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December 17, 1990
Fort St. Vrain
Unit No. 1
P-90343

A. Clegg Crawford
Vice President
Nuclear Operations

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

ATTN: Mr. Seymour H. Weiss, Director
Non-Power Reactor Decommissioning and
Environmental Project Directorate

Docket No. 50-267

SUBJECT: FORT ST. VRAIN DECOMMISSIONING FINANCIAL ASSURANCE

**REFERENCE: PSC letter, Crawford to Weiss, dated November 5, 1990
(P-90318)**

Dear Mr. Weiss:

PSC submitted the Proposed Decommissioning Plan for Fort St. Vrain Nuclear Generating Station in the letter referenced above. In preliminary evaluation of this submittal, the NRC has expressed concern over the level of detail provided for site specific decommissioning costs and for the lack of a funding plan to accumulate funds for those identified decommissioning costs. Therefore, the purpose of this letter is to further address these NRC concerns regarding the cost of decommissioning, as understood by PSC, and to provide further clarification of PSC's position as presented in Section 5 of the Proposed Decommissioning Plan.

As identified in the referenced letter and Section 5 of the plan, PSC fully recognizes its responsibility to provide additional cost information (proprietary Tables 5-1, 5-2 and 5-3) and the decommissioning funding plan. PSC plans to provide the proprietary tables by the end of 1990 and will provide a copy of the PSC/Westinghouse contract and the decommissioning funding plan by or before mid-1991. As noted in the referenced letter, PSC reaffirms its commitment to provide a copy of the final contract to perform decommissioning activities that is now being negotiated between PSC and Westinghouse.

Attachments to this letter, which are summarized below, provide further PSC evaluations related to the acceptability of a firm fixed price contract in lieu of detailed decommissioning cost estimates. PSC remains convinced that use of a competitive bid process involving four major decommissioning contractors, and a subsequent firm fixed price contract represents accuracy, commitment and provides a level of financial assurance significantly beyond that presented by a single detailed cost estimate.

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Attachment 1, Decommissioning Financial Assurance for Fort St. Vrain, provides supplemental justification related to the acceptability of PSC's use of its decommissioning cost estimate based on the competitive bid process and award of a firm fixed price contract.

Attachment 2, PSC Competitive Bid Process and Award of Fixed Price Contract, provides a detailed summary of the process used by PSC to fully define the scope of the decommissioning effort and to select its decommissioning contractor.

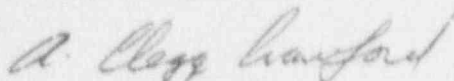
Attachment 3, Comparison of PSC Decommissioning Cost Breakdown with Regulatory Requirements and Guidelines, contains a detailed comparison of the contents of the Fort St. Vrain Proposed Decommissioning Plan with existing regulatory requirements and guidance.

Attachment 4, Proposed Work Breakdown Structure for the Fort St. Vrain Decommissioning Project, provides the proposed Level IV project breakdown. PSC and the Westinghouse team propose to provide a cost for each of the items listed in this proposed outline.

PSC is extremely proud of the innovative, thorough process that it has undertaken to identify the workscope and cost for decommissioning and to select the decommissioning contractor. PSC firmly believes that this process is the most thorough used in the industry and that this approach will lead the nuclear industry in the use and selection of firm fixed price contracts for decommissioning. PSC would welcome the opportunity to make a presentation to the NRC on PSC's competitive bid process, in order to demonstrate that the entire scope of decommissioning activities has been identified, as well as share more specific information on the evaluation of the qualified decommissioning proposals.

If you have any further questions related to the Proposed Decommissioning Plan or would like to arrange a presentation on PSC's competitive bid process, please contact Mr. M. H. Holmes at (303) 480-6960.

Very truly yours,



A. Clegg Crawford
Vice President
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ACC:CRB/cb

Attachments

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cc: Regional Administrator, Region IV
ATTN: Mr. G.L. Constable, Chief
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Mr. J.B. Baird
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ATTACHMENT 1 TO P-90343

DECOMMISSIONING FINANCIAL ASSURANCE FOR FORT ST. VRAIN

I. INTRODUCTION

Decommissioning costs and the proposed schedule for submittal of the decommissioning funding plan to support the DECON alternative for Fort St. Vrain were provided in the Proposed Decommissioning Plan, forwarded to the NRC in Reference 1. In Section 5 of the Proposed Decommissioning Plan, Public Service Company of Colorado (PSC) provided justification that use of a competitive bid process and subsequent award of a firm fixed price contract will provide the requisite level of cost and funding assurance desired by 10 CFR 50.82(b)(4) and NRC Regulatory Guide 1.159 "Assuring the Availability of Funds for Decommissioning Nuclear Reactors" (Ref. 2). However, following preliminary evaluation of the Reference 1 cost and funding plan information, the NRC has expressed reservations over the level of detail provided to support the decommissioning cost. Therefore, supplemental information in this attachment is provided to further amplify PSC's position that the competitive bid process being used by PSC and a firm fixed price contract represent a significantly higher level of assurance in determining the cost of decommissioning than that provided by a single cost estimate.

It is PSC's opinion that over-reliance is placed on "detailed" cost estimates in which the site specific work scope has not been adequately identified, and that inadequate consideration has been given to other methods that will provide equivalent or greater assurances of identifying decommissioning costs. The NRC is requested to evaluate PSC's approach to determine if this approach satisfies the ultimate intent of the rule, i.e., to adequately define the cost to decommission Fort St. Vrain.

The NRC requirement for detailed cost estimates is intended to provide assurance that realistic costs have been identified for all anticipated activities proposed to be conducted under the purview of the decommissioning dismantlement plan. However, PSC is convinced that the information provided in PSC's current cost breakdown (Ref. 1), together with the detailed description of associated activities, provide a significant level of assurance of the adequacy of the cost to decommission Fort St. Vrain. In that the proposed cost for the decommissioning is based on a firm fixed price, and the price has been independently verified by a competitive bid process, the focus of the NRC review, in PSC's opinion, should be on the adequacy of the proposed dismantlement plan to fully define the scope of work to be performed during decommissioning.

II. UNCERTAINTIES IN DETAILED DECOMMISSIONING COST ESTIMATES

During decommissioning planning efforts, some uncertainty existed on the part of PSC concerning the feasibility of dismantling and decontaminating the PCRV. Therefore, PSC commissioned an outside third-party consultant (Bechtel) to determine the technical feasibility of dismantling and decontaminating the PCRV using existing technology, or whether PSC should wait until more advanced techniques were available in the future. This evaluation was particularly important since PSC did not have the benefit of generic evaluations of decommissioning techniques and costs, as commissioned by the NRC for PWRs and BWRs in NUREG/CR-0130 and NUREG/CR-0672.

The results of this independent evaluation were provided to the NRC in Reference 3. The independent study clearly indicated that the technology now exists to dismantle the PCRV, and dismantlement can be performed at a reasonable cost. This study, which included the technical approach and cost estimate, was evaluated by PSC, who determined that the study fully evaluated the scope of work for PCRV dismantlement. This study then served as a partial basis for the Request for Proposal that was sent to major bidders for competitive bid.

Bechtel was one of the four major bidders evaluated by PSC to be the potential decommissioning contractor for Fort St. Vrain. However, when evaluating a comparable scope of work (PCRV dismantlement only, which is the significant portion of the decommissioning cost), Bechtel's fixed price contract proposal was nearly double their original cost study.

The implications of this major difference between the fully detailed cost study and the actual firm fixed price proposal for a major contractor are significant. The cost estimate for the original study was performed at a level of detail consistent with previous NUREGs and previously accepted decommissioning cost estimates. There were no significant changes in project scope (for PCRV dismantlement) contained in the RFP beyond those identified in the original cost study. However, this inconsistency represented a major contractor unwilling to use their own cost study in a fixed price arena without allowance for substantial margin for uncertainty, risk and profit.

This difference leads PSC to question the reliance on a detailed cost estimate as the singular basis for assuring that the actual cost of decommissioning has been accurately identified. PSC believes that the competitive bid process provides assurances beyond reliance on a single detailed cost estimate. In PSC's experience, each of the four qualified bidders performed detailed internal cost evaluations. The four qualified bidders were willing to assume some of the risk inherent in their cost estimates by submitting firm fixed price proposals.

Based on the competitive bid process, the previous Bechtel study, and PSC's own engineering analysis, PSC is confident that the scope of work has been fully identified and was included in the firm fixed price proposals. Secondly, based on these proposals, PSC is equally confident that the cost of decommissioning has been accurately identified. Thirdly, based on an award of the firm fixed price contract together with PSC-established contingencies, PSC is confident that an upper limit has been placed on the maximum cost of decommissioning to PSC. This is critical to PSC shareholders and any future negotiations with the Colorado Public Utilities Commission (CPUC). Lastly, based on PSC's own experience with a "fully-detailed cost estimate" and its relationship with the actual contract proposal, PSC is convinced that the "real" cost of decommissioning has been identified, which is the ultimate intent of the Decommissioning Rule and Reg. Guide 1.159.

III. INHERENT PROBLEMS IN "CANNED" COST ESTIMATES

Over-reliance on detailed cost estimates can also lead to other potential problems. Plants that select the SAFSTOR decommissioning alternative are allowed by 10 CFR 50.82(d) to submit proposed decommissioning plans that do not fully identify detailed dismantlement plans. However, these same plants are also required to submit detailed cost estimates to "identify" the full cost of decommissioning.

This approach may result in submittal of a detailed cost estimate based on a "canned" cost estimating methodology, that will generate an acceptably detailed cost estimate. This cost estimate implicitly generates a "de facto" dismantlement plan, although the licensee will not prepare their actual dismantlement plan until many years in the future. When the licensee's dismantlement plan is eventually prepared and submitted, the identified work scope may be substantially different from the "de facto" dismantlement plan on which the cost estimate was based. However, the NRC would have received a "fully detailed" cost estimate with the proposed decommissioning plan on which to base the NRC conclusion that the cost of decommissioning has been accurately estimated.

Therefore, a detailed cost estimate does not necessarily provide the necessary assurance sought by the NRC to ensure that the cost of decommissioning is accurately identified. If the licensee has not submitted a detailed dismantlement plan on which the cost estimate is based, no such assurance is available. In PSC's case, a detailed dismantlement plan was submitted in Reference 1 that fully identifies the technology and costs of dismantlement and decommissioning, and PSC has selected a contractor willing to legally obligate itself to a contract and assume responsibility for satisfactory completion of the decommissioning project, as well as assume responsibility for certain project cost overruns. To PSC, this process assures that the intent of the Decommissioning Rule and Reg. Guide 1.159 are satisfied.

IV. CPUC PREFERENCE FOR FIRM FIXED PRICE CONTRACTS

In preliminary meetings to inform the Colorado Public Utilities Commission (CPUC) of its intentions, PSC approached each of the CPUC commissioners and identified options currently being evaluated for the repowering of Fort St. Vrain. Repowering is necessary to provide the funding to perform immediate dismantlement and decommissioning of Fort St. Vrain. These options were identified in Reference 1. Since Fort St. Vrain has been removed from the rate base, PSC must obtain CPUC agreement with the selected option prior to proceeding with repowering Fort St. Vrain. These repowering efforts will allow restart of the plant as a fossil powered unit and, in turn, will generate the necessary revenues (either directly from the rate base or indirectly from a power purchase agreement) to fund the decommissioning of the radioactive portions of Fort St. Vrain. Therefore, PSC has a significant financial interest, in addition to its regulatory interest, in accurately representing the cost of decommissioning.

PSC also presented each CPUC commissioner with proposed plans for decommissioning Fort St. Vrain under the DECON decommissioning alternative, and identified the proposed terms of the contract between PSC and the Westinghouse team to decommission the plant. Based on these conversations, PSC believes the CPUC commissioners would have a preference that options to repower and to decommission Fort St. Vrain should be based on fixed price contracts. The CPUC commissioners do not desire further financial exposure of ratepayers as a result of Fort St. Vrain.

As noted in the Reference 1, without decommissioning funding from revenues generated from a repowered Fort St. Vrain, PSC will be unable to finance the DECON alternative and it will be necessary to select the SAFSTOR decommissioning alternative for Fort St. Vrain.

V. USE OF PREFERRED INDUSTRY AND GOVERNMENT CONTRACTING PRACTICE

It is also important to note that the PSC approach to awarding the decommissioning contract is no different than the approach typically used by both private industry and Federal government contract administrators. The agency or firm desiring a contract for a product or service identifies its need and prepares a work scope specification and an internal cost estimate on which to evaluate the validity and reasonableness of contract proposals. The agency or firm then advertises its RFP and specifies its contractual arrangements, such as the following common contract types: firm fixed price, time and material (T&M), or cost plus fixed fee (CPFF).

Of these contract types, there is a distinct buyer preference for a firm fixed price contract over either T&M or CPFF contracts. Major government agencies (e.g., DOD and DOE) are under strong congressional pressure to restructure major contracts to be firm fixed price contracts, in order to limit future government contract

liabilities and prevent contract overruns. With a firm fixed price contract, responsibility for satisfactory completion of the contract is shared between the contractor and the contracting agency: the contracting agency is responsible for ensuring that the scope of work is accurately and completely defined, and the contractor is responsible for ensuring that all costs have been properly estimated and are included in the proposal.

Once the internal cost estimate has been completed and proposals have been received from qualified bidders, the proposal prices are compared with the internal cost estimate. Proposals that are either too high or too low may be determined to be unresponsive to the contract, and disqualified at that point. Typically the remaining bidders ("short" list) may be asked to present their proposals to the contracting authority, and may be offered an opportunity to refine and resubmit their proposed price. The government contracting authority will then award the contract to the successful low bidder. In private industry, there is no requirement to award the contract to the lowest bidder, and in fact PSC did not award the contract to the lowest bidder.

Since the contractor assumes more risk in a firm fixed price contract, an appropriate risk premium is usually included in the contractor's proposed price. Therefore, assuming the project scope has been properly evaluated and included in the awarded contract, the contracting authority has greater confidence that the product or service will be performed for the proposed price under a firm fixed price contract than for other contract types. This fact became readily apparent during PSC negotiations with bidders who submitted proposals for decommissioning of Fort St. Vrain. As part of the Request for Proposal, PSC requested that each proposal be based on a firm fixed price contract. However, due to the bidder's reluctance to commit to a firm fixed price, only one of the four qualified proposals was originally submitted on a firm fixed price basis. Subsequently, PSC restated its request and received a firm fixed price quote from each of the three remaining qualified bidders. It is significant to note that when required to submit their firm fixed price bids, the bid price for two of the three bidders increased an average of 37% to compensate them for the added risk and increased responsibility to properly complete the project.

In the specific case of Fort St. Vrain, the Westinghouse team was selected over other qualified bidders, despite submitting a proposal with a proposal price in excess of other competitors. The Westinghouse team was selected since their method of dismantlement was least sensitive to errors in the activation analysis and radiation levels, and the Westinghouse team was the most willing to share the risks involved with decommissioning and repowering of Fort St. Vrain.

VI. DISCLOSURE OF DETAILED CONTRACTOR PRICING INFORMATION

PSC is concerned about submission of more detailed pricing information for three important reasons:

1. Disclosure of detailed pricing data, even though submitted on a confidential basis, could represent a significant competitive advantage if it were disclosed to other competitors.
2. Fixed price bids are, by their very nature, based on a defined and comprehensive work scope. If this work scope is correct (and PSC has spent months with different, independent contractors defining this work scope), this process is a substantial improvement over detailed cost estimates that are computer-generated and frequently based on inadequate work scope definition. Moreover, assuming the defined work scope is correct, Westinghouse has the contractual liability for all cost overruns.
3. PSC believes that to now submit an estimate in a format akin to that prepared for Pathfinder cannot realistically provide any further assurance to the NRC regarding the decommissioning costs for Fort St. Vrain that approaches the process followed in the competitive bidding on a firm fixed price basis.

PSC recognizes that, at this time, the NRC does not have the level of detail necessary to evaluate the fixed price contract. PSC has committed to provide the contractual details as soon as the contract negotiations can be culminated. Contract negotiations between PSC and the Westinghouse team to finalize terms of the decommissioning are still in progress. Disclosure among the parties of such pricing data, which would be necessary in order to provide the needed breakdown to the NRC, could create significant barriers to successful conclusion of the contract negotiations as described above. Once the contract has been finalized, PSC will forward additional cost information in a level of detail comparable to the most recent Westinghouse team proposed work breakdown structure, contained in Attachment 4.

VII. USE OF ALTERNATIVE COST ESTIMATING METHODOLOGIES

Another area of PSC concern is the NRC's insistence on the form and contents of a detailed decommissioning cost estimate. NRC's own guidance in Reg. Guide 1.159 clearly states that "*(s)udies other than the PNL or ORNL studies may be used to estimate decommissioning costs. The reasonableness of the estimate should be shown by indicating the bases used, and the principal assumptions used in the estimate...*".

Contrary to the above, to date only one cost estimating methodology, based on computer generated estimates prepared by one decommissioning contractor, has been accepted by the NRC which is inconsistent with the guidance provided in Reg. Guide 1.159. As an aside, this decommissioning contractor was also heavily involved in the preparation of the PNL studies in which the NRC established their preferred methodology and level of detail for cost estimates.

VIII. CONCLUSION

The use of the competitive bid process and award of a firm fixed price contract is not a new approach, but rather is an acceptable and proven industry contracting approach, although it is somewhat different from the customary cost information and the prescriptive methodology typically received by the NRC to document cost estimates for decommissioning. The NRC appears to be overly focussed on one detailed cost estimating methodology rather than the overall intent of the rule, which is to ensure that decommissioning costs are fully identified and funds will be available to meet these decommissioning costs.

PSC believes that regulatory requirements and guidance provided by the Decommissioning Rule, NRC regulatory guides, and NRC staff interpretation of this guidance should not be so restrictive as to preclude licensees from alternative approaches as allowed by Reg. Guide 1.159, thereby effectively precluding licensees from the same options available to the NRC in the NRC's own contract proceedings. It appears that the NRC's position is that a licensee cannot be assured of identifying all decommissioning costs unless a specific type of cost estimate has been prepared. This specific type of cost estimate is "not" endorsed in any published regulatory guidance.

The original Bechtel study, in conjunction with PSC's own studies, provided PSC with a basis for evaluating submittals provided during the competitive bid process. The full project scope was determined in the RFP and during the research period prior to the contract award. PSC has complete confidence that all required decommissioning actions were adequately identified and will be included in the final Westinghouse contract. Use of the competitive bid process requires bidders to be responsible for estimating costs to support this scope of work. The Bechtel study and cost estimate, along with four fixed price bids, provide PSC with assurance that the successful bidder did not underestimate decommissioning costs.

It is important to note that the NRC review and concurrence with a detailed cost estimate does not automatically infer that a contractor can or will be found that will perform the decommissioning for the estimated amount. To the contrary, PSC has found that even if a detailed cost estimate is available, there exists in the decommissioning scenario sufficient uncertainty, risk and profit considerations to increase the actual decommissioning cost above the value of a detailed cost estimate.

PSC recognized, when filing the Proposed Decommissioning Plan, that a level of cost detail beyond that presented would be required for both the cost estimate and the funding plan. In this respect, PSC committed to provide additional information as soon as it became available. PSC commits to provide the following information:

1. A copy of the final negotiated contract between PSC and the Westinghouse team for decommissioning containing the contractual provisions, the work specification, and the work breakdown schedule.
2. Contract costs consistent with the work breakdown schedule (see Attachment IV), with supporting assumptions.
3. The detailed funding plan as soon as possible after selection of one of the four options outlined in the Proposed Decommissioning Plan for the repowering and decommissioning of Fort St. Vrain.

PSC submitted the Proposed Decommissioning Plan with full awareness of the above commitments, based on a high level of confidence in the cost information provided during the fixed price proposal process. In PSC's opinion, there is more than sufficient information available to the NRC to continue its review of the Proposed Decommissioning Plan while awaiting the additional information identified above.

PSC is also concerned that the mandatory disclosure of detailed confidential pricing information to licensees and others will make it extremely difficult for other utilities in the future to obtain firm fixed price proposals for decommissioning, once bidders realize that detailed costing data must be released. Moreover, in PSC's opinion, firm fixed price contracts are preferable to CPFF or T&M contracts, in which all or nearly all of the financial exposure is retained by the utility or federal government and is not contractually shared by the contractor. CPFF contracts will tend to push utilities into SAFSTOR, and the cost exposure in 50 years is potentially many hundreds of times greater than for immediate dismantlement (DECON).

In summary, PSC reiterates its position that the use of the competitive bid approach has fully defined the scope of work to be accomplished during the decommissioning effort, and use of a firm fixed price contract has placed an upper bound on the cost of decommissioning to PSC. Such an approach provides financial assurance beyond those assurances provided by a single detailed cost estimate without either a defined workscope or a contractor's obligation to meet that estimate. Therefore, it is PSC's position that preparation of a detailed cost estimate is not necessary to meet the underlying intent of the regulation. The approach

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identified in the Fort St. Vrain Proposed Decommissioning Plan, use of the competitive bid process and award of a firm fixed price contract, achieves the underlying purpose of the rule, i.e., to identify the real cost of decommissioning and provide financial assurances that funds will be available to pay for the decommissioning costs.

REFERENCES

1. PSC letter, Crawford to Weiss, dated November 5, 1990 (P-90318)
2. NRC Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors", August 1990.
3. PSC letter, Crawford to Weiss, dated May 1, 1990 (P-90124)

ATTACHMENT 2 TO P-90343

PSC COMPETITIVE BID PROCESS AND AWARD OF FIXED PRICE CONTRACT

I. Introduction

PSC firmly believes that it has undertaken one of the most innovative and thorough processes to define the scope of decommissioning for Fort St. Vrain, and to select its decommissioning contractor. This process took approximately 12 months to prepare and validate the Request for Proposal, allowed four months for contractors to respond, and took an additional three months for PSC to evaluate the proposals and select its decommissioning contractor. The following were key steps involved in the competitive bid process which will be described in further detail in the following paragraphs:

1. Preliminary Technical Feasibility Studies
2. Development of the Decommissioning Request for Proposal
3. Proposal Solicitation and Bidder Onsite Visits
4. Formal Bidder Presentations
5. Proposal Evaluation
6. PSC Corporate Evaluation and Decommissioning Contractor Selection

PSC believes that the process that was used is the most thorough that has been used in the industry. In PSC's opinion, use of the competitive bid process will establish an industry precedent to allow use of firm fixed price contracts for decommissioning.

II. Preliminary Technical Feasibility Studies

During exploratory decommissioning planning efforts, PSC initiated a decommissioning study for the dismantlement of the Prestressed Concrete Reactor Vessel (PCRVR) with the assistance of the Bechtel Corporation. This study was necessary since some uncertainty existed on the part of PSC concerning the feasibility of dismantlement and decontamination of the PCRVR. In parallel, PSC internally evaluated decontamination and dismantlement of other contaminated systems external to the PCRVR.

The Bechtel study was initiated in August 1988 and was completed in January 1989. Results of the associated Bechtel cost estimate included identification of estimated costs and work scope to dismantle the PCRVR, as well as costs to remove major PCRVR internal components, including the core barrel, core support floor, and steam generator modules. For PSC, the study results affirmed that the technology was now available to dismantle the PCRVR, and that dismantlement could be performed at a reasonable cost.

III. Development of the Decommissioning Request For Proposal

At this time, other significant events were occurring with respect to the future of Fort St. Vrain. In December 1988, based on economic considerations, PSC informed NRC that it was PSC's decision to permanently shutdown and decommission Fort St. Vrain, and that power operations would be terminated not later than June 30, 1990.

Therefore, once the Bechtel study was received in January 1989, PSC began planning efforts for eventual decommissioning of Fort St. Vrain, and a decision was made to begin preparation of a comprehensive Request for Proposal (RFP).

The quantities and types of material involved were estimated for the PCRV, PCRV internals, and each radioactive system for inclusion in the RFP. Detailed radiation survey data was included, as well as a detailed listing of system piping and components (quantities and related information, such as pipe and valve sizes and pipe lengths were included). The RFP also presented detailed requirements regarding use of existing plant equipment and services, regulatory guidance, responsibilities for PSC and the contractor, programmatic requirements (quality assurance, radiation protection, waste management, configuration control, etc.), and project management requirements (work breakdown structure, scheduling, change control, cost control, etc.), i.e., the RFP identified the complete work scope.

In the Bechtel study, several methods were evaluated for removal of the PCRV internal components and for dismantlement of contaminated portions of the vessel itself. Although the Bechtel study was utilized as a major source of input data, the RFP did not specify a preferred method to dismantle the PCRV and the RFP allowed bidders to evaluate the best methods available.

This data was then utilized in the development and preparation of the RFP for the dismantlement, decontamination and decommissioning of Fort St. Vrain.

In addition to the decision to permanently shutdown Fort St. Vrain, other significant decommissioning milestones occurred during this period:

- June 30, 1989: PSC submitted the Preliminary Decommissioning Plan to the NRC based on the SAFSTOR alternative.
- August 29, 1989: The PSC Board of Directors affirmed the PSC management decision to permanently shutdown Fort St. Vrain following a malfunctioning control rod incident and identification of significant cracking in the steam generator ring headers.

IV. Proposal Solicitation and Bidder Onsite Visits

During preparation of the decommissioning RFP, PSC preselected nine potential contractors who possessed the technical qualifications, experience, and financial resources necessary to dismantle and decommission Fort St. Vrain. By letter dated October 20, 1989, PSC notified each of these companies of the upcoming RFP, and solicited a statement of technical qualifications if the prospective bidder was interested in bidding on the decommissioning effort, so that PSC could pre-qualify each of the bidders. Based on the statements of qualification received from these companies, PSC eliminated two of the nine potential bidders, resulting in a bidders list of seven qualified bidders.

PSC completed and issued the formal Request for Proposal to these seven qualified bidders on December 8, 1989. Issuance of the RFP followed an exhaustive effort to define the scope of the decommissioning effort. Bidders were requested to provide proposals by April 2, 1990, to respond to the following six decommissioning and conversion options:

- (1) dismantlement/decommissioning (D&D) of the PCRV only;
- (2) D&D of radioactive systems only;
- (3) D&D of site environs only;
- (4) combined D&D of PCRV, radioactive systems and site environs;
- (5) combined D&D of PCRV, systems and site, and conversion of balance of plant to fossil fuel; and
- (6) any entrepreneurial approach the bidder might desire to present.

Of these initial seven qualified bidders, one withdrew from further consideration and two bidders chose a teaming arrangement, resulting in five remaining qualified bidders. In order to support the bidders during preparation of their proposals, PSC established an extensive reference library, complete with all available plant drawings, system descriptions and construction specifications for use by the bidders. This was in addition to detailed drawings provided in the RFP. Additionally, PSC scheduled a one-week visit at PSC offices and the Fort St. Vrain site, to allow each bidder to individually review information in the reference library, ask specific detailed technical and financial questions, and to conduct site walk-downs. Each of the five bidder teams participated in these visits, and each bidder typically sent an average of 8 to 10 technical and management individuals.

During these visits to PSC offices and the Fort St. Vrain site, PSC provided senior PSC plant personnel whose time was dedicated to assist the bidders during plant walk-downs, answer technical questions, and locate information or drawings requested by the bidders to support their bid proposals. Additionally, during follow-on preparation of the bidder proposals, PSC responded to

subsequent written requests for additional information for each bidder.

PSC continued to track the progress of each bidder to ensure that the proposals would be complete and responsive to the entire scope of work. Since the RFP had specified firm fixed price bids, the bidders requested and were provided a significant level of detail regarding the plant design, physical layout and radiation/contamination history. As a result of the site visits and requests for supporting information from five independent bidders, PSC is extremely confident that the entire scope of work was identified and included in each of the bidder's proposals.

V. Formal Bidder Presentations

Proposals were received from each of the five remaining qualified firms in response to the RFP. In each case, the bidder presented detailed descriptions of the approach and techniques which would be utilized for decommissioning of the PCRV and contaminated systems and descriptions of the specific programmatic systems that would be instituted for quality assurance, radiation protection, waste management, waste shipping and disposal, work control, personnel health and safety, configuration control, and purchasing.

Each of the proposals involved teaming arrangements between major companies based on specific areas of expertise. It is significant to note that these teaming arrangements included two major British firms and the Central Electric Generating Board (CEGB) from Great Britain. These British firms are currently involved in planning for the decommissioning of 14 gas cooled reactors in the United Kingdom. Therefore, the competitive bid process has allowed PSC to benefit from their experience in identifying and resolving problems identified in their decommissioning planning process.

All five proposals were responsive in detail describing the methods of achieving compliance with federal regulations and the requirements to be implemented in the various programs and project controls. Each proposal contained, in response to the RFP requirements, a delineation of any significant assumptions or qualifying conditions made in establishment of the fixed price.

Proposals were received from each of the five qualified bidders on the bid deadline of April 2, 1990. Following receipt of the proposals, the proposals were issued to internal PSC review groups to begin preliminary review of each of the proposals. A formal PSC bid evaluation team was established to evaluate each of the proposals, comprised of technical, licensing, radiation protection, transportation, and financial experts within PSC.

To familiarize the bid evaluation team and PSC management with contents of the proposals, each of the five bidders were requested to make a formal presentation of their proposal to these key PSC

personnel, and allow PSC to ask direct questions in any area related to the bidder's proposal or qualifications to perform the decommissioning effort. Each of these presentations lasted approximately eight hours.

During the formal bidder presentation, each bidder outlined the principal elements of their proposal, including the decommissioning approach, methodology and equipment, to ensure that the evaluation team fully understood the scope, assumptions and pricing of the proposal. To support them during the presentation, each of the bidders typically brought in its proposed management team, representatives from other joint venture companies, and technical experts who could address specific details of their decommissioning plans. Each bidder also brought in financial experts to address the proposed methods to finance the decommissioning and repowering efforts.

To indicate the high level of attention these evaluations received within PSC, EACH of the presentations was attended by PSC's Senior Vice President of Electric Operations, the Vice President of Nuclear Operations, and the Vice President for Engineering and Planning, as well as approximately 40 other PSC nuclear operations management and technical staff.

VI. Proposal Evaluation

Of the five proposals that were received, one bidder was immediately determined to be non-responsive to the RFP and was notified that their proposal would no longer be considered, leaving four qualified proposals that were carried through to final evaluation. Of the four remaining proposals, only one proposal (the original Westinghouse team proposal) was responsive to the RFP request to submit a firm fixed price bid.

Therefore, PSC requested that each of the remaining three bidders submit a firm fixed price bid for their proposal or be dropped from further consideration. Each of these three bidders then provided a firm fixed price proposal. It is significant to note that when required to submit firm fixed price bids, the outcome cannot be predicted. In PSC's case, the bid price for two of the three bidders increased an average of 37%, while the third bid price remained the same!!!

Following the presentation and responses to PSC questions on each proposal, PSC's bid evaluation team proceeded to break down and evaluate each of the four remaining proposals. The bid evaluation team evaluated each proposal with respect to the scope of work, methodology and approach, compliance with regulatory requirements, project management and controls systems to be utilized, proposed terms and conditions, pricing basis and associated assumptions, and any unique qualifying conditions. Each proposal was individually evaluated, and then cross-comparisons were made with other proposals

in the above evaluation areas. Comparisons were also made with the original feasibility study and other estimates developed as a precursor to the RFP.

Proposals were technically evaluated in the following areas: (1) overall decommissioning approach; (2) PCRV concrete, liner and insulation removal; (3) PCRV core barrel removal; (4) core support floor removal; (5) removal of core region components; (6) removal of lower plenum elements; (7) radioactive waste handling and processing; (8) contaminated system plans; and (9) site cleanup plan.

Following technical evaluation, other non-technical issues were also evaluated, including corporate commitment, experience, proposed project management, and completeness and quality of the proposals. Each of these factors were weighted, with technical approach and experience receiving 70% of the final weighted value.

As questions arose during the bid evaluation, formal letters were sent to the bidder requesting additional clarification or information. During the evaluation period, the sensitivity of assumptions regarding the amount of material or components to be removed, the waste volumes and contamination or radiation levels were discussed with the bidders. These discussions and the evaluation of the response to the formal questions were an important final step in the bid evaluation process to ensure that the proposed fixed prices fully covered the decommissioning work to be accomplished.

The remaining four proposals were evaluated in detail over a two month period in the above areas. Each of these four proposals were also normalized or leveled to the extent possible, in order to base evaluations and decisions on comparable waste volumes, transportation distances and other key assumptions, such as taxes, insurance costs, and PSC-performed activities.

The bid evaluation team prepared a detailed assessment of the four remaining proposals, and forwarded the results of this evaluation to a PSC management team. The bid evaluation team recommended two vendors as being essentially equal in the overall evaluation. Of the two recommended proposals, one utilized a dry method for PCRV dismantlement and the other utilized a wet method (PCRV filled with water).

The proposals were compared after the total fixed price for each proposal had been adjusted and leveled in those areas identified above. Although a variation of 31% existed in the total evaluation of the final four bidders, a variation of only 5.5% existed for three of the four proposals. Between the top two proposals, a variation of only 3% was present. Additionally, there was only a variation of 2.25% in the top three proposals based on leveled net present value of the proposals. These variations were determined

using the total fixed price of each proposal, which included both the cost of decommissioning and of conversion. The small variation in the overall project costs may be attributable to minor differences in assumptions and allocation of costs between decommissioning and conversion portions of each proposal, and serves to reinforce PSC's confidence in the validity of the decommissioning cost.

VII. PSC Corporate Evaluation and Decommissioning Contractor Selection

This PSC corporate management team consisted of high level corporate officers, including the Senior Vice President of Electric Operations and the Vice President for Nuclear Operations. This management team further evaluated the proposals on additional factors, such as conversion, financing and willingness to share risk or risk aversion on the part of the bidder. Of the two vendors recommended by the bid evaluation team, the PSC management team selected one of the two remaining bidders and made a final recommendation to PSC's President and Chief Executive Officer and to the PSC Board of Directors.

The PSC Board of Directors affirmed the recommendation to proceed with early dismantlement (DECON), and the Westinghouse team was notified of their winning proposal on July 2, 1990. Additionally, it is noted that the winning Westinghouse proposal price was not the lowest firm fixed price proposal.

VIII. Summary of Contractor Selection Process

As demonstrated in the previous paragraphs, PSC employed a multi-step process to select a qualified bidder and establish a firm fixed price for the decommissioning effort. Based upon this process, PSC is convinced that the decommissioning work scope, compliance with regulatory requirements and costs associated with labor, equipment, materials, permits/fees and administration, and the technical support necessary to complete the work have been adequately captured by the bidders in their firm fixed price proposals. Clearly, with a project of this magnitude and its potential liabilities, the bidders have taken extraordinary care in the development of the proposed work and associated internal cost estimates to ensure that the resultant firm fixed price proposal adequately covers their exposure.

The process of competitively bidding on a firm fixed price basis, together with the detailed pre-bid preparations and post-bid evaluations to ensure that the bidder has adequately captured and responded to the scope of work, represents a comprehensive and thorough method of assuring PSC and the NRC that the decommissioning costs have been completely identified.

ATTACHMENT 3 TO P-90343

COMPARISON OF
PSC DECOMMISSIONING COST BREAKDOWN
WITH REGULATORY REQUIREMENTS AND GUIDELINES

I. REGULATORY REQUIREMENTS:

The requirement for an updated decommissioning cost estimate is identified in 10 CFR 50.82(b)(4), which specifies the following:

*"The proposed decommissioning plan must include -
(4) An updated cost estimate for the chosen alternative for decommissioning, comparison of that estimate with present funds set aside for decommissioning, and plan for assuring the availability of adequate funds for completion of decommissioning."*

PSC Response:

An updated cost estimate was prepared by PSC. Use of the competitive bid process and subsequent award of a firm fixed price contract for decommissioning provides assurance that the scope of decommissioning activities has been completely identified and that the real cost of decommissioning has been identified. Additionally, by receiving four fixed price bids and awarding a firm fixed price contract, PSC has proceeded further than performance of a single detailed cost estimate. Moreover, selecting and contractually obligating a decommissioning contractor to perform the specified scope of work is in the best interests of PSC, the State of Colorado, and the NRC.

II. DRAFT REGULATORY GUIDE DG-1005 GUIDANCE:

Additional guidance contained in NRC Regulatory Guide DG-1005 "Standard Format and Content for Decommissioning Plans for Nuclear Reactors", Section 5, is limited to the following guidance on cost information to be submitted with the Proposed Decommissioning Plan:

"... the licensee should present an updated cost estimate as required by paragraph 50.82(b)(4) based on the detailed information submitted in this plan."

PSC Response:

As noted above, a cost estimate has been performed. Moreover, a suitably detailed dismantlement plan for Fort St. Vrain has been prepared and was included in Reference 1 of Attachment 1.

Additionally, a proposed scope of work was identified in Appendix 1 of the Proposed Decommissioning Plan, and PSC committed to provide the NRC with a signed contract when contract negotiations have been completed. Therefore, although a "detailed" cost estimate is not available, the detailed dismantlement plan and completed contract will provide sufficient assurance that the entire scope of decommissioning efforts are identified.

III. Regulatory Guide 1.159 Guidance

Further guidance regarding decommissioning costs is provided in NRC Regulatory Guide 1.159, "Assuring the Availability of Funds for Decommissioning Nuclear Reactors" (Attachment 1, Ref. 2). In its "Introduction", Reg. Guide 1.159 states:

"As a guidance document, this regulatory guide and its provisions are not designed to be restrictive or to represent binding requirements. The guide presents methods acceptable to the NRC staff for complying with the decommissioning regulations. The NRC staff recognizes that in certain circumstances (e.g., to meet requirements established by Federal or State economic regulatory agencies or to comply with other applicable laws) other approaches may be necessary."

PSC Response:

The contents of the Proposed Decommissioning Plan have also been compared to the guidance contained in Reg. Guide 1.159, which clearly states that its provisions are not designed to be restrictive or to represent binding requirements. Due to the premature shutdown of Fort St. Vrain, and the fact that all delays and resulting costs are borne by the PSC shareholders, PSC has expedited the process to select a contractor to decommission Fort St. Vrain.

PSC designed a process, consistent with standard industry and government contracting practices, which it felt would define the complete scope of decommissioning and dismantlement activities and provide both PSC and the NRC with sufficient assurances that the associated costs of decommissioning would be accurately defined. This process was more detailed than a single detailed cost estimate through involvement of five major contractors bidding on the proposal. Knowledge that their internal cost estimates would be used as the basis for the firm fixed price contract on a specific decommissioning scope of work provided PSC with firm assurances that the cost of decommissioning was adequately defined.

A. Determination of Reasonableness of the Estimate:

Section C, 1.4.1, of Reg. Guide 1.159 ("Regulatory Position") specifies that:

cost estimates for specific reactors may be developed using, as a basis, the studies performed by Battelle PNL and ORNL."

Reg. Guide 1.159 further specifies that:

"studies other than the PNL and ORNL studies may be used to estimate decommissioning costs. The reasonableness of the estimate should be shown by indicating the bases used (e.g., NUMARC (formerly AIF) studies, other generic studies, licensee model, recent experience), and the principal assumptions used in the estimate..."

PSC Response:

Contrary to the above, to date only one cost estimating methodology, based on computer generated estimates prepared by one decommissioning contractor, has been accepted by the NRC which is inconsistent with the guidance provided in Reg. Guide 1.159.

It is PSC's opinion that inadequate consideration has been given to other methods that will provide equivalent or greater assurances of identifying decommissioning costs. The NRC is requested to evaluate PSC's approach, as PSC is convinced that its approach satisfies the ultimate intent of the rule, i.e., to adequately define the cost to decommission Fort St. Vrain.

B. General Cost Estimate Considerations:

In preparing cost estimates for decommissioning, Reg. Guide 1.159 directs that the following general considerations be evaluated:

1. Estimates should be based on technology current at the time the estimate is prepared.
2. The estimate should indicate the year's dollars on which the costs are based.
3. Estimates should be based on existing guidance and criteria on residual radioactivity and occupational exposure.

PSC Response:

The Proposed Decommissioning Plan is fully responsive to the general considerations identified in Reg. Guide 1.159, paragraph 1.4.3, specifically:

- (1) PDP Section 2.3 demonstrates that all proposed activities rely on generally accepted industry practices. All

practices and techniques proposed for use are being used and have received extensive experience in the U.S. nuclear industry and in the United Kingdom.

- (2) The basis (year) for the costs is appropriately identified to be based on future value dollars in the year in which the expenditure is made; and
- (3) PDP Sections 2.3.6 and 4 clearly identify the criteria for residual radioactivity and occupational exposure.

C. Specific Cost Estimate Considerations:

In addition to the general considerations identified above, Reg. Guide 1.159 specifies that cost estimates should consider the following:

1. Planning and preparation of the facility and site for decommissioning.
2. Decontamination and dismantling of radioactive facility structures, systems, and components.
3. Packaging, shipment, and burial of radioactive wastes.
4. The final radiation survey.

PSC Response:

The Proposed Decommissioning Plan is also fully responsive to the description of cost estimate details (Reg. Guide 1.159, 1.4.4).

- (1) Activities related to the planning and preparation of the facility and site are identified in PDP Section 2.3 and Appendix I. Further breakdown of the costs for these activities will be provided in PDP Table 5-2 (proprietary).
- (2) A detailed dismantlement plan is provided in PDP Sections 2.3.3 and 2.3.4. Activities related to decontamination of the radioactive facility to levels which will allow release for unrestricted use in accordance with NRC interim guidance are identified in PDP Sections 2.3 and 4. Costs for these activities will be provided in PDP Table 5-2 (proprietary).
- (3) Activities related to packaging, shipment and burial of radioactive wastes are identified in PDP Section 3.3.3. Costs for these activities will be provided in PDP Tables 5-2 and 5-3 (proprietary).
- (4) Activities related to the final radiation survey are identified in PDP Section 4 and associated costs will be provided in PDP Table 5-2 (proprietary).

D. Principal Cost Estimate Factors:

If studies other than those performed by PNL and ORNL are used in developing costs for the above activities, Reg. Guide 1.159 directs that a summary be included that indicates the principal factors used in the estimates. The following principal factors should be included:

1. Estimated radiological conditions at the time of facility shutdown, including radionuclide inventories and component and surface dose rates.
2. Inflation between the time the studies were completed and the time the facility-specific cost estimate is made...
3. Major facility design and layout differences from the studies that could significantly influence decommissioning costs.
4. The cost of labor: estimated staff-years and bases; unit costs of labor specific to local; use of contractors and effect on labor costs.
5. The cost of energy: estimated energy usage and bases; unit costs of energy for electricity and fuel oil specific to locale.
6. Waste disposal costs: estimated number of containers and casks; shipments to be made; burial volumes; special charges; differences in transport distances from those indicated in the PNL study and effects of escalation.
7. Estimated costs of major items: special tools, supplies, specialty contractors, nuclear insurance."

PSC Response:

PSC has identified those principal factors that were used as the basis for the decommissioning cost in PDP Section 5.3 (Reg. Guide 1.159, 1.4.4.2). However, detailed information related to labor and energy costs are not available due to the proprietary nature of the contractor's firm fixed price proposal. The following are evaluations of PSC responsiveness to principal factors identified in Reg. Guide 1.159:

- (1) Estimated radiological conditions, including detailed site surveys and results of the PCRV activation analysis, are identified in PDP Sections 3.1, 3.3, and Appendix II.
- (2) Inflation effects are represented in the fixed price and will be included in the decommissioning funding plan to be submitted at a later date.
- (3) Facility design and layout have been fully evaluated in the detailed dismantlement plan (PDP Section 2.3), and fully accounted for in the Westinghouse team scope of work and decommissioning cost.
- (4) Waste disposal quantities have been fully identified in PDP Section 3.1 and 3.3, and disposal costs have been evaluated in PDP Tables 5-2 and 5-3. Appropriate

adjustments have been made to account for an anticipated change in burial site from Beatty NV to Richland WA after 1992.

- (5) Estimated costs of major items, including specialty contractors, have been incorporated into the PSC decommissioning costs presented in PDP Table 5-2. Nuclear insurance costs have been significantly reduced to reflect the permanent shutdown condition and reduced value of Fort St. Vrain nuclear assets, and are no longer a major consideration.

A detailed breakdown of the cost of labor and the cost of energy has not been provided, since this contract will be awarded on the basis of a firm fixed price contract. Disclosure of detailed information related to the bidder's proposal for estimated staff-years and energy costs could represent a significant competitive disadvantage for the Westinghouse team if this information were to become available to competitors of the Westinghouse team. PSC's confidence in the proposed cost, including costs for staffing and energy, is based on comparison with an independent cost estimate performed and used as a basis for the Request for Proposal submitted to pre-selected qualified bidders. Comparison of the proposals that were received with this preliminary cost estimate provided PSC with a sufficient level of confidence that each of the bidders had not underbid the decommissioning cost.

It is also important to note that although cost was an important element of the evaluation process, the contract was not awarded to the low bidder.

ATTACHMENT 4 TO P-90343

**PROPOSED WORK BREAKDOWN STRUCTURE
FOR THE
FORT ST. VRAIN DECOMMISSIONING PROJECT**

In order to provide the NRC with a degree of confidence in the level of cost detail that will be provided once the firm fixed price contract has been signed between PSC and Westinghouse, a breakdown of detailed cost items is provided in this attachment. PSC and the Westinghouse team will provide a detailed identification of decommissioning costs consistent with the Level IV detail contained in the Westinghouse Project Work Breakdown Structure. Specific items to be identified in this Level IV detail are identified in the following outline.

A cost will be provided for each of the Level IV cost items identified in this outline. Although the final terms of the contract are still under negotiation, the work breakdown structure associated with the final contract should vary only slightly from the outline presented below.

- 1.0 PHASE I ACTIVITIES
- 1.1 Project Management and Support
 - 1.1.1 Project Control
 - 1.1.1.1 Project Management
 - 1.1.1.2 Cost Control
 - 1.1.1.3 Planning and Scheduling
 - 1.1.1.4 Contract Administration
 - 1.1.1.5 Reporting
 - 1.1.1.6 Records Management and Document Control
 - 1.1.1.7 Project Control Manual
 - 1.1.2 General Administration
 - 1.1.2.1 General Administration Services
 - 1.1.2.2 Personnel Relocation Planning
 - 1.1.3 Quality Assurance Planning
 - 1.1.3.1 QA Plan Development
 - 1.1.3.2 Engineering Audit and Surveillance
 - 1.1.4 Licensing and Permitting
 - 1.1.4.1 NRC Licensing and Permitting
 - 1.1.4.2 EPA Licensing and Permitting
 - 1.1.4.3 State and Local Licensing and Permitting
 - 1.1.4.4 Licensing and Permitting Plan
 - 1.1.4.5 Decommissioning Plan Defense
 - 1.1.5 Procurement
 - 1.1.5.1 Development of Procurement Management System
 - 1.1.6 Health, Safety and Environmental Management
 - 1.1.6.1 Radiological Protection Plan Development
 - 1.1.6.2 Occupational Safety Plan
 - 1.1.6.3 Site Release Criteria and Implementation Plan
 - 1.1.6.4 Environmental Licensing Support
 - 1.1.6.5 Decontamination Specification Development

- 1.2 Engineering
 - 1.2.1 Initial Site Characterization
 - 1.2.1.1 Radiological Characterization
 - 1.2.1.2 Asbestos Identification
 - 1.2.1.3 Facility Equipment Status
 - 1.2.1.4 Chemical Characterization
 - 1.2.2 Decommissioning Plan Development
 - 1.2.2.1 Radiological Status - PDP
 - 1.2.2.2 Radiation Protection - PDP
 - 1.2.2.3 Radioactive Waste Management - PDP
 - 1.2.2.4 Accident Analysis
 - 1.2.2.5 Final Radiation Survey Plan - PDP
 - 1.2.2.6 Technical Specifications
 - 1.2.2.7 Quality Assurance
 - 1.2.2.8 Security
 - 1.2.2.9 Transportation Plan
 - 1.2.2.10 Integration
 - 1.2.3 Project Manuals
 - 1.2.3.1 Configuration Control Plan
 - 1.2.3.2 Emergency Plan
 - 1.2.3.3 Fire Protection Plan
 - 1.2.3.4 Training Manual
 - 1.2.3.5 Safety Manual (Industry)
 - 1.2.3.6 Hazards Communication Program
 - 1.2.4 Site Preparation Specifications
 - 1.2.4.1 Temporary Facilities, Including Fire Protection
 - 1.2.4.2 Warehousing
 - 1.2.4.3 Utilities
 - 1.2.4.4 Laydown
 - 1.2.4.5 Contaminated Segmentation and Repair Work Area
 - 1.2.4.6 Decontamination/Repackaging Work Areas
 - 1.2.4.7 Shipping Area
 - 1.2.5 Asbestos Removal Specification
 - 1.2.5.1 PCRV Asbestos
 - 1.2.5.2 Contaminated System Asbestos
 - 1.2.5.3 Conversion Asbestos
 - 1.2.6 Personnel Test and Training Programs
 - 1.2.6.1 Asbestos
 - 1.2.6.2 Radiation Worker Training
 - 1.2.6.3 Safety Training
 - 1.2.6.4 Specific Job Training
 - 1.2.6.5 Fitness For Duty
 - 1.2.6.6 Site Orientation Training
 - 1.2.7 Liquid Waste Disposal Specifications and Procedures
 - 1.2.7.1 Installation of Liquid Waste System
 - 1.2.7.2 Disposal of Liquid Waste
 - 1.2.7.3 Removal of Liquid Waste System
- 1.3 PCRV D/D Design, Specifications and Procedures
 - 1.3.1 Initial Preparations, Disassembly Planning and Engineering
 - 1.3.1.1 Design and Specify PCRV D/D Tools
 - 1.3.1.2 Design and Specify Underwater Tools
 - 1.3.1.3 Plan D/D Preparations
 - 1.3.1.4 Specify Main Crane Modifications
 - 1.3.1.5 Specify Handling Equipment Refurbishment
 - 1.3.1.6 Tendon Removal
 - 1.3.1.7 Remove RCDs, CRDs and Reflectors Blocks
 - 1.3.1.8 Helium Purification Well Equipment Removal
 - 1.3.2 Shielded Access to PCRV Planning and Engineering
 - 1.3.2.1 Specify Concrete Removal Tools
 - 1.3.2.2 Specify Underwater Light and Remote Cameras
 - 1.3.2.3 Seal PCRV Cooling Tube Removal
 - 1.3.2.4 Center Access Penetration
 - 1.3.2.5 PCRV Shielding Water System
 - 1.3.2.6 Contamination Control Equipment and Facility
 - 1.3.2.7 PCRV Top Head Cutting
 - 1.3.2.8 PCRV Flooding
 - 1.3.2.9 PCRV Cavity Work Platform

- 1.3.3 PCRV Core Dismantlement Planning and Engineering
 - 1.3.3.1 Graphite Grappling Tool Design and Specification
 - 1.3.3.2 PCRV Tooling Mockup Design and Specification
 - 1.3.3.3 Defueling Element Removal
 - 1.3.3.4 Removal of Replaceable and Permanent Hexagonal Reflectors
 - 1.3.3.5 Large Side Reflector Element Removal
 - 1.3.3.6 Boronated Spacer Element Removal
 - 1.3.3.7 Hastelloy Can Hexagonal Reflector Block Removal
 - 1.3.3.8 Core Support Block and Post Removal
- 1.3.4 CSF, Core Barrel and Insulation Removal Planning and Engrg
 - 1.3.4.1 CSF Tooling - Design and Specification
 - 1.3.4.2 CSF Column and Helium Ductwork Tooling
 - 1.3.4.3 Core Barrel and Key Removal
 - 1.3.4.4 CSF Removal
 - 1.3.4.5 Top CSF Insulation Removal
- 1.3.5 PCRV Lower Plenum Planning and Engineering
 - 1.3.5.1 Steam Generator Removal Tool Design Specification
 - 1.3.5.2 Steam Generator Mockup Design and Specification
 - 1.3.5.3 Steam Generator Module (12) Removal
 - 1.3.5.4 Helium Diffuser (4) and S.O. Valve Assembly removal
 - 1.3.5.5 CSF Columns, Lower Floor, and Flexible Column Removal
 - 1.3.5.6 PCRV Lower Plenum Insulation and Cover Plate Removal
- 1.3.6 Final PCRV D&D, Cleanup Planning and Engineering
 - 1.3.6.1 Beltline Activated Concrete, Liner & Insulation Removal
 - 1.3.6.2 Lower PCRV Liner Decontamination
 - 1.3.6.3 PCRV Wells, Penetrations, Piping, Instrumentation Decon
 - 1.3.6.4 Area Cleanup and Demobilization
 - 1.3.6.5 PCRV Decontamination Procedure for Final Release Survey
- 1.4 Contaminated System D&D Design, Specifications and Procedures
 - 1.4.1 Disassembly Tools
 - 1.4.1.1 Mechanical Cutting Tool Specifications
 - 1.4.1.2 Miscellaneous Tool Specification
 - 1.4.2 BOP Systems Dismantling Planning and Engineering
 - 1.4.2.1 Preparation Activities
 - 1.4.2.2 System 13 Fuel Handling System
 - 1.4.2.3 System 14 Fuel Storage Facility
 - 1.4.2.4 System 16 HSF, ATC, and ESWs
 - 1.4.2.5 System 23 Helium Purification System
 - 1.4.2.6 System 46 Reactor Plant Cooling Water System
 - 1.4.2.7 System 47 Purification Cooling Water System
 - 1.4.2.8 System 61 Decontamination System
 - 1.4.2.9 System 62 Radioactive Liquid Waste System
 - 1.4.2.10 System 63 Radioactive Gas Waste System
 - 1.4.2.11 System 72 Reactor Building Drain System
 - 1.4.2.12 System 73 Reactor Plant Ventilation System
 - 1.4.2.13 System 93 Instrumentation and Controls System
 - 1.4.2.14 Contaminated Laundry and Radwaste Compa. tion Facilities
 - 1.4.2.15 Demobilize and Cleanup Area
- 1.5 Site Cleanup Specifications and Detailed Procedures
 - 1.5.1 Tools and Equipment Specifications
 - 1.5.2 Site Cleanup Specifications and Detailed Procedures
 - 1.5.2.1 Evaporation Ponds (4)
 - 1.5.2.2 Sewage Lagoons (2)
 - 1.5.2.3 Diesel Storage Tanks (3)
 - 1.5.2.4 Effluent Ditches (2)
 - 1.5.2.5 Farm Pond
 - 1.5.3 Demobilization
- 1.6 Radioactive Waste Management Plan
 - 1.6.1 Waste Processing Methodology and Facilities
 - 1.6.1.1 Concrete Segmentation
 - 1.6.1.2 Metal Segmentation
 - 1.6.1.3 Graphite Segmentation
 - 1.6.1.4 Water Management
 - 1.6.1.5 Segmentation Area

- 1.6.2 Waste Packaging
 - 1.6.2.1 Standard LSA Containers
 - 1.6.2.2 Non-Standard LSA Containers
 - 1.6.2.3 High Integrity Container Packaging
 - 1.6.2.4 Shielded Container Packaging
- 1.6.3 Waste Shipping
 - 1.6.3.1 Staging Area
 - 1.6.3.2 Highway Shipments
 - 1.6.3.3 Rail Shipments
 - 1.6.3.4 Miscellaneous Shipments
- 1.6.4 Waste Burial
 - 1.6.4.1 Burial
 - 1.6.4.2 Westinghouse Scientific Ecology Group
 - 1.6.4.3 Other
- 1.6.5 Waste Program Management
 - 1.6.5.1 Training
 - 1.6.5.2 Waste Classification Compliance Program
 - 1.6.5.3 Sampling and Analysis
 - 1.6.5.4 Waste Management Procedures Manual
- 2.0 PHASE II ACTIVITIES
- 2.1 Project Management and Support
 - 2.1.1 Project Control
 - 2.1.1.1 Project Management
 - 2.1.1.2 Cost Control
 - 2.1.1.3 Planning and Scheduling
 - 2.1.1.4 Contract Administration
 - 2.1.1.5 Reporting
 - 2.1.1.6 Records Management and Document Control
 - 2.1.2 General Administration
 - 2.1.2.1 General Administration Services
 - 2.1.2.2 Personnel Relocation
 - 2.1.2.3 Procurement Services
 - 2.1.2.4 Facility Services (Snow Removal, Equip. Maint., Janitorial, Security)
 - 2.1.3 Quality Assurance
 - 2.1.3.1 Quality Assurance
 - 2.1.3.2 Quality Control
 - 2.1.4 Licensing and Permitting
 - 2.1.4.1 NRC Licensing and Permitting
 - 2.1.4.2 EPA Licensing and Permitting
 - 2.1.4.3 State and Local Licensing and Permitting
 - 2.1.4.4 Decommissioning Plan Maintenance
 - 2.1.4.5 Final Decommissioning Report and Defense
 - 2.1.5 Site Engineering
 - 2.1.5.1 Detailed Procedure Revisions
 - 2.1.5.2 Engineering document Revisions
 - 2.1.5.3 Decommissioning Plan Update Support
 - 2.1.5.4 General Site Engineering Services
 - 2.1.5.5 Final Decommissioning Report Support
 - 2.1.6 Health, Safety and Environmental Management
 - 2.1.6.1 Radiological Engineering Services
 - 2.1.6.2 Radiation Controls
 - 2.1.6.3 Laboratory Support (Onsite, Contract, Asbestos)
 - 2.1.6.4 Independent Verification Contractor Interface
 - 2.1.6.5 Industrial Safety Management
 - 2.1.6.6 First Aid
 - 2.1.6.7 Environmental document Support
 - 2.1.6.8 Final Release Survey Documentation
 - 2.1.6.9 Contaminated Laundry and Radwaste Compaction Facilities
 - 2.1.7 Project Closeout
 - 2.1.7.1 Remove Temporary Structures and Site Restoration
 - 2.1.7.2 D&D Demobilization
 - 2.1.7.3 Document Turnover to PSC
 - 2.1.7.4 Facility and Materials Relocation

- 2.2 Common Facilities and Services
 - 2.2.1 Site Preparations
 - 2.2.1.1 Temporary Facilities
 - 2.2.1.2 Warehousing
 - 2.2.1.3 Utilities
 - 2.2.1.4 Laydown
 - 2.2.1.5 Contaminated Segmentation and Equipment Repair
 - 2.2.1.6 Decontamination and Repackaging Work Area
 - 2.2.1.7 Shipping Area
 - 2.2.1.8 Other Equipment Modifications
 - 2.2.2 Personnel Testing and Training
 - 2.2.2.1 Asbestos Training
 - 2.2.2.2 Radiation Worker Training
 - 2.2.2.3 Safety Training
 - 2.2.2.4 Specific Job Training
 - 2.2.2.5 Waste Packaging Training
 - 2.2.2.6 Fitness For Duty
 - 2.2.2.7 Site Orientation/Security Training
 - 2.2.3 Liquid Waste Disposal
 - 2.2.3.1 Install/Modify Liquid Waste System
 - 2.2.3.2 Dispose of Liquid Wastes
 - 2.2.3.3 Dismantle and Package the Liquid Waste System
 - 2.2.4 Decontamination
 - 2.2.4.1 Decontaminate Materials for Unrestricted Release
 - 2.2.4.2 Decontaminate for Release to the Environment
 - 2.2.5 Construction Support Procurements
 - 2.2.6 Procurements
 - 2.2.6.1 Construction Tooling (Concrete Rmvl, Metal Cutting, Rigging, Hoisting)
 - 2.2.6.2 Facility Related Procurements (Furniture, Vehicles, Utilities, Other)
 - 2.2.6.3 Environmental Safety and Health Procurement
 - 2.2.7 Radiological Surveys and Assessments
 - 2.2.7.1 System Radiological Assessments
 - 2.2.7.2 Final Release Surveys
- 2.3 PCR, Dismantling and Decontamination
 - 2.3.1 Initial Preparations, Disassembly
 - 2.3.1.1 PCRV D/D Tools
 - 2.3.1.2 Underwater Tools
 - 2.3.1.3 PCRV Asbestos Removal (Preparations, Packaging, Cleanup, Inspections)
 - 2.3.1.4 Preparations
 - 2.3.1.5 Modify Reactor Building Crane
 - 2.3.1.6 Refurbish Helium Circulator/Component Handling
 - 2.3.1.7 Tendon Detensioning and Removal
 - 2.3.1.8 Remove RCDs and Reflector Blocks
 - 2.3.1.9 Remove Helium Purification Well Equipment
 - 2.3.2 Shielded Access to PCRV
 - 2.3.2.1 Concrete Removal Tools
 - 2.3.2.2 Underwater Lighting and Remote Cameras
 - 2.3.2.3 Seal PCRV Cooling Tubes
 - 2.3.2.4 Center Access Penetration
 - 2.3.2.5 PCRV Shielding Water System
 - 2.3.2.6 Contamination Control Tent (Refueling Floor)
 - 2.3.2.7 Cut PCRV Top Head
 - 2.3.2.8 Flood the PCRV
 - 2.3.2.9 Install the PCRV Cavity Work Platform
 - 2.3.3 Dismantle the PCRV Core
 - 2.3.3.1 Graphite Grappling Tools
 - 2.3.3.2 PCRV Tooling Mockup
 - 2.3.3.3 Remove Defueling Elements
 - 2.3.3.4 Remove Replaceable and Permanent Hexagonal Reflectors
 - 2.3.3.5 Remove Large Side Reflector Elements
 - 2.3.3.6 Remove Boronated Spacer Elements
 - 2.3.3.7 Remove Hastelloy Can Hexagonal Reflector Blocks
 - 2.3.3.8 Remove Core Support Blocks and Posts
 - 2.3.4 CSF, Core Barrel and Insulation Removal
 - 2.3.4.1 CSF Tooling
 - 2.3.4.2 CSF Column and Helium Ductwork Mockup
 - 2.3.4.3 Remove Core Barrel and Keys
 - 2.3.4.4 Remove Core Support Floor
 - 2.3.4.5 Remove Top CSF Insulation

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- 2.3.5 PCRV Lower Plenum
 - 2.3.5.1 Steam Generator Removal Tools
 - 2.3.5.2 Steam Generator Full Scale Mockups
 - 2.3.5.3 Remove Steam Generator Modules (12)
 - 2.3.5.4 Remove Helium Diffusers (4) and Shutoff Valve Assembly
 - 2.3.5.5 Remove CSF Columns, Lower Floor, and Flexible Columns
 - 2.3.5.6 Remove PCRV Lower Plenum Insulation and Cover Plates
- 2.3.6 Final PCRV D&D, Cleanup
 - 2.3.6.1 Remove Beltline Activated Concrete, Liner & Insulation
 - 2.3.6.2 Decontaminate Lower PCRV Liner
 - 2.3.6.3 Decontaminate PCRV Wells, Penetrations, Piping, Instrumentation
 - 2.3.6.4 Area Cleanup and Demobilization
 - 2.3.6.5 Decontaminate PCRV for Final Release Survey
- 2.3.7 PCRV Options
 - 2.3.7.1 Control Rod Drive Orifice Assemblies
 - 2.3.7.2 Lower Portion of Helium Circulators
- 2.4 Contaminated System D&D
 - 2.4.1 Initial Preparations and Disassembly
 - 2.4.1.1 Mechanical Cutting Tools
 - 2.4.1.2 Miscellaneous Tools
 - 2.4.1.3 BOP Asbestos Removal
 - 2.4.2 Dismantling Operations
 - 2.4.2.1 Preparation Activities
 - 2.4.2.2 System 13 Fuel Handling System
 - 2.4.2.3 System 14 Fuel Storage Facility
 - 2.4.2.4 System 16 HSF, ATC, and ESWS
 - 2.4.2.5 System 23 Helium Purification System
 - 2.4.2.6 System 46 Reactor Plant Cooling Water System
 - 2.4.2.7 System 47 Purification Cooling Water System
 - 2.4.2.8 System 61 Decontamination System
 - 2.4.2.9 System 62 Radioactive Liquid Waste System
 - 2.4.2.10 System 63 Radioactive Gas Waste System
 - 2.4.2.11 System 72 Reactor Building Drain System
 - 2.4.2.12 System 73 Reactor Plant Ventilation System
 - 2.4.2.13 System 93 Instrumentation and Controls System
 - 2.4.2.14 Contaminated Laundry and Radwaste Compaction Facilities
 - 2.4.2.15 Demobilize and Cleanup Area
- 2.5 Site Cleanup
 - 2.5.1 Tools and Equipment Acquisition
 - 2.5.2 Site Cleanup Operations
 - 2.5.2.1 Evaporation Ponds (4)
 - 2.5.2.2 Sewage Lagoons (2)
 - 2.5.2.3 Diesel Storage Tanks (3)
 - 2.5.2.4 Effluent Ditches (2)
 - 2.5.2.5 Farm Pond
 - 2.5.3 Demobilization
 - 2.5.4 Backfill Option
- 2.6 Radioactive Waste Management
 - 2.6.1 Rad Waste Processing
 - 2.6.1.1 Concrete Segmentation
 - 2.6.1.2 Metal Segmentation
 - 2.6.1.3 Graphite Segmentation
 - 2.6.1.4 Water Management
 - 2.6.2 Rad Waste Packaging
 - 2.6.2.1 Standard LSA Containers
 - 2.6.2.2 Non-Standard LSA Containers
 - 2.6.2.3 High Integrity Container Packaging
 - 2.6.2.4 Shielded Container Packaging
 - 2.6.3 Rad Waste Shipping
 - 2.6.3.1 Staging Area
 - 2.6.3.2 Highway Shipments
 - 2.6.3.3 Rail Shipments
 - 2.6.3.4 Miscellaneous Shipments

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- 2.6.4 Waste Burial
 - 2.6.4.1 Rad Waste Burial
 - 2.6.4.2 Westinghouse Scientific Ecology Group
 - 2.6.4.3 Other
- 2.6.5 Rad Waste Program Management
 - 2.6.5.1 Training
 - 2.6.5.2 Waste Classification Compliance Program
 - 2.6.5.3 Sampling and Analysis
 - 2.6.5.4 Waste Management Procedures Manual Maintenance