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September 12, 2006

Mr. James Schmidt
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Division of Nuclear Materials Safety
Materials Security and Industrial Branch
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King Of Prussia, PA 19406-1415

J-8
MS-16

**SUBJECT: Philotechnics Ltd. updated financial assurance funding plan,
Control No. 138391**

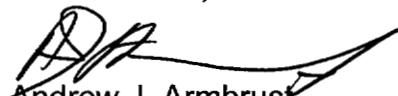
License No. 37-28329-01
Docket No. 030-30941

Dear Mr. Schmidt:

We are in receipt of your letter dated July 28, 2006 regarding our revised Decommissioning Funding Plan. You indicated the assumptions made regarding manpower estimates were not considered reasonable and that we needed to include the estimated cost to remove the sewer line prior to final license termination. We have prepared a revised plan in accordance with the guidance of NUREG 1757, "Consolidated NMSS Decommissioning Guidance," Volume 3, Appendix A, Section A.3. The revised plan is enclosed with this letter.

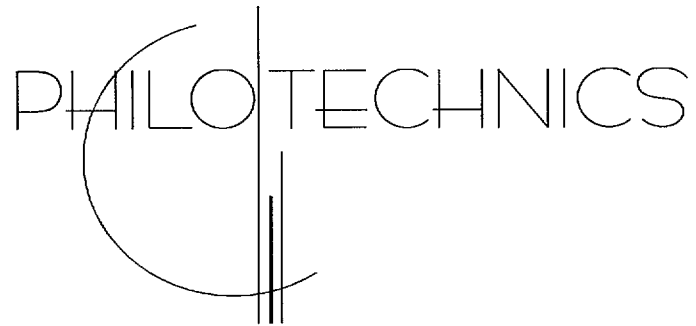
We prepared a revised estimate based on your comments. This revised estimate triples the total man-days onsite and provides funding to remove the wastewater discharge pipe. The cost estimate has been increased accordingly. Should you have any questions or require additional information, please do not hesitate to contact me at (865) 285-3008.

Sincerely,
Philotechnics, Ltd.


Andrew J. Armbrust
President

Enclosures:
Decommissioning Funding Plan

138391
NMSS/RGN1 MATERIALS-002



Decommissioning Funding Plan

U.S. NRC License 37-28329-01

September 12, 2006

Table of Contents

| | | |
|------|--------------------------------------|---|
| I. | Executive Summary..... | 1 |
| II. | Process..... | 2 |
| III. | Assumptions..... | 4 |
| IV. | Appendix 1 –Cost Estimate and Detail | |

I. Executive Summary

This report documents the basis, assumptions, and results of a decommissioning cost estimate prepared the Philotechnics, Ltd. nuclear laundry located in Clairton, PA. The site is licensed under U.S. Nuclear Regulatory Commission (NRC) license number 37-28329-01 and include facilities located at:

600 State Street, Clairton, PA

The decommissioning cost estimate was prepared in accordance with the guidance provided in Appendix A, Section A.3 of NUREG 1757, *Consolidated NMSS Decommissioning Guidance, Volume 3*; and Section 3, Appendix F of NUREG 1727, *NMSS Decommissioning Standard Review Plan*.

The estimated decommissioning costs are:

| Site | Estimate | 25% Contingency | Total Cost Estimate |
|--------------|-----------------|------------------------|----------------------------|
| Clairton, PA | \$71,493 | \$17,873 | \$89,366 |

The 25% contingency is required by the U.S. NRC for decommissioning cost estimates.

II. Process

The decommissioning cost estimates were prepared based upon the use of radioactive materials at each site. This report documents the development of the entire cost estimate. This report is organized into a main body documenting the approach and assumptions utilized and an appendix that contains the actual cost estimate and basis. Assumptions are contained in Section III.

Decommissioning cost estimates were prepared in accordance with the guidance contained in Appendix A, Section A.3 of NUREG 1757, *Consolidated NMSS Decommissioning Guidance, Volume 3*; and Section 3, Appendix F of NUREG 1727 *NMSS Decommissioning Standard Review Plan*. This is a best estimate approximation of all direct and indirect costs of facility decommissioning under the routine facility conditions expected to exist. This estimate reflects current radiological conditions and operations routinely performed at the facility.

Based on the inventory of facility features the level of effort was estimated to perform decontamination and decommissioning. The level of effort was based upon the size of the area and the amount of equipment, casework, shelving and similar items within each area.

Waste generation from D&D activities was also determined based upon typical storage levels and the volume of equipment.

Restoration activities were estimated based upon the expected scope of remediation and similar work that Philotechnics has performed decommissioning other facilities.

Wastewater is discharged to the city sewer system via a 6-inch diameter pipe. In the event the pipe will need to be removed, the cost estimate includes two days of work to excavate and dispose of the entire pipe.

The level of effort estimated for final status surveys was based upon the license termination criterion of 25 mrem per year using NUREG 1575 *Multi-Agency Radiation Site Survey and Investigation Manual* protocols.

A facility description is provided for the estimate. It includes:

- The license number and type
- Specific quantities and types of materials authorized by the license
- A general discussion of how radioactive materials are used at the facility
- A description of facility buildings, rooms and grounds including the number and dimensions of areas requiring decontamination
- The number and dimensions of facility components
- Levels of contamination
- Quantities of materials or wastes accumulated prior to shipping or disposal

The cost estimates account for all phases of the decommissioning process and distinguish between labor and non-labor costs. Labor costs are broken out for:

- Planning and preparation
- D&D of facility components
- Facility restoration, as needed
- Final radiation survey

Non-labor costs are broken out for:

- Packing materials
- Shipping costs
- Equipment and supplies
- Disposal costs
- Laboratory costs
- Miscellaneous expenses

Consistent with NRC guidance, a 25% contingency factor is provided for unforeseen circumstances that could increase decommissioning costs.

III. Assumptions

Inventories of materials and wastes at the time of decommissioning are in amounts consistent with routine facility conditions over time.

Nearly all material will be decontaminated or will be demonstrated by surveys not to have been contaminated. Radioactive waste in the form of equipment, pipes, etc. will be size reduced by cutting prior to packaging. It is estimated that 5% of installed equipment, cabinets, ventilation ducts, sinks, and drains will be disposed of as radioactive waste.

Costs will be incurred to clean up areas where contamination has built up over time but gone undetected due to accumulation of small spills. Experience indicates contaminated surfaces may be discovered as equipment is removed.

Decommissioning activities begin immediately after cessation of operations without multi-year storage-for-decay periods. The cost estimate reflects expected conditions during routine operations and does not rely on radioactive decay to meet license termination criteria.

Work is performed by an independent third party contractor.

The cost estimate neglects credit for salvage value or the sale of assets during or after decommissioning.

To date, radionuclides handled at the laundry facility have been primarily byproduct material as oxides in solid form, in quantities ranging from picocuries to millicuries. These conditions are expected to remain relatively constant during future operations.

Removable radioactive contamination levels in the facility are historically less than 1000 dpm/100 cm². This is expected to be true at decommissioning. Isolated areas of elevated contamination on the order of a few thousand dpm/100 cm² may be present in washing and sorting areas and on some equipment.

The decontamination endpoint for facility structures and installed fixtures and equipment is the derived concentration guideline (DCGL) associated with license termination criterion of 25 mrem per year.

The decontamination endpoint for removable equipment is the applicable value in NRC Regulatory Guide 1.86. Material that cannot be decontaminated to that level will be disposed of as radioactive waste.

Number and Dimensions of Facility Components

A few pieces of equipment are believed to be potentially contaminated.

1. **Ductwork.** There are three pieces of ductwork connecting the three dryer exhausts to the HEPA filtered ventilation unit, and a flexible duct connecting the sorting room to another HEPA-filtered ventilation unit. All of this ductwork, approximately 50 feet in total length, will be cut longitudinally and surveyed, and decontaminated as necessary. Even if decontamination is only 50% successful, the compacted volume is expected to be less than six cubic feet.
2. **Piping and hoses.** Potentially contaminated material consists of 40 feet of 1½ inch ABS pipe and 40 feet of 1½ inch flexible hose. Piping and hoses will be cut longitudinally, surveyed, and decontaminated. The expected waste volume is three cubic feet. The discharge pipe to the sewer is a 6-inch diameter pipe and is conservatively assumed to be 100 feet in length. For purposes of this cost estimate, the entire pipe is assumed to be internally contaminated and will require excavation and disposal.
3. **Washers and dryers.** These will be disassembled and surveyed for release. Major components are stainless steel and will be easily decontaminated. Discharge pumps and other components with inaccessible surfaces will be discarded as radioactive waste. Past experience has shown the washers and major portions of the dryers are not contaminated. The total waste volume is expected to be 15 cubic feet.
4. **Ventilation units.** Both HEPA units are nuclear grade portable units designed and manufactured by Nuclear Power Outfitters, and are designed to be easily decontaminated. The four roughing filters and four HEPA filters from this equipment will be discarded as radioactive waste. Total expected waste volume is ten cubic feet.
5. **Transfer pump.** The transfer pump will be disassembled and surveyed. Expected waste volume is two cubic feet.
6. **Storage tanks.** The poly storage tanks will be cut up and surveyed, and decontaminated to the extent practicable. Total expected waste volume from the tanks is nine cubic feet.
7. **Tables and bins.** Tables, bins, carts, etc. used for laundry operation will be disassembled as needed, and surveyed for contamination. Most of this equipment will be released. The total expected volume of waste is 1.5 cubic feet.

Floors, Walls and Ceilings

The floor areas having the greatest potential for loose contamination, i.e. sorting room, wash/dry area, and tank area, are covered with a Lonseal® floor covering which is wrapped up over the lower sections of the walls. Lonseal® is a floor covering with heat-

welded seams for the purpose of protecting the concrete floor. Concrete walls in these areas were waterproofed and then painted before partitioning.

Process areas having the potential to become contaminated during operation are posted and controlled as contamination areas. Even so, contamination levels are maintained as low as reasonably achievable (ALARA). Detectable loose surface contamination is quickly identified and removed to maintain the facility "clean". Philotechnics has never had to post additional contamination areas. Attachment 1 reflects the typical removable contamination levels throughout the facility.

Walls, floors, and ceilings will be surveyed and released. No waste generation is expected.

Survey units are defined as:

Class 1 Area: Impacted areas with concentrations of residual activity, prior to remediation, that exceed the DCGL_w

Class 2 Area: Impacted areas for which concentrations of residual activity that exceed the DCGL_w are not expected.

Class 3 Area: Impacted areas that have a low probability of containing areas with residual radioactivity.

Even though very little contamination exists, the sorting, washing, and tank areas are assumed to be MARSSIM class 1 survey areas.

Walls are 8 ft. tall. Walls will be the same class as the floor areas they bound.

All ceilings are Class 3.

Roof Areas are considered class 3 survey units.

For determination of number of survey units the following limits were used:

| Classification | Suggested Area |
|-------------------------------------|---------------------------------------------------------------|
| Class 1 Structures Land Areas | Up to 100 m ² Up to 2000 m ² |
| Class 2 Structures Land Areas | 100 to 1,000 m ² 2,000 to 10,000 m ² |
| Class 3 Structures Land Areas | No limit No limit |

Using the conversion of approximately 10 ft² per square meter, class 1 survey units were limited to 1,000 ft² and class 2 structure survey units were limited to 10,000 ft².

Labor Costs

The cost estimates are based on fully burdened market place wage rates for all personnel. An overhead rate equal to 100% of base salary and fringe benefits was assumed. In addition, the Project Manager, Supervisors, Shipper, Health Physicist, Health Physics technicians, and skilled workers are assumed to be non-local hires. Consequently their wage rate also reflects a daily living allowance of \$145. This is the approximate government per diem rate for the Pittsburgh area. Non-skilled and Clerical workers are assumed to be local hires.

Packaging, Shipping and Disposal of Radioactive Wastes

The radioactive waste generated from facility D&D activities is assumed to be metal waste and DAW at a density of 20 pounds per cubic foot. This waste is shipped in B-25 boxes holding 96 ft³ of waste.

Waste processing and disposal costs are based on those available in the industry for large facility decommissioning projects. Mileage and shipping expenses are included.

Miscellaneous Costs

Insurance includes General Liability Insurance at a rate of \$7.00 per \$1,000 of project price.

Since work is assumed to be provided by an independent third party cost estimates also include an allowance for sales tax (professional services) taken as 10% of project costs, minus miscellaneous costs. The tax allowance is listed as a miscellaneous cost.

3.4 FACILITY DECOMMISSIONING SUMMARY

| |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Radioactive Material license numbers and types (i.e., Byproduct, Source): |
| The nuclear laundry facility located at 600 North State Street, Clairton, PA is licensed under USNRC Materials license number 37-28329-01. |
| Types and quantities of materials authorized under the licenses listed above: |
| Byproduct Material atomic number 1 through 96, 100 mCi per radionuclide, 500 mCi total; Cs-137, 500 mCi; Source material, 10 mCi; Special nuclear material, 10 grams |
| Description of how licensed materials are used: |
| Collection, laundering and decontamination of contaminated clothing and other launderable non-apparel items; for collection and decontamination of respirators and other such non-launderable non-apparel items that are used in conjunction with a protective clothing program. |
| Description of facility, including buildings, rooms, grounds, and description of where particular types of materials are used: |
| Small laundry. Receiving and sorting area with tables; (3) washers, (3) dryers, respirator washer, respirator dryer, (2) laundry monitors, and tanks, pumps, hoses and piping. |
| Quantities of materials or waste accumulated before shipping or disposal |
| Typically one truckload of laundry is on site at any one time awaiting processing or shipment. For decommissioning purposes, laundry will be returned to the customer whether it has been processed or not. Some DAW and other radioactive waste is assumed to be present at the time of decommissioning. Such waste is assumed to be less than 96 ft ³ (one B-25 box). |

3.5 Number and Dimensions of Facilities Components

Use this table to summarize relevant features of the facility. Copy and complete the table as necessary for each room, laboratory, or area. Rooms laboratories, or areas with similar levels of contamination may be consolidated into one table.

| Laundry | | New Brunswick Building 107 Synthesis Suite | | | | |
|---------------------------|-----------------------|--------------------------------------------|-----------------------------------------|----------------------------------|-----------------|-----------------|
| Level of Contamination: | | ≈1,000 -500,000 dpm/100 cm ² | | | | |
| Component | Quantity of Component | Unit | Dimensions of Component (specify units) | Total Dimensions (specify units) | | |
| Glove Boxes | 0 | Each | 4'w x 3'd x 3'f | 0 | ft ³ | |
| Fume Hoods | 0 | Each | 5'w x 4'd x 8'f | 0 | ft ³ | |
| Lab Benches (Casework) | 14 | Linear Feet | 4'd x 3'f | 168 | ft ³ | |
| Sinks | 1 | Each | 4'w x 4'd x 3'f | 48 | ft ³ | |
| Drains | 220 | Linear Feet | 3" diameter | 11 | ft ³ | |
| Floors | | Class 1 Sq. Feet | Includes Ceilings | 2,444 | ft ² | |
| Walls (Class1) | | Class 1 Sq. Feet | | 1,967 | ft ² | |
| Walls (Class 2) | | Class 2 Sq. Feet | | 1,656 | ft ² | |
| Ceilings | | Class 2 Sq. Feet | | 2,444 | ft ² | |
| Ventilation/Ductwork | 75 | Linear Feet | 18" diameter | 66 | ft ³ | |
| Cabinets | 0 | Linear Feet | 3'd x 3'f | 0 | ft ³ | |
| Hot Cells | 0 | Each | | 0 | ea | |
| Equipment/Materials | 32 | 50 Ft ³ Units | | 1,600 | ft ³ | |
| Soil Plots | 0 | Sq. Feet | | 0 | ea | |
| Storage Tanks | 0 | Each | | 0 | ea | |
| Storage Areas | 0 | Each | | 0 | ft ² | |
| Radwaste Areas | 0 | Each | | 0 | ea | |
| Scrap Recovery Areas | 0 | Each | | 0 | ft ² | |
| Maintenance Shop | 0 | Each | | 0 | ft ² | |
| Equipment Decontamination | 1000 | Each | | 1,000 | ft ² | |
| Other Class 2 Areas | | Class 2 Sq. Feet | | 4,137 | ft ² | |
| Other Class 3 Areas | | Class 3 Sq. Feet | | 4,675 | ft ² | |
| Sewer Pipe | 100 | Linear Feet | | 79 | ft ³ | |
| Other (Specify) | | Each | | 0 | ea | |
| | | | | Features/Equipment Volume | 1,893 | ft ³ |
| | | | | Waste Fraction | 0.05 | |
| | | | | Waste Volume | 173 | ft ³ |
| | | | | Waste Density (lb/ft3) | 20 | |
| | | | | Waste Mass | 1,893 | lb |

**3.6 PLANNING AND PREPARATION
(Work Days)**

Estimate the number of workdays, by specific labor category, that will be required to complete planning and preparation activities. Include all labor categories, including Supervisor, Foreman, Craftsman, Technician, Health Physicist, Laborer, Clerical, and others as needed.

| Activity | Project Mgr/Health Physicist | Shipper | HPT | Skilled Workers | Unskilled Workers | Clerical |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------|-------------|-----------------|-------------------|------------|
| Preparation of Documentation for Regulatory Agencies | 2 | 0 | 0 | 0 | 0 | 0 |
| Submittal of Decommissioning Plan to NRC when required by 10 CFR 30.36(g)(1), 40.42(g)(1), or 70.38(g)(1) | 1 | 0 | 0 | 0 | 0 | 1 |
| Development of Work Plans | 1 | 0.5 | 0 | 0 | 0 | 0.25 |
| Procurement of Special Equipment | 1 | 0 | 0 | 0 | 0 | 0 |
| Staff Training | 0.5 | 0 | 0 | 0 | 1 | 0 |
| Characterization of Radiological Conditions (including sampling, soil and tailings analysis, or groundwater analysis, if applicable) | 1.25 | 0 | 1.25 | 0 | 0 | 0.25 |
| Other (specify) Mobilization | 0.5 | 0.5 | 0.5 | 0 | 0 | 0 |
| TOTALS | 7.25 | 1 | 1.75 | 0 | 1 | 1.5 |

**3.7 DECONTAMINATION OR DISMANTLING OF RADIOACTIVE FACILITY COMPONENTS
(Work Days)**

Estimate the number of workdays, by specific labor category, that will be required to complete decontamination and/or dismantling activities for each facility component. Copy and complete this table as necessary for each room, laboratory, or area. Rooms, laboratories, or areas with similar levels of contamination may be consolidated in one table.

| Name of room, laboratory, or area: | | Laundry | | | | | |
|------------------------------------|------------------|-----------------------------------------|------------|-------------|-----------------|-------------------|------------|
| Level of Contamination: | | ≈1,000 -500,000 dpm/100 cm ² | | | | | |
| Component | Action | Project Mgr/Health Physicist | Shipper | HPT | Skilled Workers | Unskilled Workers | Clerical |
| Glove Boxes | Remove/Disp | | | | | | |
| Fume Hoods | Remove/Disp | | | | | | |
| Lab Benches | Decon/Remove | 0.1 | 0 | 0.5 | 0.5 | 0 | 0.1 |
| Sinks | Decon/Remove | 0.1 | 0 | 0.5 | 0.5 | 0 | 0.1 |
| Drains | Remove/Disp | 0.1 | 0 | | 0 | 0.5 | 0.1 |
| Floors | Decon/Wipe | 0.1 | 0 | 0.3 | 0 | 1 | 0.1 |
| Walls | Decon/Wipe | 0.1 | 0 | 0.1 | 0 | 0.2 | 0.1 |
| Ceilings | Decon/Wipe | 0.1 | 0 | 0.2 | 0 | 0.2 | 0.1 |
| Ventilation/Ductwork | Remove/Dismantle | 0.1 | 0 | 1 | 1 | 1 | 0.1 |
| Cabinets | Decon/Remove | 0 | 0 | 0 | 0 | 0 | 0.1 |
| Hot Cells | Remove/Disp | | | | | | |
| Equipment/Materials | Sur/Rem/Disp | 1 | 0.3 | 4 | 2 | 2 | 0.1 |
| Soil Plots | Sample | | | | | | |
| Storage Tanks | Remove/Disp | 0.2 | 0.3 | 1 | | 0.5 | |
| Storage Areas | Remove/Disp | | | | | | |
| Radwaste Areas | Remove/Disp | 0.2 | 0.5 | 0.2 | | 0.5 | 0.1 |
| Scrap Recovery Areas | N/A | | | | | | |
| Maintenance Shop | Remove/Disp | | | | | | |
| Equipment Decontamination | Decon/Remove | | | 1 | 2 | 2 | |
| Sewer Line | Remove/Disp | 1 | 0.3 | 2 | | 2 | 0.5 |
| Other (specify) | Remove/Disp | | | | | | |
| TOTALS | | 3.1 | 1.4 | 10.8 | 6 | 9.9 | 1.5 |

**3.8 RESTORATION OF CONTAMINATED AREAS ON FACILITY GROUNDS
(Work Days)**

Estimate the number of work days, by specific labor category, that will be required to restore contaminated areas on the facility grounds.

| Name of room, laboratory, or area: | | Laundry | | | | |
|------------------------------------|------------------------------|---------|-----|-----------------|-------------------|----------|
| Activity | Project Mgr/Health Physicist | Shipper | HPT | Skilled Workers | Unskilled Workers | Clerical |
| Restore Floors | 0.5 | 0 | 0.5 | 1 | 2 | 0.25 |
| Restore Walls | | | | | | |
| Restore Roof | | | | | | |
| Restore Utilites | | | | | | |
| TOTALS | 0.5 | 0 | 0.5 | 1 | 2 | 0.25 |

**3.9 FINAL RADIATION SURVEY
(Work Days)**

Estimate the number of work days, by specific labor category, that will be required to conduct a final radiation survey.

| Name of room, laboratory, or area: | | Laundry | | | | |
|------------------------------------|------------------------------|----------|--------------|-----------------|-------------------|----------|
| Activity | Project Mgr/Health Physicist | Shipper | HPT | Skilled Workers | Unskilled Workers | Clerical |
| FSS Setup | 1 | | 0.5 | | | 0.25 |
| Survey Packages | 0.5 | | 0.25 | | | 0.25 |
| Class 1 | 0.5 | | 4 | | | 0.25 |
| Class 2 | 0.5 | | 4 | | | 0.25 |
| Class 3 | 0.5 | | 2 | | | |
| TOTALS | 3 | 0 | 10.75 | 0 | 0 | 1 |

**3.10 SITE STABILIZATION AND LONG-TERM SURVEILLANCE
(Work Days)**

Estimate the number of work days, by specific labor category, that will be required to complete site stabilization and long-term surveillance activities.

| Activity | Project Mgr/Health Physicist | Shipper | HPT | Skilled Workers | Unskilled Workers | Clerical |
|--------------------------|------------------------------|---------|-----|-----------------|-------------------|----------|
| No Site Stabilization or | | | | | | |
| Long Term Maintenance | | | | | | |
| | | | | | | |
| | | | | | | |
| TOTALS | 0 | 0 | 0 | 0 | 0 | 0 |

3.11 TOTAL WORK DAYS BY LABOR CATEGORY

Enter the total work days for each specific labor category from the applicable table above (i.e., from the bottom rows of Tables 3.6 through 3.10).

| Task | Project Mgr/Health Physicist | Shipper | HPT | Skilled Workers | Unskilled Workers | Clerical |
|--------------------------------------------------------------------------------------------------------------------|------------------------------|---------|-------|-----------------|-------------------|----------|
| Planning and Preparation (TOTALS from Table 3.6) | 7.25 | 1 | 1.75 | 0 | 1 | 1.5 |
| Decontamination and/or Dismantling of Radioactive Facility Components (Sum of TOTALS from all copies of Table 3.7) | 3.1 | 1.4 | 10.8 | 6 | 9.9 | 1.5 |
| Restoration of Contaminated Areas on Facility Grounds (TOTALS from Table 3.8) | 0.5 | 0 | 0.5 | 1 | 2 | 0.25 |
| Final Radiation Survey (TOTALS from Table 3.9) | 3 | 0 | 10.75 | 0 | 0 | 1 |
| Site Stabilization and Long-Term Surveillance (TOTALS from Table 3.10) | 0 | 0 | 0 | 0 | 0 | 0 |

3.12 WORKER UNIT COST SCHEDULE

Estimate labor costs (including salary, fringe benefits, and corporate overhead). Include all appropriate labor categories, including Supervisor, Foreman, Craftsman, Technician, Health Physicist, Laborer, Clerical, and others as needed.

| Labor Cost Component | Project Mgr/Health Physicist | Shipper | HPT | Skilled Workers | Unskilled Workers | Clerical |
|---------------------------------------|------------------------------|-----------|-----------|-----------------|-------------------|----------|
| Salary & Fringe (\$/year) | \$67,000 | \$45,000 | \$45,000 | \$35,000 | \$20,000 | \$24,000 |
| Overhead Rate (%) | 125% | 125% | 125% | 125% | 125% | 125% |
| Total Cost Per Year | \$150,750 | \$101,250 | \$101,250 | \$78,750 | \$45,000 | \$54,000 |
| Living Expenses (PD*7/5) ¹ | \$203 | \$203 | \$203 | \$203 | \$0 | 0 |
| Total Cost Per Work Day ² | \$783 | \$592 | \$592 | \$506 | \$173 | \$208 |

¹ Per Diem Rate: \$145 per day.

² Based on 260 work days per year (e.g., 260).

3.13 TOTAL LABOR COSTS BY MAJOR DECOMMISSIONING TASK

Multiply the estimated work days for each specific labor category (from Table 3.11) by the total cost per work day for the corresponding labor category (from Table 3.12), and enter the results in the table below. Then, add across all labor categories to determine the total labor costs for each major decommissioning task.

| Labor Cost Component | Project Mgr/Health Physicist | Shipper | HPT | Skilled Workers | Unskilled Workers | Clerical | Total Labor Cost |
|-----------------------------------------------------------------------|------------------------------|---------|---------|-----------------|-------------------|----------|------------------|
| Planning and Preparation | \$5,675 | \$592 | \$1,037 | \$0 | \$173 | \$312 | \$7,789 |
| Decontamination and/or Dismantling of Radioactive Facility Components | \$2,427 | \$829 | \$6,398 | \$3,035 | \$1,713 | \$312 | \$14,715 |
| Restoration of Contaminated Areas on Facility Grounds | \$391 | \$0 | \$296 | \$506 | \$346 | \$52 | \$1,592 |
| Final Radiation Survey | \$2,348 | \$0 | \$6,369 | \$0 | \$0 | \$208 | \$8,925 |
| Site Stabilization and Long-Term Surveillance | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |

**3.14 PACKAGING, SHIPPING, AND DISPOSAL OF RADIOACTIVE WASTES
(Excluding Labor Costs)**

(a) Packing Material Costs

Estimate the types and volumes of waste expected to be generated, along with the number and types of containers required for packaging the waste. Multiply the number of containers required by the unit cost per container.

| Waste Type | Volume (ft3) | Number of Containers | Type of Containers | Unit Cost of Container | Total Packaging Costs |
|--------------|--------------|----------------------|-----------------------------------|------------------------|-----------------------|
| DAW | 96 | 9 | B-25 | \$700 | \$6,300 |
| Metal | 173 | 2 | B-25 | \$700 | \$1,400 |
| Liquids | 0 | 0 | 55 gal. inner 85 gal. overpack | \$200 | \$0 |
| Biological | 0 | 0 | 55 gal. inner 85 gal. overpack | \$200 | \$0 |
| TOTAL | | | | | \$7,700 |

(b) Shipping Costs

Estimate the types and volumes of waste expected to be generated, along with the number and types of containers required for packaging the waste. Multiply the number of containers required by the unit cost per container.

| Waste Type | Number of Truckloads | Unit Cost (\$/mile/truckload) | Surcharges (\$/mile) | Overweight Charges (\$/mile) | Distance Shipped (miles) | Total Shipping Costs |
|--------------|----------------------|-------------------------------|----------------------|------------------------------|--------------------------|----------------------|
| DAW | 1 | \$0.00 | 1 | 1 | 800 | \$0 |
| Metal | 1 | \$0.00 | 1 | 1 | 800 | \$0 |
| Liquids | 0 | \$0.00 | 1 | 1 | 1 | \$0 |
| Biological | 0 | \$0.00 | 1 | 1 | 1 | \$0 |
| TOTAL | 2 | | | | | \$0 |

Shipping costs are included in waste disposal costs shown below.

(c) Waste Disposal Costs

Estimate the volume of waste to be disposed. Multiply the volume of waste disposed by the unit disposal cost (including any volume based surcharges). Add any surcharges that are based on the number of containers of waste, along with the number and types of containers required for packaging the waste. Multiply the number of containers required by the unit cost per container.

| Waste Type | Disposal Volume (ft3) | Density (lb/ft3) | Disposal Mass (lbs) | Unit Cost | Surcharges (\$/ft3 or \$/container) | Total Disposal Costs |
|--------------|-----------------------|------------------|---------------------|-----------|-------------------------------------|----------------------|
| DAW | 96 | 15 | 1440 | 7.50 | 1 | \$10,800 |
| Metal | 173 | 20 | 3463 | 2.50 | 1 | \$8,658 |
| Liquids | 0 | 60 | 0 | 4.00 | 1 | \$0 |
| Biological | 0 | 20 | 0 | 25.00 | 1 | \$0 |
| TOTAL | 269 | | | | | \$19,458 |

3.15 EQUIPMENT/SUPPLY COSTS (Excluding Containers)

| Estimate the quantity of equipment and supplies required for decommissioning and multiply that quantity by the appropriate unit costs. | | | |
|----------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|-----------------------------|
| Equipment/Supplies | Quantity | Unit Cost | Total Equipment/Supply Cost |
| Protective Clothing | 1 | \$500 | \$500 |
| Respirators | 0 | | \$0 |
| Misc Tools | 1 | \$1,000 | \$1,000 |
| Consumables | 1 | \$500 | \$500 |
| TOTAL | | | \$2,000 |

3.16 LABORATORY COSTS

| If applicable, estimate the costs for analyses to be performed by an independent third party laboratory. | | | |
|----------------------------------------------------------------------------------------------------------|----------|-----------|-----------------|
| Activity | Quantity | Unit Cost | Total Item Cost |
| Sampling | 5 | \$100 | \$500 |
| Transport of Samples | 1 | \$50 | \$50 |
| Testing and Analysis | 5 | \$100 | \$500 |
| Other (specify) | | | |
| TOTAL | | | \$1,050 |

3.17 MISCELLANEOUS COSTS

| Estimate any other applicable costs. | |
|--------------------------------------|------------|
| Activity | Total Cost |
| License Fees | --- |
| Insurance | \$443 |
| Taxes | \$6,323 |
| Backhoe & operator, 2 days | \$1,500 |
| TOTAL | \$8,265 |

3.18 TOTAL DECOMMISSIONING COSTS

Enter the total costs reported in Tables 3.13, 3.14(a)-(c), 3.15, 3.16, and 3.17 into the appropriate cells below, and add them to obtain a subtotal. Add to the subtotal a contingency allowance in the amount of 25 percent of the total decommissioning cost estimate. Also, calculate for each task/component the percentage it represents of the total.

| Task/Component | Cost | Percentage |
|------------------------------------------------------------------------------|-----------------|---------------|
| Planning and Preparation (from Table 3.13) | \$7,789 | 10.9% |
| Decontamination and/or Dismantling of Radioactive Facility (From Table 3.13) | \$14,715 | 20.6% |
| Restoration of Contaminated Areas on Facility Grounds (From Table 3.13) | \$1,592 | 2.2% |
| Final Radiation Survey (From Table 3.13) | \$8,925 | 12.5% |
| Packing Material Costs (TOTAL from Table 3.14(a)) | \$7,700 | 10.8% |
| Shipping Costs (TOTAL from Table 3.14(b)) | \$0 | 0.0% |
| Waste Disposal Costs (TOTAL from Table 3.14(c)) | \$19,458 | 27.2% |
| Equipment/Supply Costs (TOTAL from Table 3.15) | \$2,000 | 2.8% |
| Laboratory Costs (TOTAL from Table 3.16) | \$1,050 | 1.5% |
| Miscellaneous Costs (TOTAL from Table 3.17) | \$8,265 | 11.6% |
| SUBTOTAL | \$71,493 | 100.0% |
| 25% Contingency | \$17,873 | 25.0% |
| TOTAL DECOMMISSIONING COST ESTIMATE | \$89,366 | 125.0% |