Checklist C: Solid waste management

March 2001

General description
Solid waste management at Kala camp is generally ineffective and is especially poor at the market where large volumes of undisposed solid waste are clearly visible and there is no appropriate system for collection, transport and disposal. Solid waste management at the reception centre is also currently insufficient, although workers clean the site daily.

In general, there is very low coverage of family garbage pits which are poorly designed and neither covered nor replaced when full. Household waste is largely organic but in general is not disposed of appropriately

Communal solid waste pits are currently under construction (Blocks A-F only) but are not yet in operation. Pits of depths above 2.5m are currently intercepting the water table.

Quality
1. Facilities and systems are technically basic in most areas.
2. Potential hazards for disease transmission: flies, mosquitoes breeding in communal pits, vermin around market and reception centre; and waste workers are currently not provided with protective clothing.
3 Current appropriate disposal systems can be sustained for >1 year (communal) and a few months (family).

Quantity
1 Ratio of pit volume per day to population is $7m^3/32$ people
2. Maximum walking distance to the nearest pit, bin or container is <30m (communal pits); and <15m (family pits).

Usage
1. Proportion of the population using appropriate collection facilities correctly: <50%.
2. Proportion of collected SW transported to approved disposal sites: <50%
3. Proportion of collected SW disposed of appropriately: <50%.

Case study

C. Solid waste management

C.1 Family or communal pit disposal (on-site)

Location of assessment: Kala camp, Zambia Date: 19/03/01 Assessor: P. Harvey

This table should be completed for each of the following as appropriate (underline or circle the relevant):

Domestic/dwelling areas *Markets Feeding centres Schools*

Data	*Collected data*	*B*	*Range*				*M*	*C*
			10	*7*	*4*	*1*		
Technical appropriateness	**Technical basic**	7	inappropriate	Technically basic	appropriate	very appropriate	0.33	**2.3**
Potential hazard to health	**Flies, mosquitoes**	6	major hazard	Basic protection	minimal hazard	no hazard	0.33	**2.0**
Sustainability of facilities	**Few months**	7	None	1 month	6 months	>1 year	0.33	**2.3**
Ratio of pit volume (per day) to population	**$1m^3/4$ $6m^3/24$**	1	None	$6m^3/200$	$6m^3/100$	$6m^3/50$	0.5	**0.5**
Maximum one-way walking distance to family pit OR	**<15m**	1	>70m	45m	30m	15m	0.5 OR	**0.5**
Maximum one-way walking distance to communal pit			>250m	200m	150m	100m	0.5	
% of population with access to appropriate facilities	**<50%**	8	None	50%	75%	>95%	0.5	**4.0**
% of population using appropriate facilities correctly	**<50%**	8	None	50%	75%	>95%	0.5	**4.0**
							Total	**15.6**

C.3 Communal waste collection (without bins) and disposal (off-site)

Location of assessment: Kala camp, Zambia ..... Date: 19/03/01 Assessor: P. Harvey .....

This table should be completed for each of the following as appropriate (underline or circle the relevant):

Markets *Feeding centres Schools*

Data		**B**	**Range**				**M**	**C**
			10	**7**	**4**	**1**		
Technical appropriateness	Inappropriate	**8**	inappropriate	technically basic	appropriate	very appropriate	0.33	**2.7**
Potential health hazard	Fires, vermin, kids playing	**8**	major hazard	basic protection	minimal hazard	no hazard	0 33	**2.7**
Sustainability of facilities	< 1 month	**9**	None	1 month	6 months	>1 year	0 33	**3.0**
Ratio of collection vehicle volume (per day) to unit of measure	None	**10**	None	0.2l/ person or 5l/stall	0.4l/ person or 10l/stall	1 0l/ person or 20l/stall	0.33	**3.3**
Distance to final disposal site from nearest habitable building	< 10m	**10**	<250m	500m	750m	>1km	0 33	**3.3**
Land available for land filling per day OR			None	0.25m³ /person	0.50m³ /person	0.75m³ /person	0.33 OR	
Ratio of pit volume (per day) to population	Virtually none	**9**	None	6m³/200	6m³/100	6m³/50	0.33	**3.0**

continued ....

C.3 Communal waste collection (without bins) and disposal (off-site)

.... continued

Data	*Collected data*	*B*	*Range*				*M*	*C*
			10	*7*	*4*	*1*		
% of population using appropriate collection facilities correctly	None	10	None	50%	75%	>95%	0.33	3.3
% of collected solid waste transported correctly	None	10	None	50%	75%	>95%	0.33	3.3
% of collected solid waste disposed of correctly	None	10	None	50%	75%	>95%	0.33	3.3
							T-al	28.0

Case study

C.3 Communal waste collection (without bins) and disposal (off-site)

Location of assessment: **Kala camp, Zambia** Date: **19/03/01** Assessor: **P. Harvey**

This table should be completed for each of the following as appropriate (underline or circle the relevant):

Markets ***Reception centres*** *Schools*

Data	*Collected data*	*B*	*Range*				*M*	*C*
			10	*7*	*4*	*1*		
Technical appropriateness	**Capacity too low**	7	inappropriate	technically basic	appropriate	very appropriate	0.33	**2.3**
Potential health hazard	**Flies, vermin, no clothing**	7	major hazard	basic protection	minimal hazard	no hazard	0.33	**2.3**
Sustainability of facilities	**<1 month**	8	None	1 month	6 months	>1 year	0.33	**2.7**
Ratio of collection vehicle volume (per day) to unit of measure	**130l wheelbarrow x 2 trips**	1	None	0.2l/ person or 5l/stall	0.4l/ person or 10l/stall	1.0l/ person or 20l/stall	0.33	**0.3**
Distance to final disposal site from nearest habitable building	**<20m**	10	<250m	500m	750m	>1km	0.33	**3.3**
Land available for land filling per day OR			None	0.25m³/person	0.50m³/person	0.75m³/person	0.33 OR	
Ratio of pit volume (per day) to population	**Virtually none**	9	None	6m³/200	6m³/100	6m³/50	0.33	**3.0**

continued ....

C.3 Communal waste collection (without bins) and disposal (off-site)

.... continued

Data	*Collected data*	*B*	*Range*				*M*	*C*
			10	*7*	*4*	*1*		
% of population using appropriate collection facilities correctly	**50%**	**7**	None	50%	75%	>95%	0.33	**2.3**
% of collected solid waste transported correctly	**90%**	**2**	None	50%	75%	>95%	0.33	**0.7**
% of collected solid waste disposed of correctly	**75%**	**4**	None	50%	75%	>95%	0.33	**1 3**
							Total	**18.2**

Market solid waste

Domestic solid waste

Case study

Checklist D: Waste management at medical centres

March 2001

General description
Segregation of different types of waste at source is currently ineffective, storage and transportation facilities are generally inappropriate, and training and support to staff is insufficient. Open containers used to segregate waste are unsafe, workers have no gloves or protective clothing, and have received no training.

The open pit for disposal of general waste is poorly managed and too close to the health post. Medical waste (including sharps) is mixed with general waste in the burner (which is unable to incinerate sharps) and the combusted waste is disposed of in a sealed pit. Placentas are currently buried in a designated area at the rear of the health post, which is socio-culturally acceptable although the site requires some management.

Quality
1. Facilities and systems are technically basic.
2. Potential hazards for disease transmission: open pit, insects, etc.: open containers without lids for sharps and infectious waste; and no protective clothing.
3. The current disposal system can be sustained for about a month.

Quantity
1 Average number of beds for each set of three segregated containers (sharps, medical, general): 20
2. Average walking distance to the container(s): 3m
3. Volume of the transport system from container to final disposal point: insufficient
4. Ratio of original pit volume per bed: 700l/bed
5. Capacity of the incinerator is very insufficient for its purpose.
6. Distance to the nearest habitable building from the pit and/or incinerator: 15m (pit); 40m (burner)

Usage
1. Proportion of waste sorted and placed in correct containers: 50%
2. Proportion of collected waste safely transported to the disposal point: 50%
3. Proportion of collected waste safely disposed of: 50%

D. Waste management at medical centres

Location of assessment: Kala camp, Zambia Date: 19/03/01 Assessor: P. Harvey

Data	Collected data	B	Range				M	C
			10	7	4	1		
Technical appropriateness	Technically basic	7	inappropriate	technically basic	appropriate	very appropriate	0.33	2.3
Potential health hazard	Open pit, no gloves incineration inefficient	7	major hazard	basic protection	minimal hazard	no hazard	0.33	2.3
Sustainability of facilities	1 month	7	None	1 month	6 months	>1 year	0.33	2.3
No. of beds* per set of segregated containers	20	1	None	40 beds/ 1 set	30 beds/ 1 set	20 beds/ 1 set	0.2	0.2
Average one- way distance to containers	<5m	1	>20m	20m	10m	<5m	0.2	0.2
Volume of transport for segregated waste	Insufficient	7	None	Insufficient	Sufficient	Ideal	0.2	1.4
Original pit volume per bed* AND/OR	700l/bed	5	None	400l/bed	800l/bed	>1200l/bed	0.2/ 0.1	0.5
Capacity of incinerator	Very insufficient	10	Very insufficient	Insufficient	Sufficient	Ideal	0.2/ 0.1	1.0
Distance of incinerator from nearest habitable building AND/OR	40m	1	0m	5m	15m	>30m	0.2/ 0.1	0.1

continued ....

D. Waste management at medical centres

.... continued

Data	*Collected data*	*B*	*Range*				*M*	*C*
			10	*7*	*4*	*1*		
Distance of pit from nearest habitable building	**15m**	**10**	<25m	50m	75m	>100m	0.2/ 0.1	**1.0**
% of waste appropriately collected and sorted	**50%**	**7**	None	50%	75%	>95%	0.33	**2.3**
% of collected waste safely transported	**50%**	**7**	None	50%	75%	>95%	0.33	**2.3**
% of collected waste safely disposed	**30%**	**8**	None	50%	75%	>95%	0.33	**2.7**
							Total	**18.7**

*Where medical centres have no beds, 2 outpatients can be taken to be equivalent to 1 bed.

Checklist E: Disposal of dead bodies

March 2001

General description
Burial site is 500m x 500m and approximately 250m from nearest dwelling. Community organises grave digging and transportation of bodies; and MSF/World Vision provide coffins.

In general, satisfactory facilities and procedures are in place for the burial of the dead, although there is a lack of site management at the cemetery. No cremation occurs.

Quality
1. Facilities are technically appropriate
2. Potential hazards for disease transmission: none.
3. Current facilities are socially and culturally acceptable.
4. Current facilities can continue to be used for several years.

Quantity
1. Space available for burial sites: 0.25m^2 per 10,000 population
2. Distance to burial or cremation sites from the nearest habitable building: 250m
3. Proportion of bodies properly disposed of in an appropriate time: 100%

Usage
1. Proportion of the affected population with access to and willing to use the designated facilities: 100%

E. Disposal of dead bodies

Location of assessment: Kala camp, Zambia Date: 19/03/01 Assessor: P. Harvey

This table should be completed for each of the following as appropriate (underline or circle the relevant):

E.1 Burial *E.2 Cremation* at ***Domestic/dwelling*** or *Medical centres*

Data	***Collected data***	***B***	***Range***				***M***	***C***
			10	***7***	***4***	***1***		
Technical appropriateness	Gen. OK poor site management	4	inappropriate	technically basic	appropriate	very appropriate	0.25	1.0
Social and cultural acceptability	Very acceptable	2	very unacceptable	unacceptable	acceptable	very acceptable	0.25	0.5
Potential health hazard	Very minimal	1	major hazard	basic protection	minimal hazard	no hazard	0.25	0.25
Sustainability of facilities	>1 year	1	None	1 month	6 months	>1 year	0.25	0.25
Sites available for burial OR	>15000m³ /10,000	1	None	500m²/ 10,000	1000m²/10,000	1500m²/10,000	0.330R	0.3
Availability of fuel for cremation			None	basic supply	adequate	plentiful	0.33	
One-way distance to burial/ cremation sites from nearest habitable building	250m	5	<100m	100m	300m	500m	0.33	1.7
Collection and storage of dead bodies before decomposition	100%	1	None	50%	75%	100%	0.33	0.3
% of population with access and willing to use designated facilities	100%	1	None	50%	75%	>95%	1.0	1.0
							Total	5.4

Checklist F: Wastewater management

March 2001

General description
In general, wastewater management at the various waterpoints throughout the camp is satisfactory. Soak-pits have been constructed at all points and these are generally appropriately designed and able to cope with the volume of wastewater produced. There is potential for some covered pits to become mosquito breeding sites, however, because of open entrances and lack of gravel infilling.

This assessment has assumed that current interventions will be completed promptly and hence associated problems have not been covered by the assessment. These include unfinished and uncovered soak-pits which currently accommodate mosquito larvae populations. Implementation of planned interventions has already commenced and should be appropriate in preventing recurrence of these problems.

Quality
1. Proportion of facilities technically appropriate for their current use at all times of year: 75%
2. Breeding sites for mosquitoes in soakpits and near one waterpoint.
3. Proportion of facilities adequately maintained and managed: 75%

Quantity
1. Proportion of facilities that have been provided with a functional wastewater disposal system: 100%

Usage
1. Proportion of the total wastewater generated disposed of to appropriate designated locations: 90%

F. Wastewater management

Location of assessment: Kala camp, Zambia Date: 19/03/01 Assessor: P. Harvey

This table should be completed for each of the following as appropriate (underline or circle the relevant):

Domestic/dwelling areas *Markets* *Feeding centres* *Medical centres* *Schools*

Data	Collected data	B	Range				M	C
			10	7	4	1		
% of facilities technically appropriate to current purpose	75%	4	None	50%	75%	100%	0 33	1.3
Potential health hazard	Mosquitoes breeding	8	major hazard	basic protection	minimal hazard	no hazard	0 33	2.7
% of wastewater facilities which are adequately maintained and managed	75%	4	None	50%	75%	100%	0.33	1.3
% of facilities with functional wastewater disposal systems	90%	2	None	50%	75%	100%	1.0	2.0
% of wastewater disposed of in appropriate designated sites	90%	2	None	50%	75%	>95%	1.0	2.0
							Total	9.3

Checklist G: Hygiene promotion

May 2001

Note: The hygiene promotion programme was not assessed in March since this was then at the trial stage only. The need for various hygiene promotion interventions was recognised and a full programme was initiated soon after. The checklist and table below were completed in May 2001 to provide an example of how these are used.

General description

Hygiene promoters have been recruited from the affected community to work for the health information and hygiene promotion teams. They have received minimal training in hygiene promotion so far. Basic messages concerning food hygiene, handwashing and water storage have been delivered through house-to-house visits, but little focus has been given to excreta disposal or solid waste management. Currently training and supervision is being conducted by the health team alone and there is no collaboration with the sanitation team; consequently the activities of the team are biased towards following up medical cases rather than hygiene promotion.

Quality

1. Proportion of facilitators from the same social and ethnic background as the affected population: 100%
2. Proportion of facilitators which has received appropriate training: 30%
3. Proportion of the messages being promoted accurate, appropriate to the target audiences and completely cover the topic: 30%
4. Proportion of methods being used to disseminate messages compatible with socio-cultural aspects of the population: 50%

Quantity

1. Number of facilitators per thousand affected people: 1.25
2. Proportion of affected area that has been targeted for hygiene promotion activities: 75%
3. Proportion of relevant sanitation sectors covered by these Guidelines which are being targeted by the promotion programme: 50%

Usage

1. Proportion of the affected population which has received, understood and remembered the messages: 30%
2. Proportion of the population that has put hygiene promotion messages into practice: 20%
3. Proportion of all messages delivered that has been implemented by the population. 30%

G. Hygiene promotion

Location of assessment: Kala camp, Zambia Date: 17/05/01 Assessor: P. Harvey

This table should be completed for each of the following as appropriate (underline or circle the relevant):

Domestic/dwelling areas *Markets* *Feeding centres* *Medical centres* *Schools*

Data	Collected data	B	Range				M	C
			10	7	4	1		
% of trained facilitators from the same social background	100%	1	None	50%	75%	100%	0.33	0.3
% of messages accurate, appropriate and complete	30%	8	None	50%	75%	100%	0.33	2.7
% of messages delivered in a way that is socio-culturally acceptable	50%	7	None	50%	75%	100%	0.33	2.3
Number of facilitators per thousand people	1/800	3	None	1	2	>2	0.33	1.0
% area covered by campaign	75%	4	None	50%	75%	100%	0.33	1.3
% of relevant sanitation sectors for which appropriate use is promoted	50%	7	None	50%	75%	100%	0.33	2.3

continued ...

G. Hygiene promotion

.... continued

Data	*Collected data*	*B*	*Range*				*M*	*C*
			10	*7*	*4*	*1*		
% of population receiving, understanding and remembering promotional messages	**30%**	**7**	None	30%	50%	>75%	0.33	**2.3**
% of population putting messages into practice	**20%**	**8**	None	30%	50%	>75%	0.33	**2.7**
% of messages delivered implemented	**30%**	**7**	None	30%	50%	>75%	0.33	**2.3**
							Total	17.3

Priority setting results

Location of assessment:..Kala camp,..Zambia. Date:...19/03/01. Assessor:...P...Harvey.

Table C3. Sector analysis results

Sector	Area						Sector average	Priority sector(s)
	D A	Mkt	R C	M C	Sch			
B. Excreta disposal								
B.1 Single/ shared	4.8					6.8	7.0	Low
B.1 Domestic communal	8.5					8.5		
B.1 Special groups	5.3					5.3		
B.2 Communal latrines		-	15.0	6.3	6.8	9.4		
C. Solid waste management								
C.1 Pit disposal	15.6					15.6	19.4	High
C.2 Bin disposal	-	-	-		-	-		
C.3 Communal disposal		28.0	18.2		-	23.1		
D. Waste management at medical centres								
D.				18.7		18.7	18.7	High
E. Disposal of dead bodies								
E.1 Burial	5.4			-		5.4	5.4	Low
E.2 Cremation	-			-		-		
F. Wastewater management								
F.	9.3		-	-		9.3	9.3	Low
G. Hygiene promotion								
G.	-	-	-	-	-		-	
Area average	8.2	28.0	16.6	12.5	6.8	12.0	**Site average**	
Priority area(s)	Low	V. High	High	Medium	Low			

D A – Dwelling areas; Mkt – Markets; R C – Reception centres; M C – Medical centres; Sch - Schools

Table C4. Summary assessment table (19/03/01)		
Sector	***Score***	***Priority***
Excreta disposal	7.0	
Solid waste management	19.4	High
Waste management at medical centres	18.7	High
Disposal of dead bodies	5.4	
Wastewater management	9.3	
Hygiene promotion	N/A	Very high
AVERAGE site score	12.0	Short-term acceptable level

Summary

In general there is a satisfactory standard of sanitation facilities, services and practices in the camp. According to medical staff the overall health status in the camp is acceptable, with malaria the most prevalent disease. The camp average score is slightly higher than the long-term acceptable level, primarily due to problems concerning solid waste and medical waste management. There is also a need for an effective hygiene promotion programme.

Recommendations

Based on this analysis the following priority sectors were identified: solid waste management, waste management at the medical centre and hygiene promotion. An outline programme design and plan of action were then produced.

C3. Outline programme design

The outline programme design was produced in March 2001, a simplified version is produced below.

The outline programme design for all relevant sectors is presented in Table C5. This includes key activities, a time-frame and responsible bodies for co-ordination of activities (the facilitator). Immediate actions should be implemented within one month.

Table C5. Sanitation plan of action

Area/time frame	*Action*	*Facilitator*
Solid waste management		
MARKET Immediate	■ Excavate pit (1.5m x 2m x 2m) approx. 75m from market along service strip. ■ Recruit workers to clean market, and transport and dispose of waste. ■ Provide overalls, boots, gloves, brooms, spades and wheelbarrows. ■ Provide at least four bins at market. ■ Fill and cover pits at market.	■ World Vision
MARKET Long-term	■ Workers to be paid for one month by World Vision and then from contributions from stall-holders. ■ Pit to be properly managed by regular infilling and combustion of waste when appropriate. ■ New pit to be constructed alongside, once pit is full.	■ World Vision ■ Market committee
RECEPTION CENTRE Immediate	■ Provide bins at reception centre. ■ Train World Vision workers in appropriate collection and disposal.	■ World Vision
RECEPTION CENTRE Long-term	■ Construct new covered pit approx. 100m from dwellings to be used by workers only ■ Close existing pit.	■ World Vision
DWELLING AREAS Immediate	■ Complete communal waste pits (Blocks A-F) and pits for vulnerable households. ■ Train hygiene promoters. ■ Hygiene team to promote respective appropriate use and management of communal pits (A-F) and family pits.	■ MSF Sanitation and Hygiene promotion team
DWELLING AREAS Long-term	■ Monitor use of communal waste pits (Blocks A-F) and compare with effectiveness of family garbage pit programme. ■ Decide on most appropriate long-term solution and continue relevant programme.	■ MSF Hygiene promotion team

	Week starting							
Activity	**26/3**	**2/4**	**9/4**	**16/4**	**23/4**	**30/4**	**7/5**	**14/5**
Recruit staff		*World Vision*						
Provide tools			*World Vision*					
Provide bins			*World Vision*					
Excavate pit			*World Vision*					
Fill old pits			*World Vision*					
Collect levies and pay staff			*Market committee*					

Area/time frame	*Action*	*Facilitator*
Waste management at medical centres		
Immediate	■ Provide uniform and labelled plastic containers with lids for medical waste. ■ Provide uniform and labelled plastic bins for general waste. ■ Collect small plastic medicine containers, glue lids on, make slots, and label for disposal of sharps. ■ Provide uniform and labelled plastic bins for disposal of glassware. ■ Fill existing pit near health post and dig new pit with cover approx. 50m from health post and OPD. ■ Construct sealed sharps pit with restrictive entrance for disposal of sharps containers and glassware only ■ Dispose of existing sharps containers in pit. ■ Locate burner next to general pit and use for medical waste (excluding sharps) only. ■ Train all health staff in new procedures ■ Train cleaning staff in importance of collection, transportation and disposal procedures.	■ MSF Sanitation and Health teams
Long-term	■ Monitor use and seal and replace pit for general waste and pit for sharps when required. ■ Monitor and manage use of placenta burial ground to ensure adequate burial and systematic use of area. ■ Monitor consistency of and advise on waste management procedures at all medical facilities (IPD, OPD and CTC).	■ MSF Sanitation team

	Week starting							
Activity	**26/3**	**2/4**	**9/4**	**16/4**	**23/4**	**30/4**	**7/5**	**14/5**
Excavate general waste pit		*MSF Sanitation*						
Construct sharps pit		*MSF Sanitation*						
Install burner		*MSF Sanitation*						
Fill and cover old pit		*MSF Sanitation*						
Train staff in final disposal			*MSF Sanitation*					
Provide bins and containers				*MSF Logistics/ Health*				
Train health and cleaning staff					*MSF Health*			
Monitor systems			*MSF Sanitation*					

Case study

Area/time frame		*Facilitator*
Hygiene promotion		
Immediate	Train hygiene promoters in following areas: ■ handwashing before food preparation and after defecation to prevent disease transmission; ■ safe water collection, storage and use to prevent disease transmission; ■ importance and design of latrines for safe excreta disposal; ■ importance of cleanliness of environment and solid waste management; and ■ prevention of malaria through appropriate waste/rain water management, and other preventative measures. Promotional methods to include: ■ House to house visits ■ School visits ■ Poster campaigns	■ MSF Sanitation and Hygiene promotion team
Long-term	Hygiene promoters to focus on following activities: ■ Basic hygiene education (covering above areas) ■ School visits for basic hygiene education and to address problems of lack of handwashing facilities at schools ■ Promotion of shallow family garbage pits, sweeping and covering with soil, composting of organic waste on vegetable plots ■ Offering **choice** of family latrines - refugees to dig pits and construct superstructure, MSF to provide technical advice (through hygiene team) and latrine slab (once work completed) ■ Provision of tools and cleaning materials to section leaders ■ Checking and promoting cleanliness of communal and family latrines ■ Monitoring use of communal and family pits	■ MSF Hygiene promotion team

	Week starting							
Activity	**26/3**	**2/4**	**9/4**	**16/4**	**23/4**	**30/4**	**7/5**	**14/5**
Train hygiene promoters			*MSF Sanitation*					
Provide tools, etc.								
House visits								
Poster campaign								
School visits								
Monitor programme								
Monitor practice								