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IMPROVING MEDICAL WASTE MANAGEMENT

PALESTINIAN HEALTH SECTOR REFORM AND DEVELOPMENT PROJECT (THE FLAGSHIP PROJECT)

SHORT-TERM TECHNICAL ASSISTANCE REPORT

Prepared by:
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Contract No. 294-C-00-08-00225-00

August 2009

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CONTENTS

ACRONYMS

HCF(s)	Health care facility/facilities
HCW	Health care worker
MoH	Ministry of Health, Palestinian Authority
TDY	Temporary Duty
UNDP	United Nations Development Programme
WHO	World Health Organization

SECTION I: BACKGROUND

The Flagship Project is a five-year initiative funded by the U.S. Agency of International Development (USAID), designed, and implemented in close collaboration with the Palestine Ministry of Health (MoH). The Project's main objective is to support the MoH, selected non-governmental organizations, and selected educational and professional institutions in strengthening their institutional capacities and performance to support a functional and democratic Palestinian health sector able to meet its priority public health needs. The Project works to achieve this goal through three components: (1) supporting health sector reform and management, (2) strengthening clinical and community-based health, and (3) supporting procurement of health and humanitarian assistance commodities.

The MoH highlighted improving its medical waste management as a key priority area during its 2008 self-assessment, and in its Institutional Development Plan. This assignment is an initial step in a continous process to improve medical waste management at MoH health facilities. The consultant developed an assessment tool and assessed 7 MoH and NGO health facilities. In this report, the consultant identified key factors that are essential to a functioning medical waste management system, as well as potential practices and models currently being implemented in the Palestinian territories, to be replicated at other facilities.

This report contributes to Flagship Project Component 3, Objective 3.1 of the Flagship Project: Supporting procurement of health and humanitarian assistance commodities; Task 3.1.1: Provide essential health commodity inputs to support successful implementation of institutional development work plans; and the following deliverables:

3.1.1.3 Conduct a medical waste management assessment for the Ministry of Health and each beneficiary NGO.

3.1.1.4 Develop a medical waste management technical assistance and mitigation plan for the MoH and each beneficiary NGO.

3.1.1.5 Prepare an annual medical waste management monitoring report for each beneficiary organization.

SECTION II: INTRODUCTION

The term medical waste refers to items generated from healthcare practices, including, blood and blood products; used needles and syringes; laboratory wastes, such as blood draw tubes, cultures and specimens; pathology wastes, such as tissue, placentas, recognizable body parts, and surgical and autopsy specimens and wastes. These items, when disposed of improperly, breed infectious organisms, attract animals and vermin and can contaminate the human and animal populations through contact with infected organisms, animals or vermin.

Medical wastes must be segregated from regular solid wastes and treated prior to disposal. Segregation requires separate containers that are labeled and designated for collection of medical wastes. Designated, labeled bags are necessary to line the containers, prevent a leak of the contents and thus contamination of the containers, allow ease of transfer from the container to a point of consolidation, and contain wastes during treatment. Once the medical wastes are accumulated, they must be routinely taken for treatment, whether on-site or off-site, to render them non-infectious. The most common forms of treatment include autoclave and incineration.

Proper waste management is recognized as a one of the three critical public health cornerstones (sanitary food and water supplies are the others). Without proper waste management, disease can be quickly introduced into the general population from contact with animals and other vectors and contamination of soil and water supplies. Medical waste management is the piece of solid waste management that includes potentially infectious and biological components from healthcare facilities. These include such things as blood and blood products, dressings and blood-soaked items, pathology tissues and specimens, and used needles and infusion bags.

Several studies assessing medical waste management from the World Bank and the United Nations Development Programme were completed for the West Bank and Gaza Strip between 2006 and 2009 (Annex E) along with recommendations for implementing a medical waste management program for the healthcare facilities (HCFs) within these regions.

During the TDY, representatives from every health facility and from the MoH all echoed the need for an effective medical waste management system in the West Bank/Gaza. To date, some progress was observed toward an implementation of a medical waste management program. However, additional work needs to be completed in order for a comprehensive, uniform medical waste management program to be successfully implemented. A structured program must be developed and implemented at each healthcare facility, including written and adopted MoH by-laws, regional treatment facilities, and development of a program by each HCF including a formal inspection program to determine compliance.

SECTION III: ACTIVITIES CONDUCTED & METHODOLOGY

The consultant worked closely with the Flagship Project and MoH staff during the period August 3-14, 2009 to determine the level of participation in a formal medical waste management program, the types of medical wastes produced, the methods of segregation, collection and disposal, and treatment practices.

Initially, meetings were conducted with the Flagship and MoH staff assigned to medical waste management Institutional Development Plan focal teams. These meetings facilitated an understanding of activities completed to date, the barriers to progress, and anticipated future activities for medical waste management in the West Bank. During these meetings, site visits were also planned for selected MoH and NGO health care facilities.

A Medical Waste Management Checklist (see Annex F) was developed to standardize the parameters to be assessed and to characterize the level of medical waste management performed by each HCF. Items assessed also included:

- Level of training of healthcare workers (HCWs);
- Designation of Medical Waste Officer (MWO);
- Written medical waste management program;
- Availability of separate medical waste containers with labeling and yellow-colored biohazard bags;
- Segregation of medical wastes (e.g., sharps, biohazardous waste) from solid waste; and
- Disposal practices.

A list of HCFs was obtained from the MoH and using the Checklist, site assessments were then performed at selected HCFs to determine the level of participation in a formal medical waste management program.

Each HCF included in the assessment was characterized for the following parameters. These parameters were identified because they influence both the rate and types of medical wastes generated.

- *Owner of HCF*: Determine if the HCF was owned by the MoH, NGO, or a Private organization. This will help to clarify the area of responsibility for each facility.
- *Number of beds*: This can be used to calculate an estimated medical waste generation rate.
- *Availability of specific services*: These can contribute to the overall medical waste generation rate of the HCF.
    - Perioperative or Surgery
    - Emergency
    - Obstetrics
    - Laboratory
- *Types of specialty services* (e.g., Pediatrics, Orthopaedics, Intensive Care)

- *Average number of surgeries performed per month*
- *Average daily census*
- *Average monthly clinic visits*

With the information generated from this assessment, medical waste was quantified by municipality and region. This information was used to understand where medical waste is produced and identify possible treatment and disposal facility locations. Based on the information listed above, the annual volume of medical wastes produced by each HCF and municipality were calculated, based on the following assumptions:

- 1.3 kg / in-patient / day
- 100 g / outpatient visit

SECTION IV: FINDINGS, RECOMMENDATIONS, AND NEXT STEPS

A. Findings

Site Visit Observations

During the individual site visits, interviews with healthcare workers, and meetings with Flagship Project and MoH staff, the following observations and findings pertinent to medical waste management at HCFs in the West Bank were discovered.

- Medical waste management is recognized as a public and environmental health problem by the MoH, individual healthcare organizations, and the community at large.
- Most HCFs are segregating sharps and infectious medical wastes from regular trash. However, the hospital facilities report that supplies of materials (e.g., yellow bags, red & yellow sharps buckets) are not consistently available for their use.
- Although medical wastes are segregated from other wastes, there are few, if any, treatment options for disposal. Some HCFs have on-site treatment; however, this is approximately 10% of the overall number of HCFs. Therefore, because of the lack of treatment options, medical wastes are usually combined with refuse and taken to the local open dump for disposal without first being treated.
- Laboratory chemicals are disposed down the drain into the sewer. In one case, the hospital was on a septic system rather than connected to the sewer system. When the site visit was conducted, the septic system was not functioning properly and several leaks were observed from the aboveground pipes that connected the liquid waste flow to the septic tank. This means that chemical and biological wastes were discharged directly onto the ground.
- Pathological wastes (tissue, body parts, placentas) are not treated prior to disposal. For instance, placentas are often reported to be triple bagged at the hospital facility. Because of lack of treatment options, these wastes are usually sent to the open dump and animals have reportedly been seen eating these wastes.
- In a UNDP report, it was recommended to restrict people from accessing the dump for their safety. However, to date, this has neither been implemented nor enforced. Because of this situation, each hospital facility that was interviewed wants their sharps to be incinerated out of concern for the public's health.
- Most hospital laboratories have a small autoclave where they treat what they define as infectious wastes (e.g., plates, cultures, blood draw tubes) prior to disposal.
- The MoH has a negative opinion of incineration technology due to complaints from the community about emissions, such as odors and smoke, from existing incineration units.

Health Care Facility Assessment Findings

The summary of findings from the health care facility assessments are presented in the table below. A copy of the facility assessment tool is included in Annex F. *Table 2: Healthcare Facility Site Assessment Summary*

Facility & Location	Date of Assessment	Number of Beds	Estimated Annual Medical Waste Volume (kgs)
Alia Hospital, Hebron	25-Aug-09	195	To be supplied
Augusta Victoria Hospital, Jerusalem	27-Aug-09	170	To be supplied
Bethlehem Arab Society for Rehabilitation, Bethlehem	07-Aug-09	70	To be supplied
Holy Family Maternity Hospital, Bethlehem	07-Aug-09	47	To be supplied
Makassed Hospital, Jerusalem	27-Aug-09	232	To be supplied
Rafidia Government Hospital, Nablus	11-Aug-09	168	To be supplied
Ramallah Government Hospital, Ramallah	05-Aug-09	155	To be supplied

Pilot Medical Waste Program

In 2007, a pilot medical waste program was implemented at Ramallah Government Hospital. The consultant conducted a site visit on August 5, 2009 with the following observations:

- Yellow biohazard bags, red/yellow sharps buckets, and yellow tote containers were used for containing medical wastes.
- Biohazard labels were available to affix to yellow bags for the purpose of identifying the facility and date of disposal.
- Signage was posted in the laboratory for staff awareness to indicate the correct disposal method for different waste streams.
- Wisam El Khalili, an administrator at the facility, was assigned to be the Medical Waste Officer (MWO) and the responsibility for medical waste.
- Training had been conducted for the healthcare staff with some success. However, Mr. El Khalili reported that there was inconsistent compliance with the program.
- Mr. El Khalili reported that medical wastes will be taken in the future to the Bahrain Pediatric Hospital for treatment in the facility's autoclave. However, the facility is not currently operating. After conducting a site review of the new autoclave and observing a demonstration of the handling process, the following observations were made:
    - The yellow wheeled containers will be taken to a secured common storage area outside of the facility.
    - A new forklift was observed and indicated to be used in the future to transport the yellow medical waste containers on pallets across the street to the autoclave facility.

- At the autoclave facility, wastes were demonstrated to be taken out of the yellow medical waste containers and placed into a second clear autoclavable bag using a metal stand to hold the autoclave bag. This process was performed for two reasons:
    1. To contain all medical wastes as some of the items placed in the yellow medical waste containers were not contained in a yellow bag or sharps container.
    2. To indicate that the wastes have or have not been treated.

- The autoclave is not currently in operation. It was reported that the electricity has not been turned on to the unit.
- The autoclave was used several times for testing purposes. During these tests, it was discovered that the clear autoclave bags did not withstand the autoclave manufacturer's time and temperature cycle of 137° C for 20 minutes and burst before the cycle ended. This resulted in loose medical waste items inside the autoclave.
- A second test was conducted on the autoclave with a reduced temperature of 121° C for an extended cycle time of 45 minutes. The autoclave bags did withstand this test cycle.
- Upon inspection of the autoclave's exhaust stack at the roofline, it was determined to be located immediately adjacent to the air intake for the hospital facility's HVAC (heating, ventilation and air conditioning) system and was extended only 0.5 meters above the roofline.

B. Recommendations

For the pilot medical waste management program at Ramallah Government Hospital, the following recommendations are given to improve and refine the program. This pilot program is recommended to be used as a model for all HCFs to use for managing their medical waste.

- Purchase and use yellow bags that will withstand the autoclave treatment process.
- Eliminate the second autoclavable bag. This additional bag creates additional time, expense, and exposure for staff.
- Handle wastes as little as possible to reduce exposure risk. Require staff to place all medical wastes into a yellow bag or sharps container prior to placing it into the large yellow container. Uncontained medical wastes should not be disposed directly into the yellow container as this increases the risk of exposure and requires additional staff time to disinfect due to blood or body fluid spills inside the containers.
- Place signage on the outside storage area for the medical waste containers. This will clearly designate the area for the intended purpose.
- Transport filled medical waste containers in an enclosed vehicle from the storage area to the treatment area. Using a forklift is not a safe mode of transportation and will result in spills, exposures, and additional staff time to respond to these incidents.
- At the Bahrain Pediatric Hospital at the Palestine Medical Complex (PMC):

- Extend the autoclave's exhaust stack to a minimum height of 2 meters above the roofline. This will allow natural air currents to capture and remove the exhaust from the building's roofline and minimize it from being drawn into the building through open windows, air intakes, or other points of entry.
- Determine if the building's HVAC air intake will capture the autoclave exhaust stack emissions. If so, the stack will need to be relocated so that this does not occur.

C. Next Steps

The following items are given with the overall objective of implementing the medical waste pilot program implemented at Ramallah Government Hospital to all HCFs.

1. Finalize the Bylaws for medical waste management (MoH). Without the approved Bylaws, there is no standard by which hospital facilities are held accountable.
2. Develop a medical waste training competency for all healthcare workers, including those transporting the wastes.
3. Require each hospital facility to designate a MWO with the authority and responsibility of medical waste management.
4. Survey the hospital facilities to determine the appropriate number of supplies initially needed (e.g., containers, bags) and establish annual par levels required for implementation.
5. Implement the medical waste program at all hospital facilities.
6. Locate central treatment facilities that have the appropriate equipment, trained staff, maintenance contract, and vehicles to support medical waste collection and treatment.
7. Perform annual assessment and review of the program by MoH staff.

The table below outlines the elements listed above, including a description, the responsible party, and a timeline for implementation.

Medical Waste Management Elements, Responsibilities, and Timeline

Element	Description	Responsible	Timeline
Bylaws	Finalize the draft medical waste management bylaws.	MoH	Sept. 2009
Training	Develop a medical waste management competency to train the following groups: • Those who produce the medical waste (e.g., patient care staff) • Those who handle the medical waste (e.g., housekeeping staff) • Those who transport the waste (e.g., municipality workers)Those who treat the waste (e.g., laboratory staff, treatment operators).	MoH, Flagship, Treatment Technology Vendors	Oct. 2009
Medical Waste Officer	Require each hospital facility to designate a Medical Waste Officer (MWO). Conduct quarterly surveys and report findings to the MoH.	MoH	Oct. 2009
Appropriate	Survey all hospital facilities to determine the	MoH, Flagship,	Oct. 2009

Supplies
 	
Appropriate Supplies - *continued*
	overall number of supplies necessary to implement the medical waste management program. The following items must be considered:
	• Yellow bags* and yellow wheeled containers (totes)* for medical wastes, such as:
	  o Dressings/bandages
	  o Items containing fluid blood
	  o Suction canisters
	• Red bags** and red wheeled containers (totes)** for infectious and pathology wastes, such as:
	  o Surgical specimens
	  o Placentas
	  o Autopsy materials
	  o Recognizable body parts
	• Sharps containers***
	• Signs and labels for identification
	
	**These materials are recommended to be:*
	• *ordered from the manufacturer and stamped with the biohazard symbol and appropriate wording*
	• *able to withstand autoclaving (137°C for 20 minutes)*
	• *able to indicate the treatment status via an indicator strip(s)*
	
	***These materials are recommended to be:*
	• *ordered from the manufacturer and stamped with the biohazard symbol and appropriate wording*
	• *of sufficient strength to contain heavy, wet wastes*
	
	****These materials are recommended to be:*
	• *puncture-resistant*
	• *leak-proof*
	• *ordered from the manufacturer and stamped with the biohazard symbol and appropriate wording*
		Hospitals	

Collection & Transportation	Designate space for storing and staging of filled containers ready for pick-up. • Adequate space (m^2) • Secured area with signageClosed to avoid contact with elements (e.g., wind, rain) and vermin (e.g., rodents, animals)	Hospitals	Oct. 2009

	Treatment Facility:
	• Closed-bed trucks designated for medical waste transport only
	• Lift-gate or ramp for ease of transfer from ground to bed of truck and back
	• Second set of totes/rigid collection containers to avoid transfer of wastes and exposure to municipality staff
	• Spill kit for each vehicle with:
	  o Absorbent (e.g., vermiculite or sand)
	  o Yellow bags
		Municipalities	Oct. 2009

	○ PPE (e.g., gloves, face shield) ○ Disinfectant • Tracking document to be completed by the driver and signed by the facility MWO each time waste is collected from facility	MoH	Oct. 2009
Treatment **Treatment - *continued***	• Procure, locate, and install treatment units for medical wastes, based on assessment findings for region/municipality. ○ Autoclave (yellow-bag wastes) ○ Incineration (red-bag & sharps wastes) • Suggested regional locations: ○ Hebron (Southern West Bank) ○ Nablus (Northern West Bank) ○ To be determined (Central West Bank) • Determine if a public review or environmental assessment is required to be performed • Study options for improving current incineration technology: ○ Alternative fuel sources or supplement diesel fuel to obtain manufacturer's minimum temperature recommendations for primary and secondary chambers ○ Emissions control equipment ○ Standardized training for operators ○ Locations away from populated areas to reduce public exposure	MoH, Flagship Municipalities MoH, Municipalities MoH, Flagship	Nov. 2009
Assessment	• Perform quarterly self-assessment for compliance with Bylaws and report to MoH. • Perform semi-annual review of quarterly compliance reports for: ○ Hospital ○ Municipality ▪ Collection & Transportation ▪ Treatment • Determine areas for improvement based on review; target education efforts	Hospitals, Municipalities MoH, Flagship MoH, Flagship	Feb., May, Aug., Nov. 2010 Jun., Dec. 2010

As part of the steps listed above, guidance from the Flagship Project is essential to help ensure that this program is appropriately developed and implemented and that the MoH and the HCFs are held accountable for their respective pieces. Additional assessments should be performed quarterly by the Flagship Project to determine compliance with the timeline. With these items established and put into place, medical waste management for the West Bank will be significantly improved and the health of the Palestinian people and the environment in which they live will also be significantly improved.

ANNEX A: TERMS OF REFERENCE

MEMORANDUM

TO: Taroub Faramand, MD (tfaramand@flagshipproject.org)
Chief of Party, Flagship Project
Damianos Odeh, MD (dodeh@flagshipproject.org)
Assistant Chief of Party, Flagship Project

FROM: Jerry Daly, MA, MSLS (jdaly@llu.edu)
Assistant Vice President for Global Outreach
Associate Director, Global Health Institute
Palestine Project Director, Loma Linda University

DATE: July 1, 2009

SUBJECT: STTA Request for Approval for Donna Gurule

COPY: Flagship PMU (FlagshipPMU@chemonics.com), Hadeel AlQassis (halqassis@flagshipproject.org), Jan Zumwalt (jzumwalt@llu.edu), Sandra Assman (sassman@llu.edu), Allison Hurlow (ahurlow@llu.edu), Mo O'Reilly (moreilly@llu.edu), Donna Gurule (dgurule@llu.edu)

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1. **Request:** Loma Linda University requests approval for Donna Gurule to travel to the West Bank, Palestine to provide short-term technical assistance (STTA) to the Palestinian Health Sector Reform and Development Project ("the Flagship Project") for the period of August 2, 2009 to August 15, 2009.

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2. **Background:** Loma Linda University (LLU) has been requested to assist with capacity building and training staff in partnership with the Flagship Project at Ministry of Health facilities throughout the West Bank. Priority will be given to management support and training and improving the quality of care.

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3. **Purpose of Proposed Visit:** To provide project support in the area of medical waste management.

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4. **Scope of Work:**
    1. To work with MoH staff and Flagship leadership to develop a strategy for medical waste management for MoH facilities.
    2. To work with Flagship and MoH personnel to assess the medical waste management processes and protocols at the Rafidiah General Hospital in Nablus, West Bank.
    3. To structure involvement at the Rafidiah General Hospital in such a manner that improvements to the management of the medical waste program can be exported and adopted at other MoH facilities—if needed.

4. To develop a written strategy to improve medical waste management at select MoH facilities.
5. To work with Flagship leadership and appropriate MoH staff on the processes necessary to further the formation of a medical waste management program for the Palestinian Medical Complex (PMC) – to be activated only if working at the PMC is approved.
6. Assess the medical waste management processes and protocols for the PMC – to be activated only if working at the PMC is approved.
7. To work closely with Flagship leadership and MoH personnel to identify key STTA needed to help accomplish Flagship goals and objectives.

5. **Logistics**: Depart Ontario or Los Angeles, California on August 1, 2009 on a U.S. flag air carrier compliant with the Fly America Act to Tel Aviv, Israel and will return via the same route on August 15, 2009. Transportation from/to the Tel Aviv airport will be provided by the Flagship Project. Housing will be provided in the West Bank.

6. **Funding:** Travel, per diem, salary, fringe benefits, and approved expenses will be charged to the following subcontract if approved: 294-C-00-08-00225-00-LLU.

7. Action: Please reply via e-mail to the attention of Jerry Daly, LLU Palestine Project Director at jdaly@llu.edu. Please send copies to Jan Zumwalt at (jzumwalt@llu.edu), Sandra Assman at sassman@llu.edu, Mo O'Reilly at moreilly@llu.edu, and Allison Hurlow at ahurlow@llu.edu**.**

ANNEX B: TDY ACTIVITIES

Date	Activity	Location	Results
8/4/09	Tour Meeting	Palestine Medical Complex Flagship office	Tour and meeting helped to provide background information to prepare for meeting with MoH
8/5/09	Site visit Site visit Meeting	Al Sheikh Zayed Hospital Ramallah Government Hospital MoH/EH engineers	The site visits and meeting with MoH/EH engineers provided good background information and context for developing recommendations
8/7/09	Site visit	Bethlehem Arab Society Rehabilitation Hospital Holy Family Maternity Hospital	The site visits provided good background information and context for developing recommendations
8/11/09	Site visit	Rafidia Hospital	The site visits provided good background information and context for developing recommendations
8/13/09	Conference	Flagship office	Met with Flagship staff regarding the report and findings
8/14/09	Exit Interview	Flagship office	Discussed findings and reporting strategies

ANNEX C: GLOSSARY OF TERMS COMMONLY USED IN THE REPORT

Sharps: include any tools and equipments that can cause cuts and wounds (e.g. needles, hypodermic needles, scalpel and other blades, knives, infusion sets, saws, broken glass and nails). Non-infected sharps are also considered hazardous waste.

Pathological Waste: includes human tissues such as organs, body parts, human fetuses and animal carcasses. Often anatomical waste is recognizable human or animal body parts.

Blood and Body Fluids: includes wastes that are not categorized as infectious waste but are contaminated with human or animal blood, secretions and excretions. It is warranted to assume that these wastes might be contaminated with pathogens.

Infectious waste: this class comprises all biomedical and healthcare waste known or clinically assessed by a medical practitioner or veterinary surgeon to have the potential of transmitting infectious agents to humans or animals. It includes discarded materials or equipment contaminated with blood and its derivatives, other body fluids or excreta from clinically confirmed infected patients or animals with hazardous communicable diseases. Contaminated waste from patients known to have blood-borne infections undergoing haemodialysis. In addition to carcasses as well as litter and animal feces from animal test laboratories.

Highly infectious waste: this class comprises all microbiological cultures in which a multiplication of pathogens of any kind has occurred. They are generated in institutes working in the fields of hygiene, microbiology and virology as well as in medical laboratories, medical practices and similar establishments. This class of waste also includes laboratory waste (cultures and stocks with any viable biological agents artificially cultivated to significantly elevated numbers, including dishes and devices used to transfer, inoculate and mix cultures of infectious agents and infected animals from laboratories).

Chemical Waste: waste from discarded solid, liquid, and gaseous chemicals such as from diagnostic and experimental work and from cleaning and disinfecting procedures. This type of waste can be either hazardous or non-hazardous.

Hazardous waste: chemicals that have an adverse impact on health and the environment and are either toxic, corrosive (e.g. acids of pH < 2 and bases of > 12), reactive (explosive, water-reactive, shock-sensitive), and/or genotoxic (e.g. Cytotoxic drugs)

Incineration: is a high temperature, dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter.

Autoclaving: involves the heating of waste material, with steam, in an enclosed container at high pressure. At appropriate levels of time, temperature and pressure effective inactivation of all vegetative microorganisms and most bacterial spores can be achieved. Preparation of material for autoclaving requires segregation to remove unsuitable material and shredding to reduce the individual pieces of waste to an acceptable size.

Waste segregation: consists of separating the different waste streams based on the hazardous properties of waste, the type of treatment and disposal practices that are applied.

Needle disposal boxes: boxes designed to hold both insulin syringes and pen needles. Leak-proof and puncture-resistant container for safe, convenient disposal of used sharps.

Landfill: a disposal facility where healthcare waste is placed in or on the land in a manner that protects the environment. It is not a land treatment facility, a surface impoundment, or an injection well.

Sterilization: is defined as the complete destruction of all forms of microbial life.

Disinfection: is the reduction of microbial contamination, especially the diminution of disease-causing microorganisms or pathogens.

ANNEX D: CONSULTANT CV

CURRICULUM VITAE

Name: **Donna R. Gurule**

Address: **1549 Crestview Road**
Redlands, CA 92374

Phone: **(909) 793-9794**

Current Position: **Environmental Health & Safety Officer, Loma Linda University Adventist Health Sciences Center, Department of Risk Management, 25027 Mound Street, Loma Linda, CA 92354**

Assistant Professor, Department of Environmental & Occupational Health, Loma Linda University School of Public Health, Loma Linda, California 92350

(909) 558-4999 Fax: (909) 558-4164
email: DGurule@llu.edu

Education:

Institution	*Degree, Certification, Registration*	*Date Received*
State of California, DHS National Environmental Health Association	REHS	1986
Occupational Health & Safety (OSHA)	HAZWOPER	1986-present
National Environmental Health Association	RHSP	1992
Loma Linda University	Bachelor of Science, Public Health Science	1985
Loma Linda University	Master of Public Health, Environmental Health	1986

Employment:

Institution	*City and State*	*Dates*
Loma Linda University, Department of Environmental & Occupational Health (Asst. Professor)	Loma Linda, CA	1992-Present
Loma Linda University Adventist Health Sciences Center, Office of Environmental Health & Safety (Officer)	Loma Linda, CA	1992-Present
San Bernardino County, Department of Environmental	San Bernardino, CA	1986-1992

Health Services
(Environmental Health
Specialist III)
Presentations:

Overview of the Hazardous Materials Management Programs for City Administrators, County of San Bernardino, 29 Palms, Yucca Valley, CA 1991

Medical Waste, Association of Practitioners in Infection Control Seminar, Redlands, CA October 17, 1989

Medical Waste, California Association of Health Facilities Seminar, Ontario, CA October 9, 1990

Hazardous Materials & Wastes, Chino Airport Businessman's Association Meeting, Chino, CA April 18, 1991

Bio-Hazardous & Medical Waste Update (UCX), UCR - Continuing Education, Riverside, CA April 18, 1991

Hazardous Materials Management Programs, Redlands Lions Club Meeting, Redlands, CA April 25, 1992

Hazardous Materials Management Programs, California Institute for Women, Department of Corrections, Seminar, Chino, CA May 8, 1991

Medical Waste, San Bernardino County Medical Center Seminar to Nurses and Department Heads, San Bernardino, CA June 4, 1991

Hazardous Waste Management, West Update (UCX), UCR - Continuing Education, Riverside, CA, September 24, 1992

Moderator and Speaker for Medical Waste, California Environmental Health Association, Citrus Chapter's Southern Update Educational Conference, Ontario, CA October 17, 1991

Medical Waste, Victor Valley Dental Association Meeting, Victorville, CA, November 1991

Medical Waste, Association for Practitioners in Infection Control Seminar, Fontana, CA, June 26, 1992

Underground Storage Tanks, Redlands Board of Realtors, Redlands, CA 1992

Hazardous Waste, San Bernardino County Public Guardian, San Bernardino, CA, August 25, 1992

Hazardous Materials, Hazardous Waste, Bio-Medical Waste, Underground Storage Tanks, City of Chino Hazardous Waste Management Workshop, Chino, CA, July 29, 1992

Bio-Medical Waste (AIDS Home Care), Department Social Services, Rancho Cucamonga, CA, July 21, 1992

Hazardous Materials, Hazardous Waste, Bio-Medical Waste, Underground Storage Tanks,

City of San Bernardino Hazardous Waste Management Workshop, September 2, 1992

Environmental Health Seminar - Medical Waste Management, Loma Linda University Medical Center, Loma Linda, CA October 28, 1992

Mission Possible: The Medical Waste Challenge, Loma Linda University Adventist Health Sciences Center's Safety Coordinator, Loma Linda, CA October 24, 2000

Weapons of Mass Destruction, Ask Your Doctor guest, KFRG radio (95.1), Colton, CA May, 2000

Household Hazardous Waste, Ask Your Doctor guest, KFRG radio (95.1), Colton, CA May, 2000

Mercury: A Hidden Household Hazard, Ask Your Doctor guest, KFRG radio (95.1), Colton, CA October, 2001

It's a Girl's World: An Introduction to Careers in Environmental Health, American Association of University Women, Pass Branch, Mt. San Jacinto College, San Jacinto, CA
1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008

Environmental Hazards & Cytotoxic Agents: Am I At Risk? Loma Linda University Medical Center, Loma Linda, CA. August 5, 2003

Committees:

Loma Linda University Safety Committee
Loma Linda University Medical Center Safety Committee
Loma Linda University East Campus Hospital Safety Committee
Loma Linda University Behavioral Medicine Center Safety Committee
Loma Linda University Health Care Safety Committee
LLU&MC Employee Safety Surveillance Sub-committee
LLU&MC Safety Education Sub-Committee, chair
Loma Linda University Medical Center Emergency Management Council
Loma Linda University Institutional Biosafety Committee
Loma Linda University Disaster Planning Committee
Loma Linda University Medical Center Education Council
Loma Linda University Medical Center Environment of Care Function Team

Courses Taught:

Hazardous Materials & Solid Waste Management (ENVH 567) 1993-2003

Lectures given:

- Public Health & Preventive Medicine (Jr. medical students)
- Principles Disaster Management (INTH 519)
- International Health Seminar (INTH 605)
- Nutrition Policy Programs & Services (NUTR 525)
- Environmental Sampling & Analysis (ENVH 569)

- Environment Health Seminar (ENVH 605)
- Public Health Seminars
- Principles of Hazardous Materials Management (UCR Extension Program) 1991-1993

Publications:

Dyjack, David and Gurule, Donna. The Industrial Hygiene Profession: Unraveling the Mystery Explaining the Abbreviations. California Journal of Environmental Health. Vol. 19, No. 1, p 28-30.

Dyjack, David; Gurule, Donna; and Dyjack, Angela. Professional Health & Safety Dangers in the Workplace: Factor Personal EHS into Your Daily Routine. California Journal of Environmental Health. Vol. 20, No. 2,
p 23-26.

Contributing Author Award, California Environmental Health Association, 2000

Community Service Activities:

Educational Member, Environmental Health Specialist Registration Committee, State of California, 1996-2005.

Member, Inland Empire Terrorism Response Group, Private Sector (PS-TRG), 2000-2004.

Member, State of California Department of Health Services Taskforce, Pharmaceutical Waste, 2001-3.

Member, State of California Department of Health Services Advisory Committee, Regulated Medical Waste Signage, 2000-2001.

Charter Member, Loma Linda Valley Kiwanis Club, 2001-4.

Member-at-large Representative, Citrus Chapter, California Environmental Health Association (CEHA) 1996 - 2000.

Event Co-chair, Relay for Kids, Loma Linda Ronald McDonald House, 2001 and 2002.
Team Captain, Relay for Kids, Loma Linda Ronald McDonald House, 1996 - Present.

Participant, Health Fair Expo, Loma Linda, CA, April, 1997

Member of the Technical and Educational Assistance Model (TEAM) Project on Pollution Prevention (1991 - 1992).

Co-author training manual and videotape for hazardous waste generator inspectors, University of California, Riverside Extension (1991-1992).

Continuing Education:

HazMat for Healthcare: First Receiver Operations & Decontamination (2008), Management Skills for Emerging Leaders in Environmental Health & Safety (2008), Environmental Management Systems in Higher Education (2007), Perceptor Skills Workshop (2007), Health Care Facilities Seminar – NFPA 99 (2006), Crisis and Risk Communication (2006), How to Conduct Effective Inspections (2005), Confined Space Awareness and Rescue (2005), Emergency Preparedness & Partnering to Protect Our Communities (2005), Behind the Badge: Combating Domestic Terrorism (2003), Crisis and Emergency Risk Communications (2002), Mold & Microbial-related Health Complaints: Assessment Techniques for Health, Safety and Environmental Professionals (2002), Management of Radiation Incident Victims (2002), Emergency Response to Terrorism Operations: A Safe Response for Public Safety Personnel (2002), Biological & Chemical Warfare and Terrorism: Medical Issues and Response (2001), Medical Management for Radiological Emergencies (2001), Bioterrorism: Your Toolbox for Action (2001), Risk Communication Workshop (2001), Assessment and Compliance in the Work Environment (2001), Life Safety Code Seminar (2001), How Writing Really Works: Myths & Baggage We Carry (2001), Mercury Elimination in Hospitals (2000), Sanitary Landfill Design (2000), California Environmental Health Association Southern Update: Y2K Readiness (1999), Medical Management of NBC Agents (1999), Conflict Resolution (1999), Compliance and Environmental Management Systems Auditing: Practical & Applied Techniques (1998), Grease Collection Systems and Cross Connection Devices Seminar (1998), Solid Waste Landfill Gas Assessment & Management Symposium (1998), California Resource Recovery Association Annual Conference (1997), Franklin Time Management (1997), National Environmental Health Association Annual Education Conference (1997), Unit Pricing and Waste Prevention Workshop (1996), JCAHO Update: Optimizing Human Resources (1996), Legal and Employment Issues (1996), How to Design Eye-Catching Brochures, Newsletters, Ads and Reports (1996), Disability Employment Conference (1996), Continuing Technical Excellence: California Campus Environmental Health & Safety Association Annual Conference (1996), JCAHO Guide to 1996 Management of Environment of Care (1996), International Symposium on Computer Mapping in Epidemiology and Environmental Health (1996), Faculty Workshop for Adult Learning (1995), Bringing Out the Star in Your Team (1995), Incident Command System: Job-Specific Training (1995), Making Magic in the Classroom (1995), 8-Hour OSHA Computer-Based Training (1995), Principles of GIS Data Management (1995), JCAHO Hazardous Materials & Waste Management (1994), Hospital Engineering Controls for Tuberculosis (1994), Basic HazCat (1994), Laboratory Safety in Academic Institutions (1994), Working with Difficult People (1994), JCAHO Standards: Organizational Functions (1994), Management Problems of the Technical Person in a Leadership Role (1994), Cal-OSHA: Beyond the Basics (1994), Geographic Information Systems (1994), Environmental Crash Course (1993), Cal-OSHA Update (1993), The Next Disaster: Are You Ready? Practical Applications for the Public Health & Environmental Health Professional (1993), Team Work and the Turnaround Situation (1993), Hazardous Materials Transportation Update: HM181 (1993), Landfills and Groundwater Quality (1993), AHA 3rd National Symposium on Health Care and the Environment (1993), Personal Safety in the field (1992), Training By Design (1991), Health & Safety Training (1991), Enforcement of California's Right-to-know Law (1991), Analytical Chemistry (1991), Hazardous Waste Source Reduction (1991), Risk Assessment (1991), Leadership & Supervisory Skills (1991), Reducing Hazardous Pollutants (1991), Environmental Issues and Health (1990), Regulatory Framework for Toxic & Hazardous Substances (1990), Hazardous Materials Investigations (1990), Hazardous Materials Emergency Response Conference (1990), Principles of Hazardous Materials Management (1990), Fundamentals of Supervision (1988), Public Contact (1987).

ANNEX E: BIBLIOGRAPHY OF DOCUMENTS COLLECTED/ REVIEWED

- World Bank Report: *Master Plan for Healthcare Waste Management West Bank/Gaza Strip*, March, 2006
- United Nations Development Programme Report, *Medical Waste Management for Ramallah District Feasibililty Study*, July, 2008
- United Nations Development Programme Report, *Draft Report on the Monitoring Plan for Medical Waste Management of Ramallah District*, June, 2009
- Palestinian Ministry of Health DRAFT Medical Waste By-Laws

ANNEX F: LIST AND COPY OF ASSESSMENT TOOLS UTILIZED DURING TDY

- Medical Waste Management Assessment Checklist

USAID Flagship Project
Medical Waste Management Assessment Checklist

Facility	*Location*	*Contact Person*	*Telephone*
No. Beds	*No. OR Theaters*	*Emergency Department? Y N*	*Specialty Areas*
Designated MWO? Y N	*Name*	*If yes, No. Beds _____*	

By Laws Ref. #	Item	Observation			Comments
	Segregation				
	Medical waste is segregated from regular trash.	**Y**	**N**	**NA**	
	Sharps are segregated from other wastes using red/yellow bucket.	**Y**	**N**	**NA**	
	Pathology wastes are segregated from other wastes.	**Y**	**N**	**NA**	
	Chemotherapy wastes are segregated from other wastes.	**Y**	**N**	**NA**	
	Containment & Labeling				
	Containers are available in sufficient quantity.	**Y**	**N**	**NA**	
	Yellow bags are of sufficient strength and adequate supply to meet the facility's needs.	**Y**	**N**	**NA**	
	Containers are labeled with a biohazard label and lined with a yellow bag.	**Y**	**N**	**NA**	
	Containers are cleaned and disinfected when visibly soiled.	**Y**	**N**	**NA**	
	Sharps are placed into rigid needle boxes labeled with a biohazard label.	**Y**	**N**	**NA**	
	Sharps boxes are emptied when 2/3 full.	**Y**	**N**	**NA**	
	A schedule exists for routine collection of medical waste.	**Y**	**N**	**NA**	
By Laws Ref. #	**Item**	**Observation**			**Comments**

	Transportation					
	Facility self-transports medical waste to off-site treatment facility.		**Y**	**N**	**NA**	
	If yes, there is a designated area and containment for medical wastes.		**Y**	**N**	**NA**	
	Municipality transports medical waste to landfill		**Y**	**N**	**NA**	
	Treatment					
	Medical wastes are treated **on-site** by autoclave.		**Y**	**N**	**NA**	
	Medical wastes are treated **on-site** by incineration.		**Y**	**N**	**NA**	
	Medical wastes are treated off-site by autoclave. *Facility:*		**Y**	**N**	**NA**	
	Medical wastes are treated off-site by incineration. *Facility:*		**Y**	**N**	**NA**	
	Training					
	Written medical waste competency training is given to staff.		**Y**	**N**	**NA**	
	Signs / posters are posted for medical waste segregation, handling, treatment & disposal.		**Y**	**N**	**NA**	

Assessed By Date