

Environmental Monitoring and Capacity Building for Vector Control Interventions (EMCAB)

USAID IQC No. EPP-I-00-03-00013-00, Task Order no. 12

Uganda IRS Environmental Evaluation Field Report

To: Teresa Bernhard; Health BEO, EMCAB COTR
Gune Dissanayake, Senior Malaria Technical Advisor, USAID Uganda
Dr. Rwakimari, Chief of Party Abt, Uganda IRS Project

From: Susan Anderson, EMCAB Team Leader and Senior Environmental Specialist

Date: October 20th, 2010

Evaluation Dates: September 13th-21st 2010

Evaluation of Environmental Compliance of IRS activities in the Northern Region of Uganda, by the EMCAB Team Leader

Objectives:

The primary objective of the visit was to assist the Uganda Mission to ensure that the Indoor Residual Spraying activities being implemented under the PMI are being carried out in accordance with the Environmental Best Management Practices to ensure Regulation 216 compliance. The visit also allowed the EMCAB Team Leader to provide problem solving support, as may be required, to the USAID Missions and their PMI Implementing Partners and host country counterpart ministries.

Background:

The PMI program began with IRS activities in the western region of Uganda in 2006, where malaria is an epidemic concern, and then moved to the northern region where malaria is endemic. In FY08/09 the IRS program used DDT on a pilot basis in Apac and Oyam Districts. It was found that the target vector has a resistance to DDT, so its use was discontinued. Presently, the program is rotating the use of either the pyrethroid, *Fendona* or the carbamate, *Bendiocarb*.

In September of 2009, Abt took over the IRS activities from RTI. The spray activities take place in 6 Districts: Kitgum, Pader, Gulu, Oyam, Apac, and Amuru. Due to political influences, four of the districts will be divided to form eight Districts, increasing the political coverage to 10 Districts. The geographical area will not expand, but Abt will need to amplify their collaboration efforts with these additional governmental entities.

Spray operations take place every 6 months during the most active transmission period. During the time of the evaluation, spray operations had been completed in the Kitgum and Pader District for this spray cycle, and only “mop up” activities were taking place in Oyam and Apac Districts, therefore the evaluation effort focused on spray operations in Gulu and Amuru Districts.

Summary:

Overall, Abt is doing a very good job at implementing and managing the IRS Uganda program. The storage facilities are in good condition and are well managed, and the spray operators are following BMP practices during spraying and wash-up activities. Most of the problems or risks observed are minor and can easily be corrected by implementing the following:

- Provide neck protection
- Provide replacement visors more regularly
- Provide plastic under the progressive rinse barrels
- Improve storage at the central warehouse
- Ensure appropriate PPE is worn at all times

The program has an ongoing problem with the quality of their spray pumps, and is taking measures to try and fix the existing supply, and improve the quality of future purchases.

Issues that are a greater risk include the appropriate construction of the soak pits, which is the very important for the treatment of all effluent wastes from the IRS activities. The existing soak pits do not have the recommended filter system installed, and should be corrected. Also, there are several evaporation tanks that have been converted into soak pits where the soak pit is buried and outside of fenced in area, this is not acceptable and should be remedied.

A common problem in many PMI countries is identifying solutions for solid waste disposal. The IRS program in Uganda has access to the Gulu Hospital Incinerator, but it has a limited capacity, and does not meet the requirements for incinerating expired pesticides. An incinerator located at Nakasongola Military base may meet the requirements, but access is restricted.

Activities and Findings:

Coordination with Mission PMI and Abt

The EMCAB COTR initiated communication with the USAID Mission in Uganda requesting an opportunity for EMCAB to conduct an Environmental Evaluation during this year's seasonal spray cycle. It was determined that mid-September would be the most appropriate time for this visit, and a Scope of Work and tentative itinerary was prepared and distributed to the mission and the Implementing Partner, Abt. The itinerary was revised based on their recommendations and all activities were collaborated with Abt.

Review environmental compliance documents

All available environmental compliance documents for the IRS program in Uganda were reviewed to gain an understanding of the program specifically for this country. The documents include the following:

- Initial Environmental Examination: Amendment, PERSUAP for RIS for Malaria control in Kabale District, Uganda, March 8, 2006
- Initial Environmental Examination: Amendment, PERSUAP for IRS for malaria control Amended Face Sheet, January 24, 2008
- Memorandum, Notification of change in insecticide in Apac and Oyam, July 23, 2009
- SEA for PMI, - IRS for Malaria Control in Uganda using Carbamate and Organophosphate Pesticides, March 25, 2010

Once in country, initial meeting PMI USAID

The EMCAB Team Leader met with the Senior Malaria Technical Advisor, Program Managers, the MEO and the PMI Team Leader, to review the goals and objectives of the evaluation, and to discuss the specific issues and concerns of the Mission.

Name	Title
Gunawardena Dissanayake	Senior Malaria Technical Advisor
Joel Kisubi	Program Management Specialist - Malaria
Patrick Okello	Program Management Specialist - Malaria
Danielle Tedesco	Mission Environmental Officer
Megan Rhodes	Health Team Leader

The PMI team works closely with Abt and is overall pleased with their implementation of the IRS program. There are only a few concerns and the PMI team is working with Abt to try and identify solutions. These issues include the following:

- The quality of the more recently purchased pumps have been poor, with an issue of leakage on various parts of the spray pump.
- Pilferage of the water soluble pesticide packets.

- The checklist in the BMP Manual is too comprehensive for typical use in the field and should be simplified and reworded
- Improve NEMA and DEO involvement

The previous year, there was a substantial quantity of solid wastes from the DDT spray cycle. Through careful and comprehensive investigation, USAID and Abt identified the best solution for disposing the expired pesticide and contaminated solid waste, and shipped the waste to South Africa to be incinerated (approximately 33,000 KG of pesticides and 1.3 ton of solid wastes were shipped in two chartered planes for \$200,000 - for more information for the costs and steps taken during the disposal process, please contact PMI Uganda). Existing evaporation tanks in Apac and Oyam Districts from the DDT wash activities have been either abandoned or converted into soak pits. Several of these tanks were visited as part of the field evaluation.

Coordination meeting with IRS Implementing Partner Abt

Following the meeting with USAID, the Team Leader met with Abt to discuss their specific issues and concerns and also to discuss the objectives and itinerary of the field evaluation.

Name	Title
Dr. J.B. Rwakimari	Chief of Party
Ranjith de Alwis	Senior IRS Advisor & Entomologist
David Rothschild	Deputy Chief of Party – Finance & Administration
Allan Were	Deputy Chief of Party – Operations and Communications

Abt had two of their team, Ranjith de Alwis and Tito Okwalinga, attend the EMCAB Workshop in Kenya, so they are familiar with the evaluation process and expectations. Abt is proposing to give an environmental evaluation workshop for the District Environmental Officials based on the EMCAB workshop.

A main concern for Abt is the quality of the spray pumps where they have found that a large quantity leak at several different locations. They are trying to address the problem by checking each and every pump, adding sealants at leak prone locations and replacing any damage parts. They also voiced a concern over the few instances of pilferage, and are identifying means to limit this problem.

Informational Meetings with Government Agencies:

- National Malaria Control Programme (NMCP) MOH

Name	Title
Dr. Seraphine Adibaku	Programme Manager

Michael Okia	Deputy Manager, Senior Entomologist
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Dr. Adibaku is pleased with the IRS activities would like to scale up operations. He would also like to study the effectiveness of IRS and ITN combined. After discussing the issue of identifying an incinerator to dispose of the IRS solid waste, Dr. Adibaku was interested in a mobile incinerator as he felt it would be an appropriate solution to many solid waste issues throughout the country. Dr. Rakimari worked at the MOH previously, so Abt has an excellent relationship with the NMCP.

- National Environmental Management Agency (NEMA) MOE

Name	Title
Christine Kasedde	Environment Impact Assessment Officer
Gerald Musoke Sawula	Deputy Executive Director
Dick Lufafa	Environment Impact Assessment Officer

Dick Lufafa attended the EMCAB Workshop in Kenya, and is familiar with the evaluation’s goals and objectives. Dick and the other members of the staff were invited to participate in the field visits, but had other obligations.

Gerald Sawula was interested in the IRS environmental evaluation and asked that he receive the field report. He is happy with the IRS progress and is interested in moving into other districts. The deputy director preferred the use of DDT, as he felt it was more effective, as was surprised that resistance was an issue. He requested that Abt work closely with the NEMA team and provide periodic environmental monitoring reports.

- Awach Subcounty Council (local authority)

Name	Title
David Ocora	Chairman

The local authority identifies the Village Health Team (VHT), who are volunteers and also the spray operators, team leaders and store managers implementing the IRS program. The Chairman is happy with the IRS activities overall. He noted a concern about the distances that the spray operators need to travel on their bicycles, stating that it is often too far. There was also a concern with ducks/chickens eating the cockroaches as they fled the houses being sprayed, and preferred the Carbonate, as it has a “knockdown” effect which doesn’t allow the insects to flee.

Field visits to IRS activities

The field visits were carried out with support from Abt and USAID. Tito Okwalinga, Abt Environmental Compliance Officer and Gune Dissanayake, IRS COTR, accompanied the Team Leader to the IRS operations in the Gulu District. The key areas that for the evaluation include the following:

- Management and supervision
- Worker health and safety
- Storage and stock control
- Transportation
- Spraying Techniques
- Wash activities
- Waste disposal (effluent and solid)

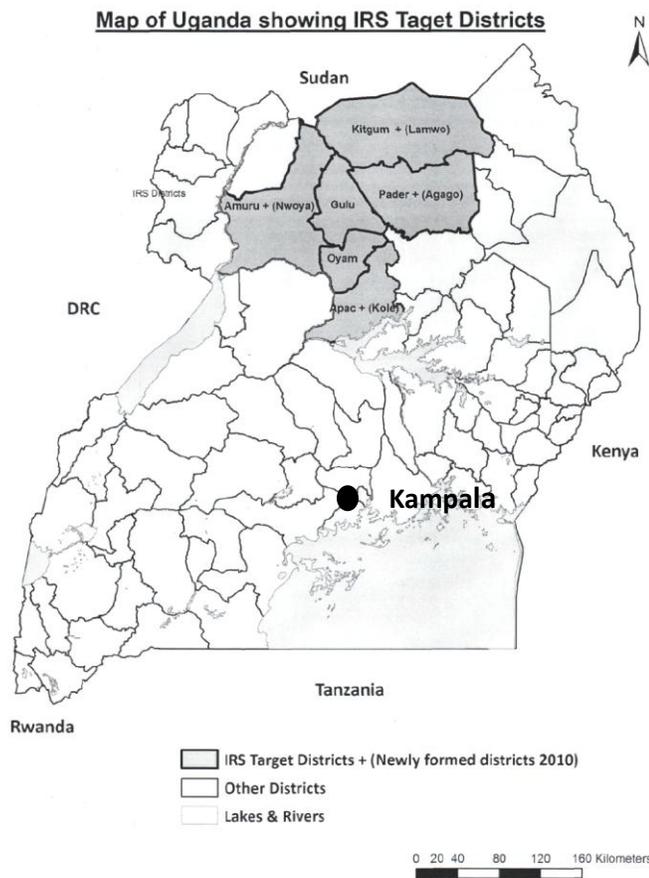


Figure 1. Map of Uganda showing IRS Districts (courtesy of Abt)

Findings and Recommendations

Management and Supervision

- Overall, there is good management and supervision at each level of operations. Though in situations where the BMPS were not being implemented (such as not wearing gloves during wash-up activities), closer supervision at the sub-country supervisor level (who are government employees) would help spot and correct any these discrepancies.

Recommendation: One way to facilitate this is to provide a basic checklist to the supervisors that could be used periodically to help identify any problems, and remind the workers of the appropriate BMPs. The checklist should be prepared and the supervisors trained on it use for the next spray season.

- The communities are receptive to the IRS activities. Abt has hired a contractor, CDFU, to conduct the IEC and is happy with their work.

Storage and stock control at the Central Warehouse and Parish storage facilities:

Storage:

- Abt currently is storing everything in one central warehouse in Gulu, then dispersing the pesticide and stock to each Parish storage facility. The warehouse is in good condition and meets the structure BMP requirements. It is also managed very well with a thorough accountability system. Some concerns is that the stored stock is a little crowded and stacked too high for some supplies, cardboard boxes are flush against damp walls, and there are too few isles to keep track of the condition of the stock (to check on spills, roof leakage, etc). Abt is looking for storage facilities in each District, which will help alleviate the crowding at the Central warehouse and reduce the travel distances to the Parish facilities. They are also aware of the storage problems and propose to add shelving and other improvements.
- The Parish storage facilities are in good condition and the store managers are doing a good job at managing the stock and keeping everything organized. The store manager works closely with the spray team leaders during daily start up activities and end of day activities, ensuring that the facilities run smoothly.
- All store keepers were wearing appropriate PPE
- All facilities are well signed with warning signs, have a single lock, 24 hour guard, and a wire fence with a gate. The Central warehouse has fire extinguishers while the parish storage facilities have a bucket of sand with a shovel. All storage facilities have first aid kits.

Stock Control:

- There is good stock accountability and record keeping at the Central Warehouse facility. All stock that is sent to each Parish facility is recorded at the start of each spray cycle.

Recommendation: To help facilitate the accounting of specific stock, there could also be a record for each type of stock (ie: gloves – number and date bought, number and date dispersed to each Parish, number and date returned at end of spray cycle, etc.). This can be done for next season spray activities.

- There is good accountability and record keeping of pesticide sachets at the Parish level, from dispersal to collection at the end of the day. Each Parish store manager counts out and documents the required number of sachets to be distributed to the Spray Leaders, who in turn counts out and documents the sachets allocated to each spray operator. At the end of the day, the process is repeated and the used and unused sachets are collected and recorded.

Transportation:

- Abt has studied the situation and have found that bicycles are the most efficient and economic way to access the spray sites, as each spray operator can easily ride directly to each house that usually is only accessible by a foot path. Each spray operator is responsible for providing their own bike, and receives a 2000 Ush (about \$1) daily stipend for maintenance. All spray operators are from the same Parish as the respective spray operations, so distances are minimized. Abt provides trucks for the few sites that are too far to travel to by bike. Each worker securely straps the spray pump to the back of the bike and their appeared to be no spillage or compliance issues with this mode of transportation. During interviews with the spray operators, a few complained that the distances were too far and preferred being given a ride to the spray sites.
- There were no first aid kits that accompanied the spray operators.

Recommendation: It was recommended that the Team Leader carry a small first aid kit in a portable bag. This should be done immediately.



Photo 1: Bicycle transportation

Spray Operations:

- Overall the spray operators were wearing appropriate PPE and were proficient in knowing the proper spray techniques. One item that was lacking was neck protection, but no one had any problems with skin irritation. Some of the PPE were quite large on small sized workers – small stature workers should be considered when ordering PPE equipment.

Recommendation: To ensure no skin is exposed, appropriate neck protection should be purchased and distributed immediately.

- Since the spray operators were from the region, they had good relationships with the beneficiaries. They discuss the spray activities before beginning operations with each resident, and inform them of the health and safety measures. Before spraying, they show the resident the contents of the spray pump, to assure them that they were using pesticides (and not just water – it is also another means to regulate pilferage of spray packets). Afterwards, the spray operator completes the tracking form and has the resident sign to ensure the information is correct. These are then collected by the Team leader at the end of the day.

- The operator sprays the walls, thatch roofs and outside under the eaves. Several inadequate practices were observed during the spraying of the eaves (leaning over with the spray pump so air entered the valve, not removing all livestock from under the eaves, not controlling livestock access during spraying, no special procedure if conditions are windy, etc). The existing BMP manual does not cover best practices for spraying under the eaves.

Recommendation: Supplemental BMPs should be developed that cover this activity. EMCAB is proposing to prepare these BMPs for distributing to the implementing partner by next season's spray cycle.

- A few of the spray nozzles were observed leaking.

Recommendation: All spray pumps should be carefully maintained to avoid leakage. Spray nozzles should be repaired in the field when possible.

- The visors became cloudy and scratched, making it difficult for the spray operators to see. No mishandling was observed.

Recommendation: New visors should be made available regularly for next season's spray activities.



Photo 2: Spraying under the eaves

Clean-up Facilities and wash up activities:

- All wash facilities/soak pits are located adjacent to the parish storage facilities.
- Good signage is located on the gates to all wash-up facilities. Warning signage has been printed in the two different dialects relative to the regions where IRS activities are taking place. The signs have the local dialect on one side, with English on the other.
- The soak pits have solid fencing and gates, and are well laid out for ease of access to progressive rinse and follow-up washing in the soak pit.
- All progressive rinse barrels were ready for wash activities before the spray operators arrived. At several locations there was only a small amount of water in the even numbered barrels. One worker in charge of filling the barrels said that it was easier to fill them as needed as she had to share the water source with families and had to wait her turn.

Recommendation: It was recommended that they fill the barrels further so they wouldn't need to add water during the rinsing activities. This would also allow for a more accessible water level so the spray operators would not have to lean down into the barrel to retrieve water.

- While conducting the progressive rinse, the sprayers did not take care to ensure that effluent did not splash outside of the barrel. This was most noticeable around the first barrel that contained left over pesticide from the day activities, as there was white residue on the ground. In some instances, the spray pump was still under pressure when the nozzle was removed, causing the effluent to spray with force and often splashed out of the barrel.

Recommendation: It was recommended to add a sheet of plastic to catch this over splash under the barrels, which can then be drained into the soak pit. Plastic should be purchased and distributed immediately. Sand could be added over the plastic to help absorb larger quantities of effluent, which can then be discarded in the soak pit at the end of the spray cycle. Also, during the progressive rinse, the nozzles should not be removed while the spray pump is under pressure. The supervisor and team leaders should make sure the operators are more careful during the progressive rinse process.

- The first barrel that contains the left over pesticide from the days spray operations must be securely covered at the end of each day. Once operations are completed, additional planning is needed to identify a nearby building where this pesticide can be effectively used up.
- In general, the spray operators implement the appropriate wash up practices, and efficiently cleaned off their spray pumps, boots, gloves, visors and tarpaulin in the soak pit after the progressive rinse. One team was observed not using their gloves during these operations, and when reminded, quickly put them back on. This is an example where regular use of a checklist would remind a supervisor to ensure everyone was following the BMPs.
- All washed overalls are hung over the soak pits to dry. Two sets of PPE are available for each spray operator, and the PPE that was worn that day is washed at the end of the day.
- Private wash areas are provided for the spray operators.



Photo 3: Over splash during progressive rinse



Photo 4: Improper soak pit filter

Waste disposal:

Effluent Waste:

- All pits seemed to be functioning appropriately. The soak pits do not have a concrete edge, but the top of the pit was lower than ground level, so there appeared to be no overflow. In several locations the pits do not have the recommended layers of saw dust, charcoal, and a series of different sized rock/gravel. Most contained a local, red rock, and in some locations, the pits contained broken clay bricks and leftover concrete.

Recommendation: It was recommended that a charcoal layer be added for next season’s spray activities. Due to the possibility that the existing filter material is contaminated, when excavated to allow for adding the charcoal, it should be placed on a plastic sheet and then reused in the pit. Any new pits should be constructed with the appropriate materials.

- There are 7 evaporation tanks in the Oyum District, all of which have been abandoned. There are 15 evaporation tanks in Apach District, six of which have been converted into soak pits. The abandoned soak pit that was observed during the field visit has started to crumble and does not appear to have any remaining DDT solids. The converted evaporation tanks have two different designs. Initially a square of concrete was removed from the base of the tank to allow for constructing a soak pit. Due the difficulty of removing the existing concrete, Abt opted to add a drain pipe which then drains to a soak pit off to the side. This is OK if done properly. At the site visited, the soak pit was buried and located outside of the fenced in area. During the field visit it was difficult to verify if there even was a soak pit at the site.

Recommendation: This should be remedied by either constructing an appropriate soak pit and extending the fence, or removing the concrete in the tank and constructing a soak pit in the middle for next season’s spray activities.



Photo 5: Abandoned evaporation Tank



Photo 6: Converted evaporation Tank

Solid Waste:

- All solid wastes were stored in empty pesticide plastic barrels. Used face masks and sachets were stored in separate, labeled barrels.

Recommendation: The team leaders or store managers should always wear gloves when handling used face masks and empty sachets collected from the spray operators at the end of the day.

- There is a stock pile of motorcycle helmets that were mistakenly ordered for previous spray cycles that need to be disposed of.
- There is a growing pile of solid waste stored in a central warehouse from the year's spray operations. Abt has previously used the Gulu hospital incinerator, but it was not in operation at the time of this visit. The team visited the incinerator to determine if it met the IRS criteria. The incinerator was donated by the British High Commission on September 1998. It is a Techtrol C25 clinical incinerator and is housed in a small brick structure. It hasn't been maintained and there were several bags of hospital wastes stored around its base.

Recommendation: The Techtrol company was contacted to determine if the incinerator would meet IRS specifications. Unfortunately it does not for expired pesticide incineration, however, it probably could be utilized to incinerate other wastes such as masks and empty sachets, though the capacity is limited and would require incineration small batches. (See Appendix A for incinerator specifications.)

An alternative incinerator is located at the Nakasongola Military Base, between Gulu and Kampala. The specifications for this incinerator were not available, but it is believed to meet IRS requirements. Concerns for this incinerator are that it would require transporting the wastes long distances. Also the military allows access only to specific agencies, would not allow Abt or USAID to oversee the operations. One option is to request the National Drug Authority (NDA), who would be allowed access, to incinerate the wastes at the end of the spray season.

Recommendation: Verify the incinerator meets specification before use.

- There is a substantial amount of expired ICON lambda-cyhalothrin from previous spray cycles that need to be incinerated.

Recommendation: If the Nakasongola incinerator is used to dispose of it, measures should be taken to avoid pilferage. Another option is to request the manufacturer of the pesticide to dispose of it appropriately.



Photo 7: Gulu Hospital Incinerator

EMCAB Follow-up

- Final Field report with findings and recommendations.
- EMCAB is available to help the Uganda Mission and Abt prepare more user friendly checklists.
- Supplemental BMPS will be prepared for the next spray cycle that will address spraying under the eaves outside of the house. The Implementing partner, PMI Mission and USAID will be requested to provide recommendations, and also take part in the review process.
- Specifications for the Hospital incinerator are included in this document. Additional information for Portable Incinerators will be made available upon request.
- EMCAB is available for follow-up evaluations during 2011 spraying rounds.

Debriefing

The Team Leader prepared a power point presentation with a summary of the findings and recommendations, which was presented at the end of the visit to the Abt Team and also to USAID.

The debriefing allowed Abt to respond to the findings and provide additional information (this information has been included in the Findings and Recommendations section).

Name	Title
Gunawardena Dissanayake	Senior Malaria Technical Advisor
Joel Kisubi	Program Management Specialist - Malaria
Patrick Okello	Program Management Specialist - Malaria
David Eckerson	Mission Director
Janex Kabarangira	Program Management Specialist/Deputy Team Leader Health

The following are the discussion points from the debriefing presentation:

Purpose of visit:

- To conduct an independent evaluation of the environmental compliance requirements for IRS activities.
- With support from the USAID PMI program and the Implementing Partner Abt.

Activities:

- Document review: IEEs, PERSUAP, SEA
- Meetings: PMI team, NMCP, NEMA, available sub-county government officials
- Field Visits: Gulu spray activities, Oyum and Apac evaporation tanks, Gulu hospital incinerator

Key areas of interest:

- Management and supervision
- Worker health and safety
- Storage and stock control
- Transportation
- Spraying Techniques
- Wash activities
- Waste disposal (effluent and solid)

Positive Observations:

- *Good collaboration with MOH, local government, military*
- *Good IEC and interaction with the beneficiaries*
- *Good storage facilities and management of stock*
- *Good management of spray personnel*
- *Good accountability of pesticide from distribution to collection at end of the day*
- *Spray operators followed BMP (spraying techniques and PPE) and record keeping practices*
- *Overall good wash up practices*
- *Good waste management*
- *Good warning signage at all facilities*

Findings and Recommendations

Minor problems:

- Storage layout in facilities can be improved
 - Allow passage between stock, do not stack too high (should be corrected for next season's spray activities)
- Supervisors need to catch minor infractions
 - provide checklist to supervisors (for next season's spray activities)
- Distances for spray operators to travel by bicycle
 - Provide transportation for long distances
- No neck protection
 - provide neck protection (for next season's spray activities)

- Excessive splash/splattering out of barrels during progressive rinse – noted chemical on ground around first barrel
 - Need to provide catchment for splash during progressive rinse, especially under first barrel (immediately)
 - Should improve progressive rinse techniques (immediately)
- Need to ensure leftover pesticide is securely covered at end of day
- Wearing full PPE (gloves)
 - Supervisor should catch minor infractions (at all times)
- Spray pump leakage
 - Abt is aware of this and trying to repair and maintain all pumps

Greater risks:

- Spraying outside under eaves
 - Need supplemental BMPs for this situation (for next season’s spray cycle)
- Soak pits do not have charcoal filter, some stone filter is suspect
 - Need to add charcoal and can replace with appropriate stone at same time (for next season’s spray cycle)
- Solid waste disposal
 - Identify incinerator that meet requirements (by end of yearly spray activities)

Additional findings

- DDT Evaporation Tanks - abandoned or converted to soak pits

EMCAB Follow - up

- Evaluation Field report will be completed in two weeks
- Help revise checklists
- Help prepare supplemental BMPS where needed
- Requested specifications from manufacturer of hospital incinerator (Techtrol)

Evaluation Itinerary:

Date	Time	Activity	Contact/Location
Sunday, September 12, 2010	20:00	Arrive in Kampala	
Monday, September 13, 2010	09:00-10:00	Meeting at USAID PMI team	PMI team, MEO, Health Team Leader/ USAID
	10:30	Meeting with Abt	Kampala office
	15:00	Meeting with NMCP	Program Deputy Director/NMCP
Tuesday September 14, 2010	10:00-11:00	Meeting with MOE/NEMA	NEMA Office
	12:30	Depart for Gulu	
Wednesday September 15, 2010	All day	Visit parish storage facilities, start up activities, transportation, and spray operations	Tito Okwalinga, Abt Environmental Compliance Officer / Bar-dege, Awach

Thursday September 16, 2010	All day	Visit central storage facilities Visit parish wash-up facilities and operations	Tito Okwalinga Gune Dissanayake / Gulu and Koro
Friday September 17, 2010	8:30	Meeting with Abt field team	Gulu Office
	9:00	Visit Gulu Hospital Incinerator	Tito Okwalinga
	10:00	Visit Evaporation Tanks	Tito Okwalinga/ Oyam and Apac District
	21:00	Return to Kampala	
Saturday September 18, 2010		Prepared Debriefing Presentation	
Sunday			
Monday September 20, 2010	10:00-11:00	Debriefing with Abt	Kampala Office
	14:30-15:30	Meeting with NMCP	Program Manager
Tuesday September 21, 2010	10:00-11:00	Debriefing with USAID	PMI Team, Mission Director/ USAID
	21:30	Depart for Washington DC	

Appendix A



TECHTROL



pyrotec clinical no. 1/1

design

The Pyrotec C is a modern incinerator designed to burn solid waste in a clean and environmentally safe manner. Using the Pyrolytic principles of combustion, it is particularly suited for a wide range of waste material. This model is specifically for burning clinical waste from hospitals and research centres and is equipped with the necessary sophistication of control, secondary chamber volume, manual or automatic loading options and chimney.

models

C25, C50, C75 and C100.

standard

BS3316, 1987

Secondary chamber residence time :- 0.5 seconds at 800°C to 1,000°C

waste type

Clinical waste

Calorific value 4,000 KCal/Kg, density 50 to 100 Kg/m³.

construction

Mild steel fabricated construction using 6mm steel plate suitably braced and stiffened.

refractory

Primary Chamber

Hot face material 1,400°C quality 76/115mm thick, backed by 50/76mm of Calcium silicate insulation.

Secondary Chamber

Hot face material 1,400°C quality 76/115mm thick, backed by 50/76mm of Calcium silicate insulation.

fuel

Natural gas, LP gas or 35 seconds fuel oil.

electricity

220/240 Volt. 1 phase. 50/60Hz - manual loading.

380/440 Volt. 3 phase. 50/60Hz - automatic loading.



burners

Automatic package burners complete with electric ignition and flame failure control complete with all necessary valves, motors and integral continuous running fan. Time clock or temperature controlled (automatic loading) to provide optimum combustion conditions, secondary chamber temperatures and fuel economy.

Primary Chamber

one @ 100,000 KCal/Hr on/off control.

Secondary Chamber

one @ 200,000 KCal/Hr on/off control, (high/low control, automatic loading).

fans

All combustion and cooling air is provided by manually adjusted or automatically controlled (automatic loading) centrifugal fans which provide air to nozzles strategically located throughout the combustion chambers to ensure optimum conditions.

finish

Two coats of primer followed by two coats of enamel finish in burgundy.

control panel

Automatic control system built to IEC Standards incorporating PLC controller, as necessary, providing all automatic plant functions and incorporating the following sequences.

1. Preheat
2. Burn cycle
3. Automatic loading (when fitted)
4. Burndown
5. Cooldown

The control panel will be equipped with an active mimic diagram showing operating status of the plant together with temperature indication of primary and secondary chambers (automatic loading). Manual loading, temperature indication only.

manual loading

Front mounted hinged opening door complete with safety interlock and observation port.

automatic loading

Hydraulically powered automatic fully sequenced ram loader designed to operate in unison with the incinerator operation with programmable time and temperature operating sequence to ensure maximum throughput. Water sprays around the loader throat to quench the ram face following each loading sequence.

ash removal door

Located to give access for ash removal from the main combustion chamber a refractory lined hinged door with locking handle will be provided.

chimney

Incinerator mounted manufactured from mild steel and lined with 65mm of 1,400°C refractory.

alternative chimney

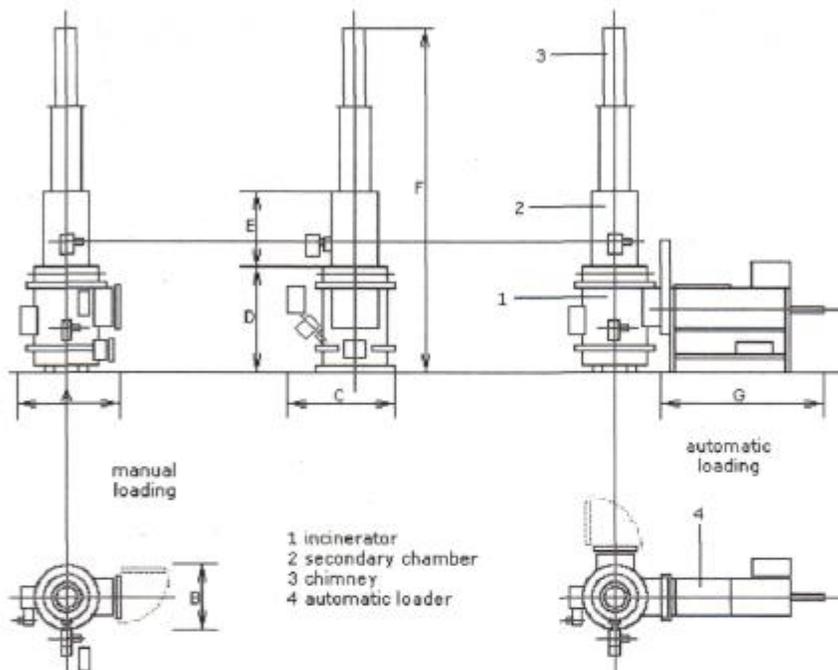
When an existing or steel floor mounted chimney is to be used, exhaust gases will be cooled to 400°C using a blower fan and cooling chamber prior to chimney entry.

wiring

Electrical wiring will be carried out in PVC covered cable, run on cable trays.

fuel piping

Fuel piping between the burners will be completed terminating in a single connection point on the incinerator.



Pyrotec Model	Capacity		Dimensions (m)							Chimney internal diameter (m)	Manual loading door size (m)	Ash door size (m)	Auto loader size (m ²)
	Kg/Hr	Thermal KCal/Hr	A	B	C	D	E	F	G				
C25	25	100,000	1.50	1.20	1.78	1.50	0.80	8.00	-	0.25	0.50 x 0.43	0.40 x 0.25	-
C50	50	200,000	1.68	1.38	1.90	2.00	1.22	8.00	3.00	0.36	0.75 x 0.60	0.50 x 0.30	0.25
C75	75	300,000	1.98	1.70	2.20	2.00	1.50	8.00	3.00	0.40	0.75 x 0.60	0.50 x 0.30	0.25
C100	100	400,000	2.08	1.80	2.30	2.20	1.50	8.00	3.30	0.46	0.75 x 0.60	0.50 x 0.30	0.50

Note :-
Burning capacities are based on waste having a calorific value of 4,000 KCal/Kg.
Our specifications are subject to alteration due to our continuous product improvement policy.