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October 26, 2000

United States Nuclear Regulatory Agency
475 Allendale Road
King of Prussia, Pa. 19406
Attention: Marie Miller

030-05980

Re: Decommissioning Plan and Cost Estimate for license no. 37-00030-02

Dear Ms. Miller,

The above enclosures satisfies condition 13 of license 37-00030-02.

If you have any further questions, please do not hesitate to contact me.

Very Truly Yours,

Larry Harmon

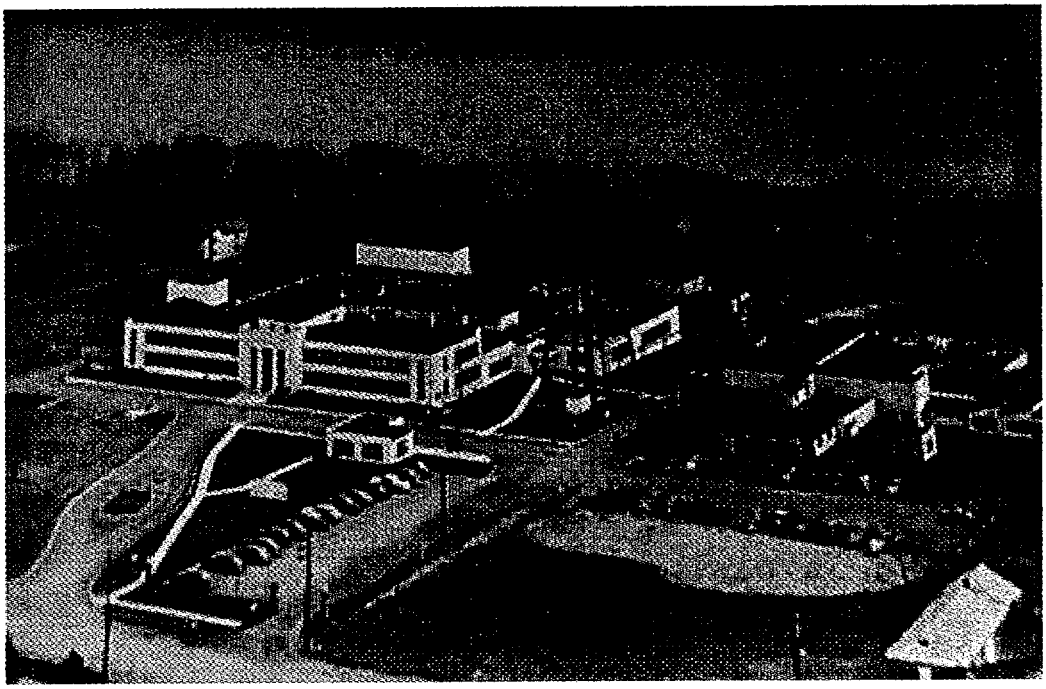
Larry Harmon,
Plant Manager

Decommissioning Cost Estimate for Safety Light Corporation Bloomsburg, Pennsylvania

NRC Material License No. 37-00030-02

Revision 0

October 2000



Prepared for:
Safety Light Corporation
Bloomsburg, Pennsylvania

Prepared by:
GTS Duratek
Radioactive Solutions
628 Gallaher Rd.
Kingston, TN 37763

DECOMMISSIONING COST ESTIMATE

for

SAFETY LIGHT CORPORATION
BLOOMSBURG, PENNSYLVANIA
NRC Material License No. 37-00030-02

Revision 0
October 2000

Prepared By: Paul C Ely — 10/13/2000
Paul Ely
Senior Radiological Engineer
Date

Reviewed By: Sandra M Beeler — 10/13/2000
Sandra M. Beeler
Senior Radiological Engineer
Date

Approved By: Robert Hornbeck — 10/16/2000
Robert Hornbeck
Operations Manager
Commercial Services
Date

Prepared By:

GTS Duratek, Inc.
628 Gallaher Road
Kingston, TN 37763

PROPRIETARY STATEMENT

EXECUTIVE SUMMARY

GTS Duratek, Inc. performed an independent cost estimate for decommissioning portions of the Safety Light Corporation facility located in Bloomsburg, Pennsylvania that are covered by NRC License No. 37-00030-02. Amendment 51 to this license required that Safety Light provide to the NRC Region I office "a schedule and plan for continuation of site remediation...including any revised decommissioning cost estimates." This estimate was prepared at the request of the Safety Light Corporation to satisfy this license commitment.

This cost estimate was developed using a systematic approach. Decommissioning criteria were identified and 1995 characterization survey data were reviewed. Specific and general information regarding equipment and structures was used in determining decontamination and demolition methodologies in order to minimize overall decommissioning costs.

This estimate includes itemized costs for manpower and equipment resources, radioactive waste volume reduction, packaging, shipping and burial activities, and the performance of final status surveys for buildings and structures. The estimated decommissioning cost is $23,508,275 in terms of 2000 dollars. This estimate is for budgetary purposes only and is not a proposal for GTS Duratek, Inc, to perform the decommissioning work.

A significant portion of the overall decommissioning costs is attributed to the processing or burial of radioactive waste. The radioactive waste disposal rate used for most of the waste in this estimate was based on shipping to Envirocare of Utah and upon negotiating a favorable rate with Envirocare of Utah based on a large waste volume and low levels of activity.

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1.0 INTRODUCTION

1.1 Purpose

GTS Duratek (GTSD) has prepared this document for the purpose of providing a cost estimate for decommissioning portions of the Safety Light Corporation that are covered by NRC License No. 37-00030-02. Amendment 51 to this license required that Safety Light provide to the NRC Region I office "a schedule and plan for continuation of site remediation...including any revised decommissioning cost estimates." This estimate was prepared at the request of the Safety Light Corporation to satisfy this license commitment.

The estimate includes only activities and cost factors necessary to reduce residual radioactivity to levels that will permit release of the associated structures, buildings and grounds for unrestricted use.

Costs associated with the demolition and removal of non-contaminated equipment or structures are not included in this cost estimate unless such activities are required to support decommissioning. An actual date to complete the site decommissioning has not been projected. The cost estimate provided by this report is in terms of 2000 dollars.

1.2 Scope

The scope of this report is to present the estimated costs derived for decommissioning portions of the Safety Light Corporation that are covered by NRC License No. 37-00030-02. The specific areas covered by this estimate include:

- Specified Rooms from the Etching Building
- Soil North of Well 5
- Ion Exchange Building and Surrounding Soil
- Old Garage Foundation and Surrounding Soil
- Soil Under Old Loading Dock
- 8 x 8 Block Building and Surrounding Soil
- Old Radium Vault and Surrounding Soil
- Soil Around Machine Shop
- Above-Ground Silo and Surrounding Soil
- Main Building
- Etching Building
- Personnel Office Building
- Lacquer Storage Building
- USR Liquid Waste Building
- Well House
- Pipe Shop

- Old House
- Strontium-90 Sources Vault
- Subsurface Soil Surrounding Underground Silo Area
- Abandoned Canal Area
- East and West Lagoon Area
- East Plant Dump
- West Plant Dump
- Drain Lines
- Drywell Tanks
- Soil by Old Berwick Rd
- Soil from Vance-Walton Property
- Soil North of Lacquer Storage Building
- Employee Parking Area
- Sidewalk Areas
- Site Paved Roads
- All Other Land Inside Fenced Area

Decommissioning costs are directly related to the degree of remediation required and the amount of radioactive waste generated. The extent of remediation is based on radiological data, proven decontamination processes and data from similar projects. The volume and weight of radioactive waste was estimated based on data obtained from site drawings, and direct measurements in the facility.

1.3 Assumptions and Bases

The following assumptions and bases were utilized in developing the cost estimate.

- Some of the older more contaminated buildings or buildings in disrepair will be removed completely. The main office building, most of the etching building, and the USR Metals liquid waste building will remain in place after decommissioning. They will be decontaminated, if required, and free released but they will not be refurbished, if required, to make them useable.

- Uncontaminated processing equipment, such as the electroplating equipment in the etching building, can have high intrinsic values and will be used at another location or sold during decommissioning. There was no cost included for decommissioning this equipment and no salvage value credit taken for this equipment.

- Contaminated equipment will be decontaminated on site, processed at a volume reduction facility prior to disposal, or sent directly to a licensed

radioactive material disposal site. The waste processing facility is assumed to be the GTS Duratek facility located 670 miles away in Oak Ridge, Tennessee.

- Radioactive waste with low specific activity will be sent to Envirocare of Utah. It was assumed that partially decontaminated equipment, protective clothing wastes, removed concrete, miscellaneous DAW and soil would qualify for disposal at Envirocare of Utah.

- Radioactive waste not suitable for disposal at Envirocare of Utah can be sent to the Barnwell, South Carolina disposal site. However, all waste qualified for disposal at Envirocare of Utah under their current license and waste acceptance criteria.

- The site remediation contractor will provide most of the demolition equipment and survey instrumentation at prevailing rates.

- Local decontamination technicians and supervisors will be used to staff this project; therefore, no travel and living funds are included for them. Health Physics technicians and supervisors and project management personnel will not be local hires; therefore, funds for travel and living expenses were included.

- Construction labor rates were obtained from 2000 RS Means Building Construction Cost Data for Harrisburg, Pennsylvania.

2.0 GENERAL FACILITY DESCRIPTION

The Safety Light Corporation site is located in South Centre Township of Columbia County in central Pennsylvania, about 6 miles east of Bloomsburg and 6 miles west of Berwick. The north site boundary is the Old Berwick Road and the south site boundary is the Susquehanna River. Safety Light Corporation owns the Vance/Walton property located along the southeast corner of the site. Other residential tracts of land are adjacent to the east and west boundaries of the site.

Safety Light Corporation occupies approximately 2 acres of the 10-acre site. The current product line includes a variety of tritium-based products:

- self-luminous safety devices for use in commercial/military aircraft, commercial buildings and marking of aircraft and helicopter landing areas;
- research and industrial applications;
- titanium tritide-coated rods and pins for use in military and industrial type electron tubes; and
- tritium targets for use in neutron-generating devices.

Safety Light leases the remaining 8 acres of the site to USR Metals, Inc., who conducts non-radioactive operations involving the manufacture of dials, nameplates, and other specialty products used in a variety of industrial and military applications. Their operations also involve anodizing of aluminum products, and application of specialty protective films to the surfaces of various metal items.

An old aerial photograph of the site appears in Figure 2-1, Safety Light Facility. Figure 2-2, Plan of Safety Light Facility shows existing buildings and features. This decommissioning cost estimate does not address the nuclear building, machine shop, solid waste building, and liquid waste building, which support current operations under NRC License 37-00030-08.

The Characterization Survey of Safety Light Corporation Site at Bloomsburg, Pennsylvania U.S.A (Monserco 1996) documents available information on site history from the 1940's through 1995. Section 3.1 of the decommissioning plan developed concurrently with this cost estimate summarizes the proposed decommissioning planning and estimating.

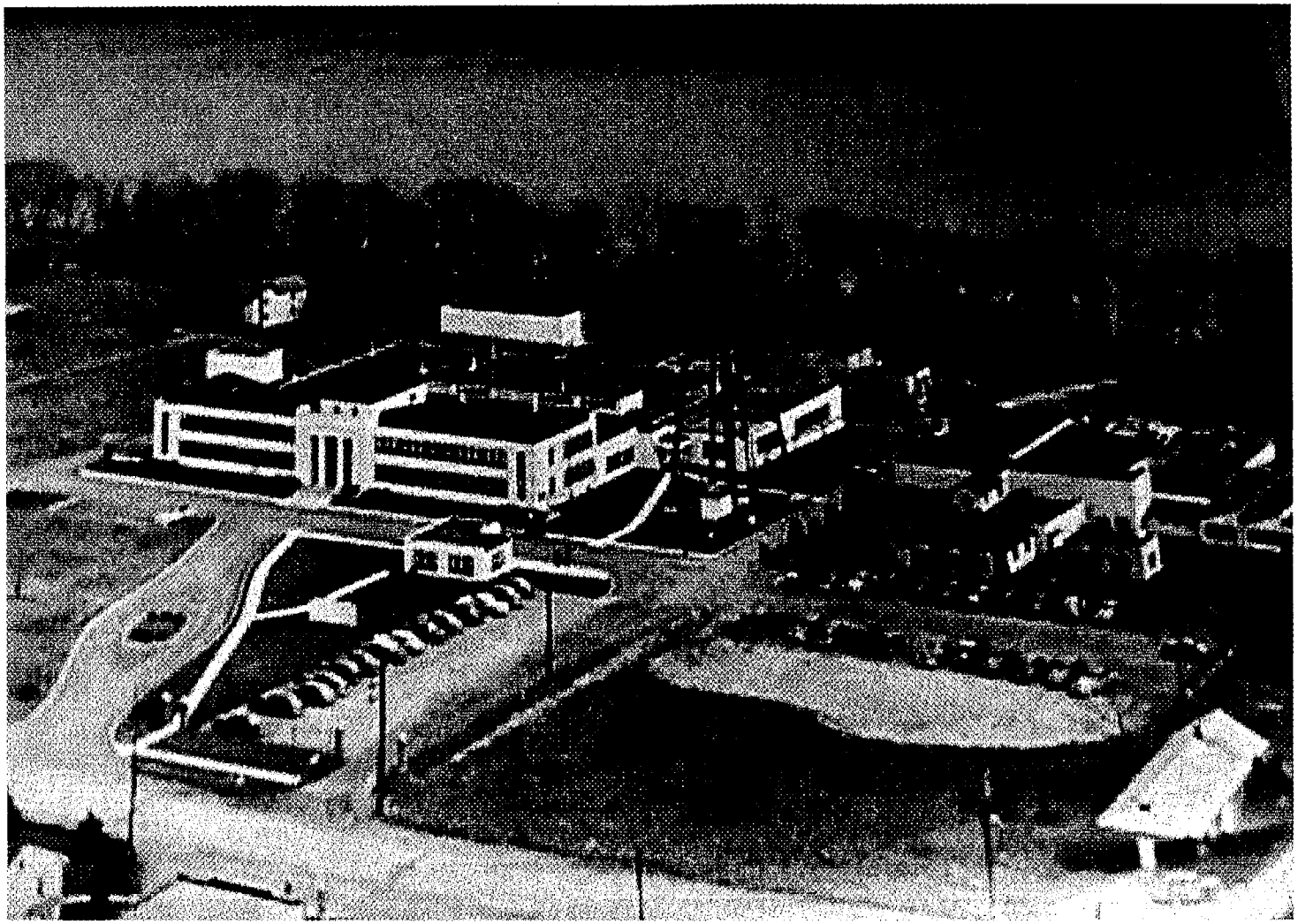

Figure 2-1 Safety Light Facility

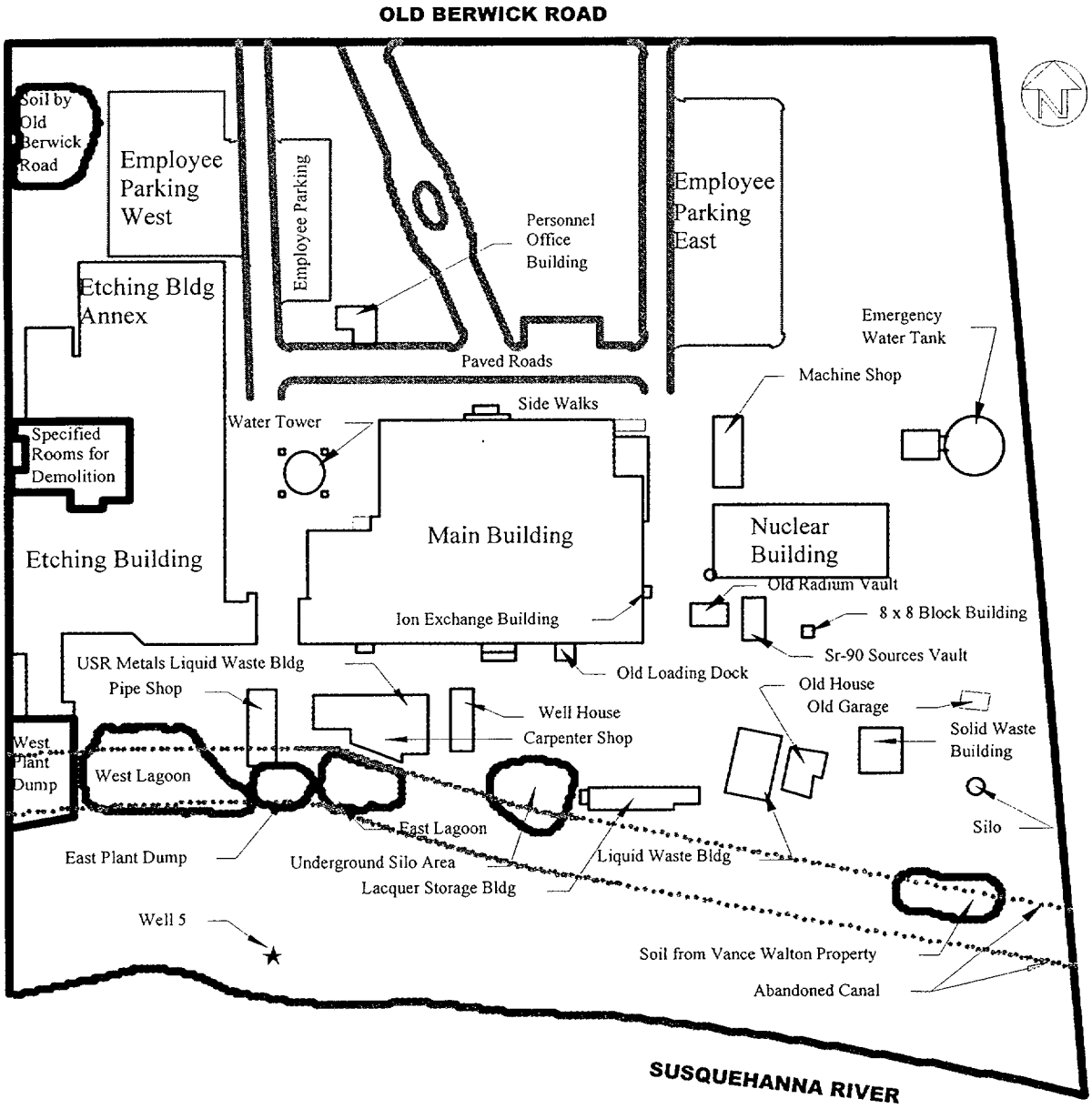

Figure 2-2 Plan of Safety Light Facility

3.0 DECOMMISSIONING CRITERIA

GTS Duratek engineers visited the Safety Light facility in Bloomsburg, Pennsylvania in June of 2000 to gather physical and radiological data. Facility sketches, building sketches, and radiological data for affected areas were obtained. On site staff members were interviewed to determine the radiological history of affected areas and the site in general.

3.1 Radionuclides of Interest

The principle radionuclides of interest are cesium-137, radium-226, strontium-90, and americium-241.

3.2 Radiological Criteria for License Termination

NRC regulations (10 CFR 20.1402) contain two separate and independent requirements for license termination:

- a 25 mrem per year dose limit must be met, and
- levels of residual radioactivity must be ALARA.

There are at least three (3) methods to demonstrate compliance with the license termination ALARA requirement:

- the quantitative method in DG-4006, *Demonstrating Compliance with the Radiological Criteria for License Termination*, including the D&D code; (NRC 1998b)
- by reference to other appropriate analyses (e.g., the Generic Environmental Impact Statement, NUREG-1496); and
- qualitative judgments (e.g., good practice, engineering judgment, unreasonable expense).

This report applies the quantitative method in DG-4006.

The proposed Derived Concentration Guideline Levels (DCGLs) for surface contamination at the Safety Light facility are those published in the 1998 Federal Register Notice, Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination (Table 1) (NRC 1998a), supplemented by RESRAD-BUILD calculations for radium-226 and americium-241. (Refer to Attachment 1, Safety Light Dose Assessment, of the current decommissioning plan.)

Buildings with surface contamination below these levels will be deemed acceptable for release for unrestricted use provided that (NRC 2000):

- Residual radioactivity has been reduced to levels that are "as low as is reasonably achievable" (ALARA),
- The residual radioactivity is contained in the top layer of the building surface (i.e., there is no volumetric contamination), and
- The fraction of removable surface contamination does not exceed 0.1.

The proposed DCGLs for surface soil (top 15 centimeters) contamination were calculated using RESRAD. (Refer to Attachment 1, Safety Light Dose Assessment, of the current decommissioning plan). These levels will be deemed acceptable for release for unrestricted use provided that (NRC 2000):

- Residual radioactivity has been reduced to levels that are ALARA,
- The residual radioactivity is contained in the top layer of the surface soil (i.e., a thickness of approximately 15 cm),
- The unsaturated zone and the groundwater are initially free of radiological contamination, and
- The vertical saturated hydraulic conductivity at the specific site is greater than the infiltration rate.

Additional subsurface soil analyses were required for the Safety Light site because there is activity below the surface soil layer. Attachment 1, Safety Light Dose Assessment, of the current decommissioning plan describes the RESRAD runs used to assign DCGLs for subsurface soil contamination. The numerical release criterion proposed for demonstrating that the dose criterion has been met for soils will be that the sum-of-fractions (quotients of concentrations and DCGLs) of contributing radionuclides for both surface and subsurface soil shall be less than unity. If a survey unit fails to meet this numerical release criterion, the need for additional sampling or remediation will be evaluated. Table 3-1 lists the proposed DCGLs for surfaces and soil.

Table 3-1: DCGLs for Surfaces and Soil

Radionuclide	Surface Contamination DCGL ($dpm/100cm^2$)	Surface Soil Concentration (to 15 cm) DCGL (pCi/g)	Subsurface Soil Concentration 15cm to 2 m deep DCGL (pCi/g)
H-3	1.2 E+08	7,773	696
Sr-90	8.7 E+03	30.1	6.1
Cs-137	2.8 E+04	14.1	43
Ra-226 + C	3.5 E+03	4	1.8
Am-241	1.8 E+02	10.3	1.1

+C indicates the value for radium-226 with its decay progeny in equilibrium. This value is the concentration of the parent radionuclide, but accounts for contributions from the complete chain of progeny in equilibrium with the parent radionuclide.

3.3 Characterization Data

The 1995 site characterization (Monserco 1996) included direct measurements of accessible structures and equipment and soil and water sampling. The principle radionuclides of interest are cesium-137, radium-226, and americium-241. Cobalt-60, strontium-90, polonium-210, and tritium were also detected. The outdoor area surveys were performed after establishing a grid pattern for the site. This grid pattern is shown in Figure 3-1. Figures 3-2 and 3-3 show the relative cesium-137 and radium-226 activity found in surface soils by survey grid.

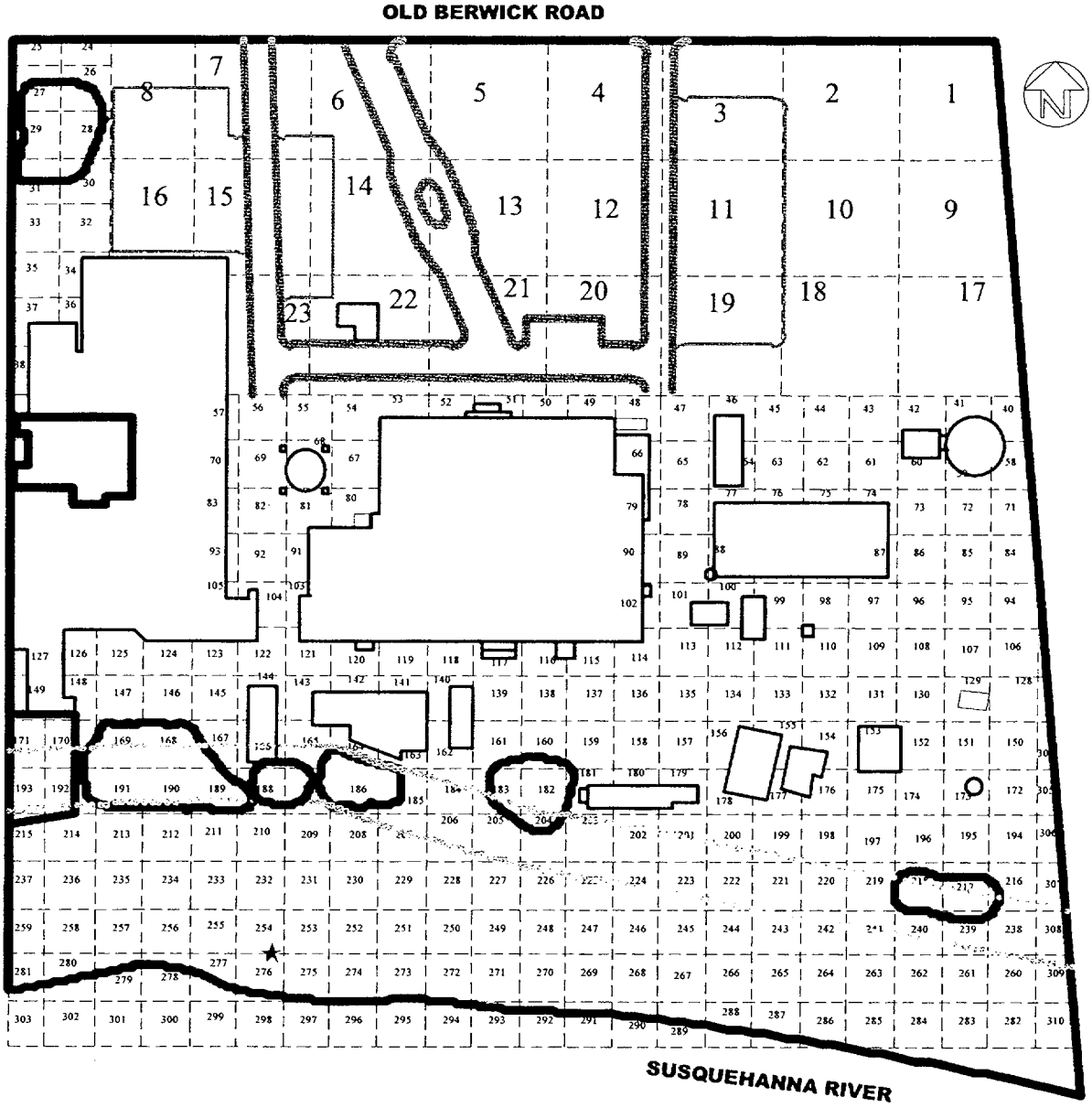

Figure 3-1 Outdoor Grid Pattern for the Safety Light Facility

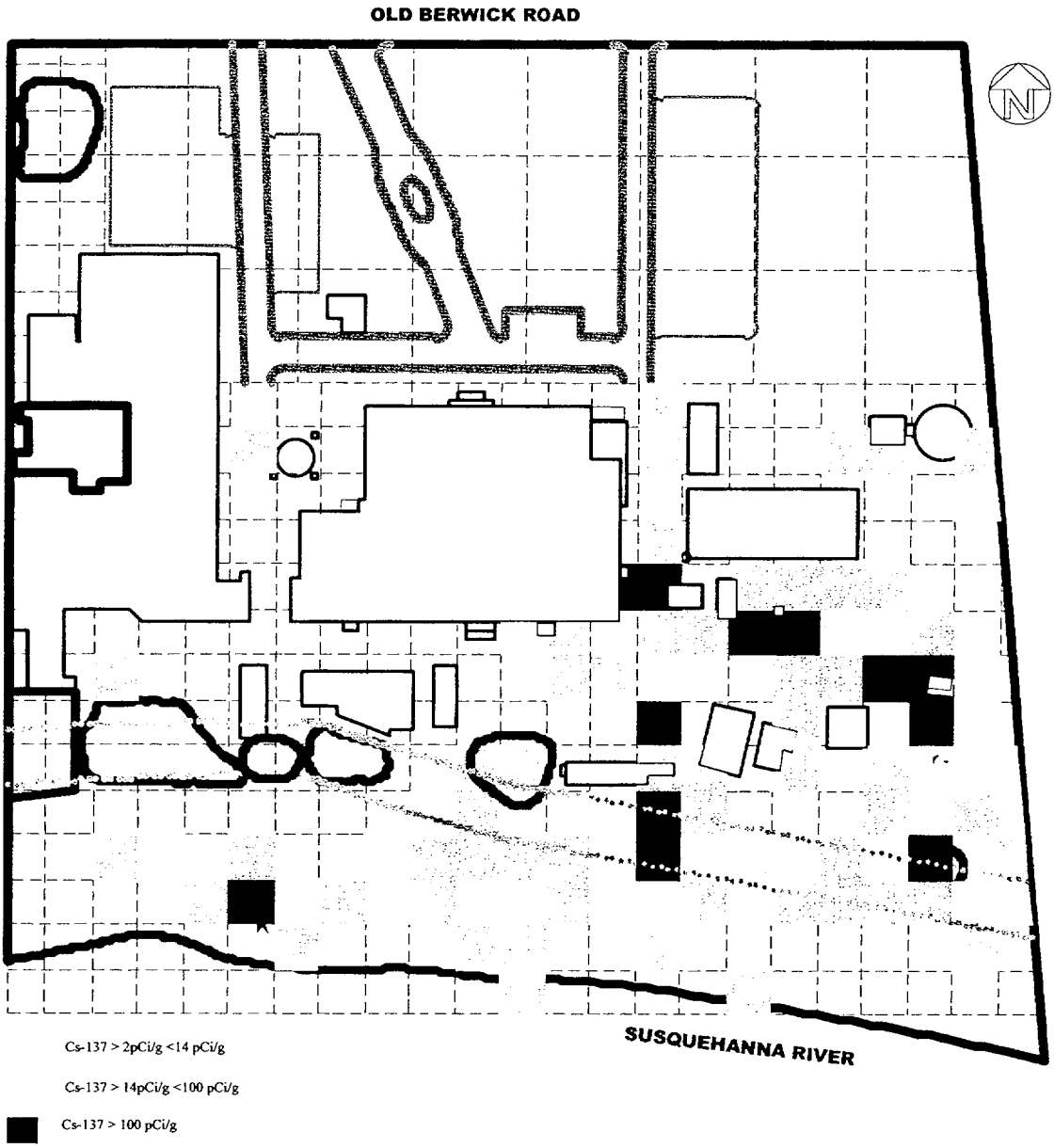

Figure 3-2 Cesium-137 Activity in Safety Light Surface Soil

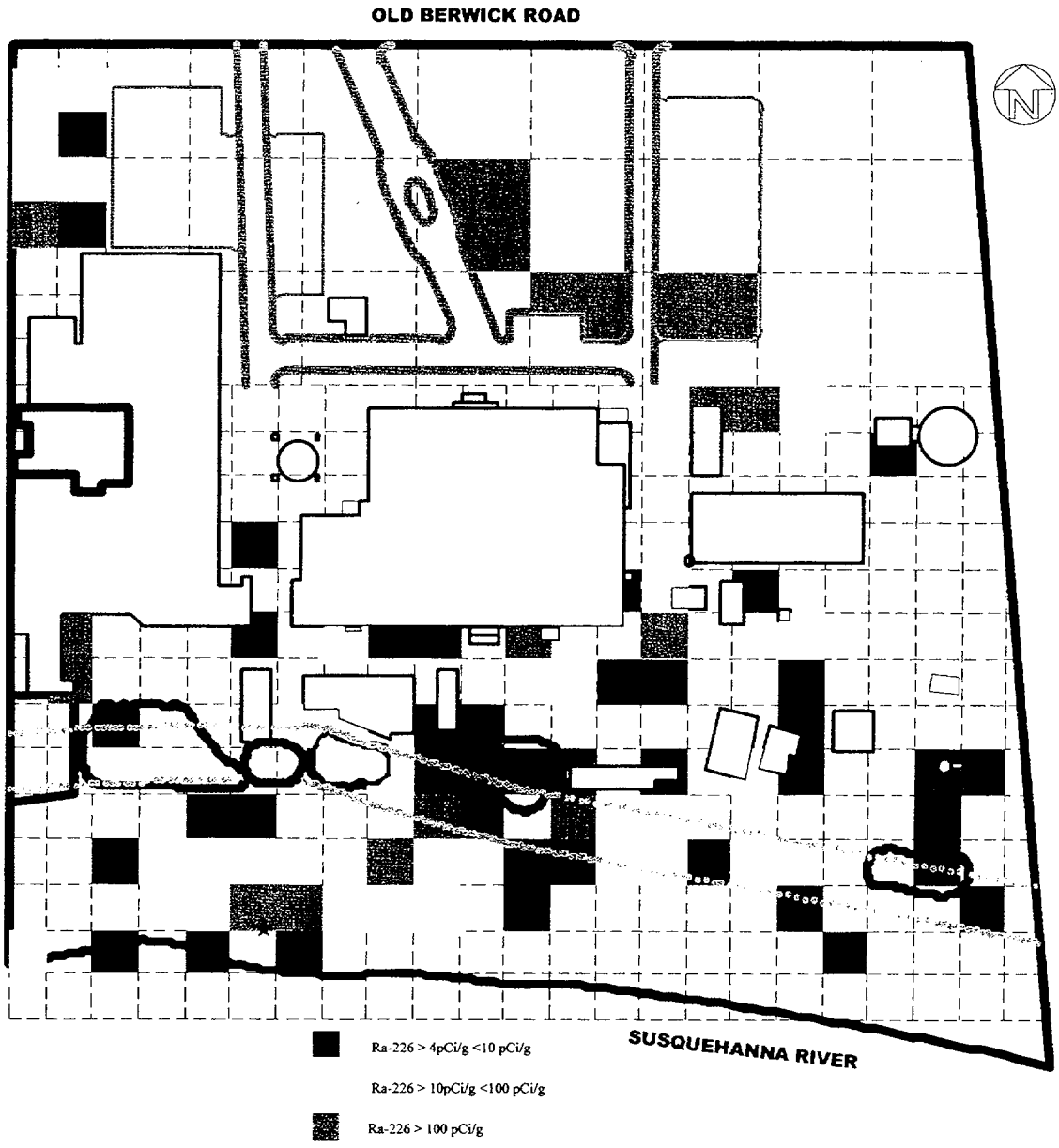

Figure 3-3 Radium-226 Activity in Safety Light Surface Soil

4.0 ESTIMATION METHODS

The estimated cost to decommission the licensed areas at the Safety Light Corporation facility is $23,508,275. This section of the cost estimate report provides an overview of the considerations and factors that influenced the decommissioning cost estimate. Table 4-1 provides a summary of the costs associated with each area of the facility.

Table 4-1: Decommissioning Cost Summary – Safety Light Facility

Operation	Man-hours	Labor	Equipment, Contracts & Supplies	Radwaste Shipping and Disposal	Total* Cost
Specified Rooms from the Etching Building	2,849	$176,447	$35,081	$1,503,726	$1,715,254
Soil North of Well 5	104	$6,439	$1,154	$621,262	$628,854
Ion Exchange Building and Surrounding Soil	66	$4,110	$6,577	$19,542	$30,230
Old Garage Foundation and Surrounding Soil	165	$10,250	$1,837	$83,916	$96,002
Soil Under Old Loading Dock	34	$2,121	$2,398	$11,556	$16,075
8 x 8 Block Building and Surrounding Soil	181	$11,230	$2,012	$34,565	$47,808
Old Radium Vault and Surrounding Soil	256	$15,872	$6,297	$148,312	$170,481
Soil Around Machine Shop	77	$4,794	$859	$486,976	$492,629
Above Ground Silo and Surrounding Soil	173	$10,717	$92,921	$51,761	$155,399
Remaining Site Buildings and Structures	26,692	$1,653,175	$296,210	$3,253,456	$5,202,842
Remaining Site Soils	5,801	$359,284	$266,838	$7,709,269	$8,335,391
Decommissioning Planning	240	$22,800			$22,800
Characterization Survey	4,008	$238,895	$42,357		$281,252
Final Survey	16,033	$955,581	$169,427		$1,125,008
Planning, Training & Mobilization	500	$25,223			$25,223
Safety Light Oversight	2,833	$283,333			$283,333
Regulatory & Licensing	3,311	$158,038			$158,038
NRC Verification Survey					$20,000
TOTALS	63,326	$3,938,311	$923,968	$13,924,342	$18,806,620
			25% Contingency		$4,701,655
			GRAND TOTAL		$23,508,275

4.1 Cost Modifying Factors

There are modifying factors that significantly affect the overall cost for remediation. One of these factors is an adjustment for productivity related to personnel protection requirements and working temperatures. The degree of protection required depends upon the extent of contamination and specific activities to be performed in a given area. As the level of personnel protection increases, so does the impact on individual productivity and task duration. Adjustments were made to account for the implementation of personnel protective measures where applicable. This estimate used

the standardized levels of personnel protection described in Table 4-2. The Productivity Factors related to these levels of personnel protection are provided in Table 4-3 for Light Work and in Table 4-4 for Heavy Work.

Table 4-2 : Personnel Protective Equipment Protection Summary

Level A:	The highest available level of respiratory, skin, and eye protection
Level B:	The highest level of respiratory protection, but less skin protection than Level A. Level B is the minimum level recommended for initial site entries, or for other entry conditions dealing with unknown hazards.
Level C:	The same level of skin protection as Level B, but a lower level of respiratory protection.
Level D Modified:	Skin protection similar to or the same as Level C, without respiratory protection.
Level D:	Standard work uniform suitable for construction work: no respiratory protection and minimal skin protection.

Table 4-3: Hazardous and Toxic Waste Productivity Factors: Light Work

Variables	U/M	Level A			Level B			Level C			Level D Modified			Level D		
		T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85
A. Standard losses	Min.	160	160	160	140	140	140	128	128	128	76	76	76	32	32	32
B. Scheduled/heat stress breaks	Min.	60	90	120	43	65	86	35	63	101	30	47	63	30	33	44
C. Dexterity losses	Min.	78	69	60	74	69	64	55	51	44	4	4	3	5	5	5
D. Total time lost per 8-hr. WD	Min.	298	319	340	257	274	290	218	242	273	110	127	142	67	70	81
E. Productivity time per 8-hr. WD	Min.	182	161	140	223	206	191	262	238	207	370	353	338	413	410	399
F. Productivity time on clean site	Min.	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430
G. HTW Productivity Factor		**0.42**	**0.37**	**0.33**	**0.52**	**0.48**	**0.44**	**0.61**	**0.55**	**0.48**	**0.86**	**0.82**	**0.79**	**0.96**	**0.95**	**0.93**

Notes:

- Standard delays account for all time losses independent of temperature variations. They include safety meetings, instructions, putting on and taking off of PPE, decontamination, switching air supply/filters, monitoring delays, and cleanup.
- Scheduled/heat stress breaks account for all paid rest periods per workday.
- Dexterity losses are based on subjective opinions of the percentage that PPE slows down a normal worker because of factors such as discomfort, clumsiness, weight, and restricted breathing and communication. The number of minutes actually worked is reduced by the percentage representing the average response for that particular PPE level.
- Values for A, B, and C were derived by averaging the survey responses for each PPE level. Responses that varied greatly from the average were subject to omission at the author's discretion.
- Total paid time = 480 minutes.
- 50-minute delay on clean site = 10-minute safety meeting and instructions + 10-minute cleanup + 30-minute breaks.
- Calculations:
  - D= A + B + C
  - E = 480 - D
  - F = 480 - 50
  - G = E/F
  - U/M = unit of measure
  - WD = workday
  - Min. = minutes
  - T = temperature (Fahrenheit)

Level A-protection is used in extreme emergency situations only. Productivity factors for Level A should be used with caution because they were extrapolated from 2 data points.

Table 4-4: Hazardous and Toxic Waste Productivity Factors: Heavy Work

Variables	U/M	Level A			Level B			Level C			Level D Modified			Level D		
		T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85	T<70	70<T	T>85
A. Standard losses	Min.	220	220	220	204	204	204	135	135	135	76	76	76	28	28	28
B. Scheduled/heat stress breaks	Min.	60	105	150	50	75	123	64	131	178	30	90	165	30	45	60
C. Dexterity losses	Min.	80	62	44	52	46	35	44	34	26	28	24	18	11	10	10
D. Total time lost per 8-hr. WD	Min.	360	387	414	306	325	362	243	300	339	134	190	259	69	83	98
E. Productivity time per 8-hr. WD	Min.	120	93	66	174	155	118	237	180	141	346	290	221	411	397	382
F. Productivity time on clean site	Min.	430	430	430	430	430	430	430	430	430	430	430	430	430	430	430
G. HTW Productivity Factor		**0.28**	**0.22**	**0.15**	**0.40**	**0.36**	**0.27**	**0.55**	**0.42**	**0.33**	**0.80**	**0.68**	**0.51**	**0.96**	**0.92**	**0.89**

Notes:

- Standard delays account for all time losses independent of temperature variations. They include safety meetings, instructions, putting on and taking off of PPE, decontamination, switching air supply/filters, monitoring delays, and cleanup.
- Scheduled/heat stress breaks account for all paid rest periods per workday.
- Dexterity losses are based on subjective opinions of the percentage that PPE slows down a normal worker because of factors such as discomfort, clumsiness, weight, and restricted breathing and communication. The number of minutes actually worked is reduced by the percentage representing the average response for that particular PPE level.
- Values for A, B, and C were derived by averaging the survey responses for each PPE level. Responses that varied greatly from the average were subject to omission at the author's discretion.
- Total paid time = 480 minutes.
- 50-minute delay on clean site = 10-minute safety meeting and instructions + 10-minute cleanup + 30-minute breaks.
- Calculations:
  - D= A + B + C
  - E = 480 - D
  - F = 480 - 50
  - G = E/F
  - U/M = unit of measure
  - WD = workday
  - Min. = minutes
  - T = temperature (Fahrenheit)
- Level A-protection is used in extreme emergency situations only. Productivity factors for Level A should be used with caution because they were extrapolated from 2 data points.

4.2 Radioactive Waste Volume Estimates

The volume of radioactive waste requiring treatment and disposal can be a very significant modifying factor due to the high cost for radwaste disposal. For the Safety Light decommissioning, the cost for radioactive waste processing, shipping, and disposal is anticipated to be about 74% of the total decommissioning cost. This is a much higher fraction than is normally seen for radioactive facilities because of the large volume of contaminated soil, facilities and equipment. Radioactive waste volume estimates are discussed in the following section. Table 4-5 provides an unprocessed waste volume summary for each area of the Safety Light facility.

Table 4-5: Safety Light Unprocessed Radioactive Waste Summary

Area Description	Contaminated Waste Volume (ft^3)	Contaminated Waste Weight (lb)	Generated Waste Volume (ft^3)
Specified Rooms from the Etching Building	18,469	934,137	33
Soil North of Well 5	7,679	614,335	4
Ion Exchange Building and Surrounding Soil	237	12,663	1
Old Garage Foundation and Surrounding Soil	1,032	84,960	2
Soil Under Old Loading Dock	143	11,400	0
8 x 8 Block Building and Surrounding Soil	422	22,288	3
Old Radium Vault and Surrounding Soil	1,831	96,284	3
Soil Around Machine Shop	6,021	481,650	2
Above Ground Silo and Surrounding Soil	636	39,388	2
Remaining Site Buildings and Structures	37,197	1,886,037	362
Remaining Site Soils	95,236	7,611,684	107
TOTALS	**168,902**	**11,794,826**	**522**

4.3 Radioactive Waste Disposal Costs

A significant portion of the overall decommissioning cost is generally attributed to the processing or burial of radioactive waste.

For many sites, the material to be disposed is first processed to the maximum extent possible. This can result in a significant reduction in the final cost for waste disposal. Current GTSD rates were used to assess the costs and benefits of waste processing for the Safety Light decommissioning project. This analysis revealed no benefit to incorporating volume reduction processes in the cost estimate. For example the cost to metal melt or decontaminate a contaminated tank was more than the cost to cut up the tank and ship it directly to Envirocare of Utah for disposal at a $62.10 per cubic foot disposal rate. The costs to transport waste to the Envirocare of Utah disposal site are based on a transport distance of 2109 miles, at a rate of $1.95 per mile.

4.4 Remediation Methods

The goal in choosing remediation methods is to select the minimum cost option to accomplish a task. There are many factors which need to be considered when selecting a method such as contamination levels, degree of penetration of contamination into substrate material, equipment cost, support equipment costs, material and chemical costs, the generation of secondary waste volumes (waste in addition to the removed contaminated material), processing rates, labor requirements, and applicability to various tasks. Typical decontamination processes are summarized in Table 4-6. For each decontamination method, this table shows application information, the process cost per square foot of area decontaminated, and the amount of secondary waste generated. These unit factors are applied to specific areas or equipment requiring remediation to determine the most cost-effective process.

Table 4-6: Decontamination Methodology Comparison

Methodology	Application	Penetration depth (in)	Crew Size	Process Cost ($/ft²)	Secondary Waste Volume (ft³/1000 ft²)
McDonald U-5 Scabbler	Floor concrete	0.25	2.0	$0.691	0
McDonald U-5 Scabbler	Floor concrete	0.5	2.0	$1.286	0
McDonald 3WCD Scabbler	Wall concrete	0.125	2.0	$3.026	0
Blastrac 10D Shot Blaster	Floor concrete	0.063	1.1	$0.230	0.26
Blastrac 10D Shot Blaster	Floor concrete	0.125	1.1	$0.303	0.26
LTC 10-60Pn Special Vacuum Blaster	All surfaces	0.031	1.3	$1.070	0.26
LTC 10-60Pn Special Vacuum Blaster	All surfaces	0.063	1.3	$1.971	0.26
EDCO CPU-10C Floor Plane	Floor concrete	0.50	2.0	$1.154	0
CO2 Blasting	All Surfaces	0.00	2.0	$2.356	0.18
Hydrolaser (5-10,000 psi)	All Surfaces	0.00	2.0	$0.522	4.54
Hands-On-Decon	Non-Porous surfaces	0	1.0	$1.441	8.33

4.5 Radioactive Waste Volume Reduction Costs

The volume reduction processes analyzed for use are summarized in Table 4-7. For each volume reduction method, this table shows application information, transportation container type, and the total process cost per unit weight. These unit factors are applied to specific items of equipment requiring disposal to determine the most cost-effective process. The waste generated at this facility will include ventilation systems, process equipment, concrete, steel, soil and secondary waste generated during the decontamination work such as protective clothing and materials used during manual decontamination work.

Table 4-7: Volume Reduction Methodology Cost Information

VR Methodology	Applicability	Transport Container Type	Total VR Cost ($/lb)
Super Compaction	Dry active waste, 20 lb/ft^3	B-25 for Envirocare Disposal	$7.54
Incineration	DAW	B-25 for Envirocare Disposal	$5.90
Metal Melt [1]	Metal	Custom	$0.86
Metal Decon [1]	Metal	Custom	$0.96
Survey & Release [2]	Dry Active Waste	55 Gal Drum	$1.56

1. This process recycles the processed material so there is no client waste for disposal.
2 Disposal in landfill included in cost

4.6 Unit Costs

A number of unit factors were used to generate this cost estimate. They are listed in Table 4-8 so project costs can be updated when required and the effects of changing unit costs can be evaluated.

Table 4-8: Decommissioning Cost Estimate Selected Unit Cost Factors

Unit Cost Factor	Unit Cost Rate	Units
Radioactive Waste Disposal at Envirocare of Utah	$62.10	cubic foot
Waste Transportation to Envirocare of Utah	$1.95	mile
Transportation Distance to Envirocare of Utah	2,109	miles
B-25 Waste Disposal Container Cost	$460.00	each
Management and Supervision	$91.59	hour
Engineer	$67.16	hour
Radiation Protection Supervisor	$67.16	hour
Laborer Foreman	$38.15	hour
Administrative Assistant	$26.91	hour
Instrument Technician	$50.08	hour
Radiation Protection Technician	$44.67	hour
Laborer	$38.00	hour
Pennsylvania sales tax	6.25%	
Fee	15%	

4.7 Final Surveys

Final survey cost estimates are based on the method presented in Draft Regulatory Guide DG-4006, *Demonstrating Compliance With the Radiological Criteria for License Termination* (NRC 1998b). This method requires the determination of the number of sample points for the various areas being surveyed and the type of survey being performed. The time to perform each of these surveys is determined, and the product of these two items is the labor time to perform the surveys. Equipment and material cost to perform the surveys is added along with staff support costs to determine a total cost. The survey requirements are based on NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM) (USEPA et. al., 1997). A spreadsheet was developed which incorporates facility dimensions, labor rates and support cost ratios to estimate the final survey cost. The facility survey labor estimate is summarized in Appendix A-6 and the open land and miscellaneous area survey labor estimate is summarized in Appendix A-7.

5.0 FACILITIES, RADIOLOGICAL CONDITIONS AND DECOMMISSIONING SCENARIO

Decommissioning of the Safety Light facility requires that residual radioactive materials be removed from the site to allow termination of the radioactive material license. The decommissioning is anticipated to proceed in stages due to limited funding and the need to continue other facility operations without interference. For the purposes of this cost estimate, once the Safety Light facility has been remediated to release limits, no further decontamination or demolition is required. Upon acceptance of the final radiological survey report and termination of the licenses by the NRC, no restrictions will be imposed upon the site due to its prior use as a radioactive material processing facility. Numerous non-radioactive structures will remain standing for an undefined period of time. No non-radioactive buildings or structures will have their structural soundness compromised by the decommissioning activities.

5.1 Characterization Survey

A characterization survey will be conducted in all areas of the facility that have a history of radioactive materials use or storage. The results of the survey will be used to determine the extent of remediation required prior to release of these areas for unrestricted use. Characterization surveys are normally performed in such a manner that if no contamination is found, the results may be used as, or to augment final survey data.

5.2 Remediation Summary

The following is a brief summary of the anticipated remediation activities, with applicable assumptions and bases, in the remaining areas. The remediation activities are summarized in Table 5-1 below. Additional facility information, radiological information, and decommissioning plans are presented in greater detail in the document sections that follow.

Table 5-1: Planned Remediation Activities

Building or Area	Remediation Activities
Specified Rooms from the Etching Building	Rooms 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, and 45 of the etching building, including room contents, will be dismantled and removed from the site for disposal. These rooms are slated for early demolition due to their poor structural condition. They are structurally independent from the rooms that will remain in place.
Soil North of Well 5	The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated and removed from the site for disposal.
Ion Exchange Building and Surrounding Soil	The building and contents will be demolished and removed from the site for processing or disposal at a licensed radioactive waste disposal facility. Following demolition, the surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated and removed from the site for disposal.
Old Garage Foundation and Surrounding Soil	The garage foundation will be decontaminated by scabbling, or completely removed if necessary. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Soil Under Old Loading Dock	The surface and subsurface soil will be surveyed, and soils in excess of the DCGL limits will be excavated and removed from the site for disposal.
8 x 8 Block Building and Surrounding Soil	The building contents will be removed, the building will be demolished, and the foundation will be decontaminated by scabbling, or completely removed if necessary. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Old Radium Vault and Surrounding Soil	The building and contents will be demolished, and the foundation will be decontaminated by scabbling, or completely removed if necessary. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Soil Around Machine Shop	The surface and subsurface soil will be surveyed, and soils in excess of the DCGL limits will be excavated and removed from the site for disposal.
Above-Ground Silo and Surrounding Soil	The Silo will be demolished, and the foundation, which is degrading, will be decontaminated by scabbling, or completely removed if necessary. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Remaining Site Buildings and Structures	This cost estimate does not include decommissioning of the nuclear building, machine shop, solid waste building and liquid waste building. These buildings are currently used for operations under Material License No. 37-00030-08. This plan assumes the main building, etching building, and USR Metals liquid waste building will remain after decommissioning. All other buildings will be demolished as part of the decommissioning effort. In general, for the buildings left standing, hot spots and elevated grids identified in the characterization survey will be decontaminated using appropriate techniques.
Main Building	Due to personnel occupation in the building, preliminary remediation efforts will require special care and scheduling. Temporary containment tents and ventilation systems will be used to minimize the potential for airborne dust and radiological contaminants affecting occupied areas. Remediation will include equipment removal, scabbling of contaminated concrete floor surfaces, and decontamination of wall surfaces by surface cleaning or surface removal methods.

Building or Area	Remediation Activities
Etching Building	(Same as for main building)
Personnel Office Building	The building contents will be removed and the personnel office building will be demolished. The dry well will be characterized and excavated as needed. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Lacquer Storage Building	This building is used to store solvent drums, and has no history of radioactive materials use, but following a release survey this building will be demolished. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
USR Metals Liquid Waste Building	The carpenter shop at the rear of this building was used for storage of radium in the late 1940s. A strontium-90 source reportedly exploded on the east wall. This building will be decontaminated by scabbling and surface cleaning.
Well House	The building contents will be removed, the building will be decontaminated then demolished, and the well will be grouted. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Pipe Shop	The building contents will be removed and the building will be demolished. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Old House	The building contents will be removed and the building will be demolished. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Strontium-90 Sources Vault	The vault contents will be removed and the vault will be demolished. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Remaining Site Soils	The grids with higher levels of contamination will be remediated first. This will lower the background for direct measurements, and minimize the potential for cross-contamination. The primary radionuclides of interest in soil based on the results of the characterization are cesium-137, radium-226, americium-241, and their daughter products.
Soil Surrounding Underground Silo Area	The area will be excavated and the contaminated subsurface silo remains and contaminated soils will be removed. The surface and subsurface soil in this area will be surveyed and any other soils in excess of the DCGL limits will be excavated.
Abandoned Canal Area	The contaminated soil will be excavated and removed. The surface and subsurface soil in this area will be surveyed and any other soils in excess of the DCGL limits will be excavated.
East and West Lagoon Area	The lagoons will be pumped out, and the recovered water sampled and routed to the river. The contaminated soil will be excavated and removed. The surface and subsurface soil in this area will be surveyed and any other soils in excess of the DCGL limits will be excavated.
East Plant Dump	The surface and subsurface soil in this area will be surveyed and soils and any ductwork found in this area will be excavated.
West Plant Dump	The contaminated soil will be excavated and removed. The surface and subsurface soil in this area will be surveyed and any other soils in excess of the DCGL limits will be excavated.

Building or Area	Remediation Activities
Drain Lines	The cement trough will be surveyed and removed if contaminated. The drain lines will be located via excavation or other means, surveyed, and removed if contaminated.
Drywell Tank	A dry well in the personnel office building basement may have been used for radioactive waste disposal. The well cover has high levels of contamination, but the well itself was not characterized. The well cover and soils in excess of the DCGL limits will be excavated.
Soil by Old Berwick Road	This soil pile will be removed. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
Soil from Vance Walton Property	This soil pile will be removed. The surface and subsurface soil will be surveyed and any other soils in excess of the DCGL limits will be excavated.
Soil North of Lacquer Storage Building	The surface and subsurface soil will be surveyed for radiological and chemical materials. Soils in excess of hazardous material limits or DCGL limits will be excavated.
Employee Parking Area	The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated.
All Other Land Inside Fenced Area	The surface and subsurface soil in excess of the DCGL limits will be excavated.

5.3 Specified Rooms from the Etching Building

Rooms 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, and 45 of the etching building will be dismantled. These rooms are slated for early demolition due to their poor structural condition. They are structurally independent from the rooms that will remain in place. Many of these rooms are not safe to enter, and therefore were not surveyed during the 1995 site characterization. These rooms and the room contents will be demolished and removed from the site for processing or disposal at a licensed radioactive waste disposal facility.

5.4 Soil North of Well 5

Table 5-2: Maximum Activity in Soil Samples North of Well 5, summarizes the maximum radioactivity concentrations reported in surface soil samples from grids 250-256 and 228-234 during the characterization study. Three wells were also drilled during the characterization study within these grids: Well M3 in grid 233, Well M4 in grid 229, and Well M5 in grid 250. The water level at Well M3 was about 1.2 meters. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

Table 5-2: Maximum Activity in Soil Samples North of Well 5

Radionuclide	Maximum Activity (pCi/g)
Cesium-137	142
Bismuth-214	294
Lead-214	305
Radium-226	421
Beta (based on Sr-90)	191

5.5 Ion Exchange Building and Surrounding Soil

This small room, originally used for cesium wastewater treatment, no longer contains any equipment or material. The characterization survey indicated all grids had fixed contamination and hot spots. The building and contents will be demolished and removed from the site for processing or disposal at a licensed radioactive waste disposal facility. Following demolition, the surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.6 Old Garage Foundation and Surrounding Soil

The old garage was used to store radioactive materials beginning in the 1940s. A cesium-137 source reportedly exploded in the garage. The structure has been removed leaving only the cement foundation. Elevated cesium-137 levels were found in this area (grids 128, 129, 150, 151) during the characterization survey. The garage foundation will be decontaminated by scabbling, or completely removed if necessary. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.7 Soil Under Old Loading Dock

A surface soil sample taken from the 10 by 10-meter grid 116 during the characterization study had 3,335 pCi/g radium-226. The surface and subsurface soil will be surveyed, and soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.8 8 x 8 Block Building and Surrounding Soil

This building was previously used to store strontium-90 deck markers, and is currently used to store tritium-contaminated equipment. The results of surface soil sample analyses from grid 110 during the characterization study were 7,265 pCi/g cesium-137, 90 pCi/g bismuth-214 (a radium-226 daughter), and approximately 900 pCi/g beta (based on strontium-90). The building contents will be removed and the building demolished. The foundation will be decontaminated by scabbling, or completely removed if necessary. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.9 Old Radium Vault and Surrounding Soil

This structure was originally used for pouring lead and handling and storing radium bromide, radium foil, and radium radiation sources. The radioactive materials have been removed from the building. This building is unsafe to enter due to its poor physical condition, and therefore the interior walls and floor were not characterized. The NRC reported high levels of alpha contamination in this building in 1970. The building and contents will be demolished, and the foundation will be decontaminated by scabbling, or completely removed if necessary. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.10 Soil Around Machine Shop

Surface soil samples from grids 44, 45, 46, 47, 18, 19 and 20 north of the machine shop had elevated radium 226 levels. The maximum radium-226 concentration was 891 pCi/g in grid 45. The maximum beta activity (based on strontium-90) was 481 pCi/g in grid 46. This area of radium-226 contaminated soil may be the result of traffic from the old radium laboratory. The surface and subsurface soil will be surveyed, and soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.11 Above-Ground Silo and Surrounding Soil

This structure, located in grid 173, was originally used to store radium-226 ionitrons. Tritium-contaminated waste is currently stored in the silo. The only elevated activity in grid 173 during the characterization survey was 21 pCi/g cesium-137. The silo contents will be removed and the silo will be demolished, and the foundation, which is degrading, will be decontaminated by scabbling, or completely removed if necessary. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12 Remaining Site Buildings and Structures

This cost estimate does not include decommissioning of the nuclear building (No. 12), machine shop (No. 11), solid waste building (No. 10) and liquid waste building (No. 8). These buildings are currently used for operations under Material License No. 37-00030-08.

In addition to the buildings mentioned above that are currently used for tritium operations, this plan assumes the main building, etching building, and USR Metals liquid waste building will remain after decommissioning. All other buildings will be demolished as part of the decommissioning effort. In general, for the buildings left standing, hot spots and elevated grids identified in the characterization survey will be decontaminated using appropriate techniques as described in later sections.

5.12.1 Main Building

This building occupies 30,000 square feet, and contains 73 rooms, three basements, and two loading docks. The original 13,600 square foot building was built in 1945, with a one-story 14,000 square foot addition constructed in 1948-49. Later a 2,000 square foot one-story extension was added. In 1968, the radium and tritium hand application area on the second floor was partially decontaminated, but contaminated ductwork remains. Contamination may also be present between the floor of this area and the ceiling below. The main roof was decontaminated in 1969. The main building is currently used by both Safety Light and USR Metals. The first floor houses administrative offices for both companies, and is also used for storage and non-radiological operations. The second floor is used for storage. The third floor "art room" is currently not

accessed due to pigeon infestation. A sewer grate behind the building is also contaminated.

Due to personnel occupation in the building, preliminary remediation efforts will require special care and scheduling. Temporary containment tents and ventilation systems will be used to minimize the potential for airborne dust and radiological contaminants affecting occupied areas. Remediation will include equipment removal, scabbling of contaminated concrete floor surfaces, and decontamination of wall surfaces by surface cleaning or surface removal methods. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12.2 Etching Building

The original etching building was built during the 1940s and had a floor area of approximately 16,000 square feet. The building was expanded to 32,000 square feet between 1949 and 1976. A 6,000 square foot manufacturing addition was constructed in 1974. The current building contains 84 rooms and 3 attics. Sixteen rooms in the tritium screening area that are in poor physical condition are scheduled for early removal. The primary radiological production activities that took place in this building were assembly and manufacture of radium and tritium instruments and dials. A 12" concrete floor in the maintenance wire enclosure area covers an old drain contaminated with radium. USR Metals Corporation currently leases approximately 25 percent of this building, and parts of the building are used by Safety Light for storage and assembly of nonradioactive components for exit signs. Safety Light also uses portions of the building, including the attic, for document storage.

Due to personnel occupation in the building, preliminary remediation efforts will require special care and scheduling. Temporary containment tents and ventilation systems will be used to minimize the potential for airborne dust and radiological contaminants affecting occupied areas. Remediation will include equipment removal, scabbling of contaminated concrete floor surfaces, and decontamination of wall surfaces by surface cleaning or surface removal methods. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12.3 Personnel Office Building

This building was originally a nurse's station. It was subsequently used for administrative office space and storage of radium-226 and strontium-90 screening machines and strontium chloride. The building is in poor structural condition and is used for storage of miscellaneous items. A dry well in the

basement may have been used for radioactive waste disposal. The well cover has high levels of contamination, but the well itself was not characterized. The building contents will be removed and the personnel office building will be demolished; the dry well will be characterized and excavated as needed. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12.4 Lacquer Storage Building

This building is used to store solvent drums, and has no history of radioactive materials use, but following a release survey this building will be demolished. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12.5 USR Metals Liquid Waste Building

The carpenter shop at the rear of this building was used for storage of radium in the late 1940s. A strontium-90 source reportedly exploded on the east wall. This part of the building will be decontaminated by scabbling and surface cleaning.

The main liquid waste building currently includes a boiler room, a waste room where waste metals are treated, and a compressor room. No operations involving radioactive materials were reportedly performed in this building. Remediation will include equipment removal, scabbling of contaminated concrete floor surfaces and decontamination of wall surfaces by surface cleaning or surface removal methods. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12.6 Well House

The well house consists of three rooms, including the north and south adhesives rooms. The old water supply well is probably contaminated with radium-226. The south adhesives room was decontaminated in 1958. The building contents will be removed, the building will be decontaminated then demolished, and the well will be grouted. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12.7 Pipe Shop

The pipe shop was constructed in the 1940s over the portion of the abandoned canal that served as a disposal area for radium-contaminated ductwork from the former United States Radium Corporation facility in Brooklyn, New York. The building was originally used for maintenance and lead melting. The primary radionuclides used in the building were radium and tritium. It is now used to store tritium-screening machines; painting tables, and lead melting pots. It is posted as an airborne radioactivity area and ventilated to reduce radon concentrations. The building contents will be removed and the building will be demolished. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12.8 Old House

The 2-story Old House, built in the 1800s, is in poor structural condition. A fire in 1998 destroyed the roof and attic. The first floor of the Old House is currently used to store plastic-covered pipes and ductwork removed from the tritium processing building. The second floor is not used. The building has a dug out earth basement. Runoff water sampled after the fire contained 1×10^5 pCi/l tritium. The building contents will be removed and the building will be demolished. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.12.9 Strontium-90 Sources Vault

This building was used to store strontium-90 solutions. It is currently used to store non-contaminated equipment. Surface contamination levels on the floor of this building during the Monserco characterization were as high as 1.2×10^6 dpm/100 cm^2. The vault contents will be removed and the vault will be demolished. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13 Remaining Site Soils

The grids with higher levels of contamination will be remediated first. This will lower the background for direct measurements, and minimize the potential for cross-contamination. The primary radionuclides of interest in soil based on the results of the characterization are cesium-137, radium-226, americium-241, and their daughter products.

5.13.1 Soil Surrounding Underground Silo Area

During the 1950s, these silos were used for disposal of miscellaneous solid radioactive waste. Silo remediation was completed in 2000. The base of the silos remains, as well as surrounding contaminated soil.

Wells M9 and M10 were drilled south of the west and east silos, respectively, during the characterization survey. The maximum gross beta counts (based on strontium-90) in soil samples collected during well drilling were 55.5 pCi/g for well M9 at 3.66 meters and 249.5 pCi/g for well M10 at 4.88 meters. The beta activity in well M10 samples peaked between 3.66 and 5.49 meters below ground surface. The soil from well M10 contained a maximum of 82 pCi/g cesium-137 at a depth of 0.61 meters. The maximum cesium-137 concentration in soil from well M7, drilled northwest of the silos, was 4 pCi/g at 2.44 meters, with no detectable gross beta activity.

The area will be excavated and the contaminated subsurface silo remains and contaminated soils will be removed. The surface and subsurface soil in this area will be surveyed and any other soils in excess of the DCGL limits will be excavated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.2 Abandoned Canal Area

The rock-lined canal extends along the southern boundary of the Safety Light site parallel to the Susquehanna River. The onsite portion of the canal covers approximately 37,500 square feet. Up to seven lagoons were constructed in the canal using earthen dams as partitions. The canal is now filled with earth with the exception of two lagoons. Between 1948 and 1949, a portion of the canal may have been used to dispose of Ra-226 contaminated ductwork from United States Radium Corporation operations in Brooklyn, New York. Liquid waste from production activities was routed to the open portions of the canal before 1960. During the 1960s, the water in the three eastern lagoons was treated and

the two easternmost lagoons were backfilled. The third easternmost lagoon was backfilled in the late 1970s. The contaminated soil will be excavated and removed. The surface and subsurface soil in this area will be surveyed and any other soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.3 East and West Lagoon Area

From 1948-1954, the existing east lagoon, which covers approximately 250 square feet, was used to dispose of sewage and process wastewater from the radium laboratory in the main building. In the 1960s, the east lagoon contents were pumped to the west lagoon. The west lagoon, which covers approximately 750 square feet, was also used to dispose of silver plating waste and anodizing solutions. The lagoons flooded in 1972, causing contamination of the surrounding soil.

Wells M4 and M5 were drilled east and southeast of the east lagoon area, respectively, during the characterization survey. The maximum gross beta counts (based on strontium-90) in soil samples collected during well drilling were 37.4 pCi/g for well M4 at 4.27 meters and 46.2 pCi/g for well M5 at 0.61 meters. The maximum radium-226 concentration in soil samples collected during well drilling was greater than 30 pCi/g for well M4 at 1.22 meters and 215 pCi/g for well M5 at 0.61 meters.

The lagoons will be pumped out, and the recovered water sampled and routed to the river. The contaminated soil will be excavated and removed. The surface and subsurface soil in this area will be surveyed and any other soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.4 East Plant Dump

The east plant dump is located on the bed of the abandoned canal near the pipe shop, and may contain strontium-90 contamination. Contaminated ductwork from the Brooklyn, New York site disposed of in this area may be causing the elevated radium-226 concentrations noted during the characterization survey. The surface and subsurface soil in this area will be surveyed and soils and any ductwork found in this area will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.5 West Plant Dump

The west dump may have been used for disposal of solid waste in the 1940's. In the early 1970s, 12,000 pounds (78 drums) of contaminated soil were removed from this area and shipped offsite for disposal. A ground penetrating radar survey performed during the site characterization showed small metallic objects, possibly radium dials, buried at the west dump. This survey did not indicate the presence of buried drums.

Well M13 was drilled in grid 170 in the west dump area during the characterization survey. The maximum concentration of radium-226 in soil samples obtained during well drilling was greater than 10 pCi/g at a depth of 0.61 meters.

The contaminated soil will be excavated and removed. The surface and subsurface soil in this area will be surveyed and any other soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.6 Drain Lines

A cement trough with sewer grates behind the main building may have radium-226 and strontium-90 contamination. This was part of the conveyance system that transported process water from the main building to the east lagoon. Information on the location of all drain lines and potential contamination is not available. The cement trough will be surveyed and removed if contaminated. The drain lines will be located via excavation or other means, surveyed, and removed if contaminated. All radioactive materials will be removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.7 Soil by Old Berwick Road

A soil pile deposited near the northwest corner of the site during construction work has radium-226 contamination. The pile is 30 x 15 ft., and 2 to 5 ft. high. This soil pile will be removed. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.8 Soil from Vance-Walton

Soil contaminated with radium-226 and cesium-137 found on the Vance-Walton property was transferred inside the fenced area south of the above ground silo. The soil mound is 16 by 10 ft. and 2 to 4 ft high. This soil pile will be removed. The surface and subsurface soil will be surveyed and any other soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.9 Soil North of Lacquer Storage Building

This area may have been used for solvent disposal. The surface and subsurface soil will be surveyed for radiological and chemical materials. Soils in excess of hazardous material limits or DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.10 Employee Parking Area

The graveled employee parking areas include an east section, approximately 125 by 125 feet (included in grids 10, 11, 18, and 19), and a west section, approximately 80 by 125 feet (included in grids 6,7,15, and 16). Based on the results of the characterization survey, some areas with elevated levels of radium-226 may be present in both parking lots. The surface and subsurface soil will be surveyed and soils in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.13.11 All Other Land Inside Fenced Area

Thirteen wells were drilled and subsurface soil samples were taken during the site characterization. In addition to the results previously discussed in relation to identified remediation areas, the following results were documented:

- Grid 240 near the southeast corner of the property had 48 pCi/g cesium-137 at 1.83 meters
- Grid 233 near the southwest corner of the property near the effluent stream had a maximum of 8.8 pCi/g gross beta (based on strontium-90) at 1.22 meters and greater than 48 pCi/g cesium-137 at 1.22 meters.
- Grid 244 south of the liquid waste building at the fence line had a maximum of 36.8 pCi/g gross beta (based on strontium-90) at 0.61 meters and 102 pCi/g radium-226 at 0.61 meters.

- Grid 178 at the southwest corner of the liquid waste building had a maximum of 2.98 pCi/g gross beta (based on strontium-90) at 3.66 meters and greater than 4 pCi/g radium-226 at 0.61 meters.
- Grid 203 immediately south of the lacquer storage building had a maximum of 9.6 pCi/g gross beta (based on strontium-90) at 2.58 meters and greater than 28 pCi/g radium-226 at 2.58 meters.
- Grid 223 to the south and between the liquid waste building and lacquer storage building near the fence line had greater than 10 pCi/g radium-226 at 0.61 meter and no detectable beta activity.

Contaminated soil was found to a maximum depth of 5.49 meters (grid 161 southeast of the well house) during the well drilling operation.

Radioactivity above NRC guidelines was found in seven onsite wells.

The surface and subsurface soil in excess of the DCGL limits will be excavated and removed from the site for disposal at a licensed radioactive waste disposal facility.

5.14 License Termination Surveys

License termination surveys, or final radiation surveys, will be performed in the applicable areas of the site using the guidance provided in NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM), (USEPA et. al., 1997). The surveys will be performed in accordance with specifically developed plans and procedures.

5.14.1 Survey Instrumentation

Selection and use of instrumentation will ensure sensitivities are sufficient to detect the identified nuclides at the minimum detection requirements. A list of typical final survey instrumentation, radiation detected, and calibration sources are provided in Table 5-3.

Table 5-3: Typical Final Survey Instrumentation

Instrument/Detector	Detector Type	Radiation Detected	Calibration Source	Use
Ludlum Model 2350/43-68	Gas-flow proportional (100 cm^2)	Alpha or beta	^{99}Tc ( ) ^{230}Th ( )	Direct measurements and smear counting
Ludlum Model 2350/44-2	NaI scintillator	Gamma	^{137}Cs	Gamma exposure rate
Ludlum Model 2350/44-40	Shielded GM (15.5 cm^2)	Beta	^{99}Tc ( )	Direct measurements
Ludlum Model 2350/43-5	ZnS scintillator	Alpha	^{230}Th ( )	Direct measurements
Tennelec Model LB5100-2080	ZnS scintillator	Alpha/Beta	^{230}Th ( ) ^{99}Tc ( )	Smear counting
Gamma Spectroscopy System	HPGe	Gamma	Mixed Gamma	Nuclide identification and quantification

6.0 REFERENCES

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6-4 NRC, 1982. NUREG/CR-1756, *Technology Safety and Costs of Decommissioning Reference Nuclear Research and Test Reactors.*

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6-6 NRC, 1990. NRC Regulatory Guide 3.66, *Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70 and 72.*

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6-8 NRC, 1998a. *Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination.* Federal Register: November 18, 1998 (Volume 63, Number 222).

6-9 NRC, 1998b. *Demonstrating Compliance with the Radiological Criteria for License Termination.* Draft Regulatory Guide DG-4006.

6-10 NRC, 1999. *Supplemental Information on the Implementation of the Final Rule on Radiological Criteria for License Termination.* Federal Register: December 7, 1999 (Volume 64, Number 234).

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6-12 USEPA, U.S. NRC, U.S. DOE, and U.S. DOD, 1997. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, Final, NUREG-1575, EPA 402-R-97-016.

6-13 Code of Federal Regulations, *10 CFR 30, Rules of General Applicability to Domestic Licensing of Byproduct Material*

APPENDIX A- 1 Contaminated Waste Volume Summary

Table A-1
CONTAMINATED WASTE VOLUME SUMMARY
Safety Light

	Area Description	Decon* Barnwell Waste Volume (ft^3)	Barnwell Direct Bury Waste Volume (ft^3)	Generated* Envirocare Waste Volume (ft^3)	Decon* Envirocare Waste Volume (ft^3)	Envirocare Direct Bury Waste Volume (ft^3)	Total Waste Volume (ft^3)
1	Specified Rooms from the Etching Building	0	0	33	95	18,469	18,597
2	Soil North of Well 5	0	0	4	0	7,679	7,683
3	Ion Exchange Building and Surrounding Soil	0	0	1	4	237	242
4	Old Garage Foundation and Surrounding Soil	0	0	2	4	1,032	1,038
5	Soil Under Old Loading Dock	0	0	0	0	143	143
6	8 x 8 Block Building and Surrounding Soil	0	0	1	3	422	426
7	Old Radium Vault and Surrounding Soil	0	0	3	0	1,831	1,834
8	Soil Around Machine Shop	0	0	2	0	6,021	6,023
9	Above-Ground Silo and Surrounding Soil	0	0	1	2	636	639
10	Remaining Site Buildings and Structures	0	0	362	2,677	37,197	40,237
11	Decontaminate Remaining Site Soils	0	0	107	0	95,236	95,343
		0	0	0	0		0
	TOTALS:	0	0	519	2,784	168,902	172,205

** Notes:*

1 Decon Waste Volume: This is the volume of waste generated directly by a decontamination process (this includes such items blasting grit, treated chemicals, etc.).

2 Generated Waste Volume: This is the volume of protective clothing waste generated by all operations on site and is a function of labor hours for each activity.

APPENDIX A- 2 Contaminated Waste Disposal Cost

Table A-2
CONTAMINATED WASTE DISPOSAL COST
Safety Light

Named Block
DISP COST

	Area Description	Decon Barnwell Disposal Cost	Barnwell Direct Bury Disposal Cost	Generated Envirocare Disposal Cost	Decon Envirocare Disposal Cost	Envirocare Direct Bury Disposal Cost	Total Waste Disposal Cost
1	Specified Rooms from the Etching Building	$0	$0	$2,575	$7,303	$1,423,031	$1,432,909
2	Soil North of Well 5	$0	$0	$323	$0	$591,681	$592,004
3	Ion Exchange Building and Surrounding Soil	$0	$0	$99	$287	$18,237	$18,622
4	Old Garage Foundation and Surrounding Soil	$0	$0	$159	$289	$79,516	$79,964
5	Soil Under Old Loading Dock	$0	$0	$32	$0	$10,980	$11,012
6	8 x 8 Block Building and Surrounding Soil	$0	$0	$194	$231	$32,513	$32,938
7	Old Radium Vault and Surrounding Soil	$0	$0	$264	$0	$141,063	$141,328
8	Soil Around Machine Shop	$0	$0	$153	$0	$463,889	$464,043
9	Above-Ground Silo and Surrounding Soil	$0	$0	$187	$154	$48,982	$49,323
10	Remaining Site Buildings and Structures	$0	$0	$27,921	$206,260	$2,866,056	$3,100,238
11	Decontaminate Remaining Site Soils	$0	$0	$8,280	$0	$7,337,930	$7,346,209
	TOTALS:	$0	$0	$40,189	$214,524	$13,013,877	$13,268,590

WASTE DISPOSAL PACKAGING & SHIPPING COST

Named Block
SHIP COST

	Area Description	Decon Barnwell Pack & Ship Cost	Barnwell Direct Bury Pack & Ship Cost	Generated Envirocare Pack & Ship Cost	Decon Envirocare Pack & Ship Cost	Envirocare Direct Bury Pack & Ship Cost	Total Waste Pack & Ship Cost
1	Specified Rooms from the Etching Building	$0	$0	$127	$361	$70,328	$70,816
2	Soil North of Well 5	$0	$0	$16	$0	$29,242	$29,258
3	Ion Exchange Building and Surrounding Soil	$0	$0	$5	$14	$901	$920
4	Old Garage Foundation and Surrounding Soil	$0	$0	$8	$14	$3,930	$3,952
5	Soil Under Old Loading Dock	$0	$0	$2	$0	$543	$544
6	8 x 8 Block Building and Surrounding Soil	$0	$0	$10	$11	$1,607	$1,628
7	Old Radium Vault and Surrounding Soil	$0	$0	$13	$0	$6,972	$6,985
8	Soil Around Machine Shop	$0	$0	$8	$0	$22,926	$22,934
9	Above-Ground Silo and Surrounding Soil	$0	$0	$9	$8	$2,421	$2,438
10	Remaining Site Buildings and Structures	$0	$0	$1,380	$10,194	$141,644	$153,218
11	Decontaminate Remaining Site Soils	$0	$0	$409	$0	$362,651	$363,060
	TOTALS:	$0	$0	$1,986	$10,602	$643,164	$655,752

APPENDIX A- 3 Waste Shipping Container Cost

Table A-3
WASTE SHIPPING CONTAINER COST
Safety Light

	Area Description	Total Waste Volume (ft^3)	B-25* Waste Containers (Ea.)	Waste Container Cost ($)
1	Specified Rooms from the Etching Building	18,597	206.6	$95,052
2	Soil North of Well 5	7,683	85.4	$39,271
3	Ion Exchange Building and Surrounding Soil	242	2.7	$1,235
4	Old Garage Foundation and Surrounding Soil	1,038	11.5	$5,304
5	Soil Under Old Loading Dock	143	1.6	$730
6	8 x 8 Block Building and Surrounding Soil	427	4.7	$2,185
7	Old Radium Vault and Surrounding Soil	1,834	20.4	$9,375
8	Soil Around Machine Shop	6,023	66.9	$30,782
9	Above-Ground Silo and Surrounding Soil	640	7.1	$3,272
10	Remaining Site Buildings and Structures	40,237	447.1	$205,654
11	Decontaminate Remaining Site Soils	95,343	1,059.4	$487,311
	TOTALS:	172,208	1,914	$880,440

** Notes:*
1 The number of waste containers is rounded up to next full container.

UNIT DISPOSAL COST FACTORS

Decon waste disposal rate forBarnwell :	$350.50	per cubic foot
DAW waste disposal rate for Barnwell :	$350.50	per cubic foot
DAW waste disposal rate for Envirocare :	$62.10	per cubic foot
Estimated mileage rate to Barnwell :	$1.65	per mile
Estimated transport distance to Barnwell :	670	miles
Estimated mileage rate to Envirocare :	$1.95	per mile
Estimated transport distance to Envirocare :	2,109	miles
Average direct bury waste density :	69.8	lb/cubic foot
Average generated waste density (Envirocare waste) :	25	lb/cubic foot
Truck transport waste weight limit :	44,000	pounds
Truck transport waste volume limit :	12	B-25 Boxes
B-25 box internal volume :	90	cubic feet
Estimated cost of used B-25 shipping containers :	$460.00	each
Local Industrial Waste Landfill Shipping & Disposal Rate :	$27.30	per cubic yard
Labor rate for shipping :	$44.67	per hour

APPENDIX A- 4 Waste Disposal Labor Estimate

Table A-4
WASTE DISPOSAL SUPPORT LABOR ESTIMATE
Safety Light

	Area Description	B-25 Waste Containers (Ea.)	Radioactive* Waste Shipments (Ea.)	Waste* Shipment Labor (man-hr)
1	Specified Rooms from the Etching Building	206.6	17.2	276.4
2	Soil North of Well 5	85.4	7.1	114.2
3	Ion Exchange Building and Surrounding Soil	2.7	0.2	3.6
4	Old Garage Foundation and Surrounding Soil	11.5	1.0	15.4
5	Soil Under Old Loading Dock	1.6	0.1	2.1
6	8 x 8 Block Building and Surrounding Soil	4.7	0.4	6.3
7	Old Radium Vault and Surrounding Soil	20.4	1.7	27.3
8	Soil Around Machine Shop	66.9	5.6	89.5
9	Above-Ground Silo and Surrounding Soil	7.1	0.6	9.5
10	Remaining Site Buildings and Structures	447.1	37.3	598.0
11	Decontaminate Remaining Site Soils	1059.4	88.3	1416.9
	TOTALS:	1,914.0	160.0	2,560.0

** Notes:*

1 The number of waste shipments is rounded up to next full shipment.

Estimated waste loading operator time :	4 hr per load
Estimated HP Tech time per rad or mixed waste load :	4 hr per load
Estimated HP shipper time per rad or mixed waste load :	8 hr per load
Estimated clean waste shipping volume limit :	1176 ft^3 per load
Estimated radwaste shipping volume limit :	12 B-25 Boxes

WASTE DISPOSAL CASK COSTS
Safety Light

	Area Description	Liners & Cask Rental (Ea.)	Radioactive* Cask Rental Cost	Waste* Shipment Labor (man-hr)
1	Specified Rooms from the Etching Building		0.0	0
2	Soil North of Well 5	1	$14,400	72
3	Ion Exchange Building and Surrounding Soil		0.0	0
4	Old Garage Foundation and Surrounding Soil		0.0	0
5	Soil Under Old Loading Dock		0.0	0
6	8 x 8 Block Building and Surrounding Soil		0.0	0
7	Old Radium Vault and Surrounding Soil		0.0	0
8	Soil Around Machine Shop		0.0	0
9	Above-Ground Silo and Surrounding Soil		0.0	0
10	Remaining Site Buildings and Structures		0.0	0
11	Decontaminate Remaining Site Soils		0.0	0
			0.0	0
	TOTALS:	1.0	$14,400	72

** Notes:*

1 The number of waste shipments is rounded up to next full shipment.

APPENDIX A- 5 Contaminated Waste Disposal Summary

Table A-5
CONTAMINATED WASTE DISPOSAL SUMMARY
Safety Light

LOC code	Total Waste Volume (ft^3)	B-25* Waste Containers (ea.)	Waste* Container Cost ($)	Radioactive* Waste Shipments (ea.)	Waste* Shipment Labor (man-hr)	Waste* Shipment Labor Cost
1	18,597	206.6	$95,052	17.2	276.4	$12,346
2	7,683	85.4	$53,671	8.1	186.2	$8,317
3	242	2.7	$1,234	0.2	3.6	$160
4	1,038	11.5	$5,304	1.0	15.4	$689
5	143	1.6	$729	0.1	2.1	$95
6	426	4.7	$2,179	0.4	6.3	$283
7	1,834	20.4	$9,375	1.7	27.3	$1,218
8	6,023	66.9	$30,782	5.6	89.5	$3,998
9	639	7.1	$3,266	0.6	9.5	$424
10	40,237	447.1	$205,654	37.3	598.0	$26,711
11	95,343	1059.4	$487,311	88.3	1416.9	$63,294
Total	172,205	1,914.0	$894,558	161.0	2,631.2	$117,535

** Notes:*

1 The number of waste containers are rounded up to next full container.
2 The number of waste shipments are rounded up to next full shipment.

APPENDIX A- 6 Building Survey Labor Summary

NON-IMPACTED BUILDING AREA SURVEY

Table A-6 — **Safety Light**

ENTER BELOW OPTNL LOC CODE	ENTER BUILDING NAME BELOW	ENTER ROOM NUMBER BELOW	ENTER AREA DESCRIPTION BELOW	SURVEY PACKAGE REQRD ? (Y/N)	ENTER AREA WIDTH BELOW (ft)	ENTER AREA LENGTH BELOW (ft)	ENTER AREA HEIGHT BELOW (ft)	ENTER FLOOR + L. WALL SURVEY CODE	ENTER U. WALL + CEILING SURVEY CODE	ENTER Survey Sketchs (each)	SURVEY PACKAGE PREP (hrs)	DIRECT SURVEY LABOR (hrs)
10	Emergency Water Tank	Exterior	Exterior	Y	30.0	30.0	45.0	1	6	1	4	12.1
10	Emerg. H20 Tank Pump House	Exterior	Exterior	N	29.0	21.0	8.0	1	5	1		7.2
10	Water Tower-Upper Structure	Exterior	Exterior	Y	22.0	22.0	14.0	1	6	1	4	12.1
10	Emerg. H20 Tank Pump House			Y	29.0	21.0	8.0	1	4	1	4	7.3
10	Emergency Water Tank			N	30.0	30.0	45.0	3	6	1		6.2
			TOTALS								12	45

IMPACTED BUILDING AREA SURVEY

Table A-6

Safety Light

ENTER BELOW OPTNL LOC CODE	ENTER BUILDING NAME BELOW	ENTER ROOM NUMBER BELOW	ENTER AREA DESCRIPTION BELOW	SURVEY PACKAGE REQRD ? (Y/N)	ENTER AREA WIDTH BELOW (ft)	ENTER AREA LENGTH BELOW (ft)	ENTER AREA HEIGHT BELOW (ft)	ENTER FLOOR + L. WALL SURVEY CODE	ENTER U. WALL + CEILING SURVEY CODE	ENTER Survey Sketchs (each)	SURVEY PACKAGE PREP (hrs)	DIRECT SURVEY LABOR (hrs)
10	Main Building #1	[illegible]	[illegible]	Y	180.0	180.0	30.0	1	5	4	4	587
10	Etching Building #2	[illegible]	[illegible]	Y	178.0	178.0	20.0	1	5	3	4	546
10	Office Building #3	[illegible]	[illegible]	Y	24.0	24.0	10.0	1	5	1	4	29
10	Lacquer Storage Bldg. #4	[illegible]	[illegible]	Y	63.0	18.0	10.0	1	5	1	4	42
10	USR Liq. Waste Bldg. #5	[illegible]	[illegible]	Y	52.0	52.0	24.0	1	5	1	4	74
10	Well House #6	[illegible]	[illegible]	Y	14.0	33.0	10.0	1	5	1	4	27
10	Pipe Shop #7	[illegible]	[illegible]	Y	20.0	40.0	10.0	1	5	1	4	34
10	Old House #9	[illegible]	[illegible]	Y	28.0	28.0	20.0	1	5	1	4	33
10	Sr-90 Sources Vault	[illegible]	[illegible]	Y	14.0	15.0	10.0	1	5	1	4	20
10	ater Tower-Lower Structur	[illegible]	[illegible]	Y	22.0	22.0	75.0	1	6	1	4	51
3	Ion Exchange Bldg.	[illegible]	[illegible]	Y	5.0	7.0	7.0	1	5	1	4	18
6	8 x 8 Building	[illegible]	[illegible]	Y	8.0	8.0	8.0	1	5	1	4	18
7	Old Radium Vault	[illegible]	[illegible]	N	14.0	20.0	10.0	1	5	1		18
9	Above Ground Silo	[illegible]	[illegible]	Y	8.0	8.0	8.0	1	5	1	4	18
1	Etching Building #2	21		Y	15.0	24.0	10.0	1	4	1	4	20
1	Etching Building #2	23		N	15.0	15.0	10.0	1	4	1		13
1	Etching Building #2	24		N	10.0	16.0	10.0	1	4	1		12
1	Etching Building #2	25		N	10.0	12.0	10.0	1	4	1		11
1	Etching Building #2	26	Hallway between tritium screening r	N	14.0	4.0	10.0	1	4	1		10
1	Etching Building #2	27	Old tritium screening room	N	20.0	20.0	10.0	1	4	1		17
1	Etching Building #2	28	Old tritium screening room	N	6.0	11.0	10.0	1	4	1		10
1	Etching Building #2	29	Old tritium screening room	N	3.0	9.0	10.0	1	4	1		9
1	Etching Building #2	30	Old tritium screening room	N	5.0	5.0	10.0	1	4	1		9
1	Etching Building #2	31	Old tritium screening room	N	10.0	17.0	10.0	1	4	1		12
1	Etching Building #2	32	Old tritium screening room	N	10.0	17.0	10.0	1	4	1		12
1	Etching Building #2	33	Old tritium screening room	N	14.0	15.0	10.0	1	4	1		13
1	Etching Building #2	34	Laboratory	N	24.0	24.0	10.0	1	4	1		20
1	Etching Building #2	35	Spray Booth	N	9.0	9.0	10.0	1	4	1		10
1	Etching Building #2	36		N	8.0	7.0	10.0	1	4	1		9
1	Etching Building #2	45	Joe Sharpless Machine Shop	N	15.0	22.0	10.0	1	4	1		16
3	Ion Exchange Bldg.			N	5.0	7.0	7.0	1	4	1		9
4	Old Garage		Foundation	Y	20.0	12.0		1	4	1	4	7
6	8 x 8 Building			N	8.0	8.0	8.0	1	4	1		9
7	Old Radium Vault			N	14.0	20.0	10.0	1	4	1		15
9	Above Ground Silo			N	8.0	8.0	8.0	1	4	1		9
10	Office Building #3			N	24.0	24.0	10.0	1	4	1		20
10	Lacquer Storage Bldg. #4			N	63.0	18.0	10.0	1	4	1		32
10	USR Liq. Waste Bldg. #5			N	52.0	52.0	24.0	1	4	1		66
10	Well House #6			N	14.0	33.0	10.0	1	4	1		19
10	Pipe Shop #7			N	20.0	40.0	10.0	1	4	1		25
10	Old House #9		First Floor	N	28.0	28.0	8.0	1	6	3		31
10	Old House #9		Second Floor	N	28.0	28.0	8.0	1	6	3		31
10	Sr-90 Sources Vault			N	14.0	15.0	10.0	1	4	1		13
10	Main Building #1	1	NW Basement Room #1	N	20.0	20.0	8.0	1	4	1		17
10	Main Building #1	2	NW Basement Room #2	N	10.0	10.0	8.0	1	4	1		10
10	Main Building #1	3	SE Basement, Phosphorous Storag	N	21.0	20.0	8.0	1	4	1		18
10	Main Building #1		East Loading Dock	N	12.0	5.0		1	4	1		3
10	Main Building #1		West Loading Dock	N	10.0	5.0		1	4	1		3
10	Main Building #1	85	Phosphor Weigh Room	Y	21.0	20.0	12.0	1	4	1	4	22
10	Main Building #1	86	Laboratory Annex	N	21.0	75.0	12.0	1	4	1		41
10	Main Building #1	87	Radium Stripping	N	18.0	20.0	12.0	1	4	1		16
10	Main Building #1	88		N	35.0	55.0	12.0	1	4	1		45
10	Main Building #1	88A	Foils Rolling Area	N	18.0	28.0	12.0	1	4	1		19
10	Main Building #1	88B	Radium Laboratory Hallway	N	18.0	8.0	12.0	1	4	1		12
10	Main Building #1	91	East Hallway	N	3.0	34.0	12.0	1	4	1		13
10	Main Building #1	92	Screen Assembly	N	21.0	27.0	12.0	1	4	1		20
10	Main Building #1	93		N	53.0	50.0	10.0	1	4	1		57
10	Main Building #1	95	Shipping Annex	N	53.0	14.0	10.0	1	4	1		25
10	Main Building #1	96	South Loading Area	N	34.0	36.0	10.0	1	4	1		32
10	Main Building #1	97	Dial Process Production	N	26.0	71.0	10.0	1	4	1		44
10	Main Building #1	98	Dial Processing North Side	N	17.0	14.0	10.0	1	4	1		14
10	Main Building #1	99A	Bathroom	N	13.0	7.0	10.0	1	4	1		10
10	Main Building #1	99B	Bathroom	N	13.0	7.0	10.0	1	4	1		10
10	Main Building #1	100	Blanking Room	N	61.0	70.0	7.0	1	4	1		83
10	Main Building #1	101	Maintenance Room	N	39.0	13.0	12.0	1	4	1		20
10	Main Building #1	102	Shipping	N	16.0	23.0	12.0	1	4	1		17
10	Main Building #1	103	Maintenance/Machine Shop	N	22.0	23.0	12.0	1	4	1		19
10	Main Building #1	104	Die Room	N	14.0	36.0	10.0	1	4	1		20
10	Main Building #1	105	Automatic Spray Room	N	17.0	36.0	10.0	1	4	1		22
10	Main Building #1	106	Screen Line	N	36.0	83.0	10.0	1	4	1		65
10	Main Building #1	107		N	17.0	12.0	10.0	1	4	1		13
10	Main Building #1	108	Tool and Die Shop	N	17.0	28.0	10.0	1	4	1		19
10	Main Building #1	110		N	17.0	17.0	10.0	1	4	1		15
10	Main Building #1	111	Floor Supervisor's Office	N	13.0	14.0	10.0	1	4	1		13
10	Main Building #1	112	Meeting Room	N	15.0	14.0	10.0	1	4	1		13
10	Main Building #1	113	West Hall A	N	3.0	14.0	10.0	1	4	1		9
10	Main Building #1	113	West Hall B	N	5.0	14.0	10.0	1	4	1		10
10	Main Building #1	113	West Hall C	N	5.0	14.0	10.0	1	4	1		10
10	Main Building #1	114		N	13.0	14.0	10.0	1	4	1		13
10	Main Building #1	115	Bathroom	N	14.0	15.0	10.0	1	4	1		13

IMPACTED BUILDING AREA SURVEY

Table A-6

Safety Light

ENTER BELOW OPTNL LOC CODE	ENTER BUILDING NAME BELOW	ENTER ROOM NUMBER BELOW	ENTER AREA DESCRIPTION BELOW	SURVEY PACKAGE REQRD ? (Y/N)	ENTER AREA WIDTH BELOW (ft)	ENTER AREA LENGTH BELOW (ft)	ENTER AREA HEIGHT BELOW (ft)	ENTER FLOOR + L. WALL SURVEY CODE	ENTER U. WALL + CEILING SURVEY CODE	ENTER Survey Sketchs (each)	SURVEY PACKAGE PREP (hrs)	DIRECT SURVEY LABOR (hrs)
10	Main Building #1	116	Time Clock Room	N	12.0	11.0	10.0	1	4	1		11
10	Main Building #1	117	Acid Etching Room	N	20.0	31.0	10.0	1	4	1		21
10	Main Building #1	118		N	13.0	37.0	10.0	1	4	1		20
10	Main Building #1	119	Sand Blasting Room	N	13.0	13.0	10.0	1	4	1		12
10	Main Building #1	120	Lunch Room	Y	34.0	35.0	8.0	1	4	1	4	35
10	Main Building #1	121		N	14.0	10.0	8.0	1	4	1		12
10	Main Building #1	122	Hallway	N	5.0	26.0	8.0	1	4	1		13
10	Main Building #1	123	Multi-Metals Office	N	27.0	28.0	8.0	1	4	1		24
10	Main Building #1	124	Multi-Metals Manager's Office	N	14.0	17.0	8.0	1	4	1		14
10	Main Building #1	125	Mail Room/Stairwell	N	20.0	19.0	8.0	1	4	1		17
10	Main Building #1	126	Vestibule	N	20.0	14.0	8.0	1	4	1		15
10	Main Building #1	127	Safety Light Office	N	35.0	35.0	8.0	1	4	1		32
10	Main Building #1	129	Safety Light Manager's Office	N	14.0	19.0	8.0	1	4	1		14
10	Main Building #1	130	Safety Light Conference Room	N	11.0	19.0	8.0	1	4	1		13
10	Main Building #1	131	Spare Office	N	11.0	19.0	8.0	1	4	1		13
10	Main Building #1	132	Safety Light 2nd Manager's Office	N	11.0	19.0	8.0	1	4	1		13
10	Main Building #1	135	HP Laboratory	N	14.0	16.0	8.0	1	4	1		13
10	Main Building #1	135WR	Wash Room	N	14.0	7.0	8.0	1	4	1		11
10	Main Building #1	136	Paint Storage Room	N	26.0	16.0	12.0	1	4	1		18
10	Main Building #1	137		N	26.0	16.0	12.0	1	4	1		18
10	Main Building #1	139	West Stairwell	N	9.0	16.0	20.0	1	4	1		12
10	Main Building #1	140	East Stairwell	N	9.0	16.0	20.0	1	4	1		12
10	Main Building #1	201	Developing Room East	Y	13.0	14.0	8.0	1	4	1	4	17
10	Main Building #1	202	Developing Room West	N	14.0	18.0	8.0	1	4	1		14
10	Main Building #1	203	Glass Plate Storage	N	10.0	5.0	8.0	1	4	1		9
10	Main Building #1	204	Photo Setup Room West	N	11.0	11.0	8.0	1	4	1		11
10	Main Building #1	205	Hallway	N	6.0	13.0	8.0	1	4	1		10
10	Main Building #1	206	Step Camera Room	N	22.0	21.0	8.0	1	4	1		18
10	Main Building #1	207	Developing Room North	N	10.0	15.0	8.0	1	4	1		12
10	Main Building #1	208	Screens Burning Room	N	8.0	18.0	8.0	1	4	1		12
10	Main Building #1	209	Hallway	N	36.0	5.0	8.0	1	4	1		15
10	Main Building #1	210	Darkroom	N	24.0	24.0	8.0	1	4	1		20
10	Main Building #1	211	Blue Ray Room	N	20.0	20.0	8.0	1	4	1		17
10	Main Building #1	212	Center Wash Room	N	5.0	9.0	8.0	1	4	1		9
10	Main Building #1	213	Dial Processing and Shipping	N	19.0	19.0	8.0	1	4	1		16
10	Main Building #1	214	Dial Processing Office	N	19.0	11.0	8.0	1	4	1		13
10	Main Building #1	215	North Wash Room	N	12.0	12.0	8.0	1	4	1		12
10	Main Building #1	216	Inactive Records Room	N	19.0	20.0	8.0	1	4	1		17
10	Main Building #1	217	Active Records Room	N	14.0	10.0	8.0	1	4	1		12
10	Main Building #1	218	Radium Dial Production Room	N	43.0	44.0	8.0	1	4	1		42
10	Main Building #1	301	Art Room	Y	24.0	25.0	8.0	1	4	1	4	25
10	Main Building #1	301A	3rd Floor Stairwell	N	19.0	5.0	16.0	1	4	1		11
10	Etching Building #2	1	Loading and Storage	Y	66.0	22.0	12.0	1	4	1	4	42
10	Etching Building #2	2	Metal Storage	N	8.0	10.0	12.0	1	4	1		10
10	Etching Building #2	3	Paint Stripping	N	19.0	7.0	8.0	1	4	1		12
10	Etching Building #2	4	Loading Dock	Y	39.0	8.0		1	4	1	4	14
10	Etching Building #2	5		N	21.0	9.0	8.0	1	4	1		13
10	Etching Building #2	6		N	19.0	18.0	10.0	1	4	1		16
10	Etching Building #2	7	Dry Chemical Storage	N	26.0	27.0	10.0	1	4	1		23
10	Etching Building #2	8		N	19.0	19.0	10.0	1	4	1		16
10	Etching Building #2	9	Inactive Boiler Room	N	10.0	4.0	8.0	1	4	1		9
10	Etching Building #2	10	Hallway	N	24.0	25.0	10.0	1	4	1		21
10	Etching Building #2	11		N	23.0	24.0	10.0	1	4	1		20
10	Etching Building #2	12	Hallway	N	29.0	4.0	10.0	1	4	1		13
10	Etching Building #2	13		N	8.0	10.0	8.0	1	4	1		10
10	Etching Building #2	14	Screen Making Room	N	21.0	21.0	10.0	1	4	1		18
10	Etching Building #2	15	Janitor Supply Room	N	12.0	5.0	10.0	1	4	1		10
10	Etching Building #2	16	Screen Laminating Room	N	4.0	6.0	10.0	1	4	1		9
10	Etching Building #2	17	Spray Booth	N	8.0	6.0	10.0	1	4	1		9
10	Etching Building #2	18	Prototype Metals Line	N	12.0	9.0	10.0	1	4	1		11
10	Etching Building #2	19	Electrical Shop	N	6.0	15.0	10.0	1	4	1		10
10	Etching Building #2	20	Maintenance Dept	N	26.0	27.0	10.0	1	4	1		23
10	Etching Building #2	22		N	7.0	13.0	10.0	1	4	1		10
10	Etching Building #2	38	Watch Dial	N	23.0	11.0	10.0	1	4	1		14
10	Etching Building #2	40	Plating	N	19.0	28.0	10.0	1	4	1		20
10	Etching Building #2	41	Change Rooms	N	19.0	28.0	10.0	1	4	1		20
10	Etching Building #2	48	Carpenter Shop	N	23.0	59.0	10.0	1	4	1		35
10	Etching Building #2	49	Watch Dial Press	N	46.0	46.0	8.0	1	4	1		46
10	Etching Building #2	50	Watch Dial	N	100.0	60.0	8.0	1	4	1		114
10	Etching Building #2	51	Bathroom	N	11.0	11.0	8.0	1	4	1		11
10	Etching Building #2	55	Vacant Store Room	N	38.0	57.0	8.0	1	4	1		47
10	Etching Building #2	56	Hallway	N	16.0	16.0	10.0	1	4	1		14
10	Etching Building #2	58	Hallway	N	6.0	22.0	8.0	1	4	1		12
10	Etching Building #2	59	Grind Room	N	21.0	11.0	8.0	1	4	1		14
10	Etching Building #2	60	Hot Room	N	12.0	11.0	8.0	1	4	1		11
10	Etching Building #2	61	Outdoor Area	N	27.0	28.0		1	4	1		15
10	Etching Building #2	62	General Machine Shop	N	68.0	30.0	16.0	1	4	1		50
10	Etching Building #2	63		N	4.0	40.0	12.0	1	4	1		15
10	Etching Building #2	65	Acid dipping room	Y	25.0	25.0	10.0	1	4	1	4	25
10	Etching Building #2	66	Women's lunch room	N	38.0	13.0	10.0	1	4	1		20
10	Etching Building #2	67		N	13.0	17.0	10.0	1	4	1		13
10	Etching Building #2	69		N	10.0	13.0	10.0	1	4	1		11

IMPACTED BUILDING AREA SURVEY

Table A-6

Safety Light

ENTER BELOW OPTNL LOC CODE	ENTER BUILDING NAME BELOW	ENTER ROOM NUMBER BELOW	ENTER AREA DESCRIPTION BELOW	SURVEY PACKAGE REQRD ? (Y/N)	ENTER AREA WIDTH BELOW (ft)	ENTER AREA LENGTH BELOW (ft)	ENTER AREA HEIGHT BELOW (ft)	ENTER FLOOR + L. WALL SURVEY CODE	ENTER U. WALL + CEILING SURVEY CODE	ENTER Survey Sketchs (each)	SURVEY PACKAGE PREP (hrs)	DIRECT SURVEY LABOR (hrs)
10	Etching Building #2	70		N	10.0	6.0	10.0	1	4	1		9
10	Etching Building #2	71		N	13.0	20.0	10.0	1	4	1		14
10	Etching Building #2	72		N	4.0	10.0	10.0	1	4	1		9
10	Etching Building #2	73		N	11.0	21.0	12.0	1	4	1		14
10	Etching Building #2	74		N	4.0	17.0	8.0	1	4	1		10
10	Etching Building #2	75		N	32.0	32.0	10.0	1	4	1		28
10	Etching Building #2	76A	Hallway	N	13.0	13.0	10.0	1	4	1		12
10	Etching Building #2	76B	Hallway	N	12.0	13.0	10.0	1	4	1		12
10	Etching Building #2	78	Women's restroom	N	9.0	10.0	10.0	1	4	1		10
10	Etching Building #2	79	Machine shop store room	N	20.0	21.0	10.0	1	4	1		18
10	Etching Building #2	79A	Chemistry Lab Storage	N	7.0	18.0	10.0	1	4	1		12
10	Etching Building #2	80		N	17.0	11.0	8.0	1	4	1		13
10	Etching Building #2	81	Tool Room	N	17.0	25.0	8.0	1	4	1		18
10	Etching Building #2	82	Men's Restroom	N	16.0	17.0	9.0	1	4	1		15
10	Etching Building #2	83	Swab Measurement	N	19.0	18.0	10.0	1	4	1		16
10	Etching Building #2	84	Entrance	N	10.0	10.0	10.0	1	4	1		10
10	Etching Building #2	201	South Attic	Y	50.0	51.0	10.0	1	4	1	4	59
10	Etching Building #2	202	Northeast Attic	N	24.0	25.0	10.0	1	4	1		21
10	Etching Building #2	203	North Central Attic	N	38.0	13.0	10.0	1	4	1		20
10	Etching Building #2	204	Northwest Attic	N	20.0	20.0	10.0	1	4	1		17
			TOTALS								92	4,645

APPENDIX A- 7 Outdoor Area Survey Labor Summary

IMPACTED UNPAVED OPEN LAND AREA SURVEY

Table A-7

Safety Light

ENTER BELOW OPTIONAL LOC CODE	ENTER SURFACE TYPES BELOW	ENTER AREA DESCRIPTION BELOW	SURVEY PACKAGE REQRD ? (Y/N)	ENTER AREA WIDTH BELOW (ft)	ENTER AREA LENGTH BELOW (ft)	SUB SURFACE ACTIVITY DEPTH (ft)	ENTER Random Survey Sketchs (each)	Survey Sketch Hours	SURVEY ACKAG PREP (hrs)	DIRECT SURVEY LABOR (hrs)
2	Woods/brush	Soil North of Well 5 (Grids 228-234, 250-256)	Y	230	66	4	2	0.7	4	156
3	Grass	Soil Surrounding Ion Exchange Building (Grid 102)	N	9	7	3	1	0.3		3
4	Grass	Soil Surrounding Old Garage Foundation (Grids 128, 129, 150, 151)	N	40	32	3	1	0.3		11
5	Grass	Soil Under Old Loading Dock (Grid 116)	N	20	10	3	1	0.3		3
6	Grass	Soil Surrounding 8x8 Building (Grids 98, 99, 110, 111)	N	20	20	3	1	0.3		4
7	Grass	Soil Surrounding Old Radium Vault (Grids 99, 100, 111, 112)	N	26	32	3	1	0.3		7
8	Grass	Soil North of Machine Shop	N	130	65	3	2	0.7		60
9	Grass	Soil Surrounding Above-Ground Silo (Grid 173)	Y	20	20	3	1	0.3	4	4
11	Grass	Underground Silo Area (Grids 182-183)	N	20	10	16	2	0.7		8
11	Pond/Soil	East Lagoon Area (Grids 207, 208, 185, 186)	Y	50	50	3	1	0.3	4	21
11	Pond	West Lagoon Area (Grids 167-169, 188-191, 210-212)	N	130	50	3	1	0.3		50
11	Woods/brush	East Plant Dump	Y	33	50	3	1	0.3	4	17
11	Woods/brush	West Plant Dump (Grids 170-171, 192-193)	N	33	50	3	1	0.3		17
11	Woods/brush	Contaminated Soil Near Old Berwick Road	Y	30	15	6	1	0.3	4	6
11	Woods/brush	Contaminated Soil from Vance Walton Property	N	16	10	4	1	0.3		3
11	Grass	Contaminated Soil North of Lacquer Storage Building	Y	33	33	3	1	0.3	4	14
11	Gravel	Employee Parking Area - East	N	125	125	3	1	0.3		112
11	Gravel	Employee Parking Area - West	Y	80	125	3	1	0.3	4	75
11	Grass	Other Unpaved Areas North of Safety Light Fence	N	690	166	3	7	2.3		852
11	Grass	Abandoned Canal Area	Y	504	50	3	7	2.3	4	195
11	rass, woods/brus	Other Soil Around Safety Light Buildings	Y	690	80	3	10	3.3	4	418
11	Woods/brush	Area Between South Fence and River	Y	721	80	3	7	2.3	4	429
						TOTALS:		17	40	2,466

IMPACTED PAVED OUTDOOR AREA SURVEY

Table A-7

Safety Light

ENTER BELOW OPTIONAL LOC CODE	ENTER SURFACE TYPES BELOW	ENTER AREA DESCRIPTION BELOW	SURVEY PACKAGE REQRD ? (Y/N)	ENTER AREA WIDTH BELOW (ft)	ENTER AREA LENGTH BELOW (ft)	ENTER Random Survey Sketchs (each)	Survey Sketch Hours	SURVEY PACKAGE PREP (hrs)	DIRECT SURVEY LABOR (hrs)
11	Asphalt	Main Entrance Road	Y	30	225	1	0.3	4	19
11	Asphalt	Visitor Parking Lot	N	25	262	1	0.3		17
11	Asphalt	Eastern North-South Road	N	20	500	1	0.3		34
11	Asphalt	Western North-South Road	N	20	500	1	0.3		34
11	Asphalt	East-West Road Across Site	Y	20	262	1	0.3	4	21
11	Cement	Sidewalk in Front of Main Building	N	3	340	1	0.3		23
11	Cement	Sidewalk around Nuclear Building	N	3	262	1	0.3		17
11	Cement	Slab north of Nuclear Building	N	24	10	1	0.3		3
		TOTALS					3	8	167

STORM DRAIN & SEWER SURVEY

Table A-7 — Safety Light

CATCH BASIN & CLEAN-OUT SURVEY

BASIN SURVEY DURATION (hrs): 4
BASIN SURVEY CREW SIZE (men): 1

ENTER BELOW OPTIONAL LOC CODE	ENTER AREA DESCRIPTION BELOW	ENTER BASIN DIAMETER BELOW (ft)	SURVEY PACKAGE REQRD ? (Y/N)	SURVEY PACKAGE PREP (hrs)	SURVEY LABOR (hrs)
10	Grate behind Main Building		Y	4	8.0
TOTALS				4	8

APPENDIX A- 8 Instrument Lease Charges

Table A-8

COMMERCIAL CLIENT INSTRUMENT COSTS

Safety Light

12 D&D Months Duration
5.0 Final Survey Months Duration
8.5 Characterization Survey Months Duration

ITEM NUMBER	INSTRUMENT DESCRIPTION	MONTHLY COMMERCIAL RENTAL RATE	CHAR SURVEY NUMBER INSTRUMENTS REQUIRED	D&D NUMBER INSTRUMENTS REQUIRED	FINAL SURVEY NUMBER INSTRUMENTS REQUIRED	D&D FULL PROJECT DURATION	D&D ALTERNATE MONTHLY DURATION	CHAR SURVEY INSTRUMENT LEASE COST	D&D INSTRUMENT LEASE COST	FINAL SURVEY INSTRUMENT LEASE COST
	RADIATION PROTECTION AND MEASUREMENT INSTRUMENTATION/SYSTEMS									
1	Becton Dickson - TRITON, Model III Tritium Monitor :	$1,758								
2	MICROSPEC-2, NaI(Tl) Gamma Spec System W/Detector, PC, Software, Case & Accessories :	$1,877	1		1			$939		$9,385
3	GEM PC, Gamma Spec System W/Detector, PC, Software, Case & Accessories Model 4610J / GC4519 :	$3,646	1	1	1	Y		$1,823	$43,752	$18,230
4	INSPECTOR, Portable Gamma Spec W/Detector, PC, Software, 84-1 Insitu Cal, Tripod & Accessories :	$2,821								
5	Qª Low Level Waste Assay System W/(3) HPGe Detectors, PC, Vault Shield W/Scale, Turntable & Acc.:	$9,846								
6	GTSD Mod. Qª Waste Assay System W/(3) HPGe Detectors, PC, Modular Shield W/Scale, Turntable & Acc.:	$5,934								
7	DCA - Portable Area Monitor 3090-3 :	$168								
8	Eberline -FASTRACK II Dosimetry System With PC, Printer, 1ea DR200, 1ea DR200R, 30ea DD100 & Software :	$1,691								
9	Eberline - Dosimeter Meter Reader Model DR-700 :	$257								
10	Eberline - Dosimeter Response Check Station Model DR-700 OPT7 :	$470								
11	Eberline - FASTRAC II, PC Dose Management Program with PC Utility :	$327								
12	Eberline - Dosimeter Model DD-300 :	$65								
13	Eberline - Personal Contamination Monitor, Model PCM-1B w/ Accessories :	$2,727								
14	Eberline - Personal Contamination Monitor, Model PCM-1C w/ Accessories :	$3,203								
15	Eberline - Personal Contamination Monitor, Model PCM-2 Base Unit :	$4,005								
16	Eberline - Portable Alpha Counter, Model SAC-4 :	$701	1	1	1	Y		$351	$8,412	$3,505
17	Eberline- Portable Beta Counter, Model BC-4 :	$578	1	1	1	Y		$764	$6,336	$2,640
18	Eberline - Portable GM Survey Instrument, Model E-520 w/ HP-270 & SK-1 :	$246								
19	Eberline - Portable GM Survey Instrument, Model E-520 W/ HP-260 & SK-1 :	$260								
20	Eberline - Portable High Range Ion Chamber, Model RO7 W/Low & Mid-Range Detectors, 5' Extension & 60' Cable :	$657								
21	Eberline - Portable Ion Chamber Instrument, Model RO7 :	$196								
22	Eberline - Portable Ion Chamber Instrument, Model RO2A :	$217								
23	Eberline - Scintillation Portal Monitor, Model PM-7 W/PC, Software, Calibration Jig, Remote ALarm & 60' Cable :	$2,531								
24	Eberline - Tool Contamination Monitor, Model TCM-2 with Spare Detector :	$3,208								
25	Eberline - TELETECTOR Gamma Dose Rate Meter, Model 6112B w/ Accessories :	$720								
26	EG&G - NOMAD, Portable PC Based Gamma Spec Analyzer W/HPGe Detector, PC, Software & Acc. :	$2,048								
27	EG&G - 30 Liter Dewar, Vertical Cryostat and Lead Shield for NOMAD :	$366								
28	F&J - BUCK Pump Kit, 5 Personal Air Samplers, Calibrator, Charger & Case :	$867								
29	F&J - Model HV-1, High Volume Air Sampler with Sample Head :	$151		1		Y			$1,812	
30	F&J - MODEL LV-1, Low Volume Air Sampler with Sample Head :	$141		2		Y			$3,384	
31	F&J - MODEL LV-14M, GOOSENECK LOW VOLUME AIR SAMPLER WITH SAMPLE HEAD :	$770								
32	LUDLUM - MODEL 12 SURVEY METER WITH 44-9 PANCAKE GM PROBE & CASE :	$138		3		Y			$4,968	
33	LUDLUM - MODEL 12 SURVEY METER WITH 43-5 ALPHA SCINTILLATION PROBE & CASE :	$184								
34	LUDLUM - MODEL 19 MICRO R METER WITH HARD CASE :	$185	1	1	1	Y		$93	$2,220	$925
35	LUDLUM - MODEL 177 ALARM RATE METER WITH 44-9 PROBE AND CASE :	$172	1	3	3	Y		$86	$6,192	$2,580
36	Ludlum - Model 239-1F Floor Monitor Cart W/O Model 12 Meter & W/Model 43-37 475 cm² Gas Flow Detector;	$415			2					$4,150
37	Ludlum - Model 2350 Data Logger Kit, W/Keypad, Barcode Reader, Pelican Case & Detectors # 38 Thru 43 Below :	$1,561	3	5	9	Y		$2,342	$93,660	$70,245
38	Ludlum - Model 2350 Data Logger Kit, W/Keypad, Barcode Reader, Pelican Case (No Detectors) :	$393								
39	LUDLUM - MODEL 43-5 ALPHA SCINTILLATION DETECTOR :	$80	1	3	3	Y		$40	$2,880	$1,200
40	LUDLUM - MODEL 43-68 100 cm2 GAS PROPORTIONAL DETECTOR :	$71								
41	LUDLUM - MODEL 44-1 BETA SCINTILLATION DETECTOR :	$73								
42	LUDLUM - MODEL 44-2 HIGH ENERGY GAMMA SCINTILLATION DETECTOR :	$73								
43	LUDLUM - MODEL 44-38 ENERGY COMPENSATED GM DETECTOR :	$76								
44	LUDLUM - MODEL 44-40 SHIELDED GM PANCAKE DETECTOR :	$55								
45	LUDLUM - BETA AIR MONITOR (CAM), MODEL 333-2 :	$807								
46	LUDLUM - MODEL 77-3 STRETCH SCOPE (TELETECTOR) :	$509								
47	NE TECHNOLOGY - MODEL CMTA CONTAMINATION MONITOR WITH DPSHA PROBE :	$793								
48	Packard - PC Based Liquid Scintillation Counter W/ Alpha / Beta Option & Accessories / A2550P2 :	$2,668								
49	Quantrad - SCOUT-1, NaI(Tl) Gamma Spec System W/Detector, PC, Software, Case & Accessories :	$1,560								
50	REUTER-STOKES - PRESSURIZED ION CHAMBER RSS-122 :	$1,056								
51	TENNELC - MODEL LB 5100-2080-III PC BASED ALPHA/BETA COUNTER SYSTEM :	$2,011								
	RADIATION PROTECTION AND MEASUREMENT INSTRUMENTATION/SYSTEMS									
52	TSI - MODEL 8020 PORTACOUNT, RESPIRATOR FIT TESTER :	$1,404								
53	XETEX - MODEL 330A TELESCAN DOSE RATE METER W/ CASE & ACCESSORIES :	$682								
	INSTRUMENTATION SOURCES (MAY BE CHARGED AS CONSUMABLE OR RENTAL)									
54	GAMMA SPEC. NIST TRACEABLE MIXED SOIL EQUIVALENT 1 LITER MARINELLI :	$205	1	1	1	Y		$103	$2,460	$1,025
55	GAMMA SPEC. NIST TRACEABLE MIXED WATER EQUIVALENT 1 LITER MARINELLI :	$205	1	1	1	Y		$103	$2,460	$1,025
56	GAMMA SPEC. NIST TRACEABLE MIXED FILTER PAPER EQUIVALENT :	$185	1	1	1	Y		$93	$2,220	$925
57	GAMMA SPEC. NIST TRACEABLE MIXED POINT SOURCE :	$185								
58	Q7 GAMMA SPEC. NIST TRACEABLE MIXED 30 INCH LINE SOURCE :	$218								
59	Q7 GAMMA SPEC. NIST TRACEABLE MIXED 6 INCH QC SOURCE :	$158								
60	ALPHA/BETA COUNTER BC-4, NIST Tc-99 47mm LINEARITY 4 SOURCE SET :	$757								
61	NIST Tc-99 47mm SOURCE PER EACH (1, 10, 100 OR 1000 nCi) :	$74	4	4	4	Y		$148	$3,552	$1,480
62	ALPHA/BETA COUNTER SAC-4, NIST Th-230 47mm LINEARITY 4 SOURCE SET :	$303								
63	NIST Th-230 47mm SOURCE PER EACH (1, 10, 100 OR 1000 nCi) :	$89	2	2	2	Y		$89	$2,136	$890
64	CMTA NIST ALPHA CAL/CHECK SOURCE WITH ALUMINUM CASE/HOLDER :	$229								
65	CMTA NIST BETA CAL/CHECK SOURCE WITH ALUMINUM CASE/HOLDER :	$209								
66	TCM-2 & PCM-1B, NIST CAL/CHECK SOURCE :	$358								
67	PM-7, NIST CAL/CHECK SOURCE :	$202								
	DECON EQUIPMENT									
68	LTC VAC-U-BLAST STEEL SHOT BLASTER :	$11,970								
69	PENTEK VAC-PAC MODEL 9A VACUUM :	$4,481		1			2		$8,962	
70	PENTEK SQUIRREL III FLOOR SCABBLER :	$1,931								
71	PENTEK CORNER CUTTER NEEDLE GUN :	$566								
72	MCDONALD AIR TOOL MODEL U-5, 5 PISTON FLOOR SCABBLER :	$1,157								
73	MCDONALD AIR TOOL MODEL 3WCW, 3 PISTON WALL SCABBLER :	$492								
74	MCDONALD AIR TOOL MODEL HS, SINGLE PISTON SCABBLER :	$104								
75	2000 CFM HEPA VENTILATION UNIT MODEL 1990C :	$237								
76	HAKO TWIN HEAD ELECTRIC HEPA VACUUM :	$339								
77	NORCLEAN TRIPLE HEAD ELECTRIC HEPA VACUUM :	$948		1		Y			$11,376	
	MULTIMETER EQUIPMENT									
78	FLUKE - 8060A DVM WITH HV PROBE, CASE AND LEADS :	$139								
79	EBERLINE - MP-2 MINIPULSER AND LUDLUM MODEL 500 MINIPULSER	$411								
80	TEKTRONIX - MODEL 2225, 100 MHZ PORTABLE OSCILLOSCOPE WITH BATTERY PACK :	$490								
81	F&J AIR FLOW CALIBRATOR MODEL D-812 :	$191								
82	F&J AIR FLOW CALIBRATOR MODEL D-814 :	$191								
83	FIELD SERVICE TOOL KIT :	$174								
	OFFICE EQUIPMENT									
84	DATA ANALYSIS COMPUTER SYSTEM :	$195	1	1	1	Y		$98	$2,340	$975
85	DOWNLOAD NOTEBOOK COMPUTERS :	$144	1	1	2	Y		$72	$1,728	$1,440
86	HP MODEL IIIP LASER JET PRINTER :	$79	1	1	1	Y		$40	$948	$395
87	HP MODEL 4L LASER JET PRINTER :	$79								
88	HP OFFICE JET FAX/COPIER :	$59								
	SAMPLING EQUIPMENT									
89	BICO - JAW CRUSHER, MODEL 241-36X35 :	$784								
90	FISHER SCIENTIFIC -TOP LOADING SCALE, 0-3 kg MODEL XE4100 :	$183	1	1	1	Y		$92	$2,196	$915
91	FISHER SCIENTIFIC - CLASS F S.S. WEIGHT SET, 1mg-2kg CAT # 02215311 :	$43	1	1	1	Y		$22	$516	$215
92	FISHER SCIENTIFIC - OVEN, ISOTEMP 5.0 120VAC CAT.# 13247750G :	$296	1	1	1	Y		$148	$3,552	$1,480
93	FORESTRY SUPPLIERS - SOIL SAMPLING AUGER KIT, CAT # 67352 :	$276								
	GLOBAL POSITIONING SYSTEM									
94	TRIMBLE NAVIGATION - SITE SURVEYOR SYSTEM, MODEL 4000SE :	$5,906								
	COMMUNICATIONS EQUIPMENT									
95	MOTOROLA - MODEL HT1000, 16 CHANNEL UHF RADIO WITH ACCESSORIES	$203								
							TOTAL INSTRUMENT LEASE COST	**$6,941**	**$218,062**	**$123,625**

APPENDIX A- 9 Equipment Lease Charges

Table A-9

COMMERCIAL CLIENT EQUIPMENT COSTS
Safety Light

12 D&D Months Duration
5 FINAL SURVEY Months Duration

ITEM NUMBER	EQUIPMENT DESCRIPTION	MONTHLY COMMERCIAL RENTAL RATE	D&D NUMBER ITEMS REQUIRED	FINAL SURVEY NUMBER ITEMS REQUIRED	D&D FULL PROJECT DURATION	D&D ALTERNATE MONTHLY DURATION	D&D EQUIPMENT LEASE COST	FINAL SURVEY EQUIPMENT LEASE COST
	DECON EQUIPMENT							
1	LTC VAC-U-BLAST Steel Shot Blaster :	$11,970						
2	PENTEK VAC-PAC Model 9A Vacuum :	$4,481						
3	PENTEK SQUIRREL III Floor Scabbler :	$1,931						
4	PENTEK CORNER CUTTER Needle Gun :	$566						
5	MCDONALD AIR TOOL Model U-5, 5 Piston Floor Scabbler :	$1,157						
6	MCDONALD AIR TOOL Model 3WCW, 3 Piston Wall Scabbler :	$492						
7	MCDONALD AIR TOOL Model HS, Single Piston Scabbler :	$104						
8	2000 CFM HEPA Ventilation Unit Model 1990C :	$232						
9	HAKO Twin Head Electric HEPA Vacuum :	$339						
10	NORCLEAN Triple Head Electric HEPA Vacuum :	$948						
	OFFICE EQUIPMENT							
11	Data Analysis Computer System :	$195						
12	Download Notebook Computers :	$144						
13	HP Model IIIP Laser Jet Printer :	$79						
14	HP Model 4L Laser Jet Printer :	$79						
15	HP Office Jet FAX/Copier :	$59						
16	35mm Camera	$64	1	1	N	2	$128	$320
17	Fax machine	$23						
18	Telephone	$5						
19	Office Trailer, 50' x 10'	$786						
20	Toilet, portable chemical	$210						
21	Desk	$129						
22	File Cabinet, 5 drawer x 28"	$123						
23	File Cabinet, fireproof, 4 drawer	$364						
24	Work Tables, 30" x 80"	$49						
25	Coat Racks, 36" x 21" x 60"	$87						
26	Draft Table	$227						
27	Desk Chairs	$54						
28	Molded Plastic Chairs	$13						
29	Microwave oven	$93						
30	Coffee Machine	$142						
31	Refrigerator	$326						
32	Waste Containers (7 gallon)	$11						
33	Waste Containers (35 gallon)	$51						
34	Draft Table Stool	$55						
35	Plan Holders (P&ID)	$87						
36	Break Room Folding Tables	$96						
37	Molded Plastic Chairs	$13						
38	Multi-Media Board, 36" x 60"	$33						
	SAMPLING EQUIPMENT							
39	BICO - Jaw Crusher, Model 241-36X35 :	$284						
40	FISHER SCIENTIFIC -Top Loading Scale, 0-3 kg Model XE4100 :	$183						
41	FISHER SCIENTIFIC - Class F S.S. Weight Set, 1mg-2kg CAT.# 0221531 :	$43						
42	FISHER SCIENTIFIC - Oven, ISOTEMP 5.0 120VAC CAT.# 13247750G :	$296						
43	FORESTRY SUPPLIERS - Soil Sampling Auger Kit, CAT.# 87352 :	$276						
	COMMUNICATIONS EQUIPMENT							
44	MOTOROLA - Model HT1000, 16 Channel UHF Radio with Accessories :	$203						
	TOOLS							
45	Full Set Misc Tools w/Chest	$89						
46	3/4" Impact Wrench	$122						
47	3/4" Impact Socket Set	$22						
48	Set of Lifting Slings	$54	1		Y		$648	
49	Drum Heaters - Evaporation	$27						
50	8' Fiberglass Step Ladder	$43	1	1	Y		$516	$215
51	4 Outlet GFCI Circuit Guard	$59						
52	Air Compressor (2-1/2 HP, 5.5 CFM)	$71						
53	1" x 150' Air Hose	$27	2		Y		$648	
54	Air Chipping Hammer with Chisels	$92						
55	Electric Drills 1/2 Inch	$44						
56	8-1/4" Circular Saw	$34						
57	Milwaukee Heavy Duty Straight Grinder	$86						
58	Long Handled Shovels	$9						
59	Snow Shovels	$4						
60	Steel Pry Bar	$2						
61	Long Handeled Pry Bar Set	$14						
62	Electric Paint Sprayer (for fixative agents)	$20						
63	Cutting Torch	$104	1		Y		$1,248	
64	Band Saw	$55	2		Y		$1,320	
65	Drum handling cart	$34						
66	Extension cord, 100 ft, 12/3, 15A	$31						
67	Lighting standard, 2 500 W halogen quartz	$35	1		Y		$420	
68	String light, 100 ft, 10 lamp	$10						
69	110,000 BTU Oil-Fired Space Heater	$57						
	HEAVY EQUIPMENT RENTAL							
70	Truck Mounted Hydraulic Crane, 25 Ton	$6,210	1		N	1	$6,210	
71	40' Telescoping Boom Lift	$3,968	1	1	N	2	$7,936	$19,840
72	Truck, Three axle dump, 16 ton payload	$4,715						
73	Oxyacetylene Cutting Outfits	$224	1		Y		$2,688	
74	1-1/4 C.Y. Backhoe Loader	$3,278	1		N	1	$3,278	
75	Backhoe Attachment, 1000 ft-lb Hydraulic Hammer	$3,565	1		N	2	$7,130	
76	Hydraulic Grapple with Shear Attachment for Loader	$1,087						
77	Service Truck	$949	1		Y		$11,388	
	SAFETY EQUIPMENT							
78	Respirators	$43						
79	Tripod Lifeline Rescue System	$183	1	1	Y		$2,196	$915
80	Portable Axial Electric Blower W/25' Ducting	$159	1		Y		$1,908	
81	Confined Space Safety Harness	$24	1	1	Y		$288	$120
82	Portable Multigas Monitor	$166	1	1	Y		$1,992	$830
83	First Aid Kit	$24	1	1	Y		$288	$120
84	Respirator Porta Count	$468						
85	Heat Stress Monitor	$82						
						TOTAL EQUIPMENT LEASE COST	$50,230	$22,360

APPENDIX A- 10 Demolition Estimate

Table A-10
Demolition Estimate
Safety Light

LABOR BASED DEMOLITION COSTS: Labor by man-hour

Management, Supervision, & HP Support Labor Not Included

LOC CODE	WBS No.	AREA	Util Operator & Craftsman $41.42	Laborers $38.00	Craftsman $41.42	HP Tech $50.08	DEMOLITION LABOR hours	TOTAL PRICE
1		General Cleanup Etching Building Area		110.00			110.0	$4,180
6		General Cleanup 8 x 8 Building		3.00			3.0	$114
7		General Cleanup Old Radium Vault		10.00			10.0	$380
9		General Cleanup Above Ground Silo		3.00			3.0	$114
10		General Cleanup Code 10 Buildings		2721.00			2,721.0	$103,387
11		General Cleanup of Outdoor Areas		120.00			120.0	$4,560
11		Pump out lagoons			16.00		16.0	$663
10		Survey and release of building contents				160.00	0.0	$8,013
							2,983.0	$121,410

TASK BASED DEMOLITON COSTS

42% Hazardous & Toxic Waste Productivity Factor: Level C, Heavy Work, 70 - 95°F

Percent Labor Cost 65.00%
Average Hourly Labor Rate $38.00

LOC CODE	WBS No.	AREA	QUANTITY	UNIT	MATERIAL UNIT PRICE	LABOR UNIT PRICE	EQUIPMENT UNIT PRICE	MATERIAL TOTAL PRICE	LABOR TOTAL PRICE	EQUIPMENT TOTAL PRICE	TOTAL PRICE
1		Early Demolition of Specified Rooms from the Etching Building	30,320	CF		$0.11	$0.11		$8,229	$7,941	$16,170
1		Etching Building Slab Demolition	3,032	SF		$5.05	$0.60		$36,481	$4,331	$40,813
1		Etching Building Soil Removal	61.49	CY		$4.07	$1.36		$595	$198	$793
1		Etching Building Equipment Removal	2	TON		$675.49	$0.00		$3,121	$0	$3,121
2		Area North of Well 5 Soil Removal - 6"	281.11	CY		$3.04	$1.37		$2,034	$917	$7,457
3		Ion Exchange Building Demolition	245	CF		$0.11	$0.11		$66	$64	$14,194
3		Ion Exchange Building Slab Demolition	35	SF		$5.05	$0.60		$421	$50	$471
3		Ion Exchange Building Soil Removal - 2' buffer, 6" deep	2	CY		$75.99	$0.00		$332	$0	$332
3		Ion Exchange Building Equipment Removal	0	TON		$675.49	$0.00		$36	$0	$36
4		Remove Old Garage Foundation	240	SF		$5.05	$0.60		$2,888	$349	$3,231
4		Old Garage Area Soil Removal, 10' buffer, 6" deep	24	CY		$4.07	$1.36		$229	$76	$306
5		Remove soil under old loading dock, 6" deep	4	CY		$75.99	$0.00		$670	$0	$670
6		8 x 8 Block Building Demolition	512	CF		$0.11	$0.11		$139	$134	$273
6		8 x 8 Block Building Slab Demolition	64	SF		$5.05	$0.60		$770	$91	$861
6		8 x 8 Block Building Soil Removal - 6" buffer, 6"" deep	13	CY		$75.99	$0.00		$2,265	$0	$2,265
6		8 x 8 Block Building Equipment Removal	0	TON		$675.49	$0.00		$66	$0	$66
7		Old Radium Vault Demolition	2,800	CF		$0.11	$0.11		$760	$733	$1,493
7		Old Radium Vault Slab Demolition	280	SF		$5.05	$0.60		$3,369	$400	$3,769
7		Old Radium Vault Soil Removal - 6' buffer, 6"deep	23	CY		$4.07	$1.36		$218	$72	$290
7		Old Radium Vault Equipment Removal	0	TON		$675.49	$0.00		$298	$0	$298
8		Area North of Machine Shop Soil Removal	158	CY		$4.07	$1.36		$1,515	$503	$2,018
9		Above Ground Silo Demolition	512	CF		$0.11	$0.10		$139	$122	$261
9		Above Ground Silo Slab Demolition	64	SF		$5.05	$0.60		$770	$91	$861
9		Above Ground Silo Soil Removal - 6' buffer, 6" deep	13	CY		$75.99	$0.00		$2,265	$0	$2,265
9		Above Ground Silo Equipment Removal	0	TON		$675.49	$0.00		$66	$0	$66
10		Personnel Building Demolition	5,760	CF		$0.11	$0.11		$1,563	$1,509	$3,072
10		Personnel Building Equipment Removal	0	TON		$675.49	$0.00		$593	$0	$593
11		Dry Well Excavation	29	CY		$1.90	$1.68		$132	$116	$248
10		Lacquer Storage Building Demolition	11,340	CF		$0.11	$0.11		$3,078	$2,970	$6,048
10		Lacquer Storage Building Slab Demolition	1,134	SF		$5.05	$0.60		$13,644	$1,620	$15,802
11		Lacquer Storage Building Soil Removal - 6" buffer, 6" deep	42	CY		$4.07	$1.35		$403	$134	$537
11		Lacquer Storage Building Equipment Removal	1	TON		$675.49	$0.00		$1,167	$0	$1,167
10		Well House Demolition (Dirt Floor)	4,620	CF		$0.11	$0.11		$1,254	$1,210	$25,480
11		Well House Soil Removal - 6" deep, no buffer	8	CY		$4.07	$1.35		$83	$28	$110
11		Well House Equipment Removal	0	TON		$675.49	$0.00		$476	$0	$476
10		Pipe House Demolition	8,000	CF		$0.11	$0.11		$2,171	$2,095	$4,266
10		Pipe House Slab Removal	800	SF		$5.05	$0.60		$9,626	$1,143	$10,789
11		Pipe House Soil Removal - 6" deep, no buffer	15	CY		$4.07	$1.35		$143	$48	$191
11		Pipe House Equipment Removal	1	TON		$675.49	$0.00		$823	$0	$823
10		Old House Demolition	15,680	CF		$0.11	$0.11		$4,256	$4,107	$8,362
11		Old House Soil Removal - 2' deep, no buffer	68	CY		$4.07	$1.36		$562	$187	$749
11		Old House Equipment Removal	1	TON		$675.49	$0.00		$1,614	$0	$1,614
10		Strontium-90 Sources Vault Demolition	2,100	CF		$0.11	$0.11		$570	$550	$1,120
11		Strontium-90 Sources Vault Soil Removal	4	CY		$4.07	$1.35		$38	$13	$50
11		Strontium-90 Sources Vault Equipment Removal	0	TON		$675.49	$0.00		$216	$0	$216
11		Underground Silo Soil Excavation/Removal	119	CY		$1.90	$1.68		$536	$474	$1,010
11		Drain East Lagoon (sample, excavate ditch to river and drain to river)	67	CY		$4.07	$1.35		$845	$214	$860
11		East Lagoon Soil Removal	46.3	CY		$4.07	$1.35		$448	$149	$597
11		Drain West Lagoon (sample, excavate ditch to river and drain to river)	67	CY		$4.07	$1.35		$645	$214	$860
11		West Lagoon Surface Soil Removal	120.4	CY		$4.07	$1.35		$1,165	$387	$1,552
11		West Lagoon Sub-Surface Soil Removal	601.9	CY		$4.07	$1.35		$5,826	$1,935	$7,760
11		Excavate West Dump	183	CY		$4.07	$1.35		$1,776	$589	$2,364
11		Excavate East Dump	183	CY		$4.07	$1.35		$1,775	$589	$2,364
11		Excavate Buried Drain Pipe	59	CY		$3.04	$1.37		$429	$193	$622
11		Remove Buried Drain Pipe, 12"	400	LF		$5.21	$1.16		$4,958	$1,105	$6,062
11		Remove Imbedded Drain Pipe (Radium drain)	50	LF	$4.29	$0.00	$2.02	$511	$0	$240	$751
11		Excavate Buried Sewer Pipe	15	CY		$3.04	$1.37		$107	$48	$156
11		Remove Buried Sewer Pipe	100	LF		$5.21	$1.16		$1,239	$276	$1,516
11		Remove Imbedded Sewer Pipe	100	LF	$4.29	$0.00	$2.02	$1,021	$0	$481	$1,502
11		Remove manholes/Catch Basins	2	EA		$227.98	$51.00		$1,066	$243	$1,328
11		Remove Contaminated Soil Near Old Berwick Road	83	CY		$3.04	$1.37		$603	$272	$875
11		Remove Contaminated Soil from Vance Walton Property	24	CY		$3.04	$1.37		$172	$77	$249
11		Remove Contaminated Soil North of Lacquer Storage Building	20	CY		$4.07	$1.35		$195	$65	$260
11		Remove Contaminated Soil from Employee Parking Area	475	CY		$4.07	$1.35		$4,593	$1,525	$6,119
11		Excavate Surface Soil at Unpaved N. of Fence, 6" deep	2,121	CY		$4.07	$1.35		$20,532	$6,818	$27,350
11		Excavate Surface Soil at Abandoned Canal Area, 6" deep	467	CY		$4.07	$1.35		$4,517	$1,500	$6,017
11		Excavate Sub-Surface Soil at Abandoned Canal Area, 6" deep	2,333	CY		$4.07	$1.35		$22,587	$7,500	$30,087
11		Excavate Other Surface Soil around Safety Light Bldge, 6" deep	1,022	CY		$4.07	$1.35		$9,895	$3,286	$13,181
11		Excavate Surface Soil in Area Between Fence and River, 6" deep	1,068	CY		$4.07	$1.35		$10,340	$3,433	$13,773
11		Backfill All Soil Excavations	4,149	CY	$4.77	$0.87	$1.35	$47,105	$8,830	$13,332	$69,067
10		Remove Contaminated Ductwork on second floor of main building	200	LF		$3.57			$1,701	$0	$1,701
10		Remove Asbestos	400	LF		$3.04			$2,895	$0	$2,895
10		Remove Equipment from Etching Building Production Rooms	3	TON		$675.49	$0.00		$4,684	$0	$4,684
10		Remove Equipment from Main Building Production Rooms	4	TON		$675.49	$0.00		$6,209	$0	$6,209
											$0
								$48,637.2	$228,331.4	$76,741.7	$395,833

APPENDIX A- 11 Decontamination Costs

SPECIFIC AREA SURFACE REMOVAL COST ANALYSES WITH ENVIROCARE DISPOSAL

INPUT APP. CODE	METHODOLOGY	INPUT AREA	INPUT ITEM	INPUT LOC CODE	INPUT WBS No.	INPUT SURFACE AREA (ft^2)	INPUT MATERIAL THICK (in)	TOTAL VOLUME (ft^3)	INPUT CONTAM. REMOVAL DEPTH (in)	INPUT CONTAM. WASTE DENSITY (lb/ft^3)	CONTAM. VOLUME (ft^3)	CONTAM. WEIGHT (lbs)	**PROCESS COST PLUS ** **ENVIROCARE WASTE DISPOSAL COST** BURIAL SHIP & BURY ($)	PROCESS COST ($/ft^2)	PROCESS COST ($)	SURFACE RELEASE COST ($)	COST GRAND TOTAL ($)
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 21	Floor	1		360	12		0.250	66.7	11.3	750	$959	$0.691	$249	$187	$1,395
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 21	10% Walls	1		78	12		0.125	66.7	1.2	81	$104	$3.026	$236	$41	$380
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 23	Floor	1		225	12		0.250	66.7	7.0	469	$599	$0.691	$155	$117	$872
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 23	10% Walls	1		60	12		0.125	66.7	0.9	63	$80	$3.026	$182	$31	$293
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 24	Floor	1		160	12		0.250	66.7	5.0	333	$426	$0.691	$110	$83	$620
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 24	10% Walls	1		52	12		0.125	66.7	0.8	54	$69	$3.026	$157	$27	$254
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 25	Floor	1		120	12		0.250	66.7	3.7	250	$320	$0.691	$83	$62	$466
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 25	10% Walls	1		44	12		0.125	66.7	0.7	46	$59	$3.026	$133	$23	$215
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 26	Floor	1		56	12		0.250	66.7	1.8	117	$149	$0.691	$39	$29	$217
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 26	10% Walls	1		36	12		0.125	66.7	0.6	38	$48	$3.026	$109	$19	$178
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 27	Floor	1		200	12		0.250	66.7	6.3	417	$533	$0.691	$138	$104	$775
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 27	10% Walls	1		80	12		0.125	66.7	1.3	83	$107	$3.026	$242	$42	$390
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 28	Floor	1		66	12		0.250	66.7	2.1	138	$176	$0.691	$46	$34	$256
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 28	10% Walls	1		34	12		0.125	66.7	0.5	35	$45	$3.026	$103	$18	$168
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 29	Floor	1		12	12		0.250	66.7	0.4	25	$32	$0.691	$8	$6	$46
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 29	10% Walls	1		24	12		0.125	66.7	0.4	26	$32	$3.026	$73	$12	$117
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 30	Floor	1		25	12		0.250	66.7	0.8	52	$67	$0.691	$17	$13	$97
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 30	10% Walls	1		20	12		0.125	66.7	0.3	21	$27	$3.026	$61	$10	$98
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 31	Floor	1		170	12		0.250	66.7	5.3	354	$453	$0.691	$117	$88	$659
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 31	10% Walls	1		54	12		0.125	66.7	0.8	56	$72	$3.026	$163	$28	$263
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 32	Floor	1		170	12		0.250	66.7	5.3	354	$453	$0.691	$117	$88	$659
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 32	10% Walls	1		54	12		0.125	66.7	0.8	56	$72	$3.026	$163	$28	$263
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 33	Floor	1		210	12		0.250	66.7	6.6	438	$559	$0.691	$145	$109	$814
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 33	10% Walls	1		58	12		0.125	66.7	0.9	60	$77	$3.026	$175	$30	$283
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 34	Floor	1		576	12		0.250	66.7	18.0	1,200	$1,534	$0.691	$398	$300	$2,232
36	Wood Planer	Etching Building Room 34	0% Walls	1		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 35	0% Floor	1		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 35	10% Ceiling	1		8	12		0.125	66.7	0.1	8	$11	$3.026	$25	$4	$40
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 36	0% Floor	1		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 36	10% Walls	1		30	12		0.125	66.7	0.5	31	$40	$3.026	$91	$16	$146
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 45	Floor	1		330	12		0.250	66.7	10.3	688	$879	$0.691	$228	$172	$1,279
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 45	10% Walls	1		74	12		0.125	66.7	1.2	77	$99	$3.026	$224	$38	$361
1	McDonald U-5 Scabbler-1/4"	Ion Exchange Bldg.	Floor	3		35	12		0.250	66.7	1.1	73	$93	$0.691	$24	$18	$136
3	McDonald 3WCD Scabbler-1/8"	Ion Exchange Bldg.	100% Walls	3		168	12		0.125	66.7	2.8	175	$224	$3.026	$508	$87	$819
1	McDonald U-5 Scabbler-1/4"	Old Garage Foundation	Floor	4		240	12		0.125	66.7	3.7	250	$320	$0.691	$166	$125	$810
1	McDonald U-5 Scabbler-1/4"	8 x 8 Bldg.	50% Floor	6		64	12		0.250	66.7	2.0	133	$170	$0.691	$44	$33	$248
3	McDonald 3WCD Scabbler-1/8"	8 x 8 Bldg.	25% Walls	6		64	12		0.125	66.7	1.0	67	$85	$3.026	$194	$33	$312
1	McDonald U-5 Scabbler-1/4"	Old Radium Vault	0% Floor	7		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Old Radium Vault	0% Walls	7		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Above Ground Silo	Floor	9		64	12		0.250	66.7	2.0	133	$170	$0.691	$44	$33	$248
1	McDonald U-5 Scabbler-1/4"	Personnel Building	Floor	10		576	12		0.250	66.7	18.0	1,200	$1,534	$0.691	$398	$300	$2,232
3	McDonald 3WCD Scabbler-1/8"	Personnel Building	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Lacquer Storage Bldg.	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Lacquer Storage Bldg.	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	USR Liquid Waste Bldg. (Incl. Carp. Shop)	Floor	10		2,704	12		0.250	66.7	84.5	5,633	$7,203	$0.691	$1,867	$1,406	$10,476
3	McDonald 3WCD Scabbler-1/8"	USR Liquid Waste Bldg.(Incl. Carp. Shop)	100% Walls	10		129,792	12		0.125	66.7	2,028.0	135,200	$172,869	$3.026	$392,686	$67,492	$633,046
3	McDonald 3WCD Scabbler-1/8"	Well House	25% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Pipe Shop	25% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Pipe Shop	10% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Sr-90 Sources Vault	Floor	10		210	12		0.250	66.7	6.6	438	$559	$0.691	$145	$109	$814
3	McDonald 3WCD Scabbler-1/8"	Sr-90 Sources Vault	10% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 1	25% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 1	25% Walls	10		160	12		0.126	66.7	2.5	167	$213	$3.026	$484	$83	$780
1	McDonald U-5 Scabbler-1/4"	Main Building Room 2	10% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 2	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 3	Floor	10		420	12		0.250	66.7	13.1	876	$1,119	$0.691	$290	$218	$1,627
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 3	10% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building East Loading Dock	50% Floor	10		0	12		0.250	66.7				$0.691			
1	McDonald U-5 Scabbler-1/4"	Main Building West Loading Dock	Floor	10		50	12		0.250	66.7	1.6	104	$133	$0.691	$35	$26	$194
1	McDonald U-5 Scabbler-1/4"	Main Building Room 65	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 65	10% Walls	10		99	12		0.125	66.7	1.5	103	$131	$3.026	$298	$51	$480
1	McDonald U-5 Scabbler-1/4"	Main Building Room 66	25% Floor	10		394	12		0.250	66.7	12.3	820	$1,049	$0.691	$272	$205	$1,526
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 66	50% Walls	10		1,152	12		0.125	66.7	18.0	1,200	$1,534	$3.026	$3,485	$598	$5,619
1	McDonald U-5 Scabbler-1/4"	Main Building Room 67	10% Floor	10		36	12		0.250	66.7	1.1	75	$96	$0.691	$25	$19	$139
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 67	10% Walls	10		91	12		0.125	66.7	1.4	95	$121	$3.026	$276	$47	$445
1	McDonald U-5 Scabbler-1/4"	Main Building Room 68	50% Floor	10		963	12		0.250	66.7	30.1	2,005	$2,564	$0.691	$665	$501	$3,729
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 68	50% Walls	10		1,080	12		0.125	66.7	16.9	1,125	$1,438	$3.026	$3,268	$562	$5,268
1	McDonald U-5 Scabbler-1/4"	Main Building Room 68A	10% Floor	10		50	12		0.250	66.7	1.6	105	$134	$0.691	$35	$26	$195
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 68A	10% Walls	10		110	12		0.125	66.7	1.7	115	$147	$3.026	$334	$57	$538
1	McDonald U-5 Scabbler-1/4"	Main Building Room 68B	10% Floor	10		14	12		0.250	66.7	0.5	30	$38	$0.691	$10	$7	$56
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 68B	10% Walls	10		16	12		0.125	66.7	0.2	16	$21	$3.026	$47	$8	$76
1	McDonald U-5 Scabbler-1/4"	Main Building Room 91	10% Floor	10		10	12		0.250	66.7	0.3	21	$27	$0.691	$7	$5	$40
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 91	10% Walls	10		89	12		0.125	66.7	1.4	93	$118	$3.026	$269	$46	$435
1	McDonald U-5 Scabbler-1/4"	Main Building Room 92	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 92	10% Walls	10		115	12		0.125	66.7	1.8	120	$153	$3.026	$349	$60	$582
1	McDonald U-5 Scabbler-1/4"	Main Building Room 93	10% Floor	10		265	12		0.250	66.7	8.3	552	$706	$0.691	$183	$139	$1,027
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 93	10% Walls	10		208	12		0.125	66.7	3.2	215	$274	$3.026	$623	$107	$1,005
1	McDonald U-5 Scabbler-1/4"	Main Building Room 95	Floor	10		742	12		0.250	66.7	23.2	1,546	$1,977	$0.691	$512	$386	$2,875
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 95	10% Walls	10		134	12		0.125	66.7	2.1	140	$178	$3.026	$405	$70	$654
1	McDonald U-5 Scabbler-1/4"	Main Building Room 96	10% Floor	10		122	12		0.250	66.7	3.8	255	$328	$0.691	$85	$64	$474
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 96	10% Walls	10		140	12		0.125	66.7	2.2	146	$186	$3.026	$424	$73	$683
1	McDonald U-5 Scabbler-1/4"	Main Building Room 97	10% Floor	10		185	12		0.250	66.7	6.8	385	$492	$0.691	$127	$96	$715
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 97	10% Walls	10		194	12		0.125	66.7	3.0	202	$258	$3.026	$587	$101	$946
1	McDonald U-5 Scabbler-1/4"	Main Building Room 98	10% Floor	10		24	12		0.250	66.7	0.7	50	$63	$0.691	$16	$12	$92
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 98	10% Walls	10		62	12		0.125	66.7	1.0	65	$83	$3.026	$189	$32	$302
1	McDonald U-5 Scabbler-1/4"	Main Building Room 99A	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 99A	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 99B	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 99B	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 100	25% Floor	10		1,068	12		0.250	66.7	33.4	2,224	$2,844	$0.691	$737	$555	$4,136
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 100	10% Walls	10		183	12		0.125	66.7	2.9	191	$244	$3.026	$555	$95	$895
1	McDonald U-5 Scabbler-1/4"	Main Building Room 101	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 101	10% Walls	10		125	12		0.125	66.7	2.0	130	$166	$3.026	$378	$65	$609
1	McDonald U-5 Scabbler-1/4"	Main Building Room 102	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 102	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 103	0% Floor	10		0	12		0.250	66.7				$0.691			

SPECIFIC AREA SURFACE REMOVAL COST ANALYSES WITH ENVIROCARE DISPOSAL

INPUT APP. CODE	METHODOLOGY	INPUT AREA	INPUT ITEM	INPUT LOC CODE	INPUT WBS No.	INPUT SURFACE AREA (ft^2)	INPUT MATERIAL THICK (in)	TOTAL VOLUME (ft^3)	INPUT CONTAM. REMOVAL DEPTH (in)	INPUT CONTAM. WASTE DENSITY (lb/ft^3)	CONTAM. VOLUME (ft^3)	CONTAM. WEIGHT (lbs)	**PROCESS COST PLUS** **ENVIROCARE WASTE DISPOSAL COST** BURIAL SHIP & BURY ($)	PROCESS COST ($/ft^2)	PROCESS COST ($)	SURFACE RELEASE COST ($)	COST GRAND TOTAL ($)
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 103	10% Walls	10		108	12		0.125	66.7	1.7	113	$144	$3.026	$327	$56	$527
1	McDonald U-5 Scabbler-1/4"	Main Building Room 104	10% Floor	10		50	12		0.250	66.7	1.6	105	$134	$0.691	$35	$26	$195
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 104	10% Walls	10		100	12		0.125	66.7	1.6	104	$133	$3.026	$303	$52	$488
1	McDonald U-5 Scabbler-1/4"	Main Building Room 105	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 105	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 106	10% Floor	10		299	12		0.250	66.7	9.3	623	$796	$0.691	$206	$155	$1,158
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 106	10% Walls	10		238	12		0.125	66.7	3.7	248	$317	$3.026	$720	$124	$1,161
1	McDonald U-5 Scabbler-1/4"	Main Building Room 107	10% Floor	10		20	12		0.250	66.7	0.6	43	$54	$0.691	$14	$11	$79
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 107	10% Walls	10		58	12		0.125	66.7	0.9	60	$77	$3.026	$176	$30	$283
1	McDonald U-5 Scabbler-1/4"	Main Building Room 108	Floor	10		476	12		0.250	66.7	14.9	992	$1,268	$0.691	$329	$248	$1,844
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 108	10% Walls	10		90	12		0.125	66.7	1.4	94	$120	$3.026	$272	$47	$439
1	McDonald U-5 Scabbler-1/4"	Main Building Room 110	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 110	10% Walls	10		68	12		0.125	66.7	1.1	71	$91	$3.026	$206	$35	$332
1	McDonald U-5 Scabbler-1/4"	Main Building Room 111	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 111	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 112	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 112	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 113A	10% Floor	10		4	12		0.250	66.7	0.1	9	$11	$0.691	$3	$2	$16
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 113A	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 113B	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 113B	10% Walls	10		38	12		0.125	66.7	0.6	40	$51	$3.026	$115	$20	$185
1	McDonald U-5 Scabbler-1/4"	Main Building Room 113C	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 113C	100% Walls	10		380	12		0.125	66.7	5.9	396	$506	$3.026	$1,150	$198	$1,853
1	McDonald U-5 Scabbler-1/4"	Main Building Room 114	25% Floor	10		46	12		0.250	66.7	1.4	95	$121	$0.691	$31	$24	$176
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 114	10% Walls	10		54	12		0.125	66.7	0.8	56	$72	$3.026	$163	$28	$263
1	McDonald U-5 Scabbler-1/4"	Main Building Room 115	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 115	10% Walls	10		58	12		0.125	66.7	0.9	60	$77	$3.026	$176	$30	$283
1	McDonald U-5 Scabbler-1/4"	Main Building Room 116	10% Floor	10		13	12		0.250	66.7	0.4	28	$35	$0.691	$9	$7	$51
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 116	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 117	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 117	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 118	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 118	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 120	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 120	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 121	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 121	10% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 122	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 122	10% Walls	10		50	12		0.125	66.7	0.8	52	$66	$3.026	$150	$26	$242
1	McDonald U-5 Scabbler-1/4"	Main Building Room 123	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 123	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 124	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 124	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 125	10% Floor	10		38	12		0.250	66.7	1.2	79	$101	$0.691	$26	$20	$147
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 125	10% Walls	10		62	12		0.125	66.7	1.0	65	$83	$3.026	$189	$32	$304
1	McDonald U-5 Scabbler-1/4"	Main Building Room 126	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 126	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 127	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 127	10% Walls	10		112	12		0.125	66.7	1.8	117	$149	$3.026	$339	$58	$546
1	McDonald U-5 Scabbler-1/4"	Main Building Room 129	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 129	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 130	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 130	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 131	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 131	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 132	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 132	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 135	10% Floor	10		22	12		0.250	66.7	0.7	47	$60	$0.691	$15	$12	$87
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 135	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 135WR	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 135WR	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 136	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 136	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 137	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 137	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 139	10% Floor	10		14	12		0.250	66.7	0.5	30	$38	$0.691	$10	$7	$56
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 139	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Main Building Room 140	10% Floor	10		14	12		0.250	66.7	0.5	30	$38	$0.691	$10	$7	$56
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 140	10% Walls	10		100	12		0.125	66.7	1.6	104	$133	$3.026	$303	$52	$488
36	Wood Planer	Main Building Room 201	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 201	0% Walls	10		43	12		0.125	66.7	0.7	45	$58	$3.026	$131	$22	$211
36	Wood Planer	Main Building Room 202	100% Floor	10		252	1		0.125	40.0	6.6	263	$559	$0.795	$200	$131	$891
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 202	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 203	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 203	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 204	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 204	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 205	10% Floor	10		8	1		0.125	40.0	0.2	8	$17	$0.795	$6	$4	$28
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 205	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 206	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 206	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 208	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 208	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 209	Floor	10		180	1		0.125	40.0	4.7	188	$400	$0.795	$143	$94	$636
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 209	10% Walls	10		66	12		0.125	66.7	1.0	68	$87	$3.026	$198	$34	$320
36	Wood Planer	Main Building Room 210	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 210	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 211	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 211	10% Walls	10		64	12		0.125	66.7	1.0	67	$85	$3.026	$194	$33	$312
36	Wood Planer	Main Building Room 212	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 212	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 213	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 213	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 214	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 214	10% Walls	10		48	12		0.125	66.7	0.8	50	$64	$3.026	$145	$25	$234
36	Wood Planer	Main Building Room 215	0% Floor	10		0	1		0.125	40.0				$0.795			

SPECIFIC AREA SURFACE REMOVAL COST ANALYSES WITH ENVIROCARE DISPOSAL

INPUT APP. CODE	METHODOLOGY	*INPUT* AREA	*INPUT* ITEM	*INPUT* LOC CODE	*INPUT* WBS No.	*INPUT* SURFACE AREA (ft^2)	*INPUT* MATERIAL THICK (in)	TOTAL VOLUME (ft^3)	*INPUT* CONTAM. REMOVAL DEPTH (in)	*INPUT* CONTAM. WASTE DENSITY (lb/ft^3)	CONTAM. VOLUME (ft^3)	CONTAM. WEIGHT (lbs)	**PROCESS COST PLUS** **ENVIROCARE WASTE DISPOSAL COST** BURIAL SHIP & BURY ($)	PROCESS COST ($/ft^2)	PROCESS COST ($)	SURFACE RELEASE COST ($)	COST GRAND TOTAL ($)
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 216	10% Walls	10		38	12		0.125	66.7	0.6	40	$51	$3.026	$116	$20	$187
36	Wood Planer	Main Building Room 216	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 216	10% Walls	10		62	12		0.125	66.7	1.0	65	$83	$3.026	$189	$32	$304
36	Wood Planer	Main Building Room 217	0% Floor	10		0	1		0.125	40.0				$0.795			
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 217	0% Walls	10		0	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 218	10% Floor	10		189	1		0.125	40.0	4.9	197	$420	$0.795	$150	$98	$669
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 218	10% Walls	10		139	12		0.125	66.7	2.2	145	$185	$3.026	$421	$72	$679
36	Wood Planer	Main Building Room 301	10% Floor	10		60	1		0.125	40.0	1.6	63	$133	$0.795	$48	$31	$212
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 301	0% Walls	10		0.	12		0.125	66.7				$3.026			
36	Wood Planer	Main Building Room 301A	10% Floor	10		10	1		0.125	40.0	0.2	10	$21	$0.795	$8	$5	$34
3	McDonald 3WCD Scabbler-1/8"	Main Building Room 301A	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 1	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 1	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 2	Floor	10		80	12		0.250	66.7	2.5	167	$213	$0.691	$56	$42	$310
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 2	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 3	50% Floor	10		67	12		0.250	66.7	2.1	139	$177	$0.691	$46	$35	$258
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 3	10% Walls	10		42	12		0.125	66.7	0.7	43	$55	$3.026	$126	$22	$203
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 4	25% Floor	10		78	12		0.250	66.7	2.4	163	$208	$0.691	$54	$41	$302
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 5	Floor	10		189	12		0.250	66.7	5.9	394	$503	$0.691	$131	$98	$732
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 5	100% Walls	10		480	12		0.125	66.7	7.5	500	$639	$3.026	$1,452	$250	$2,341
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 6	Floor	10		342	12		0.250	66.7	10.7	713	$911	$0.691	$236	$178	$1,325
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 6	100% Walls	10		740	12		0.125	66.7	11.6	771	$986	$3.026	$2,239	$385	$3,609
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 7	10% Floor	10		70	12		0.250	66.7	2.2	146	$187	$0.691	$48	$37	$272
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 7	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 8	Floor	10		361	12		0.250	66.7	11.3	752	$962	$0.691	$249	$188	$1,399
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 8	100% Walls	10		760	12		0.125	66.7	11.9	792	$1,012	$3.026	$2,299	$395	$3,707
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 9	Floor	10		40	12		0.250	66.7	1.3	83	$107	$0.691	$28	$21	$155
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 9	10% Walls	10		64	12		0.125	66.7	1.0	67	$85	$3.026	$194	$33	$312
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 10	10% Floor	10		60	12		0.250	66.7	1.9	125	$160	$0.691	$41	$31	$232
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 10	10% Walls	10		98	12		0.125	66.7	1.5	102	$131	$3.026	$296	$51	$478
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 11	Floor	10		552	12		0.250	66.7	17.3	1,150	$1,470	$0.691	$381	$287	$2,139
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 11	100% Walls	10		940	12		0.125	66.7	14.7	979	$1,252	$3.026	$2,844	$489	$4,585
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 12	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 12	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 13	Floor	10		80	12		0.250	66.7	2.5	167	$213	$0.691	$55	$42	$310
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 13	100% Walls	10		288	12		0.125	66.7	4.6	300	$384	$3.026	$871	$150	$1,405
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 14	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 14	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 15	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 15	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 16 (17A)	Floor	10		24	12		0.250	66.7	0.8	50	$64	$0.691	$17	$12	$93
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 16 (17A)	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 17	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 17	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 18	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 18	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 19	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 19	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 20	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 20	10% Walls	10		106	12		0.125	66.7	1.7	110	$141	$3.026	$321	$56	$517
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 22	Floor	10		91	12		0.250	66.7	2.8	190	$242	$0.691	$63	$47	$363
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 22	100% Walls	10		1,820	12		0.125	66.7	28.4	1,896	$2,424	$3.026	$5,506	$946	$8,877
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 38	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 38	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 40	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 40	10% Walls	10		94	12		0.125	66.7	1.5	98	$125	$3.026	$284	$49	$458
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 41	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 41	10% Walls	10		94	12		0.125	66.7	1.5	98	$125	$3.026	$284	$49	$458
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 48	10% Floor	10		136	12		0.250	66.7	4.2	283	$361	$0.691	$94	$71	$526
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 48	10% Walls	10		[illegible]	12		0.125	66.7	2.6	171	$218	$3.026	$496	$85	$800
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 49	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 49	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 50	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 50	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 51	0% Floor	10		0	12		0.250	66.7				$0.691			
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 51	0% Walls	10		0	12		0.125	66.7				$3.026			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 55	50% Floor	10		1,083	12		0.250	66.7	33.8	2,256	$2,885	$0.691	$748	$563	$4,196
36	Wood Planer	Etching Building Room 55	10% Walls	10		152	1		0.125	40.0	4.0	168	$337	$0.795	$121	$79	$537
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 56	Floor	10		256	12		0.250	66.7	8.0	533	$682	$0.691	$177	$133	$992
36	Wood Planer	Etching Building Room 56	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 58	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 58	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 59	10% Floor	10.		23	12		0.250	66.7	0.7	48	$62	$0.691	$16	$12	$89
36	Wood Planer	Etching Building Room 59	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 62	10% Floor	10		204	12		0.250	66.7	6.4	425	$543	$0.691	$141	$106	$790
36	Wood Planer	Etching Building Room 62	10% Walls	10		314	1		0.125	40.0	8.2	327	$696	$0.795	$249	$163	$1,108
3	McDonald 3WCD Scabbler-1/8"	Etching Building Room 62	10% Walls	10		314	12		0.125	66.7	4.9	327	$418	$3.026	$949	$163	$1,530
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 63	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 63	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 65	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 65	10% Walls	10		100	1		0.125	40.0	2.6	104	$222	$0.795	$79	$52	$353
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 66	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 66	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 67	10% Floor	10		22	12		0.250	66.7	0.7	46	$59	$0.691	$15	$11	$86
36	Wood Planer	Etching Building Room 67	10% Walls	10		60	1		0.125	40.0	1.6	63	$133	$0.795	$48	$31	$212
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 69	25% Floor	10		33	12		0.250	66.7	1.0	68	$87	$0.691	$22	$17	$126
36	Wood Planer	Etching Building Room 69	10% Walls	10		46	1		0.125	40.0	1.2	48	$102	$0.795	$37	$24	$163
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 70	Floor	10		60	12		0.250	66.7	1.9	125	$160	$0.691	$41	$31	$232
36	Wood Planer	Etching Building Room 70	10% Walls	10		32	1		0.125	40.0	0.8	33	$71	$0.795	$25	$17	$113
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 71	10% Floor	10		26	12		0.250	66.7	0.8	54	$69	$0.691	$18	$14	$101
36	Wood Planer	Etching Building Room 71	10% Walls	10		66	1		0.125	40.0	1.7	69	$147	$0.795	$52	$34	$233
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 72	10% Floor	10		4	12		0.250	66.7	0.1	8	$11	$0.691	$3	$2	$15
36	Wood Planer	Etching Building Room 72	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 73	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 73	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 74	10% Floor	10		7	12		0.250	66.7	0.2	14	$18	$0.691	$5	$4	$26

SPECIFIC AREA SURFACE REMOVAL COST ANALYSES WITH ENVIROCARE DISPOSAL

INPUT APP. CODE	METHODOLOGY	*INPUT* AREA	*INPUT* ITEM	*INPUT* LOC CODE	*INPUT* WBS No.	*INPUT* SURFACE AREA (ft^2)	*INPUT* MATERIAL THICK (in)	TOTAL VOLUME (ft^3)	*INPUT* CONTAM. REMOVAL DEPTH (in)	*INPUT* CONTAM. WASTE DENSITY (lb/ft^3)	CONTAM. VOLUME (ft^3)	CONTAM. WEIGHT (lbs)	**PROCESS COST PLUS** **ENVIROCARE WASTE DISPOSAL COST** BURIAL SHIP & BURY ($)	PROCESS COST ($/ft^2)	PROCESS COST ($)	SURFACE RELEASE COST ($)	COST GRAND TOTAL ($)
36	Wood Planer	Etching Building Room 74	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 75	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 75	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 76A	25% Floor	10		42	12		0.250	66.7	1.3	88	$113	$0.691	$29	$22	$164
36	Wood Planer	Etching Building Room 76A	10% Walls	10		52	1		0.125	40.0	1.4	54	$115	$0.795	$41	$27	$184
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 76B	25% Floor	10		39	12		0.250	66.7	1.2	81	$104	$0.691	$27	$20	$151
36	Wood Planer	Etching Building Room 76B	10% Walls	10		50	1		0.125	40.0	1.3	52	$111	$0.795	$40	$26	$177
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 78	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 78	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 79	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 79	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 79A	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 79A	10% Walls	10		50	1		0.125	40.0	1.3	52	$111	$0.795	$40	$26	$177
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 80	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 80	0% Walls	10		0	1		0.125	40.0				$0.795			
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 81	0% Floor	10		0	12		0.250	66.7				$0.691			
36	Wood Planer	Etching Building Room 81	10% Walls	10		67	1		0.125	40.0	1.8	70	$149	$0.795	$53	$35	$238
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 83	10% Floor	10		34	12		0.250	66.7	1.1	71	$91	$0.691	$24	$18	$133
36	Wood Planer	Etching Building Room 83	10% Walls	10		74	1		0.125	40.0	1.9	77	$164	$0.795	$59	$38	$262
1	McDonald U-5 Scabbler-1/4"	Etching Building Room 84	10% Floor	10		10	12		0.250	66.7	0.3	21	$27	$0.691	$7	$5	$39
36	Wood Planer	Etching Building Room 84	0% Walls	10		0	1		0.125	40.0				$0.795			
36	Wood Planer	Etching Building Room 201	10% Floor	10		255	1		0.125	40.0	6.6	266	$566	$0.795	$203	$133	$901
36	Wood Planer	Etching Building Room 201	10% Walls	10		202	1		0.125	40.0	5.3	210	$448	$0.795	$161	$105	$714
36	Wood Planer	Etching Building Room 202	10% Floor	10		60	1		0.125	40.0	1.6	63	$133	$0.795	$48	$31	$212
36	Wood Planer	Etching Building Room 202	10% Walls	10		98	1		0.125	40.0	2.6	102	$218	$0.795	$78	$51	$346
36	Wood Planer	Etching Building Room 203	25% Floor	10		124	1		0.125	40.0	3.2	129	$274	$0.795	$98	$64	$437
36	Wood Planer	Etching Building Room 203	0% Walls	10		0	1		0.125	40.0				$0.795			
36	Wood Planer	Etching Building Room 204	25% Floor	10		100	1		0.125	40.0	2.6	104	$222	$0.795	$79	$52	$353
36	Wood Planer	Etching Building Room 204	0% Walls	10		0	1		0.125	40.0				$0.795			
								TOTAL:			2,790.8	184,247	$237,889			$83,819	$766,409

SPECIFIC AREA SURFACE CLEANING COST ANALYSES WITH BARNWELL DISPOSAL

INPUT APP. CODE	METHODOLOGY	*INPUT* AREA	*INPUT* ITEM	*INPUT* LOC CODE	*INPUT* WBS No.	*0.0929* *INPUT* SURFACE AREA (ft^2)	*INPUT* ORIGINAL CONTAM. VOLUME (ft^3)	*INPUT* ORIGINAL CONTAM. WEIGHT (lb)	*ft² per m²* GENERATED RW VOLUME (ft^3)	GENERATED WASTE DENSITY (lb/ft^3)	GENERATED WASTE WEIGHT (lb)	** PROCESSED RADWASTE DISPOSAL ** BURIAL SHIP & BURY ($)	PROCESS COST ($/ft^2)	PROCESS COST ($)	SURFACE RELEASE COST ($)	COST GRAND TOTAL ($)	BARNWELL RATE ($/ft^3)
																	$0.00
																	$0.00
																	$0.00
																	$0.00

SPECIFIC AREA SURFACE CLEANING COST ANALYSES WITH ENVIROCARE DISPOSAL

INPUT APP. CODE	METHODOLOGY	*INPUT* AREA	*INPUT* ITEM	*INPUT* LOC CODE	*INPUT* WBS No.	*0.0929* *INPUT* SURFACE AREA (ft^2)	*INPUT* CONTAM. VOLUME (ft^3)	*INPUT* ORIGINAL CONTAM. WEIGHT (lb)	*ft² per m²* GENERATED RW VOLUME (ft^3)	GENERATED WASTE DENSITY (lb/ft^3)	GENERATED WASTE WEIGHT (lb)	** PROCESSED RADWASTE DISPOSAL ** BURIAL SHIP & BURY ($)	PROCESS COST ($/ft^2)	PROCESS COST ($)	SURFACE RELEASE COST ($)	COST GRAND TOTAL ($)	ENVIROCARE RATE ($/ft^3)
													$0.00				
													$0.00				
													$0.00				
													$0.00				
						SUB TOTAL:	0	0	0.0		0.0	$0		$0	$0	$0	

APPENDIX A- 12 Soil Waste Volume

Appendix A-12
SOIL WASTE VOLUME ESTIMATES
Safety Light

LOC CODE	Soil Rad Waste Estimate AREA	(f	Excavated Soil Density / Original Soil Density DEPTH (in)	(lbs/ft^3) (lbs/ft^3) VOLUME (ft^3)	CONTAMINATED FRACTION
1	Soil Under Demolished Etching Building Area	*	6	1,854	0.86
2	Surface Soil North of Well 5	*	6	7,679	0.71
3	Surface Soil Surrounding Ion Exch. Bldg.	*	6	45	1.00
4	Surface Soil Surrounding Old Gar. Fdtn.	*	6	912	1.00
5	Surface Soil Under Old Loading Dock	*	6	143	1.00
6	Surface Soil Surrounding 8x8 Building	*	6	71	0.25
7	Surface Soil Surrounding Old Radium Vault	*	6	296	0.50
8	Surface Soil North of Machine Shop	*	6	6,021	1.00
9	Surface Soil Surrounding Above-Ground Silo	*	6	285	1.00
11	Excavate Drywell Under Personnel Building	*	120	1,119	1.00
11	Sub-Surface Soil at Underground Silo Area	*	156	3,705	1.00
11	Soil Under Demolished Well House Bldg.	*	6	329	1.00
11	Soil Under Demolished Pipe House Bldg.	*	6	570	1.00
11	Soil Under Demolished Old House Bldg.	*	24	2,234	1.00
11	Soil Under Demolished Sr-90 Sources Vault	*	6	150	1.00
11	Surface East Lagoon Area	*	6	891	0.50
11	Surface Soil at West Lagoon Area	*	6	2,316	0.50
11	Sub-Surface Soil at West Lagoon Area	*	30	8,906	1.00
11	Surface Soil at East Plant Dump	*	6	0	0.00
11	Sub-Surface Soil at East Plant Dump	*	30	5,878	1.00
11	Surface Soil at West Plant Dump	*	6	0	0.00
11	Contaminated Soil Near Old Berwick	*	60	3,206	1.00
11	Contaminated Soil From Vance Walton	*	48	912	1.00
11	Soil Under Demolished Lacquer Storage Bldg.	*	6	1,603	1.00
11	Surface Contaminated Soil N. of Lacquer St.	*	6	776	1.00
11	Surface Soil at Employee Parking Area - East	*	6	3,674	0.33
11	Surface Employee Parking Area - West	*	6	1,781	0.25
11	Surface Soil at Other Unpaved Areas N. of Fence	*	6	8,161	0.10
11	Surface Soil at Abandoned Canal Area	*	6	5,746	0.32
11	Sub-Surface Soil at Abandoned Canal Area	*	30	28,728	0.32
11	Other Surface Soil Around Safety Light Bldgs.	*	6	8,653	0.22
11	Surface Soil at Area Between Fence and River	*	6	5,343	0.13
	RAD WASTE SUBTOTAL:			**111,986**	

APPENDIX A- 13 Miscellaneous Item Inventory Estimate

Table A-13
MISCELLANEOUS ITEM INVENTORY ESTIMATE
Safety Light

DESCRIPTION	LOC CODE	WBS No.	UNITS	NUMBER OF UNITS	MATERIAL OF CONSTRUCT.	BULK DENSITY (lb/ft^3)	UNIT WEIGHT (lb)	UNIT VOLUME (ft^3)	TOTAL WEIGHT (lb)	TOTAL VOLUME (ft^3)	PERCENT DIRECT BURY (vol %)	ENVIRO DISPOSAL WEIGHT (lb)	BARNWELL DISPOSAL WEIGHT (lb)	BARNWELL DISPOSAL VOLUME (ft^3)	ENVIRO DISPOSAL VOLUME (ft^3)
Early Demolition of Specified Rooms for the Etching Building	1		CF	11,218	Misc	34.5		1.0	387,035	11,218	100%	387,035	0	0	11,218
Floor Slabs Demolition for Specified Rooms for the Etching Building	1		CF	1,516	Concrete	100.0		1.0	151,600	1,516	100%	151,600	0	0	1,516
Equipment Removal from Early Demolition Rms Etching Building	1		CF	3,881	Misc	63.7		1.0	247,217	3,881	100%	247,217	0	0	3,881
Ion Exchange Building Demolition	3		CF	130	Misc	34.5		1.0	4,468	130	100%	4,468	0	0	130
Floor Slab Ion Exchange Building Demolition	3		CF	18	Concrete	100.0		1.0	1,750	18	100%	1,750	0	0	18
Equipment Removal Ion Exchange Building	3		CF	45	Misc	63.7		1.0	2,854	45	100%	2,854	0	0	45
Floor Slab Old Garage	4		CF	120	Concrete	100.0		1.0	12,000	120	100%	12,000	0	0	120
8 x 8 Block Building Demolition	6		CF	237	Misc	34.5		1.0	8,170	237	100%	8,170	0	0	237
Floor Slab 8 x 8 Block Building Demolition	6		CF	32	Concrete	100.0		1.0	3,200	32	100%	3,200	0	0	32
Equipment Removal 8 x 8 Block Building	6		CF	82	Misc	63.7		1.0	5,218	82	100%	5,218	0	0	82
Old Radium Vault Building Demolition	7		CF	1,036	Misc	34.5		1.0	35,742	1,036	100%	35,742	0	0	1,036
Floor Slab Old Radium Vault Building Demolition	7		CF	140	Concrete	100.0		1.0	14,000	140	100%	14,000	0	0	140
Equipment Removal Old Radium Vault Building	7		CF	358	Misc	63.7		1.0	22,830	358	100%	22,830	0	0	358
Above Ground Silo Demolition	9		CF	237	Misc	34.5		1.0	8,170	237	100%	8,170	0	0	237
Floor Slab Above Ground Silo Demolition	9		CF	32	Concrete	100.0		1.0	3,200	32	100%	3,200	0	0	32
Equipment Removal Above Ground Silo	9		CF	82	Misc	63.7		1.0	5,218	82	100%	5,218	0	0	82
Personnel Building Demolition	10		CF	2,131	Misc	34.5		1.0	73,526	2,131	100%	73,526	0	0	2,131
Equipment Removal Personnel Building	10		CF	737	Misc	63.7		1.0	46,965	737	100%	46,965	0	0	737
Lacquer Storge Building Demolition	10		CF	4,196	Misc	34.5		1.0	144,755	4,196	100%	144,755	0	0	4,196
Floor Slab Lacquer Storge Building	10		CF	567	Concrete	100.0		1.0	56,700	567	100%	56,700	0	0	567
Equipment Removal Lacquer Storge Building	10		CF	363	Misc	63.7		1.0	23,115	363	100%	23,115	0	0	363
Well House Building Demolition	10		CF	1,709	Misc	34.5		1.0	58,974	1,709	100%	58,974	0	0	1,709
Equipment Removal Well House Building	10		CF	591	Misc	63.7		1.0	37,670	591	100%	37,670	0	0	591
Pipe House Building Demolition	10		CF	2,960	Misc	34.5		1.0	102,120	2,960	100%	102,120	0	0	2,960
Floor Slab Pipe House Building	10		CF	400	Concrete	100.0		1.0	40,000	400	100%	40,000	0	0	400
Equipment Removal Pipe House Building	10		CF	1,024	Misc	63.7		1.0	65,229	1,024	100%	65,229	0	0	1,024
Old House Building Demolition	10		CF	5,802	Misc	34.5		1.0	200,155	5,802	100%	200,155	0	0	5,802
Equipment Removal Old House Building	10		CF	2,007	Misc	63.7		1.0	127,848	2,007	100%	127,848	0	0	2,007
Sr-90 Sources Vault Building Demolition	10		CF	777	Misc	34.5		1.0	26,807	777	100%	26,807	0	0	777
Equipment Removal Sr-90 Sources Vault Building	10		CF	269	Misc	63.7		1.0	17,123	269	100%	17,123	0	0	269
Removed Buried Drain Pipe	11		CF	59	Misc	75.0		1.0	4,425	59	100%	4,425	0	0	59
Removed Imbedded Drain Pipe	11		LF	400	Steel	68.9	53.6	0.8	21,424	311	100%	21,424	0	0	311
Removed Buried Sewer Pipe	11		CF	15	Misc	75.0		1.0	1,125	15	100%	1,125	0	0	15
Removed Imbedded Sewer Pipe	11		LF	100	Steel	94.6	19.0	0.2	1,897	20	100%	1,897	0	0	20
Removed Manholes and Catch Basins	11		CF	2	Misc	55.7	4,200.0	75.40	8,400	151	100%	8,400	0	0	151
Removed Duct Work for Main Bldg 2'nd Floor	10		LF	200	Steel	15.2	3.0		600	39	100%	600	0	0	39
Remove Asbestos	10		LF	400	Asbestos	20.0		0.2	1,571	79	100%	1,571	0	0	79
Remove Equipment from Etching Building Production Rooms	10		CF	5,825	Misc	63.7		1.0	371,058	5,825	100%	371,058	0	0	5,825
Remove Equipment from Main Building Production Rooms	10		CF	7,721	Misc	63.7		1.0	491,821	7,721	100%	491,821	0	0	7,721
								TOTALS	**2,835,979**	**56,916**	**100%**	**2,835,979**	**0**	**0**	**56,916**