

FINAL REPORT ON THE ASSESSMENT OF THE GEOGRAPHICAL BSE RISK OF ISRAEL

13 September 2002

NOTE TO THE READER

Independent experts have produced this report, applying an innovative methodology by a complex process to data that were supplied by the responsible country authorities. Both, the methodology and the process are described in detail in the final opinion of the SSC on "the Geographical Risk of Bovine Spongiform Encephalopathy (GBR)", 6 July 2000 and its update of 11 January 2002. These opinions are available at the following Internet address:

<http://europa.eu.int/comm/food/fs/sc/ssc/outcome_en.html>

This report, and the opinion of the SSC based on it, are now serving as the risk assessment required by the TSE-Regulation EU/999/2001 for the categorisation of countries with regard to their BSE-status. The final BSE-status categorisation depends also on other conditions as stipulated in annex II to that TSE-Regulation.

1. DATA

- The available information for the GBR risk assessment was sufficient to carry out the qualitative assessment of the GBR.

Sources of data

- Country dossier (CD) consisting of information provided from the country's authorities in 1998 - 2002.

Other sources:

- EUROSTAT data on export of "live bovine animals" and on "flour, meal and pellets of meat or offal, unfit for human consumption; greaves" (customs code 230110), covering the period 1980-2001.
- UK-export data (UK) on "live bovine animals" (1980-1996) and on "Mammalian Flours, Meals and Pellets", 1988-1996. As it was illegal to export mammalian meat meal, bone meal and MBM from UK since 27/03/1996, exports indicated after that date under customs code 230110 should only have included non-mammalian MBM.
- Export data from Cyprus, the Czech Republic, Estonia, Hungary, Lithuania, Romania, Slovenia and Switzerland.

2. EXTERNAL CHALLENGES

2.1 Import of cattle from BSE-Risk¹ countries

Table 1, below, provides an overview of the data on live cattle imports, as provided in the country dossier (CD) and the corresponding data on relevant exports as available from BSE risk countries that exported to Israel. Only data from risk periods are indicated, i.e. those periods when exports from a BSE risk country already represented, according to the SSC opinion on the GBR method of January 2002, an external challenge.

The majority of cattle imported for breeding purposes between 1980 and 2000 originated from France and Germany.

Cattle imported from Poland, Cyprus, the Czech Republic, Hungary and Romania were for fattening or immediate slaughter with the exemption of 953 cattle from Cyprus which were declared to have been breeding cattle (Cyprus export statistics). Also France and Germany have exported about 2,000 cattle (including veal calves) for fattening or immediate slaughter.

¹ BSE-Risk countries are all countries already assessed as GBR III or IV or with at least one confirmed domestic BSE case.

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COUNTRY: ISRAEL																								Total
Country	Data	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	0	1	Total
Cyprus	CD																244							244
	Other															20	729	893	2985	534	1724			6885
Czech Rep.	CD																1273	513	555					2341
	Other																134	513						647
France	CD	90	115		93	114	104	130	224	67	55	55		262	886	231	218	113	87	680	62			3586
	Other		89		93	114	104		224	67	55			100	956	212	215	60	83	392	56			2820
Germany	CD							511	725						94	70	394		240			132		2166
	Other		26					511	658	69				549		59				493				2365
Hungary	CD																							0
	Other																					796		796
Italy	CD																							0
	Other															34								34
Netherlands	CD																							0
	Other																					1		1
Poland	CD														199	4833	6013	2431	7618					21094
	Other																							0
Romania	CD																							0
	Other																					70		70
UK	CD																							0
	Other		4											257	1									0
Totals																								
Non-UK	CD	90	115	0	93	114	104	641	949	67	55	55	0	262	1179	5134	8142	3057	8500	680	62	132	0	29431
	Other	0	115	0	93	114	104	511	882	136	55	0	0	649	956	291	1112	1466	3068	1419	1780	867	0	13618
UK	CD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other	0	4	0	0	0	0	0	0	0	0	0	0	257	1	0	0	0	0	0	0	0	0	262

Table 1: Live cattle imports into Israel (CD) and corresponding exports from BSE-Risk countries. Source for export data: Eurostat and UK export statistics and, where available, export statistics from other BSE-Risk countries. Note: Only imports in Risk periods (grey shaded) are taken into account for assessing the external challenge. Risk periods are defined according to the SSC opinion of January 2002.

The following facts have been taken into account in assessing the external challenge from imported cattle:

- According to the country dossier Israel did not import live cattle from the UK during the reference period 1980-2000. The UK confirmed that cattle exports to Israel reported in EUROSTAT and UK statistics for 1981, 1992 and 1993 were listed under a wrong code and did not take place. Accordingly these could not represent a challenge.
- For cattle imported for immediate slaughter and fattening evidence was provided that they have been under strict control conditions. They were slaughtered at an age not allowing approaching the end of the BSE incubation period and it is regarded unlikely that they could have entered the national herd. Therefore they are unlikely to present an external challenge.
- The country of origin of some imports that were indicated in the country dossier for 1980-81 is not specified beyond the statement that they were imported from Europe. These have been taken into account as any other import from non-UK BSE risk countries.
- With regard to imports of breeding stock from France (according to the country expert all males from beef breeds) they have only been allowed from French regions where BSE had never been recorded. Also, the herds had to be, according to declarations of the French authorities, free from BSE and the animals should never have been fed with MBM. The Israelian Veterinary Service reported that regular visits were conducted to France in order to verify these matters and the condition of the animals to be imported. These inspections included investigations regarding issues related to BSE (e.g. on-site inspection of cattle feed labels). The earliest date reported for such a visit is 1989. Therefore, prior to 1989 it is assumed that these conditions did not apply. Anyway, one has to take account of the fact that BSE is, according to latest epidemiological data, more widespread in France than previously thought.

2.2 Import of MBM² or MBM-containing feedstuffs from BSE-Risk countries

An overview of the MBM imports into Israel, as provided in the country dossier and by Eurostat and other data is given in table 3.

A ban on the importation of mammalian MBM (MMBM) from the UK is in force since 12/1988 and from all other countries since 7/1990. According to the CD, ruminant MBM had not been imported to Israel at least since 1983. However, imports of poultry meal (PM) and feather meal have always been allowed. Also, it is noted in the CD that it cannot be excluded that MBM exports from UK and other BSE-affected countries could have included MMBM if they occurred before the bans in 1988 and 1990. Such imports therefore represented an external challenge as any other MBM import from BSE-risk countries.

According to the country dossier, MBM exports from the UK to Israel have been exclusively of poultry origin since 1988. However, the latest update of UK statistics (August 2001) indicate that there were 1,505 tons of MBM exported to Israel in 1989 that could not be confirmed by the UK veterinary authority to be of non-mammalian origin. A reasonable worst case assumption is therefore that this import included or consisted of MMBM.

The following statements were supported by information provided by Israel:

MBM imports from UK:

- Israel has required since December 1988 that MBM could only be imported from UK-rendering plants that exclusively utilise poultry or fish as raw material. A letter from the UK-CVO, of January 1989, confirms that "the UK has eleven plants which deal exclusively with poultry material" and that "the Veterinary Service will ensure that only meat meal etc. originating from such plants will be exported to Israel from Great Britain." It was further explained that each consignment was required to be accompanied by certificates certifying that the plants were dedicated to poultry and/or fish, and that only domestic but no imported material was used. This reduces the external challenge resulting from imports from the UK after January 1989, at least for those where the UK authorities could confirm certification as non-ruminant MBM.
- In addition, since 1996 it was illegal to export MMBM from the UK. Accordingly a certificate of freedom of ruminant protein accompanies each MBM shipment. This certificate is issued by MAFF, VLA and based on an ELISA test carried out since 1996 in the UK by means of a bovine/porcine specific ELISA test. The test is claimed to be capable of detecting heat-stable ruminant proteins in rendered animal materials even if heated to 140°C for 1.5 h. However, scientific evidence indicated that the ELISA test cannot differentiate species specific proteins after this type of heat treatment.

Also since 1996 all meals, imported from UK, even if officially classified as "poultry", are checked in Israel at import by a multi-species-specific ELISA test kit, developed for cooked meat but not validated for MBM. Three to five samples are taken from each

² For the purpose of the GBR assessment the abbreviation "MBM" refers to rendering products, in particular the commodities Meat and Bone Meal as such; Meat Meal; Bone Meal; and Greaves. With regard to imports it refers to the customs code 230110 "flours, meals and pellets, made from meat or offal, not fit for human consumption; greaves".

container. Usually each container contains products from one plant only. Scientific evidence indicates that this test could detect mammalian protein that was produced in accordance with the 133/20/3 standard.

It is concluded that the external challenge resulting from UK-exports after 1996 could only result from deliberate (fraud) or accidental contamination of poultry or fish meal with mammalian protein heated above the detection range of the applied ELISA tests.

MBM-imports from other BSE-risk countries:

- Also since 1996, all imports of poultry meals from other BSE-affected countries were tested in Israel with the same test kit. However, this is not validated for MBM. Table 2 gives an overview of the tests and their results. Israel acknowledged that the ELISA test kit might not be optimal. However, they argue that mammalian protein contamination would either not be detected because it was heat-treated above 121°C or it would be detected if the material was not heated above 121°C. In any case the risk of introducing the BSE-agent was reduced by these tests, not at least because exporters were aware that the inclusion of MMBM into poultry meals could be detected. This valid argument has been taken into consideration in the assessment. However, it is also acknowledged that insufficiently heat treated MMBM (T >121°C and <133°C) could not be detected.

		1996	1997	1998	1999	2000
Great Britain	N plants	?	2	2	2	?
	N shipments	25 ^a	38 ^a / 58 ^b	53 ^a / 42 ^b	57 ^a / 51 ^b	33 ^b
	Tons	443	3,247	5,258	6,137	1,111
	N samples	25 ^a	38 ^a / 106 ^b	53 ^a / 181 ^b	57 ^a / 219 ^b	120 ^b
France	N plants		4	1	1	
	N shipments		21	23	15	
	Tons		485	541	337	
	N samples		3	65	45	
Germany	N plants			1	1	1
	N shipments			3	7	2
	Tons			55 ^c	110 ^c	23
	N samples			5	15	7
Netherlands	N plants		3			
	N shipments		4			
	Tons		145			
	N samples		10			
Italy	N plants		1			
	N shipments		1			
	Tons		18			
	N samples		2			
Suspected^d		1 (pork)	2 (pork)	2 (pork)	4 (pork)	
Result		negative	negative	negative	Negative	

Table 2: MBM shipments from the UK and other BSE affected countries, samples taken and results obtained by means of a multispecies ELISA-test (Tepnel Biokit) from 1996-2000. Tests began 05/96.

^a Data from CD provided on 4 December 2000.

^b Data from CD provided on 8 March 2001.

^c Volume registered on the year before in the import statistics.

^d Shipments suspected to have pork antigens that were refused entry and sent for verification to a German laboratory where the suspicion was not confirmed.

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Country	Data	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	0	1	Total
Belgium	CD							810	1150	802	1100	1220												5082
	Other					10	1805	1402	1000	2602	1250	1229						103	1152	407	641	798		12399
Denmark	CD											3947	1076		2594	1157	898	180						9852
	Other							491	2295	21	4670	1072		2593							500			11642
France	CD							40		20		40	173	165	328	598	305		485	541	337	430		3462
	Other		50			20	184	156	115	163	163	72	86	51	67	80	122	103	176	125	431	551		2715
Germany	CD								1771	1053	6374	2688	343	507					55	110			23	12924
	Other								1191	2456	6261	3133	100	377	619	1078	180	610			2	19		16026
Italy	CD							1200	1000	6737	1820	300	3548	3872		3572	1866		18					23933
	Other					101	1052	1539	1200	7753	3000		3814	4474	3175	3301	2263	1398	18					33088
Netherlands	CD											597		1470			294			145				2506
	Other						21					572	149	1620										2362
Poland	CD								1191															1191
	Other																							0
Spain	CD							1450	1752	2808	2929	1110	316											10365
	Other					40	1096	2502	2145	2570	760	100			256									9469
UK	CD									17	3844	3590	8937	7928	8164	2064	2002	443	3247	5258	6137	1111		52742
	Other									92	2718	3677	9816	7264	4008	1486	945	447	1503	4092	5196	4620		45864
Totals																								
Non-UK	CD	0	0	0	0	0	0	3500	6864	12017	16170	7904	4380	7138	1485	5362	2351	0	703	651	337	453	0	69315
	Other		50	0	0	131	3102	4684	8303	15712	18063	7886	4100	7495	4117	4459	2565	2214	1346	532	1574	1368	0	87701
UK	CD	0	0	0	0	0	0	0	0	17	3844	3590	8937	7928	8164	2064	2002	443	3247	5258	6137	1111	0	52742
	Other	0	0	0	0	0	0	0	0	92	2718	3677	9816	7264	4008	1486	945	447	1503	4092	5196	4620	0	45864

Table 3: MBM imports into Israel (CD) and corresponding exports from BSE-Risk countries. Source for export data: Eurostat and UK export statistics and, where available, export statistics from other BSE-Risk countries. Note: Only imports in Risk periods (grey shaded) are taken into account for assessing the external challenge. Risk periods are defined according to the SSC opinion of January 2002.

- Israel further explained that import permits have to be renewed each year and that since 1 January 1989 imports of MBM from all countries were only allowed from plants authorised by the Israelian Authorities. This authorisation apparently was based on a declaration of the veterinary authorities of the exporting country that the plant would comply with the import requirements established by Israel. In addition, shipments have to be accompanied by a certification of the production plant. This certificate has to state that "the raw materials are of local origin only" (excluding fish), that no imported animal meal has been included in the said product and that the meals did not contain "by-material derived from animals that may be infected with scrapie, BSE or other scrapie-like agents".

It is concluded that the external challenge resulting from imports of animal meals from BSE-risk countries other than the UK could after 1996 for all tested consignments only result from deliberate (fraud) or accidental contamination of poultry or fish meal with mammalian protein heated above the detection range of the applied ELISA tests.

- The Italian Export Statistics (ISTAT) which were provided by the Italian veterinary service as confirmation of these exports, lists separately meat meal, fish meal and poultry meal exports. These ISTAT statistics indicate that meat meal was exported to Israel before 1993 (3,000 t), in 1993 (3,175 t) and in 1996 (1,398 t); i.e. 7,573 t in total. No detailed explanation was provided by the Italian authorities and the Israelian authorities question the appropriateness of these statistics, hinting on their strict import requirements and the fact that the documents of each import consignment were carefully checked by official veterinarians in the two relevant import ports. Official Italian documents were supplied by Israel in April 2002 and indicate that these shipments are of poultry origin or free from BSE and other TSE infected materials.
- The Danish authorities have confirmed exports of 500 tons of MBM to Israel in 1999, which are not indicated in the country dossier, but without further specifying the species of origin. Israel has provided certificates accounting for 45.5 tonnes that were fishmeal and canned pet food. However, neither fishmeal nor canned pet food should be covered by the same customs code as MBM. Israel supplied additional official Danish documents in April 2002 indicating that these shipments were of poultry origin.

It is noted that the imports into Israel from the UK and other BSE risk countries increased remarkably in the period 1988-90 when the first MMBM-ban was implemented in the UK. At that time, it can be assumed that the domestic demand in the UK for non-ruminant (i.e. poultry) MBM increased, while a massive surplus of UK-produced MMBM occurred that could still be legally exported. From an economic point of view the interest to export poultry meal from the UK must have been much smaller than to export MMBM.

However, since 1989 all imports from UK were from dedicated poultry meal-plants. In addition, a significant fraction of these imports was feather meal. This makes accidental cross-contamination during production unlikely. If, as indicated by the CD, the product was packed in sacks, also cross-contamination during transport is unlikely. Israel has supplied British documents indicating that all shipments were packed either in 25 kg multiply paper bags with inner liner or in big bags of 1000 kg with inner liner. Israel indicated that the increase in the imports of animal meals in the late 80s was due to a significant increase in the poultry production in the country. However, the available data only indicate a small increase in poultry production for this particular time period.

2.3 Overall assessment of the external challenge

The level of the external challenge that has to be met by the BSE/cattle system is estimated according to the guidance given by the SSC in its final opinion on the GBR of July 2000 (as updated in January 2002).

▪ Live cattle imports:

Between 1980 and 2000 the country imported 29,431 (CD) live cattle from BSE risk countries other than the UK, and 262 cattle from the UK itself (Eurostat and other data). Together these imports represent a moderate external challenge. Broken down to 5-years periods the resulting external challenge is as given in table 4. This assessment takes into account the different aspects discussed above that allow to assume that certain imported cattle did not enter the domestic BSE/cattle system, i.e. were not rendered into feed. Since 1996, when all rendering of bovine material was prohibited cattle could not have been rendered anymore.

• MBM imports:

In total the country imported over the period 1980-2001 87,701 tons MBM (Eurostat and other data) from non-UK BSE-risk countries and 52,742 tons from the UK itself (CD). Together these imports represent a very high external challenge. Broken down to 5-years periods the resulting external challenge is as given in table 4. This assessment takes into account the different aspects discussed above that allow to assume that certain imported MBM did not enter the domestic BSE/cattle system or did not represent an external challenge for other reasons.

Due to the measures in place in Israel since 1990 to assure that imported MBM is of poultry origin only, it is assumed that the imports of MBM after 1990 only imposed a negligible challenge.

External Challenge experienced by <u>ISRAEL</u>				
<i>External challenge</i>		<i>Reason for this external challenge</i>		
Period	Overall Level	Cattle imports	MBM imports	Comment
1980-1985	Moderate	Very low	Moderate	The cattle challenge is assessed taking account of the final use of the imported animals and the MBM challenge is assessed taking account of the measures taken to ensure that they were, since 1988/90 of non-mammalian origin only.
1986-1990	Very high		Very high	
1991-1995	Low	Low	Negligible	
1996-2000				

Table 4: External Challenge resulting from live cattle and/or MBM imports from the UK and other BSE-Risk countries. The Challenge level is determined according to the SSC-opinion on the GBR of July 2000 (as updated in January 2002).

On the basis of the available information, the overall assessment of the external challenge is as given in the table above.

3. STABILITY

3.1 Overall appreciation of the ability to avoid recycling of BSE infectivity, should it enter processing

Feeding

Since 1988/1990, mammalian MBM has not been on the Israelian market due to import bans. However, domestically produced MMBM could still be included in poultry feed. Since 8/1996 all mammalian MBM (MMBM) is banned from the feed for livestock, fish and poultry. The only type of animal meal available since 1996 is poultry meal (poultry offal meal and feather meal) and fish meal. Poultry meal (only feather meal in practice) and fishmeal (FM) are still permitted to be fed to cattle.

In 4/2001 the Animal Disease regulation 2001 (feeding of Animals), was adopted by the Israelian Parliament and took effect in July 2001. The regulations prohibit the feeding of mammals with protein and meals produced from animals, excluding protein present in milk and milk products, and Dicalcium phosphate.

No official controls of domestic cattle feedstuff with regard to the absence of mammalian-MBM were carried out. The Israelian authorities explained that this was not necessary since after 1990 imported MMBM could not have been legally present in the country and since 1996, when also domestic rendering of mammalian material stopped, domestic MMBM was not available for inclusion in animal feed.

Before 1996, there was no official feed ban that prevented the deliberate feeding of MMBM to farm animals. Thus, before this date, it was not forbidden and not controlled, and can therefore not be excluded that (domestic) MMBM was given to cattle in Israel.

However, before 1996 cattle rations did not, according to the CD, include animal meals other than fishmeal and poultry meals. In general, plant proteins (soybean meal and gluten) were seen in Israel to offer a better alternative, both nutritionally and economically.

Still, even if intentional feeding of MMBM to cattle was not practised, it could have reached cattle due to accidental inclusion in cattle ratios (cross-contamination). This could have occurred due to insufficient cleansing of production lines after the production of poultry feeds containing MBM. In meeting this argument, the Israelian authorities pointed out, and showed evidence of the checks made by the feed mills, prior to inclusion of new batches of feed ingredients in their products. They argue that by looking at parameters like crude protein and crude fat a significant contamination would have been recognised because of the inevitable differences. However, although it is likely that a product containing pure MMBM can be distinguished from pure poultry meal in this way, it is regarded as unlikely that a low level of contamination could be detected.

After the feed ban of 8/1996, aimed at blocking the inclusion of MMBM into all farm animal feed, the only possible route by which the BSE-agent could reach cattle is by imported poultry meals in combination with cross-contamination. This risk has been addressed in the external challenge assessment. As poultry meals were included into cattle feed until 4/2001, any BSE contaminated poultry meal could have reached domestic cattle in Israel. Since 4/2001 this risk decreased, thanks to a voluntary ban of the feed industry to

exclude poultry meal from cattle rations. This ban became obligatory since 7/2001 (laid down in Israeli law).

Cross-contamination

Before 8/1996, the control of cross-contamination in domestic feed production was not a legal issue because feeding of MBM to farmed animals, including cattle, was permitted. Also, the Israeli authorities did not consider the MBM available on the market to be a hazard. Therefore, measures to avoid involuntary inclusion of small amounts or traces of MBM were not taken. On the other hand it was explained that the feed industry would not have tolerated, for quality reasons, significant contamination.

Cattle feed and poultry feed have been produced in the same factories and on the same production lines before and after 1996. Thus, since MMBM could be imported until July 1990 and domestically produced until 1996, and no measures were taken to prevent cross-contamination, it cannot be excluded that it ended up in cattle feed, even if it was not intentionally included (see 3.1 Feeding).

After 1990 the consequences of any cross-contamination were less severe because the only MBM imported has been poultry MBM that could only have contained, if at all, low levels or traces of contamination with MMBM. The potential consequences decreased further in 1995, when the only rendering plant that previously accepted bovine carcasses ceased with its production, implying that also domestic MBM could only be of poultry origin after that date. It decreased further in 8/1996 when the inclusion of MMBM in feed for all farmed animals (incl. poultry) was prohibited, and the control of imported poultry meals was intensified with the introduction of the ELISA test.

In conclusion, until 1990 cross-contamination of cattle feed with imported MMBM was possible and likely, at rather low levels. Between 1990-1995 cross-contamination of cattle feed with (domestic) MMBM was possible and likely, at rather low levels. Since 1996, cross-contamination is still possible but could only be due to poultry meal (domestic or imported). The risk associated with such cross-contamination is likely to be very low due to the demands and checks put on imported poultry meal since that date.

Rendering

Rendering of bovine material is prohibited since 8/1996, and since then all bovine material has to be buried.

Until August 1996 bovine and other mammalian raw material was rendered at two sites. In both rendering establishments SRM was included in the raw material. One of the premises was linked/integrated with a slaughterhouse and processed only waste from that slaughterhouse but never took in material from external sources. Between 1986 and 1995 a second "stand alone" establishment was in operation that collected bovine offal and fallen stock from the surrounding region of Israel. However, only a part of the total annual bovine fallen stock was rendered because the single plant that took in bovine cadavers served only one region of Israel.

The "stand alone" plant was originally established in 1983 to deal with poultry waste from poultry slaughterhouses in the region. In 1985 a wing for rendering bovines was added and put into operation in 1986. The plant rendered dead young cattle (less than 6 months) as well as fallen stock older than 6 months. The bovine-processing activity was closed down

early in 1995 because of environmental considerations and never re-opened, because in 8/96 rendering of bovine material was banned. The annual number of bovine fallen stock that was rendered ranged from 267 in 1987 to 641 in 1994. It is worth noting that, according to the Israelian veterinary service, the definition of "fallen stock" includes also emergency slaughter. As indicated above, the alternative way of disposing of carcasses, by burial, was widely practised already before the ban.

The temperature/time/pressure conditions of the applied batch rendering process were not regulated. However, for the "stand alone plant", a declaration by the general manager was provided concerning the temperature/time/pressure conditions that were applied in the plant from 1/1982-8/1996. According to this declaration a "hydrolysed³ batch rendering process at 150°C/30min/4/bar" was applied throughout the referred to period. However, the bovine rendering activity was only in operation from 1986 to end 1994 and hydrolysis is normally not applied to rendering bovine material but for processing feathers into feather meal. It therefore seems that this declaration is mainly referring to the poultry processing part of the plant. In addition, no information was provided how these conditions were verified or why such severe conditions were applied to bovine material. The process currently used (only for poultry and fish material, see below) is continuous rendering at 142°C for 45 minutes at 2 bar.

In Israel cattle and poultry material is collected and transported by different enterprises. Compensation is paid by an insurance system for all dead cattle above the age of 6 months against a certification by the veterinarian from the local authority, confirming the identity of the cattle (passport) and its correct disposal (until 1995 rendering or burial, since 1996 burial, and since early 2001 incineration).

Poultry material is still rendered in 6 premises in Israel. These rendering plants are attached/linked to poultry slaughterhouses and are obliged to engage part time veterinarians for process control. The plants process slaughter waste (not including dead poultry) from the attached poultry slaughter premises. Bovine material is not included. The processes applied would not be able to reduce BSE infectivity.

In the view of the Israelian authorities the ban on rendering bovine material was easily controlled and no attempts to include ruminant offal into rendering raw material have ever been found. These controls were described as follows: Only officially certified and supervised abattoirs are allowed to slaughter cattle and only those slaughterhouses would have been linked to the offal collection system for rendering that anyway only covered a part of the annual production of offal. If "black" slaughter happened it would be very unlikely that such material would get into offal collection points, which were controlled by official veterinarians who would try to close down any illegal slaughter activity. Also, the official controls in the rendering plants where the offal was processed would have imposed an avoidable risk to be caught, preventing illegal slaughter offal ending-up in rendering.

On the basis of the available information it is concluded that rendering of bovine material was performed in Israel, officially until 8/96. The only plant, however, that accepted fallen bovine stock was closed for environmental reasons already in 1995. Bovine slaughter offal was, however, processed into MBM until 1996. The systems used did not comply with the

³ The Israelian CVO explained that the term "hydrolysed" refers to the fact that the material was cooked in water.

133°C/20^{min}/3^{bar} standard. Thus, if the BSE-agent had entered the rendering system its infectivity would not have been reduced.

SRM and fallen stock

There has never been any official SRM-ban in Israel as long as rendering of bovine material took place. Consequently, SRM was included in the rendering of slaughter offal until 8/1996 and in rendered fallen stock from 1986 to early 1995.

Since 8/1996 all bovine waste material and fallen stock must, by law, be buried in four approved locations in the country. Since 1/2001 fallen stock is taken to the central incinerator.

Conclusion on the ability to avoid recycling

In light of the above-discussed information it has to be assumed that the BSE-agent, should it have entered the territory of Israel before 1990 in imported MMBM, or as BSE-contaminated poultry meal thereafter, it could have been recycled and amplified. However, the assumed combined effect of the ban of MMBM from the diet of farmed animals (cattle, poultry and fish) and the stop of domestic rendering of bovine materials, make the recycling and amplification of the agent highly unlikely after 8/1996.

3.2 Overall appreciation of the ability to identify BSE-cases and to eliminate animals at risk of being infected before they are processed

Cattle population structure

- The cattle population of Israel is small. Figures for 1997 were given as follows: the total population was 363,045 heads, of which 263,737 were for dairy production (73%) and 99,308 (27%) were raised as beef cattle. About 250.000 cattle were said to be over 24 months old.
- The age-distribution of the current dairy cattle population is provided in table 5, below. It shows that more than 50,000 of the dairy cows currently alive in Israel were born before 1997 while the entire dairy herd over 24 months counts to 108,351 heads.

Year of birth	≤ 84	85	86	87	88	89	90	91	92	93	94	95	96	97	98
N° of cows alive	1	4	2	9	23	47	145	441	1087	2286	4068	7501	12655	19384	26682

Table 5: Age-distribution of the current dairy cow population (Herd book data, Feb. 2001).

- The Israelian Cattle Breeders' Association maintains the Israelian Holstein Herd book, performs milk recording and operates the central laboratory for milk recording. In 2000, 88.3% out of an estimated 120,000 cows (after first calving, age > 24 months) and 74.3% of 1,365 herds were registered. The average milk yield is around 9,000-10,000 litres/year with some herds up to 13,000 litres/year. This high performance system implies that under-performing cows are likely to be taken out of production at a relative young age. Given the fact that productivity decrease could be a first sign of BSE, this mechanism could effectively prevent appearance of clear clinical signs for BSE in cattle.

- The dairy husbandry system is intensive, "zero-grazing systems". About 2 million tons of grain are imported annually for cattle feed. Roughage is domestically produced and includes wastes from the food industry, such as peels and skins of citrus fruits.
- Cattle identification and registration is compulsory since 1976, including a cattle passport system that requires each cattle to be accompanied by it whenever it moves and until its final destination. It is fully computerised since 1996.
- The annual slaughter rate is around 54,000 head of which roughly 2% are emergency slaughter. In addition it was indicated that annually about 1,800 fallen stock were rendered as long as the plant was in operation (i.e. 1995). The latter figure is taken from the data of the cattle insurance system.
- The average age of slaughter of bovines is said to be between 4-5 years. This means that 20-30% of the cows slaughtered each year are at an age when clinical signs of BSE could occur, but a large fraction is also too young to be likely to show clinical signs even if infected close to birth.

BSE Surveillance

- **Notification** of BSE has been compulsory since 1992 but already in May 1990 the Israelian CVO described the following criteria for a BSE-suspect in a letter sent to all the veterinarians:
 - a. Behavioural changes: i. Anxiety; ii. Nervousness; iii. Hesitation when entering yards.
 - b. Changes in posture: i. Posterior ataxia; ii. Staggering; iii. Trembling; iv. Falling
 - c. Hypersensitivity: i. Overreaction to sound and touch; ii. Licking movements.

- **Awareness / training** measures have been apparently in place since 1987. Since 1989, BSE is taught to the veterinary students (only one school in the country) and the state veterinary service.

Articles are published in the Journals of dairy cattle and beef cattle associations respectively. All large animal practitioners as well as all slaughterhouse veterinarians have participated in BSE diagnostic workshops and are aware of TSE's, their epidemiology and symptomatology.

State veterinarians, large animal practitioners, slaughterhouse veterinarians and cattle breeders associations were notified and updated by means of:

- a. Articles and updates in the monthly Veterinary Bulletins (more than 400 items since December 1987);
- b. Workshops and lectures, central and regional, some of them with participation of UK experts and demonstration of British video-taped clinical BSE cases;
- c. Circulars including detailed descriptions of clinical BSE epidemiology and symptoms.

The described measures are considered to be effective and should ensure that clinical cases could be correctly recognised.

- **Compensation** schemes exist and should further support notification of suspects. There is a compulsory insurance scheme against total condemnation, which covers all dairy cattle older than 6 months. The insurance scheme is operational since 1982 and its costs are mutually borne by the state and the farmers. Compensations are paid only for animals that have been inspected by a veterinarian, where the diagnosis has

consequently been approved by the VSAH, and the cadavers are correctly disposed off. The Israelian veterinary service regards this to be a strong incentive to correctly dispose of fallen stock. Compensation is also paid since 1992 for all dairy cattle older than 6 months that die or are emergency slaughtered and confiscated in slaughterhouses. Animals destroyed under order (should it be BSE or any other disease) are fully compensated under the Animal Diseases Ordinance (new version), of 1985.

- **Veterinary supervision:** All farms are closely supervised by an association of about 60 veterinarians, covering more than 90% of the national cattle herd. Each farm is visited at least weekly. Due to the flat rate payment to the association multiple visits to sick cattle are normal. Diagnosis in the Kimron Veterinary Institute is done without extra charge and does not represent a financial burden to the farmer. This allows for a very close supervision of the animals directly by the veterinarians.

BSE-examination: Since 1992 bovine brains of CNS suspects are analysed for BSE (training of two persons in Weybridge, in brain histopathology for BSE-examination). All were found negative. Since 1997, Immunohistochemistry is used (but not systematically) in addition to histopathology. In January 2001, two persons were trained at Prionics in Switzerland to perform the rapid Prionics-check BSE-test. Since then, more than 2,329 cattle brains were examined using this test.

In addition to examination of notified CNS suspects ("passive surveillance"), random sampling is executed in slaughterhouses ("active surveillance") since 1994.

Rabies is endemic in the country and every bovine displaying neurological symptoms which died or was killed/slaughtered because of recumbence, is examined by the CVL, Department of Pathology, Kimron Veterinary Institute (KVI); 162 examinations were carried out in the period 1977-2001. This examination systematically includes BSE.

Cattle examined for BSE by histopathology and since 97 IHC, but not in all cases, and since 2001 including rapid test results in all cases								
Unknown age [n°]	Year	BSE examinations		Age (n°)		Differential Diagnosis	N° of doubtful	N° of positive
		n°	Reason(s)	24-36 month	Over 36 month			
	1990							
	1991	99	CNS suspect				0	0
	1992	48					0	0
	1993	72					0	0
	1994	134	CNS & random sampling				0	0
	1995	167					0	0
23	1996	210					0	0
	1997	149		65	61	23	0	0
40	1998	227		73	114	56	0	0
64	1999	280		44	172	58	0	0
3	2000	300	35	72	16	0	0	
144	2001	1520	268	1108	171	0	0	
24	01/01/02-15/04/2002	809	33	742	0	0	0	
298	Total	4015		518	2264	324	0	0

Table 6: Number of brains of CNS suspects or randomly sampled animals in slaughterhouses examined for BSE. 2001/2002 reasons.

In addition, Israel recently started a screening program based on rapid testing of cattle brains. Until 15/04/2002, 2,329 slaughtered cattle and 724 fallen stock have been tested, all negative. Of these figures a total of 1,099 brains were examined from cattle.

A BSE case was first identified on 28 May 2002 and confirmed by the OIE reference laboratory in Bern, Switzerland, on 6 June 2002.

It should be noted that the surveillance system in Israel appears to be very good and could therefore enhance stability.

3.3 Overall assessment of the stability

For the overall assessment of the stability the impact of the three main factors (i.e. feeding, rendering and SRM-removal) and of the additional stability factor, surveillance, has to be estimated. Again the guidance provided by the SSC in its opinion on the GBR of July 2000 is applied.

Feeding

Feeding of MBM to cattle was allowed until 1996. Even if there is reason to assume that it was not widespread, it has to be assumed that it happened as long as MBM was available in the country. Feeding is therefore "**not OK**" between 1980-1996. The efficiency of implementation of the 1996 ban of mammalian MBM from farm animal feed cannot be judged, since there have been no official control measures instituted. In any case, it would be difficult to control contamination of poultry meal with mammalian meals. In view of the fact that neither imported nor domestic MMBM could any more have been legally available in the country from 1990 and 1996 respectively, feeding is assumed to be "**reasonably OK**" from 1997 onwards until 7/2001, because poultry meal may still have been included in the cattle diet. Since 7/2001, feeding is regarded "**OK**", due to the introduction of a law, which forbids feeding of animal meals to ruminants.

Rendering

Rendering is assumed being "**not OK**" as long as bovine material was rendered, i.e. until 1996. Even if process conditions are still not according to the 133°C/20min/3bar-standard the control of the input material is assumed to ensure that no bovine material could enter the process any more since 8/1996. Rendering is therefore assessed as "**OK**" from 1997 onwards. However, if BSE infectivity would enter the process it would not be optimally reduced.

SRM-removal

As long as bovine material was rendered it included SRM, (some) fallen stock and emergency slaughters. Therefore SRM removal was "**not OK**" until 1996. SRM-removal is assessed as "**OK**" from 1997 onwards because after this date SRM, fallen stock and emergency slaughter is buried, as rendering of bovine material ceased, and since 1/2001 fallen stock and emergency slaughters are incinerated.

BSE surveillance

The good BSE surveillance enhances the stability of the system to some extent since 1988 and to a larger extent since 2001.

Stability of the BSE/cattle system in <u>ISRAEL</u> over time					
Stability		Reasons			
Period	Level	Feeding	Rendering	SRM removal	BSE surveillance
1980-87	Extremely unstable	Not OK	Not OK	Not OK	→
1988-96					↑
1997-2000	Very stable	Reasonably OK	OK	OK	
2001-	Optimally stable	OK			

Table 7: Stability resulting from the interaction of the three main stability factors and BSE surveillance. The Stability level is determined according to the SSC-opinion on the GBR of July 2000.

On the basis of the available information it has to be concluded that the Israelian BSE/cattle system was extremely unstable until 1996. The combined measures taken in 1996 to improve feeding (total feed ban) and the stop of rendering bovine material (partly already in 1995), made the system very stable. It can be regarded optimally stable since 2001 because the use of poultry meals was stopped.

4. CONCLUSION ON THE RESULTING RISKS

4.1 Interaction of stability and challenges

In conclusion, the stability of the Israelian BSE/cattle system in the past and the external challenges the system has coped with are summarised in the table below.

From the interaction of the two parameters “stability” and “external challenge” a conclusion is drawn on the level of “internal challenge” that emerged and had to be met by the system, in addition to external challenges that occurred.

An external challenge resulting from cattle imports could only lead to an internal challenge once imported infected cattle were rendered for feed and thus contaminated domestic feed reached domestic cattle. Cattle imported for slaughter would normally be slaughtered at an age too young to harbour plenty of BSE infectivity or to show signs, even if infected prior to import. Imported breeding cattle, however, would normally be about two years at import and live several years after import. Animals having problems would be slaughtered younger. If being at an age of 4-6 years when slaughtered, they could approach the end of the BSE-incubation period and harbour, while being pre-clinical, as much infectivity as a clinical BSE-case. Hence the date when cattle imports could have led to an internal challenge is about 3 years after the import of breeding cattle that could have been infected prior to import. Special measures taken to avoid processing of imported cattle into feed could influence the risk of this happening.

On the other hand contaminated MBM would lead to an internal challenge in the same year it was imported because it is normally incorporated into feed soon after import and would then reach domestic animals, including cattle. This exposure could then induce infection.

Between 1980 and 1985 the extremely unstable Israeli system was exposed to a moderate, from 1986 to 1990, a very high (mainly due to animal meal imports from BSE risk countries), and since 1991 to a low external challenge. It is therefore likely that the BSE-agent was introduced in the country, most probably before 1991.

It most probably has reached Israeli cattle and an internal challenge developed. From 1991 to 1995, due to the import control measures taken against BSE-risk countries, the external challenge declined to some extent. The system was still extremely unstable and thus new infections could still arise whenever the imported "poultry" meal was contaminated with the BSE-agent. However, the number of new infections that could have resulted from those external challenges would have been less than during the late 80s.

Since 1997, the system has been very stable and the risk that already circulating BSE infectivity has been recycled and amplified is negligible. It is therefore concluded that since 1997 the internal challenge is decreasing with the rate at which cattle born before that year leave the system.

INTERACTION OF STABILITY AND EXTERNAL CHALLENGE IN <u>ISRAEL</u>			
Period	Stability	External Challenge	Internal challenge
1980-1985	Extremely Unstable	Moderate	Likely present and growing
1986-1990		Very high	
1991-1996		Low	
1997-2000	Very stable		Likely present and declining
2001	Optimally stable		

Table 8: Internal challenge resulting from the interaction of the external challenge and stability over time. The internal challenge level is determined according to guidance given in the SSC-opinion on the GBR of July 2000.

4.2 Risk that BSE infectivity entered processing

It is likely that the BSE-agent was imported in the 80s by contaminated MBM and/or infected live cattle, particularly during the latter half. Therefore, since the early 90s and until 8/1996 (end 1994 for fallen stock), infected imported and/or domestic cattle could have entered processing (slaughter and/or rendering as fallen stock or emergency slaughter) while being in pre-clinical stages of the incubation. Given the very unstable system at this period, this risk increased until 1996. It will continue to exist, with regard to slaughter, until the last birth cohorts born before 1997 have left the system. Thereafter the risk that BSE enters processing depends mainly on the remote risk that cattle from post-1996 birth cohorts have been exposed to contaminated imported poultry meal. For animals born after 4/2001 this risk is even more remote, thanks to the voluntary ban (since 7/2001 this ban became obligatory) by the feed industry on poultry meal in cattle feed.

4.3 Risk that BSE infectivity was recycled and propagated

If BSE entered the system in the 80s and imported or domestic cattle were processed in the early 90s while incubating BSE, the infectivity harboured by these (pre-clinical) animals could have been rendered for feed and recycled (mainly via cross-contamination) to domestic cattle, where it was amplified. Given the fact that the system remained extremely unstable until 1996, it has to be assumed that some of the BSE infectivity that entered the country in the 80s was recycled, propagated and amplified until 8/1996.

With the closing down early in 1995 of one of the two bovine processing rendering plants that processed fallen stock, the likelihood of recycling decreased significantly. After 8/96 also the remaining rendering plant ceased processing of ruminant material and the risk that the BSE-agent was recycled and propagated was further reduced. The ban on feeding MMBM to all farmed animals in addition to the stop of domestic rendering of bovine material also reduced the recycling and propagation risk. It is now assumed that the system is able to eliminate BSE infectivity and to reduce it over time. The rate of this reduction mainly depends on the rate at which the cattle at risk of being infected are eliminated. Should new infections result from imported contaminated "poultry" meal, that continued to be fed to cattle until 4/2001, this would counterbalance the decline of the amount of BSE infectivity circulating in the country. However, due to the intensified controls of imported poultry meal also this risk decreased since 1996. After April 2001 the risk of propagating any recycled BSE infectivity is negligible, thanks to the voluntary exclusion (obligatory exclusion since 7/2001) of also poultry meal from cattle feed.

5. CONCLUSION ON THE GEOGRAPHICAL BSE-RISK

5.1 The current GBR as function of the past stability and challenge

The current geographical BSE-risk (GBR) level is *III*, *i.e. it is likely and confirmed at a lower level* that domestic cattle are (clinically or pre-clinically) infected with the BSE-agent.

5.2 The expected development of the GBR as a function of the past and present stability and challenge

In view of the negligible risk that domestic cattle have been infected after 1996, the GBR will continue to decrease with the disappearance of the pre-1997 birth cohorts. The recent ban of all animal meals, including non-mammalian meals, from cattle feed, will allow the GBR to decrease fast.

5.3 Recommendations for influencing the future GBR

Official controls of cattle feed for traces of MBM will reassure that the Israelian system is kept optimally stable to external challenges.

The increase of active surveillance by systematic testing of all adult cattle in fallen stock and emergency slaughter that has already started will enhance the capacity of the surveillance system to discover small numbers of clinical BSE cases.