2010

LACBWR

DECOMMISSIONING & DECONTAMINATION

COST STUDY UPDATE

Prepared by LACBWR Staff

November 2010

Approved by ORC _____

Date 11/30/10

LACBWR continues to be committed in its efforts to provide an accurate, realistic update to the estimated decommissioning cost every five years, or when significant changes have occurred. This revised cost study is an addendum to the 1994 study performed by Sargent & Lundy. Since the original 1994 cost study was performed, many lessons learned from the experiences of others, and technological changes have allowed us to revise the overall scope of the dismantlement project at LACBWR. Updated decontamination factors, decontamination methods and cost containments have enabled us to update the original estimated burial volumes, contingencies, and escalators, to provide a more accurate full funding level. This revision provides an up-to-date study using new methods and actual lessons learned to ensure that Dairyland's financial planning is adequate to ensure sufficient funds will be available for the decommissioning of LACBWR after the removal of the spent fuel.

Reference Materials

1. Sargent & Lundy, "LACBWR Decommissioning Cost Study" (1994)
2. AIF/NESP-036, "Guidelines for Producing Commercial Nuclear Power Plants Decommissioning Cost Estimates" (1986)
3. LaGuardia, T., and Dietz, W., "Decommissioning Cost Estimates and Schedule," Chapter 13
4. TLG Services, "Trends in Nuclear Decommissioning Costs"
5. Rochester Gas and Electric Corporation, "Direct Testimony of Wm. Manion," Feb. 2002
6. Main Yankee LTP, Section 7, "Update of Site Specific Decommissioning Costs"
7. U.S. Department of Labor – Bureau of Labor Statistics 1987-2007
8. Review of PGE's Decommissioning Plan for the Trojan Nuclear Plant
9. 1998 LACBWR Decommissioning and Decontamination Cost Study Update
10. 2000 LACBWR Decommissioning and Decontamination Cost Study Update
11. 2003 LACBWR Decommissioning and Decontamination Cost Study Update
12. 2007 LACBWR Decommissioning and Decontamination Cost Study Update
13. Sargent & Lundy "Independent Review of Decommissioning Cost Study for LACBWR" (SL010039, April 15, 2010)
14. AIF/NESP-036 Guidelines for Producing Commercial Nuclear Power Plant Decommissioning Cost Estimates
15. 2004 DOE Study of Construction Technologies and Schedules, O&M Staffing and Cost, Decommissioning Cost and Funding Requirements for Advanced Reactor Designs
16. Energy Solutions Schedule of Charges Effective Date January 1, 2011 through December 31, 2016.

Changes

Since the 1994 study, technological changes have occurred in the dismantlement of a nuclear power station. New knowledge and experience in decommissioning methods and philosophies have been gained from actual plant dismantlement, not only at LACBWR but at other shutdown facilities. The disposal of radioactive waste, once a volatile market, has somewhat stabilized in recent years. Expected sharp rises in radioactive waste disposal costs have not been experienced as they were in the 1980's. Because of these changes, the original 1994 cost study methodologies, assumptions, contingencies, and escalators can be modified to provide a more accurate, more realistic cost study.

Attachment 3 contains a list of changes to the 1994 Cost Study from the previous revisions, (1998, 2000, 2003 and 2007)

Following are the latest revisions to the 1994 cost study:

- All costs have been adjusted, based on 2010 dollars.
- Spent fuel will be placed in dry storage at an onsite ISFSI in 2011. It will be sent to an offsite repository when one becomes available.
- Dismantlement of LACBWR will continue to be performed by plant personnel, in a limited fashion, until all spent fuel has been placed in dry storage.
- Once all spent fuel has been placed in dry storage, full-time dismantlement will commence. The work will be performed by DPC personnel and supplemented by contractors as necessary. This will begin as early as 2012 and is expected to last for approximately seven years.
- Labor costs for 2010 will be based on a DPC labor cost for metal removal. Specialty contractor rate for concrete removal will be used on System IDs where concrete or soil removal is required.

  Assumptions

  - DPC labor cost $68.30/hr
  - Contractor labor cost $83.20/hr
  - Contractor labor and equipment cost $145.60/hr
  - Blended rate (DPC and Contractor with equipment $106.95/hr)

- Each system ID was reviewed to determine an appropriate unit removal rate. This was accomplished using Reference 15 as recommended by Sargent & Lundy in Reference 13. The system unit removal rates are listed on Attachment 4.

- For the shipment of concrete and soils, voids in the packaging need to be considered. Sargent & Lundy uses a 40% void factor. Shipping and burial costs for concrete and soil removal during decommissioning will be determined by applying a factor of 1.4 to the volumes removed.

- As recommended by the Sargent & Lundy study (Reference 13), several contingency values have been updated to reflect the recommendations of AIF/NESP-036 (Reference 14).

    - Materials – contingency has been raised from DPC's 10% to the recommended rate of 25%.
    - DOC – contingency has been raised from DPC's 10% to the recommended rate of 15%.
    - Reprocessing – contingency has been raised from DPC's 0% to the recommended rate of 5%.

- Due to the uncertainties of the burial rates in years beyond, DPC's pricing contract (Reference 16), which expires in 2016, the burial contingency for soil and concrete has been raised from 25% to 50%. This has been applied to the following System I.D. numbers: 211/212/213/216/217/218/219.

- As per Reference 16, the annual escalated rates for Radwaste Recycling and Radwaste Burial will be 5%.

- All costs for reprocessing and burial of radioactive material are based on Reference 16.

- System 221.3 – FESW removal including racks. System weight has been revised to reflect true weights found from system drawings

- System 230 – Turbine 130,260 lbs. were removed from the total weight as this material has been sent to burial since 2007.

- System 230 – Main generator total weight was reduced by 10,000 lbs. due to the coolers being sent to burial since 2007.

- System 231 – Turbine lube oil. This system was removed except for the clean/dirty oil tank.

- Add System 1100 to cover cost of the ISFSI decommissioning. This will be a separate funded system number.

System Identification

This revised cost study consists of two separate attachments covering each system and/or component to be removed. These attachments cover the dismantlement activities of the systems and/or components identified by the following ID number system:

ID #	Components	ID#	Components
211	Site Work - removal of contaminated soil & riprap	231	Removal of Turbine oil system
212	Reactor Building Decon	232	Removal of Main Condenser & Accessories
213	Turbine Building and Heater Bay Decon	233/235	Removal of the T.B. Condensate and Feedwater System
216	Waste Treatment Building and Tunnel Decon	234	Removal of the TB Steam System
217	Gas Storage Vault Decon	236	Removal of TB CCW
218	Stack Decon	237	Removal of Alternate Core Spray
219	Penetration Area Decon	238	Removal of the HPSW system in Turbine Building
221.2	Reactor Control Devices – upper CRD's/instrument tubes/valves and insulation	238.1	Removal of Circulating Water system in Turbine Building
221.3	FESW Removal, including racks	238.2	Removal of LPSW system in Turbine Building
222.1	Removal of FCP System	240	Temporary Construction Electrical Work
222.2	Removal of Rx Main Steam System	241	Removal of Electrical
222.3	Removal of Decay Heat System	242	Station Service Equipment
222.4	Removal of Purification System	243	Misc. Electrical
222.5	Removal of Reactor Feedwater Sys.	251	Removal of Instrument/Service Air
223.2	Removal of FESW System	253	Removal of Heating Steam
223.3	Removal of Seal Injection System	300	Asbestos Removal
223.5	Removal of Overhead Storage Tank	600	Resin Management
223.7	Removal of HVA System	700	Normal Radioactive Waste Management
224.1/ 227	Removal of Liquid Waste System	801	Temporary Facilities
224.2	Removal of Waste Gas System	802	Equipment Needs
224.3	Removal of Solid Waste (Resin Transfer) System	804	Radiological Equipment & Supplies

ID #	Components	ID#	Components
225	Removal of Fuel Handling Equipment	805	Liquid and Solid Waste Removal
226	Removal of Reactor Building CCW System	807	Final Site Cleanup
228.1	Removal of Reactor Building demin. Water system	900	Indirect Costs
228.2	Removal of Misc. Reactor Water System	1000	Final Release Survey
229	Removal of Reactor Support System	1100	ISFSI
230	Removal of Main Turbine		
230.1	Removal of Main Generator		

The two attachments list such items as total weight, man-hours, expected personnel exposure, disposal rates, and contingencies.

- Attachment 1 provides a summary of costs
- Attachment 2 provides an individual system cost breakdown

As each system or component is removed and sent to disposal, its associated costs will be deducted from the decommissioning total, which will provide for an up-to-date cost estimate at any time in the future.

System Classification

As a lesson learned from the dismantlement of other nuclear facilities, removal costs and removal contingency percentages vary, depending upon whether the system is a contaminated system or can be classified as a potentially clean system. To more accurately determine LACBWR's final cost and to better apply reprocessing, labor, and burial costs, LACBWR dismantlement activities are broken into categories based on contamination levels as follows:

- > 20 mRem/hr general dose rate
- < 20 mRem/hr general dose rate
- Potentially clean, < 0.1 mRem/hr general dose rate

Potentially Clean

ID #	Components
211	Site Work - removal of contaminated soil & riprap
223.7	Removal of HVA System
226	Removal of Reactor Building CCW system
228.1	Removal of Reactor Building demin. water system
229	Removal of Reactor Support System
230.1	Removal of Main Generator
231	Removal of Turbine oil system
236	Removal of TB CCW
237	Removal of Alternate Core Spray
238	Removal of the HPSW system in Turbine Building
238.1	Removal of Circulating Water system in Turbine Building
238.2	Removal of LPSW system in Turbine Building
240	Temporary Construction Electrical Work
241	Removal of Electrical
242	Station Service Equipment
243	Misc. Electrical
251	Removal of Instrument/Service Air
253	Removal of Heating Steam
801	Temporary Facilities
802	Equipment Needs
804	Radiological Equipment & Supplies
807	Final Site Cleanup
900	Indirect Costs
1000	Final Release Survey
1100	ISFSI

< 20 mRem/hr General Dose Rate

ID #	Components
212	Reactor Building Concrete Removal
213	Turbine Building and Heater Bay Decon
216	Waste Treatment Building and Tunnel Decon
217	Gas Storage Vault Decon
218	Stack Decon
219	Penetration Area Decon
222.2	Removal of Rx Main Steam System
222.3	Removal of Decay Heat System

ID #	Components
222.4	Removal of Purification System
222.5	Removal of Reactor Feedwater Sys.
223.2	Removal of FESW System
223.3	Removal of Seal Injection System
223.5	Removal of Overhead Storage Tank
224.1/227	Removal of Liquid Waste System
224.2	Removal of Waste Gas System
224.3	Removal of Solid Waste (Resin Transfer) System
225	Removal of Fuel Handling Equipment
228.2	Removal of Misc. Reactor Water System
230	Removal of the Main Turbine
232	Removal of Main Condenser & Accessories
233/235	Removal of the T.B. Condensate and Feedwater System
234	Removal of the TB Steam System
300	Asbestos Removal
700	Normal Radioactive Waste Management
805	Liquid and Solid Waste Removal

> 20 mRem/hr General Dose Rate

ID #	Components
221.2	Reactor Control Devices - upper CRD's/ instrument tubes/ valves and insulation
221.3	FESW Removal, including racks
222.1	Removal of FCP System
600	Resin Management

Labor

An extensive review of the labor rates was performed for this update to ensure realistic rates are used. Sargent & Lundy performed a review as found in Reference 13. In addition, DPC personnel conducted an independent review of appropriate labor rates. The following labor rates have been determined and are utilized in this update:

1. DPC personnel (LACBWR) cost = $68.30/hr
2. Contracted labor rate to DPC = $83.20/hr
3. Contracted labor rate with required equipment to DPC = $145.60/hr

For this study, the DPC personnel labor cost of $68.30/hr will be used for all system IDs requiring the removal of metal.

For the removal of concrete or soils or blended crew of 50% DPC personnel and 50% contracted labor with equipment will be used for a blended labor rate of $106.95/hr.

Contingency estimates that are to be applied to all costs in this study were determined by reviewing references 1, 2, and 3.

The contingency estimates to be applied to labor costs vary slightly in the three referenced documents. Using the Sargent & Lundy 1994 report as our base reference, the following contingency estimates have been applied to LACBWR's dismantlement labor costs:

- Contaminated component removal – 25% (Ref. 1)
- Clean component removal – 15% (Ref. 2)
- Contaminated concrete removal – 25% (Ref. 1)

Shipping

Transportation of material from LACBWR will be made by either truck or rail. In most cases, truck transport will be utilized because it is readily available and normally less expensive. Rail will be used to transport contaminated concrete and soils because of the large volumes of material needing transport.

Shipping costs have fluctuated slightly due to fuel costs since LACBWR's first cost study in 1994. Both Burlington Northern Railroad and Hittman Nuclear Transporters were contacted to obtain their transportation rates.

Contingency estimates are again determined by reviewing the documents listed in the labor section of this report. Using the Sargent & Lundy 1994 report as our base reference, the following contingency estimates will be applied to LACBWR's dismantlement shipping costs:

- Conventional Radwaste shipping, both truck and rail – 15% (Ref. 2)

Due to the stability of transportation costs and expected increases as designated by our reprocessing contractor, an annual escalation of 3% per year will be used on all waste shipments.

Radioactive Waste Recycling

As the decommissioning of nuclear power plants has moved from its infancy, a significant cost savings measure has been found. The use of radwaste processors has been found to consistently decrease the cost for direct burial of decommissioning waste by approximately 50% (Ref. 4). LACBWR has been a long-time user of radwaste processors. Past experience of radioactive waste shipments from LACBWR, sent for processing, has shown that of the total material processed approximately 50% has been sent to burial. LACBWR will continue to process all of the Class A material removed, except concrete and soil, to reduce the total volume of waste material needing burial at Energy Solutions.

A unique aspect in the use of a radwaste processor is that, by signing an agreement for the processing, set rates are established between LACBWR and the processor. The processor's contracted rates cover both the processing and burial of materials sent to their facilities. These radwaste processing changes are fixed by contract. The pricing used in this update is per Reference 16. A Tennessee tax of $0.015/lb. has been applied to the processing cost of the material sent to Tennessee for reprocessing.

As recommended by Sargent & Lundy in Reference 13, a 5% contingency rate has been added to the recycling fees to cover the uncertainty of the amount of material to be sent to the reprocessor.

Radwaste processing costs contain both the processing and disposal costs of all material. Processor representatives were contacted to determine if there was a trend in cost escalation that could be found. All Class A material requiring burial will be sent to Energy Solutions for disposal. The current annual burial costs at Energy Solutions are escalating at a rate of 5%. This is the escalation rate used by LACBWR's processor as per Reference 16, and is used for this study.

Burial

The cost of radioactive waste burial has been the most volatile element in determining the decommissioning cost of a nuclear power plant. These burial costs, however, have been much more stable in the last few years and have not displayed sharp increases as were seen in the 1990's.

All LACBWR Class A metallic waste and DAW (not concrete or soil) will be sent to a processor and are not considered in the burial costs. All concrete and soil produced in the

decommissioning of LACBWR will be sent to Energy Solutions for direct burial. These shipments, due to volume, will be made by rail when possible. Class B and C waste, will not be created as a burial site is not available after 2008.

The pricing used in this update is per Reference 16. A 5.263% tax has been added to the burial fees for all material sent to direct burial at Clive, UT.

The contingency estimates to be applied to burial cost vary slightly in the reference documents. This study uses the following contingency percentage as realistic values:

- Conventional radwaste burial – 25%
- Soil and concrete radwaste burial – 50%

The burial cost in this study will be routinely monitored, and any large cost fluctuations may require a reevaluation of LACBWR's decommissioning cost. This study uses the following annual escalation rates for burial of material.

- Energy Solutions 5% – as per Reference 16 by LACBWR's processor.

Materials

The cost of materials/consumables throughout this process has remained relatively constant. Therefore, no changes are made to this cost. The escalator rate of 4% and the contingency rate of 25% are as recommended in Reference 13.

Decommissioning Operations Contractor (DOC) – ID # 900

It was initially thought that a DOC needed to be hired by the utility to perform the dismantlement for the utility. Other decommissioning projects have demonstrated this to be a costly option. Lessons learned have indicated that by the utility assuming the role of the prime contractor, and hiring specialty contractors as needed, an indirect cost savings of up to 20% is obtained. DPC has already assumed the prime contractor role through limited dismantlement and its efforts to place the fuel in dry storage.

The escalator rate of 4% and contingency rate of 15% as recommended in Reference 13.

Payout

After the spent fuel has been removed from the reactor building and placed in dry storage, LACBWR will enter a full dismantlement period. During this period, DPC will assume the role of the DOC, as stated above, and DPC employees will assume primary dismantlement duties. They will be supplemented by contract specialists as is deemed necessary. Using this approach, full dismantlement of LACBWR, once the fuel is removed, is estimated to be completed in seven years. Tasks will be completed in various time frames. The following is an assumed timetable:

Years 1 thru 4	All S&L ID #s not specifically stated in this table. Plus 2/3 of period 3 and 4 indirect cost.
Years 5 and 6	S&L ID #s 211, 212, 213, 216, 217, 218, 219. Plus 1/3 of period 3 and 4 indirect cost.
Year 7	S&L ID #s 807 and 1000. Plus period 5 indirect costs.

This work schedule would cause the following payout schedule from the decommissioning fund:

	2010 Costs	**% of Total Cost**
YEAR 1	$7,096,565	10.5%
YEAR 2	$7,096,565	10.5%
YEAR 3	$7,096,565	10.5%
YEAR 4	$7,096,565	10.5%
YEAR 5	$13,904,804	20.5%
YEAR 6	$13,904,804	20.5%
YEAR 7	$11,637,216	17.0%
TOTAL	$67,833,082	

TABLE 1

2010 Cost Study Contingency Estimates

LABOR	
Contaminated component removal	25%
Contaminated concrete removal	25%
Clean component removal	15%
SHIPPING	
Contaminated material shipments	15%
RADWASTE RECYCLING	5%
RADIOACTIVE WASTE BURIAL	
Conventional radwaste burial	25%
Soil and concrete radwaste burial	50%
MATERIAL	25%
DOC	15%

TABLE 2

2010 Cost Study Annual Escalator Rates

LABOR	4%
SHIPPING	
Contaminated material shipments	3%
RADWASTE RECYCLING	5%
(Includes burial at Energy Solutions)	
RADWASTE BURIAL	
Energy Solutions (All soil and concrete)	5%
MATERIAL	4%
DOC	4%

TABLE 3

Yearly Escalated Costs

2011	$69,977,317	2020	$102,138,947
2012	$72,973,926	2021	$106,533,746
2013	$76,100,505	2022	$111,120,098
2014	$79,362,764	2023	$115,906,463
2015	$82,766,669	2024	$120,901,678
2016	$86,318,450		
2017	$90,024,617		
2018	$93,891,968		
2019	$97,927,605		

IDENTIFICATION NUMBER	LABOR COST	SHIPPING COST	REPROCESSING COST	BURIAL COST	MATERIAL NEEDED	TOTAL COST	TOTAL WITH CONTINGENCY
211	$101,338.00	$72,450.00	$0.00	$1,383,658.00	$0.00	**$1,557,446.00**	$2,275,343.20
212	$3,211,908.00	$519,033.00	$383,775.00	$8,088,339.00	$0.00	**$12,203,055.00**	$17,147,245.20
213	$585,978.00	$280.00	$0.00	$5,268.00	$0.00	**$591,526.00**	$740,696.50
216	$331,718.00	$1,535.00	$0.00	$28,942.00	$0.00	**$362,195.00**	$459,825.75
217	$60,070.00	$178.00	$0.00	$3,353.00	$0.00	**$63,601.00**	$80,321.70
218	$1,932,736.00	$1,242.00	$1,290.00	$16,421.00	$0.00	**$1,951,689.00**	$2,443,334.30
219	$51,917.00	$315.00	$0.00	$5,953.00	$0.00	**$58,185.00**	$74,188.00
221.1	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00
221.2	$47,332.00	$1,559.00	$36,660.00	$0.00	$0.00	**$85,551.00**	$99,450.85
221.3	$11,611.00	$0.00	$0.00	$348,181.00	$0.00	**$359,792.00**	$362,694.75
222.1	$485,681.00	$15,999.00	$376,153.00	$0.00	$0.00	**$877,833.00**	$1,020,460.75
222.2	$28,003.00	$923.00	$15,211.00	$0.00	$0.00	**$44,137.00**	$52,036.75
222.3	$168,769.00	$5,560.00	$91,685.00	$0.00	$0.00	**$266,014.00**	$313,624.50
222.4	$101,289.00	$3,337.00	$55,029.00	$0.00	$0.00	**$159,655.00**	$188,229.25
222.5	$37,837.00	$1,247.00	$20,565.00	$0.00	$0.00	**$59,649.00**	$70,323.55
223.2	$184,205.00	$6,068.00	$100,051.00	$0.00	$0.00	**$290,324.00**	$342,288.00
223.3	$58,533.00	$1,929.00	$31,806.00	$0.00	$0.00	**$92,268.00**	$108,780.90
223.5	$100,060.00	$3,296.00	$54,352.00	$0.00	$0.00	**$157,708.00**	$185,935.00
223.7	$26,637.00	$1,254.00	$7,192.00	$0.00	$0.00	**$35,083.00**	$39,626.25
224.1/227	$219,311.00	$7,224.00	$119,115.00	$0.00	$0.00	**$345,650.00**	$407,517.10
224.2	$544,214.00	$25,612.00	$422,319.00	$0.00	$0.00	**$992,145.00**	$1,153,156.25
224.3	$84,965.00	$3,999.00	$65,945.00	$0.00	$0.00	**$154,909.00**	$180,047.35
225	$13,660.00	$11,250.00	$185,500.00	$0.00	$0.00	**$210,410.00**	$224,787.50
226	$80,526.00	$4,143.00	$23,755.00	$0.00	$0.00	**$108,424.00**	$122,312.10
228.1	$13,592.00	$640.00	$3,670.00	$0.00	$0.00	**$17,902.00**	$20,220.30
228.2	$100,879.00	$3,323.00	$54,787.00	$0.00	$0.00	**$158,989.00**	$187,446.55
229	$177,034.00	$8,332.00	$47,773.00	$0.00	$0.00	**$233,139.00**	$263,332.55
230	$78,613.00	$64,728.00	$1,067,302.00	$0.00	$0.00	**$1,210,643.00**	$1,293,370.55
230.1	$32,374.00	$26,666.00	$152,884.00	$0.00	$0.00	**$211,924.00**	$228,424.20
231	$14,138.00	$802.00	$4,596.00	$0.00	$0.00	**$19,536.00**	$22,006.80
232	$463,483.00	$58,725.00	$968,310.00	$0.00	$0.00	**$1,490,518.00**	$1,663,613.00
233/235	$51,635.00	$7,081.00	$116,763.00	$0.00	$0.00	**$175,479.00**	$195,288.05
234	$85,812.00	$7,853.00	$129,479.00	$0.00	$0.00	**$223,144.00**	$252,248.90
236	$108,590.00	$13,759.00	$78,884.00	$0.00	$0.00	**$201,233.00**	$223,529.55
237	$28,478.00	$3,909.00	$22,411.00	$0.00	$0.00	**$54,798.00**	$60,776.60
238	$31,896.00	$3,502.00	$20,080.00	$0.00	$0.00	**$55,478.00**	$61,791.70
238.1	$59,728.00	$1,856.00	$10,643.00	$0.00	$0.00	**$72,227.00**	$81,996.75
238.2	$36,328.00	$3,989.00	$22,871.00	$0.00	$0.00	**$63,188.00**	$70,379.10
239	$0.00	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00
240	$262,272.00	$0.00	$0.00	$0.00	$10,000.00	**$272,272.00**	$314,112.80
241/245/249	$696,660.00	$16,875.00	$96,750.00	$0.00	$0.00	**$810,285.00**	$922,152.75
242	$17,075.00	$0.00	$0.00	$0.00	$0.00	**$17,075.00**	$19,636.25
243	$58,738.00	$0.00	$0.00	$0.00	$0.00	**$58,738.00**	$67,548.70
251	$62,148.00	$2,327.00	$13,339.00	$0.00	$0.00	**$77,814.00**	$88,152.20
253	$25,145.00	$3,452.00	$19,789.00	$0.00	$0.00	**$48,386.00**	$53,665.00
300	$47,507.00	$1,368.00	$55,389.00	$0.00	$0.00	**$104,264.00**	$119,115.40
600	$48,356.00	$44,250.00	$0.00	$511,360.00	$177,000.00	**$780,966.00**	$971,782.50
700	$48,220.00	$6,615.00	$215,502.00	$0.00	$0.00	**$270,337.00**	$294,159.35
801	$97,532.00	$0.00	$0.00	$0.00	$321,400.00	**$418,932.00**	$513,911.80
802	$0.00	$0.00	$0.00	$0.00	$1,070,000.00	**$1,070,000.00**	$1,337,500.00
804	$0.00	$0.00	$0.00	$0.00	$2,141,300.00	**$2,141,300.00**	$2,676,625.00
805	$0.00	$0.00	$0.00	$0.00	$216,000.00	**$216,000.00**	$270,000.00
807	$601,286.00	$0.00	$0.00	$0.00	$15,000.00	**$616,286.00**	$710,228.90
900	$14,029,160.00	$0.00	$0.00	$0.00	$0.00	**$14,029,160.00**	$16,133,534.00
1000	$9,238,528.00	$0.00	$0.00	$0.00	$0.00	**$9,238,528.00**	$10,624,307.20
new TOTALS	**$34,983,505.00**	**$968,485.00**	**$5,091,625.00**	**$10,391,475.00**	**$3,950,700.00**	**$55,385,790.00**	**$67,833,081.95**

System/Project: Removal of Site Contaminated Soil and Riprap

1994 S&L ID#: 211 LACBWR System #: 25

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = Soil and debris disposal direct to Clive, UT
$65/ft^3 + 5.263% tax = $68.42/ft^3

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 1.3 man hours/cy

E Labor Rate: = Contract labor rate with equipment $145.60/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =		lbs

NOTES: Soil by NW WTB = 1,080 ft^3
Outfall Riprap = 13,365 ft^3
Total = 14,445 ft^3 (535 cy)
1.4 Void Factor – Burial Volume = 20,223 ft^3

COSTS

Assigned labor hours: 696 hrs Assigned ManRem: 0 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$145.60/hr	$101,338	15	$116,538
Shipping	$6,100/car	$72,450	15	$83,318
Reprocessing	-	-	-	-
Burial	$68.42ft^3	$1,383,658	50	$2,075,487
Material	-	-	-	-
		$1,557,446 = TOTAL =		$2,275,343

System/Project: Reactor Building Concrete Removal

1994 S&L ID#: 212 LACBWR System #: 37

2010 Rates Used to Determine Cost

A Reprocessing Rates: = Airlock and rebar to Oak Ridge, TN, for GIC release
$0.63/lb. + $0.015 tax = $0.645/lb.

B Burial Rates: = Concrete disposal direct to Clive, UT
$65/ft^3 + 5.263% tax = $68.42/ft^3

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 2.7 man hours/cy concrete / 0.05 man hours/lb. metal

E Labor Rate: = Contract labor rate with equipment for concrete $146.60/hr
= Metal DPC rate $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others: Airlock 16,000 lbs/rebar 579,000 lbs.				lbs
Concrete = 13,340,499 lbs.		=		lbs
				lbs
		Total weight =	13,935,499	lbs

NOTES: Concrete sent to burial/metal reprocessed
10,285,499 lbs. of 150 lbs/ft^3 = 68,570 ft^3
3,650,000 lbs. of 230 lbs/ft^3 = 15,870 ft^3
Total = 13,340,499 lbs/84,440 ft^3/3127 cy
Concrete = 1.4 Void Factor – Burial Volume = 118,216 ft^3

COSTS

Assigned labor hours-concrete: 8,049 hrs Assigned ManRem: 0.1 Rem
Assigned labor hours-metal: 29,750 hrs

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Concrete Labor	$146.60/hr	$1,179,983	25	$1,474,979
Metal Labor	$68.30/hr	$2,031,925	25	$2,539,906
Shipping-Concrete	$6100/Car	$452,095	15	$519,909
Shipping-Metal	$4500/Truck	$66,938	15	$76,979
Reprocessing	$0.645/lb	$383,775	5	$402,964
Burial	$68.42/ft^3	$8,088,339	50	$12,132,509
Material	-	-	-	-
		$12,203,055	= TOTAL =	$17,147,245

System/Project: Turbine Building and Heater Bay Decon

1994 S&L ID#: 213 LACBWR System #: 19

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = Concrete disposal direct to Clive, UT
$65/ft^3 + 5.263% tax = $68.42/ft^3

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 2.1 man hours/cy

E Labor Rate: = Contract labor rate $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =		lbs

NOTES: 55 ft^3 of concrete removed from building decon (2 cy)
High labor hours are assigned as building decon is labor dependent
1.4 Void Factor – Burial Volume = 77 ft^3

COSTS

Assigned labor hours: 7043 hrs Assigned ManRem: 0.1 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20/hr	$585,978	25	$732,472
Shipping	$6,100/car	$280	15	$322
Reprocessing	-	-	-	-
Burial	$68.42/ft^3	$5,268	50	$7,902
Material	-	-	-	-
		$591,526 = TOTAL =		$740,697

System/Project: Waste Treatment Building and Tunnel Decon

1994 S&L ID#: 216 LACBWR System #: 17

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = Concrete disposal direct to Clive, UT
$65/ft^3 + 5.263% tax = $68.42/ft^3

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 2.1 man hours/cy

E Labor Rate: = Contract labor rate $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =		lbs

NOTES: 302 ft^3 of concrete removed for area decon (11 cy)
1.4 Void Factor – Burial Volume = 423 ft^3
High labor hours are assigned as area decon is labor dependent

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COSTS

Assigned labor hours: 3,987 hrs Assigned ManRem: 0.1 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20/hr	$331,718	25	$414,648
Shipping	$6,100/car	$1,535	15	$1,765
Reprocessing	-	-	-	-
Burial	$68.42/ft^3	$28,942	50	$43,413
Material	-	-	-	-
		$362,195 = TOTAL =		$459,826

System/Project: Gas Storage Vault Decon

1994 S&L ID#: 217 LACBWR System #: 25

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = Concrete disposal direct to Clive, UT
$65/ft^3 + 5.263% tax = $68.42/ft^3

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 2.1 man hours/cy

E Labor Rate: = Contract labor rate $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	_____	Linear feet =	_____	lbs
Piping > 2.5"	_____	Linear feet =	_____	lbs
Valves >8"	_____	=	_____	lbs
Valves 2.5" – 8"	_____	=	_____	lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
_____		=	_____	lbs
				lbs
		Total weight =	_____	lbs

NOTES: 35 ft^3 of concrete removed for area decon (1.3 cy)
1.4 Void Factor – Burial Volume = 49 ft^3
High labor hours are assigned as area decon is labor dependent

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COSTS

Assigned labor hours: 722 hrs Assigned ManRem: 0.05 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20/hr	$60,070	25	$75,088
Shipping	$6,100/car	$178	15	$205
Reprocessing	-	-	-	-
Burial	$68.42/ft^3	$3.353	50	$5,030
Material	-	-	-	-
		$63,601 = TOTAL =		$80,322

System/Project: Stack Decon

1994 S&L ID#: 218 LACBWR System #: 25

2010 Rates Used to Determine Cost

A Reprocessing Rates: = Exhaust fans to Oak Ridge, TN, for GIC release
$0.63/lb + $0.015 tax = $0.645/lb

B Burial Rates: = Concrete disposal direct to Clive, UT
$65/ft^3 + 5.263% tax = $68.42/ft^3

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 2.3 man hours/cy

E Labor Rate: = Contract labor rate $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
	Exhaust fans	=	2000	lbs
				lbs
		Total weight =	2000	lbs

NOTES: 100 ft^3 of concrete removed for area decon (3.7 cy)
1.4 Void Factor – Burial Volume = 140 ft^3 plus 100 ft^3 of sand used for decon
High labor hours are assigned as area decon is labor dependent

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COSTS

Assigned labor hours: 23,230 hrs Assigned ManRem: 0 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20/hr	$1,932,736	25	$2,415,920
Shipping-Concrete	$6100/Car	$1,017	15	$1,170
Shipping-Metal	$4500/Truck	$225	15	$259
Reprocessing	$0.645/lb	$1,290	5	$1,355
Burial	$68.42/ft^3	$16,421	50	$24,632
Material	-	-	-	-
		$1,951,689 = TOTAL =		$2,443,334

System/Project: Penetration Area Decon

1994 S&L ID#: 219 LACBWR System #: 19

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = Concrete disposal direct to Clive, UT
$65/ft^3 + 5.263% tax = $68.42/ft^3

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 2.1 man hours/cy

E Labor Rate: = Contract labor rate $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =		lbs

NOTES: 62 ft^3 of concrete removed for area decon (2.3 cy)
1.4 Void Factor – Burial Volume = 87 ft^3
High labor hours are assigned as area decon is labor dependent

---

COSTS

Assigned labor hours: 624 hrs Assigned ManRem: 0.05 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20/hr	$51,917	25	$64,896
Shipping	$6,100/car	$315	15	$362
Reprocessing	-	-	-	-
Burial	$68.42/ft^3	$5,953	50	$8,930
Material	-	-	-	-
		$58,185 = TOTAL =		$74,188

System/Project: Reactor Control Devices – Upper CRDs/Instrument Tubes/Valves

1994 S&L ID#: 221.2 LACBWR System #: 32

2010 Rates Used to Determine Cost

A Reprocessing Rates: = >20 mRem/hr metal to Oak Ridge, TN
$2.63/lb + $0.015/lb tax = $2.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others: Upper CRDs – 9,860 lbs.				lbs
Tubes & Misc. – 4,000 lbs.		=	13,860	lbs
				lbs
		Total weight =	13,860	lbs

NOTES: Each Upper CRD weighs 340 lbs. There are 29 CRDs.

COSTS

Assigned labor hours: 693 hrs Assigned ManRem: 0.4 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$47,332	25	$59,165
Shipping	$4,500/load	$1,559	15	$1,793
Reprocessing	$2.645/lb	$36,660	5	$38,493
Burial	-	-	-	-
Material	-	-	-	-
		$85,551 = TOTAL =		$99,451

System/Project: FESW Removal – Including Racks

1994 S&L ID#: 221.3 LACBWR System #: 58

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = Pricing per special quote #3283 from Energy Solutions for 5 Sea Vans to Clive, UT

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.002 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =	85,078	lbs

NOTES: Control rod storage rack – 560 lbs.
Core spray bundle rack – 6,100 lbs.
Crash pad – 10,000 lbs.
Fuel racks – 68,418 lbs.

COSTS

Assigned labor hours: 170 hrs Assigned ManRem: 0.13 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$11,611	25	$14,514
Shipping	$4,500/load	-	15	-
Reprocessing	$2.85/lb.	-	5	-
Burial	Quote# 3283	$348,181	-	$348,181
Material	-	-	-	-
		$359,792	= TOTAL =	$362,695

System/Project: Removal of FCP System

1994 S&L ID#: 222.1 LACBWR System #: 50

2010 Rates Used to Determine Cost

A Reprocessing Rates: = > 20 mRem/hr metal to Oak Ridge, TN
$2.63/lb + $0.015/lb tax = $2.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	150	Linear feet	=	1,149	lbs
Piping > 2.5"	308	Linear feet	=	17,864	lbs
Valves >8"	4		=	3,200	lbs
Valves 2.5" – 8"			=		lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
Recirc pumps and roto valves			=	120,000	lbs
					lbs
		Total weight =		142,213	lbs

NOTES: Recirc pumps = 40,000 lbs. each
Roto valves = 40,000 lbs.

COSTS

Assigned labor hours: 7,111 hrs Assigned ManRem: 58.5 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$485,681	25	$607,101
Shipping	$4,500/load	$15,999	15	$18,399
Reprocessing	$2.645/lb	$376,153	5	$394,961
Burial	-	-	-	-
Material	-	-	-	-
		$877,833	= TOTAL =	$1,020,461

System/Project: Removal of Main Steam System in Reactor Building

1994 S&L ID#: 222.2 LACBWR System #: 64

2010 Rates Used to Determine Cost

A Reprocessing Rates: = < 20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015/lb tax = $1.855

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"	100	Linear feet =	5,800	lbs
Valves >8"	3	=	2,400	lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =	8,200	lbs

NOTES:

COSTS

Assigned labor hours: 410 hrs Assigned ManRem: 0.4 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$28,003	25	$35,004
Shipping	$4,500/load	$923	15	$1,061
Reprocessing	$1.855/lb	$15,211	5	$15,972
Burial	-	-	-	-
Material	-	-	-	-
		$44,137 = TOTAL =		$52,037

System/Project: Removal of the Decay Heat System

1994 S&L ID#: 222.3 LACBWR System #: 56

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	100	Linear feet	=	766	lbs
Piping > 2.5"	420	Linear feet	=	24,360	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"	25		=	12,500	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
Cooler/pump/motor			=	11,000	lbs
					lbs
		Total weight =		49,426	lbs

NOTES: Cooler = 7,000 lbs.
Pump/motor = 4,000 lbs.

COSTS

Assigned labor hours: 2,471 hrs Assigned ManRem: 2.2 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$168,769	25	$210,961
Shipping	$4,500/load	$5,560	15	$6,394
Reprocessing	$1.855/lb	$91,685	5	$96,269
Burial	-	-	-	-
Material	-	-	-	-
		$266,014	= TOTAL =	$313,624

System/Project: Removal of the Purification System

1994 S&L ID#: 222.4 LACBWR System #: 51

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	370	Linear feet	=	2,835	lbs
Piping > 2.5"	35	Linear feet	=	2,030	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"	6		=	3,000	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
Cooler/Pump/Ion Exchanger			=	21,000	lbs
					lbs
		Total weight =		29,665	lbs

NOTES: Cooler/pump = 3,000 lbs.
Ion Exchanger = 18,000 lbs.

COSTS

Assigned labor hours: 1,483 hrs Assigned ManRem: 1.53 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$101,289	25	$126,611
Shipping	$4,500/load	$3,337	15	$3,838
Reprocessing	$1.855/lb	$55,029	5	$57,780
Burial	-	-	-	-
Material	-	-	-	-
		$159,655	= TOTAL =	$188,229

System/Project: Removal of Reactor Feedwater System in Reactor Building

1994 S&L ID#: 222.5 LACBWR System #: 65

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	100	Linear feet	=	766	lbs
Piping > 2.5"	133	Linear feet	=	7,720	lbs
Valves >8"	2		=	1,600	lbs
Valves 2.5" – 8"			=		lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
		Misc.	=	1,000	lbs
					lbs
		Total weight =		11,086	lbs

NOTES:

COSTS

Assigned labor hours: 554 hrs Assigned ManRem: 8.42 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$37,837	25	$47,296
Shipping	$4,500/load	$1,247	15	$1,434
Reprocessing	$1.855/lb	$20,565	5	$21,593
Burial	-	-	-	-
Material	-	-	-	-
		$59,649	= TOTAL =	$70,323

System/Project: Removal of the FESW System

1994 S&L ID#: 223.2 LACBWR System #: 58

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	100	Linear feet	=	766	lbs
Piping > 2.5"	435	Linear feet	=	29,870	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"	29		=	14,500	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
Cooler/pump/filter			=	8,000	lbs
					lbs
		Total weight =		53,936	lbs

NOTES:

COSTS

Assigned labor hours: 2,697 hrs Assigned ManRem: 2.57 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$184,205	25	$230,256
Shipping	$4,500/load	$6,068	15	$6,978
Reprocessing	$1.855/lb	$100,051	5	$105,054
Burial	-	-	-	-
Material	-	-	-	-
		$290,324	= TOTAL =	$342,288

System/Project: Removal of Seal Injection System

1994 S&L ID#: 223.3 LACBWR System #: 52

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	200	Linear feet	=	1,532	lbs
Piping > 2.5"	83	Linear feet	=	4,814	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"			=		lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
Pump/tanks/etc.			=	10,000	lbs
					lbs
		Total weight =		17,146	lbs

NOTES: Estimated pump weight 4,000 lbs./each.
Misc. tank, etc. = 2,000 lbs.

COSTS

Assigned labor hours: 857 hrs Assigned ManRem: 1.5 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$58,533	25	$73,166
Shipping	$4,500/load	$1,929	15	$2,218
Reprocessing	$1.855/lb	$31,806	5	$33,396
Burial	-	-	-	-
Material	-	-	-	-
		$92,268	= TOTAL =	$108,780

System/Project: Removal of the Overhead Storage Tank

1994 S&L ID#: 223.5 LACBWR System #: 69

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
	OHST	=	29,300	lbs
				lbs
		Total weight =	29,300	lbs

NOTES: OHST weight from FSAR Sec 6.2-5

COSTS

Assigned labor hours: 1,465 hrs Assigned ManRem: 0.64 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$100,060	25	$125,075
Shipping	$4,500/load	$3,296	15	$3,790
Reprocessing	$1.855/lb	$54,332	5	$57,070
Burial	-	-	-	-
Material	-	-	-	-
		$157,708	= TOTAL =	$185,935

System/Project: Removal of the HVA System

1994 S&L ID#: 223.7 LACBWR System #: 61

2010 Rates Used to Determine Cost

A Reprocessing Rates: = To Oak Ridge, TN, for GIC release
$0.63/lb + $0.015 tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.035 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	150	Linear feet =	1,150	lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
Tank skid		=	10,000	lbs
				lbs
		Total weight =	11,150	lbs

NOTES: HVA tank skid = 10,000 lbs.
(this is an estimated weight)

COSTS

Assigned labor hours: 390 hrs Assigned ManRem: 1.76 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$26,637	15	$30,635
Shipping	$4,500/load	$1,254	15	$1,442
Reprocessing	$0.645/lb	$7,192	5	$7,551
Burial	-	-	-	-
Material	-	-	-	-
		$35,083	= TOTAL =	$39,628

System/Project: Removal of the Liquid Waste System

1994 S&L ID#: 224.1/227 LACBWR System #: 54

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	5,000	Linear feet	=	38,305	lbs
Piping > 2.5"	61	Linear feet	=	3,538	lbs
Valves >8"			=		lbs
Valves 2.5" – 8"			=		lbs
Plate steel from tanks or components			=	19,370	lbs
Others:					lbs
Pump/misc.			=	3,000	lbs
					lbs
		Total weight =		64,213	lbs

NOTES: Retention tanks 13' 9" x 9' 6" (1/4" steel)
4500 waste tank 23' x 5' 8" (1/4" steel)
3000 waste tank 16' x 5' 9" (1/4" steel)

COSTS

Assigned labor hours: 3211 hrs Assigned ManRem: 16.98 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$219,311	25	$274,139
Shipping	$4,500/load	$7,224	15	$8,308
Reprocessing	$1.855/lb	$119,115	5	$125,071
Burial	-	-	-	-
Material	-	-	-	-
		$345,650	= TOTAL =	$407,518

System/Project: Removal of the Waste Gas System

1994 S&L ID#: 224.2 LACBWR System #: 55

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.035 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	350	Linear feet =	2,680	lbs
Piping > 2.5"	100	Linear feet =	5,800	lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=	129,185	lbs
Others:				lbs
*		=	90,000	lbs
				lbs
		Total weight =	227,665	lbs

NOTES: * includes flues and ducts/blowers/steam ejector/exhaust fans/sump pump
10 min. holdup tank 9' x 6' x ½" with baffles
Storage tanks 10.5' x 21' x 1 5/16"

COSTS

Assigned labor hours: 7968 hrs Assigned ManRem: 10.96 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$544,214	25	$680,268
Shipping	$4,500/load	$25,612	15	$29,454
Reprocessing	$1.855/lb	$422,319	5	$443,435
Burial	-	-	-	-
Material	-	-	-	-
		$992,145 = TOTAL =		$1,153,157

System/Project: Removal of the Solid Waste System (Resin Transfer)

1994 S&L ID#: 224.3 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.035 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	300	Linear feet =	2,300	lbs
Piping > 2.5"	200	Linear feet =	11,600	lbs
Valves >8"	1	=	800	lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=	2,850	lbs
Others:				lbs
Duct work/Misc.		=	18,000	lbs
				lbs
		Total weight =	35,550	lbs

NOTES: Spent resin receiving tank – 6' x 12' x ¼"
Includes 10-ton WTB crane

COSTS

Assigned labor hours: 1244 hrs Assigned ManRem: 0.44 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$84,965	25	$106,206
Shipping	$4,500/load	$3,999	15	$4,599
Reprocessing	$1.855/lb	$65,945	5	$69,243
Burial	-	-	-	-
Material	-	-	-	-
		$154,909 = TOTAL =		$180,048

System/Project: Removal of the Fuel Handling Equipment

1994 S&L ID#: 225 LACBWR System #: 35

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.002 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=	100,000	lbs
				lbs
		Total weight =	100,000	lbs

NOTES: Overhead crane weight from FSAR 6.5-5 = 88,000 lbs.
Fuel handling bridge weight estimate = 12,000 lbs.

COSTS

Assigned labor hours: 200 hrs Assigned ManRem: 0.1 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$13,660	25	$17,075
Shipping	$4,500/load	$11,250	15	$12,938
Reprocessing	$1.855/lb	$185,500	0.5	$194,775
Burial	-	-	-	-
Material	-	-	-	-
		$210,410 = TOTAL =		$224,788

System/Project: Removal of the CCW System in the Reactor Building

1994 S&L ID#: 226 LACBWR System #: 57

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.032 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	300	Linear feet	=	2,300	lbs
Piping > 2.5"	504	Linear feet	=	29,230	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"	7		=	3,500	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
		Cooler	=	1,000	lbs
					lbs
		Total weight =		36,830	lbs

NOTES:

COSTS

Assigned labor hours: 1179 hrs Assigned ManRem: 2.96 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$80,526	15	$92,605
Shipping	$4,500/load	$4,143	15	$4,764
Reprocessing	$0.645/lb	$23,755	5	$24,943
Burial	-	-	-	-
Material	-	-	-	-
		$108,424	= TOTAL =	$122,312

System/Project: Removal of the Denim Water System in the Reactor Building

1994 S&L ID#: 228.1 LACBWR System #: 67

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.035 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	200	Linear feet	=	1,530	lbs
Piping > 2.5"	32	Linear feet	=	1,860	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"	1		=	500	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
Tank/etc.			=	1,000	lbs
					lbs
		Total weight =		5,690	lbs

NOTES:

COSTS

Assigned labor hours: 199 hrs Assigned ManRem: 0.11 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$13,592	15	$15,631
Shipping	$4,500/load	$640	15	$736
Reprocessing	$0.645/lb	$3,670	5	$3,854
Burial	-	-	-	-
Material	-	-	-	-
		$17,902	= TOTAL =	$20,221

System/Project: Removal of Misc. Reactor Water System

1994 S&L ID#: 228.2 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.05 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	370	Linear feet	=	2,835	lbs
Piping > 2.5"	412	Linear feet	=	23,900	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"			=		lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
		Misc.	=	2,000	lbs
					lbs
		Total weight =		29,535	lbs

NOTES:

COSTS

Assigned labor hours: 1477 hrs Assigned ManRem: 3.11 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$100,879	25	$126,099
Shipping	$4,500/load	$3,323	15	$3,821
Reprocessing	$1.855/lb	$54,787	5	$57,527
Burial	-	-	-	-
Material	-	-	-	-
		$158,989 = TOTAL =		$187,447

System/Project: Removal of Reactor Building Support System

1994 S&L ID#: 229 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.035 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	100	Linear feet	=	766	lbs
Piping > 2.5"	224	Linear feet	=	13,000	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"	19		=	9,500	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
*			=	50,000	lbs
					lbs
		Total weight =		74,066	lbs

NOTES: * Consists of air system/heating and cooling. No weights found for A/C units. Estimated weights = 20,000 lbs/each
Estimated duct work weight = 10,000 lbs.

COSTS

Assigned labor hours: 2592 hrs Assigned ManRem: 0.32 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$177,034	15	$203,589
Shipping	$4,500/load	$8,332	15	$9,582
Reprocessing	$0.645/lb	$47,773	5	$50,161
Burial	-	-	-	-
Material	-	-	-	-
		$233,139 = TOTAL =		$263,332

System/Project: Turbine

1994 S&L ID#: 230 LACBWR System #: 20

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.002 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=	575,365	lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =	575,365	lbs

NOTES: LP Spindle = 47,000 lbs.
130,260 lbs. disposed of since 2007

COSTS

Assigned labor hours: 1151 hrs Assigned ManRem: 0.1 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$78,613	25	$98,266
Shipping	$4,500/load	$64,728	15	$74,437
Reprocessing	$1.855/lb	$1,067,302	5	$1,120,667
Burial	-	-	-	-
Material	-	-	-	-
		$1,210,643	= TOTAL =	$1,293,370

System/Project: Main Generator

1994 S&L ID#: 230.1 LACBWR System #: 16

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.002 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=	237,030	lbs
				lbs
		Total weight =	237,030	lbs

NOTES: Stator 224,000 lbs.
Skid/Spacers/Blocking = 13,030 lbs.

COSTS

Assigned labor hours: 474 hrs Assigned ManRem: 0.1 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$32,374	15	$37,230
Shipping	$4,500/load	$26,666	15	$30,666
Reprocessing	$0.645/lb	$152,884	5	$160,529
Burial	-	-	-	-
Material	-	-	-	-
		$211,924 = TOTAL =		$228,425

System/Project: Removal of the Turbine Oil System

1994 S&L ID#: 231 LACBWR System #: 92

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.029 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=	7,125	lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =	7,125	lbs

NOTES: Clean/Dirty Oil Tank 7' x 9' x 24' = 7,125 lbs.

COSTS

Assigned labor hours: 207 hrs Assigned ManRem: 0.05 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$14,138	15	$16,259
Shipping	$4,500/load	$802	15	$922
Reprocessing	$0.645/lb	$4,596	5	$4,825
Burial	-	-	-	-
Material	-	-	-	-
		$19,536 = TOTAL =		$22,006

System/Project: Removal of the Main Condenser and Accessories

1994 S&L ID#: 232 LACBWR System #: 64

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.013 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others: Misc. = 52,000 lbs				lbs
Main Condenser = 470,000 lbs.		=	522,000	lbs
				lbs
		Total weight =	522,000	lbs

NOTES: Sludge will be disposed of under S&L ID# 805

COSTS

Assigned labor hours: 6786 hrs Assigned ManRem: 1.49 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$463,483	25	$579,354
Shipping	$4,500/load	$58,725	15	$67,534
Reprocessing	$1.855/lb	$968,310	5	$1,016,726
Burial	-	-	-	-
Material	-	-	-	-
		$1,490,518 = TOTAL =		$1,663,614

System/Project: Removal of the TB Condensate and Feedwater System

1994 S&L ID#: 233 & 235 LACBWR System #: 65/73/90/98

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.012 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=	4,245	lbs
Others:				lbs
	Reheaters	=	58,700	lbs
				lbs
		Total weight =	62,945	lbs

NOTES: 5 tanks – 4,245 lbs.
#1 Reheater = 22,000 lbs.
#2 Reheater = 18,800 lbs.
#3 Reheater = 17,900 lbs.
(all piping and valves were removed under FC-90-96-03

COSTS

Assigned labor hours: 756 hrs Assigned ManRem: 0.4 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$51,635	25	$64,544
Shipping	$4,500/load	$7,081	15	$8,143
Reprocessing	$1.855/lb	$116,763	5	$122,601
Burial	-	-	-	-
Material	-	-	-	-
		$175,479	= TOTAL =	$195,288

System/Project: Removal of the TB Main Steam System

1994 S&L ID#: 234 LACBWR System #: 64

2010 Rates Used to Determine Cost

A Reprocessing Rates: = <20 mRem/hr metal to Oak Ridge, TN
$1.84/lb + $0.015 tax = $1.855/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.018 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"	200	Linear feet =	11,600	lbs
Valves >8"	2	=	1,600	lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
Major Components		=	56,600	lbs
				lbs
		Total weight =	69,800	lbs

NOTES: Major Components: Steam-reheater = 25,000 lbs.
Flash Tank = 1,600 lbs.
Moisture separator = 30,000 lbs.
All piping and valves have been removed under FC-64-97-11, except for directly under the turbine.

COSTS

Assigned labor hours: 1256 hrs Assigned ManRem: 0.4 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$85,812	25	$107,265
Shipping	$4,500/load	$7,853	15	$9,031
Reprocessing	$1.855/lb	$129,479	5	$135,953
Burial	-	-	-	-
Material	-	-	-	-
		$223,144 = TOTAL =		$252,249

System/Project: Removal of CCW System in the Turbine Building

1994 S&L ID#: 236 LACBWR System #: 57

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.013 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	600	Linear feet	=	4,600	lbs
Piping > 2.5"	350	Linear feet	=	20,300	lbs
Valves >8"	10		=	8,000	lbs
Valves 2.5" – 8"			=		lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
		Misc.	=	89,400	lbs
					lbs
		Total weight =		122,300	lbs

NOTES: Coolers = 42,200 lbs. each
Pump/expansion tank = 5,000 lbs.

COSTS

Assigned labor hours: 1590 hrs Assigned ManRem: 0.1 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$108,590	15	$124,879
Shipping	$4,500/load	$13,759	15	$15,823
Reprocessing	$0.645/lb	$78,884	5	$82,828
Burial	-	-	-	-
Material	-	-	-	-
		$201,233	= TOTAL =	$223,530

System/Project: Removal of the Alternate Core Spray System

1994 S&L ID#: 237 LACBWR System #: 38

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.012 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel .
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	100	Linear feet	=	766	lbs
Piping > 2.5"	303	Linear feet	=	17,580	lbs
Valves >8"	3		=	2,400	lbs
Valves 2.5" – 8"	28		=	14,000	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
			=		lbs
					lbs
		Total weight =		34,746	lbs

NOTES:

COSTS

Assigned labor hours: 417 hrs Assigned ManRem: 0.25 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$28,478	15	$32,750
Shipping	$4,500/load	$3,909	15	$4,495
Reprocessing	$0.645/lb	$22,411	5	$23,532
Burial	-	-	-	-
Material	-	-	-	-
		$54,798	= TOTAL =	$60,777

System/Project: Removal of the HPSW System in Turbine Building

1994 S&L ID#: 238 LACBWR System #: 75

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.015 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	200	Linear feet	=	1,532	lbs
Piping > 2.5"	200	Linear feet	=	11,600	lbs
Valves >8"			=		lbs
Valves 2.5" – 8"	30		=	15,000	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
Surge tank/pump			=	3,000	lbs
					lbs
		Total weight =		31,132	lbs

NOTES:

COSTS

Assigned labor hours: 467 hrs Assigned ManRem: 0.1 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$31,896	15	$36,680
Shipping	$4,500/load	$3,502	15	$4,027
Reprocessing	$0.645/lb	$20,080	5	$21,084
Burial	-	-	-	-
Material	-	-	-	-
		$55,478	= TOTAL =	$61,791

System/Project: Removal of Circulating Water System in Turbine Building

1994 S&L ID#: 238.1 LACBWR System #: 76

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.053 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"	50	Linear feet =	2,900	lbs
Valves >8"	2	=	1,600	lbs
Valves 2.5" – 8"	12	=	6,000	lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
4-42" Butterfly valves		=	6,000	lbs
				lbs
		Total weight =	16,500	lbs

NOTES:

COSTS

Assigned labor hours: 875 hrs Assigned ManRem: 0.01 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$59,728	15	$68,687
Shipping	$4,500/load	$1,856	15	$2,134
Reprocessing	$0.645/lb	$10,643	5	$11,175
Burial	-	-	-	-
Material	-	-	-	-
		$72,227 = TOTAL =		$81,996

System/Project: Removal of LPSW System in Turbine Building

1994 S&L ID#: 238.2 LACBWR System #: 91

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.015 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	180	Linear feet =	1,379	lbs
Piping > 2.5"	210	Linear feet =	12,180	lbs
Valves >8"	8	=	6,400	lbs
Valves 2.5" – 8"	31	=	15,500	lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =	35,459	lbs

NOTES:

COSTS

Assigned labor hours: 532 hrs Assigned ManRem: 0.01 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$36,328	15	$41,777
Shipping	$4,500/load	$3,989	15	$4,587
Reprocessing	$0.645/lb	$22,871	5	$24,015
Burial	-	-	-	-
Material	-	-	-	-
		$63,188 = TOTAL =		$70,379

System/Project: Temporary Construction Electrical Work

1994 S&L ID#: 240 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	_____	Linear feet =	_____	lbs
Piping > 2.5"	_____	Linear feet =	_____	lbs
Valves >8"	_____	=	_____	lbs
Valves 2.5" – 8"	_____	=	_____	lbs
Plate steel from tanks or components		=	_____	lbs
Others:				lbs
_____		=	_____	lbs
				lbs
		Total weight =	_____	lbs

NOTES: Man hours for 1994 S&L Study

COSTS

Assigned labor hours: 3840 hrs Assigned ManRem: 5.15 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$262,272	15	$301,613
Shipping				
Reprocessing				
Burial				
Material		$10,000	25	$12,500
		$272,272 = TOTAL =		$314,113

System/Project: Removal of the Electrical System

1994 S&L ID#: 241 (245 & 249) LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.068 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
Actual weight unknown		=	150,000	lbs
				lbs
		Total weight =	150,000	lbs

NOTES:

COSTS

Assigned labor hours: 10,200 hrs Assigned ManRem: 4.42 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$696,660	15	$801,159
Shipping	$4,500/load	$16,875	15	$19,406
Reprocessing	$0.645/lb	$96,750	5	$101,588
Burial	-	-	-	-
Material	-	-	-	-
		$810,285	= TOTAL =	$922,153

System/Project: Station Service Equipment

1994 S&L ID#: 242 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	_____	Linear feet	= _____	lbs
Piping > 2.5"	_____	Linear feet	= _____	lbs
Valves >8"	_____		= _____	lbs
Valves 2.5" – 8"	_____		= _____	lbs
Plate steel from tanks or components			= _____	lbs
Others:				lbs
_____			= _____	lbs
				lbs
		Total weight =	_____	lbs

NOTES: _____

COSTS

Assigned labor hours: 250 hrs Assigned ManRem: 0.34 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$17,075	15	$19,636
Shipping	-	-	-	-
Reprocessing	-	-	-	-
Burial	-	-	-	-
Material	-	-	-	-
		$17,075	= TOTAL =	$19,636

System/Project: Main Electrical

1994 S&L ID#: 243 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		=		lbs
				lbs
		Total weight =		lbs

NOTES:

COSTS

Assigned labor hours: 860 hrs Assigned ManRem: 1.15 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$58,738	15	$67,549
Shipping	-	-	-	-
Reprocessing	-	-	-	-
Burial	-	-	-	-
Material	-	-	-	-
		$58,738 = TOTAL =		$67,549

System/Project: Removal of Instrument/Service Air System

1994 S&L ID#: 251 LACBWR System #: 70

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.044 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	650	Linear feet	=	5,000	lbs
Piping > 2.5"	160	Linear feet	=	9,280	lbs
Valves >8"	1		=	800	lbs
Valves 2.5" – 8"			=		lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
Air compressor (A&B) receivers & dryers			=	5,600	lbs
					lbs
		Total weight =		20,680	lbs

NOTES:

COSTS

Assigned labor hours: 910 hrs Assigned ManRem: 0.63 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$62,148	15	$71,470
Shipping	$4,500/load	$2,327	15	$2,676
Reprocessing	$0.645/lb	$13,339	5	$14,006
Burial	-	-	-	-
Material	-	-	-	-
		$77,814	= TOTAL =	$88,152

System/Project: Removal of the Heating System

1994 S&L ID#: 253 LACBWR System #: 73

2010 Rates Used to Determine Cost

A Reprocessing Rates: = GIC to Oak Ridge, TN
$0.63/lb + $0.015/lb tax = $0.645/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.012 man hours/lb.

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	1,000	Linear feet	=	7,660	lbs
Piping > 2.5"	290	Linear feet	=	16,820	lbs
Valves >8"	4		=	3,200	lbs
Valves 2.5" – 8"	2		=	1,000	lbs
Plate steel from tanks or components			=		lbs
Others:					lbs
		Misc.	=	2,000	lbs
					lbs
		Total weight =		30,680	lbs

NOTES:

COSTS

Assigned labor hours: 368 hrs Assigned ManRem: 1.34 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$25,145	15	$28,917
Shipping	$4,500/load	$3,452	15	$3,970
Reprocessing	$0.645/lb	$19,789	5	$20,778
Burial	-	-	-	-
Material	-	-	-	-
		$48,386	= TOTAL =	$53,665

System/Project: Plant Asbestos Removal

1994 S&L ID#: 300 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = Asbestos direct compact(ACF)to Oak Ridge, TN
$4.54/lb + $0.015/lb tax = $4.555/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = Contract Labor $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
				lbs
				lbs
		Total weight =	12,160	lbs

NOTES: Only misc. asbestos insulation remains

COSTS

Assigned labor hours: 571 hrs Assigned ManRem: 0.75 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20/hr	$47,507	25	$59,384
Shipping	$4,500/load	$1,368	15	$1,573
Reprocessing	$4.555/lb	$55,389	5	$58,158
Burial	-	-	-	-
Material	-	-	-	-
		$104,264 = TOTAL =		$119,115

System/Project: Resin Management

1994 S&L ID#: 600 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = Burial at Clive, UT based on contingent containerized waste disposal
$45,000/container + $13.636% tax = $51,136/container

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.012 man hours/lb

E Labor Rate: = DPC labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
Resin ~ 50 lb/ft^3 1,180 ft^3			59,000	lbs
				lbs
		Total weight =	59,000	lbs

NOTES: Annual resin usage thru 2011 = 36 ft^3/year
Final cleanup = 1,000 ft^3
All resins will be Class A material
Shipments based on 120 ft^3 of resin per shipment (10 shipments)

COSTS

Assigned labor hours: 708 hrs Assigned ManRem: 0.7 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$48,356	25	$60,445
Shipping	$4,500/load	$44,250	15	$50,888
Reprocessing	-	-	-	-
Burial	$51,136/container	$511,360	25	$639,200
Material	-	$177,000	25	$221,250
		$780,966	= TOTAL =	$971,783

System/Project: Normal Radioactive Waste Management

1994 S&L ID#: 700 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = Bulk DAW to Oak Ridge, TN, in B-25's
$3.65/lb + $0.015/lb tax = $3.665/lb

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.012 man hours/lb

E Labor Rate: = DPC Labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
	4,900 ft^3		58,800	lbs
				lbs
		Total weight =	58,800	lbs

NOTES: Assume approximately 350 ft^3/year until 2024
12 lbs/ft^3 = DAW Non Compacted

COSTS

Assigned labor hours: 706 hrs Assigned ManRem: 2.2 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$68.30/hr	$48,220	25	$60,275
Shipping	$4,500/load	$6,615	15	$7,607
Reprocessing	$3.655/lb	$215,502	5	$226,277
Burial	-	-	-	-
Material	-	-	-	-
		$270,337 = TOTAL =		$294,159

System/Project: Temporary Facilities

1994 S&L ID#: 801 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = DPC Labor $68.30/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	_____	Linear feet =	_____	lbs
Piping > 2.5"	_____	Linear feet =	_____	lbs
Valves >8"	_____	=	_____	lbs
Valves 2.5" – 8"	_____	=	_____	lbs
Plate steel from tanks or components		=	_____	lbs
Others:				lbs
_____			_____	lbs
				lbs
		Total weight =	_____	lbs

NOTES: _____

COSTS

Assigned labor hours: 1,428 hrs Assigned ManRem: N/A Rem

Work to be Accomplished	2010 Cost	% Contingency	2010 with Contingencies
Set up temporary trailers	$7,000	25	$8,750
Trailer rent for 72 months	$242,400	25	$303,000
Potable water hookup	$8,000	25	$10,000
Waste/vent hookup	$8,000	25	$10,000
Electrical hookup	$13,000	25	$16,250
Phone hookup	$7,000	25	$8,750
Sheds	$36,000	25	$45,000
Labor	$97,532	15	$112,162
	$418,932	= TOTAL =	$513,912

System/Project: Equipment Needs

1994 S&L ID#: 802 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = N/A

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3
Normal concrete weight = 150 lbs/ft^3
High density concrete weight = 230 lbs/ft^3
58 lbs/ft of 8" piping schedule 80
7.66 lb/ft of 3" piping schedule 80
40 lbs/ft^2 of 1" plate steel
800 lbs for 8" valves
500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
		Total weight =		lbs

NOTES:

COSTS

Assigned labor hours: N/A hrs Assigned ManRem: N/A Rem

S&L Required Equipment	Quantity	2010 Cost	% Contingency	2010 with Contingencies
50-ton forklift	1	$300,000	25	$375,000
2-ton flat rack truck	1	$55,000	25	$68,750
Pickup truck	3	$99,000	25	$123,750
6-ton fwd all-terrain forklift	1	$55,000	25	$68,750
Walk-about cherry picker	1	$55,000	25	$68,750
Front-end loader/hoe	1	$38,500	25	$48,125
Dump truck	1	$99,000	25	$123,750
Scaffold 6' 6"	24	$16,500	25	$20,625
Cutting torches	8	$8,800	25	$11,000
Vacuum truck	1	$275,000	25	$343,750
750 cfm air compressor	1	$55,000	25	$68,750
Dust suppression water supply and hoses	1	$13,200	25	$16,500
		$1,070,000	= Total =	$1,337,500

System/Project: Radiological Equipment and Supplies

1994 S&L ID#: 804 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = N/A

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	_____	Linear feet =	_____	lbs
Piping > 2.5"	_____	Linear feet =	_____	lbs
Valves >8"	_____	=	_____	lbs
Valves 2.5" – 8"	_____	=	_____	lbs
Plate steel from tanks or components		=	_____	lbs
Others:				lbs
_____			_____	lbs
				lbs
		Total weight =	_____	lbs

NOTES: HP equipment = $393,300
Consumables = $1,748,000

COSTS

Assigned labor hours: N/A hrs Assigned ManRem: N/A Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor				
Shipping				
Reprocessing				
Burial				
Material		$2,141,300	25	$2,676,625
		$2,141,300	= TOTAL =	$2,676,625

System/Project: Liquid and Solid Waste Removal

1994 S&L ID#: 805 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = N/A

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3
Normal concrete weight = 150 lbs/ft^3
High density concrete weight = 230 lbs/ft^3
58 lbs/ft of 8" piping schedule 80
7.66 lb/ft of 3" piping schedule 80
40 lbs/ft^2 of 1" plate steel
800 lbs for 8" valves
500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
				lbs
				lbs
		Total weight =		lbs

NOTES: Filter systems/evaporation/bottles solidification system
DOT drums (2,153 at $16.70 each)

COSTS

Assigned labor hours: N/A hrs Assigned ManRem: N/A Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor				
Shipping				
Reprocessing				
Burial				
Material		$216,000	25	$270,000
		$216,000	= TOTAL =	$270,000

System/Project: Final Site Cleanup

1994 S&L ID#: 807 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = Contract labor $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3
Normal concrete weight = 150 lbs/ft^3
High density concrete weight = 230 lbs/ft^3
58 lbs/ft of 8" piping schedule 80
7.66 lb/ft of 3" piping schedule 80
40 lbs/ft^2 of 1" plate steel
800 lbs for 8" valves
500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"	_____	Linear feet =	_____	lbs
Piping > 2.5"	_____	Linear feet =	_____	lbs
Valves >8"	_____	=	_____	lbs
Valves 2.5" – 8"	_____	=	_____	lbs
Plate steel from tanks or components		=	_____	lbs
Others:				lbs
_____			_____	lbs
				lbs
		Total weight =	_____	lbs

NOTES: _____

COSTS

Assigned labor hours: 7,227 hrs Assigned ManRem: 0 Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20	$601,286	15	$691,479
Shipping				
Reprocessing				
Burial				
Material		$15,000	25	$18,750
		$616,286 = TOTAL =		$710,229

System/Project: Indirect Costs

1994 S&L ID#: 900 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = N/A

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3
Normal concrete weight = 150 lbs/ft^3
High density concrete weight = 230 lbs/ft^3
58 lbs/ft of 8" piping schedule 80
7.66 lb/ft of 3" piping schedule 80
40 lbs/ft^2 of 1" plate steel
800 lbs for 8" valves
500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

RECOST ANALYSIS

	Period 3 (Planning)	Period 4 (Dismantlement)	Period 5 (Release)	Totals
A/E Costs	$1,720,680	$4,057,040	$169,600	$5,947,320
Construction Costs	$916,760	$3,152,760	$50,400	$4,119,920
HP Costs	$287,560	$3,515,720	$36,000	$3,806,880
Security Costs	$21,840	$93,600	$7,200	$122,640
TOTALS	$2,946,840	$10,819,120	$263,200	$14,029,160

COSTS

Assigned labor hours: N/A hrs Assigned ManRem: N/A Rem

	2010 Cost	% Contingency	2010 with Contingencies
A/E Costs	$5,947,320	-	-
Construction Costs	$4,119,920	-	-
HP Costs	$3,806,880	-	-
Security Costs	$122,640	-	-
TOTALS	$14,029,160	15	$16,133,534

System/Project: Final Release Survey

1994 S&L ID#: 1000 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = N/A

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = N/A

E Labor Rate: = Contract labor $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
				lbs
				lbs
		Total weight =		lbs

NOTES:

COSTS

Assigned labor hours: 111,040 hrs Assigned ManRem: N/A Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20	$9,238,528	15	$10,624,307
Shipping				
Reprocessing				
Burial				
Material				
		$9,238,528	= TOTAL =	$10,624,307

System/Project: ISFSI

1994 S&L ID#: 1100 LACBWR System #: N/A

2010 Rates Used to Determine Cost

A Reprocessing Rates: = N/A

B Burial Rates: = Concrete to Clive, UT
$65/ft^3 + $5.263% tax = $68.42/ft^3

C Transportation Cost: = $4,500/load of 40,000 lbs of waste material to Oak Ridge, Tenn.
= $6,100/railcar of 180,000 lbs of waste to Energy Solutions

D Unit Removal Rate: = 0.006 man hours/lb.

E Labor Rate: = Contract labor $83.20/hr

F Weights Used for Conversion

Dirt Weight = 150 lbs/ft^3	7.66 lb/ft of 3" piping schedule 80
Normal concrete weight = 150 lbs/ft^3	40 lbs/ft^2 of 1" plate steel
High density concrete weight = 230 lbs/ft^3	800 lbs for 8" valves
58 lbs/ft of 8" piping schedule 80	500 lbs for 3" – 8" valves

G Larger component weights are obtained from tech. manuals when available

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MATERIAL REMOVED

Piping < 2.5"		Linear feet =		lbs
Piping > 2.5"		Linear feet =		lbs
Valves >8"		=		lbs
Valves 2.5" – 8"		=		lbs
Plate steel from tanks or components		=		lbs
Others:				lbs
				lbs
				lbs
		Total weight =		lbs

NOTES: 191 CY of concrete to dispose of (5,157 ft^3)

This cost will not be added into LACBWR's decommissioning cost but Will be used to establish a separate fund for ISFSI decommissioning.

COSTS

Assigned labor hours: 4286 hrs Assigned ManRem: N/A Rem

	Rate	2010 Cost	% Contingency	2010 with Contingencies
Labor	$83.20	$356,629	15	$410,084
Shipping	$4,500/load	$87,024	15	$100,078
Reprocessing				
Burial	$68.42/ft^3	$352,842	25	$441,052
Material		$115,642	10	$127,206
		$912,137	= TOTAL =	$1,078,420

Cost Study Historical Changes

A. Changes made in the 1998 revision to the 1994 cost study:

1. Schedule

Because of new initiative in the area of dry cask storage, the tentative schedule for shipping spent fuel has been moved up. The most optimistic time frame for commencement of fuel shipping appears, at this time, to be in the year 2003. If the schedule can be met, then the other elements of the decommissioning timeline shown in Section 5 of the study can also be adjusted.

2. Burial Costs Based on Weight vs. Volume

The methods for establishing burial costs at South Caroline's Barnwell disposal facility have been changed. Burial costs are now based on the weight of material being buried and no longer on volume at Barnwell. Presently the burial cost is approximately $6.50/lb. A second facility, located in Utah, is Envirocare which continues to charge for burial by volume. The current cost of burial at Envirocare is $150/ft^3.

3. Disposal of Concrete in the Containment Building

The concrete surfaces in the Containment Building will not be scabbled as was assumed in the S&L study. Rather, all concrete in the Containment Building will be demolished, surveyed, and sent to disposal as needed. All rebar removed from the Containment Building will be sent to a recycler for decon and release. A decon rate of 90% is used only for the rebar. This assumption was changed due to new technology being used on site to reduce, radiologically monitor, and separate concrete rubble for proper disposal. This eliminates the concern for estimating how much concrete has been contaminated by leakage from the spent fuel pool and subsequent contamination of the Containment Building concrete from the pool area to the steel containment shell. The current assumption reduces the variability and uncertainty for this task.

4. Reactor Vessel Removal Methodology

The reactor vessel may be removed in one piece through the freight door or an opening cut into the side of the Containment Building. A new cost estimate is being pursued but may not be available for this update.

5. Recycling of Material

LACBWR's current policy is to send all material removed during dismantlement, except for concrete rubble and rep-rap, to a licensed recycler. Material may be surveyed and released at LACBWR on a case-by-case basis, but will not be considered the norm. Present cost to recycle dismantlement material is approximately $1.50/lb. Decontamination factors of 10% to 40% have been

assigned to each system. These decon factors will change as we obtain additional decon rates from our recyclers as the type of dismantlement material changes.

6. Waste Volume Generated

From the experience of the last several years, it appears the amount of material that will have to be sent to burial will be substantially less than that reported in the 1944 study. Better decontamination methods and factors, greater compaction, and metal melting techniques have contributed to this burial reduction.

LACBWR's present cost study has determined that the following material will be sent to recycling and/or burial during the dismantlement of LACBWR:

a) Normal rubbish – 5,400 ft^3 – to local landfill

b) Asbestos insulation – 2,690 ft^3 – for compaction and burial at Barnwell

c) Reactor vessel – 964,000 lbs. – directly to burial at Barnwell

d) Concrete – 101,060 ft^3 – directly to Envirocare

e) All others – 1,143,326 lbs. – to recycling. Of this material, it has been determined that 1,143,326 lbs. will be unconditionally released. This leaves 1,451,442 lbs. of material to be buried at Barnwell.

7. Labor

Labor rates obtained from the local AFL-CIO offices will be used to determine labor costs necessary for dismantlement. The hourly wage rate and benefit costs for a union boilermaker will be applied to all labor hours. Some dismantlement may be performed by general workers at a lower labor rate. These hours, however, have not been considered. It has been determined that 1,246,883 man hours and 146 manRem will be required for the dismantlement of LACBWR.

8. Time Necessary to Achieve Full Funding

Current estimates place the fund at greater than 60% of the full funding goal. The combination of further cash infusion, anticipated fund growth, and continued limited dismantlement may allow for full funding to be achieved by the optimistic spent fuel shipping completion date of 2003.

B. Changes Made in the 2000 Revision to the 1994 Cost Study

1. Schedule

Because of new initiatives in the area of dry cask storage, the tentative schedule for shipping spent fuel has been moved up. The most optimistic time frame for commencement of fuel shipping appears, at this time, to be in the year 2004. If

the schedule can be met, then the other elements of the decommissioning timeline shown in Section 5 of the 1994 Sargent & Lundy study can also be adjusted.

2. Burial Costs Based on Weight vs. Volume

The methods for establishing burial costs at South Caroline's Barnwell disposal facility have been changed. Burial costs are now based on the weight of material being buried and no longer on volume at Barnwell. Presently the burial cost is approximately $6.50/lb. A second facility, located in Utah, is Envirocare which continues to charge for burial by volume. The current cost of burial at Envirocare is $71/ft^3 through our reprocessor.

3. Burial Sites

Prior to 1999, Dairyland disposed of its radioactive material at the Barnwell, South Caroline, disposal facility at a cost of $6.50/lb. In 1999, LACBWR personnel conducted an audit of the Envirocare disposal site. After the audit, it was determined that the Envirocare facility was operating as required. Dairyland then began using the Envirocare site for disposal of its radioactive material and has continued to use Envirocare exclusively since that time. We have given approval to our reprocessor to ship all material, which is not free-released, to Envirocare for final disposal. Through our reprocessor, Dairyland's current disposal charge at the Envirocare facility is $71/ft^3. The disposal records of Dairyland's previous shipments to our reprocessor indicate that, after reprocessing and compaction, our waste density is approximately 70 lbs/ft^3 or $1/lb. The following burial assumption were discussed and determined during a meeting of LACBWR's Operation Review Committee, ORC-00-12 on 10/26/00.

a) All concrete or soils removed would be sent to burial at Envirocare using the rate of $71/ft^3.

b) All DAW, systems, and equipment removed from LACBWR that require burial after reprocessing will be sent to Envirocare. For conservatism, it was determined to use a cost of $2/lb., because of the uncertainties associated with the compaction and disposal of carious material not yet evaluated by actual removal costs.

c) The reactor vessel and any resin generated at LACBWR will still need to be buried at the Barnwell facility because of their Part 61 classification. This burial will remain at a cost $6.50/lb.

4. Reprocessing of Material

LACBWR's current policy is to send material removed during dismantlement, except for concrete rubble and rip-rap, to a licensed recycler. Material may be surveyed and released at LACBWR on a case-by-case basis, but will not be considered the norm. Present cost to process dismantlement material is approximately $1.50/lb. Decontamination factors of 10% to 40% have been

assigned to each system. These decon factors will change as we obtain additional decon rates from our reprocessor as the type of dismantlement material changes.

Our experience, obtained form the materials already sent to our reprocessor, indicates a current decon factor of 74-76%. However, we have not yet obtained enough actual reprocessing decon factors to justify updating the decon factors currently used. The variation in system materials, components, contamination levels, and potential activation of material is too significant to consider making any change at this time to the decon factors currently in use.

5. Waste Volume Generated

From the experience of the last several years, it appears the amount of material that will have to be sent to burial will be substantially less than that reported in the 1944 study. Better decontamination methods and factors, greater compaction, and metal melting techniques have contributed to this burial reduction.

LACBWR's present cost study has determined that the following material will be sent to recycling and/or burial during the dismantlement of LACBWR:

a) Normal rubbish – 5,400 ft^3 – to local landfill

b) Asbestos insulation – 2,000 ft^3 – for compaction and burial

c) Reactor vessel – 964,000 lbs. – directly to burial at Barnwell

d) Concrete – 101,060 ft^3 – directly to Envirocare

e) All others – 2,481,631 lbs. - to reprocessing. Of this material, it has been determined that 1,091,918 lbs. will be unconditionally released. This leaves 1,389,713 lbs. of material to be buried.

6. Labor

Labor rates obtained from the Local 434 Plumber and Steam Fitter's office will be used to determine labor costs necessary for dismantlement. The hourly wage rate and benefit costs for a union boilermaker will be applied to all labor hours. Some dismantlement may be performed by general workers at a lower labor rate. These hours, however, have not been considered. It has been determined that 1,244,714 man hours and 142 manRem will be required for the dismantlement of LACBWR.

7. Time Necessary to Achieve Full Funding

Current estimates place the fund at greater than 60% of the full funding goal. The combination of further cash infusion, anticipated fund growth, and continued limited dismantlement may allow for full funding to be achieved by the optimistic spent fuel shipping completion date of 2004.

C) **Changes Made in the 2003 Revision to the 1994 Cost Study:**

- All costs have been adjusted, based on 2003 dollars.
- All Class A metallic radioactive waste and DAW will be sent to a reprocessor for survey, repackaging, burial or release, as determined by the reprocessor. All Class A waste requiring burial will be sent to Energy Solutions in Clive, Utah. As of 2003, Duratek located in Oak Ridge, Tennessee, is LACBWR's reprocessor. They are operating under a fixed price contract.
- All Class A concrete and soil wastes will be sent directly to Envirocare for disposal. The burial cost of this material has increased significantly from the 200 cost study rates. This due to the change of reprocessing companies.
- All Class B & C wastes will be sent directly to burial in Barnwell, S.C.
- Due to the amount of time that has now elapsed since plant shutdown, there has been a significant reduction of radionuclides as a result of natural decay. No system decon will be needed as originally thought.
- Cost estimates for the removal of the following components or systems have been added to the study:
  - #230 Removal of Main Turbine
  - #230.1 Removal of Main Generator
  - #231 Removal of Turbine Oil System
  - #238 Removal of the HPSW system in the Turbine Building
  - #238.1 Removal of Circulating Water System in Turbine Building
  - #238.2 Removal of LPSW System in Turbine Building
- The weight of the main condenser listed in ID #232 was found to be inaccurate. This weight has been corrected.
- Contingency % and escalator % will be changed based on the original 1994 cost study, along with knowledge gained from our own research, which included various industrial reports published by cost study professionals.
- The weight of the reactor vessel listed in ID #221.1 was found to be inaccurate. This weight has been corrected.
- DPC will act as its own Decommissioning Operations Contractor (DOC). Outside assistance will be contracted as needed, but the overall project management will be based in-house.
- Spent fuel will be placed in dry storage as soon as practical. It will be sent to an offsite ISFSI or repository when one becomes available, possibly as soon as 2005.
- Dismantlement of LACBWR will continue to be performed by plant personnel, in a limited fashion, until all spent fuel has been placed in dry storage.
- Once all spent fuel has been placed in dry storage, full-time dismantlement will commence. The work will be performed by DPC personnel and supplemented by

contractors as deemed necessary. This could begin as early as 2005 and is expected to last for seven years.

D. Changes Made in the 2007 Revision to the 1994 Cost Study:

- All costs have been adjusted, based on 2007 dollars.
- All Class A metallic radioactive waste and DAW will be sent to a reprocessor for survey, repackaging, burial or release, as determined by the reprocessor. All Class A waste requiring burial will be sent to Energy Solutions in Clive, Utah. As of 2007, Energy Solutions located in Oak Ridge, Tennessee, is LACBWR's reprocessor. They are operating under a fixed price contract. LACBWR is currently pursuing a contract to utilize the services of Studsvik Race a waste processor located in Memphis, TN.
- All Class A concrete and soil wastes will be sent directly to Energy Solutions in Utah for disposal.
- All Class B & C wastes will be sent directly to burial in Barnwell, S.C. before 2008 as the Barnwell disposal site will close at this time and no other site will accept B & C waste at this time.
- Due to the amount of time that has now elapsed since plant shutdown, there has been a significant reduction of radionuclides as a result of natural decay. No system decon will be needed as originally thought.
- DPC will act as its own Decommissioning Operations Contractor (DOC). Outside assistance will be contracted as needed, but the overall project management will be based in-house.
- Spent fuel will be placed in dry storage as soon as practical. It will be sent to an offsite ISFSI or repository when one becomes available, possibly as soon as 2010.
- Dismantlement of LACBWR will continue to be performed by plant personnel, in a limited fashion, until all spent fuel has been placed in dry storage.
- Once all spent fuel has been placed in dry storage, full-time dismantlement will commence. The work will be performed by DPC personnel and supplemented by contractors as deemed necessary. This could begin as early as 2014 and is expected to last for seven years.
- System ID #239 - (Removal of Misc. TB Steam Components) will be removed as all materials associated with this system has been removed and disposed of.
- System ID #221.1 – (Reactor Vessel Removal) will be removed from the study. The RPV was removed and disposed of in 2007.
- System ID #900 – (Indirect Costs) this value will be adjust to reflect DOC costs associated with the RPV removal.
- All systems in which material has been removed and disposed of since 2003 will be updated.
- System ID #802 – the cost for rental of the 300 ton Manirowac rigger is removed due to RPV removal.

- Labor costs for 2007 will be based on a steam fitters cost instead of a boilermaker. Steam fitters are responsible from the first valve from the boiler out.

- Due to the closing of Barnwell in 2008 all B & C waste has been disposed of. LACBWR will no longer create B & C waste. No shipments of radioactive material will be disposed of in Barnwell.

- System ID #230 – surveys taken inside the turbine covers indicate significant levels of radioactive contamination. This system is no longer classified as a clean system. Material will be removed and buried at a rate of $2.19/lb.

MATERIAL REMOVAL RATE FACTORS

Attachment 4

System	Removal Rate		System	Removal Rate	
211	1.3	man-hours/cubic yard	230.1	0.002	man-hours/cubic yard
212	2.7	man-hours/cubic yard	231	0.029	man-hours/cubic yard
213	2.1	man-hours/cubic yard	232	0.013	man-hours/cubic yard
216	2.1	man-hours/cubic yard	233/235	0.012	man-hours/cubic yard
217	2.1	man-hours/cubic yard	234	0.018	man-hours/cubic yard
218	2.3	man-hours/cubic yard	236	0.013	man-hours/cubic yard
219	2.1	man-hours/cubic yard	237	0.012	man-hours/cubic yard
221.2	0.05	man-hours/pound	238	0.015	man-hours/pound
221.3	0.002	man-hours/pound	238.1	0.053	man-hours/pound
222.1	0.05	man-hours/pound	238.2	0.015	man-hours/pound
222.2	0.05	man-hours/pound	240	N/A	man-hours/pound
222.3	0.05	man-hours/pound	241	0.068	man-hours/pound
222.4	0.05	man-hours/pound	242	N/A	man-hours/pound
222.5	0.05	man-hours/pound	243	N/A	man-hours/pound
223.2	0.05	man-hours/pound	251	0.044	man-hours/pound
223.3	0.05	man-hours/pound	253	0.012	man-hours/pound
223.5	0.05	man-hours/pound	300	N/A	man-hours/pound
223.7	0.035	man-hours/pound	600	0.012	man-hours/pound
224.1/227	0.05	man-hours/pound	700	0.012	man-hours/pound
224.2	0.035	man-hours/pound	801	N/A	man-hours/pound
224.3	0.035	man-hours/pound	802	N/A	man-hours/pound
225	0.002	man-hours/pound	804	N/A	man-hours/pound
226	0.032	man-hours/pound	805	N/A	man-hours/pound
228.1	0.035	man-hours/pound	807	N/A	man-hours/pound
228.2	0.05	man-hours/pound	900	N/A	man-hours/pound
229	0.035	man-hours/pound	1000	N/A	man-hours/pound
230	0.002	man-hours/pound	1100	0.006	man-hours/pound