 41 182 129 110 18 69 179 198
43 26 90 87 92 88 120 9 60 8 165 186 53 19 124 134 164 83 13 176 185
108 104 189 36 123 130 200 121 173 190 49 167 102 73 177 106 3 86 126 64 117
50 171 45 181 63 144 75 178 84 35 153 138 98 168 113 4 65 59 116 148 51
128 78 101 47 23 109 71 79 195 76 174 122 170 28 169 187 25 31 100 154 42
193 183 199 58 95 85 1 54 68 38 188 14 61 30 39 62 158 141 139 96 10
115 55 192 161 150 22 194 66 114 99 6 155 16 175 72 12 40 112 125 143 46
146 20 157 7 166 80 67 44 180 140 133

103 15207 06-12-2009 PFE INV
124 107 137 192 117 76 186 103 119 17 110 20 64 87 6 68 48 95 73 34
134 147 168 70 79 91 194 155 179 183 156 33 106 40 159 130 35 5 185 171
173 195 144 96 26 121 152 81 31 111 28 176 88 71 123 196 16 11 129 24
158 9 149 63 154 42 182 82 114 67 51 108 160 75 170 94 37 10 3 102
83 49 133 97 36 191 184 77 187 139 193 169 105 15 80 38 141 128 151 47
113 45 175 65 174 92 60 55 138 150 58 104 166 172 19 118 165 1 142 18
197 54 89 7 164 56 112 122 153 198 157 86 84 69 90 188 146 66 109 74
99 181 14 189 93 8 132 46 116 57 120 163 27 44 39 2 115 136 101 21
78 43 85 190 23 145 29 148 178 161 13 100 127 140 12 135 98 41 126 131
32 25 61 199 50 53 62 200 180 72 30 177 162 59 143 167 52 125 22 4

104 15244 06-04-2009 MME DIR
66 4 16 26 111 20 33 104 155 14 77 189 185 115 122 179 141 88 181 44
175 27 17 178 103 76 171 110 170 121 10 31 50 159 184 65 197 135 53 68
146 34 194 91 164 136 28 71 39 18 3 57 124 45 23 160 154 138 142 180
123 129 55 37 24 49 96 97 60 52 22 162 182 21 176 6 137 41 188 152
101 1 139 78 112 168 72 158 93 36 134 107 30 42 109 199 35 85 8 183
84 165 92 73 150 198 13 56 12 2 87 54 70 114 19 7 196 108 187 106
128 40 153 119 62 51 46 75 195 174 130 80 79 151 118 140 116 127 161 190
83 143 32 157 5 43 172 100 125 38 74 186 48 132 144 64 95 105 89 59
47 193 82 192 9 25 117 200 149 120 131 173 113 11 166 126 145 177 86 58
147 67 169 163 63 69 191 94 102 29 81 167 15 90 98 156 61 99 133 148

105 15123 01-19-2009 MME INV
112 162 193 31 128 110 5 159 86 6 30 68 158 141 186 73 171 134 11 195 27
95 84 70 155 71 61 34 19 160 177 105 22 40 144 180 33 156 14 63 12 26
98 165 58 97 38 17 169 122 9 191 143 54 121 10 44 124 67 28 146 127 187
56 76 94 119 43 77 25 32 83 48 132 102 116 154 37 53 3 163 65 129 24
52 85 164 178 152 145 47 118 100 147 21 142 123 91 126 192 161 104 140 51 200
62 167 81 198 153 174 157 90 173 7 136 4 41 39 74 172 149 131 18 99 139
113 59 15 166 36 66 80 135 107 103 13 151 78 125 89 96 75 176 179 20 150
35 190 170 120 69 189 109 197 60 138 57 88 188 182 82 29 49 79 8 196 72
183 111 87 64 115 93 168 42 184 133 23 46 175 106 16 108 114 1 117 2 55
45 50 194 101 185 130 199 137 92 148 181

106 15304 01-22-2009 NEH DIR
98 157 60 121 181 200 137 88 42 143 87 196 187 190 127 65 81 58 97 93 27
61 62 43 99 52 22 23 175 80 47 171 151 158 18 103 19 117 154 114 55 102
76 104 92 59 67 69 138 73 120 89 136 113 148 174 115 130 106 50 173 153 46
6 161 111 105 8 91 166 133 21 36 160 108 14 112 41 194 68 141 164 156 63
10 179 135 4 159 5 180 28 7 100 72 2 134 33 90 169 71 32 82 193 124
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107 15263 02-10-2009 MME DIR
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161 103 76 116 122 96 143 121 2 108 9 91 151 8 114 154 158 174 118 85 53
133 176 134 155 49 70 15 156 21 123 46 150 186 12 13 142 112 52 31 44 72
89 109 65 80 20 144 137 42 57 86 95 127 189 181 194 148 16 177 71 170 45
184 37 129 197 167 30 82 84 56 152 101 14 94 92 164 36 105 5 102 198 50
107 159 136 180 38 128 7 81 39 83 58 40 125 55 130 191 141 61 25 6 32
182 171 62 78 185 60 17 139 24 88 33 18 111 74 195 19 126 162 183 145 157
178 175 4 188 93 160 187 153 51 79 23 11 135 113 179 69 132 172 3 106 73
77 34 193 26 87 27 22 124 146 35 67 47 147 100 149 173 166 63 1 104 165
98 196 115 131 54 97 48 43 199 192 120

108 15310 02-06-2009 PFE DIR
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109 15175 06-03-2009 MME INV
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110 15234 01-23-2009 NEH DIR
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127 71 183 139 194 140 102 1 46 61 184 84 167 157 155 28 24 31 128 15 123
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54 135 101 91 81 68 65 16 70 97 103 83 198 50 187 9 199 121 132 177 188
20 131 94 115 141 35 108 4 142 6 174

TA0111: 500×20

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111 36790  04-21-2009  NEH
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112 37236  04-22-2009  NEH  DIR
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 452 143 482 412 211  38 368 170 423  51 179 270 230 242 291 123 223 193 467 252
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 173 300 189 425 246 311 370  29 168 237 164 161 490 484 485 250 265 498 132 470
 390  76  24 109   9 404  15 440 289 247 194 243 302   2 414 207 445 119 344 175
 327  33  40  45 120 277 191 301 110 410 478  53 364 186  61 454 464 196 100  91
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 466 318  47 332 432 307 244  56 171 184  48 472 351 279  75 338 371 473  36  63
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113 37024 04-24-2009 NEH INV

329	162	71	378	443	210	361	67	464	490	81	37	292	496	3	347	184	13	115	178
88	199	142	11	51	69	357	396	317	131	200	159	419	63	56	287	50	346	260	482
12	373	449	435	393	233	365	145	270	130	41	469	16	316	192	319	350	120	237	176
72	169	65	163	338	354	242	121	295	339	441	211	90	193	226	249	395	259	278	379
185	487	70	342	20	78	76	229	391	400	14	334	416	362	282	83	173	327	408	326
42	188	35	116	418	429	171	307	108	153	277	15	367	304	168	231	112	22	275	315
477	212	117	190	135	155	269	344	305	266	49	448	6	308	497	96	375	460	181	407
100	21	197	331	48	77	30	422	165	201	214	209	230	296	205	257	87	91	251	434
123	345	380	456	499	95	402	189	52	337	445	245	225	425	437	150	356	466	404	377
183	478	167	431	483	132	323	386	2	384	223	55	500	175	289	325	9	290	340	164
127	5	272	4	44	106	457	324	297	124	286	151	492	494	421	312	480	427	99	137
122	352	306	174	82	156	104	470	471	45	53	495	227	177	10	388	321	276	101	172
241	129	60	29	140	43	247	267	265	397	293	428	74	368	313	442	248	358	389	300
479	166	387	198	451	279	136	31	66	207	89	152	33	235	405	467	222	284	64	170
244	27	424	118	301	433	204	7	268	353	412	335	299	34	158	390	320	234	336	68
349	157	92	59	217	283	105	294	291	109	398	318	414	439	47	302	426	371	385	256
39	179	61	148	330	489	202	228	411	444	141	463	328	1	351	382	399	86	298	113
250	216	23	476	134	394	438	161	381	180	218	80	203	468	114	240	484	232	111	343
403	107	85	154	453	62	195	94	186	413	254	430	280	258	309	84	102	149	359	219
363	252	310	271	221	355	420	406	18	144	491	415	206	220	191	119	138	486	450	103
465	110	17	213	372	19	54	38	314	409	26	25	98	322	73	75	239	455	366	58
452	285	187	236	436	332	311	341	458	440	93	147	376	485	36	160	370	215	410	473
40	369	383	348	374	139	498	446	246	224	182	281	417	333	146	474	79	461	447	462
432	126	8	264	364	125	128	243	392	194	262	493	143	57	97	481	28	401	238	46
288	24	303	273	208	261	274	253	196	360	423	488	472	263	133	32	459	454	255	475

114 37183 04-28-2009 TRP INV

151	117	191	479	139	414	30	165	363	27	314	266	426	19	354	58	127	373	55	214
9	211	78	118	228	434	349	233	412	455	124	394	488	25	156	457	61	336	292	477
371	398	303	315	167	1	262	291	419	328	137	183	157	310	440	231	324	392	11	484
295	242	330	185	66	13	119	250	201	338	178	54	15	281	104	73	445	181	287	218
251	208	76	105	472	494	113	436	327	77	143	67	225	175	26	239	444	320	245	70
431	173	370	356	149	169	422	229	130	205	135	385	172	96	390	168	267	24	256	486
493	261	102	35	374	192	427	7	357	384	274	136	403	333	64	109	56	350	49	153
341	39	226	453	378	286	152	268	270	282	411	495	114	343	121	132	302	329	140	244
480	227	470	491	358	500	413	159	300	456	203	278	133	85	296	142	388	210	387	237
20	45	235	97	230	190	482	283	490	187	125	92	435	236	313	439	417	379	339	93
462	449	193	234	293	471	308	83	41	69	332	408	353	404	265	401	316	433	288	318
18	360	372	448	116	389	179	207	254	247	319	47	331	202	2	65	425	309	6	3
346	289	465	280	101	108	131	81	221	337	209	232	463	204	476	38	150	473	240	423
446	91	42	438	322	87	241	86	161	21	182	447	397	141	305	238	361	249	406	442
342	213	279	415	468	88	396	451	147	367	311	497	59	400	474	409	197	60	145	273
162	84	352	386	459	4	276	478	407	164	129	301	366	258	222	146	194	375	298	454
359	483	443	380	351	216	299	306	57	275	393	29	421	176	224	107	377	51	99	180
53	8	10	217	90	437	22	391	174	312	464	134	255	50	195	212	199	158	416	452
364	290	32	272	188	166	189	269	382	284	62	334	75	63	40	450	365	335	466	376
16	28	52	304	323	72	418	43	260	144	71	14	122	82	206	481	170	383	424	405
80	399	220	110	12	120	467	95	154	297	395	128	243	223	177	171	264	196	498	368
469	123	33	257	410	215	355	362	37	34	499	475	340	369	326	184	94	432	347	277
23	112	36	429	100	492	263	321	441	48	420	496	106	348	17	271	200	248	458	155
253	252	160	79	294	344	111	163	325	89	487	46	430	317	461	402	489	381	198	98
68	138	148	285	31	126	44	74	485	219	246	115	103	259	428	186	345	460	307	5

115 36833 05-02-2009 NYM INV

271	63	57	281	266	283	361	298	391	114	412	148	211	267	91	240	93	447	177	100
160	454	252	39	324	339	241	13	332	346	34	69	214	397	40	54	28	284	322	387
463	178	97	224	362	79	297	293	461	287	203	129	185	188	167	302	363	435	418	136
30	141	499	316	319	210	109	154	125	161	112	343	371	189	256	191	383	193	279	70
306	457	237	103	173	139	151	204	5	476	340	460	323	106	50	110	43	48	4	261
133	344	485	23	44	288	313	62	223	46	130	206	359	337	75	417	320	87	186	426
92	328	53	389	80	291	335	194	183	492	78	368	229	212	314	358	121	56	239	21
439	234	155	318	436	410	88	377	232	180	113	477	307	25	356	364	128	58	166	55
456	443	327	47	367	156	487	22	296	404	465	431	336	73	115	163	122	162	422	117
168	98	453	378	310	238	442	158	479	253	470	388	258	61	486	216	493	301	373	221
209	419	142	392	218	380	49	104	437	338	228	471	102	208	384	245	278	94	495	491
101	96	276	331	83	451	199	481	172	413	72	262	119	27	382	347	41	138	345	385
394	290	317	35	315	10	111	7	459	9	68	381	59	494	425	386	414	400	321	452
416	16	225	33	445	357	406	277	74	366	67	217	490	488	150	403	408	146	292	421
309	118	472	350	484	190	26	430	244	375	198	184	108	500	329	147	468	32	17	334
144	269	467	411	116	299	169	428	424	149	176	99	220	126	427	399	429	280	478	393
369	235	81	137	360	243	175	249	247	333	474	348	2	8	464	483	330	498	246	420
260	82	352	192	365	76	370	303	77	230	250	264	181	124	395	282	157	448	127	18
440	231	409	3	64	105	402	42	251	444	341	254	170	153	152	469	407	195	226	140
165	222	415	398	433	182	432	60	305	273	294	242	405	449	52	274	1	462	65	353
11	379	355	482	489	66	304	95	295	107	475	85	268	89	257	255	308	159	174	285
197	38	134	325	196	265	473	86	458	164	187	270	480	423	434	390	272	275	31	71
51	450	6	84	259	497	143	12	207	171	14	131	326	496	233	202	37	289	20	205
396	36	438	120	349	263	372	219	123	374	455	200	446	90	401	354	466	342	441	300
132	311	236	286	248	145	24	135	376	19	213	227	45	179	215	201	351	312	29	15

116 37195 05-19-2009 MME DIR

80	495	447	24	482	207	337	155	84	277	177	26	393	12	156	442	428	58	367	185
288	55	17	7	9	470	166	404	212	192	197	59	325	312	40	102	473	320	475	202
267	306	342	243	94	120	408	472	453	228	68	161	36	434	421	16	105	201	343	290
226	113	187	232	436	162	93	180	253	382	43	257	380	486	265	190	390	90	88	418
338	151	314	394	263	223	435	420	248	402	42	136	199	38	300	328	330	494	44	34
250	370	270	57	96	375	432	303	132	139	425	211	433	69	49	239	493	195	32	246
398	56	289	171	484	308	189	485	446	206	373	81	173	276	344	391	430	208	19	198
45	279	335	222	91	411	95	403	15	10	121	50	414	409	319	65	481	458	406	164
292	146	48	426	287	499	271	397	321	275	305	184	67	112	349	431	304	64	449	128
440	70	241	281	5	182	469	92	100	86	441	301	471	37	348	491	309	227	110	242
466	11	20	99	354	200	341	385	72	334	477	77	159	221	124	181	126	350	331	383
87	474	165	255	444	422	311	115	336	372	452	142	272	163	454	66	293	74	376	318
215	71	244	129	326	225	8	479	266	170	379	73	204	371	106	214	79	384	386	465
489	294	333	233	47	399	480	131	451	174	302	387	423	407	457	260	463	347	392	218
157	23	168	109	209	183	133	368	487	203	252	322	296	179	317	459	443	274	467	307
103	369	269	358	172	154	285	313	1	410	236	27	496	483	366	490	346	417	298	412
82	329	85	30	78	140	149	28	401	464	497	429	381	488	31	217	75	186	76	332
141	231	238	280	152	498	104	137	353	235	500	297	220	461	437	262	365	339	147	245
22	395	361	352	97	249	356	4	127	264	374	261	378	130	119	345	101	415	258	117
41	144	462	54	256	237	364	389	360	116	455	323	122	492	175	205	194	416	125	327
291	247	53	234	111	230	450	134	6	138	178	445	362	357	21	315	135	108	63	39
143	52	51	25	359	460	251	148	355	476	324	405	286	167	438	273	188	46	240	210
118	196	396	216	268	191	62	229	2	419	18	282	224	310	219	400	295	13	14	176
83	468	33	193	363	169	377	427	114	448	316	259	3	299	160	107	35	388	439	351
456	278	478	145	424	213	29	61	284	89	98	150	60	413	153	158	283	340	123	254

117 36944 05-20-2009 MME DIR

464	312	472	18	140	355	422	145	242	210	398	237	286	98	330	337	150	57	82	438
379	317	234	188	23	67	451	443	349	425	459	222	195	174	356	473	265	209	465	37
221	52	21	351	180	207	391	4	65	342	327	392	120	129	272	158	440	331	282	323
191	226	8	5	305	446	353	89	70	263	200	6	467	301	3	53	56	311	340	362
373	227	125	326	132	141	217	149	258	77	315	364	299	71	178	186	357	387	321	11
332	324	385	105	292	476	456	322	295	228	352	360	378	429	136	109	154	173	24	248
142	457	167	255	432	19	106	393	485	215	130	54	498	134	20	329	181	413	348	439
175	288	309	9	296	165	297	94	68	73	168	361	239	404	80	303	17	115	192	95
370	143	376	64	487	414	246	338	397	233	308	205	179	480	359	231	287	403	384	407
377	170	416	7	423	107	223	93	267	350	161	319	97	310	112	454	448	163	307	78
182	477	22	252	83	30	29	197	266	34	450	358	343	273	46	171	201	235	336	13
380	415	381	344	499	290	118	420	229	484	208	48	81	85	421	212	447	444	45	116
493	49	27	193	236	146	396	196	368	194	110	157	462	139	155	31	417	402	325	293
152	99	437	43	144	25	424	382	60	128	232	483	92	486	84	79	138	427	479	133
386	123	91	430	117	216	285	470	51	371	189	241	113	187	369	206	127	276	224	76
365	33	39	102	15	494	375	264	458	111	401	238	203	304	419	69	481	151	185	119
169	289	478	367	495	214	177	466	471	164	277	269	409	388	366	426	75	199	433	271
122	10	42	354	2	101	463	449	441	339	36	492	475	26	445	103	162	490	482	341
61	347	316	489	452	245	114	55	253	274	126	1	166	488	108	44	460	428	328	275
184	280	291	58	66	294	135	314	204	35	90	219	491	124	334	121	172	497	50	38
453	279	298	418	63	435	412	468	160	198	442	32	14	383	372	408	211	318	243	406
302	254	395	59	74	183	455	268	137	363	461	41	87	131	333	256	496	346	148	374
147	262	28	284	72	40	47	411	100	400	399	202	220	250	394	281	389	218	159	12
104	176	86	240	474	300	153	335	270	190	283	225	249	278	306	390	257	156	405	345
431	251	261	259	230	16	410	434	469	62	500	313	436	320	247	213	260	244	96	88

118 37238 05-20-2009 MME DIR

6	432	189	194	494	420	113	442	268	491	382	116	488	8	319	372	281	226	341	359
304	172	403	238	450	65	231	303	344	229	220	20	380	37	4	191	156	135	195	103
149	161	397	97	462	490	374	77	283	223	92	177	129	361	451	213	309	423	201	495
343	32	205	386	411	320	112	72	23	370	128	293	400	114	363	264	277	45	222	35
334	118	322	34	314	483	83	337	185	339	428	484	385	311	421	225	138	212	115	378
485	166	434	244	273	409	316	183	218	435	305	68	340	347	51	90	111	368	272	181
448	57	148	354	471	190	193	107	369	204	81	9	98	24	299	11	95	235	258	500
288	94	199	401	427	147	342	367	308	12	236	267	59	284	224	154	211	251	389	271
144	162	182	239	376	266	74	56	477	357	331	91	413	404	326	455	175	93	80	171
375	360	394	19	407	325	155	395	176	463	131	253	387	476	151	379	86	487	262	50
179	440	396	465	49	498	260	405	164	393	298	398	458	73	249	60	16	109	252	278
2	140	110	328	439	492	64	157	349	338	275	414	70	168	43	52	28	335	257	47
132	124	200	106	307	330	227	408	355	416	431	300	54	461	62	61	100	280	469	459
173	123	452	383	66	390	282	125	26	10	352	327	38	208	269	88	287	472	424	259
457	215	33	265	31	323	301	290	436	444	159	329	234	36	443	297	296	63	44	82
237	1	119	101	410	87	75	310	21	318	22	139	481	217	104	497	294	187	202	467
158	480	279	245	167	216	295	348	289	30	117	419	25	79	78	276	210	482	353	417
141	48	69	143	203	126	473	142	384	373	493	39	18	274	449	479	209	365	165	160
153	460	13	446	5	366	192	246	152	40	145	67	441	345	392	133	377	453	136	134
261	3	445	178	29	475	174	121	317	206	89	71	96	315	137	53	474	270	243	58
120	346	429	312	17	496	256	130	324	478	108	84	336	447	292	426	358	437	291	230
332	438	486	180	466	15	388	406	169	122	196	198	214	163	433	197	255	105	248	233
399	150	46	184	102	470	415	7	422	306	127	27	241	41	364	146	250	286	247	242
351	402	85	207	254	263	55	464	42	302	232	391	333	99	499	362	228	456	371	186
170	285	14	350	240	418	219	454	188	381	76	430	321	412	221	425	313	468	489	356

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232	424	285	316	442	40	125	344	335	500	79	260	127	144	245	292	224	307	305	54
199	330	143	63	12	21	36	355	161	331	242	490	243	198	258	179	146	497	32	367
45	26	35	238	68	214	31	278	18	441	461	46	96	233	286	303	165	398	84	69
141	82	74	426	110	288	321	323	170	404	15	176	160	200	308	97	300	167	407	457
481	126	221	42	283	234	230	326	135	312	350	228	459	129	267	91	111	206	482	241
257	225	211	142	1	57	302	488	253	483	396	75	240	89	462	43	408	130	76	16
156	39	220	309	353	172	431	249	25	152	369	157	287	363	148	147	175	382	304	190
94	223	182	23	105	265	92	104	164	475	409	445	120	252	134	275	362	473	374	83
313	248	256	185	95	124	112	373	52	98	365	251	333	231	403	131	443	106	183	477
204	434	318	329	341	195	100	343	498	450	55	174	368	114	272	391	169	34	266	413
420	384	166	385	145	62	452	436	61	71	423	395	236	250	28	8	108	352	22	78
88	299	274	451	322	339	336	392	455	478	421	154	13	487	495	216	186	254	476	466
412	315	486	438	72	325	463	387	151	460	268	328	50	128	400	311	430	376	47	298
188	41	480	347	237	33	219	85	284	358	390	158	440	73	301	155	202	317	136	402
87	389	123	3	295	469	394	208	471	56	213	212	9	81	494	349	279	103	93	425
411	354	184	366	474	269	499	194	338	51	472	226	205	415	467	178	99	60	320	356
378	77	406	418	217	282	289	427	388	53	113	64	465	397	7	291	227	159	203	193
140	70	370	218	332	277	345	189	281	422	297	435	296	386	360	27	496	132	327	153
37	86	262	191	449	29	115	30	401	361	229	118	67	447	310	192	162	348	14	414
66	280	324	196	314	247	173	357	342	5	393	448	416	491	80	439	207	117	209	293
271	484	24	6	10	222	264	133	306	116	244	454	273	20	432	149	59	19	239	4
375	58	372	319	456	38	364	419	479	215	290	210	246	468	464	180	294	107	90	2
446	417	44	137	453	11	235	359	119	177	101	334	102	337	138	340	377	351	428	383
197	437	263	163	458	489	485	405	429	168	65	470	150	410	121	380	399	139	261	122
49	493	381	255	433	187	171	276	48	444	379	270	371	259	17	492	181	201	109	346

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111	245	38	225	351	158	215	47	84	488	342	272	183	45	398	9	426	339	421	276
423	352	220	46	394	431	91	251	365	306	13	246	310	271	204	145	477	73	456	211
261	54	149	146	379	413	392	167	127	360	460	252	332	377	277	10	62	50	229	361
362	240	83	288	480	222	311	374	66	151	458	42	59	22	34	51	485	294	305	4
435	180	407	82	475	315	490	203	98	140	119	48	366	3	14	126	309	184	86	496
389	445	396	405	171	357	297	25	257	301	130	262	425	278	143	436	248	341	205	172
393	308	483	153	265	207	99	317	300	178	335	408	274	399	195	382	441	187	155	223
224	287	464	206	492	148	307	350	268	281	450	433	156	457	417	103	313	465	280	468
372	194	65	74	12	160	410	85	100	107	346	283	199	181	321	219	43	314	132	19
120	334	147	326	88	298	478	395	11	385	497	58	275	57	273	208	31	455	49	386
134	56	494	376	329	139	391	286	474	162	173	52	373	174	359	499	430	7	449	295
133	105	462	289	30	93	355	16	141	36	170	320	216	247	76	481	118	440	434	234
33	89	319	135	343	348	418	400	290	209	432	422	416	61	21	28	358	258	285	177
368	438	420	253	161	60	123	446	68	29	484	2	228	378	459	344	101	472	237	367
192	419	324	198	179	94	303	32	284	136	331	453	243	333	235	138	108	500	401	6
157	491	443	487	70	35	90	175	217	444	26	117	154	231	448	115	63	95	353	404
259	364	226	469	304	67	8	340	388	354	270	233	20	166	189	369	75	318	185	471
163	482	451	299	110	337	202	463	370	53	387	267	291	493	327	109	282	473	242	55
81	296	18	322	168	116	371	79	380	201	412	214	17	227	210	71	122	486	442	191
44	15	402	415	256	266	152	476	363	397	302	190	1	24	406	221	176	114	292	182
80	316	212	5	150	429	411	131	230	137	279	102	165	144	269	345	96	78	461	37
489	409	381	403	23	330	312	197	77	349	64	27	325	260	97	427	383	106	437	263
470	495	356	232	250	384	336	218	164	87	414	293	255	452	112	200	338	424	129	241
323	428	113	186	454	213	375	447	390	188	39	254	104	498	40	72	159	196	124	69
328	169	249	193	236	238	41	92	264	121	128	125	244	142	347	466	467	479	239	439