GTS DURATEK
Radiological Engineering And Field Services

UNIVERSITY OF MICHIGAN
INCINERATOR DECOMMISSIONING WORK PLAN

OCTOBER 1999

Prepared by: Paul A. Jones Date 10/25/99
Paul Jones
Project Manager

Reviewed by: Carl J Ross Date 10/25/99
Quality Assurance

Approved by: Robert Hornbeck Date 10/26/99
Robert Hornbeck
Radiation Protection Manager

Approved by: Sandra M Beeler Date 10/26/99
Sandra M. Beeler
Radiation Safety Officer

Prepared By:

GTS Duratek
628 Gallaher Road
Kingston, TN 37763

TABLE OF CONTENTS

1.0 INTRODUCTION

GTS Duratek has been contracted by the University of Michigan to decontaminate, demolish, and dispose of a low-level radioactive waste pathological incinerator located at the North Campus Transfer Facility, Ann Arbor, MI. The pathological incinerator was in service from 1982 to 1996. During this time, small animals and bedding contaminated with a variety of isotopes of varying activities were incinerated. The incinerator consists of three major components: a steel-cased firebox, a stack, and a blower unit and blower duct. The steel firebox (6'-7 1/2" high x 7'-6 3/4"square) is lined with varying thickness of firebrick and insulating brick. The stack (7'-0" I.D. x 50'-0" high) consists of 4 1/2" thick firebrick inside a steel sheath. The attached blower unit consists of a 50 horsepower motor connected to a fan, and is attached to a ~4' x 6' x 35' duct. The incinerator is located adjacent to a LLRW processing area, separated from an office area by block wall construction. Within 20 yards of the incinerator are storage areas for general U of M radioactive waste. The scope of work does not include any characterization or remediation of the adjacent radiological areas. The University of Michigan incinerator has not operated since 1996.

2.0 SCOPE OF WORK

2.1 General Project Description

GTS Duratek will perform all incinerator decommissioning under its D & D License (No. R-73018-E00). The decommissioning consists of the removal of 3 major components. The major components and an estimate of current isotopic activity is provided in Table 2-1. The radionuclide activities provided are conservative estimates based upon Incinerator release records and for the purposes of GTS Duratek license possession.

Table 2-1, Component Activity Estimate

Component	Radionuclide	Estimate of Activity (mCi)
Fan Housing, fan motor, and feed duct.	H-3	<.1
	C-14	<.1
	Na-22	<.1
Incinerator Box	H-3	6.45
	C-14	1.35
	Na-22	31.5
Incinerator Stack	H-3	.645
	C-14	.135
	Na-22	3.45
Totals	**H-3**	**7.1**
	C-14	**1.5**
	Na-22	**35.0**

2.2 Project Deliverables

Upon completion of incinerator component removal, performance of verification surveys, waste sample identification and waste packaging and shipping, GTS will demobilize its personnel and equipment from the site. A final report describing the completed task, major accomplishments, any deviations from the proposal and work plan, final survey results and waste disposal will be prepared and submitted to the University of Michigan.

3.0 RESPONSIBILITIES

3.1 University of Michigan

The University of Michigan will provide:

- a small office with a 110vac outlet, phone, fax machine, and copier for use by GTS Duratek for this project,
- electrical service for this project,
- sufficient parking areas for equipment and personnel, and
- liquid scintillation equipment for H-3 and C-14 analysis as needed.

3.2 GTS

GTS will provide:

- Incinerator Decommissioning Work Plan
- Site Specific Health and Safety Plan
- HAZWOPER trained personnel
- Bioassays for radionuclides, as required
- Decontamination equipment and consumables to perform the incinerator decommissioning services
- Personnel protective equipment
- Health physics survey equipment
- Health physics operational & survey staff for this project

4.0 PROJECT PERSONNEL

GTS understands the importance of providing a team of trained and knowledgeable professionals to support this project. The following team organization, which is comprised of management and radiological professionals of the highest caliber, will be used. This team will perform the necessary tasks to accomplish the objective in the most cost efficient and time efficient manner.

Mr. Robert Hornbeck will be the off-site Project Manager and will provide the corporate support and resources necessary to insure the project is completed in a timely and cost effective manner. Mr. Hornbeck has over 20 years of health physics and radiological engineering experience, including supervising decontamination and facility survey efforts similar to the University of Michigan project.

Mr. Paul Jones will be the on-site Project Manager and Site Safety and Health Officer (SSHO) for this project and will provide the day to day project oversight. Mr. Jones will interface with the University of Michigan site representative. Mr. Jones is a certified National Registry of Radiation Protection Technologist (NRRPT) & Occupational Health and Safety Technologist (OHST). Mr. Jones has over 12 years of commercial and decommissioning health physics experience. His experience includes extensive characterization and license termination survey experience.

5.0 RADIATION PROTECTION

Prior to beginning work at the site, personnel involved in the project will be appraised of the radiological conditions, radiological and hazardous materials in the waste, and the precautions necessary for individual protection. The decontamination and decommissioning efforts will be conducted under the conditions specified on the Radiation/Hazardous Work Permit (RHWP). The RHWP will detail the radiological hazards and the precautions required to protect the individual workers. A job specific prospective dosimetry evaluation will be performed for all employees. If an employee's dose evaluation exceeds 10% of the annual limit, then external dosimetry and bioassay will be required. Radiation Protection Program implementing procedures that apply to this project are listed in Attachment 2.

6.0 WORK PLAN

6.1 Plan Preparation

GTS will prepare the Project Work Plan, Incinerator Decommissioning Plan and the Site Health and Safety Plan. These documents will incorporate the federal and state requirements. Site specific documents will be reviewed and approved before the start of mobilization.

6.2 Mobilization and Training

Upon notification to proceed by University of Michigan, GTS will initiate the mobilization of personnel and equipment and begin the site preparations required to effectively perform the decommissioning activities. This task includes the transportation of personnel, materials and equipment to the site and preparation of the work area to begin on-site work activities. Site Specific training will include the training as defined in the Site Health and Safety Plan.

6.3 Incinerator Component Decommissioning

Disassembly of the three major components is described below.

-Fan, Housing and Motor Removal

Upon completion of release surveys, the fan motor, fan housing and its ducting will be removed and transported to a metal recycle facility. The opening produced by this disconnection at the stack will be sealed to prevent any inadvertent release of radioactive material to the surrounding room.

-Firebox Removal

The ash from the bottom of the firebox and stack will then be removed and packaged for disposal to Envirocare or other permitted disposal facility as approved by University of Michigan. The connection between the firebox and the stack will then be breached and the openings sealed at both the stack and the firebox. Any small connections to the firebox will be disconnected and sealed prior to separating it from the stack. The firebox will then be moved in one piece with a forklift from inside the building to a sealand container located in an approved waste staging area. The firebox will be sent to the GTS Duratek Bear Creek facility for waste segregation and disposal.

-Incinerator Stack Removal

The stack will be removed in two large sections and sent to the GTS Duratek Bear Creek facility for processing. Any torch cutting on the stack or other contaminated equipment will use portable HEPA ventilation and particulate air monitoring to prevent the release of and monitor for airborne radioactive materials. As needed, firebrick will be removed from the stack to ensure safe removal of the stack. The firebrick that is removed will be segregated to prevent cross-contamination.

The top of the stack will be sealed to prevent any release of radioactive materials to the environment prior to stack removal. A thin layer of metal will be wrapped and secured to the weak area located on the outside of the stack approximately 15' above the roof of the building. Approximately three large c-clamps will then be installed onto the outside of the stack. These clamps are also used as lifting devices for removal the stack. The upper portion of the stack will then be rigged to the crane and readied for lifting. The flashing located on the roof around the stack will then be removed. A cut will be made around the middle firebrick retaining ring of the stack and just below the roofline. The crane will then lift the upper portion of the stack approximately 6 inches. The bottom of the upper portion and then the top of the lower portion will then be sealed prior to movement. The upper portion of the stack will then be lifted and moved into the pre-staged sea-land container on the ground at the North side of the roof.

Approximately three large c-clamps will be installed on the lower portion of the stack. If needed, the roof will be cut to accommodate the additional width of the clamps on the lower portion of the stack. The lower portion of the stack will then be rigged to the

crane. Any bracing or supports connected to the lower portion of the stack will be disconnected. The lower portion of the stack will then be lifted approximately 6 inches and the opening at the bottom of the stack sealed, if needed. The lower portion of the stack will then be lifted and moved into the staged sea-land container on the ground at the North side of the roof. After removing the stack a permanent roof repair will be made. This permanent cover will be approved by the University of Michigan. If needed, a temporary cover will be used until the permanent roof repair is complete.

-Floor decontamination

The concrete located beneath the firebox and stack will then be scarified to remove any residual contamination if needed.

6.4 Radiological Surveys and Facility Posting

Radiological characterization surveys will be performed at the beginning of the project. Contamination surveys will be performed on a daily basis in areas where work is in progress and the immediate surrounding clean areas to ensure that contamination control is maintained. Posting of contamination areas will be per GTS Duratek's procedures. Low volume air sampling will be performed during all decontamination activities. After decontamination is completed a final verification survey will be performed to document the final status of the building.

6.5 Survey Instrumentation

GTS will use the instruments listed in Table 6-1 or equivalent for this project.

Table 6-1, Survey Instrumentation

Radiation Detected	Detector Type	Manufacturer and Model Number
Surface Beta-Gamma, Alpha	Gas flow proportional	Ludlum Models 43-68 or 43-106
Exposure Rates	Gamma Scintillation	Ludlum Model 44-2
Surface or Pipe Beta-Gamma	Geiger-Mueller	Ludlum Model 44-40
Removable Surface Beta-Gamma, Alpha	Gas flow proportional	Tennelec LB-5100
Low energy Beta	Liquid Scintillation	Packard (Provided by U of M)

6.6 Waste Processing and Disposal

Waste produced during this project will include the incinerator components, scabbling dust, and misc. personal protective equipment. The low-level radioactive waste that is in compliance with GTS Duratek's Waste Acceptance Guidelines will be packaged for shipment to GTS Duratek for the required processing. All radioactive waste will be packaged in suitable containers prior to shipment. GTS will manifest these packages and ship them to the Bear Creek Facility for processing and disposal.

6.7 Demobilization

Upon completion of the incinerator decontamination activities, final surveys and waste shipments, GTS will demobilize its personnel and equipment from the University of Michigan site.

7.0 FINAL REPORT

GTS Duratek will prepare a Final Report of the project in sufficient detail to document the completeness and accuracy of the incinerator decommissioning work performed. This report will:

- Summarize the results of the project using the survey records and survey results.
- Describe the decontamination/decommissioning methods used and the results of those methods.
- Provide a summary of waste processing and disposal.

8.0 SCHEDULE

The schedule (Attachment 1) depicts the specific tasks and estimated time frame for execution of the proposed scope of work.

9.0 ATTACHMENTS

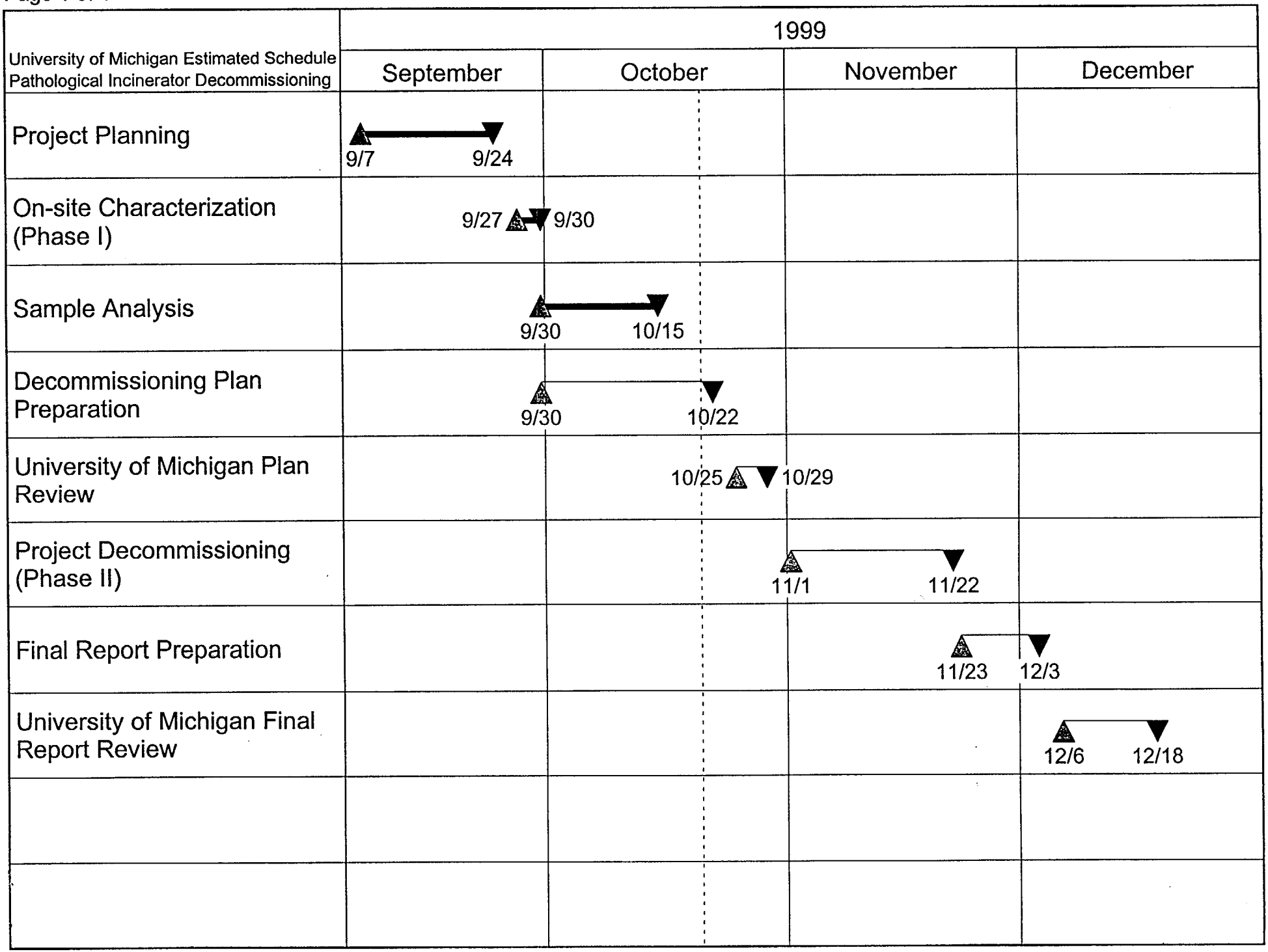
Attachment 1: Estimated Project Schedule
Attachment 2: Project Procedure List

ATTACHMENT 1

Schedule

10/20/1999

University of Michigan Estimated Schedule
Pathological Incinerator Decommissioning



ATTACHMENT 2
Project Procedures List (Page 1 of 2)

	PROC. NO.	TITLE	REVISION
1.	REDS-ADM-105	Conduct of Operations Under Radioactive Material License No: R-73018-E00	1
2.	REDS-CHM-101	Sample Identification and Chain-of-Custody	2
3.	REDS-CHM-108	Data Quality Management Guidelines for Off-Site Laboratories	0
4.	REDS-CHM-205	Sample Preparation for Gross Alpha and Gross Beta Analysis	0
5.	REDS-CHM-206	Sample Preparation for Gamma Spectral Analysis	0
6.	REDS-CHM-217	Preparation of Smears for Dual Labeled Analysis of C-14 and H-3	0
7.	REDS-CHR-100	Site Characterization Plan	1
8.	REDS-CHR-101	Characterization of Structures	0
9.	REDS-CHR-102	Characterization of Systems	0
10.	REDS-DOS-100	External and Internal Dosimetry Program	2
11.	REFS-HS-020	Welding and Cutting Operations	0
12.	REDS-HS-101	Confined Space Entry	2
13.	REDS-HS-106	Operation of the Industrial Scientific TMX410 Multi-Gas Monitor	1
14.	REDS-INST-100	Radiation Protection Instrumentation Program	2
15.	REDS-INST-101	Issue, Control and Accountability of Radiation Protection Instrumentation	2
16.	REDS-INST-102	Quality Control of Counting Systems and Portable Counters	2
17.	REDS-INST-104	Calibration and Test Requirements for Radiation Protection Instrumentation	0
18.	REDS-INST-201	Operation of Ludlum Model 2350 Data Logger	4
19.	REDS-INST-239	Operation of the BTI MicroSpec-2™ NaI(Tl) Portable Gamma Spectroscopy Instrument	0
20.	REDS-OPS-301	Performance of Surveys	5
21.	REDS-OPS-302	Survey Documentation and Review	4
22.	REDS-PDC-102	Document Control of Procedures and Supporting Documents	1
23.	REDS-PDC-103	Review and Approval of Documents	1
24.	REDS-PDC-104	Acknowledgement of Document Understanding	1

Note: This list is the expected procedure list for the project. Additional procedures will be added and deleted as project progresses.

ATTACHMENT 2
Project Procedures List (Page 2 of 2)

	PROC. NO.	TITLE	REVISION
25.	REFS-QA-12.1	Control of Measuring and Test Equipment	1
26.	REFS-QA-13.1	Handling, Shipping and Storage	0
27.	REFS-QA-15.1/16.1	Nonconformance Reporting and Corrective Action	0
28.	REFS-QA-17.1	Quality Records Management	2
29.	REFS-QA-18.1	Audit Program	0
30.	REFS-QA-2.1	Personnel Training and Indoctrination	
31.	REFS-QAP	Quality Assurance Plan	2

Note: This list is the expected procedure list for the project. Additional procedures will be added and deleted as project progresses.