

**A Study To Develop A Protocol To Assist MHS Management In Assigning Staff
To Plants.**

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ACMS Division

August 2000

1. MANAGEMENT SUMMARY

1.1.1 This Report presents the results of a study to assess the possibility of producing a standard Protocol for use by Meat Hygiene Service managers when assessing the staffing needs of plants. The results of timing the complete range of in plant inspection processes in beef and lamb plants are presented and it is concluded that an Operational Resource Planning Protocol is practical and could, if applied, result in a standard, simple and consistent method for staffing plants, while also ensuring that fully compliant inspection standards are maintained evenly across the country.

1.1.2

The Report includes a draft Operational Resource Planning Protocol based on the results of the timing studies. The focus of the Protocol is placed here because the bulk of resource in the majority of premises is deployed to routine post mortem inspections and Specified Risk Material (SRM) controls.

1.1.3 The Protocol is at Appendix III and is designed to calculate the minimum staff needed to undertake the post mortem inspections and SRM controls defined by the Regulations and the MHS Operations Manual, and undertaken whilst the mechanical line is operational.

1.1.3 It does not take account of additional duties which are needed and which would include necessary administrative and other supervisory activities. The Protocol will not, therefore, define the total staff needed in any particular plant.

1.1.4 ACMS Division August 2000

2. SECTION 2

2.1 Introduction

2.1.1 This Report describes the development methodology, statistical foundation and operational method for the Meat Hygiene Service Operational Resource Planning Protocol. The study was carried out during the period December 1998 to July 1999 by Ian Bosbery of MAFF's Audit Consultancy and Management Services (ACMS) Division, Martin Dimmick (ARM), Geraint Jones (SMHI), David Mills (SMHI) and Adrian Thorne (POVS) of the MHS Wales Region and Ron Spellman of UNISON. The Report was edited by David Mayes of ACMS, and the study was developed on behalf of Ivor Pumfrey the Regional Director of the MHS in Wales.

2.2 Terms of Reference

2.2.1 The Terms of Reference for the study were agreed at a meeting between Mr J McNeill Chief Executive of the MHS, Mr Pumfrey and Mr M Piggott (Head of Branch) and Mr I Bosbery of ACMS on 24 October 1998. They were as follows :-

- a) to assess the data so far developed on the operational resource requirements for fresh meat and SRM inspection procedures;
- b) to investigate the practical operational difficulties encountered by inspection staff;
- c) to develop a practical guide for the use of Regional Management in deciding staffing levels for inspection staff within fresh meat slaughter plants; concentrating initially on beef and sheep plants. The guide will meet all MHS legislative operational requirements, while, at the same time, taking account of research and other evidence of the constraints on staff in terms of working conditions, attention spans etc.;

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- d) to test the applicability of the guide within one or more Regions of the Service;
- e) to report to the Client on any organisational or other issues which may arise during the course of the Study; and
- f) to produce a final report in a form to be agreed with the client.

2.3 Consultation

2.3.1 Following agreement of the Terms of Reference Mr Bosbery undertook a number of consultation and familiarisation visits to a variety of plants within the Wales Region. The study team would like to express their thanks to the MHS staff and plant management's in Wales and Central Region of the MHS, without whose help and co-operation this study could not have been completed.

3. SECTION 3

3.1 Programme and Methodology

3.1.1 Prior to the start of the study, detailed analysis of the operational activities which are needed to fully comply with the basic minimum Statutory requirements of the Fresh Meat (Hygiene and Inspection) Regulations 1995,

the Specified Risk Material Regulations 1997 legislation and related MHS operational instructions, was undertaken. These Statutory requirements include the basic minimum requirements relating to post mortem inspection which must be carried out on each and every carcass of the particular species. The inspection processes for the agreed species were tabulated, together with all those activities required for SRM and other controls. A table listing the inspection functions which have been examined in this study is given at Appendix I. It should be noted that the Protocol does not cover additional inspection requirements which are needed for certain categories of animal, nor does it cater for the additional tasks which may need to be undertaken if disease lesions are detected. In using the Protocol it is important that additional staffing needs which may arise from these additional tasks are taken into account.

3.1.2 During the course of the preliminary analysis timings were taken of each of the tasks described at Appendix I. It was initially thought that times for each individual sub task could be used to develop the Protocol. It became apparent, however that many of these sub tasks were of very short duration, and were of the order of 2 - 3 seconds. They were difficult to distinguish from each other in an operational setting without the use of complex systems such as video recording, which, by their intrusive nature, would themselves affect the performance of inspections. It was recognised that the individual variation involved in this approach would make the analysis of times and the calculations involved in developing standard

staffing excessively complex. In addition, there would be a need, using such a system, for each process, at each plant, to be timed individually at the

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point when staffing was being assessed. With the consequent need for a large number of individual managers to undertake timing operations, the degree of possible variation involved and the scope for individual interpretation would mean that the exercise would lose objectivity and that the system could not be applied consistently across the Service. As the final Protocol needs to remove any scope for such variation and to produce consistent results, a different approach has been adopted.

3.1.3 It was recognised that the inspection of carcasses involves a number of standard operations which can be grouped together, and for each group, the operations are sequential. The groups are a) carcass eligibility, b) inspection of head tissues, c) inspection of red offal, d) inspection of green offal and e) inspection of carcass meat (per side for beef carcasses). The prescribed inspection activities for each species for each task group are referred to by code in Appendix I and in more detail in the Annexes to Appendix III.

3.1.4 It is universally the case that the tasks associated with a group, as defined above and as expanded in the Appendices, will be undertaken by an individual Inspector. By grouping tasks together the times taken are longer and easier to measure and the small variations involved in timing individual operations are evened out. In this way the timings for each group of activities become representative of the times achieved by any Inspector, providing that in taking the representative timings the sample of Inspectors who are timed is representative of the range of Inspectors as a whole. Additionally the time decided upon for any group must be shown to be within the range of timings achievable by the whole population of Inspectors. These factors are taken into account in the Protocol.

3.2 Sampling methodology

3.2.1 This study has concentrated on plants processing beef and young lamb carcasses. The emphasis throughout has been on ensuring a

consistent inspection process which is fully compliant with the legislation and MHS operational procedures. In advance of undertaking the fieldwork the inspection processes involved at each stage of the operation were examined in detail and standard definitions of all activities were produced. These were consistent with full compliance with the minimum requirements for post mortem inspection contained within legislation, and for SRM controls, but excluded any on line activities which were not statutorily required or required under MHS work instructions, such as trimming and rectification carried out as a concession to plant management as well as certain additional duties off line. In undertaking timings of operations Inspectors were required to comply with these set standards and in order to ensure that compliance could be consistently achieved throughout the timing process, plants were chosen that had a mid range line speed. In this way individual Inspectors were not under undue pressure to complete inspections but, similarly, did not have exceptional amounts of spare capacity. It must be emphasised that the timing exercise was only concerned with the specific on line activities described above. In calculating plant manning levels using the Protocol, account will need to be taken of the off line activities such as completion of operational paperwork, hygiene supervision and ante-mortem inspection. Appendix II lists the main off line functions not included within the Protocol and for which allowance must be made in calculating staffing figures.

3.2.2 Following discussions and advice from Mr I Webb, the Head of Economics and Resource Use Division and a MAFF Senior Statistician, a Protocol for undertaking in plant timings which was capable of statistical analysis was devised. Individual timings of the inspection process were undertaken by a two man team consisting of an experienced Inspector, who was responsible for ensuring that the defined standards were consistently achieved and the ACMS consultant who undertook the timings of individual inspections. For each plant visited a total of ten inspections were timed for each group of events and for each species. Times were recorded using a consistent method

which commenced from the point at which the Inspector first approached the unit and stopped at the point when the unit was released. Times were recorded in seconds down to one hundredth of a second using a standard digital stop watch. Additionally timings were taken for the main types of personal hygiene operations required, namely hand and apron washing (HAW) and hand, knife and apron washing (HKAW). Appendix III gives examples of the inspection operations which were used to ensure consistent timings

3.3 Results and discussion

3.3.1 The timings produced for each species and for each plant visited are produced at Appendix IV. The results of the statistical analysis is at Appendix V, and these are reproduced graphically at Appendix VI.

3.3.2 Appendix V shows the lengths of time for each operation, along with the associated standard errors. The Standard Error represents the unbiased deviation of the data about the mean. This means that, generally, the greater the error the greater the deviation of the data and vice versa. For example, operation SI is estimated to take 6 seconds on average, with the 95% confidence limits being ± 1 second. The analysis shows that there are differences between plants, and the Protocol takes this into account.

3.3.3 No two plants will be identical. The results show that differences for each operation fall within a fairly narrow range. This leads to the conclusion that the times can be used to represent the likely inspection time required for the operation. For the timings taken, the spread across operations and the mean and standard errors are tabulated below.

•

Operation	Identifier code	Low	High	Spread	Mean	St. Error
Sheep Eligibility	S1	5.31	7.46	2.15	6.17	0.43
Red Offal	S2	8.37	10.39	2.02	9.25	0.56
Green Offal	S3	5.46	8.64	3.18	6.62	0.70
Carcass	S4	18.32	31.20	12.88	25.05	2.53
Young Lamb stamp	S5	5.41	8.21	2.80	6.69	0.57
Beef Eligibility	B1	8.92	12.77	3.85	10.01	0.83
Head	B2	44.20	56.28	12.08	49.96	2.59
Red Offal	B3	73.84	93.21	19.37	83.89	3.86
Green Offal	B4	8.48	12.14	3.66	10.53	0.92
Carcass	B5	44.82	68.54	23.72	58.05	6.48
Hygiene operations						
Hand & Apron	H1	11.21	16.48	5.27	13.52	1.53
Hand, Knife, Apron	H2	14.92	26.54	11.62	20.78	4.27

3.3.4 The spread of timings across individual operations represents the wide variety of situations that Inspectors can encounter. These are reflected in the greater range of results from the more complex sets of operations.

3.3.5 One area where a difference between minimum operations and necessary practice was apparent was in respect to red offal inspections in sheep. In these tissues the level of pathology detected was, in some cases, at levels which could have affected the resource needs in some plants. This may relate to the source of animals supplied to the plant. Where such appreciable levels of pathology occur, the OVS may need to reduce the line speed.

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3.4 Effects of applying the timings to some plant staffing

3.4.1 The timings so far produced would lead to the adoption within the Protocol of standard times for each of the operational groups. From these times, general conclusions on staffing levels can be deduced. The times, rounded to the nearest tenth of a second, would be :-

Sheep	S1	6.2 sec
	S2	9.3sec
	S3	6.6sec
	S4	25.1sec
Beef	B1	10.0 secs
	B2	50.0sec
	B3	83.9sec
	B4	10.5sec
	B5	58.1sec
Hygiene	H1	13.5sec
	H2	20.8sec

3.4.2 From the above timings the maximum number of units that an Inspector can be expected to assess at each point in the Inspection line can be calculated. The calculation needs to take account of the requirement for personal hygiene measures at the levels laid down in the Operations Manual. It is also necessary to take account of the need for Inspectors to be able to maintain concentration and hence efficiency. Concentration levels can be maintained by building into the system a provision to encompass a regular rotation between stations and the time needed to cover the regular off line inspection functions such as supervision of staining of SRM material. The time needed for these activities will be specific to each plant as it will depend on the distance between stations, or between the line stations and the gut room etc. The MHS Operations Manual requires inspection of staining every thirty minutes, and this period would also be a suitable one for rotation between , stations. Using such a system it is possible to make a calculation on the time needed for these activities. The calculation will be specific to each plant.

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3.4.3 The following formulae calculate the maximum numbers of units that can reasonably be inspected each hour, at each inspection station if the inspection process is to maintain full compliance. Hygiene measures are explained definitively in the MHS Operations Manual Chapter 1 page 8.

$$\begin{aligned}\text{Sheep S1} &= \text{Time} + \text{Hygiene visit (HI) after every 7 Units} = \\ &= (6.2\text{secs} \times 7) + (13.5)/7 = 8.1\text{secs} \\ \text{S2} &= \text{Time} + \text{Hygiene visit after every 7 Units} \\ &= (9.3\text{secs} \times 7) + (13.5)/7 = 11.2\text{secs} \\ \text{S3} &= \text{Time} + \text{Hygiene visit after every 7 Units} \\ &= (6.6\text{secs} \times 7) + (13.5)/7 = 8.5\text{secs} \\ \text{S4} &= \text{Time} + \text{Hygiene visit after every 7 Units} \\ &= (6.7\text{secs} \times 7) + (13.5)/7 = 27.0\text{secs}\end{aligned}$$

$$\begin{aligned}\text{Beef B1} &= \text{Time} + \text{Hygiene visit (HI) after every 7 Units} \\ &= (10.0\text{secs} \times 7) + (13.5)/7 = 11.9\text{secs} \\ \text{B2} &= \text{Time} + \text{Hygiene visit (H2) after every Unit} \\ &= 50.0\text{secs} + 20.8\text{secs} = 70.8\text{secs} \\ \text{B3} &= \text{Time} + \text{Hygiene visit after every Unit} \\ &= 83.9\text{secs} + 20.8\text{secs} = 104.7\text{secs Time} \\ \text{B4} &= \text{Time} + \text{Hygiene visit after every Unit} \\ &= 10.5\text{secs} + 20.8\text{secs} = 31.3\text{secs Hygiene visit} = \\ \text{B5} &= \text{Time} + \text{Hygiene after every Unit (side)} \\ &= 58.1\text{secs} + 20.8\text{secs} = 78.9\text{secs}\end{aligned}$$

3.4.4 The units are then calculated by dividing the number of seconds for each operation into 3,600 (the number of seconds in each hour) to produce the following maximum number of units per hour.

$$\begin{array}{lll}\text{Sheep} & \text{S1} & = 444 \text{ Units} \\ & \text{S2} & = 321 \text{ Units} \\ & \text{S3} & = 424 \text{ Units} \\ & \text{S4} & = 133 \text{ Units}\end{array}$$

$$\begin{array}{lll}\text{Beef} & \text{B1} & = 303 \text{ Units} \\ & \text{B2} & = 51 \text{ Units} \\ & \text{B3} & = 34 \text{ Units} \\ & \text{B4} & = 115 \text{ Units} \\ & \text{B5} & = 46 \text{ Sides*}\end{array}$$

*This represents a maximum of 23 carcasses per hour

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3.4.5 Decisions on staffing for any particular plant will depend on a number of factors besides the hourly kill rate. These are covered in detail in the Protocol for applying the system which is at Appendix III. In particular, within the Protocol, allowance needs to be made for the layout of the plant, including the time and space available to Inspectors and account taken of the non line operations such as stain checking which are required. The Protocol contains two worked examples of how the measurements are to be applied.

3.4.6 It is, however, possible to make some calculations based on the above timings which will give a guide as to how the minimum numbers needed in a plant to deal with a given line speed can be derived. It must be emphasised that this is provided as an example of the use of the timings to obtain minimum numbers of staff. In applying the Protocol to real plants direct measurement of the times and distances involved in moving between stations, attending to off line checks etc. must be made.

3.4.7 For a beef plant which operates at a kill rate of 30 animals an hour the relevant time that an inspector would be fully occupied on each of the task groups would be :-

B1	11.9secx30	= 357sec	= 6.0 min.
B2	70.8secx30	= 2124sec	= 35.4 min.
B3	104.7secx30	= 3141sec	= 52.4 min.
B4	31.3secx30	= 939sec	= 15.7 min.
B5	78.9sec x 60 (sides)	= 4734sec	= 78.9 min.

3.4.8 The number of staff required (i.e. the above figures divided by 60 minutes) is therefore :-

B1	0.1
B2	0.6
B3	0.9
B4	0.3
B5	1.3

Total

3.2

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3.4.9 This represents a staffing of just over three Inspectors for on line work. A decision would need to be made on staff needed to cover the "off line" activities, such as operational paperwork etc., not covered by the Protocol. In this case the use of a Meat Technician would only be justified for a small percentage of time.

3.4.10 Using a similar calculation the staffing needed for a sheep plant operating at a kill rate of 400 animals per hour would be :-

S1	8.1secx400	= 3240sec	=54.0 min.
S2	11.2secx400	= 4480sec	=74.7 min.
S3	8.5secx400	= 3400sec	=56.7 min.
S4	27.0sec x 400	= 10800sec	= 180.0 min.

3.4.11 This translates to staffing figures as before :-

S1	0.9
S2	1.2
S3	0.9
S4	3.0
S5	1.0
Total	7.0

3.4.12 On the basis of the above figure the minimum indicated total is seven staff, of whom two may be Meat Technicians. With this number of staff it may be necessary for one of the Inspectors to be a Senior Inspector to maintain management control and ensure correct organisation of ancillary duties. In this instance the calculations take no account of the possibilities for sharing duties between stations. However, this would normally need to be done and is taken into account in Appendix III. Further time may also be needed for off line duties.

3.4.13 It must also be emphasised that the figures are derived from timing operations which used a strict and standard interpretation of the Regulations and Operational Instructions. No allowances have been made for additional

operations, such as trimming of carcasses, which Inspectors undertake, often in an habitual manner. The assumption underlying the Operational Resource Planning Protocol is that the MHS is not required to carry out these tasks on behalf of plant management and that if they are to be done by MHS staff, it must be recognised that they require resources, which must be paid for.

3.5 **Conclusions**

- 3.5.1 The study has shown that the operations performed by Inspection staff can be standardised and that when this is done and the processes involved are timed, the timings produced fall within a narrow range. This leads to the conclusion that it is possible to apply standard timings to MHS Inspection Operations and that the timings can be used to develop a simple, usable system for deciding staffing levels in plants.

APPENDIX IV

Timings of Individual Inspection Processes

Operation	Observation Group	Time	Adequate Space	Operation	Observation Group	Time	Adequate space		
S1	1	6.25	Y	R1	26	9.36	Y		
S1		5.84	Y	R1		10.11	Y		
S1		5.93	Y	B1		8.92	Y		
S1		6.21	Y	B1		9.32	Y		
S1		6.56	Y	B1		9.55	Y		
S1		5.98	Y	B1		9.42	Y		
S1		6.21	Y	B1		9.61	Y		
S1		6.05	Y	B1		9.99	Y		
S1		5.92	Y	B1		9.38	Y		
S1		6.05	Y	B1		27	9.21	Y	
S1	2	6.94	Y	B1	27	9.34	Y		
S1		5.86	Y	B1		9.82	Y		
S1		5.69	Y	B1		9.61	Y		
S1		6.23	Y	B1		9.34	Y		
S1		6.41	Y	B1		9.46	Y		
S1		6.03	Y	B1		9.83	Y		
S1		5.95	Y	B1		9.76	Y		
S1		5.88	Y	B1		9.31	Y		
S1		5.99	Y	B1		28	10.45	Y	
S1		5.31	Y	B1		28	9.76	Y	
S1	3	6.44	Y	B1	28		11.92	Y	
S1		5.98	Y	B1			10.21	Y	
S1		5.77	Y	B1			9.36	Y	
S1		6.31	Y	B1			11.4	Y	
S1		5.75	Y	B1			12.77	Y	
S1		5.97	Y	B1			11.13	Y	
S1		5.88	Y	B1			9.87	Y	
S1		6.15	Y	B1			29	10.45	Y
S1		6.05	Y	B1			29	10.31	Y
S1		6.44	Y	B1		29		10.24	Y
S1	4	6.77	Y	B1	29			11.05	Y
S1		6.54	Y	B1				10.75	Y
S1		6.87	Y	B1				9.28	Y
S1		7.46	Y	B1				10.17	Y
S1		5.91	Y	B1				9.83	Y
S1		5.87	Y	B1				10.77	Y
S1		5.36	Y	B1				9.21	Y
S1		6.74	Y	B2				30	56.28
S1		6.83	Y	B2			30	52.26	Y
S1		6.3	Y	B2		44.46		Y	

Operation	Observation Group	Time	Adequate Space	Operation	Observation Group	Time	Adequate space
	Observation Groups 5-9 Not Used			B2		44.2	Y
				B2		55.36	Y
				B2		48.42	Y
				B2		49.34	Y
				B2		50.88	Y
				B2		49.75	Y
				B2		51.36	Y
				B2	31	49.97	Y
				B2		47.81	Y
				B2		51.4	Y
				B2		49.88	Y
				B2		46.26	Y
				B2		44.92	Y
				B2		52.38	Y
				B2		46.23	Y
				B2		47.51	Y
				B2	32	53.68	Y
				B2		51.2	Y
				B2		49.28	Y
				B2		48.47	Y
				B2		49.34	Y
				B2		47.84	Y
				B2		48.74	Y
				B2		51.34	Y
				B2		49.99	Y
				B2		49.73	Y
				B2	33	50.42	Y
				B2		51.31	Y
				B2		50.29	Y
				B2		51.74	Y
				B2		49.28	Y
				B2		52.35	Y
				B2		51.38	Y
				B2		50.61	Y
			B2		51.68	Y	
			B2		49.39	Y	
			B2	34	51.74	Y	
			B3		85.2	Y	
			B3		87.1	Y	
			B3		82.71	Y	
			B3		85.62	Y	
			B3		82.51	Y	
			B3		83.62	Y	
			B3		85.21	Y	

	Observation Group	Time	Adequate Space	Operation	Observation Group	Time	Adequate space
				B3		86.48	Y
S2	10			B3		83.31	Y
S2		8.98	N	B3		87.31	Y
S2		9.63	N	B3	35	78.21	Y
S2		9.26	N	B3		83.47	Y
S2		9.2	N	B3		85.87	Y
S2		8.89	N	B3		83.35	Y
S2		9.04	N	B3		82.38	Y
S2		9.32	N	B3		77.23	Y
S2		9.48	N	B3		73.84	Y
S2	11	8.88	N	B3		85.99	Y
S2		9.07	N	B3		87.56	Y
S2		10	Y	B3		88.61	Y
S2		8.64	Y	B3	36	85.84	Y
S2		9.08	Y	B3		87.28	Y
S2		8.81	Y	B3		84.39	Y
S2		8.67	Y	B3		74.89	Y
S2		9.52	Y	B3		87.28	Y
S2		10.09	Y	B3		84.37	Y
S2		8.66	Y	B3		80.31	Y
S2		8.37	Y	B3		88.37	Y
S2	12	10.39	Y	B3		85.73	Y
S2		9.45	Y	B3		82.19	Y
S2		10.21	Y	B3	37	81.74	Y
S2		9.87	Y	B3		79.31	Y
S2		9.31	Y	B3		81.56	Y
S2		8.54	Y	B3		85.93	Y
S2		10.38	Y	B3		87.57	Y
S2		9.64	Y	B3		93.21	Y
S2		8.43	Y	B3		86.38	Y
S2		9.01	Y	B3		81.2	Y
S2	13	9.87	Y	B3		79.15	Y
S2		8.66	Y	B3		83.32	Y
S2		8.93	Y	B4	38	12.14	Y
S2		8.69	Y	B4		10.26	Y
S2		9.52	Y	B4		11.98	Y
S2		9.63	Y	B4		10.87	Y
S2		10.21	Y	B4		10.81	Y
S2		8.72	Y	B4		9.96	Y
S2		8.56	Y	B4		10.14	Y
S2		9.11	Y	B4		10.08	Y
S3	14	9.48	Y	B4		9.67	Y
S3		6.32	Y	B4		10.88	Y
S3		6.31	Y	B4	39	11.79	Y

Operation	Observation Group	Time	Adequate Space	Operation	Observation Group	Time	Adequate space
S3		6.66	Y	B4		10.62	Y
S3		6	Y	B4		8.48	Y
S3		6.43	Y	B4		12.08	Y
S3		6.06	Y	B4		10.98	Y
S3		6.47	Y	B4		11.21	Y
S3		6.45	Y	B4		9.72	Y
S3		6.81	Y	B4		10.48	Y
S3		6.45	Y	B4		11.25	Y
S3	15	5.88	Y	B4		11.51	Y
S3		6.24	Y	B4	40	9.06	Y
S3		6.48	Y	B4		10.27	Y
S3		5.89	Y	B4		9.35	Y
S3		8.64	Y	B4		9.72	Y
S3		6.88	Y	B4		9.46	Y
S3		6.4	Y	B4		10.88	Y
S3		6.21	Y	B4		11.63	Y
S3		6.62	Y	B4		10.84	Y
S3		6.81	Y	B4		9.87	Y
S3	16	7.82	Y	B4		10.09	Y
S3		8.12	Y	B4	41	10.87	Y
S3		6.44	Y	B4		8.87	Y
S3		6.38	Y	B4		11.21	Y
S3		5.56	Y	B4		8.79	Y
S3		6.16	Y	84		11.48	Y
S3		8.13	Y	B4		10.69	Y
S3		6.9	Y	B4		10.91	Y
S3		5.46	Y	B4		11.21	Y
S3		5.81	Y	B4		10.8	Y
S3	17	5.99	Y	B4		10.23	Y
S3		6.82	Y	B5	42	45.49	Y
S3		6.78	Y	B5		46.21	Y
S3		6.94	Y	B5		48.37	Y
S3		7.31	Y	B5		48.42	Y
S3		5.92	Y	B5		46.89	Y
S3		7.33	Y	B5		44.82	Y
S3		6.95	Y	B5		49.72	Y
S3		6.71	Y	B5		52.09	Y
S3		7.39	Y	B5		51.07	Y
S4	18	25.84	Y	B5		52.76	Y
S4		26.93	Y	B5	43	60.33	N
S4		24.81	Y	B5		61.21	N
S4		21.74	Y	B5		64.94	N
S4		25.84	Y	B5		62.48	N
S4		24.42	Y	B5		61.27	N

Operation	Observation Group	Time	Adequate Space	Operation	Observation Group	Time	Adequate space
S4		25.73	Y	B5		63.29	N
S4		23.39	Y	B5		60.84	N
S4		23.97	Y	B5		63.29	N
S4		24.88	Y	B5		61.27	N
S4	19	28.04	Y	B5		62.48	N
S4		23.94	Y	B5	44	68.32	Y
S4		24.21	Y	B5		68.54	Y
S4		26.21	Y	B5		63.48	Y
S4		28.42	Y	B5		62.65	Y
S4		23.81	Y	B5		63.48	Y
S4		22.38	Y	B5		64.24	Y
S4		22.82	Y	B5		62.11	Y
S4		22.83	Y	B5		65.88	Y
S4		23.43	Y	B5		64.37	Y
S4	20	31.2	Y	B5		61.93	Y
S4		27.65	Y	B5	45	55.87	Y
S4		27.88	Y	B5		57.07	Y
S4		28.44	Y	B5		55.76	Y
S4		26.18	Y	B5		55.91	Y
S4		26.22	Y	B5		57.99	Y
S4		27.54	Y	B5		58.1	Y
S4		21.01	Y	B5		56.42	Y
S4		19.65	Y	B5		57.81	Y
S4		18.32	Y	B5		57.74	Y
S4	21	22.81	Y	B5		57.02	Y
S4		25.62	Y	H1	46	15.39	Y
S4		26.75	Y	H1		14.95	Y
S4		24.21	Y	H1		13.72	Y
S4		26.24	Y	H1		15.88	Y
S4		27.71	Y	H1	47	14.24	Y
S4		24.02	Y	H1		16.48	Y
S4		26.73	Y	H1		12.28	Y
S4		25.21	Y	H1		11.21	Y
S4		24.89	Y	H1	48	14.78	Y
S5	22	6.78	Y	H1		13.29	Y
S5		6.93	Y	H1		12.84	Y
S5		6.72	Y	H1		11.78	Y
S5		6.84	Y	H1	39	12.22	Y
S5		7.29	Y	H1		12.93	Y
S5		7.48	Y	H1		13.07	Y
S5		7.31	Y	H1		12.82	Y
S5		6.28	Y	H1		12.04	Y
S5		6.39	Y	H2	50	15.97	Y
S5		6.15	N	H2		15.45	Y

Operati	Observation Group	Time	Adequate Space	Operation	Observation Group	Time	Adequate space
S5	23	7.34	N	H2		15.37	Y
S5		8.21	N	H2		14.92	Y
S5		6.94	N	H2		15.51	Y
S5		6.12	N	H2	51	24.91	Y
S5		6.26	N	H2		22.31	Y
S5		7.06	N	H2		23.76	Y
S5		6.43	N	H2		26.54	Y
S5		6.01	N	H2		21.02	Y
S5		5.94	N	H2	52	18.93	Y
S5		6.52	N	H2		17.57	Y
S5	24	6.33	Y	H2		19.91	Y
S5		5.98	Y	H2		17.83	Y
S5		6.26	Y	H2		18.4	Y
S5		6.55	Y	H2	53	25.99	Y
S5		7.03	Y	H2		23.74	Y
S5		6.62	Y	H2		26.52	Y
S5		6.34	Y	H2		25.48	Y
S5		6.39	Y	H2		25.55	Y
S5		6.94	Y				
S5		7.03	Y				
S5	25	5.41	Y				
S5		5.85	Y				
S5		6.73	Y				
S5		6.35	Y				
S5		6.85	Y				
S5		7.22	Y				
S5		6.69	Y				
S5		7.31	Y				
S5		6.99	Y				
S5		7.85	Y				

APPENDIX V

Mean Times and Standard Errors for Timed Operations

Timed Operation	Mean Time	Standard Error
Sheep		
S1	6.17	0.43
S2	9.25	0.56
S3	6.62	0.70
S4	25.00	2.53
S5	6.54	0.57
Beef		
B1	10.01	0.83
B2	49.96	2.59
B3	83.89	3.86
B4	10.53	0.92
B5	58.04	6.48
Hygiene		
H1	13.52	1.53
H2	20.78	4.27

The Standard Error represents the unbiased deviation of the data about the mean. This means that, generally, the greater the error the greater the deviation of the data and vice versa.

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1. GUIDANCE FOR USERS

1.1 Introduction

- 1.1.1 This MHS Operational Resource Planning Protocol (ORPP) has been developed to provide an easy to use and consistent method of determining the minimum personnel numbers required at any licensed Fresh Meat premises to carry out full Meat Hygiene Inspector(MHI)/Meat Technician (MT) operations. These guidance notes explain how to use the Protocol to assist in providing a consistent approach to determining staffing levels across the MHS.
- 1.1.2 The Protocol is designed to determine the minimum staffing levels needed for full statutory operation. Account is taken of the need to maintain personal hygiene measures and to ensure that staff are able to maintain operational efficiency so as to comply with all the requirements of the Regulations and the MHS Operations Manual.
- 1.1.3 It should be noted that additional personnel will be required if higher levels of monitoring and more detailed health inspections are needed. Additionally the Protocol does not cover other functions such as sampling. It is assumed that MHS staff will not be undertaking any additional operations and that material will be presented in a manner suitable for inspection. Additional personnel may be required if MHS carry out trimming or other types of operation, either on-line or on detained material. Such operations should be carried out only by agreement with plant management.
- 1.1.4 The Protocol is based upon specifications for MHS work as described in the current legislation and MHS operational instructions. Where the required level of inspection activity was unclear, definitive guidance on the statutory requirement was sought from colleagues in policy divisions of MAFF, who were responsible for the work at that time. All statutory activities are

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described so as to develop an accurate and complete compliance specification for MHS activity. Adherence to the processes described in the Protocol will ensure that full compliance with the relevant legislation can be achieved.

1.1.5 The method for assessing staffing requirement is based on standard timings for all the required inspection tasks. The time for each operation has been determined using in plant observations taken under normal operating conditions. All times were derived using a standard Protocol and have been replicated sufficiently to give a high level of confidence that they can be consistently achieved.

1.2 Ante-Mortem Inspection

1.2.1 Ante-mortem inspection involves veterinary judgements which cannot be easily quantified and hence are outside the scope of this Protocol. It will be necessary when assessing overall plant staffing levels to ensure that adequate provision is available to meet ante-mortem requirements free from restrictions imposed by other work needs.

1.3 Post Mortem Health Inspection

1.3.1 Post mortem health inspection is assessed against the requirements of The Fresh Meat (Hygiene And Inspection) Regulations 1995 as amended, and MHS work instructions contained within the MHS Operations Manual. The specifications prescribed are described in detail for each species/age category in Annexes I to VII of this document. Assessment is carried out as described below. The specific Annex relating to each species is :-

Annex I Post mortem Inspection - Ovine

Annex II Post mortem Inspection - Bovine (over 6 months)

Annex III Post mortem Inspection - Bovine (under 6 months)

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1.4 Specified Risk Material (SRM) Control

1.4.1 Where cattle and/or sheep/goats are processed, additional supervision is required for SRM controls. SRM controls are assessed in a similar manner to those detailed above using functional stations and a series of specifications. These have been derived from the Specified Risk Material Regulations 1997 and MHS work instructions contained in the MHS Operations Manual. The specifications are prescribed in detail in the following Annexes: -Annex IV Sheep and Goats Primary SRM Controls Annex V Sheep and Goats Secondary SRM Controls. Annex VI Specified Risk Material - Bovine (over 6 months) Annex VII Specified Risk Material - Bovine (under 6 months)

1.5 Other MHS work requirements

1.5.1 This Protocol does not take account of the staffing needs for off line activities such as sampling, completion of records, dealing with queries, staff management and supervision etc. Area Resource Managers will need to take account of these additional tasks when reaching a conclusion on overall staffing needs.

2. METHOD OF ASSESSING INSPECTION RESOURCE NEEDS

2.1 Definitions

2.1.1 **The station length** is the linear measurement of space available to the Meat Hygiene Inspector at each station to carry out his functions. On a chain or driven line this is taken to be the minimum distance separating carcasses/offal presented to the Meat Hygiene Inspector. Where more than one Inspector works at a station it is the space available to each individual Inspector which is relevant. If Inspectors are examining alternate carcasses the station length is the distance between alternate carcasses. In smaller slaughterhouses, where line production is not employed, these measurements are still critical and must be accurately assessed, having regard to the extent of adequate lighting, separation from slaughtering operations, etc.

2.1.2 **The inspection window** is the period, in seconds, when carcass/offal is available for inspection at each inspection station. This is determined as the time taken for carcass/offal to completely transit the inspection station length. In the case of non-line operations the inspection window is the period during which each carcass/offal is available at the inspection station.

2.1.3 **The transit time** between inspection stations is the time, in seconds, required for a Meat Hygiene Inspector/Meat Technician to move between two inspection stations whilst maintaining all necessary hygiene and safety procedures.

2.1.4 **An inspection station** is the point or position at which carcass/offal is presented for post mortem inspection. Stations may be more or less clearly defined by plant and process layout but must meet statutory lighting requirements and have satisfactory access, etc. In some, especially smaller plants, stations may be physically combined but must still be assessed separately;

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- 2.1.5 Time per station is the time as assessed using the timings in the relevant Annex for each specified inspection process to be satisfactorily completed at each inspection station.
- 2.1.6 Detention rate is the maximum measured, or expected percentage rate at which carcasses are expected to be detained for trimming etc. and subsequently re-presented for inspection.
- 2.1.7 Station needs statement is a written assessment of the physical needs of an inspection station in terms of lighting, access space, hygiene facilities etc.
- 2.2 Assessing Inspection requirements
- 2.2.1 The inspection resource requirement of any plant is determined in the following order:-
- a. identify all necessary inspection/control operations according to the species to be assessed and using the identified operations in the relevant Annex;
 - b. prepare a flow chart of the production line layout;
 - c. collect and include in the flow chart, all relevant plant data including location of inspection stations and tasks undertaken at each station, details of material presented, hygiene facilities, transit times between stations, throughput figures and details of inspection window and station length;
 - d. determine the optimum operations to be undertaken at each station, ensuring that all specified operations, including SRM controls, are covered. It is worth exploring the possibility of re-arranging tasks or the order of work at some stations so as to improve efficiency;
 - e. assess requirements for ante mortem and any other required tasks, and
 - f. determine resource needs by using the task timings in the relevant

Annex, taking account of ancillary tasks such as hygiene visits, knife sharpening and of the specific details of the plant such as transit times.

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2.3 Inspection Stations

- 2.3.1 The position, number and tasks undertaken at each inspection station must be accurately recorded, together with a record of the hygiene facilities available; details of transit times and window lengths are also vital to completing an accurate assessment.
- 2.3.2 All inspection stations must be sufficient to enable statutory inspection functions to be completed in full compliance with the specification. Inspection/Check stations are more variable for SRM controls than for post mortem health inspection due to differing plant/equipment design and operation; these too must be adequate to enable the appropriate minimum statutory inspections/checks to be completed. **IF ANY INSPECTION STATION IS NOT ADEQUATE IMMEDIATE ACTION MUST BE TAKEN.**
- 2.3.3 Separate assessments must be made for each species and for each production line/process. Assessment must be based on recorded observation and measurement. Where direct observation is not possible (e.g. in a new plant) the best possible assessment available must be achieved using whatever evidence can be obtained, e.g. scale plans etc. Anecdotal evidence must be avoided.

Flow Charts

- 2.4.1 A flow chart of each production line process must be prepared, describing the existing situation and showing the relationship between stations. Charts should include notes detailing all relevant data such as transit times and any special restrictions between stations; it is important that a full note is made of any restrictions imposed by the plant layout.

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2.7 Checks for accuracy and completeness

2.7.1 Once completed the flow chart must be fully checked against the relevant Annex so as to ensure that all necessary tasks are being carried out and that the notes fully reflect the details of the inspection process and all ancillary activities such as hygiene visits, knife sharpening etc.

2.8 Determination of staffing need

2.8.1 The minimum number of Meat Hygiene Inspectors/Meat Technicians is determined as that needed to ensure that all material is inspected in a manner that fully complies with the inspection requirements as described in the relevant specifications at each inspection/check station, taking account of the task timings required for each operation and allowing sufficient time to fully comply with the necessary ancillary operations such as personal hygiene, knife sharpening etc.

2.8.2 In determining the required resource, the prescribed task timings in the relevant Annex are combined with the on site observations on transit times to produce a staffing assessment for each station.

2.8.3 In addition to the need to ensure that adequate numbers of staff are allocated to a line it is necessary to ensure that account is taken of the need for staff to rotate between stations and to be able to operate in a consistent fashion, maintaining concentration levels throughout their period on the line. How this can be covered is demonstrated later in the examples in Section 3.

2.8.4 **2.9 Assessment Sheet**

2.9.1 The completion of the flowchart must be followed by a record of decisions made and recorded at each stage based on the data gathered as described above. The Assessment Sheet (Annex VIII) provides a record of these decisions and must be completed.

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2.10 Resource Allocation Sheet

2.10.1 The Resource Allocation Sheet (Annex IX) records decisions on the allocation of staff and their respective duties in relation to the specifications in the relevant Annex. This is the definitive statement of resource requirements and must be fully completed and carefully checked against the relevant Annex.

2.10.2 Once the minimum inspection/check resource requirement has been determined, staffing that establishment is a matter for the relevant Area Resource Manager having regard to optimum efficiency, charging policy and overall operational constraints.

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3. EXAMPLES OF CALCULATION OF RESOURCE NEEDS

3.1 Example 1

3.1.1 The following paragraphs show how the Protocol has been used to calculate staffing levels for a typical small beef plant. The timings and measurements were taken during normal operations. The plant operated with a semi automatic line drive and was working at a maximum line speed of 20 Units per hour.

3.1.2 A flow chart of the plant showing the inspection stations, the operations to be conducted at each station and the transit times for inspectors between stations is reproduced below. The inspection operations are coded as in Annexes II and VI. The chart also contains notes on the specific problems associated with the plant, which may be relevant to the inspection process. Using the data collected on site and by reference to the chart and notes, the Assessment Sheet has been completed. It is important that the Assessment Sheet lists all the necessary operations both Inspection and SRM. It is vital that all the steps taken are fully recorded and, in particular, that all the required inspection processes and SRM checks are documented so as to ensure that full compliance with the Regulations can be achieved within the proposed resource level.

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RECORDED DATA

STATION 1

Length 3mtrs **Transit times to** S2 20sec; S3 30sec; S4 15sec; S5 40sec.

Window 180seconds

Activities **Prescribed Time**

Hygiene Visit 22 seconds after every 7th unit

*BAR1A Dentition

11.5 seconds

* These activities are more fully described in Annexes II and VI

STATION 2

Length 3mtrs **Transit times to** SI 20sec; S3 30sec; S4 15sec; S5 15sec.

Window 180seconds

Activities **Prescribed Time**

Hygiene Visit 20 seconds after every unit

*BAI1 Throat, dentition

Tongue

Internal/External Masseter

51 seconds

STATION 3

Length 3mtrs **Transit times to** SI 30sec; S2 30sec; S4 15sec; S5 15sec.

Window 180seconds

Activities **Prescribed Time**

Hygiene Visit 20seconds after every visit

*BAI6 Alimentary Lymph nodes Visual examination

Alimentary Lymph nodes Palpate

*BAI7 Spleen Visual examination

*BAR5 Spleen removal 11.5seconds

Intestines/Abomasum separation See non line tasks below

Spleen staining See non line tasks below

Intestines staining See non line tasks below