VALUE ENGINEERING STUDY

**SUBPROJECT L-O45H
300 AREA TREATED EFFLUENT
DISPOSAL FACILITY**

**HANFORD ENVIRONMENTAL COMPLIANCE PROJECT
HANFORD SITE
RICHLAND, WASHINGTON**

JUNE 1991

**U. S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT**

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INDEX

		<u>Page No.</u>	DOE/RL/12175--T1
	INDEX	i	DE92 003440
	EXECUTIVE SUMMARY	iii	
PART I	INTRODUCTION	1	
I-1	Project Designation	1	
I-2	Subproject Designation	1	
I-3	Study Sponsor	1	
I-4	Purpose	1	
I-5	Objective	1	
I-6	Study Participants	1	
I-7	Study Period	2	
I-8	Project History	2	
I-9	Subproject History	2	
I-10	Initial Study Assumptions	4	
I-11	Assumptions Developed During the Study	5	
PART II	DISCUSSION	6	
II-1	Conduct of the Study	6	
	A. Study Format	6	
	B. Phasing	6	
	C. Procedural Approach	7	
	D. Timeline Illustration	7	
	E. Fast Approach	7	
	F. Fast Definition	7	
	G. CPM	8	
	H. Study of the Critical Path	8	
II-2	Background Information	9	
	A. Best Available Technology Determination	9	
	B. Waste Water Characterization	10	
	C. Columbia River Characterization	10	
	D. Ongoing Efforts	11	
	E. Applicable National and State Laws and Regulations	11	
II-3	Study Results	11	
	A. Bench Scale Testing	11	
	B. Evaporator	11	
	C. Design/Build Construction	11	
	D. Acceptance Testing	12	
	E. PSAR/PSAD	12	
	F. Risks/Cost	12	
	G. Design	13	
	H. Design Strategy - Innovation	15	
	I. SEPA (State Environmental Policy Act)	16	

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	<u>Page No.</u>
J. Permitting	17
K. Contracting Strategy	21
L. Other Areas Explored	26
 PART III CONCLUSIONS	 29
III-1 Activity Functional Relationships	29
III-2 Partnering	29
III-3 Schedule Acceleration	29
III-4 Schedule Constraints	29
A. The BAT Process	29
B. Nuclear vs. Non-Nuclear Issue	29
C. River Sampling	30
D. Preliminary NPDES Criteria	30
E. Regulator Deliverables	30
F. Clean Air Act Permitting	30
G. Treatment Process Changes	30
H. Evaporator Procurement	30
I. PSAD	31
J. Deconflicting Projects	31
K. Negotiations with EMO	31
III-5 Other Areas for Consideration	31
A. Relocation of Treatment Facility	31
B. Integration of Projects	31
C. Contracting Strategy	31
 PART IV RECOMMENDATIONS	 33
IV-1 Timing of Value Engineering Studies	33
IV-2 Project Schedule	33
IV-3 Other Areas for Consideration	33

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EXECUTIVE SUMMARY

1. This Value Engineering study was sponsored by Department of Energy, Richland Field Office. The study focuses on the project schedule for Project L-045H, 300 Area Treated Effluent Disposal Facility. The 300 Area Treated Effluent Disposal Facility is a Department of Energy subproject of the Hanford Environmental Compliance Project.

2. The study scope is limited to validation of the project schedule only. The primary purpose of the study is to find ways and means to accelerate the completion of the project, thereby hastening environmental compliance of the 300 Area of the Hanford site. Such traditional Value Engineering parameters as cost, construction methodology, value, and quality were approached indirectly, and only as they came to bear on the schedule. This study limitation is at the request of the customer.

3. The study was initiated on Friday June 7, 1991 and continued the following Monday June 10, through Thursday June 14, 1991. An oral presentation of the study results was made July 16, 1991 at DOE Richland, Washington.

4. The study used a multi-agency approach, emphasizing aspects of partnering. Study team members represented key players in the programming, project management, permitting, construction and operations functions, from Department of Energy, Richland Field Office, the Environmental Protection Agency, Region 10, Washington State Department of Ecology, Kaiser Engineers Hanford, Pacific Northwest Laboratory, and Westinghouse Hanford Company. The study facilitators were provided by the Corps of Engineers, Kansas City District.

5. Study Results.

a. Acceleration of the project schedule is not feasible.

b. Significant problem areas exist that may cause project schedule slippage. These areas are addressed in the report as "key critical events", and represent areas that management must monitor closely to prevent project schedule slippage.

PART I - INTRODUCTION

I-1. Project Designation.

Hanford Environmental Compliance Project.

I-2. Subproject Designation.

300 Area Treated Effluent Disposal Facility (L-045H).

I-3. Study Sponsor.

Department of Energy Field Office, Richland (RL).

I-4. Purpose.

A. The purpose of this study is to examine, validate, and explain ways to accelerate an integrated schedule of the project using Value Engineering methodology.

B. Cost is not directly addressed by this study, although cost awareness was present throughout the study. Certain impacts on cost, as a result of schedule changes, were examined as the need arose.

C. Purpose and scope are further defined in appendix 4. This appendix includes the guidance furnished prior to initiating the study.

I-5. Objective.

The objective of this study is to show where project schedule time savings might be achieved through innovative management, permitting, design, construction, scheduling, procurement, or other undefined approaches, in order to hasten environmental compliance of the 300 area process effluent discharge.

I-6. Study Participants.

The VE team included representatives from Department of Energy, Richland Field Office (RL), the Environmental Protection Agency (EPA), Washington State Department of Ecology (Ecology), Kaiser Engineers Hanford (KEH), Pacific

Northwest Laboratory (PNL), and Westinghouse Hanford Company (WHC). The facilitators were provided by the Corps of Engineers, Kansas City District. A list of the study participants are at appendix 2.

I-7. Study Period.

The study was initiated on Friday June 7, 1991 and continued the following Monday June 10, through Thursday June 14, 1991. An oral presentation of the study results was made July 16, 1991 at Department of Energy's Richland Field Office, Richland, Washington.

I-8. Project History.

During operations over prior years, waste management facilities and processes at the Hanford Site were constructed and operated in a manner consistent with standard industry practices of the time. Over the years, more stringent regulatory requirements have evolved, necessitating upgrades and modifications to facilities and processes to maintain compliance with current standards. These upgrades and modifications are the basis for the improvements provided by the Hanford Environmental Compliance Project, of which subproject L-045H is a part.¹

I-9. Subproject History.

A. The "300 Area" has been utilized extensively as a laboratory area, with a diverse array of laboratory facilities installed and operational.

B. The 300 Area Process Sewer, located in the 300 Area on the Hanford Site, collects waste water from approximately 62 sources. This waste water is discharged into two 1500 feet long percolation trenches. Current environmental statutes and policies dictate that this practice be discontinued at the earliest possible date in favor of treatment and disposal practices that satisfy applicable regulations. In May, 1989, an agreement reached among the U.S. Department of Energy (DOE), the Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) prioritized environmental remediation activities at Hanford (DOE 1989). Included within this agreement (known as the

¹Hanford Environmental Compliance Environmental Assessment (HEC-EA) Resubmittal, 4 April 1991, p. 1.

Tri-Party Agreement) was Milestone M-17-06, "Cease All Discharges to the 300 Area Process Trenches."²

C. This subproject will provide the collection, treatment, and disposal facility for the 300 Area process water effluent. The process wastes liquid effluent is considered to be process industrial waste water. However, waste water contaminants do not fall neatly into one of the thirty four industrial categories identified in CWA regulatory guidance. The effluent is well below the DOE requirements for radiological secondary containment, and is not considered a Resource Conservation and Recovery Act (RCRA) hazardous waste. This treated effluent will be discharged to the Columbia River.³

D. The facilities will be located north of the 300 Area. The existing process sewer line will be intercepted and rerouted to a collection sump and lift station. The waste water will be routed through a combination of piping and a new 50,000-gallon surge tank to the treatment system, which will be enclosed in a building or structure equivalent to a pre-engineered, metal building. The system will use commercially available equipment and technologies whenever practicable. Minimum collection system requirements provide for the use of existing gravity-flow piping compatible with process effluent wherever practical. However, pumps may be required. The installation and tie-ins of new pipelines will be scheduled to minimize interferences with current operations.⁴ This project does not address replacement or modifications to the existing collection system. This project will connect to the existing process sewer with a lift station, which will pump the effluent to the new treatment facility.

E. The treatment system will have various types of treatment equipment that will be used in the combination necessary to remove the contaminants required. Secondary wastes will be minimized to the extent practical. The treatment system will be designed for a process flow rate of approximately 300 gallons per minute. Treatment system design will be supported by bench testing of effluent treatment unit operations using synthetic and/or actual waste

²Comment Draft, 300 Area TEDF Technology Selection Engineering Report, June 1991, Ebasco Environmental, p. 2.

³Hanford Environmental Compliance Environmental Assessment (HEC-EA) Resubmittal, 4 April 1991, p. 28.

⁴Hanford Environmental Compliance Environmental Assessment (HEC-EA) Resubmittal, 4 April 1991, p. 28.

solutions.⁵

F. After treatment, the effluent will be monitored and then released to the Columbia River. Discharges will be permitted under the National Pollutant Discharge Elimination System (NPDES) section of the Clean Water Act (CWA). Immediately after post discharge monitoring, there will be the capability to divert the flow to one of two diversion basins (each basin will be sized for approximately 1,000,000 gallons). The basins will be double-lined and covered, which will meet Resource Conservation and Recovery Act (RCRA) design standards. The diverted effluent will be retained until it can be sampled and cleared for release or returned for further treatment.⁶

I-10. Initial Study Assumptions.⁷

A. The project total estimated capital cost shall target the current approved budget of \$14.7M.

B. The plant capacity shall remain at 300 gpm.

C. The Conceptual Design Report (CDR) concept validated in FY 1990 shall serve as the baseline concept and schedule

D. Recognizing the process train will be proposed under BAT and designed to meet the NPDES permit criteria, the VE study shall examine the schedule and identify items in scope which impact cost.

E. Applicable statutes, regulations, and DOE Orders shall not be violated.

F. Schedule changes will be justified by action which will be new or different, i.e., procedures or new methods.

G. 300 Area flow reductions:

12/91	400 gpm
12/92	300 gpm
5/93	200 gpm

⁵Hanford Environmental Compliance Environmental Assessment (HEC-EA) Resubmittal, 4 April 1991, p. 28.

⁶Hanford Environmental Compliance Environmental Assessment (HEC-EA) Resubmittal, 4 April 1991, p. 28.

⁷Value Engineering Study Proposal, 21 May 1991.

I-11. Assumptions Developed During the Study.

- A. The effluent is classified as non-nuclear/low hazard.**
- B. Columbia River sampling will take place during the summer of 1991.**
- C. Preliminary Safety Analysis Report (PSAR)/Preliminary Safety Accident Determination (PSAD) needs 183 working days for completion.**
- D. Conceptual Design Report (CDR) treatment train will be utilized.**
- E. The Hanford Environmental Compliance Environmental Assessment (HEC-EA) will be approved on schedule.**

PART II - DISCUSSION

II-1. Conduct of the Study:

A. This study is carried out in a Value Engineering (VE) format, using VE methodology, rather than standard (ie. Critical Path Method) project engineering methods. The use of a structured process, which involves technical and regulatory expert representatives from the key decisionmaking agencies, and independent facilitators, was utilized as a means of attaining schedule credibility and optimization.

B. This study encompasses six phases. The six phases and a brief description of them are:

(1) Information Phase - Phase 1.

The first phase is the Information Phase. This phase ensures that all team members completely understand the function and/or purpose of the project by gathering all information related to it. It is critical that correct information be obtained to establish the data base prior to the development of suitable alternatives.

(2) Speculation Phase - Phase 2.

The second phase is the Speculation Phase. This is the creative phase where the team "brain-storms" alternative methods of achieving the required functions of a project. At this point, ideas are not evaluated since criticism of an idea could discourage participation, decrease the flow of alternatives, and inhibit the creative endeavor.

(3) Analytical Phase - Phase 3.

The third phase is the Analytical Phase. This phase forces the study team to eliminate all alternatives which are not feasible or are otherwise unsuitable. The remaining alternatives are ranked in the order of feasibility and cost.

(4) Development Phase - Phase 4.

The fourth, or Development Phase, is a designated study phase where the best alternatives are developed into proposals for presentation. Alternatives are developed sufficiently to (1) demonstrate technical viability, (2) permit reasonably accurate estimates of their costs, (3) determine

advantages/disadvantages, and (4) facilitate design documentation and construction.

(5) Presentation Phase - Phase 5.

The fifth phase is the Presentation Phase. This phase consists of presenting the developed alternatives as formal proposals to decision makers. The presentation must be clear, concise and present factual data to the decision makers. The Presentation Phase should include a plan for implementation.

(6) Implementation Phase - Phase 6.

The last phase is the Implementation Phase. This phase is for follow-up and implementation, during which the approved VE proposals must be converted into actions. The proposals of the VE study are actually a collection of concept designs in sufficient detail to facilitate further development into plans and specifications by the project manager and designer.

C. The procedural approach to this VE study encompassed (1) gathering pertinent information; (2) development of a simplified project timeline illustration; (3) development of a series of FAST diagrams; (4) study of successive iterations of the critical path; (5) identification of key critical functions; (6) development and exploration of alternatives to enhance the schedule.

D. The simplified project timeline illustration focused on the major events and problems associated with the project, from the project manager's viewpoint. This illustration served to orient team members, and provided a focus on critical events known to exist at the beginning of the study. A reproduction of that illustration is included at Appendix 5.

E. The entire project schedule was studied utilizing the Functional Analysis Systems Techniques (FAST) diagram approach. This approach provided the forum upon which functional analysis of project requirements took place, and provided visibility of key project functions and the sequence that these functions must be performed. Additional FAST diagram analysis of key functions were made as the need arose.

F. FAST is a graphic display of functions of the project under study. It shows their relationships and verifies their description accuracy. It is a logic stimulator and the diagram presents the graphic representation of functional logic. The FAST diagram's most useful function is to serve as an aid to attain a visualization of the entire project. Management can review the FAST diagram and visually see the functional interrelationships of the project. In this case, functions covering permitting, design, construction, and operations were included with each

function arranged according to constraint. To determine if a function is in it's proper location it should answer the question, "How," as you read to the right and work your way through the diagram. As you read the diagram to the left you ask the question, "Why." Using these deterministic logic questions, the functions are placed in a logical sequence. FAST diagrams for this project is included in appendix 7. The detail in which the functions are developed to the right of the chart can be carried out to any detail desired. The FAST diagram differs from a critical path chart in that it is not a time flow of function but a logic arrangement of functions. After completion, the entire project can be visually seen in a logical sequence with all the dependent functions clearly visible. The FAST diagram enhances communications and gives visual reassurance.

G. The Critical Path Method (CPM) is a management tool which focuses on events, time duration of events and determining which events, if not executed in a timely manner, will immediately cause time delay.

1. CPM critical events are defined as "no float". No float means that, should completion of the function be delayed, there will be a day for day extension to the overall project schedule, and, conversely, there is no opportunity to begin performance of the function ahead of time.

2. CPM is time oriented, not function oriented. CPM depends on input data to define functional and time relationships. CPM assumes that functional logic is correct, and is incapable of checking the logic. CPM is also incapable of providing a clear visualization of possible changes in logic that may improve the schedule.

3. Human creativity must be utilized, through the medium of a VE study or other process, to apply human judgements to the CPM process. FAST diagraming does provide such a logic method to achieve clear, logical definition and visibility of the process under study.

H. Study of the Critical Path.

1. The primary thrust of this study is to improve the time duration of the project schedule. Once the logical sequence of functions was developed and the CPM database updated, the critical path was studied through successive iterations. By use of an on-hand laptop computer, with appropriate CPM software, functions on the critical path were studied, alternatives identified, adjustments made to durations, and a new critical path generated for further study. These successive iterations identified critical functions in the project, which were further explored to shorten the overall project duration. During this process, logic problems were uncovered in the CPM database, which were corrected prior to proceeding with the next iteration. Eventually, key critical events became the

focus for the study, and these events provided the basis for validation of the project schedule.

2. For purposes of highlighting events that are critical to the overall success of the project, we have utilized a definition of "key critical function" to denote those activities that, if not accomplished in a timely manner, will severely impact the execution of the majority of follow-on functions encompassed in the project, and will severely impact the potential for accomplishment of project goals. The designation of a function as a "key critical function" implies that the designated function and the relationships between it and other functions have been studied in detail, and educated corporate judgement has determined their criticality, through the medium of the VE study.

II-2. Background Information.

A. Best Available Technology (BAT) Determination.⁸

1. The 300 Area waste stream is unique in terms of the combination of contaminant species and associated concentrations. In general, federal or state regulations cannot be directly applied in establishing effluent limitations and associated treatment levels necessary for the waste water stream. Existing guidance for selection of BAT for industrial streams cannot be directly applied due to the uniqueness of the 300 area waste stream.

2. Due to the treatment and regulatory complexities involved, the DOE has established a procedure for determining the Best Available Technology (Economically Achievable), abbreviated "BAT", to be utilized in treating waste water streams. The DOE has organized the BAT selection process into a series of five steps which can be applied, in sequence, to determine BAT for a given waste water stream.

3. The first step involves acquisition and correlation of stream specific data. This step is simply described as "Waste Water Characterization".

4. The succeeding four steps are applied in sequence, but only up to the point at which a determination of BAT is reached. These four steps are (1) Effluent Guidelines Method; (2) Technology Transfer Method; (3) Treatability Studies Method; (4) Generic Treatment Systems Method.

5. The BAT process is more fully described in the WHC BAT Guidance

⁸Comment Draft, 300 Area TEDF Technology Selection Engineering Report, June 1991, Ebasco Environmental, p. 7.

Document (WHC-EP-0137). This document has received tacit regulatory approval.

B. Waste Water Characterization.⁹

1. Waste water characterization is necessary to provide a basis for making treatment and disposal decisions and to support the approval and permitting process. Some waste water characterization has occurred in the past, and supports project goals, objectives and methodology. Complete characterization of the waste stream is complicated by current and planned changes to the 300 Area Process Sewer effluent sources, and unknowns concerning the potential for heavy metal deposits in the process sewer.

2. WHC has instituted a program of physical and administrative source controls and waste minimization of the 300 Area Process Sewer effluent.

3. Further waste water characterization will enhance the quality of pollutant concentration estimates and BAT selection. Implementation of the planned flow reduction and source control tasks will reduce the process sewer flow rate from about 1300 gpm to about 200 gpm, reduce the concentration of some of the constituents of concern, and reduce the potential for chemical spills to the process sewer. These tasks include elimination of overflow from emergency water supply storage tanks, replacement of some HVAC water chillers with air-cooled units, rerouting of some coolant water to the sanitary sewer, drain plugging, various process modifications, the use of closed loop cooling systems, and the implementation of additional administrative policy controls. These activities are ongoing and will not be completed until shortly before the treatment facility is placed in operation. As a result, characterization data for the process sewer effluent must be estimated from chemical analysis after accounting for the effects of the proposed source controls and waste minimization efforts.

C. Columbia River Characterization.

Characterization of the Columbia River is necessary to determine background quantities of pollutants of concern contained in the river. The primary function of this effort is to determine the degree to which each waste water constituent must be treated, and whether a mixing zone is allowable for a given constituent or parameter. Sampling must take place during periods of low flow, i.e. prior to 1 October 1991 or 1992, during low summer flow. Additional sampling must also be taken during periods of low winter flow, (i.e. March 1992). However, the primary schedule constraint at this time is the low summer flow sampling.

⁹Comment Draft, 300 Area TEDF Technology Selection Engineering Report, June 1991, Ebasco Environmental, p. 8.

D. Ongoing Efforts.

1. Final selection of BAT is supported by other efforts. Principle among these are (1) continuing refinement of waste water characterization, (2) Colombia River characterization, (3) a literature study to determine what technology is available for waste water treatment, (4) the actual selection of BAT, bench testing the BAT selection, (5) possible pilot testing.

2. Ebasco Environmental is under contract with Westinghouse Hanford Company to conduct a study of possible waste water treatment schemes that may be utilized for this project. The Selection Engineering Report comment draft dated 7 June 1991 was considered by this study.

3. The HEC-EA is currently being staffed for approval at DOE Headquarters.

E. Applicable National and State Laws and Regulations.

Discussion concerning which laws are applicable to this project and their impact are described in the draft EBASCO report (reference No. 4).

II-3. Study Results.

A. Bench scale testing of the recommendations of the BAT from the Ebasco report will be required to write the performance specifications for the design/build contract and to write the NPDES application. Bench scale testing requires that the waste water and the Columbia River be characterized. Bench scale testing will also be used to estimate the amount and characteristics of the secondary waste being generated. All of this information is used to verify the design criteria.

B. Of the five possible treatment trains under study by Ebasco, three require evaporators. Of these three, two require a 20 GPM evaporator, while the third requires a 2 GPM evaporator. Procurement of the evaporator is a long lead time requiring 18 months for delivery. This procurement cannot occur until after treatment technology is selected, the PSAD is completed, and the design/build contract is awarded. Consequently, the study team determined that providing the evaporator as Government furnished equipment (GFE) would shorten the schedule. The risk is that, if the technology requiring a 20 GPM evaporator is not selected, then the Government is stuck with a new evaporator, at a cost of \$500,000. If the treatment train requiring a 2 GPM evaporator were selected, then the 20 GPM evaporator would be grossly oversized. The study team opted to recommend providing a 20 GPM evaporator as GFE to improve schedule.

C. The design/build construction requires nearly two years. Any attempt at

improvement of this activity duration ran into the problem that construction cannot begin until permits are in place, with the outfall construction requiring the most permits. It was discovered that permitting the outfall will require a preliminary design which must be completed before the design/build contract is awarded. An additional constraint on construction was that it cannot be completed without an evaporator being delivered at least 90 days prior to its end date. The eighteen months required for procurement of the evaporator must therefore begin before the design/build contract is awarded.

D. The acceptance testing can begin 30 days before the completion of construction but must extend to 60 days after all construction is completed so that any defective equipment can be replaced and the total system tested again. The operational testing will also require 90 days which must be started after the successful completion of the acceptance testing so that all systems are ready for a final readiness review of 30 days which can start only after the operational testing is completed.

E. Discussion was made concerning whether the PSAR/PSAD would really take 183 days. The start of the PSAR/PSAD is contingent upon getting enough design information from the performance specifications to allow the safety analysis to begin. Consideration was given to either shortening this timespan or seeing if some of the time requirement for this function could be satisfied prior to PSAR/PSAD becoming critical, in concert with other project activities. Since the proponent of the PSAR/PSAD was not represented on the VE study team, the team opted to leave it alone, at 183 days duration.

F. Risks/Cost.

Certain assumptions were made at the outset of this study to form the baseline that the study was to follow. Some of these assumptions of concern were that the treatment process will be the system that was conceived in the project L-045H Conceptual Design Report. That is, the train will include filtration, granulated activated carbon (GAC), reverse osmosis (RO), ion exchange (IX) and filter backwash, secondary washes being further reduced by use of a mechanical vapor recompression (MVR) evaporator. Another key assumption is that the facility has been designated as a low hazard, non-nuclear facility. There are risks involved to this project such as:

1. Nuclear vs. non-nuclear. Small amounts of radioactive material have been periodically identified in the waste water stream. This constituent is not in sufficient concentration to be an environmental threat, and is below discharge limits. However, this issue is highly inflammatory with the general public, and may cause significant difficulties during public comment. If a nuclear determination is

made, then 6430.1A compliance review will be needed which may add safety features that will add time and cost to the project.

2. If the treatment process changes from the CDR concept through the development of the BAT, the time and cost may be changed according to the complexity of the final treatment process.

3. As the schedule was worked on during the VE study, certain aspects of the project were modified, such as procurement of the evaporator. The project baseline had the offsite design/build contractor designing/procuring and installing this evaporator. To improve schedule, this evaporator is to be a Government furnished item.

4. Failure to take river characterization samples in summer 1991 will push schedule end date past the December, 1994 project completion date.

5. HEC-EA challenged in public review. If further environmental impacts need studies, procurement and construction activities may be delayed.

6. SEPA process may allow environmental impact statement (EIS) challenge.

7. PSAR/PSAD completion by mid September 92 to support procurement of the evaporator.

8. Public comment from the NPDES process to limit use of river. Public may be concerned with direct discharge from plant to river. Public may want hold up basins or soil discharge which would be major scope changes.

9. CPM Task C3W2T107, State air permit decision point, occurs around April 1992, and will decide whether full air permitting is required or a simple notification letter is sufficient. If the full permit process is required, this will impact start of construction.

G. Design.

1. Key constraints to achieving schedule goals are characterization, BAT selection, bench scale testing, and project design. The sequence of events generally is the following:

a. Columbia River and effluent characterizations.

b. BAT study.

- c. Bench scale testing.
- d. Treatment train selection and design.
- e. Procurement package (specifications) preparation.
- f. Design of support requirements by design-build contractor.
- g. Design of utilities extensions by KEH.
- h. Design of the evaporator by the evaporator manufacturer.

2. Using a design-build strategy, the bulk of design effort normally takes place after contract award and runs concurrent with construction. This allows for a telescoping of the design and construction functions as much as possible, thereby shortening the needed time to cycle through the design-build process. For project L-045H, achieving the advantages of design-build will be only partially achieved. Due to function path interdependence and schedule constraint, certain key design functions will be performed by other than the design-build contractor, and must precede procurement package preparation. These functions include selection and design of the treatment train through the BAT selection process, design of the evaporator, preliminary design of the outfall, and procurement package (specifications) preparation for the design/build contracting effort. Additionally, design of utility extensions by KEH is handled separately.

3. This project has already been compressed, prior to adding the strategy of design/build, by pursuing permitting and design concurrently. This initial telescoping causes functional interplay that must be understood and clearly defined. Adding design/build to the strategy further complicates the schedule by separating some design and procurement actions from other design functions, and complicates the interplay between the various major functions, such as permitting, design, and construction.

4. The fundamental design strategy for L-045H was based on the A/E providing innovation during the design phase in the form of a "commercially available" treatment train. There was concern that, based on limited knowledge, an exotic BAT would be selected which might drive up the cost for operation and maintenance. Since upfront engineering has been limited by time and resource constraints, the A/E innovation was considered essential. Having the A/E provide innovation, however, created problems.

a. L-045H permitting is based on BAT which is process oriented. Consequently, the treatment train needs to be identified early in the permitting

process. Waiting for an A/E to determine BAT creates significant delays in the schedule.

b. To get an A/E to develop the BAT during the design phase was constrained by the BAT process itself which is technology based, and not regulation limit based (receiving water criteria). Consequently, writing a performance specification which required the meeting of a discharge criteria was not practical. This is especially the case since Ecology does not provide final discharge limits prior to evaluation of the BAT which is supported by bench scale testing.

c. The current contract between RL and KEH does not provide for awarding a contract by negotiation.

d. Waiting for the A/E to provide final selection of the BAT and the supporting bench scale testing would move the completion of L-045H a significant period (probably more than six months) into 1995.

H. Design Strategy - Innovation.

1. Upfront engineering support has been limited by time and resource constraints. As a result, a significant amount of upfront engineering has not been performed to support the completion of the NPDES permit application and development of the performance specification.

2. WHC is currently negotiating a subcontract with Environmental Management Operation (EMO) to provide engineering support for L-045H. EMO will have waste water treatment experience within the areas of upfront engineering, permitting, design and construction management. An opportunity exists to utilize the EMO subcontractor's experience with waste water treatment to evaluate the BAT study being prepared by EBASCO to further compress the schedule. If the statement of work (SOW) with EMO can be modified and work completed by December 1991 to provide for the following, then the December 1994 completion may be achievable.

a. Development of sampling and analysis plans for the 300 area process sewer effluent and the Columbia River.

b. Sampling and characterization of the Columbia River and the effluent.

c. Evaluation of the Ebasco BAT report with special emphasis on the assumptions made which led to the preliminary effluent characterization which in turn drives the Ebasco BAT selection.

d. The opportunity for the EMO subcontractor to provide technology innovation to the BAT based on their "best professional judgement".

e. Confirm the existing Ebasco BAT and any innovation through bench scale testing.

f. Verify and/or establish the final design criteria and BAT.

g. Determine air emissions based on characterization of the effluent.

h. Specify air pollution control technology if necessary to meet air permitting requirements.

i. Provide support in the development of a Technical Performance Specification which utilizes the final BAT as the driver to design.

j. Develop an engineering summary report which ties together all upfront engineering activities and their results into an integrated document which supports design and permitting.

k. Provide technical consultation on permitting activities.

l. Provide further characterization, as necessary, as waste minimization (volume reduction) activities are completed.

I. SEPA (State Environmental Policy Act).

1. The role and integration of the SEPA process into the overall permitting strategy of Project L045H needs to be better defined. Of particular concern is the integration of SEPA into public hearings required for the State and Federal permits is of particular concern.

2. State of Washington Comments Concerning Permitting.

Gary Anderson offered the following informal comments concerning the State permitting process.

a. There has historically been mistrust and hostility between the state regulators and permittees.

b. Many of these environmental problems could have been cleared up twenty years earlier.

c. "Hanford" is one of the big guys like Boeing, Weyerhaeuser. Hanford is being treated like a "big guy".

d. Establishing trust between Hanford and Ecology will take time. It will take effort on the part of both parties.

e. "Hanford" doesn't seem to take Ecology questions seriously.

f. There are too many "dog and pony" shows from Hanford, and not enough serious communications.

g. There seems to be a lack of communications within both organizations (Ecology and Hanford). There is a definite lack of communication between both organizations.

h. Mistrust. How do we get rid of it? Open and frank discussion between the worker bees and management on both sides. No hidden agendas, no hidden issues.

J. Permitting.

1. A great deal of effort went into defining the parameters of the permitting process, including BAT, bench scale testing, and characterization, and the interplay between those processes and the various permitting processes and checklists, with procurement package preparation and design. A summation of required permits and the proponent agency is at figure 1.

2. EPA Deliverable for NPDES Permitting.

a. Discussions with EPA representative Sylvia Kawabata disclosed the following EPA permitting expectations.

(1) Deliverables include the BAT report, with effluent (influent to the treatment facility) characteristics.

(2) Results of bench scale testing.

(3) Results of Columbia River characterization.

(4) The permit application.

b. General guidance received was to (1) justify what you are going to do by the most expedient means possible; (2) the state has an informal role only; (3) 173-201 is the starting point.

FIGURE 1

PERMIT PROPONENCY

PERMIT	PROPONENT
National Pollution Discharge Elimination System Permit (NPDES)	Environmental Protection Agency (EPA)
Hydraulics Permit	Washington State Dept. of Fisheries
Outfall Permit	U.S. Army Corps of Engineers (COE)
Wild and Scenic Rivers Act Permit	National Park Service (NPS)
Air Quality Permit	Washington Dept. of Health
Toxics & Radioactivity Permits	Washington State Dept. of Ecology
Outfall Lease	Washington State Dept of Natural Resources

3. The overall time allowed for permit preparation in the current schedule is relatively short. When permitting appeared on the critical paths during the various schedule manipulations, the underlying reason was lack of sufficient design information being available for permit generation, not length of time allowed for permit application generation, review, or permit issuance. Specific design information required is Columbia River characterization, effluent characterization, bench scale testing results, and a projected annual radionuclide inventory for air emissions evaluation and the Clean Air Act Permit.

4. This Value Engineering Study repeatedly found that the links between effluent characterization, river characterization, treatment train definition, and bench scale testing results constrained the start of permit preparation, and thereby forced permitting onto the Critical Path.

5. These schedule manipulation exercises served to underscore the importance of the early characterization and bench scale testing activities currently being proposed. This data and the definition of the treatment train will allow for the early preparation of the NPDES permit application. If this permit can be issued during the "off site design" phase, the risk to the project schedule from design changes mandated by the agencies or as a result of the public comment period can be greatly reduced.

6. One area of concern for permitting revealed by the Value Engineering Study was the emission estimates of airborne effluents that will determine the level of air permitting required. These emission estimates for toxic and radioactive air emissions are critical for the determination of the applicability of the upcoming Washington State regulations controlling toxic air emissions and radioactive airborne emissions, respectively. If the airborne emission estimates show that the radioactive and toxic emissions are below the trigger levels, significant time will be gained by using the agencies' notification processes to obtain preconstruction approval. Agency preconstruction approval is required prior to initiation of construction.

7. This VE Study also served to identify the need to thoroughly define the contents of the various design, procurement, and construction activities in the Project schedule. This definition is required to properly impose the regulatory constraints for overall project construction. Lacking this definition, permit approval constraints were conservatively applied to the beginning of all potentially affected construction activities.

8. The results of the study effort in the permitting area are a refined FAST diagram, changed CPM logic, and the recognition that bench scale testing and events leading up to bench scale testing are key critical functions. Characterization of both the Columbia River constituents and the process effluent

must be conducted expeditiously to support follow-on functions on the critical path.

K. Contracting Strategy.

1. Contracting strategy is all-encompassing, addressing not only the contracting method (IFB, two step, negotiations) that will be used, but also (2) the construction methodology (design build for this project); selection of the design agent (multi-party for this project); any other factors that ultimately impact on suitability of the final product for its intended use and on the ability of the contracting officer to select the best possible source. The following guidelines also are considered in contracting strategy formulation.

a. Maximize competition. Full and open competition is required, except under certain circumstances.

b. Ensure impartial and comprehensive evaluation of offeror's proposals/bids.

c. Reasonableness of Government source selection actions and conformance of Government procedures and actions to the FAR and other published guidance.

d. Price Reasonableness (FAR 31.2).

e. Verification of awardee responsibility.

f. Verification of the offeror's understanding of the work.

g. Realism of the bid or proposal.

2. Contracting strategy was explored from the viewpoint of (1) improving the schedule, and (2) targeting a contracting strategy for achieving innovation. This exploration involved examining two key areas and possible alternative contracting methods. The two key areas examined were:

a. Where must design take place, taking into account the interplay with permitting, and what is the impact on contracting strategy.

b. What contracting strategy offers the best possible opportunity for success at achieving project goals.

3. The alternative contracting methods examined was contracting by negotiation (FAR Part 15), and invitation for bid (IFB) (Far part 14).

4. The IFB strategy cannot be utilized because:

a. Time does not permit the solicitation, submission, and evaluation of sealed bids.

b. The award will not be made solely on the basis of price and other price-related factors.

c. It is necessary to conduct discussions with the responding sources about their bids.

5. This project has progressed to a point of no return concerning contracting strategy. Adoption of the alternative strategy of acquisition by negotiation at this time would disrupt the project schedule flow already set into motion and, ultimately, cause the schedule to extend. Additionally, budgeting for high proposal evaluation costs has not taken place, and these costs probably would cause a minor cost overrun.

6. If contracting by negotiation is to be pursued for a given project, the decision to do so must come early in the project definitization process so that the entire strategy can be formulated with the targets of quality and innovation in mind. The current strategy, including permit preparation by Government agents, and design and construction by multiple contractual parties, does not lend itself to contracting by negotiation.

7. Figure 2 depicts a comparison of two step sealed bidding versus contracting by negotiation.

FIGURE 2

CONTRACTING STRATEGY SUMMARY

STUDIED CRITERIA	STRATEGY	
	2 STEP SEALED BIDDING FAR PART 14 SUBPART 14.5	NEGOTIATION FAR PART 15
Contracting Agency	Kaiser Engineers Hanford	RL or some other contracting agency.
Innovation	Achieved up-front thru design AE. Little opportunity for Design/Build contractor to be innovative.	Achieved thru discussion. Max innovation possible for design-build contractor.
Technical Quality	Judgement made on a one shot basis during source selection. Minimum criteria, limited discussions.	Offeror provided 3 opportunities to demonstrate Technical competence. Competition enhances technical quality.

FIGURE 2

CONTRACTING STRATEGY SUMMARY, CONTINUED

STUDIED CRITERIA	STRATEGY	
	<u>2 STEP SEALED BIDDING</u> FAR PART 14 SUBPART 14.5	<u>NEGOTIATION</u> FAR PART 15
Design	Substantial design before solicitation. Some design by design-build contractor.	Some design before solicitation. Substantial design by offerors. Substantial design by design-build contractor.
Proposal Costs	Moderate	High
Source Selection Costs	Moderate	High
Price Competition	Achievable.	Achievable. May get higher level of competition.
Price Negotiation	Achievable only in an exceptional circumstance.	Achievable.

FIGURE 2

CONTRACTING STRATEGY SUMMARY, CONTINUED

STUDIED CRITERIA	STRATEGY	
	2 STEP SEALED BIDDING FAR PART 14 SUBPART 14.5	NEGOTIATION FAR PART 15
Value Maximization {Price vs. Technical Quality}	Fair. A one-shot deal.	Maximized. Multiple opportunities thru pressures exerted during discussions.
Design-Build Advantages Achievable	Good	Excellent
Permitting	Performed by Government Agent.	May be included as Evaluation/Performance factor.
Source Selection	Objective judgement based. Price only.	Subjective judgement- Technical and price.

L. Other Areas Explored.

1. Partnering.

a. Partnering refers to the establishment of close working relationships between interested parties for the purpose of achieving project goals and objectives. An organization hosting a project can be considered as a solid, well defined entity. This organization has a shadow that includes contractors, suppliers, customers, and a higher headquarters, that are normally participants in one way or another, in day to day operations. An extended shadow includes those entities who have a vested interest in the project and who should be kept informed and involved throughout project development and execution.

b. The quality fulfillment of project goals and objectives hinges on partnering. The specific goals of partnering are the development of mutually satisfying project goals, objectives, and solutions, and the development of bonding through mutual trust and respect. Mutually satisfying goals and objectives are achieved through buying in to the developed solution. Mutual trust and respect is developed by establishment of rapport between the organizational players, and individual team players; timely and truthful communications between the parties; development of a mutual understanding between the parties; a sharing of common purpose and intent. One should realize that, without a developed insight about other project partner's needs and objectives, what is absolute truth to one party can be deemed slanted truth by another. Effective communications, including listening, is of paramount importance.

c. In addition to RL and it's contractors, the shadow includes all regulatory agencies such as EPA; Ecology; Fish and Wildlife; Fisheries; National Park Service; and Corps of Engineers. For this project, the partnering concept has been initiated by multi-agency participation in the VE study. Positive benefits are already seen from this action as follows:

- (1) Development of ownership of the planning and scheduling strategy.
- (2) Being a part of the answer.
- (3) Developing better communications.
- (4) Developing trust.

d. In terms of partnering with regulatory agencies for this project, the following areas need clarification and agreement:

- (1) What are the hold points beyond RL control?

- (2) Which hold points are based on regulations?
- (3) Which hold points are accommodation and can therefore be negotiated?
- (4) How much turnaround time is needed for a decision?
- (5) What are the deliverables on which a decision concerning a hold point is based?
- (6) What form will a decision take (letter, form, checklist, informal go ahead, meeting minutes)?

e. For this project, the following areas need to be addressed by RL and it's contractors.

- (1) How can Regulatory agencies be included as full players, as integral parts of the overall quality solution to the problem.
- (2) How can communications be further enhanced between all partners?
- (3) How can mutual trust and respect between the parties be fostered?
- (4) How can deep insight into partner goals, objectives, needs, and desires be achieved?

2. 300 Area Water Management Integration.

a. Water in the 300 Area is supplied from the Columbia River via the 312 pump station, 315 filter plant, and 382/3902 storage tanks (except for a separate 331 building supply). The filter plant produces a single, potable water supply (unlike other Hanford areas which have segregated "raw and sanitary" supply networks) using an alum/sand filter/chlorination process. The filter plant generates a filter backflush waste stream which currently discharges to a large percolation pond. The treated water is stored in several large surface and elevated tanks which have been overflowing to the process sewer to maintain residual chlorine levels. After use, the water not consumed nor evaporated ends up in one of several places, including: the just mentioned process sewer which currently discharges to some percolation trenches; the sanitary sewer which currently discharges to various septic tank/tile field systems; the ash sluicing stream from the powerhouse which currently discharges to a percolation pond; and various condensate streams discharged to local french drains.

b. Currently there are a number of projects involved with most of the pieces of the water/waste water system identified above. These include: L-045H, which is attempting to find a permanent alternative to the current process discharge trenches; V-784 which will replace the current sanitary system with an oxidation lagoon; L-059 which is attempting to address alternate means for ash sluicing stream disposal; V-791HB the filter backflush project almost completed which provides a lined settling basin and a permitted river outfall for the clarified overflow; L-070 which intends to replace much of the existing process sewer piping with a positive pressure, near-surface pipe system; L-001 which is eliminating the treated water overflow from the storage tanks; the process water waste minimization effort which is reducing flows to the process sewer (309,306, etc.).

c. There are several advantages to combining certain aspects of many of these efforts into an integrated waste water management effort. These range from cost and time savings (common support facilities, shared manpower, streamlined permitting, reduced redundancy, etc.) to improved safety and environmental protection (integrated alarms, reduced sources of contamination, additional monitoring capabilities, less exposure to construction personnel, etc.). The VE discussions briefly outlined some of the connections which could lead to these benefits. Several constraints and drawbacks were also mentioned, and include: the federal line item budget process, the Tri-Party Agreement milestone dates, and time phasing problems related to currently planned schedules. The VE process provided a mechanism to promote the exploration of a more logical, integrated program, and at the same time provide the upper management of all TPA parties the incentive to cut through artificial road blocks and optimize waste water treatment in the 300 Area.

d. It is a strong belief that the advantages of additional project integration should not be overlooked. This potential should be simultaneously evaluated along with the current L-045H schedule path defined by this study.

PART III - CONCLUSIONS

III-1. Activity Functional Relationships:

The primary result of this study has been a definition of activity functional relationships, resulting in a clearer definition of logic in the CPM database. This result has significantly enhanced the probability of successful attainment of project goals.

III-2. Partnering:

Secondary but very important results are:

- A. Development of ownership of the planning and scheduling strategy.
- B. Allowing organizations with a vested interest to be a part of the answer.
- C. The development of better communications between all parties concerned.
- D. The development of trust between all involved parties.

III-3. Schedule Acceleration:

The schedule cannot be appreciably accelerated without extreme risk of project schedule failure. The fact that treatment train selection/permitting and design/build are being pursued concurrently, and functional interdependence, limits schedule improvement to small, relatively minor improvements.

III-4. Schedule Constraints:

Several conditions exist that may impact on project execution in a timely manner. These conditions include:

- A. The BAT process, including characterization and follow-on bench scale testing, are the primary known early constraints, and are key critical functions.
- B. Nuclear vs. Non-Nuclear issue. Should the effluent or air emissions be considered nuclear, then additional time will be required to make changes to the design and permitting, and the project could be held up indefinitely pending resolution of issues. Should this issue surface during public comment, then significant delays will be incurred.

C. River Sampling.

a. Should low summer flow river sampling not take place prior to 1 October 1991, then it would take place, at the earliest, during summer, 1992. This could cause a four to six month delay in project completion.

b. Should the river sampling be unacceptable to the regulators in terms of method or results, then resampling would take place during the summer of 1992, and project completion may be delayed from four to six months.

D. Regulator agreement on preliminary NPDES criteria, to be incorporated into the design of the treatment train prior to issuance of an NPDES permit, is a key critical function. Should regulators force design changes after issuance of the solicitation for the design/build requirements, project delays of unknown duration would take place.

E. Regulator Deliverables.

1. Should agreement not be reached on deliverable parameters, then repeated delays in schedule should be anticipated.

2. Failure to define and agree upon the requirements of the SEPA process may cause project completion delays of an unknown nature and extent.

F. Clean Air Act Permitting. Should permitting be required and not identified and pursued in a timely manner, then project delay will occur.

G. If the treatment process changes from the CDR concept through the development of the BAT, the project completion target date and cost may be changed according to the complexity of the final treatment process.

H. Evaporator Procurement.

Should the course of action to procure an evaporator prior to need verification be pursued, then there is a risk that a treatment train may be adopted that does not require the evaporator. If this occurs, then \$500,000 in capital costs will have been expended unnecessarily. Alternatively, should the course of action to procure an evaporator prior to need verification not be pursued, then there is a risk that a treatment train may be adopted that requires an evaporator, and the project completion date will be delayed on a day for day basis until the evaporator is delivered and installed.

I. Failure to execute PSAD on a timely basis will cause delay in procurement of the evaporator, and delay procurement of supplies and equipment for all construction.

J. Projects to replace the process sewer and sanitary systems in the 300 area and building a sanitary sewer treatment plant could have some impact on this project. Deconflicting these projects is of paramount importance to overall project completion.

K. Negotiations with EMO. Bringing an EMO subcontractor on-line to conduct characterization, bench scale testing and estimating the secondary wastes is a key critical function. Failure to complete these tasks in a timely manner will cause project slippage on a day for day basis.

III-5. Other Areas for Consideration:

A. Relocation of Treatment Facility:

Move the treatment facility west to minimize NPS permitting. By moving the entire facility, less the outfall to the Columbia River, west outside of the one quarter mile limit will minimize NPS permitting to involve the outfall structure only.

B. Integration of Projects.

From a permitting point of view, integration of all projects within the 300 area offers much to gain. If the outfall for the sanitary treatment facility and the process waste water treatment facility were combined into one, then permitting would need to be accomplished only once, thus simplifying permitting.

C. Contracting Strategy.

1. This project does not fit well into the criteria necessary for success through contracting by negotiation for the following reasons:

a. The design and construction functions are piecemealed to various agents for execution to enhance schedule, and are not intended to be serviced by a single contract instrument.

b. Project quality criteria, to be identified partially through the BAT process, are not well defined. Yet, when definition is achieved, there will not be much room for discussions. A definitive set of specifications will be available.

c. The dollar value of the design/build portion of the project, less the treatment train, is marginally low, and probably does not warrant high proposal and evaluation costs.

2. Contracting by IFB is not viable because all of the statutory criteria have not been met for use of an IFB.

3. Should this project be combined with other 300 area projects, then acquisition by negotiation could be a viable option, and would enhance overall project quality and schedule if adopted as a strategy.

PART IV - RECOMMENDATIONS

IV-1. Timing of Value Engineering Studies.

A. Recommend VE studies addressing schedule be conducted as early in project life as is feasible. To gain the full benefit of partnering, close coordination with regulators, and enhancement of mutual understanding, a VE study of this nature should be conducted as the project is being definitized, before creation of the CPM logic. Such a use of VE studies would enhance the probability of acceptable schedule performance at a reasonable cost.

B. Recommend that future complex projects be studied utilizing VE methodology. The benefits of achieving visibility and clear definition of logic more than justifies the cost of such studies.

IV-2. Project Schedule.

A. Recommend frequent project review to ensure that key critical functions, identified by this study, are executed on time, and allow for timely resolution of problem areas to minimize schedule impacts.

B. Recommend adoption of the current schedule completion date, December 1994.

IV-3. Other Areas for Consideration.

A. Recommend relocation of the treatment facility west outside the one quarter mile limit to minimize NPS permitting.

B. Recommend the outfall for this project and the sanitary waste water treatment facility be combined into one outfall to minimize permitting and construction costs.

C. Recommend the requirements for similar types of construction in a given area be combined in the future to enhance contracting strategy selection, and minimize permitting and construction costs.

D. Recommend RL obtain the capability to conduct acquisition by negotiations, and future complex projects with definite quality related criteria be acquired through contracting by negotiation.

APPENDICES:

1. References.
2. Study Participants.
3. Acronyms
4. Value Engineering Study Proposal
5. Simplified project timeline illustration.
6. Contracting Methodology Excerpt.
7. FAST Diagrams.
8. CPM logic diagram.

APPENDIX 1

REFERENCES

APPENDIX 1

REFERENCES

VALUE ENGINEERING STUDY

SUBPROJECT L-045H

300 AREA TREATED EFFLUENT DISPOSAL FACILITY

1. Hanford Environmental Compliance Environmental Assessment (HEC-EA) Resubmittal, 4 April 1991.
2. Functional Design Criteria for the 300 Area Treated Effluent Disposal Facility (Subproject L-045H), April 1990, Westinghouse Hanford Company.
3. Conceptual Design Report, 300 Area Treated Effluent Disposal Facility, Project 92L-GFL-045H, May 1990, Kaiser Engineers, Hanford Company.
4. Comment Draft, 300 Area TEDF Technology Selection Engineering Report, June 1991, Ebasco Environmental
5. Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 interagency agreement for remediation activities at the Hanford Site, dated May 1989.

APPENDIX 2

STUDY PARTICIPANTS

SUBPROJECT L-045H

300 AREA TREATED EFFLUENT DISPOSAL FACILITY

PRIMARY STUDY PARTICIPANTS

NAME	PHONE NO.	FAX NO.	FRI	MON	TUE	WED	THU
Gary Anderson Ecology, Wash. State	206-438-7558		X	X	X	X	X
V. Sam Arumugam PRC (EPA Contractor)	206-624-2892	206-624-3679	X	X	X	X	
L.E. Borneman WHC-Env Permits	509-376-1044	509-376-8476	X	X	X	X	X
J.Randy Burgess WHC	509-373-4752		X	X	X	X	
Paula Davis WHC - Reg. Analysis	509-376-2389		X	X	X	X	X
Joe M. Frank KEH Env/Waste Projects	509-376-6047	509-376-4581	X	X	X	X	X
Roy Gale PNL-Engineering	509-376-0550	509-376-6676	X	X	X	X	X
Jeff J. Luke WHC Environmental Permits	509-376-8629		X	X	X	X	X

SUBPROJECT L-045H

300 AREA TREATED EFFLUENT DISPOSAL FACILITY

PRIMARY STUDY PARTICIPANTS

NAME	PHONE NO.	FAX NO.	FRI	MON	TUE	WED	THU
Gary R. Mezger RL	509-376-5039		X	X	X	X	X
Frank J. Muller WHC Projects	509-373-1529		X	X	X	X	X
Jay Rude WHC O.S.S.	509-376-3575		X	X	X	X	X
Luis Soler WHC Programs	509-376-4427		X	X	X	X	X
Bob Stordeur WHC	509-373-5274		X	X	X	X	
Merle Braden Corps of Engineers, Kansas City District	816-426-2933	816-426-2730	X	X	X	X	X
Harold Yates Corps of Engineers, Kansas City District	816-426-2429	816-426-2730	X	X	X	X	X

SUBPROJECT L-045H

300 AREA TREATED EFFLUENT DISPOSAL FACILITY

HANFORD ENVIRONMENTAL COMPLIANCE PROJECT

PART TIME PARTICIPANTS

NAME	PHONE NO.	FAX NO.	FRI	MON	TUE	WED	THU
Bruce Davis RL-WMD/SWEC	6-5799		X		X	X	
Dave Einan EPA Hanford Project Office	509-376-3883	509-376-2396	X	X			X
Don Flyckt WHC Eff. Program	509-373-3483		X				
Ken Hayden WHC Landlord Program	509-376-4479					X	
Sylvia Kawabata EPA Seattle (NPDES Permits)	206-553-1644			X			
Roger J. Landon WHC Regulatory Analysis	376-6992					X	
Earle Marvin KEH Contract Admin.	509-373-3900	509-373-4897					X

SUBPROJECT L-045H

300 AREA TREATED EFFLUENT DISPOSAL FACILITY

HANFORD ENVIRONMENTAL COMPLIANCE PROJECT

PART TIME PARTICIPANTS

NAME	PHONE NO.	FAX NO.	FRI	MON	TUE	WED	THU
Rick Oldham WHC Env. Permits	509-376-5616	509-376-8476	X	X			
W.R. Owen WHC Program	509-373-4967				X		
Dennis Takasumi W'HC Projects	509-373-4897		X				

SUBPROJECT L-045H
300 AREA TREATED EFFLUENT DISPOSAL FACILITY
HANFORD ENVIRONMENTAL COMPLIANCE PROJECT

OTHER ATTENDEES

NAME	PHONE NO.	FAX NO.	FRI	MON	TUE	WED	THU
Gerry Becker WHC-WM&E	509-373-4301		X				
Teresa Hennig RL/WMD	509-376-6888		X				
John H. Jacobson Corps of Engineers, Walla Walla District	509-376-1250		X				
John Neath RL	509-376-3964		X				X
Jim Rasmussen RL	509-376-2247		X				
John Stewart Corps of Engineers Walla Walla District	509-376-9101		X				
Cindy Veneziano RL/VE	509-376-8375		X				X

APPENDIX 3

ACRONYMS

APPENDIX 3
LIST OF ACRONYMS
VALUE ENGINEERING STUDY
SUBPROJECT L-045H
300 AREA TREATED EFFLUENT DISPOSAL FACILITY

AHU	AIR HANDLING UNIT
AKART	ALL KNOWN, AVAILABLE, AND REASONABLE TECHNOLOGY
ALARA	AS LOW AS REASONABLY ACHIEVABLE
BAT	BEST AVAILABLE TECHNOLOGY ECONOMICALLY ACHIEVABLE
CDR	CONCEPTUAL DESIGN REPORT
CEQ	COUNCIL ON ENVIRONMENTAL QUALITY
CERCLA	COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT
CICA	COMPETITION IN CONTRACTING ACT
COE	U.S. ARMY CORPS OF ENGINEERS
CPM	CRITICAL PATH METHOD
D/B	DESIGN/BUILD
DOE-HQ	U.S. DEPARTMENT OF ENERGY - HEADQUARTERS
RL	U.S. DEPARTMENT OF ENERGY - RICHLAND FIELD OFFICE
DOH	WASHINGTON STATE DEPARTMENT OF HEALTH
EE	ENVIRONMENTAL EVALUATION
EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
FAR	FEDERAL ACQUISITION REGULATIONS
FAST	FUNCTIONAL ANALYSIS SYSTEMS TECHNOLOGIES
FY	FISCAL YEAR
GAC	GRANULATED ACTIVATED CARBON

GPD	GALLONS PER DAY
GPM	GALLONS PER MINUTE
HEC-EA	HANFORD ENVIRONMENTAL COMPLIANCE ENVIRONMENTAL ASSESSMENT
HEPA	HIGH-EFFICIENCY PARTICULATE AIR
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
IFB	INVITATION FOR BID
IX	ION EXCHANGE
KEH	KAISER ENGINEERS HANFORD COMPANY
MPH	MILES PER HOUR
MVR	MECHANICAL VAPOR RECOMPRESSION
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
NPDES	NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PC	PROCESS CONDENSATE
PNL	PACIFIC NORTHWEST LABORATORIES
PSAD	PRELIMINARY SAFETY ANALYSIS DETERMINATION (Non-Nuclear)
PSAR	PRELIMINARY SAFETY ANALYSIS REPORT (Nuclear)
RCRA	RESOURCE CONSERVATION AND RECOVERY ACT
SEPA	STATE ENVIRONMENTAL POLICY ACT
UBC	UNIFORM BUILDING CODE
VE	VALUE ENGINEERING
WAC	WASHINGTON ADMINISTRATIVE CODE
WHC	WESTINGHOUSE HANFORD COMPANY

APPENDIX 4

VALUE ENGINEERING STUDY PROPOSAL

May 21, 1991

PROJECT L-045H
(1992 Line Item)

300 AREA TREATED EFFLUENT DISPOSAL FACILITY

VALUE ENGINEERING STUDY PROPOSAL

- Purpose Accelerate integrated schedule for completion of Project L-045H through application of Value Engineering (VE) methodology.
- Background The Tri-Party Agreement (TPA) M-17-06 Milestone requires cessation of discharge to the 300 Area Process Trenches by December 1991. DOE's plan to ultimately cease discharges are embodied in Project L-045H, 300 Area Treated Effluent Disposal Facility, whose start of operations is scheduled for December 1994. In addition, it should be noted that a 300 Area flow minimization activity is in progress which is tied to the current project schedule. In discussions with the Environmental Protection Agency (EPA) and the Washington Department of Ecology (Ecology), it was agreed that a Value Engineering Study would be performed with the goal of improving the current project schedule.
- The use of a structured process, which involves technical and regulatory expert representatives from the key decision making agencies, and an independent process facilitator, as is provided by Value Engineering (VE), is accepted by all parties as the best means of attaining schedule credibility.
- Assumptions
1. The project total estimated capital cost shall not exceed the current \$14.7M.
 2. The plant capacity shall remain at 300 gpm.
 3. The Conceptual Design Report (CDR) concept validated in FY 1990 shall serve as the baseline concept and schedule.
 4. The process train will be negotiated under the NPDES Permit, not the VE study.
 5. Applicable statutes, regulations, and DOE Orders shall not be violated.
 6. Schedule changes will be justified by action which will be new or different, i.e., procedures or new methods.
 7. 300 Area flow reductions:

12/91	400 gpm
12/92	300 gpm
5/93	200 gpm

Scope	<ol style="list-style-type: none"> 1. The VE study shall consider all aspects of the integrated project schedule for completeness of required activities and requisite durations and shall include, but not be limited to: Design, procurement, construction, permitting, testing, and readiness. 2. Procedural barriers and deficiencies in the entire process shall be identified. 3. The VE study will validate the current project schedule relative to completeness of required activities and requisite durations. 4. The VE team will include representatives from EPA, Ecology, DOE-RL, Kaiser Engineers Hanford (KEH), Pacific Northwest Laboratory (PNL), and Westinghouse Hanford Company (WHC). The facilitator will be sought from an independent source such as U.S. Corps of Engineers.
Goal	Complete Project L-045H prior to the scheduled date of December 1994.
Deliverables	<ol style="list-style-type: none"> 1. Define allowable and specific elements which will significantly contribute toward improving or otherwise affect the schedule. 2. Submit VE proposals by July 1, 1991 identifying improvement opportunities in the integrated schedule. 3. The VE study team shall provide a presentation and report of their findings. 4. Integrate VE proposals into a preliminary implementation plan by July 16, 1991. <p><u>Note:</u> The VE study will provide proposals which will be integrated into the preliminary implementation plan which will be reviewed by DOE-RL, Ecology, and EPA. Comments will be incorporated and the implementation plan approved by DOE-RL, Ecology, and EPA.</p>
Expectations	<ol style="list-style-type: none"> 1. DOE-RL, Ecology, and EPA will review the VE recommendations provided by the action plan and provide their comments to DOE-PMD. 2. The implementation plan shall be approved by DOE-RL, Ecology, and EPA within which shall be included the actions which are accepted by all three agencies. 3. DOE-RL, Ecology, and EPA will agree upon and support methods to fast track the schedule and application of priority.

Roles &
Respon-
sibilities

1. DOE-RL - Initiate and manage the VE study
- Manage the implementation plan
2. Ecology - Participate as a member of the VE study team
- Provide technical input in their area of cognizance
3. EPA - Participate as a member of the VE study team
- Provide technical input in their area of cognizance

Paul T. Day
Tri-Party Agreement Manager
U. S. Environmental Protection Agency
Region 10

Date

Steven H. Wisness
Tri-Party Agreement Manager,
Richland Operations Office, U. S. Department of Energy

Date

Timothy Nord
Tri-Party Agreement Manager
Department of Ecology

Date

APPENDIX 5

SIMPLIFIED PROJECT TIMELINE ILLUSTRATION

1991

1992

FLOW
REDUCTIONS

△ 400 GPM

SAMPLING &
CHARACTERIZATION

COLUMBIA RIVER
EFFLUENT

TREATMENT
TRAIN
SELECTION

BAT-TECHNOLOGY EVAL

PAPER EVAL. TECH

BENCH SCALE TEST

ALTERNATIVES

Regulators
Agree
Criteria
△

PERMIT
PROCESS

PERF-SPEC

BID & AWARD

DESIGN-BUILD

2 STEP
PROCESS
△

OUTFALL
DESIGN ?
△

● APPROVAL

■ PERMIT

1993

1994

300 GPM

200 GPM

○ FSAR

□ CAA PERMIT IF REQUIRED
OR NOTIFICATION
(EMISSIONS ESTIMATE)

● SEPA ? CHECKLIST APPROVAL

● NEPA (HECEA) ENVIRON. ASSESSMENT

FSAR
NPDES
PERMIT
OPS

↑
O D

DESIGN

PROCURE
FABRICATE

CONSTRUCT

CONSTRUCTION
I
OUTFALL
CONSTR.

ATP

OTP

SURR

TRAINING

NATIONWIDE PERMIT #7
CORPS OF ENGINEERS ?

● FISH & WILDLIFE

● WILD & SCENIC
(Aesthetics Bldg Dwg)

● DEPARTMENT OF NATURAL RESOURCES
- LOW WATER MARK
- LEASE

PROJECT TIMELINE ILLUSTRATION

300 AREA TREATED
EFFLUENT DISPOSAL

APPENDIX 6

CONTRACTING METHODOLOGY EXCERPT

APPENDIX 6

CONTRACTING METHODOLOGY

1. The following is a descriptive excerpt from Department of the Army Pamphlet 27-153, Contract Law, dated 15 September 1990.

2. General.

a. Two primary acquisition methods are authorized by the FAR: sealed bidding and competitive proposals (negotiations).

b. Sealed bidding historically was the preferred method of acquiring goods and services on behalf of the United States. The preference, which was expressed both in statute and in regulation, remained virtually unchanged until the enactment of the Competition in Contracting Act of 1984 (CICA). The statute now directs use of sealed bidding if four conditions are met, but it no longer requires that a specific statutory exception from sealed bidding requirements be justified in order to negotiate. Competitive proposals which are commonly called negotiations, may be used "when sealed bids are not appropriate." Contracting officers are directed to exercise good judgment in selecting the method of contracting that best meets the needs of the Government. The recent changes in the law, while still recognizing the advantages gained by the objectivity of sealed bidding, also recognize that obtaining full and open competition is the primary goal in selecting a method of Government contracting. The Competition in Contracting Act recognized that this goal is no longer statutorily preferred over negotiations; rather, sealed bidding must be used under the circumstances specified by statute and negotiations shall be used under all other circumstances.

3. Sealed bidding is a method of contracting that employs competitive bids, public opening of bids, and awards.

a. Sealed bidding is used when four condition are met:

(1) Time permits the solicitation, submission, and evaluation of sealed bids;

(2) The award will be made on the basis of price and other price-related factors;

(3) It is not necessary to conduct discussions with the responding sources about their bids; and

(4) There is a reasonable expectation of receiving more than one sealed bid.

b. Acquisition by sealed bidding is a rigid, mechanical, time consuming process that requires the submission of sealed bids by qualified offerors, a public opening of bids at a set time and place, and the awarding of a contract by the Government to that responsible bidder whose bid, conforming to the invitation for bids, will be most advantageous to the Government, considering only price and other price related factors included in the invitation. In these four main steps, emphasis is consistently placed on balancing the interests of speedy and efficient acquisition procedures against the maximum opportunity to compete and the avoidance of favoritism or fraud in the making of public contracts.

c. Only under special conditions may a bid be accepted that deviates from the invitation for bids, bids can rarely be changed after the public opening, and only in very limited circumstances may mistakes or irregularities in bids be rectified.

d. Such important bargaining factors as quality, delivery terms, and business reputation cannot be made to be determinative factors by the Government's purchasing officer. There is no provision for any give and take between buyer and seller over the inclusion and wording of contract clauses, so each sealed bidding transaction is entered into at arm's length with virtually no opportunity for the parties to negotiate the specific terms of the contract.

4. The negotiations method of acquisition also referred to as competitive proposal in the CICA and in the FAR, is used if sealed bidding is not appropriate. The use of sealed bids is not appropriate if the circumstances of the proposed acquisition do not fit into all of the statutory requirements for use of sealed bids.

a. For many complex, high dollar value projects, contracting by negotiation offers exceptional opportunities for achieving value through technical quality, based on innovation. This process achieves technical quality by (1) advertising the project needs; (2) submittal, by interested offerors, of technical and price proposals to fulfill stated needs, offering whatever strategies and techniques they propose to use; (3) evaluating proposals by an iterative technical/price evaluation and discussion process; (4) selecting the source that best meets the needs of the project. Inherent in this process is identifying and stating the quality criteria, evaluating based on that criteria, subjectively analyzing proposal attributes, price and other factors considered, and selecting the source that best fulfills the needs of the project. This process lends itself well to complex, high dollar value projects where most functions, including the majority of design and permit preparation, can be performed by the selected offeror, and where quality, measured in terms of technical and management capability, are of paramount importance.

b. The procedures for conducting negotiated acquisitions are stated in 10 U.S.C. 2305 and 41 U.S.C. 253b. These statutory provisions are implemented in FAR Part 15. When the Government purchases goods or services through the negotiations

method of acquisition, the formal procedures and rather rigid rules for acquisition by sealed bidding need not be observed. The negotiations procedure is initiated when the Government issues a RFP. The RFP is similar to, but differs in major respects from, the Invitation for Bids (IFB) used in sealed bidding. Both sealed bidding and negotiations procedures require solicitation of a sufficient number of suppliers to ensure that competition is secured to the maximum practical extent. Negotiations with one supplier may be used, however, when sufficient facts and circumstances are set out to justify procurement with that single source. Unlike sealed bidding, negotiations require no public opening of bids. For an offeror to be considered for award in sealed bidding, that offeror must have submitted a bid that was responsive to the solicitation. But, in negotiated acquisitions, proposals not fully conforming to the terms of the solicitation may be considered. While a nonconforming initial proposal may be considered if it is reasonably susceptible to being made acceptable through negotiations, the proposal must ultimately conform to the solicitation to be awarded. Of particular importance, of course, is the fact that when negotiating, the Government may consider other criteria besides price and price-related factors when selecting an offeror for award. Finally, the two methods differ in the offeror's ability to change its bid or proposal. In sealed bidding, an offeror may not change its bid after bid opening. In negotiated acquisitions, if discussions are held, an offeror not only can modify its proposal, but may even be encouraged to modify its proposal. Finally, since the firm bid rule does not apply in negotiations, an offeror may withdraw it at any time until award is made.

c. The underlying principles of source selection for acquisition by negotiation are:

(1) Maximize competition.

The Government issues a Request For Proposal under the presumption that more than one offer will be received, thereby providing competition. Competition, coupled with discussions, is presumed to provide a high probability that technical quality will be higher and prices provided by offerors will be lower than would be received through IFB, sole source or restricted competition contracting. The higher the number of offers existing in the competitive range over the life of the source selection process, the more justified is the presumption of a high level of technical quality achieved at a fair and reasonable price. (FAR 15.804-3)

(2) Minimize the complexity of the solicitation, evaluation, and the selection decision.

(3) Ensure impartial and comprehensive evaluation of offeror's proposals.

(4) Ensure selection of the source whose proposal has the highest degree of realism and whose performance is expected to best meet stated Government requirements.

(5) The following factors support the underlying principles listed above:

(a) Fairness in the treatment of offerors.

(b) Reasonableness of Government source selection actions and conformance of Government procedures and actions to the FAR and other published guidance.

(c) The use of competition to achieve acceptable quality at a reasonable cost (the highest value possible).

(d) Price Reasonableness (FAR 31.2).

(e) Offeror responsibility.

(f) Verification of the offeror's understanding of the work through detailed proposal evaluation and analysis, and, if necessary and appropriate, rectifying shortcomings in offeror understanding through discussions.

d. The selection of the successful offeror is based upon evaluation of the technical proposal and the price proposal. Selection is not based solely on either technical factors or price, but is based on all factors bearing on award of a contract. Frequently, technical factors (evaluation factors for award as shown in the solicitation) and price are subjectively equal in importance in determining source selection.

5. Two-step sealed bidding.

a. Two-step sealed bidding is a combination of competitive procedures designed to obtain the benefits of sealed bidding when adequate specifications are not available. Two-step sealed bidding is to be used only if the following conditions exist:

There are insufficiently definite or complete specifications to permit sealed bidding;

There are definite criteria to permit evaluation of technical proposals;

More than one qualified source is expected to be available;

There is sufficient time to use the two step method; and

A firm fixed-price or fixed-price with economic price adjustment contract will be used.

b. Step one in the two-step method is similar to a negotiated acquisition. A request for technical proposals is issued to interested offerors. The request must set

forth the criteria that will be used to evaluate proposals. After proposals are submitted, they are evaluated and classified as either acceptable, unacceptable, or reasonably susceptible of being made acceptable. For those in the last category, the Government is required to outline deficiencies and to obtain clarifications and make a final determination of acceptability. The contracting officer may, however, proceed directly with step two if there are sufficient acceptable proposals and the delay required to make additional proposals acceptable would not be in the Government's interest. All offerors submitting acceptable proposals can participate in step two.

c. Step two is very much like sealed bidding. All offerors with acceptable proposals in step one submit sealed bids on their proposals. The offeror submitting the low bid will receive the award unless the bid alters or changes the proposal previously submitted in step one.

APPENDIX 7

FAST DIAGRAMS

SUBMIT SEPA CHECKLIST

→
HOW

MAINTAIN
OPERATIONS

PROTECT
ENVIRONMENT

DISCHARGE
TREATED
EFFLUENT

TREAT
EFFLUENT

CONDUCT
START UP

C
R

KEY

FAST DIAGRAM

LOGIC DISPLAY OF
PRIMARY FUNCTIONS
300 AREA TREATED
DISPOSAL PROJECT

←
WHY

→
HOW

KEY

←
WHY

FAST DIAGRAM

LOGIC DISPLAY OF
PERMITTING FUNCTIONS

300 AREA TREATED EFFLUENT
DISPOSAL PROJECT (L-045H)

→
HOW

KEY

WHY

FAST DIAGRAM

LOGIC DISPLAY OF
OUTFALL CONSTRUCTION
AND PERMITTING

300 AREA TREATED EFFLUENT
PROJECT (L-045H)

→
HOW

KEY

←
WHY

FAST DIAGRAM

LOGIC DISPLAY OF TREATMENT FACILITY
CONSTRUCTION AND PERMITTING

300 AREA TREATED EFFLUENT
DISPOSAL PROJECT (L-045H)

→
HOW

KEY

←
WHY

FAST DIAGRAM

LOGIC DISPLAY OF UTILITIES
CONSTRUCTION FUNCTIONS

300 AREA TREATED EFFLUENT
DISPOSAL PROJECT (L-045H)

→
HOW

←
WHY

FAST DIAGRAM

LOGIC DISPLAY OF
DESIGN FUNCTIONS

300 AREA TREATED EFFLUENT DISPOSAL
PROJECT (L-045H)

APPENDIX 8

CPM LOGIC DIAGRAM

1990			
1Aug	1Oct	1Jan	1A

1W2LC3W2T101	DETERMINE PRELIM AIR EMISSIONS (APPENDIX D)	23.00D
1W2LC3W2T103	PRELIM AIR EMISSIONS DETERMINED	0.00D
1W2LC3W2T105	DETERMINE PERMIT NEEDS	22.00D
1W2LC3W2T107	PERMIT NEEDS DETERMINED	0.00D
1W2LC3W2T113	BACT ASSESSMENT	88.00D
1W2LC3W2T109	MHC AIR EMISSIONS ESTIMATE (ACTUAL)	22.00D
1W2LC3W2T117	MHC PREPARE CAA PERMIT APPLICATIONS	66.00D
1W2LC3W2T115	BACT ASSESSMENT COMPLETE	0.00D
1W2LC3W2T119	MHC REVIEW & APPROVAL CAA PERMITS	25.00D
1W2LC3W2T121	DOE-RL APPROVAL	92.00D
1W2LC3W2T123	AGENCY APPROVAL	132.00D
1W2LC3W2T125	AIR PERMITS APPROVED	0.00D
1W2LC3W2T126	AIR PERMITS EFFECTIVE DATE	22.00D
3WHM038309	DESIGN/BUILD CONSTRUCTION	255.00D
3WHM038401	FIELD INSPECTION	250.00D
3WHM038405	EXCEPTIONS	240.00D
3WHM038111	ATP	66.00D
3WHM038113	L-045H PROJECT COMPLETE	0.00D
1W2LC8W1T101	OTP	66.00D
1W2LC8W2T103	FINALIZE READINESS REVIEW	15.00D
1W2LC8W2T105	START - UP	0.00D

Activities Included By Selected Logic

1W2LC3W1T110	ISSUE WILD AND SCENIC RIVERS PERMIT	0.00D
1W2LC3W1T423	NPDES PERMIT EFFECTIVE DATE	0.00D
1W2LC3W2T111	MHC AIR EMISSIONS ESTIMATE COMPLETE	0.00D
1W2LC7W1T103	FINALIZE PROCEDURES	43.00D
1W2LC7W2T101	OPERATOR TRAINING	131.00D
1W2LC8W2T101	READINESS REVIEW	239.00D
3WHM038103	D/B DESIGN	175.00D
3WHM038205	KEH LONG LEAD PROCUREMENT	400.00D
3WHM038303	KEH UTILITIES CONSTRUCTION	132.00D
3WHM038307	OUTFALL CONSTRUCTION-INSTALLATION	44.00D
3WHM038403	AS BUILTS	240.00D

Legend

Early CPM

1991		1992				1993				1994				
Pr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct

1990		
1Aug	1Oct	1Jan

L-045H BAT DOCUMENTATION			
1W2LC4W1T101	PREPARE TECHNOLOGY SELECTION BAT ENG STUDY	56.000	2May
1W2LC4W1T103	DRAFT BAT ENG STUDY DOCUMENT COMPLETE	0.000	
1W2LC4W1T104	DRAFT BAT DOCUMENT TO MHC/DOE-RL REVIEW	15.000	
1W2LC4W1T105	DOE-RL DOCUMENT CLEARANCE	5.000	
1W2LC4W1T107	EPA/ECOLGY REVIEW OF BAT ENG STUDY	10.000	
1W2LC4W1T109	COMMENT RESOLUTION	10.000	
1W2LC4W1T113	REVISED BAT ENG STUDY	5.000	
1W2LC4W1T115	FINAL BAT ENG STUDY TO EPA/ECOLOG	5.000	
1W2LC4W1T123	TREATMENT TRAIN INFORMAL CONCURRENCE	0.000	
L-045H BENCH SCALE TESTING			
1W2LC4W2T105	CONDUCT BENCH SCALE TESTING	87.000	
1W2LC4W2T106	COMPLETE BENCH SCALE TESTING	0.000	
L-045H SAMPLING PLANS & CHARACTER			
1W2LC4W4T101	EMO PREP RIVER SAMPLING & CHARACTERIZATION PLAN	55.000	3.
1W2LC4W4T103	SAMPLING PLAN REGULATORS APPROVAL	10.000	
1W2LC4W4T105	INFLUENT SAMPLING PLAN PREPARATION	71.000	
1W2LC4W4T106	INFLUENT SAMPLING PLAN REGULATOR APPROVAL	10.000	
L-045H RIVER SAMPLING & CHARACTER			
1W2LC4W5T202	RIVER SAMPLE	0.000	
1W2LC4W5T203	RIVER SAMPLE CHARACTERIZATION ANALYSIS	44.000	
1W2LC4W5T204	INFLUENT SAMPLING & CHARACTERIZATION	51.000	
1W2LC4W5T205	POST WASTE MINIMIZATION SAMPLING	0.000	
1W2LC4W5T206	POST WASTE MINIMIZATION SAMPLING	0.000	
1W2LC4W5T301	VERIFY DESIGN CRITERIA	5.000	
L-045H RECYCLE SUBSECTION			
1W2LC4W6T101	RECYCLE SUBSECTION-MHC CENTRAL ENG	26.000	3.
1W2LC4W6T102	SHUTDOWN SUBSECTION BAT STUDY-PNL	26.000	3.
1W2LC4W6T103	TEMPORARY TREATMENT SUBSECTION BAT STUDY-EBASCO	26.000	3.
Activities Included By Selected Logic			
1W2LC3W1T401	MHC PREPARE NPDES PERMIT APPLICATION	43.000	
1W2LC5W1T101	REVISE PSE	44.000	
1W2LC5W1T105	PREPARE DETAILED SAFETY DOCUMENTATION SCHEDULE	22.000	
1W2LC6W2T201	PREP PROGRAM PLAN FOR BENCH SCALE TESTING	22.000	
1W2LC6W2T207	FINALIZE DRAFT	5.000	
1W2LC6W5T107	PREPARE PERFORMANCE SPEC	116.000	
1W2LC6W6T101	UPDATE WASTE VOL REDUCTION PLAN (FRITZ DOCUMENT)	10.000	10Oct ☐ 12Oct
3W2M038103	D/B DESIGN	175.000	

Legend

Early CPM ☐

5H TECHNOLOGY DEVELOPMENT

1991			1992				1993				1994			
1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct

			1980		
			1Aug	1Oct	1Jan
L-045H NEPA DOCUMENTATION					
1W2LC2W1T101	DOE REVIEW & APPROVAL OF HEC E.A.	195.00D	1Jan		
1W2LC2W1T102	HEC E.A. APPROVED BY DOE	0.00D			
L-045H SEPA DOCUMENTATION					
1W2LC2W2T101	COMPLETE & SUBMIT SEPA CHECKLIST	45.00D			
1W2LC2W2T103	PROVIDE ADDITIONAL INFORMATION	43.00D			
1W2LC2W2T105	DETERMINE NON-SIGNIF. DECISION/SEPA APPLICABIL	22.00D			
1W2LC2W2T107	PUBLIC COMMENT	21.00D			
1W2LC2W2T109	REVISE AND ISSUE FINAL DNS	23.00D			
Activities Included By Selected Logic					
1W2LC3W1T203	DOE APPROVAL MDF HYDRAULIC PERMIT APPLICATION	21.00D			
1W2LC3W1T205	WA STATE DEPT OF FISHERIES APPROVAL	23.00D			
3WHM038201	KEH ONSITE PROCUREMENT	130.00D			
3WHM038205	KEH LONG LEAD PROCUREMENT	400.00D			
3WHM038303	KEH UTILITIES CONSTRUCTION	132.00D			
Legend					
Early CPM					

045H NEPA DOCUMENTATION

1991			1992				1993				1994			
Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct

Project: L-045H2	1W2LC2	Date: 25Jun91 13:51
PROJECT MASTER SCHEDULE		
Page: 1	Randy Burgess 3-4752	

L-045H EN

1990			
1Aug	1Oct	1Jan	1Apr

L-045H NPDES PERMIT

1W2LC3W1T101 WHC PREP NATL PK SVC WILD & SCENIC RIVER ACT APP 21.00D

1W2LC3W1T103 DOE-RL APPROVAL 21.00D

1W2LC3W1T107 REVISE NPS WILD AND SCENIC RIVER ACT APPROVAL 21.00D

1W2LC3W1T109 NPS APPROVE WILD AND SCENIC RIVER ACT APPL 21.00D

1W2LC3W1T110 ISSUE WILD AND SCENIC RIVERS PERMIT 0.00D

1W2LC3W1T201 WHC PREP WA DEPT FISHERIES HYDRAULIC PERMIT APPL 44.00D

1W2LC3W1T203 DOE APPROVAL WDF HYDRAULIC PERMIT APPLICATION 21.00D

1W2LC3W1T205 WA STATE DEPT OF FISHERIES APPROVAL 23.00D

1W2LC3W1T206 ISSUE FISHERIES PERMIT 0.00D

1W2LC3W1T301 WHC PREPARE CORPS OF ENGINEERS APPLICATION 43.00D

1W2LC3W1T303 DOE-RL APPROVAL CORPS OF ENGINEERS APPLICATION 22.00D

1W2LC3W1T305 PUBLIC COMMENT CORPS OF ENGINEERS APPLICATION 21.00D

1W2LC3W1T307 REVISE CORPS OF ENGINEERS APPLICATION 23.00D

1W2LC3W1T309 APPROVE CORPS OF ENGINEERS APPLICATION 21.00D

1W2LC3W1T310 ISSUE CORPS OF ENGINEERS PERMIT 0.00D

Activities Included By Selected Logic

1W2LC2W1T101 DOE REVIEW & APPROVAL OF HEC E.A. 195.00D

1Jan ☐

1W2LC2W2T103 PROVIDE ADDITIONAL INFORMATION 43.00D

1W2LC3W1T405 DOE-RL APPROVAL & SUBMIT TO EPA 43.00D

3WHM038102 DESIGN OUTFALL SYSTEM 44.00D

3WHM038103 D/B DESIGN 175.00D

3WHM038303 KEH UTILITIES CONSTRUCTION 132.00D

3WHM038307 OUTFALL CONSTRUCTION-INSTALLATION 44.00D

3WHM038309 DESIGN/BUILD CONSTRUCTION 255.00D

Legend

Early CPM ☐

ENVIRONMENTAL PERMITS-PAGE ONE

		L-		
		1990		
		1Aug	1Oct	1Jun
L-045H NPDES PERMIT				
1W2LC3W1T401	WMC PREPARE NPDES PERMIT APPLICATION	43.00D		
1W2LC3W1T403	WMC APPROVE	22.00D		
1W2LC3W1T405	DOE-RL APPROVAL & SUBMIT TO EPA	43.00D		
1W2LC3W1T407	EPA PREPARE PERMIT	175.00D		
1W2LC3W1T411	STATE AGREEMENT TO CERTIFY	21.00D		
1W2LC3W1T413	PUBLIC COMMENT ON NPDES PERMIT & STATE CERTIF.	43.00D		
1W2LC3W1T415	REVISE PERMIT	43.00D		
1W2LC3W1T417	EPA APPROVE PERMIT	22.00D		
1W2LC3W1T419	OBTAIN STATE CERTIFICATION	22.00D		
1W2LC3W1T421	EPA/ECOLOGY FINAL REVIEW OF PERMIT	22.00D		
1W2LC3W1T422	ISSUE NPDES PERMIT	0.00D		
1W2LC3W1T423	NPDES PERMIT EFFECTIVE DATE	0.00D		
L-045H AIR PERMITS				
1W2LC3W2T101	DETERMINE PRELIM AIR EMISSIONS (APPENDIX D)	23.00D		
1W2LC3W2T103	PRELIM AIR EMISSIONS DETERMINED	0.00D		
1W2LC3W2T105	DETERMINE PERMIT NEEDS	22.00D		
1W2LC3W2T107	PERMIT NEEDS DETERMINED	0.00D		
1W2LC3W2T109	WMC AIR EMISSIONS ESTIMATE (ACTUAL)	22.00D		
1W2LC3W2T111	WMC AIR EMISSIONS ESTIMATE COMPLETE	0.00D		
1W2LC3W2T113	BACT ASSESSMENT	88.00D		
1W2LC3W2T115	BACT ASSESSMENT COMPLETE	0.00D		
1W2LC3W2T117	WMC PREPARE CAA PERMIT APPLICATIONS	66.00D		
1W2LC3W2T119	WMC REVIEW & APPROVAL CAA PERMITS	25.00D		
1W2LC3W2T121	DOE-RL APPROVAL	92.00D		
1W2LC3W2T123	AGENCY APPROVAL	132.00D		
1W2LC3W2T125	AIR PERMITS APPROVED	0.00D		
1W2LC3W2T126	AIR PERMITS EFFECTIVE DATE	22.00D		
Activities Included By Selected Logic				
1W2LC3W1T101	WMC PREP NATL PK SVC WILD & SCENIC RIVER ACT APP	21.00D		
1W2LC3W1T201	WMC PREP WA DEPT FISHERIES HYDRAULIC PERMIT APPL	44.00D		
1W2LC3W1T301	WMC PREPARE CORPS OF ENGINEERS APPLICATION	43.00D		
1W2LC4W1T123	TREATMENT TRAIN INFORMAL CONCURRENCE	0.00D		
1W2LC4W2T106	COMPLETE BENCH SCALE TESTING	0.00D		
1W2LC4W5T203	RIVER SAMPLE CHARACTERIZATION ANALYSIS	44.00D		
1W2LC8W2T105	START - UP	0.00D		
3WHM03B102	DESIGN OUTFALL SYSTEM	44.00D		
3WHM03B309	DESIGN/BUILD CONSTRUCTION	255.00D		
Legend				
Early CPM ☐				

045H ENVIRONMENTAL PERMITS-PAGE TWO

1991				1992				1993				1994			
1Apr	1Jul	1Oct		1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct

L-045H

1990			
1Aug	1Oct	1Jan	1

L-045H DESIGN

3WHM038101	KEH DESIGN	131.000
3WHM038102	DESIGN OUTFALL SYSTEM	44.000
3WHM038103	D/B DESIGN	175.000
3WHM038111	ATP	66.000
3WHM038113	L-045H PROJECT COMPLETE	0.000

L-045H PROCUREMENT

3WHM038201	KEH ONSITE PROCUREMENT	130.000
3WHM038205	KEH LONG LEAD PROCUREMENT	400.000

L-045H CONSTRUCTION

3WHM038303	KEH UTILITIES CONSTRUCTION	132.000
3WHM038306	OUTFALL CONSTRUCTION-FABRICATION	44.000
3WHM038307	OUTFALL CONSTRUCTION-INSTALLATION	44.000
3WHM038309	DESIGN/BUILD CONSTRUCTION	255.000

L-045H FIELD ENGINEERING

3WHM038401	FIELD INSPECTION	250.000
3WHM038403	AS BUILTS	240.000
3WHM038405	EXCEPTIONS	240.000

Activities Included By Selected Logic

1W2LC2W1T102	HEC F.A. APPROVED BY DOE	0.000
1W2LC2W2T109	REVISE AND ISSUE FINAL DNS	23.000
1W2LC3W1T101	MHC PREP NATL PK SVC WILD & SCENIC RIVER ACT APP	21.000
1W2LC3W1T110	ISSUE WILD AND SCENIC RIVERS PERMIT	0.000
1W2LC3W1T201	MHC PREP WA DEPT FISHERIES HYDRAULIC PERMIT APPL	44.000
1W2LC3W1T206	ISSUE FISHERIES PERMIT	0.000
1W2LC3W1T301	MHC PREPARE CORPS OF ENGINEERS APPLICATION	43.000
1W2LC3W1T310	ISSUE CORPS OF ENGINEERS PERMIT	0.000
1W2LC3W1T401	MHC PREPARE NPDES PERMIT APPLICATION	43.000
1W2LC3W2T126	AIR PERMITS EFFECTIVE DATE	22.000
1W2LC4W2T105	CONDUCT BENCH SCALE TESTING	87.000
1W2LC5W2T101	PREPARE PSAR	183.000
1W2LC5W3T101	PREPARE FSAR	261.000
1W2LC6W1T101	CONDUCT SITE RADIATION SURVEY	44.000
1W2LC6W1T203	SITE SOIL TESTING COMPLETE	0.000
1W2LC6W4T103	DOE APPROVAL PROJECT AUTHORIZATION	64.000
1W2LC6W5T107	PREPARE PERFORMANCE SPEC	116.000
1W2LC6W5T129	AWARD DESIGN-BUILD CONTRACT	34.000
1W2LC7W1T101	PREPARE OPERATING PROCEDURES	108.000
1W2LC8W1T101	OTP	66.000
1W2LC8W2T103	FINALIZE READINESS REVIEW	15.000

Legend

Early CPM ☐

DESIGN/PROCUREMENT/CONSTRUCTION

1991			1992				1993				1994			
Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct

L-045H

1990			
1Aug	1Oct	1Jan	1Apr

L-045H PRELIMINARY SAFETY EVAL

1W2LC5W1T101	REVISE PSE	44.000	190
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1W2LC5W1T103	PSE REVISION COMPLETE	0.000	
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1W2LC5W1T105	PREPARE DETAILED SAFETY DOCUMENTATION SCHEDULE	22.000	
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1W2LC5W1T107	COMPLETE DETAILED SAFETY DOCUMENTATION SCHEDULE	0.000	
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1W2LC5W1T109	6430.1A COMPLIANCE REVIEW	49.000	8Ju
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1W2LC5W1T110	CONFIRMATION OF PSAD	22.000	
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L-045H PRELIM SAFETY ANALYSIS REP

1W2LC5W2T101	PREPARE PSAR	183.000	
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L-045H FINAL SAFETY ANALYSIS REP

1W2LC5W3T101	PREPARE FSAR	261.000	
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Activities Included By Selected Logic

1W2LC4W1T103	DRAFT BAT ENG STUDY DOCUMENT COMPLETE	0.000	
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1W2LC6W1T101	CONDUCT SITE RADIATION SURVEY	44.000	31
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1W2LC6W5T107	PREPARE PERFORMANCE SPEC	116.000	23
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1W2LC7W1T103	FINALIZE PROCEDURES	43.000	
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3WHM03B201	KEH ONSITE PROCUREMENT	130.000	
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3WHM03B403	AS BUILTS	250.000	
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Legend

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SAFETY DOCUMENTATION

1991		1992				1993				1994			
1Jul	10ct	1Jan	1Apr	1Jul	10ct	1Jan	1Apr	1Jul	10ct	1Jan	1Apr	1Jul	10ct

Project: L-045H2	1W2LC5	Date: 25Jun91 13:48
PROJECT MASTER SCHEDULE		
Page: 1	Randy Burgess 3-4752	

		1990		1991		
		1Aug	1Oct	1Jan	1Apr	1Jul
L-045H OTP						
1W2LC8W1T101	OTP					
						66.00D
L-045H READINESS						
1W2LC8W2T101	READINESS REVIEW					
						239.00D
1W2LC8W2T103	FINALIZE READINESS REVIEW					
						15.00D
1W2LC8W2T105	START - UP					
						0.00D
Activities Included By Selected Logic						
1W2LC3W1T423	NPDES PERMIT EFFECTIVE DATE					
						0.00D
1W2LC7W1T103	FINALIZE PROCEDURES					
						43.00D
1W2LC7W2T101	OPERATOR TRAINING					
						131.00D
3WHM030113	L-045H PROJECT COMPLETE					
						0.00D
3WHM038403	AS BUILTS					
						250.00D
3WHM038405	EXCEPTIONS					
						240.00D
Legend						
Early CPM		☐				

SH READINESS REVIEW

1990	
1Aug	1Oct

L-045H PRELIMINARY SITE WORK		
1W2LC6W1T101	CONDUCT SITE RADIATION SURVEY	44.00D
1W2LC6W1T103	SITE RADIATION SURVEY COMPLETE	0.00D
1W2LC6W1T201	PERFORM SITE SOIL TESTING	44.00D
1W2LC6W1T203	SITE SOIL TESTING COMPLETE	0.00D
1W2LC6W2		
1W2LC6W2T201	PREP PROGRAM PLAN FOR BENCH SCALE TESTING	22.00D
1W2LC6W2T203	DRAFT PROG PLAN FOR BENCH SCALE TESTING COMPLETE	0.00D
1W2LC6W2T205	CONCURRENT REVIEW-WHC, EPA, ECOLOGY	10.00D
1W2LC6W2T207	FINALIZE DRAFT	5.00D
L-045H PROJECT MANAGEMENT PLAN		
1W2LC6W3T101	PROJECT MANAGEMENT PLAN	94.00D
L-045H REQUEST PROJECT AUTHORIZATION		
1W2LC6W4T101	REQUEST PROJECT AUTHORIZATION	2.00D
1W2LC6W4T103	DOE APPROVAL PROJECT AUTHORIZATION	64.00D
L-045H PERFORMANCE SPECIFICATION		
1W2LC6W5T101	SOW FOR DRAFT PERFORMANCE SPEC	42.00D
1W2LC6W5T103	PERFORMANCE SPEC PROPOSAL	11.00D
1W2LC6W5T105	AWARD CONTRACT: PERFORMANCE SPEC	5.00D
1W2LC6W5T106	PERFORMANCE SPEC CONTRACT AWARDED	0.00D
1W2LC6W5T107	PREPARE PERFORMANCE SPEC	116.00D
1W2LC6W5T109	PERFORMANCE REVIEW APPROVAL	23.00D
1W2LC6W5T117	PREPARE BID DOCUMENTS	88.00D
1W2LC6W5T119	PREPARE ADP PLAN	44.00D
1W2LC6W5T123	COMMERCE BUSINESS DAILY AD	21.00D
1W2LC6W5T125	ISSUE RFP, PREPARE PROPOSALS	55.00D
1W2LC6W5T127	EVALUATE PROPOSALS	66.00D
1W2LC6W5T129	AWARD DESIGN-BUILD CONTRACT	34.00D
Activities Included By Selected Logic		
1W2LC4W1T101	PREPARE TECHNOLOGY SELECTION BAT ENG STUDY	56.00D
1W2LC4W1T113	REVISED BAT ENG STUDY	5.00D
1W2LC4W2T105	CONDUCT BENCH SCALE TESTING	87.00D
1W2LC4W2T106	COMPLETE BENCH SCALE TESTING	0.00D
1W2LC4W5T301	VERIFY DESIGN CRITERIA	5.00D
1W2LC5W1T105	PREPARE DETAILED SAFETY DOCUMENTATION SCHEDULE	22.00D
1W2LC5W1T110	CONFIRMATION OF PSAD	22.00D
1W2LC5W2T101	PREPARE PSAR	183.00D
3WHM038101	KEH DESIGN	131.00D
3WHM038102	DESIGN OUTFALL SYSTEM	44.00D
3WHM038103	D/B DESIGN	175.00D

Legend
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5H PROJECT MANAGEMENT/CONTROL-PAGE ONE

1991				1992				1993				1994			
1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct

L-045H PROJECT

1990			
1Aug	1Oct	1Jan	1Apr

L-045H WASTE MINIMIZATION

1W2LC6W6T101	UPDATE WASTE VOL REDUCTION PLAN (FRITZ DOCUMENT)	10.00D
1W2LC6W6T103	WASTE MINIMIZATION ACTIVITIES 400 GPM FLOW	326.00D
1W2LC6W6T105	WASTE MINIMIZATION ACTIVITIES 300 GPM FLOW	262.00D
1W2LC6W6T107	WASTE MINIMIZATION ACTIVITIES 200 GPM FLOW	107.00D

10ct ☐ 120ct

10ct

L-045H PROJECT MANAGEMENT

1W2LC6W7T101	PROJECT MANAGEMENT FY 1991	260.00D
1W2LC6W7T103	PROJECT MANAGEMENT FY 1992	262.00D
1W2LC6W7T105	PROJECT MANAGEMENT FY 1993	261.00D
1W2LC6W7T107	PROJECT MANAGEMENT FY 1994	261.00D

10ct

L-045H MISC PROJECT SUPPORT

1W2LC6W8T101	OSS. OPS SUPPORT	260.00D
1W2LC6W8T103	OSS. OPS SUPPORT	262.00D
1W2LC6W8T105	OSS. OPS SUPPORT	261.00D
1W2LC6W8T107	OSS. OPS SUPPORT	261.00D
1W2LC6W8T201	TECHNOLOGY SUPPORT	260.00D
1W2LC6W8T203	TECHNOLOGY SUPPORT	262.00D
1W2LC6W8T205	TECHNOLOGY SUPPORT	261.00D
1W2LC6W8T207	TECHNOLOGY SUPPORT	261.00D
1W2LC6W8T301	DESIGN REVIEW SUPPORT	260.00D
1W2LC6W8T303	DESIGN REVIEW SUPPORT	262.00D
1W2LC6W8T305	DESIGN REVIEW SUPPORT	261.00D
1W2LC6W8T307	DESIGN REVIEW SUPPORT	261.00D

10ct

10ct

10ct

Activities Included By Selected Logic

1W2LC4W1T101	PREPARE TECHNOLOGY SELECTION BAT ENG STUDY	56.00D
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2May

Legend

Early CPM ☐

MANAGEMENT/CONTROL-PAGE TWO

1991		1992				1993				1994			
1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct	1Jan	1Apr	1Jul	1Oct

18Jul

END

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