DECOMMISSIONING STUDY

OF

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

UNITS 1 & 2

PREPARED FOR

NORTHERN STATES POWER COMPANY

BY

NUCLEAR ENERGY SERVICES

Project Application 5149-200	Prepared By M. J. Dawonskey	Date 9/28/79
	APPROVALS	
TITLE/DEPT.	SIGNATURE	DATE
Project Mgr.	R. Hykys	9-28-79
V. P. Engineering	A. H. Yoh	9-28-79
President	W. Marcus	9-28-79
Mgr. Eng. Supt. Services	T. S. LaGuardia	9-28-79
8006180101		

5/29/80

NOTE TO: Document Control
Room 016

FROM: G. D. CALKINS

Please place the attached document in the PDR using the following file and file points:

PDR File (Select One)		Related Documents (Enter if appropriate)	
Proposed Rule (PR)	30, 40, 50, 70	ACRS Minutes No.	
Reg. Guide		Proposed Rule (PR)	
Draft Reg. Guide		Draft Reg. Guide	
Petition (PRM)		Reg. Guide	
Effective Rule (RM)		Petition (PRM)	
		Effective Rule (RM)	
		Federal Register Notice	43FR 10370
		SD Task No.	EP 902-1
		NUREG Report	NUREG/CR-0130
		Contract No.	

Subject: DECOMMISSIONING REACTORS

TABLE OF CONTENTS

1. SUMMARY

This report provides cost and schedule estimates of the prompt removal/dismantling, safe storage entombment, and delayed removal/dismantling (after safe storage entombment) alternatives for the decommissioning of Prairie Island Units 1 and 2. The estimated cost of each of these decommissioning modes is presented in 1979 dollars. Interest and escalation have not been applied to these estimates and consequently a direct cost comparison can not be made for alternatives that occur at different times. Northern States Power Company will account for these financial aspects in the economic evaluations it will perform in planning for the recovery of Prairie Island decommissioning costs.

Prompt removal/dismantling implies that radioactive materials are removed from the site and all buildings and facilities dismantled immediately after shutdown. The dismantling, shipment and burial of activated and contaminated systems is more costly than dismantling of non-activated/non-contaminated systems. This is due to the fact that highly radioactive components must be removed by remote cutting, shipped, and buried under stringent and costly requirements. The time period required to dismantle the plant at shutdown, remove waste and restore the site, is 73 months.

The safe storage entombment alternative consists of sealing the radioactive components and structures within an entombment barrier at shutdown. Site maintenance costs are provided for security intrusion monitoring equipment, insurance, and facility maintenance to ensure entombment integrity. Safe storage entombment activities require 34 months for completion.

USNRC Regulatory Guide 1.86 defines safe storage entombment as an open-ended alternative with no provision for ultimate disposal. The period required for radioactive materials to decay to unrestricted access levels is generally too long to favor safe storage entombment as a viable permanent alternative for power reactors.

Delayed removal/dismantling consists of safe storage entombment at shutdown, and plant disassembly and disposal after a dormancy period. For this study, a dormancy period of 100 years was considered for cost evaluation. Dormancy periods of 30 years and 85 years are discussed generally (i.e. no detailed cost estimates have been developed for these dormancy periods).

After 30 years dormancy, the occupational exposure for dismantling radioactive piping and systems would be reduced which would reduce the total personnel exposure. However, there would be no significant reduction in dismantling costs. After 85 years dormancy, the contaminated piping and components at Prairie Island would decay to unrestricted access levels. After 100 years dormancy, the radioactive materials within the reactor vessel would have decayed sufficiently to permit removal without sophisticated remote underwater cutting techniques. Therefore, dismantling after 85 to 100 years of dormancy is less costly (in 1979 dollars) than prompt dismantling. However, safe storage entombment-delayed dismantling is more costly (in 1979 dollars) than prompt dismantling because of the cumulative annual dormancy cost and the initial cost of safe storage entombment.

The cost estimates for each Prairie Island decommissioning mode considered are summarized below. Prairie Island Nuclear Generating Plant is a two unit plant with facilities shared between Units 1 & 2. The decommissioning cost estimate for the first Prairie Island unit is based on the single unit site assumption of the AIF/NESP-009 Study (Ref. 1). To make the cost estimate for the entire Prairie Island site, additional calculations were performed to determine the cost impact of the second unit. This calculation utilizes the single unit decommissioning cost minus reductions for shared engineering costs and costs for removal of shared structures and equipment. A tabulation of second unit decommissioning costs is also provided in the following cost estimate summary. All costs are in 1979 dollars and include a 25% contingency.

SUMMARY OF PRAIRIE ISLAND DECOMMISSIONING COST ESTIMATES
(In 1979 Dollars, including 25% Contingency)

Prompt Removal/Dismantling	
First Unit	$51,655,000.00
Second Unit	14,813,000.00
TOTAL	$66,468,000.00
Safe Storage Entombment	
First Unit	$14,013,000.00
Second Unit	1,652,000.00
TOTAL	$15,665,000.00
Dormancy (per year)	
First Unit	$ 94,400.00
Second Unit	34,200.00
TOTAL	$ 128,600.00
Safe Storage Entombment-Delay Dismantling	
100 Year Dormancy	
First Unit	$55,517,000.00
Second Unit	16,645,000.00
TOTAL	$72,162,000.00

2. END PRODUCT DESCRIPTION

2.1 INTRODUCTION

The initial phase of decommissioning activities after plant shutdown would be performed by the existing operating plant staff. These activities would include removal of all fuel and source material from the vessel and storage racks for off-site disposal, in accordance with existing plant technical specifications and procedures. Plant work areas would be cleaned of surface contamination, as required, and all liquid and solid wastes would be removed. Concurrent with these activities, Northern States Power would request a possession-only license and submit a Decommissioning Plan (Dismantlement Plan) to the NRC for approval in accordance with Regulatory Guide 1.86 (Ref. 11).

2.2 PROMPT REMOVAL/DISMANTLING

Prompt removal/dismantling consists of removing from the site all fuel assemblies, radioactive fluids and waste, and in accordance with an NRC approved Decommissioning Plan, all other materials, structures, components, etc. having activities above accepted unrestricted activity levels. The site may then be released for unrestricted use with no requirements for a license. The remainder of the reactor facility may then be dismantled and shipped for disposal.

Prompt dismantling of the entire facility requires that activated components such as vessel internals and associated piping systems must be remotely segmented using equipment such as an arc-saw. The segments must be packaged, shipped, and buried in accordance with Regulatory Guide 1.86, DOT 49CFR173-189 (References 11 and 12, respectively) and in accordance with the burial facility's license. For this cost estimate, all buildings and structures (reactor, turbine, radwaste, auxiliary fuel handling, resin disposal, screenhouse, machine shops, etc.) are removed from the site to three feet below grade. Non-contaminated concrete rubble may be used on-site for fill of building cavities below grade. When all radioactive material has been removed, the site may be restored to its natural contour, landscaped and released for unrestricted use.

Prompt removal/dismantling of the entire facility is an irreversible process in which the plant would never again be used for the generation of electricity. Therefore, there are no ongoing environmental obligations or financial burdens that must be borne by the utility after dismantling as there are with the safe storage entombment mode of decommissioning.

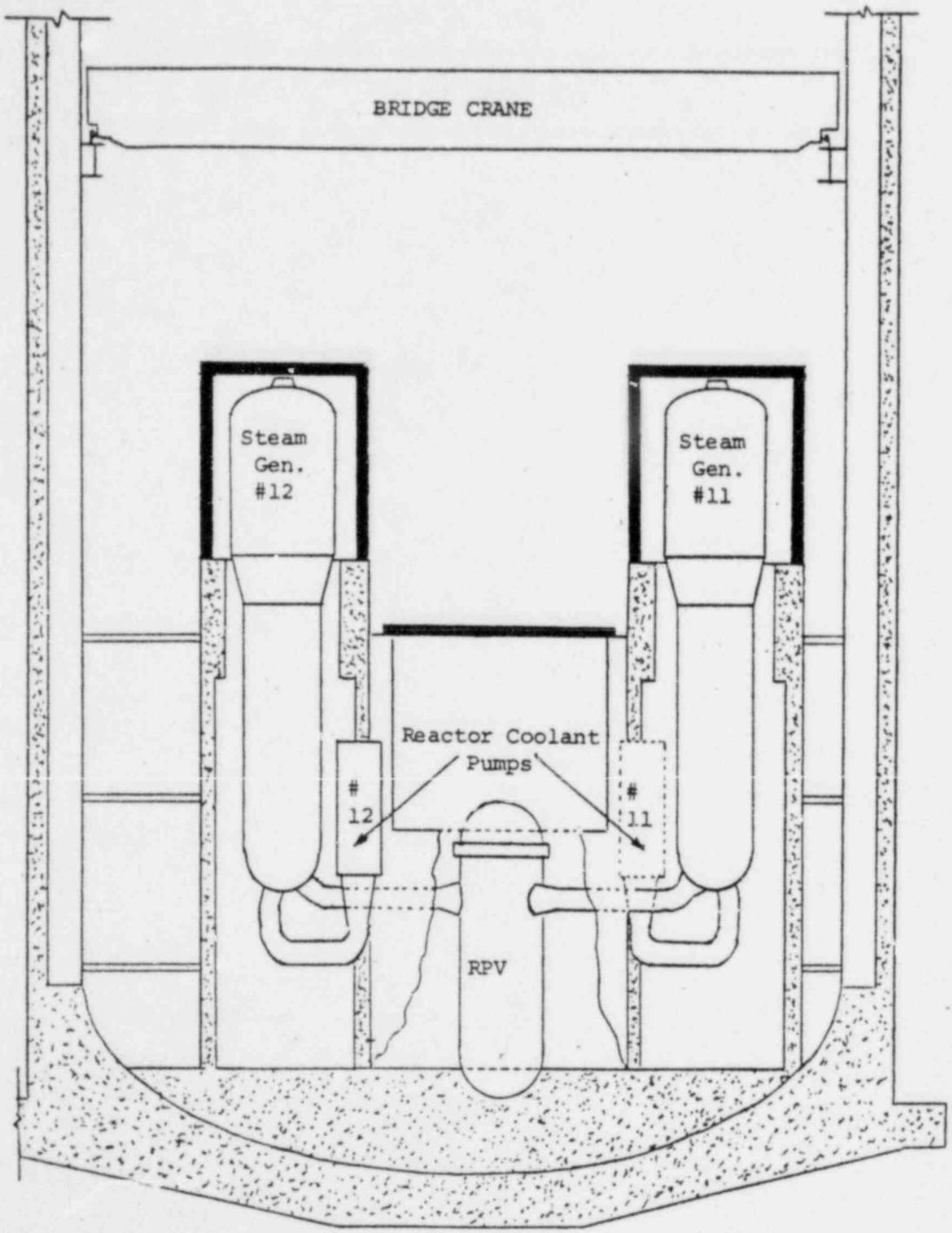
2.3 SAFE STORAGE ENTOMBMENT

Safe storage entombment consists of removing spent fuel and residual operating wastes, decontaminating or removing contaminated material and equipment outside the entombment boundary, and constructing an entombment barrier within the reactor building.

The entombment boundary proposed for use at the Prairie Island site is within the reactor buildings to limit the plant areas requiring controlled access. The boundary consists of the reactor-steam generator shield wall, fuel transfer canal, and adjacent fuel building structural concrete as shown in Figures 1, 2, and 3. The structural barriers at this boundary would contain the radioactive reactor vessel and internals, reactor coolant system piping steam generators and pressurizers, incore instrumentation system, and other miscellaneous components. All openings in this boundary, including the fuel transfer canal and equipment and access hatches would be sealed with 2 foot thick reinforced concrete slabs to prevent personnel entry.

All remaining contaminated systems external to the safe storage entombment boundary would be decontaminated or removed for off-site burial in controlled burial grounds. This would include contaminated systems in the reactor, auxiliary radwaste, resin disposal, fuel handling, and turbine buildings. Non-contaminated systems in all buildings would be drained, de-energized and secured in place.

All systems required during the dormancy period such as fire protection, lighting, radiation and intrusion monitoring would be prepared for continued use. All external doors and hatches of the buildings on-site would be locked closed. All other accesses to plant buildings would be secured to prevent unauthorized entry, but would be accessible for periodic inspections.



= 2 ft. Thick Reinforced Concrete Constructed as Entombment Barrier

FIGURE 1
SECTION OF REACTOR BUILDING

= 2 Ft. Thick Reinforced Concrete Constructed As Entombment Barrier

= Access Hatches permanantly sealed shut

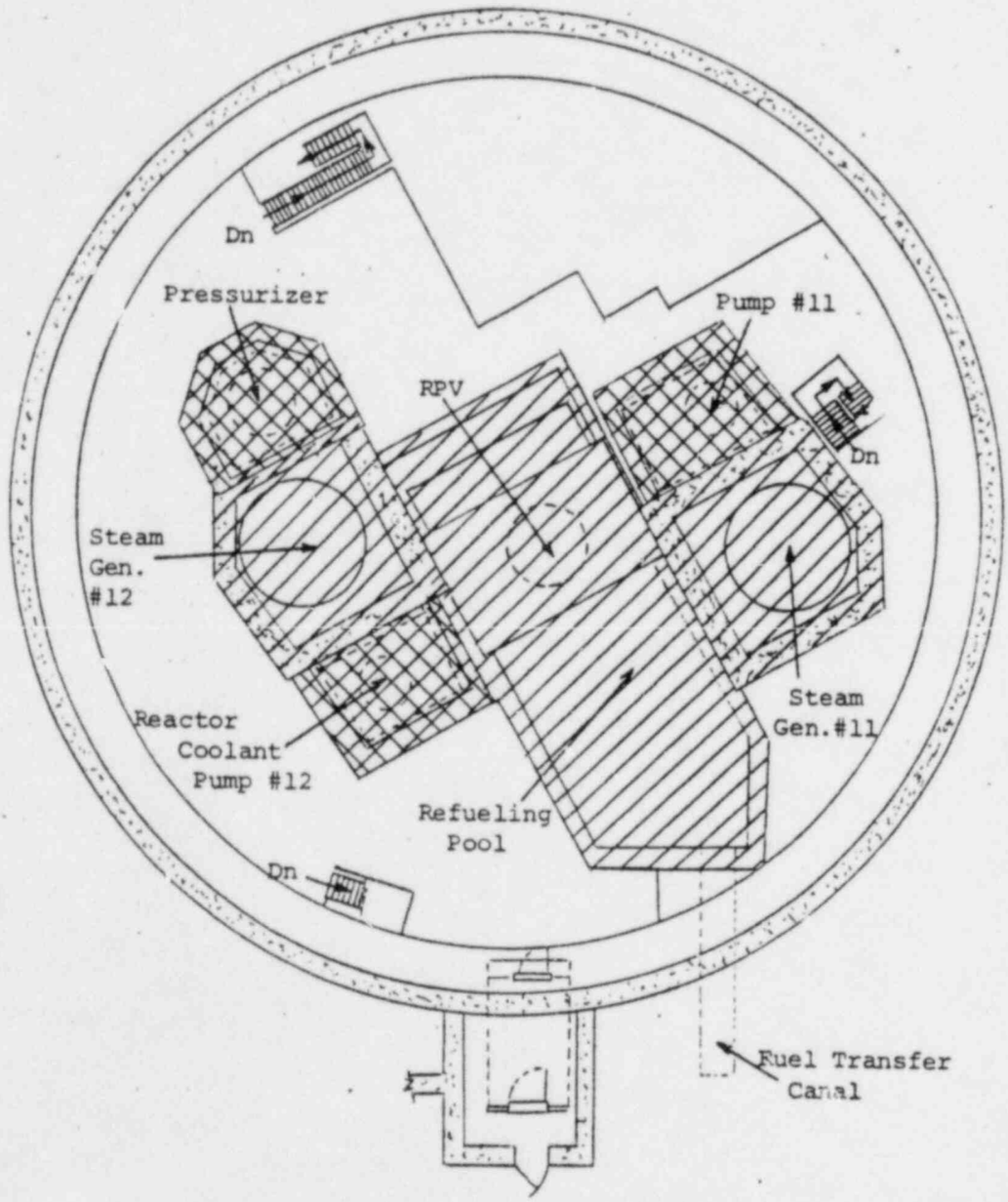


FIGURE 2
SECTION THROUGH REACTOR BUILDING
(looking down)

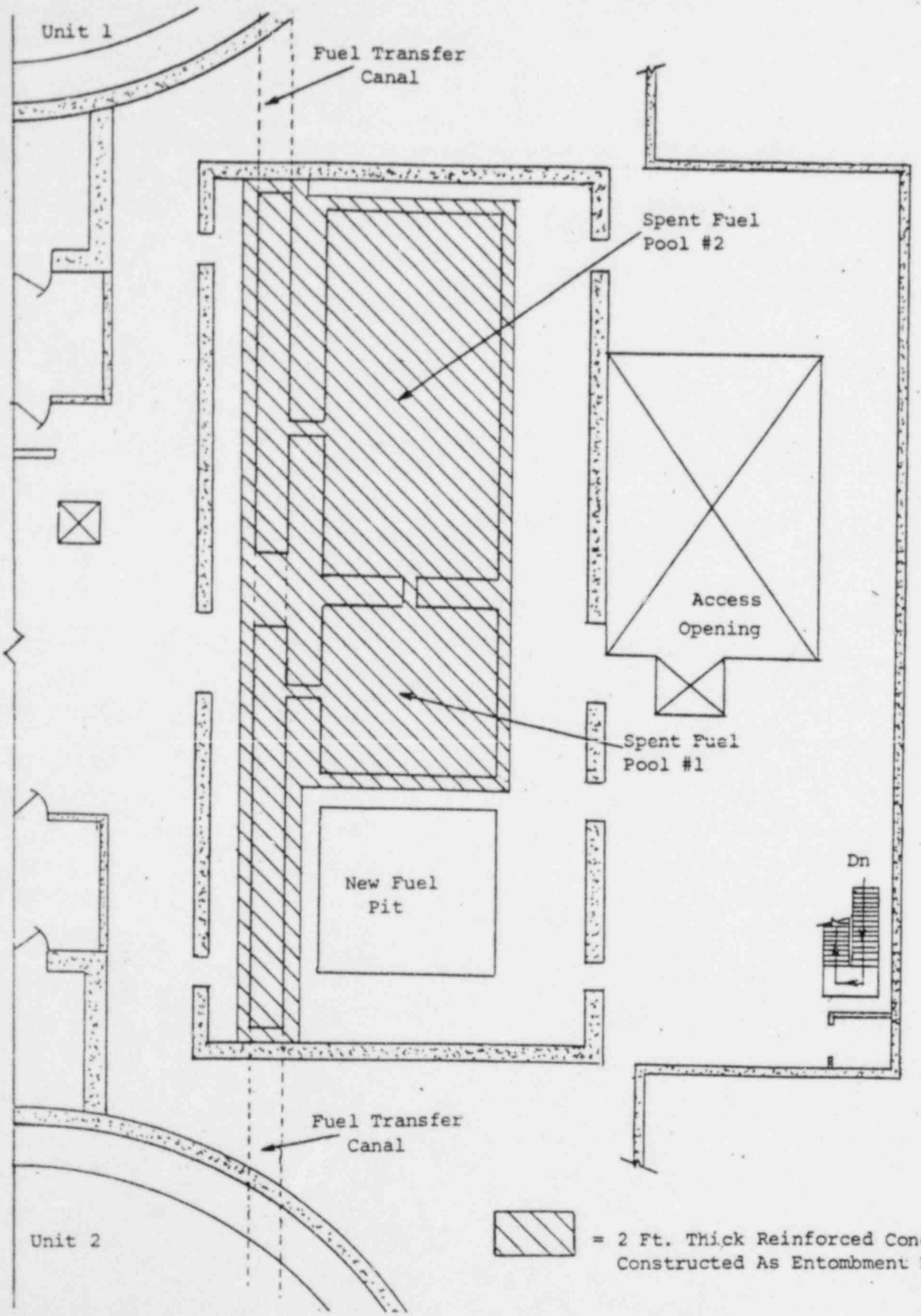


FIGURE 3
FUEL HANDLING AREA

A final radiation survey would be performed of all plant buildings and grounds outside the safe storage entombment barrier to ensure that there is no radioactive contamination above unrestricted access levels.

2.4 DELAYED REMOVAL/DISMANTLING

2.4.1 Safe Storage Entombment

The reactor would be entombed at shutdown as described in Section 2.3.

2.4.2 Dormancy

A dormancy period of 30 years would allow the contamination in reactor auxiliary systems to decay to lower (although still radioactive) levels, and would permit delayed dismantling at reduced occupational exposure. In addition, a recent decommissioning study prepared by Battelle Pacific Northwest Labs as reported in NUREG/CP-0008 ("Boiling Water Reactor," by Richard I. Smith, p. 137 Ref. 13) states the volume of radioactive waste for burial is essentially unchanged after approximately 30 years of dormancy. This study implies that a facility would have to be entombed for approximately 50 years for any significant reduction in waste volume or disposal costs to be realized. Dismantling of the reactor vessel and internals after 30 years of dormancy must still be performed using sophisticated remote tooling. None of the contaminated systems would decay during a 30 year dormancy to 0.4 mR/hr* at 1 cm exposure rate (selected as criterion for unrestricted use or access based on the precedent set for earlier decommissioning programs and used as the criterion in the AIF Study). It should be noted that the NRC recently proposed a guideline for unrestricted release of decommissioned facilities of 5 mRem/year absorbed dose to any individual. NUREG/CP-0008, page 273 explains that this dose assumes an individual resides in the facility three years after facility decommissioning for 2000 hours per year in an average field of 0.005 mR/hr (one-half natural background). This level of radioactivity begins to approach the lower limits of detectability (0.0025 - 0.005 mR/hr). The 0.4 mR/hr at 1 cm assumed in this study for calculational purposes, is measured at the component. If the 0.4 mR/hr at 1 cm

* For the purpose of this discussion, 1 mR/hr exposure rate is approximately equal to 1 mRem/hr absorbed dose rate.

is applied to the same pathways analysis used for the NRC guideline of 5 mRem/year, the annual exposure rate would be lower than 5 mRem/year. Exposure rate is approximately inversely proportional to distance for large components, and inversely proportional to distance squared for small components. At a habitable distance of 100 cm from the component, the field would be at least two orders of magnitude lower (0.004 mR/hr) than at 1 cm. Therefore the 0.4 mR/hr at 1 cm assumed in the study is approximately the same as the proposed NRC guideline. If an additional three years decay were allowed prior to occupancy (as in the NRC analysis), the 2000 hr/year dose would be approximately 4 mRem/year.

A dormancy period of 85 years would allow the highest level contaminated system (the steam generator system) to decay to unrestricted access levels (0.4 mR/hr at 1 cm). All other contaminated systems are assumed to have decayed to unrestricted access levels at this time. Dismantling of the reactor vessel and internals must still be performed by remote tooling.

A dormancy period of approximately 100 years is estimated to provide sufficient time for the radioactive vessel internals to decay to levels low enough to permit manual removal. Specifically, the most highly activated core shroud would decay to a contact exposure rate of approximately 300 mR/hr (exclusive of Ni-59 (approximately 30 mR/hr); and niobium 94, which may not be present). This reduced radiation level would eliminate the need for special remote-operated underwater cutting tools, necessary for dismantling at reactor shutdown, to segment and remove internals and vessel segments. Local supplementary shielding may be required for removal of vessel internals. A 100 year dormancy period is estimated to be sufficient to allow contamination in reactor auxiliary systems (primarily cobalt 60) to decay to unrestricted access levels (0.4 mR/hr at 1 cm). The decay process would eliminate the need for decontamination of any systems.

For safe storage entombment there would be no need for a full-time physical security guard force during the dormancy period, since all radioactive material is contained within the entombment barrier. For the purpose of this study, it is considered that periodic inspections would be made in accordance with USNRC Regulatory Guide 1.86 (Ref. 11) as described below.

A dormancy period would require monitoring or intrusion and radiation detectors. The alarms for these detectors would be installed in either an adjacent manned utility-owned facility, or in local law enforcement agency facilities. These monitors must be inspected and maintained periodically.

The plant buildings and grounds must be maintained to ensure the integrity of the perimeter fence and access doors to the plant buildings. These physical barriers would be inspected quarterly in accordance with USNRC Regulatory Guide 1.86.

A facility radiation survey would be performed at least quarterly to verify that radioactive materials were being contained within the entombment barriers.

An environmental radiation survey would be performed at least semiannually to verify compliance with all environmental protective requirements.

2.4.3 Delayed Removal/Dismantling

At the end of a dormancy period, the dismantling and removal phase of the decommissioning program would be initiated. In general, all remaining radioactive structures, systems and components would be removed and shipped to controlled burial sites. The remaining non-radioactive systems and components would be removed and scrapped. All structures would be demolished to a level of 3 feet below grade and non-contaminated concrete would be used on-site for fill. The disposition of specific structures, systems and components are discussed below.

Access barriers installed or constructed for the entombment alternative must be removed. The concrete entombment barrier over the vessel, reactor coolant pumps, steam generators, pressurizer, and fuel transfer canal must be dismantled by controlled blasting.

All non-contaminated piping, valves, pumps and electrical equipment would be removed from the reactor building and either salvaged or sold for scrap. The overhead crane would be the last piece of equipment to be dismantled within the reactor building. The reactor building would be removed by controlled blasting, wrecking ball, and torch cutting.

Concurrent with removal of the components in the reactor building, systems non-essential to the dismantling activities may be removed from the remaining buildings on-site. Circulating water pumps, tanks and piping would be removed and scrapped. The systems essential to dismantling (and which have been maintained during dormancy) such as lighting and ventilation would be secured and removed from each building when they are no longer required to support dismantling. Structural steel would be cut into shippable lengths and sold for scrap. Concrete floors, walls and roofs would be removed and used as fill for the building cavities below grade level. Local sand or soil may be used to fill the remaining foundation cavities to grade level. The site would be graded as required to conform to the surrounding site contour.

A final radiation survey would be performed to ensure there is no radiation in excess of unrestricted access levels. Upon approval of the final survey, the USNRC would terminate the possession-only license and return the site to unrestricted use.

3. COST ESTIMATES

The basis for the cost estimates was the AIF/NESP-009 study report, "An Engineering Evaluation of Nuclear Power Reactor Decommissioning Alternatives" by W.J. Manion and T.S. LaGuardia (Ref. 1). The cost estimates are summarized on Table 3.1. The assumptions made concerning the size of the Prairie Island plants relative to the AIF study reference plant, labor rates in Red Wing, Minnesota, shipping distance for waste disposal, cost impacts after a 100 year dormancy period, and insurance provisions are listed in Table 3.2. The unit cost factors used in the estimate for Prairie Island are in 1979 dollars and are adjusted to reflect the labor cost in the vicinity of the plant. A list of the cost factors used in this study is shown on Table 3.3.

3.1 PRIMARY DECOMMISSIONING ALTERNATIVES

The cost estimates for the primary decommissioning alternative of Prompt Removal/Dismantling and Safe Storage Entombment are summarized in Table 3.1, with and without a 25% contingency. The costs for each major activity are presented in Tables 3.4 and 3.5. Table 3.6 lists the notes referenced in the cost tables to explain key elements of specific work activities.

3.2 COMBINATION ALTERNATIVE

The cost estimate for the Safe Storage Entombment-Delayed Removal/Dismantling combination decommissioning mode is shown graphically in Figures 4 and 5. It is also summarized in Table 3.1 (with and without contingency). Dismantling after 30 year and 85 year dormancy periods are discussed generally in the following section. Dismantling cost advantages and estimated costs following 100 years of dormancy are discussed in detail.

3.2.1 Safe Storage Entombment-Delayed Removal/Dismantling

The curves plotted on Figures 4 and 5 graphically represent the costs of various decommissioning alternatives at any point in time. Figures 4 and 5 are useful in representing the times at which reductions in decommissioning costs occur due to technical simplification. The most significant cost reduction breakpoint at 100 years has been calculated and plotted on Figures 4 and 5. Cost reductions at 30 years and 85 years have not been calculated for this report, but their approximate magnitudes are generally discussed in the following paragraphs.

Safe storage entombment with a 30 year dormancy period prior to removal-dismantling does not provide a decommissioning cost advantage from decay of radionuclide inventory. Radiation levels on reactor piping and components would be too high at plant shutdown to decay during the 30 year dormancy to the assumed unrestricted release criteria of 0.4 mR/hr at 1 cm. None of the contaminated systems would decay to unrestricted access levels and would therefore require shipping to and burial at a controlled burial site with the associated undistributed overhead costs. Accordingly, there would be no significant dismantling cost reductions from delaying dismantling for 30 years. The 30-year delayed dismantling costs would be greater than the prompt dismantling cost (in 1979 dollars) because of the annual maintenance and surveillance cost of $128,600 for 30 years, and the additional expense of entombing the facility at shutdown.

The first removal-dismantling cost reduction (not calculated for this report and, therefore, not shown on Figures 4 and 5) is expected to occur at 85 years based on the AIF study results when the system with the highest contamination level decays to assumed unrestricted access levels (0.4 mR/hr at 1 cm) and does not have to be decontaminated, shipped and buried. The controlling system in this case is the steam generator system which has an estimated initial contact surface exposure rate of 31 R/hr primarily from Cobalt-60 contamination. It takes approximately 85 years for the Cobalt-60 in this system to decay to 0.4 mR/hr, at which time a dismantling cost reduction is possible. This reduction results from the reduction of decontamination, shipping and burial costs, and from simplified concrete removal using conventional removal techniques at a lower cost ($95/yd^3 vs $355/yd^3). These reductions are associated with critical path activities, and accordingly reduced period dependent undistributed costs are also included.

The second removal/dismantling cost reduction occurs at approximately 100 years. The 100 year cost reduction is estimated to be approximately a factor of 2 larger than the 85 year cost reduction discussed above. At this time, costs change due to

the simplified removal of the vessel and internals and reduced burial and shipping costs. Simplified removal is possible because the most radioactive internals (top guide) would have decayed to a contact dose rate of approximately 300 mR/hr*.

The following items would decrease in cost as a result of approximately 100 years Co-60 decay:

	Item	Unit I Cost Decrease (without contingency)	Unit 2 Cost Decrease (without contingency)
1.	Vessel remote tooling	$ 837,600.00	$ 0.00
2.	Internals cutting (includes shipping, burial)	$ 152,300.00	152,300.00
3.	Vessel cutting (includes shipping, burial)	$ 145,500.00	145,500.00
4.	Decontamination	$ 416,900.00	416,900.00
5.	Contaminated concrete removal	$ 985,000.00	177,800.00
6.	Shipping (piping, components structures)	$ 1,868,800.00	151,900.00
7.	Burial (piping, components, structures)	$ 1,325,000.00	432,000.00
8.	Undistributed costs	$ 5,238,500.00	1,179,600.00
	TOTAL DECREASE	$10,969,600.00	$ 2,656,000.00

* Arbitrarily selected as the criteria for which manual removal is considered feasible.

This reduces dismantling costs (immediately following entombment) from $45.8* million to $32.1** million for Prairie Island Unit 1 (after 100 years). For Prairie Island Unit 2, the dismantling cost (immediately following entombment) drops from $14.9*** million to $11.6**** million (after 100 years of radioactive decay). The total cost for safe storage entombment-delayed removal/dismantling of both Prairie Island units after 100 years of dormancy is $72.2 million in 1979 dollars (including a 25% contingency).

* This is calculated (including 25% contingency) as follows (see page 19 for definitions of component numbers):
(41,324,200 - 4,153,300 - 607,600 + 60,000)(1.25) = $45,779,100.00

** This is calculated (including 25% contingency) as follows (see page 19 for definitions of component numbers):
(41,324,200 - 4,153,300 - 607,600 + 60,000 - 10,969,600)(1.25) = $32,067,100.00

*** This is calculated (including 25% contingency) as follows (see page 20 for definitions of component numbers):
(11,850,700 + 60,000)(1.25) = $14,888,400.00

**** This is calculated (including 25% contingency) as follows (see page 20 for definitions of component numbers):
(11,850,700 + 60,000 - 2,656,000)(1.25) = $11,568,400.00

The calculations used to determine the costs of safe storage entombment-delayed dismantling (after 100 years of dormancy) are shown below:

For Unit 1

1.	Cost to entomb the plant at shutdown (from Table 3.5.a)		$11,210,100.00*
2.	Plus 100 years of dormancy costs (from Table 3.5.a)		+7,550,000.00**
3.	Plus delayed dismantling cost (which is calculated as follows from numbers in Tables 3.4.a, 3.5.a and page 17):		
-	Prompt removal/dismantling estimated cost	$41,324,200.00	
-	Minus prompt removal/dismantling predecommissioning	-4,153,300.00	
-	Minus dismantling cost of items removed to accomplish safe storage entombment	-607,600.00	
-	Plus cost to remove concrete constructed to accomplish entombment ($632\ yd^3 \times \$95/yd^3 = \$60,000$)	+60,000.00	
-	Minus dismantling cost reductions due to 100 years of dormancy	-10,969,600.00	
	Delayed Dismantling Cost	$25,653,700.00	25,653,700.00***
			44,413,800.00
	Plus 25% contingency		11,103,200.00
	TOTAL		$55,517,000.00

* Entombment cost with 25% contingency = $14,013,000.00
** Dormancy cost with 25% contingency = $9,437,500.00
*** Delayed dismantling cost with 25% contingency = $32,067,100.00

For Unit 2

1.	Cost to entomb the plant at shutdown (from Table 3.5.b)		$ 1,321,500.00*
2.	Plus 100 years of dormancy costs (from Table 3.5.b)		2,740,000.00**
3.	Plus delayed dismantling cost (which is calculated as follows from numbers in Tables 3.4.b, 3.5.b, and page 17):		
-	Prompt removal/dismantling predecommissioning	$11,850,700.00	
-	Minus prompt removal/dismantling predecommissioning	****	
-	Minus dismantling cost of items removed to accomplish safe storage entombment	****	
-	Plus cost to remove concrete constructed to accomplish entombment ($632\ yd^3 \times \$95/yd^3 = \$60,000$)	+60,000.00	
-	Minus dismantling cost reductions due to 100 years of dormancy	-2,656,000.00	
	Delayed Dismantling Cost	$ 9,254,700.00	9,254,700.00***
			13,316,200.00
	Plus 25% contingency		3,329,000.00
	TOTAL		$16,645,200.00

* Entombment cost with 25% contingency = $1,652,000.00
** Dormancy cost with 25% contingency = $3,425,000.00
*** Delayed dismantling cost with 25% contingency = $11,568,400.00
**** Included in calculation of $11,850,700.00

For Both Units

1.	Cost to entomb at shutdown	
	Unit 1	$11,210,100.00
	Unit 2	1,321,500.00
2.	Plus 100 years of dormancy costs	
	Unit 1	7,550,000.00
	Unit 2	2,740,000.00
3.	Plus delayed dismantling cost	
	Unit 1	25,653,700.00
	Unit 2	9,254,700.00
		$57,730,000.00
	Plus 25% contingency	14,432,000.00
	TOTAL	$72,162,000.00

The calculations just performed can be carried out to give an approximate cost of safe storage entombment-delayed dismantling after 30 years of dormancy as shown below:

For Unit 1

1.	Cost to entomb the plant at shutdown (from Table 3.5.a)		$11,210,100.00
2.	Plus 30 years of dormancy costs (from Table 3.5.a)		2,265,000.00
3.	Plus delayed dismantling cost (which is calculated as follows from numbers in Tables 3.4.a and 3.5.b):		
-	Prompt removal/dismantling predecommissioning	$41,324,200.00	
-	Minus prompt removal/dismantling predecommissioning	-4,153,300.00	
-	Minus dismantling cost of items removed to accomplish safe storage entombment	-607,600.00	
-	Plus cost to remove concrete construction to accomplish entombment ($632\ yd^3 \times \$95/yd^3 = \$60,000$)	+60,000.00	
-	Minus dismantling cost reductions due to 30 years of dormancy*	≃ 0.00*	
	Delayed Dismantling Cost	$36,623,300.00	36,623,300.00**
			50,098,400.00
	Plus 25% contingency		12,524,600.00
	TOTAL		$62,623,000.00

* The precise calculation of the 30 year cost reduction was not performed for this report.

** Approximately delayed dismantling cost with 25% contingency = $45,779,100.

For Unit 2

1.	Cost to entomb the plant at shutdown (from Table 3.5.b)		$ 1,321,500.00
2.	Plus 30 years of dormancy costs (from Table 3.5.b)		822,000.00
3.	Plus delayed dismantling cost (which is calculated as follows using numbers from Table 3.4.b):		
-	Prompt removal/dismantling estimated cost	$11,850,700.00	
-	Minus prompt removal/dismantling predecommissioning	*	
-	Minus dismantling cost of items removed to accomplish safe storage entombment	*	
-	Plus cost to remove concrete constructed to accomplish entombment ($632\ yd^3 \times \$95/yd^3 = \$60,000$)	+60,000.00	
-	Minus dismantling cost reduction due to 30 years of dormancy**	≈ 0.00**	
		$11,910,700.00	11,910,700.00***
			$14,054,200.00
	Plus 25% contingency		3,513,600.00
	TOTAL		$17,567,800.00

* Included in calculation of $11,850,700.00

** The precise calculation of the 30 year cost reduction was not performed for this report.

*** Approximate delayed dismantling cost with 25% contingency = $14,888,400.

For Both Units

1.	Cost to entomb at shutdown	
	Unit 1	$11,210,100.00
	Unit 2	1,321,500.00
2.	Plus 30 years of dormancy costs	
	Unit 1	2,265,000.00
	Unit 2	822,000.00
3.	Plus delayed dismantling cost	
	Unit 1	36,623,300.00
	Unit 2	11,910,700.00
		$64,152,600.00
	Plus 25% contingency	16,038,150.00
	TOTAL	$80,190,750.00

These 30 year delayed dismantling calculations assume that there will be no dismantling cost reduction due to 30 years of dormancy. Actually, the dismantling cost reduction after 30 years of dormancy will be greater than zero by some number which is relatively small compared to the total cost of this decommissioning combination (see page 16 for more details).

TABLE 3.1

SUMMARY OF PRAIRIE ISLAND DECOMMISSIONING COST ESTIMATES*

Description	Estimated Cost	25% Contingency	Total Cost
Prompt Removal/Dismantling			
Unit 1 (from Table 3.4a)	$41,324,200.00	$10,330,800.00	$51,655,000.00
Unit 2 (from Table 3.4b)	11,850,700.00	2,962,300.00	14,813,000.00
TOTAL	53,174,900.00	13,293,100.00	66,468,000.00
Entombment			
Unit 1 (from Table 3.5a)	11,210,100.00	2,802,900.00	14,013,000.00
Unit 2 (from Table 3.5b)	1,321,500.00	330,500.00	1,652,000.00
TOTAL	12,531,600.00	3,133,400.00	15,665,000.00
Dormancy after Entombment/yr			
Unit 1 (from Table 3.5a)	75,500.00	18,900.00	94,400.00
Unit 2 (from Table 3.5b)	27,400.00	6,800.00	34,200.00
TOTAL	102,900.00	25,700.00	128,600.00
Entombment/Dismantling After 100 Years Delay			
Unit 1 (per calc. on p. 19)	44,413,800.00	11,103,200.00	55,517,000.00
Unit 2 (per calc. on p.20)	13,316,000.00	3,329,000.00	16,645,000.00
TOTAL	$57,729,800.00	$14,432,200.00	$72,162,000.00

* Costs are in 1979 dollars; assumptions and bases of estimate are listed on Table 3.2

NOTES

1) Costs shown are in 1979 dollars and include 25% contingency.
2) The "Delayed Removal/Dismantling" curve differs from the prompt removal/dismantling cost total of table 3.1 because of adjustments made to eliminate duplicated pre-decommissioning and equipment removal costs and to account for removal of the entombment barriers when dismantling follows safe storage entombment (see calculations on pages 18 & 19 for details).

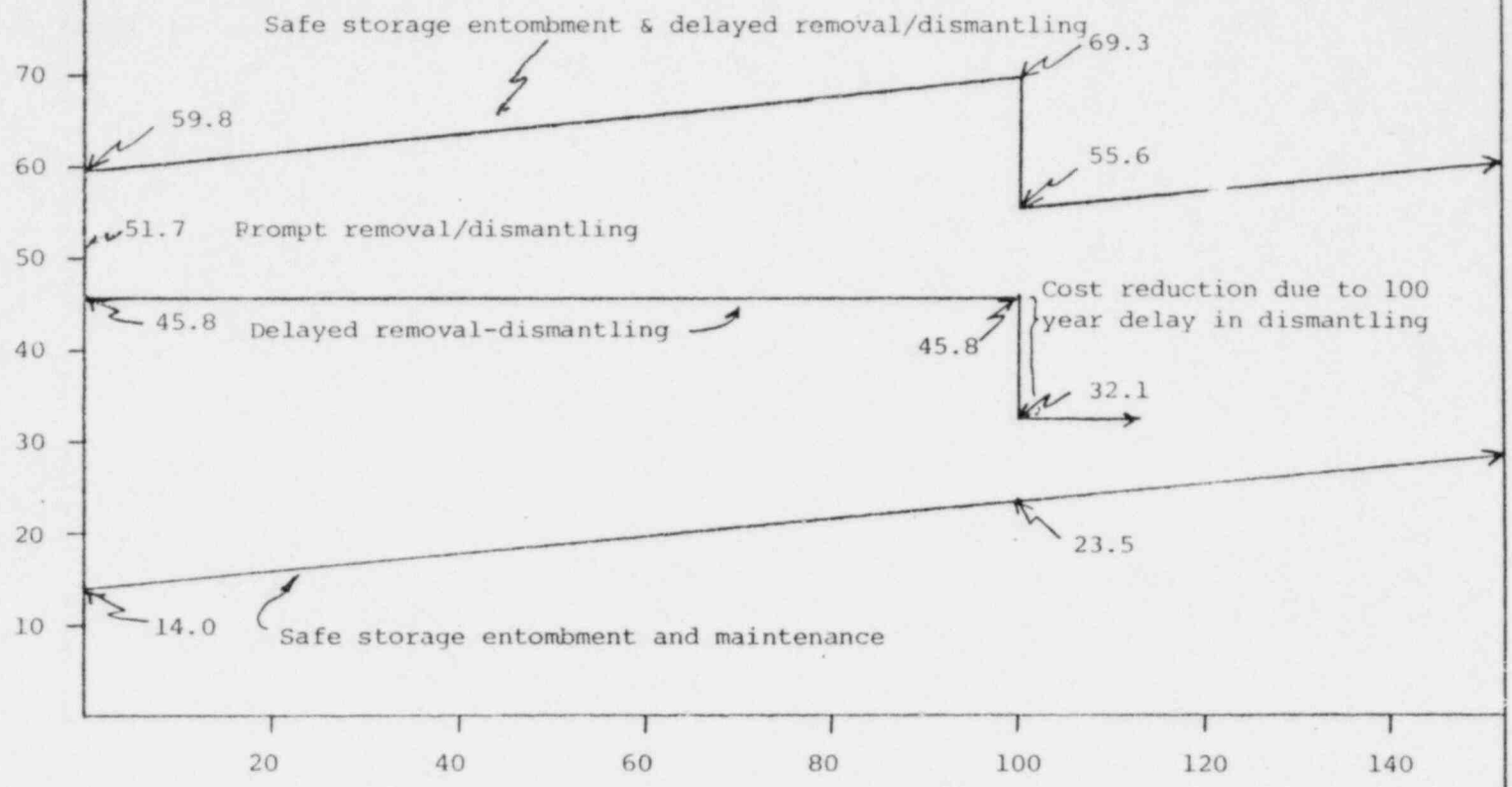


Figure 4

SAFE STORAGE ENTOMBMENT-
DELAYED REMOVAL/DISMANTLING COMBINATION FOR FIRST PRAIRIE ISLAND UNIT

REF.

NOTES

1) Costs shown are in 1979 dollars and include 25% contingency.

2) The "Delayed Removal/Dismantling" and prompt removal/dismantling points overlap each other at time zero. (See calculations on pages 18 & 20 for details).

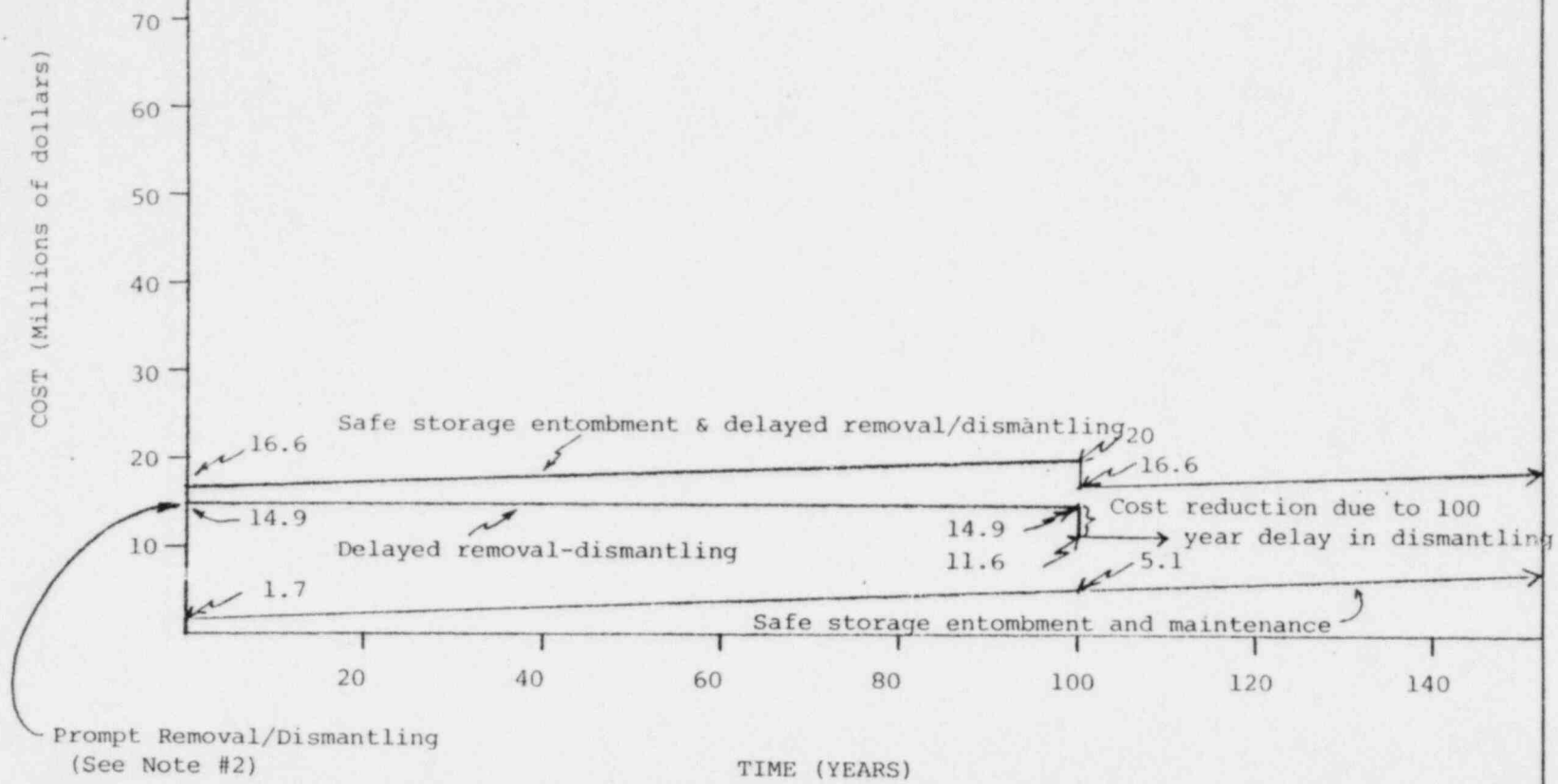


Figure 5

SAFE STORAGE ENTOMBMENT-
DELAYED REMOVAL/DISMANTLING COMBINATION FOR SECOND PRAIRIE ISLAND UNIT

REF.

TABLE 3.2

ASSUMPTIONS USED IN DECOMMISSIONING COST ESTIMATE
FOR PRAIRIE ISLAND NUCLEAR GENERATING PLANT

1. Plant piping and component quantities are approximately the same as the reference PWR plant in the AIF Study. Adjustments for volumes of concrete and steel were made per data and drawings of the Prairie Island Plant. Cost reductions due to decommissioning both units concurrently were taken into account.

2. Contract labor costs were estimated from rates provided by Northern States Power Company for Red Wing, Minnesota area.

3. Consultant rates were estimated at $45/hr (vs $30/hr in the AIF study).

4. Salaried employee and craft labor rates used in the study were increased by 27% over those used in the AIF Study (to account for escalation from 1975 to 1979 and regional variation).

5. Raw material and capital equipment costs were increased by 69% and 38% respectively, over those used in the AIF Study (for escalation and regional variation).

6. All costs shown are in 1979 dollars.

7. Shipping costs were based on a 1,564 mile trip to the Hanford, WA burial grounds (one way). The Hanford facility was used as the basis for burial costs.

8. No decontamination would be required during dismantling after a 100 year dormancy period.

9. Disposal of the reactor vessel and internals after a 100 year dormancy period would still require controlled burial as either low specific activity (LSA) or large quantity radioactive material. Estimated cost for burial of the vessel and internals after 100 years decay is approximately 10% of the cost to bury these components if dismantled at shutdown.

10. Contaminated piping and components would decay to unrestricted access levels during a 100 year dormancy period.

11. Property insurance during decommissioning includes liability for equipment and plant scrap value during decommissioning. Following decommissioning, no property insurance is carried. Builders risk insurance is included in subcontract labor costs.

12. Scrap value credit (based on value of metal being melted down and reused) is included in the cost estimate calculations. Scrap value of non-contaminated metal is considered to cancel the cost for its removal from on-site laydown areas, by decommissioning contractors.

    No equipment salvage value (based on resale as used equipment) is considered in the estimates since salvage values can not be predicted with reasonable accuracy. This assumption is conservative.

TABLE 3.2 (Cont'd)

13. The costs shown in Table 3.4 are based on segmenting the reactor vessel and internals into the maximum size that can be shipped without exceeding roadweight limits for a loaded tractor trailer (includes payload, shielding, cask and tie-downs) and the 60,000 curie per shipment burial limit at the Hanford burial site.

14. Due to the high degree of integration between Prairie Island Unit 1 and Unit 2, single unit decommissioning (while the other unit is operating) is not considered feasible. Physical division of many site structures is difficult. These assessments are the basis for the following assumptions:

    A. Decommissioning of both plant units would occur approximately simultaneoulsy.

    B. Removal costs for the turbine, radwaste, resin disposal, and auxiliary buildings, screenhouse, fuel handling area, discharge structures, and the site canals are accounted for in the estimate for the first unit decommissioned. This makes the second unit decommissioning costs appear relatively low.

    C. Only one decommissioning staff is considered to be on site (rather than two working in parallel).

    D. Backfilling costs, grading costs, and scrap value are divided evenly between units 1 and 2 for accounting purposes, even though this is not physically representative.

    E. Reactor Vessel cutting equipment is purchased only once and reused on the second unit.

    F. Shared facility and engineering effort costs are accounted in the first unit costs.

15. It is assumed that the canals can be filled by grading from high spots on the site landscape. If the canals are to be filled with purchased fill trucked onto the site, the estimated removal/dismantling cost would increase by $1,158,800.00.

16. The costs of all required safety analyses and safety measures for the protection of the general public, the environment, and decommissioning workers (as presently identified by NRC Regulatory Guide 1.86) are included in all of the cost estimates.

    The costs for compliance with all applicable regulatory requirements are also included in these estimates. The applicable regulatory requirements are:

    10 CFR 20 "Standards for Protection Against Radiation".
    10 CFR 30 "Rules of General Applicability to Licensing of Byproducts Materials".
    10 CFR 40, "Licensing of Source Material".
    10 CFR 50, "Domestic Licensing of Production and Utilization Facilities".
    10 CFR 51, " Licensing and Regulatory Policy and Procedures for Environmental Protection".
    10 CFR 70, "Domestic Licensing of Special Nuclear Material".
    29 CFR 1910, "Occupational Safety and Health Standards".
    49 CFR 170-189, "Department of Transportation Regulations Governing the Transport of Hazardous Materials.

TABLE 3.3

COST FACTOR SUMMARY

Reactor Vessel Removal:	Cost Factor
Remote Arc Saw Cutting - "thin" steel sections (0-2")	$18/inch^2 cut
Remote Arc Saw Cutting - "thick" steel sections (2"+)	$10/inch^2 cut
Remote Removal of Items With Tack Welded Bolts	$572/bolt
Manual Flame Cutting 0-2" Steel Sections	$.33/inch cut
Demolition of Site Structures:	
Heavily Reinforced Activated/ Contaminated Concrete	$345/yd^3
Heavy Foundations	$525/yd^3
Containment Structure & Other Heavily Reinforced Seismically Designed Concrete Structures	$95/yd^3
Scarfing of Concrete Floors and Walls	$5/ft^2
Heavily Reinforced Non-Seismically Designed Concrete	$32/yd^3
Concrete Buildings (non-seismic; common commercial construction; lightly reinforced).	$12.50/yd^3 (of bldg. vol.)
Concrete Block	$1.04/ft^2 (floor area)

TABLE 3.3 (CONT'D)

COST FACTOR SUMMARY

Demolition of Site Structures (cont'd)	Cost Factor
Concrete Walls (not reinforced)	$9.80/ft^3
Structural Steel	$93/ton
Steel Buildings (non-seismic, common commercial construction)	$10.69/yd^3 (of bldg. vol.)
Built Up Roofing	$46/1000 ft^2
Component Removal:	
Set Up for Removal of PWR Steam Generator	$7083/set up
PWR Steam Generator	$53,600/steam generator
Pipe 0-6" (Sawing)	$65/cut
Pipe 6" + (Torch Cutting)	$123/cut
Valves 6" + (Torch Cutting)	$60/valve
Pumps 0-300 pounds	$101/pump
Pumps 300-5000 pounds	$217/pump
Pumps 5000 + pounds	$1799/pump
Heat Exchangers 0-3000 pounds	$313/exchanger
Heat Exchangers 3000 + pounds	$939/exchanger
Filters	$200/filter
Ion Exchangers	$200/ion exchanger
Tanks 0-1000 gallons	$200/tank
Tanks 1000-10,000 gallons	$310/tank
Tanks 10,000 + gallons	$.83/inch cut

TABLE 3.3 (CONT'D)

COST FACTOR SUMMARY

Component Removal (cont'd):	Cost Factor
Electrical Consoles, Panels and Components 0-300 pounds	$89/item
Electrical Consoles, Panels and Components 300-1000	$190/item
Electrical Consoles, Panels and Components 1000 + pounds	$282/item
Cable Trays	$31/cut
Conduit	$59/100 ft.
Feedwater Heaters	$1160/heater
Misc. Process Equipment 0-300 pounds	$101/item
Misc. Process Equipment 300-5000 pounds	$217/item
Misc. Process Equipment 5000 + pounds	$1799/item
Shipping of Waste Materials (to Hanford, WA):	
One Way Trip by Truck (0-45,000 lb. payload; two drivers, LSA material)	$2065/trip
Round Trip by Truck (0-45,000 lb. payload; Two drivers; LSA material)	$3847/trip
Round Trip by Truck (50,000 lb. - 70,000 lb. payload; cask shipment, two drivers; includes overweight permits)	$7534/trip
Cask Rental (7 days)	$875/Shipment
Rail Shipping (One Way)	$8.50/(100 lb.)
Steel Liner (and container) Fabrication (includes labor and materials)	$218/(100 lb.)
Lead and Steel Liner Fabrication (includes labor and materials)	$141/(100 lb.)

TABLE 3.3(CONT'D)

COST FACTOR SUMMARY

Shipping of Waste Materials (Cont'd)	Cost Factor
Wooden Boxes:	
4' x 4' x 8'	$169/ea.
6' x 8' x 12'	$393/ea.
8' x 8' x 12'	$520/ea.
6' x 8' x 24'	$822/ea.
8' x 8' x 24'	$906/ea.
12' x 12' x 24'	$1531/ea.
Burial (At Hanford, WA.)	
General Bulk Burial Rate	$4.75/$ft^3$
Weight Surcharge (10,000 lb. and greater)	$50 + $.01/lb. (weight over 10,000 lb.)
Curie Surcharge (for 100 or more Ci)	$375 + $.05/Ci (Ci over 300 Ci)
Cask Handling (min.)	$250/cask
Decontamination & Waste Processing:	
Tanks and Large Internal Volume Components	$4.30/$ft^2$
Hook-Up Decontamination Rig	$172/hook-up
Surface Wipedown	$1.29/$ft^2$
Decontamination Flushing Rig	$55,100/ea.
Evaporation & Solidfication of Liquid Wastes (using #2 fuel oil & cement)	$.22/gal.

TABLE 3.3 (CONT'D)

COST FACTOR SUMMARY

Miscellaneous Activities:

Vacuum Drying	$1112/vacuum pump used
Back Filling	$.86/yd^3
Grading	$1.42/yd^3
Landscaping	$734/acre

TABLE 3.4a
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
					Pre-decommissioning period	
				--	1. Remove fuel and incore source material	a
				--	2. Clean plant areas and process all liquid and solid wastes.	a
				55,100	3. Review plant drawings.	
				22,800	4. Perform detailed radiation survey.	
				8,400	5. Estimate residual by-product inventory	
				22,500	6. Prepare and submit possession-only license application with revised technical specifications	
				5,400	7. Prepare end product discription	
				31,800	8. Perform detailed calculations of by-product inventory	
				7,200	9. Define major sequence of work activities	
				16,200	10. Perform safety analysis of the dismantling operations	

TABLE 3.4a
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				11,300	11. Prepare and submit dismantlement plan to NRC for approval.	
				1,800	12. Receive possession only license-deactivate reactor & implement revised technical specifications.	
				--	13. Receive dismantlement order; commence dismantling removal program.	
				182,500	SUBTOTAL PRE-DECOMMISSIONING WORK ACTIVITIES	
					UNDISTRIBUTED COSTS, REMOVAL/DISMANTLING	
				17,300	Project Management	
				17,300	Engineering QA	
				3,814,700	Utility Staff during Pre-Decommissioning period	b
				121,500	Decommissioning staff start up	c
				3,970,800	SUBTOTAL UNDISTRIBUTED COSTS	
				4,153,300	TOTAL PRE-DECOMMISSIONING PERIOD COST	
					Decommissioning Period	
				1,110,200	14. Prepare activity specifications for dismantling	
				21,600	15. Prepare integrated dismantlement sequence	

TABLE 3.4a
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTE
				310,700	16. Perform plant preparation and construct temporary facilities	
				9,000	17. Design temporary liquid waste clean up systems	
				1,047,000	18. Design & procure cutting equipment for vessel and internals removal	
				115,500	19. Procure contamination control envelope and special equipment.	
				9,000	20. Obtain contracts for cask liners and shipping containers	
				800,200	21. Prepare detailed work procedures for dismantling activities	
				35,200	22. Install temporary liquid waste clean-up system	
91,700	1,043,700	79,900	303,700	1,519,000	23. Remove and dispose of non-essential systems.	e
2,000				2,000	24. Decontaminate Reactor Vessel Head	
	4,500	10,200	4,200	18,900	25. Remove & dispose of CRD Housings, Instrumentation Tubes & CRD Cooling Assemblies.	
	200	83,100	9,400	92,700	26. Cut, load, ship, and bury the reactor vessel head.	

TABLE 3.4 a
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
	344,000	712,000	847,900	1,903,900	27. Cut, ship and bury vessel internals	
	447,900	201,900	148,100	797,900	28. Cut, ship and bury reactor vessel.	
237,600	1,053,400	269,400	454,700	2,015,100	29. Drain, decontaminate remove, and dispose of essential systems.	f
	73,200			73,200	30. Remove steam generator missile shield	
	81,100	79,300	42,300	202,700	31. Remove Vessel Shield	
	644,600	249,800	133,200	1,027,600	32. Remove reactor building floors & walls	
169,000				169,000	33. Decontaminate Steam generator tubes	
				1,000	34. Seal weld all openings of steam generators and pressurizer.	
				6,100	35. Perform radiation survey.	
	130,600			130,600	36. Open top of reactor building	
	122,000	121,100	300,300	543,400	37. Segment and remove steam generator & pressurizer.	
8,100	4,000			12,100	38. Remove Polar Crane	
					39. Remove remaining plant buildings	
	688,500			688,500	Reactor Building	
	1,683,000			1,683,000	Turbine Building	
	208,200	76,300	40,700	325,200	Radwaste and Resin Disposal Buildings	

TABLE 3.4a
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
	2,551,800	983,300	524,500	4,059,600	Auxiliary Buildings	
	1,182,200	448,000	239,000	1,869,200	Fuel Handling Area	
	151,900			151,900	Screenhouse	
	396,600			396,600	Cooling Towers	
	28,600			28,600	Discharge Structures	g
	357,200			357,200	Intake, Recycle and Cooling Tower Discharge Canals	
	777,100			777,100	Miscellaneous Structures	h
				47,100	40. Back fill foundations	
				227,000	41. Grade and landscape	
				6,100	42. Perform final radiation survey	
				27,000	43. Prepare final report to NRC.	
				1,800	44. Terminate possession-only license and return site to unrestricted use.	
508,400	11,974,300	3,314,300	3,048,000	22,619,500	SUB-TOTAL REMOVAL/DISMANTLING WORK ACTIVITIES	

TABLE 3.4 a
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
					REMOVAL/DISMANTLING UNDISTRIBUTED COSTS:	
		424,600	19,100	455,600	Process liquid waste generated by decontamination	i
				8,810,200	Decommissioning Staff (through Activity 31)	d
				619,200	Decommissioning Staff (after Activity 31)	d
				268,700	Health Physics Supplies	
				72,200	Decontamination Rig and supplies	
				1,095,800	Heavy Equipment	
				6,000	Equipment for pipe cutting	
				457,200	Security Force	
				73,700	Nuclear & Property Insurance	
				864,000	Engineering Consultants	
				1,828,800	Project Administration (QA)	
				14,551,400	SUBTOTAL UNDISTRIBUTED COSTS:	
508,400	11,974,300	3,738,900	3,067,100	41,324,200	TOTAL ESTIMATED DECOMMISSIONING COSTS: REMOVAL/DISMANTLING	
				51,655,000	TOTAL DECOMMISSIONING COST (including 25% contingency): Removal/Dismantling	

TABLE 3.4 b
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				--	1. Remove fuel and incore source material.	a
				--	2. Clean plant areas and process all liquid and solid wastes.	a
				—	3. Review plant drawings.	
				22,800	4. Perform detailed radiation survey.	
				8,400	5. Estimate residual by-product inventory.	
				—	6. Prepare and submit possession-only license application with revised technical specifications.	
				—	7. Prepare end product description.	
				31,800	8. Perform detailed calculations of by-product inventory.	
				—	9. Define major sequence of work activities.	
				—	10. Perform safety analysis of the dismantling operations.	

TABLE 3.4 b
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				—	11. Submit dismantlement plan to NRC for approval.	
				1,800	12. Receive possession only license-deactivate reactor and implement revised technical specifications.	
				--	13. Receive dismantlement order; commence dismantling removal program.	
				64,800	SUBTOTAL PRE-DECOMMISSIONING WORK ACTIVITIES	
					UNDISTRIBUTED COSTS, REMOVAL/DISMANTLING	
				—	Project Management	
				—	Engineering QA	
				—	Utility Staff during Pre-Decommissioning period	
				—	Decommissioning staff start up	
				—	SUBTOTAL UNDISTRIBUTED COSTS	
				64,800	TOTAL PRE-DECOMMISSIONING PERIOD COST	
					Decommissioning Period	
				—	14. Prepare activity specifications for dismantling	
				—	15. Prepare integrated dismantlement sequence	

TABLE 3.4 b
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				—	16. Perform plant preparation and construct temporary facilities	
				—	17. Design temporary liquid waste clean up systems	
				—	18. Design and procure cutting equipment for vessel and internals removal	
				—	19. Procure contamination control envelope and special equipment	
				—	20. Obtain contracts for cask liners and shipping containers	
				—	21. Prepare detailed work procedures for dismantling activities	
				35,200	22. Install temporary liquid waste clean-up system	
91,700	1,043,700	79,900	303,700	1,519,000	23. Remove and dispose of non-essential systems	
2,000				2,000	24. Decontaminate Reactor Vessel Head	
	4,500	10,200	4,200	18,900	25. Remove and dispose of CRD Housings, Instrumentation Tubes and CRD Cooling Assemblies	
	200	83,100	9,400	92,700	26. Cut, load, ship, and bury the reactor vessel head	

TABLE 3.4 b
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
	344,000	712,000	847,900	1,903,900	27. Cut, ship and bury vessel internals	
	447,900	201,900	148,100	797,900	28. Cut, ship and bury reactor vessel	
237,600	1,053,400	269,400	454,700	2,015,100	29. Drain, decontaminate remove, and dispose of essential systems	f
	73,200			73,200	30. Remove steam generator missile shield	
	81,300	79,300	42,300	202,700	31. Remove Vessel Shield	
	644,600	249,800	133,200	1,027,600	32. Remove reactor building floors and walls	
169,000				169,000	33. Decontaminate Steam generator tubes	
				1,000	34. Seal weld all openings of steam generators and pressurizer	
				6,100	35. Perform radiation survey	
	130,600			130,600	36. Open top of reactor building	
	122,000	121,100	300,300	543,400	37. Segment and remove steam generator and pressurizer	
8,100	4,000			12,100	38. Remove Polar Crane	
					39. Remove remaining plant buildings	
	688,500			688,500	Reactor Building	
				—	Turbine Building	
				—	Radwaste and Resin Disposal Buildings	

TABLE 3.4 b
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				—	Auxiliary Buildings	
				—	Fuel Handling Area	
				—	Screenhouse	
	396,600			396,600	Cooling Towers	
				—	Discharge Structures	g
				—	Intake, Recycle and Cooling Tower Discharge Canals	
				—	Miscellaneous Structures	
				47,100	40. Back fill foundations	
				227,000	41. Grade and landscape	
				6,100	42. Perform final radiation survey	
				27,000	43. Prepare final report to NRC	
				—	44. Terminate possession only license and return site to unrestricted use	
508,400	5,034,500	1,806,700	2,243,800	9,942,700	SUB-TOTAL REMOVAL/ DISMANTLING WORK ACTIVITIES	

TABLE 3.4 b
COST SUMMARY FOR PROMPT REMOVAL/
DISMANTLING OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
					REMOVAL/DISMANTLING UNDISTRIBUTED COSTS:	
		424,600	19,100	455,600	Process liquid waste generated by decontamination	i
				—	Decommissioning Staff (through Activity 31)	
				—	Decommissioning Staff (after Activity 31)	
				268,700	Health Physics Supplies	
				17,100	Decontamination supplies	
				1,095,800	Heavy Equipment	
				6,000	Equipment for pipe cutting	
				—	Security Force	
				—	Nuclear & Property Insurance	
				—	Engineering Consultants	
				—	Project Administration (QA)	
				1,843,200	SUB-TOTAL UNDISTRIBUTED COSTS:	
508,400	5,034,500	2,231,300	2,262,900	11,850,700	TOTAL ESTIMATED DECOMMISSIONING COSTS: REMOVAL/DISMANTLING	
				14,813,000	TOTAL DECOMMISSIONING COSTS: REMOVAL DISMANTLING (including 25% contingency)	

TABLE 3.5a
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
					Pre-decommissioning Period	
				--	1. Remove fuel and incore source material	a
				--	2. Clean plant areas and process all liquid and solid wastes	a
				55,100	3. Review plant drawings	
				22,800	4. Perform detail radiation survey	
				8,400	5. Estimate residual by-product inventory	
				22,500	6. Prepare and submit possession-only license application with revised technical specifications	
				5,400	7. Prepare end-product description	
				31,800	8. Perform detailed calculations of by-product inventory	
				5,400	9. Define major sequence of work activities	
				16,200	10. Perform safety analysis of the entombment operations	
				118,800	11. Prepare a safety analysis of the end-product including seismic analysis	
				9,000	12. Prepare and submit Safe Storage Entombment Plan to NRC for approval.	

TABLE 3.5a
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (First unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				1,800	13. Receive possession only license; deactivate reactor; implement revised technical specifications. NRC review of Safe Storage Entombment Plan and issue of Safe Storage Entombment Order.	
				297,200	SUBTOTAL PRE-DECOMMISSIONING WORK ACTIVITIES, SAFE STORAGE ENTOMBMENT.	
					UNDISTRIBUTED COSTS, ENTOMBMENT	
				25,800	Project Management	
				25,800	Engineering Quality Assurance	
				3,814,700	Utility Staff	b
				121,500	Decommissioning Staff Start-Up	c
				3,987,800	SUB-TOTAL UNDISTRIBUTED COSTS	
				4,285,000	TOTAL PRE-DECOMMISSIONING PERIOD COST, SAFE STORAGE ENTOMBMENT.	
					Decommissioning Period	
				138,900	14. Prepare activity specifications for entombment	
				16,200	15. Prepare integrated safe storage entombment sequence.	
				119,500	16. Prepare detailed work procedures for safe storage entombment operations.	
				9,000	17. Procure equipment for vacuum drying of reactor vessel	

TABLE 3.5a
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				5,800	18. Procure cask & container linings obtain shipping cask container permits.	
				--	19. Drain, de-energize and secure non-contaminated systems	a
				--	20. Drain reactor vessel	a
				607,600	21. Drain, decontaminate, de-energize and secure or remove contaminated systems.	
				6,400	22. Prepare lighting, fire protection, ventilation and alarm systems for post decommissioning use.	
				29,200	23. Construct entombment structure	
				6,400	24. Install reactor containment pressure equalization line.	
				21,800	25. Decontaminate floors and walls	
				6,100	26. Perform radiation survey	
				--	27. Secure buildin, access	a
				9,000	28. Prepare and submit final report to NRC	

TABLE 3.5a
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				975,900	SUB-TOTAL DECOMMISSIONING WORK ACTIVITIES SAFE STORAGE ENTOMBMENT	
					UNDISTRIBUTED COSTS, SAFE STORAGE ENTOMBMENT	
				455,600	Process liquid wastes generated by decontamination	
				4,276,800	Decommissioning staff	
				55,200	Health physics supplies	
				72,200	Decontamination rig and Other decontamination equipment	
				42,300	Equipment for pipe cutting & hoists	
				228,600	Security Force	
				347,300	Engineering consultants	
				209,600	Project Quality Assurance	
				209,600	Project Administration	
				52,000	Nuclear Insurance & Property Insurance	
				5,949,200	SUB-TOTAL UNDISTRIBUTED COSTS, SAFE STORAGE ENTOMBMENT	
				11,210,100	TOTAL ESTIMATED DECOMMISSIONING COSTS, SAFE STORAGE ENTOMBMENT	
				14,013,000	TOTAL DECOMMISSIONING COSTS, SAFE STORAGE ENTOMBMENT (Including 25% contingency)	

TABLE 3.5a
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (first unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
					POST DECOMMISSIONING DORMANCY COST (ANNUAL)	
				17,100	29. Perform quarterly inspections defined in Regulatory Guide 1.86.	
				12,700	30. Perform semi-annual environmental survey	
				18,300	31. Prepare reports defined in Regulatory Guide 1.86	
				48,100	SUB-TOTAL POST-DECOMMISSIONING WORK ACTIVITIES DORMANCY	
					UNDISTRIBUTED COSTS (per year), DORMANCY	
				1,000	Health Physics	
				1,000	Nuclear Insurance	
				25,400	Maintenance Allowance	
				27,400	SUB-TOTAL UNDISTRIBUTED COSTS, DORMANCY	
				75,500	TOTAL ESTIMATED ANNUAL COST FOR DORMANCY PERIOD	
				94,400	TOTAL ANNUAL COST FOR DORMANCY (including 25% contingency)	

TABLE 3.5 b
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
					Pre-decommissioning Period	
				--	1. Remove fuel and incore source material.	
				--	2. Clean plant areas and process all liquid and solid wastes.	
				—	3. Review plant drawings	
				22,800	4. Perform detail radiation survey.	
				8,400	5. Estimate residual by-product inventory.	
				—	6. Prepare and submit possession-only license application with revised technical specifications.	
				—	7. Prepare end-product description.	
				31,800	8. Perform detailed calculations of by-product inventory.	
				—	9. Define major sequence of work activities.	
				—	10. Perform safety analysis of the entombment operations.	
				—	11. Prepare a safety analysis of the end-product including seismic analysis.	
				—	12. Prepare and submit Safe Storage Entombment Plan to NRC for approval.	

TABLE 3.5 b
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				1,800	13. Receive possession-only license; de-activate reactor; implement revised technical specifi-cations. NRC review of Safe Storage En-tombment Plan and issue of Safe Storage Entombment Order.	
				64,800	SUB-TOTAL PRE-DECOMMIS-SIONING WORK ACTIVITIES, SAFE STORAGE ENTOMBMENT.	
					UNDISTRIBUTED COSTS, ENTOMBMENT	
				—	Project Management	
				—	Engineering Quality Assurance	
				—	Utility Staff	
				—	Decommissioning Staff Start-up	
				—	SUB-TOTAL UNDISTRIBUTED COSTS	
				64,800	TOTAL PRE-DECOMMISSIONING PERIOD COST, SAFE STORAGE ENTOMBMENT	
					Decommissioning Period	
				—	14. Prepare activity specifications for entombment	
				—	15. Prepare integrated safe storage en-tombment sequence	
				—	16. Prepare detailed work procedures for safe storage entomb-ment operations	
				—	17. Procure equipment for vacuum drying of reactor vessel	

TABLE 3.5 b
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				—	18. Procure case & container linings obtain shipping cask containe. permits.	
				--	19. Drain, de-energize and secure non-contaminated systems.	
				--	20. Drain reactor vessel.	
				607,600	21. Drain, decontaminate, de-energize and secure or remove contaminated systems.	
				6,400	22. Prepare lighting, fire protection, ventilation and alarm systems for post decommissioning use.	
				29,200	23. Construct entombment structure.	
				6,400	24. Install reactor containment pressure equalization line.	
				21,800	25. Decontaminate floors and walls.	
				6,100	26. Perform radiation survey.	
				--	27. Secure building access.	
				9,000	28. Prepare and submit final report to NRC.	

TABLE 3.5 b
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
				686,500	SUB-TOTAL DECOMMISSIONING WORK ACTIVITIES, SAFE STORAGE ENTOMBMENT	
					UNDISTRIBUTED COSTS, SAFE STORAGE ENTOMBMENT	
				455,600	Process liquid wastes generated by decontamination.	
				—	Decommissioning staff	
				55,200	Health physics supplies	
				17,100	Decontamination Equipment	
				42,300	Equipment for pipe cutting & hoists	
				—	Security Force	
				—	Engineering consultants	
				—	Project Quality Assurance	
				—	Project Administration	
				—	Nuclear Insurance & Property Insurance	
				570,200	SUB-TOTAL UNDISTRIBUTED COSTS, SAFE STORAGE ENTOMBMENT	
				1,321,500	TOTAL ESTIMATED DECOMMISSIONING COSTS, SAFE STORAGE ENTOMBMENT	
				1,652,000	Total Decommissioning Costs, Safe Storage Entombment (including 25% contingency)	

TABLE 3.5 b
COST SUMMARY FOR SAFE STORAGE ENTOMBMENT
OF PRAIRIE ISLAND (second unit)

DECON-TAMINATION	REMOVAL	SHIPPING	BURIAL	TOTAL	MAJOR ACTIVITY	NOTES
					Post Decommissioning Dormancy Cost (Annual)	
				—	29. Perform quarterly inspections defined in Regulatory Guide 1.86.	
				—	30. Perform semi-annual environmental survey.	
				—	31. Prepare reports defined in Regulatory Guide 1.86.	
				—	SUB-TOTAL POST-DECOMMISSIONING WORK ACTIVITIES DORMANCY	
					UNDISTRIBUTED COSTS (per year), DORMANCY	
				1,000	Health Physics	
				1,000	Nuclear Insurance	
				25,400	Maintenance Allowance	
				27,400	SUB-TOTAL UNDISTRIBUTED COSTS, DORMANCY	
				27,400	TOTAL ESTIMATED ANNUAL COST FOR DORMANCY PERIOD	
				34,200	Total Annual Cost For Dormancy Period (including 25% contingency)	

TABLE 3.6
DECOMMISSIONING COST ESTIMATE NOTES

a. This activity would be performed by the utility staff. The cost is included in the undistributed cost category.

b. During pre-decommissioning, the utility staff consists of the plant operations staff and utility craft labor (such as mechanics, health physics technicians, maintenance personnel) to be used during decommissioning.

c. Decommissioning staff startup consists of the administrative staff contracted to perform the decommissioning. This would include a project superintendent, administrative personnel, health physics technicians, clerks, and craft labor.

d. Decommissioning staff (after Activity 31) for dismantling represents a reduced dismantling workforce because of the reduced work activity.

e. Nonessential systems are:

Main Steam and Turbine Bypass
Chemical and Volume Control
Emergency Core Cooling
Containment Vessel Internal Spray
Containment Spray Additive
Auxiliary Feedwater
Cooling Water
Sampling System
Emergency Diesel Generator
Condensate and Feedwater Chemical Injection
Steam Generator Blowdown
Turbine Generator
Main Condenser and Air Removal
Circulating Water
Condensate and Feedwater
Phosphate Injection System
Fuel Pool Cooling
Fuel Handling (including new and spent fuel racks)
DC Power
Extraction Steam (Gland Seal, Bleed Steam)

TABLE 3.6 (Cont'd)

f. Essential Systems are:

- Reactor Coolant
- Residual Heat Removal
- Condensate Storage Facilities
- Electric Power
- Instrumentation and Control
- Compressed Air
- Station Service Water
- Demineralized Water Make-up (Reactor Make-up Control System)
- Domestic Water
- Heating, Ventilation, and Air Conditioning
- Fire Protection
- Gaseous Radwaste
- Liquid Radwaste
- Solid Radwaste
- Containment Air Cooling
- Component Cooling
- Auxiliary Steam
- Hot Water and Glycol Heating

g. Discharge Structures include the Discharge Basin, Distribution Basin, Discharge Structure, and Cooling Tower Pump House.

TABLE 3.6 (Cont'd)

h. Misc. Structures include the following:

Nine Transmission towers
Holding Basin (Pipe Cleaning)
Transformer Oil Sumps (2)
Guard Houses (2)
Warehouses (4)
Construction Building
Neutralizing House
Hydrogen House
Transformer Separating Walls and Pits
Equipment House
Crew Quarters
Circulating Water Conduits

i. The total includes processing (i.e., oil fueled evaporation of liquid wastes and solidification in cement) which is not considered a decontamination or removal cost, and is therefore, not tallied in any of the other table columns. Therefore, the total activity cost is greater than the sum of the shipping and burial costs shown.

4. SCHEDULE ESTIMATES

The schedule for each major activity in the prompt removal/dismantling program is shown on Table 4.1a. Table 4.1.b lists the estimated schedule for delayed dismantling after 100 years of dormancy. The duration of entombment activities is shown in Table 4.2.

It is assumed that both Prairie Island units are decommissioned simultaneously. Therefore, the schedule for second unit decommissioning would be approximately the same as those shown on Tables 4.1.a, 4.1.b, and 4.2. Dismantling of the second unit would be slightly behind the schedule of the first unit to permit sharing of major pieces of equipment such as the arc saw and large cranes.

TABLE 4.1(a)
SCHEDULE OF PRAIRIE ISLAND (ONE UNIT)
PROMPT REMOVAL/DISMANTLING ACTIVITIES

Activity		Activity Schedule, Months*
1.	Remove fuel and in-core source material	0 - 6½
2.	Decontaminate plant areas and process all liquid and solid wastes	0 - 6½
3.	Review plant drawings	0 - 1
4.	Perform detailed radiation survey	1 - 3
5.	Estimate residual by-product inventory	1½ - 2½
6.	Prepare and submit possession-only license application with revised technical specifications	1½ - 4
7.	Prepare end-product description	2½ - 3
8.	Perform detailed calculations of by-product inventory activities	2½ - 5
9.	Define major sequence of work activities	3 - 5
10.	Perform safety analysis of the dismantling operations	4½ - 6½
11.	Prepare and submit Dismantling Plan to NRC for approval	6 - 9
12.	Receive possession-only license; deactivate reactor; implement revised technical specifications	6½ - 7½
13.	NRC review of Dismantling Plan and Issue of Dismantling Order	9 - 12
14.	Prepare activity specifications for dismantling	2 - 14
15.	Prepare integrated dismantling sequence	12 - 14

* Time since reactor shutdown (months).

TABLE 4.1 a - CONT.

Activity		Activity Schedule, Months*
16.	Perform plant preparation and construct temporary facilities	0 - 12
17.	Design water clean-up system	11 - 12
18.	Design and procure remote cutting equipment for vessel and internals removal	6 - 13
19.	Procure contamination control envelope and special equipment	10 - 13
20.	Obtain contracts for casks, liners, and shipping containers	11½ - 13
21.	Prepare detailed work procedures for dismantling activities	7 - 15
22.	Install water clean-up system	12 - 13
23.	Drain, decontaminate, remove and dispose of non-essential systems.	8 - 19
24.	Decontaminate vessel head	11½ - 12
25.	Remove CRD housings, instrumentmentation tubes and CRD cooling assemblies.	12 - 14
26.	Cut, load, ship and bury the reactor vessel head	14 - 15
27.	Cut, ship and bury vessel internals	15 - 33
28.	Cut, ship and bury reactor vessel	33 - 44½
29.	Drain, decontaminate, remove and dispose of essential systems	36.5 - 57½
30.	Remove steam generator shield wall	44½ - 47
31.	Remove reactor vessel shield wall and ship for burial.	57½ - 65½
32.	Remove containment building internal walls and floors.	44½ - 54

* Time since reactor shutdown (months).

TABLE 4.1a - CONT.

Activity		Activity Schedule, Months*
33.	Decontaminate steam generator tubes.	52½ - 57½
34.	Seal weld all openings of steam generators and pressurizer	57½ - 59
35.	Perform radiation survey	62½ - 63
36.	Open top of reactor building	63 - 64
37.	Segment and remove steam generators and pressurizer	59 - 65
38.	Remove polar crane	65 - 65½
39.	Remove remaining structures	47- 70
40.	Backfill foundations	70½- 72½
41.	Grade and landscape	71- 73
42.	Perform final radiation survey	70 - 70½
43.	Prepare and submit final report to NRC	68- 73
44.	Terminate possession-only license and return site to unrestricted use.	

TABLE 4.1.b
SCHEDULE of PRAIRIE ISLAND (ONE UNIT)
DELAYED REMOVAL/DISMANTLING
ACTIVITIES

Activities	Activity Schedule, Months **
1. thru 13. (activities are same as those identified for prompt dismantling)	0
14. thru project completion (activities are same as those identified for prompt dismantling)	0-24

* Time since reactor shutdown (months).

** Time since completion of 100 years of dormancy (months).

TABLE 4.2

SCHEDULE OF PRAIRIE ISLAND (ONE UNIT)

SAFE STORAGE ENTOMBMENT ACTIVITIES

Activities		Activity Schedule, Months*
1.	Remove fuel and in-core source material	0 - 6½
2.	Clean plant areas and process all liquid and solid wastes	0 - 6½
3.	Review plant drawings	0 - 1
4.	Perform detail radiation survey	1 - 3
5.	Estimate residual by-product inventory	1½ - 2½
6.	Prepare and submit possession-only license application with revised technical specifications	1½ - 4
7.	Prepare end-product description	2½ - 4
8.	Perform detailed calculations of by-product inventory	2½ - 5
9.	Define major sequence of work activities	3½ - 5
10.	Perform safety analysis of the entombment operations	4½ - 6½
11.	Prepare a safety analysis of end product	3½ - 6
12.	Prepare and submit Entombment Plan to NRC for approval	6 - 9
13.	Receive possession-only license; deactivate reactor; implement revised technical specifications.	6½ - 12
14.	Prepare activity specifications for entombment	1½ - 14
15.	Prepare integrated entombment sequence	11½ - 14
16.	Prepare detailed work procedures for entombment operations	8 - 12

* Time since reactor shutdown (months).

TABLE 4.2 -, CONT.

Activity		Activity Schedule, Months*
17.	Procure equipment for vacuum drying of reactor vessel	6 - 12
18.	Procure cask and container linings; obtain shipping cask/container permits	11½ - 13
19.	Drain, de-energize and secure non-contaminated systems	9 - 13
20.	Dry reactor vessel	13 - 14
21.	Drain, decontaminate, de-energize and secure or remove the contaminated systems	12 - 29
22.	Prepare lighting, fire-protection and alarm systems for post decommissioning	29- 30½
23.	Construct entombment structure	16 - 17
24.	Install reactor containment pressure equalization line	29½- 30
25.	Decontaminate floors and walls	27- 29
26.	Perform radiation survey	30- 31
27.	Secure building access	30- 31
28.	Prepare and submit final report to NRC	31- 34
	DORMANCY	
1.	Provide maintenance and surveillance of the site	Unspecified

* Time since reactor shutdown (months).

5. REFERENCES

1. W.J. Manion and T.S. LaGuardia, "An Engineering Evaluation of Nuclear Power Reactor Decommissioning Alternatives," AIF/NESP-009, November 1976.

2. "Producer Prices and Price Indexes," April 1979, U.S. Department of Labor, Bureau of Labor Statistics.

3. "Employment and Earnings," April 1979, U.S. Department of Labor, Bureau of Labor Statistics.

4. "Building Construction Cost Data 1979," Robert Snow Means Company, Inc., Duxbury, Massachusetts.

5. "Building Construction Cost Data 1975," Robert Snow Means Company, Inc., Duxbury, Massachusetts.

6. "1978 Dodge Guide," McGraw-Hill Information Systems Company, New York, New York.

7. "Iron Age Magazine," August 20, 1979 issue.

8. NECO burial cost information for the Hanford burial site.

9. Tri-State Motor Transit Co., Joplin, Missouri.

10. NES D.O.E. Decommissioning Handbook (currently in preparation).

11. U.S. Nuclear Regulatory Commission Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors".

12. Department of Transportation, Section 49 of Code of Federal Regulations, entitled "Transportation," Parts 173 and 189.

13. Smith, R.I., NUREG/CP-0008, "Boiling Water Reactors".

NUCLEAR ENERGY SERVICES, INC.

DOCUMENT NO. 81A0623

REVISION LOG

REV. NO.	DATE	PAGE NO.	DESCRIPTION	APPROVAL
1	2/18/80	All	CRA No. 1199 - Major revision; renumbered all pages	R. Hyberger

TERA

MEMORANDUM

TO: Distribution

DATE: June 16,1980

FROM: B. Murray

COPIES TO: J. Long
M. Seville
See Distribution
040 B/W
R

SUBJ: Minutes of Team Leaders' Meeting

The following summarizes decisions made at our meeting today:

FILE LEVELS

Docket 50-129 became category W on 790927
Docket 50-147 became category W on 740716
Topical reports about specific plants do not get TOPRP file levels.

DUPLICATES

Everyone who checks dupes must be reminded to check existing data records for new information added to a document the second time around, especially docket dates, task numbers and file levels. The new information must be added to the old data records.

DATA DICTIONARY CHANGES

TPCONT (contracts) should be changed to reflect the external affiliation (contractor) as the primary affiliation, and the NRC officer as the secondary affiliation, in order to permit a DCN search using the contractor's code.

Add new DTC for Congressional Record Highlights (TZHIGH) from the Ofc of Congressional Affairs (author). Title should read "Congr. Record highlights for date." Availability info expected shortly. Sample attached.

Change description for TTTRAN: depositions and narrative testimonies get author names.

STYLE/TITLES

Please use the following:

man rems	pH
manhours	/h (per hour)

QC REMINDERS

Be sure Docket 50 category is written on document, and any time the category is changed on the list, be SURE to change it on the PDR copy of the document (in DDC).

- Always check the accession number on the document. If it is wrong, please check the PDR copy of the document also.

Front-end QC person should always initial corrected coding form.

DTC for the monthly journal (NUREG-0540) is TZINDX.

FORMAL REPORT NUMBERS

Please read attached memo carefully.

DISTRIBUTION

S. Alfaro
L. Reeder
O. Nevins
P. Maida
D. Warner
B. Zwilsky
E. Dull (Dictionary)

HIGHLIGHTS

TZHIGH

CONGRESSIONAL RECORD - Wednesday, June 4, 1980

House:

President transmitted a proposed Agreement between the U.S. and Morocco on the Peaceful Uses of Nuclear Energy. Referred to Foreign Affairs.

Page H 4470

Mr. Udall (D-AZ) submitted the conference report on S. 562, NRC FY '80 Authorizations; H. Rpt. 96-1070.

Page H 4472-4482

Senate:

President transmitted a proposed Agreement between the U.S. and Morocco on the Peaceful Uses of Nuclear Energy. Referred to Foreign Relations.

Page S 6262-6263

Senate Budget reported S. Res. 440, budget waiver for S. 2443, West Valley Waste Demonstration Project.

Page S 6264

Extension of Remarks:

Mr. Myers (R-IN) talks about NRC reorganization and inserts testimony of Commissioner Kennedy.

Page E 2720

Mr. McCormack (D-WA) inserts article entitled "Why Britain is Going Nuclear".

Page E 2721

House Interior Subcommittee on Energy and the Environment began markup of H.R. 6390, Atomic Energy Act Amendments.

Page D 820

TO: Encoders/QC

DATE: 6/16/80

FROM: B. Murray
T. Sawallis

COPIES: M. Seville
J. Long
155 B/W
040 B/W
R

RE: Formal Report Document Control Numbers (DCNs)

In an attempt to diminish our problem with duplicate formal reports (especially NUREGs) getting into the system, we will standardize all DCN entries according to the attached table of priorities and options.

The procedure is simple: enter the NUREG (or other number) in the DIN, and read down the list of priorities to find the placement of modifiers like volumes, revisions, drafts, etc. If the modifier is supposed to be placed in a field which already has an entry, move to the next option for the next possible placement.

For example, NUREG-0123, Volume 2, Number 3, Revision 1: enter the NUREG number in the DIN. Check the table and find the volume number must be placed in the DPN, and the number must be placed in the DRN. The revision number is last on the priority list, and is supposed to be entered in the DRN field, which is already filled. Move to Option 2 to find the next correct placement for the revision number, which is is the DIN using the format R1.

We are willing to bet this table is not foolproof, so any problem reports which do not conform to the table should be given to Tom Sawallis for a decision.

Formal Report DCNs

PRIORITY	OPTION 1	OPTION 2	OPTION 3	OPTION 4
Volume	DPN (Ø4)			
Number	DRN (Ø4)			
Draft	DIN+DPN (DRFT 4)	DPN+DRN (DRF 4)	DRN (DR or D4)	DIN (DR or D4)
Revision	DRN (Ø4)	DIN (R4)		
Addendum/ Appendix	DIN (+DPN) (APP B)	DPN+DRN (APP B)	DRN (B)	DIN (AP or AB)
Supplement	DIN (S4)	DPN (S4)	DRN (S4)	DIN (S4)
Summary	DIN (SUMM)	DPN (ES)		

The only entries ever made in the FRN field are V1, N2, R3, S4, APP A, ADD 5.