



Department of Energy

Richland Operations Office
P.O. Box 550
Richland, Washington 99352

START

APR 19 1989



Mr. Terry Husseman, Assistant Director
State of Washington
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504-8711

Dear Mr. Husseman:

HANFORD WASTE VITRIFICATION PLANT

In your letter of January 9, 1989, you requested additional information to support your review of the Hanford Waste Vitrification Plant (HWVP) relative to its qualification as an interim status facility under the State Dangerous Waste Regulations (WAC 173-303). The information you requested is provided in the following attachments:

- Attachment 1 - Describes the nature and extent of contractual obligations for HWVP design and construction; also describes the monetary losses which would be incurred should these contracts be cancelled or delayed. The obligation and cost data are as of December 1988.
- Attachment 2 - Describes the activities associated with HWVP construction which had occurred prior to November 27, 1987.
- Attachment 3 - Provides the detailed cost estimate for the total project cost; also provides a detailed description of the costs incurred prior to November 27, 1987.
- Attachment 4 - Provides the responses to Questions 6 and 7 of your letter of January 9, 1989. The availability of comparative cost estimate alternatives and additional information on high-level tank wastes is explained.

We appreciate your commitment to provide the necessary support to allow construction of the HWVP in a timely manner.



Mr. Terry Husseman

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APR 19 1989

It is our intent to provide you with the necessary support to ensure that the construction and operation schedules for HWVP are not impacted. If you need any additional information to support your review, do not hesitate to contact Ms. M. J. Anthony of the U.S. Department of Energy, Richland Operations Office on (509) 376-8375 or Mr. H. E. McGuire of Westinghouse Hanford Company on (509) 376-1400.

Sincerely,



E. A. Bracken, Acting Director
Environmental Restoration
Richland Operations Office

ERD:DLD



R. E. Lerch, Manager
Environmental Division
Westinghouse Hanford Company

Attachments

1. Contractual Obligations
2. HWVP Construction Activities
3. Detailed Cost Estimates
4. Responses to Questions 6 and 7

cc w/ atts:
P. T. Day, EPA
C. E. Findley, EPA

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<p>Author L. L. Powers 376-6208</p> <p>INCOMING Correspondence No. 8901773 (XRF: 8900148)</p>	<p>H4-57</p>	<p>Addressee Mr. Terry Husseman, Assistant Director State of Washington Department of Ecology Mail Stop PV-11 Olympia, Washington 98504</p>
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CONTRACTUAL OBLIGATIONS

A. Background Information Concerning DOE's Contractual Obligations for the Hanford Waste Vitrification Plant

A fundamental goal of the U.S. Department of Energy, Richland Operations Office (DOE-RL) is to end present interim storage practices for defense wastes and to provide for permanent disposal. To achieve this goal DOE-RL has established as an objective that high-level waste be immobilized prior to shipment to a geological repository. The Hanford Waste Vitrification Plant (HWVP) project has been established to accomplish this objective. The goal of the HWVP is to vitrify pre-treated waste in borosilicate glass, cast the glass into stainless steel canisters, and store the canisters at the Hanford Site until they are shipped to a Federal geological repository.

Kaiser Engineers Hanford Company (KEH) completed a Preliminary Conceptual Design in fiscal year 1986. Fluor-Daniel, Incorporated, of Irvine, California, was selected by DOE-RL to perform a Reference Conceptual Design (RCD), with options. The RCD effort was initiated in April 1986 and completed in June 1987. An Advance Conceptual Design (ACD) was initiated in May 1987 and was completed in January 1988. Preliminary Design began in January 1988, and will be followed by detailed design, procurement, plant construction, and plant start-up operations.

B. Description of Contractual Obligations Between DOE & Its Contractors

1.0 THE FLUOR-DANIEL, INC. CONTRACT [No. DE-AC06-86RL10838]

1.1 STATEMENT OF WORK SUMMARY

The Fluor-Daniel contract is a cost-reimbursement architect-engineer (A/E) agreement. Under this contract Fluor-Daniel is responsible for the quality, technical accuracy, cost effectiveness, coordination, and development of design drawings, specifications, cost estimates, schedules, and other services as required. Contract options include ACD, Definitive Design, engineering services during construction and engineering and inspection services during construction.

Fluor-Daniel has completed RCD, ACD and is presently working on Preliminary Design Phase I of Definitive Design.

1.2 ADVANCED CONCEPTUAL DESIGN (May 1987 - January 1988)

The ACD resulted in a summary report that collected the individual topical reports covering the items of work performed.

The A/E used the following principal objectives in the development of the ACD for the HWVP.

- o Design the facility with an operational life of 40 years considering normal maintenance is provided.
- o Meet project technical requirements as imposed by the baseline documents.
- o Provide the minimum construction cost consistent with operational, environmental, security, safety requirements, and acceptable life cycle cost analysis.
- o Meet safety, security, energy, and quality assurance (QA) requirements imposed by the baseline documents.
- o Meet applicable federal, state, and local requirements.

1.2.1 Scope

The process key diagram, melter, melter-turntable, slurry frit blaster, and canister closure designs were provided by the operating and engineering contractor (O&EC). The A/E was to integrate these designs into the ACD, including design of necessary support structures and facility interfaces.

The O&EC will provide the design and equipment concepts for the feed preparation, melter feed, melter off-gas systems, and the canyon crane that was incorporated into the design by the A/E. Additional system information will be provided by the O&EC as the design proceeds.

1.2.2 Basis of Design

The HWVP technical baseline requirements for the ACD were established by the latest revision of the Functional Design Criteria (FDC) (SD-HWV-FDC-001), and the Technical Data Package (TDP) (SD-HWV-DP-001), including approved changes. These documents will remain in effect for the life of the project, and are subject to the provisions of the change control procedure included in the Project specific procedures.

The RCD report was used as a reference for the preparation of the ACD.

1.3 PRELIMINARY DESIGN WORK (October 1988 - Present)

The A/E is to perform Preliminary Design in sufficient detail to firmly fix the project scope, design features and concepts including the process, mechanical, electrical, heating, ventilation, and air conditioning (HVAC), instrumentation, supporting systems designs, building configuration, total estimated cost, and schedule for completion of the HWVP Project.

The A/E is using the following objectives in the development of the Preliminary Design for the HWVP:

- o Meet project technical requirements as imposed by the baseline documents
- o Provide the minimum construction cost consistent with operational, environmental, security, and safety requirements, and with acceptable life-cycle cost analysis
- o Meet safety, environmental, security, energy, and quality assurance (QA) requirements imposed by the baseline documents
- o Meet applicable federal, state, and local requirements.

1.3.1 Scope

The A/E is considered the responsible design organization as defined in the American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) NQA-1, Supplement 3S-1, Section 2, excluding design furnished by the O&EC, via baseline documents and design media.

The process key diagram, feed preparation, melter feed, melter and turntable, slurry frit blaster, and canister-closure equipment designs are incorporated in the technical baseline provided by the O&EC. The A/E shall incorporate these designs, including O&EC-approved modifications, design of necessary support structures and facility interfaces, into the Preliminary Design.

The O&EC will provide the design and equipment concepts for the melter off gas, process vessel vent, and canyon crane systems that will be incorporated into the design by the A/E. Additional system information will be provided by the O&EC as design proceeds.

The A/E is responsible for ensuring that the overall HWVP design, including design furnished by the O&EC, meets all of the project baseline design criteria. Any changes recommended by the A/E to the O&EC-supplied design shall be submitted to the O&EC for review and approval.

1.3.2 Basis of Design

The HWVP technical baseline requirements for the Preliminary Design are established by the latest revision of the FDC (SD-HWV-FDC-001) and the TDP (SD-HSV-DO-001), including approved changes. These documents will remain in effect for the life of the project and are subject to the provisions of the change control procedure included in the HWVP project-specified procedures. The RCD and the ACD work shall be used as a reference in preparation of Preliminary Design.

1.4 EFFECTIVE DATE

The Fluor-Daniel contract was awarded on February 26, 1986, and has a period of performance scheduled to extend through June 30, 1990. Execution of all existing options will extend the contract through start-up of check-out and turn-over to operations.

1.5 ARCHITECT/ENGINEER SCHEDULE

<u>Service</u>	<u>Start</u>	<u>Complete</u>
Reference Conceptual Design	4/86	6/87
Advanced Conceptual Design	5/87	1/88
Definitive Design:		
Phase I Preliminary Design	1/88	6/90
Phase II Detailed Design	1/90	6/93
Engineering Services During Construction	7/91	6/98
Engineering & Inspection Services During Construction	7/91	6/98

1.6 OBLIGATION OF FUNDS

The total amount obligated under the Fluor-Daniel contract to date is \$16,263,924 (sixteen million, two hundred sixty-three thousand, nine hundred and twenty-four dollars). A rough estimate of the total Fluor-Daniel contract cost approaches \$120 million.

2.0 THE WESTINGHOUSE HANFORD COMPANY CONTRACT [No. DE-AC06-87RL10930]

2.1 STATEMENT OF WORK

The WHC contract is a cost-plus-award fee contract pursuant to which WHC manages, operates, and maintains certain U.S. Department of Energy facilities in accordance with the contract terms.

The portion of the WHC contract pertaining to HWVP is contained in the section on the management and operation of all Defense Waste Management activities. These activities include handling, treatment, storage and disposal of radioactive and nonradioactive solid, liquid and gaseous wastes generated from defense programs. Wastes from non-defense activities will also be managed under the Defense Waste Program. The Contractor is responsible for using expertise available from other Hanford contractors as appropriate. The program is divided into two main activities, (1) handling, treatment, storage and disposal of wastes, and (2) developing and implementing technology for long term disposal of wastes.

Examples of new facilities which will be managed and operated under this contract include the Waste Receiving and Packaging Facility and the HWVP. WHC has established a dedicated project office for the management of the HWVP activities.

2.2 EFFECTIVE DATE

The WHC contract was signed on June 5, 1987, and became effective on June 29, 1987. The contract will continue in effect through September 30, 1992, unless sooner terminated as provided for in other provisions of the contract.

2.3 OBLIGATION OF FUNDS

WHC has expended \$23,094,000 on HWVP project activities.

**3.0 THE KAISER ENGINEERS HANFORD COMPANY CONTRACT
[No. DE-AC06-87RL10900]**

3.1 STATEMENT OF WORK

The KEH agreement is a cost-plus-award fee contract with DOE-RL pursuant to which KEH furnishes all labor, material, management, and supervision necessary for the performance of construction, construction management, maintenance, repair, and other construction related services for Hanford. KEH services were utilized for HWVP activities under work order authority, which included Preliminary RCD and preliminary construction support.

3.2 EFFECTIVE DATE

The KEH contract was signed on February 20, 1987. The period of performance for the work specified commenced on March 1, 1987, and continues through February 29, 1992. The KEH work order providing preliminary support to HWVP for conceptual design and construction planning activities was terminated on January 16, 1989. Currently, a General Contractor is being selected.

3.3 OBLIGATION OF FUNDS

KEH expended approximately \$1,519,000 on HWVP activities.

**4.0 THE BATTELLE MEMORIAL INSTITUTE, PACIFIC NORTHWEST LABORATORY
CONTRACT [No. DE-AC06-76RL01830]**

4.1 STATEMENT OF WORK

Under its contract with DOE-RL, Battelle is required to perform technical work and services. Battelle supports HWVP under Letter of Instruction to perform the services including but not limited to, the conduct of applied research, development, engineering, production support vitrification technology transfer, waste form qualification testing and design verification work.

4.2 EFFECTIVE DATE

The initial Battelle contract was effective on December 30, 1964; as amended from time to time, the period of performance runs through September 30, 1992, unless sooner terminated as provided for in other provisions of the contract.

4.3 OBLIGATION OF FUNDS

To date, Battelle has spent approximately \$10,280,000 on HWVP work.

C. Extent to Which the Above Obligations Are Dependent on DOE's Annual Budgetary Cycle (cite appropriate contract language)

Each of the above contracts contains an "Obligation of Funds" provision (clause I-66 in the WHC contract) which provides that payments by the Government of allowable costs shall not exceed the amount obligated. Furthermore, DOE-RL is prohibited by the Anti-Deficiency Act, 31 USC 1341, from making or authorizing any "expenditure or obligation exceeding an amount available in an appropriation or fund for the expenditure or obligation," 31 USC 1341 (a)(1)(A). The Anti Deficiency Act also prohibits any officer or employee of the U.S. Government from involving the government "in a contract or obligation for the payment of money before an appropriation is made unless authorized by law," 31 USC 1341 (a)(1)(B).

D. Monetary Losses Which Would Have Been Incurred if Above Contractual Agreements Were Cancelled in November 1987

Each of the above contracts has a "termination for convenience" provision which allows DOE to terminate the work in whole or in part when DOE determines it is in the government's best interest to do so. Because of the broad scope of work under WHC's, KEH's and Battelle's contracts if a particular project, such as HWVP, were terminated the costs incurred on account of the termination would not be as great as

under a contract, such as that held by Fluor-Daniel, which is dedicated to HWVP. However, even under the WHC, KEH, or Battelle contract there would be certain administrative or phase-out costs associated with terminating a project such as HWVP. For example, it may be necessary to close-out accounts, preserve records, and develop plans and schedules to accomplish an orderly phase-out, reassign technical staff, account for Government furnished property, cancel leases and subcontracts, and, assuming other suitable work cannot be found, lay off personnel. Because of the many variables (e.g., factors such as years of employment) which affect dislocated employees' entitlement to severance compensation, the precise amount of termination liability is difficult to estimate.

Although, no estimates have been made regarding the "task specific monetary losses which would have been incurred if the WHC, KEH, and Battelle contractual agreements were cancelled or modified by DOE in November 1987," we have provided rough estimates for the Fluor-Daniel contract.

The Fluor-Daniel contract is a cost-reimbursement A/E contract. Because the work under the contract is dedicated to HWVP, the impact of termination would be much greater than under the WHC, KEH, or Battelle contracts.

Assuming the contracts were to be terminated for convenience, Fluor-Daniel would be issued a "notice of termination" under Clause 45 of the contract and, assuming the DOE Contracting Officer did not provide any specific written directions to the contract, Fluor-Daniel would be required to:

- (1) Stop work under the contract on the date and to the extent specified in the notice of termination;
- (2) Place no further orders or subcontracts for materials, services, or facilities, except as may be necessary for completion of such portion of the work under the contract as is not terminated; and
- (3) Terminate all orders and subcontracts to the extent they relate to the performance of work terminated by the notice of termination.

The Government would be required to make "full and complete settlement of all claims of the A/E with respect to terminated work" as follows:

- (1) The Government shall have the right, in its discretion, to "assume all obligations, commitments, and claims that the A/E may have theretofore in good faith undertaken or incurred in connection with the terminated work, the cost of which would be allowable in accordance with the provisions of this contract; and the A/E shall, as a condition of receiving the payments mentioned in this article, execute and deliver all such papers and take such steps as the contracting officer may require for the purpose of vesting in the

Government all the rights and benefits of the A/E, related to such obligations, commitments, and claims;

- (2) The Government shall treat as allowable costs all expenditures made in accordance with the clause herein entitled "Allowable Cost and Payment," not previously so allowed or otherwise credited;
- (3) The Government shall reimburse the A/E for such further expenditures made after the date of termination for the protection of Government property and for such legal and accounting services in connection with settlement as are required or approved by the contracting officer;
- (4) The A/E shall be paid that portion of the fixed fee which the work actually completed, so determined by the contracting officer, bears to the entire work under this contract less payments previously made on account of the fee.
- (5) In arriving at the amount, if any, due the A/E under this article, there shall be deducted from what would otherwise be due (i) all unliquidated advances and all other unliquidated payments on account theretofore made to the contractor; (ii) any claims of the Government against the contractor in connection with this contract, and (iii) all deductions due under the terms of this contract and not otherwise recovered by or credited to the Government.

Utilizing these contractual provisions, and based on prior contracting experience, DOE estimates that the approximate cost to terminate the Fluor-Daniel contract in November 1987 would have been \$251,000.00 (two hundred and fifty one thousand dollars) in addition to the costs which had been incurred under the contract prior to that date.

HWVP CONSTRUCTION ACTIVITIES

No physical construction has been initiated to date. Costs incurred as of November 23, 1987, were for engineering studies, process flow sheet development, development of waste acceptance criteria, and conceptual design. Actual physical construction of the Hanford Waste Vitrification Plant is scheduled to commence in July 1991.

DETAILED COST ESTIMATES

The Hanford Waste Vitrification Plant (HWVP) Construction Project Data Sheet (CPDS), provides information regarding the total project cost for HWVP. Please note that the costs are divided into operating expense, capital construction, and capital equipment not related to construction. The total estimated cost has been increased by 22 percent to allow for contingencies. This contingency factor represents the degree of uncertainty in the calculations.

The cost information developed by the Project is based on the Reference Conceptual Design. By the U.S. Department of Energy (DOE) Policy and Orders, Field Offices are obligated to invest sufficient funds such that a valid cost estimate can be prepared for any candidate line item construction project. This investment is generally about 2% of the eventual capital cost.

Estimates for HWVP prepared in accordance with DOE Orders, have been validated by independent review, and contain a contingency allowance that is commensurate with the maturity of the project at this stage.

The CPDS also shows the costs which were incurred prior to October 1987, and identifies the activities for which the costs were incurred. These costs are also divided into operating expense, capital construction, and capital equipment not related to construction.

Enclosed is the FY 1990/91 Congressional CPDS provided to you earlier. It is currently being revised to reflect agreements discussed in the Tri-Party Agreement. Once approved, copies will be forwarded to you.

Department of Energy
 FY 1990/FY 1991 CONGRESSIONAL BUDGET REQUEST
 CONSTRUCTION PROJECT DATA SHEET
 Atomic Energy Defense Activities
 Defense Waste and Environmental Restoration
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Hanford waste vitrification plant (HWVP), Richland, Washington	2. Project No.: 88-D-173
3. Date A/E work initiated: 2nd Qtr. FY 1988	5. Previous cost estimate: \$920,000 <u>a/</u> Date: 4/87
3a. Date physical construction starts: 4th Qtr. FY 1991	6. Current cost estimate: \$965,000 <u>b/</u> Date: 12/88
4. Date construction ends: 3rd Qtr. FY 1999 <u>b/</u>	

7. Financial schedule

<u>Fiscal Year</u>	<u>Appropriation</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 7,500	\$ 7,500	\$ 6,766
1989	22,500	22,500	21,434
1990	29,100	29,100	25,100
1991	55,500	55,500	49,500
1992	110,000	110,000	81,200
1993	196,200	196,200	157,000
1994	183,000	183,000	131,000
1995	197,200	197,200	149,000
1996	75,000	75,000	144,000
1997	50,000	50,000	127,000
1998	39,000	39,000	59,000
1999	0	0	14,000

8. Brief physical description of project

The HWVP facility houses vitrification process equipment and support services for immobilizing Hanford Defense liquid high-level waste (HLW). The facility occupies an area of approximately 35 acres located southwest of B Plant in the 200 East Area on the Hanford Site. The HWVP process system is based upon a liquid fed ceramic melter. The vitrified product is poured into corrosion resistant stainless steel canisters. The filled canisters are decontaminated and seal welded. After inspection, the canisters are placed in storage awaiting transfer to a federal repository. The storage area has a capacity to store up to 5 years of nominal plant production capacity with the capability to expand to an extra 5 years of nominal production capacity.

a/ Cost estimate (Revision 1) based upon completed Reference Conceptual Design and incorporates scheduling and packaging improvements resulting in a more leveled funding profile.

b/ The cost estimate increase and 18-month slip in construction completion is due to funding restrictions in FY 1990 and 1991 delaying completion of preliminary design and start of detailed design. In addition, these funding restrictions delay the start of critical path construction and procurement activities in 1992.

CONSTRUCTION PROJECT DATA SHEET

1. Title and location of project: Hanford waste vitrification plant (HWVP),
Richland, Washington

2. Project No.: 88-U-173

8. Brief physical description of project (continued)

Approximately 35 acres of land will be cleared and graded for construction of the HWVP, access roads, and railroad spurs. Temporary facilities, such as; office trailers, receiving and storage facilities, and a field fabrication shop, will be provided during construction. Except for the export waterline, roads, railroads, and waste transfer encasement, the site is undisturbed.

The HWVP buildings are comprised primarily of two types of construction. The reinforced concrete Category 1 structures house radioactive materials with shielding, special HVAC systems, and remote handling equipment such as cranes, manipulators and fire protection. These structures are designed to prevent or mitigate the consequences of natural occurrences such as earthquakes.

The second type of building construction is standard, non-Category 1 type steel frame with siding construction which house offices, control and change rooms, HVAC equipment, chemicals, supplies, spare equipment, and nonradioactive maintenance areas.

Utilities and general services are provided, including 3.5 miles of electrical distribution lines, communications, cooling water, steam and steam condensate, cold drains and sanitary sewer systems.

Special equipment/process systems used for plant operations are provided, including melter feed systems, sampling systems, melter/turntable, off-gas treatment equipment, canister closure and decontamination equipment, radioactive and nonradioactive waste treatment systems, distributed control system, chemical supply equipment, radiation monitoring system and health protection system.

Liquid low-level radioactive wastes are returned to the 200 East Area Tank Farms for disposal in cementitious grout. Nonradioactive chemical wastes are collected, treated, concentrated and packaged for disposal.

FY 1990 funds will be used for initiation of detailed design and construction and for associated management activities.

9. Purpose, justification of need for, and scope of project

A major mission of the Hanford Defense Waste Program is to achieve permanent disposal of Hanford defense wastes with safe, environmentally acceptable, and cost effective disposal methods which meet applicable regulations. The Atomic Energy Act of 1954 and the Department of Energy (DOE) Organization Act of 1977 directed the DOE and its predecessors to manage defense related nuclear wastes. Consistent with that responsibility, in June of 1983, and in accordance with Public Law 97-90, the Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1982, the President submitted the Defense Waste Management Plan (DWMP) to Congress. The fundamental goal of this Plan is to end present interim storage practices for defense wastes and to provide for permanent disposal. To achieve this goal, the DWMP establishes, as an objective, that the HLW be immobilized prior to shipment to a geologic repository. The HWVP Project has been established to accomplish this objective. The HWVP will vitrify pretreated waste in borosilicate glass, cast the glass into stainless steel canisters, and store the canisters at Hanford until they are shipped to a Federal Geologic Repository.

To achieve the most efficient use of available resources, the DWMP called for a sequential approach for the development of liquid HLW immobilization facilities at two of the three DOE sites. First would be the Savannah River (SR) Plant, and then

CONSTRUCTION PROJECT DATA SHEET

1. TITLE and LOCATION OF PROJECT: Hanford waste VITRIFICATION plant (HWVP),
Richland, Washington

2. Project No.: 88-U-173

9. Purpose, justification of need for, and scope of project (continued)

the Hanford Site. Hanford would be followed by development of an immobilization facility for the calcined waste at the Idaho National Engineering Laboratory (INEL). This approach permits the experience gained at the first site to be applied to the other sites.

Consistent with the President's Plan, the Department of Energy-Richland Operations Office (DOE-RL) published the Interim Hanford Waste Management Plan (HWMP) and its subsequent annual revisions and the companion Interim Hanford Waste Management Technology Plan. With these plans, an integrated strategy for permanent disposal of Hanford defense wastes was established, involving the consideration of a broad spectrum of alternatives, subject to satisfactory completion of the appropriate National Environmental Policy Act steps. Included as part of this strategy is the processing of high-level defense wastes through a system that will assure safe and acceptable disposal in a geologic repository. The process proposed for the Hanford HLW is the vitrification of waste in borosilicate glass in the HWVP and is based upon the same technology being used at the SR Plant in South Carolina; West Valley, New York; and at waste processing plants in Germany, France, Japan, and the United Kingdom.

Hanford currently has 62.6 percent of the nation's high-level defense wastes contained in 149 single shell and 28 double shell tanks. Immobilization of the HLW in these tanks will involve pretreatment in B Plant to produce a relatively large waste stream suitable for disposal as low-level waste in cementitious grout and a relatively small waste stream for vitrification in borosilicate glass for disposal in a geologic repository. For example, pretreatment of the existing and future double shell tank Neutralized Current Acid Waste (NCAW) waste will allow 96.7 percent of the radioactivity (representing only 4.0 percent of the volume) to be vitrified.

The HWVP will be designed with the capacity to vitrify the double shell tank wastes. The HWVP will also be designed so that single shell tank waste could be accommodated in the future with minimal impact on cost, schedule, and plant performance.

Design life of the plant is 40 years, which will provide for the defense high-level waste vitrification need at Hanford over the next few decades. The nominal plant throughput is 45 kg/hour of vitrified waste product. The HWVP will be designed to safely store 5 years of vitrified and canistered product with an average heat content of 1.5 kw per canister. The design will permit expansion for additional canister storage.

There are three factors that support the current schedule for the HWVP and they are as follows:

1. Hanford must take full advantage of the plant systems being designed for the DWPF. The current timing is correct for the HWVP Project to take full advantage of the technical expertise and experience gained on the DWPF before the DWPF design organizations complete their tasks and personnel are reassigned to new jobs.
2. The State of Washington and bordering states, as well as the general public, expect the DOE to take positive and timely action in achieving final disposition of HLW. Washington State officials have expressed concern over Hanford's continued storing of liquid waste in underground tanks. The waste material to be vitrified by the HWVP represents the most intensive radioactive liquid waste at Hanford. Northwest congressional representatives have strongly criticized the DOE's lack of funding to take care of Hanford's waste management issues.
3. It is the policy of the DOE to conduct the Department's operations in compliance with the letter and spirit of applicable environmental statutes, regulations, and standards. It is also DOE policy that efforts to meet environmental obligations be carried out consistently across all operations and among all field organizations and programs in close cooperation with

CONSTRUCTION PROJECT DATA SHEET

1. Title and location of project: Hanford waste vitrification plant (HWVP),
Richland, Washington

2. Project No.: 88-U-173

9. Purpose, justification of need for, and scope of project (continued)

host state agencies. Thus it is essential the DOE address the issue of Hanford defense waste disposal through timely and cost-effective action. With already well developed vitrification technology in use around the world, there is no readily apparent reason for not moving forward with the HWVP to assure the State of Washington, the bordering states, and the general public that the DOE is indeed taking responsible and assertive action.

10. Details of cost estimate

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering design and inspection costs at approximately 21% of construction costs		\$ 138,080
b. Construction Cost		652,220
(1) Improvements to land	\$ 8,500	
(a) Temporary facilities for construction (\$4,850K)		
(b) Site work-general (\$3,650K)		
(2) Buildings a/	178,920	
(a) Vitrification building, 236,541 sq. ft. @ approxi- mately \$487 per sq. ft. (total cost \$115,105K) b/		
(b) Service building, 50,325 sq. ft. @ approximately \$162 per sq. ft. (total cost \$8,150K)		
(c) Canister storage, 58,525 sq. ft. @ approximately \$375 per sq. ft. (total cost \$21,925K) b/		
(d) Fan house, 18,701 sq. ft. @ approximately \$624 per sq. ft. (total cost \$11,665K) b/		
(e) Operations control building, 30,143 sq. ft. @ approxi- mately \$233 per sq. ft. (total cost \$7,035K)		
(f) Regulated entrance facility, 8,305 sq. ft. @ approximately \$278 per sq. ft. (total cost \$2,310K)		
(g) Manipulator repair building, 9,339 sq. ft. @ approximately \$293 per sq. ft. (total cost \$2,740K)		
(h) Feed storage tank/waste holding tank building, 7,940 sq. ft. @ approximately \$73 per sq. ft. (total cost \$580K)		
(i) Switchgear/generator building, 11,277 sq. ft. @ approximately \$370 per sq. ft. (total cost \$4,175K)		
(j) Systems integration facility building, 12,000 sq. ft. @ approximately \$367 per sq. ft. (total cost \$4,400K)		
(k) Site work-buildings (total cost \$435K)		

a/ The building square footage represents the gross square feet of all floors of steel and/or concrete structures, including stairwells, tunnels, elevator shafts, etc. Openings that pass multiple floors are counted only at the base level of the opening.

b/ High square footage costs for the Vitrification and Canister Storage Building are a result of the concrete structure and shielding requirements. For the Fan House, the cause is the concrete structure and the HVAC attributed to the building.

CONSTRUCTION PROJECT DATA SHEET

1. TITLE and location of project: Hanford waste vitrification plant (HWVP),
Richland, Washington

2. Project No.: 88-U-173

10. Details of cost estimate (continued)

	<u>Item Cost</u>	<u>Total Cost</u>
(3) Other structures	\$ 16,200	
(a) Sand filter (total cost \$11,900K)		
(b) Stack, cooling tower, exhaust air tunnel, exhaust duct, chemical waste evaporator tank, and feed and waste lines (total cost \$4,300K)		
b. Construction costs (continued)		
(4) Utilities - included electrical distribution, communications, cooling water, steam and steam condensate, cold drains, and sanitary sewer	7,600	
(5) Special equipment/process systems - includes melter feed systems, sampling systems, melter/turntable, off-gas treatment equipment, canister closure and decontamination equipment, nonradioactive waste treatment systems, distributed control system, chemical supply equipment, radiation monitoring system, and health protection system	436,050	
(6) Laboratory equipment	2,150	
(7) Standard equipment and office furniture	950	
(8) Shop equipment	1,850	
c. Removal less salvage		0
Subtotal		<u>790,300</u>
d. Contingency of above costs at approximately 22%		174,700
Total		<u>\$ 965,000</u>

11. Method of performance

Preliminary design, detailed design, and engineering and inspection during construction services will be performed under a negotiated cost reimbursable architect-engineer contract. Procurement and construction will be performed under fixed-price contracts awarded on the basis of competitive bids to the maximum extent possible. The on-site engineer/constructor contractor will perform construction management services.

CONSTRUCTION PROJECT DATA SHEET

1. Title and location of project: Hanford waste vitrification plant (HWVP),
Richland, Washington

2. Project No.: 88-0-173

12. Funding schedule of project funding and other related funding requirements

	<u>Prior Years</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>FY 1990</u>	<u>FY 1991</u>	<u>FY 1992</u>	<u>FY 1993</u>
a. Total project costs							
(1) Total facility costs							
{a} Construction line item..	\$ 0	\$ 6,766	\$ 21,434	\$ 25,100	\$ 49,500	\$ 81,200	\$157,000
{b} PF&D.....	0	0	0	0	0	0	0
{c} Inventories.....	0	0	0	0	0	0	0
Total Facility Funding.....	\$ 0	\$ 6,766	\$ 21,434	\$ 25,100	\$ 49,500	\$ 81,200	\$157,000
(2) Other project costs <u>a/</u>							
(a) Research and Development b/.....	\$ 16,250	\$ 3,012	\$ 5,600	\$ 10,200	\$ 11,000	\$ 11,000	\$ 9,800
{b} Conceptual Design.....	11,208	1,177	0	0	0	0	0
{c} Environmental and Safety Design Analysis..	521	371	700	1,786	847	910	900
{d} Technical Support, Training, & Startup.....	8,988	3,155	3,070	5,014	5,954	6,590	8,400
{e} Capital Equipment not Related to Construction.	0	0	0	0	3,305	4,700	6,110
{f} Other PACE Related to Construction.....	0	0	0	0	0	0	0
Total Other Project Costs...	\$ 36,967	\$ 7,715	\$ 9,370	\$ 17,000	\$ 21,106	\$ 23,200	\$ 25,210
Total Project Costs.....	\$ 36,967	\$ 14,481	\$ 30,804	\$ 42,100	\$ 70,606	\$104,400	\$182,210

a/ Dollars escalated to year of expenditure using a 4.9% per year escalation rate.

b/ Research and Development category is applied technology concerning existing DOE vitrification systems (no research is required to support the HWVP design).

CONSTRUCTION PROJECT DATA SHEET

1. Title and location of project: Hanford waste vitrification plant (HWVP),
Richland, Washington

2. Project No.: 88-U-173

12. Funding schedule of project funding and other related funding requirements (continued)

	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000/ FY 2001	TOTAL
a. Total project costs								
(1) Total facility costs								
(a) Construction line item.	\$131,000	\$149,000	\$144,000	\$127,000	\$ 59,000	\$ 14,000	\$ 0	\$ 965,000
(b) PE&D.....	0	0	0	0	0	0	0	0
(c) Inventories.....	0	0	0	0	0	0	0	0
Total Facility Costs.....	<u>\$131,000</u>	<u>\$149,000</u>	<u>\$144,000</u>	<u>\$127,000</u>	<u>\$ 59,000</u>	<u>\$ 14,000</u>	<u>\$ 0</u>	<u>\$ 965,000</u>
(2) Other project costs a/								
(a) Research and Development b/.....	\$ 8,115	\$ 8,745	\$ 8,685	\$ 6,400	\$ 6,000	\$ 5,000	\$ 6,000	\$ 115,807
(b) Conceptual Design.....	0	0	0	0	0	0	0	13,385
(c) Environmental and Safety Design Analysis.	400	409	439	464	527	554	1,250	9,478
(d) Technical Support, Training, & Startup....	9,500	12,000	15,000	19,000	29,000	38,000	65,000	228,671
(e) Capital Equipment not Related to Construction	7,665	0	0	0	0	0	0	21,780
(f) Other PACE Related to Construction.....	0	0	0	0	0	0	0	0
Total Other Project Costs..	<u>\$ 26,080</u>	<u>\$ 21,154</u>	<u>\$ 24,124</u>	<u>\$ 25,864</u>	<u>\$ 30,527</u>	<u>\$ 43,554</u>	<u>72,250</u>	<u>\$ 389,121</u>
Total Project Costs.....	<u>\$157,080</u>	<u>\$170,154</u>	<u>\$168,124</u>	<u>\$152,864</u>	<u>\$ 94,527</u>	<u>\$ 57,554</u>	<u>\$ 72,250</u>	<u>\$1,354,121</u>

a/ Dollars escalated to year of expenditure using a 4.9% per year escalation rate.

b/ Research and Development category is applied technology concerning existing DOE vitrification systems (no research is required to support the HWVP design).

CONSTRUCTION PROJECT DATA SHEET

1. Title and location of project: Hanford waste vitrification plant (HWVP), Richland, Washington 2. Project No.: 88-U-173

12. Funding schedule of project funding and other related funding requirements (continued)

b. Other Related Annual Costs (estimated life of project - 22 years)

(1) Facility operating costs	\$ 53,600
(2) Programmatic operating expenses directly related to the facility <u>a/</u>	1,050
(3) Capital equipment not related to construction but related to the programmatic effort in the facility	12,960
(4) Maintenance, repair, GPP and other construction related to programmatic effort in the facility	<u>13,640</u>
Total Other Related Annual Costs	<u>\$ 82,250</u>

13. Narrative explanation of total project funding and other related funding requirements

a. Total Project Costs

(1) Total Facility

(a) The total facility costs includes: engineering, design, and inspection during construction (site preparation, Vitrification Building, Service Building, Canister Storage Building, sand filter, fan house, stack, etc.) construction management and project management.

(2) Other Project Costs a/

(a) Research and Development includes b/: process technology, equipment adaptation and testing, and waste form qualification activities, and technology coordination with the Defense Waste Processing Facility at Savannah River.

(b) Conceptual Design includes all conceptual design costs prior to the initiation of preliminary design.

(c) Environmental and Safety Design Analysis includes all environmental and safety support for design and startup of the facility.

(d) Technical Support, Training and Startup includes: project criteria, engineering studies, plant operational and maintenance support, systems integration testing, training and certification, preoperational testing, readiness reviews, quality assurance and program management.

(e) Capital Equipment Not Related to Construction includes: replacement pilot scale melter testing equipment, and spare equipment.

a/ THIS does not address the costs of transporting the canisters to the geologic repository or the repository disposal costs.

b/ Research and Development category is applied technology concerning existing DOE vitrification systems (no research is required to support the HWVP design).

CONSTRUCTION PROJECT DATA SHEET

1. Title and location of project: Hanford waste vitrification plant (HWVP),
Richland, Washington

2. Project No.: 88-U-173

13. Narrative explanation of total project funding and other related funding requirements (continued)

- b. Other Related Annual Costs a/ - It is estimated that the facility will be used 22 years for its material costs, fixed costs and utilities.

Labor costs include: operations personnel, engineering personnel, safety and quality assurance personnel, and management personnel. The yearly manpower required to operate the facility is estimated to be approximately 260 manyears which includes approximately 115 manyears to operate the plant in shifts 24 hours a day, 7 days a week.

(1) Facility operating costs

Material costs include the costs of chemicals, canisters, and glass frit to operate the plant.

Fixed costs include the costs of rail service, laundry, waste disposal and special service contracts (e.g. routine sample analysis at other contractors).

The cost of utilities includes the cost of electricity, steam, and water.

- (2) Includes programmatic operating expenses directly related to the facility. a/

- (3) Capital equipment not related to construction but related to the programmatic effort in the facility.

The estimated cost is based on Hanford experience for equipment replacement costs at production facilities, and represents an average value over the operating life of the facility, including melter changeouts every three years.

- (4) Maintenance, repair, GPP or other construction related to the programmatic effort - This estimate is comprised of projected maintenance and repair labor costs.

a/ Dollars escalated to year of expenditure using a 4.9% per year escalation rate.

RESPONSES TO QUESTIONS 6 AND 7

6. Detailed comparative information documenting capital costs which would be required to build the HWVP versus the capital costs to build an entirely new Hanford Treatment, Storage, and/or Disposal facility (see chapter 173-303 WAC, sections 805(7)(e) and 040(30)).

The capital replacement costs for the Hanford treatment, storage, and disposal facilities are being calculated. These costs will be available by June 1989.

7. Any other information which you believe may be pertinent to this issue.

The treatment of high-level tank wastes, some of which contain chemicals which are subject to the Resource Conservation and Recovery Act land disposal restrictions, is necessary to comply with the land disposal restriction regulations. The Hanford Waste Vitrification Plant (HWVP) provides the necessary treatment to meet these federal regulatory requirements. Additionally, the HWVP process also ensures that the Hanford high-level wastes are processed for final disposal as mandated in the federal Nuclear Waste Policy Act.