

Appendix C. TN-40 Decommissioning Costs

The information in the following attachments was obtained from Section 9, ISFSI Decommissioning, of the Supplemental Notebook for Xcel Energy's Prairie Island Nuclear Generating Plant 2008 Decommissioning Cost Study (2008 DEC Study)¹. Attachment A-1 summarizes the "direct" ISFSI decommissioning costs – costs of packaging, transporting, and disposal of casks. These direct ISFSI Decommissioning costs are estimated to be \$12,126,952 that includes \$9,533,057 in disposal costs for 68 TN-40 casks². In addition to direct costs, Attachment A-2 identifies the management/supervisory and related overhead costs during the decontamination, demolition, and site restoration for the ISFSI. These overhead costs are estimated at \$2,347,000. These costs are included in the total decommissioning cost estimate for Prairie Island Unit 1 and 2.

Attachment B is the schedule of activities and costs associated with the ISFSI Decommissioning.

Attachment C provides the unit cost factors for demolition of the ISFSI pad concrete.

¹ The 2008 Decommissioning Study was conducted prior to the current Administration's position on Yucca Mountain. The uncertainty surrounding the Department of Energy's license withdrawal request and the future of Yucca Mountain as a repository will be addressed in the next Triennial Decommission Filing due in 2010.

² The 2008 Decommissioning Cost Study assumed plant shutdown at the end of current operating licenses in 2013 and 2014 which resulted in the need for 68 casks. Assuming that Prairie Island is relicensed, the next decommissioning cost study due in 2011 will assume an estimated 98 casks to support continued operation through 2033 and 2034 and the extended power uprate.

Attachment A

A.1 Summary of Direct Costs for ISFSI Decommissioning

	License Termination	Demolition and Site Restoration	Project Total
Decontamination	\$0	\$0	\$0
Removal	\$10,356	\$744,333	\$754,688
Packaging	\$633,868	\$0	\$633,868
Shipping	\$353,809	\$0	\$353,809
Burial	\$6,541,199	\$0	\$6,541,199
Other	\$1,654,802	\$45,292	\$1,700,094
Contingency	\$106,294	\$2,036,999	\$2,143,293
TOTAL	\$9,300,328	\$2,826,624	\$12,126,952
Labor only Decon Costs	\$0		\$0
Labor only Removal Costs	\$0	\$146,288	\$146,288
Craft Man-hours	5,819	3,181	9,000
Consultant Man-hours	2,240	160	2,400
Waste Quantities Volume (ft ³)	63,724	0	63,724
Waste Quantities Weight (lbs)	12,852,753		12,852,753
Note: Columns may not add due to rounding.			

Waste Quantities

	Volume (ft ³)	Density (lbs/ft ³)	Weight (lbs)
Filters	-	-	-
Activated Liner Removal	-	-	-
TN-40 MPC disposal (68 casks)	63,686.76	-	12,852,000.00
Disposal of DAW Waste	37.63	-	752.64
TOTAL	63,724.39	201.69	12,852,752.64

Storage Cask

Volume of cask	936.57 ft ³
Length of cask	202 inches
Diameter of cask OD	101 inches
Weight of cask with fuel on pad	241,000 pounds
Weight of cask without fuel on pad	189,000 pounds

Attachment A

A-2. Management and Related Overhead Costs Extracted from Table C-1 and C-2 (ISFSI D and D Support Only) Prairie Island Nuclear Generating Plant Unit 1 and Unit 2 Decommissioning Cost Estimate (Thousands of 2008 Dollars)

Activity Index	Activity Description	Removal Cost	Other Costs	Total Contingency	Total Costs	Spent Fuel Management Costs	Utility and Contractor Manhours
PERIOD 3e - ISFSI Decontamination							
Period 3e Collateral Costs							
3e.3	Subtotal Period 3e Collateral Costs	-	-	-	-	-	-
Period 3e Period-Dependent Costs							
3e.4.1	Insurance	-	243	24	267	267	-
3e.4.2	Property taxes	-	44	4	48	48	-
3e.4.3	Heavy equipment rental	488	-	73	562	562	-
3e.4.4	Plant energy budget	-	170	25	195	195	-
3e.4.5	NRC ISFSI Fees	-	65	7	72	72	-
3e.4.6	Security Staff Cost	-	291	44	335	335	5,020
3e.4.7	Utility Staff Cost	-	238	36	274	274	3,803
3e.4	Subtotal Period 3e Period-Dependent Costs	488	1,051	213	1,752	1,752	8,823
PERIOD 3f - ISFSI Site Restoration							
Period 3f Collateral Costs							
3f.3.1	Small tool allowance	2.4	-	0.4	3	3	-
3f.3	Subtotal Period 3f Collateral Costs	2.4	-	0.4	3	3	-
Period 3f Period-Dependent Costs							
3f.4.1	Insurance	-	-	-	-	-	-
3f.4.2	Property taxes	-	22	2	24	24	-
3f.4.3	Heavy equipment rental	163	-	24	187	187	-
3f.4.4	Plant energy budget	-	85	13	98	98	-
3f.4.5	Security Staff Cost	-	147	22	169	169	2,531
3f.4.6	Utility Staff Cost	-	99	15	114	114	1,569
3f.4	Subtotal Period 3f Period-Dependent Costs	163	353	76	592	592	4,099
Period 3e and 3f TOTALS		654	1,404	290	2,347	2,347	12,922

Note: Columns may not add due to rounding.

Attachment B

Decommissioning Cost Estimate: Prairie Island Nuclear Generating Plant ISFSI

COST ACTIVITY DESCRIPTION		Waste Volume (cu ft)	Craft Labor (m-hrs)	Consultant Labor (m-hrs)	Total Cost \$	
PHASE 0: Planning (during fuel shipment period)						
	Write Activity Specifications:			160	\$19,975	
	Write Detailed Procedures			400	\$49,939	
	Revise Decommissioning Documentation			1,200	\$149,816	
	General Licensing Costs				\$802,761	
PHASE 1: Decontamination and License Termination						
	Site Characterization	1 month	1,056		\$56,120	
	Sprung Structure Lease (JAC Hand Calc 6/24/97)				\$240,828	
	TN-40 MPCs disposal	63,687	2,720		\$9,533,057	
	License Termination Survey	2 weeks	1,632		\$98,043	
	Regulator Verification Survey	2 weeks	408		\$136,843	
	Terminate 10 CFR 72 License			480	\$59,926	
Phase 1 Undistributed Costs						
	Health Physics Supplies				\$12,944	
	Rigging/CCEs/Tooling/etc.				\$36,299	
	Miscellaneous Equipment				\$27,224	
	Office Trailer Rental	Note 1				
	Disposal of DAW Waste		38	3	\$7,258	
	Heavy Equipment Rental	Note 1				
	Nuclear Liability Insurance	Note 1				
	Property Taxes	Note 1				
	Plant Energy Budget	Note 1				
PHASE 2: Demolition and Site Restoration						
		Quantities				
UCF 272	Remove Fencing (linear foot)	1,344	73		\$4,714	
UCF 274	Remove Asphalt Paving	100,000	1,100		\$90,850	
	Demolish & Remove site buildings		900		\$81,000	
UCF 201	Remove Retaining Wall (cu-yd)	0	0		\$0	
UCF XXX	Break up clean sections of storage casks (cu-yd)	0	0		\$0	
UCF XXX	Remove ISFSI Pad (cu-yd)	2,183	484		\$54,784	
UCF XXX	Remove Retaining Wall Foundation (cu-yd)	0	0		\$0	
UCF 233	Remove Rubble - in parallel (cu-yd)	2,620	359		\$530,767	
	Concrete Crushing		119		\$34,245	
UCF 229	Backfill Below Grade Voids	2,183	131		\$43,942	
UCF 271	Grade & Landscape Site (acres)	3.00	16		\$3,530	
	Final Report to NRC			160	\$19,975	
Phase 2 Undistributed Costs						
	Rigging/Tooling/etc.				\$32,110	
	Office Trailer Rental	Note 1				
	Heavy Equipment Rental	Note 1				
	Nuclear Liability Insurance	Note 1				
	Property Taxes	Note 1				
	Plant Energy Budget	Note 1				
PROJECT TOTALS						
	ISFSI License Termination		63,724	5,819	2,240	\$11,231,033
	ISFSI Demolition and Site Restoration		0	3,181	160	\$895,918
TOTAL			63,724	9,000	2,400	\$12,126,952
Note 1: Costs are calculated in the period dependent worksheet. See Attachment A-2						
Columns may not add due to rounding.						

Attachment C

Prairie Island Nuclear Generation ISFSI Demolition Unit Cost Calculation Example

UCF XXX - Demolition of ISFSI Pad Concrete					
Breaking up of reinforced grade slab concrete with excavator mounted demolition hammer.					
Productivity is:		262	cubic yards per day Ref. (2)		
Assume a work difficulty factor of 50% due to extra reinforcing					
Actual productivity:		131	cubic yards per day		
Equipment and material O&P		16.5%			
Regional Adjustment Factor :		0.929			
Crew	Number	Duration	Rate	Cost	
		hr	\$/hr		
Laborers	2.00	8	\$42.06	\$672.91	per day
Craftsmen	1.00	8	\$58.49	\$467.95	per day
Foreman	0.50	8	\$58.53	\$234.12	per day
General Forman	0.13	8	\$60.53	\$62.95	per day
Total labor cost				\$1,437.94	per day
Equipment					
Excavator - Crawler mounted				\$471.57	per day
Hydraulic Impact Breaker, mdl H180S, 6638 flb				\$402.76	per day
Consumables					
Excavator - Crawler mounted				\$487.03	per day
Hydraulic Impact Breaker, mdl H180S, 6638 flb				\$58.88	per day
Total equipment and material				\$1,420.24	per day
Total cost				\$2,858.17	per day
To convert from \$ per day to \$ per cubic yard divide total by 131					
Total cost per cubic yard				\$21.82	per cuyd
Total labor cost				\$10.98	per cuyd
Total equipment and material cost				\$10.84	per cuyd
Total craft labor manhours per cubic yard				0.2217	per cuyd
Ref. (2): Features of Demo Hydraulic Breakers from Daemo Engineering Co. Ltd.					
Columns may not add due to rounding.					