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MASTER

Power System Programs

Global Spent Fuel Logistics Systems Study (GSFLS)

Contract No. EN-77-C-03-1583

Volume 3A GSFLS Technical Analysis (Appendix)

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Interim Report
January 31, 1978

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ABSTRACT

This report is a part of the interim report documentation for the Global Spent Fuel Logistics System (GSFLS) study. The technical and financial considerations underlying a global spent fuel logistics systems have been studied and are reported herein. The Pacific Basin is used as a model throughout this report; however the stated methodology and, in many cases, considerations and conclusions are applicable to other global regions. Spent fuel discharge profiles for Pacific Basin Countries were used to determine the technical systems requirements for alternative concepts. Functional analyses and flows were generated to define both system design requirements and logistics parameters. A technology review was made to ascertain the state-of-the-art of relevant GSFLS technical systems. Modular GSFLS facility designs were developed using the information generated from the functional analysis and technology review. The modular facility designs were used as a basis for siting and cost estimates for various GSFLS alternatives. Various GSFLS concepts were analyzed from a financial and economic perspective in order to provide total concepts costs and ascertain financial and economic sensitivities to key GSFLS variations. Results of the study include quantification of GSFLS facility and hardware requirements; drawings of relevant GSFLS facility designs; system cost estimates; financial reports - including user service charges; and comparative analyses of various GSFLS alternatives.

KEY WORDS

Air-Cooled Vaults	Modules	Siting
Casks	Nuclear	Spent Fuel
Concepts	Reactor	Water Basin Storage
Financial Analysis	Reprocessing	
Geologic Storage	Ships	

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APPENDIX A

This appendix contains the functional flow sheets for the operations to be performed in a Global Spent Fuel Logistics System. The following legend delineates the symbols used in these flow sheets.

= Reference only function - not analyzed

= And gate, all paths taken

= Or gate, only one path taken

= Collection or summing point

= Function block; first number, x.x, is the block identifier, the number in parenthesis (Y), is the estimated time to accomplish that particular operation or function

= Decision block, one or the other path taken based on some particular constraint

= On page connector

= Off page connector

= special note symbol

For each of the flow sheets there is a loop equation which defines the critical path times. In most instances these equations are given in terms of the number of casks being handled.

A-3

- NOTES: 1) THIS FLOW IS FOR THE SOLE CONDITION WHERE A DEDICATED TRAIN, WITH X CASKS, ARRIVES AT A REACTOR SITE TO CAMPAIGN THE YEARLY DISCHARGE
- 2) NUMBERS IN () ARE (PWR/BWR) TIMES IN MINUTES
- 3) PWR CRITICAL PATH TIME = $3.1 + (C) (15.8) + T1$ (HOURS) (HOURS)
- BWR CRITICAL PATH TIME = $3.1 + (C) (20.3) + T1$ (HOURS) (HOURS)
- C = NUMBER OF CASKS INVOLVED
- T = TRAVEL TIME

FUNCTION 1.0

TRANSPORT SPENT FUEL FROM REACTOR STORAGE POOL TO AN INTERMODAL SHIPPING TRANSFER POINT (PWR/BWR RAIL CASKS)

- NOTE: 1) THIS FLOW IS FOR THE SOLE CONDITION WHERE TRUCK MOUNTED CASKS ARE USED TO CAMPAIGN A REACTOR DISCHARGE.
 2) TIME IS 121 MINUTES FOR THE FIRST CASK, 72 MINUTES FOR SUBSEQUENT UNITS
 3) NUMBERS IN () ARE (PWR/BWR) TIMES IN MINUTES
 4) PWR CRITICAL PATH TIME (HOURS) = $13.5 + T$ (HOURS) FOR THE FIRST CASK LOAD
 PWR CRITICAL PATH TIME (HOURS) = $12.7 + T$ (HOURS) FOR ALL SUBSEQUENT LOADS
 BWR CRITICAL PATH TIME (HOURS) = $15.1 + T$ (HOURS) FOR THE FIRST CASK LOAD
 BWR CRITICAL PATH TIME (HOURS) = $14.25 + T$ (HOURS) FOR ALL SUBSEQUENT LOADS

FUNCTION 2.0

TRANSPORT SPENT FUEL FROM REACTOR STORAGE POOL TO AN INTERMODAL SHIPPING TRANSFER POINT (PWR/BWR TRUCK CASKS)

A-5

* IF THIS IS A PORT AT A REACTOR SITE AND THE SHIP WILL HAVE TO WAIT ON THE CASK, THEN THE WAIT TIME MUST BE INSERTED SERIALLY AT THIS POINT.

FUNCTION 3.0

SHIP TRANSPORTER OPERATION -
CASK LOADING/UNLOADING FUNCTION
FOR A REGIONAL PORT OR A REACTOR
SITE PORT

SHT 1 of 2

FUNCTION 3.0

(Con't)

Ship Loading/Unloading Time at the Reactor Intermodal Transfer Point + One Way Travel to the AFR Dock

For the condition where the ship docks at the reactor site, unloads a single cask which is transported to the reactor, loaded and returned to the ship for the number of times necessary to load the ship the system equation is:

$$13 + T2 + 4 (C) + W (C)$$

T2 = Boat travel time from reactor to AFR site dock (D/V)

$$\text{Where } W = 3.1 + 15.8 + T3 + T3 + 90/60 \quad \text{PWR}$$

$$= 20.2 + 2 T3$$

$$\text{Or } W = 3.1 + 20.3 + 2T3 + 1.5 \quad \text{BWR}$$

$$= 24.9 + 2 T3$$

Where T3 = Absolute travel time of transporter & cask to & from
reactor (D/V) (hours)

$$EQ_{PWR} = 13 + T2 + 4C + (C) \quad 20.2 + 2 T3$$

$$= 13 + T2 + C \quad 24.2 + 2 T3 \quad \text{PWR}$$

$$EQ_{BWR} = 13 + T2 + 4(C) \quad 24.9 + 2 T3$$

$$= 13 + T2 + (C) \quad 28.9 + 2 T3 \quad \text{BWR}$$

For the condition where the ship docks at the intermodal shipping point and loads casks sequentially; then departs. There is no waiting for casks.

Rail Only

$$EQ = 180 + 120 + (240) (C) / (CR) + 180 + 240 + 60 + T2$$

T2 = Travel time from intermodal point to AFR dock (hours)

C = Total number of casks loaded onto the ship (both empty and full)

CR = Number of cranes loading the ship

$$EQ = 13 + 4(C/CR) + T2 \quad (\text{hours})$$

FUNCTION 3.0

(Con't)

Rail and Truck

$$\begin{aligned} \text{EQ} &= 180 + 120 + (120) C_R / CR + 160 + (120) C_t / CR + (120) C_t / CR + 180 \\ &\quad + (120) C_R / CR + 180 + 240 + 60 + T2 \\ &= 1120 + 240 C_r / CR + 240 C_t / CR + T2 \end{aligned}$$

$$\text{EQ} = 18.7 + \frac{4}{CR} (Cr + Ct) + T2 \quad (\text{hours})$$

C_R = Rail Casks Carried on the Ship

C_t = Truck Casks Carried on the Ship

$T2$ = Ship Travel Time from Intermodal Point to AFR Dock (Hours)

FUNCTION 4.0
RAIL TRANSPORT OF SPENT FUEL OR WASTE FROM
ONE WATER BASIN TO ANOTHER WATER BASIN.
(AGNS - TO - WEST VALLEY - TO -
OAK RIDGE - TO - HANFORD - TO - ETC)

A-9

SYSTEM LOOP EQUATIONS:

@ WB1 - LOAD EMPTY CASKS

$$\text{PWR LOOP} = 2.25 + 10.4 (C_T/P_1)$$

$$\text{BWR LOOP} = 2.25 + 12.0 (C_T/P_1)$$

@ WB2 - UNLOAD FULL CASKS

$$\text{PWR LOOP} = 3.25 + 15.3 (C_T/P_2)$$

$$\text{BWR LOOP} = 3.25 + 19.0 (C_T/P_2)$$

TRANSPORT FROM WB1 TO WB2 = T4 (HOURS)

TRANSPORT FROM WB2 TO WB1 = T5 (HOURS)

WB1 = WATER BASIN 1

WB2 = WATER BASIN 2

C_T = CASKS/TRAIN

P_1 = NUMBER OF UNLOADING PORTS AT WB2

P_2 = NUMBER OF UNLOADING PORTS AT WB2

FUNCTION 4.0

"CONTINUED"

SHEET 2 OF 2

SYSTEM LOOP EQUATIONS (BOAT ONLY)

$$\text{RAIL ONLY} = 13 + 4 \left(\frac{C_R}{C_R} \right) + T7 \quad \text{CR}$$

$$\text{RAIL AND TRUCK} = 18.7 + 4 \left(\frac{C_R}{C_R} \right) (C_R + C_T) + T7$$

C_R = NUMBER OF RAIL CASKS PER SHIP

C_T = NUMBER OF TRUCK CASKS PER SHIP

CR = NUMBER OF CRANES

T7 = TRAVEL TIME TO REACTOR OR
INTERMODAL SHIPPING POINT

FUNCTION 5.0

APR DOCK - SHIP
LOADING AND UNLOADING OPERATIONS

A-11

▷ TIMES ARE SHOWN ON SHT 2

FUNCTION 6.0

RECEIVE SPENT FUEL AT WATER BASIN, UNLOAD FUEL INTO STORAGE AND RETURN EMPTY TRANSPORTERS AND CASKS TO INTERMODAL SHIPPING POINT

SHT 1 of 3

FUNCTION 6.0
(Con't)

<u>BLOCK</u>	RAIL		TRUCK	
	<u>PWR</u>	<u>BWR</u>	<u>PWR</u>	<u>BWR</u>
6.1	50	50	40	40
6.2	10	10	0	0
6.3	40	40	35	35
6.4	40	40	30	30
6.5	11	11	8	8
6.6	71	71	56	56
6.7	23	23	18	18
6.8	100	100	95	95
6.9	17	17	17	17
6.10	16	16	6	6
6.11	198	198	154	154
6.12	80	80	50	50
6.13	9	9	9	9
6.14	8	8	8	8
6.15	167	391	25	39
6.16	283	582	91	113
6.17	14	14	10	10
6.18	7	7	7	7
6.19	114	114	23	23
6.20	8	8	8	8
6.21	51	51	51	51
6.22	20	20	20	20
6.23	14	14	14	14
6.24	77	77	77	77
6.25	55	55	45	45
6.26	126	126	71	71
6.27	60	60	30	30
6.28	19	19	110	110

FUNCTION 6.0

(Con't)

System Loop Equations

At Water Basin

RAIL

$$PWR = 3.25 + 15.3 (Cr/P_2)$$

$$BWR = 3.25 + 19.0 (Ct/P_2)$$

ROAD

$$PWR = 1.8 + 9.3 (Ct/P_2)$$

$$BWR = 1.8 + 9.5 (Ct/P_2)$$

Transport

Transport empty train from WB2 to intermodal point = T9

Transport empty truck from WB2 to intermodal point = T10

Transport full train from intermodal point to WB2 = T6

Transport full truck from intermodal point to WB2 = T8

At Dock Side

$$\underline{RAIL} = 2.2 + 2 (r/CR)$$

$$ROAD = 0.5 + 4 \quad Ct/CR \quad (1st \text{ truck cask})$$

FUNCTION 7.0
SPENT FUEL PACKAGING FOR STORAGE IN AN AIR COOLED VAULT
OR GEOLOGIC STORAGE SYSTEM

NOTE: THIS IS AN ASSEMBLY LINE TYPE OF OPERATION. THE LONGEST SINGLE PROCESS FLOW IS 135 MIN. A 135 MIN. DELAY IS BUILT-IN BEFORE THE NEXT CANISTER BEGINS THE FUNCTION SEQUENCE.

A-15

CRITICAL PATH TIME (CPT) = 155 MIN/CANISTER
= 2.6 HOURS/CANISTER

FUNCTION 8.0
GEOLOGIC REPOSITORY OPERATIONS EXCLUDING
RECEIVING BASIN AND PACKAGING FACILITY
FUNCTIONS

A-16

* CONTINUES ONLY WHEN SPENT FUEL IS REMOVED
FROM VAULT FOR REPROCESSING OR THROW AWAY

CRITICAL PATH TIME - 145 MIN

FUNCTION 9.0
AIR COOLED STORAGE VAULT OPERATIONS

* FUEL FEED INPUT CAN BE DERIVED FROM
EITHER A WATER BASIN FACILITY
(WB1), A DECANING FACILITY (DC-1) OR BOTH.

FOR THE PURPOSES OF THIS STUDY, THE REPROCESSING PLANT WILL BE CONSIDERED
TO BE A "BLACK BOX". SIZING OF PROCESS FUNCTIONS WILL NOT BE ACCOMPLISHED.
BOTH LIQUID AND SOLID WASTE STREAMS AS WELL AS PRODUCT OUTPUT WILL BE
ESTIMATED FOR PLANT SIZES OF 2500 AND 5000 MTU/YEAR.

FUNCTION 10.0

REPROCESSING PLANT OPERATIONS

FUNCTION 11.0

SPENT FUEL DECANNING OPERATIONS IN SUPPORT OF REPROCESSING;
INCLUDING CANISTER AND OVER-PACK REWORK

SHT 1 OF 2

NOTE: THIS IS AN ASSEMBLY LINE TYPE OF OPERATION.
THE LONGEST SINGLE PROCESS FLOW IS ABOUT 140 MIN.
AFTER A DELAY OF 140 MIN THE SECOND CANISTER
BEGINS. THIS WOULD ALLOW 10.3 CANISTERS/DAY/LINE

A-19

FUNCTION 11.0

CONTINUED

SHT 2 of 2

A-20

NOTE: THE LONGEST FUNCTION TIME IS APPROXIMATELY 115 MIN (ESTIMATED). THIS MEANS THAT A MAXIMUM OF 12 CANISTERS/DAY/LINE COULD BE HANDLED. HOWEVER, THE NUMBER WILL ULTIMATELY DEPEND UPON THE QUANTITY OF METAL FROM REPROCESSING.

FUNCTION 12.0
SOLID WASTE PROCESSING
(FROM REPROCESSING)

THE PROCESS FUNCTIONS IN THIS FLOW ARE ESSENTIALLY CONTINUOUS OPERATIONS. THE LONGEST MECHANICAL TASK WILL BE TO ENPLACE THE GLASS INTO THE CANISTERS AND TO COOL THE CANISTER SUFFICIENTLY FOR IT TO BE TRANSFERRED TO THE WELDING STATION. THIS TIME IS ESTIMATED TO BE 4 HOURS TOTAL. SIX CANISTERS PER DAY COULD BE HANDLED PER OPERATING LINE.

FUNCTION 13.0

LIQUID WASTE PROCESSING - CALCINING, VITRIFICATION, CANNING AND OVER PACKING

APPENDIX B1

FUNCTIONAL REQUIREMENTS

The data contained in this appendix are the functional requirements which are imposed upon the functional flows in Appendix A. In the "FUNCTION" there are references, on a one-to-one basis, to the functional flows in Appendix A. Any special equipment requirements are shown opposite and include any special notes.

FUNCTION	EQUIPMENT REQUIREMENT
1.0 SHIP SPENT FUEL FROM REACTOR SITE BY RAIL TO INTERMODAL TRANSFER POINT	
1.1 <u>RECEIVE CASKS</u>	
1.1.1 PROVIDE ACCESS THROUGH OUTER GATE	1.1.1 NONE REQUIRED
1.1.2 LOG INTO PLANT & PROVIDE SECURITY	1.1.2 A LOG BOOK IS REQUIRED. SPECIAL I.D. BADGES FOR ALL PERSONNEL; BADGES MAY BE PUNCH OR MAGNETICALLY CODED. ALL PERSONNEL MUST SIGN IN.
1.2 <u>UNLOAD CASKS</u>	
1.2.1 WASH CASKS DOWN TO REMOVE ROAD GRIME NOTE: THIS OPERATION IS NORMALLY ACCOMPLISHED BY THE SITE PERSONNEL.	1.2.1 a) A SINGLE WASH DOWN STATION IS REQUIRED b) A HIGH PRESSURE HIGH VOLUME WATER SUPPLY IS REQUIRED c) A STEAM SUPPLY IS REQUIRED TO REMOVE ACCUMULATED GREASE DEPOSITS d) HAND CLEANING EQUIPMENT IS REQUIRED e) A RAD-WASTE DRAIN SYSTEM IS REQUIRED f) WEATHER PROTECTION FOR PERSONNEL IS REQUIRED NOTE: THE REQUIREMENTS ABOVE ARE NORMALLY MET BY THE REACTOR AND WILL NOT BE PRICED.
1.2.2 REMOVE CASK TRANSPORTATION BARRIER (THIS STEP REQUIRED ONLY IF CASK ARRIVED FROM AN OVERLAND TRIP THROUGH PUBLIC DOMAIN)	1.2.2 a) A PALLET TO PLACE THE BARRIER ON IS REQUIRED b) A BARRIER SLING IS REQUIRED; TWO POINT LIFT, APPROXIMATELY 2 TONS CAPACITY c) A HOIST IS REQUIRED TO REMOVE THE BARRIER d) HAND TOOLS ARE REQUIRED NOTE: a) and c) ARE NORMALLY SUPPLIED BY THE UTILITY
1.2.3 REMOVE CASK IMPACT LIMITERS (THIS STEP REQUIRED ONLY IF CASK WAS IMMEDIATELY OFFLOADED FROM SHIP OR AIRCRAFT)	1.2.3 a) TWO PALLETS 8' x 8' ARE REQUIRED TO SET THE IMPACT LIMITERS ONTO b) AN IMPACT LIMITER SLING IS REQUIRED, ONE LIFT POINT, 5 TON CAPACITY c) A HOIST IS REQUIRED TO REMOVE THE IMPACT LIMITERS d) HANDTOOLS ARE REQUIRED NOTE: a) and c) ARE NORMALLY SUPPLIED BY THE UTILITY

FUNCTION	EQUIPMENT REQUIREMENT
1.2.4 REMOVE CASK FROM TRANSPORTER	1.2.4 a) A CASK LIFT SLING IS REQUIRED. THIS SLING MUST HAVE FULL REDUNDANCY. IT MUST BE CAPABLE OF LIFTING 125 TONS ON ANY TWO OPPOSITE ARMS. b) A CASK LIFT SLING ADAPTER TO CRANE HOOK MAY BE REQUIRED. c) A MINIMUM 125 TON CRANE IS REQUIRED TO LIFT THE CASK, DOUBLY REEVED. d) HAND TOOLS ARE REQUIRED. NOTE: c) PROVIDED BY UTILITY.
1.2.5 TRANSFER CASK TO FUEL LOADING POSITION	1.2.5 a) 125 TON CRANE WITH X, Y TRANSLATIONAL CAPABILITIES IS REQUIRED. NOTE: CRANE PROVIDED BY UTILITY.
1.3 <u>PLACE CASK INTO STORAGE POOL</u>	
1.3.1 CONNECT CASK COOLING & PURGING SYSTEM	1.3.1 a) HEAVY WALL, HIGH PRESSURE HOSES, TO MATE WITH THE CASK CAVITY ISOLATION VALVES ARE REQUIRED. b) AN AIR SUPPLY IS REQUIRED; 100-120 PSIG, OIL FREE, 4 SCFM MIN. c) HAND TOOLS ARE REQUIRED. NOTE: ALL ITEMS SUPPLIED BY UTILITY
1.3.2 REMOVE CASK CLOSURE FASTENERS	1.3.2 a) HIGH STRENGTH SOCKETS & BITS REQUIRED, SIZES 2" to 3" b) AN AIR TURBINE WRENCH IS REQUIRED 0-1250 FT-LBS. c) A TORQUE MULTIPLIER IS REQUIRED, 4:1
1.3.3 ATTACH CLOSURE SLING TO CLOSURE	1.3.3 a) A CASK CLOSURE SLING IS REQUIRED, 3 POINT LIFT, 10 TON CAPACITY b) HAND TOOLS ARE REQUIRED
1.3.4 HOIST CASK & LOWER INTO STORAGE POOL	1.3.4 a) SEE 1.2.5 a)

FUNCTION	EQUIPMENT REQUIREMENT
1.3.5 DISCONNECT SLING FROM CASK	1.3.5 a) PNEUMATIC OPERATION OF SLING ARMS IS REQUIRED b) A PNEUMATIC CONTROL BOX IS REQUIRED TO OPERATE THE SLING c) AN AIR SUPPLY IS REQUIRED, 100-120 psi, OIL FREE d) CONNECTING AIR HOSE WITH Q.D.'s ARE REQUIRED NOTE: c) IS SUPPLIED BY UTILITY
1.3.6 HOIST MAIN SLING FROM POOL	1.3.6 SEE 1.2.5 a)
1.3.7 HOIST CASK CLOSURE FROM CASK	1.3.7 a) 10 TON HOIST IS REQUIRED. MUST HAVE X,Y TRANSLATIONAL CAPABILITY NOTE: THIS IS SUPPLIED BY THE UTILITY
1.4 <u>LOAD SPENT FUEL INTO CASK</u>	
1.4.1 REMOVE CASK FUEL ELEMENT SPACER	1.4.1 a) A HOIST IS REQUIRED TO REMOVE THE SPACER. SPACER WEIGHT LESS THAN 500 LBS. USUALLY SATISFIED BY FUEL HANDLING MACHINE.
1.4.2 RETRIEVE SPENT FUEL FROM WATER BASIN STORAGE RACK & PLACE INTO CASK	1.4.2 a) A CRANE IS REQUIRED TO HOIST AND TRANSFER SPENT FUEL IN THE STORAGE POOL. b) VISUAL OPTICAL AIDES ARE REQUIRED TO INSURE PROPER FUEL ELEMENT TO HOIST ATTACHMENT c) PHOTO OPTICAL SYSTEM REQUIRED TO RECORD THE FUEL ELEMENT SERIAL NUMBERS. NOTE: THIS EQUIPMENT USUALLY SUPPLIED BY UTILITY
1.4.3 REPLACE CASK FUEL ELEMENT SPACER	1.4.3 a) SEE 1.4.1 a)
1.4.4 REPLACE CASK CLOSURE	1.4.4 a) SEE 1.3.7 a)
1.4.5 COOL CASK INTERNAL CAVITY AND FUEL ASSEMBLIES	1.4.5 a) SEE 1.3.1 a) b) COOL WATER, LESS THAN 80°F, 15 GPM MINIMUM FLOW RATE. WATER SHALL BE DEMINERALIZED NOTE: WATER IS SUPPLIED BY UTILITY
1.5 <u>REMOVE CASK FROM STORAGE POOL</u>	
1.5.1 ATTACH SLING TO CASK	1.5.1 a) SEE 1.3.5 a) THROUGH d)

FUNCTION	EQUIPMENT REQUIREMENT
1.5.2 HOIST CASK FROM STORAGE POOL	1.5.2 a) SEE 1.2.5 a)
1.5.3 TRANSFER CASK TO LAYDOWN AREA	1.5.3 a) SEE 1.2.5 a)
1.5.4 DISCONNECT SLING FROM CASK	1.5.4 a) SEE 1.3.5 a) THROUGH d)
1.6 <u>PERFORM CASK OUTLOADING OPERATIONS</u>	
1.6.1 PERFORM HEALTH/PHUSICS CHECK	1.6.1 a) A RADIATION MONITORING DEVICE IS REQUIRED
1.6.2 DECONTAMINATE CASK	1.6.2 a) LOW PRESSURE DEMINERALIZED WATER IS REQUIRED
	b) A SHADOW SHIELDING SET IS REQUIRED
	c) SPECIAL DECONTAMINATION FLUIDS ARE REQUIRED
	d) CLEANING BRUSHES ARE REQUIRED
	e) A SMEAR TEST SAMPLE KIT & ANALYSIS KIT ARE REQUIRED
	f) A PORTABLE SCREEN TO PUT AROUND THE CASK IS REQUIRED
1.6.3 RE-INSTALL AND TORQUE CASK CLOSURE FASTENERS & REMOVE CLOSURE SLING	1.6.3 a) SEE 1.3.2 a), b), c)
1.6.4 PURGE CASK CAVITY	1.6.4 a) AN AIR PRESSURE SUPPLY IS REQUIRED, 100-120 PSIG, OIL FREE, 4 SCFM IS REQUIRED
	b) A RAD WASTE DISPOSAL SYSTEM AND/OR WATER DEMINERALIZER IS REQUIRED TO TREAT THE CASK EFFLUENTS
	c) A CONTROL SYSTEM IS REQUIRED
	d) STD HELIUM "K" BOTTLES ARE REQUIRED. THESE SHALL BE A MINIMUM OF 220 SCF @ 2000 PSI.
	e) A HELIUM REGULATOR IS REQUIRED WITH A MAXIMUM PRESSURE SETTING OF 35 PSIG.
1.6.5 LEAK TEST CASK CLOSURE AND SEAL	1.6.5 a) A LEAK TEST SET IS REQUIRED. IT SHALL BE CAPABLE OF DETECTING LEAKS AS SMALL AS 10^{-7} ATM-CC/SEC.

FUNCTION	EQUIPMENT REQUIREMENT
1.6.6 DISCONNECT CASK COOLING AND PURGING EQUIPMENT	1.6.6 a) HAND TOOLS ARE REQUIRED b) PLASTIC GLOVES ARE REQUIRED c) HIGH ABSORBENCY COTTON RAGS ARE REQUIRED
1.6.7 MONITOR CASK PRESSURE AND TEMPERATURE	1.6.7 a) A MONITORING SET IS REQUIRED TO INTERFACE WITH THE CASK MONITORING INSTRUMENTS. PRESSURE SHALL BE CAPABLE OF READING 0-100 PSIG WITH ± 5 PSIG ACCURACY AT FULL SCALE. THE TEMPERATURE MONITOR SHALL BE CAPABLE OF READING 50-750°F WITH A ± 10 °F ACCURACY AT FULL SCALE. BOTH TEMPERATURE AND PRESSURE SHALL BE RECORDED ON A HARD COPY PRINTER. THESE SHALL BE MONITORED FOR A MINIMUM OF 1. HR. OR UNTIL SUCH TIME AS A DEFINITE PRESSURE/TEMPERATURE PROFILE CAN BE ESTABLISHED.
1.7 <u>INSTALL CASK ON TRANSPORTER</u>	
1.7.1 ATTACH SLING TO CASK	1.7.1 a) SEE 1.3.5 a) THROUGH d)
1.7.2 HOIST AND TRANSFER CASK TO TRANSPORTER	1.7.2 a) SEE 1.2.5 a)
1.7.3 LOWER CASK ONTO TRANSPORTER	1.7.3 a) SEE 1.2.5 a)
1.7.4 DISCONNECT SLING FROM CASK	1.7.4 a) SEE 1.3.5 a) THROUGH d)
1.7.5 CONNECT CASK COOLING SYSTEM (IF REQUIRED)	1.7.5 a) AN EXTERNAL CASK COOLING SYSTEM IS REQUIRED TO MAINTAIN THE CASK NEUTRON SHIELD AND SPENT FUEL AT A SAFE TRANSPORT LEVEL. THIS SYSTEM BE REDUNDANT AND SHALL BE MOUNTED ON THE TRANSPORTER. IT SHALL BE CONNECTABLE BY QUICK DISCONNECTS.
1.7.6 MONITOR CASK INTERNAL PARAMETERS (THIS OPERATION IS ONLY REQUIRED WHEN A PROTRACTED TRANSFER OR TRAVEL TIME IS TO BE UNDERTAKEN)	1.7.6 a) SEE 1.6.9 a) b) THE MONITORING SET SHALL BE PERMANENTLY MOUNTED TO THE TRANSPORTER AND IN SUCH A POSITION TO BE EASILY SEEN. c) AN ALARM SET IS REQUIRED TO SIGNAL AN OUT OF TOLERANCE CONDITION WITHIN THE CASK SUPPORT SYSTEMS. THIS SHALL BE TRANSMITTED BACK TO THE SECURITY CAR AND SHALL MANIFEST ITSELF IN THE FORM OF A FLASHING LIGHT AND BUZZER.

FUNCTION	EQUIPMENT REQUIREMENT
	THE BUZZER SHALL BE RESET ONLY FROM THE MONITOR SET IN b).
1.7.7 ATTACH CASK TO TRANSPORTER	1.7.7 a) HAND TOOLS ARE REQUIRED
1.7.8 INSTALL CASK IMPACT LIMITERS (THIS STEP REQUIRED ONLY IF CASK & TRANSPORTER WILL BE REQUIRED TO TRAVEL IN THE PUBLIC DOMAIN)	1.7.8 a) SEE 1.2.3. b), c), d)
1.7.9 INSTALL CASK TRANSPORTATION BARRIER (THIS STEP REQUIRED ONLY IF CASK & TRANSPORTER WILL BE REQUIRED TO TRAVEL IN THE PUBLIC DOMAIN)	1.7.9 a) SEE 1.2.2 b), c), d)
1.8 MOVE NEXT TRANSPORTER INTO THE UNLOADING SPOT (THIS STEP ONLY OCCURS IF A DEDICATED TRAIN ARRIVES AT A REACTOR SITE. SINGLE CASK TRANSPORTERS SUCH AS IS IN USE IN JAPAN WOULD NOT USE THIS STEP).	
1.8.1 ATTACH CAR PULLER (TRACTOR) TO LOADED CASK/TRANSPORTER AND MOVE OUT OF THE UNLOADING AREA.	1.8.1 a) A CAR MOVER WHICH HAS THE CAPABILITY TO MOVE FULLY LOADED RAIL CARS. THIS DEVICE MAY BE A RUBBER TIRED VEHICLE, A COMBINATION OF THESE OR A CABLE PULLER. NOTE: THIS DEVICE IS TO BE SUPPLIED BY THE UTILITY
1.8.2 MOVE NEXT CAR/CASK INTO POSITION	1.8.2 a) SEE 1.8.1 a)
1.9 DISPATCH TRANSPORTER/TRAIN TO INTERMODAL TRANSFER POINT (THESE OPERATIONS WILL BE PERFORMED ONLY IF A DEDICATED TRAIN IS TO BE MADE UP & WHICH WILL TRAVEL IN THE PUBLIC SECTOR: EXCEPTIONS 1.9.1, 1.9.2, 1.9.3.	

FUNCTION	EQUIPMENT REQUIREMENT
1.9.1 RETURN CASK LOADING EQUIPMENT TO SUPPORT VEHICLE (LAST OPERATION OF REACTOR CAMPAIGN)	1.9.1 a) A CRANE WILL BE REQUIRED TO LOAD THE CASK LIFT SLING & ADAPTER INTO THE SUPPORT VEHICLE. NOTE: CRANE SUPPLIED BY UTILITY
1.9.2 PERFORM FINAL HEALTH/PHYSICS CHECK	1.9.2 a) SEE 1.6.1 a)
1.9.3 PERFORM FINAL CASK PARAMETER CHECKS	1.9.3 a) SEE 1.6.9 a)
1.9.4 OBTAIN ENGINE & CABOOSE	1.9.4 a) COORDINATE WITH LOCAL RR FOR EQUIPMENT
1.9.5 INSTALL "RADIOACTIVE" SIGNS ON TRANSPORTER (IF REMOVED)	1.9.5 a) SIGNS ARE REQUIRED TO WARN PUBLIC OF POTENTIAL HAZARD
1.9.6 OBTAIN FINAL DISPATCH INSTRUCTIONS	1.9.6 a) NONE
1.10 <u>TRANSPORT SPENT FUEL</u>	
1.10.1 TRANSPORT SPENT FUEL FROM THE REACTOR SITE TO THE INTERMODAL TRANSFER POINT BY RAIL	1.10.1 a) THERE ARE TWO CONDITIONS FOR THIS TRANSPORT SCENARIO: 1) THE CONDITION WHERE THE TRANSPORTER TRAVELS SOLELY ON UTILITY PROPERTY ONE AT A TIME TO THE UTILITY WHARF 2) THE CONDITION WHERE THE TRANSPORTERS ARE ASSEMBLED INTO A DEDICATED TRAIN WHICH WILL BE REQUIRED TO TRAVEL FROM THE REACTOR SITE (OR PRIVATE) RAILWAYS WHICH ARE OFF OF UTILITY PROPERTY.
	<p>THE EQUIPMENT REQUIREMENT FOR THESE SCENARIOS ARE:</p> <p>a)1) A STANDARD 66' FLATCAR CAPABLE OF CARRYING A MINIMUM OF 125 TONS. THIS FLAT CAR SHOULD BE MODIFIED TO PROVIDE TIE DOWN POINTS FOR THE RAIL CASK TRUNNION CRADLE.</p>

FUNCTION	EQUIPMENT REQUIREMENT
1.10.1 (CONT'D)	<p>A RAIL CASK TRUNNION CRADLE WHICH IS CAPABLE OF SUPPORTING A 100 TON RAIL CASK AND WHICH WILL PROVIDE TIE DOWN SUPPORT FOR THE CASK. THIS UNIT MUST INTERFACE WITH THE STANDARD MODIFIED FLATCAR AND THE RAIL CASK & MUST ALLOW THE CASK TO BE ROTATED FROM THE HORIZONTAL TO VERTICAL (90°).</p> <p>AN EMERGENCY COOLING SYSTEM IS REQUIRED. THIS SYSTEM MUST BE MOUNTED ON THE FLATCAR WITH THE CASK TRUNNION CRADLE. IT MUST BE CAPABLE OF REJECTING A MINIMUM OF 25 KILOWATTS OF HEAT CONTINUOUSLY. THIS SYSTEM MAY BE EITHER ONCE THROUGH OR CONTINUOUSLY CIRCULATING. IT SHOULD BE POWERED BY INTERNAL COMBUSTION DEVICES. IT MUST INTERFACE WITH THE CASK OUTER JACKET COOLING SYSTEM. IT MUST DISCONNECT RAPIDLY.</p> <p>A RAIL CAR "CAR MOVER" IS REQUIRED. THIS UNIT MUST BE CAPABLE OF MOVING THE RAILCAR AND CASK, APPROXIMATELY 450,000 LBS., FROM THE REACTOR SITE TO THE DOCK SIDE. IT MUST BE CAPABLE OF STOPPING THE RAIL CAR IN A MINIMUM DISTANCE. THIS UNIT MAY BE RUBBER TIRED OR RAIL MOUNTED OR BOTH.</p> <p>AN ALTERNATE TO THE FLAT CAR & CAR MOVER SYSTEMS IS A RUBBER TIRED FLAT BED AND TRACTOR CAPABLE OF TRANSPORTING 125 TONS. THE CASK TRUNNION CRADLE MUST INTERFACE WITH THE FLATBED IN THIS CASE. THE EMERGENCY COOLING SYSTEM MAY BE MOUNTED ON A SEPARATE VEHICLE BUT MUST INTERFACE WITH THE CASK.</p> <p>a)2) A STANDARD 66' FLAT CAR CAPABLE OF CARRYING A MINIMUM OF 150 TONS. THIS FLAT CAR SHOULD BE MODIFIED TO PROVIDE TIE DOWN POINTS FOR THE RAIL CASK TRUNNION CRADLE, THE CASK COOLING SYSTEM, AND THE ANTI-PERSONNEL TRANSPORTATION BARRIER.</p>

FUNCTION	EQUIPMENT REQUIREMENTS
1.10.1 CONT'D	<p>A RAIL CASK TRUNNION CRADLE WHICH IS CAPABLE OF SUPPORTING A MINIMUM OF 125 TONS AND WHICH WILL PROVIDE TIEDOWN SUPPORT FOR THE CASK. THIS UNIT MUST INTERFACE WITH THE FLAT CAR TIEDOWN POINTS. IT MUST FIT WITHIN THE CONFINES OF THE TRANSPORTATION BARRIER. IT MUST ALLOW ROOM FOR THE CASK IMPACT LIMITERS TO BE REMOVED AND RE-INSTALLED. SUFFICIENT ROOM MUST BE ALLOCATED FOR CASK NEUTRON SHIELD EXPANSION TANKS AND CASK OUTER JACKET COOLING SYSTEM CONNECTIONS.</p> <p>A CASK OUTER JACKET COOLING SYSTEM IS REQUIRED. THIS SYSTEM MUST BE CAPABLE OF REMOVING 25 KW FROM THE CASK ON A CONTINUOUS BASIS. IT MUST BE FULLY REDUNDANT. INTERNAL COMBUSTION DEVICES MUST BE USED TO PROVIDE POWER. FUEL FOR 7 DAYS MUST BE CARRIED. THIS UNIT MUST INTERFACE WITH THE CASK AND PROVIDE QUICK CONNECTION AND DISCONNECT.</p> <p>IT MUST INTERFACE WITH THE CASK TRUNNION CRADLE AND FLAT CAR TIE DOWN POINTS. IT MUST FIT WITHIN THE ANTI-PERSONNEL TRANSPORTATION BARRIER ENVELOPE.</p> <p>A SAFEGUARDS PERSONNEL CAR IS REQUIRED TO TRAVEL WITH THE DEDICATED TRAIN. THIS CAR MUST BE EQUIPPED WITH MOBILE RADIO-TELEPHONES AND CITIZEN BAND RADIOS. IT MUST PROVIDE SLEEPING, DINING, SANITATION FACILITIES FOR A MINIMUM OF FOUR GUARDS. IT MUST PROVIDE DIRECT VIEWING OF ALL CASKS AND TRANSPORTERS AT ALL TIMES.</p>

FUNCTION	EQUIPMENT REQUIREMENT
2.0 <u>TRANSPORT SPENT FUEL (TRUCKS)</u>	
2.1 <u>RECEIVE CASK AND TRANSPORTER</u>	
2.1.1 PROVIDE ACCESS THROUGH OUTER GATE	2.1.1 None
2.1.2 LOG INTO PLANT AND PROVIDE SECURITY	2.1.2 See 1.1.2
2.2 <u>UNLOAD CASK</u>	
2.2.1 WASH CASK DOWN TO REMOVE ROAD GRIME	2.2.1 See 1.2.1
Note: THIS OPERATION IS NORMALLY ACCOMPLISHED BY SITE PERSONNEL	
2.2.2 REMOVE CASK TRANSPORTATION BARRIER	2.2.2 See 1.2.2
2.2.3 REMOVE CASK IMPACT LIMITERS	2.2.3 See 1.2.3
2.2.4 REMOVE CASK FROM TRANSPORTER	2.2.4 See 1.2.4 except minimum crane size is 30 tons
2.2.5 TRANSFER CASK TO FUEL LOADING POSITION	2.2.5 See 1.2.5(a) except minimum crane size is 30 tons
2.3 <u>PLACE CASK INTO STORAGE POOL</u>	
2.3.1 CONNECT CASK COOLING AND PURGING SYSTEM	2.3.1 See 1.3.1
2.3.2 REMOVE CASK CLOSURE FASTENERS	2.3.2 See 1.3.2
2.3.3 ATTACH CLOSURE SLING TO CLOSURE	2.3.3 See 1.3.3 except sling capacity is 5 tons
2.3.4 HOIST CASK AND PLACE INTO POOL	2.3.4 See 1.2.5(a) except crane size is 30 tons minimum
2.3.5 DISCONNECT SLING FROM CASK	2.3.5 See 1.3.5
2.3.6 HOIST MAIN SLING FROM POOL	2.3.6 See 1.2.5 (a) except crane size is 30 tons minimum
2.3.7 HOIST CASK CLOSURE FROM CASK	2.3.7 See 1.3.7 except crane size is 5 tons minimum

FUNCTION	EQUIPMENT REQUIREMENT
2.4 <u>LOAD SPENT FUEL INTO CASK</u>	
2.4.1 REMOVE CASK FUEL ELEMENT SPACER	2.4.1 See 1.4.1 except spacer weight approximately 100 pounds.
2.4.2 RETRIEVE SPENT FUEL FROM WATER BASIN STORAGE RACK AND PLACE INTO CASK	2.4.2 See 1.4.2
2.4.3 REPLACE CASK FUEL ELEMENT SPACERS	2.4.3 See 2.4.1
2.4.4 REPLACE CASK CLOSURE	2.4.4 See 2.3.7
2.4.5 COOL CASK INTERNAL CAVITY AND FUEL ASSEMBLIES	2.4.5 See 1.4.5 except water flow rate approximately 3 GPM
2.5 <u>REMOVE CASK FROM POOL</u>	
2.5.1 ATTACH SLING TO CASK	2.5.1 See 1.3.5
2.5.2 HOIST CASK FROM STORAGE POOL	2.5.2 See 1.2.5(a) except crane size 30 tons minimum
2.5.3 TRANSFER CASK TO LAY DOWN AREA	2.5.3 See 2.5.2
2.5.4 DISCONNECT SLING FROM CASK	2.5.4 See 1.3.5
2.6 <u>PERFORM CASK OUTLOADING OPERATIONS</u>	
2.6.1 PERFORM HEALTH PHYSICS CHECK	2.6.1 See 1.6.1
2.6.2 DECONTAMINATE CASK	2.6.2 See 1.6.2
2.6.3 REINSTALL AND TORQUE CASK CLOSURE FASTENERS AND REMOVE CLOSURE SLING	2.6.3 See 1.3.2 and 1.3.3
2.6.4 PURGE CASK CAVITY	2.6.4 See 1.6.4
2.6.5 LEAK TEST CASK CLOSURE AND SEAL	2.6.5 See 1.6.5
2.6.6 DISCONNECT CASK COOLING AND PURGING EQUIPMENT	2.6.6 See 1.6.6

FUNCTION	EQUIPMENT REQUIREMENT
2.6.7 MONITOR CASK PRESSURE AND TEMPERATURE	2.6.7 See 1.6.7
2.7 <u>INSTALL CASK ON TRANSPORTER</u>	
2.7.1 ATTACH SLING TO CASK	2.7.1 See 1.3.5
2.7.2 HOIST AND TRANSFER CASK TO TRANSPORTER	2.7.2 See 2.2.4
2.7.3 LOWER CASK ONTO TRANSPORTER	2.7.3 See 2.2.4
2.7.4 DISCONNECT SLING FROM CASK	2.7.4 See 1.3.5
2.7.5 MONITOR CASK INTERNAL PARAMETERS	2.7.5 See 1.7.6 except monitor alarms shall be located in tractor transporter
2.7.6 ATTACH CASK TO TRANSPORTER	2.7.6 See 1.7.7
2.7.7 INSTALL CASK IMPACT LIMITERS (ONLY IF TRANSPORTER TO TRAVEL OVER PUBLIC ROADS AT ROAD SPEEDS)	2.7.7 See 1.2.3
2.7.8 INSTALL CASK TRANSPORTATION BARRIER (ONLY IF TRANSPORTER TO TRAVEL OVER PUBLIC ROADS)	2.7.8 See 1.2.2
2.8 <u>MOVE NEXT TRANSPORTER INTO UNLOADING SPOT</u>	
2.8.1 DRIVE FIRST COMPLETED TRACTOR TRANSPORTER OUT OF AREA	2.8.1 None
2.8.2 MOVE NEXT TRANSPORTER INTO UNLOADING POSITION	2.8.2 None
2.9 <u>DISPATCH TRANSPORTER TO INTERMODAL TRANSFER POINT</u>	
2.9.1 RETURN CASK HANDLING EQUIPMENT TO	

FUNCTION	EQUIPMENT REQUIREMENT
2.9.1 (Con't) SUPPORT VEHICLE (ONLY WHEN REACTOR CAMPAIGN IS OVER)	2.9.1 See 1.9.1
2.9.2 PERFORM FINAL HEALTH PHYSICS CHECK	2.9.2 See 1.6.8 (a)
2.9.3 INSTALL "RADIOACTIVE" SIGNS IN TRANSPORTER	2.9.3 See 1.9.5
2.9.4 OBTAIN FINAL DISPATCH INSTRUCTIONS	2.9.4 None
2.10 <u>TRANSPORT SPENT FUEL</u>	
2.10.1 TRANSPORT SPENT FUEL FROM THE REACTOR SITE TO THE INTERMODAL TRANSFER POINT BY TRUCK	<p>2.10.1 a) A special cask transporter is required. This unit must be capable of carrying a 30 ton load. This unit will be the cask trunnion support cradle. It must interface with the cask transportation barrier. It must provide access room for the cask impact limiters.</p> <p>b) A standard tractor capable of moving the transporter down public roadways at maximum legal speeds.</p>

FUNCTION	EQUIPMENT REQUIREMENT
3.0 SHIP TRANSPORTER OPERATION - CASK LOADING/UNLOADING FUNCTION FOR A REGIONAL PORT OR A REACTOR SITE PORT	
3.1 DOCK SHIP	3.1 Tugboat services may be required.
3.2 PREPARE HEAVY LIFT CRANES	3.2 There are two different scenarios. The cranes may be dock mounted or ship mounted. The equipment requirements are described below.
<u>SHIP MOUNTED</u>	
3.2.1 SECURE THE SHIP TO THE DOCK	3.2.1 A dock mounted system which will couple to the ship to prevent ship rotation about its longitudinal axis during cask loading. This may be a four bar linkage (watts) which will allow the ship to rise and fall with the tide, but prevent rotation.
3.2.2 DE-RIG THE CRANES FROM STORAGE POSITION	3.2.2 None
3.2.3 SWING JIB OVER INTO POSITION TO PICK UP CASK SLING	3.2.3 None
3.2.4 PICK UP SLING FROM STORAGE POSITION	3.2.4 The crane hook must be a fully redundant sister hook. It must interface with the cask hoisting sling.
3.2.5 PROOF LOAD THE CRANE	3.2.5 Prior to loading or unloading at each dock site, the cranes must be proof loaded to insure that the system is safe. The crane and sling will be tested to 150%. A 200T dynamometer shall be used to measure the applied load. The proof load attach points shall be located on the dock and shall be located at the maximum extension of the crane jib.
<u>DOCK MOUNTED</u>	
3.2.6 PICK UP SLING FROM STORAGE POSITION	3.2.6 See 3.2.4

FUNCTION	EQUIPMENT REQUIREMENT
3.2.7 PROOF LOAD THE CRANE	3.2.7 See 3.2.5
3.3 <u>UNCOVER UPPER DECK</u>	
3.3.1 REMOVE WATER-PROOF COVER FROM HATCH	3.3.1 A tarpolin or other water-proof covering is required to be put over the hatch covers to prevent water inclusion into the cask storage hold during inclement weather situations.
3.3.2 REMOVE AND STORE THE HATCH COVERS	3.3.2 A small ship mounted crane and sling are required to remove the upper hatch covers. The crane must be able to access all hatch covers and must be capable of placing the hatch covers on the dock and out of the way.
3.4 <u>HOIST EMPTY RAIL CASK AND PLACE ON TRANSPORTER</u>	
3.4.1 MOVE EMPTY TRANSPORTER INTO POSITION TO RECEIVE CASK	3.4.1 A rail car "car mover" is required. This unit must be capable of moving the rail car and cask, approximately 450,000 pounds. It must be capable of stopping the rail car in a minimum of distance. This unit may be rubber tired or rail mounted or both.
3.4.2 REMOVE CASK TIE DOWNS AND PREPARE CASK FOR TRANSFER	3.4.2 Hand tools are required to remove the cask trunnion tie-down fasteners and cooling hoses.
3.4.3 TRANSLATE CASK SLING TO CASK AND ATTACH TO CASK	3.4.3 Hand tools may be required to attach the sling to the cask.
3.4.4 HOIST CASK FROM SHIP AND TRANSFER TO THE DOCK SIDE TRANSPORTER	3.4.4 a) The crane must be reeved redundantly for safe operation. b) The crane must be capable of translating the cask from the ships hold and over to the dock side for placement on the empty transporter.

FUNCTION	EQUIPMENT REQUIREMENTS
3.4.5 DETACH SLING AND TRANSLATE TO THE FULL TRANSPORTER	3.4.5 Hand tools may be required to detach the sling from the cask.
3.4.6 ATTACH CASK TO TRANSPORTER	3.4.6 a) Hand tools are required to attach the cask to the transporter
NOTE: The following 2 steps will not be required if the cask and transporter are traveling from a reactor dock to an on-site utility.	b) See 1.10.1 a) 1) for cask trunnion support cradle.
3.4.7 STORE CASK IMPACT LIMITERS ON FLAT CAR TRANSPORTER	3.4.7 A forklift with 15,000 pounds lift capacity will be required to put the impact limiters on the transporter.
3.4.8 PLACE ANTI-PERSONNEL TRANSPORTATION BARRIER ONTO TRANSPORTER	3.4.8 a) A dock side crane with 5 ton capacity is required to hoist the transportation barrier onto the transporter. b) Hand tools are required to fasten the barrier to the transporter. c) A transportation barrier sling will be required, two point lift with 5 ton capacity.
3.5 <u>DISPATCH DEDICATED TRAIN TO REACTOR SITE</u>	
3.5.1 OBTAIN ENGINE AND CABOOSE	3.5.1 Coordinate with local RR for equipment
3.5.2 OBTAIN FINAL DISPATCH INSTRUCTIONS	3.5.2 None
3.6 <u>TRANSPORT EMPTY RAIL CASKS</u>	
3.6.1 Provide safeguards	3.6.1 A safeguards personnel car is required to travel with the dedicated train provided that the train is traveling in the public sector. This car must be equipped with mobile radio-telephone and citizens band radio. It must provide sleeping, dining and sanitation facilities for a minimum of four guards. It must provide for direct viewing of all casks at all times. Safeguards personnel are not required to travel with empty rail casks.

FUNCTION	EQUIPMENT REQUIREMENT
3.7 <u>UNCOVER LOWER DECK</u>	
3.7.1 REMOVE MAIN DECK CASK SUPPORT EQUIPMENT FROM HATCH COVERS	3.7.1 a) See 3.3.2 as required b) Hand tools are required
3.7.2 REMOVE HATCH COVERS	3.7.2 See 3.3.2
3.8 <u>HOIST EMPTY TRUCK CASKS AND PLACE ON TRANSPORTER</u>	
3.8.1 MOVE EMPTY TRANSPORTER INTO POSITION TO RECEIVE CASK	3.8.1 A standard road tractor (truck) is required to move the transporter into position.
3.8.2 REMOVE CASK TIEDOWNS AND PREPARE CASK FOR TRANSFER	3.8.2 Hand tools are required to remove the cask trunnion tie down fasteners.
3.8.3 TRANSLATE CASK SLING TO CASK AND ATTACH TO CASK	3.8.3 Hand tools may be required to attach the sling to the cask.
3.8.4 HOIST CASK FROM SHIP AND TRANSFER TO THE DOCK SIDE TRANSPORTER	3.8.4 a) See 3.4.4 a), b) b) The sling and crane must be capable of supporting 40 tons. The sling and crane must be proof loaded prior to unloading the first truck cask on every loading or unloading operation at each dock.
3.8.5 DETACH SLING AND TRANSLATE TO THE FULL TRANSPORTER	3.8.5 Hand tools may be required.
3.8.6 ATTACH CASK TO TRANSPORTER	3.8.6 Hand tools are required to bolt the trunnion caps on and torque.
3.8.7 INSTALL CASK IMPACT LIMITERS	3.8.7 a) A jib crane or forklift is required to hoist the impact limiter into position to be mounted. This unit must be capable of supporting at least two tons. b) Hand tools are required to fasten the impact limiters to the cask.

FUNCTION	EQUIPMENT REQUIREMENT
3.8.8 INSTALL ANTI-PERSONNEL TRANSPORTATION BARRIER	3.8.8 a) A jib crane or forklift is required to hoist the transportation barrier into position on the transporter. b) Hand tools will be required to fasten the barrier to the transporter.
3.9 <u>HOIST FULL TRUCK CASKS AND PLACE INTO SHIPS HOLD</u>	
3.9.1 REMOVE CASK TRANSPORTER TRANSPORTATION BARRIER	3.9.1 See 3.8.8 a), b)
3.9.2 REMOVE CASK IMPACT LIMITERS	3.9.2 See 3.8.7 a), b)
3.9.3 DETACH CASK FROM TRANSPORTER	3.9.3 See 3.8.6
3.9.4 ATTACH SLING TO CASK	3.9.4 See 3.8.5
3.9.5 HOIST CASK FROM TRANSPORTER AND TRANSFER TO THE SHIPS SECOND LEVEL DECK	3.9.5 See 3.8.4 a), b), and c)
3.9.6 DETACH SLING FROM CASK AND TRANSLATE TO NEXT EMPTY CASK	3.9.6 See 3.8.3
3.9.7 ATTACH CASK TO SHIP-BOARD CASK TRUNNION SUPPORT CRADLE	3.9.7 See 3.8.2
3.10 <u>DISPATCH TRUCK TRANSPORTER TO REACTOR SITE</u>	
3.10.1 OBTAIN ROUTING INSTRUCTIONS	3.10.1 None required
3.10.2 OBTAIN ESCORT VAN	3.10.2 An escort van is required to travel with the casks in its return trip. This van shall have space for four guards two of which must have the transporter (or transporters) in sight at all times. It shall be equipped with radio-telephone and citizens band radio. Range shall be 500 miles.

FUNCTION	EQUIPMENT REQUIREMENT
<p>3.11 <u>TRANSPORT EMPTY TRUCK CASKS</u></p> <p>3.11.1 TRANSPORT CASKS TO REACTOR</p>	<p>3.11.1 a) A special cask transporter is required. This transporter shall interface with the cask lifting and rotation trunnions. It shall provide space for the cask impact limiters at each end of the cask. It shall interface with an anti-personnel transportation barrier. For U.S. transport, the vehicle, when combined with the tractor and cask, shall weigh no more than 73,200 GVW.</p> <p>b) A standard tractor is required for each transporter.</p> <p>c) A transportation barrier is required for each transporter to prevent access to the cask. This unit shall have lift or forklift points for removal. It must interface with the transporter and cask.</p> <p>d) A mobile radio-telephone is required for each tractor.</p> <p>e) A citizens band radio is required for each tractor.</p> <p>f) A cask pressure/temperature monitor system is required for each cask. This unit shall provide for continuous recording and shall provide a visual and audible alarm in the tractor cab.</p>
<p>3.12 <u>ESTABLISH COOLING</u></p> <p>3.12.1 PROVIDE COOLING</p>	<p>3.12.1 a) The truck casks are not cooled by any circulating water. Regulations require that the cask surface temperature be no more than 82°C (180°F) during shipping phases (foreign only). Each cask will generate a certain amount of heat (5 year old fuel):</p> <p>1 PWR = 1200 watts (4100 BTU/HR)</p> <p>2 BWR = 1000 watts (3400 BTU/HR)</p>

FUNCTION	EQUIPMENT REQUIREMENT
	3.12.1 (Con't) (a) It is required that the heat removal system maintain the cask transport area at a nominal 25°C (77°F) for personnel comfort.
3.13 <u>COVER THE LOWER DECK</u>	
3.13.1 RE-INSTALL HATCH COVERS	3.13.1 See 3.3.2
3.13.2 RE-INSTALL MAIN DECK CASK SUPPORT EQUIPMENT ONTO HATCH COVERS	3.13.2 a) See 3.3.2 as required b) Hand tools are required
3.14 <u>HOIST FULL RAIL CASK AND PLACE ONTO MAIN DECK</u>	
3.14.1 MOVE CASK TRANSPORTER AND FULL CASK INTO POSITION	3.14.1 See 3.4.1
3.14.2 REMOVE CASK TRANSPORTATION BARRIER	3.14.2 See 3.4.8 a) through c)
3.14.3 REMOVE CASK IMPACT LIMITERS	3.14.3 See 3.8.7a except crane capacity at least 5 tons See 3.8.7b
3.14.4 DETACH CASK FROM RAIL TRANSPORTER	3.14.4 Hand tools will be required to remove the trunnion tie downs and outer jacket cooling hoses.
3.14.5 TRANSLATE CASK SLING TO CASK AND ATTACH TO CASK	3.14.5 Hand tools may be required.
3.14.6 HOIST CASK FROM TRANSPORTER AND TRANSFER TO SHIP	3.14.6 See 3.4.4
3.14.7 DETACH SLING AND TRANSFER TO NEXT CASK	3.14.7 Hand tools may be required to detach sling from cask.

FUNCTION	EQUIPMENT REQUIREMENT
3.14.8 INSTALL CASK TIE DOWNS	3.14.8 a) Hand tools are required to install cask tie downs. b) A special cask support cradle is required to handle the rail cask. This unit must securely hold the cask and must provide load spreading structural members to prevent overloading the ship main deck. It must be small enough to allow close fitting of other casks in the hold.
3.15 <u>ESTABLISH COOLING</u>	
3.15.1 PROVIDE COOLING	3.15.1 a) A neutron shield cooling system is required to prevent the aqueous shield from overpressurizing the cask outer shim or boiling off. This cooling system must be capable of removing sufficient heat from the cask such that the water in the neutron shield remain below 90°C. This system must interface with the cask outer jacket cooling fittings. The system shall be closed loop and shall use demineralized water in the primary loop. An air cooled or sea water cooled heat exchanger may be used. The system must be fully redundant. Heat load for 5-year old fuel is: 10 PWR = 12,000 watts (40,000 BTU/hr) 24 BWR = 12,000 watts (40,000 BTU/hr) for each cask transported. b) Regulations require that the cask surface temperature remain at or below (Foreign) 82°C. This is a safe cask requirement, but it is much too high for personnel comfort. It is required that heat be removed from the cask compartments to maintain the cask compartment at or below 25°C for personnel comfort.
3.16 <u>COVER UPPER DECK</u>	
3.16.1 REPLACE MAIN DECK HATCH COVERS	3.16.1 See 3.3.2

FUNCTION	EQUIPMENT REQUIREMENTS
3.16.2 REPLACE WATER-PROOF COVER OVER HATCH	3.16.2 See 3.3.1
3.17 <u>PREPARE SHIP FOR DEPARTURE</u>	
3.17.1 RETURN CASK SLING TO STORAGE POSITIONS	3.17.1 See 3.2.4
3.17.2 RIG CRANES INTO TRANSPORT POSITIONS	3.17.2 None
3.17.3 REMOVE THE DOCK/SHIP STABILIZERS	3.17.3 See 3.2.1
3.18 <u>DISPATCH SHIP</u>	
3.18.1 OBTAIN ROUTING	3.18.1 None
3.18.2 TRANSFER SHIP OUT OF HARBOR	3.18.2 Tugboat services may be required.
3.19 <u>TRANSPORT CASKS TO AFR, ETC.</u>	
3.19.1 PROVIDE SHIP TRANSPORT	<p>3.19.1 The following additional requirements are placed on the ship transporter</p> <ul style="list-style-type: none"> a) longitudinal bulkheads placed at 1/5 the headth of the ship at both sides b) double hulled c) transverse bulkheads d) personnel decontamination facilities e) emergency flooding and firefighting equipment f) controlled discharge of effluents in drains with subsequent health physics monitoring g) redundant navigation equipment h) increased hull strength i) fully redundant cooling and electrical equipment j) minimum 3000 OWT for overseas transport k) size dependent upon optimum number of casks carried

FUNCTION	EQUIPMENT REQUIREMENT
4.0 <u>RAIL TRANSPORT OF SPENT FUEL OR WASTE FROM ONE WATER BASIN TO ANOTHER WATER BASIN</u>	
4.1 <u>RECEIVE EMPTY RAIL CASKS</u>	
4.1.1 PROVIDE ACCESS THROUGH OUTER GATE	4.1.1 None
4.1.2 LOG INTO PLANT AND PROVIDE SECURITY	4.1.2 a) A log book is necessary to list data. b) Special I.D. badges are required for all personnel. Badges may be either punch or magnetically coded. Badges must show face picture.
4.2 <u>UNLOAD CASK FROM TRANSPORTER</u>	
4.2.1 WASH CASKS DOWN TO REMOVE ROAD GRIME	4.2.1 See 1.2.1 a) through f) except delete note.
4.2.2 REMOVE CASK TRANSPORTATION BARRIER	4.2.2 See 1.2.2 a) through d) except delete note.
4.2.3 REMOVE CASK IMPACT LIMITERS	4.2.3 See 1.2.3 a) through d) except delete note.
4.2.4 MOVE CASK/TRANSPORTER INTO CASK UNLOADING AREA	4.2.4 a) See 1.8.1 a) except delete note. b) An air-lock system is required. Either one or the other of the air-lock doors may be open at any one time, but not both. All doors to be operated from a master control room. Alarms and indicators shall be installed to indicate when doors are open and closed. The air-lock may serve as the washdown station. c) A cask unloading area is required. This area should allow direct-easy access to the cask/transporter. It must provide a positive means of preventing the transporter from moving during cask hoisting operations.

FUNCTION	EQUIPMENT REQUIREMENT
4.2.5 REMOVE CASK FROM TRANSPORTER	4.2.5 a) See 1.2.4 a) through d) except delete note.
	b) See 1.2.5 a) except delete note.
4.2.6 TRANSFER CASK TO FUEL LOADING POSITION	4.2.6 a) See 1.2.5 a) except delete note.
4.3 <u>PLACE CASK INTO POOL</u>	
4.3.1 CONNECT CASK COOLING AND PURGING SYSTEM	4.3.1 a) See 1.3.1 a), b), and c)
4.3.2 REMOVE CASK CLOSURE FASTENERS	4.3.2 a) See 1.3.2 a), b) and c)
4.3.3 ATTACH CLOSURE SLING TO CLOSURE	4.3.3 a) See 1.3.3 a), b)
4.3.4 HOIST CASK AND LOWER INTO POOL	4.3.4 a) See 1.2.5 a)
4.3.5 DISCONNECT SLING FROM CASK	4.3.5 a) See 2.3.5 a) through d) except delete note.
4.3.6 HOIST MAIN CASK SLING FROM POOL	4.3.6 a) See 1.2.5 a)
4.3.7 HOIST CASK CLOSURE FROM CASK	4.3.7 a) See 1.3.7 except delete note.
4.4 <u>LOAD CASK</u>	
4.4.1 REMOVE CASK FUEL ELEMENT SPACER	4.4.1 See 1.4.1 a)
4.4.2 RETRIEVE SPENT FUEL FROM WATER BASIN STORAGE	<p>4.4.2 a) A 15 ton crane is required to hoist the storage basket from its storage rack and translate it to the storage pool-to-cask loading pool transfer device. This crane shall be remotely controlled from an operators console.</p> <p>b) A stiff link from the crane hook to the storage basket bail is required. This unit shall be of sufficient length to prevent the hook on the crane from entering the storage pool.</p>

FUNCTION	EQUIPMENT REQUIREMENT
4.4.2 (Con't)	c) A basket transfer device which will support a fully loaded storage basket and move it from the storage pool into the basket loading/unloading area is required.
4.4.3 RETRIEVE SPENT FUEL FROM STORAGE BASKET	<p>4.4.3 a) A fuel handling device is required to remove the fuel from the storage basket. This device must be capable of lifting a minimum of 3000 lbs. The fuel element grapple must have ninety degree rotational capability for alignment to the fuel elements. Automatic and manual grapple latching shall be incorporated. The grapple heads shall be replaceable and interchangeable.</p> <p>b) An underwater device for viewing the condition of the spent fuel element is required. The serial number of the spent fuel element shall be read and permanently recorded through the viewing device using either video tape or photographic means.</p>
4.4.4 PLACE SPENT FUEL INTO CASK	4.4.4 a) See 4.4.3 a)
4.4.5 ESTABLISH COOLING WATER FLOW IN CASK	<p>4.4.5 a) A 15 gpm demineralized water source is required. Operating pressure should be approximately 10 psig at the cask. The water shall be delivered through the cooling and purging system.</p> <p>b) The cooling water shall be returned to a holding tank after filtration for subsequent clean-up if necessary. This tank (or tanks) shall have agitators to prevent particulate matter from settling out. This water shall be passed through particulate filters and subsequently deionized in a resin exchange system. Filter backwash will be sent to a rad-waste holding tank (with agitator) until such time as final clean up can be effected.</p>
4.4.6 RE-INSTALL CASK FUEL ELEMENT SPACER	4.4.6 a) See 1.4.1 a)

FUNCTION	EQUIPMENT REQUIREMENT
4.4.7 RE-INSTALL CASK CLOSURE ON CASK	4.4.7 a) See 1.3.7 except delete note
4.5 <u>REMOVE CASK FROM POOL</u>	
4.5.1 ATTACH SLING TO CASK	4.5.1 a) See 1.2.4 a) through d) except delete note b) See 1.2.5 a) except delete note
4.5.2 HOIST CASK FROM STORAGE POOL	4.5.2 a) See 1.2.5 a) except delete note b) A low pressure high volume water rinse system is required. This system shall be used to flood the cask as it is being withdrawn from the storage pool. It shall be placed as near the surface of the pool water as possible. 50-100 GPM flow at 2-5 PSI.
4.5.3 TRANSFER CASK TO LAYDOWN AREA	4.5.3 a) See 1.2.5 a) except delete note.
4.5.4 PERFORM HEALTH PHYSICS CHECK	4.5.4 a) A portable radiation monitoring device is required. b) A smear test sample and analysis kit is required.
4.6 <u>PERFORM CASK OUTLOADING OPERATIONS</u>	
4.6.1 RE-INSTALL AND TORQUE CASK CLOSURE FASTENERS AND REMOVE CLOSURE SLING.	4.6.1 a) See 1.3.2 a), b), and c)
4.6.2 TRANSFER CASK TO DECONTAMINATION PIT AND REMOVE CASK SLING	4.6.2 a) See 1.2.5 a) except delete note b) See 1.3.5 a) through d) except delete note
4.6.3 DECONTAMINATE CASK	4.6.3 a) See 1.6.2 a) through e) b) A special decontamination pit for the cask is required. This pit shall be located near the cask unloading/loading pool. Steam at 90-120 PSI, 3/4 inch line is required. Water at 90-100 PSI is required (3/4 inch line) and must have

FUNCTION	EQUIPMENT REQUIREMENT
4.6.3 (Con't)	<p>4.6.3 b) (Con't).</p> <p>capability of being regulated. It is estimated that 500-1000 gallons of water will be required to decontaminate a single cask. It is expected that decontamination will occur only on 1% of the casks. For a 2500 MTU/year receiving basin (outgoing only) this would be approximately 6 casks per year. If both incoming and outgoing cask are considered, the 12 casks per year could require decontamination. This is one cask every 25 days. The worst case would be when two casks would require decontamination in the same day. This would require disposition of about 2000 gallons of rad-waste drain water per day. This water shall be passed through a filter system and subsequently on to a holding tank. This holding tank shall be equipped with agitators to prevent particulates from settling out. Filtered water will be passed through a demineralizer and returned to use. Filter backwash is pumped to a holding tank with an agitator until such time as final clean up can be accomplished.</p>
4.6.4 PURGE CASK CAVITY	<p>4.6.4 a) See 1.6.4 a) through e)</p> <p>b) See 4.4.5 b)</p>
4.6.5 LEAK TEST CASK CLOSURE AND SEAL	<p>4.6.5 a) See 1.6.5 a)</p>
4.6.6 REMOVE CASK FROM DECONTAMINATION PIT	<p>4.6.6 a) See 1.2.5 a) except delete note</p> <p>b) See 1.2.4 a) through d) except delete note</p>
4.6.7 DISCONNECT CASK COOLING AND PURGING EQUIPMENT	<p>4.6.7 a) See 1.6.6 a), b), and c)</p>
4.6.8 MONITOR CASK PRESSURE AND TEMPERATURE	<p>4.6.8 a) See 1.6.7 a)</p>

FUNCTION	EQUIPMENT REQUIREMENT
4.7 <u>INSTALL CASK ON TRANSPORTER</u>	
4.7.1 HOIST AND TRANSFER CASK TO TRANSPORTER	4.7.1 a) See 1.2.5 a) except delete note
4.7.2 LOWER CASK ONTO TRANSPORTER	4.7.2 a) See 1.2.5 a) except delete note
4.7.3 DISCONNECT SLING FROM CASK	4.7.3 a) See 1.3.5 a) through d) except delete note
4.7.4 CONNECT CASK COOLING	4.7.4 a) See 1.7.5 a)
4.7.5 MONITOR CASK INTERNAL PARAMETERS	4.7.5 a) See 1.6.7 a)
	b) See 1.7.6 b) and c)
4.7.6 ATTACH CASK TO TRANSPORTER	4.7.6 Hand tools are required.
4.7.7 INSTALL CASK IMPACT LIMITERS	4.7.7 a) See 1.2.3 b), c), and d) except delete note
4.7.8 INSTALL CASK TRANSPORTATION BARRIER	4.7.8 a) See 1.2.2 b), c), and d) except delete note
4.8 <u>MOVE NEXT TRANSPORTER INTO UNLOADING SPOT</u>	
4.8.1 MOVE CASK/TRANSPORTER INTO AIR-LOCK AND INTO FINAL PREPARATION STATION	4.8.1 a) See 4.2.4 a), b), and c)
4.8.2 MOVE NEXT TRANSPORTER INTO CASK UNLOADING SPOT	4.8.2 a) See 4.2.4 a), b), and c)
4.9 <u>DISPATCH TRANSPORTER/TRAIN TO NEXT WATER BASIN</u>	
4.9.1 PERFORM FINAL HEALTH/PHYSICS CHECK	4.9.1 a) See 1.6.1 a)
4.9.2 PERFORM FINAL CASK PARAMETER CHECKS	4.9.2 a) See 1.6.7 a)
4.9.3 OBTAIN ENGINE AND CABOOSE	4.9.3 Coordinate with local RR for equipment.
4.9.4 INSTALL "RADIOACTIVE" SIGNS ON TRANSPORTER	4.9.4 a) See 1.9.5 a)

FUNCTION	EQUIPMENT REQUIREMENT
4.9.5 OBTAIN FINAL DISPATCH INSTRUCTIONS	4.9.5 None
4.10 <u>TRANSPORT CASKS TO NEXT WATER BASIN</u>	
4.10.1 TRANSPORT SPENT FUEL FROM WATER BASIN 1 TO WATER BASIN 2 BY RAIL; INCLUDING SAFEGUARDS PERSONNEL SUPPORT	4.10.1 a) See 1.10.1 a) 2)
4.11 <u>CHECK INTO WATER BASIN SITE</u>	
4.11.1 COMMUNICATE ARRIVAL TO WATER BASIN COMMUNICATIONS CENTER	4.11.1 a) The mobile radio-telephone in the dedicated train safeguards car satisfies this requirement.
4.11.2 INITIATE CROSS RADIATION SURVEY OF CASKS AND TRANSPORTERS	4.11.2 a) A portable radiation monitor is required. It shall have an extensible probe such that no personnel will be required to come within 10 feet of the unit under checkout. b) A smear test sampling and analysis kit is required to verify surface contamination are below DOT allowable transportation levels.
4.11.3 INITIATE PHYSICAL DAMAGE SURVEY	4.11.3 a) Photographic recording equipment required to document any damage to either transporters or casks.
4.11.4 PROVIDE ACCESS THROUGH OUTER GATE	4.11.4 a) None
4.11.5 DISPATCH TRANSPORTER TO HOLDING AREA	4.11.5 a) See 1.8.1 a) except delete note.
4.11.6 PROVIDE TRANSPORTER SECURITY	4.11.6 a) Site size requirements 1) Site must be large enough to prevent line-of-site viewing of production facilities. 2) Site observation should preferably be obstructed by natural terrain features.

FUNCTION	EQUIPMENT REQUIREMENTS
4.11.6 (Con't)	<p>4.11.6 b) Site boundary definition</p> <ol style="list-style-type: none"> 1) Site must be clearly delineated 2) Unauthorized entry easily detected <p>c) Plant fence criteria</p> <ol style="list-style-type: none"> 1) Plant shall have a double fence system. Outer fence shall be at least 300 ft. from the building in all directions. The inner fence shall be at least 200 feet inside the outer fence. 2) Both fences should be at least 7 ft. high chain link, topped with twisted barbed wire selvage. 3) Both fences must be capable of detecting a poaching action. <p>d) Isolation area equipment</p> <ol style="list-style-type: none"> 1) Each area should be equipped with highly redundant intrusion detection systems. These may be microwave line of sight, buried magnetic sensors, closed-circuit television and a redundant illumination system that provides sufficient lighting for TV observation. <p>e) Isolation area guard posts</p> <ol style="list-style-type: none"> 1) Hardened guard posts shall be provided as necessary adjacent to, and part of the area between the fence systems. Access to these posts should be strictly controlled. Access should be via tunnel from inside the operating plant.

FUNCTION.	EQUIPMENT REQUIREMENT
4.11.7 LOG SHIPMENT INTO MATERIAL CONTROL SYSTEM	4.11.7 a) Bill-of-lading documentation showing part no., serial no., and other pertinent data such as initial fuel enrichment, specific power levels, burnup time in reactor, discharge date, time in reactor cooling basin. b) Computer accounting system for maintaining traceability of above data.
4.12 <u>CHECK CASK FOR CONTAMINATION</u>	
4.12.1 REMOVE CASK/TRANSPORTER PERSONNEL BARRIER	4.12.1 a) See 1.2.2 a) through d) except delete note.
4.12.2 PERFORM RADIATION SRUVEY OF CASK AND TRANSPORTER	4.12.2 a) See 4.11.2 a) and b)
4.12.3 REMOVE CASK IMPACT LIMITERS	4.12.3 a) See 1.2.3 a) through d) except delete note.
4.12.4 DISPATCH CASK AND TRANSPORTER TO INSPECTION AND WASHDOWN TO REMOVE ROAD DIRT AND GRIME.	4.12.4 a) See 1.8.1 a) except delete note.
4.13 <u>COOL CASK EXTERNALLY</u>	
4.13.1 DISCONNECT CASK COOLING AT CASK	4.13.1 a) Hand tools may be required.
4.13.2 CONNECT PLANT CASK COOLING SYSTEM	4.13.2 a) A plant cooling system, for the casks, is required. Each cask will be generating about 25 kw (5 year old fuel). The plant cooling system must be able to remove this amount of heat from each cask waiting to be unloaded. This system should be a closed loop system. It shall use demineralized water. Since this water will not come into contact with any nuclear material or contaminants, it need not be especially filtered or treated. Enough locations for supply and return must have flex hose and Q.A.'s to mote with the cask outer jacket cooling system. Two trains shall be

FUNCTION	EQUIPMENT REQUIREMENT
4.13.2 (Con't)	4.13.2 a) (Con't) serviced in this manner. (Currently a train will have 4 casks, but this may be as high as 20).
4.13.3 VERIFY CASK TEMPERATURE WITHIN MANUFACTURERS LIMITS.	4.13.3 a) See 1.7.6 a), b), and c)
4.14 <u>INSPECT AND WASHDOWN CASK AND TRANSPORTER</u>	
4.14.1 WASH CASK/TRANSPORTER TO REMOVE DIRT AND GRIME	4.14.1 a) See 1.2.1 a) through f) except delete note. b) The cask receiving station air-lock system may be used for the washdown station. One washdown station is required for each set of rail tracks leading into the cask unloading area.
4.14.2 RE-INSPECT CASK/TRANSPORTER FOR DAMAGE AND RECORD RESULTS	4.14.2 a) See 4.11.3 a)
4.15 <u>TRANSFER CASK TO RECEIVING STATION</u>	
4.15.1 OPEN OUTSIDE AIR-LOCK DOOR	4.15.1 a) See 4.2.4 a)
4.15.2 TRANSFER CASK INTO AIR-LOCK	4.15.2 a) See 1.8.1 a)
NOTE: THE AIR-LOCK CELL MAY BE UTILIZED AS THE WASHDOWN STATION FOR THE CASK AND TRANSPORTER	
4.15.3 CLOSE OUTSIDE AIR-LOCK DOOR AND OPEN INSIDE AIR-LOCK DOOR	4.15.3 a) See 4.2.4 a)
4.15.4 MOVE CASK AND TRANSPORTER TO CASK RECEIVING AREA	4.15.4 a) See 1.8.1 a)
4.15.5 CLOSE INSIDE AIR-LOCK DOOR	4.15.5 a) See 4.2.4 a)

FUNCTION	EQUIPMENT REQUIREMENT
4.16 <u>UNLOAD CASK FROM TRANSPORTER</u>	
4.16.1 INSTALL CASK TRANSPORTER TIE-DOWNS	4.16.1 a) A transporter tie-down set is required. This set shall be used to secure the cask transporter to the facility structure to prevent inadvertent movement of the transporter during cask hoisting operations. This requirement may be satisfied by a mating half of a car coupler embedded in facility structure.
4.16.2 REMOVE CASK FORWARD TRUNNION TIE-DOWNS AND STORE	4.16.2 a) Hand tools are required. b) A shadow shielding set may be required. This shall consist of a two foot wide x 5 foot high x 4 inch thick section of lead sheathed in 1/4 inch stainless steel. This could be required during off-normal unloading conditions. c) Asbestos gloves may be required due to heating of components by cask payload (25 kw per cask). d) A hand operated water spray may be required to keep worker hands cool during trunnion cap removal. e) A storage box for trunnion bolts is required.
4.16.3 INSTALL CASK LIFTING SLING	4.16.3 a) See 1.2.4 a) through d) except delete note. b) See 1.3.5 a) through d) except delete note.
4.16.4 LIFT AND ROTATE CASK TO VERTICAL	4.16.4 a) See 1.2.5 a) except delete note
4.16.5 REMOVE CASK AFT TIE-DOWNS	4.16.5 a) See 4.16.2 a) through e)
4.16.6 HOIST CASK FROM TRANSPORTER	4.16.6 a) See 1.2.5 a) except delete note.
4.17 <u>TRANSFER CASK TO DECON PIT</u>	

FUNCTION	EQUIPMENT REQUIREMENT
4.17.1 TRANSFER AND LOWER CASK INTO DECON PIT	4.17.1 a) See 1.2.5 a) except delete note. b) An impact limiter at the bottom of the decon pit is required. This unit shall be capable of absorbing the kinetic energy of a 100 ton cask falling from a free height of 30 feet without damage to facility integrity.
4.17.2 REMOVE CASK LIFTING SLING	4.17.2 a) See 1.2.4 a) through d) except delete note. b) See 1.3.5 a) through d) except delete note.
4.18 <u>DECONTAMINATE CASK</u>	
4.18.1 <u>PERFORM RADIATION SURVEY TO FIND HOT SPOTS</u>	4.18.1 a) See 4.11.2 a)
4.18.2 ACTIVATE WATER FLUSH TO REMOVE CONTAMINANTS	4.18.2 a) See 1.6.2 a) through e) b) See 4.6.3 b)
4.18.3 HAND CLEAN HOT SPOTS	4.18.3 a) Protective personnel clothing is required. b) Cleaning brushes are required. c) Acid (nitric) is required.
4.18.4 HOIST CASK FROM DECON PIT	4.18.4 a) See 1.2.4 a) through d) except delete note. b) See 1.3.5 a) through d) except delete note.
4.19 <u>TRANSFER CASK TO LAY DOWN AREA</u>	
4.19.1 TRANSLATE CASK TO PREPARATION STATION	4.19.1 a) See 1.2.5 a) except delete note.
4.19.2 REMOVE CASK SLING FROM CASK	4.19.2 a) See 1.2.4 a) through d) except delete note b) See 1.3.5 a) through d) except delete note.

FUNCTION	EQUIPMENT REQUIREMENT
4.20 <u>CONNECT CASK SAMPLING, PURGING AND COOLING LINES</u>	
4.20.1 CONNECT COOLING, SAMPLING AND PURGING LINES	4.20.1 a) See 1.3.1 a), b), and c)
4.20.2 PRESSURIZE LINES WITH AIR TO EQUAL CASK PRESSURE	4.20.2 a) See 1.3.1 b) above
4.21 SAMPLE, PURGE, COOL AND DEPRESSURIZE CASK	
4.21.1 SAMPLE CASK CAVITY: RECORD PRESSURE, TEMPERATURE, AND ACTIVITY LEVELS	<p>4.21.1 a) A pressure/temperature recording device is required to connect to the cask instrumentation. This device should be a two channel recorder and shall operate off std. power.</p> <p>b) Air shall be passed through the cask cavity. Air pressure shall be maintained at cask shipping pressure. This air shall be sampled by mass spectrometric means to determine the presence of noble fission gas products: levels shall be recorded.</p> <p>c) The air flow of b) shall be sampled to determine if either particulate or vaporous fission products are contained in the cask environment. This data shall be recorded.</p> <p>d) All gases including the sweeping air into the cask shall be sent to the radio-active off gas control system.</p>
4.21.2 PURGE CASK CAVITY	4.21.2 a) A radioactive off gas collection and control system is required. This system must be capable of handling a total of 2000 ft ³ (std. conditions) per day for a 2500 MTU/year receiving facility. A 5000 MTU/year will require 4000 ft ³ per day to be handled. This off gas system shall be

FUNCTION	EQUIPMENT REQUIREMENT
4.21.2 (Con't.)	<p>4.21.2 a) (Con't.) designed to recover I-129, C-14, Kr-85, Ru-103, Ru-106, and H-3. Quantities of these elements are trace only.</p> <p>b) Cleaned air shall be passed through a final sand filter prior to atmospheric discharge. Discharge shall be through a stack tower at least 100 ft. high.</p> <p>c) Prior to air entering the off gas system, the air shall be passed through HEPA filters to remove particulate matter.</p> <p>d) Each cask will be purged with 3 cask volumes of air.</p>
4.21.3 COOL CASK CAVITY	<p>4.21.3 a) Water at temperature and pressure of cask internal environment is required. A pressure inside the cask shall be maintained to prevent the coolant water from flashing into steam. The effluent water shall be maintained at pressure until such time as it is cooled to a point below the steam flash point.</p> <p>b) Water flow shall be at approximately 15 GPM. The cask will be filled in 33 minutes.</p> <p>c) The displaced cask air shall be passed through an air/water separator. The air shall be passed into the radioactive off gas system of 4.21.2.</p> <p>d) Cask inlet water shall be lowered at a linear rate to bring the spent fuel elements to a safe temperature of approximately 80°F. This shall be accomplished in a maximum time of 1-1/2 hours.</p> <p>e) When cask effluent temperature reaches 80°F, the cask pressure shall be reduced to ambient.</p>

FUNCTION	EQUIPMENT REQUIREMENT
4.21.3 (Con't)	<p>4.21.3 f) See 4.4.5 b)</p> <p>g) Water quantity is estimated as follows:</p> <p>15 GPM x 33 minutes = 500 gallons (cask filling)</p> <p>15 GPM x 90 minutes = 1350 gallons (cask cooling)</p> <p>15 GPM x 97 minutes = 1455 gallons (cooling main- tenance)</p> <p style="text-align: center;">————— 3305 gallons</p> <p>This amount is required per cask. For a 2500 MTU/year facility approximately 2 casks/day will require unloading this, these will require about 6600 gallons of water. Double this amount is required for a 5000 MTU/year facility.</p> <p>h) This cooling water shall be cooled and depressurized to 80°F or less and ambient pressure.</p> <p>i) Water shall be filtered for particulate removal. Filter backwash shall be passed to a holding tank with agitator to prevent settling. This water will be sent to a concentrator (part of pool clean-up system). Filtered water will be sent to the water purification and de-mineralizer (part of pool clena-up system) and returned to service water supply.</p>

FUNCTION	EQUIPMENT REQUIREMENT
4.22 <u>PREPARE FOR INNER CLOSURE REMOVAL</u>	
4.22.1 REMOVE OUTER LID FASTENERS AND STORE	4.22.1 a) Hand tools are required
	b) A box for storing fasteners is required
4.22.2 REMOVE AND STORE OUTER CASK CLOSURE	4.22.2 a) A jib crane and hoist capable of lifting 1500 pounds
	b) A sling that attaches to the closure is required. It shall be a three point lift with rated load capacity of 1500 pounds.
	c) A wooden pallet is required to place the closure onto for storage.
4.22.3 DETORQUE INNER CLOSURE FASTENERS	4.22.3 a) See 1.3.2 a) through c)
4.22.4 INSTALL INNER CLOSURE SLING	4.22.4 a) See 1.3.3 a) and b)
4.23 <u>HOIST AND LOWER CASK TO UNLOADING POSITION</u>	
4.23.1 ATTACH SLING TO CASK	4.23.1 a) See 1.2.4 a) through d) except delete note.
	b) See 1.3.5 a) through d) except delete note.
4.23.2 HOIST AND TRANSLATE CASK TO CASK UNLOADING POOL	4.23.2 a) See 1.2.5 a) except delete note.
4.23.3 LOWER CASK INTO UNLOADING POOL - REMOVE CLOSURE FASTENERS PRIOR TO CASK SUBMERGENCE	4.23.3 a) See 4.23.2 a) above
	b) Hand tools required to remove fasteners
	c) Strap box required to hold closure fasteners
	d) An impact structure at the bottom of the cask unloading pool is required to absorb the kinetic energy of a falling cask. It shall be capable of preventing a cask of 100 T weight falling

4.23.3 (Con't)

4.23.4 DISCONNECT CASK SLING AND REMOVE FROM POOL

4.24 REMOVE CASK INNER CLOSURE AND SPACER

4.24.1 REMOVE INNER CASK CLOSURE AND STORE

4.24.2 REMOVE FUEL ELEMENT SPACER

4.25 UNLOAD CASK CONTENTS INTO STORAGE BASKETS

4.25.1 TRANSLATE FUEL HANDLING MACHINE (FHM) TO CASK FUEL ELEMENT

4.25.2 LIFT FUEL ASSEMBLY FROM CASK

4.25.3 TRANSFER FUEL ASSEMBLY TO STORAGE BASKET

4.23.3 d) (Con't)

60 feet, through water, from damaging the facility to a point where coolant containment integrity is lost.

4.23.4 a) See 1.2.4 a) through d) except delete note.

b) See 1.3.5 a) through d) except delete note.

4.24.1 a) See 1.3.7 a) except delete note

b) A shelf shall be provided at cask height to store the closure on during unloading operations.

4.24.2 a) See 1.4.1 a)

b) See 4.24.2 b)

4.25.1 a) A fuel handling crane is required. This unit shall have removable grapples which will interface with specified fuel elements. It should have a minimum capacity of 3000 pounds. The crane shall have a load limiting device to prevent overloading the fuel elements. The grapple shall have an electro-mechanical or pneumatic latching mechanism.

4.25.2 a) See 4.25.1 a) above.

4.25.3 a) See 4.25.1 a) above.

b) A fuel assembly storage basket is required.

FUNCTION	EQUIPMENT REQUIREMENT
4.26.3 (Con't.)	<p>4.26.3 a) (Con't)</p> <p>required. This device shall interface with the storage basket in the same manner as the permanent storage basket rack. The drive mechanism is to be redundant. The device shall not transfer the basket any faster than 5 FPM. It shall be capable of supporting a fully loaded basket (approximately 28,000 lbs). It shall not permit a basket to become dislodged and fall during a seismic event.</p>
4.26.4 PLACE SPENT FUEL STORAGE BASKET INTO STORAGE RACK IN WATER BASIN	<p>4.26.4 a) A barrier wall enclosing the water basin is required. This wall shall prevent damage to the water basin from either natural phenomena or sabotage. It shall be an air plenum for the spent fuel off gas from leaking assemblies. It shall provide the capability to prevent the main cask lifting crane from falling into the storage basin.</p> <p>b) Basket handling cranes are required. Two units per storage basin module are needed. Each shall be 15 T and have redundant reeving. Each shall be remotely operated from an operators console.</p> <p>c) A basket sling is required to provide the interface between the crane and the basket. It shall be a single solid (or tubular) device (as opposed to cable) of sufficient length to prevent the crane hook from entering the pool water at any time. It shall have a pneumatic latch at each end to prevent it from inadvertently coming off of the crane hook or the basket disengaging and falling off.</p> <p>d) Basket storage racks are required. The rack shall support the basket from a point above the center of gravity of a fully loaded basket. The</p>

FUNCTION	EQUIPMENT REQUIREMENT
4.26.4 (Con't)	<p>4.26.4 d) (Con't)</p> <p>basket shall disengage the rack when lifted less than one foot. The number of storage baskets per rack shall depend upon the pool size. Racks shall support the baskets and prevent disengagement during the design earthquake condition.</p> <p>e) The storage basin shall be filled with demineralized or distilled water.</p> <p>f) The water basin cooling system shall be capable of removing 4 (10^6) BTU/HR for a 500 MTHM storage pool and 6 (10^6) BTU/HR for a 750 MTHM pool. Pool water shall be a nominal 40°C (104°F). There shall be an emergency cooling make-up water system. This system shall also be the supply tankage for normal spent fuel handling operations. Make-up from the commercial or deep well systems shall be piped into the make-up water tank. A holding pond is required. This pond shall be sized to fit either a 500 MTHM Module or 750 MTHM Module depending upon the receiving design used.</p> <p>g) The water basin clean-up system shall be capable of filtering and de-ionizing a 45 curie release into the pool. Nominal operating value is 2 (10^{-4}) Ci/M³. Water shall be passed through a filtration system to remove suspended particulates. Filter back-wash shall be transferred to a shielded storage tank with an agitator. This backwash water will be passed through a concentrator to reduce the volume. The distillate shall be returned to the make-up water supply. The de-ionizer must be capable of removing dissolved solids.</p>

FUNCTION	EQUIPMENT REQUIREMENT
4.26.4 (Con't)	<p>4.26.4 h) The pool water concentrator (evaporator) shall be capable of reducing the water volume 20:1. In a 2500 MTU/year plant the volume of cask water to be handled is the backwash from filters which handle 6600 GPD. If the filters are washed at 15 GPM for an hour this will be about 100 gallons per day. A 5000 MTU/year plant will generate about 200 gallons per day. Additionally the wash water from cask/transporter wash down and decontamination areas will need to be considered. It has been estimated that washdown will require 500 gallons/transporter and decon will require 500-1000 gallons/cask. A 2500 MTU/year plant will process two transporter simultaneously and possibly two decontamination per day. If the filter backwash is at 50 GPM for 30 minutes for each system then this will amount to</p> <div style="margin-left: 40px;"> <p>Washdown; 50 x 30 x 2 = 300 Gallons/day</p> <p>Decon 50 x 30 x 2 = 300 Gallons/day</p> <hr style="width: 100px; margin-left: 150px;"/> <p style="text-align: right;">600 Gallons/day</p> </div> <p>When cask cooling water is included, this amount totals 700 GPD. A 5000 MTU/year plant will generate 1400 GPD.</p> <p>The concentrator-evaporator will also be required to handle the filter backwash from the pool clean up system. It is expected though that this will amount to 3500 gallons/day for the smaller pools and 7000 GPD for the larger pools.</p> <p>The total concentration load then is about 4200 GPD for the 2500 MTU/year plant and 8400 GPD for the 5000 MTU/year facility. If we maintain the 20:1 evaporation rate, then the output of the concentrators-evaporators</p>

FUNCTION	EQUIPMENT REQUIREMENTS
4.26.4 (Con't)	4.26.4 h) (Con't)
	will be 210 GPD and 420 GPD.
4.26.5 PREPARE SOLID OPERATIONAL WASTES FOR TEMPORARY STORAGE	4.26.5 a) It has been estimated that a 3000 MTU/year facility (SRL estimate) will generate 20 M ³ of miscellaneous wastes per year and, 17 M ³ of HEPA filter waste. The 5000 MR/year plant will double this amount. This waste shall be packaged into drums for temporary storage until such time that the waste facility is on line. A single 55 gallon drum is about 7.4 ft ³ . 20 M ³ is about 710 ft ³ . Therefore, about 100 drums/year of compacted operational waste will be required. The HEPA filter waste will need 81 drums. A one year's lag storage space is required. The combustible solid wastes will ultimately be transferred to the waste packaging facility for incineration and disposal with the calcined waste streams. HEPA filter wastes will be shredded and packaged into canisters.
4.27 <u>REPLACE CASK CLOSURE SEAL</u>	
4.27.1 REMOVE OLD CASK SEAL AND PLACE INTO WASTE CONTAINER	4.27.1 a) A grapple is required to remove the old seal. It will need to be about 40 ft. long.
	b) Waste container is required.
4.27.2 OBTAIN NEW SEAL AND PLACE ON CASK	4.27.2 a) See 4.27.1 a)
	b) New seal is required for each cask. For 2500 MTU/year plant this will be 550 seals. For 5000 MTU/year this will be 1100 units. Seals are metallic o-rings 3/8" dia. by 50 inches major diameters.
4.27.3 OBTAIN SEAL SPACER AND INSTALL ON CASK	4.27.3 a) See 4.27.1 a)
	b) A seal spacer is required. This unit will be

FUNCTION	EQUIPMENT REQUIREMENT
4.27.3 (Con't)	4.27.3 b) (Con't.) installed between cask and closure to prevent plastic deformation of the new seal when the closure is torqued. An optional method is to use the old seal until a new load of spent fuel is hauled then put a new seal on at the reactor.
4.28 <u>REPLACE CASK CLOSURE AND SPACER</u>	
4.28.1 REPLACE FUEL ELEMENT SPACER	4.28.1 a) See 1.4.1 a)
4.28.2 REPLACE CASK CLOSURE	4.28.2 a) See 1.3.7 a) except delete note.
4.29 <u>FLUSH AND PURGE CASK CAVITY</u>	
4.29.1 FLUSH CASK CAVITY WITH 3 VOLS OF WATER	4.29.1 a) See 4.5.4 a), b)
4.29.2 PURGE CASK CAVITY (NOTE THIS OPERATION IS TO BE ACCOMPLISHED AFTER CLOSURE IS SECURELY FASTENED DOWN.	4.29.2 a) See 1.6.4 a) b) See 4.4.5 b) c) See 4.2.1 d)
4.30 HOIST AND TRANSLATE CASK FROM WATER BASIN	
4.30.1 INSTALL SLING ON CASK	4.30.1 a) See 1.3.5 a) through d) except delete note.
4.30.2 HOIST CASK FROM CASK UNLOADING POOL	4.30.2 a) See 1.2.4 a) through d) except delete note.
4.31 DECONTAMINATE CASK CLOSURE AREA AND PERFORM CASK OUTLOADING OPERATIONS	
4.31.1 FLOOD CASK CLOSURE WITH WATER ON REMOVAL FROM POOL	4.31.1 a) See 4.5.2 b)

FUNCTION	EQUIPMENT REQUIREMENT
4.31.2 PERFORM HEALTH/PHYSICS CHECK	4.31.2 a) See 4.5.4 a)
4.31.3 INSTALL CLOSURE FASTENERS	4.31.3 a) Fasteners stored in 4.23.3 c) b) Hand tools are required
4.31.4 TRANSLATE CASK TO LAY DOWN AREA AND DISCONNECT SLING	4.31.4 a) See 1.2.5 a) except delete note. b) See 1.3.5 a) through d) except delete note.
4.31.5 TORQUE CLOSURE FASTENERS AND REMOVE CLOSURE SLING	4.31.5 a) See 1.3.2 a), b), and c) b) Hand tools are required.
4.31.6 DISCONNECT CASK COOLING AND PURGING EQUIPMENT	4.31.6 a) See 1.6.6 a), b), and c)
4.32 CHECK CASK FOR CONTAMINATION	
4.32.1 CHECK CASK EXTERIOR SURFACE WITH MONITOR PROBE	4.32.1 a) See 4.5.4 a)
4.32.2 IF 4.32.1 SATISFACTORY CHECK SURFACE WITH SMEAR TEST KIT	4.32.2 a) See 4.5.4 b)
4.33 <u>HOIST AND PLACE CASK INTO DECON AREA</u>	
4.33.1 ATTACH SLING TO CASK	4.33.1 a) See 1.3.5 a) through d) except delete note.
4.33.2 HOIST AND TRANSLATE CASK TO DECON PIT	4.33.2 a) See 1.2.5 a) except delete note.
4.33.3 REMOVE SLING FROM CASK	4.33.3 a) See 1.3.5 a) through d) except delete note. b) See 1.2.5 a) except delete note.
4.34 <u>DECONTAMINATE CASK</u>	

FUNCTION	EQUIPMENT REQUIREMENT
4.34.1 PROVIDE DECONTAMINATION FACILITIES	4.34.1 a) See 4.6.3 a), b)
4.35 <u>HOIST CASK FROM DECON PIT</u>	
4.35.1 RE-INSTALL SLING ON CASK	4.35.1 a) See 1.3.5 a) through d) except delete note. b) See 1.2.4 a) through d) except delete note.
4.36 <u>INSTALL CASK ON TRANSPORTER</u>	
4.36.1 TRANSLATE CASK TO TRANSPORTER	4.36.1 a) See 1.2.5 a) except delete note.
4.36.2 INSTALL AFT TRUNNION TIEDOWNS	4.36.2 a) Hand tools are required.
4.36.3 LOWER AND ROTATE CASK TO HORIZONTAL	4.36.3 a) See 1.2.5 a) except delete note.
4.36.4 REMOVE CASK LIFTING SLING	4.36.4 a) See 1.2.4 a) through d) except delete note. b) See 1.3.5 a) through d) except delete note.
4.36.5 INSTALL CASK FORWARD TIEDOWNS	4.36.5 a) Hand tools are required.
4.36.6 REMOVE TRANSPORTER TIEDOWNS	4.36.6 a) None
4.36.7 MOVE TRANSPORTER THROUGH AIR-LOCK	4.36.7 a) See 4.2.4 a) b) See 1.8.1 a)
4.36.8 INSTALL CASK IMPACT LIMITERS	4.36.8 a) See 1.2.3 b), c) and d) except delete note.
4.36.9 INSTALL CASK TRANSPORTATION BARRIER	4.36.9 a) See 1.2.2 b), c) and d) except delete note.
4.37 <u>DISPATCH CASK AND TRANSPORTER</u>	
4.37.1 PERFORM FINAL HEALTH/PHYSICS CHECK	4.37.1 a) See 1.6.1 a)
4.37.2 OBTAIN ENGINE AND CABOOSE	4.37.2 a) See 4.9.3 a)
4.37.3 OBTAIN FINAL DISPATCH INSTRUCTIONS	4.37.3 a) None

FUNCTION	EQUIPMENT REQUIREMENT
<p>4.38 <u>TRANSPORT CASKS TO NEXT WATER BASIN</u></p> <p>4.38.1 TRANSPORT CASKS FROM WATER BASIN 2 TO WATER BASIN 1. INCLUDING SAFEGUARDS PERSONNEL SUPPORT.</p>	<p>4.38.1 a) See 1.10.1 a) 2)</p>

FUNCTION	EQUIPMENT REQUIREMENT
5.0 <u>AFR DOCK-SHIP LOADING AND UNLOADING OPERATIONS</u>	
5.1 <u>DOCK SHIP</u>	5.1 See 3.1
5.2 <u>PREPARE HEAVY LIFT CRANES</u>	5.2 See 3.2
<u>SHIP MOUNTED</u>	
5.2.1 SECURE SHIP TO DOCK	5.2.1 See 3.2.1
5.2.2 DE-RIG CRANES FROM STORAGE POSITION	5.2.2 None
5.2.3 SWING JIB OVER INTO POSITION TO PICK-UP CASK SLING	5.2.3 None
5.2.4 PICK UP SLING FROM STORAGE POSITION	5.2.4 See 3.2.4
5.2.5 PROOF-LOAD CRANES	5.2.5 See 3.2.5
<u>DOCK MOUNTED</u>	
5.2.6 PICK UP SLING FROM STORAGE	5.2.6 See 3.2.6
5.2.7 PROOF LOAD CRANE	5.2.7 See 3.2.7
5.3 <u>UNCOVER UPPER DECK</u>	
5.3.1 REMOVE WATER PROOF COVERS FROM HATCH	5.3.1 See 3.3.1
5.3.2 REMOVE AND STORE HATCH COVERS	5.3.2 See 3.3.2
5.4 <u>HOIST RAIL CASKS FROM SHIP AND PLACE ON TRANSPORTERS</u>	
5.4.1 MOVE EMPTY TRANSPORTER INTO POSITION TO RECEIVE CASK	5.4.1 See 3.4.1

FUNCTION	EQUIPMENT REQUIREMENT
5.4.2 REMOVE CASK TIE-DOWNS AND PREPARE CASK FOR TRANSFER	5.4.2 See 3.4.2
5.4.3 TRANSLATE CASK SLING TO CASK AND ATTACH TO CASK	5.4.3 See 3.4.3
5.4.4 HOIST CASK FROM SHIP AND TRANSFER TO DOCK SIDE TRANSPORTER	5.4.4 See 3.4.4 a), b)
5.4.5 DETACH SLING AND TRANSLATE TO NEXT CASK ON SHIP	5.4.5 See 3.4.5
5.4.6 INSTALL CASK IMPACT LIMITERS	5.4.6 a) See 1.2.3 b), c) and d) except delete note.
5.4.7 INSTALL CASK TRANSPORTATION BARRIER	5.4.7 a) See 1.2.2 b), c) and d) except delete note.
5.5 <u>DELETED</u>	
5.6 <u>ESTABLISH CASK COOLING ON TRANSPORTER</u>	
5.6.1 CONNECT CASK TRANSPORTER COOLING EQUIPMENT	5.6.1 a) Hand tools required. b) See 1.7.5 a)
5.6.2 MONITOR CASK PARAMETERS	5.6.2 a) See 1.6.7 a) b) See 1.7.5 b), c)
5.7 <u>DISPATCH TRANSPORTER TO WATER BASIN</u>	
5.7.1 PERFORM FINAL HEALTH/PHYSICS CHECK	5.7.1 a) See 1.6.1 a)
5.7.2 PERFORM FINAL CASK PARAMETER CHECKS	5.7.2 a) See 1.6.7 a)
5.7.3 OBTAIN ENGINE AND CABOOSE	5.7.3 a) See 1.9.4 a)
5.7.4 INSTALL "RADIOACTIVE" SIGNS ON TRANSPORTER	5.7.4 a) See 1.9.5 a)

FUNCTION	EQUIPMENT REQUIREMENT
5.7.5 OBTAIN FINAL DISPATCH INSTRUCTIONS	5.7.5 a) None
5.8 <u>TRANSPORT CASKS TO WATER BASIN</u>	
5.8.1 TRANSPORT CASKS FROM AFR DOCK TO WATER BASIN	5.8.1 a) See 1.10.1 a) 2)
5.9 <u>UNCOVER LOWER DECK</u>	
5.9.1 REMOVE MAIN DECK CASK SUPPORT EQUIPMENT FROM HATCH COVERS	5.9.1 a) See 3.3.2 b) Hand tools are required
5.9.2 REMOVE HATCH COVERS	5.9.2 a) See 3.3.2
5.10 <u>HOIST TRUCK CASKS FROM SHIP AND PLACE ON EMPTY TRANSPORTER</u>	
5.10.1 MOVE EMPTY TRANSPORTER INTO POSITION TO RECEIVE CASK	5.10.1 a) See 3.8.1
5.10.2 REMOVE CASK TIEDOWNS AND PREPARE CASK FOR TRANSFER	5.10.2 a) See 3.8.2
5.10.3 TRANSLATE CASK SLING TO CASK AND ATTACH TO CASK	5.10.3 a) See 3.8.3
5.10.4 HOIST CASK FROM SHIP AND TRANSFER TO DOCK SIDE TRANSPORTER	5.10.4 a) See 3.4.4 a), b) b) See 3.8.4 b)
5.10.5 DETACH SLING FROM CASK AND TRANSLATE TO EMPTY TRUCK CASK	5.10.5 a) See 3.8.5
5.10.6 ATTACH CASK TO TRANSPORTER	5.10.6 a) Hand tools are required
5.10.7 INSTALL CASK IMPACT LIMITERS	5.10.7 a) See 3.8.7 a), b)
5.10.8 INSTALL ANTI-PERSONNEL TRANSPORTATION BARRIER	5.10.8 a) See 3.8.8 a), b)

FUNCTION	EQUIPMENT REQUIREMENT
5.11 <u>MOVE EMPTY TRANSPORTER INTO POSITION TO RECEIVE CASK</u>	
5.11.1 OBTAIN NEXT TRANSPORTER IN LINE AND MOVE INTO CASK LOADING SPOT.	5.11.1 a) See 3.8.1
5.12 <u>HOIST EMPTY ROAD CASKS FROM TRANSPORTER AND PLACE INTO HOLD OF SHIP</u>	
5.12.1 REMOVE CASK ANTI-PERSONNEL TRANSPORTATION BARRIER	5.12.1 a) See 3.8.8 a), b)
5.12.2 REMOVE CASK IMPACT LIMITERS	5.12.2 a) See 3.8.7 a), b)
5.12.3 DETACH CASK FROM TRANSPORTER	5.12.3 a) See 3.8.6
5.12.4 ATTACH SLING TO CASK	5.12.4 a) See 3.8.5
5.12.5 HOIST CASK FROM TRANSPORTER AND TRANSFER TO SHIP SECOND LEVEL DECK	5.12.5 a) See 3.8.4 a), b), and c)
5.12.6 DETACH SLING FROM CASK AND TRANSLATE TO NEXT FULL CASK	5.12.6 a) See 3.8.3
5.12.7 ATTACH CASK TO SHIP-BOARD CASK TRUNNION SUPPORT CRADLE	5.12.7 a) See 3.8.2
5.13 <u>DISPATCH TRUCK TRANSPORTER TO WATER BASIN</u>	
5.13.1 OBTAIN ROUTING INSTRUCTIONS	5.13.1 a) None
5.13.2 OBTAIN ESCORT VAN	5.13.2 a) See 3.10.2
5.14 <u>TRANSPORT TRUCK CASKS</u>	
5.14.1 TRANSPORT CASKS TO WATER BASIN	5.14.1 a) See 3.11.1 a) through f)
5.15 <u>COVER THE LOWER DECK</u>	

FUNCTION	EQUIPMENT REQUIREMENT
5.15.1 RE-INSTALL HATCH COVERS	5.15.1 a) See 3.3.2
5.15.2 RE-INSTALL MAIN DECK CASK SUPPORT EQUIPMENT ONTO HATCH COVERS	5.15.2 a) See 3.3.2
	b) Hand tools are required.
5.16 <u>HOIST EMPTY RAIL CASKS FROM TRANSPORTER AND PLACE ON DECK</u>	
5.16.1 MOVE CASK/TRANSPORTER INTO POSITION	5.16.1 a) See 3.4.1
5.16.2 REMOVE CASK TRANSPORTATION BARRIER	5.16.2 a) See 3.4.8 a) through c)
5.16.3 REMOVE CASK IMPACT LIMITERS	5.16.3 a) See 3.8.7 a) except crane capacity
5.16.4 DETACH CASK FROM RAIL TRANSPORTER	5.16.4 a) Hand tools required.
5.16.5 TRANSLATE CASK SLING TO CASK AND ATTACH TO CASK	5.16.5 a) Hand tools are required.
5.16.6 HOIST CASK FROM TRANSPORTER AND TRANSFER TO SHIP	5.16.6 a) See 3.4.4
5.16.7 DETACH SLING AND TRANSFER TO NEXT CASK	5.16.7 a) Hand tools are required.
5.16.8 INSTALL CASK TIEDOWNS	5.16.8 a) See 3.14.8 a), b)
5.17 <u>COVER UPPER DECK</u>	
5.17.1 REPLACE MAIN DECK HATCH COVERS	5.17.1 a) See 3.3.2
5.17.2 REPLACE WATER-PROOF COVER OVER HATCH	5.17.2 a) See 3.3.1
5.18 <u>PREPARE SHIP FOR DEPARTURE</u>	
5.18.1 RETURN CASK SLING TO STORAGE POSITION	5.18.1 a) See 3.2.4

FUNCTION	EQUIPMENT REQUIREMENT
5.18.2 RIG CRANES INTO TRANSPOWT POSITION	5.18.2 None
5.18.3 REMOVE THE DOCK/SHIP STABILIZERS	5.18.3 a) See 3.2.1
5.19 <u>DISPATCH SHIP</u>	
5.19.1 OBTAIN ROUTING	5.19.1 None
5.19.2 TRANSFER SHIP OUT OF HARBOR	5.19.2 a) See 3.18.2
5.20 <u>TRANSPORT EMPTY CASKS</u>	
5.20.1 PROVIDE SHIP TRANSPORT	5.20.1 See 3.19.1 a) through k)

FUNCTION	EQUIPMENT REQUIREMENT
<p>6.0 <u>RECEIVE SPENT FUEL AT WATER BASIN, UNLOAD FUEL INTO STORAGE AND RETURN EMPTY TRANSPORTERS AND CASKS TO INTERMODAL SHIPPING POINT</u></p> <p>NOTE: THE FUNCTIONS ON THIS TASK ARE IDENTICAL TO THE FUNCTIONS IN 4.0. AS SUCH, ONLY THE BASIC BLOCK NUMBER WILL BE SPECIFIED WITH REFERENCE TO 4.0</p>	
<p>6.1 <u>CLECK INTO WATER BASIN</u></p>	<p>6.1 a) See 4.11.1 a) b) See 4.11.2 a), b) c) See 4.11.3 a) d) See 4.11.4 a) e) See 4.11.5 a) f) See 4.11.6 a) 1), 2); b), 1), 2); c), 1), 2), 3); d) 1); e), 1) g) See 4.11.7 a), b)</p>
<p>6.2 <u>COOL CASK EXTERNALLY</u></p>	<p>6.2 a) See 4.13.1 a) b) See 4.13.2 a) c) See 4.13.3 a)</p>
<p>6.3 <u>CHECK CASK FOR CONTAMINATION</u></p>	<p>6.3 a) See 4.12.1 a) b) See 4.12.2 a) c) See 4.12.3 a) d) See 4.12.4 a)</p>

FUNCTION	EQUIPMENT REQUIREMENT
6.4 <u>INSPECT AND WASH DOWN CASK AND TRANSPORTER</u>	6.4 a) See 4.14.1 a), b) b) See 4.14.2 a)
6.5 <u>TRANSFER CASK TO RECEIVING STATION</u>	6.5 a) See 4.15.1 a) b) See 4.15.2 a) c) See 4.15.3 a) d) See 4.15.4 a) e) See 4.15.5 a)
6.6 <u>UNLOAD CASK FROM TRANSPORTER</u>	6.6 a) See 4.16.1 a) b) See 4.16.2 a) through e) c) See 4.16.3 a), b) d) See 4.16.4 a) e) See 4.16.5 a) f) See 4.16.6 a)
6.7 <u>TRANSFER CASK TO DECON PIT</u>	6.7 a) See 4.17.1 a), b) b) See 4.17.2 a), b)
6.8 DECONTAMINATE CASK	6.8 a) See 4.18.1 a) b) See 4.18.2 a), b) c) See 4.18.3 a), b), c) d) See 4.18.4 a), b)
6.9 <u>TRANSFER CASK TO LAY DOWN AREA</u>	6.9 a) See 4.19.1 a) b) See 4.19.2 a), b)

FUNCTION	EQUIPMENT REQUIREMENT
5.10 <u>CONNECT CASK SAMPLING PURGING AND COOLING LINES</u>	6.10 a) See 4.20.1 a) b) See 4.20.2 a)
6.11 <u>SAMPLE, PURGE, COOL AND DEPRESSURIZE CASK</u>	6.11 a) See 4.21.1 a) through d) b) See 4.21.2 a) through d) c) See 4.21.3 a) through i)
6.12 <u>PREPARE FOR INNER CLOSURE REMOVAL</u>	6.12 a) See 4.22.1 a), b) b) See 4.22.2 a), b), c) c) See 4.22.3 a) d) See 4.22.4 a)
6.13 <u>HOIST AND LOWER CASK TO UNLOADING POSITION</u>	6.13 a) See 4.23.1 a), b) b) See 4.23.2 a) c) See 4.23.3 a) through d) d) See 4.23.4 a), b)
6.14 <u>REMOVE CASK INNER CLOSURE AND SPACER</u>	6.14 a) See 4.24.1 a), b) b) See 4.24.2 a), b)
6.15 <u>UNLOAD ALL SPENT FUEL INTO STORAGE BASKET</u>	6.15 a) See 4.25.1 a) b) See 4.25.2 a) c) See 4.25.3 a), b)
6.16 <u>PLACE SPENT FUEL INTO WATER BASIN</u>	6.16 a) See 4.26.1 a) through d) b) See 4.26.2 a) through b) c) See 4.26.3 a) d) See 4.26.4 a) through h) e) See 4.26.5 a)

FUNCTION	EQUIPMENT REQUIREMENT
6.17 <u>REPLACE CASK CLOSURE SEAL</u>	6.17 a) See 4.27.1 a) through b) b) See 4.27.2 a) through b) c) See 4.27.3 a) through b)
6.18 <u>REPLACE CASK CLOSURE AND SPACER</u>	6.18 a) See 4.28.1 a) b) See 4.28.2 a)
6.19 <u>FLUSH AND PURGE CASK CAVITY</u>	6.19 a) See 4.29.1 a) b) See 4.29.2 a) through c)
6.20 <u>HOIST AND TRANSLATE CASK FROM WATER BASIN</u>	6.20 a) See 4.30.1 a) b) See 4.30.2 a)
6.21 <u>DECONTAMINATE CASK CLOSURE AREA</u>	6.21 a) See 4.31.1 a) b) See 4.31.2 a) c) See 4.31.3 a) and b) d) See 4.31.4 a) and b) e) See 4.31.5 a) and b) f) See 4.31.6 a) and b)
6.22 <u>CHECK CASK FOR CONTAMINATION</u>	6.22 a) See 4.32.1 a) b) See 4.32.2 a)
6.23 <u>HOIST AND PLACE CASK INTO DECON AREA</u>	6.23 a) See 4.33.1 a) b) See 4.33.2 a) c) See 4.33.3 a) and b)
6.24 <u>DECONTAMINATE CASK</u>	6.24 a) See 4.34.1 a)
6.25 <u>HOIST CASK FROM DECON AREA</u>	6.25 a) See 4.35.1 a)

FUNCTION	EQUIPMENT REQUIREMENT
6.26 <u>INSTALL CASK ON TRANSPORTER</u>	6.26 a) See 4.36.1 a) b) See 4.36.2 a) c) See 4.36.3 a) d) See 4.36.4 a) and b) e) See 4.36.5 a) f) See 4.36.6 a) g) See 4.36.7 a) and b) h) See 4.36.8 a) i) See 4.36.9 a)
6.27 <u>DISPATCH CASK AND TRANSPORTER</u>	6.27 a) See 4.37.1 a) b) See 4.37.2 a) c) See 4.37.3 a)
6.28 <u>TRANSPORT CASK TO PRIMARY TRANSPORTER DOCK</u>	6.28 a) See 4.38.1 a) b) See 2.10.1 a) and b)

FUNCTION	EQUIPMENT REQUIREMENT
7.0 <u>SPENT FUEL PACKAGING FOR STORAGE IN AN AIR COOLED VAULT OR GEOLOGIC STORAGE SYSTEM</u>	
7.1 <u>RETRIEVE STORAGE BASKET FROM WATER BASIN</u>	
7.1.1 REMOVE STORAGE BASKET FROM STORAGE RACK	7.1.1 a) See 4.26.4 b) and c)
7.1.2 TRANSFER BASKET TO TRANSFER DEVICE	7.1.2 a) See 4.26.4 b) and c)
7.1.3 PLACE BASKET INTO TRANSFER DEVICE	7.1.3 a) See 4.26.4 b) and c)
7.2 <u>TRANSFER BASKET TO HOT CELL</u>	
7.2.1 TRANSFER SPENT FUEL STORAGE BASKET FROM WATER BASIN TO HOT CELL	7.2.1 a) See 4.26.3 a)
7.3 <u>TRANSFER FUEL HANDLING MACHINE TO BASKET</u>	
7.3.1 TRANSFER CRANE TO STORAGE BASKET	7.3.1 a) A crane is required to hoist the spent fuel. It shall have a grapple which will mate with the spent fuel elements. This grapple shall be interchangeable and shall be remotely operable. The crane capacity shall be at least one ton capacity. It must have translational capability but shall not move faster than 5 FPM.
7.3.2 ATTACH GRAPPLE TO FUEL ASSEMBLY	7.3.2 a) See 7.3.1 a) b) A means of viewing the grapple/fuel assembly during mate-up.
7.4 <u>TRANSFER FUEL ASSEMBLY TO DRYING STATION</u>	
7.4.1 HOIST AND TRANSFER FUEL ASSEMBLY TO DRYING STATION	7.4.1 a) See 7.3.1 a)
7.4.2 PLACE FUEL ASSEMBLY INTO DRYING UNIT	7.4.2 a) See 7.3.1 a)

FUNCTION	EQUIPMENT REQUIREMENT
7.5 <u>DRY FUEL ASSEMBLY</u>	
7.5.1 ACTIVATE FUEL ASSEMBLY DRYER	7.5.1 a) A fuel assembly drying station is required.. Old fuel elements which have been in water basin storage for a long time will have decayed to a low level of heat generation and will take some time to dry out. The dryer shall be capable of receiving one fuel element and then passing air (argon) over the unit until the assembly is dried out.
7.5.2 HOIST AND TRANSLATE FUEL ASSEMBLY TO INSPECTION STATION	7.5.1 a) See 7.3.1 a)
7.6 <u>RETURN EMPTY STORAGE BASKET TO STORAGE POOL</u>	
7.6.1 TRANSFER SPENT FUEL BASKET FROM HOT CELL TO WATER BASIN	7.6.1 a) See 4.26.3 a)
7.6.2 TRANSFER SPENT FUEL FROM TRANSFER DEVICE TO STORAGE RACK IN WATER BASIN	7.6.2 a) See 4.26.4 b) and c)
7.7 <u>INSPECT FUEL ASSEMBLY; READ AND RECORD SERIAL NUMBER</u>	
7.7.1 PLACE FUEL ASSEMBLY INTO VIEWING STATION	7.7.1 a) See 7.3.1 a)
7.7.2 PHOTOGRAPH FUEL ASSEMBLY AND NOTE ANY DAMAGE	7.7.2 a) A photographic device lighting and optics are required to permanently record fuel element condition.
7.7.3 READ AND RECORD FUEL ASSEMBLY SERIAL NUMBER AND ANY OTHER PERTINENT DATA	7.7.3 a) See 7.7.2 a) b) Computer system for maintenance of inventory is required.
7.8 <u>TRANSFER FUEL ASSEMBLY TO PACKAGING CELL</u>	

FUNCTION	EQUIPMENT REQUIREMENT
7.8.1 HOIST AND TRANSLATE FUEL ASSEMBLY TO HOT CELL	7.8.1 a) See 7.3.1 a) b) Transfer ports are required to keep the cells separate.
7.9 <u>TRANSFER FUEL ASSEMBLY TO PACKAGING DEVICE</u>	
7.9.1 VERIFY CANISTER READY TO RECEIVE SPENT FUEL ASSEMBLY	7.9.1 a) Visual means are required to verify that the canister is in place. b) Mechanical interlocks are required to prevent release of fuel assembly when no canister is emplaced.
7.10 <u>PLACE PWR FUEL ASSEMBLY INTO CANISTER</u>	
7.10.1 LOWER FUEL ASSEMBLY INTO CANISTER	7.10.1 a) See 7.3.1 a) b) A load indicating device is required to indicate when the fuel assembly is in the canister. c) A fuel assembly restraint device is required to temporarily hold the fuel element in position d) Canisters are required to emplace the fuel into. This canister shall be 16 inches O.D. and 15.0 inches I.O. It shall be at least 185 inches in length inside. The bottom shall be pre-welded in and shall be sufficiently braced to withstand the weight of sand and fuel element at a safety factor of 5 or better. This canister shall be fabricated of type 304L stainless steel pipe. For a 2500 MTU/year receiving plant at 60% fuel being PWR then 5016 canisters per year will be required. 10,031 will be used per year in the 5000 MTU/year plant. The top edge of the canister, on the inside, shall have a lifting ring by which empty or full canisters can be moved about prior to the end cap being welded on. The weld edge shall have been previously prepared for welding.

FUNCTION	EQUIPMENT REQUIREMENT
7.10.2 DISENGAGE CRANE AND GRAPPLE AND RETURN FOR NEXT FUEL ASSEMBLY	7.10.2 a) See 7.3.1 a)
7.11 <u>FILL CANISTER WITH SAND</u>	
7.11.1 MATE SAND FUNNEL WITH CANISTER	7.11.1 a) A sand filling/transfer device is required to put sand into the canister. It shall limit the amount of sand lost over the edge of the canister.
7.11.2 FILL CANISTER WITH SAND	7.11.2 a) Dry glass grade sand is required for placement around the fuel assemblies in the canisters. This will require that the commercial grade sand be washed and dried on site before being transferred to the canister. Each PWR canister will require approximately 15 ft ³ of dry sand. Each BWR canister will require approximately 12 ft ³ of sand. For a 2500 MTU/year plant this is about 2600 cubic yards - double this for 5000 MTU/year throughput.
7.11.3 PACK SAND INTO CANISTER	<p>7.11.3 a) A canister vibrating device is required. This shall be used to insure that sand is completely filled in around the fuel element.</p> <p>b) A sand level indicating device is required to insure that the correct amount of sand is emplaced in the canister.</p> <p>c) A viewing device is required to inspect the sand level and final position of the spent fuel assembly in the canister.</p>
7.11.4 REMOVE SAND FUNNEL AND FUEL ELEMENT RESTRAINT	7.11.4 a) None
7.12 <u>TRANSFER CANISTER TO WELDING MACHINE</u>	
7.12.1 HOIST FULL CANISTER FROM SAND FILLING STATION	7.12.1 a) A crane with a minimum capacity of 5T is required to hoist the filled storage canister (approximately 6000 lbs).

FUNCTION	EQUIPMENT REQUIREMENT
7.12.1 (Con't)	7.12.1 b) A special grapple on the crane is required to engage the canister lifting ring. It shall be remotely operable and shall have hoist interlocks to prevent crane movement if not fully engaged: This information shall be displayed to the crane operator.
7.12.2 TRANSFER CANISTER TO WELDING MACHINE	7.12.2 a) See 7.12.1 a)
7.13 <u>INTERFACE CANISTER TO WELDING MACHINE</u>	
7.13.1 PLACE CANISTER ONTO WELDING MACHINE ROTARY TABLE	7.13.1 a) See 7.12.1 a) b) A viewing device is required to insure that canister is correctly emplaced.
7.13.2 ACTIVATE ROTARY TABLE CLAMPING ARMS	7.13.2 a) It is necessary to rotate the canister during the welding operations. A large "Chuck" will be required to accomplish this function. It shall have arms or latching units to hold the canister in a centered position.
7.13.3 INTERFACE THE WELDING MACHINE TO THE CANISTER	7.13.3 a) The lid will require welding on in an inert atmosphere. The welding "hood" will require interfacing with the canister to within 1/4 inch on the diameter. b) Hood shall be capable of both vertical and swing-away movement.
7.14 <u>EMPLACE CAP ONTO CANISTER AND WELD CLOSED</u>	
7.14.1 PLACE CANISTER CAP ON CANISTER	7.14.1 a) The cap shall interface with the canister and shall have a prepared "J" weld preparation. It shall have the standard "Oak Ridge" lifting pin located in its geometric center: It shall be sized to safety factor of 5 or better.

FUNCTION	EQUIPMENT REQUIREMENT
7.14.1 (Con't)	7.14.1 b) The canister caps shall be fed into the weld hood from a magazine or similar device. c) A pneumatic device is required to insure that the cap is accurately seated on the canister. d) A viewing device is required for operator verification of correct cap emplacement.
7.14.2 PURGE THE WELDING HOOD WITH ARGON OR HELIUM WELDING GAS	7.14.2 a) Fluxless wire will be used for welding: it will be necessary to flood the welding area to prevent bad welds resulting from air. Pressure 1/2 PSIG above ambient, 1 CFM/Minute flow (75 CFM/canister will be required; this is 752,250 ft ³ /year or 3500 std k bottles). b) An operator controlled valve is required.
7.14.3 ACTIVATE WELDING MACHINE AND WELD CAP TO CANISTER	7.14.3 a) A MIG welding machine is required to weld the canister/canister cap. It shall use stainless steel feed wire. Feed rates, amperage, voltage shall be operator controlled. b) The canister rotoary table shall be activated upon activation of the welding machine. It shall also be manually controlled by the operator. c) After the first pass it will be necessary to reposition the weld stinger to make the next pass: therefore the unit must be adjustable remotely. d) A viewing device is required for operator verification of satisfactory welds.

FUNCTION	EQUIPMENT REQUIREMENT
7.14.4 TERMINATE WELDING GAS FLOW AND REMOVE WELDING HOOD FROM CANISTER	7.14.4 a) See 7.14.2 b) b) See 7.13.3 b)
7.15 <u>TRANSFER CANISTER TO INSPECTION STATION</u>	
7.15.1 ATTACH HOIST TO CANISTER STANDARD LIFTING PIN	7.15.1 a) A crane is required to hoist the canister from the weld station. It shall be a minimum of 5T. It shall be equipped with a grapple which mates to the canister standard lifting pin. This grapple shall be equipped with interlocks which prevent crane hoisting if the grapple is not fully engaged. This information shall be displayed to the operator.
7.15.2 RELEASE WELD MACHINE ROTARY TABLE CLAMPING ARMS	7.15.2 a) See 7.13.2 a)
7.15.3 HOIST AND TRANSLATE CANISTER TO WELD INSPECTION STATION	7.15.3 a) See 7.15.1 a)
7.15.4 PLACE CANISTER INTO WELD INSPECTION STATION	7.15.4 a) See 7.15.1 a)
7.16 <u>VERIFY WELD INTEGRITY</u>	
7.16.1 VERIFY WELD WITH ULTRASONIC NDE DEVICE	7.16.1 a) An ultrasonic device is required to ascertain if voids or other weld imperfections exist in the cap/canister weld joint. A "map" of each canister weld shall be provided and shall be on permanent record.
7.16.2 VERIFY WELD GAS TIGHTNESS WITH MASS SPECTROMETER	7.16.2 a) A vacuum chamber with an inflatable seal is required to interface with the canister beyond the weld area. A vacuum pump is required to pull a vacuum of 17-20 PSIG. b) A mass spectrometer is required to test for argon leaking out of the cylinder.

FUNCTION	EQUIPMENT REQUIREMENT
7.16.3 DISENGAGE VACUUM CHAMBER FROM CANISTER	7.16.3 a) See 7.16.2 a)
7.17 <u>TRANSFER CANISTER TO OVER PACKING DEVICE</u>	
7.17.1 HOIST AND TRANSFER CANISTER TO OVER-PACKING STATION	7.17.1 a) Visual means are required to verify that overpack canister is in place. b) Mechanical interlocks are required to prevent release of the inner canister when no over-pack canister is emplaced. c) See 7.15.1 a).
7.18 <u>PLACE CANISTER INTO OVER-PACK CANISTER</u>	
7.18.1 LOWER INNER CANISTER INTO OVER-PACK CANISTER	7.18.1 a) See 7.15.1 a) b) A load indicating device is required to indicate when the inner canister is in the overpack. c) A restraint is required to hold the inner canister in place during sand filling. d) Over-pack canisters are required to emplace the inner canister into. This canister shall be 17.5 inches O.D. 16.5 inches I.D. It shall be 195 inches in length inside. The bottom shall be pre-welded in and shall be sufficiently braced to withstand the weight of the inner canister at a safety factor of 5 or better. This canister shall be fabricated of type 304L stainless steel pipe. 10,031 will be used per year for a 5000 MTU/year plant. The top edge of the over-pack shall be amenable to a hoisting grapple. The weld edge shall have been previously prepared for welding.

FUNCTION	EQUIPMENT REQUIREMENT
7.18.2 DISENGAGE CRANE AND GRAPPLE AND RETURN FOR NEXT FUEL ASSEMBLY	7.18.2 a) See 7.15.1 a)
7.19 <u>FILL OVER-PACK CANISTER WITH SAND</u>	
7.19.1 MATE SAND FUNNEL WITH OVER-PACK CANISTER	7.19.1 a) See 7.11.1 a) except funnel to fit over-pack.
7.19.2 FILL OVER-PACK CANISTER WITH SAND	7.19.2 a) See 7.11.2 a) except that quantity of sand per over-pack is approximately 3 ft ³ . This would be 1200 cubic yards per year (4 yards/day).
7.19.3 PACK SAND INTO OVER-PACK	7.19.3 a) See 7.11.3 a) through c) except read canisters in lieu of spent fuel elements.
7.19.4 REMOVE SAND FUNNEL AND CANISTER RESTRAINT	7.19.4 a) None
7.20 <u>TRANSFER CANISTER TO WELDING MACHINE</u>	
7.20.1 HOIST OVER-PACK CANISTER FROM SAND FILLING STATION	7.20.1 a) Similar to 7.12.1 a) except crane capacity now 6-10 T. b) Similar to 7.12.1 b) except lifting ring will most likely have to be on the outside of the canister and the canister O.D. is now 17 inches.
7.20.2 TRANSFER OVER-PACK CANISTER TO WELDING MACHINE	7.20.2 a) See 7.20.1 a) and b)
7.21 <u>INTERFACE CANISTER TO WELDING MACHINE</u>	
7.21.1 PLACE OVER-PACK CANISTER ONTO WELDING MACHINE ROTARY TABLE	7.21.1 a) See 7.20.2 a) b) See 7.13.1 b)
7.21.2 ACTIVATE ROTARY TABLE CLAMPING ARMS	7.21.2 a) See 7.13.2 a) except over-pack canister is used instead of inner canister.
7.22 <u>EMPLACE CAP ON OVER-PACK AND WELD CLOSED</u>	

FUNCTION	EQUIPMENT REQUIREMENT
7.22.1 PLACE CANISTER CAP ON OVER-PACK CANISTER	7.22.1 a) See 7.14.1 a) through d)
7.22.2 PURGE THE WELDING HOOD WITH ARGON OR HELIUM WELDING GAS	7.22.2 a) See 7.14.2 a) and b)
7.22.3 ACTIVATE WELDING MACHINE AND WELD CAP TO OVER-PACK	7.22.3 a) See 7.14.3 a) through d)
7.22.4 TERMINATE WELDING GAS FLOW AND REMOVE WELDING HOOD FROM CANISTER	7.22.4 a) See 7.14.2 b) b) See 7.13.3 b)
7.23 <u>TRANSFER CANISTER TO INSPECTION STATION</u>	
7.23.1 ATTACH HOIST TO OVER-PACK STANDARD LIFTING PIN	7.23.1 a) See 7.15.1 a) except load is now 6-10T
7.23.2 RELEASE WELD MACHINE ROTARY TABLE CLAMPING ARMS	7.23.2 a) See 7.13.2 a)
7.23.3 HOIST AND TRANSLATE CANISTER TO WELD INSPECTION STATION	7.23.3 a) See 7.23.1 a)
7.23.4 PLACE OVER-PACK CANISTER INTO WELD INSPECTION STATION	7.23.4 a) See 7.23.1 a)
7.24 <u>VERIFY WELD INTEGRITY</u>	
7.24.1 VERIFY WELD INTEGRITY WITH ULTRASONIC NDE DEVICE	7.24.1 a) see 7.16.1 a)
7.24.2 VERIFY WELD GAS TIGHTNESS WITH MASS SPECTROMETER	7.24.2 a) See 7.16.2 a) and b)
7.24.3 DISENGAGE VACUUM CHAMBER FROM CANISTER	7.24.3 a) See 7.16.2 a)
7.25 <u>TRANSFER CANISTER TO DECON STATION</u>	

FUNCTION	EQUIPMENT REQUIREMENT
7.25.1 HOIST AND TRANSLATE OVER-PACK CANISTER TO DECON STATION	7.25.1 a) See 7.15.1 a)
7.25.2 LOWER OVER-PACK CANISTER INTO DECON STATION	7.25.2 a) See 7.15.1 a)
7.26 <u>DECON CANISTER SURFACE</u>	
7.26.1 ACTIVATE DECON SPRAY AND WASH CANISTER	<p>7.26.1 a) A high pressure spray system is required to clean the canister exterior. This will utilize one of the commercially available decon fluids. Pressure should be about 100 PSIG. Cleaning fluid to be recirculated.</p> <p>b) The canister will require drying upon withdrawal from the decon pit. This requirement may vanish if the canister is placed into a lag storage area.</p>
7.27 <u>TRANSFER CANISTER TO TEMPORARY LAY-DOWN AREA</u>	
7.27.1 HOIST OVER-PACK AND TRANSFER TO LAY-DOWN AREA	7.27.1 a) See 7.15.1 a)
7.27.2 PLACE OVER-PACK INTO STORAGE RACK	<p>7.27.2 a) A storage rack is required to contain the canister during storage. It shall be designed such that no canister is hoisted above any other canister during movement. Canister spacing shall be such that k_{eff} is always .95 or less under all conditions. Rack shall restrain canisters under the design basis earthquake.</p> <p>b) Lag storage cooling is required. Air sweep system to remove 100,000 BTU/hr. Exit air must be HEPA filtered.</p>
7.28 <u>PLACE BWR SPACER INTO CANISTER</u>	
7.28.1 HOIST SPACER AND PUT INTO CANISTER	7.28.1 a) A spacer is required for the BWR storage canister to maintain the correct alignment of the fuel

FUNCTION	EQUIPMENT REQUIREMENT
7.28.1 (Con't)	7.28.1 (con't)
	a) (Con't)
	assemblies in the canister.
7.29 <u>PLACE BWR ASSEMBLY INTO CANISTER</u>	7.29 This function is identical to the requirements of 7.10, except that there are now three BWR fuel assemblies to be placed into a storage canister instead of one.
7.30 <u>TRANSFER CANISTER TO MILLING DEVICE</u>	
7.30.1 <u>HOIST CANISTER FROM INSPECTION STATION AND TRANSFER TO MILLING MACHINE STATION</u>	7.30.1 a) See 7.15.1 a)
	b) See 7.13.1 a) and b)
7.30.2 <u>ACTIVATE MILLING MACHINE ROTARY TABLE CLAMP ARMS</u>	7.30.2 a) See 7.13.2 a)
7.31 <u>MACHINE OLD WELD AWAY</u>	
7.31.1 <u>POSITION MILLING MACHINE AT WELD</u>	7.31.1 a) The milling machine cutter head must be adjustable by the operator. It must be remotely controlled such that the cutter can be moved in and out and up and down.
	b) Visual means are required so that the operator can verify the position of the canister/cutter prior to activation of the milling machine.
7.31.2 <u>ACTIVATE ROTARY TABLE</u>	7.31.2 a) It is necessary for the canister to be turned as the milling machine cuts the old weld away. Activation shall be by the operator. Activation shall be indicated to the operator.
7.31.3 <u>ACTIVATE MILLING MACHINE AND MACHINE WELD AWAY</u>	7.31.3 a) The milling machine must be remotely activated (switched on). Satisfactory activation shall be indicated to the operator.
	b) The milling machine cutting head must be adjustable by the operator.

FUNCTION	EQUIPMENT REQUIREMENT
7.31.3 (Con't)	7.31.3 c) See 7.31.1 b)
7.32 <u>TRANSFER CANISTER TO WELD MACHINE</u>	
7.32.1 PLACE WELDING HOOD OVER CANISTER	7.32.1 a) See 7.13.3 a)
NOTE: SINCE THE CAP AND STANDARD LIFTING PIN HAVE BEEN MACHINED OFF, IT WILL NOT BE POSSIBLE TO HOIST AND TRANSFER THE CANISTER. RATHER THE WELDING HOOD WILL BE BROUGHT TO IT.	
7.33 <u>REWELD CANISTER CAP</u>	
7.33.1 PURGE THE WELDING HOOD WITH ARGON/ HELIUM GAS	7.33.1 a) See 7.14.2 a) and b) except yearly quantity of gas approximately 1% of value.
7.33.2 ACTIVATE WELDING MACHINE AND REWELD CAP TO CANISTER	7.33.2 a) See 7.14.3 a) through d)
7.33.3 TERMINATE WELDING GAS FLOW AND REMOVE WELDING HOOD FROM CANISTER	7.33.3 a) See 7.14.4 a) and b)
7.34 <u>VERIFY WELD INTEGRITY</u>	
7.34.1 ATTACH HOIST TO CANISTER STANDARD LIFTING PIN	7.34.1 a) See 7.15.1 a)
7.34.2 RELEASE WELD MACHINE/MILLING MACHINE ROTARY TABLE CLAMP ARMS	7.34.2 a) See 7.13.2 a)
7.34.3 HOIST AND TRANSLATE CANISTER TO WELD INSPECTION STATION	7.34.3 a) See 7.15.1 a)
7.34.4 PLACE CANISTER INTO INSPECTION STATION	7.34.4 a) See 7.15.1 a)

FUNCTION	EQUIPMENT REQUIREMENT
7.34.5 VERIFY WELD WITH ULTRASONIC NDE DEVICE	7.34.5 a) See 7.16.1 a)
7.34.6 VERIFY WELD GAS TIGHTNESS WITH MASS SPECTROMETER	7.34.6 a) See 7.16.2 a) and b)
7.34.7 DISENGAGE VACUUM CHAMBER FROM CANISTER	7.34.7 a) See 7.16.2 a)
7.34.8 TRANSFER CANISTER BACK INTO MAIN PROCESS FLOW	7.34.8 a) See 7.15.1 a)

FUNCTION	EQUIPMENT REQUIREMENT
8.0 <u>GEOLOGIC REPOSITORY OPERATIONS EXCLUDING RECEIVING BASIN AND PACKAGING FACILITY FUNCTIONS</u>	
8.1 <u>TRANSFER CANISTER TO MINE HOIST FROM PACKAGING FACILITY (OR ACV) INTO TRANSFER CELL</u>	
8.1.1 PLACE CANISTER INTO TRANSFER DEVICE	8.1.1 a) A crane is required to hoist the canister from the temporary lag storage area and place into the transfer car. This crane shall be remotely operated and shall have a minimum of 5T capacity. This crane shall be a part of the packaging facility. This unit shall have the standard lift pin connector.
8.1.2 TRANSFER THE CANISTERS INTO THE ELEVATOR TRANSFER CELL	8.1.2 a) A transfer car is required to move the canisters from the packaging facility laydown area into the elevator transfer cell. This device shall be capable of transporting two canisters. It shall transfer at a maximum speed of 5 FPM. It shall be capable of restraining the canisters, in the event of a design basis earthquake. The transfer car shall be remotely operated.
8.1.3 TRANSFER THE CANISTERS FROM THE TRANSFER CAR INTO THE ELEVATOR CAR	8.1.3 a) A crane is required to hoist the canisters from the transfer car into the elevator car. This unit is functionally the same as 8.1.1 a). b) An air-lock closure door is required to seal the transfer car port. This door shall be remotely controlled. It shall provide both the functions of an air-lock and a shielding door. c) An offset in the elevator cage will be necessary in order to load the canisters into the cage.
8.2 <u>LOWER CANISTER TO MINE WORKING LEVEL</u>	

FUNCTION	EQUIPMENT REQUIREMENT
8.2.1 PROVIDE AN ELEVATOR CAR AND HOIST MECHANISM	8.2.1 a) The elevator car shall have an automatic braking system in the event of hoist cable failure. b) The elevator cabling shall be redundant. c) The elevator should reach the mine working level in 10 min. or less.
8.3 <u>TRANSFER CANISTER TO TRANSPORTER</u>	
8.3.1 MOVE TRANSPORTER INTO POSITION OVER LOADING PORT	8.3.1 a) See 9.2.1 a)
8.3.2 MATE TRANSPORTER TO PORT	8.3.2 a) See 9.2.1 a)
8.3.3 TRANSFER CANISTER INTO TRANSPORTER	8.3.3 a) See 9.2.3 a) through d)
8.3.4 DEMATE TRANSPORTER FROM LOADING PORT	8.3.4 a) See 9.2.3 b)
8.4 <u>HOIST RETURN TO SURFACE</u>	
8.4.1 PROVIDE ELEVATOR CAR SYSTEM AND HOIST MECHANISM	8.4.1 a) See 8.2.2 a) through c)
8.5 <u>TRANSPORT TO BURIAL CHAMBER</u>	
8.5.1 PROVIDE TRANSPORT FOR THE SPENT FUEL CANISTERS TO SPECIFIED LOCATION IN THE GEOLOGIC STORAGE CHAMBER	8.5.1 a) See 9.2.1 a)
8.6 <u>ALIGN TRANSPORTER WITH STORAGE SLEEVE</u>	
8.6.1 GROSSLY POSITION TRANSPORTER OVER STORAGE SLEEVE PLUG	8.6.1 a) See 9.4.1 a) and b)
8.6.2 FINE ALIGN TRANSPORTER OVER SLEEVE PLUG	8.6.2 a) See 9.4.2 a) and b)

FUNCTION	EQUIPMENT REQUIREMENT
8.7 <u>REMOVE SHIELD PLUG</u>	
8.7.1 ATTACH GRAPPLE TO SLEEVE PLUG STANDARD LIFTING PIN	8.7.1 a) See 9.5.1 a) through b)
8.7.2 HOIST SLEEVE PLUG FROM STORAGE SLEEVE	8.7.2 a) See 9.5.2 a) through b)
8.8 <u>TRANSLATE CASK OVER SLEEVE AND MATE</u>	
8.8.1 MOVE SLEEVE PLUG AWAY FROM SLEEVE	8.8.1 a) See 9.2.1 a)
8.8.2 MOVE TRANSPORTER CASK INTO POSITION OVER SLEEVE AND MATE	8.8.2 a) See 9.2.1 a) b) See 9.4.2 a) and b)
8.9 <u>LOWER CANISTER INTO SLEEVE</u>	
8.9.1 OPEN CASK CLOSURE	8.9.1 a) See 9.7.1 a) and b)
8.9.2 LOWER CANISTER INTO SLEEVE	8.9.2 a) See 9.2.3 b)
8.9.3 DISCONNECT CANISTER GRAPPLE FROM CANISTER AND RETRACT INTO CASK	8.9.3 a) See 9.2.3 b)
8.9.4 CLOSE CASK CLOSURE	8.9.4 a) See 9.7.1 a)
8.10 <u>TRANSLATE CASK OFF OF SLEEVE</u>	
8.10.1 MOVE TRANSPORTER CASK FROM POSITION OVER SLEEVE	8.10.1 a) See 9.2.1 a) b) See 9.4.2 a)
8.10.2 MOVE SLEEVE PLUG BACK OVER SLEEVE	8.10.2 a) See 9.2.1 a)
8.11 <u>RE-INSTALL SHIELD PLUG</u>	
8.11.1 LOWER SLEEVE PLUG INTO SLEEVE RECEPTACLE	8.11.1 a) See 9.5.1 b) b) See 9.5.2 b)

FUNCTION	EQUIPMENT REQUIREMENT
8.11.2 DISENGAGE PLUG GRAPPLE AND WITHDRAW FROM PLUG	8.11.2 a) See 9.5.1 a) and b)
8.12 <u>RETURN TRANSPORTER FOR NEXT CANISTER</u>	
8.12.1 DRIVE EMPTY TRANSPORTER BACK TO LOADING PORT	8.12.1 a) see 9.2.1 a)
8.13 <u>INSTALL MONITOR EQUIPMENT</u>	
Note: THIS PARAGRAPH WILL BE USED TO DESCRIBE THE FACILITY REQUIREMENTS IN ADDITION TO MONITORING EQUIPMENT.	
8.13.1 PROVIDE STORAGE SPACES FOR CANISTERS	8.13.1 a) The canisters shall be emplaced in concrete lined sleeves which are in turn embedded in the geologic media. b) The storage canisters shall be cooled by conduction into the geologic media. c) A shield plug shall be emplaced in the sleeve and shall limit the radiation to 2 mrem at the floor level. This plug shall be stepped to prevent neutron shine..
8.13.2 PROVIDE COOLING AIR TO MINE TUNNELS	8.13.2 a) Cooling air is required in the tunnels to limit the temperature to levels where personnel can work safely. b) Emergency air fans and HEPA filters are required to filter the mine air in case canister leaks are detected. Size of system is estimated at 100,000 CFM.
8.13.3 INSTALL MONITORS	8.13.3 a) See 9.11.3 a)

FUNCTION	EQUIPMENT REQUIREMENT
9.0 <u>AIR COOLED VAULT OPERATIONS</u>	
9.1 <u>TRANSFER CANISTER TO TRANSPORTER LOADING PORT</u>	
9.1.1 RETRIEVE CANISTER FROM PACKAGING FACILITY CANISTER LAY DOWN AREA	9.1.1 a) A crane is required to hoist the canister from the laydown area. Capacity of this crane should be 5T minimum. b) An adapter device (grapple) is required. This shall be the "Oak Ridge" standard lifting adapter. c) This crane and grapple shall be remotely controlled.
9.1.2 TRANSFER CANISTER TO HOT CELL TRANSFER DEVICE	9.1.2 a) See 9.1.1 a), b), c)
9.1.3 TRANSFER CANISTER TO TRANSPORTER LOADING PORT	9.1.3 a) A canister transfer car (basket) is required. This unit shall be sized to carry two canisters. It shall be remotely operated. Speed of transfer shall be limited to 5 FPM. b) An impact limiting device is required under the transfer car to prevent damage to the facility structure in case of an accident. This device may be made of wood.
9.2 <u>TRANSFER CANISTER TO TRANSPORTER</u>	
9.2.1 MOVE TRANSPORTER INTO POSITION OVER LOADING PORT	9.2.1 a) A shielded canister transporter is required. This unit must provide shielding from the spent fuel elements contained in the canisters. This unit must have translational capabilities such that accurate alignment over the loading port can be accomplished. This unit must also have the capability to raise and lower the cask such that the cask can mate directly with the port.

FUNCTION	EQUIPMENT REQUIREMENT
9.2.2 MATE TRANSPORTER TO PORT	9.2.2 a) See 9.2.1 a)
9.2.3 TRANSFER CANISTER INTO TRANSPORTER	<p>9.2.3 a) See 9.2.1 a)</p> <p>b) The transporter shall have an integral hoist inside the cask to hoist the canisters. It shall have the standard lifting pin grapple. The hoist shall be equipped with a device for indicating when the canister is fully inside the transporter cask. A cask closure shall seal the cask.</p> <p>c) The facility loading port shall be equipped with a shielded air lock door. This door shall be remotely controlled and shall not be opened until the transporter is in place. An interlock shall be provided to prevent the transporter from demating with the transfer port prior to door closure.</p> <p>d) The transporter cask shall have an integral heat exchanger to which plant water can be coupled. This shall be used in case of emergency when the transporter must hold the loaded canister for a length of time greater than the time required for emplacement.</p>
9.2.4 DEMATE TRANSPORTER FROM LOADING PORT	9.2.4 a) See 9.2.3 b)
9.3 <u>TRANSPORT CANISTER TO STORAGE CHAMBER</u>	
9.3.1 PROVIDE TRANSPORT FOR THE SPENT FUEL CANISTERS TO SPECIFIED LOCATIONS IN THE AIR-COOLED VAULT.	9.3.1 a) See 9.2.1 a)

FUNCTION	EQUIPMENT REQUIREMENT
9.4 <u>ALIGN TRANSPORTER WITH STORAGE SLEEVE</u>	
9.4.1 POSITION TRANSPORTER OVER STORAGE SLEEVE PLUG GROSSLY	9.4.1 a) An indicator system on the floor of the facility is required. b) Alignment devices on the transporter cab are required.
9.4.2 FINAL POSITION TRANSPORTER OVER SLEEVE PLUG	9.4.2 a) Optical alignment targets on the facility adjacent to the storage plug are required. Two each shall be provided and shall be at least 90° apart. b) An optical system for the transporter operator shall be provided. The operator shall be able to fine align the transporter to the sleeve plug for removal of the plug.
9.5 <u>REMOVE SHIELD PLUG</u>	
9.5.1 ATTACH GRAPPLE TO SLEEVE PLUG STANDARD LIFTING PIN	9.5.1 a) The sleeve plug shall be equipped with a standard lifting pin. b) The transporter shall have a sleeve hoist capable of lifting the sleeve. Hoist height distance shall be approximately six feet.
9.5.2 HOIST SLEEVE PLUG FROM STORAGE SLEEVE	9.5.2 a) See 9.5.1 b) above b) Hoist speed shall be 5 FPM or less.
9.6 <u>TRANSLATE CASK OVER SLEEVE AND MATE</u>	
9.6.1 MOVE SLEEVE PLUG AWAY FROM SLEEVE	9.6.1 a) See 9.2.1 a)
9.6.2 MOVE TRANSPORTER CASK INTO POSITION OVER SLEEVE AND MATE	9.6.2 a) See 9.2.1 a) b) See 9.4.2 a), b)

FUNCTION	EQUIPMENT REQUIREMENT
9.7 <u>LOWER CANISTER INTO SLEEVE</u>	
9.7.1 OPEN CASK CLOSURE	9.7.1 a) The cask/cask closure shall be sufficiently interlocked that the closure cannot be activated until the cask is firmly resting on the facility. b) An air seal shall be established at the cask/sleeve interface.
9.7.2 LOWER CANISTER INTO SLEEVE	9.7.2 a) See 9.2.3 b)
9.7.3 DISCONNECT CANISTER CASK GRAPPLE FROM CANISTER AND RETRACT INTO CASK	9.7.3 a) See 9.2.3 b)
9.7.4 CLOSE CASK CLOSURE	9.7.4 a) See 9.7.1 a)
9.8 <u>TRANSLATE CASK OFF-OF-SLEEVE</u>	
9.8.1 MOVE TRANSPORTER CASK FROM POSITION OVER SLEEVE	9.8.1 a) See 9.2.1 a) b) See 9.4.2 a)
9.8.2 MOVE SLEEVE PLUG BACK OVER SLEEVE	9.8.2 a) See 9.2.1 a)
9.9 <u>RE-INSTALL SHIELD PLUG</u>	
9.9.1 LOWER SLEEVE PLUG INTO SLEEVE RECEPTICLE	9.9.1 a) See 9.5.1 b) b) See 9.5.2 b)
9.9.2 DISENGAGE PLUG GRAPPLE AND WITHDRAW FROM PLUG	9.9.2 a) See 9.5.1 a), b)
9.10 <u>RETURN TRANSPORTER FOR NEXT CANISTER</u>	
9.10.1 DRIVE EMPTY TRANSPORTER BACK TO LOADING PORT	9.10.1 a) See 9.2.1 a)
9.11 <u>INSTALL MONITORING EQUIPMENT</u>	

FUNCTION	EQUIPMENT REQUIREMENT
9.11 (Con't)	
NOTE: THIS PARAGRAPH WILL BE USED TO DESCRIBE THE FACILITY REQUIREMENTS IN ADDITION TO MONITORING EQUIPMENT.	
9.11.1 PROVIDE STORAGE SPACES FOR CANISTERS	<p>9.11.1 a) The canisters shall be emplaced in concrete lined sleeves. The space around the sleeve-to-canister shall be sufficient to allow natural convection air flow. Two module sizes shall be considered a nominal 500 MTHM and 1000 MTHM storage space size.</p> <p>b) The stored canisters shall be cooled by conduction and natural convection.</p> <p>c) A shield plug shall be emplaced in the sleeve and shall limit the radiation level in the vault area above the floor to 2 mrem dose. This plug shall be stepped to prevent neutron shine.</p> <p>d) A temporary air shield shall be installed at the top or bottom of an empty sleeve to prevent loss of air.</p>
9.11.2 PROVIDE COOLING AIR TO CANISTERS	<p>9.11.2 a) Inlet air ducts are required.</p> <p>b) An outlet ducting system is required.</p> <p>c) Emergency dampers in the outlet ducts are required. These shall be automatically and manually activated upon detection of contamination in the exit cooling air stream.</p> <p>d) Suction fans with a capability fo 50,000 CFM are required to provide emergency cooling and drawing air through HEPA filters. Two fans per bay are required.</p>

FUNCTION	EQUIPMENT REQUIREMENT
9.11.2 (Con't)	9.11.2 e) HEPA filters are required. These shall match the fan capacity.
9.11.3 INSTALL MONITORS	9.11.3 a) An air sampling system is required. It shall be capable of detecting either fission gas products or particulate contamination in the effluent air stream.

FUNCTION	EQUIPMENT REQUIREMENT		
<p>10.0 <u>REPROCESSING PLANT OPERATIONS</u></p> <p>NOTE: ONLY THE INPUT STREAMS AND THE OUTPUT STREAMS, INCLUDING Pu, U, SOLID WASTE, AND LIQUID WASTES, WILL BE DETERMINED IN THIS FUNCTION. A BLOCK BY BLOCK EQUIPMENT REQUIREMENT WILL NOT BE ATTEMPTED.</p>	<p><u>PLANT THROUGHPUT</u></p> <p>1500 MTU/year (7 PWR/11BWR/day)</p>		<p><u>HULLS AND END FITTINGS</u></p> <p>60 ft³ (3800 lbs)</p>
	<p><u>DRUMMED WASTE (TRU)</u></p> <p>40 ft³ (240 lbs) Combustible 11 ft³ (700 lbs) Non-combustible</p>		<p><u>DRUMMED WASTE BETA-GAMMA</u></p> <p>624 ft³ (3700 lbs) Combustible 159 ft³ (10,000 lbs) Non-combustible</p>
	<p><u>LIQUID WASTE</u></p> <p>25,000 l/day (5000 l/mt)</p>	<p><u>URANIUM</u></p> <p>5 MTU @ .82% Enrichment</p>	<p><u>Pu</u></p> <p>.035 mt (28.6 kg)</p>
	<p>Each of the values above can be scaled to find the values for any other plant size.</p>		

FUNCTION	EQUIPMENT REQUIREMENT
11.0 <u>SPENT FUEL DECANNING OPERATIONS IN SUPPORT OF REPROCESSING, INCLUDING CANISTER AND OVER-PACK REWORK</u>	
11.1 <u>TRANSFER TRANSPORTER TO STORAGE CHAMBER</u>	
11.1.1 DRIVE TRANSPORTER TO STORAGE SLEEVE	11.1.1 a) See 9.2.1 a)
11.2 <u>ALIGN TRANSPORTER WITH STORAGE SLEEVE</u>	
11.2.1 GROSSLY POSITION TRANSPORTER OVER STORAGE SLEEVE	11.2.1 a) See 9.4.1 a) through b)
11.2.2 FINAL POSITION TRANSPORTER OVER SLEEVE PLUG	11.2.2 a) See 9.4.2 a) through b)
11.3 <u>REMOVE SHIELD PLUG</u>	
11.3.1 ATTACH GRAPPLE TO SLEEVE PLUG STANDARD LIFTING PIN	11.3.1 a) See 9.5.1 a) through b)
11.3.2 HOIST SLEEVE PLUG FROM STORAGE SLEEVE	11.3.2 a) See 9.5.1 b) b) See 9.5.2 b)
11.4 <u>TRANSLATE CASK OVER SLEEVE AND MATE</u>	
11.4.1 MOVE SLEEVE PLUG AWAY FROM SLEEVE	11.4.1 a) See 9.2.1 a)
11.4.2 MOVE TRANSPORTER CASK INTO POSITION OVER SLEEVE AND MATE	11.4.2 a) See 9.2.1 a) b) See 9.4.2 a) and b)
11.5 <u>HOIST CANISTER INTO TRANSPORTER CASK</u>	
11.5.1 OPEN CASK CLOSURE	11.5.1 a) See 9.7.1 a) and b)

FUNCTION	EQUIPMENT REQUIREMENT
11.5.2 LOWER GRAPPLE INTO SLEEVE AND ATTACH TO CANISTER	11.5.2 a) See 9.2.3 b)
11.5.3 HOIST CANISTER INTO TRANSPORTER	11.5.3 a) See 9.2.3 b)
11.5.4 CLOSE CASK CLOSURE	11.5.4 a) See 9.7.1 a)
11.6 <u>TRANSLATE CASK OFF OF SLEEVE</u>	
11.6.1 MOVE TRANSPORTER CASK FROM POSITION OVER SLEEVE	11.6.1 a) See 9.2.1 a) and b)
11.6.2 MOVE SLEEVE PLUG BACK OVER SLEEVE	11.6.2 a) See 9.2.1 a)
11.7 <u>RE-INSTALL SHIELD PLUG</u>	
11.7.1 LOWER SLEEVE PLUG INTO SLEEVE RECEPTACLE	11.7.1 a) See 9.5.1 b) b) See 9.5.2 b)
11.7.2 DISENGAGE PLUG GRAPPLE AND WITHDRAW FROM PLUG	11.7.2 a) See 9.5.1 a) and b)
11.8 <u>TRANSPORT CANISTER TO UNLOADING PORT</u>	
11.8.1 PROVIDE TRANSPORT FOR THE SPENT FUEL CANISTERS TO THE UNLOADING PORT	11.8.1 a) See 9.2.1 a)
11.9 <u>UNLOAD CANISTERS FROM TRANSPORTER</u>	
11.9.1 MOVE TRANSPORTER INTO POSITION OVER LOADING PORT	11.9.1 a) See 9.2.1 a)
11.9.2 MATE TRANSPORTER TO PORT	11.9.2 a) See 9.2.1 a)
11.9.3 TRANSFER CANISTER FROM TRANSPORTER TO HOT CELL TRANSFER DEVICE	11.9.3 a) See 9.2.3 a) through d)
11.9.4 DEMATE TRANSPORTER FROM LOADING PORT	11.9.4 a) See 9.2.3 b)

FUNCTION	EQUIPMENT REQUIREMENT
11.10 <u>TRANSFER CANISTER TO TEMPORARY LAY DOWN AREA</u>	
11.10.1 <u>TRANSFER CANISTER TO LAY DOWN CELL</u>	11.10.1 a) See 9.1.3 a) and b)
11.10.2 HOIST CANISTER FROM TRANSFER CAR AND PLACE INTO TEMPORARY STORAGE RACK	11.10.2 a) See 9.1.1 a) through c)
11.11 <u>TRANSFER CANISTER INTO DE-CANNING CELL</u>	
11.11.1 ATTACH HOIST TO OVER-PACK CANISTER STANDARD LIFTING PIN	11.11.1 a) See 7.15.1 a) except load is now 6-10T
11.11.2 HOIST AND TRANSFER CANISTER INTO DE-CANNING CELL	11.11.2 a) See 11.11.1 a)
11.12 <u>POSITION CANISTER IN CAP REMOVAL MACHINE</u>	
11.12.1 PLACE OVER-PACK CANISTER ONTO ROTARY TABLE	11.12.1 a) See 11.11.1 a)
11.12.2 ACTIVATE ROTARY TABLE CLAMPING ARMS	11.12.2 a) See 7.21.2 a)
11.13 <u>REMOVE CANISTER CAP</u>	
11.13.1 POSITION MACHINE CUTTING HEAD	11.13.1 a) See 7.31.1 a) and b)
11.13.2 ACTIVATE ROTARY TABLE	11.13.2 a) See 7.31.2 a)
11.13.3 ACTIVATE MACHINE AND CUT CANISTER CAP AWAY	11.13.3 a) See 7.31.3 a) through c)
11.14 <u>TRANSFER CANISTER CAPS TO MACHINE SHOP</u>	
11.14.1 ATTACH GRAPPLE TO STANDARD LIFT PIN AND PULL CAP FROM CANISTER	11.14.1 a) See 11.11.1 a)
11.14.2 TRANSFER CANISTER CAP TO "WARM" MACHINE SHOP	11.14.2 a) See 11.11.1 a)
	b) A transfer port is required between the
	decanning cell and warm shop.

FUNCTION	EQUIPMENT REQUIREMENT
11.15 <u>REMOVE CANISTER FROM CAP REMOVAL DEVICE</u>	
11.15.1 HOIST OVER-PACK CANISTER FROM CAP REMOVAL DEVICE	11.15.1 a) See 7.20.1 a) and b)
11.15.2 TRANSFER OVER-PACK CANISTER TO INNER CANISTER REMOVAL STATION	11.15.2 a) See 7.20.1 a) and b)
11.16 <u>REMOVE INNER CANISTER FROM OVER-PACK</u>	
11.16.1 PLACE OVER-PACK CANISTER INTO INNER CANISTER REMOVAL STATION	11.16.1 a) See 7.20.1 a) and b) b) A clamping device which will "grip" the overpack canister during inner canister withdrawal is required.
11.16.2 ACTIVATE CLAMPS TO HOLD OVER PACK	11.16.2 a) An operators console is required to activate the canister clamping device. Full clamp-up shall be indicated to the operator.
	b) Visual means are required to verify clamp-up.
11.16.3 ATTACH INNER CANISTER GRAPPLE TO STANDARD LIFTING PIN	11.16.3 a) See 7.15.1 a)
11.16.4 ACTIVATE OVER-PACK VIBRATOR AND WITHDRAW INNER CANISTER	11.16.4 a) A vibrator is required to fluidize the sand between the over-pack and inner canister. Unit is functionally the same as 7.11.3 a).
	b) See 7.15.1 a)
11.17 <u>TRANSFER CANISTER TO CAP REMOVAL MACHINE</u>	
11.17.1 HOIST AND TRANSFER CANISTER TO CAP REMOVAL MACHINE #2	11.17.1 a) See 7.15.1 a)
11.18 <u>POSITION CANISTER IN CAP REMOVAL MACHINE</u>	
11.18.1 PLACE INNER CANISTER ONTO ROTARY TABLE	11.18.1 a) see 7.15.1 a)

FUNCTION	EQUIPMENT REQUIREMENT
11.18.2 ACTIVATE ROTARY TABLE CLAMPING ARMS	11.18.2 a) See 7.21.2 a)
11.19 <u>REMOVE CANISTER CAP</u>	
11.19.1 POSITION MACHINE CUTTING HEAD	11.19.1 a) See 7.31.1 a) and b)
11.19.2 ACTIVATE ROTARY TABLE	11.19.2 a) See 7.31.2 a)
11.19.3 ACTIVATE MACHINE AND CUT CANISTER CAP AWAY	11.19.3 a) See 7.31.3 a) through c)
11.20 <u>REMOVE CANISTER FROM CAP REMOVAL DEVICE</u>	
11.20.1 HOIST CANISTER FROM CAP REMOVAL MACHINE	11.20.1 a) See 7.12.1 a) and b)
11.21 <u>TRANSFER CANISTER TO WITHDRAWAL DEVICE</u>	
11.21.1 TRANSFER CANISTER TO SPENT FUEL ELEMENT REMOVAL STATION	11.21.1 a) See 7.12.1 a) and b)
11.21.2 PLACE CANISTER INTO FUEL ELEMENT REMOVAL STATION	11.21.2 a) See 7.12.1 a) and b)
11.21.3 ACTIVATE CLAMPS TO HOLD CANISTER	11.21.3 a) See 11.16.2 a) and b)
11.21.4 ENGAGE SPENT FUEL ELEMENT GRAPPLE	11.21.4 a) See 7.3.1 a) b) See 7.3.2 b)
11.22 <u>VIBRATE CANISTER AND REMOVE FUEL</u>	
11.22.1 ACTIVATE INNER CANISTER VIBRATOR AND REMOVE SPENT FUEL ASSEMBLY	11.22.1 a) See 7.3.1 a) b) See 7.3.2 b) c) See 11.16.4 a) except overpack is now canister and inner canister is spent fuel assembly.

FUNCTION	EQUIPMENT REQUIREMENT
11.23 <u>TRANSFER FUEL ASSEMBLY TO INSPECT STATION</u>	
11.23.1 TRANSLATE FUEL ASSEMBLY TO INSPECTION STATION	11.23.1 a) See 7.3.1 a)
11.23.2 PLACE FUEL ASSEMBLY IN STATION	11.23.2 a) See 7.3.1 a)
11.24 <u>TRANSFER OVERPACK CANISTER TO SAND REMOVAL DEVICE</u>	
11.24.1 HOIST OVER PACK CANISTER FROM INNER CANISTER REMOVAL STATION	11.24.1 a) See 7.20.1 a) and b)
11.24.2 TRANSFER OVER-PACK CANISTER TO SAND REMOVAL STATION	11.24.2 a) See 11.24.1 a)
11.25 <u>TRANSFER CANISTER TO SAND REMOVAL DEVICE</u>	
11.25.1 HOIST INNER CANISTER FROM SPENT FUEL REMOVAL DEVICE	11.25.1 a) See 7.12.1 a) and b)
11.25.2 TRANSFER CANISTER TO SAND REMOVAL STATION	11.25.2 a) See 11.25.1 a)
11.26 <u>REMOVE SAND</u>	
11.26.1 INSERT VACUUM PROBE INTO CANISTER	11.26.1 a) Sand will be removed from canisters by vacuum transport means.
11.26.2 SUCK SAND FROM CANISTERS	11.26.2 a) A vacuum suction machine is required. It shall be able to remove the sand from a full canister in 10 minutes or less and transfer it to a holding tank. The tank shall hold a 10 days quantity of sand. b) Visual means are required to inspect the inside of the cansiters to verify complete sand removal.
11.27 <u>TRANSFER CANISTERS AND OVER PACK TO MACHINE SHOP</u>	

FUNCTION	EQUIPMENT REQUIREMENT
11.27.1 TRANSFER INNER CANISTER TO WARM MACHINE SHOP	11.27.1 a) See 7.12.1 a) and b)
11.27.2 TRANSFER OVER PACK TO WARM MACHINE SHOP	11.27.2 a) See 7.20.1 a) and b)
11.28 <u>TRANSFER SAND TO WASTE PROCESS AREA</u>	
11.28.1 AIR TRANSFER SAND TO WASTE PROCESS AREA.	11.28.1 a) A vacuum transfer device is required to move the sand from the canister sand removal station to the waste process station. b) A holding tank of 10 days supply of sand is required in the waste process area.
11.29 <u>TRANSFER INNER CANISTER TO MILLING MACHINE</u>	
11.29.1 HOIST AND TRANSFER INNER CANISTER TO MILLING MACHINE	11.29.1 a) See 7.12.1 a) except canister is now empty
11.29.2 PLACE CANISTER INTO MILLING MACHINE ROTARY TABLE	11.29.2 a) See 7.12.1 a)
11.29.3 ACTIVATE MILLING MACHINE ROTARY TABLE CLAMP ARMS	11.29.3 a) See 7.13.2 a)
11.30 <u>MILL END OF CONTAINER TO ORIGINAL CONFIGURATION</u>	
11.30.1 POSITION MILLING MACHINE AT CANISTER	11.30.1 a) See 7.31.1 a) and b)
11.30.2 ACTIVATE ROTARY TABLE	11.30.2 a) See 7.31.2 a)
11.30.3 ACTIVATE MILLING MACHINE AND REWORK CANISTER	11.30.3 a) See 7.31.3 a) through c)
11.31 <u>INSPECT MILL FINISH WORK</u>	

FUNCTION	EQUIPMENT REQUIREMENT
11.31.1 GAGE SQUARENESS OF REWORKED END	11.31.1 a) A device to measure the perpendicularity of the machined end to the canister axis is required.
11.31.2 VISUALLY COMPARE REWORK TO ORIGINAL DRAWING	11.31.2 a) Visual means are required to inspect the canister rework.
11.32 <u>TRANSFER INNER CANISTER TO WASTE PROCESS AREA</u>	
11.32.1 HOIST CANISTER FROM REWORK AREA	11.32.1 a) See 7.31.1 a) and b)
11.32.2 TRANSFER CANISTER TO WASTE PROCESS AREA	11.32.2 a) See 11.32.1 a) above
11.33 <u>TRANSFER OVER-PACK CANISTER TO MILLING MACHINE</u>	11.33 a) Same as 11.29
11.34 <u>MILL END OF CONTAINER TO ORIGINAL CONFIGURATION</u>	11.34 a) Same as 11.30
11.35 <u>INSPECT MILL FINISH WORK</u>	11.35 a) Same as 11.31
11.36 <u>TRANSFER OVER PACK CANISTER TO WASTE PROCESS AREA</u>	11.36 a) Same as 11.32
11.37 <u>TRANSFER INNER CANISTER CAP TO MILLING MACHINE</u>	
11.37.1 HOIST CAP AND TRANSLATE TO MILLING MACHINE	11.37.1 a) See 7.15.1 a) except crane is 1T
11.37.2 PLACE CAP INTO MILLING MACHINE CHUCK AND RELEASE GRAPPLE	11.37.2 a) See above 11.37.1 a)
11.37.3 ACTIVATE CHUCK COLLET	11.37.3 a) A collet type chuck is required to hold the cap during rework. b) Visual means are required to insure proper cap placement.
11.38 <u>REWORK CAP TO ORIGINAL CONFIGURATION</u>	

FUNCTION	EQUIPMENT REQUIREMENT
11.38.1 POSITION MILLING MACHINE AT CAP	11.38.1 a) See 7.31.1 a) and b)
11.38.2 ACTIVATE CHUCK	11.38.2 a) See 7.31.2 a)
11.38.3 ACTIVATE MILLING MACHINE AND REWORK CAP	11.38.3 a) See 7.31.3 a) through c)
11.39 <u>INSPECT REWORK</u>	
11.39.1 GAGE REWORK	11.39.1 a) A template or comparator is required to insure that the cap is reworked per drawing.
11.39.2 VISUALLY COMPARE REWORK TO ORIGINAL DRAWING	11.39.2 a) Visual means are required to inspect the cap rework.
11.40 <u>TRANSFER INNER CANISTER CAP TO WASTE PROCESS AREA</u>	
11.40.1 HOIST CAP FROM MILLING MACHINE	11.40.1 a) See 11.37.1 a)
11.40.2 TRANSFER CAP TO WASTE PROCESS AREA	11.40.2 a) See 11.37.1 a)
11.41 <u>TRANSFER OVER PACK CANISTER CAP TO REWORK AREA</u>	Same as 11.37
11.42 <u>REWORK CAP TO ORIGINAL CONFIGURATION</u>	Same as 11.38
11.43 <u>INSPECT REWORK</u>	Same as 11.39
11.44 <u>TRANSFER OVER PACK CANISTER CAP TO WASTE PROCESS AREA</u>	Same as 11.40

FUNCTION	EQUIPMENT REQUIREMENT
12.0 <u>SOLID WASTE PROCESSING (FROM REPROCESSING)</u>	
12.1 <u>TRANSFER METALIC WASTE TO PROCESS STATION</u>	
12.1.1 PLACE HULLS AND END FITTINGS IN TRANSFER CONTAINER	<p>12.1.1 a) A container is required to transfer the cropped end fittings from the shear cell of the reprocessing plant into the waste processing area. This container shall hold a 10 day collection of fittings and should therefore be about 170 ft³ for a 2500 MTU/year plant (340 ft³ for 5000 MTU/plant or two containers).</p> <p>b) A container for leached hulls from the acid dissolution process is required. This container will need to be about 100 ft³ for one days operation of hulls removed for a 2500 MTU/year plant (200 ft³ for a 5000 MTU/year plant)</p>
12.1.2 TRANSFER CONTAINERS TO PROCESS STATION	12.1.2 a) The containers may either be transferred by crane or rail transfer car.
12.2 <u>REDUCE METALIC WASTE TO SMALL PARTICLES</u>	
12.2.1 EMPTY CONTAINERS OF 12.1 INTO ROLL CRUSHER HOPPER	<p>12.2.1 a) This process cell must be completely flooded with argon to prevent ZR combustion.</p> <p>b) A halon type fire extinguishing system is required in this cell.</p> <p>c) A container inverting device is required to empty the containers of 12.1.1 a) and b)</p>
12.2.2 FEED MATERIAL INTO THE ROLL CRUSHER	<p>12.2.2 a) Feed control shall be operator controlled.</p> <p>b) The roll crusher shall be capable of reducing the total hull and end fitting feed material to 50% theoretical density: For a 2500 MTU/day plant this is 100 ft³ and 6300 lbs/day. The 6300 pounds is basically stainless steel and ZR in which the density is about .29 pounds/in³. At 50%</p>

FUNCTION	EQUIPMENT REQUIREMENT
12.2.2 (Con't)	12.2.2 b) (Con't) theoretical density this would be .58 pounds/in ³ . the 6300 pounds then should be reducible to 11,000 in ³ or 6.3 ft ³ (double for 5000 MTU/plant). In the 2500 MTU/plant one canister would be filled every two days; one per day for the 5000 MTU/year plant..
12.3 <u>TRANSFER WASTE TO CANNING STATION</u>	
12.3.1 REMOVE THE CRUSHED MATERIAL FROM THE ROLL CRUSHER AND PLACE INTO TRANSFER HOPPER (CONVEYOR)	12.3.1 a) A manually controlled access door is required to remove the crushed material. b) A transfer mechanism is required to move the crushed material to the canister filling station..
12.4 <u>MIX WASTE WITH RECOVERED SAND AND PLACE INTO CANISTER</u>	
12.4.1 EMPLACE EMPTY INNER CANISTER UNDER HOPPER TO RECEIVE CRUSHED MATERIAL	12.4.1 a) See 7.15.1 a) b) A slide transfer mechanism to move the canister under the hopper.. c) A bellows funnel is required to mate with the canister.
12.4.2 EMPLACE CRUSHED METALIC MATERIAL	12.4.2 a) A hopper door which is interlocked with a weighing scale is required. When the specified volume of material is put in the canister. b) A scale is required to weigh the canister and contents. The indication shall be presented to the operator in the operating aisle.
12.4.3 PLACE SAND INTO CANISTER	12.4.3 a) Feed control shall be by manual operator control. b) See 12.4.2 a) and b)

FUNCTION	EQUIPMENT REQUIREMENT
12.5 <u>TRANSFER CANISTER TO CAP WELDING DEVICE</u>	Same as 7.12 and 7.13
12.6 <u>PLACE CAP ON CANISTER AND WELD CLOSED</u>	Same as 7.14
12.7 <u>TRANSFER CANISTER TO WELD INSPECTION STATION</u>	Same as 7.15
12.8 <u>VERIFY WELD INTEGRITY</u>	Same as 7.16
12.9 <u>TRANSFER CANISTER TO OVER-PACK PACKING DEVICE</u>	Same as 7.17
12.10 <u>PLACE CANISTER INTO OVER-PACK CANISTER</u>	Same as 7.18
12.11 <u>FILL SPACE BETWEEN CANISTERS WITH SAND</u>	Same as 7.19
12.12 <u>TRANSFER OVER-PACK CANISTER TO WELD MACHINE</u>	Same as 7.20 and 7.21
12.13 <u>PLACE CAP ON OVER-PACK AND WELD CLOSED</u>	Same as 7.22
12.14 <u>TRANSFER OVER-PACK TO WELD INSPECTION STATION</u>	Same as 7.23
12.15 <u>VERIFY WELD INTEGRITY</u>	Same as 7.24
12.16 <u>TRANSFER CANISTERS TO DECONTAMINATION STATION</u>	Same as 7.25
12.17 <u>DECONTAMINATE OVER-PACK CANISTER SURFACE</u>	Same as 7.26
12.18 <u>TRANSFER CANISTER TO TEMPORARY LAY-DOWN AREA</u>	Same as 7.27
12.19 <u>TRANSFER CANISTER TO MILLING DEVICE</u>	Same as 7.30
12.20 <u>MACHINE OLD WELD AWAY</u>	Same as 7.31

FUNCTION	EQUIPMENT REQUIREMENT
12.21 <u>TRANSFER CANISTER TO WELD MACHINE</u>	Same as 7.32
12.22 <u>RE-WELD CANISTER CAP</u>	Same as 7.33
12.23 <u>VERIFY WELD INTEGRITY</u>	Same as 7.34

FUNCTION	EQUIPMENT REQUIREMENT
13.0 <u>LIQUID WASTE PROCESSING - CALCINING, VITRIFICATION, CANNING AND OVER-PACKING</u>	
13.1 <u>INCINERATE ALL COMBUSTIBLE ROD WASTE</u>	
13.1.1 TRANSFER ROD WASTE PACKAGED IN DRUMS FROM REPROCESSING	13.1.1 a) A forklift is required to move the drums into the incinerator receiving area. b) A lag storage area for drums is required.
13.1.2 OPEN THE DRUMS AND PLACE COMBUSTIBLES INTO SHREDDER	13.1.2 a) A "warm" room is required to open the drums. b) Manipulators are required. c) A drum handling device is required to empty the drums. d) A feed hopper for the shredder is required.
13.1.3 SHRED THE COMBUSTIBLE MATERIAL	13.1.3 a) A shredder is required to reduce the combustible material to a size compatible with the incinerator. A forty horsepower unit with automatic reversing would be sufficient. b) Material shall be fed into a ram incinerator charging device. c) The yearly feed material for a 2500 MTU/year plant is about 1100 ft ³ . This is about 4 ft ³ /day to be incinerated.
13.1.4 INCINERATE THE COMBUSTIBLE MATERIAL	13.1.4 a) An incinerator with the capability to burn 4 ft ³ /day is required. This unit shall completely reduce the material to ash. b) An air filtration system is required to prevent any radioactive materials from leaving the incinerator. c) The ash shall be deposited into a feed hopper for transfer to the liquid waste stream.

FUNCTION	EQUIPMENT REQUIREMENT
13.2 <u>MIX LOW AND INTERMEDIATE LIQUID WASTE INTO HLLW</u>	
13.2.1 TRANSFER LOW LEVEL LIQUID WASTES INTO MIXING TANK	<p>13.2.1 a) Transfer pumps are required in various places in the reprocessing plant to move the liquids from holding tanks into an interim storage tank.</p> <p>b) An interim storage tank is required. This tank shall hold the output from the HLLW stream and the low level waste streams. For a 2500 MTU/year plant this is about 42,000 gallons/day. (5000 l/month).</p> <p>c) The intermediate holding tank shall be equipped with an agitator to prevent radioactive material from settling out.</p>
13.3 <u>MIX ASH FROM INCINERATOR WITH LIQUID WASTE STREAMS</u>	
13.3.1 TRANSFER ASH INTO MIXING CHAMBER	<p>13.3.1 a) A hopper mechanism which is related to the liquid flow into the chamber is required.</p>
	<p>b) A mixing chamber is required. It shall be continuously agitated to prevent any settling..</p>
13.3.2 TRANSFER HLLW STREAM INTO MIXING CHAMBER	<p>13.3.2 a) Flow meters are required in the input to determine the amount of ash to be mixed in.</p>
13.4 <u>CONCENTRATE LIQUID/SLURRY</u>	
13.4.1 TRANSFER SLURRY INTO CONCENTRATOR	<p>13.4.1 a) Pump and flow meters are required.</p>
13.4.2 CONCENTRATE MIXTURE 20:1	<p>13.4.2 a) An evaporator/concentrator system is required. The nitric acid waste stream must be concentrated from 42,000 GPD to 2100 GPD.</p>
13.4.3 <u>TRANSFER SLURRY TO NEXT CONCENTRATOR</u>	<p>13.4.3 a) Pumps and flow meters are required.</p>

FUNCTION	EQUIPMENT REQUIREMENT
13.5 <u>CONCENTRATE LIQUID/SLURRY 2.0 to 1</u>	
13.5.1 EVAPORATE ROFINATE BY 2:1 AND SETUM DISTILLATE TO HLLW STREAM	13.5.1 a) See 13.4.2 a) except reduce 2100 gallons to 1100 gallons.
13.6 <u>CALCINE LIQUID/SLURRY TO SOLIDS</u>	
13.6.1 TRANSFER SLURRY TO CALCINER	13.6.1 a) Pumps are required (5 GPM Max.)
13.6.2 CALCINE SLURRY	13.6.2 a) A kerosene buring calciner is required. It shall be capable of reducing 5 GPM slurry to a solid granular material in a continuous mode. This should be about 60 liters of material per MTHM processed.
13.7 <u>RETURN DECONTAMINATED LIQUIDS TO PROCESS</u>	
13.7.1 TRANSFER LIQUIDS (ACID) TO PROCESS STREAM	13.7.1 a) Pump arc required to return distillates back into process stream.
13.8 <u>VITRIFY CALCINE/SAND MIXTURE</u>	
13.8.1 TRANSFER CALCINE INTO INDUCTION FURNACE	13.8.1 a) An induction furnace capable of melting the calcined solids into a glass-like substance is required. The capacity shall be at least 17 ft ³ per day. It shall be a continuous device. Glass grade and recovered from spent fuel storage shall be added at equal volumes during the vitrification process.
13.9 <u>PLACE GLASS INTO STORAGE CANISTER</u>	
13.9.1 OPEN VALVE IN FURNACE AND LET GLASS MIXTURE FLOW INTO CANISTER	<p>13.9.1 a) A canister to catch the glass mixture in is required. This shall be the same canister as the spent fuel ACV canister.</p> <p>b) Canister filling shall be complete when 17 ft³ have been emplaced. (Two canisters per day for a 2500 MTU/day plant. Heat load per canister will be 3500 watts).</p>

FUNCTION	EQUIPMENT REQUIREMENT
13.10 <u>COOL CANISTER</u>	
13.10.1 <u>TRANSFER CANISTER TO AIR COOLING STATION</u>	13.10.1 a) A transfer mechanism is required to move the filled canister to an air cooling station. This may be satisfied by a crane similar to 7.15.1 a)
13.10.2 <u>COOL THE CANISTER</u>	13.10.2 a) It is necessary to cool the canister and contents to a temperature less than 1000°F. b) A vortex compressed air cooling system may be used to generate and direct cold air into the canister.
13.11 <u>TRANSFER CANISTER TO WELDING MACHINE</u>	13.11 a) Same as 7.12 and 7.13
13.12 <u>EMPLACE CAP ON CANISTER AND WELD CLOSED</u>	13.12 a) Same as 7.14
13.13 <u>TRANSFER CANISTER TO WELD INSPECTION STATION</u>	13.13 a) Same as 7.15
13.14 <u>VERIFY WELD INTEGRITY</u>	13.14 a) Same as 7.16
13.15 <u>TRANSFER CANISTER TO OVER-PACKING DEVICE</u>	13.15 a) Same as 7.17
13.16 <u>PLACE INNER CANISTER INTO OVER-PACK CANISTER</u>	13.16 a) Same as 7.18
13.17 <u>FILL SPACE BETWEEN CANISTER WITH SAND</u>	13.17 a) Same as 7.19
13.18 <u>TRANSFER OVER-PACK CANISTER TO WELDING MACHINE</u>	13.18 a) Same as 7.20 and 7.21
13.19 <u>PLACE CAP ON OVER-PACK AND WELD CLOSED</u>	13.19 a) Same as 7.22
13.20 <u>TRANSFER OVER-PACK CANISTER TO WELD INSPECTION STATION</u>	13.20 a) Same as 7.23
13.21 <u>VERIFY WELD INTEGRITY</u>	13.21 a) Same as 7.24

FUNCTION	EQUIPMENT REQUIREMENT
13.22 <u>TRANSFER CANISTER TO DECONTAMINATION STATION</u>	13.22 a) Same as 7.25
13.23 <u>DECONTAMINATE CANISTER SURFACE</u>	13.23 a) Same as 7.26
13.24 <u>TRANSFER CANISTER TO TEMPORARY LAY-DOWN AREA</u>	13.22 a) Same as 7.27
13.25 <u>TRANSFER CANISTER TO STORAGE BASKETS</u>	
13.25.1 HOIST AND TRANSFER CANISTER TO STORAGE BASKETS	13.25.1 a) See 7.15.1 a) b) Storage basket which will hold 3 over-pack canisters and fit into the envelope of a spent fuel storage rack is required.
13.26 <u>TRANSFER STORAGE BASKET INTO POOL.</u>	
13.26.1 HOIST AND TRANSFER CANISTER BASKET TO BASKET STORAGE RACK	13.26.1 a) See 7.2.1 a) b) See 4.26.4 b) and c)
13.27 <u>TRANSFER CANISTER TO MILLING DEVICE</u>	13.27 a) Same as 7.30
13.28 <u>MACHINE OLD WELD AWAY</u>	13.28 a) Same as 7.31
13.29 <u>TRANSFER CANISTER TO WELD MACHINE</u>	13.29 a) Same as 7.32
13.30 <u>REWELD CANISTER CAP</u>	13.30 a) Same as 7.33
13.31 VERIFY WELD INTEGRITY	13.31 a) Same as 7.34

APPENDIX B2
EQUIPMENT AND OPERATING PERSONNEL

The data contained in this appendix summarizes the equipment requirements which were presented in Appendix B1. Included in the appendix is a listing, by facility type, of the personnel necessary to operate that facility. The equipment pages contain a listing of the major system components, the quantity of each required, and any special remarks.

MODULE: 5000 MTU/YEAR WATER BASIN RECEIVING		SHT. 1 OF 10
SYSTEMS & COMPONENTS	QTY	REMARKS
<u>OPERATING PERSONNEL</u>		
2 SUPERVISORS		
3 INSTRUMENT/ELECTRICAL TECHS		
3 MECHANICS		
2 HEALTH PHYSICS		
10 CASK PREP MECHANICS		
2 CASK CRANE OPERATORS		
8 FUEL HANDLING MACHINE OPERATORS		
2 PHYSICS TECH (SIPPING)		
6 MECH (PRE PREP IN PARKING AREA)		
3 FORKLIFT/MOBILE CRANE OPERATORS		
41 PER SHIFT		
123 PER DAY		

REC

MODULE: 5000 MTU/YEAR WATER BASIN RECEIVING

SHT. 2 OF 10

SYSTEMS & COMPONENTS	QTY	REMARKS
<u>A. CASK HANDLING SYSTEM</u>		
1. BRIDGE CRANE	2 EA	125 TON, REDUNDANT REEVING, 85' SPAN, FULLY REDUNDANT SISTER HOOK
2. AUXILIARY CRANE	2 EA	20 TON, MOUNTED ON 125 T CRANE
3. CASK SLING	4 EA	125 TON, BEAM TYPE, 4 ARM, FABRICATED FROM 304L STAINLESS STEEL
4. CASK SLING	2 EA	30 TON, BEAM TYPE, 4 ARM, FABRICATED FROM 304L STAINLESS STEEL
5. CASK SLING ARM CONTROL SET	4 EA	PNEUMATIC VALVE BOX TO CONTROL AND MOVE CASK BEAM SLING ARMS. TWO FUNCTIONS; OPEN ARMS OUT, SWING ARMS AWAY
<u>B. CASK COOLING & PURGING & SAMPLING SYSTEM</u>		
1. CASK PRESSURE & TEMPERATURE RECORDER	4 EA	TWO CHANNEL RECORDER WHICH WILL CONNECT TO THE CASK INSTRUMENTATION PLUGS. OPERATE ON 110 VOLT AC, 5 INCHES PER MIN. PAPER SPEED.
2. CASK COOLING HOSE SET	4 EA	TWO SHIELDED HOSES, 20 FT. LONG, 3/4 IN. LINE SIZE, DRY BREAK Q.D'S, MAX OPERATING TEMP 350°F, MAX OPERATING PRESSURE 250 PSIG.
3. AIR COMPRESSOR & RECEIVING TANK	2 EA	120 PSIG, 120 CFM, 71 FT ³ AIR RECEIVERS 1-1/2 INCH SUPPLY LINES, AIR DRYERS, WATER SEPARATORS
4. CASK AIR SAMPLING SYSTEM	2 EA	MASS SPECTROMETER. EACH UNIT CROSS CONNECTED TO ALL CASK COOLING POSITIONS. ALL LINES FROM CASK COOLING AREA SHIELDED. AIR SAMPLING VALVING MANIFOLDED TO COOLING HOSE SET.

B2-3

REC

MODULE: 5000 MTU/YEAR WATER BASIN RECEIVING		SHT. 3 OF 10
SYSTEMS & COMPONENTS	QTY	REMARKS
5. CASK AIR SUPPLY SYSTEM CONTROL	2 EA	CONTROL PANEL TO OPEN/CLOSE CASK COOLING VALVES, OPEN/CLOSE VALVES TO MASS SPECTROMETER AND OPEN/CLOSE VALVES TO OFF GAS SYSTEM. PRESSURE READOUTS FOR SUPPLY AIR, CASK INPUT AIR, CASK OUTPUT AIR, MASS SPECTROMETER LINES FOR 4 CASK STATIONS.
6. CASK COOLING WATER SUPPLY	1 EA	SYSTEM SHALL FLOW 15 GPM IN EACH OF FOUR CASK COOLING UNITS. DEMINERALIZED WATER, 12,000 GPD REQUIRED.
7. CASK COOLING WATER HEATER	4 EA	HEATER TO BRING 15 GPM H ₂ O TO CASK TEMP (350°F)
8. WATER PRESSURE REGULATOR	4 EA	MAINTAIN 15 GPM H ₂ O AT 0-50 PSIG REMOTELY SETTABLE
9. AIR/WATER/STEAM SEPARATOR	4 EA	15 GPM H ₂ O FLOW OR 4 CFM AIR FLOW WATER TO FLOW TO FILTERS. AIR TO FLOW TO OFF GAS SYSTEM
10. WATER FILTER	8 EA	10 MICRON, 50 PSI, 350°F, AIR/H ₂ O BACKWASH CAPABILITY

B2-4

REC

MODULE: 5000 MTU/YEAR WATER BASIN

SHT. 4 OF 10

SYSTEMS & COMPONENTS	QTY	REMARKS
C. <u>FUEL HANDLING SYSTEMS</u>		
1. FUEL CRANE	4	10T, 20 FT SPAN
2. FUEL ELEMENT GRAPPLES	16	MATE WITH FUEL ELEMENTS & CRANES. ELECTRO OR PNEUMATIC LATCHING/UNLATCHING
3. FUEL ELEMENT SIPPERS	16	4 @ EACH CASK UNLOADING POOL
4. MASS SPECTROMETER	2	DETECT NOBLE FISSION GAS PRODUCTS GANGED & MANIFOLDED TO CASK COOLING SYSTEM ALSO.
5. FAILED FUEL CAN	25	USED TO STORE BROKEN ELEMENTS IN 1/8 IN. STAINLESS STEEL 9.5 IN. X 9.5 IN. X 180 IN. WATER PRESSURE RELIEF VALVE
6. SLING - CASK CLOSURE	5	RAIL CASK - 10 T, 3 ARM, SOLID S.S. TYPE 304L
7. SLING - CASK CLOSURE	5	TRUCK CASK - 5T, 3 ARM, SOLID S.S. TYPE 304L
8. SPENT FUEL ELEMENT SPACER GRAPPLE	4	1 T, ATTACHES TO FUEL HANDLING MACHINE, SINGLE LINK WITH HOOK
9. UNDERWATER TELEVISION SYSTEM	4	MUST OPERATE UNDER 40-60 FT. OF WATER, RADIATION HARDENED. MUST INCLUDE HIGH INTENSITY LIGHT. MUST INCLUDE REMOTELY OPERABLE TILT, PAN, AND FOCUS. FOR USE IN THE CASK UNLOADING POOL. INCLUDE MONITORS.

B2-5

MODULE: 5000 MTU/YEAR WATER BASIN RECEIVING

SHT. 5 OF 10

SYSTEMS & COMPONENTS	QTY	REMARKS
10. CLEANING BRUSH	4	REMOTELY OPERABLE UNIT, ROTARY, WORKS IN 40 FT. OF WATER, USED TO CLEAN AREA AROUND SERIAL NUMBER OF FUEL ASSY.
11. PHOTOGRAPHIC CAMERA	4	MUST BE ABLE TO PHOTOGRAPH FROM TELEVISION SCREEN. USED TO RECORD FUEL ASSEMBLY SERIAL NUMBERS AND ANY VISIBLE DAMAGE.
12. GRAPPLE	4	MUST HAVE 'HAND' AT END TO REMOVE 50 IN. DIAMETER CASK CLOSURE SEAL. WILL NEED TO BE ABOUT 40 FT. LONG. FAB FROM STAINLESS STEEL.
13. CASK SEALS	1100	3/8 INCH TUBE DIAMETER, 50 INCH MAJOR DIAMETER METALLIC O-RING, SILVER PLATED (.002 IN. PLATING)
14. CASK SEAL SPACER	1/CASK	50 INCH DIA., 1/2 INCH T, ALUMINUM, 2 - 48 INCH DIAMETER RUBBER O-RINGS

B2-6

SYSTEMS & COMPONENTS	QTY	REMARKS
<p>D. <u>SOLID WASTE SYSTEM</u></p> <p>1. COMPACTOR (1)</p> <p>2. DRUMS (189)</p> <p>3. PALLETS (48)</p> <p>4. FORKLIFT (1)</p> <p>5. SHREDDER (1)</p> <p>6. HOPPER & INPUT CHUTE (1)</p>	1	<p>IT IS ESTIMATED THAT 33 M³ OF OPERATIONAL SOLID WASTE WILL BE GENERATED IN ONE YEAR'S OPERATION. ADDITIONALLY 28 FT³ OF HEPA FILTERS WILL BE RECOVERED. THIS WILL REQUIRE COMPACTION AND CONTAINERIZING. A STD. DRUM COMPACTOR IS REQUIRED. NO LESS THAN 50% REDUCTION IS REQUIRED FOR THE OPERATIONAL WASTES. THIS WILL REQUIRE ABOUT 88 DRUMS PER YEAR. THE HEPA FILTERS WILL BE SHREDDED AND BE COMPACTED 25% OR MORE. THIS WILL REQUIRE 101 DRUMS. TOTAL DRUMS = 189. DRUMS WILL BE STORED 4/PALLET; 48 PALLETS WILL BE REQUIRED. A FORK LIFT CAPABLE OF 15,000 LBS AND 15 FT. LIFT IS REQUIRED. A 40 HORSEPOWER SHREDDER IS REQUIRED TO REDUCE THE HEPA FILTERS & OTHER LARGE BULKY WASTE.</p>

SYSTEMS & COMPONENTS	QTY	REMARKS
<p>E. <u>CASK RINSE SYSTEM</u></p> <p>1. RING NOZZLE (4)</p> <p>2. LOW PRESSURE PUMP (4)</p> <p>3. HOSES (4)</p> <p>4. PUMPS (4)</p>	1	<p>LOW PRESSURE RINSE SYSTEM. 50 - 100 GPM. 2-5 PSI. HOSES ABOUT 10 FT. LONG. A RING WITH NOZZLES (100 INCH DIA) IS USED TO WASH THE CASK & SLING AS IT IS MOVED FROM THE CASK UNLOADING POOL. WATER SHOULD COME FROM THE POOL MAKE-UP WATER SUPPLY. DISCHARGE TO POOL.</p>
<p>F. <u>CASK CLOSURE TOOL SET</u></p> <p>1. AIR TURBINE WRENCH</p> <p>2. TORQUE MULTIPLIER</p> <p>3. 2-1/2 INCH SOCKETS</p>	<p>4</p> <p>4</p> <p>4</p>	<p>0-1250 FT-LBS 1 INCH DRIVE, REVERSIBLE WITH REACTION PLATE</p> <p>4 TO 1, 1-1/2 INCH DRIVE OUT, 1 INCH DRIVE IN.</p> <p>HIGH STRENGTH 1-1/2 INCH DRIVE</p>

MODULE: 5000 MTU/YEAR WATER BASIN RECEIVING		SHT. 8 OF 10
SYSTEMS & COMPONENTS	QTY	REMARKS
<p>G. <u>CASK RECEIVING</u></p> <p>1. LOG BOOK (AS REQD)</p> <p>2. I.D. BADGES (500)</p> <p>3. GEIGER COUNTER & SMEAR TEST SAMPLE KIT (4)</p> <p>4. CAMERA (2)</p>	1	<p>SPECIAL LOG BOOKS</p> <p>MAGNETIC/PUNCH CODED PICTURE BADGES (CODES CHANGED FREQUENTLY)</p> <p>USED FOR GROSS CONTAMINATION CHECK</p> <p>POLAROID INSTANT PRINT TYPE</p>
<p>H. <u>CASK WASH DOWN SYSTEM</u></p> <p>1. HIGH PRESSURE WATER</p> <p>2. STEAM (BOILER)</p> <p>3. RAD WASTE DRAIN (1)</p> <p>4. SUMP PUMP (1)</p>	4	<p>90-100 PSIG, 3/4 INCH LINE</p> <p>90-120 PSIG, 3/4 INCH LINE*</p> <p>WATER RETURN TO CENTRAL WASTE WATER COLLECTION SYSTEM</p> <p>*ABOUT SAME AS AUTO STEAM CLEANER</p>
<p>I. <u>CASK DECONTAMINATION SYSTEM</u></p> <p>1. HIGH PRESSURE WATER</p> <p>2. STEAM</p> <p>3. FILTERS (2)</p> <p>4. PUMPS (1)</p> <p>5. DELON FLUID (25 GALLONS)</p> <p>6. SMEAR TEST SAMPLE KITS (12)</p> <p>7. GEIGER/SCINTILLATION COUNTER (1)</p>	4	<p>WATER & STEAM @ 90-120 PSIG WILL BE USED TO REMOVE PARTICULATE CONTAMINANTS. IF NECESSARY, SPECIAL HAND CLEANING WILL BE ACCOMPLISHED WITH DILUTE NITRIC ACID. THE SMEAR TEST & COUNTERS WILL BE USED TO DETERMINE WHEN THE CASK IS CLEAN.</p>

SYSTEMS & COMPONENTS	QTY	REMARKS
J. <u>AIR LOCK SYSTEM - TRANSPORTER</u>	4	DOORS INTERLOCKED SUCH THAT ONLY ONE CAN BE OPENED AT A TIME. EACH REQUIRES TWO SIGNALS TO OPEN - AT DOOR, AND ONE IN MAIN PLANT CONTROL ROOM. EACH AIRLOCK MUST BE LONG ENOUGH TO HOLD RAIL CAR & CAR MOVER.
K. <u>CASK RECEIVING/UNLOADING AREA</u>	4	RAILS INTO FACILITY. RAIL CAR COUPLER EMBEDDED IN FACILITY STRUCTURE IS REQUIRED TO PREVENT CAR MOVEMENT DURING HOISTING.
L. <u>CASK CLOSURE SEAL LEAK TEST SET</u>	4	VACUUM PUMP (.5 CFM) HOSES FITTINGS TO MATE TO CASK CLOSURE TEST PORT (1/8 INCH PIPE FITTING). ULTRA SENSITIVE ABSOLUTE PRESSURE READOUT TO DETERMINE PRESSURE RISE ACROSS SEAL. CALIBRATED IN TERMS OF LEAK RATE WHEN COMBINED WITH TIME.

SYSTEMS & COMPONENTS	QTY	REMARKS
<p>M. <u>CASK HOLDING AREA</u></p> <ol style="list-style-type: none"> 1. CASK COOLING SYSTEM (1) 2. SHELTERED PARKING LOT (1) 3. CAR MOVER (2) 4. FORKLIFT (2) 5. CRANES (2) 6. PALLETS (24) 7. TRANSPORTATION BARRIER SLING (2) 8. IMPACT LIMITER SLING (2) 	1	<p>PLANT WATER SHALL BE AVAILABLE IN THE CASK PARKING LOT FOR CASK COOLING. HEAT REMOVAL REQUIRED IS 40,000 BTU/CASK; 8 CASKS TO BE PARKED. PARKING AREA SHOULD BE SHELTERED FOR PERSONNEL.</p> <p>CARMOVER SHALL BE ABLE TO MOVE 450,000 LB CAR, RUBBER TIRED.</p> <p>15,000 LB FORKLIFTS - 15 FT. LIFT</p> <p>15 TON MOBILE CRANES</p> <p>2 POINT LIFT SLING - 2 TONS</p> <p>1 POINT LIFT SLING FOR IMPACT LIMITER 5 TONS.</p> <p>24 PALLETS REQUIRED TO PLACE IMPACT LIMITERS & TRANSPORTATION BARRIER ON.</p>

MODULE: 750 MTHM WATER BASIN

SHT. 1 OF 6

SYSTEMS & COMPONENTS	QTY	REMARKS
<p><u>OPERATING PERSONNEL</u></p> <p>2 BASKET TRANSFER DEVICE OPERS</p> <p>2 BASKET CRANE OPERATORS</p> <p>1 SUPERVISOR</p> <p>2 MECHANICS</p> <p>1 ELEC TECH</p> <p>1 HEALTH PHYSICS</p> <p>9 PER SHIFT</p> <p>27 PER DAY</p>		

B2-12

SYSTEMS & COMPONENTS	QTY	REMARKS
<u>FUEL STORAGE SYSTEM</u>		
A. STORAGE BASKETS - PWR	100	STORAGE CELLS ARE 9.5 IN. X 9.5 IN. X 180 IN. X 3/16 IN. T, 10 EACH PER BASKET, 1/2 INCH PLATE 24 IN. X 60 IN., 3/16 IN. PLATE 36 IN. X 168 IN., 1 INCH PLATE 24 IN. X 60 IN. ALL FABRICATED FROM TYPE 304L STAINLESS STEEL
B. STORAGE BASKETS - BWR	66	STORAGE CELLS ARE 5.5 IN. X 5.5 IN. X 180 IN. X 3/16 IN. T, 24 EA PER BASKET, 1/2 INCH PLATE, 24 IN. X 60 IN., 3/16 IN. PLATE 36 IN. X 168 IN. 1 IN. PLATE 24 IN. X 60 IN., ALL FABRICATED FROM TYPE 304L STAINLESS STEEL
C. STORAGE RACKS	16	EACH RACK TO HOLD 14 BASKETS 58 SPACES WILL BE FOR EXPANSION OR SURGE STORAGE. RACKS SHALL SUPPORT BASKETS 2 FEET OFF OF FLOOR. FABRICATED FROM WF 8X50 STAINLESS STEEL BEAMS - 270 LINEAL FT.
D. DEMINERALIZED WATER	3(10 ⁶) GALLONS	
E. TRANSFER CAR - BASKET	4	TRANSPORT FULL STORAGE BASKET FROM CASK LOADING POOL TO STORAGE BASIN - 15 TONS CAPACITY, 5 FPM, FAB FROM STAINLESS STEEL.

B2-13

MOD

MODULE: 750 MTHM WATER BASIN

SHT. 3 OF 6

SYSTEMS & COMPONENTS	QTY	REMARKS
F. TELEVISION SYSTEM, UNDERWATER	2	UNDERWATER UNITS CAPABLE OF WORKING IN 40 - 60 FT. OF WATER, RADIATION HARDENED, MUST HAVE TILT, PAN & FOCUS. FOR USE IN THE FUEL STORAGE POOL AT THE CRANES MUST INCLUDE HIGH INTENSITY LIGHTS AND MONITORS.
G. TELEVISION SYSTEM, DRY	4	ONE TV CAMERA IN EACH CORNER OF THE STORAGE MODULE, INCLUDE LIGHTING, MONITORS. UNITS TO HAVE TILT, PAN & FOCUS.
H. STORAGE POOL CRANES - BASKET	2	REMOTELY OPERABLE CRANES TO HOIST AND TRANSLATE STORAGE BASKETS FROM THE TRANSFER CAR TO THE STORAGE RACK, 15T, 55 FT. SPAN. MUST HAVE REDUNDANT REEVING.
I. STORAGE BASKET SLING	2	INTERFACE BETWEEN CRANE & BASKET BAIL. MUST HAVE PNEUMATIC/ELECTRO LATCHES AT EACH END. 15T CAPACITY, SINGLE BAR, STAINLESS STEEL, 40 FT. LONG.

B2-14

MODULE: 750 MTHM WATER BASIN

SHT. 4 OF 6

SYSTEMS & COMPONENTS	QTY	REMARKS
<p>J. <u>POOL COOLING SYSTEM</u></p> <p>1. COOLING TOWER (1)</p> <p>2. HEAT EXCHANGER (4)</p> <p>3. FILTERS (8)</p> <p>4. PUMPS (4)</p> <p>5. PIPING (AS REQD.)</p>	1	<p>COOLING SYSTEM TO REMOVE 6 (10^6) BTU/HR. POOL WATER TO BE NOMINAL 40°C. AN EMERGENCY MAKE-UP WATER SUPPLY SHALL BE PROVIDED. HEAT EXCHANGER SHOULD BE SHELL & TUBE TYPE: FLOW 1500 GPM, INLET= 104°F, OUTLET = 94°F, SHELL SIDE; FLOW 1500 GPM, INLET = 105°F, OUTLET = 115°F, DESIGN PRESSURE = 150 PSIG, DESIGN TEMPERATURE = 220°F.</p> <p>FILTERS TO REMOVE SUSPENDED SOLIDS FROM WATER. TO HAVE A BACKWASH CAPABILITY.</p> <p>PIPING SHALL BE 10 INCH - 14 INCH I.D. STAINLESS STEEL. APPROXIMATE LENGTH IS 500 FT.</p>

B2-15

MODULE: 750 MTHM WATER BASIN		SHT. 5 OF 6
SYSTEMS & COMPONENTS	QTY	REMARKS
<p>K. <u>WATER EVAPORATION SYSTEM</u></p> <ol style="list-style-type: none"> 1. EVAPORATOR (1) 2. INPUT STORAGE TANK (1) 3. OUTPUT STORAGE TANK (1) 4. PUMPS (2) 5. FILTERS (4) 6. TANK AGITATORS (2/TANK) 7. PIPING (AS REQD.) 	1	<p>THE WATER EVAPORATION SYSTEM WILL REDUCE THE FILTER BACKWASH WATER FROM THE POOL FILTER, CASK COOLING FILTERS, CASK WASH DOWN FILTERS, CASK DECON FILTERS, POOL CLEAN UP FILTERS AND EVAPORATE IT IN A 20 TO 1 RATIO. THE INPUT QUANTITY OF WATER IS APPROXIMATELY 8400 GPD. OUTPUT QUANTITY IS 420 GPD. DISTILLATE WILL BE REFILTERED, PASSED BACK THROUGH THE POOL DE-IONIZERS AND RETURNED TO POOL WATER MAKE-UP TANK. ALL STORAGE TANKS MUST BE SHIELDED (4" LEAD) AND MUST HAVE AGITATORS TO PREVENT SETTLING OF PARTICULATES. THIS SHALL BE A CONTINUOUS SYSTEM. OUTPUT TANK SHALL CONTAIN 126,000 GALLONS. PIPING SHALL BE 2 IN. OR LESS, 500 FT. LONG. ALL MATERIALS OF CONSTRUCTION SHALL BE TYPE 304L STAINLESS STEEL.</p>

B2-16

SYSTEMS & COMPONENTS	QTY	REMARKS
<p>K. POOL WATER CLEAN-UP SYSTEM</p> <ol style="list-style-type: none">1. FILTER SYSTEM (2)2. DE-IONIZER (1)3. PIPING (AS REQUIRED)	1	<p>SYSTEM TO BE CAPABLE OF REMOVING 45 CI RELEASE INTO THE POOL WATER. NOMINAL OPERATING LEVEL IN POOL IS $2(10^{-4})\text{CI/M}^3$ OR LESS. FILTERS MUST REMOVE ALL SUSPENDED PARTICLES AND MUST HAVE BACKWASH CAPABILITY. DE-IONIZERS MUST REMOVE DISSOLVED SOLIDS. (CATION TYPE OF RESIN BED)</p> <p>FLOW RATE IS TO BE 650 GPM AND MUST BE ABLE TO CLEAN THE TOTAL POOL WATER IN 8.2 DAYS.</p> <p>PIPING WILL BE STAINLESS STEEL, 6 IN. - 8 IN. I.D., 250 FT.</p> <p>ALL MATERIALS OF CONSTRUCTION SHALL BE TYPE 304L STAINLESS STEEL.</p>

MODULE: AIR COOLED VAULT

SHT. 1 OF 6

SYSTEMS & COMPONENTS	QTY	REMARKS
<p><u>OPERATING PERSONNEL</u></p> <p>1 SUPERVISOR</p> <p>4 BASKET TRANSFER OPERATORS</p> <p>4 TRANSFER PORT OPERATORS</p> <p>1 HEALTH PHYSICS TECH</p> <p>1 MECHANIC</p> <p>4 TRANSPORTER DRIVERS</p> <hr/> <p>15 PER SHIFT</p> <p>45 PER DAY</p>		

82-18

SYSTEMS & COMPONENTS	QTY	REMARKS
A. CANISTER TRANSFER CAR & IMPACT LIMITER	4	UNIT USED TO TRANSFER CANISTER FROM PACKAGING FACILITY LAY DOWN (LAG STORAGE AREA) INTO THE ACV TRANSPORTER LOADING AREA. IT SHALL HOLD TWO CANISTERS. TOTAL CAPACITY OF 12,000 LBS. MAX SPEED 5 FPM. REMOTELY CONTROLLED. ALL STAINLESS STEEL CONSTRUCTION. IT SHALL BE MOUNTED ON RAILS AND SHALL BE CAPTIVE SUCH THAT THE CAR CANNOT BE DISLODGED FROM ITS TRACK. SIZE OF THE CAR IS 8' X 8' X 16' IMPACT LIMITER, 6 IN. CYPRESS WOOD, 10 FT. WIDE & 30' LONG.
B. MANIPULATORS	8	REMOTE MANIPULATORS WITH A REACH OF 10'
C. SHIELDED LEAD GLASS WINDOWS	4	24 IN. X 24 IN. X 38 INCH T
D. AIR LOCK STATIONS	4	3 LEAF SLIDING DOOR, VERTICAL WITH AIR SEALS. OPEN/CLOSE INTERLOCKED TO TRANSPORTER LOADING PORT

B2-19

SYSTEMS & COMPONENTS	QTY	REMARKS
E. TRANSPORTER REPAIR & MAINTENANCE AREA 1. DOORS 2. TOOLS	4	A 'WARM' SHOP FOR NORMAL MAINT. OF TRANSPORTERS. DOORS SIMILAR TO ITEM D ARE USED. FULL COMPLÉMENT OF MECHANICS TOOLS REQ'D.
F. TRANSPORTER LOADING AIR LOCK	4	A SHIELDED PORT HATCH, REMOTELY OPERATED, 4 INCH LEAD, 1/2 INCH STAINLESS STEEL CLAD, 4' X 4' ON ROLLERS. PNEUMATIC CYLINDERS TO OPEN & CLOSED. AIR SEAL ON UPPER SURFACE. REMOTELY OPERATED. INTERLOCKED TO AIR-LOCK DOOR & TRANSPORTER CASK CLOSURE.
G. COOLING AIR MONITORING UNIT	1	MASS SPECTROMETER LOCATED IN THE HEALTH PHYSICS AREA. CONNECTED TO THE 'CHIMNEYS OF THE INDIVIDUAL AIR CHANNELS (32 INPUTS). DATA SHALL BE RECORDED. UNIT SHALL GENERATE SIGNALS WHICH CAN BE USED TO ACTIVATE AN EMERGENCY AIR FILTERING SYSTEM WHEN PRESENT LIMITS ARE EXCEEDED.

MODULE: AIR COOLED VAULTS

SHT. 4 OF 6

SYSTEMS & COMPONENTS	QTY	REMARKS
<p>H. EMERGENCY AIR HANDLING SYSTEM</p> <ol style="list-style-type: none">1. FANS (4)2. AIR DUCTS (2 MAIN)3. AIR DUCT DAMPERS (32)4. DUCT DAMPER ACTUATORS (32)5. CONTROL SYSTEM (1)6. HEPA FILTERS (4)7. TEMPERATURE SENSORS	4/MOD	<p>SUCTION FANS @ 50,000 CFM EACH, 1/2 PSI. ONE IN EACH CORNER OF THE FACILITY. DAMPERS LOCATED IN CHIMNEYS AND CONNECTED TO MASS SPECTROMETER SIGNAL FOR AUTOMATIC OPERATION. ALL AIR DRAWN THROUGH HEPA FILTERS PRIOR TO DISCHARGE TO ATMOSPHERE. ALL CONTROLS, INCLUDING DAMPER & FAN TEST PANELS ARE LOCATED IN ELECTRICAL EQUIPMENT ROOM. TEMP SENSORS IN CHIMNEYS SHALL PROVIDE AN AUTOMATIC OVERRIDE TO DAMPERS WHEN CRITICAL CANISTER TEMPERATURE REACHED.</p>

B2-21

MODULE: ACV		SHT. 5 OF 6
SYSTEMS & COMPONENTS	QTY	REMARKS
I. CANISTER TRANSPORTER	4 (1ST MODULE ONLY)	SHIELDED, CASK; 4-6 INCHES LEAD EQUIVALENT SHIELDING. CASK MOVEMENT X, Y & Z DIRECTIONS. CANISTER HOIST AND GRAPPLE LOCATED INSIDE THE CASK OR CABLE PASSED THROUGH OPENING AT TOP OF CASK. HOIST ABOUT 5T CAPACITY. 2ND HOIST REQUIRED TO HOIST SLEEVE PLUG FROM SLEEVE; USES SAME GRAPPLE TYPE. CASK MUST HAVE A REMOTELY-CONTROLLED CLOSURE: INTER-LOCKED TO CANISTER TRANSPORTER PORT AND Z HEIGHT (I.E. CANNOT BE OPENED UNLESS MATED TO TRANSFER PORT OR STORAGE SLEEVE). THE CASK SHALL BE EQUIPPED WITH AN EXTERNAL HEAT EXCHANGER COIL WHICH CAN BE CONNECTED TO PLANT WATER FOR EMERGENCY COOLING.

82-22

SYSTEMS & COMPONENTS	QTY	REMARKS
J. PLANT WATER SYSTEM - EMERGENCY TRANSPORTER COOLING	6 (3 EACH BAY)	SIX SUPPLY RETURN SYSTEMS REQUIRED. 2 INCH LINE SIZE, 55 FT OF FIRE HOSE FOR SUPPLY AND 55 FT. FOR RETURN AT EACH STATION. HOSES SHALL BE EQUIPPED WITH QUICK DISCONNECTS.
K. STORAGE SLEEVE ALIGNMENT SYSTEM 1. GRID MARKS ON FLOOR 2. ALIGNMENT PINS ON TRANSPORTER 3. TARGETS ON FLOOR 180° THROUGH STORAGE SLEEVE (2 PER SLEEVE) 4. OPTICAL ALIGNMENT TV SYSTEM ON TRANSPORTER (2) 5. MONITOR-TV, LOCATED IN TRANSPORTER DRIVERS COMPARTMENT	--	EACH FACILITY TO BE MARKED WITH A SERIES OF MARKS TO WHICH THE TRANSPORTER OPERATOR CAN ALIGN THE VEHICLE. OPTICAL TARGETS NEXT TO EACH STORAGE SLEEVE ARE NECESSARY FOR FINAL CASK ALIGNMENT. T.V. CAMERAS SHALL BE MOUNTED TO CASK AND IN ALIGNMENT WITH TARGETS.

B2-23

SYSTEMS & COMPONENTS	QTY	REMARKS
A. SHIP	AS SPECI- FIED	3000 DWT MINIMUM
B. HEAVY LIFT CRANES	2	125 TONS, SHIP BOARD, REDUNDANT HOOK & REEVING
C. DOCK STABILIZERS	2	WATTS LINKAGE FROM SHIP TO DOCK TO PREVENT SHIP ROTATION DURING CASK HOISTING.
D. CASK SLINGS *TWO ARE REQUIRED/SHIP - ONE EACH FOR EACH REACTORS' USE WHEN LOADING AN EMPTY CASK AT UTILITY	2* (4)	125 T, BEAM TYPE, 4 ARM, FABRICATED FROM TYPE 304L STAINLESS STEEL
	2* (4)	30 T, BEAM TYPE, 4 ARM, FABRICATED FROM TYPE 304L STAINLESS STEEL.
E. DYNAMOMETER	4	50 T EACH. CONNECT TO EACH ARM OF THE SLING FOR LOAD MEASUREMENT DURING PROOFLOAD.
F. WATER PROOF HATCH COVERS	AS REQD.	USED TO KEEP SALT WATER FROM SHIPS HOLD
G. RAIL MOUNTED SHIP GANTRY CRANE	1	10 TON CRANE FOR SMALL EQUIPMENT HANDLING
H. AIR HANDLING SYSTEM LOWER DECK	1	MOVE 25,000 CFM AIR THROUGH TRUCK CASK TRANSPORT HOLD. HEPA FILTERS REQUIRED ON EFFLUENT STREAM.

MODULE: SHIP

SHT. 2 OF 3

SYSTEMS & COMPONENTS	QTY	REMARKS
<p>I. RAIL CASK COOLING SYSTEM</p> <p>1. HEAT EXCHANGERS (2)</p> <p>2. PUMPS (2)</p> <p>3. DEMINERALIZED WATER (10,000 GALLONS)</p> <p>4. HOSES & Q.D'S (8)</p> <p>5. MANIFOLD (2)</p>	2	<p>DEMINERALIZED WATER WILL BE CIRCULATED THROUGH THE CASK OUTER JACKET COOLING SYSTEM TO KEEP THE CASK AND CONTENTS FROM EXCEEDING SAFE TEMPERATURES. EACH CASK WILL GENERATE 40,000 BTU/HR. TWO COOLING SYSTEMS FOR EACH 4 CASK LOT IS REQUIRED. HOSES WITH Q.D'S WILL CONNECT THE CASK TO THE SUPPLY AND RETURN MANIFOLDS. THE PUMPS WILL CIRCULATE THE WATER THROUGH THE HEAT EXCHANGERS AND BACK INTO THE STORAGE TANK.</p>
<p>J. AIR HANDLING SYSTEM - MAIN DECK</p>	1	<p>MOVE 50,000 CFM AIR THROUGH RAIL CASK TRANSPORT HOLD. HEPA FILTERS REQUIRED ON EFFLUENT STREAM.</p>

B2-25

B2-26

MODULE: SHIP		SHT. 3 OF 3
SYSTEMS & COMPONENTS	QTY	REMARKS
<p>K. MISCELLANEOUS</p> <ol style="list-style-type: none"> 1. LONGITUDINAL BULKHEADS @ 1/5 THE BREADTH OF SHIP @ EACH SIDE 2. DOUBLE HULLED 3. TRANSVERSE BULKHEADS 4. PERSONNEL DEION FACILITIES 5. EMERGENCY FLOODING & FIREFIGHTING SYSTEMS 6. RAD WASTE DRAINS & HEALTH PHYSICS MONITORING 7. REDUNDANT NAV. SYSTEMS 8. INCREASED HULL STRENGTH 9. FULLY REDUNDANT HEATING, COOLING & ELECTRICAL EQUIP. 10. 14 OPERATING PERSONNEL 11. CASK SEAL LEAK TEST SET 	<p>1/REACTOR SITE VISITED ON TRIP</p>	<p>MATES TO TEST PORT ON CASK CLOSURE. PULLS VACUUM AND TEST FOR PRESSURE RISE IN INTER SPACE BETWEEN CASK SEALS.</p>

MODULE: RAIL SAFEGUARDS SUPPORT CAR		SHT. 1
SYSTEMS & COMPONENTS	QTY	REMARKS
A. CABDOSE	1/TRAIN	SLEEPING, DINING, SANITATION FOR 4 GUARDS FOR 7 DAY TRIP.
B. RADIO-TELEPHONES	2/CAR	
C. C/B RADIOS (FIXED)	2/CAR	
D. C/B RADIOS (PORTABLE)	2/CAR	
E. GUARDS	4/TRIP	

B2-27

MODULE: 2500 MTU/YEAR SPENT FUEL PACKAGING

SHT. 1 OF 1

SYSTEMS & COMPONENTS	QTY	REMARKS
<u>OPERATING PERSONNEL</u>		
1 SUPERVISOR		
28 MECHANICAL TECH.		
4 SERVICE GALLERY MAINT PERSONNEL (3 MECH., 1 ELEC.)		
2 WARM SHOP MAINT PERSONNEL		
3 HEALTH/PHYSICS - COUNTING ROOM PERSONNEL		
2 MECH IN CANISTER/CAP STORAGE		
10 CRANE OPERATORS		
2 ROVING MAINT MECHANICS		
2 MECHANICS IN SAND STORAGE		
2 BASKET TRANSFER OPERATORS		
4 CRANE OPERATORS IN TEMP STORAGE AREA		
60 PER SHIFT		
180 PER DAY		

B2-28

MODULE: 500 MTHM WATER BASIN		SHT.
SYSTEMS & COMPONENTS	QTY	REMARKS
<u>OPERATING PERSONNEL</u> 2 Basket Transfer Device Operators 2 Basket Crane Operators 1 Supervisor 2 Mechanics 1 Elec. Tech. 1 Health Physics 9 Per Shift 27 Per Day		

MODULE: GEOLOGIC REPOSITORY (5000 MTU/YEAR)

SHT.

SYSTEMS & COMPONENTS	QTY	REMARKS
4 Health Physics & Count Room Opers		
4 Mechanics		
2 Elec Techs		
2 Crane Repair		
8 Basket Transfer		
2 Supervisors		
2 Crane Opers		
2 Hoist Opers		
2 Basket Transfer (Below Grade)		
1 Supervisor (Below Grade)		
2 Mech		
10 Transport Drivers		
41 Per Shift		
123 Per Day		

B2-30

B2-31

MODULE: 2500 MTU/YEAR WATER BASIN RECEIVING		SHT.
SYSTEMS & COMPONENTS	QTY	REMARKS
<u>OPERATING PERSONNEL</u> 1 Supervisor 2 Instrument/Electrical Techs. 2 Mechanics 1 Health/Physics 5 Cask Prep. Mechanics 2 Cask Crane Operators 4 Fuel Handling Machine Operators 1 Physics Tech. (Sipping) 4 Mech. (Pre-prep in Parking Area) 2 Forklift/Mobile Crane Operators <hr/> 24 Per Shift 72 Per Day		

MODULE: GEOLOGIC REPOSITORY (2500 MTU/YEAR)		SHT.
SYSTEMS & COMPONENTS	QTY	REMARKS
<u>SYSTEM OPERATING PERSONNEL</u>		
3 Health Physics & Count Room Oper.		
1 Crane Repair		
4 Canister Basket Transfer Operers.		
3 Mechanics		
1 Elec. Tech.		
1 Crane Operator		
2 Hoist Operators		
2 Canister Basket Opers (Below Grade)		
1 Supervisor (Below Grade)		
1 Supervisor		
2 Mech (Below Grade)		
5 Canister Transporter Drivers		
26 Per Shift		
78 Per Day		

MODULE: 5000 MTU/YEAR SPENT FUEL PACKAGING

SHT. 1 OF 1

SYSTEMS & COMPONENTS	QTY	REMARKS
<p><u>OPERATING PERSONNEL</u></p> <p>2 SUPERVISORS</p> <p>56 MECH TECHS</p> <p>6 SERVICE GALLERY MAINT PERSONNEL (4 MECH, 2 ELEC)</p> <p>4 WARM SHOP MAINT PERSONNEL</p> <p>4 HEALTH/PHYSICS - COUNTING ROOM PERSONNEL</p> <p>2 MECH IN CANISTER/CAP STORAGE</p> <p>20 CRANE OPERATORS</p> <p>4 ROVING MAINT MECHANICS</p> <p>2 MECHANICS IN SAND STORAGE</p> <p>4 BASKET TRANSFER OPERATORS</p> <p>4 CRANE OPERATORS IN TEMP STORAGE AREA</p> <p>108 PER SHIFT</p> <p>324 PER DAY</p>		

B2-33

MODULE: AIR COOLED VAULT (2500/YEAR - 500 MTHM STORAGE)

SHT.

SYSTEMS & COMPONENTS	QTY	REMARKS
<p><u>OPERATING PERSONNEL</u></p> <p>1 Supervisor</p> <p>2 Basket Transfer Operators</p> <p>2 Transfer Port Operators</p> <p>1 Health Physics Tech.</p> <p>1 Mechanic</p> <p>2 Transporter Drivers</p> <p>9 Per Shift</p> <p>27 Per Day</p>		

APPENDIX C TECHNOLOGY REVIEW

This appendix contains a breif review of the current technology required to transport, store, and reprocess spent nuclear fuel. Data was generally obtained from the ERDA 76-43 series of documents.

C1.0 TECHNOLOGY REVIEW

C1.1 TECHNOLOGY PREMISE

A major concern, in the conceptualizing and cost estimating of the Global Spent Fuel Logistics Systems (GSFLS) Components, is the assessment of the technology and the future state-of-the-art. If future technology gains are predicted and used, then concept design and subsequently the cost estimates for a concept would be difficult to obtain and would be subject to a wide variance. If, however, current state-of-the-art technology is used in the conceptual designs then reasonably accurate concept designs can be provided with more accurate cost estimating a final result. It was decided in the project planning state to utilize the state-of-the-art technology.

Once the decision was made to use the current technology then it was necessary to search out specific data for each of the concept components. The best information, currently available, is found in the ERDA 76-43 document series: All of the GSFLS components are found in this five volume series. Supplemental information and data would be obtained from the literature on an as required basis.

The basic GSFLS components were categorized into four major groupings:

- a) Transportation of spent fuel
- b) Interim storage of spent fuel/waste
- c) Permanent storage of spent fuel/waste
- d) Reprocessing of spent fuel

A technology assessment for each of the groupings is presented in the following sections. Such characteristics as design times, construction time, specific maintenance requirement and any potential or unresolved problems are noted.

C1.2 TRANSPORTATION

C1.2.1 Casks

After irradiation in a reactor, nuclear fuel is usually cooled in the reactor storage pool for a minimum of 120 days. Subsequent to this minimum cooling time the spent fuel will either be shipped to an interim storage pool, a geologic repository or to a reprocessing plant. The spent fuel assemblies contain unburned fuel, activated structural materials, transuranic elements and large amounts of highly radioactive fission products. The natural decay of the radioactive species generates large quantities of heat. Spent fuel casks must provide shielding which limits radiation to a safe level and must have a large heat removal system.

The technology to transport spent fuel from the current generation of reactors exists today. Spent fuel casks are available that can be used to transport fuel with the maximum exposure after the minimum cooling time: Casks are available for both truck and rail transport. Most of the current cask designs will accept either PWR or BWR fuel by utilizing a special basket inside the cask; some, however, are designed to carry only one or the other fuel assembly types. Table C-1 contains a listing of casks which are in design, in construction, or available for use. They are representative of the state-of-the-art in cask design and construction. Some utilize a liquid-filled cavity for heat transfer while others use a dry cavity which depends upon internal convection and radiation to remove heat from the spent fuel assemblies.

Spent fuel casks must conform to handling capabilities at the reactor spent fuel storage basin and at the spent fuel's final destination. The spent fuel will be loaded into and out of the cask underwater and it must be compatible with these underwater operations. Casks must be designed to facilitate decontamination before being transported off-site, whether empty or full.

Table C-1: Spent Fuel Cask Profile ¹⁾

TYPE	NTL 2	NTL 3	NTL 4	NTL 5	NTL 8	NTL 9	NTL 10	NTL 11	NTL 12	NTL 14	EXL 13/3A	EXL 14	SGHWR
COMPETENT AUTHORITY APPROVAL NO.	F59	1106	1132	1124		F 136A		1146		1154	1126/1141	1147	1120
OWNER	NTL	NTL	NTL	NTL	NTL	NTL	NTL	NTL	NTL	NTL	BNFL	BNFL	UKAEA
CAPACITY PWR (ASSEMBLIES/mm) BWR (ASSEMBLIES/mm)	4/200 9/114	7/200 —	7/200 19/114	7/200 12/140	3/215 —	— 7/140	12/230 —	7/215 17/140	12/215 30/140	5/230 —	5/215 14/140	5/215 14/140	2/197 10/127 ^b
THERMAL CAPACITY (kW)	15	30	35	35	35	25	100	42	100	50	30	40	20
TOTAL WEIGHT (t)	32	52	65	69	36	34	104	75	95	82	72/72.5	100	45
PAYLOAD (t · U)	1.1	2.0	2.3	2.3	1.4	1.4	6.2	3.3	5.7	2.7	2.7	2.7	1.8
CAVITY LENGTH (mm) CAVITY DIAMETER (mm)	3875 440 □	3380 864	4370 864	4675 864	4280 3 x 230 □	4520 474	5050 1220	4630 914	4580 1220	5160 914	4674/4776 864	4887 914	4420 610
PRIMARY COOLANT	AIR	WATER	WATER	WATER	AIR	AIR	AIR (WATER)	WATER	AIR (WATER)	WATER	WATER	WATER	WATER
PRIMARY MODE OF TRANSPORT	ROAD	RAIL	RAIL	RAIL	ROAD	ROAD	RAIL	RAIL	RAIL	RAIL	RAIL	RAIL	RAIL/ ROAD
APPROVAL STATUS	LICENSED	LICENSED	LICENSED	LICENSED	LICENSED	LICENSED	PENDING	LICENSED	PENDING	LICENSED	LICENSED	PENDING	LICENSED
FLASKS OPERATING	2	3	1	1	2	2	—	—	—	—	3/4	—	1
FLASKS UNDER CONSTRUCTION/ ORDERED	—	1	—	—	—	—	1	2	1	2	—	PENDING	—

1) REFERENCE: REGIONAL NUCLEAR FUEL CYCLE CENTERS REPORT (IAEA, VIENNA 1977)

Table C-1: Spent Fuel Cask Profile ¹⁾

TYPE	NFS-4	NLI 1/2	TN-8	TN-9	IF-300	NLI 10/24
COMPETENT AUTHORITY APPROVAL NO.	6698	9010	9015	9016	9001	9023
OWNER	NFS NAC	NLI	TNY	TNY	GE	NLI
CAPACITY PWR (ASSEMBLIES/mm) BWR (ASSEMBLIES/mm)	1/215 2/140	1/215 2/140	3/215 —	— 7/140	7/215 18/140	10/215 24/140
THERMAL CAPACITY (kW)	11	11	35	25	61	70
TOTAL WEIGHT (t)	22	22	36	34	64	91
PAYLOAD (t . U)	0.5	0.5	1.4	1.4	3.5	4.7
CAVITY LENGTH (mm) CAVITY DIAMETER (mm)	4521 343	4521 321	4280 3 x 230 Φ	4520 474	4578 953	4559 1143
PRIMARY COOLANT	WATER	AIR	AIR	AIR	WATER	AIR/He
PRIMARY MODE OF TRANSPORT	ROAD	ROAD	ROAD	ROAD	RAIL	RAIL
APPROVAL STATUS	LICENSED	LICENSED	LICENSED	LICENSED	LICENSED	LICENSED
FLASKS OPERATING	6	3	—	—	4	—
FLASKS UNDER CONSTRUCTION/ORDER	—	—	2	3	—	4

1) REFERENCE: REGIONAL NUCLEAR FUEL CYCLE CENTERS REPORT (IAEA, VIENNA 1977)

The technology to safely and efficiently transport irradiated LWR fuel is currently available. Casks designed and constructed in the near future will be replicas of or variations of currently available casks. The major construction thrust will be the production of a sufficient number of units to meet the needs of a growing nuclear power industry. Long term developments in spent fuel cask design may include the following:

- a) Development of casks capable of transporting a larger number of fuel assemblies,
- b) Development of casks for higher burnup, shorter cooling time fuel,
- c) Improvements in safety and handling features. Safety-related design efforts will mainly attempt to reduce cask weights while providing the same high degree of transportation safety,
- d) Improvements in neutron shielding to provide adequate shielding at decreased weights,
- e) Development of intermodal transportation systems utilizing air and sea transport.

C1.2.2 Land Transporters

Each of the spent fuel casks, of C1.2.1, is transported on a special, unique vehicle peculiar to that cask. Highway transporters are limited to 73,200 GCVW in most states although the federal government is attempting to increase the allowable load limitations to 80,000 GCVW. The advances made in highway transport will closely align with new cask development to increase the payload capabilities of the transportation system. Both the materials and the technology exist to provide light weight transporters which can accept heavier casks.

Rail transporters are currently equal to the task of transporting large shielded casks. Rail could probably be used to handle even larger casks if they were available. However, most reactors are not able to handle a cask larger than 100 T. It is expected, then, that the rail transporters themselves will experience very little change in the next few years. Unfortunately, rail transport of spent nuclear fuel is not highly regarded among the railroads. Although a recent court decision directed that owners treat spent nuclear fuel in the same manner as any other cargo, it is to be expected that special routings, dedicated trains and some tariffs will exist to hamper rail transport.

C1.2.3 Air Transporters

Air shipment of spent fuel casks is not expected to prove beneficial. There are only a handful of aircraft which are capable of lifting the weight of a fully loaded spent fuel cask. In addition to the payload capacity of the aircraft, there are two additional major problems to overcome. The first is to get the cask into the aircraft through a doorway, and the second is distributing the cask weight over a sufficient amount of deck space to prevent localized floor failure. The largest commercially available aircraft is the B-747. One of the models would meet the payload capacity requirement. Boeing is currently selling an aircraft which has a taxi-weight of 823,000 pounds which can carry a payload of 231,000 pounds. The range for this configuration would be a nominal 3,000 miles. This diminished range would require many intermediate stops for refueling between the Pacific community and the United States. These stops would require third party agreements to allow the landing of the aircraft for refueling. Needless to say, the disaster potential is great.

C1.2.4 Sea Transportation

Sea transportation of spent nuclear fuel is an accomplished fact. Fuel has been shipped from both Italy and Japan to Europe for some number of years.

Currently, there are no special requirements which are imposed on commercial carriers except when they must move in coastal waters. Japan has, so far, adopted the most stringent of these requirements. These are listed below:

- a) Longitudinal bulkheads at one fifth the breadth of the ship at each side,
- b) Double hulled,
- c) Transverse bulkheads,
- d) Personnel decontamination facilities,
- e) Emergency flooding and firefighting systems,
- f) Radioactive waste drains and health/physics monitoring,
- g) Redundant navigation systems,
- h) Increased hull structural strength,
- i) Fully redundant heating, cooling and electrical systems.

The minimum size of ship, for intercontinental shipments has been suggested as 3000 DWT. This is a small ship, but it is still acceptable for long range shipments. Although the requirements specified above will make the ships cost considerably more, there is nothing which is beyond the current state-of-the art.

C1.3.1 Water Basins

Storage of spent fuel in water basins has been demonstrated by many years experience at reactor sites and reprocessing plants. The technology for water basin storage is well developed and demonstrated. There appears to be no technological barriers to future design of water basins for short term storage. There have been many design studies and the general consensus is that a storage facility will require 6 to 8 years to design, construct and license. If modular water basins are used then the second and subsequent water basins would require significantly less time.

No major development areas need to be addressed to meet design requirements. There, however, are some potentially beneficial areas into which profitable research might be directed. Some of them are described below:

- a) Dry cask unloading. Most concept and designs use a wet cask unloading method which subjects the outer cask surface to pool water and contamination. This requires a certain amount of time to clean-up before the cask can be returned for another load. Concepts involving dry unloading should be developed which would eliminate this problem.
- b) Spent fuel storage racks which are integral cask baskets. This would permit an entire cask load of spent fuel to be unloaded from the cask at once and placed into storage. This would eliminate a considerable amount of time, especially in unloading a large rail cask.
- c) Develop methods to quickly determine failed fuel elements. This one has two directions-sipping fuel to

find leakers and broken assemblies upon removal from the cask and the monitoring of pool water to determine radioactively and location of a newly failed element in storage.

- d) **Densification of storage.** Most storage concepts rely on geometrical storage for criticality control which requires a large pool for a certain amount of fuel. New and acceptable techniques for neutron suppression in closely spaced fuel assemblies could be developed and the costs lowered to a more nominal amount. This would allow smaller and less expensive pools to be constructed at the expense of storage racks.

C1.3.2 Air Cooled Vaults

Air cooled vaults for the storage of packaged spent fuels have not yet been designed. There are two types which could be considered: forced air cooling and natural draft. As implied, forced draft requires air pumps and filters to move air across the canisters for cooling.

The natural draft vault system requires only residual decay heat from the spent fuel and an open path for the air flow. The addition of heat to the air causes a density change. The lighter air will move upward because of the buoyant forces at some velocity. This natural flow will keep the canisters at some level of heat.

The design of such a system requires that individual chimneys be placed around each spent fuel canister to channel the air flow.

The technology status of this concept is current. There appears to be no technological barriers to design and construction of such a system. HTGR elements are currently stored in unpackaged, forced air vaults.

Air cooled vault concepts for the storage of waste have been defined. These concepts could be applied directly to the spent fuel problem. The spent fuel would have to be precooled for some time in water basins prior to air cooled storage. It has been estimated that design construction, and licensing would take 7-9 years if a go ahead were given in the immediate future.

Major new developments should be directed to the problem of confinement and basic design. Corrosion of the packaging material needs to be further evaluated in a wide range of environments.

C1.3.3 Geological Storage

Storage of spent fuel in geological formations would be similar to waste storage concepts. The disposal area for spent fuel will be about the same as that for waste if heat dissipation determines geometrical spacing. It would require more space if total number of packages define the storage area.

Any geologic facility constructed by conventional room and pillar mining methods will have the same basic features. These might include:

- o Cask receiving facilities
- o Water basins
- o Packaging facilities
- o Hoisting equipment and shaft
- o Underground receiving transport equipment
- o Man/materials shaft
- o Ventilation/filter systems
- o Excavated material handling and disposal
- o Support facilities

The basic technology to design and construct and license a geologic facility exists. The usage of the facility may be dependent upon in-site testing

and qualification. This alone could occur in as short or two - five years or as long as 20 years.

C1.3.4 Packaging Facility

Although not a storage facility this module is considered here because of the prepackaging of spent fuel prior to storage in either an air cooled vault or in geologic storage.

Packaging of spent fuel (and waste) is accomplished by placing the fuel assembly inside a container with either a solid or gaseous heat transfer medium and sealing the canister. This first canister is the second barrier for confinement. The concepts chosen for this study over pack the fuel in a second canister to begin with. It too has a heat transfer media between inner canister and outer canister. This outer canister provides a third barrier for confinement.

Most of the technology concerning packaging of spent fuel has been developed for fuels other than LWR fuels. There are no technological barriers to the design of spent-fuel packages and packaging facilities. It is estimated that two to four years would be required to verify the corrosion resistance of container materials and to optimize the canister design and loading for the particular concept. The design and construction of a packaging facility could proceed concurrently with a storage facility with an elapsed time of seven to nine years.

There are some areas in which major development should be directed:

- a) Selection of construction material for fuel element containers. Material selection should consider a cost benefit analysis for the container in a particular medium or concept.

- b) Selection of container filter. If a material other than helium is selected then long term compatability should be investigated.
- c) Calculations for PWR and BWR fuel assemblies (intact and disassembled or separated) to determine allowable package loading considering both heat removed and criticality.
- d) Advanced weld verification techniques which are useable in a high radiation, high heat environment.

APPENDIX D

This appendix contains the GSFLS Systems Requirements Computer Analysis documentation. It is presented as a stand alone document and as such has references to its own appendices: All of these are contained within the document presented as Appendix D.

Abstract

This document describes the analysis, and computer models generated to assist in the analysis, of a global-scale logistics network for transporting and storing spent nuclear fuels.

Additional documentation exists in the form of on-line computer files, magnetic tapes and card decks enabling the described programs to be compiled and run on the Boeing Computer Systems' Control Data Corporation 6600/CYBER computing system under the NOS Operating System (installed 1 Jan 1978).

The project was performed under the direction of A. Kriger, Boeing Engineering and Construction, during the period October, 1977 through January, 1978 and was funded by the U. S. Department of Energy under Letter Contract Number EN-77-C-03-1583.

Key Word List

Logistics Network

Transportation Network

Spent Nuclear Fuel

Computer Systems Model

Nuclear Fuel Cask

Global Transport Network

System Requirements Analysis

Spent Fuel Storage

Systems Analysis

Network Analysis

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SUMMARY

The GSFLS Transportation and Capital Facilities Systems Requirements Analysis is composed of two primary analysis efforts which have been combined into a set of loosely coupled computer program modules. These modules run independently as well as exchanging data to enable succeeding program modules to provide the requisite analysis results. The two primary analyses involve:

- (1) Transportation Network Analysis for the determination of transportation requirements for spent nuclear fuel over a fixed timespan or project period.
- (2) Fixed Facilities Requirements Analysis which determines the number of spent fuel water basin and air-cooled vault modules required over the same time period as above.

The analysis model and methodology employed are described in this document. The model can be used to assess spent fuel systems requirements at the country, regional or multi-regional levels. Results, including sensitivity studies and trade-off analyses, conducted to date, are discussed in detail in the Appendices to this report. The generality of the model permits it to be applied to a wider range of logistics transportation problems than those discussed herein, although some computer program modification may be required should such application be desired.

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1.0 INTRODUCTION

1.0 INTRODUCTION

1.1 Objective

The rationale behind the development of a model for a global spent fuel logistics network is to permit the rapid and easy modification of model parameters such as distance, time of facility construction, velocity of cask transporters, carrying capacities of cask transporters and other factors used as inputs to the model, observing the resulting effects such modifications have on logistics system requirements.

In this way, an optimal solution to the total set of system requirements may be approached in an iterative or heuristic manner.

In order to arrive at a least cost solution, under engineering feasibility and political constraints it is necessary to perform a further economic analysis.. The outputs from the systems requirements analysis model are, therefore, used as inputs. However, during the course of determining the logistics system operational requirements, it is possible to narrow the number of candidate scenarios substantially through the use of the systems requirements computer model without performing a detailed economic trade-off study for each and every potential scenario variation.

The computer models are sufficiently general to permit exploration of a wide range of logistics system scenarios.

1.2 System Components

The GSFLS Systems Analysis is directed at the assessment of the requirements for:

- (1) The Transportation Systems elements--number of ships, spent fuel transportation casks, cask transporters, etc.--used in moving spent fuel and transuranic wastes from one facility to another.
- (2) The Fixed Facilities required to support the quantities of spent fuel and transuranic wastes stored or reprocessed at each node of the transportation system. Facilities include:

Existing and new water basins constructed to hold spent fuel and transuranic wastes on a temporary basis for later permanent storage or reprocessing.

1.3 Analysis Approach

The most complex aspect of the analysis is in the determination of the transportation requirements--number and size of ships as well as land transport vehicle requirements and number of spent fuel transport casks. For this reason, initial analysis efforts were focussed on this aspect of the overall logistics systems network. Two computer models were postulated, a deterministic and a simulation model.

Major effort is currently being expended on the deterministic model due to its flexibility and adaptability. It was determined early in the study not to attempt an optimizing model due to the inherent complexity of closed transportation systems.

Instead, the model was designed to operate in an heuristic manner. That is, each iteration of the model provides insight into the choice of parameters for succeeding runs, thus permitting optimality to be approached as closely as desired.

Side studies exploring the sensitivities of the transportation system to varying ship sizes, transportation element utilizations, system queuing, and system operational variations were also conducted, both prior to computer model construction and in the course of model runs.

Additional side studies are possible and potentially desirable in the areas of system queuing effects, ship sizing and ship staging. The results of sensitivity studies performed to date are presented in Section 5.

After the underlying characteristics and model of the system were defined, the model was built into the Boeing computer system in order to have the ability to perform multiple runs and sensitivity analyses. Outputs from the computer model are then used as input to the financial models--also built into the Boeing computer systems.

1.4 Regional Aspects

Although the computer model is quite general, the approach taken to date has been to examine one region of the world exploring the systems requirements for this region by varying system parameters such as the siting and construction of timing of spent fuel storage facilities. The Pacific Basin countries spent fuel transport requirements were the focus of the analysis to date. However, the basis of the systems requirements model construction is multi-regional in nature.

It is expected that Global requirements will follow naturally from the multiple regional analyses once complete.

It is also possible to perform a complete set of analyses on an individual country level, for any number of countries required.

2.0 SCOPE AND CONCEPT

2.0 SCOPE AND CONCEPT

2.1 Scope of Analysis

The Systems Requirements Analysis covers the transportation system requirements and the fixed facilities requirements for the regional and Global movement of spent nuclear fuels from light water BWR and PWR reactors.

Variable inputs for each computational run include:

- (1) Reactor assembly discharge data by type of reactor, country and year under the assumption that no additional reactors are constructed beyond the year 2000.
- (2) Transportation distances, determined from field surveys and separate analysis studies for each link in the transportation system.
- (3) Transport vehicle average speeds determined through separate study.
- (4) Fuel cask loading and unloading flow times, based upon separate engineering flow analyses, for each transportation inter-transfer point and cask handling location.
- (5) Fixed facility initial dates of operation determined on the basis of engineering feasibility and other constraints.

2.2 Conceptual Framework and Global Model

The global model developed to depict the transportation linkages and fixed facilities siting is shown in Figure 1.

In general, in the "back end" of the nuclear fuel cycle, spent fuel from light water PWR or BWR reactors is discharged to an At Reactor Storage (ARS) water basin where it is held for some variable period of time before being loaded into spent fuel transportation casks and then transported to another water basin (AFR water basin) where the cask is unloaded and placed in temporary water basin storage.

The AFR water basin may be co-located with any one or more of the following:

- (1) An air-cooled storage vault (AV) for longer term storage.
- (2) Geologic Repository (GR) for permanent storage.
- (3) A Recycle Center (RC) used for reprocessing the spent fuel into new fuel assemblies for reuse. Use of this option produces waste (w_r) which is then stored either at the local WB, AV or GR or transported to a distant storage site. If all requisite storage and/or reprocessing elements are co-located, the complex of facilities is identified as a Fuel Storage or Recycle Complex (FSRC).

Figure 1.0: Global Spent Fuel Logistics System Model

Alternatively, spent fuel stored in an AFR WB may be later transported to a distant FSRC for either longer term storage or reprocessing. If this is the case, the transportation cask must be reloaded at AFR WB#1 and unloaded at AFR WB#2 at the distant FSRC.

Empty spent fuel casks are transported back to reactor sites from water basin storage/unloading locations.

The spent fuel transportation cask may travel on differing transportation carriers--R/R, ship or road transporter while in transit to and from Water Basin locations.

A degenerate FSRC is simply a water basin without additional storage and/or reprocessing capabilities.

3.0 LOGISTICS SYSTEM MODEL ANALYSIS

3.0 LOGISTICS SYSTEM MODEL ANALYSIS

3.1 Problem Analysis Discussion

The analysis of the system begins with a model basis for the most complex portion--the transportation requirements in terms of ships, airplanes, trucks and trains required to transport spent nuclear fuel from ARS WB to AFR WB. The conceptual framework for the general transportation model is depicted in Figure 2. The conceptual model shows the flow of spent fuel from reactor water basins to and through other handling, storage and reprocessing facilities. Once a transportation cask is emptied of its spent fuel or reprocessing wastes, it is returned to a reactor site or distant AFR WB for the next fuel or waste pick-up, thus effecting a closure of the system.

Reactors (spent fuel sources) may be thought of in individual terms or as aggregate spent fuel sources by country or region. The objective of the analysis is to determine the minimum transportation facilities requirements for each concept under consideration given realistic estimates of the parameters of distance, speed, location, and time as well as facilities throughput, utilization and queuing.

3.2 Overview of Transport System Operation

Starting at the left of Figure 2, the sequence of transportation system operation is as follows:

SIMPLEX TRANSPORT FROM REACTOR TO AFR
(AT TIME = t_i)

Legend:

- R - Aggregate Group of Reactors
- xfer - Point where modes of transportation are changed (e.g. Seaport)
- $F_r(t_i)$ - Rate of Spent Fuel Flow at System Nodes in year t_i
(F_r leaving reactor must = arrival rate at xfer pts and AFR)

Figure 2.0: Spent Fuel Transport Routing

- (a) Empty casks arrive by ship at the seaport dock transfer point and are moved by rail or road transporter to the At Reactor Storage Water Basin.
- (b) Fuel is unloaded from the ARS water basin, placed into a transportation cask, and loaded onto the rail or road transporter and moved to the seaport dock facility where the transportation cask is loaded onto a ship.
- (c) The ship⁽¹⁾ may either wait for casks to arrive or may load waiting casks and depart with a full load of casks from the dockside queue. (Fewer ships are required if the ship does not wait for casks to complete a round trip to and from the reactor. However, if the amount of fuel to be transported in a given period does not require that the ship be utilized fully, then the ship can afford to wait for casks to arrive, thus saving one set of casks which would otherwise need to be kept at that dock facility). The ship always carries a set of either full or empty casks in order to maximize ship utilization. Empty casks are unloaded at the same time as the full casks are loaded⁽²⁾.

-
- (1) Ship can refer to either a waterborne vessel or "airship" as indicated in the depiction.
- (2) The times required to perform these operations were determined in a set of Flow Time Analyses. (See Appendix B.)

- (d) Ships then travel to the land mass on which the AFR WB (FSRC) is located. The full casks are unloaded at a transfer facility (seaport) where they are either loaded onto a waiting transporter (train or road transporter) or wait until a transport vehicle is available. Empty casks are loaded onto the ship for transport back to another ARS WB.
- (e) While the empty casks are in transit by ship back to an ARS site, the full casks are in transit to the AFR WB at the FSRC.
- (f) The full cask arrives at the AFR WB where the spent fuel is unloaded into the water basin. The empty cask is then re-loaded onto the transporter for the return journey to the same or another transfer point.
- (g) The empty casks are moved to the transfer point where they either queue up awaiting transportation or are loaded onto a waiting ship for transportation to an ARS site.

The above operational sequence describes the transportation operation under the simplest set of circumstances and forms the basis for the analysis model.

Appendix B.2. contains the mathematical description of the transportation analysis module.

3.3 Routing from AFR WB to Other Sites

Once spent fuel has arrived at an AFR water basin site, it may later be re-transported to another site(s) if the initial AFR site has no long term storage and/or reprocessing capabilities. Additionally, wastes from reprocessing operations may be transported via cask to longer term or permanent storage sites.

These activities may occur at the same time as spent fuel shipments from ARS sites are occurring.

This, of course, greatly increases the complexity of the analysis of the requirements for transportation casks, transporters, and other handling facilities. In addition, if fixed facilities WB, AV, GR and/or RC receive spent fuel or wastes from a number of routes, queueing at cask handling areas may be increased, depending upon the relative quantities of fuel or waste arriving from these secondary routes.

Figure 3 illustrates one such case in the manner which the deterministic model treats the analysis (i.e., dual routes occurring after the year 2000, where Route 1 is the primary route and Route 2 indicates the secondary routing). Since casks are transported only from WB to WB, it is not necessary to show the co-located facilities referenced in Figure 1.

Similarly, the transportation routing sequence may be established for any number of conceptual networks employing the fixed facilities previously described.

GSFLS DETERMINISTIC MODEL
TRANSPORT AND LOGISTICS SYSTEM

TIME PERIOD: $t_1 = 1978$ to 1985

SPENT FUEL TRANSPORT RATE = $R(t_1)$, $1978 \leq t_1 \leq 1985$

SYMBOL LEGEND:

- FAR EAST REACTORS
- ▴ LAND TRANSPORT VEHICLES
- ◇ SHIP OR AIRPLANE
- ◻ AFR WATER BASIN
- ⊞ TRANSPORTATION TRANSFER POINT

TIME PERIOD: $t_2 = 1986$ to 2000

SPENT FUEL TRANSPORT RATE = $R(t_2)$, $1986 \leq t_2 \leq 2000$

TIME PERIOD: $t_3 = 2001$ to 2030

SPENT FUEL TRANSPORT RATE = $\sum_{\text{ROUTE 1}} R_i(t_3)$, $2001 \leq t_3 \leq 2030$

ROUTE 1

Figure 3.0: Cask Transport Flow Schematic

4.0 COMPUTER MODEL SUMMARY

4.0 COMPUTER MODEL SUMMARY

4.1 Problem Parameters

The movement of spent LWR nuclear fuel from reactor water basins to storage and/or reprocessing centers constitutes a problem which falls into a class of closed loop transportation/logistics systems where there exist a number of resource requirement determinants in order to effect a solution:

- (1) Time required for a set of transportation requirements to complete a trip around the network and return to the origin without queuing.
- (2) The amount of commodity carried per roundtrip for each loop in the system.
- (3) The queuing which occurs at each node or handling point in the transportation network.
- (4) The throughput (flow rate) capabilities of each commodity handling facility, including transportation transfer points.
- (5) The flow rate of the commodity entering the system and distributed through each connecting loop. In the case of the commodity Spent Fuel, the flow rate varies by year and generally increases over time.

4.2 Model Structure Summary

Prior to constructing a computer model for the spent fuel transportation logistics system, it was decided to separate the analysis into a set of semi-independent tasks, coupled by the data that was needed by each task program module. In this manner, each task could be analyzed separately and run as a logical sequence of programs. Because of the structure, it is not necessary to run all the modules at once.

The restriction on running a program module independently is that a program module dependent upon another program module may not run until the data files for the prior module(s) have been prepared for input to the dependent modules.

An overview of the interrelationships and dependency structure between the computer modules is shown in Appendix A. Appendix B contains a program description, flow chart summaries for each of the modules and the program module listings. The program modules are:

- (a) Fuel Profile (Input): Computes a year-by-year fuel profile for the country or region using individual reactor or country input data. (Two external versions were constructed as well as an internal subroutine to the Transportation Requirements Analysis module, allowing it to run as a full independent module (useful for sensitivity and trade-off analyses).

- (b) Transportation Requirements Analysis: Computes the annual operational complement needed for ships, casks, and other transporters--road or rail.
- (c) Fixed Facilities Requirements Analysis: Determines the number of on-site modules of fuel storage facilities required by year.
- (d) Major Requirements Summary Module: Determines the annual buys of the above items, taking the life cycle characteristics of each element into account, as determined by separate engineering studies.
- (e) Interface Module: Performs the following functions:
- Determines the dependent facility items based upon the major Fixed Facility requirements and timing.
 - Computes an acquisition cost spread based upon total dollar requirements by facility required.
 - Outputs a printed facilities breakdown based upon the above.
 - Creates a file of the above to be passed as input to the financial model(s).

5.0 REGIONAL EXAMPLE: PACIFIC BASIN SPENT FUEL

5.0 REGIONAL EXAMPLE: PACIFIC FUEL CYCLE CENTER W/ VAULT STORAGE

5.1 Introduction

Eleven concepts for siting and timing of fixed spent fuel storage and reprocessing facilities for spent fuel originating from Pacific Basin Countries (Japan, Korea, Taiwan, Philippines, etc.) were chosen initially for study. These concepts have been previously discussed. The siting of the fixed facilities as well as the physical characteristics of the Pacific Basin reactor sites--present and planned--determine the transportation distances and, to some extent, transportation modes. However, great latitude still remains in the choice of carrier types, sizes of ocean-going vessels and land transportation modes.

In addition, flexibility exists in the choice of scheduling schemes for the transportation carriers.

The preceding, along with the annually increasing spent fuel population affects the choice of the logistics systems elements, including the number and size of ships, casks, transporters, water basins, air-cooled storage vaults, geologic repositories, and spent fuel reprocessing facilities.

5.2 Assumptions

The following are the major system assumptions followed in the analysis and construction of the computer model:

- (1) The project life span covers the 53 years from 1978 to 2030.
- (2) No new reactors are built after year 2000 and hence no annual increments to the ARS spent fuel population occur after 2001.
- (3) Three transportation loops can adequately describe the basic transportation network. That is, no complex ship transfer of casks takes place from one size ship to another. (This possibility is explored in a side study, discussed later and in Appendix C.)
- (4) An average transportation distance from multiple reactors will sufficiently approximate the fuel-weighted distance average.
- (5) Queuing effects on transportation system requirements may be adequately accounted for by inclusion of an inflating Q factor at multiple points in the model.
- (6) Utilization of transportation facilities may be adequately accounted for in similar fashion to queuing.
- (7) Vehicle travel velocities derived from research sources adequately account for delays and accidents en route.
- (8) Dockside transfer facilities permit effective handling of spent fuel casks in accordance with engineering flow time analyses performed for the project.

- (9) No more than two different cask sizes will be transported simultaneously.
- (10) Land transport of an individual cask requires an individual transport carrier per cask (a train may be composed of any number of transport carriers).
- (11) Fuel is fully removed from fixed facility storage (WB or AV) at a linear rate and placed into new storage (AV or GR) or reprocessing facilities as they come on stream. Full drawdown from old storage is accomplished during the time span from construction of new facilities to construction of next succeeding storage facility or by the end of the project life, whichever occurs first.
- (12) Spent fuel is shipped in even amounts during each one year period of the project time span.

5.3 Fuel Inputs

Figure 4 depicts a fuel profile for the Pacific Basin region used as the initial aggregate input to the model. The initial fuel profile was derived from firm plus future projections of spent fuel growth over all Pacific Basin region countries. Countries included in the spent fuel population considered are:

Figure 4.0: Cumulative Fuel Profile: Pacific Basin

Japan	Philippines
Taiwan	Australia
Korea	Thailand
Other Pacific Basin Countries	

In order to determine the appropriate spent fuel profile to use, it was necessary to consider the age of the spent fuel to be shipped. Such factors as the desirability of maintaining full core reserves in ARS were considered as well as current ARS pool sizes and engineering factors associated with optimal fuel age for shipment by transportation cask. These factors are considered in depth in a separate volume.

However, in constructing a fuel profile for the Pacific Basin region, it was found that a desirable transportation schedule would gradually reduce the age of the spent fuel shipped from that currently in ARS storage (approximately 8 years for the oldest Pacific Basin spent fuel) to 5 year old fuel. This draw-down of existing ARS pools is depicted in the annual spent fuel shipment profile shown in Figure D-1 (Appendix D). Figure 3 depicts the cumulative spent fuel shipments for the Pacific Basin countries through the year 2030 under the fuel shipment assumption just described.

5.4 Pacific Basin Example

Using the fuel profile shown, a number of Pacific Basin cases were run using the computer model. The following describes the cask transport routing along with the computed results from one of these cases--PFCC-V (Pacific Fuel Cycle Center with Air-Cooled Vault Storage).

In the example chosen, spent fuel from Pacific Basin countries, predominantly Japan, is transported from 1978 through 1984 to storage locations in the United States. In 1985 an AFR storage facility is constructed on a mid-Pacific island. The first structure is an AFR Water Basin. In 1987 the first AFR Air Cooled Vault module is constructed. Beginning in 1990 spent fuel previously shipped to the U.S. is re-transported to the mid-Pacific AFR site. This was schematically illustrated in Figure 3.0. The computer module determines the transportation requirements in number of ships and casks on an annual system operational requirement basis; the number of major fixed facility elements operationally required; and the number of each of the previous logistics elements which must be acquired to maintain system operability conditions under certain life cycle assumptions (as follows).

LIFE CYCLE ASSUMPTIONS: PACIFIC BASIN EXAMPLE

<u>Transportation Element or Fixed Facility</u>	<u>Life (Years)</u>
● Ship	35
● Cask	20
● Cask Transporter	15
● Cask Unloading Port	Over 53
● Water Basin	Over 53
● Air-Cooled Storage Vault	Over 53
● Geologic Repository	Over 53
● Recovery Facility	Over 53

(Fifty-three years is the project time span. Any value greater than this will insure that no additional acquisitions of these capital items occurs, while

those with values less than 53 years will require replacement acquisitions during the project time span.)

A PFCC-V example case result follows (Inputs used are shown on each page preceding the individual module results. Further information on selection and use of input values are contained in Appendices A and B)

5.5 Sensitivity and Trade-Off Analysis

5.4.1 Ship Capacity and Number of Casks Required

Trade-off analyses indicates that for transoceanic shipping distances less than 2500 miles, use of smaller ships (4 cask capacity) minimizes the requirement for casks in the system. This analysis was performed prior to construction of the computer models and, therefore, the computer model does not currently contain provisions for transfer of casks from one size vessel to another since most regional fuel centers are expected to be located within or close to the 2500 mile distance from ARS sources.

See Appendix C for further discussion of these trade-offs.

5.4.2 Facility Utilization and Queuing Sensitivities

Low utilization of facilities and transportation delays or scheduling problems can have major impacts on the costs of system operation in any complex logistics network. These factors were accounted for and provided as estimates to

GSFLS TRANSPORTATION REQUIREMENTS ANALYSIS-- PFCC-V(1) JAN. 10, 1978

INPUT PARAMETERS

YEAR	YEAR	CASK	PORT	CASK	L	QUEUEING	FUEL					
START	END	UTIL	UTIL	BEG	SIZE	SHIP	SOURCE	DEST	TIME	SPAN	AMT(MTHM)	
1978	2030	.85	1.00	A	LARGE	1	.92	.98	.85	0	0	0.00
1990	2030	.85	1.00	A	LARGE	1	.92	.85	.85	1990	2030	13.76

YEAR	YEAR	CONSTANTS							
START	END	A1	A2	A3	A4	A5	A6	A7	A8
1978	2030	18.1	2.0	6.5	6.5	2.0	17.2	3.3	3.1
1990	2030	2.8	2.0	6.5	6.5	2.0	17.2	3.3	2.3

YEAR	YEAR	CASE	S/D	SHIP				SOURCE				DESTINATION			
START	END			DIST	VEL	UTIL	C	DIST	VEL	UTIL	C	DIST	VEL	UTIL	C
1978	1984	BA	12	5572.	16.	.95	4.	0.	20.	.85	4.	2394.	20.	.85	4.
1985	1986	BA	13	4100.	16.	.95	4.	0.	20.	.85	4.	0.	20.	.85	4.
1987	1989	BA	13	4100.	16.	.95	4.	0.	20.	.85	4.	0.	20.	.85	4.
1990	2030	BA	13	4100.	16.	.95	4.	0.	20.	.85	4.	0.	20.	.85	4.
1990	2030	BS	23	4300.	16.	.95	4.	2394.	20.	.85	4.	0.	20.	.85	4.

ANNUAL SYSTEM OPERATIONAL REQUIREMENTS--- PFCC-V(1) JAN. 10, 1978

YEAR	FUEL /YR	SHIP	REACTOR				AFR US				AFR CANTON				TRANS CUPS				TRANS CUPS			
			CASKS		TRANS		TRANS		CUPS		TRANS		CUPS		TRANS		CUPS		TRANS		CUPS	
			LG	SM	LG	SM	LG	SM			LG	SM			LG	SM			LG	SM		
1978	12	1	10	0	5	0	6	0	4		0	0	0		0	0	0		0	0	0	
1979	17	1	10	0	5	0	6	0	4		0	0	0		0	0	0		0	0	0	
1980	25	1	10	0	5	0	6	0	4		0	0	0		0	0	0		0	0	0	
1981	56	1	10	0	5	0	6	0	4		0	0	0		0	0	0		0	0	0	
1982	91	1	10	0	5	0	6	0	4		0	0	0		0	0	0		0	0	0	
1983	162	1	10	0	5	0	6	0	4		0	0	0		0	0	0		0	0	0	
1984	201	2	15	0	5	0	6	0	4		0	0	0		0	0	0		0	0	0	
1985	463	3	20	0	5	0	0	0	0		6	0	4		0	0	0		0	0	0	
1986	517	3	20	0	5	0	0	0	0		6	0	4		0	0	0		0	0	0	
1987	578	3	20	0	5	0	0	0	0		6	0	4		0	0	0		0	0	0	
1988	663	4	24	0	5	0	0	0	0		6	0	4		0	0	0		0	0	0	
1989	736	4	24	0	5	0	0	0	0		6	0	4		0	0	0		0	0	0	
1990	883	6	34	0	5	0	6	0	0		12	0	4		0	0	0		0	0	0	
1991	1016	6	34	0	5	0	6	0	0		12	0	4		0	0	0		0	0	0	
1992	1240	7	39	0	5	0	6	0	0		12	0	4		0	0	0		0	0	0	
1993	1505	8	43	0	5	0	6	0	0		12	0	4		0	0	0		0	0	0	
1994	1760	10	53	0	5	0	6	0	0		12	0	4		0	0	0		0	0	0	
1995	2008	11	58	0	5	0	6	0	0		12	0	4		0	0	0		0	0	0	
1996	2317	12	62	0	10	0	6	0	0		12	0	4		0	0	0		0	0	0	
1997	2549	13	67	0	10	0	6	0	0		12	0	4		0	0	0		0	0	0	
1998	2780	14	72	0	10	0	6	0	0		12	0	4		0	0	0		0	0	0	
1999	3058	16	81	0	10	0	6	0	0		12	0	4		0	0	0		0	0	0	
2000	3290	17	86	0	10	0	6	0	0		12	0	4		0	0	0		0	0	0	
2001	3516	18	90	0	10	0	6	0	0		12	0	4		0	0	0		0	0	0	
2002	3876	19	95	0	10	0	6	0	0		12	0	4		0	0	0		0	0	0	
2003	4158	21	105	0	10	0	6	0	0		12	0	4		0	0	0		0	0	0	
2004	4414	22	109	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2005	4774	24	119	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2006	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2007	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2008	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2009	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2010	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2011	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2012	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2013	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2014	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2015	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2016	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2017	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2018	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2019	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2020	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2021	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2022	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2023	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2024	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2025	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2026	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2027	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2028	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2029	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	
2030	5056	25	123	0	15	0	6	0	0		12	0	4		0	0	0		0	0	0	

GSFLS FIXED FACILITIES REQUIREMENTS ANALYSIS— PFCC-V(1)JAN.10,1978

INPUT PARAMETERS

	MODULE SIZE(MTHM)					
NEW WB	CO-LOCATED STORAGE V.	CO-LOCATED REPOSITORY	WB WITH REPOSITORY	DISTANT REPOSITORY		PERCENT WASTE FROM RECOVERY
750.00	1700.00	1000.00	750.00	1000.00		.20

YEAR START	YEAR END	LINE CODE	DESCRIPTION
1978	1984	1	REACTOR—EXIST WATER BASIN
1985	1986	2	REACTOR—NEW WATER BASIN
1987	1989	4	REACTOR—NEW WB—C. STORAGE VAULT
1990	2030	5	REACTOR—NEW WB—C.RECOVERY—C.STORAGE V
1990	2030	11	EXIST WB—NEW WB—C.RECOVERY—C.STORAGE V

ANNUAL SYSTEM OPERATIONAL REQUIREMENTS-- PFCC-V(1).JAN. 10, 1978

YEAR	NEW FSRC						DISTANT FSRC	
	WB	REP	SV	RECOVERY	WASTE	CUM WASTE	WB	REP
	MOD	MOD	MOD	AR			MOD	MOD
1978	0	0	0	0.	0.	0.	0	0
1979	0	0	0	0.	0.	0.	0	0
1980	0	0	0	0.	0.	0.	0	0
1981	0	0	0	0.	0.	0.	0	0
1982	0	0	0	0.	0.	0.	0	0
1983	0	0	0	0.	0.	0.	0	0
1984	0	0	0	0.	0.	0.	0	0
1985	1	0	0	0.	0.	0.	0	0
1986	2	0	0	0.	0.	0.	0	0
1987	2	0	1	0.	0.	0.	0	0
1988	1	0	2	0.	0.	0.	0	0
1989	1	0	2	0.	0.	0.	0	0
1990	1	0	2	956.	191.	191.	0	0
1991	1	0	2	1089.	218.	409.	0	0
1992	1	0	3	1313.	263.	672.	0	0
1993	1	0	3	1579.	316.	987.	0	0
1994	1	0	3	1833.	367.	1354.	0	0
1995	1	0	3	2081.	416.	1770.	0	0
1996	1	0	3	2390.	478.	2248.	0	0
1997	1	0	4	2622.	524.	2772.	0	0
1998	1	0	4	2853.	571.	3343.	0	0
1999	1	0	4	3131.	626.	3969.	0	0
2000	1	0	5	3363.	673.	4642.	0	0
2001	1	0	5	3589.	718.	5360.	0	0
2002	1	0	5	3949.	790.	6149.	0	0
2003	1	0	6	4231.	846.	6995.	0	0
2004	1	0	6	4487.	897.	7893.	0	0
2005	1	0	7	4847.	969.	8862.	0	0
2006	1	0	7	5129.	1026.	9888.	0	0
2007	1	0	8	5129.	1026.	10914.	0	0
2008	1	0	8	5129.	1026.	11940.	0	0
2009	1	0	9	5129.	1026.	12965.	0	0
2010	1	0	10	5129.	1026.	13991.	0	0
2011	1	0	10	5129.	1026.	15017.	0	0
2012	1	0	11	5129.	1026.	16043.	0	0
2013	1	0	11	5129.	1026.	17068.	0	0
2014	1	0	12	5129.	1026.	18094.	0	0
2015	1	0	12	5129.	1026.	19120.	0	0
2016	1	0	13	5129.	1026.	20146.	0	0
2017	1	0	14	5129.	1026.	21172.	0	0
2018	1	0	14	5129.	1026.	22197.	0	0
2019	1	0	15	5129.	1026.	23223.	0	0
2020	1	0	15	5129.	1026.	24249.	0	0
2021	1	0	16	5129.	1026.	25275.	0	0
2022	1	0	16	5129.	1026.	26300.	0	0
2023	1	0	17	5129.	1026.	27326.	0	0
2024	1	0	17	5129.	1026.	28352.	0	0
2025	1	0	18	5129.	1026.	29378.	0	0
2026	1	0	19	5129.	1026.	30403.	0	0
2027	1	0	19	5129.	1026.	31429.	0	0
2028	1	0	20	5129.	1026.	32455.	0	0
2029	1	0	20	5129.	1026.	33481.	0	0
2030	1	0	21	5129.	1026.	34507.	0	0

GSFLS MAJOR REQUIREMENTS ACQUISITION SUMMARY— PFCC-V(1) JAN. 10, 1978

INPUT PARAMETERS

SHIPS	CASKS		TRANSPORTERS		CUPS	WATER BASIN	STORAGE VAULT	REPOSITORY
	LARGE	SMALL	LARGE	SMALL				
35.	20.	20.	15.	15.	60.	60.	60.	60.

MAJOR ELEMENT ANNUAL ACQUISITION SCHEDULE— PFCC-V(1)JAN.10,1978

YEAR	SHIPS	CASKS		TRANSPORTERS		CUPS	WATER BASIN (750.)	STORAGE VAULT (1700.)	REPOSITORY (1000.)
		LARGE	SMALL	LARGE	SMALL				
1978	1	10	0	11	0	4	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0
1984	1	5	0	0	0	0	0	0	0
1985	1	5	0	6	0	4	1	0	0
1986	0	0	0	0	0	0	1	0	0
1987	0	0	0	0	0	0	0	1	0
1988	1	4	0	0	0	0	0	1	0
1989	0	0	0	0	0	0	0	0	0
1990	2	10	0	6	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0
1992	1	5	0	0	0	0	0	1	0
1993	1	4	0	11	0	0	0	0	0
1994	2	10	0	0	0	0	0	0	0
1995	1	5	0	0	0	0	0	0	0
1996	1	4	0	5	0	0	0	0	0
1997	1	5	0	0	0	0	0	1	0
1998	1	15	0	0	0	0	0	0	0
1999	2	9	0	0	0	0	0	0	0
2000	1	5	0	6	0	0	0	1	0
2001	1	4	0	0	0	0	0	0	0
2002	1	5	0	0	0	0	0	0	0
2003	2	10	0	0	0	0	0	1	0
2004	1	9	0	5	0	0	0	0	0
2005	2	15	0	6	0	0	0	1	0
2006	1	4	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	1	0
2008	0	4	0	11	0	0	0	0	0
2009	0	0	0	0	0	0	0	1	0
2010	0	10	0	0	0	0	0	1	0
2011	0	0	0	5	0	0	0	0	0
2012	0	5	0	0	0	0	0	1	0
2013	1	4	0	0	0	0	0	0	0
2014	0	10	0	0	0	0	0	1	0
2015	0	5	0	6	0	0	0	0	0
2016	0	4	0	0	0	0	0	1	0
2017	0	5	0	0	0	0	0	1	0
2018	0	15	0	0	0	0	0	0	0
2019	1	9	0	5	0	0	0	1	0
2020	1	5	0	6	0	0	0	0	0
2021	0	4	0	0	0	0	0	1	0
2022	0	5	0	0	0	0	0	0	0
2023	1	10	0	11	0	0	0	1	0
2024	0	9	0	0	0	0	0	0	0
2025	2	15	0	0	0	0	0	1	0
2026	0	4	0	5	0	0	0	1	0
2027	1	0	0	0	0	0	0	0	0
2028	1	4	0	0	0	0	0	1	0
2029	2	0	0	0	0	0	0	0	0
2030	1	10	0	6	0	0	0	1	0

the model. Estimates for utilization were found in prior studies of the Nuclear Spent Fuel Cycle. Queuing effects on the system are uniquely dependent upon the structure of the logistics network postulated and cannot be easily determined except through detailed analysis. However, the limited analysis of queuing effects performed to date indicates that the combined effects of utilization and queuing on the transportation requirements could be quite substantial, particularly if low facilities utilizations are found in combination with large and variable system delays.

However, project cost studies on total systems costs, including both transportation and fixed facilities provide some evidence that, due to the relatively minor cost impacts of the transportation elements, total system cost sensitivity to utilization and queuing effects will probably not exceed +10% except under unusual operational circumstances. Further study in this area is indicated by results to date.

For additional information, see Appendix C.2.

APPENDICES

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APPENDIX A: COMPUTER PROGRAM MODULE STRUCTURE

1.0 MODEL STRUCTURE OVERVIEW

The computer program modules were constructed separately using the Fortran computer language for all modules except one version of the spent fuel module which was written using the BASIC programming language.

In addition, there exists a spent fuel subroutine in the transportation module which permits this module to run as a completely independent entity if desired. The spent fuel subroutine in the spent fuel module is based upon a set of equations which are separately entered rather than on tabular input data. Therefore, it is necessary to create the requisite equations if it is desired that the transportation requirements module be run independently.

The interrelationships and dependency structure between program modules are shown in Figure A-1.

2.0 CAPABILITIES

Each module--Spent Fuel, Transportation Requirements, Fixed Facility Requirements, Major Requirements Summary and Equipment Breakdown/Interface--was constructed to determine the logistics system requirements at either of the following levels:

LOGISTICS SYSTEMS
REQUIREMENTS MODELLING

Figure A-1: System Requirements Computer Model Structure

(1) Single reactor to single AFR.

(2) Multiple reactors to single AFR where a multiple reactor siting could be a country or regional siting. (If a country or regional aggregate of reactors is used, it is necessary to determine an average transportation distance to the transoceanic transfer point prior to entering the distance parameter information for the reactor transport loop.)

In addition, transportation to secondary AFR's or reshipment to prior storage locations is also accounted for in the model.

The model structure allows many parameters to be varied, permitting exploration of numerous complex logistics system networks, summarizing the requirements for both transportation and fixed facilities elements. The transportation and fixed facilities element characteristics were explored in great depth prior to the computer model construction and were based upon engineering constructs discussed in the other volumes of this study. All numbers and parameters used in the construction of the computer model were carefully researched and checked prior to final runs. A complete list of references used will be found in the last volume of the study. Appendix B contains a description of each program module along with the inputs and flow relationships within each module. Also refer to Section 5 for output examples. A sample tryout data file lay-out used to set-up case runs as shown in Table A1.

Table A-1: Sample Input Data File Layout

CONCEPT TITLE (10 CHAR.)	TIME PERIOD	LINE CODE	SOURCE DESIGNATION TITLES 110 CHAR EACH	SOURCE TO SEAPORT		SEAPORT TO SEAPORT		SEAPORT TO DEST INATION		WAIT FACTOR N, M, P	SHIPMENT SOURCE SHIPMENT DEST TRANS SHIPMENT	CASK SIZE	QUEUING		PORTAL MODULE E, S, L, A, OR B	ANNUAL FUEL DRAW DOWN	CONSTANTS								UTILIZATION				WANT SUMMARY YES OR NO	LIFE CYCLE										STORAGE SIZE				FUNCTIONAL RATE OF RECOVERY																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
				SITE CODE	S D	DIST	VEL	DIST	VEL				DIST	VEL			Q SHIP	Q SOURCE	Q DEST.	A1	A2	A3	A4	A5	A6	A7	A8	CASK		PORT	SHIP	SOURCE	DESTINATION	SHIPS	LARGE CASKS	SMALL CASKS	LARGE TRANSP.	SMALL TRANSP.	RR ENGINES	ROAD TRACTORS	PORTS	WATER BASIN	STORAGE VAULT		REPOSITORY	CO-LOCATED		DISTANT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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PFCC V (1)	1978-1984	1	JAPAN - US	12	0	20	5672	16	2364	20	PA	1	4	4	4	LARGE	92	98	85	A	U	18.1	2.0	6.5	6.5	2.0	17.2	3.3	3.1	85	1.0	95	85	85	YES	36	20	20	15	15	15	10	60	60	60	750	1700	1000	750	1000	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	1985-1989	2	JAPAN - CANTON	13	0	20	4100	16	0	20	BA	1	4	4	4	LARGE	92	98	85	A	U	18.1	2.0	6.5	6.5	2.0	17.2	3.3	3.1	85	1.0	95	85	85	YES	36	20	20	15	15	15	10	60	60	60	750	1700	1000	750	1000	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	1990-2030	4	JAPAN - CANTON	13	0	20	4100	16	0	20	BA	1	4	4	4	LARGE	92	98	85	A	U	18.1	2.0	6.5	6.5	2.0	17.2	3.3	3.1	85	1.0	95	85	85	YES	36	20	20	15	15	15	10	60	60	60	750	1700	1000	750	1000	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	1990-2030	5	JAPAN - CANTON	13	0	20	4100	16	0	20	BA	1	4	4	4	LARGE	92	98	85	A	U	18.1	2.0	6.5	6.5	2.0	17.2	3.3	3.1	85	1.0	95	85	85	YES	36	20	20	15	15	15	10	60	60	60	750	1700	1000	750	1000	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	1990-2030	11	US - CANTON	23	2394	20	4300	16	0	20	BA	1	4	4	4	LARGE	92	98	85	A	U	13.78	2.8	2.0	6.5	6.6	2.0	17.2	3.3	2.3	85	1.0	95	85	85	YES	36	20	20	15	15	15	10	60	60	60	750	1700	1000	750	1000	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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3.0 LIMITATIONS

The model, as constructed, does not compute system queueing at transfer and loading facilities, except as entered as an input parameter determined separately prior to running the transportation requirements module. A simulation submodel has been constructed to explore this factor in depth but has not been completed to date. Consequently, it has been necessary to estimate the degree of queueing in the system based upon experience. Analysis indicates that under normal conditions, queueing effects in relation to overall transportation requirements and fixed facility costs should have minor impacts on total logistics systems requirements costs. At this time it is not possible to estimate the precise effects but they are expected to cause a variation on total system requirements costs no greater than $\pm 5\%$.

There also exist limitations regarding the extent of the network that can be analyzed using the model, as well as routing limitations on spent fuel transportation. To date, the model has provided sufficient or more than sufficient capabilities for the networks postulated. However, should there arise a need to construct a logistics network with more than a total of five (5) aggregate reactor spent fuel sources and AFR destinations, it will be necessary to extend the model. There are also potential transportation route sequences which could arise that are not accounted for within the present model context which could necessitate model extensions.

APPENDIX B

COMPUTER MODULE DOCUMENTATION AND OUTPUT RUNS

APPENDIX B: COMPUTER MODULE DOCUMENTATION

1.0 SPENT FUEL PROFILE MODULE I (BASIC PROGRAM "FUEL1")

1.1 Objective and Scope

The objective of Fuel Profile Module I is to calculate the amount of spent fuel discharged per year, or transported per year, from reactor sites as well as to determine from this basic data the following dependent items, as required:

- (1) Cumulative spent fuel discharged or transported.
- (2) Spent fuel discharged or transported can be calculated and examined on a country-by-country total basis and by any grouping of countries. It is important to note that this version of the program does not break out Futura Spent Fuel by country but can provide total Futura (and cumulative) by year for a given grouping of countries.
- (3) Based upon a cask capacity of 4.58 mthm, the program calculates caskloads of spent fuel discharged or transported per annum and cumulative, if desired.
- (4) The program also computes total and cumulative mthms of Spent Fuel per annum.

- (5) The ratio of BWR fuel discharged or shipped to total spent fuel discharged or shipped is also calculated.

1.2 Outputs

Two types of output are provided:

- (1) Report format for direct analysis and examination. (See Table B-1.)

- (2) An output file is built and passed to the Transportation and Facilities Requirements computational modules for use therein.⁽¹⁾

These outputs, as mentioned above are used as the input to succeeding computational routines.

1.3 Implementation Language

The Spent Fuel Input Module is constructed in the BASIC programming language.

(1) The Final Facilities Requirements Module shows the spent fuel quantities discharged and transported to other fixed facility locations over the years 1978 through 2030 under the assumption that no additional light water reactors become operational after the year 2000. These results and Table B-1 were used to construct Tables 4 and 5.

Table B-1: Pacific Basin Spent Fuel

YR (1)	SF/YR (2)	SF-CUM (3)	CL/YR (4)	B: TOTAL (5)
1978	13.6822	13.6882	2.98869	1
1979	30.2781	43.9663	6.61093	.452083
1980	37.6513	81.6176	8.22082	.363552
1981	86.0376	167.655	18.7855	.651851
1982	176.07	343.725	38.4433	.505329
1983	228.144	571.869	49.8131	.389988
1984	283.307	855.176	61.8574	.362369
1985	385.15	1248.33	84.0939	.526189
1986	487.62	1716.95	104.066	.55524
1987	563.166	2280.11	122.962	.588403
1988	775.117	3055.23	169.24	.535673
1989	928.408	3983.64	202.709	.522993
1990	973.632	4957.27	212.583	.488352
1991	1111.96	6069.23	242.787	.568993
1992	1343.5	7412.73	293.34	.570555
1993	1586.22	8998.95	346.336	.554922
1994	1882.47	10881.4	411.019	.593631
1995	2195.64	13077.1	479.397	.605418
1996	2357.3	15434.4	514.695	.587125
1997	2656.95	18091.3	580.12	.574718
1998	2951.17	21042.5	644.359	.583387
1999	3159.6	24202.1	689.869	.577033
2000	3420.84	27622.9	746.907	.570536
2001	3756.91	31379.8	820.286	.579515
2002	3915.2	35295.	854.848	.5758
2003	4261.35	39556.4	930.427	.574355
2004	4576.81	44133.2	999.304	.576306
2005	4763.37	48896.6	1040.04	.571615
2006	4764.89	53661.4	1040.37	.571752
2007	4312.8	58474.2	1050.83	.576015
2008	4763.37	63237.6	1040.04	.571615
2009	4766.41	68004.	1040.7	.571889
2010	4814.32	72818.3	1051.16	.576149
2011	4763.37	77581.7	1040.04	.571615
2012	4764.89	82346.6	1040.37	.571752
2013	4812.8	87159.4	1050.83	.576015
2014	4763.37	91922.7	1040.04	.571615
2015	4766.41	96689.2	1040.7	.571889
2016	4814.32	101503.	1051.16	.576149
2017	4763.37	106267.	1040.04	.571615
2018	4764.89	111032.	1040.37	.571752
2019	4812.8	115845.	1050.83	.576015
2020	4763.37	120608.	1040.04	.571615
2021	4766.41	125374.	1040.7	.571889
2022	4814.32	130189.	1051.16	.576149
2023	4763.37	134952.	1040.04	.571615
2024	4764.89	139717.	1040.37	.571752
2025	4812.8	144530.	1050.83	.576015
2026	4763.37	149293.	1040.04	.571615
2027	4766.41	154059.	1040.7	.571889
2028	4814.32	158874.	1051.16	.576149
2029	4763.37	163637.	1040.84	.571615
2030	4764.89	168402.	1040.37	.571752

NOTE:

(1) YEAR

(2) SPENT FUEL TRANSPORTED PER YEAR FROM ARS

(3) CUMULATIVE SPENT FUEL TRANSPORTED

(4) CASKLOADS TRANSPORTED PER YEAR

(5) RATIO OF BWR SPENT FUEL TO TOTAL SPENT FUEL

Input data for the module comes from spent fuel reactor assembly discharge data by reactor type by country. The data is modified to permit initial shipments from 1978 of spent fuel from reactor water basins leaving a full core storage reserve (FCR) in each reactor water basin. The existing reactor water basin reserve is gradually expanded during the project period to fix the average age of fuel shipped at 5 years by 1991, thus enabling future ARS storage basins to be constructed with average capacities equal to 5 years of spent fuel plus FCR.

The Pacific Basin tabular profile of spent fuel shipments used as input to the other deterministic model computational modules is shown on the following page. See Appendix D for a discussion of the methodology and assumptions employed in constructing the Pacific Basin Region spent fuel shipments profile.

1.4 Program Variables and Constraints

(1) FUEL1 Variable Map

X = Individual reactor discharge or spent fuel assemblies discharged or shipped--either BWR or PWR by year and by country
(two dimensions: J=reactor#; I=year#)

B = BWR and PWR Assemblies by country by year. See table below:
(two dimensions: L=country code#, M=year#)

<u>L</u>	<u>ASSEMBLY TYPE</u>	<u>COUNTRY</u>
1	BWR	JAPAN
2	BWR	KOREA
3	BWR	TAIWAN
4	BWR	PHILIPPINES
5	BWR	FUTURA
6	BWR	OTHER
7	PWR	JAPAN
8	PWR	KOREA
9	PWR	TAIWAN
10	PWR	PHILIPPINES
11	PWR	FUTURA
12	PWR	OTHER

J1 = Number of reactors by country
(one dimension: L=country code#)

A1 = Sum of BWR Fuel Assemblies over all countries by year
(one dimension: M=year#)

P = Sum of PWR Fuel Assemblies over all countries by year
(one dimension: M=year#)

T1 = BWR mthm's by country by year

(two dimensions: L=country code# per above table; M=year#)

T2 = PWR mthm's by country by year

(two dimensions: see T1)

T3 = Sum of BWR mthm's over all countries by year

(one dimension, M: see A1, P)

T4 = Sum of PWR mthm's over all countries by year

(one dimension, M: see A1, P)

T = Sum of all mthm's (T=T1+T2) by country by year

(two dimensions: see T1, T2)

T5 = Total mthm's over all countries by year

(one dimension, M: see A1, P)

C = Total cask loads of spent fuel by country by year

(two dimensions: see T, T1, T2)

T6 = Cumulative mthm's of spent fuel by country by year

(two dimensions: see T)

C1 = Cumulative cask loads of spent fuel over all countries by year
(one dimension: see T1, et al.)

R1 = Ratio of BWR fuel to total fuel, calculated from mthm's over
all countries
(one dimension, M: see T3, T4)

T7 = Total cask loads of spent fuel from all countries by year
(one dimension, M: see T5)

Y = Calculated year# for output table
(one dimension, M: see T7)

(2) Input Parameters for FUEL1

N8 = Number of countries x 2.0 (BWR plus PWR)

N1 = System starting date

N3 = Project ending date

N2 = Starting date for individual reactor or (if aggregated) country

N4 = 1st pattern of spent fuel shipments for any number of years
(see below comment for 2nd pattern)

K = 2nd pattern of shipments. (The computer program causes this pattern to be repeated until project end. 2nd pattern starts in year immediately succeeding last year of 1st pattern)

(3) Imbedded Constants

5.26 = BWR assemblies per mthm spent fuel

2.17 = PWR assemblies per mthm spent fuel

4.58 mthm's per caskload of spent fuel

1977 = Base year for computing system start-up date

2. = Factor accounting for BWR as well as PWR spent fuel assemblies for each country.

1.5 Overview Flowchart

Figure B-1 presents an overview of the computer program flow.

Figure B-1: Flow Overview: Fuel 1 BASIC Program

2.0 SPENT FUEL PROFILE MODULE-2 (FORTRAN Program "DISCPG")

2.1 Objective and Scope

The objective of the Spent Fuel Profile Module-2 is to tabulate the electric-power generating and spent fuel profiles of nuclear powerplants by country and international region. Specifically, the Spent Fuel Profile Module-2:

- (1) tabulates by year from 1977 to 2000 the total electric generating capacity of firm nuclear powerplants (those which are operating or are definitely planned to begin operation) and of projected nuclear powerplants (those which are envisioned) for each given country
- (2) tabulate for each reactor in a given country the estimated cumulative amounts of spent fuel that will be discharged to ARS and AFR storage since reactor start-up by the years 1985, 1990, 2000, and 2030.
- (3) tabulates by year from 1977 to 2030 the total annual amount of spent fuel discharged and the total annual amount of spent fuel discharged to AFR storage for both firm and projected reactors in a given country.
- (4) tabulates by year from 1977 to 2030 the total cumulative amount of spent fuel discharged and the total cumulative amount of spent fuel discharged to AFR storage for both firm and projected reactors in a given country.

- (5) performs steps (1), (3), and (4), above, but for an international region instead of a single country

2.2 Input

Input to the Spent Fuel Profile Module-2 consists of firm and projected reactor data for each country of the desired international region. Data input for each firm reactor includes the year of start-up, electric generating capacity, effective ARS pool size, core size, annual spent fuel discharge, and the year of initial discharge. Data input for each projection includes the projection year, the additional generating capacity of the projected reactors in the projection year, the rate of spent fuel discharge, and an average effective pool size. A definition of each input variable and a description of the input data-card record structure is imbedded in the program listing.

2.3 Output

Two types of output are produced by the Spent Fuel Profile Module-2:

- (1) Hardcopy reports
- (2) Disc file, which contains data to be used as input by the Transportation and Facilities Requirements computational modules

Example hardcopy report output produced by an example execution of the Spent Fuel Profile Module-2 is shown in Table B-1.1, which contains output reports

Table D-1.1(a)
GENERATING CAPACITY (GWE) - PACIFIC BASIN

COUNTRY	1985			1990		
	FIRM	PROJ	TOT	FIRM	PROJ	TOT
JAPAN-5Y-1985	21.73	4.30	26.03	21.73	38.30	60.03
REP OF CHINA-5Y-1985	5.14	0.00	5.14	5.14	4.10	9.24
REP OF KOREA-5Y-1985	1.25	.90	2.15	1.25	5.00	6.25
THAILAND	0.00	0.00	0.00	.60	1.80	2.40
PACIFIC-OTHERS	0.00	0.00	0.00	0.00	2.80	2.80
PHILIPPINES-5Y-1985	.62	.62	1.24	.62	1.86	2.48
AUSTRALIA	0.00	0.00	0.00	0.00	1.00	1.00
TOTAL	28.73	5.82	34.55	29.33	54.86	84.19

COUNTRY	1995			2000		
	FIRM	PROJ	TOT	FIRM	PROJ	TOT
JAPAN-5Y-1985	21.73	70.30	92.03	21.73	110.30	132.03
REP OF CHINA-5Y-1985	5.14	7.40	12.54	5.14	10.70	15.84
REP OF KOREA-5Y-1985	1.25	9.20	10.45	1.25	13.40	14.65
THAILAND	.60	2.80	3.40	.60	4.80	5.40
PACIFIC-OTHERS	0.00	4.80	4.80	0.00	8.80	8.80
PHILIPPINES-5Y-1985	.62	3.46	4.08	.62	5.20	5.82
AUSTRALIA	0.00	3.00	3.00	0.00	7.00	7.00
TOTAL	29.33	100.96	130.29	29.33	160.20	189.53

Table B-1.1(b)
ANNUAL SPENT FUEL PROFILE — PACIFIC BASIN

YEAR	ANNUAL DISCHARGE (MTU)			ANNUAL AFR REQMT. (MTU)		
	FIRM	PROJECTED	TOTAL	FIRM	PROJECTED	TOTAL
1977	163.	0.	163.	12.	0.	12.
1978	230.	0.	230.	12.	0.	12.
1979	318.	0.	318.	17.	0.	17.
1980	475.	0.	475.	25.	0.	25.
1981	508.	0.	508.	56.	0.	56.
1982	556.	22.	578.	91.	0.	91.
1983	618.	45.	663.	162.	0.	162.
1984	669.	67.	736.	201.	0.	201.
1985	764.	106.	870.	463.	0.	463.
1986	852.	151.	1003.	517.	0.	517.
1987	878.	349.	1227.	556.	22.	578.
1988	878.	615.	1493.	618.	45.	663.
1989	878.	869.	1747.	669.	67.	736.
1990	878.	1117.	1995.	764.	106.	870.
1991	878.	1425.	2304.	852.	151.	1003.
1992	878.	1658.	2536.	878.	349.	1227.
1993	878.	1839.	2767.	878.	615.	1493.
1994	878.	2167.	3045.	878.	869.	1747.
1995	878.	2399.	3277.	878.	1117.	1995.
1996	878.	2625.	3503.	878.	1426.	2304.
1997	878.	2985.	3863.	878.	1658.	2536.
1998	878.	3267.	4145.	878.	1889.	2767.
1999	878.	3523.	4401.	878.	2167.	3045.
2000	878.	3883.	4761.	878.	2399.	3277.
2010	878.	4165.	5043.	878.	4165.	5043.
2020	878.	4165.	5043.	878.	4165.	5043.
2030	878.	4165.	5043.	878.	4165.	5043.

Table B-1.1(c)

CUMULATIVE SPENT FUEL PROFILE —PACIFIC BASIN

YEAR	CUM DISCHARGE (1000 MTU)			CUM AFR RQMT. (1000 MTU)		
	FIRM	PROJECTED	TOTAL	FIRM	PROJECTED	TOTAL
1977	.466	0.000	.466	.042	0.000	.042
1978	.696	0.000	.696	.054	0.000	.054
1979	1.014	0.000	1.014	.071	0.000	.071
1980	1.489	0.000	1.489	.096	0.000	.096
1981	1.997	0.000	1.997	.152	0.000	.152
1982	2.553	.022	2.575	.243	0.000	.243
1983	3.171	.067	3.238	.405	0.000	.405
1984	3.840	.134	3.974	.606	0.000	.606
1985	4.604	.240	4.844	1.069	0.000	1.069
1986	5.456	.391	5.847	1.586	0.000	1.586
1987	6.334	.740	7.074	2.142	.022	2.164
1988	7.212	1.356	8.568	2.760	.067	2.827
1989	8.090	2.224	10.314	3.429	.134	3.563
1990	8.968	3.341	12.309	4.193	.240	4.433
1991	9.846	4.768	14.614	5.045	.391	5.436
1992	10.724	6.425	17.149	5.923	.740	6.663
1993	11.602	8.315	19.917	6.801	1.356	8.157
1994	12.480	10.482	22.962	7.679	2.224	9.903
1995	13.358	12.881	26.239	8.557	3.341	11.898
1996	14.236	15.506	29.742	9.435	4.768	14.203
1997	15.114	18.491	33.605	10.313	6.425	16.738
1998	15.992	21.758	37.750	11.191	8.315	19.506
1999	16.870	25.291	42.151	12.069	10.482	22.551
2000	17.748	29.164	46.912	12.947	12.881	25.828
2010	26.528	70.816	97.344	21.727	49.990	71.717
2020	35.308	112.468	147.776	30.507	91.642	122.149
2030	44.088	154.120	198.208	39.287	133.294	172.581

Table B-1.1(d)

28	6JAPAN-5Y-1985			1
1970	357	30	61	12TSURUGA B 1972
1970	340	99	40	13MIHAMA1 P 1972
1971	460	156	78	16FUKUSH1-1B 1973
1972	500	119	48	16MIHAMA2 P 1974
1974	460	156	78	16SHIMANE B 1976
1974	784	214	107	26FUKUSH1-2B 1976
1974	826	122	72	24TAKAHAMA1P 1976
1975	559	97	48	16GENKAI-1 P 1977
1975	826	122	72	24TAKAHAMA2P 1977
1976	784	182	107	26FUKUSH1-3B 1978
1976	540	119	72	17HAMAOKA1 B 1978
1976	826	134	72	24MIHAMA3 P 1978
1977	566	96	48	16IKATA1 P 1979
1977	1100	148	148	36TOKAI2 B 1979
1978	784	130	107	26FUKUSH1-4B 1980
1978	1175	150	89	30OHI -1 P 1980
1978	784	130	107	26FUKUSH1-5B 1980
1978	840	125	105	25HAMAOKA2 B 1980
1978	1175	150	89	30OHI -2 P 1980
1979	1100	165	142	33FUKUSH1-6B 1981
1980	524	81	81	18ONAGAWA-1B 1982
1981	559	80	48	16GENKAI-2 P 1983
1981	566	80	48	16IKATA2 P 1983
1982	1100	165	142	33FUKUSH2-1B 1984
1983	890	120	72	24SENDAI1 P 1985
1983	1100	165	142	33FUKUSH2-2B 1985
1984	1100	165	142	33FUKUSH2-3B 1986
1984	1100	165	142	33NIIGATA-1B 1986
1980	0	26	130	
1985	4.3	26	130	
1990	38.3	26	130	
1995	70.3	26	130	
2000	110.3	26	130	
2030	110.3	26	130	
6	4REP OF CHINA-5Y-1985			1
1978	636	120	75	20CHINSHAN1B 1979
1979	636	100	75	20CHINSHAN2B 1980
1981	985	150	114	30KUOSHENG1B 1982
1982	985	150	114	30KUOSHENG2B 1983
1984	951	110	64	22MAANSHAN1P 1985
1985	951	110	64	22MAANSHAN2P 1986
1987	0	26	130	
1990	4.1	26	130	
2000	10.7	26	130	
2030	10.7	26	130	
2	6REP OF KOREA-5Y-1985			1
1978	595	96	56	16KORI-1 P 1979
1984	650	80	56	16KORI-2 P 1985
1984	0	26	130	
1985	.9	26	130	
1990	5	26	130	
1995	9.2	26	130	
2000	13.4	26	130	
2030	13.4	26	130	
1	12THAILAND			1
1986	600	130	78	26AO-PHAI-1- 1987
1986	0.	26.	130.	
1987	.9	26.	130.	
1989	.9	26.	130.	
1990	1.8	26.	130.	
1992	1.8	26.	130.	
1993	2.8	26.	130.	
1995	2.8	26.	130.	

1996	3.8	26.	130.		
1998	3.8	26.	130.		
1999	4.8	26.	130.		
2000	4.8	26.	130.		
2030	4.8	26.	130.		
0	16PACIFIC-OTHERS				1
1986	0.	26	130		
1987	.7	26	130		
1988	1.4	26	130		
1989	1.4	26	130		
1990	2.8	26	130		
1991	2.8	26	130		
1992	3.8	26	130		
1993	3.8	26	130		
1994	4.8	26	130		
1995	4.8	26	130		
1996	5.8	26	130		
1997	6.8	26	130		
1998	6.8	26	130		
1999	7.8	26	130		
2000	8.8	26	130		
2030	8.8	26	130		
1	12PHILIPPINES-5Y-1985				1
1983	620	90	56	18BAGAC1	P 1984
1983	0	26	130		
1984	.62	26	130		
1987	.62	26	130		
1988	.69	26	130		
1989	1.24	26	130		
1990	1.86	26	130		
1992	1.86	26	130		
1993	2.66	26	130		
1994	2.66	26	130		
1995	3.46	26	130		
2000	5.2	26	130		
2030	5.2	26	130		
0	12AUSTRALIA				1
1986	0.	26.	130.		
1987	1.	26.	130.		
1990	1.	26.	130.		
1991	2.	26.	130.		
1992	2.	26.	130.		
1993	3.	26.	130.		
1995	3.	26.	130.		
1996	5.	26.	130.		
1998	5.	26.	130.		
1999	7.	26.	130.		
2000	7.	26.	130.		
2030	7.	26.	130.		
99999	PACIFIC BASIN				

produced for the international region termed the "Pacific Basin." The countries Republic of China, Republic of Korea, Japan, Phillipines, Thailand, and Australia comprise the Pacific Basin. Output reports for each individual country of the Pacific Basin were also produced but not included in this report.

2.4 Program Variables

The Spent Fuel Profile Module utilizes two main blocks of singly-dimensioned arrays for storage of tabular data. The first block of singly-dimensioned arrays is utilized for storage of aggregate characteristics of reactors within a given country. The second block is utilized for storage of aggregate characteristics of reactors within a given international region (composed of a set of countries). Program arrays FGC, PGC, TGC, FAD, PAD, TAD, FCD, PCD, TCD, FAE, PAE, TAE, EFCD, EPCD, and ETCD comprise the former block, and arrays TFGC, TPGC, TTGC, TFAD, TPAD, TTAD, TFCD, TPCD, TTCD, TFAE, TPAE, TTAE, TEFCO, TEPCD, and TETCD comprise the latter block. The definitions of respective arrays within each block are identical except for the region of applicability (i.e., the definition of FGC is the same as the definition of TFGC except that reactor data for a singly country are stored in FGC whereas reactor data for a collection of countries are stored in TFGC). A definition of each array within the first block is given below:

$FGC(I)$ = Generating capacity (MWE) of firm reactors in year I⁽²⁾

$PGC(I)$ = Generating capacity (MWE) of projected reactors in year I

$TGC(I) = FGC(I) + PGC(I)$

$FAD(I)$ = Spent fuel discharge (MTU) of firm reactors in year I

$PAD(I)$ = Spent fuel discharge (MTU) of projected reactors in year I

$TAD(I) = FAD(I) + PAD(I)$

$FCD(I)$ = Total cumulation of spent fuel discharged (MTU) by firm reactors
by year I

$PCD(I)$ = Total cumulation of spent fuel discharged (MTU) by projected
reactors by year I

$TCD(I) = FCD(I) + PCD(I)$

$FAE(I)$ = Spent fuel (MTU) shipped to AFR storage from firm reactors by
year I

⁽²⁾ Year 1 is 1977

PAE(I) = Spent fuel (MTU) shipped to AFR storage from projected reactors
in year I

TAE(I) = FAE(I) + PAE(I)

EFCD(I) = Total cumulation of spent fuel (MTU) discharged to AFR storage
from firm reactors by year I

EPCD(I) = Total cumulation of spent fuel (MTU) discharged to AFR storage
from projected reactors by year I

ETCD(I) = EFCD(I) + EPCD(I)

2.5 Program Summary Flowchart

A flowchart which shows the general sequence of processes performed by the
Spent Fuel Profile Module-2 is shown in Figure B-1.1.

Figure B-1.1: Spent Fuel Profile Module - 2 Flow (FORTRAN Program "DISCPG")

3.0 DESCRIPTION: TRANSPORTATION REQUIREMENTS ANALYSIS MODULE (FORTRAN PROGRAM "ALOGTR")

3.1 Computation Method

The analysis in the transportation requirements module is based on combinations of a general closed transportation route. The basic route contains three loops; the land source loop, the middle transoceanic loop, and the land destination loop. Secondary routes used in transporting spent fuel from FSRC to FSRC are similarly constructed of 3 loops. Any loop can be bypassed by zeroing the distance and respective transfer and loading time constants. This is done when a route from FSRC to FSRC does not include the transoceanic loop. Specifically, the ship distances are set to zero as are A2, A3, A4 and A5 (see figure B-2). Route specific information includes; time span for the route, source and destination code, distances and velocities for the three loops, and the waiting factor. Several routes are entered sequentially if the time spans are in an increasing order. Routes that overlap in their time spans must be separated by a network structure. Structure specific information consists of; utilization factors, queuing factors, transfer and loading constants, number of casks and land transporters per ship, number of loading cranes and size of casks. In this manner, routes and structures are manipulated to construct complex transportation networks limited to five source and destination sites.

Figure B-2: Transport Routing Model Analytic Relationships

3.2 Inputs

The transportation requirements module permits flexibility by specification of input variables at run time. There are two primary types of input variables, route specific and structure specific, and five distinct card images of data. The route specific data is entered from a single 80-character card image, and the structure specific information is arranged on two card images. The first card image expected in the input deck is the title card. It contains:

- (1) concept title (allows 20 characters) ~
- (2) site headings (10 characters each) for four of the source and destination sites (REACTOR is an assumed heading)

The second card image has a flag to open the Summary Module input file followed by the life cycles of the transportation equipment (ships, large and small casks, large and small transporters, road tractors and cask unloading ports). The structure specific information is passed on the third and fourth card images and consist of: (Refer to 3.3, Constant Definitions).

- (1) L
- (2) C, T_r , T_p
- (3) cask size
- (4) queuing factors, Q_s , Q_r , Q_p

(5) portal module beginning

(6) annual spent fuel and time span when the source is not the reactor

(The annual spent fuel amount must be calculated before it can be input. It is used to draw down a cumulation of spent fuel from an AFR site and transport it to another AFR. If the draw down takes place over a time span starting in year X and ending in year Y, the annual spent fuel equals the cumulation divided by $(Y-X+1)$. This gives an even spread of the cumulated fuel over the draw down period.)

(7) time constants, A1 through A8

(8) utilization factors, U_c , U_{port} , U_s , U_r , U_p

The structure card images are followed by route definition cards. The route card image includes:

(1) the time span (year start and year end)

(2) source and destination code (five sites are available)

(3) distance for source loop, D_r

(4) velocity of source site transporter, V_r

- (5) distance for ship loop, D_s
- (6) velocity of ship, V_s
- (7) distance for destination loop, D_p
- (8) velocity of destination site transporters, V_p
- (9) wait factor at source transfer station, W_r
- (10) wait factor at destination transfer station, W_p

Several routes are defined within one structure in an increasing order respective to the time span. A route involving an overlapping time span must be included in a separate structure. Structure cards are separated from previous route cards by a route card with a starting year of zero (a blank card will suffice).

An example of an input file layout is shown in table B-2.1 (also see Section 5.4).

3.3 Constant Definitions

H_y = 8760 (hours/year)

A_l = unloading and loading time constant to remove empty casks and return full casks to transporter (hours/cask)

PFCC-V(1)JAN.10,1978AFR US AFR CANTON														
SUM	35.	20.	20.	15.	15.	15.	10.	60.						
	14.0	4.0	4.0	LARGE	.92	.98	.85	A0.0			0	0		
18.1	2.	6.5	6.5	2.	17.2	3.3	3.1	.85	1.0	.95	.85	.85		
197819841	20.0			20.		5572.		16.		2394.		20.	BA	
198519861	30.0			20.		4100.		16.		0.0		20.	BA	
198719891	30.0			20.		4100.		16.		0.0		20.	BA	
199020301	30.0			20.		4100.		16.		0.0		20.	BA	
0000														
	14.0	4.0	4.0	LARGE	.92	.85	.85	A13.76			19902030			
2.8	2.	6.5	6.5	2.	17.2	3.3	2.3	.85	1.0	.95	.85	.85		
199020302	32394.			20.		4300.		16.		0.0		20.	BB	

Figure B-2.1: Input Data File Layout : Transportation Module

- A2 = unloading and loading time constant to remove full casks from transporter and secure full casks in ships hold (hours/cask)
- A3 = departure time constant for ship (hours/trip)
- A4 = arrival time constant for ship (hours/trip)
- A5 = unloading and loading time constant to remove full casks from ships hold and place full casks on transporter (hours/cask)
- A6 = unloading and loading time constant to remove full casks and return empty casks to transporter (hours/cask)
- A7 = arrival time constant to transfer station for transporter (hours/trip)
- A8 = departure time constant from transfer station for transporter (hours/trip)
- C = number of casks carried on one ship (cask/trip)
- T_r = number of transporters at the source site required to transport the casks handled by one ship (transporters/ship)
- T_p = number of transporters at the destination site required to transport the casks handled by one ship (transporters/ship)

L = number of cranes available to load the casks per ship (cask loaders/ship)

U_c = cask utilization factor--the time percentage casks are useable for scheduled transport activities

U_{port} = cask unloading portal (cup) module utilization factor

U_s = ship utilization factor

U_r = source site transporters utilization factor

U_p = destination site transporter utilization factor

(equipment may be unuseable due to factors such as; maintenance, unexpected weather conditions, unscheduled delay of services or facilities)

Q_s = queuing factor affecting the ship

Q_r = queuing factor affecting the source site transporter arrival

Q_p = queuing factor affecting the destination site transporters

D_s = one-way distance for ship to travel between transfer stations (miles)

V_s = average ship velocity (miles/hour)

D_r = one-way distance from source site to transfer station (miles)

V_r = average velocity for source site transporters (miles/hour)

D_p = one-way distance from destination site to transfer station
(miles)

V_p = average velocity for destination site transporters (miles/hour)

W_r = waiting factor at source transfer station

W_p = waiting factor at destination transfer station

3.4 Analytic Model

The closed transportation route has been separated mathematically into three distinct loops. The land source and destination loops are dependent upon several of the ship loop determinants. The driving assumption in the transportation cycle is that the amount of spent fuel from the reactor site in a given year will be transported to a storage location in the same year.

Let SF = amount spent fuel to be transported from source to destination in a given year. (This amount is passed from the Spent Fuel Input Module when the source is the reactor site, and calculated from the cumulative spent fuel when the source is an AFR facility.)

$F = SF / (\text{mthm per cask}) = \text{caskloads of spent fuel to be transported from source to destination in a given year.}$

The number of cask unloading (cup) portal modules required at the destination facility depends on the number of caskloads delivered. The number of cups, P, is rounded to the next greatest integer divisible by two or four depending upon facility module size selected:

$$(1) \quad P = \frac{A6 \cdot F}{H_y \cdot U_{\text{port}}}$$

The ship loop determinants are now calculated within the appropriate subroutine in the Transportation Requirements Program.

$$(2) \quad t_r = \frac{2 \cdot C \cdot D_r + A1 \cdot C + A8 \cdot C}{T_r \cdot V_r} \quad \bar{T}_r$$

where t_r = time for casks to complete a round trip from transfer station to source facility in hours. Does not include any time spent waiting for ship to arrive with casks.

$$(3) \quad t_p = \frac{2 \cdot C \cdot D_p}{T_p \cdot V_p} + \frac{A6 \cdot C}{P} + \frac{A7 \cdot C}{T_p}$$

where $\frac{C}{P}$ is rounded to the next greatest integer

t_p = time for casks to complete a round trip from transfer station to destination facility in hours. Also does not include waiting time.

It is assumed that either the ship or the casks wait at the transfer station. This is indicated by the waiting factor; A signifies that the ship does not wait, the casks wait and B signifies that the ship waits. There is a waiting factor for both the source and destination transfer stations (W_r and W_p , each input as A or B). The time in the ship loop depends on the length of time the ship spends waiting. Therefore,

$$(4) \quad t_s = \frac{2(A2 + A5) \cdot C}{L} + 2 \cdot (A3 + A4) + 2 \cdot \frac{D_s}{V_s} + WSR + WSP$$

where WSR = 0, if ship does not wait, ($W_r = A$)

t_r , if ship waits, ($W_r = B$)

WSP = 0, if ship does not wait, ($W_p = A$)

t_p , if ship waits, ($W_p = B$)

t_s = time for one ship to complete a round trip from transfer station to transfer station in hours.

$$(5) \text{ The number of ships, } S = \frac{F \cdot t_s}{H_y \cdot C \cdot U_s \cdot Q_s}$$

where S is rounded to the next greatest integer

and,

$$(6) \text{ The number of casks required in the ship loop, } C_s = \frac{C \cdot S}{U_c}$$

where C_s is rounded to the next greatest integer

The number of transporters and casks required in the land loops are similarly calculated. The subscript, r , typically refers to the source variables, and p , to the desination variables.

Let:

n_r, n_p = number of ship departures between sequential cask shipment arrivals.

Then,

$$(7) \quad n_r = \frac{t_r \cdot F}{H_y \cdot C} \quad (8) \quad n_p = \frac{t_p \cdot F}{H_y \cdot C}$$

where n_r and n_p are rounded to the next greatest integers

And, let:

TX_r, TX_p = number of transporters required in the source land loop destination.

Then,

$$(9) \quad TX_r = \frac{T_r \cdot n_r}{U_r \cdot Q_r} \quad (10) \quad TX_p = \frac{T_p \cdot n_p}{U_p \cdot Q_p}$$

where TX_r and TX_p are rounded to the next greatest integers

Also, let:

C_r, C_p = number of casks required in the source loop destination.

Then,

$$(11) \quad C_r = \frac{n_r \cdot C}{U_c} \quad \text{if } W_r = A$$

$$(12) \quad C_r = \frac{n_p \cdot C}{U_c} \quad \text{if } W_p = A$$

$$C_r = 0 \quad \text{if } W_r = B$$

$$C_p = 0 \quad \text{if } W_p = B$$

where C_r and C_p are rounded to the next greatest integer

Equations (1) through (12) above suffice to represent the transportation network illustrated in figure B-2. The model now contains sufficient description to compute the transportation requirements for the movement of a given amount of spent fuel from a source to a destination. By varying the source, destination and spent fuel quantities, a transportation network is constructed and the number of ships, casks, and transporters required by year to move the fuel is accordingly computed.

Figure B-3 illustrates the program module flow relationships.

Figure B-3: Transportation Module Flow Diagram

4.0 FIXED FACILITIES MODULE (FORTRAN PROGRAM "SFFLOW")

4.1 Description

The Fixed Facilities Requirements Module calculates the number of storage modules required annually. The storage facilities include water basins, air-cooled vault facilities and geologic repositories. The number of storage modules required depends upon the cumulative amount of spent fuel. The cumulative spent fuel is calculated directly from the fuel flow sequence which is specified by a combination of routes. Routes are symbolized by numeric line code:

<u>Line Code</u>	<u>Route Description</u>
1.	REACTOR to EXISTING WATER BASIN
2.	REACTOR to NEW WATER BASIN
3.	REACTOR to NEW WATER BASIN to CO-LOCATED RECOVERY
4.	REACTOR to NEW WATER BASIN to CO-LOCATED AIR VAULT STORAGE
5.	REACTOR to NEW WATER BASIN to CO-LOCATED RECOVERY to CO-LOCATED AIR VAULT STORAGE
6.	REACTOR to NEW WATER BASIN to CO-LOCATED REPOSITORY
7.	REACTOR to NEW WATER BASIN to CO-LOCATED RECOVERY to CO-LOCATED REPOSITORY
8.	REACTOR to NEW WATER BASIN to CO-LOCATED RECOVERY to CO-LOCATED AIR VAULT to CO-LOCATED REPOSITORY (NOT IMPLEMENTED)

9. EXISTING WATER BASIN to NEW WATER BASIN to CO-LOCATED RECOVERY
10. EXISTING WATER BASIN to NEW WATER BASIN to CO-LOCATED AIR VAULT
11. EXISTING WATER BASIN to NEW WATER BASIN to CO-LOCATED RECOVERY
CO-LOCATED AIR VAULT
12. EXISTING WATER BASIN to NEW WATER BASIN to CO-LOCATED REPOSITORY
13. EXISTING WATER BASIN to NEW WATER BASIN to CO-LOCATED
RECOVERY to CO-LOCATED REPOSITORY
14. EXISTING WATER BASIN to NEW WATER BASIN to CO-LOCATED
RECOVERY to CO-LOCATED AIR VAULT to CO-LOCATED REPOSITORY (NOT
IMPLEMENTED)
15. CO-LOCATED RECOVERY (NEW WATER BASIN) to DISTANT REPOSITORY
16. NEW WATER BASIN to DISTANT REPOSITORY
17. REACTOR to DISTANT REPOSITORY
18. EXISTING WATER BASIN to DISTANT REPOSITORY
19. EXISTING WATER BASIN to (RECOVERY) to NEW WATER BASIN to
CO-LOCATED AIR VAULT

Complex transportation networks are constructed by rearranging routes and associated time spans. The specific routes chosen are restricted to those above, but any number of routes may be used. Time spans associated with routes are within the time interval, 1978-2030. A spent fuel transport network consists of routes allowing overlapping or non-sequential time spans.

The amount of spent fuel to be transported on each route affects the number of facilities modules required. When the route starts at the reactor (line codes 1-8, 17), the amount of spent fuel is passed from the Fuel Profile Module. The

routes that leave from the existing water basin (line codes 9-14, 18-19) occur any time after a route has deposited fuel there (line code 1). The annual amount of spent fuel to be transported from the existing water basin is calculated by spreading the cumulative fuel evenly throughout the time span. In this manner, the existing water basin will be empty at the end of that particular time span. Similar drawdown of spent fuel occurs when additional facilities are constructed. The assumption of spreading the cumulative spent fuel evenly throughout the drawdown holds for all routes. Since the routes are dependent on each other in this manner, certain networks are most reasonable. Several examples of route combinations used in the basic concepts are;

PFCC-V:	1	PSC-G:	1	UR&R-G:	1
	2		2		2
	4		6		3
	5		12		9
					15

(See Appendix E for additional detail.)

By manipulating the route combinations, the spent fuel transportation network is constructed. This allows access to the cumulative spent fuel in any facility at any time. With this information and the sizes of the storage modules, the facilities module requirements are computed.

PFOC-V(1)JAN.10,1978

SUM 60. 60. 60.

750. 1700. 1000. 750. 1000. .20

1978 1984 1 REACTOR—EXIST WATER BASIN

1985 1986 2 REACTOR—NEW WATER BASIN

1987 1989 4 REACTOR—NEW WB—C. STORAGE VAULT

1990 2030 5 REACTOR—NEW WB—C.RECOVERY—C.STORAGE V

1990 2030 11 EXIST WB—NEW WB—C.RECOVERY—C.STORAGE V

Figure B-3.1: Input Data File Layout: Fixed Facilities Module

4.2 Inputs

The facilities requirements module builds a spent fuel transportation network through combinations of the inputs. There are four distinct card images of input data; title card, Summary Module flag card, module size card and route card. The title card is the first card image in the input deck and allows 20 characters for an alphanumeric title. The second card image has a flag to open the Summary Module transfer file, followed by the life cycles of the water basin, air vault and repository storage modules. The third card image expected in the input deck is the module size card. It contains:

- (1) Size of new water basin module (MTU's)
- (2) Size of co-located air vault storage module
- (3) Size of co-located repository module
- (4) Size of distant water basin module
- (5) Size of distant repository module
- (6) Fractional waste after recovery

The next cards are all route cards. They are ordered such that any route dependency is satisfied. The route card consists of:

- (1) Time span (year start and year end)
- (2) Line code
- (3) 40 characters of route description

An example of the Input Data File Layout is shown in Figure B-3.1.

An overview of the program module flow relationships is shown in Figure B-4.

Figure B-4: Fixed Facilities Requirements Module Flow Diagram

5.0 MAJOR REQUIREMENTS ACQUISITION SUMMARY MODULE (FORTRAN PROGRAM "SUMMARY")

5.1 Description

The Major Requirements Acquisition Summary Module computes the major requirements acquisition schedule from the annual system operational requirements.

The major requirements include: ships, casks (large and small), transporters (large and small), cask unloading port (CUP) modules, water basin modules, air-cooled storage vault modules and repository modules.

The acquisition schedule is based on the annual operational requirements as well as the life cycle of each item. This information is passed to the Summary Module from either or both the Transportation Requirements Module and Fixed Facilities Requirements Module. The annual acquisition requirements are calculated by comparing the number of items required with the number of items in use and the items retired due to their life cycle. The algorithm involves two equations;

- (1) the number of items to acquire (A) in year n = the number of required items (C) in year n - available items (B) at end of year n-1 + items retired in year n, or

$$\begin{aligned} A_n &= (C_n - B_{n-1} + A_{n-\text{life cycle}}) && \text{if quantity is positive} \\ &= 0 && \text{if quantity is negative} \end{aligned}$$

where the subscript n indicates the year and life cycle is the number of years an item may be used.

- (2) the available items (B) at end of year n = available items at end of year n-1 less the items retired in year n plus the items acquired (A) in year n, or

$$B_n = B_{n-1} - A_{n-\text{life cycle}} + A_n$$

These equations determine the number of items to acquire annually to insure that the operational requirements are satisfied without overpurchasing.

5.2 Inputs

The Summary Module has no external inputs. Instead it depends on internal transfer file constructed by either or both the Transportation Requirements Module and Fixed Facilities Requirements Module. The second card image in the Transportation Requirements Module input deck contains:

- (1) a flag to open the transfer file, SUM
- (2) ship life cycle
- (3) cask (large and small) life cycles
- (4) transporters (large and small) life cycles

- (5) railroad engine life cycle
- (6) road tractor life cycle
- (7) CUP life cycle

Similarly, the second card image in the Fixed Facilities Requirements Module input deck contains:

- (1) a flag to open the transfer file, SUM.
- (2) water basin module life cycle
- (3) air storage vault module life cycle
- (4) repository module life cycle

If an element's life span equals or exceeds the project life time period, the life cycle input value must be greater than 53 (typically set to 60). The life cycle information is written to the transfer file with the annual system operational requirements, the module sizes and the concept title. This transfer is wholly internal. Thus the Summary Module is dependent on the transfer file and cannot be run unless the transfer file exists. The Transportation Module and Fixed Facilities Modules must be run sequentially in order to construct the complete transfer file, although either module may be run separately and generate valid summary results.

Figure B-5 illustrates the flow relationships for this module.

Figure B-5: Major Requirements Acquisition Summary Module Flow Diagram

6.0 CAPITAL EQUIPMENT BREAKDOWN AND INTERFACE MODULE (FORTRAN PROGRAM "INTF")

6.1 Description

The functions to be performed by the INTF module include:

- (1) Determining the capital equipment work breakdown structure (WBS) levels for all the dependent fixed facilities elements (i.e., dependent upon the major fixed facilities elements determined in running modules SFFLOW and SUMMARY, previously described).
- (2) Assignment of current dollar costs of acquisition, operation and maintenance to the WBS items as well as performing an investment time spread, based upon specified distribution tables, for each of the WBS items.
- (3) Preparation of both a printed hardcopy report of the WBS and a computer file of the same, to be passed to the financial models which were constructed to assess the economic and financial impacts of any number of cases run through the System Requirements Analysis model.

6.2 Current Status

The INTF module is still in the planning stage and has not yet been implemented. It is expected to be implemented early in Phase II of the GSFLS project, thus eliminating many hand calculations which are currently necessary.

APPENDIX C

SENSITIVITY AND TRADE-OFF ANALYSES

APPENDIX C: SENSITIVITY AND TRADE-OFF ANALYSES

1.0 TRADE-OFF BETWEEN SHIP SIZE AND NUMBER OF CASKS

Prior to building the computer model, the transportation systems analysis indicated a potential trade-off between number of casks carried onboard ship (which equates to ship size) and the total number of casks required in the system at any point in time. In order to explore the trade-off relationship further, distance and staging point assumptions were made about the manner in which ships could be staged from, say, individual reactor locations in Japan. From the Japanese reactor dockside loading ports, four cask capacity ships travel to a staging or intermediate transfer point where 20 cask capacity ships are then loaded for the trip to, say, the United States and there transferred to trains for transport to the AFR water basin. For comparison a second scenario was constructed in which only the four cask capacity boat is used for the entire trans-oceanic voyage. The assumptions and mathematics for these two cases follow which indicates that fewer casks are required if the four cask ship is used for the complete voyage while fewer ships are needed if a transfer to a larger vessel is performed. (However, some of these are 20 cask capacity ships and thus more expensive to acquire and operate.)

The results provide some indication that the economies gained through use of larger vessels are marginal for shorter trips, as would normally occur with a regionally located AFR facility. Trade-off analysis detail and assumptions follow.

(1) Pacific Transportation Trade-Off Scenario 1

(a) Assumptions:

- All Pacific reactors are located on ocean with port facilities capable of taking a four cask boat.
- Four casks are taken each time a boat arrives (4.6 mthm per cask -- all casks identical).
- Year is after 2005 (annual shipment rate is a constant 1000 caskloads/year of spent fuel).
- Four cask boats travel to a Pacific transfer point where they are loaded onto a 20 cask ship.
- 20 cask ships then travel to U.S. transfer point where casks are transferred to four cask trains.
- Trains travel to U.S. AFR 2000 miles from transfer point where casks are unloaded and placed into water basin.
- Recovery facility or repository is co-located with AFR.
- Empty casks are always exchanged for full casks.
- Travel times and one-way distance assumptions are shown in figure C-1A.

A: Four to Twenty Cask Transport Staging

B: Four Cask Transport W/O Staging

Figure C-1: Transport Staging

(b) Determine:

- Number of total casks required in system.
- Number of vehicles of each type required.

(c) Round-Trip Loop Times (C = number of casks per transport vehicle)

The following equations are derived from preliminary engineering flow time analyses and include the time for transportation as shown in figure C-1.

(c-1) Reactor to/fm Reactor Port --

$$20.1C + 16.1 \text{ hrs} = 4 \text{ days } (C = 4)$$

(c-2) Reactor port to/fm Far East Transfer Point (4 to 20 casks) --

$$4C + 159.3 \text{ hrs} = 7.3 \text{ days } (C = 4)$$

(c-3) Far East Transfer Point to/fm U.S. Transfer Point --

$$4C + 688.5 \text{ hrs} = 32 \text{ days } (C = 20)$$

(c-4) U.S. Transfer Point to/fm U.S. AFR W.B. --

$$7.6C + 296.7 \text{ hrs} = 13.6 \text{ days } (C = 4)$$

(d) Computation:

- (d-1) Since each transport vehicle always carries a full complement of either empty or full casks at all times, the total number of required casks in the system at any time will be:

$$TSC = C_1 B_1 + C_2 B_2 + C_3 R_1 + C_4 R_2 + \dots + C_k R_n$$

where: C_i = number casks per transporter
 B_j = boat types or capacity sizes
 R_m = land transport vehicle types or capacity sizes

- (d-2) To determine the number of different vehicles required, it is easiest to start at the U.S. AFR and work backwards to the reactor sites, using the incoming spent fuel shipment vehicles required:

- Number of required U.S. train shipments/yr =

$$\frac{1000 \text{ caskloads/yr}}{4 \text{ casks/trainload}} = 250$$

- Average interval between train arrivals at AFR =

$$\frac{365 \text{ days}}{250 \text{ shipments}} = 1.46 \text{ days}$$

- Number of U.S. trains required =

$$\frac{\text{Train Loop Time}}{\text{Inter-Arrival Interval}} = 9.3 \approx 10$$

- Since a boat arriving at U.S. can carry 20 casks, it need arrive only once every

$$\frac{20}{4} \times 1.46 = 7.3 \text{ days}$$

- Number of 20-cask capacity boats required =

$$\frac{\text{Ship Loop Time}}{\text{Ship Inter-Arrival Interval}} = \frac{32}{7.3} = 4.4 \approx 5$$

- Far East boat can carry only 4 casks.

Thus, one boat must arrive every

$$7.3 / (20 \div 4) = 1.46 \text{ days}$$

- Number of Far East 4-cask boats required =

$$\frac{\text{FE Boat Loop Time}}{1.46} = \frac{7.3}{1.46} = 5$$

Similarly, the Reactor Loop transport vehicle must arrive with four casks every 1.46 days, requiring 5 transporters.

However, there exist in reality more than five reactors and each would have its own transporter. Since we assumed an idealized loop in the Far East with one aggregate reactor, the above result tells us that, at most, five reactor transporters capable of carrying four casks each need be active at any time and only the number of casks active at any time are required in a given loop.

(e) Summary of Results:

(e-1) From (d-1) above --

$$\text{TSC} = 10(4) + 5(20) + 5(4) + 5(4) = 180$$

(e-2) A lower bound on total number of required casks is given by --

$$(f) \frac{1000}{365} \sum_{i=1}^n L_i \quad \text{where } L_i = \text{loop time for each loop in this case}$$

Therefore,

$$TSC_{\text{Lower Bound}} = \frac{1000}{365} (4 + 7.3 + 32 + 13.6)$$

$$= \frac{1000}{365} (56.9)$$

$$= \underline{\underline{156}}$$

(e-3) Number of 20 cask and 4 cask boats required may be taken directly from the above calculations:

$$\frac{20 \text{ Cask Boats}}{5} \qquad \frac{4 \text{ Cask Boats}}{6}$$

The actual number of boats and casks must be inflated by a factor to account for maintenance time required (utilization) and queuing factors.

(2) Pacific Transportation Trade-Off Scenario 2

Same as Scenario 1 except that no transfer to 20-cask boat is made. Four-cask boats travel between Far East reactor port and U.S. port. Trans-Pacific speed is assumed to be 12 mph. (Refer to figure C-1B.)

Round trip loop times change to following:

(a) Computations:

(a-1) $TSC_{1b} = \frac{1000}{365} (38.6 + 4 + 3.6) = 126 \text{ casks}$

Number of 4-cask boats required = 26

(a-2) Number of carriers required --

U.S. trains = 10

Trans-Pac boats = 26

Reactor transports = 3 (dummy number, see discussion
in Scenario 1)

(a-3) $TSC_{est} = 39 \times 4 = 156$

(b) Trade-Offs Between Scenarios 1 and 2:

		<u>Scenario 1</u>	<u>Scenario 2</u>
		4 to 20	4-Cask
		Cask Transfer	Boats Only
BOATS	4-cask	5	26
	20-cask	5	0
		<hr/>	
CASKS	Lower Bound	156	126
	Estimate	180	156

2.0 SENSITIVITY ANALYSES: SHIP WAIT/CASK WAIT, QUEUING AND UTILIZATION

(1) Discussion

In order to assess the impact on the transportation requirements of the factors outlined below, a set of sensitivity analysis runs were made, varying the factor parameters whose characteristics were under investigation. A thorough assessment of the impact of these factors has not been performed to date. However, sufficient investigation has been performed to assess the probable magnitude of impact on a given GSFLS scenario. The factors explored were:

- (a) Ship Wait/Cask Wait: A logistics scheduling system could attempt to maximize the use of ships in the system by forcing a systems management philosophy requiring ships to arrive/depart from reactor docks and AFR docks without waiting for the next succeeding set of casks to arrive. This requirement would minimize shipping delays, thus maximizing usage of ships and minimizing the need for ships.

However, in order to assure that any ship always carries a full load of either empty or full casks, it then becomes necessary to add sufficient casks to the system to enable this condition.

There exists, therefore, a trade-off between number of ships required vs. number of casks required, depending upon whether

the ship is required to wait at a dock until sufficient casks have arrived to fill the ship to capacity or whether additional casks are added to the system, forcing casks to wait at dockside for ship arrival. The necessity of the choice is forced by the mismatch which occurs in the loop times for the transoceanic and land transport loops. This effect is related to system queuing but is only a minor aspect thereof.

(2) System Queuing

In a real system, mismatching of transportation loop times and, hence, queuing occurs all the time to a much greater degree than a mismatch in average loop times, causing a lengthening of the effective time to complete a cycle from filling and transporting a cask to emptying and returning the same cask. These queuing effects are caused not only by the above discussed factor but also by servicing and handling time variations at each fixed facility in the cycle. Since time constraints have not permitted full exploration of the queuing impact, it was decided to input an estimate of the extent of queuing that might occur and observe this effect relative to a system without any queuing (except for potential ship wait/cask wait consequences). A parameter, Q , was chosen to represent the expected queuing. Transportation element equations were appropriately divided by the Q factor to effect the desired inflation of requirements due to queuing. The values of the Q factor chosen for the sensitivity studies performed to date is 0.85 vs. 1.00 (no queuing in system).

(3) Utilization of Transport Elements and Facilities

No element in a real system can be utilized 100% of the time.

Therefore, in order to more closely estimate system requirements, utilization factors were investigated. Study research indicated that a utilization of approximately 80 to 90% could be expected in system operation. Therefore, utilization factors of 0.85 and 1.00 (100% utilization) were used to explore these effects.

Two of the Pacific Basin concept scenarios, PFCC-V and UFCC-G, were included in the sensitivity analysis runs. Table C-1 summarizes the case to case run variation set-ups.

(4) Analysis of Results

From the previous analysis, it can be seen that the impacts of ship wait vs. cask wait are minimal, relative to the impacts of system queuing and utilization of facilities. In fact, if the ship wait/cask wait impacts are incorporated into the queuing impacts where they actually belong, system queuing impacts could approximate the same degree of severity as utilization of facilities. The combined effects of low utilization and erratic schedules could substantially impact the transportation requirements, perhaps trebling them in the real system over significant periods of time. However, since economic analysis show transportation costs to be relatively small in comparison

TABLE C-1: TRANSPORTATION REQUIREMENTS SENSITIVITY SET-UP VARIATIONS

CASE NO.	CONCEPT ⁽¹⁾	TIME PERIOD	SHIP/CASK WAIT ⁽²⁾	UTIL FACTOR	'Q' FACTOR
1-1	PFCC-V	1978-84	BB	0.85	1.00
		1985-86	BB	0.85	1.00
		1987-99	BB	0.85	1.00
		2000-30	BA	0.85	1.00
		----- ⁽³⁾ 2000-30	BB	0.85	1.00
1-2	PFCC-4	Same As Above	Same A Above	Same As Above	Same As Above
1-3	PFCC-V	Same As Above	BB (all times)	Same As Above	1.00 (all times)
1-4	PFCC-V	1978-84	BA	Same As Above	Same As Above
		1985-86	BA		
		1987-99	BA		
		2000-30	BA		
		----- ⁽³⁾ 2000-30	AA		
1-5	PFCC-V	Same As Above	Same As Above	0.85 (all times)	0.85 (all times)
1-6	PFCC-V	Same As Above	Same As Above	1.00 (all times)	Same As Above
1-7	PFCC-V	Same As Above	Same As Above	0.85 (all times)	Same As Above
2-1	UFCC-G	1978-84	BA	0.85	0.85
		1985-99	BA	0.85	0.85
		2000-30	BA	0.85	0.85
		----- ⁽³⁾ 2000-30	BB	0.85	0.85
2-2	UFCC-G	1978-84	BB	Same As Above	Same As Above
		1985-99	BB		
		2000-30	BA		
		----- ⁽³⁾ 2000-30	BB		

Notes:

- (1) PFCC-V = Pacific Fuel Cycle Center w/Air-Cooled Vault Concept
UFCC-G = U.S. Fuel Cycle Center w/Geologic Repository
- (2) B = Ships Wait, Casks do not Wait; A = Cask Wait, Ships do not Wait
(1st letter position indicates reactor loop location; 2nd letter is AFR/FSRC loop)
- (3) Indicates fuel reshipment from temporary storage location.

with total transportation and fixed facilities costs, these impacts combined would probably not cause total system costs to vary more than +10% except under unusual circumstances of system operation.

In order to fully assess these impacts, a further analysis effort is desirable in this area.

Table C-2 summarizes the results for the cases discussed previously.

Table C-2: GSFLS Transportation Requirements Sensitivity Analysis Results

I. SHIP WAIT VS CASK WAIT:

CASE NO. REQ'TS SELECTED YEAR OF COMPARISON	1-1		1-3		1-4		2-1		2-2	
	SHIPS	CASKS	SHIPS	CASKS	SHIPS	CASKS	SHIPS	CASKS	SHIPS	CASKS
1978	1	5	1	5	1	10	1	10	1	5
1982	2	10	2	10	2	15	2	15	2	10
1990	3	15	3	15	3	20	7	38	8	38
2000	11	58	12	57	11	68	26	142	26	142
2010	15	76	16	76	15	86	36	194	36	194
2030	15	76	16	76	15	86	36	194	36	194

II. EFFECTS OF QUEUEING:

CASE NO. & EFFECTS SELECTED YEAR OF COMPARISON	1-1 (Q = 1.00)		1-2 (Q = 0.85)		EFFECT (1-2) ÷ (1-1)		1-4 (Q = 1.00)		1-5 (Q = 0.85)		EFFECT (1-5) ÷ (1-4)	
	SHIPS	CASKS	SHIPS	CASKS	SHIPS	CASKS	SHIPS	CASKS	SHIPS	CASKS	SHIPS	CASKS
1978	1	5	1	5	0.0	0.0	1	10	1	10	0.0	0.0
1982	2	10	2	10	0.0	0.0	2	15	2	15	0.0	0.0
1990	3	15	4	19	1.3	1.3	3	20	3	20	0.0	0.0
2000	11	58	13	67	1.2	1.2	11	68	13	77	1.2	1.1
2010	15	76	18	90	1.2	1.2	15	86	18	100	1.2	1.2
2030	15	76	18	90	1.2	1.2	15	86	18	100	1.2	1.2

III. UTILIZATION OF TRANSPORT & FIXED FACILITIES:

CASE NO. & EFFECTS SELECTED YEAR OF COMPARISON	1-6 (U = 1.00)		1-7 (U = 0.85)		EFFECT (1-7) ÷ (1-6)	
	SHIPS	CASKS	SHIPS	CASKS	SHIPS	CASKS
1978	1	8	1	10	0.0	1.3
1982	1	8	2	15	2.0	1.9
1990	3	16	3	20	0.0	1.3
2000	10	52	13	77	1.3	1.5
2010	13	64	18	100	1.4	1.6
2030	13	64	18	100	1.4	1.6

APPENDIX D: FUEL SHIPMENT DRAWDOWN ANALYSIS

1.0 DISCUSSION

In order to construct a first Pacific Basin Region fuel profile to be used as input to the FUEL1 program model (see Appendix B), it was necessary to incorporate the following fuel shipment assumptions into the construction of the input table:

- (1) From the engineering studies it was determined that a constant age fuel could be more readily handled in the cask method of spent fuel transportation. From the same studies, it was determined that 5 year-old spent fuel is the appropriate manageable age. Therefore, it became desirable to specify shipment of 5 year old spent fuel starting at an early point in the project time period.
- (2) However, at present and in early years of the project, reactor ARS storage basins accumulate spent fuel that, due to lack of alternative storage methods, is estimated at 8 years of age for the oldest fuel. Therefore, if a Full Core Reserve (FCR) maintenance philosophy is adopted in the early years (which minimizes logistics system requirements during the period chosen), then, under a FIFO transportation discipline, the average age of fuel shipped in the early years will equal the average size of the ARS pools less FCR. Nuclear Assurance Corporation (NAC) data (APR'77 Report) shows this to be about 8 years, as mentioned above.

Therefore, in order to bring the spent fuel shipment age to 5 years (which minimizes or eliminates any requirement to build future ARS pools to sizes greater than 5 years storage capability plus FCR), a drawdown of spent fuel residing in present reactor pools is necessary.

Once this is accomplished, a fuel profile may be constructed which shows the annual and cumulative amount of spent fuel transported according to the above discipline.

Figure D-1 (dotted line) shows the resulting profile.

2.0 DRAWDOWN CURVE ANALYSIS

In order to properly construct the curve, an appropriate drawdown rate must be selected and this is an arbitrary determination. It was found that the curve represented by the following equation provides satisfactory results:

$$f = 251.5 e^{-.215n}$$

where:

f = computed annual spent fuel (in mthm's)

n = $y - 1984$

y = year during which drawdown occurs

Figure D-1: Pacific Basin Fuel Profile With Drawdown

3.0 ALLOCATION TO REACTORS AND COUNTRIES

After determining the amount of spent fuel in mthm's to be drawn down, the tonnage was then allocated by country on the basis of individual reactor discharge patterns. Table D-1 depicts this allocation.

4.0 ASSEMBLY INPUT DATA

Finally, in order to construct an input table for the FUEL1 program module, NAC reactor discharge data tables were examined. One table with transportation of spent fuel from existing ARS maintaining FCR was constructed and another table was constructed from the initial reactor discharge data shifted 5 years. The drawdown allocation table was then blended into the above tables, resulting in an input table for the FUEL1 module, Table D-2.

5.0 RESULTS

The fuel profile resulting from the input data for the Pacific Basin Region was shown in Table B-1, (and as illustrated in Figure D-1). The cumulative Pacific Basin regional spent fuel curve was shown in Figure 4.0.

Other means, including use of live survey data were used to form the basis for the second fuel profile computer module. To date, there exist some minor differences between results obtained through the use of the FUEL1 program module and the other program module, DISCPG, but, in general, the comparison is quite good as shown on Figure D-2 and Table D-3 (Pacific Basin Region only).

TABLE D-1: ALLOCATION OF SPENT FUEL ACCORDING TO DRAWDOWN

		$\eta =$	0	1	2	3	4	5	6	7		
		Yr =	'84	'85	'86	'87	'88	'89	'90	'91		
B o	Annual mthms's (f) resulting from DRAWDOWN ($f = 251.5e^{.215\eta}$)	A o FCR from NAC	<u>251.5</u>	319.4	383.2	431.1	447.0	577.1	747.4	806.9		
				311.8	386.6	479.4	594.3	736.9	913.6		<u>1129</u>	o NAC w/5 Yr shift
C o	DRAWDOWN - NAC FCR (A.-B.)			-7.6	3.4	48.3	147.3	159.8	166.2			
F o	Total Annual mthm's shipped w/DRAWDOWN		<u>251.5</u>	<u>319.4</u>	<u>386.6</u>	<u>479.4</u>	<u>586.7</u>	<u>736.9</u>	<u>913.6</u>	<u>1129</u>		
D o	ADJUSTED DRAWDOWN - NAC FCR			0	3.4	48.3	139.7	159.8	166.2			
E o	CUMULATIVE DRAWDOWN - NAC FCR			0	3.4	51.7	191.4	351.2	<u>517.4</u>			
G o	<u>INCREMENTAL ASS'Y ALLOCATION BY COUNTRY</u>											
	- JAPAN	BWR		0	18	149	317	327	290			
		PWR		0	0	43	92	95	85			
	- KOREA	PWR		0	0	0	40	40	40			
	- TAIWAN	BWR		0	0	0	185	185	185			
	- PHILIPPINES	PWR		0	0	0	40	0	40			

INPUT TABLE D-2: FUEL INPUT TABLE (ASSEMBLIES)

Program Index --			1	2	3	4	5	6	7	8	9	10	11	12	13	14
			<u>'78</u>	<u>'79</u>	<u>'80</u>	<u>'81</u>	<u>'82</u>	<u>'83</u>	<u>'84</u>	<u>'85*</u>	<u>'86*</u>	<u>'87*</u>	<u>'88*</u>	<u>'89*</u>	<u>'90*</u>	<u>'91</u>
<u>BWR</u>	JAPAN	- B Fut	72 0	72	72	295	468	468	468	862	970	1335	1543	1693 0	1696 1204	1612 1048
	KOREA	- B Fut	0													
	TAIWAN	- B Fut							72	204	422	408	641	861	601	464 204
	PHILIPPINES	- B Fut	0													
Above Futura Other Futura <u>Total Futura</u>															204	1252
<u>PWR</u>	JAPAN	- P Fut	0	36	52	53	109	222	312	316	380	423	560	723	713	576
	KOREA	- P Fut				12	80	80	80	80	80	80	120	120	120	80
	TAIWAN	- P Fut											22	78	112	
	PHILLIPINES	- P - Fut											79	40	80	40
Above Futura Other Futura <u>Total Futura</u>															56	232

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15	16	17	18	19	20	21	22	23	24	25	26	27	28	Constant Table		
'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'94	'05	N2	N4	I
1604 1532	1600 2198	1604 2926	1596 3494	1600 4082	1596 4670	1596 5258	1596 5846	6434	7022	7610	8198	8786	K 9374	1 13	19 15	1 1
		204	180	180	384	360	360	360	360	564	540	540	Ø	1 17	1 9	1 1
716 180	448 180	456 180	708 384	448 360	464 360	716 360	448 600	456 574	708 574	574	726	706	K 858	7 14	9 14	6 1
			164	144	144	144	144	308	288	288			Ø	1 18	1 6	1 1
1712	204 2582	508 3818	466 4688	466 5232	618 5972	598 6744	598 7546	702 8214	882 9148	858 9814	1062 10,814	1242 11,562	1218 (1218) 12,278	16 13	11 15	3 1
													576	2	12	1
														4	10	1
														11	2	1
														11	3	1
444	724	852	1072	1304	1644	1860	2092	2380	2620	2796	3128	3400	3620	13	15	1

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Figure D-2: Comparison of Pacific Basin Fuel Profiles (NAC Data Versus Survey)

TABLE D-3: COMPARISON OF NAC/"FUEL1" PROGRAM AND SURVEY/PROGRAM 2

FUEL SHIPMENTS TO AFR

<u>YEAR</u>	<u>NAC</u> <u>("FUEL1")</u>	<u>SURVEY</u> <u>("DISCPG")</u>
1978	13.7	12.0
1979	30.3	17.0
1980	37.7	25.0
1981	86.0	56.0
1982	176.1	91.0
1983	228.1	152.0
1984	283.3	187.0
1985	385.2	420.0
1990	973.6	870.0
1995	2195.6	1995.0
2000	3420.8	3277.0
2005	4763.4	Not Printed
2010	4814.3	5043.0
2020	4763.4	5043.0
2030	4764.9	5043.0

3
B

**BOEING
ENGINEERING &
CONSTRUCTION**
THE BOEING ENERGY
AND ENVIRONMENT DIVISION

Power System Programs

Global Spent Fuel Logistics Systems Study (GSFLS)

Contract No. EN-77-C-03-1583

Volume 3B: GSFLS Financial - Economic Analysis Appendices

**Interim Report
January 31, 1978**

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ABSTRACT

This report is a part of the interim report documentation for the Global Spent Fuel Logistics System (GSFLS) study. The technical and financial considerations underlying a global spent fuel logistics systems have been studied and are reported herein. The Pacific Basin is used as a model throughout this report; however the stated methodology and, in many cases, considerations and conclusions are applicable to other global regions. Spent fuel discharge profiles for Pacific Basin Countries were used to determine the technical systems requirements for alternative concepts. Functional analyses and flows were generated to define both system design requirements and logistics parameters. A technology review was made to ascertain the state-of-the-art of relevant GSFLS technical systems. Modular GSFLS facility designs were developed using the information generated from the functional analysis and technology review. The modular facility designs were used as a basis for siting and cost estimates for various GSFLS alternatives. Various GSFLS concepts were analyzed from a financial and economic perspective in order to provide total concepts costs and ascertain financial and economic sensitivities to key GSFLS variations. Results of the study include quantification of GSFLS facility and hardware requirements; drawings of relevant GSFLS facility designs; system cost estimates; financial reports - including user service charges; and comparative analyses of various GSFLS alternatives.

KEY WORDS

Air Cooled Vaults	Modules	Siting
Casks	Nuclear	Spent Fuel
Concepts	Reactor	Water Basin Storage
Financial Analysis	Reprocessing	
Geologic Storage	Ships	

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APPENDIX E
Economic & Financial Model

PREFACE

This appendix describes the methods of calculation, the input formats, and the output formats used in the evaluation of various GSFLS concepts. Also included is a discussion of the effect of the pattern of investments and returns on the cost of money used for implementation of the GSFLS concepts. The financial data associated with each concept or variation is also included as provided by the computer tab runs as follows.

- a) Summary of concept characteristics
- b) Profit and Loss Statement
- c) Balance Sheet
- d) Cash Summaries
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- f) WBS Summaries

APPENDIX E
Economic & Financial Model

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APPENDIX E

ECONOMIC & FINANCIAL MODEL

E1.0 Economic and Financial Model

The economic and financial model for the GSFLS Project is basically a set of six computer programs which include: 1) a master work breakdown structure (WBS) programs; 2) a service charge program; 3) an income statement program; 4) a balance sheet program; 5) a cash flow program; and 6) a return on investment program. These six programs are then interconnected by a master executive program which allows the terminal operator to run the GSFLS case scenario with simple input of case descriptive data.

The following paragraphs include the assumptions used and a description of each of the six programs.

E1.1 Master WBS Program

The purpose of the Master WBS Program is to accept into the computer almost all of the inputs for the case scenario. It is an interactive program between the computer and the terminal operator. Information put into the terminal includes development, capital and operating costs by WBS, type of financing for capital items (i.e., interest rate, down payment, and length of loan), and the timing of these costs. A typical Input Sheet is shown as Figure E-1. With this information the model will then sort the cost data by WBS and by year according to interest payment, principle repayment, and operation and maintenance (O&M) expense. The model also calculates depreciation expense and total capital commitments and sorts them by year and WBS. Straight line depreciation is used in the depreciation calculation and the standard mortgage capital recovery factor is the method used for capital loan repayment calculations, (i.e., the yearly

GSFLS CASE ① PFCC-V CIA

WBS NO.	WBS LINE NO.	START YEAR	FLOW TIME	CURVE	COMMITTED \$'s (000)	EQUITY REQ. %	OTHER INSTRUCTIONS
1.0							
1.1							
1.1.1	1	78	35		5 000	33	
		82	35		5 000	↑	
		86	35		5 000		
		88	35		5 000		
		91	35		10 000		
		92	35		5 000		
		93	35		5 000		
		94	35		5 000		
		95	35		5 000		
		96	34		5 000		
		97	33		5 000		
		98	32		10 000		
		99	31		5 000		
		00	30		10 000		
		01	29		5 000		
		02	28		5 000		
		03	27		5 000		
		04	26		5 000		
		05	25		5 000		
		06	24		5 000		
		13	17		5 000		
		17	13		5 000		
		21	9		5 000		
		23	7		5 000		
		26	4		10 000		
		27	3		5 000		
		28	2		5 000	↓	
		29	1		5 000		
		30	1		5 000	33	

η SIGNIFIES DELTA LOAD TO WBS LINE NUMBER

Figure E-1: Typical WBS Program Input Sheet

E1.1 (cont.)

payments made to the lender are uniform and include both interest and principle repayment). The recovery factor is computed by the following fortran equation: :

$$R = (P) [i * (1 + i) **n] / [(1 + i) **n - 1]$$

where

R = the annual payment
P = the original loan
i = the interest rate used
n = the length of the loan
* = multiplied by
** = raised to the power of
/ = divided by

For purposes of the GSFLS analysis debt financing is used for all capital expenditures. At the time of a capital expense it is assumed that the enterprise owners (stockholders) provide one third of the capital, whether from their own contributions or enterprise generated cash, and two thirds of the capital expense is debt financed regardless of what the then outstanding debt equity ratio might be at the time. Facilities and Equipment are financed over their depreciation life. The interest rate used is 10% unless otherwise noted.

This analysis looks at a project of 52 years ending on 2030. In that light, all loans are assumed to be paid by that year. This means that loans initiated in the later years of the project are financed over a period to be repaid by the year 2030. In addition all capital items are depreciated to zero value by the year 2030.

The output of the Master WBS program is a listing by year, or the total of the 52 years, of all expenses. Capital and O&M expenses, total interest expenses, total depreciation

E1.1 (cont.)

expense, and total capital commitments are saved to be used by the other program models. Figure E-2 is a typical WBS output.

E1.2 Service Charge Program

The purpose of the Service Charge Program is to calculate the charge that must be levied against the customer for the enterprise to take and dispose of the customers spent fuel. The service charge is calculated for a given rate of return from the before tax unfinanced cash flows of the enterprise. It is an iterative process where the discounted positive cash flows (cash being received by the enterprise) are equated to the discounted negative cash flows (cash being paid out by the enterprise). The discount rate is the rate of return.

$$\sum_{n=1}^{52} \frac{F_{\text{pos}_n}}{(1+r)^n} = \sum_{n=1}^{52} \frac{F_{\text{neg}_n}}{(1+r)^n}$$

where:

F_{pos_n} = yearly positive cash flows

F_{neg_n} = yearly negative cash flows

n = year from project start

r = rate of return

The positive cash flows are the sum of revenue received from selling the products of reprocessing the spent fuel, and the service charge levied against the customer for using the firms service. The service charge is the unknown in the above equation. The negative cash flows are the firms O&M expenses and the firms committed capital expenses.

The output of the program is the calculated service charge, the rate of return used, and the total net cash flow over the life of the project. Also a listing of the yearly

CLOSAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY-DOLLARS IN MILLIONS

WBS	COMMITTED COST			FINANCED COST			
	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
0.0 TOTAL	4,668.3	5,202.0	9,870.3	4,674.9	5,202.0	5,202.0	10,862.4
1.0 CAPITAL ITEMS	4,668.3		4,668.3	4,674.9			4,674.9
1.1 SYSTEM FACILITIES-EQUIPMENT	3,579.1		3,579.1	3,580.7			3,580.7
1.1.1 SHIP	180.0		180.0	180.0			180.0
1.1.2 CRAN	222.0		222.0	222.0			222.0
1.1.3 CRAN TRANSPORTER-PAIL CR	22.4		22.4	22.4			22.4
1.1.4 PAIL CR TUG	0.8		0.8	0.8			0.8
1.1.5 CRAN TRANSPORTER		1.0	1.0		1.5		2.5
1.1.6 SEACRY FAC		48.0	48.0		82.6		130.6
1.1.7 WATER BASIN 4 PORT							
1.1.8 WATER BASIN 2 PORT		24.0	24.0		41.3		65.3
1.1.9 WATER BASIN STORAGE							
1.1.10 FACIATING FACILITY							
1.1.11 FACIATING FAC	116.0		116.0	116.0	201.2		317.2
1.1.12 CRANSTERS	216.5		216.5	216.5	139.1		355.6
1.1.13 REPLACEMENT TRANS	18.0		18.0	18.0	11.7		29.7
1.1.14 CRAN MODULE	677.9		677.9	677.9	599.2		1,277.1
1.1.15 GEOLOGIC REC MOD							
1.1.16 REPOSITORY STORAGE MOD							
1.1.17 CRAN	47.0		47.0	47.0	20.9		127.8
1.1.18 LUNGING FAC	75.0		75.0	75.0	150.1		225.1
1.1.19 MLD PROC FAC	671.4		671.4	671.4	1,437.8		2,109.2
1.1.20 RECOVERY FAC	628.2		628.2	628.2	1,436.4		2,064.6
1.2 SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6		39.3
1.2.1 ADM BLD G FLT YD	2.4		2.4	2.4	3.5		5.9
1.2.2 WAREHOUSE & FLT	12.3		12.3	12.3	21.1		33.4
1.3 CRANERS COST	537.3		537.3	537.3	626.7		1,164.0
1.4 INTEREST DURING CON	532.2		532.2	532.2	622.7		1,154.9
2.0 CRAN & MAINT		5,202.0	5,202.0			5,202.0	5,202.0
2.1 DEFECT LAGOR		1,163.4	1,163.4			1,163.4	1,163.4
2.1.1 PORT & REC TRANS		5.1	5.1			5.1	5.1
2.1.2 WATER BASIN REC (PORT)		143.6	143.6			143.6	143.6
2.1.3 WATER BASIN REC (PORT)							
2.1.4 WATER BASIN REC		27.1	27.1			27.1	27.1
2.1.5 FACI FAC LAGOR		313.7	313.7			313.7	313.7
2.1.6 FACI FAC LAGOR							
2.1.7 CRAN REPLACEMENT LAGOR							
2.1.8 GEOLOGIC REC MOD LAGOR							
2.1.9 CRAN TRANS MAINT LAB		31.6	31.6			31.6	31.6
2.1.10 LCI LN PROCES LAGOR		15.2	15.2			15.2	15.2
2.1.11 MLD PROC LAGOR		312.4	312.4			312.4	312.4
2.1.12 RECOVERY PLANT LAB		312.4	312.4			312.4	312.4
2.2 DEFECT LAGOR		1,751.4	1,751.4			1,751.4	1,751.4
2.2.1 PORT & REC TRANS LAB		8.1	8.1			8.1	8.1
2.2.2 MLD REC (PORT) LAB		218.6	218.6			218.6	218.6
2.2.3 MLD REC (PORT) LAB							
2.2.4 MLD REC (PORT) LAB		40.5	40.5			40.5	40.5
2.2.5 FACI FAC IND LAB		470.4	470.4			470.4	470.4
2.2.6 FACI FAC IND LAB		65.8	65.8			65.8	65.8
2.2.7 CRAN IND LAB							
2.2.8 GEO REC MOD IND LAB							
2.2.9 CRAN TRANS MAINT LAB		47.2	47.2			47.2	47.2
2.2.10 LCI LN PROC IND LAB		7.7	7.7			7.7	7.7
2.2.11 MLD PROC IND LAB		446.5	446.5			446.5	446.5
2.2.12 REC PLANT IND LAB		446.5	446.5			446.5	446.5
2.3 MATERIAL SUP UTIL ECT		1,764.9	1,764.9			1,764.9	1,764.9
2.3.1 PORT REC FMS		8.1	8.1			8.1	8.1
2.3.2 MLD REC CRIS 4 PORT		218.6	218.6			218.6	218.6
2.3.3 MLD REC CRIS 2 PORT							
2.3.4 MLD STORAGE CRIS		40.5	40.5			40.5	40.5
2.3.5 FACI CRIS (2000)							
2.3.6 FACI CRIS (2000)		470.4	470.4			470.4	470.4
2.3.7 CRAN CRIS		65.8	65.8			65.8	65.8
2.3.8 GEOLOGIC REC CRIS							
2.3.9 CRAN TRANS		47.2	47.2			47.2	47.2
2.3.10 LCI LN PROC CRIS		21.3	21.3			21.3	21.3
2.3.11 MLD PROCESSING CRIS		446.5	446.5			446.5	446.5
2.3.12 RECOVERY PLANT CRIS		446.5	446.5			446.5	446.5
2.4 CONTRACTED SERVICES		414.9	414.9			414.9	414.9
2.4.1 CRAN ON		329.4	329.4			329.4	329.4
2.4.2 US PORT FEE		0.4	0.4			0.4	0.4
2.4.3 EUROPE PORT FEE STOP							
2.4.4 US PORT FEE TO STOP		17.2	17.2			17.2	17.2
2.4.5 EUROPE PORT FEE							
2.4.6 US PORT FEE (CRAN)		50.6	50.6			50.6	50.6
2.4.7 EUROPE PORT FEE							
2.4.8 US PORT FEE							
2.4.9 EUROPE PORT FEE							
2.4.10 EUROPE PORT FEE							
2.4.11 EUROPE PORT FEE							
2.4.12 US PORT FEE		16.9	16.9			16.9	16.9
2.4.13 EUROPE PORT FEE							
2.4.14 EUROPE PORT FEE							
2.4.15 US PORT FEE		0.4	0.4			0.4	0.4
2.4.16 EUROPE PORT FEE							
2.4.17 EUROPE PORT FEE							
2.4.18 EUROPE PORT FEE							
2.4.19 EUROPE PORT FEE							
2.4.20 EUROPE PORT FEE							
2.4.21 EUROPE PORT FEE							
2.5 RECOVERY PLANT FUND		100.0	100.0			100.0	100.0

Figure E-2: Typical WBS Program Output Sheet

E1.2 (cont.)

service charge revenue, reprocessing revenue, and total revenue are saved to be used by other program models.

E1.3 Income Statement Program

The purpose of the Income Statement Program is to generate yearly income statements over the 53 year life of the analysis. Reprocessing revenue, service charge revenue, total revenue, O&M expense, interest expense, depreciation expense, total expenses, income taxes, and net income are calculated for each year of the analysis.

The major assumption used in the income statement is that of calculating yearly income taxes. For the years where income is negative, zero income taxes are assumed, and for the years of positive income an income tax rate of 38% is assumed. The corporate income tax rate is 48% but since no provision is made for investment tax credits and income loss carry-forwards, the 38% value is considered a credible average tax rate.

The output of the Income Statement Program is the yearly income statements as illustrated in Figure E-3.

E1.4 Balance Sheet Program

The purpose of the balance sheet program is to generate yearly performance balance sheets for the 53 years of the analysis. In addition to the balance sheet a capital investment or committed capital stream is generated. The balance sheet is high level and consists of only four categories: fixed assets, working capital, long term debt, and owners equity.

COST OF ORE FUEL SERVICE (DOLLARS/100) 4100.781
 RATE OF RETURN ON INVESTMENT 20.000
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 409791.520

YEARLY PROFIT AND LOSS STATEMENT

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	1.4	1.4	.8	5.1	2.5	8.4	.0	7.0
1979	.0	3.1	3.1	1.0	8.6	4.1	14.3	.0	11.2
1980	.0	3.8	3.8	2.5	13.6	6.2	22.3	.0	18.0
1981	.0	8.7	8.7	3.6	21.9	10.0	35.5	.0	28.8
1982	.0	17.7	17.7	5.4	37.4	21.1	64.0	.0	56.2
1983	.0	23.0	23.0	6.7	52.0	26.5	85.1	.0	79.1
1984	.0	28.6	28.6	8.1	70.3	34.0	112.4	.0	100.8
1985	.0	38.8	38.8	20.4	97.6	44.3	162.3	.0	123.3
1986	.0	48.0	48.0	21.3	130.3	59.7	211.3	.0	153.3
1987	.0	58.8	58.8	23.7	163.4	76.0	263.0	.0	188.3
1988	.0	78.1	78.1	24.4	182.3	86.8	322.5	.0	234.4
1989	.0	93.6	93.6	24.4	189.9	87.2	323.5	.0	282.1
1990	1235.0	98.1	1333.1	114.2	187.7	89.4	391.3	376.9	614.9
1991	1235.0	112.1	1347.1	115.3	187.8	90.4	393.4	391.4	622.2
1992	1235.0	135.4	1420.4	115.8	188.7	92.1	396.6	399.0	624.7
1993	1235.0	158.9	1444.9	116.3	190.6	94.6	401.5	396.3	628.9
1994	1235.0	182.7	1477.7	116.8	192.2	95.1	404.0	408.0	629.6
1995	1235.0	221.3	1556.3	117.3	187.6	95.6	400.5	428.2	629.6
1996	1235.0	237.6	1522.6	117.8	185.7	96.1	399.6	428.7	629.2
1997	1235.0	247.8	1522.8	118.1	185.4	97.9	401.5	437.5	713.0
1998	1235.0	297.4	1582.4	119.4	187.4	101.0	407.8	446.4	728.3
1999	1235.0	318.4	1603.4	119.9	184.6	101.5	406.0	450.0	742.4
2000	1235.0	344.8	1629.8	120.4	183.3	103.3	407.1	464.6	756.1
2001	1235.0	378.6	1663.6	120.4	182.4	105.8	408.7	478.9	779.1
2002	1235.0	394.6	1679.6	121.0	180.6	107.7	409.3	482.7	787.6
2003	1235.0	429.5	1714.5	121.5	178.8	110.3	410.6	495.5	808.4
2004	1235.0	461.3	1756.3	122.2	175.6	112.4	410.1	507.7	828.4
2005	1235.0	489.1	1765.1	122.7	171.1	113.8	407.7	515.8	841.6
2006	1235.0	480.2	1765.2	122.4	164.4	115.6	402.0	516.9	843.2
2007	1235.0	485.0	1770.0	122.0	161.5	113.0	396.5	521.6	851.5
2008	1235.0	480.1	1765.1	122.0	155.8	113.1	391.2	521.6	851.5
2009	1235.0	480.4	1765.4	122.0	148.2	112.7	382.9	523.7	854.4
2010	1235.0	485.2	1770.2	122.0	142.2	112.9	381.1	527.9	861.3
2011	1235.0	480.1	1765.1	122.9	135.4	117.1	375.5	528.0	861.3
2012	1235.0	480.2	1765.2	122.9	126.5	114.3	364.3	528.4	868.6
2013	1235.0	485.0	1770.0	123.0	118.4	114.8	356.2	527.2	876.5
2014	1235.0	480.1	1765.1	122.9	108.4	114.8	346.1	529.2	879.8
2015	1235.0	480.4	1765.4	122.9	98.6	111.5	333.0	524.3	888.0
2016	1235.0	485.2	1770.2	122.8	88.7	110.9	322.4	520.1	897.6
2017	1235.0	480.1	1765.1	122.6	77.7	103.2	303.7	525.3	906.6
2018	1235.0	480.2	1765.2	122.8	65.4	103.9	296.1	528.3	916.6
2019	1235.0	485.0	1770.0	122.8	53.4	105.8	287.0	525.6	919.5
2020	1235.0	480.1	1765.1	122.7	47.8	61.0	231.5	522.7	920.8
2021	1235.0	480.4	1765.4	122.7	45.1	63.3	231.2	522.6	920.5
2022	1235.0	485.2	1770.2	122.7	43.4	68.4	234.5	523.6	920.9
2023	1235.0	480.1	1765.1	122.7	43.4	72.0	238.0	520.3	924.8
2024	1235.0	480.2	1765.2	122.7	41.9	80.0	244.6	527.8	924.8
2025	1235.0	485.0	1770.0	122.6	40.5	85.8	252.9	526.3	926.6
2026	1235.0	480.1	1765.1	122.6	37.6	103.5	263.7	520.3	929.8
2027	1235.0	480.4	1765.4	122.6	32.2	115.4	270.2	526.2	927.6
2028	1235.0	485.2	1770.2	122.6	29.2	141.1	292.9	528.0	917.3
2029	1235.0	480.1	1765.1	122.5	16.1	167.8	306.5	524.3	924.3
2030	1235.0	480.2	1765.2	122.5	4.7	212.8	338.0	522.7	929.5
TOTL	20625.0	16971.7	67656.6	5301.9	5974.6	4648.0	15923.8	20941.8	32670.5
AVG	994.1	820.2	1314.3	99.1	112.7	87.7	299.6	395.1	620.6
21-YR	912.9	100.8	413.6	30.9	35.5	27.6	94.0	124.7	175.3

Figure E-3: Typical Income Statement Output

E1.4 (cont.)

The committed capital column is the yearly expenditure for new plant and equipment. It reflects the value of the new, or improvements to, facilities and equipment. In the balance sheet, the fixed asset column represents the current net book value of facilities and equipment. It is the cumulative sum of the capital investments and yearly depreciation charges. The long term debt column represents the end of the year amount of long term loans outstanding resulting from the debt financing of the fixed assets. The value of long term debt is increased by the borrowing of more funds and is decreased by the repaying of loans.

Working capital is defined as the current assets less the current liabilities retained in the firm. Working capital has been maintained equal to two months worth of operating expenses, (i.e., O&M expenses plus interest expense). Revenue received by the enterprise increases working capital. Operating and Maintenance expense, interest expense, loan repayments and taxes decrease working capital. Whenever there is a shortfall of working capital, (i.e., the net of revenue less O&M expense, interest expense, non-debt financed capital expenditures, loan repayments, and taxes added to the previous years working capital is less than the required working capital) an infusion of funds from the enterprise owners is required. Whenever there is excess working capital, funds are paid out to the owners. In other words, stock in the enterprise is sold whenever there is a deficiency in required working capital and dividends are paid whenever there is an excess of working capital.

Owners equity equals the net of assets less the debt outstanding. It also represents the value of the enterprise owned by the stock holders in liquidation if all assets could

E1.4 (cont.)

be disposed of for their book value. Its value is increased by total revenue received and funds received from owners. Its value is decreased by O&M expenses, interest expense, taxes, depreciation expense, and dividends paid out to the enterprise owners.

Since fixed assets plus working capital equal long term debt plus owners equity a continuous check can be made on the values. The major assumptions used in this program relate to the financing of new fixed assets. For this analysis all new fixed assets, (i.e., the capital investment line) are financed; 33% with enterprise funds and 67% with debt funds. The enterprise funds come from working capital. If they are not available, then the stockholders are required to make up the difference with stock purchasers. The retiring of the debt is via standard mortgage practices with equipment loans repaid over the service life of the equipment.

Since all loans are repaid by the year 2030 and all fixed assets are depreciated by the year 2030 some cases will show an unrealistic negative number in the owners equity column. This says that the debt outstanding is actually greater than the book value of the firms assets. Lenders would normally never let this happen. In this case it happens because straight line depreciation and the standard mortgage capital recovery factor do not apply at the same rate. Straight line depreciation subtracts equal proportions of a fixed asset throughout its life while the standard mortgage factor subtracts much less of the outstanding debt in early years and much more in later years. Therefore, the value of the fixed assets decline faster than the value of the outstanding debt in the early years and visa versa in later years. Since the assets book value in this program declines much faster than its revenue producing capability the fixed asset and owners equity values do not show the

E1.4 (cont.)

normal meaning of such values in an ungoing firm. Figure E-4 shows a typical Balance Sheet output.

E1.5 Cash Summary Program

The purpose of the cash summary program is to generate yearly cash summary during the life of the project to be used for rate of return calculations.

Three separate cash summaries are generated: an unfinanced enterprise cash summary, a financed enterprise cash summary, and an owners or stockholders cash summary. The unfinanced enterprise cash summary is increased only by total revenues, and is decreased only by O&M expenses. The financed enterprise cash summary is increased by total revenue and is decreased by O&M expense, interest expense, taxes, enterprise portion of capital asset financing and long term debt repayments. The stockholders cash summary is the same as the financed enterprise except that increases in working capital decrease the cash summary. The stock holder summary is negative when the stockholder is required to input funds into the enterprise and is positive when the stockholder receives dividends.

The output of the cash summary program is a listing by year of the net and cumulative values of these three cash summaries. Figure E-5 is a sample cash summary program output.

E1.6 Return on Investment (ROI) Program

The purpose of the ROI program is to determine the financed enterprise rate of return on investment and the stockholders rate of return on equity.

E1.6 (cont.)

These rates of return are calculated from their respective cash streams generated by the cash summary program. The given rate of return for the total program is the return generated by the unfinanced enterprise cash flows. This rate is used to calculate the service charge which determines the service charge revenues and is before taxes. The financed rate of return is calculated from a cash stream that is after taxes and levered by the debt financing. This ROI will be higher than the unfinanced ROI if borrowing can be obtained at a rate lower than the unfinanced ROI. The owners rate of return is calculated from the owners cash stream and should be close to the value of the financed enterprise ROI since stock purchases are made only when needed and all profits are returned to the owners where generated.

CAPITAL INVESTMENT BALANCE SHEET

YRFF	CAPITAL INVESTMENT		FIXED ASSETS	DEPRECIATING CAPITAL	LONG TERM DEBT	CUMULATIVE EQUITY
1978	70.9	*	13.4	1.0	50.0	50.0
1979	55.7	*	125.1	1.7	55.0	55.0
1980	74.8	*	181.6	2.7	125.4	58.0
1981	125.2	*	305.9	4.3	217.4	62.8
1982	388.4	*	628.1	8.8	471.8	200.1
1983	176.0	*	317.7	10.9	566.5	248.1
1984	248.1	*	1031.0	13.9	748.4	297.2
1985	339.4	*	1336.9	19.7	970.1	376.4
1986	497.0	*	1764.1	25.3	1295.0	454.3
1987	500.9	*	2175.0	32.2	1623.3	508.9
1988	298.1	*	2406.3	39.5	1816.0	630.8
1989	44.1	*	2323.2	39.7	1825.0	577.8
1990	60.2	*	2334.0	50.3	1849.1	530.2
1991	26.0	*	2369.6	50.5	1848.4	471.7
1992	40.4	*	2317.9	50.7	1850.2	413.4
1993	53.7	*	2132.0	51.2	1871.9	361.2
1994	13.8	*	2099.8	51.0	1855.6	290.3
1995	10.8	*	2017.2	50.8	1836.7	231.1
1996	12.0	*	1934.1	50.6	1814.9	169.7
1997	41.7	*	1877.9	50.6	1809.0	119.4
1998	30.5	*	1857.4	51.1	1805.8	68.7
1999	12.9	*	1788.9	50.7	1793.5	24.1
2000	42.8	*	1707.6	50.6	1776.2	18.0
2001	54.0	*	1658.3	50.5	1758.2	55.1
2002	48.2	*	1596.8	50.3	1738.5	91.8
2003	55.6	*	1522.3	50.6	1714.5	132.2
2004	44.6	*	1474.0	49.8	1678.0	181.3
2005	33.0	*	1396.2	49.0	1624.3	239.0
2006	41.7	*	1322.4	48.2	1569.6	299.0
2007	50.6	*	1240.0	47.4	1520.9	358.6
2008	39.5	*	1185.2	46.5	1457.8	425.7
2009	33.6	*	1110.2	45.4	1386.9	501.3
2010	32.2	*	1029.6	44.2	1304.3	580.5
2011	57.1	*	969.6	43.1	1218.4	675.6
2012	36.8	*	891.4	41.6	1135.3	782.3
2013	55.8	*	832.5	40.2	1048.5	897.8
2014	35.2	*	753.9	39.5	959.4	1020.0
2015	43.9	*	674.2	38.9	868.0	1141.0
2016	48.0	*	631.0	38.3	797.5	1270.5
2017	41.7	*	569.8	33.4	666.9	1397.7
2018	67.5	*	533.3	32.6	577.6	1517.8
2019	33.1	*	465.7	30.2	487.7	1628.2
2020	57.4	*	422.0	28.4	422.8	1728.2
2021	49.4	*	439.1	28.1	400.2	1818.0
2022	55.8	*	426.5	28.0	393.3	1898.2
2023	43.8	*	397.3	27.7	369.3	1969.3
2024	57.1	*	374.6	27.4	345.8	2030.2
2025	70.1	*	354.9	27.2	323.1	2089.0
2026	62.1	*	313.5	26.7	281.2	2135.0
2027	43.8	*	241.1	23.8	213.6	2168.6
2028	55.5	*	155.6	24.8	158.7	2197.8
2029	28.6	*	16.3	23.1	1.7	2200.1
2030	50.7	*	15.2	21.2	1.3	2201.4

TOTAL CAPITAL INVESTMENT 4663.2

Figure E-4: Typical Balance Sheet Output

	UNFINANCED ENTERPRISE				FINANCED ENTERPRISE				GRUPE			
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	1.4	76.7	- 75.3	- 75.3	- 80.9	- 80.9	- 80.9	- 80.9	- 80.9	- 80.9	- 80.9	- 80.9
1979	0.1	55.3	- 55.2	- 130.5	- 80.9	- 161.8	- 80.9	- 161.8	- 80.9	- 161.8	- 80.9	- 161.8
1980	3.8	77.8	- 74.0	- 204.5	- 80.9	- 242.7	- 80.9	- 242.7	- 80.9	- 242.7	- 80.9	- 242.7
1981	8.7	127.9	- 119.2	- 323.7	- 80.9	- 323.7	- 80.9	- 323.7	- 80.9	- 323.7	- 80.9	- 323.7
1982	17.7	388.8	- 371.1	- 694.8	- 80.9	- 694.8	- 80.9	- 694.8	- 80.9	- 694.8	- 80.9	- 694.8
1983	23.0	182.7	- 159.7	- 854.5	- 80.9	- 854.5	- 80.9	- 854.5	- 80.9	- 854.5	- 80.9	- 854.5
1984	26.6	206.2	- 179.6	- 1034.1	- 80.9	- 1034.1	- 80.9	- 1034.1	- 80.9	- 1034.1	- 80.9	- 1034.1
1985	28.3	222.8	- 194.5	- 1228.6	- 80.9	- 1228.6	- 80.9	- 1228.6	- 80.9	- 1228.6	- 80.9	- 1228.6
1986	28.0	218.3	- 190.3	- 1418.9	- 80.9	- 1418.9	- 80.9	- 1418.9	- 80.9	- 1418.9	- 80.9	- 1418.9
1987	26.3	209.3	- 183.0	- 1601.9	- 80.9	- 1601.9	- 80.9	- 1601.9	- 80.9	- 1601.9	- 80.9	- 1601.9
1988	28.1	222.8	- 194.7	- 1796.6	- 80.9	- 1796.6	- 80.9	- 1796.6	- 80.9	- 1796.6	- 80.9	- 1796.6
1989	33.6	222.8	- 189.2	- 1985.8	- 80.9	- 1985.8	- 80.9	- 1985.8	- 80.9	- 1985.8	- 80.9	- 1985.8
1990	133.1	174.4	140.7	- 1845.1	- 80.9	- 1845.1	- 80.9	- 1845.1	- 80.9	- 1845.1	- 80.9	- 1845.1
1991	1297.1	141.3	1155.8	- 689.3	- 80.9	- 689.3	- 80.9	- 689.3	- 80.9	- 689.3	- 80.9	- 689.3
1992	1429.4	126.2	1303.2	1013.9	- 80.9	1013.9	- 80.9	1013.9	- 80.9	1013.9	- 80.9	1013.9
1993	1444.9	126.0	1318.9	2332.8	- 80.9	2332.8	- 80.9	2332.8	- 80.9	2332.8	- 80.9	2332.8
1994	1474.7	125.8	1348.9	3681.7	- 80.9	3681.7	- 80.9	3681.7	- 80.9	3681.7	- 80.9	3681.7
1995	1566.3	120.3	1446.0	5127.7	- 80.9	5127.7	- 80.9	5127.7	- 80.9	5127.7	- 80.9	5127.7
1996	1522.6	120.3	1402.3	6530.0	- 80.9	6530.0	- 80.9	6530.0	- 80.9	6530.0	- 80.9	6530.0
1997	1552.3	120.3	1432.0	7962.0	- 80.9	7962.0	- 80.9	7962.0	- 80.9	7962.0	- 80.9	7962.0
1998	1582.4	120.3	1462.1	9424.1	- 80.9	9424.1	- 80.9	9424.1	- 80.9	9424.1	- 80.9	9424.1
1999	1663.4	120.3	1543.1	10967.2	- 80.9	10967.2	- 80.9	10967.2	- 80.9	10967.2	- 80.9	10967.2
2000	1629.8	122.4	1507.4	12474.6	- 80.9	12474.6	- 80.9	12474.6	- 80.9	12474.6	- 80.9	12474.6
2001	1623.6	171.9	1451.7	13926.3	- 80.9	13926.3	- 80.9	13926.3	- 80.9	13926.3	- 80.9	13926.3
2002	1679.6	169.2	1510.4	15436.7	- 80.9	15436.7	- 80.9	15436.7	- 80.9	15436.7	- 80.9	15436.7
2003	1714.5	177.3	1537.2	16973.9	- 80.9	16973.9	- 80.9	16973.9	- 80.9	16973.9	- 80.9	16973.9
2004	1746.3	166.8	1579.5	18553.4	- 80.9	18553.4	- 80.9	18553.4	- 80.9	18553.4	- 80.9	18553.4
2005	1745.1	158.2	1586.9	20140.3	- 80.9	20140.3	- 80.9	20140.3	- 80.9	20140.3	- 80.9	20140.3
2006	1745.2	154.8	1590.4	21730.7	- 80.9	21730.7	- 80.9	21730.7	- 80.9	21730.7	- 80.9	21730.7
2007	1770.0	173.6	1596.4	23327.1	- 80.9	23327.1	- 80.9	23327.1	- 80.9	23327.1	- 80.9	23327.1
2008	1765.1	161.5	1603.6	24930.7	- 80.9	24930.7	- 80.9	24930.7	- 80.9	24930.7	- 80.9	24930.7
2009	1745.4	162.6	1582.8	26513.5	- 80.9	26513.5	- 80.9	26513.5	- 80.9	26513.5	- 80.9	26513.5
2010	1770.2	158.2	1612.0	28105.5	- 80.9	28105.5	- 80.9	28105.5	- 80.9	28105.5	- 80.9	28105.5
2011	1745.1	160.1	1585.0	29690.5	- 80.9	29690.5	- 80.9	29690.5	- 80.9	29690.5	- 80.9	29690.5
2012	1745.2	159.7	1585.5	31276.0	- 80.9	31276.0	- 80.9	31276.0	- 80.9	31276.0	- 80.9	31276.0
2013	1770.0	173.8	1596.2	32872.2	- 80.9	32872.2	- 80.9	32872.2	- 80.9	32872.2	- 80.9	32872.2
2014	1745.1	158.1	1587.0	34459.2	- 80.9	34459.2	- 80.9	34459.2	- 80.9	34459.2	- 80.9	34459.2
2015	1745.4	173.7	1571.7	36050.9	- 80.9	36050.9	- 80.9	36050.9	- 80.9	36050.9	- 80.9	36050.9
2016	1770.2	170.8	1599.4	37640.3	- 80.9	37640.3	- 80.9	37640.3	- 80.9	37640.3	- 80.9	37640.3
2017	1745.1	161.6	1583.5	39223.8	- 80.9	39223.8	- 80.9	39223.8	- 80.9	39223.8	- 80.9	39223.8
2018	1745.2	199.3	1545.9	40769.7	- 80.9	40769.7	- 80.9	40769.7	- 80.9	40769.7	- 80.9	40769.7
2019	1770.0	160.9	1609.1	42368.8	- 80.9	42368.8	- 80.9	42368.8	- 80.9	42368.8	- 80.9	42368.8
2020	1745.1	160.1	1585.0	43953.8	- 80.9	43953.8	- 80.9	43953.8	- 80.9	43953.8	- 80.9	43953.8
2021	1745.4	163.2	1582.2	45536.0	- 80.9	45536.0	- 80.9	45536.0	- 80.9	45536.0	- 80.9	45536.0
2022	1770.2	178.5	1591.7	47127.7	- 80.9	47127.7	- 80.9	47127.7	- 80.9	47127.7	- 80.9	47127.7
2023	1745.1	163.7	1581.4	48709.1	- 80.9	48709.1	- 80.9	48709.1	- 80.9	48709.1	- 80.9	48709.1
2024	1745.2	179.8	1565.4	50274.5	- 80.9	50274.5	- 80.9	50274.5	- 80.9	50274.5	- 80.9	50274.5
2025	1770.0	192.7	1577.3	51841.8	- 80.9	51841.8	- 80.9	51841.8	- 80.9	51841.8	- 80.9	51841.8
2026	1745.1	184.7	1560.4	53392.2	- 80.9	53392.2	- 80.9	53392.2	- 80.9	53392.2	- 80.9	53392.2
2027	1745.4	185.6	1559.8	54932.0	- 80.9	54932.0	- 80.9	54932.0	- 80.9	54932.0	- 80.9	54932.0
2028	1770.2	178.1	1592.1	56464.1	- 80.9	56464.1	- 80.9	56464.1	- 80.9	56464.1	- 80.9	56464.1
2029	1745.1	151.1	1594.0	58058.1	- 80.9	58058.1	- 80.9	58058.1	- 80.9	58058.1	- 80.9	58058.1
2030	1745.2	173.2	1572.0	59590.1	- 80.9	59590.1	- 80.9	59590.1	- 80.9	59590.1	- 80.9	59590.1

RATE OF RETURN TO ENTERPRISE OWNER 19.33%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 19.33%

Figure E-5: Typical Cash Summary Program Output

E2.0 Cash Flow Patterns

When analyzing cash flows using the present value or present worth criterion, three important parameters effect the answer obtained by the analysis: a) the quantity of the cash flow values, b) the rate, and c) the pattern of the cash flows. It is obvious that a set of cash flows (F1) greater than another set (F2) will have the greater present value if the two flow patterns are the same. An example is shown below for a pattern of equal investments over a 3 year period.

Year	F1 Cash Flow	PV at 10% of Cash Flow	F2	PV at 10% of Cash Flow
1	2.0	1.81	1.0	0.90
2	2.0	1.65	1.0	0.82
3	2.0	1.50	1.0	0.75
Total	6.0	4.97	3.0	2.48

PV of F1 = 4.9 PV of F2 = 2.5

It is not quite so obvious what happens if the patterns of the cash flows are not equal. An example is shown below for case F1 where most investment is at the end of period and F2 where most of the investment is at the start of the period.

Year	F1 Cash Flow	PV at 10% of Cash Flow	F2	PV at 10% of Cash Flow
1	0	0	5.8	5.27
2	0	0	0.1	0.08
3	6.0	4.51	0	0
	6.0	4.51	5.9	5.35

In this case the sum of the F1 cash flow is greater than the sum of the F2 cash flow but the present value of F1 is less than the present value of F2.

Following is a short discussion of the effect of patterns of cash flows on present values. The economic analysis of the GSFLS Program spans a time frame of 53 years. Therefore, there might be cash flows occurring late in the program. The question then becomes, how do cash

E2.0 (cont.)

flows in the later years compare with cash flows in the earlier years. The general answer says that people prefer to receive cash sooner than later and prefer to disburse it later than sooner. The measure of how much they prefer this is called the discount rate. The higher the rate the more one prefers to delay payment.

For a specific answer to the GSFLS problem, three cash flow patterns will be discussed. All of the patterns assume cash outlay early in the project and cash returns later in the project. This is normal for most investment problems.

Pattern one assumes an investment of 1 in year 0 and all returns to be received will be collected in year 50. Pattern two assumes a series of one dollar investments each year for 20 years and all returns to be received equally over 30 years starting in year 21. This approximates what is happening in the reprocessing case where the reprocessing facility comes on-line in the year 2000. The third example assumes a series of one dollar investments for 20 years and returns to be proportionally increasing from zero in year zero to maximum in year 20, and then constant until year 50. This approximates a return received with each MTU of spent fuel received. See figures E-6, E-7 and E-8.

20% discounting will be used to evaluate these examples since that is the value used in the baseline analysis. For pattern number one, a one dollar investment in year zero must return \$9,100 in year 50, or \$15,725 in year 53, to bring about a 20% rate of return.

For pattern number two, the series of 20 one dollar investments in the first 20 years must return a series of thirty 37.7 dollar payments in years 21 through 50 for the investor to make a 20% rate of return.

Figure E-6: One Front End Investment - One Final Return

Figure E-7: Uniform Front End Investment - Uniform Return Aft End

Figure E-8: Uniform Front End Investment - Uniform Return per MTU Received
E2-3

E2.0 (cont.)

For pattern number three the series of 20 one dollar investments must only return a maximum payment of 3.4 dollars for the series of 30 equal payments. This value is lower due to the receipt of increasing early payments in years 1 thru 20.

At high discount rates such as the 20% used in the examples, the effect of the pattern of investments and returns has a significant effect on the service charge. The pattern effect may be greater than the amount of investment itself.

E3.0 Economic and Financial Model Results

Output results of the Economic and Financial Model are included in the following sections:

<u>Section</u>	<u>Case Number</u>	<u>Description</u>
E3.1	1A (Revision 1)	Fuel Cycle Center (FCC) baseline
E3.2	2A (Revision 1)	FCC baseline except enterprise ROI @ 15%
E3.3	3A (Revision 1)	FCC baseline except enterprise ROI @ 25%
E3.4	4A (Revision 1)	FCC baseline except enterprise ROI @ 30%
E3.5	5A (Revision 1)	FCC baseline except recovered products @ 150 \$/Kg
E3.6	6A (Revision 1)	FCC baseline except recovered products @ 350 \$/Kg
E3.7	7A	FCC baseline except vault cost factor 0.75
E3.8	8A	FCC baseline except vault cost factor 0.50
E3.9	9A	FCC baseline except location cost factor 0.7
E3.10	10A	FCC baseline except location cost factor 2.4
E3.11	11A	FCC baseline except location cost factor 2.4 and desalinization added
E3.12	12A	FCC baseline desalinization added
E3.13	13A	FCC baseline except geologic storage and location in Japan
E3.14	14A	FCC baseline except geologic storage and location in U.S.
E3.15	15A	FCC baseline except geologic storage and location in mid Pacific
E3.16	16A	FCC baseline except geologic storage and location in Europe
E3.17	1A-T	FCC baseline except transportation portion only
E3.18	1A-S	FCC baseline except storage portion only
E3.19	1A-R	FCC baseline except recovery portion only
E3.20	1A-W	FCC baseline except waste management portion only
E3.21	1A-A	FCC baseline sum of transport, storage, recovery, and waste management functions (for checking)
E3.22	21B	FCC baseline except recovery deferred to 1990

<u>Section</u>	<u>Case Number</u>	<u>Description</u>
E3.23	22A	FCC baseline except recovery deferred to 2010
E3.24	23A	FCC baseline except recovery deferred to 1990 and variable value of recovery products
E3.25	24A	FCC baseline except variable value of recovery products
E3.26	25A	FCC baseline except recovery deferred to 2010 and variable value of recovery products
E3.27	31A	FCC baseline except recovery deferred to 1990 and multiple recovery plants, and variable value of recovered products
E3.28	32A	FCC baseline except recovery deferred to 1990, multiple recovery plants
E3.29	26A	FCC baseline except service charge 200 \$/Kg and recovery credit provided
E3.30	17A	Storage Center (SC) baseline
E3.31	20A	SC baseline except geologic storage and location in mid Pacific
E3.32	27A	SC baseline except finance rate 7% and no taxes (tax free private enterprise)
E3.33	33A	SC baseline except finance rate 7%, equity rate 7%, and no taxes (government non-profit enterprise)
E3.34	28A	SC baseline except RO1 = 15%
E3.35	29A	SC baseline except RO1 = 25%
E3.36	30A	SC baseline except RO1 = 30%
E3.37	17A-T	SC baseline except transportation only
E3.38	17A-S	SC baseline except storage portion only
E3.39	17A-W	SC baseline except waste management portion only
E3.40	17A-A	SC baseline except sum of transport, storage, and waste management functions (for checking)

Section E 3.1

Case: 1A (Revision 1)

Description: Fuel Cycle Center (FCC) Baseline

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government Financial Participation - None (Private Enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage Cost Factor - 1.0

Recovery

Start up time - 2000

Modular Plant - Single Plant

Value of Recovered Products - 260 \$/Kg spent fuel

Pricing

Service charge - Average over fuel population

Recovery Credit - None

Summary of Output Characteristics:

Capital Investment - 4.777 billion dollars

Owners ROI - 21.4 %

Service charge - \$183/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/MG) \$163.381
 RATE OF RETURN ON INVESTMENT 29.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$65111.768

1AR1

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.5	2.5	1.3	5.1	2.5	8.9	.0	8.4
1979	.0	5.5	5.5	1.5	8.6	4.1	14.3	.0	8.7
1980	.0	6.9	6.9	2.5	11.3	5.3	19.1	.0	12.2
1981	.0	15.8	15.8	3.6	16.0	7.6	27.1	.0	11.4
1982	.0	32.3	32.3	4.3	22.4	10.7	37.5	.0	5.2
1983	.0	41.8	41.8	5.1	28.2	13.6	46.9	.0	2.0
1984	.0	51.9	51.9	5.9	32.8	16.8	54.7	.0	2.7
1985	.0	70.6	70.6	16.8	36.1	17.9	72.0	.0	1.4
1986	.0	87.4	87.4	16.7	38.1	19.2	76.0	4.3	7.0
1987	.0	103.2	103.2	32.0	41.0	21.2	114.2	.0	11.0
1988	.0	142.1	142.1	52.9	43.9	23.5	120.1	6.3	15.6
1989	.0	170.2	170.2	53.8	45.1	24.5	123.4	17.6	24.6
1990	.0	178.5	178.5	53.8	47.2	26.1	127.1	19.5	31.8
1991	.0	203.8	203.8	54.2	56.9	31.3	142.5	23.3	36.0
1992	.0	246.3	246.3	55.4	60.9	42.4	178.8	25.6	41.8
1993	.0	290.9	290.9	56.1	62.5	43.1	197.7	35.4	57.7
1994	.0	345.1	345.1	56.9	110.2	58.5	225.5	45.4	77.1
1995	.0	402.5	402.5	57.7	135.3	71.6	264.8	52.3	85.4
1996	.0	432.1	432.1	58.6	174.3	91.1	324.1	41.1	87.0
1997	.0	487.0	487.0	59.6	209.3	108.6	377.5	41.6	87.9
1998	.0	541.0	541.0	60.6	236.0	123.7	420.3	45.9	74.8
1999	.0	579.2	579.2	61.7	246.7	132.0	440.3	52.8	66.1
2000	1413.5	627.8	2041.5	126.5	248.4	134.8	509.6	581.7	949.2
2001	1413.5	688.6	2102.1	126.9	245.3	135.2	507.5	606.0	968.7
2002	1413.5	717.7	2131.2	127.5	242.4	135.8	505.7	617.7	1007.8
2003	1413.5	761.1	2194.6	128.1	239.6	137.0	504.7	642.2	1047.7
2004	1413.5	828.9	2242.4	128.8	236.5	138.4	503.7	664.5	1084.2
2005	1413.5	873.1	2286.6	129.3	232.6	139.6	501.5	678.3	1104.8
2006	1413.5	873.4	2286.9	129.6	229.6	141.5	500.8	678.7	1107.4
2007	1413.5	882.2	2295.7	129.8	225.7	137.3	492.9	669.8	1116.9
2008	1413.5	873.1	2286.6	130.0	218.5	136.6	485.6	684.5	1117.8
2009	1413.5	873.7	2287.2	129.9	212.4	135.9	478.2	687.4	1121.6
2010	1413.5	882.5	2296.0	129.8	206.7	135.9	472.4	693.6	1130.6
2011	1413.5	873.1	2286.6	129.8	199.0	134.2	463.5	692.8	1130.3
2012	1413.5	873.4	2286.9	129.8	192.2	133.8	455.8	696.1	1135.8
2013	1413.5	882.2	2295.7	129.7	185.0	131.1	445.8	702.9	1148.9
2014	1413.5	873.1	2286.6	129.7	177.2	129.4	436.2	703.1	1147.2
2015	1413.5	873.7	2287.2	129.6	169.7	124.1	423.5	708.2	1155.0
2016	1413.5	932.5	2296.0	129.6	161.6	122.6	413.8	715.2	1164.9
2017	1413.5	873.1	2286.6	129.5	153.3	117.7	400.8	716.6	1169.2
2018	1413.5	873.4	2286.9	129.5	146.8	116.0	392.2	720.0	1174.7
2019	1413.5	882.2	2295.7	129.4	139.7	113.8	382.9	726.9	1185.9
2020	1413.5	873.1	2286.6	129.4	130.7	113.9	373.9	726.8	1185.9
2021	1413.5	873.7	2287.2	129.3	121.7	115.3	366.3	729.9	1191.6
2022	1413.5	882.5	2296.0	129.3	111.9	115.0	359.2	737.1	1202.7
2023	1413.5	873.1	2286.6	129.2	101.6	116.0	346.0	737.1	1202.7
2024	1413.5	873.4	2286.9	129.2	91.1	117.4	337.6	740.7	1208.6
2025	1413.5	882.2	2295.7	129.1	78.6	117.1	324.8	749.0	1222.8
2026	1413.5	873.1	2286.6	129.1	66.7	120.5	316.3	748.7	1221.6
2027	1413.5	873.7	2287.2	129.0	52.9	121.7	300.6	753.8	1229.8
2028	1413.5	882.5	2296.0	129.0	39.6	131.7	290.3	758.4	1237.3
2029	1413.5	873.1	2286.6	128.9	28.5	125.3	286.7	760.0	1239.9
2030	1413.5	873.4	2286.9	128.9	3.9	8.7	141.4	815.3	1230.2
TOTAL	43818.5	30868.1	74686.6	4797.4	6600.3	4743.8	16141.5	22271.7	36274.1
AW	626.6	582.4	1469.2	90.5	124.5	69.5	304.5	420.2	684.4
SG-1C	260.2	183.3	443.5	22.5	39.2	28.2	99.8	132.3	215.4

1AR1
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	2.5	77.2	- 74.7	- 74.7	- 29.3	- 29.3	- 30.3	- 30.3	- 30.3	- 30.3
1979	5.5	55.3	- 49.7	- 124.3	- 28.9	- 58.2	- 23.5	- 53.9	- 23.5	- 53.9
1980	6.9	42.4	- 35.5	- 160.0	- 20.8	- 78.9	- 21.4	- 75.2	- 21.4	- 75.2
1981	15.8	75.1	- 59.4	- 219.3	- 26.4	- 105.4	- 25.2	- 104.2	- 25.2	- 104.2
1982	32.3	101.3	- 69.0	- 288.4	- 22.0	- 127.3	- 22.2	- 133.8	- 22.2	- 133.8
1983	41.8	93.6	- 51.8	- 340.1	- 22.7	- 150.0	- 23.7	- 157.5	- 23.7	- 157.5
1984	51.9	78.0	- 26.1	- 366.2	- 13.0	- 163.0	- 13.9	- 171.5	- 13.9	- 171.5
1985	70.6	71.0	- .4	- 366.6	- 4.0	- 167.1	- 5.6	- 178.1	- 5.6	- 178.1
1986	87.4	52.6	34.8	- 331.8	- 11.5	- 178.5	- 11.1	- 187.6	- 11.1	- 187.6
1987	103.2	100.4	2.8	- 329.1	- 10.0	- 187.6	- 16.1	- 183.1	- 16.1	- 183.1
1988	142.1	103.9	38.2	- 290.9	- 15.0	- 152.6	- 14.3	- 168.8	- 14.3	- 168.8
1989	170.2	79.1	91.1	- 199.7	- 39.2	- 113.4	- 38.9	- 129.9	- 38.9	- 129.9
1990	178.5	93.2	85.3	- 114.4	- 38.2	- 75.2	- 37.8	- 92.0	- 37.8	- 92.0
1991	203.8	210.1	- 6.3	- 120.7	- 9.7	- 65.5	- 8.0	- 84.0	- 8.0	- 84.0
1992	246.3	425.7	- 179.4	- 300.1	- 48.1	- 113.6	- 52.3	- 136.3	- 52.3	- 136.3
1993	290.8	244.6	46.1	- 254.0	- 32.5	- 81.1	- 30.4	- 105.9	- 30.4	- 105.9
1994	345.1	337.9	7.2	- 246.8	- 25.3	- 55.8	- 22.2	- 83.7	- 22.2	- 83.7
1995	402.5	458.0	- 55.5	- 302.3	- 7.2	- 48.7	- 2.8	- 86.5	- 2.8	- 86.5
1996	432.1	663.7	- 231.7	- 534.0	- 63.4	- 112.1	- 70.8	- 150.9	- 70.8	- 150.9
1997	467.0	614.0	- 147.0	- 681.0	- 32.4	- 144.4	- 33.4	- 189.3	- 33.4	- 189.3
1998	541.0	498.8	42.1	- 638.9	- 23.9	- 120.6	- 19.3	- 170.6	- 19.3	- 170.6
1999	579.2	265.6	313.6	- 325.3	- 116.2	- 4.3	- 114.3	- 55.1	- 55.1	- 55.1
2000	2040.5	303.2	1637.3	1332.0	1020.2	1015.9	1009.1	953.4	953.4	953.4
2001	2102.1	153.6	1948.5	3480.5	1077.8	2093.7	1078.2	2031.6	2031.6	2031.6
2002	2131.2	147.0	1984.2	5464.7	1090.9	3184.5	1091.3	3122.9	3122.9	3122.9
2003	2194.6	155.4	2039.2	7503.9	1124.6	4309.1	1125.0	4247.8	4247.8	4247.8
2004	2252.4	159.0	2093.4	9597.3	1156.1	5465.2	1126.5	5374.3	5374.3	5374.3
2005	2286.6	155.4	2131.3	11728.6	1175.3	6640.4	1175.9	6580.1	6580.1	6580.1
2006	2286.9	178.9	2108.0	13836.6	1163.9	7804.3	1164.3	7741.4	7741.4	7741.4
2007	2255.7	144.4	2111.3	15947.9	1164.2	8968.5	1165.1	8929.0	8929.0	8929.0
2008	2266.6	152.4	2114.2	18062.1	1175.2	10143.7	1176.1	10100.0	10100.0	10100.0
2009	2267.2	144.3	2122.9	20185.0	1178.9	11340.6	1178.0	11283.0	11283.0	11283.0
2010	2266.0	156.3	2109.7	22294.7	1175.6	12516.2	1176.6	12460.1	12460.1	12460.1
2011	2266.6	144.1	2122.5	24417.2	1174.1	13690.4	1175.3	13630.5	13630.5	13630.5
2012	2266.9	145.3	2121.6	26538.8	1171.8	14862.2	1173.0	14808.5	14808.5	14808.5
2013	2265.7	157.1	2108.6	28647.4	1175.0	16037.1	1176.2	15984.7	15984.7	15984.7
2014	2266.6	153.9	2112.7	30760.1	1170.2	17207.3	1171.5	17156.1	17156.1	17156.1
2015	2267.2	164.6	2102.6	32862.7	1173.9	18381.2	1175.2	18331.3	18331.3	18331.3
2016	2266.0	149.1	2116.9	34979.6	1163.8	19555.0	1165.1	19516.5	19516.5	19516.5
2017	2266.6	156.9	2109.7	37089.3	1164.0	20749.0	1165.4	20701.9	20701.9	20701.9
2018	2266.9	168.5	2098.4	39187.7	1161.6	21930.6	1162.7	21884.6	21884.6	21884.6
2019	2265.7	167.2	2098.5	41286.2	1168.4	23119.0	1169.6	23074.1	23074.1	23074.1
2020	2266.6	142.4	2124.3	43410.5	1168.4	24307.4	1169.9	24264.0	24264.0	24264.0
2021	2267.2	155.4	2111.8	45522.3	1161.7	25489.1	1163.2	25447.3	25447.3	25447.3
2022	2266.0	156.6	2109.4	47631.7	1167.1	26676.3	1168.8	26636.1	26636.1	26636.1
2023	2266.6	156.6	2110.0	49741.7	1179.2	27856.0	1181.5	27817.5	27817.5	27817.5
2024	2266.9	165.9	2101.0	51842.7	1175.3	29031.3	1177.0	28994.6	28994.6	28994.6
2025	2265.7	148.7	2117.0	53959.7	1166.6	30217.9	1168.7	30183.3	30183.3	30183.3
2026	2266.6	170.2	2096.4	56056.1	1176.0	31403.9	1178.0	31361.4	31361.4	31361.4
2027	2267.2	149.9	2117.3	58173.4	1184.7	32578.5	1187.0	32546.2	32546.2	32546.2
2028	2266.0	169.1	2096.9	60269.3	1180.7	33759.3	1182.9	33731.2	33731.2	33731.2
2029	2266.6	155.7	2110.9	62380.2	1162.5	34941.8	1185.4	34916.3	34916.3	34916.3
2030	2266.9	155.4	2111.5	64491.7	1331.2	36273.0	1334.3	36236.9	36236.9	36236.9

DATE OF RETURN TO ENTERPRISE OWNER 21.03%
DATE OF RETURN AFTER TAX OF ENTERPRISE 21.83%

1AR1

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1976	75.9	*	73.4	1.1	50.5	23.9
1977	53.7	*	123.1	1.7	86.0	36.7
1978	39.9	*	157.7	2.3	112.1	47.9
1979	71.6	*	221.7	3.3	159.0	60.9
1980	97.0	*	307.9	4.5	222.4	89.9
1981	68.5	*	332.8	5.5	279.7	108.6
1982	72.2	*	439.0	6.4	325.6	119.8
1983	53.1	*	474.1	9.0	358.1	126.1
1984	33.9	*	488.7	9.5	377.2	121.0
1985	48.5	*	516.0	10.5	400.3	126.1
1986	51.0	*	543.7	16.1	434.4	129.3
1987	25.2	*	544.5	16.3	440.4	115.5
1988	39.3	*	557.7	16.0	465.0	109.5
1989	153.9	*	682.3	18.5	561.2	139.6
1990	378.3	*	1018.1	22.7	799.1	233.7
1991	188.5	*	1149.5	24.8	913.3	261.0
1992	281.1	*	1372.1	27.8	1067.1	318.9
1993	480.3	*	1700.8	32.2	1337.6	390.4
1994	605.1	*	2214.8	38.8	1721.2	532.4
1995	554.4	*	2660.6	44.8	2066.7	638.7
1996	438.2	*	2975.1	49.4	2338.3	694.2
1997	283.9	*	3047.0	51.4	2432.4	666.0
1998	76.7	*	2969.0	62.5	2445.4	606.0
1999	11.7	*	2865.5	62.0	2411.0	516.5
2000	19.5	*	2749.1	61.6	2377.7	439.1
2001	27.4	*	2639.5	61.3	2344.9	395.9
2002	38.2	*	2531.2	60.9	2268.5	282.6
2003	26.1	*	2417.6	68.3	2263.5	214.5
2004	49.2	*	2325.3	59.9	2227.7	157.6
2005	14.4	*	2262.4	59.0	2178.0	91.3
2006	22.4	*	2088.3	58.1	2114.1	32.2
2007	14.4	*	1966.7	57.0	2047.9	24.1
2008	28.4	*	1859.3	56.1	1965.5	70.1
2009	14.3	*	1739.4	54.9	1809.4	115.1
2010	19.6	*	1626.0	53.7	1632.0	102.3
2011	27.4	*	1522.3	52.5	1536.3	101.5
2012	24.2	*	1417.2	51.1	1474.1	205.0
2013	34.9	*	1328.0	49.9	1403.4	225.5
2014	19.6	*	1224.9	48.5	1317.1	243.7
2015	27.4	*	1134.5	47.2	1241.6	239.9
2016	39.1	*	1057.6	46.0	1171.3	267.9
2017	37.8	*	961.6	44.8	1098.0	271.6
2018	13.0	*	880.6	43.3	1159.6	275.0
2019	26.1	*	791.4	41.8	1101.1	267.9
2020	27.4	*	703.8	40.2	998.0	264.0
2021	27.4	*	615.1	38.5	886.5	232.0
2022	36.7	*	534.5	36.7	772.6	201.3
2023	19.6	*	437.0	34.6	639.7	168.0
2024	41.2	*	357.7	32.6	514.7	124.4
2025	20.9	*	256.0	30.3	368.7	81.6
2026	40.1	*	165.2	28.1	220.5	27.2
2027	6.8	*	36.7	20.2	34.5	27.4
2028	6.5	*	34.5	22.1	33.3	22.3

TOTAL CAPITAL INVESTMENT 4777.4

1AR1

Capital Investment Sources

YEAR	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.40601	25.6602	25.6602
1979	129.69	43.67003	42.79768	42.79768
1980	169.62	57.55009	55.97459	55.97459
1981	241.19	82.2001	79.59368	79.59367
1982	338.1799	115.73	111.3994	111.3994
1983	426.6799	146.9502	140.8044	140.8044
1984	498.8398	173.2803	164.6171	164.6171
1985	551.8997	199.8303	182.1389	182.1389
1986	585.7495	208.3803	193.2973	186.7232
1987	634.2195	228.8504	209.2924	202.7183
1988	665.2393	230.3503	226.1209	206.585
1989	710.4893	265.0706	234.4614	206.585
1990	749.8091	284.8306	247.437	206.585
1991	905.6669	344.4407	298.8706	221.675
1992	1275.929	476.8311	421.0564	306.2197
1993	1464.459	551.1311	463.2712	312.7905
1994	1745.509	658.4519	576.0172	334.4805
1995	2145.799	808.2219	706.1135	385.5862
1996	2750.909	1029.712	907.7998	524.9111
1997	3305.289	1258.582	1090.745	645.9612
1998	3743.489	1413.173	1235.351	720.3772
1999	3947.379	1514.973	1382.635	720.3772
2000	4024.109	1578.673	1327.356	720.377
2001	4035.809	1624.833	1331.817	720.3767
2002	4055.389	1677.373	1338.236	720.3765
2003	4082.668	1737.783	1347.281	720.3762
2004	4112.287	1804.362	1357.252	720.376
2005	4138.945	1875.49	1365.852	720.3757
2006	4188.184	1960.52	1382.1	720.3755
2007	4202.543	2032.519	1386.839	720.3752
2008	4224.98	2110.686	1394.243	720.375
2009	4239.34	2191.436	1399.982	720.3748
2010	4267.777	2282.283	1408.366	720.3745
2011	4282.074	2372.671	1413.064	720.3745
2012	4301.633	2469.66	1419.539	720.3743
2013	4328.992	2572.789	1428.567	720.374
2014	4353.23	2679.117	1438.566	720.3738
2015	4388.168	2784.886	1448.095	720.3735
2016	4407.727	2890.584	1454.55	720.3733
2017	4435.886	2993.514	1463.572	720.373
2018	4474.145	3102.613	1476.468	720.3728
2019	4511.941	3213.569	1488.94	720.3726
2020	4524.941	3325.369	1493.23	720.3723
2021	4551	3449.659	1501.83	720.3721
2022	4578.359	3580.358	1510.858	720.3718
2023	4605.719	3712.268	1519.887	720.3716
2024	4642.457	3869.696	1532.011	720.3713
2025	4662.016	4022.335	1539.465	720.3711
2026	4703.172	4188.461	1552.047	720.3708
2027	4724.831	4355.32	1558.93	720.3706
2028	4764.168	4543.868	1572.175	720.3704
2029	4770.926	4736.414	1574.405	720.3704
2030	4777.426	4744.866	1576.55	720.3701

PRESENT VALUE OF CAPITAL INV AT RATE % 4M 19.99998

410.8907
PRESENT VALUE OF CAPITAL INV AT RATE % 4M 10.
1032.799

1AR1

Cost Summary—Dollars in Millions.

FIS		COMMITTED COST			FINANCED COST			TOTAL
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	
0.0	TOTAL	4,777.5	4,807.6	9,585.1	4,777.4	8,640.9	4,807.6	18,225.9
1.0	CAPITAL ITEMS	4,777.5		4,777.5	4,777.4	8,640.9		11,418.3
1.1	SYSTEM FACILITIES-EQUIPMENT	3,646.6		3,646.6	3,646.5	5,124.7		8,771.2
1.1.1	SHIP	165.0		165.0	165.0	19.1		339.1
1.1.2	CASH	242.0		242.0	242.0	173.6		415.6
1.1.3	CASH TRANSPORTER, RAIL CAR	18.8		18.8	18.8	11.4		30.1
1.1.4	RAIL CAR TUG	0.8		0.8	0.8	0.4		1.2
1.1.5	CASH TRANSPORTER							
1.1.6	TEARPORT FAC	1.0		1.0	1.0	1.5		2.5
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	82.6		130.6
1.1.8	WATER BASIN 2 PORT							
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3		65.3
1.1.10	PACKAGING FACILITY							
1.1.11	PACKAGING FAC	116.0		116.0	116.0	201.2		317.2
1.1.12	CRANSTEPS	216.5		216.5	216.5	316.5		533.0
1.1.13	EMPLACEMENT TRANS	18.0		18.0	18.0	11.9		29.9
1.1.14	HAULT MODULE	640.3		640.3	640.3	698.1		1,338.5
1.1.15	CEOLOGIC REC MODULE							
1.1.16	REPOSITORY STORAGE MOD							
1.1.17	CASH	47.0		47.0	47.0	60.9		127.9
1.1.18	LOCK INTER FAC	75.0		75.0	75.0	150.1		225.1
1.1.19	HLW PFCO FAC	940.4		940.4	940.4	1,631.0		2,571.4
1.1.20	RECOVERY FAC	693.8		693.8	693.8	1,350.2		2,444.0
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6		39.3
1.2.1	NEW BLD & PLT YD	2.4		2.4	2.4	3.5		5.9
1.2.2	WAREHOUSE & ULT	12.2		12.2	12.2	21.1		33.3
1.3	CHIEFS COST	558.1		558.1	558.1	745.8		1,303.9
1.4	INTEREST DURING CONS	558.2		558.2	558.1	745.8		1,304.0
2.0	OPER. & MAINT		4,807.6	4,807.6			4,807.6	4,807.6
2.1	DIRECT LABOR		1,666.4	1,666.4			1,666.4	1,666.4
2.1.1	PORT C REC TRANS		5.1	5.1			5.1	5.1
2.1.2	WATER BASIN REC (PORT)		145.8	145.8			145.8	145.8
2.1.3	WATER BASIN REC (PORT)							
2.1.4	WATER BASIN STOP		27.1	27.1			27.1	27.1
2.1.5	PACK FAC LABOR		15.2	15.2			15.2	15.2
2.1.6	PACK FAC LABOR		313.7	313.7			313.7	313.7
2.1.7	HAULT EMPLOYMENT LABOR		44.0	44.0			44.0	44.0
2.1.8	CEOLOGIC REC MOD LABOR							
2.1.9	CASH TRANS MAINT LAB		31.2	31.2			31.2	31.2
2.1.10	LOI LH PFCOES LABOR							
2.1.11	HLW PFCO LABOR		242.1	242.1			242.1	242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1			242.1	242.1
2.2	INDIRECT LABOR		1,660.5	1,660.5			1,660.5	1,660.5
2.2.1	PORT C REC TRANS LAB		8.1	8.1			8.1	8.1
2.2.2	W.B. REC (PORT) I LAB		216.6	216.6			216.6	216.6
2.2.3	W.B. REC (PORT) I LAB							
2.2.4	W.B. STOP IND LAB		40.5	40.5			40.5	40.5
2.2.5	PACK FAC IND LAB							
2.2.6	PACK FAC IND LAB		470.4	470.4			470.4	470.4
2.2.7	HAULT IND LABOR		65.8	65.8			65.8	65.8
2.2.8	CEO REC MOD IND LAB							
2.2.9	CASH TRANS MAINT LAB		46.6	46.6			46.6	46.6
2.2.10	HLW PFCO IND LAB		7.7	7.7			7.7	7.7
2.2.11	HLW PFCO IND LAB		371.3	371.3			371.3	371.3
2.2.12	REC PLANT IND LAB		371.3	371.3			371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0			1,614.0	1,614.0
2.3.1	PORT C REC TRANS		8.1	8.1			8.1	8.1
2.3.2	W.B. REC (PORT) 4 PORT		216.6	216.6			216.6	216.6
2.3.3	W.B. REC (PORT) 2 PORT							
2.3.4	W.B. STORAGE ORNS		40.5	40.5			40.5	40.5
2.3.5	PACK ORNS (2000)							
2.3.6	PACK ORNS (2000)		470.4	470.4			470.4	470.4
2.3.7	HAULT ORNS		65.8	65.8			65.8	65.8
2.3.8	CEOLOGIC REC ORNS							
2.3.9	CASH TRANS		46.6	46.6			46.6	46.6
2.3.10	HLW PFCO CASH		21.3	21.3			21.3	21.3
2.3.11	HLW PROCESSING ORNS		371.3	371.3			371.3	371.3
2.3.12	RECOVERY PLANT ORNS		371.3	371.3			371.3	371.3
2.4	CONTRACTED SERVICES		423.6	423.6			423.6	423.6
2.4.1	SHIP CH		327.2	327.2			327.2	327.2
2.4.2	US PORT FEE		0.4	0.4			0.4	0.4
2.4.3	ELFCR PORT FEE STOP							
2.4.4	US FAULT (TO STOP)		17.7	17.7			17.7	17.7
2.4.5	ELFCR FAULT TRANS							
2.4.6	US STOP (TIME CHRG)		61.3	61.3			61.3	61.3
2.4.7	ELFCR STOP							
2.4.8	US RECON CF							
2.4.9	ELFCR REC CR							
2.4.10	ELFCR WASTE DIS							
2.4.11	US FAULT TRANS		17.0	17.0			17.0	17.0
2.4.12	ELFCR FAULT TRANS							
2.4.13	ELFCR FAULT TRANS							
2.4.14	US PORT FEE							
2.4.15	ELFCR PORT FEE							
2.4.16	ELFCR PORT FEE							
2.4.17	PACIFIC PORT FEE							
2.4.18	PACIFIC PORT FEE							
2.4.19	PACIFIC PORT FEE							
2.4.20	PAC FAULT TRANS							
2.4.21	PAC FAULT TRANS							
2.5	DECON TRUST FUND		103.0	103.0			103.0	103.0

Section E 3.2

Case: 2A (Revision 1)

Description: Fuel Cycle Center (FCC) Baseline
Except enterprise ROI @ 15%

Summary of Input Characteristics:

Financial

Enterprise ROI - 15%
Borrowing - 2/3 of any capital expenditure at 10%
Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific
Location cost factor - 1.0
Water provisions - none

Storage

Type of storage - aircooled vaults
Storage cost factor - 1.0

Recovery

Start up time - 2000
Modular plant - single plant
Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population
Recovery credit - none

Summary of Output Characteristics:

Capital Investment	-	4.777 billion dollars
Owners ROI	-	14.3%
Service charge	-	\$81.5/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/KG) \$81.494
 RATE OF RETURN ON INVESTMENT 15.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$47967.358

2A11

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SEPU CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	1.1	1.1	1.3	5.1	2.3	8.9	.0	7.8
1979	.0	2.5	2.5	1.5	8.6	4.1	14.3	.0	11.8
1980	.0	3.1	3.1	2.5	11.3	5.3	19.1	.0	16.0
1981	.0	7.0	7.0	3.6	16.0	7.6	27.1	.0	20.1
1982	.0	14.3	14.3	3.3	22.4	10.7	37.5	.0	29.1
1983	.0	18.6	18.6	5.1	28.2	13.6	46.9	.0	28.3
1984	.0	23.1	23.1	5.9	32.8	16.0	54.7	.0	31.6
1985	.0	31.4	31.4	18.0	36.1	17.2	72.0	.0	40.6
1986	.0	38.8	38.8	18.7	38.1	19.2	76.0	.0	37.2
1987	.0	45.9	45.9	32.0	41.0	21.2	114.2	.0	68.3
1988	.0	63.2	63.2	32.9	43.9	23.3	120.1	.0	57.0
1989	.0	73.7	73.7	33.6	45.1	24.5	123.4	.0	47.6
1990	.0	79.3	79.3	33.0	47.2	26.1	127.1	.0	47.2
1991	.0	90.6	90.6	34.2	56.9	31.3	142.5	.0	51.5
1992	.0	109.3	109.3	35.4	60.9	32.4	178.8	.0	69.3
1993	.0	129.3	129.3	36.1	92.5	39.1	197.7	.0	66.4
1994	.0	153.4	153.4	36.9	110.2	38.3	225.5	.0	72.1
1995	.0	178.9	178.9	37.7	135.5	71.6	264.8	.0	85.3
1996	.0	192.1	192.1	38.6	174.3	91.1	324.1	.0	132.0
1997	.0	216.5	216.5	39.6	209.3	108.6	377.5	.0	161.0
1998	.0	240.5	240.5	60.6	236.0	123.7	420.3	.0	179.8
1999	.0	257.5	257.5	61.7	246.7	132.0	440.3	.0	182.8
2000	1413.5	278.8	1692.3	126.5	248.4	134.8	509.6	449.4	733.2
2001	1413.5	306.2	1719.7	126.9	245.3	135.2	507.5	460.6	751.0
2002	1413.5	319.1	1732.6	127.5	242.4	135.8	505.7	468.2	760.7
2003	1413.5	347.3	1760.8	128.1	239.6	137.0	504.7	477.3	778.8
2004	1413.5	373.0	1786.5	128.0	236.5	138.4	503.7	487.4	795.3
2005	1413.5	386.2	1801.7	129.3	232.6	139.6	501.5	494.1	806.1
2006	1413.5	388.3	1801.8	129.6	229.6	141.5	500.8	494.4	806.6
2007	1413.5	392.2	1805.7	130.0	223.7	137.3	491.0	499.6	815.1
2008	1413.5	388.2	1801.7	130.0	218.5	136.6	485.0	500.3	816.3
2009	1413.5	388.4	1801.9	129.9	212.4	135.9	478.2	503.0	820.7
2010	1413.5	392.3	1805.8	129.9	206.7	135.9	472.4	506.7	826.7
2011	1413.5	388.2	1801.7	129.8	199.5	134.2	463.5	508.5	829.7
2012	1413.5	388.3	1801.8	129.8	192.2	133.0	455.0	511.8	833.0
2013	1413.5	392.2	1805.7	129.7	185.0	131.1	445.8	516.8	843.1
2014	1413.5	388.2	1801.7	129.7	177.2	129.4	436.2	518.9	846.6
2015	1413.5	388.4	1801.9	129.6	169.7	124.1	423.5	523.2	854.6
2016	1413.5	392.3	1805.8	129.6	161.6	122.6	413.8	529.0	863.0
2017	1413.5	388.2	1801.7	129.5	153.5	117.7	400.8	532.3	868.5
2018	1413.5	388.3	1801.8	129.5	146.8	116.0	392.2	539.6	873.9
2019	1413.5	392.2	1805.7	129.4	139.7	113.8	382.9	540.7	882.2
2020	1413.5	388.2	1801.7	129.4	130.7	113.9	373.9	542.5	890.2
2021	1413.5	388.4	1801.9	129.3	121.7	113.3	356.3	545.5	898.1
2022	1413.5	392.3	1805.8	129.3	111.9	113.0	336.2	550.9	908.6
2023	1413.5	388.2	1801.7	129.2	101.6	110.0	316.8	552.8	920.0
2024	1413.5	388.3	1801.8	129.2	91.1	117.4	327.8	556.4	927.8
2025	1413.5	392.2	1805.7	129.1	78.6	117.1	324.8	562.8	938.2
2026	1413.5	388.2	1801.7	129.1	66.7	120.5	316.3	564.4	940.9
2027	1413.5	388.4	1801.9	129.0	52.9	121.7	303.6	569.4	949.0
2028	1413.5	392.3	1805.8	129.0	39.6	131.7	300.3	572.1	953.5
2029	1413.5	388.2	1801.7	128.9	22.5	132.3	286.7	575.7	959.3
2030	1413.5	388.3	1801.8	128.9	9.7	131.0	269.6	581.0	969.4
TOTAL	43010.5	10720.7	53731.2	4797.4	6600.3	4743.0	16140.6	18679.9	25121.6
N/C	826.8	258.9	1085.7	90.5	124.5	69.5	304.5	307.2	474.0
\$4-YC	268.2	81.5	349.7	28.5	39.2	28.2	95.8	96.7	149.2

2AR1
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	1.1	77.2	- 76.1	- 76.1	- 30.7	- 30.7	- 31.7	- 31.7	- 31.7	- 31.7
1979	2.5	55.3	- 52.8	- 128.9	- 26.0	- 56.6	- 26.6	- 58.3	- 26.6	- 58.3
1980	3.1	42.4	- 39.4	- 168.3	- 24.6	- 81.2	- 25.2	- 83.0	- 25.2	- 83.0
1981	7.0	75.1	- 68.1	- 236.4	- 37.2	- 118.4	- 38.2	- 121.7	- 38.2	- 121.7
1982	14.3	101.3	- 87.0	- 323.4	- 45.9	- 164.3	- 47.1	- 168.8	- 47.1	- 168.8
1983	13.6	93.6	- 79.0	- 402.4	- 45.9	- 210.2	- 47.0	- 215.8	- 47.0	- 215.8
1984	23.1	79.0	- 55.9	- 458.3	- 41.9	- 252.1	- 42.6	- 258.5	- 42.6	- 258.5
1985	31.4	71.0	- 39.6	- 497.9	- 43.2	- 295.3	- 43.6	- 302.1	- 43.6	- 302.1
1986	38.8	52.6	- 13.7	- 511.6	- 32.7	- 328.0	- 33.2	- 337.3	- 33.2	- 337.3
1987	45.9	100.4	- 54.6	- 566.2	- 67.4	- 395.4	- 73.4	- 410.7	- 73.4	- 410.7
1988	63.2	103.9	- 40.7	- 606.9	- 55.6	- 451.0	- 56.3	- 467.0	- 56.3	- 467.0
1989	75.7	79.1	- 3.4	- 610.3	- 37.5	- 488.5	- 37.9	- 505.0	- 37.9	- 505.0
1990	79.3	93.2	- 13.9	- 624.2	- 41.4	- 529.9	- 41.8	- 546.8	- 41.8	- 546.8
1991	90.6	210.1	- 119.5	- 743.7	- 80.2	- 610.1	- 81.3	- 628.0	- 81.3	- 628.0
1992	109.5	423.7	- 314.2	- 1057.9	- 129.2	- 739.3	- 123.4	- 751.4	- 123.4	- 751.4
1993	129.3	244.6	- 115.4	- 1173.3	- 93.7	- 833.0	- 95.7	- 847.8	- 95.7	- 847.8
1994	153.4	337.9	- 184.5	- 1357.8	- 120.9	- 953.9	- 124.0	- 966.2	- 124.0	- 966.2
1995	176.9	458.0	- 281.1	- 1638.9	- 164.1	- 1118.0	- 168.4	- 1134.6	- 168.4	- 1134.6
1996	192.1	663.7	- 471.6	- 2110.5	- 262.3	- 1380.3	- 268.3	- 1401.4	- 268.3	- 1401.4
1997	216.5	614.0	- 397.5	- 2508.0	- 261.3	- 1641.6	- 267.2	- 1668.2	- 267.2	- 1668.2
1998	240.5	498.8	- 258.3	- 2766.3	- 230.7	- 1872.3	- 235.3	- 1903.8	- 235.3	- 1903.8
1999	257.5	265.6	- 8.1	- 2774.4	- 152.7	- 2025.0	- 154.6	- 2059.4	- 154.6	- 2059.4
2000	1692.3	203.2	1489.0	- 1285.4	804.3	- 1220.7	793.2	- 1313.2	793.2	- 1313.2
2001	1719.7	138.6	1581.0	544.4	840.6	410.1	841.1	472.1	841.1	472.1
2002	1732.6	147.0	1585.6	1630.0	843.7	433.7	844.1	372.0	844.1	372.0
2003	1760.8	155.4	1605.4	3235.4	855.6	1289.3	856.0	1228.0	856.0	1228.0
2004	1786.5	159.0	1627.5	4862.9	867.2	2156.4	867.8	2095.8	867.8	2095.8
2005	1801.7	155.4	1646.3	6509.2	874.6	3031.1	875.2	2970.8	875.2	2970.8
2006	1801.8	178.9	1622.9	8132.1	863.1	3894.2	863.5	3834.3	863.5	3834.3
2007	1805.7	144.4	1661.4	9793.5	880.4	4774.6	881.4	4715.0	881.4	4715.0
2008	1801.7	152.4	1649.3	11442.8	874.0	5648.6	875.4	5591.0	875.4	5591.0
2009	1801.9	144.3	1657.7	13099.5	876.1	6524.7	877.1	6468.1	877.1	6468.1
2010	1805.8	158.3	1647.5	14747.0	871.7	7396.4	872.7	7340.8	872.7	7340.8
2011	1801.7	144.1	1657.6	16404.6	873.5	8270.0	874.7	8215.0	874.7	8215.0
2012	1801.8	149.3	1652.5	18057.1	871.0	9141.4	872.2	9087.7	872.2	9087.7
2013	1805.7	157.1	1648.6	19705.7	871.2	10012.6	872.4	9960.1	872.4	9960.1
2014	1801.7	153.9	1647.8	21353.5	869.5	10882.1	870.6	10830.9	870.6	10830.9
2015	1801.9	164.6	1637.4	23000.9	873.1	11755.2	874.3	11705.3	874.3	11705.3
2016	1805.8	149.1	1656.7	24657.6	879.9	12635.1	881.3	12586.0	881.3	12586.0
2017	1801.7	156.9	1644.8	26302.4	883.4	13518.4	884.7	13471.3	884.7	13471.3
2018	1801.8	160.5	1641.3	27943.7	880.8	14399.3	882.0	14353.2	882.0	14353.2
2019	1805.7	167.2	1638.5	29582.2	884.6	15283.9	885.8	15239.0	885.8	15239.0
2020	1801.7	155.4	1646.3	31228.5	887.7	16171.6	889.2	16128.2	889.2	16128.2
2021	1801.9	156.6	1645.3	32873.8	888.9	17060.5	892.4	17018.6	892.4	17018.6
2022	1805.8	156.6	1649.2	34523.0	883.3	17943.7	884.9	17895.0	884.9	17895.0
2023	1801.7	156.9	1644.8	36167.8	879.1	18814.8	880.8	18776.3	880.8	18776.3
2024	1801.8	165.9	1635.9	37803.7	874.5	19689.3	876.3	19652.6	876.3	19652.6
2025	1805.7	148.7	1657.0	39460.7	882.8	20572.1	884.9	20537.5	884.9	20537.5
2026	1801.7	170.2	1631.5	41092.2	875.3	21447.5	877.3	21414.8	877.3	21414.8
2027	1801.9	149.9	1652.0	42744.2	882.8	22330.3	884.1	22291.0	884.1	22291.0
2028	1805.8	169.1	1636.7	44380.9	876.8	23207.1	879.1	23168.0	879.1	23168.0
2029	1801.7	155.7	1646.0	46026.9	881.8	24088.9	884.7	24044.7	884.7	24044.7
2030	1801.8	155.4	1646.4	47673.3	1038.4	25127.4	1033.6	25096.3	1033.6	25096.3

RATE OF RETURN TO ENTERPRISE OWNER 14.28%
RATE OF RETURN AFTER TAX OF ENTERPRISE 14.37%

2AR1

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	*	FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1976	75.9	*	70.4	1.1	50.5	23.9
1977	53.7	*	123.1	1.7	86.0	38.7
1978	39.9	*	157.7	2.3	112.1	47.9
1979	71.6	*	221.7	3.3	159.0	65.9
1980	97.0	*	307.9	4.5	222.4	83.9
1981	68.5	*	362.0	5.5	275.7	108.8
1982	72.2	*	439.0	6.4	325.6	119.8
1983	53.1	*	474.1	9.0	358.1	125.1
1984	33.9	*	488.7	9.5	377.2	121.0
1985	48.5	*	516.0	13.5	405.3	125.1
1986	51.0	*	543.7	18.1	434.4	129.4
1987	25.2	*	544.5	16.5	443.4	115.2
1988	39.3	*	537.7	16.8	450.6	109.5
1989	155.9	*	682.3	18.0	561.2	139.8
1990	370.3	*	1010.1	22.7	799.1	233.7
1991	189.5	*	1149.5	24.0	913.3	261.0
1992	281.1	*	1372.1	27.0	1087.1	312.9
1993	400.3	*	1700.8	32.2	1337.6	395.4
1994	605.1	*	2214.0	38.0	1721.2	532.4
1995	554.4	*	2660.6	44.6	2066.7	638.7
1996	438.2	*	2975.1	49.4	2330.3	694.2
1997	203.9	*	3047.0	51.4	2432.4	664.0
1998	76.7	*	2969.0	62.5	2445.4	606.0
1999	11.7	*	2665.5	62.0	2411.0	516.5
2000	19.5	*	2749.1	61.6	2377.7	433.1
2001	27.4	*	2639.5	61.3	2344.9	395.9
2002	30.2	*	2531.2	60.9	2308.5	283.6
2003	26.1	*	2417.6	60.3	2263.5	214.5
2004	49.2	*	2325.3	59.9	2227.7	157.6
2005	14.4	*	2202.4	59.0	2170.0	91.3
2006	22.4	*	2088.3	58.1	2114.1	32.2
2007	14.4	*	1966.7	57.0	2047.9	24.1
2008	28.4	*	1859.3	56.1	1985.5	70.1
2009	14.3	*	1739.4	54.9	1909.4	115.1
2010	19.6	*	1626.0	53.7	1832.0	152.3
2011	27.4	*	1522.3	52.5	1756.3	161.5
2012	24.2	*	1417.2	51.1	1674.1	205.8
2013	34.9	*	1328.0	49.9	1603.4	225.5
2014	19.6	*	1224.9	48.5	1517.1	243.7
2015	27.4	*	1134.5	47.2	1441.6	259.9
2016	39.1	*	1027.6	46.0	1371.5	267.9
2017	37.8	*	981.6	44.8	1298.0	271.8
2018	13.0	*	880.6	43.3	1199.6	275.8
2019	26.1	*	791.4	41.0	1101.1	267.9
2020	27.4	*	703.0	40.2	998.0	254.0
2021	27.4	*	615.1	38.5	886.5	232.8
2022	36.7	*	534.5	36.7	772.6	201.3
2023	19.6	*	437.0	34.6	659.7	168.0
2024	41.2	*	357.7	32.6	544.7	124.4
2025	20.9	*	256.8	30.5	428.7	81.6
2026	40.1	*	165.2	28.1	320.5	27.2
2027	6.8	*	36.7	25.2	34.5	27.4
2028	6.5	*	34.5	22.1	33.3	23.3

TOTAL CAPITAL INVESTMENT 4777.4

2AR1

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.40081	25.0602	25.0602
1979	129.69	43.67063	42.79768	42.79768
1980	169.62	57.55009	55.97459	55.97458
1981	241.13	82.28061	79.59268	79.59267
1982	338.1799	115.73	111.5994	111.5994
1983	426.6799	146.9582	140.8044	140.8044
1984	498.8398	173.2803	164.6171	164.6171
1985	551.2997	193.2803	182.1269	182.1269
1986	585.7495	208.5803	195.2973	195.2974
1987	634.2195	228.8984	209.2924	209.2925
1988	665.2393	250.8503	226.1289	226.1291
1989	710.4893	265.0706	234.4614	234.4616
1990	749.8091	284.8306	247.437	247.4372
1991	903.6689	344.4407	298.8706	298.8708
1992	1275.529	476.8311	421.8564	421.8566
1993	1464.459	551.1311	463.2712	463.2713
1994	1745.509	658.4519	576.0178	576.0178
1995	2145.799	808.2212	706.1135	706.1135
1996	2750.909	1029.712	907.7998	907.7998
1997	3305.299	1238.562	1090.745	1090.745
1998	3743.469	1413.173	1235.351	1235.351
1999	3947.379	1514.973	1302.635	1302.635
2000	4024.189	1578.673	1327.956	1327.956
2001	4035.899	1624.833	1331.817	1331.817
2002	4055.309	1677.573	1333.252	1333.252
2003	4082.668	1737.783	1347.281	1347.281
2004	4112.887	1804.362	1357.252	1357.252
2005	4138.945	1875.49	1365.852	1365.852
2006	4168.164	1968.52	1382.1	1382.1
2007	4202.543	2032.519	1386.839	1386.839
2008	4224.98	2110.886	1394.245	1394.245
2009	4239.34	2191.436	1398.962	1398.962
2010	4267.777	2282.283	1408.366	1408.366
2011	4282.074	2372.671	1413.084	1413.084
2012	4301.633	2469.66	1419.539	1419.539
2013	4328.992	2572.769	1428.567	1428.567
2014	4353.23	2679.117	1436.566	1436.566
2015	4386.168	2784.806	1448.095	1448.095
2016	4407.727	2890.584	1454.55	1454.55
2017	4435.086	2993.514	1463.578	1463.578
2018	4474.145	3102.613	1476.468	1476.468
2019	4511.941	3213.969	1488.94	1488.94
2020	4524.941	3325.365	1493.23	1493.23
2021	4551	3449.859	1501.83	1501.83
2022	4578.359	3580.358	1510.258	1510.258
2023	4605.719	3719.268	1519.887	1519.887
2024	4642.457	3869.896	1532.011	1532.011
2025	4682.016	4022.335	1538.465	1538.465
2026	4703.172	4188.461	1552.047	1552.047
2027	4724.031	4355.32	1558.94	1558.94
2028	4764.168	4543.668	1572.175	1572.175
2029	4770.926	4736.414	1574.405	1574.405
2030	4777.426	4744.066	1576.55	1576.55

PRESENT VALUE OF CAPITAL INV AT RATE % 4M 15.
613.093
PRESENT VALUE OF CAPITAL INV AT RATE % 4M 10.
1092.799

2AR1

Cost Summary—Dollars in Millions

FIS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS
0.0	TOTAL	4,777.3	4,807.6	9,585.1	4,777.4	6,640.9	4,807.6
1.0	CAPITAL ITEMS	4,777.3		4,777.3	4,777.4	6,640.9	
1.1	SYSTEM FACILITIES-EQUIPMENT	3,646.6		3,646.6	3,646.5	5,124.7	
1.1.1	SHIP	165.0		165.0	165.0	194.1	
1.1.2	CASH	242.0		242.0	242.0	173.6	
1.1.3	CASH TRANSPORTER, RAIL CAR	18.8		18.8	18.8	11.4	
1.1.4	RAIL CAR TUG	0.8		0.8	0.8	0.4	
1.1.5	CASH TRANSPORTER						
1.1.6	SEAPORT FAC	1.0		1.0	1.0	1.5	
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	82.6	
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3	
1.1.10	PACKAGING FACILITY						
1.1.11	PACKAGING FAC	116.0		116.0	116.0	201.2	
1.1.12	CHIMNEYS	216.5		216.5	216.5	316.5	
1.1.13	DISPLACEMENT TRANS	18.0		18.0	18.0	11.9	
1.1.14	HAULT MODULE	640.3		640.3	640.3	658.1	
1.1.15	CEOLOGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CASH	47.0		47.0	47.0	60.9	
1.1.18	LOW INTER FAC	75.0		75.0	75.0	130.1	
1.1.19	HLW PROC FAC	940.4		940.4	940.4	1,631.0	
1.1.20	RECOVERY FAC	693.8		693.8	693.8	1,250.2	
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6	
1.2.1	ASH BLD & FLT YD	2.4		2.4	2.4	3.5	
1.2.2	WAREHOUSE & FLT	12.2		12.2	12.2	21.1	
1.3	OWERS COST	558.1		558.1	558.1	745.8	
1.4	INTEREST DURING CONS	558.2		558.2	558.1	745.8	
2.0	OPER. MAINT		4,807.6	4,807.6			4,807.6
2.1	DIRECT LABOR		1,666.4	1,666.4			1,666.4
2.1.1	PORT C REC TRANS		5.1	5.1			5.1
2.1.2	WATER BASIN REC (PORT)		145.8	145.8			145.8
2.1.3	WATER BASIN REC (SEAPORT)						
2.1.4	WATER BASIN STOP		27.1	27.1			27.1
2.1.5	FROM FAC LABOR		15.2	15.2			15.2
2.1.6	FROM FAC LABOR		313.7	313.7			313.7
2.1.7	HAULT EMPLOYMENT LABOR		44.0	44.0			44.0
2.1.8	CEOLOGIC REC MOD LABOR						
2.1.9	CASH TRANS MAINT LAB		31.2	31.2			31.2
2.1.10	LOW INTER PROCESS LABOR						
2.1.11	HLW PROC LABOR		242.1	242.1			242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1			242.1
2.2	INDIRECT LABOR		1,660.5	1,660.5			1,660.5
2.2.1	PORT C REC TRANS LAB		8.1	8.1			8.1
2.2.2	WATER BASIN REC (PORT) LAB		218.6	218.6			218.6
2.2.3	WATER BASIN REC (SEAPORT) LAB						
2.2.4	WATER BASIN STOP LAB		40.5	40.5			40.5
2.2.5	FROM FAC LAB						
2.2.6	FROM FAC LAB		470.4	470.4			470.4
2.2.7	HAULT LAB		65.8	65.8			65.8
2.2.8	CEOLOGIC REC MOD LAB						
2.2.9	CASH TRANS MAINT LAB		46.6	46.6			46.6
2.2.10	LOW INTER PROCESS LAB		7.7	7.7			7.7
2.2.11	HLW PROC LAB		371.3	371.3			371.3
2.2.12	RECOVERY PLANT LAB		371.3	371.3			371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0			1,614.0
2.3.1	PORT REC FNS		8.1	8.1			8.1
2.3.2	WATER BASIN REC (PORT) FNS		218.6	218.6			218.6
2.3.3	WATER BASIN REC (SEAPORT) FNS						
2.3.4	WATER BASIN STOP FNS		40.5	40.5			40.5
2.3.5	FROM FAC FNS						
2.3.6	FROM FAC FNS		470.4	470.4			470.4
2.3.7	HAULT FNS		65.8	65.8			65.8
2.3.8	CEOLOGIC REC FNS						
2.3.9	CASH TRANS FNS		46.6	46.6			46.6
2.3.10	LOW INTER PROCESS FNS		21.3	21.3			21.3
2.3.11	HLW PROCESSING FNS		371.3	371.3			371.3
2.3.12	RECOVERY PLANT FNS		371.3	371.3			371.3
2.4	CONTRACTED SERVICES		423.6	423.6			423.6
2.4.1	SHIP ON		327.2	327.2			327.2
2.4.2	US PORT FEE		0.4	0.4			0.4
2.4.3	ELFOP PORT FEE STOP						
2.4.4	US FRIUSE TO STOP		17.7	17.7			17.7
2.4.5	ELFOP PAIR TRANS						
2.4.6	US STOP (TIME CHRG)		61.3	61.3			61.3
2.4.7	ELFOP STOP						
2.4.8	US RECON OF						
2.4.9	ELFOP REC OF						
2.4.10	ELFOP WASTE DIS						
2.4.11	US PAIR TRANS		17.0	17.0			17.0
2.4.12	ELFOP PAIR TRANS						
2.4.13	ELFOP PAIR TRANS						
2.4.14	US PORT FEE						
2.4.15	ELFOP PORT FEE						
2.4.16	ELFOP PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	PACIFIC PORT FEE						
2.4.19	PACIFIC PORT FEE						
2.4.20	PACIFIC PORT FEE						
2.4.21	PACIFIC PORT FEE						
2.5	DECON TRUST FUND		103.0	103.0			103.0

Section E 3.3

Case: 3A (Revision 1)

Description: Fuel Cycle Center (FCC) Baseline
Except enterprise ROI @ 25%

Summary of Input Characteristics:

Financial

Enterprise ROI - 25%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - None

Summary of Output Characteristics:

Capital Investment - 4.777 billion dollars

Owners ROI - 28.3%

Service charge - \$279.5

COST OF SPENT FUEL SERVICE (DOLLARS/YO) \$279.492
 RATE OF RETURN ON INVESTMENT 25.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$61310.360

3AR1

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	3.8	3.8	1.3	3.1	2.5	6.9	.0	5.1
1979	.0	8.5	8.5	1.5	6.6	4.1	14.3	.0	5.8
1980	.0	18.5	18.5	2.5	11.3	5.3	19.1	.0	8.6
1981	.0	24.0	24.0	3.6	16.8	7.5	27.1	.0	3.1
1982	.0	49.2	49.2	4.3	22.4	10.7	37.5	4.5	7.3
1983	.0	63.8	63.8	5.1	28.2	13.8	46.9	6.4	10.5
1984	.0	79.2	79.2	5.9	32.8	16.8	54.7	9.3	15.2
1985	.0	107.6	107.6	10.0	36.1	17.9	72.0	13.6	22.1
1986	.0	133.2	133.2	10.7	38.1	19.2	76.8	21.7	35.5
1987	.0	157.4	157.4	32.0	41.0	21.2	114.2	16.4	25.8
1988	.0	216.6	216.6	32.9	43.9	23.3	120.1	36.7	35.8
1989	.0	259.5	259.5	33.8	45.1	24.5	123.4	51.7	34.4
1990	.0	272.1	272.1	33.8	47.2	26.1	127.1	55.1	39.9
1991	.0	310.8	310.8	34.2	56.9	31.3	142.5	64.8	104.4
1992	.0	373.5	373.5	35.4	60.9	42.4	178.6	74.7	122.6
1993	.0	443.3	443.3	36.1	92.5	49.1	197.7	93.3	152.3
1994	.0	526.1	526.1	36.9	110.2	58.5	225.5	114.2	186.4
1995	.0	613.7	613.7	37.7	135.5	71.8	264.8	122.6	216.3
1996	.0	658.8	658.8	38.6	174.3	91.1	324.1	127.2	207.6
1997	.0	742.6	742.6	39.6	209.3	108.6	377.5	136.7	226.3
1998	.0	824.0	824.0	60.6	226.8	123.7	420.3	153.7	220.8
1999	.0	883.1	883.1	61.7	246.7	132.0	440.3	166.2	274.2
2000	1413.5	956.1	2369.6	126.5	248.4	134.8	509.6	706.8	1153.2
2001	1413.5	1058.0	2463.5	126.9	245.3	135.2	507.5	743.3	1212.7
2002	1413.5	1094.3	2507.8	127.5	242.4	135.8	505.7	760.8	1241.3
2003	1413.5	1191.0	2604.5	128.1	239.6	137.0	504.7	797.9	1301.9
2004	1413.5	1279.2	2692.7	128.8	236.5	138.4	503.7	831.8	1357.1
2005	1413.5	1331.3	2744.8	129.3	232.6	139.6	501.5	852.4	1390.8
2006	1413.5	1331.7	2745.2	129.6	229.6	141.5	500.8	852.9	1391.5
2007	1413.5	1345.1	2758.6	130.0	223.7	137.3	491.0	861.7	1405.9
2008	1413.5	1331.3	2744.8	130.0	218.5	136.6	485.0	858.7	1401.1
2009	1413.5	1332.2	2745.7	129.9	212.4	135.9	478.2	861.7	1405.9
2010	1413.5	1345.6	2759.1	129.9	206.7	135.9	472.4	868.9	1417.7
2011	1413.5	1331.3	2744.8	129.8	199.5	134.2	463.5	866.9	1414.4
2012	1413.5	1331.7	2745.2	129.8	192.2	133.0	455.0	870.3	1420.0
2013	1413.5	1345.1	2758.6	129.7	185.0	131.1	445.8	878.9	1433.9
2014	1413.5	1331.3	2744.8	129.7	177.2	129.4	436.2	877.3	1431.3
2015	1413.5	1332.2	2745.7	129.6	169.7	124.1	423.5	882.4	1439.7
2016	1413.5	1345.6	2759.1	129.6	161.6	122.6	413.8	891.2	1454.0
2017	1413.5	1331.3	2744.8	129.5	153.5	117.7	400.8	890.7	1453.3
2018	1413.5	1331.7	2745.2	129.5	146.8	116.0	392.2	894.1	1458.9
2019	1413.5	1345.1	2758.6	129.4	139.7	113.8	382.9	902.8	1473.0
2020	1413.5	1331.3	2744.8	129.4	130.7	113.9	373.9	900.9	1469.9
2021	1413.5	1332.2	2745.7	129.3	121.7	113.3	366.3	904.2	1475.2
2022	1413.5	1345.6	2759.1	129.3	111.9	115.0	356.2	913.1	1489.8
2023	1413.5	1331.3	2744.8	129.2	101.6	116.0	345.8	911.2	1486.7
2024	1413.5	1331.7	2745.2	129.2	91.1	117.4	327.6	914.9	1492.7
2025	1413.5	1345.1	2758.6	129.1	86.7	117.1	324.8	924.9	1509.0
2026	1413.5	1331.3	2744.8	129.1	78.6	120.5	316.3	922.8	1506.7
2027	1413.5	1332.2	2745.7	129.0	66.7	121.7	308.6	926.0	1514.1
2028	1413.5	1345.6	2759.1	129.0	59.6	131.7	290.3	934.5	1524.5
2029	1413.5	1331.3	2744.8	128.9	22.5	135.3	286.7	934.1	1524.0
2030	1413.5	1331.7	2745.2	128.9	3.9	8.7	141.4	939.5	1514.4
TOTAL	43818.5	47067.0	90885.2	4797.4	6600.3	4742.0	16140.6	26411.5	46009.1
Avg	826.8	688.1	1714.8	90.5	124.5	89.5	304.5	536.1	874.2
\$3-YO	260.2	279.5	539.7	28.5	39.2	28.2	95.9	168.7	275.1

3AR1 Yearly Cash Statement

UNFINANCED ENTERPRISE BEFORE TAX					FINANCED ENTERPRISE AFTER TAX			OWNERS	
YEAR	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	
1979	3.8	77.2	- 73.4	- 73.4	- 28.0	- 28.0	- 29.0	- 29.0	
1979	6.5	55.3	- 48.8	- 122.2	- 20.0	- 47.9	- 20.0	- 49.0	
1980	10.5	42.4	- 31.9	- 154.1	- 17.1	- 65.1	- 17.7	- 67.4	
1981	24.0	75.1	- 51.1	- 205.2	- 20.2	- 85.2	- 21.1	- 88.5	
1982	49.2	101.3	- 52.1	- 257.3	- 15.0	- 100.7	- 16.7	- 105.2	
1983	63.6	90.6	- 27.0	- 284.3	- 7.1	- 107.9	- 8.2	- 113.4	
1984	79.2	76.0	1.2	- 283.0	4.9	- 103.0	4.0	- 109.4	
1985	107.6	71.8	35.8	- 247.3	19.5	- 83.5	16.9	- 92.5	
1986	133.2	52.6	80.7	- 166.7	39.9	- 43.6	39.5	- 53.0	
1987	157.4	100.4	57.0	- 109.7	27.7	- 15.9	21.7	- 31.4	
1988	216.6	103.9	112.7	3.0	61.2	45.3	60.0	29.2	
1989	259.5	79.1	180.4	183.4	94.6	139.9	94.3	123.4	
1990	272.1	99.2	172.9	356.4	96.2	236.2	96.9	219.3	
1991	310.8	210.1	100.7	457.1	76.0	312.2	74.3	293.7	
1992	375.5	425.7	- 50.2	406.9	32.0	344.2	27.8	321.5	
1993	443.3	244.6	198.7	605.6	127.1	471.3	125.0	446.5	
1994	526.1	307.9	218.2	823.8	137.6	608.8	134.5	581.0	
1995	613.7	458.0	155.7	979.5	138.1	747.0	133.7	714.7	
1996	658.8	663.7	- 4.9	974.6	77.2	824.1	70.6	785.3	
1997	742.6	614.0	128.6	1103.2	126.1	950.2	130.1	915.4	
1998	824.0	498.8	325.2	1428.4	199.9	1150.1	195.3	1100.7	
1999	883.1	265.6	617.5	2045.9	304.7	1454.8	302.7	1403.4	
2000	2369.6	203.2	2166.4	4212.3	1224.2	2679.0	1213.2	2557.6	
2001	3463.5	138.6	3324.9	7537.2	1301.8	3980.8	1292.2	3816.8	
2002	2507.8	147.0	2360.8	9898.0	1324.4	5305.2	1324.7	5180.5	
2003	2604.5	155.4	2449.1	11347.1	1372.7	6677.9	1379.1	6543.6	
2004	2692.7	159.8	2532.9	13879.9	1429.0	8106.9	1429.4	8052.1	
2005	2744.8	155.4	2589.5	16469.4	1459.4	9566.3	1459.9	9512.0	
2006	2745.2	176.9	2568.3	19037.7	1448.0	11014.3	1448.5	10960.5	
2007	2758.6	144.4	2614.2	21651.9	1471.2	12485.5	1472.2	12432.6	
2008	2744.8	152.4	2592.4	24244.3	1459.3	13944.8	1460.1	13892.8	
2009	2745.7	144.3	2601.4	26845.7	1461.2	15406.0	1462.2	15353.0	
2010	2759.1	156.3	2602.8	29448.5	1462.7	16868.7	1463.7	16818.7	
2011	2744.6	144.1	2600.7	32049.2	1458.2	18326.9	1459.4	18278.1	
2012	2745.2	149.3	2595.9	34645.1	1456.0	19782.9	1457.2	19735.3	
2013	2758.6	157.1	2601.6	37246.7	1462.0	21244.9	1463.2	21198.5	
2014	2744.8	153.9	2590.9	39837.6	1454.3	22699.2	1455.5	22654.0	
2015	2745.7	164.6	2581.1	42418.7	1456.2	24155.4	1459.5	24113.5	
2016	2759.1	149.1	2609.9	45028.6	1470.9	25626.3	1472.3	25585.8	
2017	2744.8	156.9	2587.9	47616.5	1468.1	27104.4	1469.5	27055.2	
2018	2745.2	168.5	2576.7	50193.2	1465.8	28570.2	1466.9	28522.1	
2019	2758.6	167.2	2591.4	52784.6	1475.4	30045.6	1476.6	29998.7	
2020	2744.8	142.4	2602.5	55387.1	1472.5	31518.1	1474.0	31472.7	
2021	2745.7	155.4	2590.3	57977.4	1466.0	32984.1	1467.0	32940.2	
2022	2759.1	156.6	2602.4	60579.8	1474.3	34458.4	1475.9	34416.1	
2023	2744.8	156.6	2588.2	63168.0	1463.8	35922.1	1465.2	35881.6	
2024	2745.2	165.9	2579.3	65747.3	1459.5	37381.6	1461.2	37342.9	
2025	2758.6	146.7	2601.9	68349.2	1473.6	38855.2	1475.7	38818.6	
2026	2744.8	170.2	2574.6	70923.8	1460.1	40315.3	1462.0	40280.6	
2027	2745.7	149.9	2595.8	73519.6	1468.9	41784.2	1471.2	41751.9	
2028	2759.1	169.1	2589.9	76109.5	1467.8	43252.0	1470.1	43221.9	
2029	2744.8	155.7	2600.1	78710.6	1466.6	44718.6	1469.4	44691.4	
2030	2745.2	135.4	2609.9	81310.4	1615.4	46332.0	1616.5	46309.9	

RATE OF RETURN TO ENTERPRISE OWNER 28.20%
RATE OF RETURN AFTER TAX OF ENTERPRISE 28.76%

3.AR1

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	MOVING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	75.9		75.4	1.1	58.5	23.9
1979	53.7		123.1	1.7	86.0	38.7
1980	39.9		157.7	2.3	112.1	47.9
1981	71.6		221.7	3.3	159.0	65.9
1982	97.0		307.9	4.5	222.4	89.9
1983	88.5		382.8	5.5	279.7	108.6
1984	72.2		439.0	6.4	323.6	119.8
1985	53.1		474.1	9.8	358.1	125.1
1986	33.9		488.7	3.5	377.2	121.0
1987	48.5		516.0	15.5	405.3	126.1
1988	51.0		543.7	16.1	434.4	125.4
1989	25.2		544.5	16.5	445.4	115.0
1990	39.3		557.7	16.8	465.0	109.0
1991	155.9		682.3	18.5	561.2	139.6
1992	378.3		1010.1	22.7	799.1	239.7
1993	188.5		1149.5	24.8	913.3	261.0
1994	281.1		1372.1	27.8	1087.1	312.9
1995	480.3		1700.8	32.2	1337.6	350.4
1996	605.1		2214.0	38.8	1721.2	332.4
1997	554.4		2660.6	44.8	2066.7	338.7
1998	438.2		2975.1	49.4	2330.3	344.2
1999	203.9		3047.0	51.4	2432.4	366.0
2000	76.7		2989.0	62.5	2445.4	306.0
2001	11.7		2865.5	62.0	2411.0	316.0
2002	19.5		2749.1	61.6	2377.7	331.1
2003	27.4		2639.5	61.3	2344.9	350.9
2004	30.2		2531.2	68.9	2388.5	288.6
2005	26.1		2417.5	60.3	2363.5	214.0
2006	49.2		2325.3	59.9	2227.7	157.6
2007	14.4		2202.4	59.0	2170.0	91.3
2008	22.4		2086.3	38.1	2114.1	32.2
2009	14.4		1966.7	57.0	2047.9	24.1
2010	28.4		1859.3	56.1	1965.5	70.1
2011	14.3		1739.4	34.9	1809.4	115.1
2012	19.6		1626.0	53.7	1632.0	152.3
2013	27.4		1522.3	52.5	1556.3	181.5
2014	24.2		1417.2	51.1	1474.1	285.8
2015	34.9		1328.0	49.9	1403.4	225.5
2016	19.6		1224.9	48.5	1317.1	243.7
2017	27.4		1134.5	47.2	1441.6	259.9
2018	39.1		1057.6	46.0	1371.5	267.9
2019	37.8		981.6	44.8	1298.0	271.6
2020	13.0		880.6	43.3	1199.6	275.6
2021	26.1		791.4	41.8	1101.1	267.9
2022	27.4		703.8	40.2	998.0	254.0
2023	27.4		615.1	38.5	886.5	232.8
2024	36.7		534.5	36.7	772.6	201.3
2025	19.6		437.0	34.6	639.7	166.0
2026	41.2		357.7	22.6	514.7	124.4
2027	20.9		256.8	30.3	368.7	81.0
2028	40.1		165.2	28.1	220.5	27.2
2029	6.8		36.7	25.2	34.5	27.4
2030	6.5		34.5	22.1	33.3	22.3

TOTAL CAPITAL INVESTMENT 4777.4

3AR1

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.40001	25.0602	25.0602
1979	129.69	42.67003	42.79768	42.79768
1980	169.62	57.55009	55.97459	55.97458
1981	241.19	82.2001	79.59268	79.59267
1982	338.1799	115.73	111.5594	105.5138
1983	426.6799	146.9502	140.8044	125.3264
1984	498.8398	173.2803	164.6171	134.8355
1985	551.8997	193.8303	182.1269	134.8355
1986	585.7495	208.5803	192.2973	134.8355
1987	634.2195	228.8904	209.2924	134.8355
1988	685.2393	250.6503	226.1269	134.8355
1989	718.4893	265.0706	234.4614	134.8354
1990	749.8091	284.8306	247.437	134.8354
1991	905.6689	344.4407	299.8706	134.8354
1992	1275.929	476.8311	421.0564	139.256
1993	1464.459	551.1311	483.2712	139.256
1994	1745.509	658.4519	576.0173	139.256
1995	2145.799	808.2219	708.1135	139.2559
1996	2750.969	1029.712	907.7998	139.2558
1997	3305.269	1238.592	1090.745	139.2558
1998	3743.489	1413.173	1233.351	139.2554
1999	3947.379	1514.973	1302.635	139.2554
2000	4024.189	1578.673	1327.956	139.2554
2001	4035.689	1624.833	1331.817	139.2553
2002	4055.309	1677.573	1338.252	139.2553
2003	4082.668	1737.783	1347.291	139.2553
2004	4112.687	1804.362	1357.252	139.2553
2005	4158.945	1875.46	1365.252	139.2553
2006	4188.184	1960.52	1382.1	139.2553
2007	4202.543	2032.519	1386.639	139.2553
2008	4224.98	2110.886	1394.243	139.2552
2009	4239.34	2191.436	1398.982	139.2552
2010	4267.777	2282.253	1408.366	139.2552
2011	4282.074	2372.671	1413.084	139.2552
2012	4301.633	2469.66	1419.539	139.2552
2013	4328.992	2572.709	1426.567	139.2552
2014	4353.23	2679.117	1436.566	139.2552
2015	4388.168	2784.806	1448.095	139.2551
2016	4407.727	2898.584	1454.55	139.2551
2017	4435.086	2993.514	1463.578	139.2551
2018	4474.145	3102.613	1476.466	139.2551
2019	4511.941	3213.969	1488.94	139.2551
2020	4524.941	3325.369	1493.23	139.2551
2021	4551	3449.859	1501.63	139.2551
2022	4578.259	3580.358	1510.258	139.255
2023	4605.719	3719.268	1519.687	139.255
2024	4642.457	3869.896	1532.011	139.255
2025	4662.016	4022.335	1538.465	139.255
2026	4703.172	4188.461	1552.047	139.255
2027	4724.031	4355.32	1558.93	139.255
2028	4764.168	4543.668	1572.175	139.2549
2029	4770.926	4736.414	1574.405	139.2549
2030	4777.426	4744.086	1576.55	139.2549

PRESENT VALUE OF CAPITAL INV AT RATE %: 8%

25

302.2298

PRESENT VALUE OF CAPITAL INV AT RATE %: 10%

10.

1032.799

3AR1

Cost Summary—Dollars in Millions

WBS		COMMITTED COST		FINANCED COST		TOTAL
		CAPITAL	OPERATIONS	PRINCIPLE	INTEREST	OPERATIONS
0.0	TOTAL	4,777.5	4,807.6	4,777.4	6,640.9	4,807.6
1.0	CAPITAL ITEMS	4,777.5		4,777.4	6,640.9	
1.1	SYSTEM FACILITIES-EQUIPMENT	3,646.6		3,646.5	5,124.7	
1.1.1	SHIP	165.0		165.0	19.1	
1.1.2	CASH	242.0		242.0	173.6	
1.1.3	CASH TRANSPORTER, RAIL CAR	18.8		18.8	11.4	
1.1.4	RAIL CAR TUG	0.8		0.8	0.4	
1.1.5	CASH TRANSPORTER					
1.1.6	SEAPORT FAC	1.0		1.0	1.3	
1.1.7	WATER BASIN 4 PORT	48.0		48.0	62.6	
1.1.8	WATER BASIN 2 PORT					
1.1.9	WATER BASIN STORAGE	24.8		24.8	41.3	
1.1.10	PACKAGING FACILITY					
1.1.11	PACKAGING FAC	116.0		116.0	201.2	
1.1.12	CHIMNEYS	216.5		216.5	316.5	
1.1.13	EMPLACEMENT TRANS	18.0		18.0	11.9	
1.1.14	FAULT MODULE	640.3		640.3	658.1	
1.1.15	CEOLOGIC REC MODULE					
1.1.16	DEPOSITORY STORAGE MOD					
1.1.17	CASH	47.8		47.8	60.9	
1.1.18	LONG-TERM FAC	73.0		73.0	100.1	
1.1.19	PLM FAC FAC	940.4		940.4	1,631.8	
1.1.20	RECOVERY FAC	693.8		693.8	1,550.2	
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	24.6	
1.2.1	ASH DLD 1 FLT YD	2.4		2.4	3.5	
1.2.2	WAREHOUSE & ULT	12.2		12.2	21.1	
1.3	CHIEFS COST	558.1		558.1	745.8	
1.4	INTEREST DURING CON	558.2		558.2	745.8	
2.0	OPER & MAINT		4,807.6			4,807.6
2.1	DIRECT LABOR		1,666.4			1,666.4
2.1.1	PORT C REC TRANS		5.1			5.1
2.1.2	WATER BASIN REC (PORT)		145.8			145.8
2.1.3	WATER BASIN REC (PORT)					
2.1.4	WATER BASIN STOP		27.1			27.1
2.1.5	PORT FAC LABOR		15.2			15.2
2.1.6	PORT FAC LABOR		313.7			313.7
2.1.7	WATER BASIN STOP		44.0			44.0
2.1.8	CEOLOGIC REC MOD LABOR					
2.1.9	CASH TRANS MAINT LAB		31.2			31.2
2.1.10	LCI LM FPOCS LABOR					
2.1.11	PLM FAC LABOR		242.1			242.1
2.1.12	RECOVERY PLANT LAB		242.1			242.1
2.2	INDIRECT LABOR		1,666.5			1,666.5
2.2.1	PORT C REC TRANS LAB		8.1			8.1
2.2.2	W.B. REC (PORT) I LAB		218.6			218.6
2.2.3	W.B. REC (PORT) I LAB					
2.2.4	W.B. STOP IND LAB		40.5			40.5
2.2.5	PORT FAC IND LAB					
2.2.6	PORT FAC IND LAB		470.4			470.4
2.2.7	WATER BASIN STOP		65.8			65.8
2.2.8	CEO REC MOD IND LAB					
2.2.9	CASH TRANS MAINT LAB		46.6			46.6
2.2.10	PLM FAC IND LAB		7.7			7.7
2.2.11	PLM FAC IND LAB		371.3			371.3
2.2.12	REC PLANT IND LAB		371.3			371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0			1,614.0
2.3.1	PORT REC FMS		8.1			8.1
2.3.2	W.B. REC (PORT) 4 PORT		218.6			218.6
2.3.3	W.B. REC (PORT) 2 PORT					
2.3.4	W.B. STORAGE OPNS		40.5			40.5
2.3.5	PORT OPNS (2000)					
2.3.6	PORT OPNS (2000)		470.4			470.4
2.3.7	WATER BASIN STOP		65.8			65.8
2.3.8	CEOLOGIC REC OPNS					
2.3.9	CASH TRANS		46.6			46.6
2.3.10	PLM FAC OPNS		21.3			21.3
2.3.11	PLM FAC OPNS		371.3			371.3
2.3.12	RECOVERY PLANT OPNS		371.3			371.3
2.4	CONTRACTED SERVICES		423.6			423.6
2.4.1	SHIP ON		327.2			327.2
2.4.2	US PORT FEE		0.4			0.4
2.4.3	ELPOR PORT FEE STOP					
2.4.4	US PORT FEE (TO STOP)		17.7			17.7
2.4.5	ELPOR PORT FEE TRANS					
2.4.6	US STOP (TIME CHRG)		61.3			61.3
2.4.7	ELPOR STOP					
2.4.8	US PORT FEE					
2.4.9	ELPOR PORT FEE					
2.4.10	ELPOR PORT FEE					
2.4.11	ELPOR PORT FEE					
2.4.12	ELPOR PORT FEE					
2.4.13	ELPOR PORT FEE					
2.4.14	ELPOR PORT FEE					
2.4.15	ELPOR PORT FEE					
2.4.16	ELPOR PORT FEE					
2.4.17	ELPOR PORT FEE					
2.4.18	ELPOR PORT FEE					
2.4.19	ELPOR PORT FEE					
2.4.20	ELPOR PORT FEE					
2.4.21	ELPOR PORT FEE					
2.5	DECON TRUST FUND		103.0			103.0

Section E 3.4

Case: 4A (Revision 1)

Description: Fuel Cycle Center (FCC) Baseline
Except enterprise ROI @ 30%

Summary of Input Characteristics:

Financial

Enterprise ROI - 30%

Borrowing - 2/3 of any capital expenditure at 10%

Government Financial Participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular Plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital Investment - 4.777 billion dollars

Owners ROI - 35%

Service charge - \$373/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YO) 4373.144
 RATE OF RETURN ON INVESTMENT 30.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 497091.810

4AR1

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	5.1	5.1	1.3	5.1	2.5	8.9	.0	3.8
1979	.0	11.3	11.3	1.5	8.6	4.1	14.3	.0	3.0
1980	.0	14.0	14.0	2.5	11.3	5.3	19.1	.0	2.1
1981	.0	32.1	32.1	3.6	16.0	7.6	27.1	1.9	3.1
1982	.0	65.7	65.7	4.3	22.4	10.7	37.5	10.7	17.5
1983	.0	85.1	85.1	5.1	28.2	13.6	46.9	14.5	23.7
1984	.0	165.7	165.7	5.9	32.8	16.0	54.7	19.4	31.7
1985	.0	143.7	143.7	18.0	36.1	17.9	72.0	27.3	44.5
1986	.0	177.8	177.8	18.7	38.1	19.2	76.0	38.7	53.1
1987	.0	210.1	210.1	52.0	41.0	21.2	114.2	36.5	59.5
1988	.0	269.2	269.2	52.9	43.9	23.3	120.1	64.3	104.8
1989	.0	346.4	346.4	53.6	45.1	24.5	123.4	64.7	138.3
1990	.0	363.3	363.3	53.8	47.2	26.1	127.1	69.8	146.4
1991	.0	414.9	414.9	54.2	56.9	31.3	142.5	103.5	168.9
1992	.0	501.3	501.3	55.4	60.9	42.4	178.8	122.6	200.0
1993	.0	591.9	591.9	56.1	92.5	49.1	197.7	149.6	244.4
1994	.0	702.4	702.4	56.9	110.2	58.5	225.5	181.2	295.7
1995	.0	819.3	819.3	57.7	135.5	71.6	264.8	210.7	343.8
1996	.0	879.6	879.6	58.6	174.3	91.1	324.1	211.1	344.4
1997	.0	991.4	991.4	59.6	209.3	106.6	375.5	233.3	380.6
1998	.0	1101.2	1101.2	60.6	236.0	123.7	420.3	258.7	422.2
1999	.0	1179.0	1179.0	61.7	246.7	128.0	440.3	280.7	458.0
2000	1413.5	1274.5	2690.0	126.5	240.4	134.0	500.9	228.5	1351.6
2001	1413.5	1491.9	2915.4	126.9	245.3	155.2	527.5	377.0	1430.9
2002	1413.5	1460.9	2874.4	127.5	242.4	155.8	525.7	360.1	1448.6
2003	1413.5	1590.1	3003.6	128.1	239.6	137.0	504.7	349.6	1549.3
2004	1413.5	1707.6	3121.3	128.8	236.5	128.4	503.7	344.7	1622.9
2005	1413.5	1777.4	3190.9	129.3	232.6	139.6	501.5	1022.0	1667.4
2006	1413.5	1778.0	3191.5	129.6	229.6	141.5	500.8	1022.5	1668.2
2007	1413.5	1795.9	3209.4	130.0	223.7	137.3	491.0	1033.0	1685.4
2008	1413.5	1777.4	3190.9	130.0	218.5	136.6	485.0	1028.2	1677.7
2009	1413.5	1778.6	3192.1	129.9	212.4	135.9	478.2	1031.3	1682.6
2010	1413.5	1796.4	3209.9	129.9	206.7	135.9	472.4	1040.3	1697.3
2011	1413.5	1777.4	3190.9	129.6	199.5	134.2	463.3	1036.4	1691.6
2012	1413.5	1778.0	3191.5	129.8	192.2	133.0	455.0	1039.9	1696.6
2013	1413.5	1795.9	3209.4	129.7	185.0	131.1	445.8	1050.1	1713.4
2014	1413.5	1777.4	3190.9	129.7	177.2	129.4	436.2	1046.8	1707.9
2015	1413.5	1778.6	3192.1	129.6	169.7	124.1	423.5	1052.0	1716.5
2016	1413.5	1796.4	3209.9	129.6	161.6	122.6	413.8	1062.5	1733.6
2017	1413.5	1777.4	3190.9	129.5	153.5	117.7	400.8	1060.2	1729.9
2018	1413.5	1778.0	3191.5	129.5	146.6	116.0	392.2	1063.7	1735.5
2019	1413.5	1795.9	3209.4	129.4	139.7	113.8	382.9	1074.1	1752.4
2020	1413.5	1777.4	3190.9	129.4	130.7	113.9	374.9	1070.4	1746.5
2021	1413.5	1778.6	3192.1	129.3	121.7	115.3	366.3	1073.6	1752.0
2022	1413.5	1796.4	3209.9	129.3	111.9	115.0	356.2	1084.4	1769.3
2023	1413.5	1777.4	3190.9	129.2	101.6	116.0	346.8	1080.7	1763.3
2024	1413.5	1778.0	3191.5	129.2	91.1	117.4	337.6	1084.5	1769.4
2025	1413.5	1795.9	3209.4	129.1	78.6	117.1	324.8	1096.2	1788.5
2026	1413.5	1777.4	3190.9	129.1	66.7	120.5	316.3	1092.3	1782.2
2027	1413.5	1778.6	3192.1	129.0	52.9	121.7	303.6	1097.6	1790.9
2028	1413.5	1796.4	3209.9	129.0	39.6	121.7	300.3	1105.7	1804.0
2029	1413.5	1777.4	3190.9	128.9	22.5	123.3	286.7	1103.6	1800.6
2030	1413.5	1778.0	3191.5	128.9	3.9	8.7	141.4	1159.0	1891.1
TOTAL	43618.5	62838.2	106456.7	4797.4	6600.3	4743.0	16140.6	94400.6	76115.4
MC	626.8	1165.6	2012.4	90.5	124.5	89.5	304.5	649.1	1028.8
SAVC	260.2	373.1	633.3	20.2	39.2	28.2	95.8	204.3	333.2

4A1
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	5.1	77.2	- 72.1	- 72.1	- 26.7	- 26.7	- 27.7	- 27.7	- 27.7	- 27.7
1979	11.3	55.3	- 44.0	- 116.1	- 17.2	- 43.9	- 17.8	- 45.5	- 45.5	- 45.5
1980	14.0	42.4	- 28.4	- 144.5	- 13.6	- 57.4	- 14.2	- 59.7	- 59.7	- 59.7
1981	32.1	75.1	- 43.0	- 187.5	- 14.0	- 71.4	- 15.0	- 74.7	- 74.7	- 74.7
1982	65.7	101.3	- 35.6	- 223.1	- 5.3	- 76.7	- 8.3	- 81.2	- 81.2	- 81.2
1983	85.1	95.6	- 10.5	- 233.6	- 6.1	- 82.8	- 9.0	- 90.2	- 90.2	- 90.2
1984	105.7	78.0	27.7	- 205.9	21.3	- 61.5	20.4	- 71.9	- 71.9	- 71.9
1985	143.7	71.0	72.7	- 133.2	41.8	- 19.7	39.3	- 32.6	- 32.6	- 32.6
1986	177.8	52.6	125.2	- 8.0	67.6	60.2	67.2	127.4	127.4	127.4
1987	210.1	100.4	109.7	101.6	68.4	128.6	54.4	181.8	181.8	181.8
1988	289.2	103.9	185.3	286.9	166.2	294.8	105.5	290.3	290.3	290.3
1989	346.4	79.1	267.4	554.3	148.5	443.3	148.2	443.5	443.5	443.5
1990	363.3	99.2	264.1	818.4	152.8	596.1	152.4	598.9	598.9	598.9
1991	414.9	210.1	204.8	1023.2	148.6	744.7	138.9	737.8	737.8	737.8
1992	501.3	425.7	75.6	1098.8	118.0	862.7	105.8	843.6	843.6	843.6
1993	591.9	244.6	347.3	1446.1	219.2	1081.9	217.1	1060.7	1060.7	1060.7
1994	782.4	337.9	444.5	1890.6	246.9	1328.8	243.8	1216.5	1216.5	1216.5
1995	619.3	458.0	161.3	2051.9	265.6	1594.4	261.2	1478.1	1478.1	1478.1
1996	879.6	663.7	215.9	2267.8	214.1	1808.5	207.5	1685.6	1685.6	1685.6
1997	991.4	614.0	377.4	2645.2	268.4	2076.9	274.4	1960.0	1960.0	1960.0
1998	1101.2	498.8	602.4	3247.6	371.2	2448.1	366.6	2326.6	2326.6	2326.6
1999	1179.0	265.6	913.4	4161.0	488.1	2936.2	486.2	2812.8	2812.8	2812.8
2000	2590.0	202.2	2387.8	6548.8	1422.9	4359.1	1411.8	4244.5	4244.5	4244.5
2001	2815.4	138.6	2676.8	9225.6	1520.0	5879.1	1520.4	5799.9	5799.9	5799.9
2002	2874.4	147.0	2727.4	11953.0	1551.7	7430.8	1552.1	7377.0	7377.0	7377.0
2003	3000.6	155.4	2845.2	14798.2	1626.2	9057.0	1626.5	8994.5	8994.5	8994.5
2004	3121.3	159.0	2962.3	17760.5	1854.8	10911.8	1855.2	10618.7	10618.7	10618.7
2005	3190.9	155.4	3035.5	20796.0	1733.9	12645.7	1736.5	12355.2	12355.2	12355.2
2006	3191.5	178.9	3012.6	23808.6	1784.7	14430.4	1785.1	14050.4	14050.4	14050.4
2007	3209.4	144.4	3065.0	26873.6	1750.9	16181.3	1751.6	15802.0	15802.0	15802.0
2008	3190.9	152.4	3038.5	30012.1	1735.9	17917.2	1736.7	17568.7	17568.7	17568.7
2009	3192.1	144.3	3047.8	33059.9	1738.0	19655.2	1739.0	19307.7	19307.7	19307.7
2010	3209.9	158.3	3051.6	36111.5	1742.3	21397.5	1743.2	21050.9	21050.9	21050.9
2011	3190.9	144.1	3046.8	39158.3	1734.8	23132.3	1736.0	22766.9	22766.9	22766.9
2012	3191.5	149.3	3042.2	42200.5	1732.6	24864.9	1733.8	24480.8	24480.8	24480.8
2013	3209.4	157.1	3052.3	45252.8	1741.4	26606.3	1742.7	26263.4	26263.4	26263.4
2014	3190.9	153.9	3037.0	48290.0	1738.8	28345.1	1739.1	27995.5	27995.5	27995.5
2015	3192.1	164.6	3027.5	51317.5	1735.0	30080.1	1736.2	29731.8	29731.8	29731.8
2016	3209.9	149.1	3060.8	54378.3	1750.4	31830.5	1751.8	31483.6	31483.6	31483.6
2017	3190.9	156.9	3034.0	57412.3	1744.7	33575.2	1746.0	33229.6	33229.6	33229.6
2018	3191.5	168.5	3023.0	60435.3	1742.4	35317.6	1743.6	34973.2	34973.2	34973.2
2019	3209.4	167.2	3042.1	63477.4	1754.8	37072.4	1756.0	36729.2	36729.2	36729.2
2020	3190.9	142.4	3048.5	66525.9	1749.1	38821.5	1750.6	38479.8	38479.8	38479.8
2021	3192.1	155.4	3036.7	69562.6	1742.8	40564.3	1744.3	40224.0	40224.0	40224.0
2022	3209.9	156.6	3053.3	72616.0	1753.8	42318.1	1755.4	41979.5	41979.5	41979.5
2023	3190.9	156.6	3034.3	75650.3	1740.4	44068.5	1742.1	43721.6	43721.6	43721.6
2024	3191.5	165.9	3025.6	78675.9	1736.1	45814.6	1737.9	45459.5	45459.5	45459.5
2025	3209.4	148.7	3060.7	81736.6	1753.1	47567.7	1755.2	47214.7	47214.7	47214.7
2026	3190.9	170.2	3020.7	84757.3	1736.6	49314.3	1738.6	48953.3	48953.3	48953.3
2027	3192.1	149.9	3042.2	87800.5	1745.7	51060.0	1748.0	50701.3	50701.3	50701.3
2028	3209.9	169.1	3040.8	90841.3	1747.4	52807.4	1749.6	52450.9	52450.9	52450.9
2029	3190.9	155.7	3035.2	93876.5	1743.2	54550.6	1746.0	54197.0	54197.0	54197.0
2030	3191.5	155.4	3036.1	96912.6	1892.1	56342.7	1895.2	56047.1	56047.1	56047.1

DATE OF RETURN TO ENTERPRISE OWNER 34.93%
RATE OF RETURN AFTER TAX OF ENTERPRISE 35.95%

4AR1

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	75.9		73.4	1.1	50.5	23.9
1979	53.7		123.1	1.7	66.8	38.7
1980	39.9		157.7	2.3	112.1	47.9
1981	71.6		221.7	3.3	159.8	65.9
1982	97.0		307.9	4.5	222.4	89.9
1983	68.5		382.8	5.5	279.7	108.6
1984	72.2		439.8	6.4	325.6	119.8
1985	53.1		474.1	9.0	358.1	125.1
1986	33.9		488.7	9.3	377.2	121.0
1987	48.5		516.8	15.5	405.3	126.1
1988	51.0		543.7	16.1	434.4	123.4
1989	25.2		544.5	16.5	445.4	113.5
1990	39.3		557.7	16.8	465.8	109.5
1991	155.9		682.3	18.5	561.2	139.6
1992	370.3		1010.1	22.7	799.1	233.7
1993	188.5		1149.5	24.8	943.3	261.0
1994	291.1		1372.1	27.6	1087.1	312.4
1995	408.3		1700.8	32.2	1357.6	395.4
1996	605.1		2214.8	38.8	1721.2	532.4
1997	554.4		2660.6	44.8	2066.7	638.7
1998	458.2		2975.1	49.4	2330.3	694.2
1999	203.9		3047.0	51.4	2432.4	666.8
2000	76.7		2599.0	62.5	2445.4	666.0
2001	11.7		2865.5	62.8	2411.8	510.5
2002	19.5		2749.1	61.6	2377.7	433.1
2003	27.4		2659.5	61.3	2344.9	355.9
2004	38.2		2531.2	68.9	2308.5	293.6
2005	26.1		2417.6	68.3	2263.5	214.5
2006	49.2		2325.3	59.9	2227.7	137.6
2007	14.4		2282.4	59.0	2170.8	91.3
2008	22.4		2088.3	58.1	2114.1	32.2
2009	14.4		1966.7	57.8	2047.9	24.1
2010	28.4		1859.3	56.1	1985.5	70.1
2011	14.3		1739.4	54.9	1909.4	115.1
2012	19.6		1626.8	53.7	1832.8	152.3
2013	27.4		1522.3	52.5	1756.3	181.5
2014	24.2		1417.2	51.1	1674.1	208.8
2015	34.9		1328.8	49.9	1583.4	225.5
2016	19.6		1224.9	48.5	1517.1	243.7
2017	27.4		1154.5	47.2	1441.8	259.9
2018	59.1		1057.8	46.8	1371.5	267.9
2019	37.8		981.6	44.8	1298.0	271.6
2020	13.0		888.6	43.3	1159.8	275.6
2021	26.1		791.4	41.8	1101.1	267.9
2022	27.4		703.8	40.2	996.8	224.0
2023	27.4		615.1	38.5	886.5	232.8
2024	36.7		534.5	36.7	772.6	201.3
2025	19.6		437.8	34.6	659.7	188.0
2026	41.2		357.7	32.6	514.7	124.4
2027	20.9		256.8	38.3	368.7	81.6
2028	48.1		165.2	28.1	228.5	27.2
2029	6.8		56.7	25.2	34.5	27.4
2030	6.5		34.5	22.1	33.3	23.3

TOTAL CAPITAL INVESTMENT 4777.4

4AR1

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT.	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.40801	25.06602	25.06602
1979	129.69	43.67883	42.79758	42.79758
1980	169.62	57.55009	55.97459	55.97458
1981	241.19	82.2801	77.59268	77.47165
1982	328.1799	115.73	111.5994	93.16959
1983	426.6799	146.2582	140.8944	99.73311
1984	498.6399	173.2603	164.6171	99.73311
1985	551.8997	193.8383	182.1269	99.73311
1986	585.7495	208.5683	195.2973	99.73309
1987	634.2195	226.8904	209.2924	99.73388
1988	655.2393	250.8383	226.1289	99.73568
1989	710.4893	265.0706	234.4614	99.73568
1990	749.8091	284.6386	247.457	99.73568
1991	905.6669	344.4487	298.6706	99.73568
1992	1275.929	476.8311	421.0564	99.73568
1993	1464.459	551.1311	483.2712	99.73568
1994	1745.509	658.4519	576.8178	99.73568
1995	2145.799	808.2219	708.1135	99.73568
1996	2750.509	1029.712	907.7998	99.73568
1997	3305.289	1238.562	1090.745	99.73483
1998	3743.489	1413.173	1235.351	99.73483
1999	3947.379	1514.572	1302.635	99.73483
2000	4024.109	1578.673	1327.956	99.73483
2001	4035.809	1624.833	1331.617	99.73482
2002	4055.309	1677.573	1338.252	99.7348
2003	4082.668	1737.783	1347.281	99.73479
2004	4112.887	1804.362	1357.252	99.73477
2005	4138.945	1875.48	1365.852	99.73476
2006	4188.184	1966.52	1382.1	99.73476
2007	4202.543	2032.519	1386.839	99.73474
2008	4224.98	2110.886	1394.243	99.73473
2009	4239.34	2191.436	1398.982	99.73471
2010	4267.777	2282.263	1406.566	99.7347
2011	4292.874	2372.671	1413.084	99.73468
2012	4301.633	2469.66	1419.539	99.73466
2013	4328.992	2572.709	1428.567	99.73465
2014	4353.23	2679.117	1436.566	99.73463
2015	4368.168	2784.886	1448.895	99.73462
2016	4407.727	2890.584	1454.55	99.7346
2017	4435.886	2993.514	1463.578	99.73459
2018	4474.145	3102.613	1476.468	99.73457
2019	4511.941	3213.969	1488.94	99.73456
2020	4524.941	3325.369	1493.23	99.73454
2021	4551	3449.859	1501.83	99.73453
2022	4578.359	3580.358	1518.658	99.73451
2023	4605.719	3719.268	1519.887	99.7345
2024	4642.457	3869.896	1532.811	99.73448
2025	4662.816	4022.325	1538.465	99.73447
2026	4702.172	4188.461	1552.847	99.73445
2027	4724.831	4355.32	1558.93	99.73444
2028	4764.168	4543.668	1572.175	99.73442
2029	4778.926	4736.414	1574.485	99.73441
2030	4777.426	4744.626	1576.55	99.73439

PRESENT VALUE OF CAPITAL INV AT RATE %: 1M

30

238.5142

PRESENT VALUE OF CAPITAL INV AT RATE %: 1M

10.

1832.759

4AR1

Cost Summary—Dollars in Millions

FIS		COMMITTED COST			FINANCED COST			
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
0.0	TOTAL	9,777.5	4,807.6	9,777.5	4,777.4	8,640.9	4,807.6	18,225.9
1.0	CAPITAL ITEMS	9,777.5		9,777.5	4,777.4	8,640.9		11,418.3
1.1	SYSTEM FACILITIES-EQUIPMENT	3,646.6		3,646.6	3,646.5	5,124.7		8,771.2
1.1.1	SHIP	162.0		162.0	162.0	19.1		359.1
1.1.2	CAS	242.0		242.0	242.0	173.6		415.6
1.1.3	CAS TRANSPORTER/PAUL CAR	18.8		18.8	18.8	11.4		30.1
1.1.4	PAUL CAR TUG	0.8		0.8	0.8	0.4		1.2
1.1.5	CAS TRANSPORTER							
1.1.6	SEAFORT FAC	1.0		1.0	1.0	1.5		2.5
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	62.6		150.6
1.1.8	WATER BASIN 2 PORT							
1.1.9	LATER BASIN STORAGE	24.8		24.8	24.8	41.3		65.3
1.1.10	PACKAGING FACILITY							
1.1.11	PACKAGING FAC	116.0		116.0	116.0	201.2		317.2
1.1.12	CHIMNEYS	216.5		216.5	216.5	333.0		539.0
1.1.13	EMPLACEMENT TRANS	18.0		18.0	18.0	11.9		29.9
1.1.14	HAULT MODULE	840.3		840.3	840.3	658.1		1,558.5
1.1.15	CEOLOGIC REC MODULE							
1.1.16	REPOSITORY STORAGE MOD							
1.1.17	CAS	47.0		47.0	47.0	60.9		127.8
1.1.18	LONG INTER FAC	75.0		75.0	75.0	150.1		265.1
1.1.19	HLW FAC FAC	940.4		940.4	940.4	1,631.0		2,571.4
1.1.20	RECOVERY FAC	893.8		893.8	893.8	1,550.2		2,444.0
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6		39.3
1.2.1	ADM BLD & FLT YD	2.4		2.4	2.4	3.5		5.9
1.2.2	WAREHOUSE & FLT	12.2		12.2	12.2	21.1		33.3
1.3	CHIEFS COST	558.1		558.1	558.1	745.8		1,303.8
1.4	INTEREST DURING CON	558.2		558.2	558.1	745.8		1,303.8
2.0	OPER C LAINT		4,807.6	4,807.6			4,807.6	4,807.6
2.1	DIRECT LABOR		1,666.4	1,666.4			1,666.4	1,666.4
2.1.1	PORT C REC TRANS		5.1	5.1			5.1	5.1
2.1.2	WATER BASIN REC(IMPORT)		145.8	145.8			145.8	145.8
2.1.3	WATER BASIN REC(EXPORT)							
2.1.4	WATER BASIN STOP		27.1	27.1			27.1	27.1
2.1.5	PAUL FAC LABOR		15.2	15.2			15.2	15.2
2.1.6	PAUL FAC LABOR		313.7	313.7			313.7	313.7
2.1.7	HAULT ENFORCEMENT LABOR		44.0	44.0			44.0	44.0
2.1.8	CEOLOGIC REC MOD LABOR							
2.1.9	CAS TRANS MAINT LAB		31.2	31.2			31.2	31.2
2.1.10	LOI LM FFACES LABOR							
2.1.11	HLW FAC LABOR		242.1	242.1			242.1	242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1			242.1	242.1
2.2	INDIRECT LABOR		1,666.5	1,666.5			1,666.5	1,666.5
2.2.1	PORT C REC TRANS LAB		8.1	8.1			8.1	8.1
2.2.2	W.B. REC(IMPORT) LAB		216.6	216.6			216.6	216.6
2.2.3	W.B. REC(EXPORT) LAB							
2.2.4	W.B. STOP IND LAB		40.5	40.5			40.5	40.5
2.2.5	PAUL FAC IND LAB							
2.2.6	PAUL FAC IND LAB		470.4	470.4			470.4	470.4
2.2.7	HAULT IND LABOR		65.8	65.8			65.8	65.8
2.2.8	CEOLOGIC REC MOD IND LAB							
2.2.9	CAS TRANS MAINT LAB		46.6	46.6			46.6	46.6
2.2.10	LOI LM FFACES LAB		7.7	7.7			7.7	7.7
2.2.11	HLW FAC IND LAB		371.3	371.3			371.3	371.3
2.2.12	REC PLANT IND LAB		371.3	371.3			371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0			1,614.0	1,614.0
2.3.1	PORT REC FNS		8.1	8.1			8.1	8.1
2.3.2	W.B. REC OPNS 4 PORT		218.6	218.6			218.6	218.6
2.3.3	W.B. REC OPNS 2 PORT							
2.3.4	W.B. STORAGE OPNS		40.5	40.5			40.5	40.5
2.3.5	PAUL OPNS(12000)							
2.3.6	PAUL OPNS(12000)		470.4	470.4			470.4	470.4
2.3.7	HAULT OPNS		65.8	65.8			65.8	65.8
2.3.8	CEOLOGIC REC OPNS							
2.3.9	CAS TRANS		46.6	46.6			46.6	46.6
2.3.10	LOI LM FFACES OPNS		21.3	21.3			21.3	21.3
2.3.11	HLW PROCESSING OPNS		371.3	371.3			371.3	371.3
2.3.12	RECOVERY PLANT OPNS		371.3	371.3			371.3	371.3
2.4	CONTRACTED SERVICES		423.6	423.6			423.6	423.6
2.4.1	SHIP CH		327.2	327.2			327.2	327.2
2.4.2	US PORT FEE		0.4	0.4			0.4	0.4
2.4.3	ELFCO PORT FEE STOP							
2.4.4	US PAUL(1ST TO STOP)		17.7	17.7			17.7	17.7
2.4.5	ELFCO PAUL TRANS							
2.4.6	US STOP(TIME CHRG)		61.3	61.3			61.3	61.3
2.4.7	ELFCO STOP							
2.4.8	US REC(1ST)							
2.4.9	ELFCO REC CP							
2.4.10	ELFCO REC CP							
2.4.11	ELFCO WASTE DIS							
2.4.12	US PAUL TRANS		17.8	17.8			17.8	17.8
2.4.13	ELFCO PAUL TRANS							
2.4.14	ELFCO PAUL TRANS							
2.4.15	US PORT FEE							
2.4.16	ELFCO PORT FEE							
2.4.17	ELFCO PORT FEE							
2.4.18	PACIFIC PORT FEE							
2.4.19	PACIFIC PORT FEE							
2.4.20	PAC PAUL TRANS							
2.4.21	PAC PAUL TRANS							
2.5	DECON TRUST FUND		102.0	102.0			102.0	102.0

Section E 3.5

Case: 5A (Revision 1)

Description: Fuel Cycle Center (FCC) Baseline
Except recovered products @ \$150/Kg

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular Plant - single plant

Value of recovered products - 150 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 4.777 billion dollars

Owners ROI - 21.8%

Service charge - \$210/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YC) 1210.266
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 121409.200

5AR1

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SEMI CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.9	2.9	1.3	5.1	2.5	8.9	.0	8.0
1979	.0	6.4	6.4	1.5	8.6	4.1	14.3	.0	7.9
1980	.0	7.9	7.9	2.5	11.3	5.3	19.1	.0	11.2
1981	.0	18.1	18.1	3.6	16.0	7.6	27.1	.0	9.0
1982	.0	37.0	37.0	4.3	22.4	10.7	37.5	.0	.7
1983	.0	48.0	48.0	5.1	28.2	13.6	46.9	.4	.7
1984	.0	59.6	59.6	5.9	32.8	16.0	54.7	1.9	3.0
1985	.0	81.0	81.0	16.0	36.1	17.9	72.0	3.4	5.6
1986	.0	100.2	100.2	16.7	38.1	19.2	76.0	9.2	10.0
1987	.0	118.4	118.4	52.0	41.0	21.2	114.2	1.6	2.6
1988	.0	163.0	163.0	52.9	43.9	23.3	120.1	16.3	26.6
1989	.0	195.2	195.2	53.8	45.1	24.5	123.4	27.3	44.5
1990	.0	204.7	204.7	53.8	47.2	26.1	127.1	29.5	48.1
1991	.0	233.8	233.8	54.2	56.9	31.3	142.5	34.7	56.6
1992	.0	282.5	282.5	55.4	60.9	42.4	178.6	39.4	64.3
1993	.0	333.5	333.5	56.1	62.5	49.1	197.7	51.6	84.2
1994	.0	395.8	395.8	56.9	110.2	56.5	223.5	64.7	105.6
1995	.0	461.7	461.7	57.7	135.5	71.6	264.8	74.8	122.1
1996	.0	495.7	495.7	58.6	174.3	91.1	324.1	65.2	106.4
1997	.0	558.7	558.7	59.6	209.3	108.6	377.5	66.8	112.3
1998	.0	620.5	620.5	60.6	236.0	123.7	420.3	76.1	124.1
1999	.0	664.4	664.4	61.7	246.7	132.0	440.3	85.1	138.9
2000	825.0	719.3	1544.3	126.5	248.4	134.8	509.6	399.2	641.5
2001	825.0	790.0	1614.9	126.9	245.3	139.2	511.5	420.8	666.6
2002	825.0	823.2	1648.2	127.5	242.4	135.8	505.7	434.2	708.4
2003	825.0	894.0	1721.0	128.1	239.6	137.0	504.7	462.2	754.1
2004	825.0	962.3	1787.3	128.8	236.5	139.4	503.7	487.0	790.8
2005	825.0	1001.6	1826.6	129.3	232.6	139.6	501.5	508.5	821.5
2006	825.0	1081.9	1906.9	129.6	229.6	141.5	500.8	583.9	822.2
2007	825.0	1012.0	1837.0	130.0	223.7	137.3	491.0	511.4	834.5
2008	825.0	1081.6	1906.6	130.0	218.5	136.6	485.0	509.8	831.8
2009	825.0	1062.2	1887.2	129.9	212.4	135.9	478.2	512.6	836.4
2010	825.0	1012.3	1837.3	129.9	206.7	135.9	472.4	518.7	846.2
2011	825.0	1001.6	1826.6	129.8	199.5	134.2	463.5	518.0	845.1
2012	825.0	1001.9	1826.9	129.8	192.2	133.0	455.0	521.3	850.6
2013	825.0	1012.0	1837.0	129.7	185.0	131.1	445.8	522.6	862.5
2014	825.0	1001.6	1826.6	129.7	177.2	129.4	436.2	528.3	862.0
2015	825.0	1002.2	1827.2	129.6	169.7	124.1	423.5	533.4	870.3
2016	825.0	1012.3	1837.3	129.6	161.6	122.6	413.8	540.9	882.5
2017	825.0	1001.6	1826.6	129.5	153.5	117.7	400.8	541.8	884.0
2018	825.0	1001.9	1826.9	129.5	146.6	116.0	392.2	545.2	889.5
2019	825.0	1012.0	1837.0	129.4	139.7	113.8	382.9	552.5	901.5
2020	825.0	1001.6	1826.6	129.4	130.7	113.9	373.9	552.0	908.6
2021	825.0	1002.2	1827.2	129.3	121.7	113.3	366.3	555.2	908.0
2022	825.0	1012.3	1837.3	129.3	111.9	115.0	356.2	562.8	918.3
2023	825.0	1001.6	1826.6	129.2	101.6	116.0	348.8	562.3	917.4
2024	825.0	1001.9	1826.9	129.2	91.1	117.4	337.6	565.9	923.4
2025	825.0	1012.0	1837.0	129.1	78.6	117.1	324.8	574.6	937.6
2026	825.0	1001.6	1826.6	129.1	66.7	120.5	316.3	573.9	936.4
2027	825.0	1002.2	1827.2	129.0	52.9	121.7	303.6	575.0	944.6
2028	825.0	1012.3	1837.3	129.0	39.6	131.7	300.3	584.1	953.0
2029	825.0	1001.6	1826.6	128.9	22.5	135.3	286.7	585.1	954.7
2030	825.0	1001.9	1826.9	128.9	3.9	8.7	141.4	586.5	1045.0
TOTL	25575.0	35409.2	60984.2	4797.4	6600.3	4743.0	16140.6	17053.6	27789.8
A/C	482.5	668.1	1150.6	56.5	124.5	89.5	304.5	321.8	524.3
FF-A/C	151.9	210.3	362.1	28.5	39.2	28.2	95.8	101.3	165.0

5AR1
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	2.9	77.2	- 74.4	- 74.4	- 28.9	- 28.9	- 30.0	- 30.0	- 30.0	- 30.0
1979	6.4	55.3	- 48.9	- 123.3	- 22.1	- 51.0	- 22.7	- 52.7	- 52.7	- 52.7
1980	7.9	42.4	- 34.5	- 157.8	- 19.7	- 70.7	- 20.3	- 73.0	- 73.0	- 73.0
1981	10.1	75.1	- 65.0	- 222.8	- 26.1	- 96.8	- 27.1	- 100.1	- 100.1	- 100.1
1982	37.0	101.3	- 64.3	- 287.1	- 23.2	- 120.1	- 24.4	- 124.5	- 124.5	- 124.5
1983	48.0	93.6	- 45.6	- 332.7	- 16.9	- 137.0	- 18.0	- 142.5	- 142.5	- 142.5
1984	59.6	78.0	- 18.4	- 351.2	- 7.3	- 144.3	- 0.2	- 144.1	- 144.1	- 144.1
1985	61.0	71.0	- 10.0	- 361.2	- 2.9	- 147.3	- 1.4	- 145.5	- 145.5	- 145.5
1986	100.2	52.6	47.7	- 313.5	19.5	- 127.8	19.0	- 126.9	- 126.9	- 126.9
1987	118.4	100.4	18.0	- 295.5	3.5	- 124.3	2.5	- 124.4	- 124.4	- 124.4
1988	163.0	103.9	59.1	- 236.4	27.9	- 96.4	27.3	- 96.7	- 96.7	- 96.7
1989	195.2	79.1	116.2	- 120.2	54.8	- 41.6	54.4	- 42.1	- 42.1	- 42.1
1990	204.7	93.2	111.6	- 8.6	54.5	13.9	54.1	- 2.0	- 2.0	- 2.0
1991	233.8	210.1	23.7	4.3	28.3	42.1	28.6	28.6	28.6	28.6
1992	262.5	425.7	- 163.2	- 158.9	- 25.6	16.5	- 29.8	- 1.2	- 1.2	- 1.2
1993	332.5	244.6	87.9	- 71.0	59.0	76.5	59.9	55.7	55.7	55.7
1994	395.8	337.9	57.9	- 13.1	56.8	133.2	53.7	109.4	109.4	109.4
1995	461.7	456.8	4.9	- 8.2	43.9	177.1	39.5	148.9	148.9	148.9
1996	495.7	663.7	- 168.0	- 116.2	- 24.0	153.1	- 30.6	118.3	118.3	118.3
1997	558.7	614.0	- 55.3	- 171.5	12.1	165.2	6.1	124.4	124.4	124.4
1998	620.5	458.8	161.7	- 5.3	73.2	238.4	68.6	193.0	193.0	193.0
1999	664.4	263.6	400.8	347.3	165.1	403.5	167.1	360.1	360.1	360.1
2000	1244.3	203.2	1041.1	1390.4	712.6	1116.1	701.5	1061.5	1061.5	1061.5
2001	1614.9	133.6	1481.3	2871.7	775.7	1891.8	776.1	1837.7	1837.7	1837.7
2002	1648.2	147.0	1501.2	4372.9	791.4	2683.2	791.8	2629.5	2629.5	2629.5
2003	1721.0	155.4	1565.6	5938.5	831.0	3514.2	831.3	3430.8	3430.8	3430.8
2004	1787.3	159.0	1628.3	7566.8	867.7	4381.9	868.1	4328.9	4328.9	4328.9
2005	1826.6	155.4	1671.2	9238.0	890.1	5272.0	890.6	5219.5	5219.5	5219.5
2006	1826.9	178.9	1648.0	10886.0	878.7	6150.7	879.1	6098.6	6098.6	6098.6
2007	1837.0	144.4	1692.6	12578.6	899.8	7050.5	900.7	6999.4	6999.4	6999.4
2008	1826.6	152.4	1674.2	14252.8	890.0	7940.5	890.8	7890.2	7890.2	7890.2
2009	1827.2	144.3	1682.9	15935.7	891.7	8832.2	892.6	8783.0	8783.0	8783.0
2010	1837.3	158.3	1679.0	17614.7	891.2	9723.4	892.2	9675.1	9675.1	9675.1
2011	1826.6	144.1	1682.5	19297.2	888.9	10612.3	890.1	10565.3	10565.3	10565.3
2012	1826.9	149.3	1677.6	20974.8	886.6	11508.9	887.8	11453.1	11453.1	11453.1
2013	1837.0	157.1	1679.9	22654.7	890.6	12409.5	891.8	12344.8	12344.8	12344.8
2014	1826.6	153.9	1672.7	24327.4	884.9	13294.4	886.2	13231.1	13231.1	13231.1
2015	1827.2	164.6	1662.7	25990.1	888.8	14183.2	890.0	14121.1	14121.1	14121.1
2016	1837.3	149.1	1688.2	27678.3	890.4	15073.6	890.8	15021.8	15021.8	15021.8
2017	1826.6	156.9	1669.7	29348.0	890.0	15963.6	890.2	15922.0	15922.0	15922.0
2018	1826.9	168.5	1658.4	31006.4	896.4	16860.0	897.5	16819.5	16819.5	16819.5
2019	1837.0	167.2	1669.7	32676.1	904.0	17764.0	905.1	17724.6	17724.6	17724.6
2020	1826.6	142.4	1684.2	34360.3	903.2	18667.2	904.7	18629.3	18629.3	18629.3
2021	1827.2	155.4	1671.8	36032.1	896.6	19563.8	898.1	19527.4	19527.4	19527.4
2022	1837.3	156.6	1680.7	37712.8	902.0	20472.0	904.4	20431.8	20431.8	20431.8
2023	1826.6	156.6	1670.0	39382.8	894.5	21366.5	896.2	21328.0	21328.0	21328.0
2024	1826.9	165.9	1661.0	41043.8	890.1	22256.6	891.0	22219.9	22219.9	22219.9
2025	1837.0	146.7	1690.3	42734.1	902.2	23158.8	904.3	23124.1	23124.1	23124.1
2026	1826.6	170.2	1656.3	44390.4	898.8	24049.5	899.7	24016.9	24016.9	24016.9
2027	1827.2	149.9	1677.3	46067.7	899.5	24949.0	901.8	24918.7	24918.7	24918.7
2028	1837.3	169.1	1668.2	47735.9	896.3	25845.3	898.6	25817.2	25817.2	25817.2
2029	1826.6	135.7	1690.9	49426.8	897.3	26742.6	900.1	26717.4	26717.4	26717.4
2030	1826.9	135.4	1691.5	51118.3	1046.0	27788.6	1049.1	27766.5	27766.5	27766.5

RATE OF RETURN TO ENTERPRISE OWNER 21.84%
RATE OF RETURN AFTER TAX OF ENTERPRISE 22.37%

5AR1

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	75.9		73.4	1.1	50.5	23.9
1979	53.7		123.1	1.7	86.0	38.7
1980	39.9		157.7	2.3	112.1	47.9
1981	71.6		221.7	3.3	159.0	63.9
1982	97.0		307.9	4.5	222.4	89.9
1983	88.3		382.0	5.5	279.7	108.6
1984	72.2		439.8	6.4	329.6	119.8
1985	53.1		474.1	9.0	356.1	125.1
1986	33.9		486.7	9.5	377.2	121.0
1987	48.5		516.0	13.5	400.3	126.1
1988	51.0		543.7	16.1	434.4	125.4
1989	25.2		544.5	16.3	443.4	115.5
1990	39.3		557.7	16.8	465.0	109.5
1991	155.9		662.3	18.5	561.2	139.6
1992	378.3		1010.1	22.7	799.3	233.7
1993	128.5		1149.5	24.8	913.3	261.6
1994	281.1		1372.1	27.8	1067.1	312.9
1995	400.3		1700.8	32.2	1337.6	395.4
1996	685.1		2214.8	38.8	1721.2	532.4
1997	554.4		2660.6	44.8	2066.7	638.7
1998	438.2		2975.1	49.4	2338.3	694.2
1999	203.9		3047.0	51.4	2432.4	666.0
2000	76.7		2909.0	62.5	2445.4	600.0
2001	11.7		2865.5	62.0	2411.0	516.5
2002	19.5		2749.1	61.6	2377.7	433.1
2003	27.4		2639.5	61.3	2344.9	355.9
2004	38.2		2531.2	60.9	2268.5	283.6
2005	26.1		2417.6	60.3	2263.5	214.5
2006	49.2		2325.3	59.9	2227.7	157.6
2007	14.4		2202.4	59.0	2170.0	91.3
2008	22.4		2088.3	58.1	2114.1	32.2
2009	14.4		1966.7	57.0	2047.9	24.1
2010	28.4		1859.3	56.1	1985.5	70.1
2011	14.3		1739.4	54.9	1909.4	115.1
2012	19.6		1626.0	53.7	1822.0	152.3
2013	27.4		1522.3	52.5	1756.3	181.5
2014	24.2		1417.2	51.1	1674.1	265.8
2015	34.9		1326.0	49.9	1603.4	225.5
2016	19.6		1224.9	48.5	1517.1	243.7
2017	27.4		1134.5	47.2	1441.6	249.9
2018	39.1		1057.6	46.0	1371.5	267.9
2019	37.8		981.6	44.8	1298.0	271.6
2020	13.8		860.6	43.3	1199.6	275.6
2021	26.1		791.4	41.8	1101.1	267.9
2022	27.4		703.8	40.2	998.0	254.0
2023	27.4		615.1	38.5	886.5	232.8
2024	36.7		534.5	36.7	772.6	201.3
2025	19.6		437.0	34.6	639.7	168.0
2026	41.2		357.7	32.6	514.7	124.4
2027	20.9		256.8	30.3	368.7	81.6
2028	40.1		165.2	29.1	220.5	27.2
2029	6.8		56.7	25.2	34.0	27.4
2030	6.5		34.5	22.1	33.3	23.3

TOTAL CAPITAL INVESTMENT 4777.4

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Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.40001	25.0602	25.0602
1979	129.69	43.67003	42.79768	42.79768
1980	169.62	57.55009	55.97459	55.97459
1981	241.19	82.2001	79.59262	79.59262
1982	338.1799	115.73	111.5994	111.5994
1983	426.6799	146.9502	140.8044	140.8044
1984	498.8298	173.2303	164.6171	162.4731
1985	551.8997	193.8303	182.1269	176.952
1986	583.7455	208.5603	193.2973	176.956
1987	634.2195	226.6904	209.2924	192.9531
1988	683.2393	250.8503	226.1289	192.9531
1989	718.4893	265.0706	234.4614	192.9531
1990	749.8091	284.3306	247.437	192.9531
1991	905.669	344.4407	298.8706	192.9531
1992	1273.929	476.8311	421.0564	205.0566
1993	1464.459	531.1311	463.2712	205.0566
1994	1745.509	638.4519	576.0172	233.0563
1995	2143.799	808.2219	708.1135	269.4343
1996	2750.909	1029.712	907.7998	369.3486
1997	3385.289	1232.562	1090.745	445.9765
1998	3743.489	1413.173	1233.351	471.0554
1999	3947.379	1514.973	1302.635	471.0554
2000	4024.109	1576.673	1327.956	471.0552
2001	4035.809	1624.233	1331.817	471.0549
2002	4055.309	1677.573	1338.252	471.0547
2003	4082.666	1737.783	1347.281	471.0544
2004	4112.887	1804.382	1357.252	471.0542
2005	4138.945	1875.48	1365.652	471.054
2006	4168.184	1960.52	1382.1	471.0537
2007	4202.543	2032.519	1386.839	471.0535
2008	4224.98	2110.866	1394.243	471.0532
2009	4239.34	2191.436	1398.982	471.053
2010	4267.777	2282.283	1408.366	471.0527
2011	4282.074	2372.671	1413.084	471.0527
2012	4301.633	2469.66	1419.539	471.0525
2013	4329.992	2572.709	1426.567	471.0522
2014	4353.23	2673.117	1436.566	471.052
2015	4388.168	2764.606	1446.095	471.0518
2016	4407.727	2890.584	1454.55	471.0515
2017	4435.086	2993.514	1463.578	471.0513
2018	4474.145	3102.613	1476.466	471.051
2019	4511.941	3213.969	1488.94	471.0508
2020	4524.941	3325.369	1493.23	471.0505
2021	4551	3449.659	1501.83	471.0503
2022	4578.359	3580.358	1510.858	471.05
2023	4605.719	3719.268	1519.887	471.0498
2024	4642.457	3869.896	1532.011	471.0496
2025	4662.016	4022.335	1538.465	471.0493
2026	4783.172	4188.461	1552.047	471.0491
2027	4724.031	4355.32	1558.93	471.0481
2028	4764.168	4543.628	1572.175	471.0488
2029	4778.926	4736.414	1574.405	471.0486
2030	4777.426	4744.686	1576.55	471.0483

PRESENT VALUE OF CAPITAL INV AT RATE %: \$M 19.99998
 410.6907
 PRESENT VALUE OF CAPITAL INV AT RATE %: \$M 10.
 1032.799

5AR1

Cost Summary—Dollars in Millions

WBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	4,777.5	4,807.6	9,585.1	4,777.4	6,640.9	11,418.3
1.0	CAPITAL ITEMS	4,777.5		4,777.5	4,777.4	6,640.9	11,418.3
1.1	SYSTEM FACILITIES-EQUIPMENT	3,646.6		3,646.6	3,646.5	5,124.7	8,771.2
1.1.1	SHIP	165.0		165.0	165.0	194.1	359.1
1.1.2	CRSL	242.0		242.0	242.0	173.6	415.6
1.1.3	CRSL TRANSPORTER/PAIL CRP	18.8		18.8	18.8	11.4	30.2
1.1.4	PAIL CRP TUG	0.8		0.8	0.8	0.4	1.2
1.1.5	CRSL TRANSPORTER						
1.1.6	SEAPORT FAC	1.0		1.0	1.0	1.5	2.5
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	82.6	130.6
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3	65.3
1.1.10	PACKAGING FACILITY						
1.1.11	PROCESSING FAC	116.0		116.0	116.0	201.2	317.2
1.1.12	CHAMBERS	216.5		216.5	216.5	316.5	533.0
1.1.13	ENFORCEMENT TANKS	18.0		18.0	18.0	11.9	29.9
1.1.14	VAULT MODULE	640.3		640.3	640.3	658.1	1,298.4
1.1.15	CEOLOGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CRSL	47.0		47.0	47.0	60.9	107.9
1.1.18	LOWINTER FAC	75.0		75.0	75.0	130.1	205.1
1.1.19	FLM PFCO FAC	240.4		240.4	240.4	1,631.0	2,871.4
1.1.20	RECOVERY FAC	693.8		693.8	693.8	1,550.2	2,444.0
1.2	SUPPORT FACILITIES-EQUIPMENT	14.7		14.7	14.7	24.6	39.3
1.2.1	ADM BLDG FLT YD	2.4		2.4	2.4	3.5	5.9
1.2.2	WAREHOUSE & ULT	12.2		12.2	12.2	21.1	33.3
1.3	CHIEFS COST	558.1		558.1	558.1	745.8	1,303.9
1.4	INTEREST DURING CONS	558.2		558.2	558.1	745.8	1,303.9
2.0	OPER & MAINT		4,807.6	4,807.6			4,807.6
2.1	DIRECT LABOR		1,666.4	1,666.4			1,666.4
2.1.1	PORT & REC TRANS		8.1	8.1			8.1
2.1.2	WATER BASIN REC (IMPORT)		145.8	145.8			145.8
2.1.3	WATER BASIN REC (EXPORT)						
2.1.4	WATER BASIN STOP		27.1	27.1			27.1
2.1.5	PAIL FAC LABOR		15.2	15.2			15.2
2.1.6	PAIL FAC LABOR		313.7	313.7			313.7
2.1.7	VAULT ENFORCEMENT LABOR		44.0	44.0			44.0
2.1.8	CEOLOGIC REC MOD LABOR						
2.1.9	CRSL TRANS MAINT LAB		31.2	31.2			31.2
2.1.10	LCI LM PFCO LABOR						
2.1.11	FLM PFCO LABOR		242.1	242.1			242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1			242.1
2.2	INDIRECT LABOR		1,660.5	1,660.5			1,660.5
2.2.1	PORT & REC TRANS LAB		8.1	8.1			8.1
2.2.2	WATER BASIN REC (IMPORT) LAB		216.6	216.6			216.6
2.2.3	WATER BASIN REC (EXPORT) LAB						
2.2.4	WATER BASIN STOP LAB		40.5	40.5			40.5
2.2.5	PAIL FAC LAB						
2.2.6	PAIL FAC LAB		470.4	470.4			470.4
2.2.7	VAULT LAB		65.8	65.8			65.8
2.2.8	CEOLOGIC REC MOD LAB						
2.2.9	CRSL TRANS MAINT LAB		46.6	46.6			46.6
2.2.10	LCI LM PFCO LAB		7.7	7.7			7.7
2.2.11	FLM PFCO LAB		371.3	371.3			371.3
2.2.12	REC PLANT LAB		371.3	371.3			371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0			1,614.0
2.3.1	PORT REC FMS		8.1	8.1			8.1
2.3.2	WATER BASIN REC 4 PORT		218.6	218.6			218.6
2.3.3	WATER BASIN REC 2 PORT						
2.3.4	WATER BASIN STOP		40.5	40.5			40.5
2.3.5	PAIL CRP (2500)						
2.3.6	PAIL CRP (2500)		470.4	470.4			470.4
2.3.7	VAULT CRP		65.8	65.8			65.8
2.3.8	CEOLOGIC REC CRP						
2.3.9	CRSL TRANS		46.6	46.6			46.6
2.3.10	LCI LM PFCO CRP		21.3	21.3			21.3
2.3.11	FLM PFCO CRP		371.3	371.3			371.3
2.3.12	RECOVERY PLANT CRP		371.3	371.3			371.3
2.4	CONTRACTED SERVICES		423.6	423.6			423.6
2.4.1	SHIP ON		327.2	327.2			327.2
2.4.2	US PORT FEE		0.4	0.4			0.4
2.4.3	EUROPE PORT FEE STOP						
2.4.4	US FEE (10 STOP)		17.7	17.7			17.7
2.4.5	EUROPE FEE TRANS						
2.4.6	US STOP (TIME CHRG)		61.3	61.3			61.3
2.4.7	EUROPE STOP						
2.4.8	US FEE (10)						
2.4.9	EUROPE FEE OF						
2.4.10	EUROPE FEE OF						
2.4.11	EUROPE FEE OF						
2.4.12	US FEE TRANS		17.0	17.0			17.0
2.4.13	EUROPE FEE TRANS						
2.4.14	EUROPE FEE TRANS						
2.4.15	US PORT FEE						
2.4.16	EUROPE PORT FEE						
2.4.17	EUROPE PORT FEE						
2.4.18	PACIFIC PORT FEE						
2.4.19	PACIFIC PORT FEE						
2.4.20	FAC FEE TRANS						
2.4.21	FAC FEE TRANS						
2.5	SECURITY FUND		107.0	107.0			107.0

Section E 3.6

Case: 6A (Revision 1)

Description: Fuel Cycle Center (FCC) Baseline
Except recovered products @ 350 \$/Kg

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%
Borrowing - 2/3 of any capital expenditure at 10%
Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific
Location cost factor - 1.0
Water provisions - none

Storage

Type of storage - aircooled vaults
Storage cost factor - 1.0

Recovery

Start up time - 2000
Modular plant - single plant
Value of recovered products - 350 \$/Kg spent fuel

Pricing

Service charge - average over fuel population
Recovery credit - None

Summary of Output Characteristics:

Capital investment - 4.777 billion dollars
Owners ROI - 21.9%
Service charge - \$160/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YR) 1159.912
 RATE OF RETURN ON INVESTMENT 20.000
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$77029.360

6AR1

Yearly Profit and Loss Statement

YEAR	PEP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.2	2.2	1.0	5.1	2.0	8.9	.0	6.7
1979	.0	4.8	4.8	1.0	8.6	4.1	14.3	.0	9.4
1980	.0	6.0	6.0	2.0	11.3	5.0	19.1	.0	13.1
1981	.0	13.8	13.8	3.6	16.0	7.6	27.1	.0	13.4
1982	.0	28.2	28.2	4.3	22.4	10.7	37.5	.0	9.3
1983	.0	36.5	36.5	5.1	28.2	13.6	46.9	.0	10.4
1984	.0	45.3	45.3	5.9	32.8	16.0	54.7	.0	9.4
1985	.0	61.6	61.6	10.0	36.1	17.9	72.0	.0	10.4
1986	.0	76.2	76.2	10.7	38.1	19.2	78.0	.1	.1
1987	.0	90.1	90.1	22.0	41.0	21.2	114.2	.0	24.1
1988	.0	124.0	124.0	52.9	43.9	23.3	120.1	1.3	0.7
1989	.0	148.5	148.5	53.8	45.1	24.5	123.4	9.5	15.0
1990	.0	155.7	155.7	53.6	47.2	26.1	127.1	10.9	17.7
1991	.0	177.8	177.8	54.2	56.9	31.3	142.5	13.4	21.9
1992	.0	214.8	214.8	55.4	60.9	42.4	178.8	13.7	28.1
1993	.0	253.7	253.7	58.1	92.5	49.1	197.7	21.3	34.7
1994	.0	301.0	301.0	56.9	110.2	58.0	225.0	28.7	46.8
1995	.0	351.1	351.1	57.7	135.5	71.8	264.8	32.8	53.0
1996	.0	377.0	377.0	58.6	174.3	91.1	324.1	30.1	32.8
1997	.0	424.9	424.9	59.6	209.3	108.6	377.5	12.0	29.4
1998	.0	471.9	471.9	60.6	236.0	123.7	420.3	13.6	28.0
1999	.0	505.3	505.3	61.7	266.7	132.0	460.3	24.7	49.3
2000	1925.0	547.0	2472.0	129.5	288.4	139.8	558.6	740.7	1216.7
2001	1925.0	600.8	2525.8	129.3	295.3	139.2	563.7	726.9	1251.3
2002	1925.0	632.1	2557.1	127.3	292.4	135.8	555.7	777.2	1268.1
2003	1925.0	681.4	2606.4	128.1	289.6	137.8	555.7	796.7	1302.1
2004	1925.0	731.9	2656.9	128.8	286.3	138.4	553.7	818.2	1350.0
2005	1925.0	781.7	2686.7	129.3	282.6	139.6	551.5	830.4	1354.8
2006	1925.0	782.0	2687.0	129.6	282.8	141.5	553.8	830.7	1353.4
2007	1925.0	789.6	2694.6	129.0	283.7	137.3	550.0	837.4	1366.2
2008	1925.0	781.7	2686.7	129.0	213.5	136.6	485.0	836.6	1365.1
2009	1925.0	782.2	2687.2	129.3	212.4	135.9	478.2	839.4	1369.6
2010	1925.0	789.9	2694.9	129.3	206.7	135.9	472.4	844.5	1377.9
2011	1925.0	781.7	2686.7	129.6	199.5	134.2	463.0	844.8	1378.4
2012	1925.0	782.0	2687.0	129.6	192.3	132.0	453.8	848.1	1383.8
2013	1925.0	789.6	2694.6	129.7	185.0	131.1	445.8	854.5	1394.3
2014	1925.0	781.7	2686.7	129.7	177.2	129.4	436.2	853.2	1395.3
2015	1925.0	782.2	2687.2	129.6	169.7	124.1	423.5	860.2	1403.5
2016	1925.0	789.9	2694.9	129.6	161.6	122.6	413.8	866.8	1414.2
2017	1925.0	781.7	2686.7	129.3	153.5	117.7	400.6	868.6	1417.3
2018	1925.0	782.0	2687.0	129.5	146.8	116.0	392.2	872.0	1422.7
2019	1925.0	789.6	2694.6	129.4	139.7	113.8	382.9	878.5	1433.3
2020	1925.0	781.7	2686.7	129.4	130.7	113.9	373.9	878.9	1433.9
2021	1925.0	782.2	2687.2	129.3	121.7	115.3	366.3	881.9	1439.6
2022	1925.0	789.9	2694.9	129.3	111.9	115.0	356.8	888.7	1450.0
2023	1925.0	781.7	2686.7	129.2	101.6	116.0	346.8	889.2	1458.7
2024	1925.0	782.0	2687.0	129.2	91.1	117.4	337.6	892.8	1459.3
2025	1925.0	789.6	2694.6	129.1	78.6	117.1	324.8	900.5	1469.3
2026	1925.0	781.7	2686.7	129.1	66.7	120.5	316.0	900.7	1469.6
2027	1925.0	782.2	2687.2	129.0	52.9	121.7	303.6	905.8	1477.8
2028	1925.0	789.9	2694.9	129.0	39.6	131.7	300.3	910.0	1484.7
2029	1925.0	781.7	2686.7	128.9	32.5	135.3	296.7	912.0	1488.0
2030	1925.0	782.0	2687.0	128.9	3.9	8.7	141.4	927.3	1478.2
TOTL	59675.8	26929.5	86604.2	4797.4	6600.3	4743.0	16140.6	26816.5	43647.1
ARC	1125.9	508.1	1634.0	90.5	124.5	69.5	304.5	266.0	823.5
FCATC	354.4	159.9	514.3	26.5	39.2	28.2	95.8	159.2	259.2

6AR1
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1976	2.2	77.2	- 75.0	- 75.0	- 29.6	- 29.6	- 30.7	- 30.7	- 30.7	- 30.7
1977	4.8	55.3	- 50.4	- 125.3	- 23.6	- 53.2	- 24.2	- 54.9	- 54.9	- 54.9
1978	6.0	42.4	- 36.4	- 161.9	- 21.6	- 74.8	- 22.2	- 77.1	- 77.1	- 77.1
1979	13.8	75.1	- 61.4	- 223.3	- 30.5	- 105.3	- 31.4	- 108.5	- 108.5	- 108.5
1980	28.2	101.3	- 73.2	- 296.4	- 32.1	- 137.4	- 33.3	- 141.8	- 141.8	- 141.8
1981	36.5	93.6	- 57.1	- 353.5	- 28.0	- 165.4	- 29.1	- 170.9	- 170.9	- 170.9
1982	45.3	78.0	- 32.7	- 386.2	- 19.7	- 185.0	- 20.6	- 191.5	- 191.5	- 191.5
1983	61.6	71.0	- 9.4	- 395.6	- 13.0	- 198.1	- 13.6	- 207.1	- 207.1	- 207.1
1984	76.2	52.6	23.7	- 372.0	4.6	- 193.5	4.2	- 202.9	- 202.9	- 202.9
1985	90.1	100.4	- 10.4	- 382.4	- 23.2	- 216.7	- 22.2	- 222.2	- 222.2	- 222.2
1986	124.0	103.9	20.1	- 362.3	3.7	- 213.0	3.1	- 229.1	- 229.1	- 229.1
1987	148.5	79.1	69.4	- 292.9	25.8	- 187.2	25.4	- 203.7	- 203.7	- 203.7
1988	152.7	93.2	59.5	- 233.4	24.1	- 163.1	23.7	- 179.9	- 179.9	- 179.9
1989	177.8	210.1	- 32.3	- 265.6	6.4	- 156.5	6.1	- 186.0	- 186.0	- 186.0
1990	214.8	425.7	- 210.8	- 476.3	67.6	- 237.1	71.8	- 209.8	- 209.8	- 209.8
1991	253.7	244.6	9.0	- 467.3	9.5	- 227.7	7.4	- 208.4	- 208.4	- 208.4
1992	301.0	337.9	- 36.9	- 504.3	2.0	- 225.7	5.1	- 207.5	- 207.5	- 207.5
1993	351.1	458.0	- 106.9	- 611.2	24.7	- 201.0	29.0	- 206.0	- 206.0	- 206.0
1994	377.0	662.7	- 285.8	- 897.0	97.6	- 351.9	104.2	- 299.7	- 299.7	- 299.7
1995	424.9	614.0	- 189.2	- 1086.1	70.9	- 422.8	72.2	- 297.2	- 297.2	- 297.2
1996	471.9	498.8	- 26.9	- 1113.0	18.9	- 403.9	22.5	- 291.2	- 291.2	- 291.2
1997	505.3	265.6	239.7	- 873.2	70.4	- 371.3	62.0	- 262.7	- 262.7	- 262.7
1998	2472.0	283.2	2188.8	1577.5	1267.2	216.5	1276.7	854.0	854.0	854.0
1999	2525.3	138.6	2386.7	3764.6	1346.4	2256.9	1346.6	2194.6	2194.6	2194.6
2000	2531.1	147.0	2384.1	6148.7	1351.2	3608.1	1351.6	3526.4	3526.4	3526.4
2001	2686.4	155.4	2531.0	8689.7	1379.9	5088.0	1380.3	4966.7	4966.7	4966.7
2002	2636.9	159.0	2477.9	11167.6	1406.8	6494.8	1407.2	6383.9	6383.9	6383.9
2003	2686.7	155.4	2531.4	13699.0	1423.3	7918.1	1423.9	7757.8	7757.8	7757.8
2004	2687.0	178.9	2508.1	16177.0	1411.9	9330.0	1412.3	9170.2	9170.2	9170.2
2005	2684.6	144.4	2540.3	18727.3	1431.5	10761.6	1432.5	10602.6	10602.6	10602.6
2006	2686.7	152.4	2534.3	21261.6	1423.2	12184.8	1424.1	12066.8	12066.8	12066.8
2007	2687.2	144.3	2542.9	23804.6	1424.9	13609.8	1425.0	13487.7	13487.7	13487.7
2008	2684.9	156.3	2528.6	26341.1	1422.9	15032.7	1423.9	14876.6	14876.6	14876.6
2009	2686.7	144.1	2542.6	28883.7	1422.2	16454.9	1423.4	16300.0	16300.0	16300.0
2010	2687.0	143.3	2543.7	31421.4	1419.8	17874.7	1421.0	17721.1	17721.1	17721.1
2011	2684.6	157.1	2527.6	33949.0	1422.3	19297.0	1423.5	19144.6	19144.6	19144.6
2012	2686.7	153.9	2532.8	36481.7	1416.2	20713.2	1419.5	20564.1	20564.1	20564.1
2013	2687.2	164.6	2522.7	39014.4	1422.0	22135.2	1423.2	21987.3	21987.3	21987.3
2014	2684.9	149.1	2535.7	41546.1	1431.1	23566.3	1422.5	23419.8	23419.8	23419.8
2015	2686.7	156.9	2529.8	44080.0	1432.1	25000.4	1423.4	24855.2	24855.2	24855.2
2016	2687.0	166.5	2520.4	46604.4	1429.6	26430.0	1420.8	26284.0	26284.0	26284.0
2017	2684.6	167.2	2517.4	49125.0	1435.7	27865.7	1426.9	27720.9	27720.9	27720.9
2018	2686.7	142.4	2544.4	51669.2	1436.4	29302.1	1428.0	29158.8	29158.8	29158.8
2019	2687.2	155.4	2531.8	54212.0	1429.6	30731.9	1431.3	30596.1	30596.1	30596.1
2020	2684.9	156.6	2528.2	56750.2	1434.5	32166.4	1426.1	32026.2	32026.2	32026.2
2021	2686.7	156.6	2530.1	59280.4	1427.8	33594.2	1425.5	33455.7	33455.7	33455.7
2022	2687.0	165.9	2521.1	61801.4	1423.3	35017.5	1425.1	34880.6	34880.6	34880.6
2023	2684.6	148.7	2535.9	64347.4	1433.9	36451.4	1426.0	36316.6	36316.6	36316.6
2024	2686.7	170.2	2516.5	66863.8	1424.0	37875.5	1426.0	37742.6	37742.6	37742.6
2025	2687.2	149.9	2537.3	69401.1	1432.7	39308.1	1425.0	39177.8	39177.8	39177.8
2026	2684.9	169.1	2515.7	71926.8	1428.0	40736.2	1420.3	40608.1	40608.1	40608.1
2027	2686.7	135.7	2551.0	74477.8	1430.6	42166.7	1423.4	42041.5	42041.5	42041.5
2028	2687.0	135.4	2551.6	77029.4	1379.2	43646.0	1322.4	43623.9	43623.9	43623.9

RATE OF RETURN TO ENTERPRISE OWNER 20.98%
RATE OF RETURN AFTER TAX OF ENTERPRISE 21.36%

6AR1

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1976	75.9	73.4	1.1	50.0	23.9
1977	53.7	123.1	1.7	86.0	36.7
1978	39.9	157.7	2.3	112.1	47.9
1979	71.6	221.7	3.3	159.0	60.9
1980	97.0	307.9	4.3	222.4	69.9
1981	88.5	362.8	5.3	279.7	108.6
1982	72.2	439.0	6.4	325.6	115.8
1983	53.1	474.1	9.0	358.1	125.1
1984	33.9	498.7	9.3	377.2	121.0
1985	48.5	516.0	13.3	405.3	126.1
1986	51.0	543.7	16.1	434.4	125.4
1987	23.2	544.3	16.3	443.4	115.3
1988	39.3	557.7	16.8	465.0	109.3
1989	155.9	682.3	18.3	561.2	139.8
1990	370.3	1010.1	22.7	799.1	233.7
1991	166.5	1149.5	24.8	913.3	261.0
1992	261.1	1372.1	27.2	1067.1	312.7
1993	460.3	1700.8	32.2	1337.6	365.4
1994	605.1	2214.8	36.8	1721.2	388.4
1995	554.4	2460.6	44.0	2066.7	408.7
1996	438.2	2975.1	49.4	2330.3	444.2
1997	203.9	3047.0	51.4	2432.4	466.0
1998	76.7	2989.0	62.3	2445.4	466.0
1999	11.7	2863.5	62.0	2411.0	416.0
2000	19.5	2749.1	61.6	2377.7	403.1
2001	27.4	2639.5	61.3	2344.9	395.9
2002	30.2	2531.2	60.9	2308.5	262.6
2003	26.1	2417.6	60.3	2263.5	214.3
2004	49.2	2325.3	59.9	2227.7	107.6
2005	14.4	2282.4	59.0	2170.0	91.3
2006	22.4	2166.3	58.1	2114.1	32.2
2007	14.4	1966.7	57.0	2047.9	24.1
2008	28.4	1859.3	56.1	1965.5	70.1
2009	14.3	1739.4	54.9	1909.4	115.1
2010	19.6	1626.0	53.7	1832.0	152.3
2011	27.4	1522.3	52.5	1756.3	181.3
2012	24.2	1417.2	51.1	1674.1	206.8
2013	34.9	1328.0	49.9	1603.4	225.5
2014	19.6	1224.9	48.5	1517.1	243.7
2015	27.4	1134.5	47.2	1441.6	209.9
2016	39.1	1057.6	46.0	1371.5	267.9
2017	37.8	981.6	44.8	1298.0	271.6
2018	13.0	880.6	43.3	1199.6	275.6
2019	26.1	791.4	41.8	1101.1	367.9
2020	27.4	703.8	40.2	998.0	254.0
2021	27.4	615.1	38.5	886.5	232.8
2022	36.7	534.5	36.7	772.6	201.3
2023	19.6	437.0	34.6	639.7	168.0
2024	41.2	357.7	32.6	514.7	124.4
2025	20.9	256.8	29.3	366.7	81.6
2026	40.1	165.2	28.1	220.5	27.2
2027	6.0	96.7	25.2	34.5	27.4
2028	6.5	34.5	22.1	33.3	23.3

TOTAL CAPITAL INVESTMENT 4777.4

6AR1

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.40001	25.0602	25.0602
1979	129.69	43.67003	42.79768	42.79768
1980	169.62	57.55002	55.97459	55.97458
1981	241.19	82.8001	79.59268	79.59267
1982	338.1799	115.73	111.5594	111.5594
1983	426.6799	146.9502	140.8044	140.8044
1984	498.8398	173.2603	164.8171	164.8171
1985	551.8997	193.8303	182.1269	182.1269
1986	585.7495	208.5803	193.2973	193.2974
1987	634.2195	228.2904	209.2924	209.2925
1988	665.2393	250.2503	226.1269	226.1269
1989	710.4893	265.0704	234.4814	234.4814
1990	749.8091	284.8206	247.437	247.437
1991	905.6689	344.4407	298.8706	298.8706
1992	1275.929	476.8311	481.8564	481.8564
1993	1464.459	551.1311	583.2712	583.2712
1994	1745.509	658.4519	576.0178	576.0178
1995	2145.759	808.2219	706.1135	706.1135
1996	2750.909	1029.712	907.7998	907.7998
1997	3505.289	1238.582	1090.745	1090.745
1998	3743.489	1413.173	1255.351	1255.351
1999	3947.379	1514.973	1302.635	1302.635
2000	4624.109	1978.673	1927.956	1927.956
2001	4835.809	1624.833	1331.817	1331.817
2002	4855.309	1677.573	1338.252	1338.252
2003	4862.668	1737.783	1347.281	1347.281
2004	4882.887	1894.362	1357.252	1357.252
2005	4898.945	1873.48	1365.352	1365.352
2006	4888.184	1960.53	1382.1	1382.1
2007	4802.543	2032.519	1386.839	1386.839
2008	4224.98	2118.386	1394.343	1394.343
2009	4239.34	2191.436	1398.982	1398.982
2010	4267.777	2282.283	1408.366	1408.366
2011	4282.074	2372.671	1413.884	1413.884
2012	4301.633	2459.86	1419.539	1419.539
2013	4328.992	2572.789	1428.567	1428.567
2014	4353.23	2679.117	1436.566	1436.566
2015	4388.168	2784.606	1446.095	1446.095
2016	4407.727	2890.584	1454.55	1454.55
2017	4435.086	2993.514	1463.578	1463.578
2018	4474.145	3182.613	1476.468	1476.468
2019	4511.941	3213.969	1486.94	1486.94
2020	4524.941	3325.369	1493.23	1493.23
2021	4551	3449.859	1501.33	1501.33
2022	4578.359	3560.358	1510.258	1510.258
2023	4605.719	3719.268	1519.897	1519.897
2024	4642.457	3869.896	1532.611	1532.611
2025	4662.016	4022.335	1538.465	1538.465
2026	4703.172	4186.481	1552.647	1552.647
2027	4724.031	4355.32	1558.93	1558.93
2028	4764.168	4543.668	1572.175	1572.175
2029	4778.926	4736.414	1574.900	1574.900
2030	4777.426	4744.066	1576.55	1576.55

PRESENT VALUE OF CAPITAL INV AT RATE %: \$M
410.6907
PRESENT VALUE OF CAPITAL INV AT RATE %: \$M
1032.799

19.99998

10.

6AR1

Cost Summary—Dollars in Millions

FIS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	4,777.5	4,807.6	9,585.1	4,777.4	6,840.9	11,618.3
1.0	CAPITAL ITEMS	4,777.5		4,777.5	4,777.4	6,840.9	11,618.3
1.1	SYSTEM FACILITIES-EQUIPMENT	3,648.6		3,648.6	3,648.5	5,124.7	8,773.2
1.1.1	SHIP	165.0		165.0	165.0	154.1	319.1
1.1.2	CASH	242.0		242.0	242.0	173.6	415.6
1.1.3	CASH TRANSPORTER-RAIL CAR	18.8		18.8	18.8	11.4	30.1
1.1.4	RAIL CAR TUG	0.8		0.8	0.8	0.4	1.2
1.1.5	CASH TRANSPORTER						
1.1.6	SEAPORT FAC	1.0		1.0	1.0	1.3	2.3
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	82.6	130.6
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3	65.3
1.1.10	PROCESSING FACILITY						
1.1.11	PROCESSING FAC	116.0		116.0	116.0	201.2	317.2
1.1.12	CRACKING STEPS	216.5		216.5	216.5	316.5	533.0
1.1.13	ENFORCEMENT TRAINS	18.0		18.0	18.0	11.9	29.9
1.1.14	WALUT MODULE	640.3		640.3	640.3	658.1	1,298.4
1.1.15	CEOLOGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CASH	47.0		47.0	47.0	80.9	127.9
1.1.18	LONG-TERM FAC	75.0		75.0	75.0	130.1	205.1
1.1.19	PLM FAC FAC	940.4		940.4	940.4	1,631.0	2,571.4
1.1.20	RECOVERY FAC	693.8		693.8	693.8	1,550.2	2,444.0
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6	39.3
1.2.1	MOBILE PLT YD	2.4		2.4	2.4	3.5	5.9
1.2.2	WAREHOUSE & ULT	12.2		12.2	12.2	21.1	33.3
1.3	OWNERS COST	558.1		558.1	558.1	745.8	1,303.9
1.4	INTEREST DURING CON	558.2		558.2	558.1	745.8	1,303.9
2.0	OPER & MAINT		4,807.6	4,807.6		4,807.6	4,807.6
2.1	DIRECT LABOR		1,666.4	1,666.4		1,666.4	1,666.4
2.1.1	PORT & REC TRNS		5.1	5.1		5.1	5.1
2.1.2	WATER BASIN REC (PORT)		145.8	145.8		145.8	145.8
2.1.3	WATER BASIN REC (PORT)						
2.1.4	WATER BASIN STOP		27.1	27.1		27.1	27.1
2.1.5	RAIL FAC LABOR		15.2	15.2		15.2	15.2
2.1.6	RAIL FAC LABOR		313.7	313.7		313.7	313.7
2.1.7	WALUT ENFORCEMENT LABOR		44.0	44.0		44.0	44.0
2.1.8	CEOLOGIC REC MOD LABOR						
2.1.9	CASH TRANS MAINT LAB		31.2	31.2		31.2	31.2
2.1.10	LOI LM PROCESS LABOR						
2.1.11	PLM FAC LABOR		242.1	242.1		242.1	242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1		242.1	242.1
2.2	INDIRECT LABOR		1,660.5	1,660.5		1,660.5	1,660.5
2.2.1	PORT & REC TRNS LAB		8.1	8.1		8.1	8.1
2.2.2	W.B. REC (PORT) LAB		218.6	218.6		218.6	218.6
2.2.3	W.B. REC (PORT) LAB						
2.2.4	W.B. STOP IND LAB		40.5	40.5		40.5	40.5
2.2.5	RAIL FAC IND LAB						
2.2.6	RAIL FAC IND LAB		470.4	470.4		470.4	470.4
2.2.7	WALUT IND LABOR		65.8	65.8		65.8	65.8
2.2.8	CEOLOGIC REC MOD LAB						
2.2.9	CASH TRANS MAINT LAB		46.6	46.6		46.6	46.6
2.2.10	LOI LM FAC IND LAB		7.7	7.7		7.7	7.7
2.2.11	PLM FAC IND LAB		371.3	371.3		371.3	371.3
2.2.12	REC PLANT IND LAB		371.3	371.3		371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0		1,614.0	1,614.0
2.3.1	PORT REC FIS		8.1	8.1		8.1	8.1
2.3.2	W.B. REC OPNS 4 PORT		218.6	218.6		218.6	218.6
2.3.3	W.B. REC OPNS 2 PORT						
2.3.4	W.B. STORAGE OPNS		40.5	40.5		40.5	40.5
2.3.5	RAIL OPNS (2000)						
2.3.6	RAIL OPNS (2000)		470.4	470.4		470.4	470.4
2.3.7	WALUT OPNS		65.8	65.8		65.8	65.8
2.3.8	CEOLOGIC REC OPNS						
2.3.9	CASH TRANS		46.6	46.6		46.6	46.6
2.3.10	LOI LM FAC OPNS		21.3	21.3		21.3	21.3
2.3.11	PLM PROCESSING OPNS		371.3	371.3		371.3	371.3
2.3.12	RECOVERY PLANT OPNS		371.3	371.3		371.3	371.3
2.4	CONTRACTED SERVICES		423.6	423.6		423.6	423.6
2.4.1	SHIP CH		327.2	327.2		327.2	327.2
2.4.2	US PORT FEE		0.4	0.4		0.4	0.4
2.4.3	ELFOR PORT FEE STOP						
2.4.4	US FRIUSE TO STOP		17.7	17.7		17.7	17.7
2.4.5	ELFOR PAIR TRNS						
2.4.6	US STOP (TIME CHRG)		61.3	61.3		61.3	61.3
2.4.7	ELFOR STOP						
2.4.8	US RECON OF						
2.4.9	ELFOR REC CR						
2.4.10	ELFOR WASTE DIS						
2.4.11	US PAIR TRNSP		17.0	17.0		17.0	17.0
2.4.12	ELFOR PAIR TRNSP						
2.4.13	ELFOR PAIR TRNSP						
2.4.14	US PORT FEE						
2.4.15	ELFOR PORT FEE						
2.4.16	ELFOR PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	PACIFIC PORT FEE						
2.4.19	PACIFIC PORT FEE						
2.4.20	PACIFIC PORT FEE						
2.4.21	PACIFIC PORT FEE						
2.5	DECON TRUST FUND		103.0	103.0		103.0	103.0

Section E 3.7

Case: 7A

Description: Fuel Cycle Center (FCC) Baseline
Except vault cost factor 0.75

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular Plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 4.534 billion dollars

Owners ROI - 21.4%

Service charge - \$171/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/KG) \$170.932
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$63283.460

7A

Yearly Profit and Loss Statement

YEAR	SEP REVENUE	SEP CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	SEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.3	2.3	.4	0.0	2.3	7.2	.0	0.0
1979	.0	5.2	5.2	.6	8.4	4.0	12.9	.0	7.7
1980	.0	6.4	6.4	.6	10.9	3.1	16.8	.0	10.3
1981	.0	14.7	14.7	1.1	15.4	7.2	23.6	.0	6.9
1982	.0	30.1	30.1	1.9	21.5	10.2	33.6	.0	3.0
1983	.0	39.0	39.0	2.3	27.0	12.9	42.3	.0	3.3
1984	.0	48.4	48.4	2.9	31.4	15.2	49.4	.0	1.0
1985	.0	55.8	55.8	19.7	34.4	16.9	70.9	.0	5.1
1986	.0	61.5	61.5	20.2	36.1	18.1	74.4	2.7	4.4
1987	.0	96.3	96.3	53.2	38.7	19.8	111.7	.0	15.4
1988	.0	132.5	132.5	53.6	41.2	21.6	116.6	8.0	9.9
1989	.0	158.7	158.7	53.9	42.1	22.4	118.3	15.4	25.1
1990	.0	166.4	166.4	53.3	43.7	23.8	121.3	17.1	28.0
1991	.0	190.1	190.1	53.0	53.0	28.6	136.6	20.3	33.2
1992	.0	229.6	229.6	53.3	76.5	39.3	171.6	22.1	36.0
1993	.0	271.1	271.1	56.4	87.1	45.2	188.8	31.3	51.1
1994	.0	321.3	321.3	57.2	103.3	53.9	214.9	40.6	66.2
1995	.0	375.3	375.3	58.0	128.3	66.3	252.6	46.6	76.1
1996	.0	462.9	462.9	58.9	166.2	80.1	310.2	55.2	97.5
1997	.0	454.2	454.2	59.9	203.9	104.6	368.4	62.6	105.2
1998	.0	504.5	504.5	61.3	229.4	118.6	409.3	66.1	109.0
1999	.0	540.1	540.1	61.9	238.4	122.6	423.9	68.4	106.6
2000	1413.0	534.7	1998.2	127.1	239.6	138.1	495.8	671.2	922.0
2001	1413.0	642.2	2055.7	127.1	237.0	138.6	492.7	593.9	969.0
2002	1413.0	629.3	2082.7	127.6	234.5	139.2	491.2	604.8	966.7
2003	1413.0	738.4	2141.9	128.1	231.8	130.2	490.1	627.7	1024.1
2004	1413.0	782.3	2195.3	128.7	228.9	131.4	489.1	648.6	1058.2
2005	1413.0	814.2	2227.7	129.2	225.2	132.5	486.9	661.5	1079.3
2006	1413.0	814.5	2228.0	129.6	222.5	134.2	486.3	661.8	1079.8
2007	1413.0	822.7	2235.2	129.5	217.0	130.9	477.4	668.3	1050.4
2008	1413.0	814.2	2227.7	129.5	212.0	130.3	471.7	667.3	1068.7
2009	1413.0	814.7	2227.2	129.4	208.0	129.7	467.1	670.8	1093.1
2010	1413.0	822.3	2235.4	129.4	200.6	129.7	459.6	673.2	1101.6
2011	1413.0	814.2	2227.7	129.3	193.8	128.4	451.5	674.9	1101.2
2012	1413.0	814.5	2228.0	129.2	186.8	127.4	443.4	678.1	1106.4
2013	1413.0	822.7	2235.2	129.2	179.6	125.9	434.9	684.3	1116.6
2014	1413.0	814.2	2227.7	129.1	172.1	124.6	425.9	684.7	1117.1
2015	1413.0	814.7	2227.2	129.1	164.7	119.8	413.6	689.2	1125.0
2016	1413.0	822.3	2235.4	129.1	156.6	118.7	404.4	696.2	1135.9
2017	1413.0	814.2	2227.7	129.0	148.5	111.4	389.9	698.7	1140.1
2018	1413.0	814.5	2228.0	128.9	142.1	110.2	381.2	701.8	1145.0
2019	1413.0	822.7	2235.2	128.9	135.2	108.8	373.0	708.0	1155.2
2020	1413.0	814.2	2227.7	128.9	128.6	109.0	364.4	708.1	1155.2
2021	1413.0	814.7	2227.2	128.8	117.7	110.1	356.6	711.2	1160.4
2022	1413.0	822.3	2235.4	128.7	108.2	109.4	346.3	718.3	1171.9
2023	1413.0	814.2	2227.7	128.7	98.1	110.1	336.9	718.5	1178.3
2024	1413.0	814.5	2228.0	128.6	87.8	111.1	327.6	722.1	1178.3
2025	1413.0	822.7	2235.2	128.6	75.6	110.4	314.6	730.2	1191.4
2026	1413.0	814.2	2227.7	128.5	64.1	113.2	305.9	730.3	1191.6
2027	1413.0	814.7	2227.2	128.5	50.6	113.5	292.6	735.5	1200.1
2028	1413.0	822.3	2235.4	128.4	37.3	122.1	288.3	740.3	1207.8
2029	1413.0	814.2	2227.7	128.4	21.6	122.0	276.0	741.6	1210.1
2030	1413.0	814.5	2228.0	128.3	8.7	122.9	269.9	743.1	1214.0
TOTL	43818.5	38783.3	72602.7	4780.5	6369.2	4000.4	15150.0	4163.0	55283.2
P/C	826.8	543.1	1369.9	90.2	120.2	84.9	295.3	488.8	665.8
1413	260.2	170.9	431.1	28.4	37.2	26.7	92.9	128.7	269.5

7A

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE OFFICE 190				FINANCED ENTERPRISE OFFICE 190				CHIEFS	
	FINANCIAL CASH IN	FINANCIAL CASH OUT	FINANCIAL NET CASH	CUM NET CASH	FINANCIAL NET CASH	CUM NET CASH	FINANCIAL NET CASH	CUM NET CASH	FINANCIAL NET CASH	CUM NET CASH
1978	2.3	74.4	- 72.1	- 72.1	- 27.8	- 27.8	- 28.7	- 28.7	- 28.7	- 28.7
1979	5.2	52.4	- 47.2	- 119.3	- 21.4	- 49.2	- 32.0	- 32.0	- 32.0	- 32.0
1980	8.4	36.7	- 28.3	- 151.6	- 18.4	- 67.6	- 18.9	- 18.9	- 18.9	- 18.9
1981	14.7	40.7	- 26.0	- 205.5	- 30.0	- 97.6	- 28.8	- 28.8	- 28.8	- 28.8
1982	30.1	34.9	- 4.8	- 270.3	- 30.4	- 118.0	- 28.0	- 28.0	- 28.0	- 28.0
1983	37.0	37.0	- 0.0	- 318.3	- 30.2	- 138.2	- 21.2	- 21.2	- 21.2	- 21.2
1984	48.4	71.0	- 22.6	- 341.0	- 10.7	- 148.9	- 11.0	- 11.0	- 11.0	- 11.0
1985	65.8	67.7	- 1.9	- 342.9	- 8.9	- 157.7	- 10.2	- 10.2	- 10.2	- 10.2
1986	81.5	50.1	31.4	- 311.5	9.3	- 148.5	- 8.9	- 8.9	- 8.9	- 8.9
1987	96.3	34.3	62.0	- 249.5	13.8	- 134.7	- 19.7	- 19.7	- 19.7	- 19.7
1988	132.5	13.5	119.0	- 130.5	12.0	- 122.7	- 11.5	- 11.5	- 11.5	- 11.5
1989	138.7	72.7	66.0	- 64.5	30.9	- 91.8	- 30.8	- 30.8	- 30.8	- 30.8
1990	166.4	86.8	79.6	- 111.9	34.8	- 57.0	- 34.5	- 34.5	- 34.5	- 34.5
1991	190.1	202.2	- 12.1	- 124.0	3.8	- 53.2	- 4.1	- 4.1	- 4.1	- 4.1
1992	223.6	417.4	- 193.8	- 317.8	23.2	- 30.0	- 27.3	- 27.3	- 27.3	- 27.3
1993	271.1	259.2	11.9	- 295.9	28.5	- 1.5	- 26.6	- 26.6	- 26.6	- 26.6
1994	321.8	303.4	18.4	- 277.5	19.6	18.9	- 10.7	- 10.7	- 10.7	- 10.7
1995	375.3	448.5	- 73.2	- 350.7	1.3	- 17.6	- 4.6	- 4.6	- 4.6	- 4.6
1996	402.9	646.3	- 243.4	- 594.1	71.5	- 146.8	- 78.0	- 78.0	- 78.0	- 78.0
1997	454.2	652.4	- 198.2	- 792.3	61.8	- 85.0	- 68.3	- 68.3	- 68.3	- 68.3
1998	504.5	477.9	26.6	- 765.7	12.1	- 72.9	- 8.0	- 8.0	- 8.0	- 8.0
1999	540.1	327.1	213.0	- 552.7	108.9	- 64.0	- 141.3	- 141.3	- 141.3	- 141.3
2000	1248.2	154.8	1093.4	395.3	1002.6	911.3	991.5	991.5	991.5	991.5
2001	1333.7	133.8	1200.0	1515.3	1054.9	1966.3	1055.4	1055.4	1055.4	1055.4
2002	2082.7	147.1	1935.6	3450.9	1067.0	3033.3	1067.4	1067.4	1067.4	1067.4
2003	2141.9	151.3	1990.6	5441.5	1089.6	4122.9	1089.9	1089.9	1089.9	1089.9
2004	2199.8	155.4	2044.4	7486.0	1122.9	5245.8	1122.3	1122.3	1122.3	1122.3
2005	2227.7	151.7	2076.0	9562.0	1147.1	6392.9	1147.6	1147.6	1147.6	1147.6
2006	2228.0	175.2	2052.8	11614.8	1136.0	7528.9	1136.4	1136.4	1136.4	1136.4
2007	2236.2	140.3	2095.9	13710.7	1134.9	8663.8	1135.9	1135.9	1135.9	1135.9
2008	2227.7	146.3	2081.4	15792.1	1148.3	9812.1	1147.1	1147.1	1147.1	1147.1
2009	2228.2	140.2	2088.0	17880.1	1148.6	10960.7	1147.3	1147.3	1147.3	1147.3
2010	2236.4	142.2	2094.2	19974.3	1148.3	12109.0	1147.3	1147.3	1147.3	1147.3
2011	2227.7	143.6	2084.1	22058.4	1143.7	13252.7	1144.9	1144.9	1144.9	1144.9
2012	2228.0	145.2	2082.8	24140.2	1142.4	14395.1	1143.6	1143.6	1143.6	1143.6
2013	2236.2	153.0	2083.2	26223.4	1144.7	15537.8	1145.9	1145.9	1145.9	1145.9
2014	2227.7	143.6	2084.1	28307.5	1139.8	16677.6	1141.1	1141.1	1141.1	1141.1
2015	2228.2	145.8	2082.4	30390.0	1143.0	17820.6	1144.2	1144.2	1144.2	1144.2
2016	2236.4	145.0	2091.4	32481.4	1151.9	18962.5	1153.3	1153.3	1153.3	1153.3
2017	2227.7	152.8	2074.9	34556.3	1153.3	20115.8	1156.6	1156.6	1156.6	1156.6
2018	2228.0	164.4	2063.6	36620.0	1152.1	21267.9	1155.2	1155.2	1155.2	1155.2
2019	2228.2	163.1	2065.1	38685.1	1157.5	22425.4	1158.6	1158.6	1158.6	1158.6
2020	2227.7	141.9	2085.8	40770.9	1156.7	23582.1	1158.2	1158.2	1158.2	1158.2
2021	2228.2	151.3	2076.9	42847.8	1151.5	24733.6	1152.9	1152.9	1152.9	1152.9
2022	2236.4	152.5	2083.9	44931.7	1156.8	25890.4	1158.4	1158.4	1158.4	1158.4
2023	2227.7	152.5	2075.2	46996.9	1149.6	27042.0	1151.4	1151.4	1151.4	1151.4
2024	2228.0	161.3	2066.7	49063.6	1155.3	28197.3	1147.0	1147.0	1147.0	1147.0
2025	2236.2	144.6	2091.6	51155.2	1156.4	29353.7	1158.2	1158.2	1158.2	1158.2
2026	2227.7	162.1	2065.6	53220.8	1146.3	30500.0	1148.2	1148.2	1148.2	1148.2
2027	2228.2	145.8	2082.4	55303.2	1152.2	31646.2	1157.4	1157.4	1157.4	1157.4
2028	2236.4	165.0	2071.4	57374.6	1151.3	32797.5	1155.4	1155.4	1155.4	1155.4
2029	2227.7	135.1	2092.6	59467.2	1152.1	33949.6	1154.8	1154.8	1154.8	1154.8
2030	2228.0	124.8	2103.2	61570.4	1255.0	35094.6	1259.8	1259.8	1259.8	1259.8

7A
Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	*	FIXED ASSETS	MODIFYING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	74.8	*	71.5	1.3	49.2	23.2
1979	81.3	*	119.4	1.5	89.1	37.1
1980	89.0	*	122.2	1.2	106.2	46.8
1981	87.2	*	212.6	3.7	152.5	52.8
1982	93.0	*	395.4	3.4	213.4	80.9
1983	84.7	*	387.1	4.9	268.2	103.8
1984	86.2	*	420.1	5.7	311.6	114.3
1985	86.1	*	451.4	9.0	341.0	119.4
1986	89.9	*	463.2	9.4	357.7	114.9
1987	43.1	*	486.5	15.3	382.6	115.2
1988	44.7	*	509.6	15.8	407.9	117.6
1989	18.9	*	566.1	16.0	415.2	106.8
1990	33.0	*	615.3	16.3	431.2	100.3
1991	147.2	*	634.0	18.0	522.5	129.4
1992	361.6	*	656.3	23.0	753.6	228.7
1993	122.7	*	1083.8	23.9	860.5	247.2
1994	265.2	*	1295.1	26.6	1023.2	296.7
1995	384.3	*	1513.3	31.0	1267.0	377.4
1996	369.3	*	2117.6	37.5	1642.2	512.8
1997	442.4	*	2409.3	44.8	2015.2	639.2
1998	446.3	*	2803.3	48.5	2286.7	668.0
1999	172.5	*	2833.1	50.1	2332.4	650.7
2000	81.7	*	2822.7	61.1	2362.6	591.3
2001	11.7	*	2773.6	60.7	2331.2	504.9
2002	15.0	*	2868.2	60.3	2362.2	464.3
2003	23.8	*	2855.7	60.6	2271.2	342.8
2004	26.8	*	2464.9	59.6	2237.2	277.8
2005	23.0	*	2344.9	59.1	2190.8	209.6
2006	15.9	*	2256.4	58.7	2162.6	152.3
2007	10.8	*	2126.2	57.7	2108.9	87.0
2008	13.9	*	2024.7	56.9	2053.8	28.6
2009	10.8	*	1909.8	55.9	1989.0	27.2
2010	24.9	*	1801.0	55.0	1928.6	72.6
2011	14.3	*	1686.3	53.9	1857.2	116.4
2012	16.6	*	1575.3	52.7	1781.8	153.6
2013	23.8	*	1473.3	51.5	1707.6	182.7
2014	26.6	*	1366.4	50.2	1626.3	206.7
2015	31.4	*	1281.0	49.6	1555.8	225.9
2016	16.0	*	1178.2	47.6	1469.1	243.3
2017	23.8	*	1090.6	46.3	1396.7	259.9
2018	35.3	*	1015.9	45.2	1322.1	268.1
2019	34.2	*	941.2	44.0	1256.8	271.5
2020	15.0	*	845.2	42.6	1182.3	274.5
2021	22.5	*	757.6	41.1	1063.7	267.0
2022	23.8	*	672.8	39.3	965.0	253.4
2023	33.8	*	585.7	37.8	866.1	232.6
2024	33.1	*	507.7	36.1	749.2	201.4
2025	16.0	*	413.2	34.0	615.7	168.4
2026	37.6	*	337.6	32.1	494.8	125.1
2027	17.3	*	241.3	29.9	353.7	82.5
2028	36.6	*	155.8	27.7	211.6	26.1
2029	6.8	*	36.6	25.6	34.4	27.2
2030	6.5	*	34.4	22.0	33.2	23.2
TOTAL CAPITAL INVESTMENT			4534.3			

7A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	73.98	24.75002	24.41339	28.71024
1979	125.77	42.35004	41.50409	50.68805
1980	163.75	55.56009	54.03749	69.5722
1981	231.35	78.84009	76.34549	95.3589
1982	324.3599	110.97	107.0387	121.8745
1983	409.0698	140.8201	134.993	143.0573
1984	477.2598	165.6802	157.4957	154.561
1985	525.3496	184.3701	173.3654	164.7547
1986	555.2295	197.5403	183.2257	164.7547
1987	598.2893	215.7102	197.4355	184.4797
1988	642.9893	235.1304	212.1864	184.4797
1989	661.9192	246.7007	218.4333	184.4797
1990	694.9192	263.7009	229.3233	184.4797
1991	842.1592	319.6411	277.9124	184.4797
1992	1203.799	448.1814	397.2537	241.731
1993	1376.529	516.0017	454.2544	241.731
1994	1641.779	616.562	541.7869	241.731
1995	2026.269	759.262	668.8687	246.2834
1996	2615.579	973.342	863.1409	324.259
1997	3208.079	1192.863	1058.666	392.512
1998	3624.729	1358.013	1196.16	392.512
1999	3799.889	1447.483	1253.963	392.512
2000	3867.619	1505.034	1276.314	392.512
2001	3879.319	1547.704	1280.175	392.512
2002	3898.819	1596.594	1286.61	392.512
2003	3922.589	1651.354	1294.454	392.512
2004	3949.219	1712.023	1303.242	392.512
2005	3971.688	1776.724	1310.657	392.512
2006	4017.338	1854.774	1325.721	392.512
2007	4028.108	1921.184	1329.275	392.512
2008	4046.938	1992.904	1335.489	392.512
2009	4057.708	2068.744	1339.043	392.512
2010	4082.558	2153.794	1347.244	392.512
2011	4096.855	2239.682	1351.962	392.512
2012	4112.824	2331.071	1357.232	392.512
2013	4136.594	2429.041	1365.076	392.512
2014	4157.242	2530.93	1371.89	392.512
2015	4188.59	2632.798	1382.234	392.512
2016	4204.559	2735.417	1387.504	392.512
2017	4228.328	2831.586	1395.348	392.512
2018	4263.797	2934.655	1407.053	392.512
2019	4298.004	3041.223	1418.341	392.512
2020	4311.004	3148.753	1422.631	392.512
2021	4333.473	3267.772	1430.046	392.512
2022	4357.242	3392.281	1437.89	392.512
2023	4381.012	3524.951	1445.734	392.512
2024	4414.16	3669.01	1456.673	392.512
2025	4430.129	3814.418	1461.942	392.512
2026	4467.695	3972.885	1474.339	392.512
2027	4484.965	4131.273	1480.038	392.512
2028	4521.512	4309.859	1492.099	392.512
2029	4528.27	4493.848	1494.329	392.512
2030	4534.77	4501.52	1496.474	392.512

7A
Cost Summary - Dollars in Millions

WBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	4,534.9	4,780.5	9,315.4	4,534.8	6,489.9	11,024.7
1.0	CAPITAL ITEMS	4,534.9		4,534.9	4,534.8	6,489.9	11,024.7
1.1	SYSTEM FACILITIES-EQUIPMENT	3,471.3		3,471.3	3,471.2	4,578.0	8,049.2
1.1.1	SHIP	156.0		156.0	156.0	161.0	317.0
1.1.2	CASH	242.0		242.0	242.0	173.6	415.6
1.1.3	CASH TRANSPORTER/PAUL CAR	18.8		18.8	18.8	11.4	30.1
1.1.4	PAUL CAR TUG	0.8		0.8	0.8	0.4	1.2
1.1.5	CASH TRANSPORTER						
1.1.6	SUPPORT FAC						
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	62.6	110.6
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3	65.3
1.1.10	PACKAGING FACILITY						
1.1.11	PACKAGING FAC	116.0		116.0	116.0	201.2	317.2
1.1.12	CONCRETE	216.6		216.6	216.6	318.3	535.0
1.1.13	ENFORCEMENT TRANS	18.8		18.8	18.8	11.9	30.7
1.1.14	PAUL TUG	675.0		675.0	675.0	364.1	1,039.1
1.1.15	CEOLOGIC REC MOD						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CASH	47.0		47.0	47.0	80.9	127.9
1.1.18	LOCK INTER FAC	75.0		75.0	75.0	130.1	205.1
1.1.19	MLM FAC FAC	940.4		940.4	940.4	1,631.0	2,571.4
1.1.20	RECOVERY FAC	693.8		693.8	693.8	1,150.2	1,844.0
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6	39.3
1.2.1	PAUL TUG	2.4		2.4	2.4	3.5	5.9
1.2.2	PAUL TUG	12.2		12.2	12.2	21.1	33.3
1.3	OTHERS COST	524.5		524.5	524.5	704.6	1,229.1
1.4	INTEREST DURING CONS					704.7	1,229.2
2.0	OPER & MAINT		4,780.5	4,780.5		4,780.5	4,780.5
2.1	DIRECT LABOR		1,066.4	1,066.4		1,066.4	1,066.4
2.1.1	PORT C REC TRANS		5.1	5.1		5.1	5.1
2.1.2	WATER BASIN REC (4PORT)		145.8	145.8		145.8	145.8
2.1.3	WATER BASIN REC (2PORT)						
2.1.4	WATER BASIN STOR		27.1	27.1		27.1	27.1
2.1.5	PAUL FAC LABOR						
2.1.6	PAUL FAC LABOR		313.7	313.7		313.7	313.7
2.1.7	PAUL ENFORCEMENT LABOR		44.0	44.0		44.0	44.0
2.1.8	CEOLOGIC REC MOD LABOR						
2.1.9	CASH TRANS MAINT LAB		31.2	31.2		31.2	31.2
2.1.10	LOCK UN PROCES LABOR		15.2	15.2		15.2	15.2
2.1.11	MLM FAC LABOR		242.1	242.1		242.1	242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1		242.1	242.1
2.2	DIRECT LABOR		1,600.5	1,600.5		1,600.5	1,600.5
2.2.1	PORT C REC TRANS LAB		8.1	8.1		8.1	8.1
2.2.2	WATER BASIN REC (4PORT) LAB		218.6	218.6		218.6	218.6
2.2.3	WATER BASIN REC (2PORT) LAB						
2.2.4	WATER BASIN STOR LAB		40.5	40.5		40.5	40.5
2.2.5	PAUL FAC LAB						
2.2.6	PAUL FAC LAB		470.4	470.4		470.4	470.4
2.2.7	PAUL ENFORCEMENT LAB		65.8	65.8		65.8	65.8
2.2.8	CEOLOGIC REC MOD LAB						
2.2.9	CASH TRANS MAINT LAB		46.6	46.6		46.6	46.6
2.2.10	LOCK UN PROC LAB		7.7	7.7		7.7	7.7
2.2.11	MLM FAC LAB		371.3	371.3		371.3	371.3
2.2.12	RECOVERY PLANT LAB		371.3	371.3		371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0		1,614.0	1,614.0
2.3.1	PORT C REC TRANS		8.1	8.1		8.1	8.1
2.3.2	WATER BASIN REC (4PORT)		218.6	218.6		218.6	218.6
2.3.3	WATER BASIN REC (2PORT)						
2.3.4	WATER BASIN STOR		40.5	40.5		40.5	40.5
2.3.5	PAUL FAC (2000)						
2.3.6	PAUL FAC (2000)		470.4	470.4		470.4	470.4
2.3.7	PAUL ENFORCEMENT		65.8	65.8		65.8	65.8
2.3.8	CEOLOGIC REC OPNS						
2.3.9	CASH TRANS		46.6	46.6		46.6	46.6
2.3.10	LOCK UN PROC OPNS		21.3	21.3		21.3	21.3
2.3.11	MLM PROCESSING OPNS		371.3	371.3		371.3	371.3
2.3.12	RECOVERY PLANT OPNS		371.3	371.3		371.3	371.3
2.4	CONTRACTED SERVICES		402.3	402.3		402.3	402.3
2.4.1	SHIP ON		325.6	325.6		325.6	325.6
2.4.2	US PORT FEE						
2.4.3	ELFOR PORT FEE STOR						
2.4.4	US FAC (150 TO STOR)						
2.4.5	ELFOR PAUL TRANS						
2.4.6	US STOP (TIME CHRG)		59.6	59.6		59.6	59.6
2.4.7	ELFOR STOR						
2.4.8	US FAC (150 CR)						
2.4.9	ELFOR REC CR						
2.4.10	ELFOR FAC DIS						
2.4.11	US FAC TRANS		17.0	17.0		17.0	17.0
2.4.12	ELFOR FAC TRANS						
2.4.13	ELFOR FAC TRANS						
2.4.14	US PORT FEE						
2.4.15	ELFOR PORT FEE						
2.4.16	PACIFIC PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	YAC FAC TRANS						
2.4.19	PAUL FAC TRANS						
2.5	TECH TRUST FUND		97.3	97.3		97.3	97.3

Section E3.8

Case: 8A

Description: Fuel Cycle Center (FCC) baseline except vault cost factor 0.50

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 4.202 billion dollars

Owners ROI - 21.4%

Service charge - \$162/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YR) \$162.385
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$62158.360

8A
 Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	IEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.2	2.2	.8	4.8	2.4	8.0	.0	5.8
1979	.0	4.9	4.9	1.3	6.1	3.8	13.5	.0	6.6
1980	.0	6.1	6.1	2.5	10.5	4.9	17.9	.0	11.8
1981	.0	14.8	14.8	3.6	14.7	6.9	25.1	.0	11.1
1982	.0	28.6	28.6	5.1	20.6	9.7	35.4	.0	6.8
1983	.0	37.0	37.0	6.3	22.2	12.0	43.4	.0	6.4
1984	.0	46.0	46.0	7.6	22.3	14.1	51.0	.0	5.0
1985	.0	62.5	62.5	15.6	22.1	15.6	67.3	.0	4.6
1986	.0	77.4	77.4	20.2	33.6	18.6	78.4	2.7	4.3
1987	.0	91.4	91.4	23.2	35.6	18.1	107.1	5.0	15.7
1988	.0	125.8	125.8	23.7	38.0	19.6	111.3	5.5	9.8
1989	.0	158.7	158.7	23.7	38.4	20.2	112.3	14.6	23.8
1990	.0	158.0	158.0	23.7	39.8	21.2	114.7	16.5	26.6
1991	.0	180.5	180.5	24.9	48.5	23.6	129.1	19.5	21.9
1992	.0	218.1	218.1	25.7	71.5	25.8	163.0	20.9	34.1
1993	.0	237.5	237.5	26.4	61.2	40.9	178.5	30.6	46.9
1994	.0	305.5	305.5	27.1	97.0	46.9	203.0	39.0	63.6
1995	.0	356.4	356.4	27.9	120.6	60.5	239.0	44.6	72.8
1996	.0	382.6	382.6	28.8	157.6	78.6	295.0	33.3	54.3
1997	.0	431.2	431.2	29.8	194.1	97.1	351.0	38.5	49.7
1998	.0	479.0	479.0	31.1	218.6	110.1	389.9	33.8	55.2
1999	.0	512.8	512.8	31.7	223.4	113.0	398.9	43.3	70.6
2000	1413.5	555.2	1968.7	126.9	225.9	116.6	469.3	58.8	929.6
2001	1413.5	609.8	2023.3	126.9	223.5	117.1	467.5	591.2	964.6
2002	1413.5	635.5	2049.0	127.4	221.5	117.7	466.5	601.3	981.1
2003	1413.5	691.6	2105.1	127.9	219.6	119.6	465.6	623.0	1016.5
2004	1413.5	742.8	2156.3	128.6	216.7	119.6	464.8	642.8	1048.7
2005	1413.5	773.1	2186.6	129.0	213.5	120.5	463.0	655.0	1068.7
2006	1413.5	773.4	2186.9	129.4	211.4	122.0	462.8	655.2	1068.9
2007	1413.5	781.1	2194.6	129.3	206.4	119.7	455.5	660.9	1078.3
2008	1413.5	773.1	2186.6	129.3	201.9	119.1	450.3	659.8	1075.5
2009	1413.5	773.6	2187.1	129.2	176.6	118.6	444.4	662.2	1080.5
2010	1413.5	781.4	2194.9	129.2	191.7	118.7	439.6	667.0	1088.3
2011	1413.5	773.1	2186.6	129.1	185.9	117.8	432.8	666.5	1087.4
2012	1413.5	773.4	2186.9	129.1	179.5	117.6	435.2	669.1	1091.6
2013	1413.5	781.1	2194.6	129.0	173.1	116.6	418.7	674.9	1101.1
2014	1413.5	773.1	2186.6	129.9	166.1	115.6	410.7	674.8	1101.1
2015	1413.5	773.6	2187.1	129.9	159.3	111.2	399.4	673.3	1168.3
2016	1413.5	781.4	2194.9	128.8	151.8	116.5	391.2	685.4	1118.3
2017	1413.5	773.1	2186.6	128.8	144.3	104.1	377.2	687.6	1121.9
2018	1413.5	773.4	2186.9	128.7	138.3	103.5	370.5	696.2	1126.1
2019	1413.5	781.1	2194.6	128.7	131.9	104.9	365.5	695.1	1134.1
2020	1413.5	773.1	2186.6	128.6	123.5	105.2	357.3	695.2	1134.2
2021	1413.5	773.6	2187.1	128.6	114.7	103.9	349.1	696.5	1139.6
2022	1413.5	781.4	2194.9	128.5	105.1	104.4	338.0	705.6	1151.3
2023	1413.5	773.1	2186.6	128.4	95.2	104.9	328.5	706.1	1152.8
2024	1413.5	773.4	2186.9	128.4	85.2	105.5	319.1	709.7	1158.0
2025	1413.5	781.1	2194.6	128.4	73.1	104.3	305.8	717.8	1171.1
2026	1413.5	773.1	2186.6	128.3	61.9	106.5	296.7	718.2	1171.7
2027	1413.5	773.6	2187.1	128.2	46.7	105.9	282.9	723.6	1180.6
2028	1413.5	781.4	2194.9	128.2	36.3	113.6	277.4	728.6	1188.6
2029	1413.5	773.1	2186.6	128.1	20.9	117.5	266.5	729.7	1190.6
2030	1413.5	773.4	2186.9	128.1	9.9	8.7	146.6	777.6	1268.7
TOTL	45810.5	27902.4	71150.7	4789.2	6070.8	4163.0	15023.2	21744.4	34747.0
A/C	626.8	515.7	1342.5	90.4	114.5	78.6	283.6	402.9	626.8
1171C	280.2	162.3	422.5	28.4	36.0	24.8	89.2	126.8	286.5

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Yearly Cash Statement

UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				UNLEAF	
YEAR	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	
1972	3.2	72.8	- 70.6	- 70.6	- 37.5	- 37.5	- 33.4	- 33.4	
1973	4.9	51.4	- 46.4	- 117.0	- 31.7	- 69.2	- 22.3	- 55.7	
1974	6.1	38.5	- 32.4	- 149.4	- 19.4	- 88.6	- 20.0	- 79.7	
1975	14.0	67.2	- 53.2	- 202.7	- 28.2	- 116.8	- 27.1	- 106.8	
1976	28.6	94.1	- 65.6	- 268.2	- 27.8	- 144.6	- 23.1	- 129.9	
1977	37.0	76.9	- 39.8	- 308.1	- 19.5	- 164.1	- 20.4	- 150.3	
1978	46.0	71.6	- 25.9	- 333.9	- 14.3	- 178.3	- 15.2	- 165.5	
1979	62.5	64.7	- 2.2	- 336.1	- 8.7	- 187.0	- 9.1	- 174.6	
1980	77.4	46.1	31.3	- 304.9	- 9.4	- 196.4	- 9.0	- 183.6	
1981	91.4	90.8	- .6	- 305.5	- 13.6	- 210.0	- 13.4	- 197.0	
1982	125.6	92.2	33.6	- 271.9	- 11.7	- 221.7	- 11.2	- 208.2	
1983	120.7	66.3	54.3	- 217.6	35.0	- 186.7	35.0	- 151.7	
1984	158.0	89.4	68.4	- 149.2	33.9	- 152.8	33.6	- 119.1	
1985	180.5	193.6	- 13.1	- 162.3	- 5.3	- 158.1	- 3.0	- 162.1	
1986	218.1	408.7	- 190.7	- 353.0	- 54.6	- 212.6	- 58.6	- 271.2	
1987	257.5	213.3	44.2	- 308.8	28.7	- 183.9	27.0	- 156.9	
1988	305.5	306.5	- 1.0	- 309.8	18.8	- 165.1	15.1	- 141.8	
1989	326.4	426.6	- 100.2	- 410.0	- 2.1	- 167.2	- 6.2	- 168.0	
1990	382.6	632.3	- 249.7	- 659.7	- 73.6	- 240.8	- 73.9	- 242.9	
1991	431.2	630.8	- 199.5	- 859.2	- 62.7	- 303.5	- 65.0	- 308.9	
1992	479.0	458.2	22.7	- 836.5	12.1	- 291.4	7.8	- 299.2	
1993	512.8	165.4	347.4	- 489.1	122.0	- 169.4	121.1	- 181.3	
1994	1968.7	303.7	1765.1	1298.4	940.8	854.3	975.3	835.0	
1995	2029.3	133.6	1895.7	3194.1	1044.3	1942.1	1044.7	1886.7	
1996	2049.0	146.9	1902.1	5106.1	1055.7	2997.8	1056.0	2950.7	
1997	2105.1	148.1	1957.1	7063.1	1068.0	4065.8	1068.3	4028.0	
1998	2156.3	151.6	2004.7	9067.9	1118.1	5183.9	1118.4	5144.4	
1999	2166.6	147.9	2018.7	11086.6	1133.6	6317.5	1134.6	6276.4	
2000	2186.9	171.4	2015.4	13102.0	1142.9	7460.3	1143.2	7401.3	
2001	2194.6	136.5	2058.1	15160.1	1140.5	8600.8	1141.3	8542.8	
2002	2186.6	144.5	2042.1	17202.2	1132.2	9733.0	1132.9	9675.8	
2003	2187.1	136.4	2050.7	19252.9	1134.0	10867.0	1134.9	10810.6	
2004	2194.9	130.4	2064.5	21317.4	1132.1	11999.1	1132.9	11943.6	
2005	2186.6	133.4	2053.2	23370.6	1128.6	13127.6	1129.6	13073.1	
2006	2186.9	141.4	2045.4	25416.0	1127.7	14255.3	1128.7	14201.9	
2007	2194.6	149.2	2045.3	27461.3	1129.4	15384.7	1130.5	15332.3	
2008	2186.6	146.0	2040.6	29501.9	1124.5	16509.2	1125.6	16438.8	
2009	2187.1	136.6	2050.5	31552.4	1127.3	17636.5	1128.3	17566.4	
2010	2194.9	141.2	2053.7	33606.1	1130.7	18767.2	1131.0	18723.4	
2011	2186.6	149.0	2037.7	35643.8	1138.1	19905.3	1139.4	19862.8	
2012	2186.9	160.6	2026.3	37670.1	1134.3	21039.6	1135.3	20998.1	
2013	2194.6	159.3	2035.4	39705.5	1136.0	22175.7	1137.1	22135.2	
2014	2186.6	141.6	2045.0	41750.5	1134.4	23310.0	1135.8	23271.0	
2015	2187.1	147.4	2039.7	43790.2	1130.4	24440.3	1131.9	24402.9	
2016	2194.9	148.7	2046.2	45836.4	1136.4	25576.7	1138.0	25540.9	
2017	2186.6	148.6	2038.0	47874.4	1129.7	26706.4	1131.3	26672.3	
2018	2186.9	157.9	2029.0	49903.4	1125.2	27831.6	1128.9	27799.2	
2019	2194.6	140.7	2053.9	51957.3	1136.1	28967.7	1138.1	28937.3	
2020	2186.6	162.3	2024.3	53981.6	1128.5	30096.2	1128.3	30065.7	
2021	2187.1	141.9	2045.2	56026.8	1135.3	31231.5	1137.7	31203.4	
2022	2194.9	161.1	2033.7	58060.5	1131.9	32363.4	1134.0	32337.3	
2023	2186.6	134.9	2051.7	60112.2	1131.5	33494.9	1134.1	33471.4	
2024	2186.9	134.6	2052.3	62164.5	1269.7	34764.6	1272.5	34743.9	

Capital Investment Balance Sheet

YEPP	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	CHIEFS EQUITY
1978	72.0	*	69.6	1.9	47.5	22.4
1979	49.0	*	110.6	1.6	60.0	36.4
1980	36.0	*	146.8	2.2	104.3	44.6
1981	63.6	*	203.5	3.0	146.0	60.0
1982	69.0	*	282.0	4.0	204.3	82.8
1983	70.6	*	341.4	5.2	249.3	96.8
1984	64.2	*	381.6	6.2	290.6	107.0
1985	45.1	*	421.1	8.6	318.4	111.3
1986	35.9	*	430.4	3.0	332.8	106.6
1987	37.6	*	449.9	14.9	354.4	110.4
1988	38.4	*	468.0	15.0	376.0	108.1
1989	12.6	*	461.3	15.4	379.7	96.9
1990	26.7	*	466.7	15.6	392.2	90.1
1991	138.6	*	579.7	17.2	478.6	110.4
1992	253.0	*	697.0	21.2	707.1	211.1
1993	156.9	*	1013.0	22.9	802.8	233.1
1994	249.4	*	1213.6	25.7	958.7	260.6
1995	268.7	*	1531.0	29.7	1191.9	309.6
1996	573.5	*	2016.7	36.1	1559.0	493.8
1997	571.0	*	2450.6	42.3	1920.4	612.5
1998	395.1	*	2773.5	46.6	2162.2	659.4
1999	166.6	*	2768.3	47.5	2266.5	609.4
2000	76.7	*	2728.5	59.8	2227.5	559.7
2001	11.7	*	2623.1	58.4	2201.9	479.6
2002	19.5	*	2524.9	58.1	2178.4	464.7
2003	20.2	*	2426.6	57.8	2151.5	332.9
2004	23.0	*	2338.0	57.0	2122.3	265.2
2005	18.9	*	2228.4	57.1	2055.6	199.9
2006	42.1	*	2146.5	56.9	2059.6	145.7
2007	7.2	*	2035.9	56.0	2009.2	62.6
2008	10.2	*	1932.0	55.2	1961.0	26.2
2009	7.2	*	1820.5	54.3	1903.1	28.2
2010	21.2	*	1723.0	53.5	1849.4	72.9
2011	14.3	*	1619.5	52.5	1787.1	112.1
2012	12.4	*	1514.3	51.4	1712.0	102.2
2013	20.2	*	1417.9	50.4	1649.9	181.6
2014	17.1	*	1319.3	49.2	1574.7	206.2
2015	27.7	*	1235.8	48.0	1510.2	226.3
2016	12.4	*	1137.7	46.0	1429.5	243.8
2017	20.2	*	1053.8	45.5	1361.6	262.5
2018	31.9	*	982.2	44.5	1298.4	271.7
2019	30.5	*	907.9	43.4	1226.0	274.7
2020	13.0	*	815.7	42.0	1154.0	276.3
2021	18.9	*	728.7	40.5	1037.9	268.7
2022	20.2	*	644.5	39.9	958.9	255.4
2023	20.2	*	559.8	37.9	831.9	234.7
2024	29.6	*	483.9	35.6	723.1	203.7
2025	12.4	*	391.9	33.6	596.2	170.7
2026	34.0	*	319.3	31.7	478.4	127.3
2027	13.7	*	227.1	29.9	341.0	84.4
2028	32.9	*	147.1	27.4	204.1	29.6
2029	6.8	*	36.6	24.8	34.5	26.9
2030	6.5	*	34.4	22.0	33.3	23.1

TOTAL CAPITAL INVESTMENT 4202.4

8A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	72.03	24.09001	23.7699	28.425
1979	121.87	41.03003	40.21709	50.77338
1980	157.89	53.56	52.10368	70.73307
1981	221.52	75.4801	73.10159	97.60876
1982	310.5598	106.2099	102.4847	126.8701
1983	381.1196	131.2297	125.7695	147.2863
1984	445.3396	154.5798	146.9621	162.4726
1985	490.4595	172.05	161.8516	171.6194
1986	516.3694	183.6101	170.4019	171.6194
1987	554.0193	199.6003	182.8264	191.0649
1988	592.4592	216.4705	195.5115	191.0649
1989	605.0791	225.3606	199.6761	191.0649
1990	631.769	239.5608	208.4838	191.0649
1991	770.3989	291.7808	234.2316	191.0649
1992	1123.419	416.3311	370.728	249.6693
1993	1280.339	477.5112	422.5117	249.6693
1994	1529.789	571.1313	504.8301	249.6693
1995	1898.479	706.5618	626.4978	255.8795
1996	2471.989	913.0117	815.7561	335.7898
1997	3042.949	1122.542	1004.173	404.7686
1998	3438.049	1275.842	1134.556	404.7686
1999	3544.699	1338.242	1169.75	404.7686
2000	3621.429	1393.903	1195.071	404.7686
2001	3633.129	1431.213	1198.932	404.7686
2002	3652.629	1474.223	1205.367	404.7686
2003	3672.809	1521.283	1212.027	404.7686
2004	3695.848	1573.563	1219.63	404.7686
2005	3714.728	1629.113	1225.86	404.7686
2006	3756.778	1697.193	1239.737	404.7686
2007	3763.958	1754.733	1242.106	404.7686
2008	3779.198	1818.184	1247.135	404.7686
2009	3786.378	1883.324	1249.505	404.7686
2010	3807.628	1958.194	1256.517	404.7686
2011	3821.928	2034.794	1261.236	404.7686
2012	3834.308	2116.355	1265.321	404.7686
2013	3854.488	2204.594	1271.981	404.7686
2014	3871.547	2296.844	1277.61	404.7686
2015	3899.297	2389.114	1286.768	404.7686
2016	3911.677	2482.225	1290.853	404.7686
2017	3931.857	2570.055	1297.513	404.7686
2018	3963.737	2665.355	1308.033	404.7686
2019	3994.347	2768.336	1318.134	404.7686
2020	4007.347	2873.326	1322.424	404.7686
2021	4026.227	2988.326	1328.655	404.7686
2022	4046.407	3107.546	1335.314	404.7686
2023	4066.587	3234.726	1341.973	404.7686
2024	4096.133	3373.023	1351.724	404.7686
2025	4108.512	3512.302	1355.809	404.7686
2026	4142.488	3664.109	1367.021	404.7686
2027	4156.168	3815.139	1371.535	404.7686
2028	4189.117	3985.018	1382.408	404.7686
2029	4195.875	4161.414	1384.639	404.7686
2030	4202.375	4169.086	1386.783	404.7686

2A
Cost Summary - Dollars in Millions

WSS		COMMITTED COST		FINANCED COST	
		CAPITAL	OPERATIONS	PRINCIPLE	INTEREST
		TOTAL	TOTAL	TOTAL	TOTAL
0.0	TOTAL	4,202.4	4,790.0	4,202.4	4,790.0
1.0	CAPITAL ITEMS	4,202.4	4,202.4	4,202.4	4,202.4
1.1	SYSTEM FACILITIES-EQUIPMENT	3,206.3	3,206.3	3,206.3	3,206.3
1.1.1	SHIP	150.0	150.0	150.0	150.0
1.1.2	CRAN	242.0	242.0	242.0	242.0
1.1.3	CRAN TRANSPORTER-PAIL CR	18.0	18.0	18.0	18.0
1.1.4	PAIL CR TUG	0.0	0.0	0.0	0.0
1.1.5	CRAN TRANSPORTER	1.0	1.0	1.0	1.0
1.1.6	RECYCLE FAC	48.0	48.0	48.0	48.0
1.1.7	LATER BASIN 4 PORT	24.0	24.0	24.0	24.0
1.1.8	LATER BASIN 2 PORT	24.0	24.0	24.0	24.0
1.1.9	LATER BASIN STORAGE	24.0	24.0	24.0	24.0
1.1.10	PROCESSING FACILITY	116.0	116.0	116.0	116.0
1.1.11	PROCESSING FAC	216.5	216.5	216.5	216.5
1.1.12	CRAN STEPS	18.0	18.0	18.0	18.0
1.1.13	REPLACEMENT TRANS	410.2	410.2	410.2	410.2
1.1.14	FAULT MODULE	47.0	47.0	47.0	47.0
1.1.15	LOGISTIC REC MODULE	60.9	60.9	60.9	60.9
1.1.16	REPOSITORY STORAGE MOD	113.1	113.1	113.1	113.1
1.1.17	CRAN	2,571.4	2,571.4	2,571.4	2,571.4
1.1.18	LOGIC INTER FAC	1,030.2	1,030.2	1,030.2	1,030.2
1.1.19	PLN PROC FAC	14.7	14.7	14.7	14.7
1.1.20	RECOVERY FAC	24.6	24.6	24.6	24.6
1.2	SUPPORT FACILITIES EQUIPMENT	14.7	14.7	14.7	14.7
1.2.1	FIELD & FLT YD	2.4	2.4	2.4	2.4
1.2.2	WAREHOUSE & ULT	12.2	12.2	12.2	12.2
1.2.3	CRAN COST	450.7	450.7	450.7	450.7
1.2.4	INTEREST DURING CON	450.7	450.7	450.7	450.7
2.0	OPER & MAINT	4,790.0	4,790.0	4,790.0	4,790.0
2.1	DIRECT LABOR	1,066.4	1,066.4	1,066.4	1,066.4
2.1.1	PORT & REC TRANS	5.1	5.1	5.1	5.1
2.1.2	LATER BASIN REC(4PORT)	145.8	145.8	145.8	145.8
2.1.3	LATER BASIN REC(2PORT)	27.1	27.1	27.1	27.1
2.1.4	LATER BASIN REC	313.7	313.7	313.7	313.7
2.1.5	PORT FAC LABOR	44.0	44.0	44.0	44.0
2.1.6	FAULT REPLACEMENT LABOR	31.2	31.2	31.2	31.2
2.1.7	LOGISTIC REC MOD LABOR	15.2	15.2	15.2	15.2
2.1.8	CRAN TRANS MAINT LAB	242.1	242.1	242.1	242.1
2.1.9	LOGIC PROCES LABOR	242.1	242.1	242.1	242.1
2.1.10	RECOVERY FLUIT LAB	1,600.5	1,600.5	1,600.5	1,600.5
2.1.11	INDIRECT LABOR	8.1	8.1	8.1	8.1
2.1.12	PORT & REC TRANS LAB	218.6	218.6	218.6	218.6
2.1.13	LOGIC REC(4PORT) LAB	40.0	40.0	40.0	40.0
2.1.14	LOGIC REC(2PORT) LAB	470.4	470.4	470.4	470.4
2.1.15	PORT FAC IND LAB	65.8	65.8	65.8	65.8
2.1.16	FAULT IND LAB	46.6	46.6	46.6	46.6
2.1.17	LOGIC REC MOD IND LAB	7.7	7.7	7.7	7.7
2.1.18	CRAN TRANS MAINT LAB	371.3	371.3	371.3	371.3
2.1.19	LOGIC PROC IND LAB	371.3	371.3	371.3	371.3
2.1.20	RECOVERY FLUIT LAB	1,614.0	1,614.0	1,614.0	1,614.0
2.2	INDIRECT SUP UTIL ECT	8.1	8.1	8.1	8.1
2.2.1	PORT REC FNS	218.6	218.6	218.6	218.6
2.2.2	LOGIC REC CHRS 2 PORT	40.0	40.0	40.0	40.0
2.2.3	LOGIC STORAGE CHRS	470.4	470.4	470.4	470.4
2.2.4	PORT CHRS(2000)	65.8	65.8	65.8	65.8
2.2.5	FAULT CHRS	46.6	46.6	46.6	46.6
2.2.6	LOGISTIC REC CHRS	21.3	21.3	21.3	21.3
2.2.7	CRAN TRANS	371.3	371.3	371.3	371.3
2.2.8	LOGIC PROCESSING CHRS	371.3	371.3	371.3	371.3
2.2.9	RECOVERY FLUIT CHRS	419.9	419.9	419.9	419.9
2.3	CONTRACTED SERVICES	325.6	325.6	325.6	325.6
2.3.1	SHIP CH	0.4	0.4	0.4	0.4
2.3.2	US PORT FEE	17.2	17.2	17.2	17.2
2.3.3	SHIP PORT FEE STOP	59.6	59.6	59.6	59.6
2.3.4	US FAULT(2 TO STOP)	17.2	17.2	17.2	17.2
2.3.5	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.6	US STOP(TIME CHRG)	59.6	59.6	59.6	59.6
2.3.7	SHIP STOP	17.2	17.2	17.2	17.2
2.3.8	US PORT CR	17.2	17.2	17.2	17.2
2.3.9	SHIP REC CR	17.2	17.2	17.2	17.2
2.3.10	SHIP WASTE DIS	17.2	17.2	17.2	17.2
2.3.11	US PAIL TRANSP	17.2	17.2	17.2	17.2
2.3.12	SHIP PAIL TRANSP	17.2	17.2	17.2	17.2
2.3.13	SHIP PAIL TRANSP	17.2	17.2	17.2	17.2
2.3.14	US PORT FEE	17.2	17.2	17.2	17.2
2.3.15	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.16	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.17	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.18	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.19	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.20	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.21	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.22	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.23	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.24	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.25	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.26	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.27	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.28	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.29	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.30	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.31	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.32	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.33	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.34	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.35	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.36	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.37	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.38	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.39	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.40	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.41	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.42	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.43	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.44	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.45	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.46	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.47	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.48	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.49	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.50	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.51	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.52	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.53	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.54	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.55	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.56	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.57	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.58	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.59	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.60	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.61	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.62	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.63	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.64	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.65	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.66	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.67	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.68	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.69	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.70	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.71	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.72	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.73	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.74	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.75	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.76	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.77	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.78	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.79	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.80	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.81	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.82	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.83	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.84	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.85	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.86	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.87	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.88	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.89	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.90	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.91	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.92	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.93	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.94	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.95	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.96	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.97	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.98	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.99	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.100	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.101	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.102	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.103	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.104	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.105	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.106	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.107	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.108	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.109	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.110	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.111	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.112	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.113	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.114	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.115	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.116	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.117	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.118	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.119	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.120	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.121	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.122	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.123	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.124	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.125	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.126	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.127	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.128	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.129	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.130	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.131	SHIP PORT FEE	17.2	17.2	17.2	17.2
2.3.132	SHIP PORT FEE	17.			

Section E3.9

Case: 9A

Description: Fuel Cycle Center (FCC) baseline except location cost factor 0.7

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 0.7

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 3.792 billion dollars

Owners ROI - 20.86%

Service charge - \$131/kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/MG) 4131.024
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$58148.730

9A
 Yearly Profit and Loss Statement

\$\$

YEAR	REP REVENUE	SEMI CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	1.8	1.8	.8	4.1	2.1	7.0	.0	- 5.2
1979	.0	4.0	4.0	1.5	7.0	3.4	11.8	.0	- 7.9
1980	.0	4.9	4.9	2.5	8.9	4.3	15.6	.0	- 10.7
1981	.0	11.3	11.3	3.5	12.4	5.9	21.8	.0	- 10.6
1982	.0	23.1	23.1	5.1	17.1	8.3	30.5	.0	- 7.4
1983	.0	23.2	23.2	6.3	21.5	10.5	38.3	.0	- 8.4
1984	.0	37.1	37.1	7.6	24.9	12.3	44.8	.0	- 7.6
1985	.0	50.5	50.5	16.3	27.3	13.7	57.3	.0	- 6.8
1986	.0	62.4	62.4	16.9	29.0	14.8	60.6	.7	- 1.1
1987	.0	73.8	73.8	43.1	31.4	16.4	90.9	.8	- 17.1
1988	.0	101.6	101.6	43.6	34.1	18.2	95.9	2.2	- 3.6
1989	.0	121.6	121.6	43.6	34.9	19.6	98.1	9.2	- 15.0
1990	.0	127.6	127.6	43.6	36.6	20.3	100.6	10.3	- 16.7
1991	.0	145.7	145.7	44.7	44.2	24.4	113.4	12.3	- 20.0
1992	.0	176.0	176.0	45.4	52.3	33.1	141.3	13.2	- 21.3
1993	.0	207.8	207.8	46.0	71.8	38.2	156.1	14.7	- 32.1
1994	.0	246.6	246.6	46.7	85.6	45.6	177.8	22.1	- 42.7
1995	.0	287.7	287.7	47.4	105.1	53.7	206.3	30.2	- 49.2
1996	.0	308.9	308.9	48.2	134.3	70.5	253.0	21.2	- 34.6
1997	.0	348.1	348.1	49.1	163.3	85.8	298.1	19.0	- 31.0
1998	.0	386.7	386.7	50.3	183.4	97.1	330.8	21.2	- 34.6
1999	.0	414.0	414.0	50.9	191.5	103.4	345.8	23.9	- 42.3
2000	1413.5	448.2	1861.7	104.1	192.2	105.6	402.6	54.5	904.6
2001	1413.5	492.2	1905.7	104.2	190.7	106.1	401.1	57.8	932.9
2002	1413.5	515.0	1928.5	104.7	188.7	106.8	400.2	58.0	946.3
2003	1413.5	523.3	1936.8	105.2	186.7	107.3	399.2	57.4	974.6
2004	1413.5	559.7	1973.2	105.8	184.4	109.0	399.2	61.3	1000.7
2005	1413.5	624.1	2037.6	106.2	181.4	110.0	397.7	62.2	1016.7
2006	1413.5	624.3	2037.8	106.6	179.6	111.2	397.9	62.2	1016.7
2007	1413.5	620.6	2034.1	106.5	174.9	108.8	390.2	62.5	1025.4
2008	1413.5	624.1	2037.6	106.5	170.7	108.2	385.4	62.8	1024.4
2009	1413.5	624.5	2038.0	106.4	165.6	107.7	379.9	63.1	1028.0
2010	1413.5	620.8	2034.3	106.4	161.4	108.0	375.7	63.4	1034.5
2011	1413.5	624.1	2037.6	106.3	155.8	106.8	368.9	63.4	1038.6
2012	1413.5	624.3	2037.8	106.2	150.0	105.9	362.2	63.7	1038.9
2013	1413.5	620.6	2034.1	106.2	144.3	104.6	355.1	64.8	1057.2
2014	1413.5	624.1	2037.6	106.1	138.1	103.4	347.7	64.2	1047.7
2015	1413.5	624.5	2038.0	106.1	132.3	100.1	338.5	64.6	1052.7
2016	1413.5	620.8	2034.3	106.0	125.6	99.1	330.8	64.1	1062.4
2017	1413.5	624.1	2037.6	106.0	119.1	98.6	318.7	63.2	1066.7
2018	1413.5	624.3	2037.8	105.9	113.9	98.6	312.4	63.7	1069.8
2019	1413.5	620.6	2034.1	105.9	108.4	91.9	306.3	63.4	1077.4
2020	1413.5	624.1	2037.6	105.8	101.3	92.1	299.2	63.6	1077.8
2021	1413.5	624.5	2038.0	105.8	94.1	93.2	293.1	63.1	1081.9
2022	1413.5	620.8	2034.3	105.7	88.3	93.8	284.8	63.6	1090.9
2023	1413.5	624.1	2037.6	105.7	82.1	93.8	277.4	63.9	1091.3
2024	1413.5	624.3	2037.8	105.6	75.9	93.8	271.3	64.3	1092.2
2025	1413.5	620.6	2034.1	105.6	69.9	93.3	260.8	64.7	1105.3
2026	1413.5	624.1	2037.6	105.5	63.8	93.6	254.9	64.4	1111.9
2027	1413.5	624.5	2038.0	105.5	57.8	93.4	244.7	64.1	1111.9
2028	1413.5	620.8	2034.3	105.4	51.7	111.2	248.6	63.1	1114.5
2029	1413.5	624.1	2037.6	105.4	45.7	115.5	237.0	63.2	1118.1
2030	1413.5	624.5	2038.0	105.3	39.7	114.2	230.6	63.5	1122.6
TOTAL	43318.5	22064.6	65383.1	3941.8	5123.0	3793.0	12857.7	50100.7	32844.6
AVG	326.8	169.3	496.1	74.4	96.7	71.6	242.6	380.8	619.7
1978-2030	330.2	131.0	461.2	23.4	30.4	22.5	76.4	119.8	195.0

Yearly Cash Statement

	UNFINANCED ENTERPRISE				FINANCED ENTERPRISE				OWNERS			
	FINANCIAL CASH IN	FINANCIAL CASH OUT	FINANCIAL NET CASH	CUM NET CASH	FINANCIAL NET CASH	CUM NET CASH	FINANCIAL NET CASH	CUM NET CASH	FINANCIAL NET CASH	CUM NET CASH	FINANCIAL NET CASH	CUM NET CASH
1974	1.8	62.6	- 60.8	- 60.8	- 23.8	- 23.8	- 24.7	- 24.7	- 23.8	- 23.8	- 24.7	- 24.7
1975	4.0	44.1	- 40.1	- 100.9	- 19.0	- 42.8	- 19.6	- 44.3	- 19.0	- 42.8	- 19.6	- 44.3
1976	4.9	21.8	- 16.9	- 117.8	- 16.7	- 59.6	- 17.2	- 61.0	- 16.7	- 59.6	- 17.2	- 61.0
1977	11.3	56.2	- 44.9	- 162.8	- 22.9	- 82.4	- 23.6	- 85.1	- 22.9	- 82.4	- 23.6	- 85.1
1978	23.1	77.2	- 54.2	- 217.0	- 24.1	- 106.6	- 25.2	- 110.3	- 24.1	- 106.6	- 25.2	- 110.3
1979	29.9	73.7	- 43.9	- 260.8	- 21.8	- 128.3	- 22.7	- 132.9	- 21.8	- 128.3	- 22.7	- 132.9
1980	37.1	60.7	- 23.6	- 284.4	- 14.9	- 143.2	- 15.7	- 148.6	- 14.9	- 143.2	- 15.7	- 148.6
1981	50.2	55.3	- 4.9	- 289.2	- 9.4	- 151.6	- 10.3	- 158.9	- 9.4	- 151.6	- 10.3	- 158.9
1982	62.4	45.2	17.2	- 272.0	3.7	- 147.9	3.4	- 155.5	3.7	- 147.9	3.4	- 155.5
1983	73.8	33.9	40.1	- 231.9	17.8	- 130.1	22.4	- 133.9	17.8	- 130.1	22.4	- 133.9
1984	101.6	87.9	13.6	- 218.3	3.0	- 127.1	2.3	- 136.2	3.0	- 127.1	2.3	- 136.2
1985	121.6	62.2	59.5	- 158.8	23.2	- 103.9	23.1	- 110.0	23.2	- 103.9	23.1	- 110.0
1986	127.6	75.2	51.3	- 107.5	21.0	- 82.9	20.7	- 90.7	21.0	- 82.9	20.7	- 90.7
1987	145.7	145.1	- 0.6	- 108.1	2.1	- 80.8	3.5	- 84.3	2.1	- 80.8	3.5	- 84.3
1988	176.0	332.3	- 156.3	- 264.4	- 48.1	- 128.9	- 51.3	- 135.6	- 48.1	- 128.9	- 51.3	- 135.6
1989	207.3	192.3	15.0	- 249.4	12.3	- 116.6	10.9	- 126.5	12.3	- 116.6	10.9	- 126.5
1990	246.6	366.3	- 119.7	- 369.2	4.4	- 112.2	2.0	- 128.5	4.4	- 112.2	2.0	- 128.5
1991	267.7	356.7	- 89.0	- 458.2	11.0	- 101.2	1.3	- 129.8	11.0	- 101.2	1.3	- 129.8
1992	208.9	209.7	- 0.8	- 459.0	42.2	- 59.0	67.2	- 62.1	42.2	- 59.0	67.2	- 62.1
1993	308.1	207.3	100.8	- 358.2	55.1	- 3.9	60.1	- 315.2	55.1	- 3.9	60.1	- 315.2
1994	366.7	392.2	- 25.5	- 383.7	1.5	- 2.4	2.0	- 300.2	1.5	- 2.4	2.0	- 300.2
1995	414.0	404.9	9.1	- 374.6	67.0	214.2	67.4	- 246.8	67.0	214.2	67.4	- 246.8
1996	1041.7	144.0	897.7	1137.0	280.1	745.5	281.0	1026.4	280.1	745.5	281.0	1026.4
1997	1005.7	117.1	888.6	2025.6	1001.4	1747.2	1001.9	1749.1	1001.4	1747.2	1001.9	1749.1
1998	1024.5	125.4	899.1	2924.7	1005.5	2752.7	1006.0	2758.7	1005.5	2752.7	1006.0	2758.7
1999	1071.9	128.7	943.2	3867.9	1034.5	3787.2	1035.7	3792.9	1034.5	3787.2	1035.7	3792.9
2000	2019.2	121.2	1898.0	5765.9	1076.4	4863.6	1076.6	4799.5	1076.4	4863.6	1076.6	4799.5
2001	2037.6	125.5	1912.1	7678.0	1050.1	5913.7	1050.6	5810.1	1050.1	5913.7	1050.6	5810.1
2002	2037.6	123.0	1914.6	9592.6	1050.3	6964.0	1050.6	6910.7	1050.3	6964.0	1050.6	6910.7
2003	2044.1	117.1	1927.0	11519.6	1077.1	8041.1	1077.3	8017.6	1077.1	8041.1	1077.3	8017.6
2004	2037.6	123.1	1914.5	13434.1	1068.9	9109.5	1069.6	8918.1	1068.9	9109.5	1069.6	8918.1
2005	2032.0	117.0	1915.0	15349.1	1071.7	10181.2	1072.6	10150.7	1071.7	10181.2	1072.6	10150.7
2006	2044.3	131.0	1913.3	17262.4	1069.2	11250.3	1069.3	11229.6	1069.2	11250.3	1069.3	11229.6
2007	2037.6	120.6	1917.0	19179.4	1068.1	12318.3	1068.0	12300.7	1068.1	12318.3	1068.0	12300.7
2008	2037.6	122.0	1915.6	21095.0	1067.0	13385.3	1068.0	13357.6	1067.0	13385.3	1068.0	13357.6
2009	2044.1	129.7	1914.4	23009.4	1068.4	14453.8	1068.4	14425.0	1068.4	14453.8	1068.4	14425.0
2010	2037.6	126.6	1911.0	24920.4	1065.1	15518.9	1065.1	15493.1	1065.1	15518.9	1065.1	15493.1
2011	2032.0	137.2	1894.8	26815.2	1066.5	16585.4	1067.5	16557.6	1066.5	16585.4	1067.5	16557.6
2012	2044.3	121.3	1923.0	28738.2	1074.7	17660.1	1075.3	17634.4	1074.7	17660.1	1075.3	17634.4
2013	2037.6	129.5	1908.1	30646.3	1076.3	18736.4	1077.4	18713.8	1076.3	18736.4	1077.4	18713.8
2014	2037.6	141.2	1896.4	32542.7	1073.5	19810.0	1074.3	19785.2	1073.5	19810.0	1074.3	19785.2
2015	2044.1	139.9	1904.2	34446.9	1077.8	20887.8	1078.8	20866.0	1077.8	20887.8	1078.8	20866.0
2016	2037.6	118.6	1919.0	36365.9	1078.8	21966.6	1079.6	21947.0	1078.8	21966.6	1079.6	21947.0
2017	2032.0	128.6	1903.4	38269.3	1074.1	23040.7	1075.3	23022.2	1074.1	23040.7	1075.3	23022.2
2018	2044.3	129.3	1915.0	40184.3	1073.3	24114.0	1073.6	24101.9	1073.3	24114.0	1073.6	24101.9
2019	2037.6	129.2	1908.4	42092.7	1073.2	25187.2	1074.6	25176.5	1073.2	25187.2	1074.6	25176.5
2020	2037.6	130.6	1907.0	44000.0	1069.3	26256.5	1070.6	26247.1	1069.3	26256.5	1070.6	26247.1
2021	2044.1	121.3	1922.8	45912.0	1079.5	27336.0	1081.2	27328.3	1079.5	27336.0	1081.2	27328.3
2022	2037.6	142.9	1894.7	47806.7	1070.6	28406.6	1072.2	28400.5	1070.6	28406.6	1072.2	28400.5
2023	2032.0	122.5	1909.5	49716.2	1079.5	29486.1	1081.3	29481.8	1079.5	29486.1	1081.3	29481.8
2024	2044.3	141.7	1902.6	51618.8	1073.6	30559.7	1075.3	30557.1	1073.6	30559.7	1075.3	30557.1
2025	2037.6	112.1	1925.5	53544.3	1076.4	31636.1	1078.7	31635.8	1076.4	31636.1	1078.7	31635.8
2026	2037.6	111.8	1925.8	55470.1	1163.0	32699.1	1191.5	32627.3	1163.0	32699.1	1191.5	32627.3

DATE OF RETURN TO ENTERPRISE OWNER 20.06%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 21.34%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	DEFINING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	61.3	*	55.7	1.8	61.1	19.4
1979	57.6	*	55.9	1.4	60.6	21.1
1980	57.4	*	124.0	1.2	60.9	27.6
1981	59.7	*	170.8	2.2	122.7	30.7
1982	72.2	*	211.4	2.7	140.0	38.4
1983	67.5	*	211.2	2.6	117.9	37.9
1984	59.7	*	192.4	5.4	127.0	30.8
1985	57.0	*	157.7	7.3	170.7	29.4
1986	48.3	*	171.2	7.8	166.5	26.0
1987	40.8	*	150.6	12.4	110.8	27.2
1988	44.3	*	221.8	12.5	146.5	26.5
1989	18.6	*	221.3	12.1	144.3	29.1
1990	32.6	*	233.6	12.4	160.8	26.2
1991	121.4	*	220.6	14.8	135.7	109.6
1992	228.9	*	224.4	18.8	219.9	122.6
1993	146.4	*	222.6	12.6	708.5	202.7
1994	219.6	*	1666.7	22.0	244.3	244.3
1995	309.3	*	1329.3	22.4	1637.7	208.8
1996	455.4	*	1765.2	20.4	1322.8	409.8
1997	455.3	*	2077.7	22.4	1612.2	260.9
1998	331.9	*	2312.3	29.8	1810.9	246.6
1999	152.9	*	2265.1	40.4	1888.2	217.3
2000	60.4	*	2317.8	49.5	1898.4	470.9
2001	12.9	*	2226.6	49.2	1873.7	402.0
2002	30.7	*	2140.4	48.9	1821.0	338.3
2003	33.6	*	2006.2	48.6	1826.5	278.3
2004	36.4	*	1972.6	48.4	1799.6	222.4
2005	32.2	*	1885.8	47.9	1765.3	168.5
2006	45.4	*	1819.4	47.7	1741.4	125.7
2007	10.6	*	1721.1	46.9	1694.8	73.2
2008	18.6	*	1631.5	46.2	1650.7	27.6
2009	18.6	*	1534.3	45.4	1597.3	17.6
2010	24.6	*	1491.0	44.6	1546.6	53.6
2011	14.3	*	1378.5	43.7	1489.6	37.4
2012	15.7	*	1268.4	42.7	1427.5	116.2
2013	22.6	*	1167.3	41.8	1327.7	139.7
2014	20.4	*	1104.5	40.7	1302.0	127.0
2015	21.1	*	1025.3	39.7	1245.9	120.6
2016	12.7	*	951.4	38.6	1174.8	104.3
2017	22.6	*	891.8	37.5	1119.3	126.6
2018	10.6	*	854.5	36.4	1061.7	100.6
2019	10.6	*	766.5	35.7	1004.1	201.9
2020	12.9	*	687.4	34.5	954.0	201.1
2021	22.6	*	616.5	33.3	847.3	177.6
2022	22.6	*	547.2	32.0	780.5	168.3
2023	22.6	*	477.8	30.9	677.0	162.5
2024	22.6	*	414.3	29.8	566.0	145.0
2025	12.7	*	364.8	27.6	466.9	120.6
2026	32.4	*	279.6	26.0	397.0	87.4
2027	11.1	*	191.1	24.8	276.3	56.8
2028	22.6	*	116.0	22.5	196.1	17.6
2029	6.8	*	7.2	20.2	7.4	20.1
2030	6.2	*	2	17.7	1	17.2

TOTAL CAPITAL INVESTMENT 3792.6

9A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	61.83	20.71002	20.40388	24.65652
1979	104.42	35.22003	34.45859	44.26103
1980	133.77	45.50006	44.14409	61.46114
1981	186.46	63.74011	61.53178	85.07147
1982	258.8199	88.77997	85.34454	110.2587
1983	326.1099	112.67	107.6162	132.9481
1984	379.2097	132.1898	125.1392	148.6147
1985	418.1897	147.4399	138.0026	158.9125
1986	446.5095	159.6099	147.3481	158.9125
1987	487.3193	176.48	160.8154	181.2809
1988	531.6392	195.1599	175.4409	181.2809
1989	550.189	205.9199	181.5623	181.2809
1990	582.8088	222.02	192.3269	181.2809
1991	704.2087	268.5303	232.3889	184.7938
1992	991.0986	371.2405	327.0625	236.0853
1993	1137.539	429.0305	375.3877	236.0853
1994	1357.188	512.9207	447.8721	236.0853
1995	1666.479	628.8115	549.9377	250.4331
1996	2121.928	796.1116	700.2363	317.6003
1997	2580.198	968.0015	851.4653	377.6873
1998	2912.078	1101.192	960.9656	382.7368
1999	3068.008	1179.822	1012.443	382.7368
2000	3128.398	1229.992	1032.371	382.7368
2001	3141.258	1267.592	1036.615	382.7368
2002	3161.918	1310.873	1043.433	382.7368
2003	3185.468	1358.963	1051.204	382.7368
2004	3211.878	1412.293	1059.919	382.7368
2005	3234.128	1468.933	1067.262	382.7368
2006	3279.548	1538.153	1082.25	382.7368
2007	3290.097	1595.303	1085.732	382.7368
2008	3308.717	1658.003	1091.876	382.7368
2009	3319.267	1721.993	1095.358	382.7368
2010	3343.887	1795.323	1103.482	382.7368
2011	3358.187	1868.614	1108.201	382.7368
2012	3373.937	1946.424	1113.399	382.7368
2013	3397.487	2029.784	1121.17	382.7368
2014	3417.917	2115.914	1127.912	382.7368
2015	3449.036	2203.203	1138.182	382.7368
2016	3464.786	2289.973	1143.379	382.7368
2017	3488.336	2373.044	1151.151	382.7368
2018	3523.586	2461.924	1162.783	382.7368
2019	3557.566	2553.474	1173.997	382.7368
2020	3570.566	2644.544	1178.287	382.7368
2021	3592.816	2745.544	1185.629	382.7368
2022	3616.366	2850.865	1193.401	382.7368
2023	3639.916	2962.584	1201.172	382.7368
2024	3672.836	3084.294	1212.036	382.7368
2025	3688.586	3205.725	1217.233	382.7368
2026	3725.936	3338.975	1229.559	382.7368
2027	3742.985	3470.715	1235.185	382.7368
2028	3779.305	3623.204	1247.17	382.7368
2029	3786.065	3778.714	1249.401	382.7368
2030	3792.565	3792.514	1251.346	382.7368

Cost Summary - Dollars in Millions

WBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS
0.0	TOTAL	3,792.4	3,941.9	7,734.3	3,792.3	3,123.0	3,941.9
1.0	CAPITAL ITEMS	3,792.4		3,792.4	3,792.3		
1.1	DESIGN FACILITIES-EQUIPMENT	2,401.8		2,401.8	2,401.7		
1.1.1	SHIP	169.0		169.0	169.0		
1.1.2	CASH TRANSPORTER/RAIL CAR	242.0		242.0	242.0		
1.1.3	RAIL CAR TUG	18.8		18.8	18.8		
1.1.4	CASH TRANSPORTER	0.8		0.8	0.8		
1.1.5	SUPPORT FAC	0.7		0.7	0.7		
1.1.6	WATER BASIN 4 PORT	33.6		33.6	33.6		
1.1.7	WATER BASIN 2 PORT						
1.1.8	WATER BASIN STORAGE	18.9		18.9	18.9		
1.1.9	PACIFIC COAST FACILITY						
1.1.10	PACIFIC COAST FAC	61.2		61.2	61.2		
1.1.11	CRANES/STEPS	216.3		216.3	216.3		
1.1.12	EMPLOYMENT TRANS	18.0		18.0	18.0		
1.1.13	HAULT MODULE	629.4		629.4	629.4		
1.1.14	GEOLOGIC REC MODULE						
1.1.15	DEPOSITORY STORAGE MOD						
1.1.16	CASH	36.4		36.4	36.4		
1.1.17	LOG/INTER FAC	31.0		31.0	31.0		
1.1.18	PLM PROC FAC	672.3		672.3	672.3		
1.1.19	RECOVERY FAC	617.2		617.2	617.2		
1.2	SUPPORT FACILITIES EQUIPMENT	10.3		10.3	10.3		
1.2.1	MOD BLD & FLT YD	1.7		1.7	1.7		
1.2.2	HAZARDOUS & ULT	8.6		8.6	8.6		
1.3	CHIEFS COST	558.1		558.1	558.1		
1.4	INTEREST DURING CONS	422.5		422.5	422.5		
2.0	OPER & MAINT		3,941.9	3,941.9		3,941.9	3,941.9
2.1	DESIGN LABOR		746.4	746.4		746.4	746.4
2.1.1	PORT & REC TRANS		3.0	3.0		3.0	3.0
2.1.2	WATER BASIN REC(4PORT)		102.1	102.1		102.1	102.1
2.1.3	WATER BASIN REC(2PORT)						
2.1.4	WATER BASIN STOR		19.0	19.0		19.0	19.0
2.1.5	PACI FAC LABOR		219.6	219.6		219.6	219.6
2.1.6	PACI FAC LABOR		30.8	30.8		30.8	30.8
2.1.7	HAULT EMPLOYMENT LABOR						
2.1.8	GEOLOGIC REC MOD LABOR						
2.1.9	CASH TRANS MAINT LAB		21.8	21.8		21.8	21.8
2.1.10	LOG LK PROCS LABOR		10.6	10.6		10.6	10.6
2.1.11	PLM PROC LABOR		169.5	169.5		169.5	169.5
2.1.12	RECOVERY PLANT LAB		169.5	169.5		169.5	169.5
2.2	INDIRECT LABOR		1,069.4	1,069.4		1,069.4	1,069.4
2.2.1	PORT & REC TRANS LAB		5.7	5.7		5.7	5.7
2.2.2	WATER BASIN REC(4PORT) LAB		153.0	153.0		153.0	153.0
2.2.3	WATER BASIN REC(2PORT) LAB						
2.2.4	WATER BASIN STOR LAB		28.3	28.3		28.3	28.3
2.2.5	PACI FAC IND LAB		329.3	329.3		329.3	329.3
2.2.6	PACI FAC IND LAB		15.3	15.3		15.3	15.3
2.2.7	HAULT IND LABOR						
2.2.8	GEO REC MOD IND LAB		32.6	32.6		32.6	32.6
2.2.9	CASH TRANS MAINT LAB						
2.2.10	LOG/INTER IN LAB		3.4	3.4		3.4	3.4
2.2.11	PLM PROC IND LAB		259.9	259.9		259.9	259.9
2.2.12	REC PLANT IND LAB		259.9	259.9		259.9	259.9
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0		1,614.0	1,614.0
2.3.1	PORT/REC FMS		8.1	8.1		8.1	8.1
2.3.2	WATER BASIN REC(4PORT)		218.6	218.6		218.6	218.6
2.3.3	WATER BASIN REC(2PORT)						
2.3.4	WATER BASIN STOR		48.5	48.5		48.5	48.5
2.3.5	PACI OPNS(2500)		478.4	478.4		478.4	478.4
2.3.6	PACI OPNS(2500)		65.8	65.8		65.8	65.8
2.3.7	HAULT OPNS						
2.3.8	GEOLOGIC REC OPNS		46.6	46.6		46.6	46.6
2.3.9	CASH TRANS		21.3	21.3		21.3	21.3
2.3.10	PLM PROC OPNS		371.3	371.3		371.3	371.3
2.3.11	RECOVERY PLANT OPNS		419.9	419.9		419.9	419.9
2.4	CONTRACTED SERVICES		325.6	325.6		325.6	325.6
2.4.1	SHIP ON		0.4	0.4		0.4	0.4
2.4.2	US PORT FEE						
2.4.3	ELFCP PORT FEE STOR		17.2	17.2		17.2	17.2
2.4.4	US RAIL(SF TO STOR)						
2.4.5	ELFCP PAINT TRANS		59.6	59.6		59.6	59.6
2.4.6	US STOR(TIME CHRG)						
2.4.7	ELFCP STOR						
2.4.8	US RECOV CR						
2.4.9	ELFCP REC CR						
2.4.10	ELFCP WASTE DIS		17.0	17.0		17.0	17.0
2.4.11	US RAIL TRANS						
2.4.12	ELFCP RAIL TRANS						
2.4.13	US PORT FEE						
2.4.14	ELFCP PORT FEE						
2.4.15	PACIFIC PORT FEE						
2.4.16	PACIFIC PORT FEE						
2.4.17	PAC RAIL TRANS						
2.4.18	PAC RAIL TRANS						
2.5	TECH TRUST FUND		72.1	72.1		72.1	72.1

Section E3.10

Case: 10A

Description: Fuel Cycle Center (FCC) baseline except location cost factor 2.4

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 2.4

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 9.772 billion dollars

Owners ROI - 22.1%

Service charge - \$435/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/100) 4434.261
 RATE OF RETURN ON INVESTMENT 10.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 490612.730

10A
Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	6.0	6.0	.8	9.4	4.4	14.6	.0	0.7
1979	.0	13.2	13.2	1.6	17.4	7.8	26.8	.0	13.6
1980	.0	16.4	16.4	2.6	23.2	10.5	36.3	.0	19.9
1981	.0	37.4	37.4	3.7	33.4	15.3	52.4	.0	15.0
1982	.0	76.6	76.6	5.3	46.4	21.7	73.4	1.2	1.9
1983	.0	99.2	99.2	6.6	59.3	28.0	93.9	2.0	3.3
1984	.0	123.2	123.2	8.0	69.6	33.3	110.9	4.7	7.6
1985	.0	167.3	167.3	23.1	75.2	36.7	147.0	7.6	12.7
1986	.0	207.3	207.3	23.9	78.6	35.1	133.6	20.4	33.3
1987	.0	245.0	245.0	97.4	83.3	42.4	223.1	6.3	13.6
1988	.0	337.1	337.1	96.0	83.0	44.8	232.0	40.6	65.2
1989	.0	403.8	403.8	98.1	90.7	48.6	237.3	63.2	103.1
1990	.0	423.3	423.3	98.1	94.3	51.6	244.2	68.1	111.1
1991	.0	453.7	453.7	99.7	114.2	52.1	276.1	78.9	128.7
1992	.0	584.4	584.4	101.0	166.0	55.8	322.8	88.0	143.6
1993	.0	689.9	689.9	102.0	189.0	59.4	391.3	113.3	185.2
1994	.0	818.9	818.9	103.1	227.3	119.4	449.8	140.2	228.0
1995	.0	955.0	955.0	104.5	282.2	147.4	534.1	160.0	261.0
1996	.0	1022.3	1022.3	106.2	366.0	169.2	641.4	138.3	225.6
1997	.0	1122.7	1122.7	108.0	431.4	233.9	773.2	137.7	224.7
1998	.0	1203.6	1203.6	110.0	506.2	265.2	881.4	152.9	249.4
1999	.0	1374.3	1374.3	110.9	537.0	282.2	930.2	172.6	281.6
2000	1413.3	1487.9	2901.4	231.0	538.0	287.0	1047.6	704.5	1149.4
2001	1413.3	1634.1	3047.6	231.2	521.5	287.4	1040.1	762.8	1244.6
2002	1413.3	1703.0	3116.3	231.9	513.0	288.0	1032.7	791.4	1291.3
2003	1413.3	1833.3	3246.6	232.5	506.9	290.1	1029.5	820.3	1387.3
2004	1413.3	1999.7	3413.0	233.5	499.5	292.4	1025.4	904.0	1474.9
2005	1413.3	2071.2	3484.5	234.0	496.8	294.6	1019.2	937.1	1529.0
2006	1413.3	2072.5	3485.8	234.4	482.0	297.6	1014.0	939.4	1532.7
2007	1413.3	2093.4	3506.7	234.4	469.7	287.8	991.9	955.7	1529.3
2008	1413.3	2071.9	3485.2	234.3	458.7	286.3	979.3	942.2	1523.6
2009	1413.3	2073.2	3486.5	234.3	446.1	285.3	965.6	958.0	1523.1
2010	1413.3	2054.0	3507.3	234.3	433.4	284.9	952.5	970.3	1584.1
2011	1413.3	2071.9	3485.2	234.2	417.2	281.2	932.6	978.1	1562.7
2012	1413.3	2072.5	3485.8	234.2	401.7	278.9	914.8	977.1	1554.2
2013	1413.3	2093.4	3506.7	234.2	385.7	274.4	894.2	962.8	1615.5
2014	1413.3	2071.9	3485.2	233.9	368.7	270.1	872.7	982.8	1619.9
2015	1413.3	2073.2	3486.5	234.1	351.4	267.6	852.6	1064.5	1639.0
2016	1413.3	2094.0	3507.3	234.1	334.3	254.1	822.4	1020.4	1664.8
2017	1413.3	2071.9	3485.2	234.0	318.6	255.9	788.5	1023.5	1673.2
2018	1413.3	2072.5	3485.8	234.0	302.1	231.1	767.1	1033.2	1665.7
2019	1413.3	2093.4	3506.7	234.0	287.4	225.6	746.9	1048.8	1711.2
2020	1413.3	2071.9	3485.2	233.9	269.0	225.6	728.5	1047.6	1709.3
2021	1413.3	2073.2	3486.5	233.9	251.1	228.4	713.4	1053.9	1719.5
2022	1413.3	2094.0	3507.3	233.8	231.4	226.2	691.0	1069.1	1744.4
2023	1413.3	2071.9	3485.2	233.8	210.3	220.9	655.0	1067.5	1742.4
2024	1413.3	2072.5	3485.8	233.8	187.9	214.6	606.3	1075.3	1754.4
2025	1413.3	2093.4	3506.7	233.7	162.4	215.4	611.6	1092.6	1782.7
2026	1413.3	2071.9	3485.2	233.7	136.5	210.0	610.3	1092.5	1782.6
2027	1413.3	2073.2	3486.5	233.7	107.6	213.9	555.1	1103.6	1799.0
2028	1413.3	2094.0	3507.3	233.6	77.9	214.3	525.9	1114.0	1817.6
2029	1413.3	2071.9	3485.2	233.6	41.1	216.1	540.9	1118.9	1825.6
2030	1413.3	2072.5	3485.8	233.5	1.2	214.3	546.9	1130.1	1807.0
TOTAL	43618.5	75248.1	117066.5	6661.2	13791.3	9772.9	32345.0	66274.0	52067.4
A/C	236.6	1382.0	2208.8	163.8	260.2	184.4	608.4	608.6	991.8
11-10	260.2	435.0	695.2	51.0	81.9	58.0	191.5	191.5	312.2

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE				FINANCED ENTERPRISE				OWNERS			
	ANNUAL CASH IN.	ANNUAL CASH OUT.	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	6.0	141.8	- 135.8	- 135.8	- 51.3	- 51.3	- 53.0	- 53.0	- 53.0	- 53.0	- 53.0	- 53.0
1979	13.2	130.9	- 117.7	- 253.5	- 44.1	- 95.4	- 47.5	- 100.5	- 47.5	- 100.5	- 47.5	- 148.0
1980	15.4	99.2	- 83.8	- 337.3	- 39.6	- 135.0	- 40.7	- 141.2	- 40.7	- 141.2	- 40.7	- 181.9
1981	37.4	158.2	- 120.8	- 458.1	- 52.8	- 187.8	- 54.5	- 195.7	- 54.5	- 195.7	- 54.5	- 250.2
1982	76.6	202.7	- 126.1	- 584.2	- 44.4	- 232.2	- 46.8	- 242.4	- 46.8	- 242.4	- 46.8	- 289.2
1983	59.2	202.7	- 143.5	- 727.7	- 37.0	- 269.2	- 39.6	- 282.0	- 39.6	- 282.0	- 39.6	- 321.6
1984	122.2	167.9	- 45.7	- 773.4	- 16.8	- 286.0	- 18.7	- 300.7	- 18.7	- 300.7	- 18.7	- 319.4
1985	167.3	126.4	40.9	- 732.5	12.3	- 273.7	7.9	- 292.9	7.9	- 292.9	7.9	- 300.3
1986	207.3	95.6	111.7	- 620.8	45.7	- 228.0	45.1	- 243.8	45.1	- 243.8	45.1	- 288.9
1987	245.0	173.2	71.7	- 549.1	22.6	- 205.4	11.6	- 235.2	11.6	- 235.2	11.6	- 246.8
1988	337.1	160.3	176.8	- 372.3	74.1	- 131.3	73.2	- 162.9	73.2	- 162.9	73.2	- 179.1
1989	403.8	154.6	249.2	- 123.1	121.7	10.2	121.2	- 41.6	121.2	- 41.6	121.2	- 83.2
1990	423.0	188.7	234.3	111.2	126.3	116.1	123.7	84.6	123.7	84.6	123.7	159.2
1991	463.7	416.4	47.3	158.5	70.3	186.4	66.7	150.7	66.7	150.7	66.7	216.9
1992	524.4	297.9	226.5	385.0	53.7	240.1	62.5	213.2	62.5	213.2	62.5	275.7
1993	553.9	486.9	66.9	451.9	133.6	373.7	129.4	343.6	129.4	343.6	129.4	473.1
1994	818.8	596.7	222.1	674.0	132.4	506.1	116.0	459.6	116.0	459.6	116.0	575.6
1995	555.0	567.0	- 112.0	562.0	38.2	543.8	78.8	530.8	78.8	530.8	78.8	609.4
1996	1023.3	1409.8	- 386.5	175.5	59.5	417.4	73.7	357.1	73.7	357.1	73.7	431.1
1997	1155.7	1449.0	- 293.3	146.2	58.2	379.1	52.8	299.3	52.8	299.3	52.8	352.1
1998	1293.6	1089.2	204.4	350.6	154.3	533.4	144.6	434.7	144.6	434.7	144.6	579.3
1999	1374.3	516.3	858.0	1208.6	356.8	890.2	353.2	783.9	353.2	783.9	353.2	1137.1
2000	2901.4	367.4	2534.0	3842.6	1310.5	2200.7	1298.0	2074.0	1298.0	2074.0	1298.0	3372.1
2001	3047.6	342.3	2705.3	6547.9	1438.9	3639.6	1440.2	3014.1	1440.2	3014.1	1440.2	4454.3
2002	3116.5	251.4	2865.1	9413.0	1474.8	5114.4	1476.0	4490.1	1476.0	4490.1	1476.0	5924.3
2003	3267.0	270.8	2996.2	12409.2	1514.6	6629.0	1515.8	6005.9	1515.8	6005.9	1515.8	7520.1
2004	3404.2	283.0	3121.2	15530.4	1631.1	8260.1	1632.2	7637.1	1632.2	7637.1	1632.2	9252.3
2005	3455.4	330.2	3125.2	18655.6	1676.3	9936.4	1677.7	9313.8	1677.7	9313.8	1677.7	10990.5
2006	3466.0	303.7	3162.3	21817.9	1661.8	11608.2	1663.1	10977.9	1663.1	10977.9	1663.1	12641.6
2007	3506.9	367.2	3139.7	24957.6	1695.7	13303.9	1697.8	12675.7	1697.8	12675.7	1697.8	14343.4
2008	3435.4	379.8	3055.6	28013.2	1675.9	15079.8	1677.6	14353.4	1677.6	14353.4	1677.6	16021.0
2009	3486.7	348.9	3137.8	31151.0	1677.5	16757.3	1679.6	16033.0	1679.6	16033.0	1679.6	17702.6
2010	3507.5	282.8	3224.7	34375.7	1681.7	18439.0	1683.8	17686.8	1683.8	17686.8	1683.8	19376.6
2011	3485.4	348.5	3136.9	37512.6	1678.1	20117.1	1680.6	19367.4	1680.6	19367.4	1680.6	21047.0
2012	3466.0	273.8	3192.2	40704.8	1667.8	21784.9	1670.4	21037.4	1670.4	21037.4	1670.4	22707.8
2013	3506.9	281.6	3225.3	43930.1	1678.6	23463.5	1681.3	22718.7	1681.3	22718.7	1681.3	24389.0
2014	3455.4	278.2	3177.2	47107.3	1666.2	25129.7	1669.1	24387.8	1669.1	24387.8	1669.1	26056.9
2015	3436.7	339.1	3097.6	50204.9	1626.4	26756.1	1683.2	26041.0	1683.2	26041.0	1683.2	27724.2
2016	3507.5	373.7	3133.8	53338.7	1697.3	28453.4	1700.1	27724.1	1700.1	27724.1	1700.1	29424.3
2017	3465.4	331.5	3133.9	56472.6	1708.4	30161.8	1711.4	29435.5	1711.4	29435.5	1711.4	31135.7
2018	3466.0	293.1	3172.9	59645.5	1707.7	31869.5	1710.1	31145.6	1710.1	31145.6	1710.1	32845.8
2019	3506.9	298.6	3208.3	62853.8	1722.5	33592.0	1725.0	32860.6	1725.0	32860.6	1725.0	34560.6
2020	3485.4	346.9	3138.5	66092.3	1720.4	35312.4	1723.4	34584.0	1723.4	34584.0	1723.4	36283.4
2021	3426.7	220.0	3206.7	69299.0	1703.9	37016.3	1726.9	36310.9	1726.9	36310.9	1726.9	38010.3
2022	3507.5	281.3	3226.2	72525.2	1714.7	38731.0	1717.9	38028.8	1717.9	38028.8	1717.9	39748.2
2023	3435.4	281.3	3154.1	75679.3	1696.1	40427.1	1699.6	40448.4	1699.6	40448.4	1699.6	42147.8
2024	3466.0	290.6	3175.4	78854.7	1688.7	42115.8	1692.4	42140.2	1692.4	42140.2	1692.4	43839.6
2025	3506.9	273.4	3233.5	82088.2	1705.1	43820.9	1709.4	43849.6	1709.4	43849.6	1709.4	45549.0
2026	3465.4	293.0	3172.4	85260.6	1665.5	45486.4	1669.8	45518.4	1669.8	45518.4	1669.8	47218.8
2027	3465.7	274.6	3191.1	88451.7	1662.6	47149.0	1697.4	47116.1	1697.4	47116.1	1697.4	48816.2
2028	3507.5	333.9	3173.6	91625.3	1689.6	48838.6	1694.5	48810.6	1694.5	48810.6	1694.5	50410.7
2029	3465.4	240.4	3225.0	94850.3	1685.4	50524.0	1691.5	50402.1	1691.5	50402.1	1691.5	52003.6
2030	3466.0	240.8	3225.2	98075.5	2007.4	52531.4	2014.1	52226.2	2014.1	52226.2	2014.1	54017.7

RATE OF RETURN TO ENTERPRISE OWNER 22.14%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 22.66%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	IMPROVING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	140.8	"	126.4	1.7	98.8	44.3
1979	119.3	"	247.9	3.2	172.9	78.2
1980	87.6	"	325.0	4.3	230.0	99.0
1981	154.5	"	464.2	6.2	332.0	138.4
1982	157.4	"	640.0	8.6	481.4	187.2
1983	156.1	"	809.1	11.0	588.9	230.1
1984	159.6	"	934.7	12.9	691.2	256.4
1985	91.2	"	989.2	18.4	746.4	281.3
1986	59.7	"	1009.8	19.1	779.4	249.5
1987	73.9	"	1043.2	30.1	821.9	251.5
1988	82.3	"	1079.3	31.0	867.1	243.4
1989	56.5	"	1087.4	31.5	893.5	225.4
1990	70.6	"	1106.2	32.1	927.6	210.6
1991	316.7	"	1360.6	35.7	1123.8	272.7
1992	776.9	"	2071.9	44.5	1637.6	478.8
1993	334.9	"	2357.4	48.6	1871.5	534.5
1994	555.6	"	2833.6	55.1	2241.4	647.3
1995	862.5	"	3548.7	64.5	2793.7	829.5
1996	1303.6	"	4663.1	78.7	3613.0	1128.9
1997	1341.8	"	5778.3	93.2	4457.1	1466.4
1998	659.2	"	6404.3	102.7	4996.1	1510.9
1999	405.4	"	6527.5	106.3	5194.5	1459.3
2000	135.6	"	6376.1	126.8	5294.2	1256.7
2001	11.7	"	6100.3	135.4	5122.7	1183.1
2002	19.5	"	5831.8	134.3	5037.7	918.4
2003	43.2	"	5565.0	123.2	4956.4	749.9
2004	50.3	"	5342.9	122.2	4872.4	592.6
2005	46.1	"	5094.4	120.8	4771.2	443.9
2006	69.3	"	4864.2	119.4	4672.1	313.5
2007	32.8	"	4611.2	117.3	4553.5	175.0
2008	45.5	"	4378.1	115.5	4434.8	50.8
2009	34.4	"	4119.3	113.4	4298.4	65.8
2010	48.5	"	3882.9	111.3	4159.7	155.5
2011	14.3	"	3616.1	108.8	3988.1	263.5
2012	39.6	"	3376.8	106.0	3822.5	359.7
2013	47.4	"	3149.9	103.3	3654.3	461.1
2014	44.3	"	2924.1	100.4	3474.9	450.4
2015	55.0	"	2721.5	97.6	3313.7	494.6
2016	39.6	"	2507.1	94.7	3131.7	529.9
2017	49.4	"	2313.5	91.8	2978.4	568.0
2018	59.1	"	2146.7	89.3	2828.4	592.4
2019	64.6	"	1985.7	86.9	2678.9	609.3
2020	13.0	"	1773.2	83.6	2477.4	620.4
2021	46.1	"	1599.9	80.8	2279.6	687.8
2022	47.4	"	1409.6	77.5	2068.5	731.4
2023	47.4	"	1226.1	74.0	1838.6	738.6
2024	56.8	"	1048.3	70.3	1595.1	476.6
2025	39.6	"	852.5	66.0	1321.0	403.3
2026	61.2	"	673.7	61.7	1045.9	310.5
2027	40.9	"	470.8	56.9	736.6	208.9
2028	60.2	"	266.7	51.9	484.4	65.8
2029	6.3	"	7.6	4.8	4.8	48.3
2030	6.5	"	.3	39.1	2.5	41.3

TOTAL CAPITAL INVESTMENT 9772.6

10A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	140.77	46.96002	46.45409	52.96451
1979	260.0598	87.19981	85.81973	100.4697
1980	347.6997	117.3598	114.7409	141.1545
1981	502.2195	170.2498	165.7324	195.6099
1982	699.6694	238.24	230.8909	242.4142
1983	895.7393	306.8101	295.5937	282.0181
1984	1055.679	364.5103	348.374	300.7249
1985	1146.919	400.5405	378.4832	300.7249
1986	1206.599	427.2007	398.1775	300.7249
1987	1282.449	460.5608	423.208	300.7249
1988	1364.729	497.6008	450.3604	300.7249
1989	1421.239	527.7109	469.0085	300.7249
1990	1491.818	564.261	492.2998	300.7249
1991	1808.518	684.7612	596.8108	300.7249
1992	2605.408	967.8013	859.7844	363.252
1993	2990.348	1118.882	986.8147	363.252
1994	3585.948	1344.582	1183.363	363.252
1995	4448.457	1664.781	1467.991	363.252
1996	5752.066	2139.11	1899.182	436.9568
1997	7093.066	2635.922	2340.712	489.7319
1998	7992.246	2996.195	2637.441	489.7319
1999	8897.633	3203.145	2771.219	489.7319
2000	8533.823	3329.039	2815.963	489.7319
2001	8544.922	3422.242	2819.824	489.7319
2002	8564.422	3526.727	2826.259	489.7319
2003	8607.672	3649.301	2840.531	489.7319
2004	8657.98	3785.562	2857.133	489.7319
2005	8704.129	3932.887	2872.362	489.7319
2006	8773.457	4101.348	2895.24	489.7319
2007	8806.273	4252.727	2906.07	489.7319
2008	8851.762	4416.949	2921.081	489.7319
2009	8886.211	4587.762	2932.449	489.7319
2010	8934.738	4775.062	2948.463	489.7319
2011	8949.035	4960.898	2953.181	489.7319
2012	8988.684	5166.18	2966.265	489.7319
2013	9036.133	5381.797	2981.924	489.7319
2014	9080.461	5605.578	2996.552	489.7319
2015	9135.488	5821.824	3014.711	489.7319
2016	9175.137	6043.414	3027.795	489.7319
2017	9222.586	6244.203	3043.453	489.7319
2018	9281.734	6453.312	3062.972	489.7319
2019	9346.371	6667.488	3084.302	489.7319
2020	9359.371	6881.969	3088.592	489.7319
2021	9405.52	7125.965	3103.821	489.7319
2022	9452.969	7384.488	3119.479	489.7319
2023	9500.418	7661.777	3135.138	489.7319
2024	9557.246	7962.125	3153.891	489.7319
2025	9596.895	8275.133	3166.975	489.7319
2026	9658.145	8612.273	3187.187	489.7319
2027	9699.894	8962.543	3200.701	489.7319
2028	9759.32	9354.898	3220.575	489.7319
2029	9766.078	9761.266	3222.805	489.7319
2030	9772.578	9775.066	3224.95	489.7319

10A
Cost Summary - Dollars in Millions

NBS		COMMITTED COST		PRINCIPLE	FINANCED COST		TOTAL
		CAPITAL	OPERATIONS		INTEREST	OPERATIONS	
0.0	TOTAL	9,772.7	6,681.3	16,454.0	9,772.1	13,791.3	32,247.7
1.0	CAPITAL ITEMS	9,772.7		9,772.7			9,772.7
1.1	SYSTEM FACILITIES-EQUIPMENT	7,999.0		7,999.0			7,999.0
1.1.1	SHIP	185.0		185.0			185.0
1.1.2	CASH	242.0		242.0			242.0
1.1.3	CASH TRANSPORTER-PAUL CAR	18.8		18.8			18.8
1.1.4	PAUL CAR TUG	0.8		0.8			0.8
1.1.5	CASH TRANSPORTER						
1.1.6	SEAFORT FAC	2.4		2.4			2.4
1.1.7	WATER BASIN 4 PORT	115.3		115.3			115.3
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	57.6		57.6			57.6
1.1.10	PACKAGING FACILITY						
1.1.11	PACKAGING FAC	278.4		278.4			278.4
1.1.12	CANNISTERS	218.5		218.5			218.5
1.1.13	EMPLACEMENT TRNS	19.0		19.0			19.0
1.1.14	HAULT MODULE	3,208.0		3,208.0			3,208.0
1.1.15	GEOLOGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CASH	112.7		112.7			112.7
1.1.18	CONV INTER FAC	180.6		180.6			180.6
1.1.19	PLN PROC FAC	2,257.0		2,257.0			2,257.0
1.1.20	RECOVERY FAC	2,144.9		2,144.9			2,144.9
1.2	SUPPORT FACILITIES EQUIPMENT	29.4		29.4			29.4
1.2.1	REIN SLS & FLT ID	29.4		29.4			29.4
1.2.2	CONCRETE & ULT	550.9		550.9			550.9
1.3	OTHERS COST						
1.4	INTEREST DURING CON	1,194.4		1,194.4			1,194.4
2.0	OPER & MAINT		6,681.3	6,681.3		6,681.3	6,681.3
2.1	DIRECT LABOR		2,559.3	2,559.3		2,559.3	2,559.3
2.1.1	PORT & REC TRNS		12.1	12.1		12.1	12.1
2.1.2	WATER BASIN REC (PORT)		350.0	350.0		350.0	350.0
2.1.3	WATER BASIN REC (PORT)						
2.1.4	WATER BASIN STOP		65.1	65.1		65.1	65.1
2.1.5	PACK FAC LABOP		752.9	752.9		752.9	752.9
2.1.6	HAULT EMPLOYMENT LABOR		165.6	165.6		165.6	165.6
2.1.7	GEOLOGIC REC MOD LABOR						
2.1.8	PAUL TRNS MAINT LAB		74.9	74.9		74.9	74.9
2.1.9	PAUL TRNS MAINT LAB		36.4	36.4		36.4	36.4
2.1.10	PLN PROC LABOR		581.1	581.1		581.1	581.1
2.1.11	RECOVERY PLANT LAB		581.1	581.1		581.1	581.1
2.2	INDIRECT LABOR		3,841.1	3,841.1		3,841.1	3,841.1
2.2.1	PORT & REC TRNS LAB		19.4	19.4		19.4	19.4
2.2.2	IND. REC (PORT) I LAB		524.6	524.6		524.6	524.6
2.2.3	IND. REC (PORT) I LAB						
2.2.4	IND. STOP IND LAB		97.2	97.2		97.2	97.2
2.2.5	PACK FAC IND LAB		1,129.0	1,129.0		1,129.0	1,129.0
2.2.6	HAULT IND LABOR		158.0	158.0		158.0	158.0
2.2.7	GEO REC MOD IND LAB						
2.2.8	CASH TRNS MAINT LAB		111.9	111.9		111.9	111.9
2.2.9	PLN PROC IND LAB		18.6	18.6		18.6	18.6
2.2.10	PLN PROC IND LAB		891.2	891.2		891.2	891.2
2.2.11	REC PLANT IND LAB		891.2	891.2		891.2	891.2
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0		1,614.0	1,614.0
2.3.1	PORT REC PHS		8.1	8.1		8.1	8.1
2.3.2	IND. REC OPNS 4 PORT		218.6	218.6		218.6	218.6
2.3.3	IND. REC OPNS 2 PORT						
2.3.4	IND. STORAGE OPNS		40.5	40.5		40.5	40.5
2.3.5	PACK OPNS (2500)		470.4	470.4		470.4	470.4
2.3.6	PACK OPNS (2000)		65.8	65.8		65.8	65.8
2.3.7	HAULT OPNS						
2.3.8	GEOLOGIC REC OPNS		46.6	46.6		46.6	46.6
2.3.9	CASH TRNS		21.3	21.3		21.3	21.3
2.3.10	PLN PROC OPNS		371.3	371.3		371.3	371.3
2.3.11	RECOVERY PLANT OPNS		419.9	419.9		419.9	419.9
2.4	CONTRACTED SERVICES		325.6	325.6		325.6	325.6
2.4.1	SHIP OIL		0.4	0.4		0.4	0.4
2.4.2	US PORT FEE						
2.4.3	ELFOP PORT REC STOP		17.2	17.2		17.2	17.2
2.4.4	US PAUL (SF TO STOP)						
2.4.5	ELFOP PAUL TRNS		59.6	59.6		59.6	59.6
2.4.6	US STOP (TIME CHFC)						
2.4.7	ELFOP STOP						
2.4.8	US RECON CP						
2.4.9	ELFOP REC CP						
2.4.10	ELFOP WASTE DIS						
2.4.11	US PAUL TRNSP		17.0	17.0		17.0	17.0
2.4.12	ELFOP PAUL TRNSP						
2.4.13	ELFOP PAUL TRNS						
2.4.14	US PORT FEE						
2.4.15	ELFOP PORT FEE						
2.4.16	PACIFIC PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	PAUL PAUL TRNSP						
2.4.19	PAUL PAUL TRNSP						
2.4.20	PAUL PAUL TRNSP						
2.4.21	PAUL PAUL TRNSP						
2.4.22	PAUL PAUL TRNSP						
2.4.23	PAUL PAUL TRNSP						
2.4.24	PAUL PAUL TRNSP						
2.4.25	PAUL PAUL TRNSP						
2.4.26	PAUL PAUL TRNSP						
2.4.27	PAUL PAUL TRNSP						
2.4.28	PAUL PAUL TRNSP						
2.4.29	PAUL PAUL TRNSP						
2.4.30	PAUL PAUL TRNSP						
2.4.31	PAUL PAUL TRNSP						
2.4.32	PAUL PAUL TRNSP						
2.4.33	PAUL PAUL TRNSP						
2.4.34	PAUL PAUL TRNSP						
2.4.35	PAUL PAUL TRNSP						
2.4.36	PAUL PAUL TRNSP						
2.4.37	PAUL PAUL TRNSP						
2.4.38	PAUL PAUL TRNSP						
2.4.39	PAUL PAUL TRNSP						
2.4.40	PAUL PAUL TRNSP						
2.4.41	PAUL PAUL TRNSP						
2.4.42	PAUL PAUL TRNSP						
2.4.43	PAUL PAUL TRNSP						
2.4.44	PAUL PAUL TRNSP						
2.4.45	PAUL PAUL TRNSP						
2.4.46	PAUL PAUL TRNSP						
2.4.47	PAUL PAUL TRNSP						
2.4.48	PAUL PAUL TRNSP						
2.4.49	PAUL PAUL TRNSP						
2.4.50	PAUL PAUL TRNSP						
2.4.51	PAUL PAUL TRNSP						
2.4.52	PAUL PAUL TRNSP						
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2.4.59	PAUL PAUL TRNSP						
2.4.60	PAUL PAUL TRNSP						
2.4.61	PAUL PAUL TRNSP						
2.4.62	PAUL PAUL TRNSP						
2.4.63	PAUL PAUL TRNSP						
2.4.64	PAUL PAUL TRNSP						
2.4.65	PAUL PAUL TRNSP						
2.4.66	PAUL PAUL TRNSP						
2.4.67	PAUL PAUL TRNSP						
2.4.68	PAUL PAUL TRNSP						
2.4.69	PAUL PAUL TRNSP						
2.4.70	PAUL PAUL TRNSP						
2.4.71	PAUL PAUL TRNSP						
2.4.72	PAUL PAUL TRNSP						
2.4.73	PAUL PAUL TRNSP						
2.4.74	PAUL PAUL TRNSP						
2.4.75	PAUL PAUL TRNSP						
2.4.76	PAUL PAUL TRNSP						
2.4.77	PAUL PAUL TRNSP						
2.4.78	PAUL PAUL TRNSP						
2.4.79	PAUL PAUL TRNSP						
2.4.80	PAUL PAUL TRNSP						
2.4.81	PAUL PAUL TRNSP						
2.4.82	PAUL PAUL TRNSP						
2.4.83	PAUL PAUL TRNSP						
2.4.84	PAUL PAUL TRNSP						
2.4.85	PAUL PAUL TRNSP						
2.4.86	PAUL PAUL TRNSP						
2.4.87	PAUL PAUL TRNSP						
2.4.88	PAUL PAUL TRNSP						
2.4.89	PAUL PAUL TRNSP						
2.4.90	PAUL PAUL TRNSP						
2.4.91	PAUL PAUL TRNSP						
2.4.92	PAUL PAUL TRNSP						
2.4.93	PAUL PAUL TRNSP						
2.4.94	PAUL PAUL TRNSP						
2.4.95	PAUL PAUL TRNSP						
2.4.96	PAUL PAUL TRNSP						
2.4.97	PAUL PAUL TRNSP						
2.4.98	PAUL PAUL TRNSP						
2.4.99	PAUL PAUL TRNSP						
2.4.100	PAUL PAUL TRNSP						
2.4.101	PAUL PAUL TRNSP						
2.4.102	PAUL PAUL TRNSP						
2.4.103	PAUL PAUL TRNSP						
2.4.104	PAUL PAUL TRNSP						
2.4.105	PAUL PAUL TRNSP						
2.4.106	PAUL PAUL TRNSP						
2.4.107	PAUL PAUL TRNSP						
2.4.108	PAUL PAUL TRNSP						
2.4.109	PAUL PAUL TRNSP						
2.4.110	PAUL PAUL TRNSP						
2.4.111	PAUL PAUL TRNSP						
2.4.112	PAUL PAUL TRNSP						
2.4.113	PAUL PAUL TRNSP						
2.4.114	PAUL PAUL TRNSP						
2.4.115	PAUL PAUL TRNSP						
2.4.116	PAUL PAUL TRNSP						
2.4.117	PAUL PAUL TRNSP						
2.4.118	PAUL PAUL TRNSP						
2.4.119	PAUL PAUL TRNSP						
2.4.120	PAUL PAUL TRNSP						
2.4.121	PAUL PAUL TRNSP						
2.4.122	PAUL PAUL TRNSP						
2.4.123	PAUL PAUL TRNSP						
2.4.124	PAUL PAUL TRNSP						
2.4.125	PAUL PAUL TRNSP						
2.4.126	PAUL PAUL TRNSP						
2.4.127	PAUL PAUL TRNSP						
2.4.128	PAUL PAUL TRNSP						
2.4.129	PAUL PAUL TRNSP						
2.4.130	PAUL PAUL TRNSP						
2.4.131	PAUL PAUL TRNSP						
2.4.132	PAUL PAUL TRNSP						
2.4.133	PAUL PAUL TRNSP						
2.4.134	PAUL PAUL TRNSP						
2.4.135	PAUL PAUL TRNSP						
2.4.136	PAUL PAUL TRNSP						
2.4.137	PAUL PAUL TRNSP						
2.4.138	PAUL PAUL TRNSP						
2.4.139	PAUL PAUL TRNSP						
2.4.140	PAUL PAUL TRNSP						
2.4.141	PAUL PAUL TRNSP						
2.4.142	PAUL PAUL TRNSP						

Section E3.11

Case: 11A

Description: Fuel Cycle Center (FCC) baseline location cost factor 2.4
and desalinization added

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 2.4

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 4.777 billion dollars

Owners ROI - 22.2%

Service charge - \$557/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/KG) #337.031
 RATE OF RETURN ON INVESTMENT 30.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT #117711.308

11A
 Yearly Profit and Loss Statement

YEPP	REP REVENUE	SEAR CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	7.6	7.6	.8	2.4	4.4	14.6	.0	7.0
1979	.0	16.9	16.9	1.6	17.4	7.0	36.0	.0	3.9
1980	.0	21.0	21.0	2.6	33.3	10.5	36.4	.0	15.4
1981	.0	47.9	47.9	3.7	42.9	19.7	66.3	.0	18.4
1982	.0	90.1	90.1	5.3	85.4	30.3	101.3	.0	3.2
1983	.0	127.1	127.1	6.6	87.7	41.3	135.7	.0	6.7
1984	.0	157.8	157.8	8.0	107.4	51.3	166.9	.0	9.1
1985	.0	214.3	214.3	54.3	112.7	54.9	221.9	.0	7.4
1986	.0	265.3	265.3	55.1	115.9	57.3	228.3	14.1	23.1
1987	.0	313.7	313.7	116.6	120.4	60.8	297.7	6.1	9.9
1988	.0	431.9	431.9	117.2	124.7	64.4	306.3	47.7	77.8
1989	.0	517.2	517.2	117.3	127.2	67.0	311.5	78.2	127.5
1990	.0	542.3	542.3	117.3	130.4	70.2	317.9	85.3	139.2
1991	.0	619.4	619.4	118.9	149.8	80.5	349.3	102.6	167.7
1992	.0	748.4	748.4	120.2	201.2	104.2	425.6	124.7	209.1
1993	.0	883.6	883.6	121.2	224.4	117.8	463.5	137.6	299.5
1994	.0	1048.6	1048.6	122.4	261.4	137.7	521.5	160.3	366.8
1995	.0	1223.0	1223.0	123.7	315.6	155.6	595.1	204.8	363.1
1996	.0	1313.1	1313.1	125.4	399.7	207.6	731.8	280.9	366.4
1997	.0	1480.0	1480.0	127.2	463.4	242.2	832.8	304.5	382.6
1998	.0	1643.9	1643.9	129.2	527.4	283.6	939.2	363.6	430.1
1999	.0	1768.0	1768.0	130.1	557.4	308.6	996.1	393.3	478.6
2000	1413.3	1905.3	3318.0	231.0	558.1	305.4	1114.5	807.7	1366.6
2001	1413.3	2092.7	3506.2	250.4	549.7	305.8	1106.0	912.1	1488.2
2002	1413.3	2180.9	3574.4	251.1	540.9	306.4	1098.4	945.0	1547.5
2003	1413.3	2373.7	3787.2	251.7	532.6	306.4	1092.8	1023.9	1670.5
2004	1413.3	2549.4	3962.9	252.7	523.7	318.0	1094.2	1092.8	1722.9
2005	1413.3	2653.3	4066.8	253.2	513.3	313.0	1079.5	1135.2	1852.1
2006	1413.3	2654.2	4067.7	253.6	503.0	315.9	1072.5	1138.2	1857.0
2007	1413.3	2680.9	4094.4	253.6	488.8	306.3	1048.6	1157.4	1889.4
2008	1413.3	2653.3	4066.8	253.3	475.7	305.0	1034.2	1152.4	1880.2
2009	1413.3	2655.0	4068.3	253.3	460.7	303.7	1018.0	1155.2	1891.4
2010	1413.3	2681.7	4095.2	253.3	445.4	303.4	1002.3	1175.3	1917.6
2011	1413.3	2653.3	4066.8	253.4	436.4	298.8	978.7	1173.5	1914.7
2012	1413.3	2654.2	4067.7	253.4	428.1	295.7	957.1	1182.0	1928.5
2013	1413.3	2680.9	4094.4	253.4	409.0	290.4	932.7	1201.4	1958.2
2014	1413.3	2653.3	4066.8	253.1	368.8	270.4	892.2	1206.3	1968.2
2015	1413.3	2655.0	4068.3	253.3	351.5	257.9	862.7	1216.2	1987.6
2016	1413.3	2681.7	4095.2	253.3	334.4	254.3	842.0	1236.2	2017.0
2017	1413.3	2653.3	4066.8	253.2	316.7	236.0	805.9	1239.1	2021.0
2018	1413.3	2654.2	4067.7	253.2	302.1	231.2	786.5	1246.9	2034.3
2019	1413.3	2680.9	4094.4	253.2	287.5	225.6	766.3	1264.7	2063.4
2020	1413.3	2653.3	4066.8	253.1	269.1	225.6	747.8	1261.2	2057.0
2021	1413.3	2655.0	4068.3	253.1	251.2	225.0	732.7	1267.6	2068.2
2022	1413.3	2681.7	4095.2	253.0	231.4	228.9	713.4	1285.1	2096.6
2023	1413.3	2653.3	4066.8	253.0	210.3	231.0	694.4	1281.5	2090.9
2024	1413.3	2654.2	4067.7	253.0	189.0	234.7	675.6	1289.0	2103.1
2025	1413.3	2680.9	4094.4	252.9	162.5	235.5	650.9	1308.5	2134.9
2026	1413.3	2653.3	4066.8	252.9	136.6	240.1	629.6	1306.2	2131.1
2027	1413.3	2655.0	4068.3	252.9	107.6	243.9	604.4	1316.4	2147.8
2028	1413.3	2681.7	4095.2	252.9	78.0	244.4	575.2	1330.0	2170.0
2029	1413.3	2653.3	4066.8	252.8	41.2	246.2	560.2	1332.5	2174.1
2030	1413.3	2654.2	4067.7	252.7	1.2	14.2	268.1	1337.7	2180.6
TOTL	43312.3	39604.0	127623.1	9564.4	14667.4	10348.0	34579.7	34186.6	63607.0
FWC	836.8	1769.9	2596.7	180.5	276.7	195.2	652.4	739.4	1204.8
FWIC	860.2	537.0	817.2	56.8	87.1	61.4	205.3	232.7	379.2

11A
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				CHANGES	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	7.6	141.6	- 134.0	- 134.0	- 49.6	- 49.6	- 51.3	- 51.3	- 51.3	- 51.3
1979	16.9	130.9	- 104.0	- 238.0	- 43.4	- 91.9	- 43.6	- 95.1	- 95.1	- 95.1
1980	31.0	50.2	- 19.3	- 307.3	- 35.1	- 127.0	- 36.2	- 131.3	- 131.3	- 131.3
1981	47.9	300.2	- 252.3	- 559.5	- 98.9	- 225.9	- 103.3	- 233.6	- 233.6	- 233.6
1982	93.1	344.7	- 251.7	- 811.2	- 88.5	- 314.4	- 98.5	- 332.1	- 332.1	- 332.1
1983	127.1	344.6	- 217.5	- 1028.7	- 84.2	- 398.6	- 68.1	- 414.3	- 414.3	- 414.3
1984	157.8	309.9	- 152.1	- 1180.8	- 64.4	- 463.0	- 68.0	- 482.2	- 482.2	- 482.2
1985	214.3	143.6	69.9	- 1110.9	6.9	- 456.2	2.2	- 454.0	- 454.0	- 454.0
1986	263.5	114.8	150.7	- 960.1	50.9	- 405.3	50.2	- 451.8	- 451.8	- 451.8
1987	313.7	158.0	155.7	- 804.4	32.4	- 370.9	21.4	- 419.4	- 419.4	- 419.4
1988	431.8	193.5	238.2	- 566.1	161.6	- 209.2	109.8	- 309.6	- 309.6	- 309.6
1989	517.2	173.8	343.4	- 222.7	160.6	- 148.7	160.2	- 148.4	- 148.4	- 148.4
1990	642.3	137.9	504.4	281.6	168.6	2.9	168.1	12.8	12.8	12.8
1991	819.4	435.6	383.7	665.3	162.9	182.8	112.4	128.0	128.0	128.0
1992	748.4	917.1	- 168.7	496.6	16.2	199.0	7.4	191.6	191.6	191.6
1993	883.6	506.1	377.4	874.0	221.6	420.6	217.6	383.0	383.0	383.0
1994	1048.6	717.2	331.4	1205.4	232.7	653.3	228.4	589.4	589.4	589.4
1995	1223.0	986.2	236.8	1442.2	221.9	875.2	212.6	802.0	802.0	802.0
1996	1313.1	1429.0	- 115.9	1326.3	84.3	959.5	72.1	874.2	874.2	874.2
1997	1480.0	1488.2	- 8.2	1318.1	129.9	1089.4	113.5	997.7	997.7	997.7
1998	1643.9	1028.4	615.5	1933.6	344.4	1433.8	333.1	1234.7	1234.7	1234.7
1999	1768.0	535.5	1232.5	3166.1	562.5	1996.1	558.9	1633.6	1633.6	1633.6
2000	3315.0	386.6	2928.4	6094.5	1535.4	3531.5	1515.1	3048.6	3048.6	3048.6
2001	3566.2	366.1	3200.1	9294.6	1636.0	5167.5	1620.3	4668.9	4668.9	4668.9
2002	3594.4	370.6	3223.8	12518.4	1736.3	6903.8	1737.7	6386.6	6386.6	6386.6
2003	3787.2	295.0	3492.2	15990.6	1841.9	8745.7	1843.2	8229.8	8229.8	8229.8
2004	3952.9	303.0	3649.9	19640.5	1941.6	10687.1	1942.9	10013.7	10013.7	10013.7
2005	4066.8	299.4	3767.3	23407.8	2000.3	12687.4	2001.9	12015.6	12015.6	12015.6
2006	4067.7	322.9	3744.7	27152.5	1985.2	14672.6	1986.9	14001.5	14001.5	14001.5
2007	4054.4	338.0	3716.4	30868.9	2021.5	16694.0	2023.8	16025.3	16025.3	16025.3
2008	4066.8	329.0	3737.8	34606.7	1997.7	18691.7	1999.9	18025.2	18025.2	18025.2
2009	4068.3	338.0	3730.3	38337.0	1993.6	20685.3	2001.1	20026.3	20026.3	20026.3
2010	4035.3	302.0	3733.2	42070.2	2005.4	22690.7	2008.0	22034.2	22034.2	22034.2
2011	4066.8	367.7	3700.1	45770.3	1998.3	24688.1	2001.5	24035.7	24035.7	24035.7
2012	4067.7	293.0	3774.7	49545.0	1988.5	26676.6	1991.8	26027.3	26027.3	26027.3
2013	4054.4	300.8	3753.6	53298.6	2003.0	28679.6	2005.8	28033.6	28033.6	28033.6
2014	4066.8	297.4	3769.4	57068.0	2014.7	30694.3	2018.1	30051.9	30051.9	30051.9
2015	4068.3	309.3	3759.0	60827.0	2029.1	32723.4	2032.0	32083.9	32083.9	32083.9
2016	4035.2	292.9	3742.3	64569.3	2049.6	34773.0	2052.5	34036.4	34036.4	34036.4
2017	4066.8	300.7	3766.2	68335.5	2097.0	36870.0	2059.9	36096.3	36096.3	36096.3
2018	4067.7	312.0	3755.7	72091.2	2056.4	38926.4	2058.8	38055.0	38055.0	38055.0
2019	4054.4	317.0	3737.4	75828.6	2074.8	40991.2	2077.3	40032.3	40032.3	40032.3
2020	4066.8	266.1	3800.7	79629.3	2068.9	43060.1	2072.6	42004.9	42004.9	42004.9
2021	4035.2	299.2	3736.0	83365.3	2032.7	45122.8	2055.6	43059.3	43059.3	43059.3
2022	4035.2	300.5	3734.7	87100.0	2057.1	47179.9	2070.3	45129.3	45129.3	45129.3
2023	4066.8	309.5	3757.3	90857.3	2044.6	49224.5	2048.1	47177.4	47177.4	47177.4
2024	4067.7	209.0	3758.7	94616.0	2037.3	51261.8	2041.1	51219.5	51219.5	51219.5
2025	4054.4	292.6	3761.8	98377.8	2057.4	53309.3	2061.6	53281.1	53281.1	53281.1
2026	4066.8	314.2	3752.6	102130.4	2034.0	55343.3	2038.3	55319.4	55319.4	55319.4
2027	4068.3	293.8	3774.5	105894.9	2041.3	57384.6	2046.2	57365.3	57365.3	57365.3
2028	4035.2	313.1	3722.1	110617.0	2041.9	59426.5	2046.9	59412.4	59412.4	59412.4
2029	4066.8	279.5	3787.3	114394.3	2032.9	61459.4	2040.0	61452.4	61452.4	61452.4
2030	4067.7	259.2	3808.5	117711.2	2336.1	63895.5	2322.2	63815.2	63815.2	63815.2

11A

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	*	FIXED ASSETS	MOVING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1979	140.8	A	136.4	1.7	93.8	44.3
1979	119.3	A	247.9	2.2	173.9	73.2
1980	87.8	A	333.0	4.3	239.3	99.0
1981	296.5	A	601.8	7.0	436.8	158.0
1982	339.4	A	910.6	11.0	650.2	272.2
1983	332.0	A	1307.2	15.7	871.2	351.7
1984	301.9	A	1427.5	19.2	1066.2	410.6
1985	91.2	A	1493.9	27.8	1118.8	403.0
1986	59.7	A	1496.3	28.0	1148.9	375.8
1987	81.4	A	1516.9	30.3	1152.0	364.4
1988	32.3	A	1534.8	40.3	1232.7	341.7
1989	66.5	A	1534.3	40.7	1236.3	366.7
1990	70.6	A	1534.7	41.3	1236.2	273.8
1991	316.7	A	1760.9	44.8	1477.8	327.9
1992	796.9	A	2453.6	53.6	1966.5	520.6
1993	384.9	A	2730.7	57.6	2214.8	563.5
1994	555.6	A	3178.5	64.0	2578.6	663.9
1995	862.5	A	3875.3	73.2	3114.1	834.4
1996	1203.5	A	4971.2	87.4	3936.0	1122.6
1997	1341.0	A	6040.0	101.8	4772.0	1369.0
1998	859.2	A	6675.6	111.1	5301.9	1464.8
1999	463.4	A	6780.4	114.6	5490.4	1464.6
2000	135.6	A	6610.6	134.9	5489.2	1226.3
2001	11.7	A	6316.5	133.4	5395.7	1054.1
2002	19.5	A	6029.6	132.0	5297.6	864.0
2003	43.2	A	5764.4	130.7	5203.8	691.3
2004	50.3	A	5503.9	129.4	5101.9	531.3
2005	46.1	A	5237.0	127.8	4903.2	501.5
2006	69.3	A	4990.4	126.1	4664.8	251.7
2007	34.4	A	4718.6	122.7	4726.1	116.2
2008	45.3	A	4459.0	121.5	4564.0	3.5
2009	34.4	A	4189.7	119.0	4422.0	113.2
2010	48.5	A	3934.9	116.5	4254.9	203.6
2011	14.3	A	3650.4	113.3	4054.1	250.4
2012	39.6	A	3394.4	110.2	3858.0	303.4
2013	47.4	A	3151.5	107.1	3658.2	399.6
2014	44.3	A	2925.4	102.6	3478.6	449.5
2015	25.0	A	2722.6	100.0	3317.2	493.9
2016	39.6	A	2507.9	97.9	3135.2	529.3
2017	47.4	A	2319.3	95.0	2981.0	567.5
2018	59.1	A	2147.3	92.6	2831.0	591.9
2019	64.6	A	1966.3	90.1	2682.3	600.8
2020	13.0	A	1773.7	87.8	2488.7	619.9
2021	46.1	A	1591.4	84.0	2282.8	667.4
2022	47.4	A	1409.9	80.7	2071.7	581.0
2023	47.4	A	1226.4	77.2	1841.8	528.2
2024	56.8	A	1048.5	73.5	1596.2	476.2
2025	39.6	A	822.7	69.2	1324.7	492.8
2026	61.2	A	673.8	64.9	1048.7	310.0
2027	40.9	A	470.8	60.1	739.3	238.4
2028	60.2	A	266.7	55.1	407.1	65.3
2029	1.6	A	7.2	49.0	7.4	48.8
2030	6.5	A	4	42.3	1	41.8

TOTAL CAPITAL INVESTMENT 10347.6

11A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	140.77	46.96002	46.45409	51.39353
1979	260.0598	87.19981	85.81973	95.10274
1980	347.6997	117.3598	114.7409	131.3081
1981	644.1697	217.55	212.576	233.6392
1982	983.5696	333.3804	324.5779	326.1428
1983	1321.59	450.4104	436.1245	414.383
1984	1623.479	557.3206	535.748	482.2456
1985	1714.719	595.9504	565.6572	482.2456
1986	1774.399	625.4714	585.5518	482.2456
1987	1855.809	663.8313	612.417	482.2456
1988	1938.089	704.3411	639.5693	482.2456
1989	1994.599	738.271	658.2175	482.2456
1990	2065.179	779.0107	681.5088	482.2456
1991	2381.879	904.1206	786.0198	482.2456
1992	3178.769	1192.241	1048.993	482.2456
1993	3563.708	1348.902	1176.024	482.2456
1994	4159.309	1580.742	1372.572	482.2456
1995	5021.816	1907.699	1657.199	482.2456
1996	6325.426	2389.469	2037.39	482.2456
1997	7666.426	2894.461	2529.92	482.2456
1998	8565.605	3263.734	2826.65	482.2456
1999	8970.992	3480.574	2960.427	482.2456
2000	9106.582	3617.355	3005.172	482.2456
2001	9118.281	3722.531	3009.032	482.2456
2002	9137.781	3840.184	3015.468	482.2456
2003	9181.031	3977.234	3029.74	482.2456
2004	9231.34	4129.434	3046.342	482.2456
2005	9277.488	4294.285	3061.571	482.2456
2006	9346.816	4482.027	3084.449	482.2456
2007	9381.266	4655.184	3095.817	482.2456
2008	9426.754	4842.754	3110.829	482.2456
2009	9461.203	5039.238	3122.197	482.2456
2010	9509.73	5254.789	3138.211	482.2456
2011	9524.027	5469.926	3142.929	482.2456
2012	9563.676	5705.664	3156.013	482.2456
2013	9611.125	5952.965	3171.671	482.2456
2014	9655.453	6176.863	3186.299	482.2456
2015	9710.48	6393.242	3204.458	482.2456
2016	9750.129	6614.969	3217.542	482.2456
2017	9797.578	6815.801	3233.2	482.2456
2018	9856.727	7024.949	3252.719	482.2456
2019	9921.363	7239.164	3274.05	482.2456
2020	9934.363	7453.684	3278.34	482.2456
2021	9980.512	7697.734	3293.569	482.2456
2022	10027.96	7956.305	3309.227	482.2456
2023	10075.41	8233.652	3324.885	482.2456
2024	10132.24	8534.07	3343.638	482.2456
2025	10171.89	8847.16	3356.722	482.2456
2026	10233.14	9184.391	3376.935	482.2456
2027	10274.09	9534.75	3390.448	482.2456
2028	10334.31	9927.215	3410.323	482.2456
2029	10341.07	10333.69	3412.553	482.2456
2030	10347.57	10347.49	3414.698	482.2456

11A
Cost Summary - Dollars in Millions

WBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS
0.0	TOTAL	10,347.7	9,364.3	19,712.0	10,347.3	14,867.4	9,364.3
1.0	CAPITAL ITEMS	10,347.7		10,347.7	10,347.3	14,867.4	
1.1	SYSTEM FACILITIES-EQUIPMENT	7,999.0		7,999.0	7,997.8	11,381.3	
1.1.1	SHIP	165.0		165.0	165.0	154.1	
1.1.2	CASH	242.0		242.0	242.0	173.6	
1.1.3	CRSI TRANSPORTER/PAIL CAR	18.0		18.0	18.0	11.4	
1.1.4	PAIL CAR TUG	0.8		0.8	0.8	0.4	
1.1.5	CRSI TRANSPORTER						
1.1.6	SUPPORT FAC	2.4		2.4	2.4	3.5	
1.1.7	WATER BASIN 4 PORT	115.3		115.3	115.3	128.5	
1.1.8	WATER BASIN 2 PORT						
1.1.9	LARGE BASIN STORAGE	57.6		57.6	57.6	59.1	
1.1.10	PACKAGING FACILITY						
1.1.11	PROCESSING FAC	278.4		278.4	278.4	462.9	
1.1.12	CANISTERS	216.5		216.5	216.5	222.4	
1.1.13	ENRICHMENT TRANS	18.0		18.0	18.0	11.9	
1.1.14	FUEL MODULE	2,208.0		2,208.0	2,208.0	1,853.3	
1.1.15	CEOLOGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CRSI	112.7		112.7	112.7	154.8	
1.1.18	LONG-TERM FAC	180.6		180.6	180.6	221.5	
1.1.19	MLM PFCO FAC	2,257.0		2,257.0	2,256.9	3,914.4	
1.1.20	RECOVERY FAC	2,144.9		2,144.9	2,144.9	3,720.3	
1.2	SUPPORT FACILITIES EQUIPMENT	497.7		497.7	497.7	776.9	
1.2.1	NON-BLD & FLT YD						
1.2.2	WAREHOUSE & FLT	29.4		29.4	29.4	50.6	
1.3	OTHERS COST	587.4		587.4	587.4	768.5	
1.4	INTEREST DURING CONS	1,264.7		1,264.7	1,264.6	1,720.6	
2.0	OPER & MAINT		9,364.3	9,364.3			9,364.3
2.1	DIRECT LABOR		2,559.3	2,559.3			2,559.3
2.1.1	PORT & REC TRANS		12.1	12.1			12.1
2.1.2	WATER BASIN REC (IMPORT)		350.0	350.0			350.0
2.1.3	WATER BASIN REC (EXPORT)						
2.1.4	WATER BASIN STOP		65.1	65.1			65.1
2.1.5	PRCI PFC LABOR						
2.1.6	PRCI PFC LABOR		732.9	732.9			732.9
2.1.7	PRCI PFC LABOR		105.6	105.6			105.6
2.1.8	CEOLOGIC REC MOD LABOR						
2.1.9	CRSI TRANS MAINT LAB		74.9	74.9			74.9
2.1.10	CEI LM PFCO LABOR		36.4	36.4			36.4
2.1.11	MLM PFCO LABOR		581.1	581.1			581.1
2.1.12	RECOVERY PLANT LAB		581.1	581.1			581.1
2.2	DIRECT LABOR		3,641.1	3,641.1			3,641.1
2.2.1	PORT & REC TRANS LPB		19.4	19.4			19.4
2.2.2	W.B. REC (IMPORT) LAB		524.6	524.6			524.6
2.2.3	W.B. REC (EXPORT) LAB						
2.2.4	W.B. STOR-IND LAB		97.2	97.2			97.2
2.2.5	PRCI PFC IND LAB						
2.2.6	PRCI PFC IND LAB		1,129.0	1,129.0			1,129.0
2.2.7	WALUT IND LABOR		156.0	156.0			156.0
2.2.8	CEC REC MOD IND LAB						
2.2.9	CRSI TRANS MAINT LAB		111.9	111.9			111.9
2.2.10	CEI LM PFCO IND LAB		18.6	18.6			18.6
2.2.11	MLM PFCO IND LAB		691.2	691.2			691.2
2.2.12	REC PLANT IND LAB		691.2	691.2			691.2
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0			1,614.0
2.3.1	PORT REC PHS		8.1	8.1			8.1
2.3.2	W.B. REC CYNO 4 PORT		218.6	218.6			218.6
2.3.3	W.B. REC CYNO 2 PORT						
2.3.4	W.B. STORAGE CYNO		40.5	40.5			40.5
2.3.5	PRCI CYNO (CYNO)						
2.3.6	PRCI CYNO (CYNO)		470.4	470.4			470.4
2.3.7	WALUT CYNO		65.8	65.8			65.8
2.3.8	CEOLOGIC REC CYNO						
2.3.9	CRSI TRANS		46.6	46.6			46.6
2.3.10	CEI LM PFCO CYNO		21.3	21.3			21.3
2.3.11	MLM PFCO CYNO		371.3	371.3			371.3
2.3.12	RECOVERY PLANT CYNO		371.3	371.3			371.3
2.4	CONTRACTED SERVICES		1,363.1	1,363.1			1,363.1
2.4.1	SHIP ON		325.6	325.6			325.6
2.4.2	US PORT FEE		0.4	0.4			0.4
2.4.3	ELFCO PORT FEE STOP						
2.4.4	US PORT FEE TO STOP		17.2	17.2			17.2
2.4.5	ELFCO PAUL TRANS						
2.4.6	US STORAGE (CHG)		59.6	59.6			59.6
2.4.7	ELFCO STORC						
2.4.8	US RECOUR CR						
2.4.9	ELFCO REC CR						
2.4.10	ELFCO WASTE DIS						
2.4.11	US PAUL TRANS		17.0	17.0			17.0
2.4.12	ELFCO PAUL TRANS						
2.4.13	ELFCO PAUL TRANS						
2.4.14	US PORT FEE						
2.4.15	ELFCO PORT FEE						
2.4.16	ELFCO PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	PACIFIC PORT FEE						
2.4.19	PRC PAUL TRANS						
2.4.20	PRC PAUL TRANS						
4.0	RECON TRUST FUND		247.0	247.0			247.0

Section E3.12

Case: 12A

Description: Fuel Cycle Center (FCC) baseline desalinization added

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 5.031 billion dollars

Owners ROI - 21.4%

Service charge - \$237/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YR) \$237.192
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$72565.560

12A
 Yearly Profit and Loss Statement

YEAR	REP REVENUE	SEMI CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEF EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	3.2	3.2	1.3	5.1	2.5	8.9	.0	5.7
1979	.0	7.2	7.2	1.3	8.6	4.1	14.0	.0	7.1
1980	.0	8.9	8.9	2.5	11.3	5.3	19.1	.0	10.2
1981	.0	20.4	20.4	3.6	20.2	9.5	33.3	.0	12.5
1982	.0	41.8	41.8	4.3	30.9	14.7	49.9	.0	8.2
1983	.0	54.1	54.1	5.1	40.9	19.6	65.6	.0	11.5
1984	.0	67.2	67.2	5.9	49.7	24.2	79.7	.0	12.5
1985	.0	91.4	91.4	28.0	52.9	26.0	106.9	.0	13.5
1986	.0	113.1	113.1	26.7	54.7	27.4	108.8	1.6	2.6
1987	.0	133.6	133.6	60.0	57.5	29.4	146.9	.0	13.3
1988	.0	183.9	183.9	60.9	60.3	31.5	152.7	11.9	19.3
1989	.0	220.2	220.2	61.8	61.4	32.6	155.8	24.5	39.9
1990	.0	230.9	230.9	61.8	63.2	34.3	159.3	27.2	44.4
1991	.0	263.7	263.7	62.2	72.8	39.4	174.5	33.9	55.3
1992	.0	318.7	318.7	63.4	86.6	50.6	210.6	41.1	67.0
1993	.0	376.2	376.2	64.1	108.0	57.2	229.3	55.8	91.1
1994	.0	446.5	446.5	64.9	125.3	66.6	256.8	72.1	117.6
1995	.0	520.6	520.6	65.7	150.4	73.7	289.8	85.5	139.5
1996	.0	559.1	559.1	66.6	168.9	80.3	315.8	77.6	126.7
1997	.0	600.2	600.2	67.6	223.5	116.8	407.9	84.5	137.8
1998	.0	700.0	700.0	68.6	249.9	131.3	450.3	94.9	154.8
1999	.0	749.4	749.4	69.7	260.2	140.1	470.0	106.2	173.3
2000	1413.3	811.4	2224.9	124.5	261.4	142.9	528.8	540.7	1045.4
2001	1413.3	891.1	2304.6	134.9	257.9	143.4	536.2	673.0	1095.4
2002	1413.3	938.7	2352.2	135.5	254.4	144.0	533.9	667.2	1121.1
2003	1413.3	1010.6	2424.3	136.1	251.0	145.2	532.3	719.0	1173.0
2004	1413.3	1085.6	2499.1	136.8	247.3	146.6	530.6	748.0	1220.4
2005	1413.3	1129.3	2543.3	137.3	242.6	147.8	527.7	765.9	1249.7
2006	1413.3	1150.2	2563.7	137.6	238.9	148.7	525.2	766.6	1250.8
2007	1413.3	1141.6	2555.1	138.0	232.1	149.5	519.6	775.0	1264.5
2008	1413.3	1129.3	2543.3	138.0	225.9	144.7	508.6	773.2	1261.5
2009	1413.3	1120.6	2534.1	137.9	218.8	144.0	500.7	776.5	1266.9
2010	1413.3	1141.9	2555.4	137.9	211.9	144.0	493.8	783.4	1278.2
2011	1413.3	1129.3	2543.3	137.8	203.4	141.8	483.1	782.9	1277.4
2012	1413.3	1150.2	2563.7	137.8	194.9	140.2	472.9	785.9	1283.9
2013	1413.3	1141.6	2555.1	137.7	186.4	137.8	461.9	785.4	1287.8
2014	1413.3	1129.3	2543.3	137.7	177.2	129.4	444.2	787.7	1301.4
2015	1413.3	1120.6	2534.1	137.6	169.7	124.1	431.5	802.8	1309.8
2016	1413.3	1141.9	2555.4	137.6	161.6	122.6	421.8	810.8	1322.6
2017	1413.3	1129.3	2543.3	137.5	153.5	117.7	408.8	811.1	1323.4
2018	1413.3	1130.2	2543.7	137.5	146.8	116.8	401.2	814.5	1329.0
2019	1413.3	1141.6	2555.1	137.4	139.7	113.9	390.9	822.4	1341.8
2020	1413.3	1129.3	2543.3	137.4	130.7	113.9	381.9	821.3	1346.1
2021	1413.3	1110.6	2524.1	137.3	121.7	115.3	374.3	824.5	1345.3
2022	1413.3	1141.9	2555.4	137.3	111.9	115.0	364.2	832.7	1358.6
2023	1413.3	1129.3	2543.3	137.2	101.6	116.0	354.8	831.6	1356.9
2024	1413.3	1150.2	2563.7	137.2	91.1	117.4	345.6	835.3	1362.8
2025	1413.3	1141.6	2555.1	137.1	76.6	117.1	332.8	844.5	1377.8
2026	1413.3	1129.3	2543.3	137.1	66.7	120.5	324.3	843.2	1375.8
2027	1413.3	1150.6	2564.1	137.0	52.9	121.7	311.6	846.3	1384.1
2028	1413.3	1141.9	2555.4	137.0	39.6	131.7	308.3	853.9	1393.2
2029	1413.3	1129.3	2543.3	136.9	22.5	135.3	294.7	854.5	1394.1
2030	1413.3	1130.2	2543.7	136.9	9.9	8.7	149.4	859.2	1404.0
TOTL	45618.5	39945.6	85564.1	2165.4	2988.8	4996.6	17150.7	25948.2	41262.9
F/C	626.8	753.7	1580.4	97.5	131.9	94.3	323.6	478.3	778.5
11.1C	260.2	237.2	497.4	30.7	41.5	29.7	101.8	150.5	245.0

Yearly Cash Statement

UNFINANCED ENTERPRISE BEFORE TAX:					FINANCED ENTERPRISE AFTER TAX:					CHIEFS				
YEPP	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	3.2	77.2	- 74.0	- 74.0	- 26.5	- 26.5	- 39.6	- 39.6	- 39.6	- 39.6	- 39.6	- 39.6	- 39.6	- 39.6
1979	7.2	59.3	- 48.1	- 122.1	- 21.3	- 47.8	- 21.9	- 61.0	- 21.9	- 61.0	- 21.9	- 61.0	- 21.9	- 61.0
1980	8.9	42.4	- 33.5	- 155.6	- 18.7	- 66.5	- 19.3	- 80.8	- 19.3	- 80.8	- 19.3	- 80.8	- 19.3	- 80.8
1981	20.4	139.6	- 118.1	- 273.7	- 49.2	- 117.7	- 50.9	- 121.7	- 50.9	- 121.7	- 50.9	- 121.7	- 50.9	- 121.7
1982	41.8	154.7	- 123.0	- 396.7	- 42.3	- 160.1	- 50.2	- 171.9	- 50.2	- 171.9	- 50.2	- 171.9	- 50.2	- 171.9
1983	54.1	157.0	- 102.9	- 499.6	- 44.7	- 204.7	- 46.5	- 218.4	- 46.5	- 218.4	- 46.5	- 218.4	- 46.5	- 218.4
1984	67.2	141.4	- 74.2	- 573.8	- 36.0	- 240.4	- 38.2	- 258.6	- 38.2	- 258.6	- 38.2	- 258.6	- 38.2	- 258.6
1985	91.4	79.0	12.3	- 561.5	- 9.0	- 249.4	- 12.9	- 271.5	- 12.9	- 271.5	- 12.9	- 271.5	- 12.9	- 271.5
1986	113.1	60.6	52.5	- 509.0	- 14.0	- 263.4	- 13.5	- 285.0	- 13.5	- 285.0	- 13.5	- 285.0	- 13.5	- 285.0
1987	129.6	182.4	- 52.8	- 561.8	- 5.6	- 269.0	- 11.6	- 296.6	- 11.6	- 296.6	- 11.6	- 296.6	- 11.6	- 296.6
1988	133.9	111.9	22.0	- 539.7	- 27.3	- 296.3	- 26.7	- 323.3	- 26.7	- 323.3	- 26.7	- 323.3	- 26.7	- 323.3
1989	220.2	67.1	153.2	- 386.5	- 56.6	- 352.9	- 56.3	- 389.2	- 56.3	- 389.2	- 56.3	- 389.2	- 56.3	- 389.2
1990	250.9	101.1	149.8	- 236.7	- 57.0	- 409.9	- 56.7	- 446.0	- 56.7	- 446.0	- 56.7	- 446.0	- 56.7	- 446.0
1991	263.7	218.1	- 45.7	- 282.4	- 33.1	- 443.0	- 31.4	- 474.4	- 31.4	- 474.4	- 31.4	- 474.4	- 31.4	- 474.4
1992	318.7	433.7	- 115.0	- 397.4	- 17.1	- 460.1	- 21.2	- 495.6	- 21.2	- 495.6	- 21.2	- 495.6	- 21.2	- 495.6
1993	376.2	252.6	123.6	- 273.8	- 71.5	- 531.6	- 69.5	- 561.1	- 69.5	- 561.1	- 69.5	- 561.1	- 69.5	- 561.1
1994	446.5	345.9	100.6	- 173.2	- 74.2	- 605.8	- 71.1	- 636.9	- 71.1	- 636.9	- 71.1	- 636.9	- 71.1	- 636.9
1995	520.8	466.0	54.8	- 118.4	- 66.4	- 672.2	- 62.1	- 698.9	- 62.1	- 698.9	- 62.1	- 698.9	- 62.1	- 698.9
1996	559.1	671.7	- 112.6	- 231.0	- 1.1	- 673.3	- 5.4	- 723.3	- 5.4	- 723.3	- 5.4	- 723.3	- 5.4	- 723.3
1997	638.2	622.0	16.2	- 214.8	- 42.0	- 715.3	- 36.1	- 761.4	- 36.1	- 761.4	- 36.1	- 761.4	- 36.1	- 761.4
1998	700.0	566.8	133.2	- 82.6	- 108.0	- 722.1	- 103.4	- 825.5	- 103.4	- 825.5	- 103.4	- 825.5	- 103.4	- 825.5
1999	749.4	273.6	475.9	- 346.7	- 287.1	- 479.2	- 285.3	- 517.7	- 285.3	- 517.7	- 285.3	- 517.7	- 285.3	- 517.7
2000	824.9	211.2	613.7	- 283.0	- 1119.7	- 1598.9	- 1128.7	- 1032.9	- 1128.7	- 1032.9	- 1128.7	- 1032.9	- 1128.7	- 1032.9
2001	8304.6	146.6	8158.0	- 233.4	- 1158.2	- 2787.2	- 1188.8	- 2721.7	- 1188.8	- 2721.7	- 1188.8	- 2721.7	- 1188.8	- 2721.7
2002	8342.2	103.0	8239.2	- 154.2	- 1266.4	- 3953.6	- 1206.9	- 3928.6	- 1206.9	- 3928.6	- 1206.9	- 3928.6	- 1206.9	- 3928.6
2003	8424.3	163.4	8260.9	- 34.3	- 1251.5	- 5245.1	- 1252.0	- 5160.6	- 1252.0	- 5160.6	- 1252.0	- 5160.6	- 1252.0	- 5160.6
2004	8499.1	167.0	8332.1	- 1177.1	- 1233.3	- 6538.4	- 1253.8	- 6475.4	- 1253.8	- 6475.4	- 1253.8	- 6475.4	- 1253.8	- 6475.4
2005	8543.3	163.4	8379.9	- 337.2	- 1318.5	- 7856.9	- 1319.1	- 7793.5	- 1319.1	- 7793.5	- 1319.1	- 7793.5	- 1319.1	- 7793.5
2006	8543.7	166.9	8376.8	- 16313.9	- 1300.8	- 9163.6	- 1307.3	- 9160.9	- 1307.3	- 9160.9	- 1307.3	- 9160.9	- 1307.3	- 9160.9
2007	8555.1	152.4	8402.7	- 13716.6	- 1328.4	- 10492.1	- 1329.5	- 10490.4	- 1329.5	- 10490.4	- 1329.5	- 10490.4	- 1329.5	- 10490.4
2008	8543.3	160.4	8382.9	- 21999.5	- 1317.4	- 11809.4	- 1318.4	- 11748.8	- 1318.4	- 11748.8	- 1318.4	- 11748.8	- 1318.4	- 11748.8
2009	8544.1	152.3	8391.8	- 23491.3	- 1318.8	- 13128.2	- 1320.0	- 13068.8	- 1320.0	- 13068.8	- 1320.0	- 13068.8	- 1320.0	- 13068.8
2010	8555.4	166.3	8389.1	- 25680.4	- 1318.7	- 14446.9	- 1319.8	- 14386.6	- 1319.8	- 14386.6	- 1319.8	- 14386.6	- 1319.8	- 14386.6
2011	8543.3	152.1	8391.2	- 26271.7	- 1315.9	- 15762.7	- 1317.3	- 15705.9	- 1317.3	- 15705.9	- 1317.3	- 15705.9	- 1317.3	- 15705.9
2012	8543.7	157.3	8386.4	- 30658.0	- 1313.9	- 17076.7	- 1315.4	- 17021.2	- 1315.4	- 17021.2	- 1315.4	- 17021.2	- 1315.4	- 17021.2
2013	8555.1	155.1	8399.0	- 33048.0	- 1312.1	- 18395.7	- 1320.3	- 18341.7	- 1320.3	- 18341.7	- 1320.3	- 18341.7	- 1320.3	- 18341.7
2014	8543.3	161.9	8381.4	- 35429.5	- 1324.4	- 19720.1	- 1325.9	- 19667.6	- 1325.9	- 19667.6	- 1325.9	- 19667.6	- 1325.9	- 19667.6
2015	8544.1	172.6	8371.5	- 37801.0	- 1328.2	- 21048.3	- 1329.5	- 20997.1	- 1329.5	- 20997.1	- 1329.5	- 20997.1	- 1329.5	- 20997.1
2016	8555.4	157.1	8398.3	- 40199.3	- 1339.7	- 22388.0	- 1341.0	- 22338.1	- 1341.0	- 22338.1	- 1341.0	- 22338.1	- 1341.0	- 22338.1
2017	8543.3	164.9	8378.5	- 42577.7	- 1338.2	- 23726.2	- 1339.6	- 23677.7	- 1339.6	- 23677.7	- 1339.6	- 23677.7	- 1339.6	- 23677.7
2018	8543.7	176.5	8367.2	- 44944.9	- 1335.9	- 25062.1	- 1337.0	- 25014.7	- 1337.0	- 25014.7	- 1337.0	- 25014.7	- 1337.0	- 25014.7
2019	8555.1	175.2	8379.9	- 47324.7	- 1344.2	- 26406.3	- 1345.4	- 26360.1	- 1345.4	- 26360.1	- 1345.4	- 26360.1	- 1345.4	- 26360.1
2020	8543.3	150.4	8393.0	- 49717.7	- 1342.6	- 27748.9	- 1344.1	- 27704.2	- 1344.1	- 27704.2	- 1344.1	- 27704.2	- 1344.1	- 27704.2
2021	8544.1	163.4	8380.7	- 52098.4	- 1336.0	- 29084.9	- 1337.5	- 29041.8	- 1337.5	- 29041.8	- 1337.5	- 29041.8	- 1337.5	- 29041.8
2022	8555.4	164.6	8390.8	- 54489.1	- 1343.0	- 30428.0	- 1344.7	- 30386.4	- 1344.7	- 30386.4	- 1344.7	- 30386.4	- 1344.7	- 30386.4
2023	8543.3	164.6	8378.8	- 56867.9	- 1334.0	- 31761.9	- 1335.7	- 31722.1	- 1335.7	- 31722.1	- 1335.7	- 31722.1	- 1335.7	- 31722.1
2024	8543.7	173.9	8369.8	- 59237.7	- 1329.5	- 33091.5	- 1331.3	- 33053.4	- 1331.3	- 33053.4	- 1331.3	- 33053.4	- 1331.3	- 33053.4
2025	8555.1	156.7	8398.4	- 61636.1	- 1324.5	- 34433.9	- 1324.6	- 34398.0	- 1324.6	- 34398.0	- 1324.6	- 34398.0	- 1324.6	- 34398.0
2026	8543.3	178.2	8365.1	- 64001.1	- 1320.2	- 35764.1	- 1322.2	- 35730.2	- 1322.2	- 35730.2	- 1322.2	- 35730.2	- 1322.2	- 35730.2
2027	8544.1	157.9	8386.2	- 66387.2	- 1329.8	- 37103.1	- 1321.3	- 37071.4	- 1321.3	- 37071.4	- 1321.3	- 37071.4	- 1321.3	- 37071.4
2028	8555.4	177.1	8378.3	- 68765.5	- 1326.6	- 38439.7	- 1323.8	- 38410.2	- 1323.8	- 38410.2	- 1323.8	- 38410.2	- 1323.8	- 38410.2
2029	8543.3	143.7	8399.7	- 71165.1	- 1326.7	- 39776.4	- 1329.6	- 39749.9	- 1329.6	- 39749.9	- 1329.6	- 39749.9	- 1329.6	- 39749.9
2030	8543.7	143.4	8400.3	- 73565.4	- 1465.5	- 41241.9	- 1468.6	- 41238.4	- 1468.6	- 41238.4	- 1468.6	- 41238.4	- 1468.6	- 41238.4

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	73.9	*	73.9	1.1	50.5	23.9
1979	53.7	*	123.1	1.7	86.0	38.7
1980	59.9	*	157.7	2.3	112.1	47.9
1981	133.0	*	283.1	4.0	201.3	65.8
1982	150.4	*	428.8	5.9	306.2	127.9
1983	151.9	*	561.1	7.7	453.2	160.9
1984	125.6	*	672.5	9.3	493.1	180.7
1985	53.1	*	699.5	13.1	524.6	186.0
1986	33.9	*	705.9	13.6	542.4	177.1
1987	48.3	*	725.8	19.6	569.1	173.0
1988	51.0	*	744.6	20.2	596.6	168.1
1989	35.2	*	737.2	20.5	606.0	151.8
1990	39.3	*	742.3	20.8	623.6	139.0
1991	155.9	*	858.7	22.3	717.8	163.4
1992	370.3	*	1178.3	36.7	953.4	201.6
1993	168.5	*	1309.6	28.7	1065.1	273.2
1994	281.1	*	1524.1	31.7	1236.1	315.7
1995	400.3	*	1844.6	36.0	1463.5	357.1
1996	605.1	*	2350.5	42.8	1863.8	529.2
1997	554.4	*	2768.1	48.5	2205.7	631.8
1998	438.2	*	3094.5	53.1	2460.2	682.3
1999	200.9	*	3158.2	55.0	2562.9	650.3
2000	76.7	*	3692.0	65.0	2571.0	537.0
2001	11.7	*	2960.3	65.5	2531.1	454.7
2002	19.3	*	2825.8	65.0	2491.9	468.9
2003	37.4	*	2718.0	64.3	2452.6	322.9
2004	30.2	*	3601.6	64.0	2469.0	256.6
2005	26.1	*	2479.9	63.3	2356.1	187.1
2006	49.2	*	2379.4	62.8	2311.6	130.6
2007	14.4	*	3248.3	61.7	2244.4	60.6
2008	22.4	*	2126.0	60.6	2178.0	8.7
2009	14.4	*	1996.4	59.4	2108.2	44.4
2010	28.4	*	1838.8	58.3	2025.1	26.0
2011	14.3	*	1733.3	56.9	1936.1	126.8
2012	19.6	*	1632.7	55.4	1845.5	157.4
2013	27.4	*	1522.2	54.0	1756.3	180.1
2014	24.2	*	1417.1	52.5	1674.1	204.5
2015	34.9	*	1327.9	51.2	1603.4	224.2
2016	19.6	*	1224.8	49.9	1517.2	242.5
2017	27.4	*	1124.4	48.5	1441.6	238.7
2018	39.1	*	1027.5	47.4	1371.6	266.7
2019	37.8	*	981.5	46.2	1298.0	270.3
2020	13.0	*	880.6	44.7	1199.6	274.4
2021	26.1	*	791.4	43.2	1101.2	266.6
2022	27.4	*	703.8	41.3	998.1	232.8
2023	27.4	*	615.1	39.8	886.5	231.6
2024	26.7	*	534.5	39.0	772.6	200.1
2025	19.6	*	457.0	38.9	659.7	166.8
2026	41.2	*	357.6	34.0	514.8	123.2
2027	20.9	*	256.8	31.6	368.8	60.4
2028	40.1	*	155.2	29.4	220.6	26.0
2029	6.8	*	36.6	26.6	34.6	28.6
2030	6.5	*	34.4	23.5	33.4	24.0

TOTAL CAPITAL INVESTMENT 5031.0

12A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.40001	25.0602	29.59659
1979	129.69	43.67003	42.79768	51.49818
1980	169.62	57.55009	55.97459	70.82758
1981	304.6099	103.33	100.5212	121.6818
1982	465.0098	158.24	153.4532	171.916
1983	616.9197	211.1201	203.5835	218.4021
1984	752.4995	259.4402	248.3248	256.6304
1985	805.5593	280.9802	265.8345	269.5325
1986	839.4092	297.0203	277.0049	269.5325
1987	887.0792	318.7405	293	281.1487
1988	938.8989	342.2605	309.8364	281.1487
1989	964.1489	358.1907	318.1689	281.1487
1990	1003.469	379.8408	331.1445	281.1487
1991	1159.329	441.531	382.5784	281.1487
1992	1529.589	576.2114	504.7642	302.3867
1993	1718.118	653.0215	566.979	302.3867
1994	1999.168	763.1016	659.7253	302.3867
1995	2399.458	915.9114	791.821	302.3867
1996	3004.569	1140.743	991.5076	307.8284
1997	3558.948	1353.292	1174.453	307.8284
1998	3997.148	1531.932	1319.059	307.8284
1999	4201.035	1638.18	1386.341	307.8284
2000	4277.715	1706.76	1411.646	307.8284
2001	4289.414	1758.309	1415.506	307.8284
2002	4308.914	1816.979	1421.941	307.8284
2003	4336.273	1883.709	1430.97	307.8284
2004	4366.492	1957.458	1440.942	307.8284
2005	4392.551	2036.467	1449.542	307.8284
2006	4441.739	2130.195	1465.79	307.8284
2007	4456.148	2211.735	1470.529	307.8284
2008	4478.586	2300.603	1477.933	307.8284
2009	4492.945	2392.712	1482.672	307.8284
2010	4521.383	2496.27	1492.056	307.8284
2011	4535.68	2599.597	1496.774	307.8284
2012	4555.238	2709.776	1503.229	307.8284
2013	4582.598	2826.276	1512.257	307.8284
2014	4606.836	2932.694	1520.256	307.8284
2015	4641.773	3038.381	1531.785	307.8284
2016	4661.332	3144.161	1538.239	307.8284
2017	4688.691	3247.09	1547.268	307.8284
2018	4727.75	3356.179	1560.157	307.8284
2019	4765.547	3467.526	1572.63	307.8284
2020	4778.547	3578.926	1576.92	307.8284
2021	4804.809	3703.416	1585.52	307.8284
2022	4831.965	3833.915	1594.548	307.8284
2023	4859.324	3972.814	1603.577	307.8284
2024	4896.062	4123.43	1615.7	307.8284
2025	4915.621	4275.871	1623.155	307.8284
2026	4956.777	4441.996	1635.736	307.8284
2027	4977.637	4608.855	1642.62	307.8284
2028	5017.773	4797.203	1655.865	307.8284
2029	5024.531	4989.941	1658.095	307.8284
2030	5031.031	4997.609	1660.24	307.8284

12A
Cost Summary - Dollars in Millions

WBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	5,031.1	5,175.6	10,206.7	5,031.0	7,629.5	12,660.5
1.0	CAPITAL ITEMS	5,031.1		5,031.1	5,031.0	7,629.5	12,660.5
1.1	SYSTEM FACILITIES-EQUIPMENT	3,646.6		3,646.6	3,646.5	5,124.7	8,771.2
1.1.1	SHIP	165.0		165.0	165.0	194.1	359.1
1.1.2	CRSI	242.0		242.0	242.0	173.6	415.6
1.1.3	CRSI TRANSPORTER, RAIL CAR	18.8		18.8	18.8	11.4	30.1
1.1.4	RAIL CRF TUG	0.8		0.8	0.8	0.4	1.2
1.1.5	CRSI TRANSPORTER						
1.1.6	SEVPORT FAC	1.0		1.0	1.0	1.0	2.0
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	82.6	130.6
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3	65.3
1.1.10	PACKAGING FACILITY						
1.1.11	PACKAGING FAC	116.0		116.0	116.0	201.2	317.2
1.1.12	ADMINISTERS	216.5		216.5	216.5	363.0	583.0
1.1.13	REPLACEMENT TRANS	18.0		18.0	18.0	11.9	29.9
1.1.14	PAULT INTODULE	840.3		840.3	840.3	1,058.5	1,898.8
1.1.15	CECLOGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CRSI	47.0		47.0	47.0	80.9	127.9
1.1.18	LOCUMTER FAC	75.0		75.0	75.0	130.1	205.1
1.1.19	PLN PRCC FAC	940.4		940.4	940.4	1,631.0	2,571.4
1.1.20	RECOVERY FAC	693.8		693.8	693.8	1,150.2	1,844.0
1.2	SUPPORT FACILITIES EQUIPMENT	209.8		209.8	209.8	327.2	537.0
1.2.1	ASH ELD & PLT YD	2.4		2.4	2.4	3.5	5.9
1.2.2	WAREHOUSE & ULT	12.2		12.2	12.2	21.1	33.3
1.3	CHIEFS COST	387.4		387.4	387.4	788.5	1,175.9
1.4	INTEREST DURING CONS	387.4		387.4	387.4	788.5	1,175.9
2.0	OPER & MAINT		5,175.6	5,175.6		5,175.6	5,175.6
2.1	DIRECT LABOR		1,066.4	1,066.4		1,066.4	1,066.4
2.1.1	PORT & REC TRANS		5.1	5.1		5.1	5.1
2.1.2	WATER BASIN REC (PORT)		145.8	145.8		145.8	145.8
2.1.3	WATER BASIN REC (STPORT)						
2.1.4	WATER BASIN STOR		27.1	27.1		27.1	27.1
2.1.5	PACK FAC LABOR		15.2	15.2		15.2	15.2
2.1.6	PACK FAC LABOR		313.7	313.7		313.7	313.7
2.1.7	MULTI EMPLOYMENT LABOR		44.0	44.0		44.0	44.0
2.1.8	CECLOGIC REC MOD LABOR						
2.1.9	CRSI TRANS MAINT LAB		31.2	31.2		31.2	31.2
2.1.10	LOCUMTER FAC LABOR						
2.1.11	PLN PRCC LABOR		242.1	242.1		242.1	242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1		242.1	242.1
2.2	INDIRECT LABOR		1,600.5	1,600.5		1,600.5	1,600.5
2.2.1	PORT & REC TRANS LAB		8.1	8.1		8.1	8.1
2.2.2	WATER BASIN REC (PORT) LAB		218.6	218.6		218.6	218.6
2.2.3	WATER BASIN REC (STPORT) LAB						
2.2.4	WATER BASIN STOR LAB		40.5	40.5		40.5	40.5
2.2.5	PACK FAC IND LAB						
2.2.6	PACK FAC IND LAB		470.4	470.4		470.4	470.4
2.2.7	MULTI IND LABOR		65.8	65.8		65.8	65.8
2.2.8	CEC REC MOD IND LAB						
2.2.9	CRSI TRANS MAINT LAB		46.6	46.6		46.6	46.6
2.2.10	LOCUMTER FAC IND LAB		7.7	7.7		7.7	7.7
2.2.11	PLN PRCC IND LAB		371.3	371.3		371.3	371.3
2.2.12	RECOVERY PLANT IND LAB		371.3	371.3		371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0		1,614.0	1,614.0
2.3.1	PORT REC FNS		8.1	8.1		8.1	8.1
2.3.2	WATER BASIN REC 4 PORT		218.6	218.6		218.6	218.6
2.3.3	WATER BASIN REC 2 PORT						
2.3.4	WATER BASIN STORAGE		40.5	40.5		40.5	40.5
2.3.5	PACK OPS (2500)		470.4	470.4		470.4	470.4
2.3.6	PACK OPS (5000)		65.8	65.8		65.8	65.8
2.3.7	MULTI OPS						
2.3.8	CECLOGIC REC OPS						
2.3.9	CRSI TRANS		46.6	46.6		46.6	46.6
2.3.10	LOCUMTER FAC OPS		21.3	21.3		21.3	21.3
2.3.11	PLN PROCESSING OPS		371.3	371.3		371.3	371.3
2.3.12	RECOVERY PLANT OPS		371.3	371.3		371.3	371.3
2.4	CONTRACTED SERVICES		791.6	791.6		791.6	791.6
2.4.1	SHIP ON		327.2	327.2		327.2	327.2
2.4.2	US PORT FEE		0.4	0.4		0.4	0.4
2.4.3	ELFOR PORT FEE STOR						
2.4.4	US FAULT (STOR)		17.7	17.7		17.7	17.7
2.4.5	ELFOR FAULT TRANS						
2.4.6	US STOR (TIME CHRG)		61.3	61.3		61.3	61.3
2.4.7	ELFOR STOR						
2.4.8	US RECUM CR						
2.4.9	ELFOR REC CR						
2.4.10	ELFOR WASTE DIS						
2.4.11	US FAULT TRANS		17.0	17.0		17.0	17.0
2.4.12	ELFOR FAULT TRANS						
2.4.13	ELFOR FAULT TRANS						
2.4.14	US PORT FEE						
2.4.15	ELFOR PORT FEE						
2.4.16	ELFOR PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	PACIFIC PORT FEE						
2.4.19	PAC FAULT TRANS						
2.4.20	PAC FAULT TRANS						
2.4.21	PAC FAULT TRANS						
2.5	ELFOR TRUST FUND		368.0	368.0		368.0	368.0
			102.0	102.0		102.0	102.0

Section E3.13

Case: 13A

Description: Fuel Cycle Center (FCC) baseline except geologic storage
and location in Japan

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - geologic

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 5.393 billion dollars

Owners ROI - 21.4%

Service charge - \$129/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS) \$129.004
 COST OF FUEL ON INVESTMENT 30.000
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$23036.330

13A
Yearly Profit and Loss Statement

YEAR	FEP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	1.8	1.8	1.1	3.8	1.9	6.9	.0	5.1
1979	.0	3.9	3.9	1.3	5.4	2.6	9.9	.0	8.0
1980	.0	4.9	4.9	2.3	6.9	3.3	13.0	.0	8.2
1981	.0	11.1	11.1	3.8	9.5	4.5	17.8	.0	6.7
1982	.0	22.7	22.7	5.6	13.2	6.3	25.1	.0	2.4
1983	.0	29.4	29.4	6.7	15.7	7.5	29.9	.0	.5
1984	.0	36.3	36.3	8.0	17.1	8.2	33.4	1.2	2.0
1985	.0	49.7	49.7	19.7	20.3	9.9	49.9	.0	.2
1986	.0	61.5	61.5	20.1	20.3	9.9	50.3	4.2	6.9
1987	.0	72.7	72.7	48.9	10.9	10.3	60.1	.0	7.4
1988	.0	100.0	100.0	49.8	22.7	11.7	84.3	6.8	9.7
1989	.0	119.8	119.8	50.0	24.6	12.8	87.4	12.3	20.1
1990	.0	125.6	125.6	50.3	26.4	13.8	90.5	13.3	21.7
1991	.0	143.4	143.4	51.5	37.2	18.8	107.6	13.6	22.2
1992	.0	173.3	173.3	52.5	64.7	31.0	148.2	9.5	15.6
1993	.0	204.6	204.6	52.8	75.5	36.1	164.5	15.3	24.9
1994	.0	242.8	242.8	54.5	93.9	44.8	193.2	18.9	30.8
1995	.0	283.2	283.2	55.4	120.0	57.0	232.3	19.3	31.6
1996	.0	304.1	304.1	56.9	153.8	77.5	287.5	2.5	4.1
1997	.0	342.8	342.8	58.0	224.3	107.4	389.7	.0	46.9
1998	.0	380.7	380.7	59.8	251.2	121.1	431.3	.0	50.5
1999	.0	407.6	407.6	60.2	268.9	128.5	457.6	.0	45.8
2000	1413.5	441.3	1854.8	136.3	268.7	132.3	537.3	500.6	816.8
2001	1413.5	484.7	1898.2	137.4	268.8	133.8	540.0	516.1	842.9
2002	1413.5	509.1	1922.6	137.9	268.3	134.9	541.2	523.4	854.0
2003	1413.5	548.7	1962.2	138.5	267.1	136.6	542.2	540.2	881.4
2004	1413.5	550.4	1963.9	139.6	264.5	137.7	541.8	554.9	865.3
2005	1413.5	614.5	2028.0	140.2	263.9	138.9	543.0	564.1	920.4
2006	1413.5	614.7	2028.2	141.3	262.9	140.6	544.8	563.7	919.7
2007	1413.5	620.9	2034.4	141.2	260.1	141.7	543.0	565.7	924.6
2008	1413.5	614.5	2028.0	141.2	257.3	141.6	540.8	565.4	922.5
2009	1413.5	614.9	2028.4	141.1	255.8	142.8	539.7	566.5	924.2
2010	1413.5	621.1	2034.6	141.0	251.7	143.1	535.8	568.8	928.0
2011	1413.5	614.5	2028.0	141.0	246.9	145.1	533.0	567.7	926.3
2012	1413.5	614.7	2028.2	140.9	241.9	147.1	529.9	565.4	928.9
2013	1413.5	620.9	2034.4	140.9	236.2	148.4	525.5	573.4	935.5
2014	1413.5	614.5	2028.0	140.3	229.7	149.8	520.3	572.9	934.8
2015	1413.5	614.9	2028.4	140.7	222.1	146.8	509.7	577.1	941.6
2016	1413.5	621.1	2034.6	140.7	214.9	148.5	504.1	581.6	948.9
2017	1413.5	614.5	2028.0	140.6	206.6	148.8	495.2	582.4	950.3
2018	1413.5	614.7	2028.2	140.5	198.7	150.4	489.6	584.7	953.9
2019	1413.5	620.9	2034.4	140.5	188.9	151.5	480.9	586.3	962.1
2020	1413.5	614.5	2028.0	140.4	180.6	153.2	474.3	589.7	968.1
2021	1413.5	614.9	2028.4	140.4	163.4	154.6	458.4	594.7	970.3
2022	1413.5	621.1	2034.6	140.3	155.4	156.2	451.9	602.9	983.7
2023	1413.5	614.5	2028.0	140.3	141.6	151.2	433.8	605.8	983.4
2024	1413.5	614.7	2028.2	140.2	128.7	150.6	419.6	612.0	988.6
2025	1413.5	620.9	2034.4	140.2	110.3	148.6	399.7	621.2	1013.5
2026	1413.5	614.5	2028.0	140.1	97.1	144.5	381.7	626.7	1022.6
2027	1413.5	614.9	2028.4	140.0	77.2	133.8	351.0	637.3	1039.8
2028	1413.5	621.1	2034.6	140.0	62.0	125.7	327.7	644.8	1052.0
2029	1413.5	614.5	2028.0	139.9	49.9	120.6	310.4	648.8	1048.8
2030	1413.5	614.7	2028.2	139.8	39.8	119.4	299.0	648.8	1121.7
TOTL	45818.5	21724.5	67542.9	5113.4	7569.1	5114.6	17797.0	10211.3	25534.2
FAC	836.6	409.9	1246.7	96.5	142.8	96.0	335.8	343.6	557.3
FFVC	868.2	129.0	997.2	30.4	44.9	30.4	105.7	108.1	173.4

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE TOTAL TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	1.8	58.2	- 56.4	- 56.4	- 32.0	- 32.0	- 33.1	- 33.1	- 33.1	- 33.1
1979	3.9	36.2	- 32.3	- 88.7	- 11.6	- 43.6	- 12.1	- 45.2	- 45.2	- 45.2
1980	4.9	25.7	- 20.8	- 109.5	- 12.9	- 56.5	- 13.3	- 58.5	- 58.5	- 58.5
1981	11.1	42.4	- 31.3	- 140.8	- 10.6	- 67.1	- 16.2	- 74.7	- 74.7	- 74.7
1982	22.7	42.1	- 19.4	- 160.2	- 10.6	- 77.7	- 16.0	- 90.7	- 90.7	- 90.7
1983	29.4	44.8	- 15.4	- 175.6	- 8.7	- 86.4	- 7.9	- 98.6	- 98.6	- 98.6
1984	36.5	31.4	5.1	- 170.5	1.1	- 85.3	1.7	- 96.9	- 96.9	- 96.9
1985	49.7	69.2	- 19.5	- 190.0	3.3	- 82.0	10.8	- 86.7	- 86.7	- 86.7
1986	61.5	82.1	- 20.6	- 210.6	14.4	- 67.6	17.3	- 69.4	- 69.4	- 69.4
1987	72.7	60.4	12.3	- 198.3	3.0	- 64.6	7.9	- 61.7	- 61.7	- 61.7
1988	100.0	81.0	19.0	- 179.3	6.6	- 58.0	8.2	- 53.5	- 53.5	- 53.5
1989	119.8	81.2	38.6	- 140.7	19.6	- 38.4	19.3	- 34.2	- 34.2	- 34.2
1990	135.6	81.5	54.1	- 86.6	21.9	- 16.5	21.5	- 12.7	- 12.7	- 12.7
1991	143.4	218.0	- 74.6	- 161.2	18.4	- 48.9	30.4	- 83.7	- 83.7	- 83.7
1992	173.3	466.6	- 293.3	- 454.5	96.6	- 149.5	101.4	- 160.0	- 160.0	- 160.0
1993	204.6	322.9	- 118.3	- 572.8	1.9	- 147.6	3.7	- 156.0	- 156.0	- 156.0
1994	242.8	333.4	- 90.6	- 663.4	26.4	- 121.2	23.8	- 132.2	- 132.2	- 132.2
1995	233.2	457.0	- 223.8	- 887.2	54.4	- 66.8	53.9	- 186.1	- 186.1	- 186.1
1996	304.1	715.5	- 411.4	- 1298.6	149.4	- 317.4	155.9	- 342.0	- 342.0	- 342.0
1997	352.0	932.7	- 580.7	- 1879.3	266.4	- 53.0	276.6	- 67.4	- 67.4	- 67.4
1998	380.7	636.3	- 255.6	- 2134.9	92.4	- 738.4	97.0	- 769.1	- 769.1	- 769.1
1999	407.6	321.6	86.0	- 2048.9	15.8	- 722.6	15.1	- 704.0	- 704.0	- 704.0
2000	1254.0	243.6	1010.4	- 1038.5	866.3	136.3	871.4	- 67.7	- 67.7	- 67.7
2001	1396.2	173.8	1222.4	237.1	931.7	1066.1	931.5	1000.5	1000.5	1000.5
2002	1316.6	175.1	1141.5	1352.6	943.7	2011.7	943.7	1944.0	1944.0	1944.0
2003	1963.2	169.2	1794.0	3146.6	970.9	2982.6	971.0	2915.1	2915.1	2915.1
2004	2003.9	134.6	1869.3	5015.9	987.9	3970.5	987.2	3902.3	3902.3	3902.3
2005	2029.0	170.6	1858.4	6874.3	1004.6	4975.1	1004.6	4907.7	4907.7	4907.7
2006	2028.2	135.0	1893.2	8767.5	996.6	5971.7	996.7	5964.0	5964.0	5964.0
2007	2034.4	171.9	1862.5	10630.0	1001.9	6973.6	1002.3	6966.7	6966.7	6966.7
2008	2028.0	130.7	1897.3	12527.3	994.0	7967.5	994.5	7961.1	7961.1	7961.1
2009	2028.4	174.8	1853.6	14380.9	993.2	8960.8	993.8	8954.9	8954.9	8954.9
2010	2034.6	302.4	1732.2	16113.1	983.8	9944.6	984.2	9879.1	9879.1	9879.1
2011	2028.0	173.0	1855.0	17968.1	986.4	10931.0	987.2	10886.3	10886.3	10886.3
2012	2028.2	178.3	1849.9	19818.0	981.7	11912.6	983.5	11849.8	11849.8	11849.8
2013	2034.4	172.6	1861.8	21679.8	981.5	12894.1	982.5	12831.3	12831.3	12831.3
2014	2028.0	176.7	1851.3	23531.1	974.4	13868.6	975.5	13806.0	13806.0	13806.0
2015	2028.4	174.6	1853.8	25384.9	979.4	14847.9	980.7	14787.5	14787.5	14787.5
2016	2034.6	178.1	1856.5	27241.4	977.4	15825.4	976.7	15766.1	15766.1	15766.1
2017	2028.0	178.0	1850.0	29091.4	973.2	16798.6	974.6	16740.7	16740.7	16740.7
2018	2028.2	190.7	1837.5	30928.9	964.3	17762.9	965.6	17706.0	17706.0	17706.0
2019	2034.4	173.0	1861.4	32790.3	968.0	18730.9	969.6	18675.9	18675.9	18675.9
2020	2028.0	216.1	1811.9	34602.2	946.2	19677.0	947.6	19623.5	19623.5	19623.5
2021	2028.4	176.3	1852.1	36454.3	958.1	20635.1	960.2	20583.7	20583.7	20583.7
2022	2034.6	177.5	1857.0	38311.3	963.6	21598.7	965.8	21549.5	21549.5	21549.5
2023	2028.0	173.8	1854.2	40165.5	968.7	22567.5	961.0	22516.5	22516.5	22516.5
2024	2028.2	173.2	1855.0	42020.5	968.0	23535.5	961.3	23471.8	23471.8	23471.8
2025	2034.4	170.3	1864.1	43884.6	963.7	24499.2	966.4	24438.2	24438.2	24438.2
2026	2028.0	173.1	1854.9	45739.5	960.2	25459.3	968.0	25406.2	25406.2	25406.2
2027	2034.4	177.2	1857.2	47596.7	963.1	26422.4	967.9	26364.1	26364.1	26364.1
2028	2034.6	173.2	1861.4	49458.1	961.6	27384.0	964.2	27328.3	27328.3	27328.3
2029	2028.0	177.1	1850.9	51309.0	962.4	28346.4	965.1	28273.4	28273.4	28273.4
2030	2028.2	204.5	1823.7	53132.7	1117.1	29463.5	1112.8	29452.2	29452.2	29452.2

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	DEPRECIATION CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	57.1	*	55.1	1.8	38.0	18.0
1979	24.4	*	78.9	1.2	54.6	24.2
1980	23.0	*	26.6	1.6	66.9	29.3
1981	28.6	*	130.8	2.2	91.1	38.8
1982	26.5	*	131.0	3.1	131.1	53.0
1983	28.1	*	211.6	3.7	155.5	59.8
1984	23.4	*	226.8	4.2	163.8	61.1
1985	29.5	*	226.4	6.7	201.4	71.7
1986	1.9	*	238.5	6.7	200.8	64.4
1987	11.6	*	259.7	11.6	206.5	64.8
1988	31.2	*	279.2	12.1	224.9	66.4
1989	31.2	*	297.6	12.4	242.8	67.2
1990	31.2	*	314.9	12.8	260.3	67.4
1991	157.3	*	463.4	14.8	388.2	118.0
1992	416.3	*	248.7	19.5	641.3	226.9
1993	179.2	*	962.8	21.4	748.6	259.6
1994	253.9	*	1221.9	24.7	929.4	316.2
1995	291.7	*	1526.5	29.2	1169.1	408.6
1996	258.6	*	2147.7	36.7	1616.7	567.6
1997	234.7	*	2973.0	47.8	2224.6	797.4
1998	229.4	*	3223.3	51.7	2491.1	843.9
1999	221.4	*	3378.2	55.0	2615.2	810.0
2000	107.3	*	3551.2	67.5	2655.9	798.8
2001	42.4	*	3639.8	67.7	2658.2	669.3
2002	37.2	*	3162.0	67.7	2656.1	579.6
2003	30.7	*	3056.7	67.6	2654.3	498.6
2004	45.0	*	2963.9	67.7	2624.1	487.5
2005	30.7	*	2855.7	67.4	2600.1	323.1
2006	43.7	*	2758.8	67.4	2560.1	246.1
2007	30.7	*	2647.8	66.9	2546.3	166.4
2008	39.5	*	2545.7	66.4	2515.7	96.5
2009	33.7	*	2436.7	66.8	2475.6	26.9
2010	61.4	*	2352.9	65.4	2447.7	29.3
2011	32.0	*	2238.8	64.6	2393.6	40.2
2012	37.4	*	2129.1	63.8	2336.6	143.7
2013	39.7	*	2019.4	62.9	2272.9	190.7
2014	35.3	*	1965.4	61.8	2196.7	231.5
2015	34.1	*	1782.7	60.5	2123.8	270.6
2016	37.4	*	1661.6	59.3	2041.2	360.9
2017	37.4	*	1570.9	57.9	1953.4	324.6
2018	50.2	*	1470.7	56.5	1863.6	326.3
2019	28.5	*	1337.7	54.9	1755.4	342.8
2020	73.7	*	1279.2	53.0	1668.0	328.3
2021	33.9	*	1159.4	51.5	1529.1	318.2
2022	37.2	*	1044.4	49.3	1394.0	308.3
2023	33.5	*	926.8	47.0	1245.9	272.9
2024	32.0	*	807.4	44.5	1087.5	230.7
2025	39.7	*	689.3	41.8	919.7	188.6
2026	32.0	*	576.8	39.0	749.9	134.1
2027	37.2	*	460.2	36.3	580.6	82.2
2028	32.2	*	376.7	33.7	434.7	24.3
2029	37.2	*	263.2	31.8	285.0	39.3
2030	44.7	*	278.6	28.8	265.6	41.2

TOTAL CAPITAL INVESTMENT 5393.1

13A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	57.10001	19.13002	18.84299	23.0925
1979	81.52	27.56004	26.9016	35.23317
1980	104.51	35.62007	34.4893	48.54767
1981	143.15	49.01009	47.23949	64.72682
1982	199.67	68.58011	65.8911	81.25479
1983	237.77	82.29012	78.4641	88.54001
1984	261.1799	91.34003	86.18936	88.54001
1985	310.7097	109.3398	102.5342	99.35422
1986	312.6597	111.8099	103.1777	99.35422
1987	324.2095	117.6797	106.9891	107.227
1988	355.4094	130.5496	117.2851	107.227
1989	386.6094	143.7996	127.5811	107.227
1990	417.8093	157.4797	137.8771	107.227
1991	585.1091	216.9099	193.066	127.633
1992	1001.449	360.1201	330.478	229.006
1993	1171.609	423.0503	386.6309	232.7432
1994	1455.519	525.0906	480.321	262.5259
1995	1857.179	668.071	612.8689	321.4197
1996	2515.829	899.0908	830.2234	478.2781
1997	3450.579	1225.981	1138.691	755.0515
1998	3879.949	1388.871	1280.383	852.0742
1999	4101.398	1486.181	1353.461	868.2139
2000	4208.707	1548.79	1388.873	868.2139
2001	4251.086	1592.909	1402.858	868.2139
2002	4288.266	1638.15	1415.127	868.2139
2003	4318.945	1684.679	1425.252	868.2139
2004	4363.922	1739.846	1440.094	868.2139
2005	4394.602	1794.496	1450.218	868.2139
2006	4438.281	1858.186	1464.633	868.2139
2007	4468.961	1922.696	1474.757	868.2139
2008	4508.5	1992.845	1487.905	868.2139
2009	4542.18	2066.615	1498.919	868.2139
2010	4603.539	2155.874	1519.168	868.2139
2011	4635.516	2241.892	1529.72	868.2139
2012	4672.875	2336.271	1542.049	868.2139
2013	4711.613	2438.669	1554.832	868.2139
2014	4747.492	2548.799	1566.672	868.2139
2015	4781.551	2657.788	1577.912	868.2139
2016	4818.91	2777.757	1590.24	868.2139
2017	4856.27	2902.846	1602.569	868.2139
2018	4906.449	3042.657	1619.128	868.2139
2019	4944.926	3189.494	1631.825	868.2139
2020	5020.582	3360.61	1656.792	868.2139
2021	5056.461	3527.399	1688.632	868.2139
2022	5093.641	3699.68	1680.901	868.2139
2023	5127.18	3881.259	1691.969	868.2139
2024	5159.156	4071.615	1702.521	868.2139
2025	5189.836	4270.113	1712.646	868.2139
2026	5221.812	4471.93	1723.198	868.2139
2027	5258.992	4660.398	1735.467	868.2139
2028	5291.23	4856.527	1746.106	868.2139
2029	5328.41	5073.437	1758.375	868.2139
2030	5393.148	5127.496	1779.739	868.2139

12A
Cost Summary - Dollars in Millions

HQS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS
0.0	TOTAL						
1.0	CAPITAL ITEMS	5,393.2	5,113.5	10,506.7	5,393.1	7,698.0	5,113.5
1.1	SISTEM FACILITIES-EQUIPMENT	3,947.3		3,947.3	3,947.3	2,688.6	
1.1.1	SHIP	70.0		70.0	70.0	85.0	
1.1.2	CASH	121.0		121.0	121.0	51.1	
1.1.3	CASH TRANSPORTER/PAUL CAR	25.6		25.6	25.6	12.8	
1.1.4	PAUL CAR TUG	0.8		0.8	0.8	0.4	
1.1.5	CASH TRANSPORTER						
1.1.6	SEAFORT FAC						
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	82.6	
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	722.4		722.4	722.4	1,042.9	
1.1.10	RECYCLING FACILITY						
1.1.11	PAUL FACILITY	116.0		116.0	116.0	169.6	
1.1.12	CRIMINISTERS	324.4		324.4	324.4	149.7	
1.1.13	DISPLACEMENT TRANS	12.0		12.0	12.0	7.9	
1.1.14	PAUL MODULE						
1.1.15	ECOLOGIC REC MODULE	67.0		67.0	67.0	116.2	
1.1.16	REPOSITORY STORAGE MOD	578.0		578.0	578.0	845.1	
1.1.17	CASH	52.7		52.7	52.7	90.8	
1.1.18	LCM INTER FAC	75.0		75.0	75.0	130.1	
1.1.19	MLM PROC FAC	940.4		940.4	940.4	1,631.0	
1.1.20	RECOVERY FAC	694.0		694.0	694.0	1,350.5	
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6	
1.2.1	FIN BLD & PLT YD	2.4		2.4	2.4	3.5	
1.2.2	WAREHOUSE & ULT	12.2		12.2	12.2	21.1	
1.3	CHIEFS COST	715.6		715.6	715.6	933.9	
1.4	INTEREST DURING CONS						
2.0	OPER & MAINT		5,113.5	5,113.5			5,113.5
2.1	DIRECT LABOR		1,686.5	1,686.5			1,686.5
2.1.1	PORT 5 REC TRANS						
2.1.2	WATER BASIN REC(4PORT)		145.8	145.8			145.8
2.1.3	WATER BASIN REC(PORT)						
2.1.4	WATER BASIN STOR		27.1	27.1			27.1
2.1.5	PACK FAC LABOR						
2.1.6	PAUL FAC LABOR		313.7	313.7			313.7
2.1.7	PAUL EMPLOYMENT LABOR						
2.1.8	ECOLOGIC REC MOD LABOR		84.0	84.0			84.0
2.1.9	CASH TRANS MAINT LAB		16.4	16.4			16.4
2.1.10	LCM LAB PROCES LAB		15.2	15.2			15.2
2.1.11	MLM PROC LABOR		342.1	342.1			342.1
2.1.12	RECOVERY PLANT LAB		342.1	342.1			342.1
2.2	INDIRECT LABOR		1,644.7	1,644.7			1,644.7
2.2.1	PORT 5 REC TRANS LAB						
2.2.2	W.B. REC(4PORT) LAB		216.6	216.6			216.6
2.2.3	W.B. REC(4PORT) 2 LAB						
2.2.4	W.B. STOR IND LAB		40.5	40.5			40.5
2.2.5	PACK FAC IND LAB						
2.2.6	PAUL FAC IND LAB		470.4	470.4			470.4
2.2.7	PAUL IND LABOR						
2.2.8	ECOLOGIC REC MOD IND LAB		125.5	125.5			125.5
2.2.9	CASH TRANS MAINT LAB		24.7	24.7			24.7
2.2.10	LCM LAB PROC IN LAB		22.3	22.3			22.3
2.2.11	MLM PROC IND LAB		371.3	371.3			371.3
2.2.12	REC PLANT IND LAB		371.3	371.3			371.3
2.3	MATERIAL SUP UTIL ECT		1,645.0	1,645.0			1,645.0
2.3.1	PORT REC FMS						
2.3.2	W.B. REC OPNS 4 PORT		216.6	216.6			216.6
2.3.3	W.B. REC OPNS 2 PORT						
2.3.4	W.B. STORAGE OPNS		40.5	40.5			40.5
2.3.5	PAUL OPNS(2200)						
2.3.6	PAUL OPNS(5000)		470.4	470.4			470.4
2.3.7	PAUL OPNS						
2.3.8	ECOLOGIC REC OPNS		125.5	125.5			125.5
2.3.9	CASH TRANS		25.0	25.0			25.0
2.3.10	MLM PROC OPEN		22.3	22.3			22.3
2.3.11	MLM PROCESSING OPNS		371.3	371.3			371.3
2.3.12	RECOVERY PLANT OPNS		371.3	371.3			371.3
2.4	CONTRACTED SERVICES		662.0	662.0			662.0
2.4.1	SHIP SH		142.8	142.8			142.8
2.4.2	US PORT FEE		0.4	0.4			0.4
2.4.3	ELFCP PORT FEE, STOR						
2.4.4	US FAULT(SF TO STOR)		17.2	17.2			17.2
2.4.5	ELFCP PAUL TRANS						
2.4.6	US STOP(TIME CHRG)		59.6	59.6			59.6
2.4.7	ELFCP STOR						
2.4.8	US RECOU CP						
2.4.9	ELFCP REC CR						
2.4.10	ELFCP WASTE DIS						
2.4.11	US PAUL TRANS		17.0	17.0			17.0
2.4.12	ELFCP PAUL TRANS						
2.4.13	ELFCP PAUL TRANS						
2.4.14	US PORT FEE		0.4	0.4			0.4
2.4.15	ELFCP PORT FEE						
2.4.16	ELFCP PORT FEE						
2.4.17	PACIFIC PORT FEE		66.1	66.1			66.1
2.4.18	PACIFIC PORT FEE						
2.4.19	PAC PAUL TRANS		358.4	358.4			358.4
2.4.20	PAC PAUL TRANS						
2.5	DECON TRUST FUND		75.4	75.4			75.4

Section E3.14

Case: 14A

Description: Fuel Cycle Center (FCC) baseline except geologic storage and location in U.S.

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from U.S.

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - geologic

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 5.700 billion dollars

Owners ROI - 21.6%

Service charge - \$147/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/100) \$147.363
 PRICE OF RETURN ON INVESTMENT 10.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$56367.468

14A

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.0	2.0	1.1	4.1	2.1	7.2	.0	5.2
1979	.0	4.5	4.5	1.6	5.8	2.8	10.4	.0	5.9
1980	.0	5.5	5.5	2.8	7.5	3.6	13.9	.0	8.2
1981	.0	12.7	12.7	3.8	10.3	4.8	18.9	.0	6.3
1982	.0	25.9	25.9	5.5	14.3	6.8	26.6	.0	.0
1983	.0	33.6	33.6	6.7	16.9	9.0	31.6	.8	1.3
1984	.0	41.7	41.7	9.0	18.4	9.8	37.1	2.8	4.1
1985	.0	56.8	56.8	22.3	21.5	10.4	54.2	1.0	1.6
1986	.0	70.2	70.2	24.4	22.4	11.0	57.7	4.8	7.8
1987	.0	83.0	83.0	24.3	23.2	12.5	60.0	.0	9.8
1988	.0	114.2	114.2	32.3	27.0	12.6	71.9	7.0	11.4
1989	.0	136.8	136.8	36.8	29.7	13.1	101.6	13.4	21.8
1990	.0	143.5	143.5	58.3	32.4	16.7	107.4	13.7	22.3
1991	.0	163.9	163.9	61.9	44.5	22.4	128.9	13.3	21.7
1992	.0	198.0	198.0	65.5	72.8	33.1	171.4	9.3	10.2
1993	.0	233.8	233.8	65.1	84.4	40.7	190.2	16.5	27.0
1994	.0	277.4	277.4	71.9	103.5	49.9	225.4	19.8	32.3
1995	.0	323.6	323.6	75.0	132.7	53.9	261.6	19.7	32.2
1996	.0	347.4	347.4	78.4	175.9	64.5	318.8	3.8	0.3
1997	.0	391.5	391.5	92.2	221.4	106.8	419.4	.0	18.8
1998	.0	434.9	434.9	95.3	248.4	130.5	474.2	.0	15.3
1999	.0	465.6	465.6	88.6	262.2	128.7	479.5	.0	13.9
2000	1413.0	504.1	1917.6	166.8	267.9	133.1	567.8	512.9	836.9
2001	1413.0	553.6	1967.1	170.1	266.7	135.2	572.0	529.4	863.6
2002	1413.0	577.0	1990.3	172.8	266.9	136.9	576.6	536.5	875.3
2003	1413.0	628.0	2041.3	175.6	266.3	138.5	580.4	544.5	904.7
2004	1413.0	674.5	2087.5	178.9	268.3	140.9	588.0	570.8	928.6
2005	1413.0	701.3	2115.4	181.8	267.5	143.1	592.4	578.8	944.3
2006	1413.0	722.2	2115.7	185.0	266.4	143.8	595.2	577.2	941.8
2007	1413.0	709.3	2122.7	184.9	263.6	145.6	594.0	580.5	947.2
2008	1413.0	701.3	2115.4	184.8	268.1	147.5	599.4	578.8	944.3
2009	1413.0	703.4	2115.9	184.8	256.3	148.9	589.9	579.9	946.1
2010	1413.0	709.5	2123.0	184.7	254.1	151.8	590.7	582.3	950.8
2011	1413.0	701.3	2115.4	184.7	249.4	153.3	587.4	580.7	947.4
2012	1413.0	702.2	2115.7	184.6	244.1	154.7	583.5	582.2	950.0
2013	1413.0	709.3	2122.7	184.5	238.2	156.6	579.3	585.5	956.9
2014	1413.0	701.3	2115.4	184.5	231.6	158.7	574.8	585.5	955.2
2015	1413.0	702.4	2115.9	184.4	233.5	159.9	577.8	582.8	962.3
2016	1413.0	709.5	2123.0	184.4	215.7	159.4	559.5	594.5	970.0
2017	1413.0	701.3	2115.4	184.3	207.4	159.2	550.9	594.9	970.6
2018	1413.0	702.2	2115.7	184.2	198.6	160.6	543.5	597.4	974.8
2019	1413.0	709.3	2122.7	184.2	188.3	162.0	534.5	603.1	983.9
2020	1413.0	701.3	2115.4	184.1	180.2	163.8	528.1	601.0	980.5
2021	1413.0	702.4	2115.9	184.1	167.9	171.2	523.2	605.2	987.5
2022	1413.0	709.5	2123.0	184.0	154.6	171.5	510.1	612.9	1008.0
2023	1413.0	701.3	2115.4	184.0	139.9	173.5	497.3	614.9	1003.2
2024	1413.0	702.2	2115.7	183.9	124.6	177.0	485.5	619.5	1010.7
2025	1413.0	709.3	2122.7	183.8	108.2	180.4	472.5	627.1	1023.1
2026	1413.0	701.3	2115.4	183.8	90.3	183.8	457.9	629.8	1027.6
2027	1413.0	702.4	2115.9	183.7	71.9	190.2	445.7	634.7	1035.0
2028	1413.0	709.5	2123.0	183.7	51.3	202.4	437.4	640.5	1040.0
2029	1413.0	701.3	2115.4	183.6	29.9	210.6	424.1	647.0	1043.7
2030	1413.0	702.2	2115.7	183.2	0.0	214.8	423.0	644.1	1146.7
TOTAL	43818.0	24816.2	68634.6	6626.8	7612.3	5700.5	19939.6	18537.2	30157.7
ABC	826.8	466.2	1293.0	125.0	143.6	107.6	376.2	949.8	369.0
DEF	260.2	147.4	407.6	39.4	45.2	33.9	118.4	110.1	179.1

Yearly Cash Statement

YEAR	UNFINISHED ENTERPRISE BEFORE TAX				FINISHED ENTERPRISE FTER TAX				UNIVERS			
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	2.6	42.2	- 39.6	- 39.6	- 23.6	- 23.6	- 24.5	- 24.5	- 24.5	- 24.5	- 24.5	- 24.5
1979	4.5	27.7	- 23.2	- 62.8	- 12.1	- 35.7	- 12.1	- 37.6	- 12.1	- 37.6	- 12.1	- 37.6
1980	5.5	28.2	- 22.7	- 85.5	- 13.6	- 49.3	- 14.0	- 51.6	- 14.0	- 51.6	- 14.0	- 51.6
1981	12.7	46.5	- 33.8	- 119.3	- 16.2	- 65.5	- 16.8	- 68.4	- 16.8	- 68.4	- 16.8	- 68.4
1982	25.9	66.0	- 40.1	- 159.4	- 14.8	- 80.2	- 15.7	- 84.1	- 15.7	- 84.1	- 15.7	- 84.1
1983	33.6	47.1	- 13.5	- 172.9	- 3.2	- 83.5	- 5.9	- 89.4	- 5.9	- 89.4	- 5.9	- 89.4
1984	41.7	31.3	10.4	- 162.5	- 3.6	- 87.1	- 3.2	- 92.3	- 3.2	- 92.3	- 3.2	- 92.3
1985	56.8	71.9	- 15.1	- 177.6	- 2.1	- 89.2	- 3.0	- 95.3	- 3.0	- 95.3	- 3.0	- 95.3
1986	70.2	39.3	30.9	- 146.7	- 11.8	- 101.0	- 11.3	- 106.6	- 11.3	- 106.6	- 11.3	- 106.6
1987	83.8	59.2	24.6	- 122.1	- 13.7	- 114.7	- 19.2	- 125.9	- 19.2	- 125.9	- 19.2	- 125.9
1988	114.2	86.5	27.7	- 94.4	- 11.9	- 126.6	- 11.4	- 137.3	- 11.4	- 137.3	- 11.4	- 137.3
1989	136.8	101.0	35.8	- 58.6	- 19.1	- 145.7	- 18.4	- 156.1	- 18.4	- 156.1	- 18.4	- 156.1
1990	143.5	104.1	39.4	- 19.2	- 20.1	- 165.8	- 19.4	- 175.5	- 19.4	- 175.5	- 19.4	- 175.5
1991	163.9	247.4	- 83.5	- 102.7	- 21.9	- 187.7	- 24.5	- 200.0	- 24.5	- 200.0	- 24.5	- 200.0
1992	198.0	494.9	- 296.9	- 399.6	- 97.9	- 285.6	- 103.2	- 388.2	- 103.2	- 388.2	- 103.2	- 388.2
1993	233.8	246.3	- 12.5	- 412.1	- 4.4	- 290.0	- 2.9	- 390.1	- 2.9	- 390.1	- 2.9	- 390.1
1994	277.4	368.9	- 91.5	- 503.6	- 25.3	- 315.3	- 29.6	- 419.7	- 29.6	- 419.7	- 29.6	- 419.7
1995	323.6	525.2	- 201.6	- 705.2	- 64.4	- 379.7	- 69.8	- 489.5	- 69.8	- 489.5	- 69.8	- 489.5
1996	347.4	740.9	- 393.5	- 1098.7	- 144.2	- 523.9	- 151.9	- 635.4	- 151.9	- 635.4	- 151.9	- 635.4
1997	391.3	783.7	- 392.4	- 1491.1	- 162.9	- 686.8	- 171.1	- 807.5	- 171.1	- 807.5	- 171.1	- 807.5
1998	434.9	518.2	- 83.3	- 1574.4	- 63.9	- 750.7	- 68.9	- 869.4	- 68.9	- 869.4	- 68.9	- 869.4
1999	465.6	337.7	127.9	- 1446.5	- 10.3	- 761.0	- 7.5	- 876.9	- 7.5	- 876.9	- 7.5	- 876.9
2000	1917.6	289.3	1628.3	- 281.8	900.8	291.5	886.8	219.0	900.8	291.5	886.8	219.0
2001	1967.1	235.4	1731.7	145.3	948.7	1240.2	948.0	1167.1	948.7	1240.2	948.0	1167.1
2002	1990.5	223.0	1767.4	3120.6	960.6	2200.8	960.1	2127.2	960.6	2200.8	960.1	2127.2
2003	2041.5	217.9	1823.5	4944.1	940.4	3191.2	940.0	3117.2	940.4	3191.2	940.0	3117.2
2004	2088.0	256.9	1831.1	6775.2	1002.6	4193.7	1002.0	4125.2	1002.6	4193.7	1002.0	4125.2
2005	2115.4	234.9	1880.5	8655.7	1022.1	5215.8	1021.7	5147.0	1022.1	5215.8	1021.7	5147.0
2006	2115.7	240.3	1875.3	10531.0	1016.1	6231.9	1015.8	6162.8	1016.1	6231.9	1015.8	6162.8
2007	2122.7	230.8	1891.9	12422.9	1024.0	7255.9	1024.5	7187.3	1024.0	7255.9	1024.5	7187.3
2008	2115.4	218.4	1897.0	14320.0	1018.0	8273.9	1018.6	8205.9	1018.0	8273.9	1018.6	8205.9
2009	2115.9	222.8	1893.1	16213.1	1014.1	9288.0	1014.7	9220.6	1014.1	9288.0	1014.7	9220.6
2010	2123.0	255.2	1867.8	18080.9	1003.3	10291.3	1003.6	10224.2	1003.3	10291.3	1003.6	10224.2
2011	2115.4	227.0	1888.4	20000.0	1004.7	11296.0	1005.5	11229.7	1004.7	11296.0	1005.5	11229.7
2012	2115.7	228.3	1887.4	21887.4	1001.3	12300.3	1002.1	12231.9	1001.3	12300.3	1002.1	12231.9
2013	2122.7	228.2	1894.5	23781.9	1001.9	13305.2	1002.9	13234.8	1001.9	13305.2	1002.9	13234.8
2014	2115.4	331.6	1783.8	25565.7	992.0	14297.2	993.1	14227.8	992.0	14297.2	993.1	14227.8
2015	2115.9	321.9	1794.0	27359.7	999.9	15297.1	1001.3	15229.1	999.9	15297.1	1001.3	15229.1
2016	2123.0	326.7	1796.2	29155.9	997.8	16294.9	999.1	16226.2	997.8	16294.9	999.1	16226.2
2017	2115.4	234.5	1880.9	31036.8	991.5	17286.4	992.9	17221.1	991.5	17286.4	992.9	17221.1
2018	2115.7	233.1	1882.5	32919.3	988.2	18274.6	989.6	18210.7	988.2	18274.6	989.6	18210.7
2019	2122.7	229.2	1893.5	34812.8	989.6	19264.1	991.3	19202.0	989.6	19264.1	991.3	19202.0
2020	2115.4	273.1	1842.3	36655.1	984.5	20248.6	985.9	20167.9	984.5	20248.6	985.9	20167.9
2021	2115.9	233.8	1882.1	38537.2	976.1	21224.7	978.2	21146.8	976.1	21224.7	978.2	21146.8
2022	2123.0	234.2	1888.8	40426.0	961.5	22186.2	963.7	22129.7	961.5	22186.2	963.7	22129.7
2023	2115.4	222.7	1892.7	42318.7	977.7	23163.9	979.8	23109.9	977.7	23163.9	979.8	23109.9
2024	2115.7	334.1	1781.6	44100.3	972.0	24135.9	974.6	24064.5	972.0	24135.9	974.6	24064.5
2025	2122.7	236.6	1886.1	45986.4	978.2	25112.2	979.9	25043.5	978.2	25112.2	979.9	25043.5
2026	2115.4	232.7	1882.7	47869.1	976.0	26088.2	978.0	26022.4	976.0	26088.2	978.0	26022.4
2027	2115.9	232.6	1883.3	49752.4	979.5	27067.7	982.7	27002.1	979.5	27067.7	982.7	27002.1
2028	2123.0	220.9	1902.1	51654.5	983.9	28051.6	987.3	28012.4	983.9	28051.6	987.3	28012.4
2029	2115.4	233.5	1881.9	53536.4	987.5	29039.1	991.1	28973.5	987.5	29039.1	991.1	28973.5
2030	2115.7	257.8	1857.9	55394.3	1148.7	30187.8	1153.0	30126.5	1148.7	30187.8	1153.0	30126.5

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	NOPI ING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	61.1	*	59.8	7.9	40.6	19.3
1979	25.9	*	22.2	1.3	57.6	25.6
1980	25.5	*	104.1	1.7	74.2	31.6
1981	42.7	*	141.9	2.3	102.1	42.2
1982	60.5	*	155.7	3.3	141.7	57.3
1983	40.4	*	228.1	3.9	167.6	64.4
1984	23.8	*	243.1	4.4	182.1	65.3
1985	40.6	*	282.2	7.3	213.6	72.9
1986	14.9	*	286.2	7.8	221.6	72.9
1987	44.9	*	310.5	13.3	249.3	82.0
1988	31.2	*	336.2	13.7	267.4	82.0
1989	44.3	*	365.3	14.4	293.7	86.0
1990	43.8	*	394.3	15.1	320.6	88.9
1991	185.5	*	557.4	17.7	440.0	135.1
1992	129.3	*	551.6	23.0	731.1	253.6
1993	183.2	*	1094.0	24.9	838.1	262.8
1994	295.9	*	1341.0	29.2	1020.1	344.7
1995	300.1	*	1737.3	34.6	1310.8	446.7
1996	662.6	*	2305.3	42.4	1743.8	603.9
1997	791.6	*	2100.0	50.6	2194.4	756.2
1998	430.0	*	3212.6	55.6	2462.3	895.8
1999	639.1	*	3523.0	58.5	2597.0	104.4
2000	122.6	*	3312.4	72.4	2650.4	734.3
2001	55.4	*	2232.6	73.1	2635.6	650.2
2002	56.2	*	3145.0	73.6	2654.1	560.4
2003	42.4	*	3049.9	74.0	2643.7	480.1
2004	55.0	*	2957.0	74.5	2639.5	462.6
2005	55.0	*	2877.0	74.9	2627.3	324.6
2006	55.4	*	2787.2	75.2	2611.8	250.6
2007	51.9	*	2676.5	74.7	2576.0	173.2
2008	55.5	*	2562.5	74.1	2537.7	98.9
2009	37.2	*	2450.8	73.5	2494.0	30.3
2010	70.5	*	2369.5	73.1	2465.9	23.3
2011	42.4	*	2253.6	72.3	2412.3	81.4
2012	43.7	*	2147.5	71.5	2352.6	133.6
2013	43.7	*	2034.6	70.5	2264.6	179.5
2014	47.1	*	1923.0	69.3	2209.8	217.4
2015	37.4	*	1804.6	68.0	2128.9	206.4
2016	42.4	*	1688.5	66.7	2040.8	265.5
2017	50.2	*	1560.4	65.3	1953.6	307.9
2018	48.9	*	1468.7	63.8	1855.2	322.7
2019	45.0	*	1350.7	62.1	1742.9	336.1
2020	88.9	*	1270.0	60.7	1646.2	315.4
2021	49.9	*	1147.6	56.7	1512.4	306.1
2022	50.2	*	1026.3	56.4	1372.6	269.9
2023	58.7	*	891.6	54.0	1212.4	266.8
2024	50.2	*	764.7	51.4	1046.9	230.7
2025	52.8	*	637.1	46.7	872.3	186.5
2026	48.9	*	502.2	45.7	685.6	137.9
2027	48.9	*	360.9	43.6	468.0	65.0
2028	37.2	*	195.7	39.2	262.2	27.3
2029	54.9	*	.0	35.6	.1	35.4
2030	74.6	*	.0	31.4	.1	31.2
TOTAL CAPITAL INVESTMENT			5700.5			

14A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	81.11	20.46002	20.16629	24.48619
1979	87.06	29.41003	28.7298	36.97765
1980	113.53	38.31004	37.13489	50.99756
1981	155.19	53.0601	51.21269	67.80211
1982	215.72	74.0101	71.18759	83.52254
1983	256.1499	88.55	84.52945	89.40178
1984	279.9397	97.8098	92.38008	89.40178
1985	329.5496	115.9197	108.7513	98.43629
1986	344.4995	122.8596	113.6848	98.43629
1987	389.3494	140.0696	128.4853	117.6314
1988	420.5493	153.1497	138.7813	117.6314
1989	464.7493	171	153.3672	117.6314
1990	510.509	189.9399	168.468	117.6314
1991	696.009	256.0103	229.683	142.1539
1992	1125.349	404.2905	371.365	245.3943
1993	1308.519	472.4507	431.811	247.685
1994	1605.429	579.9009	529.7915	277.2844
1995	2055.569	740.3718	678.3376	347.0632
1996	2718.119	974.3518	896.979	490.9602
1997	3419.669	1225.242	1128.49	670.1038
1998	3852.679	1390.362	1271.384	739.0066
1999	4091.809	1494.812	1350.297	739.0066
2000	4214.375	1563.989	1390.744	739.0066
2001	4269.754	1614.188	1409.019	739.0066
2002	4319.934	1665.788	1425.578	739.0066
2003	4362.312	1718.566	1439.563	739.0066
2004	4420.289	1780.804	1458.695	739.0066
2005	4473.328	1846.053	1476.198	739.0066
2006	4528.707	1916.912	1494.473	739.0066
2007	4564.586	1986.601	1506.313	739.0066
2008	4598.125	2060.42	1517.381	739.0066
2009	4635.305	2141.301	1529.65	739.0066
2010	4705.762	2239.858	1552.901	739.0066
2011	4748.141	2335.817	1566.886	739.0066
2012	4791.82	2439.246	1581.301	739.0066
2013	4835.5	2550.877	1595.715	739.0066
2014	4882.559	2672.806	1611.244	739.0066
2015	4919.996	2791.083	1623.598	739.0066
2016	4962.375	2921.622	1637.583	739.0066
2017	5012.555	3058.973	1654.143	739.0066
2018	5061.434	3200.192	1670.273	739.0066
2019	5106.41	3363.538	1685.115	739.0066
2020	5195.328	3549.167	1714.458	739.0066
2021	5244.207	3731.776	1730.588	739.0066
2022	5294.387	3921.746	1747.147	739.0066
2023	5333.125	4120.762	1759.931	739.0066
2024	5383.305	4336.453	1776.49	739.0066
2025	5436.082	4563.82	1793.907	739.0066
2026	5484.961	4799.18	1810.837	739.0066
2027	5533.84	5043.197	1826.167	739.0066
2028	5571.02	5308.859	1838.436	739.0066
2029	5625.879	5625.77	1856.54	739.0066
2030	5700.496	5700.387	1881.164	739.0066

14A
Cost Summary - Dollars in Millions

HES		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	5,700.6	6,666.8	12,367.4	5,700.5	7,612.4	13,312.9
1.0	CAPITAL ITEMS	5,700.6		5,700.6	5,700.5	7,612.4	13,312.9
1.1	SYSTEM FACILITIES-EQUIPMENT	4,369.1		4,369.1	4,369.1	5,941.6	10,310.7
1.1.1	SHIP	215.0		215.0	215.0	249.9	464.9
1.1.2	CASH	326.0		326.0	326.0	249.3	575.3
1.1.3	CASH TRANSPORTER/PAUL CAR	32.2		32.2	32.2	16.7	48.9
1.1.4	PAUL CAR TUG	0.8		0.8	0.8	0.4	1.2
1.1.5	CASH TRANSPORTER						
1.1.6	SEAFORT FAC						
1.1.7	WATER BASIN 4 FORT	48.0		48.0	48.0	82.6	130.6
1.1.8	WATER BASIN 2 FORT						
1.1.9	WATER BASIN STORAGE	744.0		744.0	744.0	1,087.8	1,831.8
1.1.10	PROCESSING FACILITY						
1.1.11	PAUL FACIFIC FAC	116.0		116.0	116.0	169.6	285.6
1.1.12	CRUISERS	224.4		224.4	224.4	149.7	374.1
1.1.13	ENFORCEMENT TRAINS	12.0		12.0	12.0	7.9	19.9
1.1.14	PAUL MODULE						
1.1.15	COLOGIC REC MODULE	67.0		67.0	67.0	116.2	183.2
1.1.16	REPOSITORY STORAGE MOD	378.0		378.0	378.0	362.6	740.6
1.1.17	CASH	66.3		66.3	66.3	114.2	180.5
1.1.18	LONGINTER FAC	75.0		75.0	75.0	120.1	195.1
1.1.19	PAUL FACIFIC FAC	240.4		240.4	240.4	1,631.0	2,871.4
1.1.20	RECOVERY FAC	694.0		694.0	694.0	1,550.5	2,444.5
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6	39.3
1.2.1	ACN BLD & FLT YD	2.4		2.4	2.4	3.5	5.9
1.2.2	WAREHOUSE & FLT	12.2		12.2	12.2	21.1	33.3
1.3	OTHERS COST	656.4		656.4	656.4	823.0	1,481.4
1.4	INTEREST DURING CONS	656.4		656.4	656.4	823.1	1,481.5
2.0	OPER & MAINT		6,666.8	6,666.8		6,666.8	6,666.8
2.1	DIRECT LABOR		1,114.3	1,114.3		1,114.3	1,114.3
2.1.1	PORT & REC TRANS						
2.1.2	WATER BASIN REC (4FORT)		145.8	145.8		145.8	145.8
2.1.3	WATER BASIN REC (2FORT)						
2.1.4	WATER BASIN STOR		27.1	27.1		27.1	27.1
2.1.5	PAUL FAC LABOR						
2.1.6	PAUL FAC LABOR		313.7	313.7		313.7	313.7
2.1.7	PAUL ENFORCEMENT LABOR						
2.1.8	COLOGIC REC MOD LABOR		84.0	84.0		84.0	84.0
2.1.9	CASH TRANS MAINT LAB		44.2	44.2		44.2	44.2
2.1.10	LCI LAB PROCES LABOR		15.2	15.2		15.2	15.2
2.1.11	PAUL FAC LABOR		242.1	242.1		242.1	242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1		242.1	242.1
2.2	INDIRECT LABOR		1,666.2	1,666.2		1,666.2	1,666.2
2.2.1	PORT & REC TRANS LAB						
2.2.2	WATER BASIN REC (4FORT) LAB		218.6	218.6		218.6	218.6
2.2.3	WATER BASIN REC (2FORT) LAB						
2.2.4	WATER BASIN STOR LAB		40.5	40.5		40.5	40.5
2.2.5	PAUL FAC IND LAB						
2.2.6	PAUL FAC IND LAB		470.4	470.4		470.4	470.4
2.2.7	PAUL IND LABOR						
2.2.8	COLOGIC REC MOD IND LAB		125.5	125.5		125.5	125.5
2.2.9	CASH TRANS MAINT LAB		66.3	66.3		66.3	66.3
2.2.10	LCI LAB PROCES IND LAB		22.3	22.3		22.3	22.3
2.2.11	PAUL FAC IND LAB		371.3	371.3		371.3	371.3
2.2.12	REC PLANT IND LAB		371.3	371.3		371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,666.0	1,666.0		1,666.0	1,666.0
2.3.1	PORT/REC FNS						
2.3.2	WATER BASIN REC (4FORT)		218.6	218.6		218.6	218.6
2.3.3	WATER BASIN REC (2FORT)						
2.3.4	WATER BASIN STOR		40.5	40.5		40.5	40.5
2.3.5	PAUL CRN (2000)						
2.3.6	PAUL CRN (2000)		470.4	470.4		470.4	470.4
2.3.7	PAUL CRN						
2.3.8	COLOGIC REC CRN		125.5	125.5		125.5	125.5
2.3.9	CASH TRANS		66.0	66.0		66.0	66.0
2.3.10	LCI LAB PROCES CRN		22.3	22.3		22.3	22.3
2.3.11	PAUL PROCESSING CRN		371.3	371.3		371.3	371.3
2.3.12	RECOVERY PLANT CRN		371.3	371.3		371.3	371.3
2.4	CONTRACTED SERVICES		2,064.9	2,064.9		2,064.9	2,064.9
2.4.1	SHIP ON						
2.4.2	US PORT FEE		66.1	66.1		66.1	66.1
2.4.3	ELFOP PORT FEE STOP						
2.4.4	US PAUL (SP TO STOP)		1,510.0	1,510.0		1,510.0	1,510.0
2.4.5	ELFOP PAUL TRANS		419.6	419.6		419.6	419.6
2.4.6	US STOP (TIME CRNG)		59.6	59.6		59.6	59.6
2.4.7	ELFOP STOP						
2.4.8	US RECOP CR						
2.4.9	ELFOP REC CR						
2.4.10	ELFOP WASTE DIS						
2.4.11	US PAUL TRANS		9.6	9.6		9.6	9.6
2.4.12	ELFOP PAUL TRANS						
2.4.13	ELFOP PAUL TRANS						
2.4.14	US PORT FEE						
2.4.15	ELFOP PORT FEE						
2.4.16	ELFOP PORT FEE						
2.4.17	ELFOP PORT FEE						
2.4.18	PAUL FAC PORT FEE						
2.4.19	PAUL FAC PORT FEE						
2.4.20	PAUL FAC TRANS						
2.4.21	PAUL FAC TRANS						
2.5	SPONSORSHIP FUND		75.4	75.4		75.4	75.4

Section E3.15

Case: 15A

Description: Fuel Cycle Center (FCC) baseline except geologic storage and location in mid Pacific

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - geologic

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 5.601 billion dollars

Owners ROI - 21.6%

Service charge - \$135/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/10) \$135.268
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$55600.660

15A
Yearly Profit and Loss Statement

YEAR	FEP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	IEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	1.9	1.9	1.1	3.8	1.9	6.9	.0	3.0
1979	.0	4.1	4.1	1.8	5.4	2.6	9.9	.0	3.8
1980	.0	5.1	5.1	2.8	6.9	3.3	13.0	.0	7.9
1981	.0	11.6	11.6	3.8	9.5	4.5	17.8	.0	6.1
1982	.0	23.8	23.8	5.3	13.2	6.3	25.0	.0	1.2
1983	.0	30.9	30.9	6.7	15.7	7.5	29.9	.4	.6
1984	.0	38.3	38.3	8.0	17.1	8.2	33.3	1.9	3.1
1985	.0	52.1	52.1	20.3	20.0	10.1	51.2	.3	.5
1986	.0	64.5	64.5	21.2	21.7	10.7	53.6	4.1	6.6
1987	.0	76.2	76.2	50.0	23.7	11.3	85.0	.0	9.3
1988	.0	104.8	104.8	50.8	26.3	13.2	90.4	5.5	9.0
1989	.0	125.6	125.6	51.1	28.1	14.3	93.5	12.2	19.3
1990	.0	131.7	131.7	51.9	30.8	15.0	96.5	12.6	20.6
1991	.0	150.4	150.4	53.3	42.5	21.2	117.1	12.7	20.7
1992	.0	181.7	181.7	54.7	69.8	33.3	157.8	9.1	14.8
1993	.0	214.6	214.6	55.6	82.4	33.4	171.4	14.1	23.0
1994	.0	254.6	254.6	57.8	160.7	48.8	266.6	18.3	29.8
1995	.0	297.0	297.0	59.2	129.8	61.7	250.6	17.6	28.7
1996	.0	318.9	318.9	60.7	172.9	82.1	315.6	1.2	2.0
1997	.0	359.4	359.4	62.3	217.4	103.0	382.6	.0	24.2
1998	.0	389.2	389.2	63.8	245.2	117.9	426.9	.0	27.6
1999	.0	427.4	427.4	65.6	258.8	125.8	450.2	.0	22.8
2000	1413.3	452.7	1875.3	142.3	264.2	130.8	536.5	509.1	830.7
2001	1413.3	508.8	1921.7	143.4	264.2	131.7	539.6	525.2	856.9
2002	1413.3	529.6	1942.9	144.3	264.8	133.4	542.7	532.2	868.3
2003	1413.3	578.4	1991.7	145.6	264.4	135.1	545.1	549.0	895.8
2004	1413.3	619.1	2032.6	146.7	263.7	136.8	547.1	564.5	921.0
2005	1413.3	644.3	2057.8	146.4	263.4	139.2	549.9	572.8	934.3
2006	1413.3	644.3	2058.0	149.4	261.8	140.8	552.0	572.3	933.8
2007	1413.3	651.0	2064.3	149.3	258.8	142.1	550.3	573.4	938.8
2008	1413.3	644.3	2057.8	149.3	255.9	143.2	548.3	573.6	937.9
2009	1413.3	644.7	2058.2	149.2	252.0	144.4	545.6	574.8	937.8
2010	1413.3	651.2	2064.7	149.1	258.2	153.5	560.8	571.3	932.4
2011	1413.3	644.3	2057.8	149.1	233.4	154.3	536.7	570.2	928.3
2012	1413.3	644.3	2058.0	149.0	247.6	156.3	552.1	571.9	933.1
2013	1413.3	651.0	2064.3	149.0	242.5	158.3	549.7	575.6	939.2
2014	1413.3	644.3	2057.8	148.9	233.5	160.2	544.6	575.8	939.2
2015	1413.3	644.7	2058.2	148.9	227.5	157.6	534.9	579.2	945.1
2016	1413.3	651.2	2064.7	148.8	219.7	159.9	528.4	583.8	952.5
2017	1413.3	644.3	2057.8	148.7	211.1	158.6	518.5	584.6	953.6
2018	1413.3	644.3	2058.0	148.7	202.8	162.2	513.7	586.9	957.5
2019	1413.3	651.0	2064.3	148.6	192.9	164.6	506.2	592.2	966.2
2020	1413.3	644.3	2057.8	148.6	181.7	167.8	497.2	593.8	967.6
2021	1413.3	644.7	2058.2	148.3	168.9	167.7	485.1	597.8	975.3
2022	1413.3	651.2	2064.7	148.4	156.1	169.0	473.5	604.7	986.6
2023	1413.3	644.3	2057.8	148.4	141.8	171.5	461.6	606.6	989.6
2024	1413.3	644.3	2058.0	148.3	125.8	173.5	447.6	612.0	998.5
2025	1413.3	651.0	2064.3	148.3	109.5	177.3	435.1	619.2	1010.3
2026	1413.3	644.3	2057.8	148.2	91.6	180.3	420.0	622.4	1015.4
2027	1413.3	644.7	2058.2	148.1	72.1	184.0	404.3	628.5	1025.5
2028	1413.3	651.2	2064.7	148.1	52.5	202.9	403.4	631.3	1038.0
2029	1413.3	644.3	2057.8	148.0	29.4	234.4	411.8	635.5	1029.6
2030	1413.3	644.3	2058.0	148.0	4.5	27.1	219.6	638.6	1019.8
TOTAL	43318.5	22779.4	66097.9	5395.5	7581.8	5601.9	18578.4	16269.1	29720.2
ARC	226.6	429.8	1236.6	181.8	143.8	105.7	331.3	345.1	560.9
SA-10	260.2	135.3	395.5	32.0	45.8	33.3	110.3	188.6	176.5

Yearly Cash Statement

YEAP	UNFINANCED ENTERPRISE BEFORE 1967				FINANCED ENTERPRISE AFTER 1967				CHIEFS			
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	1.9	56.2	-	56.3	-	56.3	-	56.3	-	56.3	-	56.3
1979	4.1	56.2	-	52.1	-	78.0	-	11.6	-	33.8	-	33.8
1980	5.1	55.7	-	26.7	-	99.1	-	12.7	-	46.4	-	46.4
1981	11.6	52.4	-	38.8	-	129.9	-	15.0	-	61.3	-	61.3
1982	23.8	52.0	-	38.2	-	168.1	-	14.0	-	75.2	-	75.2
1983	30.9	54.8	-	13.9	-	182.1	-	9.6	-	81.5	-	81.5
1984	38.3	31.4	-	6.9	-	175.1	-	2.3	-	79.2	-	79.2
1985	52.1	77.6	-	25.5	-	200.6	-	9.9	-	89.2	-	89.2
1986	64.9	58.2	-	26.9	-	173.3	-	10.0	-	78.6	-	78.6
1987	76.2	53.2	-	7.0	-	179.3	-	10.7	-	89.3	-	89.3
1988	104.8	93.7	-	11.2	-	166.2	-	3.4	-	84.0	-	84.0
1989	120.6	82.2	-	43.3	-	124.3	-	20.8	-	63.2	-	63.2
1990	131.7	96.1	-	35.6	-	89.3	-	18.2	-	45.0	-	45.0
1991	150.4	233.6	-	83.1	-	172.3	-	22.1	-	67.1	-	67.1
1992	181.7	468.2	-	286.5	-	458.8	-	94.8	-	161.9	-	161.9
1993	214.6	651.9	-	37.2	-	497.1	-	9.6	-	171.5	-	171.5
1994	224.6	343.0	-	88.4	-	585.4	-	25.2	-	196.7	-	196.7
1995	247.0	505.4	-	258.4	-	793.8	-	68.0	-	264.7	-	264.7
1996	318.9	719.4	-	400.5	-	1194.4	-	147.7	-	412.4	-	412.4
1997	339.4	750.9	-	391.5	-	1585.9	-	165.9	-	578.4	-	578.4
1998	399.2	604.8	-	105.6	-	1691.5	-	76.5	-	654.8	-	654.8
1999	437.4	300.3	-	127.1	-	1564.4	-	1.2	-	653.6	-	653.6
2000	1876.2	259.5	-	1616.8	-	32.3	-	694.7	-	241.1	-	241.1
2001	1981.7	138.6	-	1733.1	-	1733.1	-	943.4	-	1184.4	-	1184.4
2002	1949.1	174.7	-	1749.4	-	3533.3	-	951.8	-	2136.2	-	2136.2
2003	1969.9	169.3	-	1800.6	-	5334.9	-	979.6	-	3115.8	-	3115.8
2004	3032.6	140.4	-	1842.2	-	7177.7	-	1602.3	-	4118.3	-	4118.3
2005	3057.8	395.8	-	1332.0	-	8509.5	-	1609.4	-	5127.7	-	5127.7
2006	3058.0	193.1	-	1264.9	-	10894.4	-	1610.2	-	6137.9	-	6137.9
2007	3064.5	140.0	-	1364.5	-	12779.0	-	1015.7	-	7153.6	-	7153.6
2008	3057.8	132.0	-	1365.8	-	14646.8	-	1005.7	-	8160.3	-	8160.3
2009	3058.2	179.9	-	1378.4	-	16327.2	-	1006.6	-	9166.9	-	9166.9
2010	3064.7	338.8	-	1735.0	-	18263.1	-	949.9	-	10116.8	-	10116.8
2011	3057.8	187.6	-	1570.3	-	20123.4	-	992.3	-	11109.0	-	11109.0
2012	3059.8	135.3	-	1372.8	-	21596.2	-	969.8	-	12098.9	-	12098.9
2013	3064.0	200.4	-	1364.2	-	23060.3	-	965.2	-	13064.1	-	13064.1
2014	3057.8	156.4	-	1271.5	-	23731.3	-	981.4	-	14065.3	-	14065.3
2015	3058.2	166.3	-	1372.0	-	27663.3	-	965.9	-	15051.3	-	15051.3
2016	3064.7	127.5	-	1277.2	-	29461.0	-	984.6	-	16036.0	-	16036.0
2017	3057.8	172.4	-	1365.4	-	31346.3	-	979.5	-	17015.5	-	17015.5
2018	3059.0	204.1	-	1334.0	-	33200.3	-	972.1	-	17987.6	-	17987.6
2019	3064.0	193.4	-	1371.1	-	35071.4	-	975.3	-	18962.9	-	18962.9
2020	3057.8	190.9	-	1366.9	-	36938.3	-	967.8	-	19930.4	-	19930.4
2021	3058.2	135.7	-	1372.6	-	38810.9	-	967.8	-	20898.2	-	20898.2
2022	3064.7	200.6	-	1364.1	-	40675.0	-	966.9	-	21865.2	-	21865.2
2023	3057.8	191.3	-	1366.6	-	42541.6	-	962.9	-	22828.1	-	22828.1
2024	3058.0	184.2	-	1373.3	-	44415.4	-	963.0	-	23791.1	-	23791.1
2025	3064.5	179.7	-	1364.8	-	46280.2	-	961.6	-	24752.7	-	24752.7
2026	3057.8	191.9	-	1366.0	-	48146.2	-	961.9	-	25714.6	-	25714.6
2027	3058.2	135.3	-	1372.9	-	50019.1	-	966.8	-	26681.5	-	26681.5
2028	3064.7	198.5	-	1366.2	-	51885.3	-	960.2	-	27641.7	-	27641.7
2029	3057.8	185.5	-	1372.4	-	53757.6	-	949.0	-	28590.6	-	28590.6
2030	3058.0	215.1	-	1342.9	-	55609.6	-	1139.3	-	29730.4	-	29730.4

Capital Investment Balance Sheet

YEPP	CAPITAL INVESTMENT	*	FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	57.1	*	55.1	1.8	38.0	18.0
1979	24.4	*	76.9	1.2	51.0	24.2
1980	33.0	*	95.6	1.6	68.9	29.3
1981	36.6	*	130.8	2.2	94.1	36.6
1982	56.5	*	131.0	3.1	151.1	53.0
1983	39.1	*	211.6	3.7	155.0	59.6
1984	33.4	*	226.8	4.2	165.8	61.1
1985	57.3	*	274.0	6.9	206.6	79.3
1986	14.9	*	278.3	7.2	214.6	70.8
1987	33.1	*	299.6	12.3	224.6	77.3
1988	42.9	*	329.3	12.9	260.6	81.5
1989	31.2	*	346.2	13.2	276.4	81.0
1990	44.2	*	374.6	13.8	304.4	83.9
1991	180.3	*	533.6	18.0	488.7	128.9
1992	414.5	*	914.8	30.8	696.3	243.3
1993	156.2	*	1071.6	33.0	816.4	278.2
1994	233.2	*	1398.8	36.4	996.6	336.6
1995	442.2	*	1823.3	31.5	1286.4	438.4
1996	658.6	*	2269.9	38.9	1715.3	555.6
1997	658.6	*	2854.6	46.6	2156.2	745.1
1998	441.1	*	3177.8	51.5	2439.5	798.8
1999	234.7	*	3226.7	54.1	2563.5	777.3
2000	117.2	*	3275.9	57.7	2614.6	727.9
2001	45.2	*	3137.4	58.0	2614.6	640.8
2002	50.2	*	3104.2	58.3	2615.8	557.5
2003	43.7	*	3012.9	58.3	2667.4	473.6
2004	43.7	*	2919.8	58.4	2595.8	392.4
2005	56.7	*	2837.3	58.6	2588.3	317.5
2006	43.7	*	3740.2	58.3	2567.7	241.0
2007	30.7	*	3628.7	58.0	2533.1	163.6
2008	38.7	*	3524.3	57.5	2499.0	92.3
2009	30.7	*	2410.6	66.9	2454.6	22.8
2010	139.6	*	2446.7	67.9	2508.2	6.4
2011	38.5	*	2330.3	67.1	2433.7	56.4
2012	36.2	*	2210.2	66.1	2390.0	114.1
2013	51.4	*	2103.3	65.2	2329.6	161.1
2014	37.4	*	1950.5	64.1	2250.0	202.4
2015	37.4	*	1850.4	62.7	2170.7	247.6
2016	38.7	*	1739.2	61.4	2081.6	281.0
2017	43.7	*	1623.3	60.0	1991.4	308.1
2018	55.4	*	1516.5	58.6	1899.2	324.1
2019	44.9	*	1395.6	56.9	1788.4	324.9
2020	42.4	*	1272.0	55.0	1663.8	326.6
2021	37.2	*	1141.4	52.9	1525.7	331.4
2022	32.1	*	1024.6	50.7	1389.2	313.9
2023	26.9	*	896.8	48.4	1233.9	289.6
2024	35.9	*	759.4	45.7	1066.8	256.7
2025	51.5	*	632.6	43.0	886.4	210.8
2026	43.7	*	496.0	40.0	676.3	166.3
2027	37.2	*	349.2	36.7	490.8	100.0
2028	50.4	*	176.7	33.4	266.6	38.4
2029	37.4	*	2	29.6	1	29.0
2030	67.1	*	2	20.4	1	20.2

TOTAL CAPITAL INVESTMENT

5681.7

15A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	57.10001	19.13002	18.84299	23.00674
1979	81.52	27.56004	26.9016	34.95773
1980	104.51	35.82007	34.4883	48.03636
1981	143.15	49.01009	47.23949	63.67651
1982	199.67	68.58011	65.8911	79.03149
1983	237.77	82.29012	78.4641	85.21915
1984	261.1799	91.34003	86.18936	85.21915
1985	318.5098	111.9399	105.1082	97.82277
1986	333.4597	118.8199	110.0417	97.82277
1987	366.6096	132.0298	120.9812	113.6759
1988	409.5095	148.8899	135.1381	113.6759
1989	440.7095	162.28	145.4341	113.6759
1990	484.9094	180.4902	160.0201	113.6759
1991	665.2092	244.5403	219.519	137.9637
1992	1079.749	387.4705	356.3171	237.5754
1993	1275.909	459.4907	421.0498	249.4233
1994	1561.119	562.511	515.1692	278.019
1995	2007.359	720.9812	662.4285	351.1023
1996	2666.009	952.8411	879.7827	506.2722
1997	3354.559	1198.402	1107.004	679.9226
1998	3795.629	1365.122	1252.557	761.2544
1999	4030.339	1466.882	1330.012	762.584
2000	4147.527	1532.88	1368.684	762.584
2001	4192.766	1578.129	1383.613	762.584
2002	4242.945	1627.969	1400.172	762.584
2003	4286.625	1679.259	1414.586	762.584
2004	4330.305	1734.549	1429.	762.584
2005	4386.984	1798.639	1447.705	762.584
2006	4430.664	1862.939	1462.119	762.584
2007	4461.344	1928.199	1472.243	762.584
2008	4500.082	2000.578	1485.027	762.584
2009	4530.762	2076.178	1495.151	762.584
2010	4720.391	2212.237	1557.729	762.584
2011	4758.867	2305.153	1570.426	762.584
2012	4795.105	2404.653	1582.385	762.584
2013	4846.484	2516.881	1599.34	762.584
2014	4883.922	2633.929	1611.694	762.584
2015	4921.359	2750.696	1624.048	762.584
2016	4960.098	2878.505	1636.832	762.584
2017	5003.805	3012.442	1651.255	762.584
2018	5059.184	3160.021	1669.53	762.584
2019	5103.98	3315.558	1684.313	762.584
2020	5146.359	3482.547	1698.298	762.584
2021	5183.539	3657.837	1710.568	762.584
2022	5235.676	3846.455	1727.773	762.584
2023	5278.555	4044.624	1741.923	762.584
2024	5314.434	4253.59	1753.783	762.584
2025	5365.91	4479.496	1770.75	762.584
2026	5409.59	4713.289	1785.165	762.584
2027	5446.77	4955.937	1797.434	762.584
2028	5497.207	5228.613	1814.078	762.584
2029	5534.645	5534.594	1826.432	762.584
2030	5601.763	5801.672	1848.568	762.584

18A
Cost Summary - Dollars in Millions

NBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS
							TOTAL
0.0	TOTAL	5,601.8	5,395.6	10,997.4	5,601.7	7,381.0	13,017.8
1.0	CAPITAL ITEMS	5,601.8		5,601.8	5,601.7	7,381.0	13,017.8
1.1	SYSTEM FACILITIES-EQUIPMENT	4,318.1		4,318.1	4,318.1	5,444.8	10,160.9
1.1.1	SHIP	175.0		175.0	175.0	207.3	382.3
1.1.2	CAS	277.0		277.0	277.0	194.8	471.8
1.1.3	COIN TRANSPORTER/PAUL CAR	23.2		23.2	23.2	12.4	35.6
1.1.4	PAUL CAR TUG	0.8		0.8	0.8	0.4	1.2
1.1.5	COIN TRANSPORTER						
1.1.6	REFFORT FAC						
1.1.7	WATER BASIN 4 PORT	48.0		48.0	46.0	62.6	130.6
1.1.8	WATER BASIN 3 PORT						
1.1.9	WATER BASIN STORAGE	744.0		744.0	744.0	1,067.8	1,631.8
1.1.10	PROCESSING FACILITY						
1.1.11	PROCESSING FAC	116.8		116.8	116.8	201.2	317.2
1.1.12	CRIMISTERS	330.8		330.8	330.8	253.9	583.9
1.1.13	EMPLACEMENT TRANS	12.0		12.0	12.0	7.4	19.4
1.1.14	FAULT MODULE						
1.1.15	GEOLGIC REC MOD	67.8		67.8	67.8	116.2	189.2
1.1.16	DEPOSITORY STORAGE MOD	561.0		561.0	561.0	378.2	939.2
1.1.17	CRS	52.7		52.7	52.7	90.8	143.5
1.1.18	LONG-INTER FAC	75.0		75.0	75.0	130.1	205.1
1.1.19	MLN PROC FAC	940.4		940.4	940.4	1,431.0	2,371.4
1.1.20	RECOVERY FAC	694.8		694.8	694.8	1,430.5	2,144.4
1.2	SUPPORT FACILITIES EQUIPMENT	15.3		15.3	15.3	23.5	40.7
1.2.1	PER 3LD & PLT YD	2.4		2.4	2.4	3.5	5.9
1.2.2	WAREHOUSE & ULT	12.8		12.8	12.8	22.0	34.8
1.3	CHIEFS COST	634.0		634.0	634.0	304.4	1,438.4
1.4	INTEREST DURING CONS	636.4		636.4	636.4	686.3	1,442.7
2.0	OPER & MAINT		5,395.6	5,395.6			5,395.6
2.1	EXPCT LABOR		1,104.2	1,104.2			1,104.2
2.1.1	PORT 4, REC TRANS						
2.1.2	WATER BASIN REC (NPORT)		145.6	145.6			145.6
2.1.3	WATER BASIN REC (SPORT)						
2.1.4	WATER BASIN STOR		27.1	27.1			27.1
2.1.5	PRO FAC LABOR						
2.1.6	PRO FAC LABOR		313.7	313.7			313.7
2.1.7	FAULT EMPLACEMENT LABOR						
2.1.8	GEOLGIC REC MOD LABOR		84.0	84.0			84.0
2.1.9	CRS TRANS MAINT LAB		34.1	34.1			34.1
2.1.10	ULI LN PROCES LABOR		15.2	15.2			15.2
2.1.11	MLN PROC LABOR		242.1	242.1			242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1			242.1
2.2	EXPCT LABOR		1,672.9	1,672.9			1,672.9
2.2.1	PORT 4, REC TRANS LAB						
2.2.2	WATER BASIN REC (NPORT) LAB		216.6	216.6			216.6
2.2.3	WATER BASIN REC (SPORT) LAB						
2.2.4	WATER BASIN STOR LAB		40.5	40.5			40.5
2.2.5	PRO FAC LAB						
2.2.6	PRO FAC LAB		470.4	470.4			470.4
2.2.7	FAULT LAB						
2.2.8	GEOLGIC REC MOD LAB		125.5	125.5			125.5
2.2.9	CRS TRANS MAINT LAB		32.9	32.9			32.9
2.2.10	MLN PROC LAB		22.3	22.3			22.3
2.2.11	MLN PROC LAB		371.3	371.3			371.3
2.2.12	REC PLANT LAB		371.3	371.3			371.3
2.3	MATERIAL SUP UTIL ECT		1,672.8	1,672.8			1,672.8
2.3.1	PORT REC FNS						
2.3.2	WATER BASIN REC 4 PORT		216.6	216.6			216.6
2.3.3	WATER BASIN REC 2 PORT						
2.3.4	WATER BASIN STOR		40.5	40.5			40.5
2.3.5	PRO FNS (2500)						
2.3.6	PRO FNS (2500)		470.4	470.4			470.4
2.3.7	FAULT FNS						
2.3.8	GEOLGIC REC FNS		125.5	125.5			125.5
2.3.9	CRS FNS		32.8	32.8			32.8
2.3.10	MLN PROC FNS		22.3	22.3			22.3
2.3.11	MLN PROCESSING FNS		371.3	371.3			371.3
2.3.12	RECOVERY PLANT FNS		371.3	371.3			371.3
2.4	CONTRACTED SERVICES		670.4	670.4			670.4
2.4.1	SHIP CH		351.2	351.2			351.2
2.4.2	US PORT FEE		0.4	0.4			0.4
2.4.3	ELFCR PORT FEE (TOR)						
2.4.4	US RAIL (SF TO STOR)		17.2	17.2			17.2
2.4.5	ELFCR PAUL TRANS						
2.4.6	US STOR (TIME CHRG)		59.6	59.6			59.6
2.4.7	ELFCR STOR						
2.4.8	US RECAL CR						
2.4.9	ELFCR REC CR						
2.4.10	ELFCR WASTE DIS						
2.4.11	US PAUL TRANS		17.0	17.0			17.0
2.4.12	ELFCR PAUL TRANS						
2.4.13	US PORT FEE		0.4	0.4			0.4
2.4.14	ELFCR PORT FEE						
2.4.15	PACIFIC PORT FEE		66.1	66.1			66.1
2.4.16	PACIFIC PORT FEE						
2.4.17	PAUL PAUL TRANS		350.5	350.5			350.5
2.4.18	PAUL PAUL TRANS						
2.5	LOCAL TRUST FUND		75.9	75.9			75.9

Section E3.16

Case: 16A

Description: Fuel Cycle Center (FCC) baseline except geologic storage and location in Europe

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - Europe

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - geologic

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 6.352 billion dollars

Owners ROI - 21.4%

Service charge - \$171/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/PO) \$171.484
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$60708.368

16A
Yearly Profit and Loss Statement

YEAR	REP REVENUE	SEMI-CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	SEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.3	2.3	11.6	12.2	5.9	29.6	.0	27.3
1979	.0	5.2	5.2	11.7	12.4	6.0	30.1	.0	24.9
1980	.0	6.5	6.5	12.3	13.7	6.7	32.7	.0	26.2
1981	.0	10.8	10.8	12.5	14.3	7.0	33.8	.0	19.1
1982	.0	20.2	20.2	13.1	15.9	7.3	36.3	.0	6.6
1983	.0	32.1	32.1	13.3	16.1	8.0	37.5	.0	1.0
1984	.0	48.6	48.6	13.9	18.9	9.3	42.4	2.4	3.8
1985	.0	66.0	66.0	14.1	18.8	9.6	42.5	9.0	14.6
1986	.0	81.7	81.7	15.7	22.4	11.6	49.7	12.2	15.9
1987	.0	96.6	96.6	16.6	23.0	12.0	51.6	17.1	27.9
1988	.0	132.9	132.9	18.0	26.3	14.0	58.3	23.3	46.1
1989	.0	159.2	159.2	18.9	29.2	15.6	63.6	26.3	35.3
1990	.0	167.0	167.0	19.7	31.6	17.1	68.4	37.4	61.1
1991	.0	190.7	190.7	22.9	43.2	23.5	91.6	37.7	61.5
1992	.0	230.4	230.4	23.6	73.0	36.9	137.6	35.3	57.5
1993	.0	272.0	272.0	29.1	68.5	43.6	161.2	42.1	66.7
1994	.0	322.3	322.3	30.7	108.8	53.5	193.1	49.3	80.4
1995	.0	376.5	376.5	33.5	140.7	68.3	243.0	50.7	82.8
1996	.0	404.2	404.2	36.3	166.5	90.9	313.7	34.4	56.1
1997	.0	453.6	453.6	39.3	234.4	114.6	388.4	25.6	41.7
1998	.0	506.1	506.1	42.0	385.9	139.7	438.6	23.6	41.8
1999	.0	541.8	541.8	44.5	277.9	153.1	460.5	30.9	50.4
2000	1413.3	586.6	2000.1	152.9	384.2	142.8	582.6	538.6	878.7
2001	1413.3	644.3	2057.6	158.3	385.3	145.4	589.1	553.1	918.5
2002	1413.3	671.4	2084.9	160.7	386.9	148.1	595.7	555.9	923.3
2003	1413.3	730.3	2144.3	163.2	387.6	150.8	601.5	566.3	956.5
2004	1413.3	784.9	2199.4	165.6	388.3	153.7	607.6	604.5	966.2
2005	1413.3	816.8	2230.3	168.1	388.0	156.6	612.7	614.7	1003.0
2006	1413.3	817.1	2230.6	170.3	388.1	159.7	618.3	612.7	999.7
2007	1413.3	825.3	2238.8	170.6	384.5	161.1	616.2	616.6	1006.0
2008	1413.3	816.8	2230.3	170.6	381.1	159.5	611.3	615.3	1003.8
2009	1413.3	817.4	2230.9	170.6	277.2	161.1	608.6	616.4	1005.7
2010	1413.3	825.6	2239.1	170.6	274.5	164.1	609.2	619.4	1010.5
2011	1413.3	816.8	2230.3	170.6	269.6	165.9	606.1	617.2	1007.0
2012	1413.3	817.1	2230.6	178.6	264.4	167.9	622.9	618.6	1009.2
2013	1413.3	825.3	2238.8	178.6	258.7	170.2	599.5	622.9	1016.4
2014	1413.3	816.8	2230.3	170.6	251.7	171.3	593.7	621.9	1014.7
2015	1413.3	817.4	2230.9	170.6	244.4	171.2	586.2	625.0	1019.7
2016	1413.3	825.6	2239.1	170.6	238.3	172.7	579.7	620.6	1026.8
2017	1413.3	816.8	2230.3	170.6	235.2	176.3	579.1	625.6	1026.2
2018	1413.3	817.1	2230.6	170.6	219.0	179.0	569.6	631.6	1030.4
2019	1413.3	825.3	2238.8	170.6	306.3	182.1	561.0	637.6	1046.2
2020	1413.3	816.8	2230.3	170.6	192.8	182.4	555.9	635.2	1036.3
2021	1413.3	817.4	2230.9	170.6	165.6	192.0	548.2	639.4	1043.2
2022	1413.3	825.6	2239.1	159.9	171.3	193.0	524.2	651.7	1063.2
2023	1413.3	816.8	2230.3	159.9	156.4	197.8	514.0	652.2	1064.1
2024	1413.3	817.1	2230.6	159.9	139.7	202.6	502.2	656.8	1071.6
2025	1413.3	825.3	2238.8	159.9	121.2	206.0	487.1	665.7	1086.1
2026	1413.3	816.8	2230.3	159.9	103.7	217.8	481.4	664.6	1084.4
2027	1413.3	817.4	2230.9	159.9	82.5	224.4	466.8	669.6	1092.5
2028	1413.3	825.6	2239.1	159.9	60.4	249.5	469.7	672.3	1097.6
2029	1413.3	816.8	2230.3	159.9	34.9	300.6	495.3	655.3	1075.7
2030	1413.3	817.1	2230.6	159.9	9.9	36.3	366.1	731.8	1064.7
TOTL	40818.5	28878.2	72696.6	5635.3	8245.0	6352.2	20232.4	19970.9	32468.2
AVG	826.6	544.9	1371.6	106.3	155.6	119.9	391.7	376.9	613.0
20-10	280.2	171.3	451.7	33.5	49.0	37.7	120.1	118.6	192.9

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				CHIEFS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	8.0	194.1	- 186.1	- 186.1	- 82.4	- 82.4	- 80.3	- 80.3	- 80.3	- 80.3
1979	9.2	15.4	- 10.7	- 206.8	- 81.1	- 163.5	- 81.1	- 167.0	- 81.1	- 167.0
1980	6.5	32.2	- 25.7	- 232.5	- 87.1	- 250.6	- 87.4	- 254.9	- 87.4	- 254.9
1981	14.3	33.3	- 19.0	- 251.5	- 10.8	- 261.4	- 16.9	- 268.3	- 16.9	- 268.3
1982	30.2	37.2	- 7.0	- 258.5	- 8.0	- 269.4	- 8.4	- 277.8	- 8.4	- 277.8
1983	39.1	42.8	- 3.7	- 262.2	- 5.5	- 274.9	- 5.4	- 283.2	- 5.4	- 283.2
1984	35.8	37.9	- 2.1	- 264.3	- 3.0	- 277.9	- 3.5	- 286.7	- 3.5	- 286.7
1985	40.8	43.1	- 2.3	- 266.6	- 21.8	- 299.7	- 21.8	- 301.5	- 21.8	- 301.5
1986	31.7	72.4	- 40.7	- 307.3	- 10.1	- 309.8	- 7.2	- 308.7	- 7.2	- 308.7
1987	36.6	58.3	- 21.7	- 329.0	- 33.2	- 343.0	- 37.1	- 345.8	- 37.1	- 345.8
1988	122.9	75.2	- 47.7	- 376.7	- 37.9	- 380.9	- 37.1	- 382.9	- 37.1	- 382.9
1989	105.2	53.1	- 52.1	- 428.8	- 30.3	- 411.2	- 24.7	- 406.5	- 24.7	- 406.5
1990	167.0	52.6	- 114.4	- 543.2	- 59.4	- 470.6	- 58.9	- 465.6	- 58.9	- 465.6
1991	190.7	231.8	- 41.1	- 584.3	- 10.3	- 480.9	- 7.5	- 473.1	- 7.5	- 473.1
1992	330.4	479.3	- 148.9	- 733.2	- 62.9	- 543.8	- 68.3	- 541.4	- 68.3	- 541.4
1993	372.0	241.2	- 130.8	- 864.0	- 33.3	- 577.1	- 30.0	- 571.4	- 30.0	- 571.4
1994	362.8	348.5	- 16.3	- 880.3	- 18.1	- 595.2	- 14.4	- 587.0	- 14.4	- 587.0
1995	376.5	325.7	- 50.8	- 931.1	- 24.6	- 619.8	- 20.4	- 606.6	- 20.4	- 606.6
1996	406.2	710.1	- 303.9	- 1235.0	- 102.8	- 722.6	- 118.9	- 721.5	- 118.9	- 721.5
1997	405.6	731.1	- 325.5	- 1560.5	- 110.5	- 833.1	- 119.0	- 840.5	- 119.0	- 840.5
1998	506.1	543.9	- 37.8	- 1598.3	- 18.6	- 851.7	- 30.2	- 870.7	- 30.2	- 870.7
1999	541.8	261.4	- 280.4	- 1878.7	- 88.0	- 939.7	- 85.6	- 956.3	- 85.6	- 956.3
2000	3080.1	292.9	- 2787.2	- 1866.8	- 94.1	- 1033.8	- 92.5	- 1045.8	- 92.5	- 1045.8
2001	3057.0	226.7	- 2830.3	- 2150.1	- 997.5	- 2031.3	- 996.9	- 2038.3	- 996.9	- 2038.3
2002	3084.9	235.6	- 2849.3	- 2434.4	- 1007.1	- 3038.4	- 1006.4	- 3044.8	- 1006.4	- 3044.8
2003	3144.3	231.5	- 2912.8	- 2726.2	- 1040.8	- 4079.2	- 1040.3	- 4079.5	- 1040.3	- 4079.5
2004	3156.4	241.8	- 2914.6	- 3017.8	- 1066.2	- 5145.4	- 1065.7	- 5146.1	- 1065.7	- 5146.1
2005	3230.3	236.4	- 2993.9	- 3317.2	- 1083.0	- 6228.4	- 1082.6	- 6228.0	- 1082.6	- 6228.0
2006	3230.6	251.5	- 2979.1	- 3615.3	- 1073.2	- 7301.6	- 1072.7	- 7304.3	- 1072.7	- 7304.3
2007	3233.6	206.5	- 3027.1	- 3917.4	- 1090.0	- 8391.6	- 1089.1	- 8390.7	- 1089.1	- 8390.7
2008	3233.3	217.4	- 3015.9	- 4219.3	- 1083.3	- 9474.9	- 1083.9	- 9478.8	- 1083.9	- 9478.8
2009	3230.9	207.8	- 3023.1	- 4522.4	- 1083.4	- 10558.3	- 1084.0	- 10562.3	- 1084.0	- 10562.3
2010	3239.1	227.2	- 3011.9	- 4824.3	- 1074.2	- 11632.5	- 1074.6	- 11637.1	- 1074.6	- 11637.1
2011	3530.3	214.3	- 3316.0	- 5140.3	- 1072.4	- 12704.9	- 1073.3	- 12708.2	- 1073.3	- 12708.2
2012	3230.6	221.0	- 3009.6	- 5440.9	- 1066.4	- 13771.3	- 1067.3	- 13778.6	- 1067.3	- 13778.6
2013	3238.8	226.0	- 3012.8	- 5743.7	- 1065.5	- 14836.8	- 1066.4	- 14843.2	- 1066.4	- 14843.2
2014	3230.3	219.5	- 3010.8	- 6054.5	- 1059.5	- 15896.3	- 1060.7	- 15907.0	- 1060.7	- 15907.0
2015	3230.9	227.3	- 3003.6	- 6358.1	- 1058.7	- 16955.0	- 1059.9	- 16964.9	- 1059.9	- 16964.9
2016	3304.1	219.5	- 3084.6	- 6666.7	- 1053.2	- 17998.2	- 1054.6	- 18052.8	- 1054.6	- 18052.8
2017	3300.3	222.5	- 3077.8	- 6974.5	- 1048.0	- 19046.2	- 1049.3	- 19095.5	- 1049.3	- 19095.5
2018	3230.6	222.3	- 3008.3	- 7272.8	- 1044.1	- 20090.3	- 1045.7	- 20136.0	- 1045.7	- 20136.0
2019	3238.8	227.3	- 3011.5	- 7584.3	- 1046.2	- 21136.5	- 1047.9	- 21184.4	- 1047.9	- 21184.4
2020	3230.3	224.5	- 3005.8	- 7889.1	- 1021.5	- 22158.0	- 1023.1	- 22181.1	- 1023.1	- 22181.1
2021	3330.9	232.3	- 3098.6	- 8197.7	- 1050.1	- 23208.1	- 1052.3	- 23260.4	- 1052.3	- 23260.4
2022	3339.1	221.7	- 3117.4	- 8509.1	- 1042.8	- 24250.9	- 1047.0	- 24297.9	- 1047.0	- 24297.9
2023	3230.3	224.9	- 3005.6	- 8814.7	- 1032.8	- 25283.7	- 1035.2	- 25318.9	- 1035.2	- 25318.9
2024	3130.6	221.7	- 2908.9	- 9123.6	- 1031.1	- 26314.8	- 1032.9	- 26347.8	- 1032.9	- 26347.8
2025	3233.6	215.2	- 3018.4	- 9432.0	- 1028.8	- 27343.6	- 1031.9	- 27375.5	- 1031.9	- 27375.5
2026	3130.3	218.5	- 2911.8	- 9743.8	- 1023.2	- 28366.8	- 1025.7	- 28392.2	- 1025.7	- 28392.2
2027	3230.9	216.8	- 3014.1	- 10057.9	- 1022.2	- 29389.0	- 1025.7	- 29414.7	- 1025.7	- 29414.7
2028	3233.1	223.0	- 3010.3	- 10368.2	- 1023.1	- 30412.1	- 1026.8	- 30438.9	- 1026.8	- 30438.9
2029	3230.3	216.5	- 3013.8	- 10682.0	- 1018.1	- 31430.2	- 1014.3	- 31444.5	- 1014.3	- 31444.5
2030	3250.6	245.9	- 3004.7	- 10986.7	- 1222.5	- 32652.7	- 1221.3	- 32674.0	- 1221.3	- 32674.0

16A.

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	*	FIXED ASSETS	DEFERRED CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	182.6	*	176.7	4.0	121.6	55.1
1979	4.3	*	175.0	4.0	123.7	55.3
1980	19.9	*	189.1	4.3	136.0	56.5
1981	11.1	*	192.2	4.3	142.3	57.7
1982	24.1	*	203.5	4.3	157.1	58.2
1983	6.3	*	206.8	4.3	159.9	51.8
1984	43.9	*	241.2	5.3	187.3	59.2
1985	1.1	*	232.7	5.3	186.2	52.6
1986	57.2	*	278.3	5.4	222.0	62.6
1987	11.7	*	278.0	5.6	227.0	57.0
1988	57.2	*	321.2	7.4	262.0	66.6
1989	44.2	*	349.6	8.0	287.6	70.1
1990	42.9	*	375.6	8.6	311.9	72.3
1991	208.9	*	561.1	11.3	446.1	126.3
1992	463.7	*	977.3	16.8	742.3	252.1
1993	312.0	*	1146.3	19.6	875.6	296.3
1994	317.7	*	1410.5	23.3	1077.5	356.3
1995	492.2	*	1832.9	29.0	1393.3	469.5
1996	703.8	*	2446.9	37.1	1847.5	636.0
1997	741.8	*	3074.0	45.6	2322.3	797.2
1998	501.9	*	3445.2	51.3	2633.3	863.2
1999	216.9	*	3324.0	53.7	2745.6	828.1
2000	137.1	*	3518.3	73.3	2809.2	762.3
2001	65.4	*	3441.3	74.0	2815.2	695.6
2002	74.9	*	3568.1	74.6	2829.9	612.7
2003	69.4	*	3365.7	75.1	2831.7	529.1
2004	76.2	*	3408.2	75.7	2834.2	449.7
2005	68.4	*	3119.9	76.0	2624.0	370.6
2006	81.4	*	3041.6	76.4	2621.2	296.9
2007	35.9	*	2916.4	77.9	2779.9	212.3
2008	49.8	*	2803.7	78.3	2746.7	132.3
2009	37.2	*	2679.3	74.6	2706.0	53.9
2010	66.6	*	2528.3	74.2	2666.6	10.2
2011	43.7	*	2420.1	73.4	2609.8	76.4
2012	50.4	*	2342.7	72.3	2542.6	124.4
2013	55.4	*	2327.6	71.3	2482.3	184.5
2014	48.9	*	2165.2	70.4	2406.0	236.4
2015	56.7	*	1990.7	69.2	2330.5	270.6
2016	43.9	*	1866.9	67.2	2241.1	306.4
2017	61.9	*	1732.5	66.3	2148.4	329.3
2018	61.2	*	1635.3	64.9	2045.0	344.7
2019	56.7	*	1509.9	63.1	1925.5	352.4
2020	39.9	*	1414.3	61.6	1815.1	339.2
2021	61.9	*	1284.2	59.4	1671.6	328.2
2022	61.9	*	1153.1	55.2	1520.3	312.0
2023	65.0	*	1070.3	52.7	1356.1	283.1
2024	61.9	*	979.6	49.9	1174.9	245.4
2025	55.4	*	729.0	46.6	977.0	201.2
2026	89.1	*	600.2	43.9	787.1	142.9
2027	56.9	*	436.6	40.4	561.3	90.1
2028	63.2	*	244.4	36.7	311.0	29.9
2029	56.7	*	1.0	32.0	1.5	31.5
2030	66.1	*	1.0	27.6	1.1	26.8
TOTAL CAPITAL INVESTMENT			6352.5			

16A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	182.57	60.95001	60.24809	86.34601
1979	186.79	63.12999	61.64069	107.4871
1980	206.64	70.64999	68.19119	134.9138
1981	217.71	75.40009	71.84428	151.8597
1982	241.78	84.6601	79.78738	160.2548
1983	248.1	88.22009	81.87299	160.2548
1984	292.0498	104.5399	96.37642	163.787
1985	293.0996	106.8897	96.72285	163.787
1986	350.2996	128.2698	115.5988	163.787
1987	361.9995	134.9497	119.4598	163.787
1988	419.1995	157.2197	138.3358	163.787
1989	463.3994	175.75	152.9218	163.787
1990	506.2993	194.4402	167.0788	163.787
1991	715.1992	269.0603	236.0157	163.787
1992	1168.909	426.4004	385.74	232.0782
1993	1380.929	505.3606	455.7063	232.0782
1994	1698.639	621.1809	560.5508	232.0782
1995	2190.849	797.3608	722.98	262.4419
1996	2894.669	1047.161	955.2405	373.3501
1997	3636.449	1313.972	1200.028	492.325
1998	4138.355	1505.078	1365.657	516.5742
1999	4355.254	1605.647	1437.234	516.5742
2000	4492.332	1683.065	1482.469	516.5742
2001	4560.711	1741.485	1505.034	516.5742
2002	4635.59	1805.724	1529.744	516.5742
2003	4703.969	1872.233	1552.31	516.5742
2004	4780.148	1945.983	1577.449	516.5742
2005	4848.527	2022.552	1600.014	516.5742
2006	4929.906	2108.751	1626.869	516.5742
2007	4965.785	2185.86	1638.709	516.5742
2008	5012.582	2265.918	1654.152	516.5742
2009	5049.762	2349.278	1666.421	516.5742
2010	5116.32	2449.696	1688.385	516.5742
2011	5160	2550.187	1702.8	516.5742
2012	5210.437	2660.844	1719.444	516.5742
2013	5265.816	2781.993	1737.719	516.5742
2014	5314.695	2908.673	1753.849	516.5742
2015	5371.375	3040.833	1772.553	516.5742
2016	5420.254	3179.182	1788.684	516.5742
2017	5482.133	3333.701	1809.104	516.5742
2018	5544.012	3499.04	1829.524	516.5742
2019	5600.691	3675.24	1848.228	516.5742
2020	5694.551	3879.49	1879.202	516.5742
2021	5756.43	4084.599	1899.622	516.5742
2022	5818.309	4298.035	1920.042	516.5742
2023	5883.309	4527.176	1941.492	516.5742
2024	5945.187	4770.305	1961.912	516.5742
2025	6000.566	5023.586	1980.187	516.5742
2026	6089.656	5302.586	2009.586	516.5742
2027	6146.594	5585.293	2028.376	516.5742
2028	6209.773	5898.742	2049.225	516.5742
2029	6266.453	6264.922	2067.929	516.5742
2030	6352.512	6351.43	2096.329	516.5742

16A
Cost Summary - Dollars in Millions

WBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	6,352.6	5,637.6	11,990.2	6,352.6	5,637.6	11,990.2
1.0	CAPITAL ITEMS	6,352.6		6,352.6	6,352.6		6,352.6
1.1	SYSTEM FACILITIES-EQUIPMENT	4,851.7		4,851.7	4,851.7		4,851.7
1.1.1	SHIP	435.0		435.0	435.0		435.0
1.1.2	ONR	435.0		435.0	435.0		435.0
1.1.3	ONR TRANSPORTER-PAUL CAR	17.4		17.4	17.4		17.4
1.1.4	PAUL CAR TUG	0.8		0.8	0.8		0.8
1.1.5	ONR TRANSPORTER						
1.1.6	ONRPORT FAC						
1.1.7	WATER BASIN 1 PORT	48.0		48.0	48.0		48.0
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	768.0		768.0	768.0		768.0
1.1.10	PROCESING FACILITY						
1.1.11	PROCESING FAC	116.0		116.0	116.0		116.0
1.1.12	CONCRETE	224.4		224.4	224.4		224.4
1.1.13	EMPLOYMENT TRANS	12.0		12.0	12.0		12.0
1.1.14	WATER TREATMENT						
1.1.15	GEOLGIC REC MOD	67.0		67.0	67.0		67.0
1.1.16	REPOSITORY STORAGE MOD	578.0		578.0	578.0		578.0
1.1.17	ONR	52.7		52.7	52.7		52.7
1.1.18	ONRPORT FAC	75.0		75.0	75.0		75.0
1.1.19	ONRPORT FAC	940.4		940.4	940.4		940.4
1.1.20	RECOVERY FAC	894.0		894.0	894.0		894.0
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7		14.7
1.2.1	ONR 1/2 1/2 FLT YD	2.4		2.4	2.4		2.4
1.2.2	WAREHOUSE & ULT	12.2		12.2	12.2		12.2
1.3	CHIEFS COST	743.1		743.1	743.1		743.1
1.4	ONRPORT DURING CON	743.1		743.1	743.1		743.1
2.0	OPER & MAINT		5,637.6	5,637.6		5,637.6	5,637.6
2.1	DIRECT LABOR		1,050.7	1,050.7		1,050.7	1,050.7
2.1.1	PORT & REC TRANS		4.8	4.8		4.8	4.8
2.1.2	WATER BASIN REC(4PORT)		139.5	139.5		139.5	139.5
2.1.3	WATER BASIN REC(2PORT)						
2.1.4	WATER BASIN STOP		26.0	26.0		26.0	26.0
2.1.5	PROF. FAC LABOR						
2.1.6	PROF. FAC LABOR		221.0	221.0		221.0	221.0
2.1.7	WATER TREATMENT LABOR						
2.1.8	GEOLGIC REC MOD LABOR		84.0	84.0		84.0	84.0
2.1.9	ONR TRANS MAINT LAB		30.9	30.9		30.9	30.9
2.1.10	ONR TRANS MAINT LAB		10.2	10.2		10.2	10.2
2.1.11	ONR TRANS MAINT LAB		342.1	342.1		342.1	342.1
2.1.12	RECOVERY PLANT LAB		342.1	342.1		342.1	342.1
2.2	INDIRECT LABOR		1,589.8	1,589.8		1,589.8	1,589.8
2.2.1	PORT & REC TRANS LAB		7.7	7.7		7.7	7.7
2.2.2	WATER BASIN REC(4PORT) LAB		209.1	209.1		209.1	209.1
2.2.3	WATER BASIN REC(2PORT) LAB						
2.2.4	WATER BASIN STOP LAB		38.7	38.7		38.7	38.7
2.2.5	PROF. FAC IND LAB						
2.2.6	PROF. FAC IND LAB		331.5	331.5		331.5	331.5
2.2.7	WATER TREATMENT LAB						
2.2.8	GEOLGIC REC MOD LAB		125.5	125.5		125.5	125.5
2.2.9	ONR TRANS MAINT LAB		119.2	119.2		119.2	119.2
2.2.10	ONR TRANS MAINT LAB		15.0	15.0		15.0	15.0
2.2.11	ONR TRANS MAINT LAB		371.3	371.3		371.3	371.3
2.2.12	RECOVERY PLANT LAB		371.3	371.3		371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,587.6	1,587.6		1,587.6	1,587.6
2.3.1	PORT REC FMS		7.7	7.7		7.7	7.7
2.3.2	WATER BASIN REC(4PORT) FMS		147.3	147.3		147.3	147.3
2.3.3	WATER BASIN REC(2PORT) FMS						
2.3.4	WATER BASIN STOP FMS		38.7	38.7		38.7	38.7
2.3.5	PROF. FAC FMS(2000)						
2.3.6	PROF. FAC FMS(2000)		331.5	331.5		331.5	331.5
2.3.7	WATER TREATMENT FMS						
2.3.8	GEOLGIC REC FMS		125.5	125.5		125.5	125.5
2.3.9	ONR TRANS FMS		119.2	119.2		119.2	119.2
2.3.10	ONR TRANS FMS		15.0	15.0		15.0	15.0
2.3.11	ONR TRANS FMS		371.3	371.3		371.3	371.3
2.3.12	RECOVERY PLANT FMS		371.3	371.3		371.3	371.3
2.4	CONTRACTED SERVICES		1,390.0	1,390.0		1,390.0	1,390.0
2.4.1	SHIP ON		841.2	841.2		841.2	841.2
2.4.2	US PORT FEE						
2.4.3	ONRPORT FEE STOP		66.1	66.1		66.1	66.1
2.4.4	US FUEL(1/2 TO STOP)						
2.4.5	ONRPORT FUEL TRANS		487.7	487.7		487.7	487.7
2.4.6	US FUEL(1/2 TO STOP)						
2.4.7	ONRPORT FUEL STOP						
2.4.8	US FUEL(1/2 TO STOP)						
2.4.9	ONRPORT FUEL STOP						
2.4.10	ONRPORT FUEL STOP						
2.4.11	ONRPORT FUEL STOP						
2.4.12	ONRPORT FUEL STOP						
2.4.13	ONRPORT FUEL STOP						
2.4.14	ONRPORT FUEL STOP						
2.4.15	ONRPORT FUEL STOP						
2.4.16	ONRPORT FUEL STOP						
2.4.17	ONRPORT FUEL STOP						
2.4.18	ONRPORT FUEL STOP						
2.4.19	ONRPORT FUEL STOP						
2.4.20	ONRPORT FUEL STOP						
2.4.21	ONRPORT FUEL STOP						
2.5	ECON TRUST FUND		74.5	74.5		74.5	74.5

Section E3.17

Case: 1A-T

Description: Fuel Cycle Center (FCC) baseline except transportation portion only

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics for Transportation Portion:

Capital investment - 616.9 million dollars

Owners ROI - 19.6%

Service charge for

transportation portion - \$44.65/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/PC) 444.653
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 16337.256

1A-7

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	.6	.6	.8	2.4	1.4	4.6	.0	-3.8
1979	.0	1.4	1.4	1.5	2.7	1.6	5.7	.0	-4.3
1980	.0	1.7	1.7	2.4	3.2	1.9	7.5	.0	-5.8
1981	.0	3.6	3.6	3.5	4.0	2.4	9.9	.0	-6.3
1982	.0	7.9	7.9	5.0	6.7	3.5	14.1	.0	-6.2
1983	.0	10.2	10.2	6.1	6.1	3.8	16.0	.0	-5.8
1984	.0	12.7	12.7	7.4	6.1	3.8	17.3	.0	-4.6
1985	.0	17.2	17.2	3.5	6.2	3.9	13.6	1.7	3.6
1986	.0	21.3	21.3	4.1	6.9	4.4	15.5	2.2	3.6
1987	.0	25.1	25.1	4.1	6.8	4.4	15.4	3.7	6.1
1988	.0	34.6	34.6	4.6	7.4	4.9	17.0	6.7	10.9
1989	.0	41.3	41.3	4.6	7.3	4.9	16.8	9.4	15.2
1990	.0	43.5	43.5	4.6	7.1	4.9	16.6	10.2	16.6
1991	.0	49.7	49.7	5.7	8.7	5.9	20.3	11.1	18.4
1992	.0	60.0	60.0	6.3	9.2	6.4	21.9	14.3	23.6
1993	.0	70.8	70.8	6.8	10.0	7.1	23.9	17.0	26.1
1994	.0	84.1	84.1	7.4	10.6	7.6	25.5	22.2	36.0
1995	.0	98.0	98.0	7.8	11.1	8.1	27.0	27.0	44.0
1996	.0	105.3	105.3	8.4	11.6	8.6	28.6	29.1	47.0
1997	.0	118.6	118.6	9.0	12.1	9.1	30.2	33.6	57.3
1998	.0	131.8	131.8	10.1	14.1	10.6	34.8	36.9	60.1
1999	.0	141.1	141.1	10.6	14.4	11.2	36.2	39.8	65.0
2000	.0	152.8	152.8	12.2	15.8	12.3	40.3	42.7	69.1
2001	.0	167.8	167.8	12.7	15.9	12.8	41.3	48.0	78.1
2002	.0	174.8	174.8	13.2	16.4	13.6	43.1	50.0	81.6
2003	.0	190.3	190.3	13.7	16.4	12.7	42.7	56.1	91.2
2004	.0	204.4	204.4	14.3	16.7	13.1	44.2	60.9	99.3
2005	.0	212.7	212.7	14.8	16.8	13.3	44.8	63.8	104.1
2006	.0	212.8	212.8	15.1	16.9	13.3	45.3	63.6	103.8
2007	.0	214.9	214.9	15.1	16.1	13.3	44.5	65.1	106.3
2008	.0	212.7	212.7	15.0	16.8	12.4	43.4	64.2	105.0
2009	.0	212.8	212.8	14.9	15.3	12.3	42.6	64.7	105.8
2010	.0	215.0	215.0	14.9	14.6	12.2	41.7	65.6	107.3
2011	.0	212.7	212.7	14.8	14.8	12.4	42.0	64.9	105.8
2012	.0	212.8	212.8	14.8	14.4	12.7	41.8	65.0	106.0
2013	.0	214.9	214.9	14.7	14.4	13.0	42.1	65.7	107.1
2014	.0	212.7	212.7	14.6	14.1	13.6	42.4	64.7	105.8
2015	.0	212.8	212.8	14.6	13.6	14.1	42.2	64.8	105.8
2016	.0	215.0	215.0	14.5	12.6	13.4	40.7	66.2	108.0
2017	.0	212.7	212.7	14.5	12.7	13.9	41.1	65.2	106.4
2018	.0	212.8	212.8	14.4	13.2	13.4	41.0	64.5	105.3
2019	.0	214.9	214.9	14.4	12.7	13.7	42.7	65.4	106.7
2020	.0	212.7	212.7	14.3	12.3	16.5	43.1	64.4	105.2
2021	.0	212.8	212.8	14.2	11.8	17.2	43.3	64.4	105.1
2022	.0	215.0	215.0	14.2	11.3	18.3	43.8	65.0	106.1
2023	.0	212.7	212.7	14.1	10.7	18.7	43.5	64.3	104.9
2024	.0	212.8	212.8	14.1	9.6	19.2	42.9	64.5	105.3
2025	.0	214.9	214.9	14.0	8.4	19.1	41.5	65.9	107.0
2026	.0	212.7	212.7	13.9	8.2	23.9	46.0	63.3	103.8
2027	.0	212.8	212.8	13.9	6.7	23.2	43.8	63.5	103.0
2028	.0	215.0	215.0	13.8	5.4	20.6	49.8	62.8	102.4
2029	.0	212.7	212.7	13.8	6.2	26.7	53.7	60.4	98.0
2030	.0	212.8	212.8	13.7	4	26.5	50.6	73.0	119.1
TOTL	.0	7519.7	7519.7	565.5	561.3	616.9	1743.7	1200.0	4567.1
R/C	.0	141.9	141.9	10.7	10.6	11.6	32.9	41.7	67.3
R/R/C	.0	44.7	44.7	3.4	3.9	3.7	10.4	13.1	21.2

1A-T
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				CHIEFS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	.6	35.9	- 35.3	- 35.3	- 14.4	- 14.4	- 14.4	- 14.4	- 14.4	- 14.4
1979	1.4	6.4	- 5.0	- 40.3	- 4.7	- 19.1	- 4.7	- 19.1	- 4.7	- 19.1
1980	1.7	10.4	- 8.7	- 49.0	- 6.9	- 26.0	- 7.1	- 26.0	- 7.1	- 26.0
1981	3.8	16.3	- 12.4	- 61.5	- 8.3	- 34.3	- 8.6	- 34.3	- 8.6	- 34.3
1982	7.9	30.8	- 22.9	- 84.4	- 12.0	- 46.3	- 12.5	- 46.3	- 12.5	- 46.3
1983	10.2	13.5	- 3.3	- 87.7	- 5.3	- 51.6	- 5.6	- 51.6	- 5.6	- 51.6
1984	12.7	3.6	4.0	- 83.6	- 3.2	- 53.8	- 2.5	- 53.8	- 2.5	- 53.8
1985	17.2	6.3	10.9	- 72.7	4.2	- 49.6	4.8	- 49.6	4.8	- 49.6
1986	21.3	17.1	4.2	- 68.6	2.5	- 47.1	2.3	- 47.1	2.3	- 47.1
1987	23.1	4.1	21.0	- 47.5	9.1	- 38.0	9.2	- 38.0	9.2	- 38.0
1988	34.6	16.3	18.3	- 29.2	10.4	- 27.6	10.2	- 27.6	10.2	- 27.6
1989	41.5	4.6	36.8	- 7.6	18.4	- 9.2	16.5	- 9.2	16.5	- 9.2
1990	43.5	4.6	38.9	46.5	19.6	10.4	19.6	10.4	19.6	10.4
1991	49.7	21.7	17.9	64.4	13.2	23.6	12.8	23.6	12.8	23.6
1992	60.0	17.9	42.0	106.4	23.6	47.2	23.4	47.2	23.4	47.2
1993	78.8	22.7	56.2	162.6	27.9	75.1	27.7	75.1	27.7	75.1
1994	84.1	20.4	63.7	226.3	36.2	111.3	36.0	111.3	36.0	111.3
1995	98.0	20.8	77.2	303.5	44.0	155.4	43.9	155.4	43.9	155.4
1996	105.3	21.4	83.9	387.4	47.5	202.9	47.4	202.9	47.4	202.9
1997	118.6	22.0	96.7	484.1	54.9	257.8	54.7	257.8	54.7	257.8
1998	131.6	47.8	84.0	568.0	52.8	310.6	52.5	310.6	52.5	310.6
1999	141.1	23.9	117.2	685.3	65.6	376.3	65.5	376.3	65.5	376.3
2000	152.8	41.3	111.4	796.7	65.5	441.7	65.0	441.7	65.0	441.7
2001	167.0	24.4	142.6	939.3	79.6	521.3	79.5	521.3	79.5	521.3
2002	174.8	32.7	142.2	1081.5	88.1	609.4	79.9	609.4	79.9	609.4
2003	190.3	26.7	163.6	1245.1	92.8	702.2	92.8	702.2	92.8	702.2
2004	204.4	30.2	174.2	1419.3	99.7	801.9	99.6	801.9	99.6	801.9
2005	212.7	26.5	186.2	1605.5	105.8	907.7	105.7	907.7	105.7	907.7
2006	212.8	28.1	184.6	1790.1	105.2	1012.9	105.1	1012.9	105.1	1012.9
2007	214.9	15.1	199.8	1989.9	112.1	1125.0	112.2	1125.0	112.2	1125.0
2008	212.7	23.1	189.6	2179.5	108.0	1233.0	108.0	1233.0	108.0	1233.0
2009	212.8	14.9	197.9	2377.4	110.6	1343.6	110.7	1343.6	110.7	1343.6
2010	215.0	14.9	200.1	2577.5	111.8	1455.4	112.0	1455.4	112.0	1455.4
2011	212.7	29.1	183.6	2761.1	105.7	1561.1	105.7	1561.1	105.7	1561.1
2012	212.8	20.0	192.8	2953.9	108.3	1669.4	108.4	1669.4	108.4	1669.4
2013	214.9	27.7	187.2	3141.1	107.0	1776.4	107.0	1776.4	107.0	1776.4
2014	212.7	24.5	188.2	3329.3	106.0	1882.4	106.1	1882.4	106.1	1882.4
2015	212.6	21.1	191.7	3521.0	106.6	1989.0	106.7	1989.0	106.7	1989.0
2016	215.0	19.7	195.2	3716.2	109.3	2098.3	109.4	2098.3	109.4	2098.3
2017	212.7	27.5	185.2	3901.4	105.1	2199.5	105.2	2199.5	105.2	2199.5
2018	212.8	39.1	173.6	4075.0	100.9	2299.3	100.8	2299.3	100.8	2299.3
2019	214.9	23.7	191.2	4266.2	107.2	2406.5	107.3	2406.5	107.3	2406.5
2020	212.7	27.3	185.4	4451.6	104.4	2509.9	104.4	2509.9	104.4	2509.9
2021	212.8	25.9	186.9	4638.5	104.6	2612.5	104.7	2612.5	104.7	2612.5
2022	215.0	27.2	187.8	4826.3	105.1	2717.6	105.2	2717.6	105.2	2717.6
2023	212.7	27.1	185.6	5011.9	104.6	2822.2	104.7	2822.2	104.7	2822.2
2024	212.8	20.6	192.2	5199.1	106.6	2928.8	106.6	2928.8	106.6	2928.8
2025	214.9	19.2	195.7	5394.8	109.1	3038.0	109.3	3038.0	109.3	3038.0
2026	212.7	34.7	178.0	5572.8	100.8	3138.8	100.9	3138.8	100.9	3138.8
2027	212.8	20.4	192.4	5765.2	105.3	3244.1	105.6	3244.1	105.6	3244.1
2028	215.0	25.5	189.4	5954.6	102.9	3347.1	103.2	3347.1	103.2	3347.1
2029	212.7	20.5	192.2	6146.8	100.9	3448.0	101.3	3448.0	101.3	3448.0
2030	212.8	20.2	192.6	6339.4	119.1	3567.1	119.8	3567.1	119.8	3567.1

1A-T

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1970	35.2	A	33.8	.0	23.2	11.0
1971	4.9	B	37.0	.7	26.2	11.4
1972	7.9	B	43.1	.9	31.2	12.8
1973	12.8	B	53.5	1.2	33.9	15.7
1974	25.8	B	75.8	1.8	55.9	21.7
1975	7.3	A	79.4	2.0	58.9	21.5
1976	1.2	A	76.6	2.2	58.6	19.2
1977	2.8	B	75.6	1.6	60.6	16.2
1978	19.8	B	84.2	1.8	68.1	18.0
1979	.0	B	79.0	1.8	66.7	14.9
1980	11.7	B	86.6	2.0	72.9	15.6
1981	.0	B	81.6	2.0	71.2	12.0
1982	.8	B	76.7	2.0	68.2	9.5
1983	26.0	B	96.8	2.4	84.3	14.6
1984	11.7	B	102.1	2.6	89.6	15.1
1985	15.9	B	110.9	2.8	97.2	18.5
1986	13.0	B	116.3	3.0	102.5	18.6
1987	13.0	B	121.3	3.2	107.4	17.0
1988	13.0	B	125.6	3.3	111.9	17.1
1989	13.0	B	129.5	3.5	115.8	17.2
1990	37.7	A	156.5	4.0	135.5	25.1
1991	13.3	B	158.6	4.2	138.2	24.6
1992	29.1	B	175.4	4.7	150.8	29.3
1993	11.7	B	174.3	4.8	150.8	28.2
1994	19.5	B	180.2	4.9	155.2	29.9
1995	13.0	B	180.6	5.0	156.9	28.7
1996	15.9	B	183.3	5.2	160.1	28.4
1997	11.7	B	181.7	5.3	160.2	26.8
1998	13.0	B	181.4	5.3	161.2	25.5
1999	.0	B	169.1	5.2	154.7	19.6
2000	8.1	B	164.8	5.2	153.4	16.6
2001	.0	B	152.5	5.0	146.2	11.4
2002	.0	B	148.9	4.9	138.4	6.9
2003	14.3	B	142.2	4.9	140.2	7.0
2004	5.2	B	134.7	4.9	135.0	4.6
2005	13.0	B	134.7	4.8	134.6	4.7
2006	9.9	B	130.9	4.8	131.5	4.2
2007	6.5	B	123.4	4.7	124.8	3.3
2008	5.2	B	115.2	4.6	117.9	1.9
2009	13.0	B	114.3	4.5	115.7	3.1
2010	24.7	B	123.6	4.6	120.6	7.6
2011	9.4	B	117.3	4.5	114.7	7.1
2012	13.0	B	113.8	4.4	110.5	7.8
2013	11.7	B	108.3	4.3	104.5	8.2
2014	13.0	B	103.0	4.2	98.1	9.1
2015	13.0	B	97.3	4.1	92.1	9.3
2016	6.5	B	84.5	3.9	80.7	7.8
2017	5.2	B	70.6	3.7	68.4	5.9
2018	20.8	B	67.6	3.7	62.9	8.3
2019	6.5	B	46.8	3.4	46.0	6.3
2020	11.7	B	29.9	3.2	27.6	5.5
2021	6.6	B	.0	2.8	.0	2.8
2022	6.5	B	.0	2.4	.0	2.4
TOTAL CAPITAL INVESTMENT			616.9			

1A-T

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	35.17999	11.65002	11.6094	11.6094
1979	40.00998	12.76003	13.31979	13.3198
1980	47.99997	16.76003	15.83999	15.84
1981	60.31996	21.50005	20.07057	20.07059
1982	66.63997	30.73006	28.59119	28.59119
1983	90.95996	34.02007	31.01007	31.01009
1984	95.18994	35.37006	31.41267	31.41267
1985	97.96994	37.35007	32.33006	31.41266
1986	110.9699	42.90009	36.62007	32.31882
1987	110.9699	44.28009	36.62007	32.31882
1988	122.6699	49.74011	40.48106	32.3188
1989	122.6699	51.50012	40.48106	32.3188
1990	122.6699	53.44012	40.48106	32.3188
1991	148.6699	64.33014	49.06107	32.31879
1992	160.3699	70.81015	52.92207	32.31877
1993	176.3299	79.03015	58.15537	32.31876
1994	189.2299	86.70012	63.44586	32.31874
1995	202.2299	94.89022	68.73536	32.31873
1996	215.2299	103.3602	71.08586	32.31871
1997	228.2299	112.4402	75.31586	32.3187
1998	255.9297	130.41	87.75679	32.31868
1999	279.1895	148.9597	92.13251	32.31866
2000	308.3093	157.5497	101.7421	32.31865
2001	320.0093	169.1697	109.603	32.31863
2002	339.5093	184.2797	112.0561	32.31862
2003	352.5093	195.5997	116.328	32.3186
2004	368.3691	208.3095	121.5618	32.31859
2005	388.0691	219.6895	129.4228	32.31857
2006	393.0691	231.6296	139.7128	32.31856
2007	393.0691	238.3396	139.7128	32.31856
2008	401.1289	247.6894	132.3725	32.31854
2009	401.1289	254.5594	132.3725	32.31854
2010	401.1289	262.7493	132.3725	32.31854
2011	415.4287	275.269	137.0915	32.31853
2012	420.6287	285.6392	136.6074	32.31851
2013	433.6287	298.7891	143.0974	32.3185
2014	443.5085	311.999	146.3576	32.31848
2015	450.0085	325.219	148.5028	32.31847
2016	455.2085	337.3191	150.2188	32.31845
2017	468.2085	352.5291	154.5068	32.31844
2018	492.9084	372.2883	162.8598	32.31842
2019	502.3683	387.5288	165.7463	32.31841
2020	515.2683	404.7788	170.0383	32.31839
2021	526.9683	422.5088	175.8993	32.31837
2022	539.9680	441.9349	178.1895	32.31836
2023	552.9683	460.8489	182.4795	32.31834
2024	559.4683	478.7483	184.6245	32.31833
2025	564.6682	496.2187	186.3465	32.31831
2026	585.468	522.5486	193.2044	32.3183
2027	591.968	545.9785	195.5494	32.31828
2028	603.668	576.0286	199.2184	32.31827
2029	610.4277	610.4185	201.4411	32.31825
2030	616.9277	616.9185	203.5861	32.31824

PRESENT VALUE OF CAPITAL INU AT RATE % 4M 19.99998
69.23122
PRESENT VALUE OF CAPITAL INU AT RATE % 4M 10.
125.8261

CASE - 1A-T
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN MILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Transport							
Capital Expenditures	619.9		619.9	619.9	561.4		1,178.3
Total Transport							
O&M Expenditures		565.5	565.5			565.5	565.5

Section E3.18

Case: 1A-S

Description: Fuel Cycle Center (FCC) baseline except storage portion only

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics Storage Portion Only:

Capital investment - 1.705 billion dollars

Owners ROI - 21.6%

Service charge - \$131/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/PC) #131.348
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT #16258.590

1A-S

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	1.8	1.8	.0	2.5	1.5	4.0	.0	2.2
1979	.0	4.0	4.0	.0	4.2	2.9	7.8	.0	3.2
1980	.0	4.9	4.9	.1	6.7	4.1	10.8	.0	3.9
1981	.0	11.3	11.3	.1	8.6	5.3	14.2	.0	8.2
1982	.0	23.1	23.1	.1	12.6	7.7	20.4	1.0	1.7
1983	.0	30.0	30.0	.2	16.5	10.1	26.8	1.2	2.0
1984	.0	37.2	37.2	.2	19.6	12.1	31.9	2.0	3.3
1985	.0	50.6	50.6	15.3	22.0	13.7	50.9	.0	3.3
1986	.0	62.6	62.6	15.3	22.9	14.4	52.6	3.0	6.2
1987	.0	74.0	74.0	47.0	25.7	16.0	69.0	.0	15.0
1988	.0	101.8	101.8	47.0	27.9	17.9	93.6	3.1	0.1
1989	.0	121.9	121.9	47.0	29.1	18.9	95.0	3.9	16.2
1990	.0	127.9	127.9	47.9	31.1	20.4	99.4	18.2	17.6
1991	.0	146.1	146.1	47.9	32.8	21.8	102.5	16.6	27.0
1992	.0	176.5	176.5	47.9	35.3	23.8	106.9	28.4	43.1
1993	.0	208.3	208.3	48.0	39.6	26.9	114.4	35.7	56.2
1994	.0	247.3	247.3	48.0	43.6	29.9	121.7	47.7	77.8
1995	.0	288.4	288.4	48.1	47.8	32.0	128.9	60.6	99.9
1996	.0	309.6	309.6	48.1	52.6	36.7	137.4	65.4	106.8
1997	.0	349.0	349.0	48.2	57.8	40.7	146.7	78.9	123.4
1998	.0	387.6	387.6	48.2	63.8	45.3	157.3	87.5	142.8
1999	.0	415.0	415.0	48.3	71.4	51.0	170.7	92.8	151.5
2000	.0	449.3	449.3	48.3	69.1	51.0	168.4	106.7	174.2
2001	.0	493.5	493.5	48.3	66.6	51.0	165.9	124.5	203.1
2002	.0	514.3	514.3	48.3	63.9	51.0	163.2	133.4	217.7
2003	.0	559.7	559.7	48.3	61.8	50.1	160.2	151.8	247.7
2004	.0	601.2	601.2	48.4	59.7	49.2	157.3	168.7	275.2
2005	.0	625.7	625.7	48.4	57.5	48.7	154.6	179.0	292.1
2006	.0	625.9	625.9	48.4	56.7	48.9	154.0	179.3	292.6
2007	.0	632.1	632.1	48.4	54.4	47.2	149.9	183.2	299.0
2008	.0	625.7	625.7	48.4	52.1	45.4	145.9	182.3	297.5
2009	.0	626.1	626.1	48.4	49.9	44.1	142.4	183.8	299.9
2010	.0	632.3	632.3	48.4	48.7	43.9	141.0	186.7	304.6
2011	.0	625.7	625.7	48.4	45.5	43.2	137.1	182.6	302.9
2012	.0	625.9	625.9	48.4	43.1	42.1	133.7	187.0	305.1
2013	.0	632.1	632.1	48.4	40.8	41.4	130.6	190.6	311.0
2014	.0	625.7	625.7	48.4	38.3	41.3	120.0	189.1	308.0
2015	.0	626.1	626.1	48.5	36.6	41.6	126.7	189.8	309.6
2016	.0	632.3	632.3	48.5	33.0	41.3	123.6	193.3	315.4
2017	.0	625.7	625.7	48.5	30.9	40.4	119.8	192.2	313.6
2018	.0	625.9	625.9	48.5	27.9	38.5	115.0	194.1	316.8
2019	.0	632.1	632.1	48.5	25.1	36.7	110.3	196.3	323.6
2020	.0	625.7	625.7	48.5	21.4	33.6	103.5	196.4	323.7
2021	.0	626.1	626.1	48.5	18.9	31.6	99.9	200.3	326.8
2022	.0	632.3	632.3	48.5	16.6	29.4	94.5	204.4	333.5
2023	.0	625.7	625.7	48.5	14.7	26.8	90.0	203.5	332.1
2024	.0	625.9	625.9	48.5	14.1	25.9	88.5	204.2	333.1
2025	.0	632.1	632.1	48.6	13.2	28.7	90.5	205.8	335.8
2026	.0	625.7	625.7	48.6	12.5	34.3	95.0	201.5	328.8
2027	.0	626.1	626.1	48.6	10.7	39.1	98.3	200.5	327.2
2028	.0	632.3	632.3	48.6	9.3	52.7	110.5	198.3	323.5
2029	.0	625.7	625.7	47.5	4.8	52.1	104.4	198.1	323.1
2030	.0	625.9	625.9	47.5	.0	.0	47.5	219.8	328.6
TOTL	.0	22119.2	22119.2	2156.0	1770.6	1706.0	6634.2	6276.0	10269.9
AUC	.0	417.3	417.3	40.7	33.5	32.2	106.3	118.4	192.6
SA-AC	.0	131.3	131.3	12.8	10.5	10.1	33.5	37.3	68.6

1A-S

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	1.8	36.9	- 35.1	- 35.1	- 13.1	- 13.1	- 13.1	- 13.1	- 13.1	- 13.1
1979	4.0	36.2	- 32.2	- 67.3	- 13.4	- 26.5	- 26.5	- 26.5	- 26.5	- 26.5
1980	4.9	29.2	- 24.3	- 91.6	- 11.9	- 38.4	- 38.4	- 38.4	- 38.4	- 38.4
1981	11.3	33.4	- 22.1	- 113.7	- 9.3	- 47.7	- 47.7	- 47.7	- 47.7	- 47.7
1982	23.1	58.6	- 35.5	- 149.2	- 11.5	- 59.2	- 59.2	- 59.2	- 59.2	- 59.2
1983	38.0	60.9	- 22.9	- 172.1	- 10.1	- 69.3	- 69.3	- 69.3	- 69.3	- 69.3
1984	37.2	49.9	- 12.7	- 184.8	- 3.7	- 73.0	- 73.0	- 73.0	- 73.0	- 73.0
1985	50.6	54.6	- 4.0	- 188.8	- 2.9	- 75.9	- 75.9	- 75.9	- 75.9	- 75.9
1986	62.6	34.2	28.4	- 160.4	19.7	- 56.2	19.7	- 36.5	19.7	- 36.5
1987	74.0	94.3	- 20.3	- 180.7	- 19.2	- 75.4	- 75.4	- 75.4	- 75.4	- 75.4
1988	101.8	67.1	34.7	- 146.0	4.9	- 70.5	4.9	- 70.5	4.9	- 70.5
1989	121.9	73.1	48.8	- 97.2	21.0	- 49.5	21.0	- 49.5	21.0	- 49.5
1990	127.9	67.2	60.7	- 36.5	18.3	- 31.2	18.3	- 31.2	18.3	- 31.2
1991	146.1	62.4	83.7	47.2	36.0	- 15.2	36.0	- 15.2	36.0	- 15.2
1992	176.5	66.5	110.0	157.2	42.3	27.3	42.3	27.3	42.3	27.3
1993	208.3	123.2	85.1	242.3	49.6	76.9	49.6	76.9	49.6	76.9
1994	247.3	125.3	122.0	364.3	70.6	147.5	70.6	147.5	70.6	147.5
1995	288.4	125.3	163.1	527.4	93.3	240.8	93.3	240.8	93.3	240.8
1996	309.6	139.5	170.1	697.5	98.2	339.0	98.2	339.0	98.2	339.0
1997	349.0	148.4	200.6	898.1	115.3	454.3	115.3	454.3	115.3	454.3
1998	387.6	162.6	225.0	1123.1	130.6	584.9	130.6	584.9	130.6	584.9
1999	415.0	191.4	223.6	1346.7	132.5	717.4	132.5	717.4	132.5	717.4
2000	449.3	48.3	401.0	1747.7	208.1	925.5	208.1	925.5	208.1	925.5
2001	493.3	48.3	445.0	2192.7	228.6	1154.1	228.6	1154.1	228.6	1154.1
2002	514.3	48.3	466.0	2658.7	238.4	1392.5	238.4	1392.5	238.4	1392.5
2003	559.7	62.7	497.0	3155.7	262.4	1654.9	262.4	1654.9	262.4	1654.9
2004	601.2	62.7	538.5	3694.2	268.6	1923.5	268.6	1923.5	268.6	1923.5
2005	625.7	62.7	563.0	4257.2	303.7	2227.2	303.7	2227.2	303.7	2227.2
2006	625.9	64.6	561.3	4818.5	296.1	2523.3	296.1	2523.3	296.1	2523.3
2007	632.1	62.7	569.4	5387.9	308.9	2832.2	308.9	2832.2	308.9	2832.2
2008	625.7	62.7	563.0	5950.9	306.7	3138.9	306.7	3138.9	306.7	3138.9
2009	626.1	62.6	563.5	6514.4	306.2	3445.1	306.2	3445.1	306.2	3445.1
2010	632.3	76.9	555.4	7069.8	307.6	3752.7	307.6	3752.7	307.6	3752.7
2011	625.7	48.4	577.3	7647.1	312.7	4065.4	312.7	4065.4	312.7	4065.4
2012	625.9	62.6	563.3	8210.4	309.0	4374.4	309.0	4374.4	309.0	4374.4
2013	632.1	62.3	569.8	8780.2	313.5	4687.9	313.5	4687.9	313.5	4687.9
2014	625.7	62.6	563.1	9343.3	309.1	5000.0	309.1	5000.0	309.1	5000.0
2015	626.1	76.9	549.2	9892.5	304.6	5304.6	304.6	5304.6	304.6	5304.6
2016	632.3	62.6	569.7	10462.2	313.1	5617.7	313.1	5617.7	313.1	5617.7
2017	625.7	62.6	563.1	11025.3	309.8	5927.5	309.8	5927.5	309.8	5927.5
2018	625.9	62.9	563.0	11588.3	312.3	6240.0	312.3	6240.0	312.3	6240.0
2019	632.1	62.6	569.5	12157.8	318.8	6558.8	318.8	6558.8	318.8	6558.8
2020	625.7	48.5	577.2	12735.0	322.6	6881.4	322.6	6881.4	322.6	6881.4
2021	626.1	62.9	563.2	13300.2	321.4	7199.8	321.4	7199.8	321.4	7199.8
2022	632.3	62.9	569.4	13869.6	329.2	7529.0	329.2	7529.0	329.2	7529.0
2023	625.7	62.9	562.8	14432.4	329.0	7858.0	329.0	7858.0	329.0	7858.0
2024	625.9	77.0	548.9	15000.3	330.9	8188.9	330.9	8188.9	330.9	8188.9
2025	632.1	62.9	569.2	15570.5	337.6	8526.5	337.6	8526.5	337.6	8526.5
2026	625.7	70.7	554.9	16125.4	328.2	8854.7	328.2	8854.7	328.2	8854.7
2027	626.1	62.9	563.2	16688.6	328.2	9182.9	328.2	9182.9	328.2	9182.9
2028	632.3	77.0	555.3	17243.9	322.3	9505.2	322.3	9505.2	322.3	9505.2
2029	625.7	47.5	578.2	17822.1	327.3	9832.5	327.3	9832.5	327.3	9832.5
2030	625.9	47.5	578.4	18399.5	338.6	10200.9	338.6	10200.9	338.6	10200.9

RATE OF RETURN TO ENTERPRISE OWNER 21.66%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 22.26%

1A-S

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	36.9	*	35.4	.4	24.4	11.4
1979	38.2	*	68.7	.6	48.2	21.3
1980	28.1	*	92.7	1.1	66.2	27.6
1981	32.3	*	119.7	1.5	66.8	34.3
1982	38.5	*	178.5	2.1	124.4	48.2
1983	60.7	*	221.1	2.8	163.0	68.9
1984	49.7	*	250.7	3.3	193.6	88.4
1985	39.3	*	284.4	6.2	216.7	73.9
1986	18.9	*	288.9	6.4	225.7	65.0
1987	46.5	*	319.1	12.2	252.5	78.8
1988	39.3	*	340.5	12.6	273.8	79.4
1989	25.2	*	346.9	12.8	284.9	74.8
1990	39.3	*	365.6	13.2	304.7	74.3
1991	34.5	*	372.5	13.4	320.3	71.8
1992	48.6	*	403.3	13.9	344.3	78.9
1993	77.3	*	453.7	14.6	388.1	88.2
1994	77.3	*	501.6	15.3	426.4	89.4
1995	77.3	*	545.3	16.0	465.1	96.2
1996	91.4	*	599.2	16.8	511.2	106.5
1997	100.3	*	659.5	17.7	561.1	115.0
1998	114.3	*	728.5	18.7	617.9	129.3
1999	143.1	*	820.6	19.9	691.1	149.5
2000	.0	*	769.6	19.6	666.1	123.1
2001	.0	*	718.6	19.2	638.6	89.2
2002	.0	*	667.6	18.7	608.3	78.0
2003	14.4	*	631.9	18.4	587.3	63.0
2004	14.4	*	597.0	18.0	565.8	49.3
2005	14.4	*	562.7	17.6	543.1	37.3
2006	36.2	*	550.1	17.5	534.0	33.6
2007	14.4	*	517.3	17.1	511.1	23.3
2008	14.4	*	486.2	16.7	489.3	13.7
2009	14.4	*	456.5	16.4	467.8	5.1
2010	20.4	*	441.0	16.2	455.3	1.9
2011	.0	*	397.0	15.7	421.9	8.4
2012	14.4	*	370.1	15.3	398.0	12.7
2013	14.4	*	343.0	14.9	373.5	15.6
2014	14.4	*	316.1	14.5	347.1	16.6
2015	28.4	*	302.9	14.2	328.9	11.8
2016	14.4	*	276.0	13.7	299.7	9.9
2017	14.4	*	250.0	13.2	269.6	6.6
2018	14.4	*	225.0	12.7	241.2	2.7
2019	14.1	*	203.2	12.3	213.8	1.6
2020	.0	*	169.5	11.6	179.0	2.2
2021	14.4	*	152.3	11.2	156.3	7.2
2022	14.4	*	137.4	10.9	137.0	11.2
2023	14.4	*	124.9	10.5	122.3	13.1
2024	28.4	*	127.5	10.4	122.6	15.3
2025	14.4	*	113.1	10.3	110.0	13.4
2026	22.2	*	101.0	10.2	97.3	13.4
2027	14.4	*	76.3	9.9	73.6	12.6
2028	28.4	*	52.1	9.6	48.1	13.7
2029	.0	*	.0	8.7	.1	8.6
2030	.0	*	.0	7.9	.1	7.8

TOTAL CAPITAL INVESTMENT 1785.3

1A-S

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	36.86	12.41	12.1636	12.1636
1979	73.05	24.86002	24.10649	24.10649
1980	101.15	34.92004	33.37949	33.37949
1981	133.48	46.85007	44.0484	44.04839
1982	191.97	67.53011	63.3501	62.3076
1983	253.67	89.69011	83.38109	81.62771
1984	302.4099	108.8	99.75526	94.70015
1985	341.7197	124.9998	112.7675	107.8724
1986	369.8196	134.9197	119.0045	107.8934
1987	407.1394	154.8396	134.356	123.244
1988	446.4592	173.8797	147.3315	131.4732
1989	471.7092	186.7596	155.664	131.4731
1990	511.0291	206.3198	168.6396	131.4731
1991	545.569	225.1799	180.018	131.4731
1992	594.0588	249.76	196.0394	131.4731
1993	671.3386	269.21	221.5417	131.4731
1994	746.6184	322.1799	247.0441	131.4731
1995	825.8982	369.8198	273.5464	131.4731
1996	917.248	406.04	303.6917	131.4731
1997	1017.308	456.4601	335.7773	131.4731
1998	1121.338	512.9001	373.5063	131.4731
1999	1274.697	563.3401	420.7181	131.4731
2000	1274.697	563.3401	420.7181	131.4731
2001	1274.697	563.3401	420.7181	131.4731
2002	1274.697	563.3401	420.7181	131.4731
2003	1269.257	701.9802	425.4546	131.4731
2004	1303.617	737.3604	430.1936	131.4731
2005	1317.987	774.8806	434.9335	131.4731
2006	1354.227	820.2307	446.6948	131.4731
2007	1366.587	857.5107	451.6335	131.4731
2008	1382.947	893.6909	456.3723	131.473
2009	1397.317	929.5012	461.1143	131.473
2010	1425.737	970.4213	470.4995	131.473
2011	1425.737	1002.862	470.4995	131.473
2012	1440.116	1042.092	475.2383	131.473
2013	1454.478	1081.602	479.9771	131.473
2014	1468.836	1121.732	484.7158	131.473
2015	1497.276	1168.402	494.1011	131.4729
2016	1511.636	1211.962	498.8398	131.4729
2017	1525.996	1256.212	503.5784	131.4729
2018	1540.366	1299.162	506.3206	131.4729
2019	1554.436	1340.642	512.9636	131.4729
2020	1554.436	1375.452	512.9636	131.4729
2021	1568.795	1412.452	517.7024	131.4729
2022	1583.155	1446.112	522.4412	131.4729
2023	1597.525	1475.231	527.1831	131.4728
2024	1623.965	1503.351	536.5684	131.4728
2025	1640.325	1530.281	541.3071	131.4728
2026	1662.465	1565.201	548.6199	131.4728
2027	1676.245	1603.231	553.3586	131.4728
2028	1705.285	1657.321	562.7439	131.4728
2029	1705.285	1705.231	562.7439	131.4728
2030	1705.285	1705.231	562.7439	131.4728
PRESENT VALUE OF CAPITAL INV. AT RATE %: 1M			19.99998	
200.3633				
PRESENT VALUE OF CAPITAL INV. AT RATE %: 1M			10.	
423.8367				

CASE - 1A-S
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN MILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Storage Capital							
Expenditures	1,705.3		1,795.3	1,705.3	1,773.7		3,478.9
Total Storage O&M							
Expenditures		2,155.3	3,155.3			2,155.3	2,155.3

Section E3.19

Case: 1A-R

Description: Fuel Cycle Center (FCC) baseline except recovery portion only

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics Recovery Portion Only:

Capital investment - 1.162 billion dollars

Owners ROI - 18%

Service charge - \$41/Kilogram of spent fuel

COST OF SPENT FUEL DEFICIT (DOLLARS/YR) - \$41.101
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$34712.610

1A-R

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SPENT ON REVENUE	TOTAL REVENUE	OPER. EXPEN	INT EXPEN	REP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	.6	.6	.0	.0	.0	.0	.0	.0
1979	.0	1.2	1.2	.0	.0	.0	.0	.0	1.2
1980	.0	1.5	1.5	.0	.0	.0	.0	.0	1.5
1981	.0	3.0	3.0	.0	.0	.0	.0	.0	3.0
1982	.0	7.2	7.2	.0	.0	.0	.0	.0	7.2
1983	.0	9.4	9.4	.0	.0	.0	.0	.0	9.4
1984	.0	11.6	11.6	.0	.0	.0	.0	.0	11.6
1985	.0	15.8	15.8	.0	.0	.0	.0	.0	15.8
1986	.0	19.6	19.6	.0	.0	.0	.0	.0	19.6
1987	.0	23.1	23.1	.0	.0	.0	.0	.0	23.1
1988	.0	31.9	31.9	.0	.0	.0	.0	.0	31.9
1989	.0	38.2	38.2	.0	.0	.0	.0	.0	38.2
1990	.0	40.0	40.0	.0	.0	.0	.0	.0	40.0
1991	.0	45.7	45.7	.0	3.1	1.9	5.0	.0	36.7
1992	.0	55.2	55.2	.1	13.2	7.9	21.3	.0	26.0
1993	.0	65.2	65.2	.2	16.2	9.6	26.1	.0	31.0
1994	.0	77.4	77.4	.3	22.2	13.5	36.0	.0	41.3
1995	.0	90.2	90.2	.4	32.1	19.5	52.0	.0	48.2
1996	.0	98.9	98.9	.6	48.0	29.3	77.9	.0	17.0
1997	.0	109.2	109.2	.8	63.8	39.1	103.6	.0	2.6
1998	.0	121.3	121.3	.9	72.3	44.6	117.8	.0	3.5
1999	.0	129.9	129.9	.9	72.3	44.6	119.8	.0	3.1
2000	1413.5	140.6	1272.9	32.7	72.3	46.3	151.3	420.8	658.7
2001	1413.5	154.4	1259.1	32.7	72.3	46.3	151.3	421.8	656.0
2002	1413.5	168.9	1244.6	32.7	70.7	46.3	149.7	419.1	653.7
2003	1413.5	177.1	1236.4	32.7	69.2	46.3	148.2	418.2	652.8
2004	1413.5	188.1	1225.4	32.7	67.3	46.3	146.3	409.9	652.6
2005	1413.5	195.8	1217.7	32.7	65.7	46.3	144.3	407.7	653.2
2006	1413.5	197.8	1217.7	32.7	63.7	46.3	142.8	406.4	656.3
2007	1413.5	197.8	1215.7	32.7	61.4	46.3	140.6	406.3	665.2
2008	1413.5	195.6	1217.7	32.7	59.0	46.3	138.2	410.2	669.3
2009	1413.5	195.9	1217.6	32.7	59.3	46.3	135.5	411.2	670.9
2010	1413.5	197.9	1215.6	32.7	53.4	46.3	132.5	411.6	671.5
2011	1413.5	195.8	1217.7	32.7	50.2	46.3	129.2	413.8	674.8
2012	1413.5	195.8	1217.7	32.7	46.6	46.3	125.7	414.7	677.0
2013	1413.5	197.8	1215.7	32.7	42.7	46.3	121.8	415.7	678.2
2014	1413.5	195.8	1217.7	32.7	38.4	46.3	117.5	418.1	682.1
2015	1413.5	195.9	1217.6	32.7	33.6	46.3	112.8	419.8	685.6
2016	1413.5	197.9	1215.6	32.7	28.4	44.6	105.7	421.8	688.2
2017	1413.5	195.8	1217.7	32.7	23.8	38.6	94.3	428.9	696.0
2018	1413.5	195.8	1217.7	32.7	18.2	36.7	87.6	429.4	700.6
2019	1413.5	197.8	1215.7	32.7	13.3	33.0	78.9	432.0	704.6
2020	1413.5	195.8	1217.7	32.7	8.5	26.9	66.1	436.8	712.6
2021	1413.5	195.9	1217.6	32.7	4.4	17.2	54.2	442.1	721.3
2022	1413.5	197.9	1215.6	32.7	1.6	7.4	41.7	446.1	727.6
2023	1413.5	195.8	1217.7	32.7	.4	1.9	35.8	449.4	733.3
2024	1413.5	195.8	1217.7	32.7	.1	.9	33.7	449.9	734.0
2025	1413.5	197.8	1215.7	32.7	.0	.0	32.7	449.6	733.0
2026	1413.5	195.8	1217.7	32.7	.0	.0	32.7	450.3	734.7
2027	1413.5	195.9	1217.6	32.7	.0	.0	32.7	450.3	734.7
2028	1413.5	197.9	1215.6	32.7	.0	.0	32.7	449.5	733.4
2029	1413.5	195.8	1217.7	32.7	.0	.0	32.7	450.3	734.7
2030	1413.5	195.8	1217.7	32.7	.0	.0	32.7	450.3	734.7
TOTL	43318.5	6921.5	36397.0	1016.5	1065.6	1161.9	3644.0	19251.2	30646.4
ROC	226.8	130.6	96.2	19.2	25.8	21.9	66.9	250.3	379.0
RR/ROC	280.2	41.1	219.1	6.0	6.1	6.9	21.0	78.8	119.3

1A-R

Yearly Cash Statement

YEAR	UNFINISHED ENTERPRISE BEFORE TAX				FINISHED ENTERPRISE AFTER TAX				UNIFERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	-	.6	-	.6	-	.6	-	.6	-	.6
1979	-	1.2	-	1.2	-	1.2	-	1.2	-	1.2
1980	-	1.5	-	1.5	-	1.5	-	1.5	-	1.5
1981	-	3.5	-	3.5	-	3.5	-	3.5	-	3.5
1982	-	7.2	-	7.2	-	7.2	-	7.2	-	7.2
1983	-	9.4	-	9.4	-	9.4	-	9.4	-	9.4
1984	-	11.6	-	11.6	-	11.6	-	11.6	-	11.6
1985	-	15.8	-	15.8	-	15.8	-	15.8	-	15.8
1986	-	19.6	-	19.6	-	19.6	-	19.6	-	19.6
1987	-	23.1	-	23.1	-	23.1	-	23.1	-	23.1
1988	-	31.9	-	31.9	-	31.9	-	31.9	-	31.9
1989	-	36.2	-	36.2	-	36.2	-	36.2	-	36.2
1990	-	40.0	-	40.0	-	40.0	-	40.0	-	40.0
1991	-	46.5	-	46.5	-	46.5	-	46.5	-	46.5
1992	-	53.2	-	53.2	-	53.2	-	53.2	-	53.2
1993	-	65.2	-	65.2	-	65.2	-	65.2	-	65.2
1994	-	77.4	-	77.4	-	77.4	-	77.4	-	77.4
1995	-	90.2	-	90.2	-	90.2	-	90.2	-	90.2
1996	-	96.9	-	96.9	-	96.9	-	96.9	-	96.9
1997	-	109.2	-	109.2	-	109.2	-	109.2	-	109.2
1998	-	121.3	-	121.3	-	121.3	-	121.3	-	121.3
1999	-	129.9	-	129.9	-	129.9	-	129.9	-	129.9
2000	1272.9	50.8	1217.1	906.5	781.1	1038.0	715.7	1038.0	715.7	1038.0
2001	1259.1	32.7	1226.4	306.0	715.7	323.0	719.9	374.8	374.8	374.8
2002	1252.6	32.7	1219.9	1525.9	715.1	391.8	715.3	374.8	374.8	374.8
2003	1238.4	32.7	1205.7	2731.6	705.7	1097.5	1096.0	1080.5	1080.5	1080.5
2004	1225.4	32.7	1192.7	3924.3	697.0	1794.5	687.3	1777.8	1777.8	1777.8
2005	1217.7	32.7	1185.0	5109.4	691.6	2486.1	691.9	2469.7	2469.7	2469.7
2006	1217.7	32.7	1185.0	6294.4	690.2	3176.3	691.1	3149.8	3149.8	3149.8
2007	1215.7	32.7	1183.0	7477.4	682.7	3865.6	689.1	3849.9	3849.9	3849.9
2008	1217.7	32.7	1185.0	8662.4	689.1	4554.7	689.5	4539.4	4539.4	4539.4
2009	1217.6	32.7	1184.9	9847.4	682.0	5242.6	688.4	5227.8	5227.8	5227.8
2010	1215.6	32.7	1182.9	11030.3	685.2	5928.8	688.1	5913.9	5913.9	5913.9
2011	1217.7	32.7	1185.0	12215.4	685.7	6614.0	688.2	6599.2	6599.2	6599.2
2012	1217.7	32.7	1185.0	13400.4	684.3	7298.3	684.9	7283.1	7283.1	7283.1
2013	1215.7	32.7	1183.0	14583.4	681.6	7979.9	682.3	7967.3	7967.3	7967.3
2014	1217.7	32.7	1185.0	15768.5	681.2	8661.1	681.9	8649.2	8649.2	8649.2
2015	1217.6	32.7	1184.9	16953.4	679.3	9340.4	680.1	9329.4	9329.4	9329.4
2016	1215.6	32.7	1182.9	18135.4	678.9	10019.3	679.7	10009.1	10009.1	10009.1
2017	1217.7	32.7	1185.0	19321.4	687.0	10706.3	687.9	10697.0	10697.0	10697.0
2018	1217.7	32.7	1185.0	20506.4	687.8	11394.1	686.8	11385.8	11385.8	11385.8
2019	1215.7	32.7	1183.0	21689.5	690.2	12084.3	691.0	12076.6	12076.6	12076.6
2020	1217.7	32.7	1185.0	22874.5	698.0	12782.6	699.3	12775.9	12775.9	12775.9
2021	1217.6	32.7	1184.9	24059.5	711.1	13493.9	711.8	13487.7	13487.7	13487.7
2022	1215.6	32.7	1182.9	25242.4	723.2	14217.1	723.7	14211.4	14211.4	14211.4
2023	1217.7	32.7	1185.0	26427.5	732.2	14949.3	732.4	14943.8	14943.8	14943.8
2024	1217.7	32.7	1185.0	27612.5	733.4	15682.7	733.5	15677.2	15677.2	15677.2
2025	1215.7	32.7	1183.0	28799.5	733.5	16416.2	733.5	16410.7	16410.7	16410.7
2026	1217.7	32.7	1185.0	29986.6	734.7	17150.9	734.7	17145.2	17145.2	17145.2
2027	1217.6	32.7	1184.9	31165.5	734.7	17885.6	734.7	17880.1	17880.1	17880.1
2028	1215.6	32.7	1182.9	32346.5	733.4	18619.0	733.4	18613.6	18613.6	18613.6
2029	1217.7	32.7	1185.0	33533.5	734.7	19353.7	734.7	19348.3	19348.3	19348.3
2030	1217.7	32.7	1185.0	34718.5	734.7	20088.4	734.7	20083.0	20083.0	20083.0

RATE OF RETURN TO ENTERPRISE OWNER 18.00%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 18.05%

1A-R

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	*	FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	.0	*	.0	.0	.0	.0
1979	.0	*	.0	.0	.0	.0
1980	.0	*	.0	.0	.0	.0
1981	.0	*	.0	.0	.0	.0
1982	.0	*	.0	.0	.0	.0
1983	.0	*	.0	.0	.0	.0
1984	.0	*	.0	.0	.0	.0
1985	.0	*	.0	.0	.0	.0
1986	.0	*	.0	.0	.0	.0
1987	.0	*	.0	.0	.0	.0
1988	.0	*	.0	.0	.0	.0
1989	.0	*	.0	.0	.0	.0
1990	.0	*	.0	.0	.0	.0
1991	46.5	*	44.6	.5	38.8	14.3
1992	151.1	*	187.8	2.2	130.7	59.4
1993	46.5	*	324.5	2.7	160.0	67.3
1994	93.0	*	304.0	3.7	219.2	88.1
1995	151.1	*	455.6	5.4	316.9	124.1
1996	244.1	*	600.4	8.1	474.4	164.0
1997	244.1	*	855.4	10.8	629.7	236.4
1998	139.5	*	950.2	12.2	713.1	249.3
1999	23.1	*	927.3	12.3	717.4	222.7
2000	23.1	*	904.4	17.7	720.4	201.7
2001	.0	*	857.9	17.4	706.7	188.7
2002	.0	*	811.4	17.2	691.6	157.1
2003	.0	*	764.9	17.0	674.9	187.0
2004	.0	*	718.5	16.7	656.7	78.5
2005	.0	*	672.0	16.4	636.6	51.8
2006	.0	*	625.5	16.1	614.5	27.1
2007	.0	*	579.0	15.7	598.1	4.6
2008	.0	*	532.5	15.3	563.4	10.6
2009	.0	*	486.1	14.8	534.8	33.1
2010	.0	*	439.6	14.3	501.6	47.7
2011	.0	*	393.1	13.8	466.0	59.1
2012	.0	*	346.6	13.2	428.9	67.8
2013	.0	*	300.1	12.6	393.8	71.1
2014	.0	*	253.7	11.8	356.4	78.9
2015	.0	*	207.2	11.1	324.3	66.8
2016	.0	*	162.6	10.2	290.4	57.6
2017	.0	*	124.8	9.3	162.2	48.5
2018	.0	*	87.3	8.5	122.7	36.9
2019	.0	*	54.3	7.7	85.1	33.1
2020	.0	*	27.3	6.9	43.9	9.7
2021	.0	*	10.2	6.2	16.6	.2
2022	.0	*	2.7	5.7	4.5	3.9
2023	.0	*	.0	5.5	1.6	4.8
2024	.0	*	.0	5.5	.0	5.4
2025	.0	*	.0	5.4	.0	5.4
2026	.0	*	.0	5.4	.0	5.4
2027	.0	*	.0	5.4	.0	5.4
2028	.0	*	.0	5.4	.0	5.4
2029	.0	*	.0	5.4	.0	5.4
2030	.0	*	.0	5.4	.0	5.4
TOTAL CAPITAL INVESTMENT			1161.9			

1A-R

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0	0	0
1982	0	0	0	0
1983	0	0	0	0
1984	0	0	0	0
1985	0	0	0	0
1986	0	0	0	0
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	45.49601	15.66602	15.3417	15.3417
1992	197.57	66.89601	65.19609	65.19607
1993	244.06	84.06601	80.53979	80.53976
1994	337.0298	117.3298	111.2198	111.2198
1995	466.1096	171.1899	161.0762	161.0762
1996	732.1694	257.73	241.6159	241.616
1997	976.3292	346.53	322.1553	322.1558
1998	1115.689	402.5903	368.1772	368.1772
1999	1138.799	421.4204	375.8035	375.8037
2000	1161.909	441.5205	383.4297	375.8035
2001	1161.909	455.2507	383.4297	375.8035
2002	1161.909	470.3508	383.4297	375.8035
2003	1161.909	486.9609	383.4297	375.8035
2004	1161.909	505.231	383.4297	375.8035
2005	1161.909	525.3311	383.4297	375.8035
2006	1161.909	547.4412	383.4297	375.8035
2007	1161.909	571.7612	383.4297	375.8035
2008	1161.909	598.5112	383.4297	375.8035
2009	1161.909	627.9314	383.4297	375.8035
2010	1161.909	660.2915	383.4297	375.8035
2011	1161.909	695.8916	383.4297	375.8035
2012	1161.909	735.0518	383.4297	375.8035
2013	1161.909	778.1318	383.4297	375.8035
2014	1161.909	825.522	383.4297	375.8035
2015	1161.909	877.6421	383.4297	375.8035
2016	1161.909	931.542	383.4297	375.8035
2017	1161.909	979.6819	383.4297	375.8035
2018	1161.909	1029.202	383.4297	375.8035
2019	1161.909	1078.612	383.4297	375.8035
2020	1161.909	1118.022	383.4297	375.8035
2021	1161.909	1145.342	383.4297	375.8035
2022	1161.909	1157.322	383.4297	375.8035
2023	1161.909	1160.342	383.4297	375.8035
2024	1161.909	1161.692	383.4297	375.8035
2025	1161.909	1161.692	383.4297	375.8035
2026	1161.909	1161.692	383.4297	375.8035
2027	1161.909	1161.692	383.4297	375.8035
2028	1161.909	1161.692	383.4297	375.8035
2029	1161.909	1161.692	383.4297	375.8035
2030	1161.909	1161.692	383.4297	375.8035

PRESENT VALUE OF CAPITAL INU AT RATE 2% 2M
43.61118
PRESENT VALUE OF CAPITAL INU AT RATE 2% 2M
204.546

19.99998

10.

CASE - 1A-R
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN MILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Recovery Capital Expenditures	1,161.9		1,161.9	1,161.9	1,365.6		2,527.5
Total Recovery O&M Expenditures		1,016.6	1,016.6			1,016.6	1,016.6

Section E3.20

Case: 1A-W

Description: Fuel Cycle Center (FCC) baseline except waste management only

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics Waste Management Only:

Capital investment - 1.320 billion dollars

Owners ROI - 27.9%

Service charge - \$45.69/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/MG) 745.684
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 15307.035

1A-W

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SEMI-CH REVENUE	TOTAL REVENUE	OPEX EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	.6	.6	.0	.3	.2	.4	.1	.1
1979	.0	1.4	1.4	.0	1.1	.7	1.8	.0	.4
1980	.0	1.7	1.7	.0	1.4	.8	2.2	.0	.5
1981	.0	3.9	3.9	.0	1.9	1.1	3.0	.3	.6
1982	.0	8.0	8.0	.0	2.7	1.6	4.4	1.4	2.3
1983	.0	10.4	10.4	.1	4.0	2.5	6.5	1.9	2.4
1984	.0	12.9	12.9	.1	5.4	3.3	8.7	1.6	2.6
1985	.0	17.6	17.6	.9	6.1	3.7	10.7	2.6	3.3
1986	.0	21.8	21.8	.9	6.1	3.8	10.8	3.2	3.8
1987	.0	25.7	25.7	1.4	6.1	3.9	11.4	5.1	3.9
1988	.0	35.4	35.4	1.4	6.1	3.9	11.3	6.2	4.9
1989	.0	42.4	42.4	1.4	5.9	3.9	11.2	11.9	19.4
1990	.0	44.5	44.5	1.4	5.8	3.9	11.1	12.7	20.7
1991	.0	50.8	50.8	1.4	5.9	3.9	10.2	13.1	21.4
1992	.0	61.4	61.4	1.5	19.4	12.2	33.1	10.7	17.0
1993	.0	72.5	72.5	1.6	32.4	14.2	48.0	13.1	21.3
1994	.0	86.0	86.0	1.6	38.5	18.1	56.3	14.3	23.4
1995	.0	100.3	100.3	1.8	38.7	24.4	64.9	15.4	21.9
1996	.0	107.7	107.7	2.0	55.3	34.7	91.9	6.0	7.8
1997	.0	121.4	121.4	2.2	71.6	45.0	118.7	1.0	1.6
1998	.0	134.8	134.8	2.3	80.3	50.8	133.4	.5	.9
1999	.0	144.3	144.3	2.3	80.6	51.8	134.7	2.7	.0
2000	.0	156.3	156.3	34.1	80.7	52.8	167.6	.0	11.3
2001	.0	171.6	171.6	33.6	79.0	52.8	165.4	2.4	3.9
2002	.0	178.9	178.9	33.6	77.2	52.8	163.6	5.8	3.5
2003	.0	194.7	194.7	33.6	75.1	52.6	161.4	13.6	20.6
2004	.0	209.1	209.1	33.6	72.9	52.1	158.7	19.2	31.2
2005	.0	217.6	217.6	33.6	70.6	52.0	156.2	23.3	38.1
2006	.0	217.7	217.7	33.6	68.1	51.7	153.4	24.4	39.9
2007	.0	219.9	219.9	33.6	65.4	51.3	150.1	25.5	43.2
2008	.0	217.6	217.6	33.6	62.5	50.9	146.4	27.1	44.1
2009	.0	217.7	217.7	33.6	59.4	49.5	142.5	28.8	45.2
2010	.0	219.9	219.9	33.6	56.2	49.1	138.9	30.8	46.2
2011	.0	217.6	217.6	33.6	52.8	48.6	135.4	31.3	41.0
2012	.0	217.7	217.7	33.6	49.0	48.9	131.5	32.7	43.4
2013	.0	219.9	219.9	33.6	44.9	48.9	127.4	35.1	47.3
2014	.0	217.6	217.6	33.6	40.4	48.9	122.9	36.6	48.7
2015	.0	217.7	217.7	33.6	35.4	48.9	117.9	37.9	51.9
2016	.0	219.9	219.9	33.6	29.9	46.9	110.5	41.6	57.9
2017	.0	217.6	217.6	33.6	24.2	40.6	98.4	45.3	73.9
2018	.0	217.7	217.7	33.6	19.2	38.6	91.4	48.6	78.3
2019	.0	219.9	219.9	33.6	14.0	34.7	82.3	52.3	85.3
2020	.0	217.6	217.6	33.6	9.0	28.4	70.9	55.7	90.9
2021	.0	217.7	217.7	33.6	4.6	18.1	56.3	61.3	100.1
2022	.0	219.9	219.9	33.6	1.7	7.8	43.2	67.2	109.6
2023	.0	217.6	217.6	33.6	.5	2.0	36.0	69.0	112.6
2024	.0	217.7	217.7	33.6	.2	1.0	34.7	69.5	113.4
2025	.0	219.9	219.9	33.6	.0	.0	33.6	70.8	115.5
2026	.0	217.6	217.6	33.6	.0	.0	33.6	69.9	114.1
2027	.0	217.7	217.7	33.6	.0	.0	33.6	70.6	114.2
2028	.0	219.9	219.9	33.6	.0	.0	33.6	70.8	115.5
2029	.0	217.6	217.6	33.6	.0	.0	33.6	69.9	114.1
2030	.0	217.7	217.7	33.6	.0	.0	33.6	69.9	114.1
TOTL	.0	7693.2	7693.2	1066.1	1551.4	1220.0	2907.5	1401.0	2523.9
ACC	.0	145.2	145.2	20.1	29.3	24.9	74.3	27.0	43.8
SS/ACC	.0	45.7	45.7	6.3	9.2	7.8	23.4	8.5	13.0

1A-W

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	.6	3.9	- 3.3	- 3.3	- 1.0	- 1.0	- 1.1	- 1.1	-	-
1979	1.4	12.7	- 11.3	- 14.6	- 4.0	- 5.1	- 7.2	- 12.3	-	- 12.3
1980	1.7	3.9	- 2.2	- 16.8	- 1.1	- 6.1	- 1.1	- 13.4	-	- 13.4
1981	3.9	7.8	- 3.9	- 20.7	- 1.1	- 7.2	- 1.2	- 14.6	-	- 14.6
1982	8.0	12.7	- 4.7	- 25.3	- .6	- 7.8	- .7	- 15.3	-	- 15.3
1983	10.4	20.5	- 10.1	- 35.4	- 2.4	- 10.2	- 2.6	- 17.9	-	- 17.9
1984	12.9	20.5	- 7.6	- 43.0	- 1.5	- 11.6	- 1.6	- 19.5	-	- 19.5
1985	17.6	12.6	5.0	- 38.0	3.3	- 8.4	3.1	- 16.4	-	- 16.4
1986	21.0	2.8	18.2	- 19.1	9.0	- .6	9.0	- 7.8	-	- 24.2
1987	25.7	3.3	22.4	- 3.3	11.1	- 11.7	11.0	- 16.8	-	- 41.0
1988	35.4	1.4	34.0	37.4	17.7	29.4	17.7	- 28.1	-	- 69.1
1989	42.4	1.4	41.0	78.4	22.0	51.3	22.0	- 50.1	-	- 119.2
1990	44.0	1.4	43.1	121.5	23.2	74.6	23.2	- 73.3	-	- 192.5
1991	50.8	50.3	.5	122.0	9.3	83.9	8.8	- 82.1	-	- 274.6
1992	61.4	160.3	- 99.1	22.9	25.9	58.0	27.6	- 54.5	-	- 329.1
1993	72.5	58.3	14.2	37.1	15.6	73.6	15.1	- 39.4	-	- 368.5
1994	86.0	99.4	- 13.3	23.8	4.4	77.9	3.8	- 43.2	-	- 411.7
1995	100.3	120.7	- 20.4	3.4	12.5	65.5	14.2	- 57.0	-	- 468.7
1996	107.7	258.7	- 151.0	- 147.9	49.0	16.4	51.8	- 6.2	-	- 474.9
1997	121.4	258.9	- 137.5	- 317.4	49.5	33.1	52.3	- 41.5	-	- 516.4
1998	134.8	149.0	- 14.2	- 331.6	10.2	43.3	11.7	- 30.3	-	- 546.7
1999	144.3	26.7	117.6	- 214.0	34.7	- 8.6	34.6	- 64.9	-	- 611.6
2000	156.3	58.5	97.7	- 116.2	16.7	8.1	11.4	- 53.5	-	- 665.1
2001	171.6	33.6	138.0	21.8	38.2	46.3	38.6	- 15.9	-	- 681.0
2002	179.9	33.6	146.3	167.1	42.0	88.3	42.3	- 68.2	-	- 749.2
2003	194.7	33.6	161.1	328.1	51.3	139.6	51.6	- 169.8	-	- 919.0
2004	209.1	33.6	175.5	503.6	60.1	199.7	60.5	- 230.3	-	- 1149.3
2005	217.6	33.6	184.0	687.6	64.8	264.5	65.1	- 295.4	-	- 1444.7
2006	217.7	33.6	184.1	871.7	64.3	328.8	64.7	- 360.1	-	- 1804.8
2007	219.9	33.6	186.3	1058.0	65.4	394.1	65.8	- 425.9	-	- 2230.7
2008	217.6	33.6	184.0	1242.0	64.1	458.2	64.5	- 490.4	-	- 2721.1
2009	217.7	33.6	184.1	1426.1	64.2	522.4	64.7	- 555.1	-	- 3276.2
2010	219.9	33.6	186.3	1612.5	65.0	587.4	65.5	- 620.6	-	- 3896.8
2011	217.6	33.6	184.0	1796.5	62.4	649.7	63.6	- 684.2	-	- 4581.0
2012	217.7	33.6	184.1	1980.6	61.1	710.8	61.7	- 745.9	-	- 5326.9
2013	219.9	33.6	186.3	2166.8	60.9	771.6	61.6	- 807.5	-	- 6134.4
2014	217.6	33.6	184.0	2350.8	57.8	829.5	58.5	- 866.0	-	- 7000.4
2015	217.7	33.6	184.1	2535.0	56.0	885.5	56.8	- 922.8	-	- 7923.2
2016	219.9	33.6	186.3	2721.3	53.1	943.6	53.0	- 975.8	-	- 8899.0
2017	217.6	33.6	184.0	2905.3	63.0	1007.4	64.8	- 1040.6	-	- 9939.6
2018	217.7	33.6	184.1	3089.4	64.8	1072.3	65.6	- 1106.2	-	- 11045.8
2019	219.9	33.6	186.3	3275.7	69.5	1142.2	70.8	- 1177.0	-	- 12222.8
2020	217.6	33.6	184.0	3459.7	75.9	1218.1	76.8	- 1253.8	-	- 13476.6
2021	217.7	33.6	184.1	3643.8	69.4	1307.6	69.2	- 1323.0	-	- 14800.0
2022	219.9	33.6	186.3	3830.1	104.7	1412.3	105.2	- 1428.2	-	- 16228.2
2023	217.6	33.6	184.0	4014.1	111.4	1523.7	111.6	- 1540.0	-	- 17768.2
2024	217.7	33.6	184.1	4198.2	112.8	1636.5	112.6	- 1652.6	-	- 19420.8
2025	219.9	33.6	186.3	4384.5	115.5	1751.9	115.5	- 1768.1	-	- 21188.9
2026	217.6	33.6	184.0	4568.5	114.1	1866.0	114.1	- 1882.1	-	- 23071.0
2027	217.7	33.6	184.1	4752.6	114.2	1980.2	114.2	- 1996.3	-	- 25067.3
2028	219.9	33.6	186.3	4939.0	115.0	2095.7	115.5	- 2111.8	-	- 27179.1
2029	217.6	33.6	184.0	5123.0	114.1	2209.8	114.1	- 2226.0	-	- 29405.1
2030	217.7	33.6	184.1	5307.0	114.1	2323.9	114.1	- 2340.1	-	- 31745.2

RATE OF RETURN TO ENTERPRISE OWNER 27.90%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 29.15%

1A-W

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	*	FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	3.9	*	3.7	.0	3.9	1.2
1979	12.7	*	15.7	.2	11.0	5.0
1980	3.9	*	12.6	.2	13.4	5.0
1981	7.8	*	25.5	.3	18.4	7.5
1982	12.7	*	36.3	.5	22.6	10.4
1983	20.5	*	54.0	.7	39.8	15.1
1984	20.5	*	71.7	.9	52.0	19.8
1985	11.7	*	79.7	1.2	59.8	21.0
1986	1.9	*	77.8	1.2	60.2	18.8
1987	1.9	*	75.9	1.3	60.5	16.7
1988	.0	*	72.0	1.2	59.3	13.9
1989	.0	*	68.1	1.2	58.0	11.5
1990	.0	*	64.2	1.2	56.8	8.7
1991	48.9	*	107.2	1.7	87.5	21.4
1992	158.9	*	253.9	3.5	198.9	66.5
1993	48.9	*	288.7	4.0	219.4	72.8
1994	97.8	*	288.4	5.0	230.6	92.2
1995	158.9	*	302.9	5.7	238.7	129.0
1996	258.7	*	724.9	9.5	543.4	190.5
1997	258.7	*	936.6	12.3	764.5	244.4
1998	146.7	*	1032.3	13.8	789.2	257.0
1999	24.4	*	1005.1	13.8	750.5	228.4
2000	24.4	*	976.8	12.1	750.2	250.7
2001	.0	*	924.0	10.8	771.8	171.0
2002	.0	*	871.2	10.5	751.5	138.1
2003	.0	*	818.5	13.1	729.5	107.2
2004	.0	*	766.4	17.0	708.2	77.9
2005	.0	*	714.4	17.4	680.9	50.8
2006	.0	*	662.2	16.9	653.7	26.0
2007	.0	*	611.6	16.5	624.7	3.4
2008	.0	*	561.3	16.0	594.2	17.0
2009	.0	*	511.7	15.5	562.3	35.0
2010	.0	*	462.7	15.0	528.0	50.3
2011	.0	*	413.7	14.4	490.4	62.3
2012	.0	*	364.8	13.8	449.2	70.6
2013	.0	*	315.9	13.1	403.8	74.9
2014	.0	*	267.0	12.3	354.8	74.7
2015	.0	*	218.1	11.5	298.2	69.6
2016	.0	*	171.2	10.6	242.5	60.7
2017	.0	*	130.6	9.6	191.8	51.6
2018	.0	*	91.9	8.8	139.7	39.0
2019	.0	*	57.2	7.9	89.6	24.5
2020	.0	*	28.9	7.1	46.2	16.3
2021	.0	*	10.8	6.4	17.5	4.4
2022	.0	*	2.9	5.9	4.8	4.0
2023	.0	*	1.0	5.7	1.7	5.0
2024	.0	*	.0	5.6	.0	5.6
2025	.0	*	.0	5.6	.0	5.6
2026	.0	*	.0	5.6	.0	5.6
2027	.0	*	.0	5.6	.0	5.6
2028	.0	*	.0	5.6	.0	5.6
2029	.0	*	.0	5.6	.0	5.6
2030	.0	*	.0	5.6	.0	5.6

TOTAL CAPITAL INVESTMENT 1320.0

1A-W

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	3.9	1.310001	1.287	1.203031
1979	16.56999	5.609992	5.466997	5.38413
1980	20.46999	7.649986	7.550995	7.471129
1981	23.26997	9.839981	9.52999	9.767282
1982	40.93997	14.34999	13.51019	10.86294
1983	61.41997	21.61	20.28859	15.32089
1984	81.88997	29.06001	27.03268	19.7211
1985	93.58997	33.76003	30.88467	19.72182
1986	95.53996	35.34004	31.52818	19.72187
1987	97.48996	37.03006	32.17168	19.72185
1988	97.48996	38.18007	32.17168	19.72185
1989	97.48996	39.45007	32.17168	19.72185
1990	97.48996	40.84009	32.17168	19.72185
1991	146.39	58.8401	48.50867	19.72185
1992	305.3198	114.42	100.7555	56.42585
1993	354.2197	134.3399	118.8925	56.42585
1994	452.8195	171.4399	149.1864	66.35196
1995	610.9495	230.2203	201.6133	98.56664
1996	867.6794	323.7805	286.334	176.316
1997	1124.409	419.9106	371.0549	261.0369
1998	1271.109	481.8708	419.4661	309.4478
1999	1295.559	505.011	427.5344	311.5696
2000	1320.009	529.6213	435.603	319.6379
2001	1320.009	548.2415	435.603	319.6379
2002	1320.009	568.5015	435.603	319.6379
2003	1320.009	590.5015	435.603	319.6379
2004	1320.009	613.7615	435.603	319.6379
2005	1320.009	639.0615	435.603	319.6379
2006	1320.009	666.3115	435.603	319.6379
2007	1320.009	695.3516	435.603	319.6379
2008	1320.009	725.7817	435.603	319.6379
2009	1320.009	757.752	435.603	319.6379
2010	1320.009	792.052	435.603	319.6379
2011	1320.009	829.6421	435.603	319.6379
2012	1320.009	870.8423	435.603	319.6379
2013	1320.009	916.1624	435.603	319.6379
2014	1320.009	966.0125	435.603	319.6379
2015	1320.009	1020.253	435.603	319.6379
2016	1320.009	1077.552	435.603	319.6379
2017	1320.009	1128.202	435.603	319.6379
2018	1320.009	1180.312	435.603	319.6379
2019	1320.009	1230.402	435.603	319.6379
2020	1320.009	1273.762	435.603	319.6379
2021	1320.009	1302.512	435.603	319.6379
2022	1320.009	1315.192	435.603	319.6379
2023	1320.009	1318.222	435.603	319.6379
2024	1320.009	1319.962	435.603	319.6379
2025	1320.009	1319.962	435.603	319.6379
2026	1320.009	1319.962	435.603	319.6379
2027	1320.009	1319.962	435.603	319.6379
2028	1320.009	1319.962	435.603	319.6379
2029	1320.009	1319.962	435.603	319.6379
2030	1320.009	1319.962	435.603	319.6379

PRESENT VALUE OF CAPITAL INV AT RATE 2% \$M
65.02457
PRESENT VALUE OF CAPITAL INV AT RATE 2% \$M
274.4421

19.99998

10.

CASE - 1A-W
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN MILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Waste Management							
Capital Expenditures	1,320.0		1,320.0	1,320.0	1,551.4		2,871.4
Total Waste Management							
G&M Expenditures		1,066.1	1,066.1			1,066.1	1,066.1

Section E3.21

Case: 1A-A

Description: Fuel Cycle Center (FCC) baseline sum of transport, storage, recovery, and waste management functions

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 4.804 billion dollars

Owners ROI - 21.05%

Service charge - \$180/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/FC) 1180.566
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 164618.568

1A-A

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SEMI CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEF EXPEN	TOTAL EXPEN	TOTAL	INCOME
1978	.0	2.5	2.5	.0	5.1	3.0	8.1	.0	-8.1
1979	.0	5.5	5.5	1.5	8.6	3.2	13.3	.0	-13.3
1980	.0	6.8	6.8	2.5	11.2	3.8	17.5	.0	-17.5
1981	.0	15.5	15.5	3.6	14.6	8.9	27.1	.0	-27.1
1982	.0	31.8	31.8	5.1	21.0	12.8	38.9	.0	-38.9
1983	.0	41.2	41.2	6.4	26.6	16.3	49.3	.0	-49.3
1984	.0	51.2	51.2	7.7	31.1	19.2	57.9	.0	-57.9
1985	.0	69.5	69.5	19.7	34.2	21.3	75.2	.0	-75.2
1986	.0	86.1	86.1	20.3	36.8	22.7	79.8	2.7	-77.1
1987	.0	101.7	101.7	53.3	38.6	24.6	116.5	.0	-116.5
1988	.0	140.0	140.0	53.8	41.4	26.7	121.9	2.9	-119.0
1989	.0	167.6	167.6	53.8	42.3	27.7	123.8	18.7	-105.1
1990	.0	175.8	175.8	53.9	44.0	29.2	127.1	18.3	-108.8
1991	.0	200.0	200.0	55.1	55.5	35.5	146.1	21.6	-124.5
1992	.0	242.6	242.6	55.9	77.1	50.3	183.3	32.5	-150.8
1993	.0	286.4	286.4	56.5	88.2	57.8	202.5	31.9	-170.6
1994	.0	339.9	339.9	57.3	105.1	69.1	231.5	41.2	-190.3
1995	.0	396.5	396.5	58.0	129.7	85.1	272.8	47.0	-225.8
1996	.0	425.6	425.6	59.1	167.5	109.3	335.9	34.1	-298.8
1997	.0	479.8	479.8	60.1	205.3	133.9	399.2	30.6	-368.6
1998	.0	532.9	532.9	61.4	230.5	151.4	443.3	34.0	-409.3
1999	.0	570.5	570.5	62.1	239.2	159.5	460.8	41.7	-419.1
2000	1413.5	617.7	2031.2	127.3	238.9	162.6	528.7	570.9	903.2
2001	1413.5	678.4	2091.9	127.3	233.5	163.1	523.9	595.9	978.0
2002	1413.5	707.0	2120.5	127.8	228.1	163.9	519.8	608.3	998.7
2003	1413.5	769.5	2183.0	128.3	222.5	161.9	512.7	634.7	1070.3
2004	1413.5	826.4	2239.9	128.9	216.9	161.0	506.8	658.6	1074.5
2005	1413.5	868.1	2273.6	129.4	210.6	160.4	500.4	673.8	1073.4
2006	1413.5	860.4	2273.9	129.7	205.4	160.4	495.5	678.3	1078.8
2007	1413.5	869.0	2282.5	129.7	197.3	157.1	484.1	683.4	1105.0
2008	1413.5	860.1	2273.6	129.7	189.6	154.6	473.9	683.9	1115.9
2009	1413.5	860.7	2274.2	129.6	181.0	152.4	463.0	686.2	1123.2
2010	1413.5	869.3	2282.8	129.6	172.9	151.7	454.1	684.9	1133.8
2011	1413.5	860.1	2273.6	129.5	163.3	151.1	443.9	680.3	1144.5
2012	1413.5	860.4	2273.9	129.4	155.1	150.2	434.7	689.6	1141.3
2013	1413.5	869.0	2282.5	129.4	142.7	149.8	421.9	707.0	1165.6
2014	1413.5	860.1	2273.6	129.4	131.2	150.3	410.9	707.8	1164.9
2015	1413.5	860.7	2274.2	129.3	119.2	151.1	399.6	712.3	1162.7
2016	1413.5	869.3	2282.8	129.3	105.0	146.2	380.5	722.9	1179.4
2017	1413.5	860.1	2273.6	129.2	90.9	133.5	353.6	729.6	1150.4
2018	1413.5	860.4	2273.9	129.2	76.6	129.2	335.0	736.0	1200.9
2019	1413.5	869.0	2282.5	129.1	65.0	126.1	314.2	748.0	1220.4
2020	1413.5	860.1	2273.6	129.1	51.2	105.4	285.6	755.4	1232.6
2021	1413.5	860.7	2274.2	129.0	39.7	84.1	252.8	758.1	1233.2
2022	1413.5	869.3	2282.8	129.0	31.3	62.9	223.2	762.6	1276.9
2023	1413.5	860.1	2273.6	128.9	26.3	49.3	204.5	766.3	1268.8
2024	1413.5	860.4	2273.9	128.9	24.1	47.0	200.0	768.1	1265.6
2025	1413.5	869.0	2282.5	128.8	21.6	47.8	198.3	762.0	1292.2
2026	1413.5	860.1	2273.6	128.8	20.7	58.1	207.6	765.1	1269.9
2027	1413.5	860.7	2274.2	128.7	17.4	64.3	210.4	764.2	1279.5
2028	1413.5	869.3	2282.8	128.7	14.6	80.3	223.6	761.4	1274.9
2029	1413.5	860.1	2273.6	127.6	9.0	88.6	224.4	778.7	1270.5
2030	1413.5	860.4	2273.9	127.5	.4	6.5	134.4	813.0	1326.5
TOTAL	42819.5	30467.7	74287.1	4683.4	5251.9	4884.1	14819.4	22591.2	36775.3
MAC	626.8	573.7	1400.5	90.6	89.1	90.6	269.4	426.2	699.9
SP/FC	260.2	160.6	440.8	28.5	31.2	28.5	88.2	134.2	218.4

1A-A
Yearly Cash Statement

YEAR	UNAFFILIATED ENTERPRISE PERIOD 1970				AFFILIATED ENTERPRISE PERIOD 1970				TOTALS			
	PERMANENT CASH IN	PERMANENT CASH OUT	PERMANENT NET CASH	CUM NET CASH	PERMANENT NET CASH	CUM NET CASH	PERMANENT NET CASH	CUM NET CASH	PERMANENT NET CASH	CUM NET CASH	PERMANENT NET CASH	CUM NET CASH
1978	2.0	76.7	- 74.3	- 74.3	- 29.0	- 29.0	- 29.0	- 29.0	- 29.0	- 29.0	- 29.0	- 29.0
1979	5.0	55.3	- 49.8	- 124.1	- 28.4	- 57.4	- 57.4	- 57.4	- 57.4	- 57.4	- 57.4	- 57.4
1980	6.0	42.4	- 35.6	- 159.7	- 21.4	- 78.8	- 78.8	- 78.8	- 78.8	- 78.8	- 78.8	- 78.8
1981	15.5	56.5	- 41.0	- 200.7	- 21.9	- 100.7	- 100.7	- 100.7	- 100.7	- 100.7	- 100.7	- 100.7
1982	31.8	102.1	- 70.3	- 271.0	- 26.9	- 127.6	- 127.6	- 127.6	- 127.6	- 127.6	- 127.6	- 127.6
1983	41.2	64.6	- 23.7	- 324.7	- 24.5	- 152.1	- 152.1	- 152.1	- 152.1	- 152.1	- 152.1	- 152.1
1984	51.2	79.1	- 28.0	- 352.6	- 19.0	- 171.1	- 171.1	- 171.1	- 171.1	- 171.1	- 171.1	- 171.1
1985	69.5	73.5	- 3.9	- 356.6	- 7.3	- 178.4	- 178.4	- 178.4	- 178.4	- 178.4	- 178.4	- 178.4
1986	86.1	54.1	32.0	- 324.6	16.1	- 162.3	- 162.3	- 162.3	- 162.3	- 162.3	- 162.3	- 162.3
1987	101.7	161.7	- 60.0	- 324.7	13.0	- 149.3	- 149.3	- 149.3	- 149.3	- 149.3	- 149.3	- 149.3
1988	140.0	104.8	35.1	- 269.5	13.2	- 136.1	- 136.1	- 136.1	- 136.1	- 136.1	- 136.1	- 136.1
1989	167.6	79.1	88.6	- 261.0	37.8	- 98.3	- 98.3	- 98.3	- 98.3	- 98.3	- 98.3	- 98.3
1990	175.6	93.2	82.6	- 118.4	36.5	- 61.8	- 61.8	- 61.8	- 61.8	- 61.8	- 61.8	- 61.8
1991	200.8	210.9	- 10.1	- 128.5	7.3	- 54.5	- 54.5	- 54.5	- 54.5	- 54.5	- 54.5	- 54.5
1992	242.6	426.1	- 183.5	- 312.0	50.8	- 3.7	- 3.7	- 3.7	- 3.7	- 3.7	- 3.7	- 3.7
1993	266.4	245.0	121.4	- 270.6	29.1	101.8	101.8	101.8	101.8	101.8	101.8	101.8
1994	399.9	358.3	116.6	- 269.0	21.2	123.0	123.0	123.0	123.0	123.0	123.0	123.0
1995	396.9	458.3	- 51.4	- 320.4	2.4	125.4	125.4	125.4	125.4	125.4	125.4	125.4
1996	425.6	664.2	- 238.6	- 559.0	88.9	147.1	147.1	147.1	147.1	147.1	147.1	147.1
1997	479.8	674.1	- 194.4	- 753.8	60.6	207.6	207.6	207.6	207.6	207.6	207.6	207.6
1998	532.9	499.6	33.2	- 720.6	13.4	194.2	194.2	194.2	194.2	194.2	194.2	194.2
1999	570.5	266.0	304.5	- 426.0	105.1	299.3	299.3	299.3	299.3	299.3	299.3	299.3
2000	8031.2	804.0	1627.2	1401.2	1607.6	916.5	916.5	916.5	916.5	916.5	916.5	916.5
2001	8091.9	132.0	1959.9	3354.1	1064.0	1982.5	1982.5	1982.5	1982.5	1982.5	1982.5	1982.5
2002	2120.5	147.3	1973.2	5327.3	1075.6	3058.1	3058.1	3058.1	3058.1	3058.1	3058.1	3058.1
2003	2183.0	155.6	2027.3	7354.6	1112.2	4170.2	4170.2	4170.2	4170.2	4170.2	4170.2	4170.2
2004	2239.9	159.1	2080.8	9435.4	1142.4	5312.6	5312.6	5312.6	5312.6	5312.6	5312.6	5312.6
2005	2273.6	155.5	2118.1	11553.5	1162.0	6474.6	6474.6	6474.6	6474.6	6474.6	6474.6	6474.6
2006	2273.9	179.0	2094.9	13648.4	1152.3	7626.9	7626.9	7626.9	7626.9	7626.9	7626.9	7626.9
2007	2282.5	144.1	2138.5	15786.9	1175.0	8801.9	8801.9	8801.9	8801.9	8801.9	8801.9	8801.9
2008	2273.6	152.1	2121.5	17908.4	1167.7	9969.6	9969.6	9969.6	9969.6	9969.6	9969.6	9969.6
2009	2274.2	144.8	2129.2	20037.6	1170.8	11140.4	11140.4	11140.4	11140.4	11140.4	11140.4	11140.4
2010	2273.9	159.9	2114.0	22151.6	1170.9	12311.3	12311.3	12311.3	12311.3	12311.3	12311.3	12311.3
2011	2273.6	159.9	2114.0	24265.6	1162.4	13473.7	13473.7	13473.7	13473.7	13473.7	13473.7	13473.7
2012	2273.9	159.9	2114.0	26379.6	1162.7	14636.4	14636.4	14636.4	14636.4	14636.4	14636.4	14636.4
2013	2282.5	156.8	2125.8	28505.4	1162.2	15801.6	15801.6	15801.6	15801.6	15801.6	15801.6	15801.6
2014	2273.6	153.6	2120.0	30625.4	1164.0	16967.6	16967.6	16967.6	16967.6	16967.6	16967.6	16967.6
2015	2274.2	164.2	2110.0	32735.4	1146.4	18114.0	18114.0	18114.0	18114.0	18114.0	18114.0	18114.0
2016	2282.8	148.8	2134.0	34869.4	1152.4	19266.4	19266.4	19266.4	19266.4	19266.4	19266.4	19266.4
2017	2273.6	156.6	2117.0	37024.7	1162.7	20429.1	20429.1	20429.1	20429.1	20429.1	20429.1	20429.1
2018	2273.9	168.2	2105.6	39130.3	1165.8	21594.9	21594.9	21594.9	21594.9	21594.9	21594.9	21594.9
2019	2282.5	152.5	2130.0	41260.3	1166.1	22761.0	22761.0	22761.0	22761.0	22761.0	22761.0	22761.0
2020	2273.6	142.1	2131.6	43391.9	1201.3	23962.3	23962.3	23962.3	23962.3	23962.3	23962.3	23962.3
2021	2274.2	153.1	2121.1	45513.0	1226.5	25188.8	25188.8	25188.8	25188.8	25188.8	25188.8	25188.8
2022	2282.8	156.3	2126.5	47639.4	1262.2	26451.0	26451.0	26451.0	26451.0	26451.0	26451.0	26451.0
2023	2273.6	156.3	2117.3	49756.8	1276.0	27727.0	27727.0	27727.0	27727.0	27727.0	27727.0	27727.0
2024	2273.9	163.8	2110.1	51866.8	1283.6	29010.6	29010.6	29010.6	29010.6	29010.6	29010.6	29010.6
2025	2282.5	146.4	2136.2	53999.0	1295.7	30306.3	30306.3	30306.3	30306.3	30306.3	30306.3	30306.3
2026	2273.6	171.7	2101.9	56100.9	1377.8	31684.1	31684.1	31684.1	31684.1	31684.1	31684.1	31684.1
2027	2274.2	149.6	2124.6	58225.4	1382.4	33066.5	33066.5	33066.5	33066.5	33066.5	33066.5	33066.5
2028	2282.8	166.8	2116.0	60341.4	1374.1	34440.6	34440.6	34440.6	34440.6	34440.6	34440.6	34440.6
2029	2273.6	134.3	2139.3	62480.7	1276.9	35817.5	35817.5	35817.5	35817.5	35817.5	35817.5	35817.5
2030	2273.9	134.0	2139.9	64610.6	1326.5	37194.0	37194.0	37194.0	37194.0	37194.0	37194.0	37194.0

RATE OF RETURN TO ENTERPRISE OWNER 21.05%
RATE OF RETURN AFTER TAX OF ENTERPRISE 21.05%

1A-A

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	SHARES EQUITY
1978	75.9	*	72.9	1.0	56.4	69.0
1979	55.7	*	121.0	1.7	55.4	57.7
1980	39.9	*	154.4	2.3	110.2	54.0
1981	53.0	*	150.7	3.0	144.2	57.1
1982	97.0	*	282.9	3.3	206.9	60.2
1983	88.5	*	355.1	5.5	222.7	57.8
1984	71.4	*	407.3	6.2	206.3	107.5
1985	53.8	*	439.8	9.0	337.2	111.6
1986	32.9	*	450.9	9.4	354.0	105.3
1987	48.5	*	474.8	15.3	379.7	110.4
1988	51.0	*	499.1	15.9	406.0	109.0
1989	25.2	*	496.7	16.0	414.2	98.6
1990	39.3	*	506.8	16.3	430.6	92.5
1991	155.9	*	627.2	18.1	523.0	122.2
1992	370.3	*	947.1	22.2	755.4	213.9
1993	169.5	*	1077.8	24.1	863.2	238.8
1994	281.1	*	1289.8	27.1	1029.1	287.7
1995	400.3	*	1605.0	31.3	1270.1	366.2
1996	605.1	*	2100.8	37.8	1641.4	497.2
1997	614.1	*	2581.0	44.2	2011.0	614.2
1998	438.2	*	2867.9	48.6	2255.8	668.7
1999	203.9	*	2912.2	50.2	2337.2	625.2
2000	76.7	*	2826.3	61.0	2327.4	559.9
2001	11.7	*	2674.9	60.1	2267.8	467.2
2002	19.5	*	2530.6	59.3	2206.6	383.3
2003	27.4	*	2296.0	58.5	2148.6	385.8
2004	38.2	*	2265.3	57.6	2088.7	234.2
2005	26.1	*	2130.9	56.7	2020.6	166.8
2006	49.2	*	2019.3	55.9	1963.4	112.3
2007	14.4	*	1977.1	54.5	1880.6	51.0
2008	22.4	*	1744.9	53.2	1808.3	2.2
2009	14.4	*	1606.9	51.8	1710.2	51.5
2010	20.4	*	1483.7	50.4	1623.2	89.1
2011	14.3	*	1346.9	48.8	1518.4	122.7
2012	19.6	*	1218.2	47.1	1409.0	143.7
2013	27.4	*	1099.8	45.4	1295.9	156.7
2014	74.2	*	967.8	43.4	1169.0	157.0
2015	34.9	*	851.7	41.4	1037.8	144.0
2016	19.4	*	745.0	39.0	890.2	124.1
2017	27.4	*	618.9	36.7	759.4	103.7
2018	39.1	*	528.7	34.6	634.2	70.6
2019	23.4	*	432.0	32.3	503.2	38.8
2020	13.0	*	339.7	30.0	379.5	9.9
2021	26.1	*	281.6	28.1	294.8	14.9
2022	27.4	*	246.0	26.7	244.4	20.3
2023	27.4	*	224.1	25.9	217.6	32.3
2024	34.9	*	212.0	25.5	203.3	34.2
2025	19.6	*	183.7	25.1	178.5	30.3
2026	43.0	*	168.6	24.9	160.2	33.3
2027	20.9	*	125.2	24.4	119.6	29.9
2028	40.1	*	82.0	23.9	75.7	30.2
2029	6.8	*	-	22.6	.0	22.5
2030	6.5	*	-	21.3	.0	21.3

TOTAL CAPITAL INVESTMENT

4604.1

1A-A

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	73.94	35.56002	35.0602	35.0602
1979	129.69	44.23003	43.79768	43.79768
1980	169.62	58.7301	58.97459	58.97459
1981	222.58	77.9901	78.40129	78.40129
1982	319.5698	112.6299	109.458	109.4581
1983	408.0698	145.3301	134.862	134.8621
1984	479.5098	173.2402	158.2382	158.2382
1985	533.2996	196.1804	175.9668	175.9669
1986	567.1494	213.1704	187.1593	187.1593
1987	615.6194	235.9604	203.1544	199.1196
1988	666.5392	260.6304	219.9909	205.281
1989	691.8692	277.7305	238.3234	205.2809
1990	731.269	300.6206	241.399	205.2809
1991	887.0688	364.0308	292.7327	323.3136
1992	1257.329	501.9111	414.9125	312.7737
1993	1445.849	562.6813	477.1299	324.9232
1994	1728.899	697.7517	569.8765	353.4623
1995	2127.189	857.1318	701.9732	413.0701
1996	2732.329	1099.963	901.6682	563.6001
1997	3346.379	1335.333	1104.505	722.741
1998	3784.579	1528.823	1248.911	816.2207
1999	3983.469	1651.272	1316.194	817.1028
2000	4065.148	1737.783	1341.499	817.1625
2001	4076.848	1809.053	1345.36	817.1623
2002	4096.348	1889.763	1351.794	817.1621
2003	4123.707	1975.062	1360.823	817.1018
2004	4153.926	2065.202	1370.795	817.1016
2005	4179.992	2159.198	1379.397	817.1013
2006	4229.23	2265.046	1395.846	817.1011
2007	4243.59	2362.936	1400.385	817.1008
2008	4266.008	2465.895	1407.782	817.1006
2009	4280.375	2570.162	1412.523	817.1003
2010	4308.812	2665.81	1421.903	817.1001
2011	4323.109	2804.606	1426.626	817.1001
2012	4342.668	2923.646	1433.08	817.0999
2013	4370.827	3074.125	1442.189	817.0996
2014	4394.266	3225.304	1450.187	817.0994
2015	4423.293	3352.161	1461.637	817.0991
2016	4448.762	3558.431	1468.091	817.0989
2017	4476.121	3716.68	1477.12	817.0986
2018	4515.187	3891.817	1490.812	817.0984
2019	4538.617	4035.437	1497.742	817.0981
2020	4551.617	4172.074	1502.033	817.0979
2021	4577.676	4282.873	1510.633	817.0977
2022	4605.035	4360.605	1519.661	817.0974
2023	4632.402	4414.881	1529.693	817.0972
2024	4667.34	4464.008	1540.222	817.0969
2025	4686.898	4508.406	1546.678	817.0967
2026	4729.853	4569.632	1560.652	817.0964
2027	4750.715	4631.108	1567.756	817.0964
2028	4790.852	4715.148	1580.981	817.0962
2029	4797.609	4797.539	1583.211	817.0959
2030	4804.109	4804.859	1585.356	817.0957

PRESENT VALUE OF CAPITAL INV AT RATE %: 8M 19.99998
403.2339
PRESENT VALUE OF CAPITAL INV AT RATE %: 8M 18.
1028.661

CASE - 1A-A
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY-DOLLARS IN MILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPAL	INTEREST	OPERATIONS	TOTAL
Total Capital Expenditures							
Recovery only	1,161.9		1,161.9	1,161.9	1,365.6		2,527.5
Transport only	616.9		616.9	616.9	561.4		1,178.3
Storage only	1,705.3		1,705.3	1,705.3	1,773.7		3,478.9
Waste management only	1,320.0		1,320.0	1,320.0	1,551.4		2,871.4
Total O&M Expenditures							
Recovery only		1,016.6				1,016.6	
Transport only		565.5				565.5	
Storage only		2,155.3				2,155.3	
Waste management only		1,066.1				1,066.1	
TOTAL	4,804.2	4,803.5	4,804.2	4,804.2	5,255.2	4,803.5	10,056.1

Section E3.22

Case: 21B

Description: Fuel Cycle Center (FCC) baseline except recovery deferred to 1990

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 1990

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 4.663 billion dollars

Owners ROI - 20.9

Service charge - \$311/Kilogram of spent fuel

COST OF SPECIAL FUEL SERVICE (DOLLARS/NO) \$311.621
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 185081.948

21B

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	4.3	4.3	.8	5.1	2.5	8.4	.0	-
1979	.0	9.4	9.4	1.0	8.6	4.1	14.3	.0	-
1980	.0	11.7	11.7	2.3	13.6	6.2	22.3	.0	-
1981	.0	26.8	26.8	3.6	21.9	10.0	35.5	.0	-
1982	.0	54.9	54.9	5.4	47.4	21.1	74.0	.0	-
1983	.0	71.1	71.1	6.7	59.0	26.5	92.1	.0	-
1984	.0	88.3	88.3	8.1	75.3	34.0	117.4	.0	-
1985	.0	120.0	120.0	20.4	97.6	44.3	162.3	.0	-
1986	.0	148.5	148.5	21.3	129.3	59.7	211.3	.0	-
1987	.8	175.5	176.3	23.7	153.4	76.0	253.0	.0	-
1988	.8	241.5	242.3	34.4	212.3	85.8	332.5	.0	-
1989	.0	269.3	269.3	34.4	233.9	87.2	355.6	.0	-
1990	261.1	303.4	564.5	114.2	167.7	89.4	371.3	58.2	193.0
1991	318.2	346.5	664.7	115.3	167.8	90.4	373.4	103.1	291.2
1992	379.6	418.7	798.3	115.8	168.7	92.1	376.6	152.8	421.0
1993	441.0	484.3	925.3	116.3	170.6	94.6	381.5	202.8	543.9
1994	502.4	566.6	1069.1	116.8	182.2	95.1	394.1	261.4	675.0
1995	564.1	654.2	1218.3	117.3	187.6	95.6	400.5	322.2	817.8
1996	625.5	734.6	1360.1	117.8	193.7	96.1	399.6	385.0	960.5
1997	682.0	828.0	1510.9	118.1	195.4	97.9	401.5	441.2	1109.2
1998	748.4	919.6	1668.0	119.4	197.4	101.0	407.8	478.9	1260.1
1999	809.8	984.6	1794.4	119.9	194.6	101.5	406.0	527.6	1387.8
2000	871.5	1066.0	1937.5	120.4	183.3	103.3	407.1	581.6	1529.4
2001	932.9	1170.7	2103.6	120.4	182.4	105.8	408.6	644.1	1694.9
2002	994.3	1220.1	2214.4	121.0	180.6	107.7	409.3	706.9	1874.2
2003	1055.8	1327.3	2383.1	121.5	178.8	110.3	410.6	749.8	1972.5
2004	1117.2	1426.2	2543.4	122.2	175.6	112.4	410.1	810.6	2132.8
2005	1178.9	1484.4	2663.3	122.7	171.1	113.8	407.6	867.1	2255.7
2006	1240.3	1484.8	2725.1	123.1	166.4	115.6	405.0	881.6	2319.5
2007	1240.3	1499.8	2740.1	123.0	161.5	113.0	397.5	896.2	2342.6
2008	1240.3	1484.4	2724.7	123.0	155.8	113.1	391.9	886.4	2332.8
2009	1240.3	1485.3	2725.6	123.0	149.6	114.7	387.2	868.6	2337.4
2010	1240.3	1500.2	2740.5	123.0	142.2	115.9	381.1	876.6	2359.4
2011	1240.3	1484.4	2724.7	122.9	135.4	117.1	375.5	892.7	2349.2
2012	1240.3	1484.8	2725.1	122.9	128.5	114.9	366.3	897.1	2358.8
2013	1240.3	1459.8	2700.1	123.0	118.4	114.8	356.2	905.8	2343.9
2014	1240.3	1484.4	2724.7	122.9	108.4	114.8	346.1	903.9	2378.6
2015	1240.3	1485.3	2725.6	122.9	98.6	111.5	333.0	909.2	2392.6
2016	1240.3	1500.2	2740.5	122.8	88.7	110.9	322.4	918.2	2418.1
2017	1240.3	1484.4	2724.7	122.8	77.7	103.2	303.7	920.0	2421.0
2018	1240.3	1484.8	2725.1	122.8	69.4	103.9	296.1	923.0	2426.0
2019	1240.3	1499.8	2740.1	122.8	58.4	105.8	287.0	932.2	2453.1
2020	1240.3	1484.4	2724.7	122.7	47.6	91.0	261.3	947.4	2463.7
2021	1240.3	1485.3	2725.6	122.7	46.1	83.3	252.2	947.5	2473.9
2022	1240.3	1500.2	2740.5	122.7	45.4	68.4	236.5	951.5	2484.0
2023	1240.3	1484.4	2724.7	122.7	43.4	72.0	238.0	944.9	2481.7
2024	1240.3	1484.8	2725.1	122.7	41.9	80.0	244.6	942.6	2482.5
2025	1240.3	1459.8	2700.1	122.6	40.5	69.8	232.9	945.1	2482.0
2026	1240.3	1484.4	2724.7	122.6	37.6	103.0	263.7	935.1	2489.0
2027	1240.3	1485.3	2725.6	122.6	32.2	115.4	270.2	933.1	2482.4
2028	1240.3	1500.2	2740.5	122.6	25.2	141.1	288.9	931.2	2481.4
2029	1240.3	1484.4	2724.7	122.5	16.1	167.8	306.5	918.9	2488.2
2030	1240.3	1484.8	2725.1	122.5	4.7	51.8	179.0	947.5	2486.6
TOTAL	42469.6	52477.6	94946.8	3201.9	3974.0	4646.0	15623.6	36233.0	78713.1
A/C	601.3	990.1	1591.4	98.1	112.7	87.7	298.6	570.4	922.5
18-70	252.2	311.6	563.8	30.9	35.5	27.6	94.0	179.5	290.3

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	4.3	76.7	- 72.4	- 72.4	- 27.0	- 27.0	- 28.0	- 28.0	- 28.0	- 28.0
1979	9.4	55.3	- 45.9	- 118.3	- 19.0	- 46.0	- 19.7	- 47.7	- 47.7	- 47.7
1980	11.7	77.3	- 65.6	- 183.9	- 29.8	- 75.8	- 30.8	- 76.5	- 76.5	- 76.5
1981	26.8	127.9	- 101.1	- 284.9	- 40.9	- 116.8	- 42.0	- 121.0	- 121.0	- 121.0
1982	54.9	388.6	- 333.7	- 618.6	- 126.9	- 243.7	- 131.4	- 252.0	- 252.0	- 252.0
1983	71.1	182.7	- 111.6	- 730.4	- 35.6	- 279.3	- 58.0	- 310.4	- 310.4	- 310.4
1984	88.3	256.2	- 167.9	- 898.4	- 81.3	- 360.6	- 84.2	- 394.7	- 394.7	- 394.7
1985	120.0	359.8	- 239.8	- 1138.2	- 115.7	- 476.3	- 121.0	- 515.7	- 515.7	- 515.7
1986	148.3	513.3	- 365.0	- 1503.2	- 175.1	- 651.4	- 160.7	- 676.4	- 676.4	- 676.4
1987	175.5	559.5	- 384.0	- 1887.2	- 219.2	- 870.6	- 230.1	- 906.5	- 906.5	- 906.5
1988	241.5	352.5	- 111.0	- 2000.0	- 106.6	- 977.2	- 169.8	- 1076.3	- 1076.3	- 1076.3
1989	289.3	98.5	190.8	- 1812.2	21.9	- 955.3	21.6	- 1015.3	- 1015.3	- 1015.3
1990	544.5	174.4	370.0	- 1442.1	146.2	- 809.1	137.6	- 877.7	- 877.7	- 877.7
1991	664.7	141.3	523.4	- 918.7	231.0	- 578.1	231.7	- 646.0	- 646.0	- 646.0
1992	798.3	156.2	642.1	- 276.7	307.5	- 268.0	307.3	- 338.7	- 338.7	- 338.7
1993	925.3	175.0	750.4	483.7	363.5	9.6	363.1	44.4	44.4	44.4
1994	1089.1	129.8	959.2	1442.9	492.3	587.9	492.5	536.9	536.9	536.9
1995	1246.3	130.3	1116.0	2560.9	589.4	1177.3	589.6	1126.4	1126.4	1126.4
1996	1360.1	130.8	1229.3	3790.2	656.9	1834.2	657.1	1793.6	1793.6	1793.6
1997	1589.9	159.9	1430.0	5220.3	737.5	2571.7	737.0	2521.1	2521.1	2521.1
1998	1648.0	159.9	1488.1	6708.4	818.6	3390.2	818.0	3339.1	3339.1	3339.1
1999	1794.4	132.9	1661.5	8370.0	917.0	4307.3	917.4	4256.5	4256.5	4256.5
2000	1937.5	162.4	1775.1	10145.0	992.9	5300.2	993.0	5249.5	5249.5	5249.5
2001	2103.6	174.9	1928.7	12073.7	1068.2	6368.3	1068.3	6317.9	6317.9	6317.9
2002	2214.4	169.2	2045.2	14118.9	1155.3	7523.7	1155.6	7483.4	7483.4	7483.4
2003	2383.7	177.3	2206.4	16325.3	1253.5	8777.1	1253.7	8747.1	8747.1	8747.1
2004	2543.4	166.8	2376.6	18701.9	1351.9	10129.0	1352.3	10099.4	10099.4	10099.4
2005	2663.2	158.2	2505.0	21196.9	1425.2	11554.3	1425.9	11525.3	11525.3	11525.3
2006	2725.1	164.0	2561.1	23758.0	1457.4	13011.6	1458.1	12983.4	12983.4	12983.4
2007	2748.1	173.6	2574.5	26332.5	1465.6	14477.3	1465.5	14449.8	14449.8	14449.8
2008	2724.6	161.5	2563.1	28895.6	1438.0	15915.3	1439.0	15908.8	15908.8	15908.8
2009	2725.6	162.6	2563.0	31458.6	1454.3	17369.5	1455.3	17364.1	17364.1	17364.1
2010	2740.5	158.2	2582.3	34040.9	1488.9	18858.4	1488.1	18846.2	18846.2	18846.2
2011	2724.6	160.1	2564.5	36605.4	1448.6	20307.1	1448.6	20268.0	20268.0	20268.0
2012	2725.1	159.7	2565.4	39170.8	1448.6	21755.8	1449.2	21718.3	21718.3	21718.3
2013	2748.1	178.8	2569.3	41740.1	1450.1	23205.9	1451.4	23169.7	23169.7	23169.7
2014	2724.6	158.1	2566.5	44306.6	1445.2	24651.1	1446.9	24616.8	24616.8	24616.8
2015	2725.6	175.7	2549.9	46856.5	1455.6	26106.8	1447.3	26063.9	26063.9	26063.9
2016	2740.5	170.2	2570.3	49426.8	1456.6	27557.4	1458.3	27522.1	27522.1	27522.1
2017	2724.6	164.6	2560.0	51986.8	1461.9	29019.3	1463.7	28989.8	28989.8	28989.8
2018	2725.1	190.3	2534.8	54521.6	1453.1	30472.4	1464.5	30440.4	30440.4	30440.4
2019	2740.1	160.9	2579.2	57090.8	1466.7	31941.1	1479.5	31918.9	31918.9	31918.9
2020	2724.6	180.1	2544.5	59635.3	1544.6	33485.6	1546.3	33437.2	33437.2	33437.2
2021	2725.6	163.2	2562.4	62197.7	1551.2	35036.8	1551.4	35008.7	35008.7	35008.7
2022	2740.5	178.5	2562.0	64760.0	1553.2	36590.0	1553.3	36562.0	36562.0	36562.0
2023	2724.6	165.7	2558.9	67318.9	1546.6	38136.6	1547.0	38109.6	38109.6	38109.6
2024	2725.1	179.8	2545.3	69864.2	1538.4	39675.0	1538.8	39647.6	39647.6	39647.6
2025	2740.1	192.7	2547.3	72411.5	1538.0	41213.0	1539.3	41185.8	41185.8	41185.8
2026	2724.6	184.7	2539.9	74951.4	1525.2	42738.3	1525.7	42711.6	42711.6	42711.6
2027	2725.6	165.6	2560.0	77511.4	1527.1	44265.4	1528.0	44239.6	44239.6	44239.6
2028	2740.5	178.1	2562.4	79973.8	1522.0	45787.4	1523.0	45762.6	45762.6	45762.6
2029	2724.6	151.1	2573.5	82547.3	1509.5	47296.9	1511.2	47273.8	47273.8	47273.8
2030	2725.1	173.2	2551.9	85100.0	1579.3	48876.2	1581.2	48855.0	48855.0	48855.0

RATE OF RETURN TO ENTERPRISE OWNER 20.91%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 21.39%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	75.9	"	73.4	1.0	50.5	23.9
1979	53.7	"	122.1	1.7	86.0	36.7
1980	74.6	"	131.6	2.7	135.4	59.0
1981	124.2	"	385.9	4.2	217.3	92.8
1982	383.4	"	568.1	6.8	471.8	200.1
1983	176.0	"	317.7	10.9	566.5	242.1
1984	258.1	"	1031.8	13.9	748.4	257.2
1985	333.4	"	1326.9	19.7	970.1	376.4
1986	437.0	"	1764.1	25.3	1295.0	444.3
1987	605.9	"	2194.0	36.2	1623.3	606.9
1988	298.1	"	2406.3	39.3	1810.0	655.8
1989	44.1	"	2363.2	39.7	1625.0	577.8
1990	60.2	"	2334.0	36.3	1849.1	555.2
1991	26.0	"	2265.6	39.3	1846.4	471.7
1992	-0.4	"	2217.9	30.7	1855.2	413.4
1993	58.7	"	2122.0	51.2	1871.9	361.2
1994	13.0	"	2099.8	51.0	1855.6	293.3
1995	13.0	"	2017.2	50.8	1856.7	231.4
1996	13.0	"	1934.1	50.6	1814.9	169.7
1997	-1.7	"	1877.9	50.6	1809.0	119.4
1998	60.5	"	1857.4	51.1	1825.8	62.7
1999	13.0	"	1768.9	50.7	1793.3	26.1
2000	-2.0	"	1707.6	50.6	1776.2	18.0
2001	54.5	"	1656.3	50.5	1762.2	55.4
2002	46.2	"	1596.8	50.3	1738.9	91.8
2003	35.8	"	1542.3	50.0	1714.5	122.2
2004	44.6	"	1474.5	49.6	1676.0	151.9
2005	35.0	"	1396.2	49.0	1624.5	179.3
2006	-1.7	"	1322.4	46.2	1569.6	199.0
2007	58.6	"	1260.0	47.4	1520.5	213.0
2008	33.5	"	1185.3	46.5	1457.6	225.7
2009	39.6	"	1110.2	45.4	1386.9	231.3
2010	35.2	"	1029.6	44.2	1304.3	230.5
2011	57.1	"	969.6	43.1	1228.4	215.8
2012	36.0	"	891.4	41.6	1135.3	202.3
2013	55.8	"	832.5	40.2	1048.5	175.6
2014	35.2	"	752.3	38.5	959.4	146.0
2015	52.9	"	694.2	36.9	843.0	111.8
2016	48.0	"	631.3	35.3	757.5	70.9
2017	-1.7	"	569.8	33.4	656.9	33.7
2018	67.5	"	533.3	22.0	547.6	17.8
2019	30.1	"	465.7	30.2	427.7	68.2
2020	57.4	"	422.0	28.4	422.8	67.6
2021	40.4	"	439.1	28.1	465.2	62.0
2022	55.9	"	426.5	28.0	393.3	61.2
2023	43.0	"	397.5	27.7	349.3	50.9
2024	57.1	"	374.6	27.4	346.8	55.2
2025	70.1	"	354.9	27.2	323.1	59.0
2026	62.1	"	313.5	26.7	281.2	59.0
2027	45.0	"	241.1	25.8	213.6	53.4
2028	55.5	"	155.6	24.8	130.7	49.7
2029	28.6	"	16.3	23.1	1.7	37.8
2030	50.7	"	15.2	21.2	1.3	35.2

TOTAL CAPITAL INVESTMENT 4663.2

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.46081	25.0682	25.0682
1979	129.69	43.67063	42.78768	42.78768
1980	204.48	69.11009	67.47839	67.47839
1981	328.71	111.3401	108.4743	108.4743
1982	712.0781	340.2605	334.9831	334.9831
1983	888.0798	381.3485	373.0662	373.0662
1984	1136.14	387.8904	374.926	374.926
1985	1475.58	505.5007	486.9412	486.9409
1986	1972.58	677.5585	650.9512	650.9507
1987	2478.459	855.1904	817.8914	817.8909
1988	2776.57	966.5666	916.3678	916.3671
1989	3220.639	995.6013	930.8108	930.8101
1990	2850.859	1031.771	950.6833	950.6898
1991	2906.859	1053.451	959.3634	959.3696
1992	3947.289	1092.062	972.6052	970.3893
1993	3005.949	1134.882	991.9631	970.3891
1994	3018.949	1163.382	996.2532	970.3898
1995	3031.949	1195.262	1000.543	970.3896
1996	3044.949	1230.082	1004.833	970.3893
1997	3066.679	1277.633	1018.664	970.3881
1998	3167.179	1341.383	1045.169	970.3879
1999	3169.179	1358.883	1049.459	970.3876
2000	3222.169	1442.979	1063.316	970.3872
2001	3276.069	1514.479	1081.391	970.3874
2002	3324.899	1566.014	1097.217	970.3871
2003	3368.899	1666.164	1115.63	970.3869
2004	3423.289	1749.244	1136.345	970.3866
2005	3480.809	1836.304	1142.067	970.3864
2006	3502.539	1932.954	1155.838	970.3862
2007	3553.138	2032.674	1172.535	970.3862
2008	3591.618	2134.664	1185.234	970.3859
2009	3631.168	2244.264	1198.223	970.3857
2010	3666.399	2362.114	1209.911	970.3854
2011	3723.498	2495.065	1226.754	970.3852
2012	3760.258	2624.925	1240.865	970.3849
2013	3816.058	2767.535	1259.299	970.3847
2014	3851.288	2911.915	1270.925	970.3844
2015	3904.167	3061.195	1288.375	970.3842
2016	3952.167	3214.715	1304.215	970.384
2017	3993.897	3357.025	1317.986	970.3837
2018	4061.397	3513.226	1340.221	970.3835
2019	4099.484	3671.793	1352.83	970.3832
2020	4156.844	3734.012	1371.758	970.383
2021	4197.273	3792.072	1385.1	970.3827
2022	4253.07	3859.759	1403.513	970.3825
2023	4296.099	3926.867	1417.712	970.3822
2024	4353.195	4006.395	1436.554	970.382
2025	4423.262	4108.129	1459.676	970.3818
2026	4485.359	4204.129	1480.168	970.3815
2027	4528.387	4314.805	1494.367	970.3813
2028	4583.926	4453.362	1512.695	970.381
2029	4612.523	4610.822	1522.133	970.381
2030	4663.25	4661.977	1533.872	970.3808

PRESENT VALUE OF CAPITAL INV AT RATE %: 8M
 810.2671
 PRESENT VALUE OF CAPITAL INV AT RATE %: 8M
 1520.553

19.99998

18.

Cost Summary - Dollars in Millions

NBS	COMMITTED COST			FINANCED COST			TOTAL
	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	
0.0 TOTAL	4,663.3	5,202.0	9,865.3	4,674.9	5,999.6	5,202.0	10,662.4
1.0 CAPITAL ITEMS	4,663.3		4,663.3	4,674.9	5,999.6		10,662.4
1.1 SYSTEM FACILITIES-EQUIPMENT	3,579.1		3,579.1	3,550.7	4,451.5		8,242.3
1.1.1 SNIP	160.0		160.0	160.0	159.1		379.0
1.1.2 CASK	252.0		252.0	252.0	178.5		430.5
1.1.3 CASK TRANSPORTER, PAUL CRP	23.4		23.4	23.4	11.9		35.3
1.1.4 RAIL CAR TUG	0.8		0.8	0.8	0.4		1.2
1.1.5 CASK TRANSPORTER							
1.1.6 SUPPORT FAC	1.0		1.0	1.0	1.5		2.5
1.1.7 WATER BASIN 4 PORT	48.0		48.0	48.0	62.6		130.6
1.1.8 WATER BASIN 2 PORT							
1.1.9 WATER BASIN STORAGE	24.0		24.0	24.0	41.3		65.3
1.1.10 PACKAGING FACILITY							
1.1.11 PACKAGING FAC	116.0		116.0	116.0	201.2		317.2
1.1.12 CRIMINISTERS	216.5		216.5	216.5	135.1		355.6
1.1.13 REPLACEMENT TRMS	18.0		18.0	18.0	11.7		29.7
1.1.14 INFLAT MODULE	877.9		877.9	877.9	599.2		1,477.1
1.1.15 GEOLOGIC REC MODULE							
1.1.16 REPOSITORY STORAGE MOD							
1.1.17 CASK	47.0		47.0	47.0	68.9		127.8
1.1.18 LUMINETER FAC	75.0		75.0	75.0	120.1		205.1
1.1.19 MLH PROC FAC	871.4		871.4	883.0	1,537.8		2,420.8
1.1.20 RECOVERY FAC	829.2		829.2	828.2	1,436.4		2,264.6
1.2 SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6		39.3
1.2.1 RM SLD & FLT TD	2.4		2.4	2.4	3.5		5.9
1.2.2 WAREHOUSE & ULT	12.2		12.2	12.2	21.1		33.3
1.3 CHIEFS COST	537.3		537.3	537.3	456.7		1,194.0
1.4 INTEREST DURING CON	532.2		532.2	532.2	652.7		1,185.0
2.0 OPER & MAINT		5,202.0	5,202.0			5,202.0	5,202.0
2.1 DIRECT LABOR		1,163.4	1,163.4			1,163.4	1,163.4
2.1.1 PORT & REC TRMS		5.1	5.1			5.1	5.1
2.1.2 WATER BASIN REC (PORT)		145.8	145.8			145.8	145.8
2.1.3 WATER BASIN REC (PORT)							
2.1.4 WATER BASIN STOP		27.1	27.1			27.1	27.1
2.1.5 RAIL FAC LABOR							
2.1.6 RAIL FAC LABOR		313.7	313.7			313.7	313.7
2.1.7 INFLAT REPLACEMENT LABOR							
2.1.8 GEOLOGIC REC MOD LABOR							
2.1.9 CASK TRMS MAINT LAB		31.6	31.6			31.6	31.6
2.1.10 LUM PROC LABOR		15.2	15.2			15.2	15.2
2.1.11 MLH PROC LABOR		312.4	312.4			312.4	312.4
2.1.12 RECOVERY PLANT LAB		312.4	312.4			312.4	312.4
2.2 INDIRECT LABOR		1,751.4	1,751.4			1,751.4	1,751.4
2.2.1 PORT & REC TRMS LAB		8.1	8.1			8.1	8.1
2.2.2 W.D. REC (PORT) LAB		218.6	218.6			218.6	218.6
2.2.3 W.D. REC (PORT) LAB							
2.2.4 W.D. STOP IND LAB		40.5	40.5			40.5	40.5
2.2.5 RAIL FAC IND LAB							
2.2.6 RAIL FAC IND LAB		478.4	478.4			478.4	478.4
2.2.7 INFLAT IND LABOR		65.8	65.8			65.8	65.8
2.2.8 GEO REC MOD IND LAB							
2.2.9 CASK TRMS MAINT LAB		47.2	47.2			47.2	47.2
2.2.10 LUM PROC IND LAB		7.7	7.7			7.7	7.7
2.2.11 MLH PROC IND LAB		446.5	446.5			446.5	446.5
2.2.12 REC PLANT IND LAB		446.5	446.5			446.5	446.5
2.3 MATERIAL SUP UTIL ECT		1,764.9	1,764.9			1,764.9	1,764.9
2.3.1 PORT REC FMS		8.1	8.1			8.1	8.1
2.3.2 W.D. REC OPNS 4 PORT		218.6	218.6			218.6	218.6
2.3.3 W.D. REC OPNS 2 PORT							
2.3.4 W.D. STORAGE OPNS		40.5	40.5			40.5	40.5
2.3.5 RAIL OPNS (2000)							
2.3.6 RAIL OPNS (2000)		478.4	478.4			478.4	478.4
2.3.7 INFLAT OPNS		65.8	65.8			65.8	65.8
2.3.8 GEOLOGIC REC OPNS							
2.3.9 CASK TRMS		47.2	47.2			47.2	47.2
2.3.10 LUM PROC OPNS		21.3	21.3			21.3	21.3
2.3.11 MLH PROCESSING OPNS		446.5	446.5			446.5	446.5
2.3.12 RECOVERY PLANT OPNS		446.5	446.5			446.5	446.5
2.4 CONTRACTED SERVICES		414.9	414.9			414.9	414.9
2.4.1 CRP ON		329.4	329.4			329.4	329.4
2.4.2 US PORT FEE		8.4	8.4			8.4	8.4
2.4.3 ELPCP PORT FEE STOP							
2.4.4 US RAIL (SF TO STOP)		17.2	17.2			17.2	17.2
2.4.5 ELPCP RAIL TRMS							
2.4.6 US STOP (TIME CHRG)		50.6	50.6			50.6	50.6
2.4.7 ELPCP STOP							
2.4.8 US RECON CP							
2.4.9 ELPCP REC CP							
2.4.10 ELPCP WASTE DIS							
2.4.11 US RAIL TRMS		16.9	16.9			16.9	16.9
2.4.12 ELPCP RAIL TRMS							
2.4.13 ELPCP RAIL TRMS							
2.4.14 US PORT FEE		8.4	8.4			8.4	8.4
2.4.15 ELPCP PORT FEE							
2.4.16 ELPCP PORT FEE							
2.4.17 PACIFIC PORT FEE							
2.4.18 PACIFIC PORT FEE							
2.4.19 RAIL RAIL TRMS							
2.4.20 RAIL RAIL TRMS							
2.5 SECON TRUST FUND		107.5	107.5			107.5	107.5

Section E3.23

Case: 22A

Description: Fuel Cycle Center (FCC) baseline except recovery deferred to 2010

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2010

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 7.068 billion dollars

Owners ROI - 21.6%

Service charge - \$198/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/10) \$198.730
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$63927.626

22A
Yearly Profit and Loss Statement

YEAR	REP REVENUE	GEN CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEF EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.7	2.7	.8	5.1	2.5	8.4	.0	5.7
1979	.0	6.0	6.0	1.3	8.7	4.1	14.3	.0	8.3
1980	.0	7.5	7.5	2.5	11.3	5.3	19.1	.0	11.6
1981	.0	17.1	17.1	3.6	16.0	7.6	27.1	.0	10.0
1982	.0	35.0	35.0	5.1	21.0	10.5	37.4	.0	2.4
1983	.0	45.3	45.3	6.4	27.3	13.3	47.1	.0	1.8
1984	.0	56.3	56.3	7.7	32.0	15.6	55.3	.4	.6
1985	.0	75.5	75.5	18.9	35.4	17.5	71.8	1.8	2.9
1986	.0	94.7	94.7	19.4	37.2	18.3	75.5	7.3	11.9
1987	.0	111.9	111.9	42.1	39.7	20.7	102.4	3.6	5.9
1988	.0	134.0	134.0	42.6	41.5	22.1	106.2	13.2	29.7
1989	.0	154.3	154.3	42.6	42.9	23.4	109.0	28.7	46.8
1990	.0	193.3	193.3	42.7	45.2	23.4	113.2	30.0	49.7
1991	.0	221.0	221.0	43.6	51.6	23.6	124.4	36.7	59.9
1992	.0	257.0	257.0	44.4	56.6	23.1	124.0	36.0	62.4
1993	.0	315.2	315.2	43.0	62.3	27.5	144.8	64.6	105.7
1994	.0	374.1	374.1	45.6	67.7	41.9	155.2	63.2	135.7
1995	.0	436.3	436.3	48.2	73.0	46.9	168.9	102.4	187.0
1996	.0	469.5	469.5	48.8	78.0	51.3	176.9	118.8	180.8
1997	.0	529.6	529.6	47.4	83.0	55.7	186.6	129.8	211.7
1998	.0	566.5	566.5	48.5	90.3	61.3	200.3	146.7	239.4
1999	.0	627.9	627.9	49.1	95.6	66.3	211.1	158.4	238.4
2000	.0	679.8	679.8	49.9	116.1	80.2	246.2	164.6	268.9
2001	.0	745.6	745.6	50.9	157.6	103.3	313.8	164.5	268.3
2002	.0	778.1	778.1	51.7	177.3	119.6	348.6	165.2	266.2
2003	.0	846.9	846.9	52.6	206.7	140.2	399.5	178.6	277.3
2004	.0	909.6	909.6	53.7	236.9	162.5	453.0	173.5	283.0
2005	.0	946.6	946.6	54.8	267.1	177.7	509.6	154.7	252.4
2006	.0	946.9	946.9	55.9	335.0	233.2	624.0	122.7	200.2
2007	.0	956.4	956.4	56.2	368.6	251.6	686.3	105.5	178.6
2008	.0	946.6	946.6	56.4	378.5	263.7	698.6	97.3	158.7
2009	.0	947.2	947.2	56.6	376.7	274.5	707.8	91.0	148.3
2010	2006.0	956.3	3012.0	117.8	366.2	273.3	757.2	857.1	1398.4
2011	2006.0	946.6	3002.6	117.7	354.7	270.2	742.6	858.6	1401.2
2012	2006.0	956.6	3002.9	117.6	342.0	269.0	728.6	844.2	1416.1
2013	2006.0	956.4	3012.4	117.5	338.8	265.5	711.8	874.3	1426.4
2014	2006.0	946.6	3002.6	117.4	314.4	261.3	693.7	877.4	1421.5
2015	2006.0	947.2	3003.2	117.4	299.2	259.6	676.5	866.4	1446.3
2016	2006.0	956.3	3012.3	117.3	284.1	258.6	659.9	867.1	1463.7
2017	2006.0	946.6	3002.6	117.2	268.4	248.3	637.9	902.4	1472.3
2018	2006.0	946.9	3002.9	117.1	255.8	234.4	610.3	909.2	1483.4
2019	2006.0	956.4	3012.4	117.0	237.2	225.9	599.1	928.5	1501.9
2020	2006.0	946.6	3002.6	116.9	219.4	223.3	569.7	926.0	1516.9
2021	2006.0	947.2	3003.2	116.8	201.3	222.9	541.1	935.2	1526.5
2022	2006.0	956.3	3012.3	116.7	182.6	214.9	514.2	949.4	1545.1
2023	2006.0	946.6	3002.6	116.7	163.6	209.3	489.5	955.0	1558.1
2024	2006.0	946.9	3002.9	116.6	143.7	203.0	463.3	965.1	1574.6
2025	2006.0	956.4	3012.4	116.5	123.2	198.6	437.7	978.4	1595.4
2026	2006.0	946.6	3002.6	116.4	102.4	194.9	415.7	989.8	1603.9
2027	2006.0	947.2	3003.2	116.3	77.8	192.5	391.6	998.4	1615.2
2028	2006.0	956.3	3012.3	116.2	52.3	190.3	365.0	1006.1	1641.6
2029	2006.0	946.6	3002.6	116.1	26.7	191.8	335.7	1013.0	1652.9
2030	2006.0	946.9	3002.9	116.1	.0	18.1	185.0	1024.1	1658.8
TOTAL	41174.0	33400.5	74574.4	3646.9	7597.9	7067.9	18712.6	22028.4	35901.3
AWC	314.6	331.4	1446.1	68.8	150.9	133.4	353.1	415.6	677.4
14-10C	236.4	158.7	435.1	21.7	47.8	42.0	111.1	130.8	213.2

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH		
1978	3.7	77.0	- 73.3	- 73.3	- 38.7	- 38.7	- 39.7	- 39.7		
1979	6.0	55.3	- 49.3	- 122.6	- 38.0	- 76.7	- 39.8	- 79.5		
1980	7.5	42.4	- 34.9	- 157.5	- 30.8	- 107.5	- 30.8	- 110.3		
1981	17.1	74.3	- 57.2	- 214.7	- 38.8	- 146.3	- 37.7	- 148.1		
1982	35.0	93.3	- 58.3	- 273.0	- 32.5	- 178.8	- 33.7	- 182.1		
1983	45.3	94.0	- 48.7	- 321.7	- 19.4	- 198.2	- 28.5	- 210.6		
1984	56.3	78.2	- 21.9	- 343.6	- 9.5	- 207.7	- 18.5	- 229.1		
1985	76.5	78.3	- 1.8	- 345.4	- .5	- 208.2	- 2.9	- 232.0		
1986	94.7	51.0	- 43.3	- 388.7	16.8	- 191.4	16.4	- 215.6		
1987	111.9	63.3	- 48.6	- 437.3	35.3	- 156.1	41.3	- 174.3		
1988	134.0	75.6	- 58.4	- 495.7	55.9	- 100.2	55.9	- 119.8		
1989	164.2	71.4	- 92.8	- 588.5	55.0	- 45.2	54.6	- 65.2		
1990	153.5	85.5	- 68.0	- 656.5	44.3	- 1.1	33.9	- 31.2		
1991	221.8	140.1	- 81.7	- 738.2	49.4	44.5	48.3	5.8		
1992	267.0	140.4	- 126.6	- 864.8	74.2	118.7	73.2	127.4		
1993	315.2	145.2	- 170.0	- 1034.8	88.7	207.4	97.7	225.0		
1994	374.1	143.0	- 231.1	- 1265.9	132.1	339.5	131.1	360.6		
1995	456.3	157.6	- 298.7	- 1564.6	181.4	520.9	180.2	540.8		
1996	448.5	144.1	- 304.4	- 1869.0	181.7	702.6	180.7	720.7		
1997	538.0	144.8	- 393.2	- 2262.2	214.3	916.9	213.3	938.2		
1998	556.5	184.8	- 371.7	- 2633.9	232.1	1149.0	230.7	1169.7		
1999	627.3	160.6	- 466.7	- 3100.6	369.3	1518.3	368.0	1581.1		
2000	674.3	306.3	- 368.0	- 3468.6	302.5	1820.7	300.1	1880.1		
2001	756.6	718.2	- 38.4	- 3507.0	114.8	1935.5	108.9	1989.0		
2002	778.1	494.3	- 283.8	- 3790.8	223.8	2159.3	220.4	2209.4		
2003	856.3	559.9	- 296.6	- 4087.4	156.2	2315.5	151.3	2460.7		
2004	809.6	534.5	- 275.1	- 4362.5	204.9	2520.4	201.7	2662.1		
2005	806.6	693.7	- 117.1	- 4479.6	55.3	2575.7	66.8	2731.9		
2006	846.9	685.6	- 161.3	- 4640.9	89.2	2664.9	61.0	2792.9		
2007	976.4	672.3	- 304.1	- 4945.0	164.4	2829.3	160.1	2953.0		
2008	946.6	647.1	- 299.5	- 5244.5	221.5	3050.8	219.8	3172.8		
2009	947.2	396.9	- 550.3	- 5794.8	224.6	3275.4	223.5	3396.3		
2010	3012.8	132.4	- 2880.4	- 8675.2	1542.6	4818.0	1534.3	4971.3		
2011	3002.6	132.1	- 2870.5	- 11545.7	1556.1	6374.1	1538.0	6527.3		
2012	3002.9	132.5	- 2870.4	- 14416.1	1556.4	7930.5	1538.5	8075.8		
2013	3013.4	130.6	- 2882.8	- 17298.9	1539.6	9470.1	1541.8	9621.9		
2014	3002.2	124.0	- 2878.2	- 20177.1	1535.0	11005.1	1537.4	11158.5		
2015	3003.2	124.2	- 2879.0	- 23056.1	1542.6	12547.7	1545.1	12702.6		
2016	3012.3	132.5	- 2879.8	- 25935.9	1547.4	14095.1	1550.0	13852.6		
2017	3002.6	130.2	- 2872.4	- 28808.3	1547.6	15642.7	1550.2	15402.8		
2018	3002.9	142.0	- 2860.9	- 31669.2	1542.0	17184.7	1545.3	16948.1		
2019	3012.4	128.4	- 2884.0	- 34553.2	1552.3	18737.0	1555.0	18492.0		
2020	3002.6	123.5	- 2879.1	- 37432.3	1548.3	20285.3	1551.3	20043.3		
2021	3003.2	128.6	- 2874.6	- 40306.9	1549.4	21834.7	1552.5	21587.2		
2022	3012.8	129.9	- 2882.9	- 43189.8	1550.8	23385.5	1552.9	23140.1		
2023	3002.6	132.6	- 2870.0	- 46060.8	1554.1	24939.6	1557.2	24701.3		
2024	3002.9	129.7	- 2873.3	- 48934.1	1556.9	26496.5	1560.3	26261.6		
2025	3012.4	133.0	- 2879.5	- 51813.6	1562.7	28059.2	1566.1	27827.6		
2026	3002.6	143.8	- 2856.8	- 54670.4	1552.1	29611.3	1555.6	29456.9		
2027	3003.2	137.2	- 2866.1	- 57536.5	1553.7	31165.0	1557.5	30970.6		
2028	3012.8	129.3	- 2883.3	- 60420.8	1551.2	32716.2	1555.3	32525.9		
2029	3002.6	128.6	- 2873.0	- 63293.8	1555.3	34271.5	1559.7	34085.7		
2030	3002.9	122.1	- 2874.9	- 66168.7	1781.6	35953.1	1786.3	35862.0		

RATE OF RETURN TO ENTERPRISE OWNER 31.09%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 22.11%

Capital Investment Balance Sheet

YEPP	CAPITAL INVESTMENT		FIXED ASSETS	DEPRECIATING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1979	75.2	A	73.7	1.0	59.7	24.0
1979	53.7	A	183.4	1.7	86.8	38.8
1980	39.9	A	157.9	2.3	113.3	48.0
1981	70.7	A	221.1	3.3	158.8	60.8
1982	88.2	A	258.3	4.3	216.2	87.1
1983	87.6	A	373.1	5.6	272.9	105.9
1984	70.6	A	428.0	6.6	317.7	118.9
1985	74.4	A	464.9	9.0	351.2	122.8
1986	31.5	A	477.6	9.4	368.8	118.3
1987	41.8	A	498.8	13.6	392.6	119.8
1988	33.0	A	503.6	14.0	429.7	114.0
1989	38.7	A	514.9	14.3	423.2	168.0
1990	42.8	A	532.3	14.6	445.1	161.8
1991	55.3	A	553.0	15.8	501.4	113.4
1992	56.0	A	566.0	16.8	556.2	122.7
1993	100.2	A	724.8	17.9	612.0	130.7
1994	97.4	A	780.3	18.9	663.8	135.4
1995	111.4	A	844.8	20.8	722.7	142.1
1996	97.3	A	890.8	20.9	769.6	148.2
1997	97.4	A	938.5	21.3	813.7	149.6
1998	136.2	A	1007.5	23.2	831.4	149.3
1999	111.4	A	1052.6	24.1	929.0	147.7
2000	346.3	A	1318.7	27.7	1128.8	217.6
2001	667.2	A	1880.7	34.8	1556.4	379.8
2002	352.6	A	2113.6	33.2	1726.9	424.8
2003	507.3	A	2480.7	33.2	2012.9	511.8
2004	330.3	A	2849.0	48.4	2365.1	592.4
2005	243.9	A	3455.2	57.0	2794.2	758.8
2006	823.3	A	4091.3	63.1	3254.8	897.1
2007	316.1	A	4356.4	69.3	3510.2	915.7
2008	259.7	A	4383.4	71.1	3599.9	854.7
2009	250.4	A	4395.3	72.2	3651.8	779.7
2010	14.6	A	4106.6	80.7	3037.4	643.9
2011	14.4	A	3844.8	78.7	3416.4	507.1
2012	3.2	A	3581.0	76.6	3279.0	378.7
2013	13.1	A	3339.6	70.4	3139.7	263.3
2014	3.6	A	3073.3	72.0	2987.8	157.5
2015	8.8	A	2885.2	69.4	2837.8	53.7
2016	5.2	A	2680.9	68.9	2673.4	27.6
2017	13.1	A	2351.6	64.3	2321.3	185.5
2018	34.9	A	2137.9	61.3	2099.1	167.3
2019	9.4	A	1918.5	59.6	2130.1	220.5
2020	9.6	A	1667.3	58.1	2005.2	261.3
2021	11.7	A	1475.6	53.8	1816.9	287.3
2022	13.1	A	1374.3	49.9	1623.8	301.1
2023	13.9	A	1081.0	46.7	1428.4	306.2
2024	13.1	A	891.5	43.4	1228.8	285.9
2025	16.5	A	710.0	39.9	1093.6	252.7
2026	27.4	A	548.9	36.5	784.4	207.3
2027	30.9	A	365.9	33.7	544.2	145.6
2028	13.1	A	183.4	28.6	283.4	69.3
2029	6.5	A	.1	24.1	.5	23.8
2030	12.0	A	.0	19.5	.1	19.3

TOTAL CAPITAL INVESTMENT 7627.9

22A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	76.24001	25.50002	25.15919	29.66307
1979	129.99	43.77003	42.8967	32.84422
1980	169.92	57.6601	56.07359	73.65009
1981	240.61	82.0201	79.40129	101.3968
1982	328.7698	112.6099	108.494	125.113
1983	416.3896	143.5	137.4086	145.6622
1984	486.9495	169.25	160.6933	156.1448
1985	541.3594	190.1902	178.6486	159.0495
1986	572.8792	204.1003	189.0501	159.0495
1987	614.719	222.1604	202.8573	159.0495
1988	647.709	238.0105	213.7439	159.0495
1989	676.439	253.2307	223.2248	159.0495
1990	719.2388	274.0908	237.3488	159.0495
1991	815.5586	314.1509	269.1343	159.0495
1992	911.5984	355.4409	300.8274	159.0495
1993	1011.808	399.8511	333.8967	159.0495
1994	1109.158	445.3711	366.022	159.0495
1995	1220.578	497.9211	402.7905	159.0495
1996	1317.918	548.3411	434.9128	159.0495
1997	1415.268	601.5212	467.0383	159.0495
1998	1551.518	670.1216	512.0007	159.0495
1999	1662.938	733.9617	548.7693	159.0495
2000	2009.278	880.4719	663.0615	159.0495
2001	2676.518	1140.092	883.2507	159.0495
2002	3029.088	1302.142	999.5989	159.0495
2003	3536.398	1523.472	1167.011	159.0495
2004	4067.188	1762.083	1342.172	159.0495
2005	4911.047	2116.832	1620.645	159.0495
2006	5740.836	2481.001	1894.476	159.0495
2007	6256.965	2746.81	2064.798	159.0495
2008	6547.664	2947.81	2160.729	159.0495
2009	6798.023	3146.179	2243.347	159.0495
2010	6812.633	3275.259	2248.169	159.0495
2011	6827.031	3410.597	2252.92	159.0495
2012	6832.27	3553.305	2254.649	159.0495
2013	6845.316	3705.614	2258.954	159.0495
2014	6851.863	3864.03	2261.115	159.0495
2015	6858.672	4021.659	2263.362	159.0495
2016	6863.91	4188.555	2265.09	159.0495
2017	6876.957	4355.645	2269.396	159.0495
2018	6901.836	4535.691	2277.606	159.0495
2019	6911.242	4721.137	2280.71	159.0495
2020	6917.789	4912.574	2282.87	159.0495
2021	6929.527	5112.594	2286.744	159.0495
2022	6942.625	5316.832	2291.066	159.0495
2023	6958.531	5530.137	2296.315	159.0495
2024	6971.629	5750.816	2300.637	159.0495
2025	6988.117	5982.484	2306.078	159.0495
2026	7015.516	6231.164	2315.12	159.0495
2027	7036.363	6492.18	2322.	159.0495
2028	7049.41	6766.059	2326.305	159.0495
2029	7055.91	7055.457	2328.45	159.0495
2030	7067.91	7067.77	2332.41	159.0495

22A
Cost Summary - Dollars in Millions

WBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	7,068.0	3,647.0	10,714.9	7,068.0	3,647.0	10,714.9
1.0	CAPITAL ITEMS	7,068.0		7,068.0	7,068.0		7,068.0
1.1	STEEL FACILITIES-EQUIPMENT	5,413.8		5,413.8	5,413.8		5,413.8
1.1.1	SHIP	165.0		165.0	165.0		165.0
1.1.2	CASH	266.0		266.0	266.0		266.0
1.1.3	CASH TRANSPORTER-RAIL CAR	18.6		18.6	18.6		18.6
1.1.4	RAIL CAR FLG	0.8		0.8	0.8		0.8
1.1.5	CASH TRANSPORTER						
1.1.6	SEAPORT FAC	1.0		1.0	1.0		1.0
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0		48.0
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0		24.0
1.1.10	PROCESSING FACILITY						
1.1.11	PROCESSING FAC	116.0		116.0	116.0		116.0
1.1.12	ORAINSTEPS	422.1		422.1	422.1		422.1
1.1.13	DISPLACEMENT TANKS	18.0		18.0	18.0		18.0
1.1.14	WATER MODULE						
1.1.15	GEOLOGIC REC MODULE	1,739.8		1,739.8	1,739.8		1,739.8
1.1.16	RECESSITORY STORAGE MOD						
1.1.17	CASH	47.0		47.0	47.0		47.0
1.1.18	LOCK INTER FAC	67.0		67.0	67.0		67.0
1.1.19	MLM PROC FAC	1,274.1		1,274.1	1,274.1		1,274.1
1.1.20	RECOVERY FAC	1,206.5		1,206.5	1,206.5		1,206.5
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7		14.7
1.2.1	ADM BLD & FLT YD	2.4		2.4	2.4		2.4
1.2.2	WAREHOUSE & FLT	12.2		12.2	12.2		12.2
1.3	OTHERS COST	824.0		824.0	824.0		824.0
1.4	INTEREST DURING CONS	815.5		815.5	815.5		815.5
2.0	OPER & MAINT		3,647.0	3,647.0		3,647.0	3,647.0
2.1	DIRECT LABOR		1,024.6	1,024.6		1,024.6	1,024.6
2.1.1	PORT & REC TRANS		5.1	5.1		5.1	5.1
2.1.2	WATER BASIN REC(4PORT)		145.8	145.8		145.8	145.8
2.1.3	WATER BASIN REC(2PORT)						
2.1.4	WATER BASIN STOP		27.1	27.1		27.1	27.1
2.1.5	RAIL FAC LABOR						
2.1.6	RAIL FAC LABOR		313.7	313.7		313.7	313.7
2.1.7	WATER BASIN STOP		44.0	44.0		44.0	44.0
2.1.8	GEOLOGIC REC MOD LABOR						
2.1.9	CASH TRANS MAINT LAB		30.8	30.8		30.8	30.8
2.1.10	MLM PROC LABOR		14.5	14.5		14.5	14.5
2.1.11	MLM PROC LABOR		221.8	221.8		221.8	221.8
2.1.12	RECOVERY PLANT LAB		221.8	221.8		221.8	221.8
2.2	INDIRECT LABOR		1,462.2	1,462.2		1,462.2	1,462.2
2.2.1	PORT & REC TRANS LAB		8.1	8.1		8.1	8.1
2.2.2	WATER BASIN REC(4PORT) LAB		218.6	218.6		218.6	218.6
2.2.3	WATER BASIN REC(2PORT) LAB						
2.2.4	WATER BASIN STOP LAB		40.5	40.5		40.5	40.5
2.2.5	RAIL FAC IND LAB						
2.2.6	RAIL FAC IND LAB		470.4	470.4		470.4	470.4
2.2.7	WATER BASIN STOP LAB		65.8	65.8		65.8	65.8
2.2.8	GEO REC MOD IND LAB						
2.2.9	CASH TRANS MAINT LAB		46.1	46.1		46.1	46.1
2.2.10	MLM PROC IND LAB		21.3	21.3		21.3	21.3
2.2.11	MLM PROC IND LAB		255.7	255.7		255.7	255.7
2.2.12	REC PLANT IND LAB		255.7	255.7		255.7	255.7
2.3	MATERIAL SUP UTIL ECT		603.7	603.7		603.7	603.7
2.3.1	PORT REC FLS		8.1	8.1		8.1	8.1
2.3.2	WATER BASIN REC(4PORT)		218.6	218.6		218.6	218.6
2.3.3	WATER BASIN REC(2PORT)						
2.3.4	WATER BASIN STOP		40.5	40.5		40.5	40.5
2.3.5	RAIL FAC(2500)						
2.3.6	RAIL FAC(5000)		224.5	224.5		224.5	224.5
2.3.7	WATER BASIN STOP		65.8	65.8		65.8	65.8
2.3.8	GEOLOGIC REC ONS		46.1	46.1		46.1	46.1
2.3.9	CASH TRANS						
2.3.10	MLM PROC ONS						
2.3.11	MLM PROCESSING ONS						
2.3.12	RECOVERY PLANT ONS						
2.4	CONTRACTED SERVICES		424.9	424.9		424.9	424.9
2.4.1	SHIP ON		321.6	321.6		321.6	321.6
2.4.2	US PORT FEE		0.4	0.4		0.4	0.4
2.4.3	ELPOR PORT FEE STOP						
2.4.4	US RAIL(SF TO STOP)		17.2	17.2		17.2	17.2
2.4.5	ELPOR RAIL TRANS						
2.4.6	US STOP(TIME CHRG)		68.7	68.7		68.7	68.7
2.4.7	ELPOR STOP						
2.4.8	US REC(ON CR)						
2.4.9	ELPOR REC CP						
2.4.10	ELPOR WASTE DIS						
2.4.11	US RAIL TRANS		16.6	16.6		16.6	16.6
2.4.12	ELPOR RAIL TRANS						
2.4.13	ELPOR RAIL TRANS						
2.4.14	US PORT FEE		0.4	0.4		0.4	0.4
2.4.15	ELPOR PORT FEE						
2.4.16	ELPOR PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	PACIFIC PORT FEE						
2.4.19	RAIL RAIL TRANS						
2.4.20	RAIL RAIL TRANS						
2.5	DOCK TRUST FUND		121.4	121.4		121.4	121.4

Section E3.24

Case: 23A

Description: Fuel Cycle Center (FCC) baseline except recovery deferred to 1990
and variable value of recovery products

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%
Borrowing - 2/3 of any capital expenditure at 10%
Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific
Location cost factor - 1.0
Water provisions - none

Storage

Type of storage - aircooled vaults
Storage cost factor - 1.0

Recovery

Start up time - 2000
Modular plant - single plant
Value of recovered products - variable \$/Kg spent fuel

Pricing

Service charge - average over fuel population
Recovery credit - none

Summary of Output Characteristics:

Capital investment - 4.663 billion dollars
Owners ROI - 20.6%
Service charge - \$294/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/10) \$294.629
 RATE OF RETURN ON INVESTMENT 30.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 496192.810

23A

Yearly Profit and Loss Statement

YEAR	PEP EXPENSE	SERV CH EXPENSE	TOTAL PEP/CH	OPER EXPENSE	INT EXPENSE	DEP EXPENSE	TOTAL EXPENSE	TAXES	NET INCOME
1978	.0	4.0	4.0	.8	5.1	2.5	8.4	.0	3.7
1979	.0	8.9	8.9	1.5	8.6	4.1	14.3	.0	5.7
1980	.0	11.1	11.1	2.5	13.6	5.2	22.3	.0	11.2
1981	.0	25.3	25.3	3.6	31.9	10.0	55.5	.0	18.1
1982	.0	51.9	51.9	5.4	47.4	21.1	74.0	.0	22.1
1983	.0	67.2	67.2	6.7	59.0	26.3	92.1	.0	24.9
1984	.0	83.5	83.5	8.1	75.3	34.0	117.4	.0	33.9
1985	.0	113.5	113.5	20.4	97.6	44.3	162.3	.0	38.8
1986	.0	140.4	140.4	21.3	130.3	59.7	211.3	.0	70.9
1987	.0	165.9	165.9	53.7	163.4	76.0	293.0	.0	127.1
1988	.0	228.4	228.4	54.4	182.3	85.8	322.5	.0	94.1
1989	.0	273.5	273.5	54.4	183.9	87.2	325.6	.0	52.1
1990	243.9	326.9	570.7	114.2	187.7	89.4	391.3	55.0	86.5
1991	324.4	327.6	652.0	115.3	187.6	90.4	393.4	98.2	160.3
1992	391.4	395.8	787.2	115.8	188.7	92.1	396.6	148.4	242.2
1993	463.3	467.3	930.7	116.3	190.6	94.6	401.5	201.1	328.1
1994	531.6	554.6	1086.4	116.8	189.2	95.1	401.1	269.4	424.9
1995	603.6	646.9	1250.5	117.3	187.6	95.6	400.5	323.0	527.0
1996	674.2	694.5	1368.7	117.6	185.7	96.1	399.6	368.3	660.9
1997	751.1	792.8	1533.9	118.1	185.4	97.3	401.5	430.3	702.1
1998	829.9	869.5	1699.4	119.4	187.4	101.0	407.8	490.8	809.2
1999	910.6	930.9	1841.5	119.9	184.6	101.5	406.0	545.5	890.0
2000	990.2	1007.9	1998.1	120.4	183.3	103.3	407.1	604.6	966.4
2001	1070.9	1106.9	2177.7	120.4	182.4	105.8	408.7	672.3	1096.8
2002	1160.7	1153.3	2314.2	121.0	180.6	107.7	409.3	723.9	1181.1
2003	1252.9	1255.5	2508.5	121.5	178.8	110.3	410.6	797.2	1306.7
2004	1358.9	1348.5	2707.3	122.2	175.6	112.4	410.1	865.3	1411.5
2005	1422.0	1403.4	2825.4	122.7	171.1	113.8	407.7	918.7	1499.0
2006	1515.4	1403.9	2919.3	123.1	166.4	115.6	405.0	955.4	1558.6
2007	1539.5	1412.0	2957.5	123.0	161.5	113.0	407.5	972.8	1587.2
2008	1554.0	1403.4	2957.4	123.0	155.8	113.1	401.9	974.9	1590.6
2009	1573.3	1404.3	2977.6	123.0	149.6	114.7	397.2	984.3	1606.0
2010	1592.6	1418.4	3011.0	123.0	142.2	115.9	391.1	999.4	1630.6
2011	1602.2	1403.4	3005.7	122.9	135.4	117.1	375.5	999.5	1630.7
2012	1621.3	1403.9	3025.4	122.9	126.5	114.9	364.3	1011.2	1649.9
2013	1640.8	1418.0	3058.8	123.0	118.4	114.8	356.2	1027.0	1675.8
2014	1665.0	1403.4	3068.4	122.9	108.4	114.8	346.1	1034.5	1687.8
2015	1679.4	1404.3	3083.8	122.9	98.6	111.5	333.0	1045.3	1705.5
2016	1698.8	1418.4	3117.2	122.8	88.7	110.9	322.4	1062.8	1732.7
2017	1718.1	1403.9	3121.5	122.8	77.7	103.2	303.7	1070.7	1747.0
2018	1737.4	1403.9	3141.2	122.8	69.4	103.9	296.1	1081.1	1764.0
2019	1751.8	1418.0	3169.8	122.8	58.4	105.8	287.0	1095.5	1787.7
2020	1776.0	1403.4	3179.4	122.7	47.8	61.0	231.5	1109.2	1827.7
2021	1795.3	1404.3	3199.6	122.7	46.1	63.3	232.2	1127.6	1839.8
2022	1809.7	1418.4	3228.2	122.7	45.4	66.4	234.5	1138.8	1854.8
2023	1833.9	1403.4	3237.3	122.7	43.4	72.0	237.8	1139.7	1859.6
2024	1853.2	1403.9	3257.1	122.7	41.9	80.0	244.6	1144.7	1867.7
2025	1872.5	1418.0	3290.5	122.6	40.5	85.8	248.9	1154.3	1883.3
2026	1891.8	1403.4	3295.2	122.6	37.6	103.5	273.7	1158.0	1879.5
2027	1911.1	1404.3	3315.4	122.6	36.2	115.4	279.2	1157.2	1888.1
2028	1930.4	1418.4	3348.8	122.6	26.2	141.1	289.9	1162.4	1896.5
2029	1949.7	1403.4	3353.1	122.5	16.1	167.3	306.5	1157.7	1888.9
2030	1969.0	1403.9	3372.9	122.5	4.7	21.8	179.0	1218.7	1900.2
TOTL	5441.9	49416.0	106057.6	5381.9	5979.8	4648.0	15829.8	34480.8	55733.1
AIC	1064.9	928.2	2001.1	98.1	112.7	87.7	298.6	650.6	1051.9
22.10	325.2	294.6	629.8	30.9	30.5	27.6	94.0	204.8	331.1

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX:				FINANCED ENTERPRISE AFTER TAX:				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	4.0	78.7	- 72.7	- 72.7	- 27.2	- 27.2	- 28.3	- 28.2	- 28.2	- 28.2
1979	8.9	55.3	- 46.4	- 119.1	- 19.5	- 46.3	- 30.2	- 58.0	- 58.0	- 58.0
1980	11.1	77.3	- 66.2	- 185.3	- 30.5	- 77.2	- 31.4	- 89.9	- 89.9	- 89.9
1981	25.3	127.9	- 102.5	- 287.8	- 42.4	- 119.6	- 43.9	- 133.9	- 133.9	- 133.9
1982	51.9	380.8	- 328.9	- 616.7	- 129.9	- 249.5	- 134.4	- 268.3	- 268.3	- 268.3
1983	67.2	182.7	- 115.5	- 732.2	- 54.7	- 304.2	- 61.5	- 329.8	- 329.8	- 329.8
1984	83.5	235.2	- 151.7	- 883.9	- 66.1	- 370.3	- 82.1	- 411.9	- 411.9	- 411.9
1985	113.5	359.8	- 246.3	- 1130.2	- 122.3	- 517.6	- 122.1	- 534.0	- 534.0	- 534.0
1986	140.4	516.9	- 376.5	- 1506.7	- 183.2	- 700.8	- 182.8	- 716.8	- 716.8	- 716.8
1987	163.9	559.5	- 395.6	- 1902.3	- 228.8	- 929.6	- 229.7	- 946.5	- 946.5	- 946.5
1988	228.4	852.5	- 624.1	- 2526.4	- 112.7	- 1042.3	- 123.0	- 1068.8	- 1068.8	- 1068.8
1989	273.0	92.5	179.5	- 1346.9	6.1	- 936.2	5.8	- 930.0	- 930.0	- 930.0
1990	538.7	174.4	364.3	- 982.6	139.7	- 796.5	129.1	- 807.9	- 807.9	- 807.9
1991	622.0	141.3	480.7	- 501.9	224.0	- 572.5	222.8	- 589.1	- 589.1	- 589.1
1992	787.2	156.2	631.0	- 113.9	300.7	- 272.9	300.3	- 282.6	- 282.6	- 282.6
1993	920.7	175.8	744.9	370.2	380.7	1.3	380.3	- 49.4	- 49.4	- 49.4
1994	1086.4	129.8	956.6	1326.8	490.7	492.5	490.6	491.5	491.5	491.5
1995	1250.5	130.3	1120.2	2447.0	590.7	1083.2	590.9	1082.4	1082.4	1082.4
1996	1368.7	130.8	1237.9	3684.9	662.2	1745.4	662.5	1749.8	1749.8	1749.8
1997	1533.9	159.9	1374.1	5059.0	752.4	2497.8	752.4	2497.2	2497.2	2497.2
1998	1699.4	199.9	1499.5	6558.5	838.0	3335.8	837.8	3334.7	3334.7	3334.7
1999	1841.5	132.9	1708.7	8267.2	946.3	4282.1	946.6	4281.4	4281.4	4281.4
2000	1996.1	162.4	1833.6	10100.8	1030.4	5312.5	1030.6	5311.9	5311.9	5311.9
2001	2177.7	174.9	2002.8	12103.6	1134.1	6446.7	1134.3	6446.2	6446.2	6446.2
2002	2314.2	169.2	2145.0	14248.6	1217.2	7663.9	1217.5	7663.7	7663.7	7663.7
2003	2508.5	177.3	2331.2	16580.5	1330.8	8994.7	1331.0	8994.7	8994.7	8994.7
2004	2687.3	166.8	2520.6	19101.1	1441.1	10435.9	1441.6	10436.2	10436.2	10436.2
2005	2825.4	159.2	2666.2	21767.3	1525.8	11961.7	1526.4	11962.7	11962.7	11962.7
2006	2919.2	164.8	2754.4	24521.7	1577.7	13539.4	1578.4	13541.1	13541.1	13541.1
2007	2957.5	173.6	2783.8	27305.5	1600.4	15139.8	1601.3	15092.4	15092.4	15092.4
2008	2957.4	161.5	2795.9	30101.4	1602.3	16742.1	1603.3	16695.7	16695.7	16695.7
2009	2977.6	162.6	2815.0	32916.4	1610.5	18352.6	1611.5	18307.2	18307.2	18307.2
2010	3011.0	158.2	2852.8	35769.2	1628.6	19981.2	1629.8	19937.0	19937.0	19937.0
2011	3005.7	180.1	2825.6	38594.8	1614.9	21596.1	1616.0	21553.0	21553.0	21553.0
2012	3025.4	159.7	2865.7	41460.5	1634.9	23231.0	1636.4	23199.0	23199.0	23199.0
2013	3058.8	178.8	2880.0	44340.5	1647.8	24878.8	1648.1	24838.6	24838.6	24838.6
2014	3068.4	158.1	2910.3	47250.8	1658.3	26537.1	1660.0	26498.5	26498.5	26498.5
2015	3083.9	173.7	2910.2	50161.0	1667.7	28204.8	1668.3	28167.2	28167.2	28167.2
2016	3117.2	170.9	2946.3	53107.3	1696.2	29895.0	1691.8	29699.7	29699.7	29699.7
2017	3121.5	164.6	2956.9	56064.2	1707.9	31602.9	1709.7	31559.4	31559.4	31559.4
2018	3141.2	190.3	2950.9	59015.1	1711.1	33314.0	1712.5	33222.0	33222.0	33222.0
2019	3169.8	180.9	3000.9	62016.0	1735.2	35049.2	1737.0	35018.2	35018.2	35018.2
2020	3179.4	180.1	2999.3	65015.3	1826.5	36875.6	1828.3	36847.2	36847.2	36847.2
2021	3199.6	183.2	3016.4	68031.7	1845.1	38720.7	1848.3	38692.5	38692.5	38692.5
2022	3228.2	179.5	3048.7	71080.4	1855.5	40576.2	1855.7	40548.2	40548.2	40548.2
2023	3237.3	165.7	3071.6	74152.0	1864.5	42440.7	1864.8	42413.0	42413.0	42413.0
2024	3257.1	179.8	3077.3	77229.3	1868.2	44308.9	1868.4	44281.4	44281.4	44281.4
2025	3290.5	192.7	3097.8	80327.1	1879.3	46188.2	1879.5	46161.0	46161.0	46161.0
2026	3295.2	184.7	3110.5	83437.6	1879.0	48067.2	1879.5	48040.5	48040.5	48040.5
2027	3315.4	165.6	3149.8	86587.4	1892.8	49950.0	1893.7	49924.2	49924.2	49924.2
2028	3348.8	178.1	3170.7	89758.1	1899.2	51849.1	1900.2	51834.3	51834.3	51834.3
2029	3353.1	151.1	3202.0	92960.1	1899.2	53758.3	1900.9	53735.2	53735.2	53735.2
2030	3372.9	173.2	3199.7	96159.8	1900.9	55709.2	1902.8	55718.0	55718.0	55718.0

RATE OF RETURN TO ENTERPRISE OWNER 20.66%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 21.14%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	%	FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	75.9	*	73.4	1.0	50.5	23.9
1979	53.7	*	123.1	1.7	66.0	38.7
1980	74.8	*	191.6	2.7	135.4	59.0
1981	124.2	*	305.9	4.2	217.4	92.8
1982	283.4	*	666.1	8.8	371.8	200.1
1983	176.0	*	817.7	10.9	566.5	242.1
1984	248.1	*	1031.8	13.9	748.4	297.2
1985	399.4	*	1326.9	19.7	970.1	376.4
1986	497.0	*	1764.1	25.9	1295.0	474.3
1987	505.9	*	2194.0	36.2	1623.3	606.9
1988	298.1	*	2406.3	39.0	1810.0	650.8
1989	44.1	*	2263.2	39.7	1825.0	577.8
1990	60.2	*	2334.0	50.3	1849.1	530.2
1991	26.0	*	2269.6	50.0	1848.4	471.7
1992	40.4	*	2217.9	50.7	1855.2	413.4
1993	53.7	*	2182.0	51.2	1871.9	361.2
1994	13.0	*	2099.8	51.0	1855.6	290.3
1995	13.8	*	2017.2	50.8	1836.7	231.4
1996	13.0	*	1934.1	50.6	1814.3	169.7
1997	41.7	*	1877.9	50.8	1809.0	119.4
1998	80.5	*	1857.4	51.1	1825.8	82.7
1999	13.0	*	1768.9	50.7	1793.5	26.1
2000	42.0	*	1707.6	50.6	1776.2	18.0
2001	54.5	*	1656.3	50.5	1762.2	55.4
2002	36.2	*	1596.8	50.3	1738.9	91.8
2003	55.8	*	1542.3	50.0	1714.5	122.2
2004	44.6	*	1474.5	49.6	1676.0	151.9
2005	35.5	*	1396.2	49.0	1624.5	179.3
2006	41.7	*	1322.4	48.2	1569.6	159.0
2007	50.6	*	1268.0	47.4	1520.5	213.0
2008	38.5	*	1183.3	46.5	1457.6	223.7
2009	29.6	*	1110.2	45.4	1396.9	231.3
2010	22.2	*	1029.6	44.2	1304.3	230.5
2011	27.1	*	969.6	43.1	1228.4	215.8
2012	36.6	*	891.4	41.6	1135.3	208.3
2013	55.8	*	832.5	40.2	1048.5	175.8
2014	35.2	*	752.9	39.0	959.4	146.0
2015	52.9	*	694.2	36.9	843.0	111.8
2016	48.0	*	631.3	35.3	737.5	70.9
2017	41.7	*	569.8	33.4	636.9	33.7
2018	67.5	*	533.3	32.0	547.6	17.8
2019	38.1	*	465.7	30.2	427.7	68.2
2020	57.4	*	462.0	29.4	422.0	67.6
2021	40.4	*	439.1	28.1	405.2	62.0
2022	55.8	*	426.5	28.0	393.3	61.2
2023	43.0	*	397.5	27.7	369.3	55.9
2024	57.1	*	374.6	27.4	346.8	55.2
2025	70.1	*	354.9	27.2	323.1	59.0
2026	42.1	*	313.5	26.7	281.2	59.0
2027	43.0	*	241.1	25.6	213.6	53.4
2028	55.5	*	155.6	24.8	130.7	49.7
2029	38.6	*	16.3	23.1	1.7	37.8
2030	50.7	*	15.2	21.2	1.3	32.2

TOTAL CAPITAL INVESTMENT 4643.2

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.46001	25.0602	25.0602
1979	129.59	43.67603	42.79768	42.79768
1980	204.43	69.11069	67.47839	67.47838
1981	328.71	111.3401	108.4743	108.4743
1982	712.0701	240.2605	234.9821	234.9821
1983	808.0798	301.5465	293.0662	293.0662
1984	1136.14	387.6904	374.926	374.9258
1985	1475.58	505.5007	486.9412	486.9409
1986	1972.53	677.5305	650.9512	650.9507
1987	2478.439	855.1904	817.8914	817.8909
1988	2776.57	966.0606	916.2676	916.2671
1989	2820.639	995.6013	930.8108	930.8101
1990	2880.859	1031.771	950.8833	950.8839
1991	2966.659	1058.451	959.3634	959.3636
1992	2947.239	1036.062	973.6052	973.6053
1993	3005.949	1134.082	991.9631	991.9631
1994	3018.949	1163.282	996.2532	996.2532
1995	3031.949	1195.262	1000.543	996.6086
1996	3044.949	1230.002	1004.833	996.8083
1997	3058.679	1277.633	1018.604	996.8081
1998	3167.179	1341.393	1045.169	996.8079
1999	3180.179	1386.663	1049.459	996.8076
2000	3222.169	1445.973	1063.316	996.8076
2001	3276.669	1514.473	1081.301	996.8074
2002	3324.899	1566.014	1097.217	996.8071
2003	3380.699	1666.164	1115.63	996.8069
2004	3425.289	1749.244	1130.345	996.8066
2005	3468.809	1806.304	1142.067	996.8064
2006	3502.539	1932.964	1159.839	996.8062
2007	3553.139	2032.674	1172.539	996.8062
2008	3591.618	2154.064	1183.234	996.8059
2009	3631.168	2244.264	1198.265	996.8057
2010	3666.398	2362.114	1209.911	996.8054
2011	3722.498	2495.065	1220.754	996.8052
2012	3768.258	2624.925	1240.685	996.8049
2013	3816.058	2767.535	1259.299	996.8047
2014	3851.268	2911.915	1270.925	996.8044
2015	3904.167	3061.155	1288.375	996.8042
2016	3952.167	3214.715	1304.215	996.804
2017	3993.897	3367.625	1317.965	996.8037
2018	4061.397	3512.626	1340.361	996.8035
2019	4099.484	3671.753	1352.83	996.8032
2020	4156.844	3734.012	1371.758	996.803
2021	4197.273	3792.072	1385.1	996.8027
2022	4253.07	3859.759	1403.513	996.8025
2023	4296.898	3926.807	1417.713	996.8022
2024	4353.195	4006.395	1436.554	996.802
2025	4423.262	4100.129	1459.675	996.8018
2026	4485.359	4204.129	1480.168	996.8015
2027	4528.387	4314.805	1494.367	996.8013
2028	4583.926	4433.262	1512.695	996.801
2029	4612.523	4610.632	1522.133	996.801
2030	4663.25	4661.977	1532.672	996.8008

PRESENT VALUE OF CAPITAL INV AT RATE %: 4M
810.2671
PRESENT VALUE OF CAPITAL INV AT RATE %: 5M
1026.553

19.99998

10.

Cost Summary - Dollars in Millions

WBS	COMMITTED COST			FINANCED COST		
	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS
TOTAL						
0.0 TOTAL	4,663.3	5,202.0	9,865.3	4,674.9	5,495.6	10,170.5
1.0 CAPITAL ITEMS	4,663.3		4,663.3	4,674.9	5,495.6	10,170.5
1.1 SYSTEM FACILITIES-EQUIPMENT	3,579.1		3,579.1	3,590.7	4,651.5	8,242.3
1.1.1 SHIP	150.0		150.0	150.0	150.1	379.2
1.1.2 CRSK	252.0		252.0	252.0	178.5	430.5
1.1.3 CRSK TRANSPORTED, PAUL CAP	23.4		23.4	23.4	11.9	35.3
1.1.4 PAUL CAP TUG	0.8		0.8	0.8	0.4	1.2
1.1.5 CRSK TRANSPORTER						
1.1.6 SUPPORT FAC	1.0		1.0	1.0	1.5	2.5
1.1.7 WATER BASIN 4 PORT	48.0		48.0	48.0	62.6	130.6
1.1.8 WATER BASIN 2 PORT						
1.1.9 WATER BASIN STORAGE	24.0		24.0	24.0	41.3	65.3
1.1.10 PROCESSING FACILITY						
1.1.11 PROCESSING FAC	116.0		116.0	116.0	281.2	317.2
1.1.12 CRUISESHIP	216.5		216.5	216.5	159.1	335.6
1.1.13 REPLACEMENT TRMS	18.0		18.0	18.0	11.7	29.7
1.1.14 MAULT MODULE	877.9		877.9	877.9	599.2	1,477.1
1.1.15 GEOLOGIC REC MODULE						
1.1.16 REPOSITORY STORAGE MOD						
1.1.17 CRSK	47.0		47.0	47.0	88.9	127.8
1.1.18 LUMINITE FAC	75.0		75.0	75.0	130.1	205.1
1.1.19 MLN FAC FAC	871.4		871.4	883.0	1,537.8	2,420.8
1.1.20 RECOVERY FAC	828.2		828.2	828.2	1,436.4	2,264.5
1.2 SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6	39.3
1.2.1 RM, BLD G, FLT YD	2.4		2.4	2.4	3.5	5.9
1.2.2 WAREHOUSE I, ULT	12.2		12.2	12.2	21.1	33.3
1.3 CHIEFS COST	537.3		537.3	537.3	656.7	1,194.0
1.4 INTEREST DURING CON	532.2		532.2	532.2	652.7	1,185.0
2.0 OPER & MAINT		5,202.0	5,202.0			5,202.0
2.1 DIRECT LABOR		1,163.4	1,163.4			1,163.4
2.1.1 PORT & REC TRMS		5.1	5.1			5.1
2.1.2 WATER BASIN REC (-PORT)		145.8	145.8			145.8
2.1.3 WATER BASIN REC (PORT)						
2.1.4 WATER BASIN STOP		27.1	27.1			27.1
2.1.5 FACI FAC LABOR						
2.1.6 FACI FAC LABOR		313.7	313.7			313.7
2.1.7 MAULT REPLACEMENT LABOR						
2.1.8 GEOLOGIC REC MOD LABOR						
2.1.9 CRSK TRMS MAINT LAB		31.6	31.6			31.6
2.1.10 LCI LK PROCESS LABOR		15.2	15.2			15.2
2.1.11 MLN FAC LABOR		312.4	312.4			312.4
2.1.12 RECOVERY PLANT LAB		312.4	312.4			312.4
2.2 INDIRECT LABOR		1,751.4	1,751.4			1,751.4
2.2.1 PORT & REC TRMS LAB		8.1	8.1			8.1
2.2.2 H.S. REC (-PORT) LAB		218.6	218.6			218.6
2.2.3 H.S. REC (-PORT) LAB						
2.2.4 H.S. STOP IND LAB		40.5	40.5			40.5
2.2.5 FACI FAC IND LAB						
2.2.6 FACI FAC IND LAB		478.4	478.4			478.4
2.2.7 MAULT IND LABOR		65.8	65.8			65.8
2.2.8 CRSK REC MOD IND LAB						
2.2.9 CRSK TRMS MAINT LAB		47.2	47.2			47.2
2.2.10 LCI LK PROC IND LAB		7.7	7.7			7.7
2.2.11 MLN PROC IND LAB		446.5	446.5			446.5
2.2.12 REC PLANT IND LAB		446.5	446.5			446.5
2.3 MATERIAL SUP UTIL ECT		1,764.9	1,764.9			1,764.9
2.3.1 PORT REC FIS		8.1	8.1			8.1
2.3.2 H.S. REC CRIS 4 PORT		218.6	218.6			218.6
2.3.3 H.S. REC CRIS 2 PORT						
2.3.4 H.S. STORAGE CRIS		40.5	40.5			40.5
2.3.5 FACI CRIS (2500)						
2.3.6 FACI CRIS (5000)		478.4	478.4			478.4
2.3.7 MAULT CRIS		65.8	65.8			65.8
2.3.8 GEOLOGIC REC CRIS						
2.3.9 CRSK TRMS		47.2	47.2			47.2
2.3.10 LCI LK PROC CRIS		21.3	21.3			21.3
2.3.11 MLN PROCESSING CRIS		446.5	446.5			446.5
2.3.12 RECOVERY PLANT CRIS		446.5	446.5			446.5
2.4 CONTRACTED SERVICES		414.9	414.9			414.9
2.4.1 SHIP ON		329.4	329.4			329.4
2.4.2 US FLAT FEE		8.4	8.4			8.4
2.4.3 ELRCP PORT FEE STOP						
2.4.4 US FLAT FEE TO STCR		17.2	17.2			17.2
2.4.5 ELRCP BATH TRMS						
2.4.6 US STOP TIME CRIS		50.6	50.6			50.6
2.4.7 ELRCP STORG						
2.4.8 US RECON CR						
2.4.9 ELRCP REC CR						
2.4.10 ELRCP TRSTE DIS						
2.4.11 US FLAT TRNSP		16.9	16.9			16.9
2.4.12 ELRCP FLAT TRNSP						
2.4.13 ELRCP FLAT TRNSP						
2.4.14 US FLAT FEE		8.4	8.4			8.4
2.4.15 ELRCP PORT FEE						
2.4.16 ELRCP PORT FEE						
2.4.17 PACIFIC PORT FEE						
2.4.18 PACIFIC PORT FEE						
2.4.19 PACIFIC PORT FEE						
2.4.20 PAC FLAT TRNSP						
2.4.21 PAC FLAT TRNSP						
2.5 SECOND TRUST FUND		107.5	107.5			107.5

Section E3.25

Case: 24A

Description: Fuel Cycle Center (FCC) baseline except variable value of recovery products

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - variable \$/Kg spent fuel

Pricing

Service charge - average over fuel population

recovery credit - none

Summary of Output Characteristics:

Capital investment - 4.777 billion dollars

Owners ROI - 21.2%

Service charge - \$179/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/KG) \$179.272
 RATE OF RETURN ON INVESTMENT 20.000%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 476789.870

24A

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SEPM CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.5	2.5	1.3	5.1	2.5	8.9	.0	6.4
1979	.0	5.4	5.4	1.5	9.6	4.1	14.3	.0	6.9
1980	.0	6.7	6.7	2.5	11.3	5.3	19.1	.0	12.4
1981	.0	15.4	15.4	3.8	16.0	7.6	27.1	.0	11.7
1982	.0	31.6	31.6	4.3	22.4	10.7	37.5	.0	5.9
1983	.0	40.9	40.9	5.1	28.2	13.6	46.9	.0	6.0
1984	.0	50.8	50.8	5.9	32.8	12.0	54.7	.0	3.9
1985	.0	69.0	69.0	10.0	36.1	17.9	72.0	.0	3.9
1986	.0	85.4	85.4	18.7	38.1	19.2	76.0	3.6	3.6
1987	.0	101.0	101.0	33.0	41.0	21.2	114.2	.0	13.2
1988	.0	133.0	133.0	33.9	43.9	23.3	120.1	7.2	11.7
1989	.0	166.4	166.4	33.8	45.1	24.5	123.4	14.4	26.7
1990	.0	174.5	174.5	33.8	47.2	26.1	127.1	18.0	29.4
1991	.0	199.3	199.3	54.2	56.9	31.3	142.5	21.6	35.3
1992	.0	240.9	240.9	55.4	60.9	42.4	178.8	33.6	38.5
1993	.0	284.4	284.4	56.1	92.5	49.1	217.7	32.9	35.7
1994	.0	337.5	337.5	56.9	110.2	53.5	220.5	42.5	64.4
1995	.0	393.6	393.6	57.7	133.5	71.6	264.8	49.0	79.9
1996	.0	422.6	422.6	58.6	174.3	91.1	324.1	37.4	61.1
1997	.0	476.3	476.3	59.6	209.3	108.6	377.5	37.5	61.3
1998	.0	529.1	529.1	60.6	236.0	123.7	420.3	41.3	67.4
1999	.0	566.4	566.4	61.7	246.7	132.0	440.3	47.9	78.2
2000	1184.9	613.3	1798.2	126.5	248.4	134.8	509.6	469.7	798.9
2001	1267.6	672.5	1941.1	126.9	245.3	135.2	507.5	544.8	888.9
2002	1360.8	701.9	2062.7	127.5	242.4	135.8	505.7	591.7	965.3
2003	1456.7	763.9	2220.6	129.1	239.6	137.0	505.7	622.1	1063.9
2004	1544.6	820.5	2365.1	128.8	236.5	138.4	503.7	707.3	1154.1
2005	1626.7	853.9	2480.7	129.3	232.6	139.6	501.5	722.8	1228.3
2006	1724.8	864.2	2579.0	129.6	229.6	141.5	500.8	722.7	1266.5
2007	1732.3	862.8	2615.1	130.0	223.7	137.3	491.0	667.1	1316.9
2008	1768.7	853.9	2622.7	130.0	218.5	136.6	485.0	612.3	1325.4
2009	1790.7	854.5	2645.2	129.9	212.4	135.9	478.2	623.5	1343.6
2010	1812.7	863.1	2675.8	129.9	206.7	135.9	472.4	637.3	1366.1
2011	1823.7	853.9	2677.6	129.8	199.5	134.2	463.5	641.4	1372.8
2012	1845.6	854.2	2699.9	129.8	192.2	133.0	455.0	653.1	1391.8
2013	1867.6	862.8	2730.4	129.7	185.0	131.1	445.8	668.1	1416.5
2014	1895.1	853.9	2749.0	129.7	177.2	129.4	436.2	678.9	1433.9
2015	1911.6	854.5	2766.1	129.6	169.7	124.1	423.5	690.2	1452.4
2016	1933.5	863.1	2796.6	129.6	161.6	122.6	413.8	695.4	1477.3
2017	195.5	873.9	1049.4	129.5	153.5	117.7	400.8	246.5	402.2
2018	1977.5	854.2	2831.7	129.5	146.8	116.0	392.2	927.0	1512.5
2019	1994.0	862.8	2856.8	129.4	139.7	113.8	382.9	940.1	1533.8
2020	2021.4	853.9	2875.4	129.4	130.7	113.9	374.9	950.5	1550.9
2021	2043.4	854.5	2897.9	129.3	121.7	113.3	366.3	922.8	1569.6
2022	2059.6	863.1	2922.6	129.3	111.9	113.0	356.2	973.3	1591.2
2023	2087.3	853.9	2941.3	129.2	101.6	112.0	345.8	950.9	1608.5
2024	2109.3	854.2	2963.5	129.2	91.1	117.4	337.6	997.8	1628.1
2025	2131.3	862.8	2994.1	129.1	78.6	117.1	324.8	1014.3	1655.0
2026	2153.3	853.9	3007.2	129.1	66.7	120.5	316.3	1022.5	1668.3
2027	2175.2	854.5	3029.7	129.0	52.9	121.7	303.6	1035.9	1690.2
2028	2197.2	863.1	3060.3	129.0	39.6	131.7	300.3	1048.8	1711.2
2029	2219.2	853.9	3073.1	128.9	22.5	133.3	286.7	1056.8	1727.6
2030	2241.1	854.2	3095.4	128.9	9.3	8.7	141.4	1123.5	1831.4
TOTL	26175.0	30159.8	86364.6	4797.4	6600.3	4743.8	16140.6	26712.2	43511.8
1	1059.9	569.6	1629.6	20.5	104.5	69.5	304.5	504.0	821.8
10	333.6	179.3	512.9	28.3	39.2	26.2	93.8	156.6	256.4

24A
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	2.5	77.2	- 74.8	- 74.8	- 29.3	- 29.3	- 30.4	- 30.4	- 30.4	- 30.4
1979	5.4	55.3	- 50.0	- 124.8	- 28.0	- 57.3	- 23.7	- 54.0	- 54.0	- 54.0
1980	8.7	42.4	- 33.7	- 160.3	- 30.9	- 78.3	- 21.5	- 75.6	- 75.6	- 75.6
1981	15.4	75.1	- 59.7	- 320.0	- 28.8	- 107.0	- 29.7	- 105.3	- 105.3	- 105.3
1982	31.6	101.3	- 69.7	- 389.8	- 28.7	- 135.7	- 29.2	- 135.2	- 135.2	- 135.2
1983	40.9	93.6	- 52.7	- 442.4	- 22.6	- 158.3	- 24.7	- 159.8	- 159.8	- 159.8
1984	50.8	78.0	- 27.2	- 469.7	- 14.2	- 172.5	- 15.1	- 174.9	- 174.9	- 174.9
1985	69.0	71.0	- 2.0	- 471.6	- 5.6	- 178.1	- 8.1	- 183.0	- 183.0	- 183.0
1986	85.4	55.6	29.8	- 441.8	10.3	- 167.8	9.9	- 173.2	- 173.2	- 173.2
1987	101.0	100.4	.6	- 441.2	12.3	- 155.5	13.3	- 166.5	- 166.5	- 166.5
1988	129.0	103.2	25.8	- 415.4	13.0	- 142.5	12.4	- 154.1	- 154.1	- 154.1
1989	166.4	78.1	88.3	- 327.1	36.9	- 105.6	26.6	- 127.5	- 127.5	- 127.5
1990	174.5	93.2	81.3	- 245.8	35.7	- 70.0	33.4	- 94.1	- 94.1	- 94.1
1991	199.3	210.1	- 10.8	- 256.6	2.9	- 67.1	2.2	- 69.3	- 69.3	- 69.3
1992	240.9	423.7	- 182.8	- 439.4	51.5	- 118.6	55.7	- 174.3	- 174.3	- 174.3
1993	284.4	244.6	39.8	- 399.6	28.5	- 90.1	26.4	- 140.7	- 140.7	- 140.7
1994	337.5	337.9	-.4	- 399.9	20.6	- 69.5	17.5	- 158.2	- 158.2	- 158.2
1995	393.6	458.0	- 64.4	- 464.3	1.7	- 67.8	2.7	- 160.9	- 160.9	- 160.9
1996	422.6	263.7	158.9	- 305.4	89.3	- 13.5	75.9	- 38.6	- 38.6	- 38.6
1997	476.3	214.8	261.5	- 42.0	39.8	124.3	45.0	11.3	11.3	11.3
1998	529.1	498.8	30.3	- 11.7	16.5	140.8	11.9	22.2	22.2	22.2
1999	566.4	265.6	300.8	109.1	108.4	249.2	166.4	118.9	118.9	118.9
2000	1798.2	203.2	1595.0	1152.2	870.9	1136.1	858.9	740.0	740.0	740.0
2001	1941.1	138.6	1802.5	2954.7	977.9	1720.4	978.4	1718.5	1718.5	1718.5
2002	2062.7	147.0	1915.7	4870.4	1048.4	2768.8	1048.8	2767.1	2767.1	2767.1
2003	2220.6	155.4	2065.2	6935.6	1140.7	3909.5	1141.1	3908.2	3908.2	3908.2
2004	2365.1	159.0	2206.1	9141.7	1225.9	5135.4	1226.3	5134.5	5134.5	5134.5
2005	2482.7	155.4	2327.3	11469.0	1296.8	6432.2	1297.4	6431.9	6431.9	6431.9
2006	2579.0	178.9	2400.1	13869.1	1345.0	7777.2	1345.4	7777.6	7777.6	7777.6
2007	2615.1	144.4	2470.7	16339.8	1382.2	9159.4	1383.1	9160.5	9160.5	9160.5
2008	2622.7	152.4	2470.3	18810.1	1383.5	10542.9	1384.4	10544.9	10544.9	10544.9
2009	2645.2	144.3	2500.9	21311.1	1398.9	11941.8	1399.3	11944.8	11944.8	11944.8
2010	2675.8	150.3	2525.5	23836.6	1411.1	13352.9	1412.0	13354.9	13354.9	13354.9
2011	2677.6	144.1	2533.5	26370.1	1416.6	14769.5	1417.8	14774.6	14774.6	14774.6
2012	2699.9	149.3	2550.6	28920.7	1427.8	16197.3	1429.0	16203.7	16203.7	16203.7
2013	2730.4	157.1	2573.3	31494.0	1444.5	17641.8	1445.7	17649.4	17649.4	17649.4
2014	2749.0	153.9	2595.1	34089.1	1456.9	19098.7	1458.2	19107.5	19107.5	19107.5
2015	2766.1	164.6	2601.5	36690.6	1470.8	20569.5	1472.1	20579.6	20579.6	20579.6
2016	2796.6	149.1	2647.5	39338.1	1494.2	22063.7	1495.5	22075.2	22075.2	22075.2
2017	1049.4	156.9	892.6	40230.7	417.0	22480.7	418.3	22493.5	22493.5	22493.5
2018	2831.7	168.5	2663.2	42893.9	1519.4	24000.1	1520.5	24014.0	24014.0	24014.0
2019	2856.8	167.2	2689.6	45583.5	1536.2	25536.3	1537.4	25551.4	25551.4	25551.4
2020	2875.4	142.4	2733.0	48316.5	1553.4	27089.7	1554.9	27106.3	27106.3	27106.3
2021	2897.9	155.4	2742.5	51059.0	1560.4	28650.1	1561.9	28666.2	28666.2	28666.2
2022	2922.6	156.6	2766.0	53825.0	1575.7	30225.8	1577.3	30245.5	30245.5	30245.5
2023	2941.3	156.6	2784.7	56609.7	1585.6	31811.4	1587.4	31832.9	31832.9	31832.9
2024	2963.5	165.9	2797.6	59407.3	1594.8	33406.1	1596.6	33429.4	33429.4	33429.4
2025	2994.1	148.7	2845.4	62252.7	1619.6	35025.7	1621.7	35051.1	35051.1	35051.1
2026	3007.2	170.3	2837.0	65089.7	1622.7	36708.5	1624.7	36675.9	36675.9	36675.9
2027	3029.7	149.9	2879.8	67969.5	1645.0	38353.5	1647.4	38323.2	38323.2	38323.2
2028	3060.3	169.1	2891.2	70860.7	1654.6	40008.1	1656.6	40000.0	40000.0	40000.0
2029	3073.1	135.7	2937.4	73798.1	1670.1	41678.2	1673.0	41653.0	41653.0	41653.0
2030	3095.4	135.4	2960.0	76758.1	1682.4	43360.7	1685.6	43488.6	43488.6	43488.6

RATE OF RETURN TO ENTERPRISE OWNER 21.23%
RATE OF RETURN AFTER TAX OF ENTERPRISE 21.73%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OMNIBUS EQUITY
1978	75.9	*	73.4	1.1	50.5	23.9
1979	53.7	*	123.1	1.7	86.0	38.7
1980	39.9	*	157.7	2.3	112.1	47.9
1981	71.6	*	221.7	3.3	159.0	69.9
1982	97.0	*	207.9	4.3	222.4	69.9
1983	68.5	*	322.8	5.5	279.7	100.6
1984	72.2	*	439.0	6.4	325.6	119.8
1985	53.1	*	474.1	9.0	358.1	125.1
1986	33.3	*	468.7	9.0	377.2	121.0
1987	46.5	*	516.0	15.5	405.3	126.1
1988	51.0	*	543.7	16.1	434.4	125.4
1989	25.2	*	514.5	16.3	443.4	115.3
1990	39.3	*	537.7	16.8	483.0	109.5
1991	155.9	*	682.3	18.0	561.2	139.6
1992	370.3	*	1016.1	22.7	799.1	203.7
1993	158.5	*	1149.5	24.8	913.3	261.0
1994	281.1	*	1372.1	27.8	1087.1	312.9
1995	400.3	*	1760.8	32.2	1337.6	390.4
1996	600.1	*	2214.8	38.8	1721.2	532.4
97	554.4	*	2660.6	44.8	2066.7	638.7
98	439.2	*	2973.1	49.4	2330.3	694.2
1999	203.9	*	3047.0	51.4	2432.4	666.0
2000	76.7	*	2969.0	62.5	2445.4	606.0
2001	11.7	*	2862.5	62.0	2411.0	518.5
2002	19.5	*	2749.1	61.6	2377.7	433.1
2003	27.4	*	2639.5	61.3	2344.9	355.9
2004	30.2	*	2531.2	60.9	2308.3	283.6
2005	26.1	*	2417.6	66.3	2263.5	214.5
2006	49.2	*	2325.3	59.9	2227.7	157.6
2007	14.4	*	2202.4	59.0	2170.0	51.3
2008	22.4	*	2088.3	58.1	2114.1	32.2
2009	14.4	*	1966.7	57.0	2047.9	24.1
2010	28.4	*	1859.3	56.1	1983.5	70.1
2011	14.3	*	1739.4	54.9	1909.4	115.1
2012	19.6	*	1626.0	53.7	1832.0	152.3
2013	27.4	*	1522.3	52.5	1756.3	181.5
2014	24.2	*	1417.2	51.1	1674.1	200.8
2015	34.9	*	1328.0	49.9	1603.4	220.5
2016	19.6	*	1224.9	48.5	1517.1	243.7
2017	27.4	*	1134.5	47.2	1441.6	259.9
2018	39.1	*	1057.6	46.0	1371.5	267.9
2019	37.0	*	981.6	44.8	1298.0	271.6
2020	13.0	*	888.6	43.3	1199.6	275.6
2021	26.1	*	791.4	41.6	1101.1	267.9
2022	27.4	*	703.8	40.2	990.0	254.0
2023	27.4	*	615.1	38.5	886.5	232.8
2024	36.7	*	534.5	36.7	772.8	201.3
2025	19.6	*	437.0	34.6	659.7	168.0
2026	41.2	*	357.7	32.6	514.7	124.4
2027	20.9	*	256.8	30.3	368.7	81.6
2028	40.1	*	165.2	20.1	220.5	27.2
2029	6.8	*	36.7	25.2	34.5	27.4
2030	6.5	*	34.5	22.1	33.3	23.3

TOTAL CAPITAL INVESTMENT 4777.4

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.40001	25.0602	25.0602
1979	129.69	43.67003	42.79768	42.79768
1980	169.62	57.55009	55.97459	55.97459
1981	241.19	62.2001	79.59268	79.59267
1982	333.1799	115.73	111.5994	111.5994
1983	426.6799	146.9502	140.8044	140.8044
1984	499.6398	173.2803	164.6171	164.6171
1985	551.8997	193.3303	182.1269	182.1269
1986	585.7495	206.5303	193.2973	187.9126
1987	634.2195	228.6904	209.2924	203.9067
1988	665.2393	250.6503	226.1289	209.7112
1989	710.4693	265.0706	234.4614	209.7112
1990	749.8091	284.6306	247.437	209.7112
1991	805.6689	344.4407	298.8706	227.3761
1992	1275.929	476.6311	421.0564	315.478
1993	1464.459	551.1311	463.2712	328.0103
1994	1745.509	656.4519	576.0176	352.9016
1995	2145.799	808.2219	708.1125	408.191
1996	2750.909	1029.712	907.7998	534.2634
1997	3305.269	1238.582	1090.745	681.0892
1998	3743.489	1413.173	1235.351	763.6753
1999	3947.379	1514.973	1302.635	763.6753
2000	4024.109	1578.673	1337.956	763.6753
2001	4035.809	1624.833	1331.817	763.675
2002	4055.369	1677.573	1336.252	763.6748
2003	4082.668	1737.783	1347.281	763.6746
2004	4112.887	1804.362	1357.252	763.6743
2005	4138.945	1875.48	1365.852	763.6741
2006	4188.134	1960.52	1382.1	763.6738
2007	4202.543	2032.515	1386.839	763.6736
2008	4224.98	2110.886	1394.243	763.6733
2009	4239.34	2191.436	1399.962	763.6731
2010	4267.777	2262.263	1408.366	763.6729
2011	4282.074	2372.671	1415.084	763.6729
2012	4301.633	2469.66	1419.339	763.6726
2013	4320.992	2572.709	1428.567	763.6724
2014	4353.23	2679.117	1436.566	763.6721
2015	4388.168	2784.306	1448.095	763.6719
2016	4407.727	2890.584	1454.55	763.6716
2017	4435.096	2993.514	1463.578	763.6714
2018	4474.145	3102.613	1476.468	763.6711
2019	4511.941	3213.969	1488.94	763.6709
2020	4524.941	3325.369	1493.23	763.6707
2021	4551	3449.859	1501.83	763.6704
2022	4578.359	3560.356	1510.658	763.6702
2023	4605.719	3719.268	1519.487	763.6699
2024	4642.457	3869.896	1532.011	763.6697
2025	4662.016	4022.325	1538.465	763.6694
2026	4703.172	4168.461	1552.047	763.6692
2027	4724.001	4355.36	1555.93	763.6692
2028	4764.168	4543.668	1572.173	763.6689
2029	4770.926	4736.414	1574.405	763.6687
2030	4777.426	4744.066	1576.55	763.6685

PRESENT VALUE OF CAPITAL INV. AT RATE %, \$M 19.99998

410.6907

PRESENT VALUE OF CAPITAL INV. AT RATE %, \$M 10.

1032.799

Cost Summary—Dollars in Millions

FIS	CAPITAL	COMMITTED COST		PRINCIPLE	FINANCED COST		TOTAL
		OPERATIONS	TOTAL		INTEREST	OPERATIONS	
0.0	TOTAL	4,777.5	4,807.6	4,777.4	6,640.9	4,807.6	16,225.9
1.0	CAPITAL ITEMS	4,777.5	4,777.5	4,777.4	6,640.9		11,418.3
1.1	SYSTEM FACILITIES-EQUIPMENT	3,646.6	3,646.6	3,646.5	5,124.7		8,771.2
1.1.1	SHIP	165.0	165.0	165.0	194.1		359.1
1.1.2	CASH	242.0	242.0	242.0	173.6		415.6
1.1.3	CASH TRANSPORTER, RAIL CAR	18.8	18.8	18.8	11.4		30.1
1.1.4	RAIL CAR TUG	0.8	0.8	0.8	0.4		1.2
1.1.5	CASH TRANSPORTER						
1.1.6	SEAPORT FAC	1.0	1.0	1.0	1.5		2.5
1.1.7	WATER BASIN 4 PORT	48.0	48.0	48.0	82.6		130.6
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0	24.0	24.0	41.3		65.3
1.1.10	PACKAGING FACILITY						
1.1.11	PACKAGING FAC	116.0	116.0	116.0	201.2		317.2
1.1.12	CANISTERS	216.5	216.5	216.5	316.5		533.0
1.1.13	ENFORCEMENT TRANS	18.0	18.0	18.0	11.9		29.9
1.1.14	HAULT MODULE	848.3	848.3	848.3	698.1		1,546.5
1.1.15	CEOLOGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CASH	47.0	47.0	47.0	60.9		107.9
1.1.18	LOW INTER FAC	75.0	75.0	75.0	130.1		205.1
1.1.19	PLM FAC FAC	948.4	948.4	948.4	1,631.8		2,580.2
1.1.20	RECOVERY FAC	893.8	893.8	893.8	1,550.2		2,444.0
1.2	SUPPORT FACILITIES EQUIPMENT	14.7	14.7	14.7	24.6		39.3
1.2.1	ASH ELD 1, FLT YD	2.4	2.4	2.4	3.5		5.9
1.2.2	WAREHOUSE & ULT	12.2	12.2	12.2	21.1		33.3
1.3	CHIEFS COST	558.1	558.1	558.1	745.8		1,303.9
1.4	INTEREST ROLLING COSTS	558.2	558.2	558.1	745.8		1,303.9
2.0	OPER. & MAINT		4,807.6			4,807.6	4,807.6
2.1	DIRECT LABOR		1,066.4			1,066.4	1,066.4
2.1.1	PORT & REC TRANS		5.1			5.1	5.1
2.1.2	WATER BASIN REC (PORT)		145.8			145.8	145.8
2.1.3	WATER BASIN REC (PCPT)						
2.1.4	WATER BASIN STOP		27.1			27.1	27.1
2.1.5	PACK FAC LABOR		15.2			15.2	15.2
2.1.6	PACK FAC LABOR		313.7			313.7	313.7
2.1.7	HAULT ENFORCEMENT LABOR		44.0			44.0	44.0
2.1.8	CEOLOGIC REC MOD LABOR						
2.1.9	CASH TRANS MAINT LAB		31.2			31.2	31.2
2.1.10	LOT LM PROCESS LABOR						
2.1.11	PLM FAC LABOR		242.1			242.1	242.1
2.1.12	RECOVERY PLANT LAB		242.1			242.1	242.1
2.2	INDIRECT LABOR		1,660.5			1,660.5	1,660.5
2.2.1	PORT & REC TRANS LAB		8.1			8.1	8.1
2.2.2	WATER BASIN REC (PORT) LAB		216.6			216.6	216.6
2.2.3	WATER BASIN REC (PCPT) LAB						
2.2.4	WATER BASIN STOP LAB		40.5			40.5	40.5
2.2.5	PACK FAC IND LAB						
2.2.6	PACK FAC IND LAB		470.4			470.4	470.4
2.2.7	HAULT IND LABOR		65.8			65.8	65.8
2.2.8	CEO REC MOD IND LAB						
2.2.9	CASH TRANS MAINT LAB		46.6			46.6	46.6
2.2.10	LOT LM PROCESS LAB		7.7			7.7	7.7
2.2.11	PLM FAC IND LAB		371.3			371.3	371.3
2.2.12	REC PLANT IND LAB		371.3			371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0			1,614.0	1,614.0
2.3.1	FACTORY ECT		8.1			8.1	8.1
2.3.2	WATER BASIN 4 PORT		218.6			218.6	218.6
2.3.3	WATER BASIN 2 PORT						
2.3.4	WATER BASIN STORAGE		40.5			40.5	40.5
2.3.5	PACK (CASH) (2000)						
2.3.6	PACK (CASH) (2000)		470.4			470.4	470.4
2.3.7	HAULT CASH		65.8			65.8	65.8
2.3.8	CEOLOGIC REC CASH						
2.3.9	CASH TRANS		46.6			46.6	46.6
2.3.10	LOT LM PROCESS CASH		21.3			21.3	21.3
2.3.11	PLM PROCESSING CASH		371.3			371.3	371.3
2.3.12	RECOVERY PLANT CASH		371.3			371.3	371.3
2.4	CONTRACTED SERVICES		423.6			423.6	423.6
2.4.1	SHIP CH		327.2			327.2	327.2
2.4.2	US PORT FEE		0.4			0.4	0.4
2.4.3	ELFOP PORT FEE STOP						
2.4.4	US FRAIL (SF TO STOP)		17.7			17.7	17.7
2.4.5	ELFOP PAINT TRANS						
2.4.6	US STOP (TIME CHRG)		61.3			61.3	61.3
2.4.7	ELFOP STOP						
2.4.8	US RECCH OF						
2.4.9	ELFOP REC OF						
2.4.10	ELFOP WASTE DIS						
2.4.11	US PAINT TRANS		17.0			17.0	17.0
2.4.12	ELFOP PAINT TRANS						
2.4.13	US PORT FEE						
2.4.14	ELFOP PORT FEE						
2.4.15	ELFOP PORT FEE						
2.4.16	PACIFIC PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	PACIFIC PORT FEE						
2.4.19	PACIFIC PORT FEE						
2.4.20	PACIFIC PORT FEE						
2.4.21	PACIFIC PORT FEE						
2.5	DECON TRUST FUND		103.0			103.0	103.0

Section E3.26

Case: 25A

Description: Fuel Cycle Center (FCC) baseline except recovery deferred to 2010 and variable value of recovery products

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2010

Modular plant - single plant

Value of recovered products - variable \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 7.068 billion dollars

Owners ROI - 21.4%

Service charge - \$194/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/PO) \$193.848
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$32756.560

25A

Yearly Profit and Loss Statement

YEAR	PER REVENUE	SERVI CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEF EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.7	2.7	.8	5.1	3.5	8.4	.0	5.8
1979	.0	5.9	5.9	1.5	6.7	4.1	14.3	.0	8.5
1980	.0	7.3	7.3	2.5	11.3	5.3	19.1	.0	11.6
1981	.0	16.7	16.7	3.6	18.0	7.8	27.1	.0	10.4
1982	.0	34.1	34.1	5.1	21.8	10.5	37.4	.0	3.2
1983	.0	44.2	44.2	6.4	27.0	13.3	47.1	.0	2.9
1984	.0	54.9	54.9	7.7	32.0	15.6	55.3	.0	1.4
1985	.0	74.7	74.7	18.9	35.4	17.5	71.8	1.1	1.6
1986	.0	92.4	92.4	19.4	37.2	18.8	75.5	2.4	16.5
1987	.0	109.2	109.2	42.1	39.7	20.7	102.4	2.6	1.2
1988	.0	150.3	150.3	42.6	41.5	22.1	106.2	16.7	27.3
1989	.0	180.0	180.0	42.6	42.9	23.4	109.0	27.0	44.0
1990	.0	188.7	188.7	42.7	45.2	25.4	113.2	28.7	8.6
1991	.0	215.6	215.6	43.0	51.0	29.6	124.4	34.6	56.5
1992	.0	260.4	260.4	44.4	56.6	33.1	134.0	48.6	78.4
1993	.0	307.5	307.5	45.0	62.3	37.5	144.8	61.8	100.9
1994	.0	364.9	364.9	45.6	67.7	41.9	155.2	79.1	130.6
1995	.0	425.6	425.6	46.3	73.8	46.9	166.9	98.3	160.4
1996	.0	497.0	497.0	46.8	78.8	51.3	176.9	106.4	178.7
1997	.0	515.0	515.0	47.4	83.5	55.7	186.6	124.8	193.7
1998	.0	572.1	572.1	48.5	89.5	61.3	200.3	141.3	230.5
1999	.0	612.5	612.5	49.1	95.6	66.3	211.1	152.5	258.9
2000	.0	663.1	663.1	49.9	116.1	69.2	246.2	158.4	258.5
2001	.0	728.3	728.3	50.9	157.6	105.3	313.8	157.5	257.0
2002	.0	759.0	759.0	51.7	177.3	119.6	348.6	155.9	254.4
2003	.0	826.1	826.1	52.6	206.7	140.2	399.5	162.1	264.4
2004	.0	887.2	887.2	53.7	236.9	162.5	453.0	165.0	265.2
2005	.0	923.4	923.4	54.8	267.1	197.7	519.6	145.8	237.9
2006	.0	923.7	923.7	55.9	335.0	233.2	624.0	113.9	185.8
2007	.0	922.9	922.9	56.2	360.6	251.6	668.3	100.6	164.1
2008	.0	923.4	923.4	56.4	370.5	263.7	690.6	88.5	144.3
2009	.0	924.0	924.0	56.6	376.7	274.5	707.8	82.2	134.0
2010	2597.1	923.2	3520.3	117.8	366.2	273.3	757.2	1053.8	1713.3
2011	2612.8	923.4	3536.2	117.7	354.7	270.2	742.6	1061.6	1722.0
2012	2644.3	923.7	3568.0	117.6	342.0	269.0	728.6	1079.0	1760.4
2013	2675.6	922.9	3598.5	117.5	328.8	265.5	711.8	1100.8	1796.1
2014	2715.1	923.4	3638.5	117.4	314.4	261.9	693.7	1119.0	1825.8
2015	2738.8	924.0	3662.7	117.4	299.2	253.9	670.5	1137.1	1855.2
2016	2770.2	923.2	3703.5	117.3	284.1	250.6	651.9	1159.6	1892.0
2017	2801.7	923.4	3725.1	117.2	268.4	242.3	627.9	1176.9	1920.2
2018	2833.2	923.7	3756.9	117.1	253.8	239.4	610.3	1199.7	1950.9
2019	2856.8	922.9	3779.7	117.0	237.2	235.9	590.1	1215.9	1963.8
2020	2896.2	923.4	3819.5	116.9	219.4	229.3	565.7	1236.5	2017.4
2021	2927.6	924.0	3851.6	116.8	201.3	222.9	541.1	1258.0	2062.5
2022	2951.2	923.2	3874.5	116.7	182.6	214.9	514.2	1280.7	2089.6
2023	2990.6	923.4	3914.0	116.7	163.6	209.3	489.5	1301.3	2123.1
2024	3022.1	923.7	3945.7	116.6	143.7	203.0	463.3	1323.3	2159.1
2025	3053.6	922.9	3976.5	116.5	123.2	198.0	437.7	1348.6	2200.3
2026	3085.0	923.4	4008.4	116.4	102.4	196.9	415.7	1365.2	2227.5
2027	3116.5	924.0	4040.5	116.3	79.8	195.5	391.6	1388.6	2262.3
2028	3148.0	923.2	4071.2	116.2	55.3	193.3	365.0	1412.2	2304.1
2029	3179.5	923.4	4102.9	116.1	28.7	191.8	336.7	1431.1	2355.0
2030	3211.0	923.7	4134.8	116.1	.0	12.1	127.8	1452.1	2403.5
TOTL	60827.2	32644.0	93471.2	5646.9	7097.9	7067.9	19712.8	26424.6	46334.0
A/C	1147.7	615.9	1763.6	68.8	150.9	133.4	353.1	536.3	674.2
25.0%	361.2	193.8	555.1	21.7	47.5	42.0	111.1	166.8	275.1

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL	CUM
1978	2.7	77.0	- 74.4	- 74.4	- 28.7	- 28.7	- 29.7	- 29.7	-	- 29.7
1979	5.2	55.3	- 50.1	- 124.5	- 32.6	- 61.3	- 38.3	- 68.1	-	- 68.1
1980	7.3	42.4	- 35.1	- 159.6	- 20.4	- 81.7	- 31.0	- 99.1	-	- 99.1
1981	16.7	74.3	- 57.6	- 217.2	- 27.2	- 108.9	- 38.2	- 137.3	-	- 137.3
1982	34.1	93.3	- 59.2	- 276.4	- 23.3	- 132.2	- 24.6	- 161.9	-	- 161.9
1983	44.2	94.0	- 49.7	- 326.1	- 20.5	- 152.7	- 21.7	- 183.6	-	- 183.6
1984	54.9	78.2	- 23.3	- 349.4	- 10.5	- 163.2	- 11.5	- 195.1	-	- 195.1
1985	74.7	73.3	1.4	- 348.0	1.6	- 161.6	4.1	- 191.0	-	- 191.0
1986	92.4	51.0	41.4	- 306.6	15.4	- 146.2	15.0	- 176.0	-	- 176.0
1987	109.2	83.9	25.2	- 281.4	6.8	- 139.4	8.6	- 184.6	-	- 184.6
1988	150.3	75.6	74.6	- 206.8	33.6	- 105.8	33.2	- 113.2	-	- 113.2
1989	160.0	71.4	88.6	- 118.2	52.2	- 53.6	52.0	- 61.3	-	- 61.3
1990	188.7	85.5	103.3	85.1	51.3	4.3	51.0	10.3	-	10.3
1991	215.6	148.1	67.4	152.5	46.1	50.4	44.9	55.4	-	55.4
1992	268.4	148.4	120.0	272.5	70.1	120.5	69.1	124.5	-	124.5
1993	307.3	145.2	162.1	434.6	92.9	213.4	92.9	216.4	-	216.4
1994	364.9	143.0	221.9	656.5	126.4	340.8	126.4	341.2	-	341.2
1995	425.6	157.6	268.0	924.5	154.7	495.5	153.6	494.8	-	494.8
1996	457.0	144.1	312.8	1237.3	174.3	670.1	173.2	668.1	-	668.1
1997	515.0	144.8	370.3	1607.6	206.2	876.2	205.3	873.4	-	873.4
1998	572.1	164.8	407.3	2014.9	223.2	1099.4	221.6	1095.0	-	1095.0
1999	612.5	160.6	451.9	2466.8	251.4	1350.8	250.4	1346.4	-	1346.4
2000	663.1	396.3	266.8	2733.6	192.1	1542.9	188.6	1535.2	-	1535.2
2001	728.3	718.2	10.1	2743.7	102.6	1645.5	95.5	1630.7	-	1630.7
2002	759.0	404.3	354.7	3098.4	212.0	1857.5	208.6	1849.3	-	1849.3
2003	826.1	559.9	266.1	3364.5	183.3	2040.9	178.3	2027.6	-	2027.6
2004	887.2	584.5	302.7	3667.2	193.0	2233.9	187.8	2216.4	-	2216.4
2005	923.4	698.7	224.7	3891.9	60.4	2294.3	72.3	2307.6	-	2307.6
2006	923.7	885.6	38.0	3929.9	54.8	2349.1	46.6	2354.2	-	2354.2
2007	932.9	572.3	360.6	4290.5	149.8	2498.9	145.5	2499.7	-	2499.7
2008	923.4	347.1	576.3	4866.8	207.0	2705.9	200.4	2699.3	-	2699.3
2009	924.0	386.9	537.0	5403.8	210.1	2916.0	209.1	2908.4	-	2908.4
2010	3530.3	132.4	3397.9	8801.7	1663.5	4579.5	1659.1	4719.4	-	4719.4
2011	3536.2	132.1	3404.1	12205.8	1666.9	6246.4	1662.8	6386.2	-	6386.2
2012	3568.0	122.9	3445.1	15650.9	1686.7	7933.1	1682.6	8077.1	-	8077.1
2013	3688.7	130.6	3478.2	19129.1	1909.3	9842.4	1911.5	9968.6	-	9968.6
2014	3633.5	124.0	3514.5	22643.6	1929.2	11771.6	1931.6	11965.2	-	11965.2
2015	3662.7	124.2	3538.6	26182.2	1951.5	13723.1	1954.0	13917.2	-	13917.2
2016	3703.5	122.3	3581.0	29763.2	1973.7	15696.8	1978.2	15915.4	-	15915.4
2017	3725.1	130.2	3594.9	33358.1	1995.5	17692.3	1998.1	17913.5	-	17913.5
2018	3756.9	142.0	3614.9	36973.0	2010.2	19702.5	2012.7	19926.2	-	19926.2
2019	3789.8	126.4	3663.3	40636.3	2034.2	21736.7	2037.0	22063.2	-	22063.2
2020	3819.5	123.5	3696.1	44332.4	2055.3	23792.0	2058.2	24321.4	-	24321.4
2021	3851.6	126.6	3725.0	48057.4	2075.4	25867.4	2078.5	26400.9	-	26400.9
2022	3884.5	129.9	3754.6	51812.0	2100.2	27967.6	2103.4	28514.3	-	28514.3
2023	3914.0	132.6	3781.4	55593.4	2119.1	30086.7	2122.3	30636.6	-	30636.6
2024	3945.7	129.7	3816.1	59409.5	2141.5	32228.2	2144.8	32881.4	-	32881.4
2025	3986.5	133.0	3853.5	63263.0	2166.6	34394.8	2170.1	34977.4	-	34977.4
2026	4008.4	143.8	3864.6	67127.6	2175.7	36570.5	2177.2	37154.6	-	37154.6
2027	4040.5	137.2	3903.3	71030.9	2196.8	38767.3	2206.6	39361.2	-	39361.2
2028	4081.2	129.3	3952.0	74982.9	2223.7	41011.0	2227.8	41589.0	-	41589.0
2029	4102.8	122.6	3980.2	78963.1	2237.4	43248.4	2241.9	43830.9	-	43830.9
2030	4134.6	128.1	4006.6	82969.7	2483.3	45731.7	2488.0	46319.7	-	46319.7

RATE OF RETURN TO ENTERPRISE OWNER 21.46%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 21.58%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	MOVING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	76.2	*	73.7	1.0	30.7	24.0
1979	53.7	*	123.4	1.7	86.2	38.8
1980	39.9	*	157.9	2.3	112.3	-6.0
1981	70.7	*	221.1	3.3	158.6	65.6
1982	66.2	*	299.8	4.0	216.2	87.1
1983	87.6	*	373.1	5.6	272.9	105.2
1984	70.6	*	428.0	6.6	317.7	115.9
1985	54.4	*	464.9	9.0	351.2	122.8
1986	31.0	*	477.6	9.4	366.8	118.3
1987	41.8	*	498.8	13.6	392.6	119.8
1988	33.0	*	509.6	14.0	409.7	114.0
1989	28.7	*	514.9	14.3	423.2	106.8
1990	42.8	*	532.3	14.6	445.1	101.8
1991	96.3	*	599.0	15.8	501.4	112.4
1992	96.0	*	662.0	16.8	556.2	122.7
1993	100.2	*	724.6	17.9	612.0	130.7
1994	97.4	*	780.3	18.9	663.8	135.4
1995	111.4	*	844.8	20.0	722.7	142.1
1996	97.3	*	890.8	20.9	765.6	142.2
1997	97.4	*	932.5	21.8	813.7	140.6
1998	136.2	*	1007.5	23.2	881.4	149.3
1999	111.4	*	1052.6	24.1	929.0	147.7
2000	346.3	*	1318.7	27.7	1128.8	217.6
2001	467.2	*	1660.7	34.8	1536.4	379.0
2002	252.6	*	2113.6	38.2	1786.9	424.8
2003	507.3	*	2468.7	43.2	2012.9	511.0
2004	530.8	*	2849.8	48.4	2309.1	592.4
2005	843.9	*	3495.2	57.0	2794.2	758.0
2006	823.8	*	4091.8	65.1	3259.8	867.1
2007	516.1	*	4356.4	69.5	3510.2	915.7
2008	298.7	*	4383.4	71.1	3599.9	894.7
2009	250.4	*	4359.3	72.2	3651.8	779.7
2010	14.6	*	4160.6	69.7	3537.4	643.9
2011	14.4	*	3844.8	78.7	3416.4	597.1
2012	5.2	*	3521.0	76.6	3279.0	378.7
2013	13.1	*	3328.6	74.4	3132.7	293.3
2014	6.6	*	3073.3	72.0	2967.8	157.4
2015	6.8	*	2826.2	69.4	2837.0	58.6
2016	5.2	*	2580.9	66.9	2675.4	27.6
2017	13.1	*	2351.6	64.3	2521.3	105.3
2018	24.9	*	2137.0	61.8	2366.1	167.3
2019	9.4	*	1918.6	59.0	2190.1	220.5
2020	6.6	*	1687.8	56.1	2005.2	261.3
2021	11.7	*	1476.6	53.0	1816.9	287.3
2022	13.1	*	1274.8	49.9	1625.8	301.1
2023	15.9	*	1081.5	46.7	1428.4	300.2
2024	13.1	*	891.5	43.4	1220.8	265.9
2025	16.5	*	710.0	39.9	1065.6	255.7
2026	27.4	*	540.5	36.5	784.4	287.4
2027	20.9	*	365.9	32.7	544.2	145.6
2028	13.1	*	185.4	28.6	283.4	69.3
2029	6.5	*	.1	24.1	.5	23.8
2030	12.0	*	.0	19.5	.1	19.3

TOTAL CAPITAL INVESTMENT 7067.9

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	78.24001	25.50662	25.15919	25.15919
1979	129.99	43.77003	42.8267	42.82666
1980	169.92	57.6601	56.07359	56.07358
1981	240.61	82.0201	79.40129	79.40128
1982	328.7696	112.6099	108.494	108.4941
1983	416.3896	143.5	137.4086	137.4087
1984	486.9495	169.25	160.6933	160.6935
1985	541.3594	190.1902	173.6466	173.6467
1986	572.8792	204.1003	189.0501	189.0506
1987	614.719	222.1604	202.6373	192.7768
1988	647.789	238.0105	213.7439	192.7768
1989	676.439	253.8507	223.2848	192.7768
1990	719.2388	274.0908	237.3466	192.7768
1991	815.3586	314.1909	269.1343	192.7768
1992	911.5964	359.4409	300.8274	192.7768
1993	1011.808	399.8511	333.8967	192.7768
1994	1169.158	445.3711	366.022	192.7768
1995	1220.578	497.9211	402.7985	192.7768
1996	1317.918	548.3411	434.9132	192.7768
1997	1415.268	601.0212	467.0383	192.7768
1998	1551.518	670.1216	512.0607	192.7768
1999	1662.938	733.9617	548.7693	192.7768
2000	2009.278	890.4719	663.6615	192.7768
2001	2676.518	1148.692	823.2507	192.7764
2002	3029.668	1302.142	929.5999	192.7764
2003	3556.396	1523.472	1187.011	192.7762
2004	4067.188	1762.083	1342.172	192.7761
2005	4911.047	2116.332	1620.645	241.6624
2006	5740.836	2481.601	1894.476	339.0764
2007	6256.965	2746.81	2064.798	346.6394
2008	6547.664	2947.81	2160.729	348.6392
2009	6798.023	3146.179	2243.347	348.6389
2010	6812.633	3275.259	2248.169	348.6389
2011	6827.031	3410.597	2252.92	348.6387
2012	6832.37	3553.305	2254.649	348.6384
2013	6845.316	3705.614	2258.954	348.6382
2014	6851.663	3864.03	2261.115	348.6379
2015	6858.672	4021.659	2263.362	348.6377
2016	6863.91	4188.535	2265.09	348.6375
2017	6876.957	4355.645	2269.396	348.6372
2018	6901.836	4535.691	2277.606	348.637
2019	6911.242	4721.137	2280.71	348.6367
2020	6917.789	4912.574	2282.87	348.6365
2021	6929.527	5112.594	2286.744	348.6362
2022	6942.625	5316.832	2291.066	348.6362
2023	6956.531	5530.137	2296.315	348.636
2024	6971.629	5750.616	2300.627	348.636
2025	6988.117	5982.484	2306.078	348.6357
2026	7015.516	6231.164	2315.12	348.6355
2027	7036.363	6492.18	2322	348.6353
2028	7049.41	6766.059	2328.385	348.6353
2029	7055.91	7055.457	2338.45	348.635
2030	7067.91	7067.77	2332.41	348.6348

PRESENT VALUE OF CAPITAL INU AT RATE 2% 4M
357.0159
PRESENT VALUE OF CAPITAL INU AT RATE 2% 4M
506.7002

19.99998

18.

Cost Summary -- Dollars in Millions

IDS	COMMITTED COST	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
	OPERATIONS				
0.0 TOTAL	7,068.0	3,647.0	10,714.9	7,067.8	17,782.7
1.0 CAPITAL ITEMS	7,068.0	3,647.0	10,714.9	7,067.8	17,782.7
1.1 SYSTEM FACILITIES-EQUIPMENT	5,413.8	5,413.8	5,413.7	5,413.4	11,826.9
1.1.1 CRIP	165.0	165.0	165.0	161.7	331.7
1.1.2 CRIP TRAMPORTER-PAIL CAP	266.0	266.0	266.0	181.7	447.7
1.1.3 PAIL CRP TUG	18.6	18.6	18.6	5.9	24.5
1.1.4 CRIP TRAMPORTER	0.6	0.6	0.6	0.4	1.0
1.1.5 SUPPORT FAC	1.0	1.0	1.0	1.0	2.0
1.1.6 WATER BASIN 4 PORT	48.0	48.0	48.0	62.6	110.6
1.1.7 WATER BASIN 2 PORT					
1.1.8 WATER BASIN STORAGE	24.0	24.0	24.0	41.3	65.3
1.1.9 PROCESSING FACILITY					
1.1.10 PROCESSING FAC	116.0	116.0	116.0	201.2	317.2
1.1.11 CRIP/STEPS	422.1	422.1	422.1	381.6	803.7
1.1.12 DISPERSEMENT TRAMS	18.0	18.0	18.0	11.7	29.7
1.1.13 TUBUL MODULE	1,739.8	1,739.8	1,739.8	1,623.9	3,363.7
1.1.14 GEOLOGIC REC MODULE					
1.1.15 RECOVERY STORAGE MOD					
1.1.16 CRIP	47.0	47.0	47.0	60.9	107.9
1.1.17 LOCK/INTER FAC	67.0	67.0	67.0	116.0	183.0
1.1.18 PLU PFAC FAC	1,274.1	1,274.1	1,274.1	1,351.6	2,625.7
1.1.19 RECOVERY FAC	1,206.5	1,206.5	1,206.4	1,469.3	2,675.7
1.2 SUPPORT FACILITIES EQUIPMENT	14.7	14.7	14.7	24.6	39.3
1.2.1 RAIL BLD & FLT YD	2.4	2.4	2.4	3.5	5.9
1.2.2 FENCE/UR & ULT	12.2	12.2	12.2	21.1	33.3
1.3 OTHER COST	624.0	624.0	624.0	1,014.9	1,638.9
1.4 INTEREST DURING CONS	815.5	815.5	815.5	1,015.0	1,830.5
2.0 CRIP & MAINT	3,647.0	3,647.0		3,647.0	7,294.0
2.1 DIRECT LABOR	1,024.6	1,024.6		1,024.6	2,049.2
2.1.1 PORT & REC TRAMS	5.1	5.1		5.1	10.2
2.1.2 WATER BASIN REC (PORT)					
2.1.3 WATER BASIN FAC (SPORT)	145.8	145.8		145.8	291.6
2.1.4 WATER BASIN STOR					
2.1.5 FAC FAC LABOR	27.1	27.1		27.1	54.2
2.1.6 FAC FAC LABOR					
2.1.7 TUBUL EMPLOYMENT LABOR	313.7	313.7		313.7	627.4
2.1.8 GEOLOGIC REC MOD LABOR	44.0	44.0		44.0	88.0
2.1.9 CRIP TRAMS MAINT LAB	30.8	30.8		30.8	61.6
2.1.10 LCI LK PROCESS LABOR	14.5	14.5		14.5	29.0
2.1.11 PLU PFAC LABOR	221.8	221.8		221.8	443.6
2.1.12 RECOVERY PLANT LAB	221.8	221.8		221.8	443.6
2.2 INDIRECT LABOR	1,462.2	1,462.2		1,462.2	2,924.4
2.2.1 PORT & REC TRAMS LAB	8.1	8.1		8.1	16.2
2.2.2 W.B. REC (PORT) LAB	218.6	218.6		218.6	437.2
2.2.3 W.B. REC (SPORT) LAB					
2.2.4 W.B. STOR LAB	40.5	40.5		40.5	81.0
2.2.5 FAC FAC IND LAB					
2.2.6 FAC FAC IND LAB	470.4	470.4		470.4	940.8
2.2.7 TUBUL IND LABOR	65.8	65.8		65.8	131.6
2.2.8 REC REC MOD IND LAB					
2.2.9 CRIP TRAMS MAINT LAB	46.1	46.1		46.1	92.2
2.2.10 LCI LK IND LAB	21.3	21.3		21.3	42.6
2.2.11 PLU PFAC IND LAB	259.7	259.7		259.7	519.4
2.2.12 REC PLANT IND LAB	259.7	259.7		259.7	519.4
2.3 MATERIAL SUP UTIL ECT	663.7	663.7		663.7	1,327.4
2.3.1 PORT/FAC FAS	3.1	3.1		3.1	6.2
2.3.2 W.B. REC CRIS 4 PORT	218.6	218.6		218.6	437.2
2.3.3 W.B. REC CRIS 2 PORT					
2.3.4 W.B. STORAGE CRIS	40.5	40.5		40.5	81.0
2.3.5 FAC CRIS (STOR)					
2.3.6 FAC CRIS (STOR)	224.5	224.5		224.5	449.0
2.3.7 TUBUL CRIS	65.8	65.8		65.8	131.6
2.3.8 GEOLOGIC REC CRIS					
2.3.9 CRIP TRAMS	46.1	46.1		46.1	92.2
2.3.10 PLU PFAC CRIS					
2.3.11 PLU PROCESSING CRIS					
2.3.12 RECOVERY PLANT CRIS					
2.4 CONTRACTED SERVICES	424.9	424.9		424.9	849.8
2.4.1 CRIP CR	621.6	621.6		621.6	1,243.2
2.4.2 CRIP PORT FEE	0.4	0.4		0.4	0.8
2.4.3 CRIP PORT FEE STOR					
2.4.4 US RAIL (ST TO STOR)	17.2	17.2		17.2	34.4
2.4.5 ELFCR PAUL TRAMS					
2.4.6 US STOR/TIME (CRIC)	68.7	68.7		68.7	137.4
2.4.7 ELFCR STOR					
2.4.8 US RECOVER					
2.4.9 ELFCR REC CR					
2.4.10 ELFCR WASTE DIS					
2.4.11 US RAIL TRAMSP	16.6	16.6		16.6	33.2
2.4.12 ELFCR PAUL TRAMSP					
2.4.13 ELFCR PAUL TRAMSP					
2.4.14 US PORT FEE	0.4	0.4		0.4	0.8
2.4.15 ELFCR PORT FEE					
2.4.16 ELFCR PORT FEE					
2.4.17 PACIFIC PORT FEE					
2.4.18 PACIFIC PORT FEE					
2.4.19 PAC PAUL TRAMSP					
2.4.20 PAC PAUL TRAMSP					
2.5 DECON TRUST FUND	121.6	121.6		121.6	243.2

Section E3.27

Case: 31A

Description: Fuel Cycle Center (FCC) baseline except recovery deferred to 1990
multiple recovery plants and variable reprocessing revenue

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 1990

Modular plant - single plant

Value of recovered products - variable \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 5.077 billion dollars

Owners ROI - 19.8%

Service charge - \$216/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YO) 1216.389
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 481771.568

31A

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SPENT CH REVENUE	TOTAL REVENUE	OPER EXPEN	INIT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	3.0	3.0	.8	5.1	3.0	8.9	.0	6.0
1979	.0	6.5	6.5	1.3	6.6	5.2	13.4	.0	8.6
1980	.0	8.1	8.1	2.5	11.2	6.8	20.5	.0	12.4
1981	.0	18.6	18.6	3.6	18.2	11.0	32.9	.0	14.2
1982	.0	38.1	38.1	5.2	22.2	19.3	57.0	.0	18.5
1983	.0	49.3	49.3	6.5	40.1	24.5	71.1	.0	21.7
1984	.0	61.3	61.3	7.9	51.7	31.7	91.3	.0	30.0
1985	.0	83.3	83.3	20.1	69.9	43.0	133.0	.0	49.7
1986	.0	103.1	103.1	20.8	86.2	53.2	160.2	.0	57.1
1987	.0	121.8	121.8	64.6	100.1	65.3	230.0	.0	113.6
1988	.0	167.7	167.7	65.3	120.7	75.5	261.6	.0	93.2
1989	.0	300.0	300.0	65.5	132.7	83.7	381.9	.0	81.0
1990	243.9	218.6	462.5	91.3	145.3	92.6	329.2	47.6	77.7
1991	324.4	248.5	572.9	99.2	154.1	99.4	348.6	82.2	134.1
1992	391.4	290.2	681.6	96.6	162.8	106.3	365.7	130.2	196.1
1993	463.3	343.1	806.4	111.8	167.0	110.8	389.6	158.4	258.4
1994	531.8	407.2	939.0	115.4	166.9	114.2	398.5	200.4	335.1
1995	603.6	474.9	1078.6	115.9	173.4	119.4	408.7	254.5	415.3
1996	674.2	509.9	1184.1	116.6	182.1	127.4	426.1	288.8	470.0
1997	751.1	574.7	1325.8	117.2	192.2	136.6	446.0	334.3	545.5
1998	828.9	632.4	1461.3	118.4	196.8	144.1	461.3	382.7	624.4
1999	910.6	683.4	1594.1	118.9	194.2	145.3	458.4	431.6	704.1
2000	990.2	740.0	1730.1	147.7	190.2	147.7	485.6	472.7	771.2
2001	1070.9	812.7	1883.6	146.2	186.3	149.9	482.4	521.7	867.5
2002	1160.7	846.9	2007.6	148.7	180.5	151.6	480.8	560.1	946.5
2003	1252.9	921.2	2174.1	149.2	174.3	151.0	474.5	645.1	1054.1
2004	1338.9	990.0	2328.9	149.9	166.2	150.6	466.7	707.4	1154.1
2005	1422.0	1030.4	2452.4	150.4	159.6	151.3	461.3	756.6	1234.4
2006	1515.4	1030.7	2546.1	150.2	150.4	146.8	447.4	798.5	1299.5
2007	1539.5	1041.1	2580.6	150.8	141.4	142.5	434.7	815.4	1330.4
2008	1554.8	1030.4	2585.3	150.8	132.6	139.8	423.2	821.2	1339.9
2009	1573.3	1031.0	2604.3	150.7	122.0	134.0	406.7	835.1	1362.5
2010	1592.6	1041.4	2634.0	150.7	112.0	124.4	387.1	853.8	1393.0
2011	1602.2	1030.4	2632.6	150.7	104.2	117.2	372.1	859.0	1401.5
2012	1621.5	1030.7	2652.2	150.7	95.5	107.1	353.2	873.6	1425.4
2013	1640.9	1041.1	2681.9	150.6	89.4	100.1	340.1	889.9	1451.9
2014	1662.0	1030.4	2692.4	150.6	82.6	94.1	327.3	899.8	1468.2
2015	1679.4	1031.0	2710.5	150.6	77.4	88.5	316.5	909.7	1464.2
2016	1698.8	1041.4	2740.1	150.6	72.0	85.2	307.8	924.0	1507.6
2017	1718.1	1030.4	2748.4	150.6	68.1	81.4	300.1	930.4	1518.0
2018	1737.3	1030.7	2768.0	150.5	65.5	82.6	298.6	936.4	1531.1
2019	1751.6	1041.1	2792.7	150.5	60.9	82.6	294.0	942.6	1549.3
2020	1776.0	1030.4	2806.4	150.5	57.3	83.2	291.0	955.8	1559.5
2021	1795.3	1031.0	2826.3	150.5	52.6	79.7	282.7	966.6	1577.0
2022	1809.7	1041.4	2851.1	150.5	49.4	77.5	277.3	978.0	1595.7
2023	1833.9	1030.4	2864.2	150.4	46.1	76.1	272.6	984.8	1606.6
2024	1841.7	1030.7	2872.4	150.4	44.1	84.4	278.9	989.9	1615.1
2025	1872.5	1041.1	2913.6	150.4	40.7	91.6	282.7	999.7	1631.1
2026	1891.8	1030.4	2922.1	150.4	37.2	103.7	291.2	999.7	1631.2
2027	1911.1	1031.0	2942.1	150.3	31.5	116.1	298.0	1004.8	1639.4
2028	1930.4	1041.4	2971.8	150.3	25.4	141.6	317.3	1006.7	1645.8
2029	1949.7	1030.4	2980.1	150.3	13.6	146.4	310.2	1014.5	1655.3
2030	1969.0	1030.7	2999.7	150.2	1.9	20.6	180.8	1071.2	1747.7
TOTL	56441.9	36426.7	92868.4	6019.3	5253.5	5077.8	16350.5	52600.5	47240.6
AVG	1064.9	687.3	1752.2	113.6	99.1	95.8	308.5	552.3	991.5
\$/YR	333.2	216.3	551.5	35.7	31.2	30.2	97.1	173.8	260.6

31A
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	3.0	76.7	- 73.8	- 73.8	- 28.5	- 28.5	- 28.5	- 28.5	- 28.5	- 28.5
1979	6.0	55.3	- 49.7	- 122.5	- 22.3	- 50.8	- 22.3	- 50.8	- 22.3	- 50.8
1980	8.1	42.4	- 34.3	- 156.8	- 20.1	- 70.8	- 20.1	- 70.8	- 20.1	- 70.8
1981	18.6	110.0	- 91.4	- 248.2	- 40.5	- 111.3	- 40.5	- 111.3	- 40.5	- 111.3
1982	38.1	217.5	- 179.4	- 427.6	- 73.2	- 184.6	- 73.2	- 184.6	- 73.2	- 184.6
1983	49.3	129.8	- 80.5	- 508.0	- 43.0	- 227.5	- 43.0	- 227.5	- 43.0	- 227.5
1984	61.3	168.8	- 107.5	- 615.5	- 64.8	- 292.3	- 64.8	- 292.3	- 64.8	- 292.3
1985	63.3	302.1	- 238.8	- 854.3	- 109.1	- 401.3	- 109.1	- 401.3	- 109.1	- 401.3
1986	103.1	277.1	- 174.0	- 1028.3	- 100.5	- 502.0	- 100.5	- 502.0	- 100.5	- 502.0
1987	121.8	365.5	- 243.6	- 1271.9	- 162.5	- 664.5	- 162.5	- 664.5	- 162.5	- 664.5
1988	167.7	321.5	- 153.9	- 1425.8	- 121.5	- 786.1	- 121.5	- 786.1	- 121.5	- 786.1
1989	208.8	270.9	- 62.1	- 1487.9	- 67.0	- 853.0	- 67.0	- 853.0	- 67.0	- 853.0
1990	454.5	312.8	141.7	- 1346.2	71.6	- 801.4	71.6	- 801.4	71.6	- 801.4
1991	564.9	264.1	300.8	- 1045.4	146.5	- 652.9	146.5	- 652.9	146.5	- 652.9
1992	682.0	271.0	411.1	- 634.3	211.5	- 441.4	211.5	- 441.4	211.5	- 441.4
1993	606.4	224.0	382.4	- 251.9	294.7	- 146.7	294.7	- 146.7	294.7	- 146.7
1994	939.0	139.8	799.2	679.2	379.6	233.0	379.6	233.0	379.6	233.0
1995	1078.6	245.1	833.5	1512.7	445.2	678.2	445.2	678.2	445.2	678.2
1996	1184.1	317.1	867.0	2379.7	478.3	1156.5	478.3	1156.5	478.3	1156.5
1997	1325.8	346.5	979.3	3359.1	546.6	1703.1	546.6	1703.1	546.6	1703.1
1998	1468.3	306.0	1162.2	4521.3	639.5	2342.6	639.5	2342.6	639.5	2342.6
1999	1594.1	000.0	1594.1	6115.4	765.3	3107.9	765.3	3107.9	765.3	3107.9
2000	1730.1	207.5	1522.6	7638.0	817.5	3925.4	817.5	3925.4	817.5	3925.4
2001	1862.5	202.7	1659.8	9297.8	909.1	4834.5	909.1	4834.5	909.1	4834.5
2002	2007.6	196.9	1810.6	10978.4	982.8	5817.2	982.8	5817.2	982.8	5817.2
2003	2174.7	205.1	1969.7	12948.1	1062.4	6879.6	1062.4	6879.6	1062.4	6879.6
2004	2328.9	194.5	2134.4	15082.5	1178.9	8058.5	1178.9	8058.5	1178.9	8058.5
2005	2452.3	208.1	2244.3	17326.9	1247.1	9305.6	1247.1	9305.6	1247.1	9305.6
2006	2546.1	192.5	2353.5	19680.4	1318.5	10624.1	1318.5	10624.1	1318.5	10624.1
2007	2680.5	201.4	2479.2	22159.6	1335.0	11959.1	1335.0	11959.1	1335.0	11959.1
2008	2844.3	200.1	2644.3	24803.9	1338.7	13297.8	1338.7	13297.8	1338.7	13297.8
2009	2904.3	172.5	2731.8	27535.7	1362.8	14660.6	1362.8	14660.6	1362.8	14660.6
2010	2934.8	185.9	2748.9	29984.6	1369.7	16030.3	1369.7	16030.3	1369.7	16030.3
2011	2932.6	207.8	2724.8	32709.4	1422.4	17452.6	1422.4	17452.6	1422.4	17452.6
2012	2932.6	207.8	2724.8	35434.2	1442.8	18895.4	1442.8	18895.4	1442.8	18895.4
2013	2932.6	207.8	2724.8	38159.0	1463.3	20358.7	1463.3	20358.7	1463.3	20358.7
2014	2932.6	207.8	2724.8	40883.8	1477.8	21836.5	1477.8	21836.5	1477.8	21836.5
2015	2932.6	207.8	2724.8	43608.6	1491.6	23328.1	1491.6	23328.1	1491.6	23328.1
2016	2932.6	207.8	2724.8	46333.4	1514.7	24842.8	1514.7	24842.8	1514.7	24842.8
2017	2932.6	207.8	2724.8	49058.2	1519.5	26362.3	1519.5	26362.3	1519.5	26362.3
2018	2932.6	207.8	2724.8	51783.0	1543.2	27895.5	1543.2	27895.5	1543.2	27895.5
2019	2932.6	207.8	2724.8	54507.8	1549.4	29444.9	1549.4	29444.9	1549.4	29444.9
2020	2932.6	207.8	2724.8	57232.6	1574.3	30999.2	1574.3	30999.2	1574.3	30999.2
2021	2932.6	207.8	2724.8	59957.4	1592.3	32561.5	1592.3	32561.5	1592.3	32561.5
2022	2932.6	207.8	2724.8	62682.2	1611.0	34132.5	1611.0	34132.5	1611.0	34132.5
2023	2932.6	207.8	2724.8	65407.0	1614.5	35717.0	1614.5	35717.0	1614.5	35717.0
2024	2932.6	207.8	2724.8	68131.8	1633.3	37310.3	1633.3	37310.3	1633.3	37310.3
2025	2932.6	207.8	2724.8	70856.6	1630.8	38901.1	1630.8	38901.1	1630.8	38901.1
2026	2932.6	207.8	2724.8	73581.4	1642.4	40503.5	1642.4	40503.5	1642.4	40503.5
2027	2932.6	207.8	2724.8	76306.2	1646.7	42110.2	1646.7	42110.2	1646.7	42110.2
2028	2932.6	207.8	2724.8	79031.0	1663.9	43724.1	1663.9	43724.1	1663.9	43724.1
2029	2932.6	207.8	2724.8	81755.8	1747.7	45441.8	1747.7	45441.8	1747.7	45441.8
2030	2932.6	207.8	2724.8	84480.6						

RATE OF RETURN TO ENTERPRISE OWNER 19.79%
RATE OF RETURN AFTER TAX OF ENTERPRISE 20.29%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1970	75.9	*	72.9	1.0	50.4	23.5
1971	53.7	*	121.5	1.7	89.4	37.7
1972	39.9	*	154.6	2.3	110.9	46.0
1973	106.4	*	250.0	3.6	160.0	73.8
1974	212.2	*	342.7	6.2	318.4	130.5
1975	123.3	*	541.5	7.6	356.0	155.3
1976	189.9	*	690.7	9.9	510.1	190.2
1977	282.0	*	929.7	15.0	656.0	254.8
1978	256.2	*	1132.7	17.8	849.6	301.6
1979	300.8	*	1366.3	28.3	1035.8	360.8
1980	256.2	*	1549.0	31.0	1188.9	381.1
1981	205.4	*	1670.7	33.0	1304.7	399.8
1982	221.5	*	1799.7	39.4	1427.6	411.3
1983	168.9	*	1869.2	41.3	1511.3	399.2
1984	174.4	*	1937.3	43.2	1595.6	389.5
1985	112.2	*	1938.7	46.5	1632.7	352.5
1986	84.4	*	1909.0	47.4	1647.5	308.8
1987	129.1	*	1918.7	49.2	1687.2	279.8
1988	200.6	*	1991.9	49.8	1768.7	273.0
1989	229.3	*	2084.6	51.6	1862.3	273.7
1990	187.7	*	2126.2	52.9	1921.3	259.6
1991	30.9	*	2013.8	52.2	1866.1	197.9
1992	59.9	*	1926.0	56.4	1826.5	155.9
1993	54.5	*	1630.6	55.7	1772.7	113.6
1994	46.2	*	1727.1	54.9	1703.4	76.0
1995	55.6	*	1631.9	50.9	1638.5	47.3
1996	44.6	*	1525.9	52.8	1557.3	21.4
1997	57.6	*	1432.1	51.7	1478.2	7.6
1998	41.7	*	1325.1	50.2	1380.1	4.8
1999	50.6	*	1233.1	46.7	1292.0	10.9
2000	49.3	*	1142.6	47.2	1201.1	11.2
2001	28.7	*	1037.4	45.5	1096.2	13.3
2002	35.2	*	948.2	43.8	1003.6	11.6
2003	57.1	*	889.1	42.5	932.2	1.7
2004	33.9	*	815.0	41.0	856.1	.1
2005	55.8	*	770.7	40.0	802.7	7.9
2006	35.2	*	711.8	38.9	741.0	9.7
2007	49.6	*	672.9	38.0	695.7	15.2
2008	48.8	*	635.7	37.2	652.7	20.2
2009	41.7	*	596.0	36.4	609.6	22.6
2010	67.5	*	581.0	36.0	583.2	33.7
2011	38.1	*	536.4	35.2	534.6	37.0
2012	57.4	*	510.6	34.6	498.7	46.5
2013	40.4	*	471.3	33.8	456.7	46.5
2014	55.8	*	449.6	33.3	431.3	51.1
2015	43.8	*	416.5	32.7	402.9	46.4
2016	57.1	*	389.2	32.4	375.0	46.7
2017	46.0	*	345.6	31.8	333.5	43.9
2018	57.1	*	299.8	31.3	286.5	43.7
2019	43.0	*	225.9	29.3	216.5	39.7
2020	55.5	*	159.8	27.3	131.3	37.0
2021	6.5	*	.1	27.3	.0	27.2
2022	28.6	*	.1	25.4	.0	25.3

TOTAL CAPITAL INVESTMENT 5077.7

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.0602	25.0602	25.0602
1979	129.69	44.25083	42.79768	42.79768
1980	169.62	58.7301	55.97459	55.97458
1981	276.8398	90.99989	91.09312	91.09317
1982	488.2498	169.8501	161.1224	161.1225
1983	611.5896	215.5901	201.8246	201.8247
1984	792.4596	292.05	261.5115	261.5117
1985	1074.439	384.4802	354.5249	34.5649
1986	1388.669	481.1003	459.1274	439.1272
1987	1631.53	595.6904	538.4645	538.4643
1988	1887.76	696.8306	622.5604	622.56
1989	2093.169	798.4714	690.7458	690.7451
1990	2314.699	887.1213	763.8206	692.5532
1991	2483.599	972.1011	819.5876	692.553
1992	2657.589	1063.011	877.1362	692.5527
1993	2770.239	1137.511	914.1787	692.5525
1994	2854.689	1207.162	942.0471	692.5522
1995	2983.789	1296.662	984.6501	692.552
1996	3184.339	1415.672	1050.232	692.5518
1997	3415.618	1551.073	1126.494	692.5515
1998	3601.258	1688.002	1188.425	692.5513
1999	3632.148	1764.092	1196.689	692.551
2000	3691.998	1865.543	1218.359	692.551
2001	3746.498	1973.773	1236.344	692.5508
2002	3794.728	2089.283	1252.26	692.5505
2003	3850.528	2212.023	1270.674	692.5503
2004	3895.118	2337.854	1285.389	692.55
2005	3952.738	2476.523	1304.483	692.5498
2006	3994.468	2614.364	1318.174	692.5496
2007	4045.067	2752.313	1334.872	692.5496
2008	4094.367	2893.314	1351.141	692.5493
2009	4123.894	3026.941	1368.621	692.5491
2010	4158.32	3154.727	1372.246	692.5488
2011	4215.418	3283.176	1391.888	692.5486
2012	4249.348	3393.236	1402.284	692.5483
2013	4305.145	3502.483	1420.698	692.5481
2014	4348.371	3599.349	1432.322	692.5479
2015	4389.93	3694.258	1448.677	692.5476
2016	4437.93	3785.198	1464.517	692.5474
2017	4479.656	3869.845	1478.286	692.5471
2018	4547.156	3963.916	1500.561	692.5469
2019	4585.246	4050.685	1513.131	692.5466
2020	4642.685	4143.941	1522.06	692.5464
2021	4683.835	4226.332	1545.401	692.5461
2022	4738.832	4307.831	1563.814	692.5459
2023	4781.859	4378.949	1578.813	692.5457
2024	4838.957	4463.957	1596.656	692.5454
2025	4886.926	4553.414	1612.685	692.5452
2026	4944.823	4657.473	1631.528	692.5449
2027	4987.051	4770.559	1645.727	692.5447
2028	5048.59	4911.27	1664.054	692.5444
2029	5049.09	5049.878	1666.199	692.5442
2030	5077.719	5077.707	1675.647	692.5439

PRESENT VALUE OF CAPITAL INV AT RATE % .8H
 534.8453
 PRESENT VALUE OF CAPITAL INV AT RATE % .8H
 1389.631

19.99998

10.

CASE - 31-A
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN BILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Capital Expenditures for Transport, Storage Recovery and Waste Management	5,077.8		5,077.8	5,077.8	5,253.6		10,331.3
Total O&M Expenditures for Transport, Storage Recovery and Waste Management		6,019.4	6,019.4			6,019.4	6,019.4

E3-164

Section E3.28

Case: 32A

Description: Fuel Cycle Center (FCC) baseline except recovery deferred to 1990
and multiple recovery plants

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 1990

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 5.077 billion dollars

Owners ROI - 19.8%

Service charge - \$216/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YR) \$233.203
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$70649.318

32A

Yearly Profit and Loss Statement

YEAR	PEP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INIT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	3.2	3.2	.8	5.1	3.0	8.9	.0	5.7
1979	.0	7.1	7.1	1.5	8.6	5.2	15.4	.0	8.3
1980	.0	8.8	8.8	2.5	11.2	6.2	20.5	.0	11.7
1981	.0	20.1	20.1	3.6	18.2	11.0	32.9	.0	12.8
1982	.0	41.1	41.1	5.2	32.2	19.5	57.0	.0	15.9
1983	.0	53.2	53.2	6.5	48.1	24.5	71.1	.0	17.8
1984	.0	66.1	66.1	7.9	51.7	31.7	81.3	.0	22.3
1985	.0	89.8	89.8	20.1	69.9	43.0	133.0	.0	43.2
1986	.0	111.1	111.1	20.8	86.2	53.2	160.2	.0	49.1
1987	.0	131.3	131.3	64.6	165.1	65.3	235.0	.0	103.7
1988	.0	180.8	180.8	65.3	180.7	75.5	321.6	.0	89.8
1989	.0	216.5	216.5	65.5	152.7	83.7	281.9	.0	65.4
1990	241.1	227.1	468.1	91.3	145.3	92.6	329.2	52.8	86.2
1991	318.2	259.3	577.5	95.2	154.1	99.4	348.6	87.0	141.9
1992	379.6	312.3	691.9	96.6	162.8	106.3	365.7	124.3	202.8
1993	441.8	369.9	811.7	111.8	167.8	110.3	389.8	158.1	261.8
1994	502.4	439.0	941.4	115.4	168.9	114.2	398.5	206.2	336.6
1995	564.1	512.0	1076.1	115.9	173.4	119.4	408.7	253.6	413.8
1996	625.5	549.7	1175.3	116.6	182.1	127.4	426.1	284.7	464.5
1997	687.0	619.6	1306.6	117.2	192.2	136.6	446.0	333.5	527.3
1998	748.4	688.2	1436.6	118.4	198.8	144.1	461.3	376.6	594.7
1999	809.8	756.6	1566.4	118.9	194.2	145.3	458.4	413.5	674.3
2000	871.5	797.8	1669.2	147.7	190.2	147.7	485.6	445.6	735.3
2001	932.9	876.1	1809.0	148.2	186.3	149.9	484.5	505.4	821.3
2002	994.3	913.0	1907.4	148.7	180.5	151.8	481.0	542.9	884.3
2003	1055.8	993.8	2049.5	149.2	174.3	151.0	474.5	596.5	976.0
2004	1117.2	1067.3	2184.5	149.9	166.8	150.6	467.4	652.3	1064.6
2005	1178.9	1110.8	2289.7	150.4	159.6	151.3	461.3	694.8	1133.6
2006	1240.3	1111.2	2351.5	150.8	150.4	148.6	450.8	722.5	1176.9
2007	1240.3	1122.4	2362.6	150.8	141.4	142.5	434.7	732.6	1195.3
2008	1240.3	1110.8	2351.1	150.8	132.6	139.8	423.2	732.6	1195.3
2009	1240.3	1111.5	2351.8	150.7	122.0	134.0	406.7	739.1	1266.0
2010	1240.3	1122.7	2363.0	150.7	112.0	124.4	387.1	730.8	1225.0
2011	1240.3	1110.8	2351.1	150.7	104.2	117.2	372.1	732.0	1227.0
2012	1240.3	1111.2	2351.5	150.7	95.5	107.1	353.2	739.3	1238.9
2013	1240.3	1122.4	2362.6	150.6	83.4	100.1	340.1	768.6	1254.0
2014	1240.3	1110.8	2351.1	150.6	82.6	94.1	327.3	769.0	1254.7
2015	1240.3	1111.5	2351.8	150.6	77.4	88.5	316.5	772.4	1261.9
2016	1240.3	1122.7	2363.0	150.6	72.6	85.2	308.5	789.7	1273.8
2017	1240.3	1110.8	2351.1	150.6	68.1	81.4	299.1	779.4	1271.7
2018	1240.3	1111.2	2351.5	150.5	65.5	82.6	298.6	780.1	1272.8
2019	1240.3	1122.4	2362.6	150.5	60.9	82.6	294.0	786.1	1282.5
2020	1240.3	1110.8	2351.1	150.5	57.3	83.2	291.0	782.8	1277.3
2021	1240.3	1111.5	2351.8	150.5	52.6	79.7	282.7	784.3	1282.6
2022	1240.3	1122.7	2363.0	150.5	49.4	77.5	277.3	792.5	1293.1
2023	1240.3	1110.8	2351.1	150.4	46.1	76.1	272.6	789.6	1288.7
2024	1240.3	1111.2	2351.5	150.4	44.1	84.4	278.9	787.6	1285.0
2025	1240.3	1122.4	2362.6	150.4	40.7	91.6	282.7	790.4	1289.6
2026	1240.3	1110.8	2351.1	150.4	37.2	103.7	291.2	782.6	1277.1
2027	1240.3	1111.5	2351.8	150.3	31.5	116.1	298.0	780.5	1273.4
2028	1240.3	1122.7	2363.0	150.3	25.4	141.6	317.3	777.3	1268.3
2029	1240.3	1110.8	2351.1	150.3	15.8	146.4	310.2	775.5	1265.4
2030	1240.3	1111.2	2351.5	150.2	1.9	38.6	189.8	824.9	1345.0
TOTAL	42474.6	39271.8	81746.2	6019.3	3852.5	5077.6	16500.5	22617.4	40378.3
A/C	301.4	741.0	1542.4	113.6	99.1	95.8	308.5	472.0	761.9
44-A/C	252.2	233.2	485.4	35.7	31.2	30.2	97.1	148.6	239.8

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX:				FINANCED ENTERPRISE AFTER TAX:				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	3.2	76.7	- 73.5	- 73.5	- 28.3	- 28.3	- 28.3	- 28.3	- 28.3	- 28.3
1979	7.1	55.3	- 48.2	- 121.8	- 21.8	- 50.0	- 21.8	- 50.0	- 21.8	- 51.7
1980	8.6	42.4	- 33.8	- 155.4	- 19.4	- 69.5	- 19.4	- 69.5	- 19.4	- 71.8
1981	20.1	110.0	- 89.9	- 245.4	- 39.0	- 108.5	- 39.0	- 108.5	- 39.0	- 112.1
1982	41.1	217.5	- 176.4	- 421.8	- 70.3	- 178.8	- 70.3	- 178.8	- 70.3	- 185.0
1983	53.2	139.2	- 86.0	- 507.8	- 39.1	- 217.9	- 39.1	- 217.9	- 39.1	- 227.9
1984	66.1	188.8	- 122.7	- 630.5	- 60.0	- 277.9	- 60.0	- 277.9	- 60.0	- 287.9
1985	89.8	302.1	- 212.3	- 842.8	- 102.6	- 380.5	- 102.6	- 380.5	- 102.6	- 393.5
1986	111.1	377.1	- 266.0	- 1108.8	- 92.5	- 473.0	- 92.5	- 473.0	- 92.5	- 485.8
1987	131.3	365.5	- 234.2	- 1343.0	- 153.0	- 626.0	- 153.0	- 626.0	- 153.0	- 641.3
1988	160.8	321.5	- 160.7	- 1503.7	- 168.5	- 794.4	- 168.5	- 794.4	- 168.5	- 810.8
1989	216.5	270.9	- 54.4	- 1558.1	- 71.3	- 865.7	- 71.3	- 865.7	- 71.3	- 882.7
1990	468.1	312.8	155.3	- 1402.8	80.1	- 785.6	80.1	- 785.6	80.1	- 765.0
1991	577.5	264.1	313.4	- 1089.4	156.3	- 629.3	156.3	- 629.3	156.3	- 610.2
1992	692.9	271.0	421.9	- 667.5	216.3	- 413.0	216.3	- 413.0	216.3	- 394.3
1993	810.9	324.0	486.9	- 180.6	297.5	- 115.5	297.5	- 115.5	297.5	- 100.0
1994	941.4	199.8	741.6	561.0	381.2	267.6	381.2	267.6	381.2	138.2
1995	1076.1	245.1	831.0	1392.0	443.7	711.3	443.7	711.3	443.7	723.1
1996	1175.3	317.1	858.2	2250.2	472.8	1184.1	472.8	1184.1	472.8	1194.3
1997	1306.6	346.5	960.1	3210.3	534.7	1718.8	534.7	1718.8	534.7	1727.2
1998	1436.6	306.0	1130.6	4340.9	619.8	2338.7	619.8	2338.7	619.8	2345.8
1999	1546.6	149.8	1396.8	5737.7	735.9	3074.6	735.9	3074.6	735.9	3082.4
2000	1669.2	207.5	1461.7	7200.0	779.7	3854.3	779.7	3854.3	779.7	3867.9
2001	1809.0	202.7	1606.3	8806.3	862.9	4717.2	862.9	4717.2	862.9	4721.5
2002	1907.4	196.9	1710.4	10516.7	920.6	5637.8	920.6	5637.8	920.6	5643.0
2003	2049.5	205.1	1844.5	12361.2	1004.7	6642.5	1004.7	6642.5	1004.7	6648.6
2004	2184.5	194.5	1990.0	14351.2	1089.4	7732.0	1089.4	7732.0	1089.4	7739.2
2005	2289.7	208.1	2081.6	16432.8	1146.2	8878.2	1146.2	8878.2	1146.2	8886.5
2006	2351.5	202.5	2149.0	18581.8	1189.9	10068.1	1189.9	10068.1	1189.9	10077.9
2007	2362.6	201.4	2161.2	20743.0	1199.9	11268.0	1199.9	11268.0	1199.9	11279.2
2008	2351.1	200.1	2151.0	22894.0	1194.1	12462.1	1194.1	12462.1	1194.1	12474.9
2009	2351.0	179.5	2171.4	25065.4	1206.3	13668.4	1206.3	13668.4	1206.3	13682.9
2010	2363.0	185.9	2177.0	27242.5	1221.7	14890.1	1221.7	14890.1	1221.7	14906.3
2011	2351.1	207.8	2143.3	29385.8	1215.8	16105.9	1215.8	16105.9	1215.8	16123.3
2012	2351.5	184.6	2166.9	31552.7	1235.9	17341.7	1235.9	17341.7	1235.9	17360.7
2013	2362.6	206.4	2156.2	33708.9	1244.9	18586.6	1244.9	18586.6	1244.9	18606.6
2014	2351.1	185.9	2165.2	35874.1	1231.9	19818.5	1231.9	19818.5	1231.9	19855.6
2015	2351.0	200.2	2150.8	38024.9	1235.5	21054.0	1235.5	21054.0	1235.5	21115.5
2016	2363.0	198.6	2164.4	40189.3	1248.0	22292.0	1248.0	22292.0	1248.0	22354.7
2017	2351.1	192.3	2158.8	42348.1	1246.4	23538.4	1246.4	23538.4	1246.4	23593.9
2018	2351.5	218.0	2133.4	44481.5	1261.3	24800.1	1261.3	24800.1	1261.3	24915.8
2019	2362.6	188.6	2174.0	46655.5	1278.5	26078.6	1278.5	26078.6	1278.5	26194.9
2020	2351.1	207.9	2143.2	48798.7	1267.1	27345.7	1267.1	27345.7	1267.1	27462.6
2021	2351.0	190.9	2160.1	50958.8	1280.1	28625.8	1280.1	28625.8	1280.1	28743.5
2022	2363.0	206.3	2156.7	53115.5	1289.9	29915.7	1289.9	29915.7	1289.9	29993.9
2023	2351.1	199.5	2151.6	55267.1	1292.9	31208.6	1292.9	31208.6	1292.9	31327.4
2024	2351.5	207.5	2144.0	57411.1	1284.4	32503.0	1284.4	32503.0	1284.4	32612.1
2025	2362.6	196.4	2166.2	59577.3	1291.7	33804.7	1291.7	33804.7	1291.7	33904.3
2026	2351.1	207.5	2143.6	61720.9	1276.8	35081.5	1276.8	35081.5	1276.8	35181.7
2027	2351.0	193.4	2157.6	63878.5	1276.4	36357.9	1276.4	36357.9	1276.4	36459.0
2028	2363.0	205.9	2157.1	66035.6	1269.2	37627.1	1269.2	37627.1	1269.2	37729.3
2029	2351.1	156.8	2194.3	68229.9	1273.9	38901.0	1273.9	38901.0	1273.9	39000.2
2030	2351.5	178.9	2172.6	70402.5	1345.8	40246.8	1345.8	40246.8	1345.8	40353.6

RATE OF RETURN TO ENTERPRISE OWNER 20.16%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 20.45%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	CUMULATIVE EQUITY
1978	72.9	*	72.9	1.0	50.4	23.5
1979	53.7	*	121.5	1.7	80.4	37.7
1980	39.9	*	154.6	2.3	110.9	48.0
1981	106.4	*	250.0	3.6	180.0	73.6
1982	212.2	*	442.7	6.2	318.4	130.5
1983	123.3	*	541.5	7.8	396.0	153.3
1984	180.9	*	690.7	9.9	510.4	190.2
1985	282.0	*	929.7	15.0	690.0	254.8
1986	256.2	*	1132.7	17.0	849.6	301.0
1987	300.8	*	1368.3	28.3	1035.8	360.8
1988	256.2	*	1549.0	31.0	1186.9	391.1
1989	205.4	*	1670.7	33.0	1304.7	399.0
1990	221.5	*	1799.7	39.4	1427.7	411.0
1991	168.9	*	1869.2	41.5	1511.5	399.2
1992	174.4	*	1937.3	43.2	1595.0	380.0
1993	112.2	*	1938.7	46.5	1632.7	352.0
1994	84.4	*	1969.0	47.4	1647.5	368.6
1995	129.1	*	1918.7	48.2	1687.2	279.6
1996	200.6	*	1991.9	49.8	1746.7	273.0
1997	229.3	*	2084.6	51.6	1862.3	273.7
1998	187.7	*	2129.2	52.9	1921.3	259.8
1999	30.9	*	2013.9	52.2	1960.1	197.9
2000	59.9	*	1926.0	56.4	1826.5	155.9
2001	54.5	*	1830.6	55.7	1772.7	113.6
2002	48.2	*	1727.1	54.9	1705.4	76.0
2003	55.8	*	1631.9	53.9	1638.5	47.3
2004	44.6	*	1545.9	52.8	1557.3	21.4
2005	57.6	*	1432.1	51.7	1476.2	7.6
2006	41.7	*	1325.1	50.2	1380.1	4.8
2007	50.6	*	1233.1	48.7	1292.8	10.9
2008	49.3	*	1142.6	47.2	1201.1	11.2
2009	29.7	*	1037.4	45.5	1096.2	13.3
2010	32.2	*	948.2	43.6	1003.6	11.6
2011	57.1	*	888.1	42.5	932.2	1.7
2012	33.9	*	815.0	41.0	856.1	.1
2013	55.8	*	770.7	40.0	802.7	7.9
2014	35.2	*	711.0	36.9	741.0	9.7
2015	49.6	*	672.9	38.0	695.7	15.2
2016	48.0	*	635.7	37.2	652.7	20.2
2017	41.7	*	596.0	36.4	609.8	22.6
2018	67.5	*	581.0	36.0	582.2	30.7
2019	38.1	*	536.4	35.2	534.6	37.0
2020	57.4	*	510.6	34.6	498.7	46.3
2021	48.4	*	471.3	33.8	456.7	46.5
2022	55.8	*	449.6	33.3	431.8	51.1
2023	43.0	*	416.5	32.7	402.9	46.4
2024	57.1	*	389.2	32.4	375.0	46.7
2025	49.0	*	345.6	31.2	333.5	43.9
2026	57.1	*	299.0	31.3	288.5	43.7
2027	43.0	*	225.9	30.3	216.5	39.7
2028	55.5	*	199.8	29.3	191.3	37.6
2029	6.5	*	.1	27.0	.0	27.2
2030	28.6	*	.1	22.4	.0	25.3

TOTAL CAPITAL INVESTMENT 5077.7

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.58882	25.0682	25.0682
1979	129.69	44.25803	42.79768	42.79768
1980	169.62	58.7301	55.97459	55.97458
1981	276.0398	95.99989	91.09312	91.09317
1982	488.2498	169.8581	161.1224	161.1225
1983	611.5896	215.5981	201.8246	201.8247
1984	792.4595	282.05	261.5115	261.5117
1985	1074.439	384.4882	354.5649	354.5649
1986	1330.889	481.1003	439.1274	439.1272
1987	1631.53	595.6904	538.4845	538.4843
1988	1887.76	698.8306	622.9604	622.96
1989	2093.169	788.4714	690.7458	690.7451
1990	2314.699	887.1213	763.8306	698.7449
1991	2483.599	972.1811	819.5876	690.7446
1992	2657.989	1063.811	877.1362	690.7444
1993	2778.239	1137.511	914.1787	690.7441
1994	2854.689	1207.162	942.8471	690.7439
1995	2983.789	1266.682	984.6581	690.7437
1996	3184.339	1415.672	1058.632	690.7434
1997	3413.618	1551.873	1128.494	690.7432
1998	3681.288	1680.882	1188.463	690.7429
1999	3932.148	1764.892	1198.689	690.7427
2000	3691.998	1885.543	1218.359	690.7427
2001	3746.498	1973.773	1236.544	690.7424
2002	3794.728	2089.283	1252.26	690.7422
2003	3850.528	2212.833	1270.674	690.7419
2004	3895.118	2337.854	1285.339	690.7417
2005	3952.738	2476.523	1304.403	690.7415
2006	3994.468	2614.364	1318.174	690.7412
2007	4045.867	2752.313	1334.872	690.7412
2008	4094.367	2893.314	1351.141	690.741
2009	4123.894	3026.941	1368.621	690.7407
2010	4158.32	3154.727	1372.246	690.7405
2011	4215.418	3283.176	1391.888	690.7402
2012	4249.348	3393.236	1402.284	690.74
2013	4305.145	3502.403	1420.698	690.7397
2014	4340.371	3599.349	1432.322	690.7395
2015	4389.93	3694.258	1448.677	690.7393
2016	4437.93	3785.198	1464.517	690.739
2017	4479.656	3869.645	1478.286	690.7388
2018	4547.156	3963.916	1500.561	690.7385
2019	4585.246	4058.685	1513.131	690.7383
2020	4642.685	4143.941	1532.06	690.738
2021	4683.835	4226.332	1545.401	690.7378
2022	4738.832	4307.031	1563.814	690.7375
2023	4781.659	4378.949	1578.013	690.7373
2024	4838.957	4463.957	1596.656	690.7371
2025	4886.926	4553.414	1612.685	690.7368
2026	4944.823	4627.473	1631.528	690.7366
2027	4987.831	4778.359	1645.727	690.7363
2028	5042.59	4911.27	1664.854	690.7361
2029	5049.89	5049.076	1666.199	690.7358
2030	5077.719	5077.787	1675.647	690.7356

PRESENT VALUE OF CAPITAL INV AT RATE %: 8% 19.99998
 634.8435
 PRESENT VALUE OF CAPITAL INV AT RATE %: 10% 10.
 1369.631

RATE OF RETURN TO ENTERPRISE OWNER 28.37%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 28.92%

CASE - 32-A
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN BILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Capital Expenditures for Transport, Storage Recovery and Waste Management	5,077.8		5,077.8	5,077.8	5,253.6		10,331.3
Total O&M Expenditures for Transport, Storage Recovery and Waste Management		6,019.4	6,019.4			6,019.4	6,019.4

Section E3.29

Case: 26A

Description: Fuel Cycle Center (FCC) baseline except service charge 200 \$/Kg
and recovery credit provided

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - 74.2

Summary of Output Characteristics:

Capital investment - 4.777 billion dollars

Owners ROI - 21.7%

Service charge - \$200/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS+Q) - 200.00
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 255512.050
 CREDIT FOR RECOVERY 74.2

26A

Yearly Profit and Loss Statement

YEAR	RECOVERY PLUS SERVICE CHARGE	CREDIT FOR RECOVERY	NET REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	2.7	.0	2.7	1.3	5.1	2.5	8.9	.0	8.2
1979	5.1	.0	5.1	1.5	8.5	4.1	14.3	.0	8.3
1980	7.5	.0	7.5	2.5	11.3	5.3	19.1	.0	11.6
1981	17.2	.0	17.2	3.6	16.0	7.6	27.1	.0	9.9
1982	35.2	.0	35.2	4.3	22.4	10.7	37.5	.0	2.3
1983	45.7	.0	45.7	5.1	26.2	13.6	46.9	.0	1.2
1984	56.7	.0	56.7	5.9	32.8	15.0	54.7	.8	1.3
1985	77.1	.0	77.1	10.0	36.1	17.9	72.0	2.8	3.2
1986	95.4	.0	95.4	16.7	38.1	19.2	76.8	7.4	12.0
1987	112.7	.0	112.7	22.0	41.0	21.2	114.2	.6	11.0
1988	155.1	.0	155.1	32.9	43.9	23.3	120.1	13.2	21.7
1989	185.8	.0	185.8	33.8	45.1	24.0	123.4	23.7	33.7
1990	194.9	.0	194.9	33.8	47.2	26.1	127.1	30.8	44.0
1991	222.6	.0	222.6	34.2	56.9	31.3	142.5	30.4	55.7
1992	268.9	.0	268.9	35.4	60.9	32.4	178.8	34.2	55.9
1993	317.5	.0	317.5	36.1	92.5	39.1	197.7	49.5	74.2
1994	376.8	.0	376.8	36.9	110.3	36.3	223.5	57.0	86.8
1995	439.4	.0	439.4	37.7	135.5	71.6	284.8	66.4	109.3
1996	471.8	.0	471.8	38.6	174.3	91.1	324.1	56.1	91.6
1997	531.8	.0	531.8	39.6	209.3	108.6	377.5	58.6	95.7
1998	590.7	.0	590.7	60.6	236.0	123.7	420.3	64.8	105.7
1999	632.4	.0	632.4	61.7	246.7	132.0	440.3	73.0	119.1
2000	2098.2	-	2098.2	136.5	248.4	134.8	509.6	491.5	202.0
2001	2165.4	-	2165.4	126.9	245.3	135.2	507.5	506.9	227.0
2002	2197.1	-	2197.1	127.5	242.4	135.8	505.7	514.4	239.3
2003	2266.4	-	2266.4	126.1	239.6	137.0	504.7	523.8	264.1
2004	2329.5	-	2329.5	126.8	236.5	138.4	503.7	545.8	287.2
2005	2366.9	-	2366.9	129.3	232.6	139.6	501.5	552.7	301.8
2006	2367.2	-	2367.2	129.6	229.6	141.5	500.8	553.1	302.3
2007	2376.8	-	2376.8	130.0	223.7	137.3	491.0	558.8	311.8
2008	2366.9	-	2366.9	130.6	218.5	136.6	485.0	558.6	312.0
2009	2367.5	-	2367.5	129.9	212.4	135.9	478.2	561.7	316.0
2010	2377.1	-	2377.1	129.9	206.7	135.9	472.4	566.0	323.5
2011	2366.9	-	2366.9	129.8	199.5	134.2	463.5	567.2	325.4
2012	2367.2	-	2367.2	129.8	192.2	133.0	455.0	570.5	330.8
2013	2376.8	-	2376.8	129.7	185.0	131.1	445.8	576.0	339.8
2014	2366.9	-	2366.9	129.7	177.2	129.4	436.2	577.5	342.3
2015	2367.5	-	2367.5	129.6	169.7	124.1	423.5	582.5	350.4
2016	2377.1	-	2377.1	129.6	161.6	122.6	413.8	588.2	359.8
2017	2366.9	-	2366.9	129.5	153.3	117.7	400.8	591.0	364.3
2018	2367.2	-	2367.2	129.5	146.8	116.0	392.2	594.3	369.7
2019	2376.8	-	2376.8	129.4	139.7	113.8	382.9	599.9	378.9
2020	2366.9	-	2366.9	129.4	130.7	113.9	373.9	601.2	380.9
2021	2367.5	-	2367.5	129.3	121.7	115.3	366.3	604.2	385.9
2022	2377.1	-	2377.1	129.3	111.9	115.0	356.2	610.2	395.0
2023	2366.9	-	2366.9	129.2	101.6	116.0	346.8	611.5	397.7
2024	2367.2	-	2367.2	129.1	91.1	117.4	337.6	615.1	403.0
2025	2376.8	-	2376.8	129.1	78.6	117.1	324.8	622.0	411.9
2026	2366.9	-	2366.9	129.1	66.7	120.5	316.3	623.1	416.6
2027	2367.5	-	2367.5	129.0	52.9	121.7	305.6	626.1	424.7
2028	2377.1	-	2377.1	128.9	39.6	121.7	290.3	631.4	430.2
2029	2366.9	-	2366.9	128.9	22.5	125.3	280.7	634.3	435.0
2030	2367.2	-	2367.2	128.9	2.9	127.7	241.4	639.6	445.2
TOTL	77524.1	- 12437.2	65087.0	4757.4	6600.3	4743.0	16140.6	10018.1	30321.1
ARC	1462.7	- 234.7	1228.1	90.5	124.5	89.5	304.5	351.2	572.3
SS+TC	460.4	-	386.5	28.5	39.2	28.2	95.8	110.5	180.1

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL	CUM
1978	2.7	77.2	- 74.5	- 74.5	- 29.1	- 29.1	- 30.1	- 30.1	-	- 30.1
1979	6.1	55.3	- 49.2	- 123.7	- 22.2	- 51.4	- 23.0	- 53.1	-	- 53.1
1980	7.5	42.4	- 34.9	- 158.6	- 20.2	- 71.6	- 20.0	- 73.9	-	- 73.9
1981	17.2	75.1	- 57.9	- 216.6	- 27.0	- 98.6	- 22.0	- 101.9	-	- 101.9
1982	35.2	101.3	- 66.1	- 282.7	- 25.0	- 123.6	- 22.2	- 126.1	-	- 126.1
1983	45.7	93.6	- 47.9	- 330.6	- 18.8	- 142.4	- 19.9	- 158.0	-	- 158.0
1984	56.7	78.0	- 21.3	- 351.9	- 9.1	- 151.5	- 10.0	- 167.9	-	- 167.9
1985	77.1	71.0	6.1	- 345.8	5.5	- 150.9	2.0	- 160.0	-	- 160.0
1986	95.4	52.6	42.8	- 302.9	16.5	- 134.4	16.0	- 143.9	-	- 143.9
1987	112.7	100.4	12.3	- 290.7	5.6	- 132.0	5.6	- 130.0	-	- 130.0
1988	155.1	103.9	51.2	- 239.5	23.0	- 112.0	23.4	- 108.1	-	- 108.1
1989	185.8	79.1	106.7	- 132.7	43.9	- 63.0	43.6	- 79.0	-	- 79.0
1990	194.3	95.2	101.7	- 31.0	48.4	- 14.7	48.0	- 31.0	-	- 31.0
1991	222.6	210.1	12.5	- 18.5	21.4	- 6.7	19.7	- 11.8	-	- 11.8
1992	268.9	425.7	- 156.8	- 175.3	- 34.1	- 27.4	- 38.3	- 50.1	-	- 50.1
1993	317.5	244.6	72.9	- 102.4	49.0	- 21.6	47.0	- 3.1	-	- 3.1
1994	376.8	337.9	38.9	- 63.5	43.0	- 6.6	41.9	- 2.8	-	- 2.8
1995	439.4	458.0	- 18.6	- 82.1	30.1	- 6.7	26.7	- 6.0	-	- 6.0
1996	471.8	663.7	- 191.9	- 274.0	- 38.3	- 57.9	- 45.4	- 19.1	-	- 19.1
1997	531.8	614.0	- 82.2	- 356.3	- 4.6	- 53.3	- 10.6	- 8.0	-	- 8.0
1998	590.7	498.8	91.9	- 264.4	54.7	- 108.0	50.1	- 58.6	-	- 58.6
1999	632.4	265.6	366.8	102.5	149.3	357.3	147.3	205.9	-	- 205.9
2000	1803.2	203.2	1599.9	1702.4	873.0	1150.3	862.0	1067.8	-	- 1067.8
2001	1841.4	138.6	1702.7	3405.1	918.1	2068.4	916.5	1984.3	-	- 1984.3
2002	1859.4	147.0	1712.4	5117.5	922.4	2990.8	922.8	2907.1	-	- 2907.1
2003	1898.9	155.4	1743.4	6861.0	941.2	3910.0	941.6	3848.7	-	- 3848.7
2004	1934.8	159.0	1775.8	8636.7	959.1	4869.1	959.5	4808.2	-	- 4808.2
2005	1956.1	155.4	1800.7	10437.4	970.3	5839.4	970.9	5779.1	-	- 5779.1
2006	1956.2	172.9	1777.3	12214.8	963.8	6793.2	959.3	6738.4	-	- 6738.4
2007	1961.7	144.4	1817.3	14032.1	977.1	7770.4	978.1	7716.4	-	- 7716.4
2008	1956.1	152.4	1803.7	15835.8	970.2	8745.6	971.1	8687.5	-	- 8687.5
2009	1956.4	144.3	1812.1	17647.9	971.8	9717.5	972.9	9660.4	-	- 9660.4
2010	1961.9	156.3	1805.6	19453.4	968.5	10686.9	969.4	10629.8	-	- 10629.8
2011	1956.1	144.1	1812.0	21265.4	969.2	11655.1	970.4	11600.2	-	- 11600.2
2012	1956.2	149.3	1806.9	23070.3	966.8	12621.9	968.0	12568.2	-	- 12568.2
2013	1961.7	157.1	1804.6	24874.9	967.9	13589.8	969.1	13537.3	-	- 13537.3
2014	1956.1	153.9	1802.2	26677.1	965.2	14555.0	968.5	14503.8	-	- 14503.8
2015	1956.4	164.6	1791.8	28468.9	968.8	15523.8	970.1	15473.9	-	- 15473.9
2016	1961.9	149.1	1812.7	30281.7	976.6	16500.5	978.0	16451.9	-	- 16451.9
2017	1956.1	156.9	1799.2	32080.9	979.1	17479.5	980.4	17432.4	-	- 17432.4
2018	1956.2	168.5	1787.7	33868.6	976.6	18456.1	977.7	18410.1	-	- 18410.1
2019	1961.7	167.2	1794.5	35663.0	981.3	19437.4	982.5	19392.9	-	- 19392.9
2020	1956.1	142.4	1813.7	37476.7	983.4	20420.8	985.0	20377.5	-	- 20377.5
2021	1956.4	155.4	1801.0	39277.7	976.7	21397.5	978.2	21351.6	-	- 21351.6
2022	1961.9	156.6	1805.2	41082.9	980.0	22377.5	981.6	22337.3	-	- 22337.3
2023	1956.1	156.6	1799.5	42882.4	974.8	23352.3	976.5	23313.8	-	- 23313.8
2024	1956.2	165.3	1790.9	44672.6	970.3	24322.5	972.0	24285.0	-	- 24285.0
2025	1961.7	148.7	1813.0	46485.8	979.5	25302.1	981.6	25267.5	-	- 25267.5
2026	1956.1	170.2	1785.8	48271.6	971.0	26273.1	973.0	26240.5	-	- 26240.5
2027	1956.4	149.9	1806.5	50078.1	979.6	27252.7	981.9	27222.4	-	- 27222.4
2028	1961.9	169.1	1792.7	51870.8	973.6	28226.3	975.8	28198.2	-	- 28198.2
2029	1956.1	155.7	1800.4	53691.2	977.6	29203.8	980.4	29178.6	-	- 29178.6
2030	1956.2	155.4	1800.9	55512.1	1126.2	30330.0	1129.3	30507.9	-	- 30507.9

RATE OF RETURN TO ENTERPRISE OWNER 21.68%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 22.19%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OTHERS EQUITY
1978	75.9		75.4	1.1	50.3	25.9
1979	53.7		123.1	1.7	86.0	38.7
1980	39.9		157.7	2.3	112.1	47.9
1981	71.6		221.7	3.3	159.0	60.4
1982	97.6		387.9	4.5	222.4	69.9
1983	88.5		382.8	5.5	279.7	106.6
1984	72.2		439.0	6.4	329.6	119.8
1985	53.1		474.1	9.0	358.1	123.0
1986	33.9		468.7	9.5	377.2	121.0
1987	48.5		516.8	10.5	405.3	129.1
1988	51.8		543.7	16.1	434.4	123.4
1989	25.2		554.5	16.5	445.4	113.5
1990	39.3		557.7	16.8	465.0	109.5
1991	155.9		662.3	19.5	561.2	139.6
1992	370.3		1010.1	22.7	799.1	230.7
1993	128.5		1149.5	24.8	913.3	261.0
1994	381.1		1372.1	27.8	1087.1	312.9
1995	460.3		1760.8	32.2	1337.6	390.4
1996	605.1		3214.8	38.8	1721.2	538.6
1997	554.4		2660.6	44.8	2066.7	538.7
1998	438.2		2975.1	49.4	2330.3	594.2
1999	203.9		3047.0	51.4	2432.4	562.0
2000	76.7		2999.0	62.5	2445.4	566.0
2001	11.7		2865.5	62.0	2411.0	516.5
2002	19.5		2749.1	61.6	2377.7	433.1
2003	27.4		2639.5	61.3	2344.9	395.9
2004	30.2		2531.2	60.9	2306.5	363.6
2005	26.1		2417.6	60.3	2263.5	314.5
2006	49.2		2325.3	59.9	2227.7	157.6
2007	14.4		2202.4	59.0	2170.0	91.3
2008	22.4		2058.3	58.1	2114.1	32.2
2009	14.4		1966.7	57.0	2047.9	24.1
2010	28.4		1859.3	56.1	1965.5	70.1
2011	14.3		1739.4	54.9	1909.4	115.1
2012	19.6		1626.0	53.7	1832.0	152.3
2013	27.4		1522.3	52.5	1756.3	181.5
2014	24.2		1417.2	51.1	1674.1	200.8
2015	34.9		1328.0	49.9	1603.4	220.5
2016	19.6		1224.9	46.5	1517.1	243.7
2017	27.4		1134.5	47.2	1441.6	249.9
2018	39.1		1057.6	46.0	1371.5	267.9
2019	37.8		981.6	44.8	1298.0	271.6
2020	13.0		880.6	43.3	1199.6	273.6
2021	26.1		791.4	41.8	1101.1	267.9
2022	27.4		703.6	40.2	998.0	234.0
2023	27.4		615.1	38.5	886.5	232.8
2024	36.7		534.5	36.7	772.6	201.2
2025	19.6		437.0	34.6	639.7	186.0
2026	41.2		357.7	32.6	514.7	124.4
2027	20.9		256.8	30.3	368.7	81.6
2028	40.1		165.2	28.1	220.5	27.2
2029	6.8		36.7	25.2	34.5	27.4
2030	6.5		34.5	22.1	33.3	22.3

TOTAL CAPITAL INVESTMENT

4777.4

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	75.94	25.46601	25.0602	25.0602
1979	129.69	43.67003	42.79768	42.79768
1980	169.62	57.55009	55.97459	55.97458
1981	241.19	82.2601	79.59363	79.59267
1982	338.1799	115.73	111.5994	111.5994
1983	426.6799	146.9502	140.8044	140.8044
1984	498.8398	173.2603	164.8171	164.2523
1985	551.8997	198.8303	182.1262	181.1453
1986	585.7495	208.5603	193.2973	181.1453
1987	634.2195	228.8904	209.2024	197.1404
1988	685.2393	250.8503	226.1289	197.1404
1989	718.4693	265.0706	234.4614	197.1404
1990	749.6091	284.8306	247.437	197.1404
1991	905.6689	344.4407	298.8706	300.5886
1992	1275.239	476.8311	421.0564	271.0591
1993	1464.459	551.1311	483.2712	271.0591
1994	1745.509	658.4519	576.0178	273.1886
1995	2145.799	808.2219	708.1135	301.313
1996	2759.969	1022.712	907.7998	416.0205
1997	3305.239	1238.582	1090.745	509.3071
1998	3743.489	1413.173	1235.331	552.8789
1999	3947.379	1514.973	1302.639	552.8789
2000	4024.109	1578.673	1327.956	552.8787
2001	4055.609	1624.333	1331.817	552.8784
2002	4055.309	1677.573	1338.352	552.8782
2003	4082.666	1737.783	1347.281	552.8779
2004	4112.837	1804.362	1357.252	552.8777
2005	4158.943	1875.48	1365.352	552.8774
2006	4186.184	1960.52	1382.1	552.8772
2007	4202.543	2032.519	1386.839	552.877
2008	4224.98	2110.886	1394.243	552.8767
2009	4239.34	2191.436	1398.982	552.8765
2010	4267.777	2282.263	1408.366	552.8762
2011	4282.874	2372.671	1413.084	552.8762
2012	4301.633	2469.66	1419.539	552.876
2013	4328.992	2572.709	1428.567	552.8757
2014	4353.23	2679.117	1436.566	552.8755
2015	4388.148	2784.806	1448.095	552.8752
2016	4407.727	2890.584	1454.55	552.875
2017	4435.086	2993.514	1463.578	552.8748
2018	4474.145	3102.613	1476.468	552.8745
2019	4511.941	3213.969	1488.94	552.8743
2020	4524.941	3325.369	1493.23	552.874
2021	4551	3449.859	1501.83	552.8738
2022	4578.359	3560.258	1510.858	552.8735
2023	4605.719	3719.268	1519.867	552.8733
2024	4642.457	3869.696	1532.011	552.873
2025	4662.016	4022.335	1538.465	552.8728
2026	4703.172	4168.461	1552.047	552.8726
2027	4724.031	4355.32	1558.93	552.8726
2028	4764.168	4543.668	1572.175	552.8723
2029	4770.926	4736.414	1574.465	552.8721
2030	4777.426	4744.886	1576.55	552.8718

PRESENT VALUE OF CAPITAL INV AT RATE %: 1M

19.99998

418.6907

PRESENT VALUE OF CAPITAL INV AT RATE %: 1M

10.

1032.799

Cost Summary—Dollars in Millions

FIS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	4,777.5	4,207.6	8,985.1	4,777.4	6,640.9	11,418.3
1.0	CAPITAL ITEMS	4,777.5		4,777.5	4,777.4	6,640.9	11,418.3
1.1	SYSTEM FACILITIES-EQUIPMENT	3,646.6		3,646.6	3,646.5	5,124.7	8,771.2
1.1.1	SHIP	165.0		165.0	165.0	154.1	319.1
1.1.2	CASH	242.0		242.0	242.0	173.6	415.6
1.1.3	CASH TRANSPORTER-PAIL CAP	18.8		18.8	18.8	11.4	30.1
1.1.4	PAIL CAP TUG	0.8		0.8	0.8	0.4	1.2
1.1.5	CASH TRANSPORTER						
1.1.6	RECEPT FAC	1.0		1.0	1.0	1.3	2.3
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	82.6	130.6
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3	65.3
1.1.10	PACKAGING FACILITY						
1.1.11	PACKAGING FAC	116.0		116.0	116.0	201.2	317.2
1.1.12	CANISTERS	216.5		216.5	216.5	316.5	533.0
1.1.13	EMPLACEMENT TRAMS	18.0		18.0	18.0	11.9	29.9
1.1.14	HAULT MODULE	840.3		840.3	840.3	656.1	1,496.4
1.1.15	GEOLOGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CASH	47.0		47.0	47.0	60.9	107.9
1.1.18	LONG INTER FAC	75.0		75.0	75.0	130.1	205.1
1.1.19	MLM FROC FAC	940.4		940.4	940.4	1,631.0	2,571.4
1.1.20	RECOVERY FAC	693.8		693.8	693.8	1,350.2	2,044.0
1.2	SUPPORT FACILITIES EQUIPMENT	14.7		14.7	14.7	24.6	39.3
1.2.1	REM ELD & FLT YD	2.4		2.4	2.4	3.5	5.9
1.2.2	WAREHOUSE & FLT	12.2		12.2	12.2	21.1	33.3
1.3	CHIEFS COST	558.1		558.1	558.1	745.8	1,303.9
1.4	INTEREST DURING CON	558.2		558.2	558.1	745.8	1,303.9
2.0	OPER & MAINT		4,207.6	4,207.6		4,867.6	4,867.6
2.1	DIRECT LABOR		1,666.4	1,666.4		1,666.4	1,666.4
2.1.1	PORT & REC TRAMS		5.1	5.1		5.1	5.1
2.1.2	WATER BASIN REC (PORT)		145.8	145.8		145.8	145.8
2.1.3	WATER BASIN REC (PORT)						
2.1.4	WATER BASIN STOP		27.1	27.1		27.1	27.1
2.1.5	PAIL FAC LABOR		15.2	15.2		15.2	15.2
2.1.6	PAIL FAC LABOR		313.7	313.7		313.7	313.7
2.1.7	HAULT EMPLACEMENT LABOR		44.8	44.8		44.8	44.8
2.1.8	GEOLOGIC REC MOD LABOR						
2.1.9	CASH TRAMS MAINT LAB		31.2	31.2		31.2	31.2
2.1.10	LOI LM FROC LABOR						
2.1.11	MLM FROC LABOR		242.1	242.1		242.1	242.1
2.1.12	RECOVERY PLANT LAB		242.1	242.1		242.1	242.1
2.2	INDIRECT LABOR		1,660.5	1,660.5		1,660.5	1,660.5
2.2.1	PORT & REC TRAMS LAB		8.1	8.1		8.1	8.1
2.2.2	W.B. REC (PORT) LAB		218.6	218.6		218.6	218.6
2.2.3	W.B. REC (PORT) LAB						
2.2.4	W.B. STOP IND LAB		40.5	40.5		40.5	40.5
2.2.5	PAIL FAC IND LAB						
2.2.6	PAIL FAC IND LAB		470.4	470.4		470.4	470.4
2.2.7	HAULT IND LABOR		65.8	65.8		65.8	65.8
2.2.8	CEO REC MOD IND LAB						
2.2.9	CASH TRAMS MAINT LAB		46.6	46.6		46.6	46.6
2.2.10	MLM FROC IND LAB		7.7	7.7		7.7	7.7
2.2.11	MLM FROC IND LAB		371.3	371.3		371.3	371.3
2.2.12	REC PLANT IND LAB		371.3	371.3		371.3	371.3
2.3	MATERIAL SUP UTIL ECT		1,614.0	1,614.0		1,614.0	1,614.0
2.3.1	PORT REC FMS		8.1	8.1		8.1	8.1
2.3.2	W.B. REC CINS 4 PORT		218.6	218.6		218.6	218.6
2.3.3	W.B. REC CINS 2 PORT						
2.3.4	W.B. STORAGE CINS		40.5	40.5		40.5	40.5
2.3.5	PAIL CINS (2000)						
2.3.6	PAIL CINS (2000)		470.4	470.4		470.4	470.4
2.3.7	HAULT CINS		65.8	65.8		65.8	65.8
2.3.8	GEOLOGIC REC CINS						
2.3.9	CASH TRAMS		46.6	46.6		46.6	46.6
2.3.10	MLM FROC CINS		21.3	21.3		21.3	21.3
2.3.11	MLM PROCESSING CINS		371.3	371.3		371.3	371.3
2.3.12	RECOVERY PLANT CINS		371.3	371.3		371.3	371.3
2.4	CONTRACTED SERVICES		423.6	423.6		423.6	423.6
2.4.1	SNP CH		327.2	327.2		327.2	327.2
2.4.2	US PORT FEE		0.4	0.4		0.4	0.4
2.4.3	ELFCP PORT FEE STOP						
2.4.4	US FAULT (TO STOP)		17.7	17.7		17.7	17.7
2.4.5	ELFCP FAULT TRAMS						
2.4.6	US STOP (TIME CHRG)		61.3	61.3		61.3	61.3
2.4.7	ELFCP STOP						
2.4.8	US RECCH CP						
2.4.9	ELFCP REC CP						
2.4.10	ELFCP WASTE DIS						
2.4.11	US FAULT TRAMP		17.0	17.0		17.0	17.0
2.4.12	ELFCP FAULT TRAMP						
2.4.13	ELFCP FAULT TRAMS						
2.4.14	US PORT FEE						
2.4.15	ELFCP PORT FEE						
2.4.16	ELFCP PORT FEE						
2.4.17	PACIFIC PORT FEE						
2.4.18	PACIFIC PORT FEE						
2.4.19	PAC FAULT TRAMP						
2.4.20	PAC FAULT TRAMP						
2.4.21	PAC FAULT TRAMP						
2.5	DECON TRUST FUND		103.0	103.0		103.0	103.0

Section Section E3.30

Case: 17A

Description: Storage Center (SC) baseline

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 8.182 billion dollars

Owners ROI - 21.7%

Service charge - \$200/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/FC) 4200.146
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 432742.290

17A Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.7	2.7	.2	4.1	2.1	7.1	.0	4.3
1979	.0	4.1	4.1	1.3	7.6	3.7	12.6	.0	2.7
1980	.0	7.3	7.3	2.0	10.1	4.8	17.4	.0	5.9
1981	.0	17.2	17.2	3.6	14.3	8.9	26.8	.0	7.3
1982	.0	35.2	35.2	5.1	20.6	9.9	35.6	.0	1.7
1983	.0	45.7	45.7	6.4	25.8	12.3	44.7	.4	.6
1984	.0	56.7	56.7	7.7	30.3	14.9	52.9	1.5	2.4
1985	.0	77.1	77.1	19.4	33.8	16.8	70.0	2.7	4.4
1986	.0	90.4	90.4	19.9	33.7	18.1	73.2	8.2	13.4
1987	.0	112.7	112.7	33.0	39.2	20.4	114.6	.0	1.2
1988	.0	135.1	135.1	33.4	41.0	21.7	118.1	14.1	23.0
1989	.0	155.8	155.8	33.3	40.9	21.9	118.1	23.7	42.0
1990	.0	174.9	174.9	33.3	43.1	23.1	123.5	36.4	3.0
1991	.0	222.6	222.6	32.2	46.2	26.0	128.5	33.8	38.3
1992	.0	268.9	268.9	32.6	31.1	29.6	137.2	30.0	61.6
1993	.0	317.5	317.5	37.1	54.8	32.6	144.5	47.7	167.2
1994	.0	376.8	376.8	37.5	59.5	36.2	153.2	54.9	138.6
1995	.0	439.4	439.4	38.0	66.6	42.8	169.4	102.6	167.4
1996	.0	471.8	471.8	38.8	72.8	46.5	178.1	111.6	162.1
1997	.0	531.8	531.8	39.6	81.5	53.1	194.2	128.3	209.2
1998	.0	590.7	590.7	39.9	86.8	57.3	204.1	146.9	239.7
1999	.0	632.4	632.4	39.1	93.2	64.1	216.3	157.4	256.7
2000	.0	684.7	684.7	39.3	122.2	69.2	261.7	160.7	262.2
2001	.0	751.9	751.9	39.9	129.3	66.7	275.9	180.9	255.1
2002	.0	783.6	783.6	38.6	142.7	97.6	308.9	183.4	299.3
2003	.0	832.9	832.9	61.3	159.3	104.6	315.2	204.3	333.4
2004	.0	916.0	916.0	62.0	155.7	112.0	329.7	222.8	363.5
2005	.0	953.4	953.4	62.6	163.8	122.4	350.8	229.0	373.6
2006	.0	953.7	953.7	63.2	175.2	132.8	371.2	221.3	361.1
2007	.0	953.3	953.3	63.2	183.5	138.6	385.2	219.7	358.4
2008	.0	953.4	953.4	63.3	187.0	144.7	395.0	212.2	346.2
2009	.0	954.0	954.0	63.4	194.5	153.0	412.8	205.6	335.5
2010	.0	953.6	953.6	63.4	209.7	163.2	437.3	203.8	322.5
2011	.0	953.4	953.4	63.4	207.3	174.3	444.9	193.2	315.2
2012	.0	953.7	953.7	63.4	212.3	183.3	459.0	188.8	306.7
2013	.0	953.3	953.3	63.5	212.3	189.4	465.1	189.3	308.8
2014	.0	953.4	953.4	63.7	215.8	200.2	479.6	180.0	293.7
2015	.0	954.0	954.0	63.8	218.1	205.4	486.3	176.9	288.7
2016	.0	953.8	953.8	63.9	239.4	219.5	503.8	174.7	255.0
2017	.0	953.4	953.4	64.8	217.5	221.2	503.1	171.1	278.2
2018	.0	953.7	953.7	64.1	220.7	237.4	522.2	163.9	267.5
2019	.0	953.3	953.3	64.3	228.7	232.3	527.6	161.7	263.8
2020	.0	953.4	953.4	64.4	218.8	248.9	532.1	152.5	246.8
2021	.0	954.0	954.0	64.5	215.6	269.7	550.9	146.3	238.7
2022	.0	953.6	953.6	64.6	205.5	300.2	571.3	149.1	243.2
2023	.0	953.4	953.4	64.6	197.5	321.7	584.0	140.4	229.6
2024	.0	953.7	953.7	64.9	183.9	341.6	589.3	132.1	225.3
2025	.0	953.3	953.3	65.0	171.7	375.7	612.4	133.3	217.5
2026	.0	953.4	953.4	65.1	157.0	424.7	646.8	118.5	196.0
2027	.0	954.0	954.0	65.2	132.0	466.0	653.3	119.5	186.2
2028	.0	953.6	953.6	65.3	156.7	567.8	739.8	83.0	138.8
2029	.0	953.4	953.4	65.5	71.5	769.2	906.2	17.9	29.3
2030	.0	953.7	953.7	64.3	18.4	868.6	951.3	328.9	373.0
TOTL	.0	33705.0	33705.0	2780.5	6396.5	3182.3	17359.2	6229.1	10122.5
AVG	.0	635.9	635.9	52.0	120.7	154.4	327.5	117.4	191.8
24.1C	.0	266.1	266.1	16.5	98.0	48.6	163.1	37.0	66.1

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE				FINANCED ENTERPRISE				OTHERS			
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1970	2.7	22.8	-	20.0	-	20.0	-	20.0	-	20.0	-	20.0
1971	2.1	22.8	-	47.7	-	107.8	-	20.8	-	40.8	-	21.5
1972	7.5	20.0	-	32.5	-	140.2	-	18.1	-	58.9	-	64.0
1973	17.2	70.4	-	53.1	-	193.4	-	23.8	-	82.7	-	82.7
1974	35.2	97.9	-	62.1	-	255.5	-	32.3	-	108.0	-	113.3
1975	48.7	86.7	-	41.1	-	296.6	-	15.3	-	123.3	-	128.7
1976	56.7	77.9	-	21.2	-	317.7	-	8.3	-	131.6	-	137.9
1977	77.1	74.6	-	2.5	-	315.2	-	.1	-	131.5	-	140.3
1978	35.4	58.9	-	23.5	-	338.7	-	17.3	-	148.8	-	153.5
1979	112.7	111.4	-	1.3	-	371.4	-	4.2	-	153.0	-	157.7
1980	155.1	69.1	-	66.0	-	405.4	-	28.7	-	181.7	-	165.7
1981	185.8	49.5	-	125.4	-	430.0	-	50.9	-	232.6	-	181.5
1982	124.9	124.0	-	60.1	-	490.1	-	38.0	-	270.6	-	219.5
1983	232.6	82.2	-	150.4	-	640.5	-	68.0	-	338.6	-	257.5
1984	228.9	129.2	-	109.7	-	750.2	-	75.2	-	413.8	-	332.7
1985	317.5	126.3	-	191.2	-	941.4	-	106.9	-	520.7	-	439.6
1986	376.9	142.1	-	234.7	-	1176.1	-	135.1	-	655.8	-	574.7
1987	432.4	211.5	-	220.9	-	1397.0	-	145.3	-	801.1	-	699.8
1988	471.9	143.6	-	328.2	-	1725.2	-	184.2	-	985.3	-	884.0
1989	531.9	212.1	-	319.7	-	2044.9	-	184.2	-	1169.5	-	1068.5
1990	550.7	169.2	-	381.5	-	2426.4	-	239.5	-	1409.0	-	1278.0
1991	632.4	215.4	-	417.0	-	2843.4	-	244.3	-	1653.3	-	1522.3
1992	424.7	200.3	-	184.3	-	2987.7	-	167.0	-	1820.3	-	1689.3
1993	751.9	309.3	-	442.1	-	3429.7	-	298.2	-	2118.5	-	1987.5
1994	783.6	311.5	-	472.1	-	3901.8	-	274.7	-	2393.2	-	2262.2
1995	822.3	318.5	-	503.8	-	4405.6	-	274.7	-	2667.9	-	2536.9
1996	918.0	324.5	-	593.5	-	4999.1	-	371.1	-	3039.0	-	2908.0
1997	953.4	322.9	-	630.5	-	5629.6	-	363.3	-	3402.3	-	3268.3
1998	973.7	329.7	-	643.8	-	6273.4	-	353.1	-	3755.4	-	3621.4
1999	983.3	324.3	-	659.0	-	6932.4	-	357.7	-	4113.1	-	3979.1
2000	983.4	314.4	-	668.0	-	7590.4	-	366.6	-	4479.7	-	4345.7
2001	984.0	283.7	-	700.3	-	8290.7	-	336.7	-	4816.4	-	4721.6
2002	983.6	273.0	-	710.6	-	8981.3	-	337.2	-	5153.6	-	5058.8
2003	983.4	262.6	-	720.8	-	9682.1	-	318.4	-	5472.0	-	5377.2
2004	983.7	253.2	-	730.5	-	10392.6	-	312.4	-	5784.4	-	5689.6
2005	983.3	212.5	-	770.8	-	11163.4	-	303.8	-	6088.2	-	5993.4
2006	983.4	205.0	-	778.4	-	11941.8	-	297.6	-	6385.8	-	6291.0
2007	984.0	202.0	-	782.0	-	12723.8	-	298.8	-	6684.6	-	6589.8
2008	983.6	203.7	-	779.9	-	13507.5	-	294.4	-	6979.0	-	6884.2
2009	983.7	221.4	-	762.3	-	14270.8	-	311.9	-	7290.9	-	7196.1
2010	983.7	206.7	-	777.0	-	14948.8	-	277.7	-	7568.6	-	7473.8
2011	983.3	205.4	-	777.9	-	15726.7	-	280.5	-	7849.1	-	7754.3
2012	983.4	205.4	-	778.0	-	16505.7	-	267.3	-	8116.4	-	8021.6
2013	984.0	205.6	-	778.4	-	17284.1	-	253.8	-	8370.2	-	8275.0
2014	983.6	227.2	-	756.4	-	18040.5	-	274.1	-	8644.3	-	8549.1
2015	983.4	225.0	-	758.4	-	18798.9	-	248.9	-	8893.2	-	8797.6
2016	983.7	222.7	-	761.0	-	19560.9	-	245.4	-	9138.6	-	9043.0
2017	983.3	224.8	-	758.5	-	20319.4	-	215.9	-	9354.5	-	9258.1
2018	983.4	200.0	-	783.4	-	21102.8	-	183.6	-	9538.1	-	9441.7
2019	983.6	221.9	-	761.7	-	21864.5	-	189.8	-	9727.9	-	9631.6
2020	983.4	222.0	-	761.4	-	22625.9	-	128.2	-	9856.1	-	9760.1
2021	983.7	222.0	-	761.7	-	23387.6	-	44.6	-	9900.7	-	9804.7
2022	983.7	222.0	-	761.7	-	24149.3	-	380.0	-	10280.7	-	10184.7

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	DEF INC CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	62.0	*	59.8	1.8	11.2	19.7
1979	68.3	*	108.4	1.5	75.8	34.2
1980	37.5	*	141.1	2.1	100.2	48.0
1981	66.0	*	201.0	3.0	144.0	68.0
1982	82.2	*	283.3	4.3	204.4	83.2
1983	60.4	*	351.1	5.4	256.4	100.1
1984	70.2	*	406.4	6.3	301.0	111.7
1985	55.2	*	444.9	8.9	330.2	118.5
1986	33.0	*	458.7	9.3	353.9	115.1
1987	56.4	*	455.7	15.7	387.5	123.9
1988	33.7	*	507.8	16.1	400.0	118.5
1989	5.2	*	491.0	16.0	403.5	103.5
1990	71.5	*	537.5	16.7	445.0	109.2
1991	66.0	*	557.5	17.1	455.2	99.4
1992	82.6	*	590.5	17.3	501.8	166.7
1993	69.2	*	627.2	18.6	538.2	167.7
1994	24.3	*	675.5	19.5	543.0	113.0
1995	153.3	*	756.1	21.1	671.6	135.7
1996	84.8	*	824.4	21.3	712.0	134.4
1997	153.5	*	924.0	33.5	795.4	152.9
1998	159.2	*	976.7	34.5	847.1	154.1
1999	156.3	*	1063.0	35.7	926.9	167.8
2000	441.1	*	1429.9	39.3	1192.5	267.6
2001	149.9	*	1453.0	31.5	1258.6	265.6
2002	230.9	*	1646.3	33.5	1387.5	322.7
2003	197.4	*	1699.0	35.1	1448.2	286.0
2004	153.6	*	1749.6	36.3	1586.3	279.6
2005	236.3	*	1853.4	39.1	1599.9	291.6
2006	227.6	*	1948.2	39.7	1686.6	301.3
2007	221.1	*	2039.7	41.1	1768.4	303.4
2008	151.1	*	2037.1	41.7	1797.1	281.7
2009	230.3	*	2102.4	43.0	1863.7	281.8
2010	214.6	*	2153.8	44.0	1913.8	278.0
2011	229.1	*	2208.8	45.1	1976.8	272.0
2012	219.0	*	2245.3	46.0	2018.2	273.1
2013	156.1	*	2213.1	46.0	2009.5	248.1
2014	221.4	*	2233.2	46.6	2035.0	244.6
2015	218.5	*	2245.3	47.6	2057.2	235.1
2016	219.8	*	2245.6	47.4	2066.9	226.2
2017	187.4	*	2191.2	47.0	2045.9	193.1
2018	240.6	*	2195.0	47.5	2059.2	183.3
2019	221.1	*	2163.9	47.5	2044.2	186.6
2020	214.6	*	2109.0	47.2	2008.4	147.7
2021	231.1	*	2041.3	46.7	1955.9	132.1
2022	162.6	*	1903.7	45.2	1849.1	99.7
2023	138.2	*	1770.2	43.7	1733.6	80.4
2024	107.9	*	1566.5	41.5	1576.0	58.0
2025	219.3	*	1430.6	39.4	1412.4	57.7
2026	230.6	*	1251.6	37.0	1215.9	62.7
2027	156.1	*	931.6	32.9	915.5	49.0
2028	226.3	*	550.1	28.7	523.4	50.4
2029	226.6	*	47.4	22.0	36.0	34.2
2030	221.1	*	.1	13.6	.1	13.7

TOTAL CAPITAL INVESTMENT 3182.3

17A
Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	61.99001	30.75002	30.4567	23.77368
1979	114.25	38.49004	37.70248	45.29362
1980	151.77	51.53	50.08409	63.96284
1981	218.56	74.53009	72.12479	88.72607
1982	310.7598	106.3799	102.5507	112.3196
1983	391.1497	134.7798	129.0794	138.6697
1984	461.3396	160.3	152.2421	137.9267
1985	516.5496	181.3604	170.4613	140.3134
1986	549.5195	195.6504	181.3414	140.3134
1987	605.9194	218.4006	199.9534	150.9377
1988	639.6694	234.311	211.0909	150.9377
1989	644.8694	241.3213	212.8069	150.9377
1990	716.3992	271.3813	236.4117	150.9377
1991	742.3992	287.2314	244.9917	150.9377
1992	825.0291	323.2014	272.2595	150.9377
1993	894.269	356.1118	295.1086	150.9377
1994	978.7988	395.7817	323.0034	150.9377
1995	1132.259	460.6819	373.6453	150.9377
1996	1217.049	505.082	401.626	150.9377
1997	1370.509	575.1023	452.2676	150.9377
1998	1479.739	632.6025	488.3135	150.9377
1999	1636.058	709.1326	539.8992	150.9377
2000	2077.118	884.5735	685.449	150.9377
2001	2227.038	968.2434	734.9226	150.9377
2002	2477.928	1090.463	817.7161	150.9377
2003	2635.288	1187.133	869.645	150.9377
2004	2797.848	1291.544	923.2896	150.9377
2005	3024.138	1424.264	997.9653	150.9377
2006	3251.728	1565.104	1073.07	150.9377
2007	3472.817	1704.413	1146.03	150.9377
2008	3623.937	1826.803	1195.899	150.9377
2009	3844.227	1980.574	1268.595	150.9377
2010	4058.817	2138.984	1339.409	150.9377
2011	4287.965	2311.982	1415.028	150.9377
2012	4507.754	2489.561	1487.559	150.9377
2013	4663.812	2653.92	1539.058	150.9377
2014	4885.16	2850.178	1612.103	150.9377
2015	5103.648	3046.496	1684.204	150.9377
2016	5323.437	3256.575	1756.734	150.9377
2017	5490.816	3445.064	1811.969	150.9377
2018	5731.406	3672.235	1891.364	150.9377
2019	5952.496	3908.295	1964.323	150.9377
2020	6167.086	4158.652	2035.138	150.9377
2021	6388.176	4432.281	2108.098	150.9377
2022	6550.734	4701.594	2181.742	150.9377
2023	6738.973	5005.422	2223.861	150.9377
2024	6896.832	5326.852	2275.954	150.9377
2025	7116.621	5704.219	2348.485	150.9377
2026	7352.27	6136.398	2426.249	150.9377
2027	7508.328	6592.875	2477.748	150.9377
2028	7734.617	7171.246	2552.423	150.9377
2029	7961.164	7925.133	2627.184	150.9377
2030	8182.254	8182.203	2700.144	150.9377

17A
Cost Summary - Dollars in Millions

HQS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	8,182.3	2,720.5	10,902.9	8,182.3	2,720.5	10,902.9
1.0	CAPITAL ITEMS	8,182.3		8,182.3	8,182.3		8,182.3
1.1	SYSTEM FACILITIES-EQUIPMENT	6,077.5		6,077.5	6,077.5		6,077.5
1.1.1	SHIP	165.0		165.0	165.0		165.0
1.1.2	CASH	243.0		243.0	243.0		243.0
1.1.3	CASH TRANSPORTER-RAIL CAR	19.0		19.0	19.0		19.0
1.1.4	RAIL CAR TUG	0.8		0.8	0.8		0.8
1.1.5	CASH TRANSPORTER						
1.1.6	EXPORT FAC	1.0		1.0	1.0		1.0
1.1.7	WATER BASIN 4 PORT	38.0		38.0	37.9	63.7	101.7
1.1.8	WATER BASIN 2 PORT						
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3	65.3
1.1.10	PACKAGING FACILITY						
1.1.11	REWORKING FAC	116.0		116.0			116.0
1.1.12	OPINISTERS	1,017.5		1,017.5	1,017.5	201.2	1,218.7
1.1.13	EMPLACEMENT TRANS	30.0		30.0	30.0	22.9	52.9
1.1.14	IMMUT MODULE	4,303.4		4,303.4	4,303.4	2,726.3	7,029.7
1.1.15	GEOLGIC REC MODULE						
1.1.16	REPOSITORY STORAGE MOD						
1.1.17	CASH	44.9		44.9	44.9	77.2	122.1
1.1.18	LOCKWATER FAC	73.0		73.0	73.0	130.1	203.1
1.1.19	PLU FROG FAC						
1.1.20	RECOVERY FAC						
1.2	SUPPORT FACILITIES-EQUIPMENT	5.4		5.4	5.4	7.9	13.3
1.2.1	FOR BLD & FLT YD	1.4		1.4	1.4	2.0	3.4
1.2.2	WAREHOUSE & ULT	3.0		3.0	3.0	5.9	8.9
1.3	OTHERS COST	1,052.4		1,052.4	1,052.4	968.5	2,020.9
1.4	INTEREST DURING CONS	1,047.0		1,047.0	1,047.0	961.3	2,008.3
2.0	OPER & MAINT		2,720.5	2,720.5		2,720.5	2,720.5
2.1	DIRECT LABOR		581.0	581.0		581.0	581.0
2.1.1	PORT & REC TRANS		5.1	5.1		5.1	5.1
2.1.2	WATER BASIN REC (HPORT)		143.8	143.8		143.8	143.8
2.1.3	WATER BASIN REC (EXPORT)						
2.1.4	WATER BASIN STOR		27.1	27.1		27.1	27.1
2.1.5	PACK FAC LABOR						
2.1.6	PACK FAC LABOR		313.7	313.7		313.7	313.7
2.1.7	IMMUT EMPLACEMENT LABOR		44.0	44.0		44.0	44.0
2.1.8	GEOLGIC REC MOD LABOR						
2.1.9	CASH TRANS MAINT LAB		30.7	30.7		30.7	30.7
2.1.10	LOCKWATER FAC LAB		14.5	14.5		14.5	14.5
2.1.11	PLU FROG LABOR						
2.1.12	RECOVERY PLANT LAB						
2.2	INDIRECT LABOR		671.8	671.8		671.8	671.8
2.2.1	PORT & REC TRANS LAB		8.1	8.1		8.1	8.1
2.2.2	WATER BASIN REC (HPORT) LAB		218.6	218.6		218.6	218.6
2.2.3	WATER BASIN REC (EXPORT) LAB						
2.2.4	WATER BASIN STOR LAB		40.5	40.5		40.5	40.5
2.2.5	PACK FAC IND LAB						
2.2.6	PACK FAC IND LAB		470.4	470.4		470.4	470.4
2.2.7	IMMUT IND LABOR		65.8	65.8		65.8	65.8
2.2.8	GEOLGIC REC MOD IND LAB						
2.2.9	CASH TRANS MAINT LAB		46.1	46.1		46.1	46.1
2.2.10	LOCKWATER FAC IND LAB		22.3	22.3		22.3	22.3
2.2.11	PLU FROG IND LAB						
2.2.12	RECOVERY PLANT IND LAB						
2.3	MATERIAL SUP UTIL ECT		870.5	870.5		870.5	870.5
2.3.1	PORT REC FMS 4 PORT		2.1	2.1		2.1	2.1
2.3.2	WATER BASIN REC (HPORT)		218.6	218.6		218.6	218.6
2.3.3	WATER BASIN REC (EXPORT)						
2.3.4	WATER BASIN STOR		40.5	40.5		40.5	40.5
2.3.5	PACK OFFICE (2500)						
2.3.6	PACK OFFICE (2500)		470.4	470.4		470.4	470.4
2.3.7	IMMUT OFFICE		65.8	65.8		65.8	65.8
2.3.8	GEOLGIC REC OFFICE						
2.3.9	CASH TRANS		45.8	45.8		45.8	45.8
2.3.10	LOCKWATER FAC OFFICE		21.3	21.3		21.3	21.3
2.3.11	PLU FROG OFFICE						
2.3.12	RECOVERY PLANT OFFICE						
2.4	CONTRACTED SERVICES		371.6	371.6		371.6	371.6
2.4.1	SHIP ON		318.4	318.4		318.4	318.4
2.4.2	US PORT FEE		0.4	0.4		0.4	0.4
2.4.3	EXPORT PORT FEE STOR						
2.4.4	US RAIL (SF TO STOR)		17.2	17.2		17.2	17.2
2.4.5	EXPORT FRAIL TRANS						
2.4.6	US STORAGE (CHRG)		19.6	19.6		19.6	19.6
2.4.7	EXPORT STORC						
2.4.8	US RAIL (CP)						
2.4.9	EXPORT REC LAB						
2.4.10	EXPORT WASTE DIS						
2.4.11	US RAIL TRANS		15.7	15.7		15.7	15.7
2.4.12	EXPORT FRAIL TRANS						
2.4.13	EXPORT FRAIL TRANS						
2.4.14	US PORT FEE		0.3	0.3		0.3	0.3
2.4.15	EXPORT PORT FEE						
2.4.16	EXPORT PORT FEE						
2.4.17	SPECIFIC PORT FEE						
2.4.18	SPECIFIC PORT FEE						
2.4.19	FFC RAIL TRANS						
2.4.20	FFC RAIL TRANS						
2.5	TRUCK TRUST FUND		55.7	55.7		55.7	55.7

Section E3.31

Case: 20A

Description: SC baseline except geologic storage and location in mid Pacific

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from mid Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - geologic

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 6.546 billion dollars

Owners ROI - 21.6%

Service charge - \$201/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/10) 1201.669
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 123550.320

20A
Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.8	2.8	.8	4.6	2.2	7.6	.0	-
1979	.0	6.1	6.1	1.5	8.3	3.8	13.6	.0	-
1980	.0	7.6	7.6	2.5	10.5	4.8	17.8	.0	-
1981	.0	17.4	17.4	3.6	14.4	6.6	24.5	.0	-
1982	.0	35.5	35.5	5.1	20.3	9.4	34.7	.3	.5
1983	.0	46.0	46.0	6.3	26.1	12.1	44.5	.8	.9
1984	.0	57.1	57.1	7.6	30.9	14.4	52.9	1.6	2.6
1985	.0	77.7	77.7	19.6	34.7	16.3	70.5	2.7	4.5
1986	.0	95.1	95.1	20.5	35.7	17.0	73.2	8.7	14.2
1987	.0	113.6	113.6	63.3	39.1	19.0	121.4	.0	-
1988	.0	155.3	155.3	64.0	43.7	21.4	129.1	10.3	16.9
1989	.0	187.2	187.2	64.1	43.3	21.4	128.8	22.2	36.2
1990	.0	196.4	196.4	62.8	43.8	23.0	131.5	24.7	46.2
1991	.0	224.3	224.3	55.9	39.3	25.3	141.7	31.4	51.2
1992	.0	271.0	271.0	66.9	32.5	26.9	146.4	47.3	77.3
1993	.0	319.9	319.9	66.5	37.8	30.6	156.4	62.1	101.4
1994	.0	379.7	379.7	65.6	62.1	32.3	164.1	81.9	133.6
1995	.0	442.8	442.8	70.6	66.1	33.0	171.7	103.1	166.1
1996	.0	475.4	475.4	71.6	70.1	37.6	179.4	112.5	183.6
1997	.0	535.9	535.9	72.6	76.0	41.2	189.9	131.5	214.5
1998	.0	595.2	595.2	73.9	83.1	45.2	202.1	149.4	243.7
1999	.0	637.3	637.3	74.0	89.6	49.3	213.0	161.2	263.1
2000	.0	669.9	669.9	74.4	94.1	52.4	220.9	178.2	290.0
2001	.0	737.7	737.7	75.6	101.4	57.1	234.0	199.0	304.7
2002	.0	789.7	789.7	76.8	109.0	62.1	247.9	205.9	335.9
2003	.0	859.5	859.5	77.9	115.9	67.2	260.9	227.4	371.1
2004	.0	929.1	929.1	79.1	122.3	72.4	273.7	246.0	402.6
2005	.0	960.7	960.7	80.8	129.3	78.4	288.5	255.4	416.8
2006	.0	981.0	981.0	81.9	137.5	85.4	304.8	249.4	406.9
2007	.0	970.7	970.7	81.9	144.5	92.1	318.6	247.6	404.3
2008	.0	960.7	960.7	81.9	151.1	98.7	331.8	239.0	390.0
2009	.0	961.3	961.3	81.9	154.7	104.1	340.7	235.8	384.8
2010	.0	971.0	971.0	81.9	160.2	111.7	353.8	234.5	382.6
2011	.0	960.7	960.7	81.9	165.3	119.4	366.6	225.0	368.4
2012	.0	961.0	961.0	81.9	167.4	125.7	375.0	222.7	363.3
2013	.0	970.7	970.7	81.9	171.9	134.5	388.3	221.3	361.1
2014	.0	960.7	960.7	81.9	174.8	143.6	400.4	212.9	347.4
2015	.0	961.3	961.3	81.9	176.7	149.5	408.2	210.2	342.9
2016	.0	971.0	971.0	81.9	177.1	159.8	417.6	210.2	343.0
2017	.0	960.7	960.7	81.9	179.5	162.6	423.0	204.3	333.4
2018	.0	961.0	961.0	81.9	181.1	174.3	437.3	199.0	324.7
2019	.0	970.7	970.7	81.9	182.1	188.9	452.9	196.7	321.0
2020	.0	960.7	960.7	81.9	181.8	204.9	468.7	187.0	305.1
2021	.0	961.3	961.3	81.9	179.5	220.2	481.6	182.1	297.6
2022	.0	971.0	971.0	81.9	175.9	240.3	498.2	179.7	293.2
2023	.0	960.7	960.7	81.9	170.1	261.7	513.7	165.9	277.1
2024	.0	961.0	961.0	81.9	177.0	284.9	539.9	143.3	233.8
2025	.0	970.7	970.7	81.9	164.2	309.7	565.7	139.8	228.0
2026	.0	960.7	960.7	81.9	147.7	397.1	626.7	126.9	207.1
2027	.0	961.3	961.3	81.9	126.1	449.4	657.4	115.5	189.4
2028	.0	971.0	971.0	81.9	96.7	516.0	694.7	105.0	171.3
2029	.0	960.7	960.7	81.9	61.2	572.8	715.9	55.0	89.8
2030	.0	961.0	961.0	81.9	11.4	585.7	779.0	255.4	-34.6
TOTL	.0	33964.8	33964.8	3468.8	5451.3	6545.0	15465.2	1044.4	11456.0
FIN	.0	640.6	640.6	65.4	102.9	123.5	291.8	132.9	216.2
2010	.0	201.7	201.7	20.6	32.4	38.9	91.8	41.8	66.0

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				CHILDS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	3.8	69.1	- 65.3	- 65.3	- 25.0	- 25.0	- 26.4	- 26.4	- 26.4	- 26.4
1979	6.1	57.5	- 51.4	- 116.7	- 22.7	- 47.7	- 23.4	- 49.7	- 49.7	- 49.7
1980	7.6	36.0	- 28.4	- 145.2	- 17.1	- 64.8	- 17.6	- 67.3	- 67.3	- 67.3
1981	17.4	62.9	- 45.6	- 191.0	- 21.0	- 85.8	- 21.9	- 89.2	- 89.2	- 89.2
1982	35.3	94.2	- 58.7	- 250.5	- 20.8	- 107.1	- 22.1	- 111.3	- 111.3	- 111.3
1983	46.0	95.3	- 49.3	- 299.8	- 18.0	- 125.1	- 19.2	- 130.5	- 130.5	- 130.5
1984	57.1	81.1	- 24.0	- 323.8	- 9.3	- 134.4	- 10.3	- 140.8	- 140.8	- 140.8
1985	77.7	78.7	- 1.0	- 324.8	- 1.2	- 135.6	- 3.9	- 144.7	- 144.7	- 144.7
1986	96.1	40.2	55.9	- 268.9	21.8	- 113.8	21.5	- 123.3	- 123.3	- 123.3
1987	113.6	118.1	- 4.6	- 273.5	10.4	- 124.1	18.1	- 141.2	- 141.2	- 141.2
1988	156.3	137.0	19.3	- 254.2	10.1	- 114.0	9.3	- 131.9	- 131.9	- 131.9
1989	187.2	64.1	123.2	- 131.0	33.2	- 80.8	53.3	- 78.7	- 78.7	- 78.7
1990	196.4	166.4	29.9	- 101.1	43.7	- 37.1	43.5	- 35.2	- 35.2	- 35.2
1991	224.3	140.3	84.0	- 16.7	48.2	11.5	44.9	- 9.7	- 9.7	- 9.7
1992	271.0	109.3	161.6	94.5	63.5	112.5	82.9	92.6	92.6	92.6
1993	315.9	126.7	189.2	283.7	53.9	266.4	92.6	185.4	185.4	185.4
1994	379.7	143.9	235.8	519.5	132.8	399.2	131.9	317.3	317.3	317.3
1995	442.8	143.6	299.2	818.7	169.0	568.3	168.2	485.5	485.5	485.5
1996	475.4	147.2	328.2	1146.9	184.9	753.1	184.0	669.5	669.5	669.5
1997	535.7	177.7	358.0	1505.1	208.1	961.2	206.9	878.5	878.5	878.5
1998	595.0	198.6	396.4	1901.5	233.6	1194.9	232.3	1108.7	1108.7	1108.7
1999	637.3	192.3	444.9	2346.4	257.2	1452.1	256.1	1364.8	1364.8	1364.8
2000	669.9	166.5	503.5	2850.1	294.7	1746.8	293.9	1658.7	1658.7	1658.7
2001	737.7	210.8	527.7	3377.8	316.9	2063.7	315.5	1974.2	1974.2	1974.2
2002	789.7	222.1	567.6	3945.4	327.2	2390.9	325.7	2299.9	2299.9	2299.9
2003	859.5	213.6	645.8	4591.2	367.8	2758.7	366.3	2666.1	2666.1	2666.1
2004	922.1	213.5	708.6	5299.8	401.3	3160.0	400.1	3066.2	3066.2	3066.2
2005	960.7	223.5	737.2	6037.0	412.8	3572.8	411.3	3477.5	3477.5	3477.5
2006	981.6	223.5	758.1	6795.1	398.0	3970.8	396.5	3874.0	3874.0	3874.0
2007	970.7	243.4	727.3	7522.4	401.0	4371.8	399.8	4273.8	4273.8	4273.8
2008	960.7	243.4	717.3	8239.7	398.9	4770.7	397.3	4671.7	4671.7	4671.7
2009	951.3	204.6	746.7	8986.4	396.9	5167.6	395.3	5077.9	5077.9	5077.9
2010	971.8	241.8	730.0	9716.4	392.9	5560.5	392.9	5469.9	5469.9	5469.9
2011	968.7	242.9	725.8	10442.2	378.3	5938.8	376.7	5863.2	5863.2	5863.2
2012	961.6	209.9	751.7	11193.9	376.0	6314.8	373.7	6240.9	6240.9	6240.9
2013	970.7	254.8	715.9	11909.8	360.4	6675.2	359.7	6600.6	6600.6	6600.6
2014	968.7	242.1	726.6	12636.4	351.0	7026.2	350.0	6950.6	6950.6	6950.6
2015	961.3	248.3	713.0	13349.4	351.7	7377.9	351.3	7301.9	7301.9	7301.9
2016	971.0	218.9	752.1	14101.5	356.6	7734.5	356.7	7658.6	7658.6	7658.6
2017	960.7	231.4	729.3	14830.8	347.1	8081.6	346.9	7991.3	7991.3	7991.3
2018	951.6	240.0	711.6	15542.4	338.0	8419.6	338.0	8229.3	8229.3	8229.3
2019	970.7	248.3	722.4	16264.8	337.9	8757.5	337.7	8567.0	8567.0	8567.0
2020	960.7	253.1	707.7	17002.5	319.9	9077.4	319.9	8886.9	8886.9	8886.9
2021	961.3	247.0	714.3	17716.8	313.4	9390.8	313.8	9199.7	9199.7	9199.7
2022	971.8	222.1	749.7	18466.5	305.9	9696.7	306.0	9505.7	9505.7	9505.7
2023	960.7	221.2	739.5	19206.0	288.2	9984.9	289.2	9796.4	9796.4	9796.4
2024	961.6	475.5	486.1	19692.1	185.4	10170.3	184.2	10040.6	10040.6	10040.6
2025	970.7	234.8	735.9	20428.0	246.6	10416.9	246.7	10287.3	10287.3	10287.3
2026	968.7	244.6	724.1	21152.1	218.7	10635.6	221.5	10518.8	10518.8	10518.8
2027	961.3	249.6	711.7	21863.8	194.8	10830.4	196.4	10709.2	10709.2	10709.2
2028	971.8	223.9	747.9	22611.7	177.5	10997.9	182.4	10891.6	10891.6	10891.6
2029	960.7	243.1	717.6	23329.3	160.2	11158.1	166.1	11057.7	11057.7	11057.7
2030	961.6	248.3	713.7	24043.0	424.7	11582.8	443.0	11440.7	11440.7	11440.7

20A
Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	23.3	*	46.1	.9	45.5	21.5
1979	56.0	*	118.3	1.6	62.5	37.4
1980	33.6	*	147.0	2.2	164.4	44.8
1981	59.4	*	139.9	3.0	143.3	59.5
1982	59.1	*	279.6	4.2	261.6	62.0
1983	69.0	*	356.6	5.4	303.8	102.1
1984	73.5	*	415.7	6.4	307.1	115.1
1985	59.1	*	458.6	9.6	344.2	123.4
1986	19.7	*	461.3	9.4	354.6	116.1
1987	54.8	*	497.1	17.1	387.9	126.3
1988	73.1	*	548.8	17.9	432.8	133.9
1989	.0	*	527.3	17.9	422.3	116.9
1990	43.7	*	548.0	18.1	432.5	113.7
1991	74.4	*	536.9	19.4	466.3	120.6
1992	42.4	*	612.3	19.9	517.9	114.3
1993	90.2	*	672.5	21.1	576.7	122.9
1994	74.4	*	714.4	21.9	611.7	124.6
1995	73.1	*	732.4	22.8	630.6	124.5
1996	75.7	*	736.4	23.6	636.0	124.1
1997	105.0	*	854.3	24.8	747.4	131.7
1998	134.3	*	933.8	26.1	815.8	143.2
1999	118.3	*	1602.8	27.3	888.0	150.1
2000	38.0	*	1642.5	28.1	923.5	147.0
2001	134.4	*	1119.8	29.5	993.0	156.3
2002	145.3	*	1203.1	31.0	1067.6	166.5
2003	135.7	*	1271.6	32.3	1132.6	171.3
2004	134.4	*	1333.7	33.6	1193.4	173.9
2005	143.7	*	1484.0	35.0	1259.7	179.3
2006	171.6	*	1430.2	36.6	1337.1	185.7
2007	161.2	*	1559.2	37.7	1402.8	194.1
2008	161.5	*	1632.0	38.8	1464.5	196.3
2009	132.7	*	1640.5	39.4	1495.2	184.8
2010	159.9	*	1688.8	40.4	1544.7	184.5
2011	160.9	*	1739.3	41.2	1588.3	183.1
2012	137.9	*	1732.5	41.6	1603.3	178.8
2013	172.9	*	1771.0	42.3	1641.1	172.2
2014	160.2	*	1787.5	42.8	1661.2	169.1
2015	158.6	*	1796.6	43.1	1678.9	168.7
2016	137.0	*	1774.8	43.2	1671.0	147.6
2017	169.3	*	1781.8	43.4	1691.6	133.6
2018	173.1	*	1765.5	43.8	1709.2	120.2
2019	166.4	*	1763.0	44.0	1763.5	162.5
2020	171.1	*	1729.2	44.0	1694.5	88.7
2021	155.1	*	1673.5	43.4	1645.1	71.9
2022	170.2	*	1603.4	43.6	1567.6	58.6
2023	169.3	*	1510.9	42.8	1566.4	46.5
2024	393.6	*	1579.6	43.2	1526.6	96.1
2025	172.9	*	1395.8	41.8	1361.3	75.5
2026	172.6	*	1171.3	38.3	1148.5	51.1
2027	167.7	*	889.6	34.7	873.2	51.1
2028	166.2	*	514.5	25.8	504.3	40.6
2029	166.4	*	1.9	23.8	2.1	23.6
2030	166.4	*	1.6	15.5	1.8	15.3

TOTAL CAPITAL INVESTMENT 6546.6

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Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	68.32001	22.85002	22.54559	26.35423
1979	124.32	41.80003	41.02559	49.74745
1980	157.88	53.4801	52.10039	67.34192
1981	217.25	73.9101	71.69249	89.2207
1982	306.3899	104.56	101.1087	111.2869
1983	395.4197	135.5698	130.4885	130.4796
1984	468.9495	161.8799	154.7533	140.8063
1985	528.0593	183.8501	174.2596	144.6631
1986	547.7693	193.1704	180.7639	144.6631
1987	602.5791	214.6604	198.8511	162.727
1988	675.6389	242.8403	222.9608	162.727
1989	675.6389	247.3105	222.9608	162.727
1990	719.3188	266.8508	237.3752	162.727
1991	793.6787	297.3611	261.9138	162.727
1992	806.0586	318.1111	275.8992	162.727
1993	926.2786	355.5913	305.6719	162.727
1994	1000.638	388.9414	330.2104	162.727
1995	1073.698	423.0613	354.3203	162.727
1996	1149.358	459.4014	379.2881	162.727
1997	1254.398	507.0413	413.9512	162.727
1998	1379.198	562.3811	455.135	162.727
1999	1497.498	617.541	494.1741	162.727
2000	1589.537	666.011	524.5471	162.727
2001	1723.957	730.9211	568.9058	162.727
2002	1869.297	801.7112	616.8679	162.727
2003	2005.017	872.3811	661.6555	162.727
2004	2139.437	946.062	706.0142	162.727
2005	2288.157	1028.462	755.0916	162.727
2006	2459.757	1122.682	811.7195	162.727
2007	2620.957	1218.132	864.9155	162.727
2008	2782.417	1317.902	918.1973	162.727
2009	2905.137	1409.933	958.6951	162.727
2010	3065.037	1520.363	1011.462	162.727
2011	3225.977	1637.633	1064.572	162.727
2012	3353.896	1750.614	1106.786	162.727
2013	3526.796	1865.723	1163.843	162.727
2014	3686.956	2025.793	1216.695	162.727
2015	3845.556	2166.613	1269.033	162.727
2016	3982.576	2311.614	1314.25	162.727
2017	4152.094	2460.492	1370.191	162.727
2018	4330.191	2621.019	1428.963	162.727
2019	4496.59	2793.088	1483.875	162.727
2020	4667.707	2983.235	1540.343	162.727
2021	4832.805	3187.673	1594.825	162.727
2022	5003.004	3415.253	1650.991	162.727
2023	5172.262	3665.851	1706.846	162.727
2024	5365.859	4039.238	1836.733	162.727
2025	5738.758	4377.445	1893.79	162.727
2026	5911.395	4762.871	1950.76	162.727
2027	6079.094	5205.883	2006.101	162.727
2028	6220.012	5715.699	2052.604	162.727
2029	6380.168	6372.074	2105.455	162.727
2030	6546.566	6544.742	2160.367	162.727

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Cost Summary - Dollars in Millions

WBS		COMMITTED COST			FINANCED COST		
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	TOTAL
0.0	TOTAL	6,546.8	3,468.1	10,014.7	6,546.6	3,468.0	10,014.6
1.0	CAPITAL ITEMS	6,546.8		6,546.8	6,546.6		6,546.6
1.1	SYSTEM FACILITIES-EQUIPMENT	4,600.9		4,600.9	4,600.9		4,600.9
1.1.1	SHIP	180.0		180.0	180.0		180.0
1.1.2	CASEN	265.0		265.0	265.0		265.0
1.1.3	CASEN TRANSPORTER/RAIL CAR	19.8		19.8	19.8		19.8
1.1.4	RAIL CAR TUG	0.8		0.8	0.8		0.8
1.1.5	CASEN TRANSPORTER						
1.1.6	SEAPORT FAC	1.0		1.0	1.0		1.0
1.1.7	LATER BASIN 4 PORT	48.0		48.0	48.0		48.0
1.1.8	LATER BASIN 2 PORT						
1.1.9	LATER BASIN STORAGE	24.0		24.0	24.0		24.0
1.1.10	RECOVERING FACILITY						
1.1.11	RECOVERING FAC	116.0		116.0	116.0		116.0
1.1.12	CONCRETE	1,105.6		1,105.6	1,105.6		1,105.6
1.1.13	DISPLACEMENT TRANS.	24.0		24.0	24.0		24.0
1.1.14	HAULT MODULE						
1.1.15	ECOLOGIC REC MOD	67.0		67.0	67.0		67.0
1.1.16	REPOSITORY STORAGE MOD	2,622.0		2,622.0	2,622.0		2,622.0
1.1.17	CPA	32.7		32.7	32.7		32.7
1.1.18	LOCK/INTER FAC	75.0		75.0	75.0		75.0
1.1.19	PLN PROC FAC						
1.1.20	RECOVERY FAC						
1.2	SUPPORT FACILITIES EQUIPMENT	5.4		5.4	5.4		5.4
1.2.1	ADM BLD & FLT YD	1.4		1.4	1.4		1.4
1.2.2	WAREHOUSE & YLT	4.0		4.0	4.0		4.0
1.3	CHIEFS COST	670.1		670.1	670.1		670.1
1.4	INTEREST DURING CON	670.1		670.1	670.1		670.1
2.0	OPER & MAINT		3,468.1	3,468.1			3,468.1
2.1	DIRECT LABOR		655.3	655.3			655.3
2.1.1	PORT & REC TRANS		5.1	5.1			5.1
2.1.2	WATER BASIN REC (PORT)		145.8	145.8			145.8
2.1.3	WATER BASIN REC (PORT)						
2.1.4	WATER BASIN STOR		27.1	27.1			27.1
2.1.5	PLN PROC LABOR						
2.1.6	PLN PROC LABOR		313.7	313.7			313.7
2.1.7	HAULT DISPLACEMENT LABOR						
2.1.8	ECOLOGIC REC MOD LABOR		119.2	119.2			119.2
2.1.9	CPA TRANS MAINT LAB		34.0	34.0			34.0
2.1.10	PLN PROC LABOR		14.5	14.5			14.5
2.1.11	RECOVERY PLANT LAB						
2.2	INDIRECT LABOR		987.9	987.9			987.9
2.2.1	PORT & REC TRANS LAB		8.1	8.1			8.1
2.2.2	W.B. REC (PORT) LAB		218.6	218.6			218.6
2.2.3	W.B. REC (PORT) LAB						
2.2.4	W.B. STOP IND LAB		40.5	40.5			40.5
2.2.5	PLN PROC IND LAB						
2.2.6	PLN PROC IND LAB		478.4	478.4			478.4
2.2.7	HAULT IND LABOR						
2.2.8	ECOLOGIC REC MOD LAB		178.1	178.1			178.1
2.2.9	CASEN TRANS MAINT LAB		50.9	50.9			50.9
2.2.10	PLN PROC IND LAB		21.3	21.3			21.3
2.2.11	PLN PROC IND LAB						
2.2.12	REC PLANT IND LAB						
2.3	MATERIAL SUP UTIL ECT		987.8	987.8			987.8
2.3.1	PORT REC FNS		8.1	8.1			8.1
2.3.2	W.B. REC CPNS 4 PORT		218.6	218.6			218.6
2.3.3	W.B. REC CPNS 2 PORT						
2.3.4	W.B. STORAGE CPNS		40.5	40.5			40.5
2.3.5	PLN PROC CPNS						
2.3.6	PLN PROC CPNS		470.4	470.4			470.4
2.3.7	HAULT CPNS						
2.3.8	ECOLOGIC REC CPNS		178.1	178.1			178.1
2.3.9	CPA TRANS		50.7	50.7			50.7
2.3.10	PLN PROC CPNS		21.3	21.3			21.3
2.3.11	PLN PROCESSING CPNS						
2.3.12	RECOVERY PLANT CPNS						
2.4	CONTRACTED SERVICES		820.6	820.6			820.6
2.4.1	SHIP ON		344.0	344.0			344.0
2.4.2	US PORT FEE		0.4	0.4			0.4
2.4.3	EUROPE PORT FEE STOR						
2.4.4	US PORT FEE TO STOR		17.2	17.2			17.2
2.4.5	EUROPE PORT TRANS						
2.4.6	US STOP/TIME CHRG		19.6	19.6			19.6
2.4.7	EUROPE STOR						
2.4.8	US REC/CP						
2.4.9	EUROPE REC CP						
2.4.10	EUROPE WASTE DIS						
2.4.11	US RAIL TRANS		15.7	15.7			15.7
2.4.12	EUROPE RAIL TRANS						
2.4.13	EUROPE RAIL TRANS						
2.4.14	US PORT FEE		0.3	0.3			0.3
2.4.15	EUROPE PORT FEE						
2.4.16	PACIFIC PORT FEE		66.1	66.1			66.1
2.4.17	PACIFIC PORT FEE						
2.4.18	PACIFIC PORT FEE		337.3	337.3			337.3
2.4.19	PACIFIC PORT FEE						
2.4.20	PACIFIC PORT FEE						
2.4.21	PACIFIC PORT FEE						
2.5	DECON TRUST FUND		12.4	12.4			12.4

Section E3.32

Case: 27A

Description: SC baseline except finance rate 7% and no taxes (tax free private enterprise)

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 8.197 billion dollars

Owners ROI - 21.7%

Service charge - \$159/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/10) 4155.945
 RATE OF RETURN ON INVESTMENT 15.95%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 415787.850

27A

Yearly Profit and Loss Statement

YEAR	REP FEE/REVENUE	SEMI CH FEE/REVENUE	TOTAL FEE/REVENUE	OPER EXPENSE	INT EXPENSE	DEP EXPENSE	TOTAL EXPENSE	TOTAL	NET INCOME
1978	.0	2.2	2.2	1.1	3.4	3.4	7.9	.0	-4.7
1979	.0	4.8	4.8	1.9	7.8	7.9	16.6	.0	-6.8
1980	.0	6.0	6.0	2.8	7.2	7.1	17.1	.0	-5.1
1981	.0	13.7	13.7	3.9	10.5	7.2	21.6	.0	-6.0
1982	.0	28.0	28.0	5.5	14.7	10.2	30.4	.0	-2.1
1983	.0	38.3	38.3	8.7	18.6	13.0	39.3	.0	2.0
1984	.0	45.0	45.0	8.0	21.7	15.3	45.0	.0	.1
1985	.0	61.2	61.2	19.7	24.8	17.2	60.9	.0	.2
1986	.0	75.8	75.8	20.3	25.2	18.6	64.0	.0	11.7
1987	.0	89.5	89.5	23.0	27.5	20.8	71.3	.0	13.2
1988	.0	123.2	123.2	33.4	28.7	22.1	84.2	.0	17.0
1989	.0	147.6	147.6	33.3	28.4	22.4	84.1	.0	14.0
1990	.0	154.8	154.8	33.3	31.3	23.5	88.1	.0	12.7
1991	.0	178.7	178.7	36.2	31.8	26.5	94.5	.0	22.2
1992	.0	213.5	213.5	36.6	35.1	30.0	101.7	.0	31.6
1993	.0	252.1	252.1	37.1	37.5	33.1	107.7	.0	44.4
1994	.0	299.2	299.2	37.5	40.5	36.7	114.7	.0	54.0
1995	.0	349.0	349.0	38.0	46.6	33.3	117.9	.0	61.1
1996	.0	374.7	374.7	38.8	49.4	36.9	125.1	.0	61.6
1997	.0	422.3	422.3	39.6	52.1	33.6	125.3	.0	62.0
1998	.0	469.1	469.1	39.9	52.6	37.7	129.2	.0	62.8
1999	.0	502.2	502.2	39.1	64.1	34.5	137.7	.0	61.6
2000	.0	543.7	543.7	39.3	62.6	30.7	132.6	.0	61.1
2001	.0	597.1	597.1	39.9	67.1	37.2	144.2	.0	62.9
2002	.0	622.3	622.3	40.6	76.0	36.1	152.7	.0	60.6
2003	.0	677.3	677.3	41.3	100.2	105.1	246.6	.0	-10.6
2004	.0	727.5	727.5	42.0	104.2	112.5	258.7	.0	-43.2
2005	.0	757.1	757.1	42.6	110.0	122.9	275.5	.0	-60.6
2006	.0	757.4	757.4	43.2	116.9	133.3	313.3	.0	-111.6
2007	.0	765.0	765.0	43.2	122.2	139.0	304.4	.0	-100.5
2008	.0	757.1	757.1	43.3	124.1	145.2	312.6	.0	-124.5
2009	.0	757.6	757.6	43.4	128.3	155.4	327.1	.0	-110.0
2010	.0	765.2	765.2	43.4	132.7	163.6	339.7	.0	-105.4
2011	.0	757.1	757.1	43.4	136.9	174.6	354.9	.0	-122.2
2012	.0	757.4	757.4	43.4	139.9	183.7	367.1	.0	-120.3
2013	.0	765.0	765.0	43.5	139.5	189.6	372.6	.0	-122.4
2014	.0	757.1	757.1	43.7	141.6	200.4	385.7	.0	-131.4
2015	.0	757.6	757.6	43.6	143.0	206.4	392.0	.0	-134.4
2016	.0	765.2	765.2	43.9	144.2	219.4	407.5	.0	-137.6
2017	.0	757.1	757.1	44.0	142.2	221.2	407.4	.0	-129.7
2018	.0	757.4	757.4	44.1	143.7	237.4	425.2	.0	-141.1
2019	.0	765.0	765.0	44.3	143.4	242.8	429.5	.0	-138.6
2020	.0	757.1	757.1	44.4	141.7	258.9	445.0	.0	-132.1
2021	.0	757.6	757.6	44.5	139.3	268.7	442.5	.0	-135.0
2022	.0	765.2	765.2	44.2	132.9	280.1	457.2	.0	-136.0
2023	.0	757.1	757.1	44.4	126.7	321.6	512.7	.0	-134.3
2024	.0	757.4	757.4	44.5	117.5	341.5	523.5	.0	-133.8
2025	.0	765.0	765.0	44.6	109.6	375.6	530.1	.0	-125.1
2026	.0	757.1	757.1	44.7	100.3	424.7	570.0	.0	-167.6
2027	.0	757.6	757.6	44.9	84.1	462.0	591.0	.0	-188.3
2028	.0	765.2	765.2	45.0	68.3	567.7	681.0	.0	-277.8
2029	.0	757.1	757.1	45.1	46.3	769.1	860.5	.0	-458.3
2030	.0	757.4	757.4	45.3	12.8	888.8	946.9	.0	-611.1
TOTAL	.0	26766.7	26766.7	2781.7	4225.6	6197.1	13204.4	.0	11562.1
N/C	.0	505.0	505.0	52.5	79.7	154.7	286.9	.0	218.2
SE/1.0	.0	158.9	158.9	16.5	25.1	48.7	90.3	.0	68.7

Yearly Cash Statement

UNFINANCED ENTERPRISE BEFORE TAX:				FINANCED ENTERPRISE AFTER TAX:				OWNERS	
YEAR	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	CUM
1978	2.2	73.1	- 71.0	- 71.0	- 26.6	- 26.6	- 27.4	- 27.4	- 27.4
1979	4.8	54.1	- 49.3	- 120.3	- 20.9	- 47.6	- 21.5	- 48.8	- 48.8
1980	6.0	48.3	- 42.4	- 162.6	- 17.8	- 65.4	- 18.3	- 67.1	- 67.1
1981	13.7	70.7	- 57.0	- 211.7	- 24.4	- 89.8	- 25.1	- 92.2	- 92.2
1982	28.0	97.7	- 69.7	- 281.3	- 35.0	- 124.9	- 36.0	- 128.2	- 128.2
1983	36.3	92.1	- 55.8	- 337.1	- 20.3	- 145.2	- 21.2	- 149.4	- 149.4
1984	45.0	78.2	- 33.2	- 370.3	- 11.6	- 156.8	- 12.4	- 161.8	- 161.8
1985	61.2	74.9	- 13.7	- 384.0	- 5.2	- 162.0	- 7.8	- 169.6	- 169.6
1986	73.8	53.2	22.5	- 361.4	14.2	- 147.9	13.9	- 155.5	- 155.5
1987	89.5	111.4	- 21.9	- 383.3	17.8	- 130.1	24.0	- 130.1	- 130.1
1988	123.2	89.6	33.6	- 349.8	20.8	- 109.3	20.7	- 109.3	- 109.3
1989	147.6	60.5	87.1	- 262.7	54.6	- 54.6	54.7	- 54.7	- 54.7
1990	154.8	128.8	27.9	- 234.7	30.6	- 24.0	30.1	- 24.0	- 24.0
1991	176.7	122.2	54.5	- 180.2	70.3	25.6	70.0	11.0	11.0
1992	213.5	109.9	103.6	- 76.6	162.6	108.4	82.2	93.1	93.1
1993	252.1	126.3	125.8	49.2	121.0	229.9	121.0	214.1	214.1
1994	299.2	142.1	157.1	216.3	158.1	388.0	157.3	371.6	371.6
1995	349.8	211.5	137.5	353.8	175.5	563.5	174.4	546.0	546.0
1996	374.7	143.6	231.1	585.0	218.0	781.5	217.4	763.4	763.4
1997	422.3	213.1	209.3	794.3	233.1	1014.5	232.0	995.4	995.4
1998	469.1	169.2	299.9	1094.2	266.2	1280.8	267.6	1263.0	1263.0
1999	502.2	215.4	286.8	1381.0	297.7	1578.5	296.7	1572.7	1572.7
2000	545.7	308.3	237.4	1618.4	280.1	1858.6	277.0	1851.7	1851.7
2001	597.1	209.8	387.3	1911.7	360.1	2218.7	359.2	2210.9	2210.9
2002	622.3	310.7	311.6	2223.3	336.8	2555.5	335.2	2545.1	2545.1
2003	677.3	218.6	458.7	2682.0	412.0	2967.5	411.5	2962.6	2962.6
2004	727.5	324.6	402.9	3084.9	450.1	3417.6	449.3	3411.9	3411.9
2005	757.1	266.9	490.2	3575.1	444.3	3861.9	443.1	3857.1	3857.1
2006	757.4	290.7	466.6	4041.7	438.0	4299.9	438.2	4298.3	4298.3
2007	765.0	284.3	480.7	4522.4	432.6	4732.5	431.7	4730.6	4730.6
2008	757.1	214.4	542.7	5065.1	440.8	5173.3	439.6	5169.9	5169.9
2009	757.6	283.2	474.4	5539.5	464.8	5638.1	464.0	5638.1	5638.1
2010	765.2	278.0	487.2	6026.7	463.8	6101.9	463.1	6102.4	6102.4
2011	757.1	292.6	464.5	6491.3	377.6	6479.5	376.9	6479.2	6479.2
2012	757.4	283.2	474.1	6965.4	378.4	6857.9	378.9	6859.1	6859.1
2013	765.0	219.6	545.4	7510.8	392.7	7250.6	392.8	7251.9	7251.9
2014	757.1	265.0	492.1	7999.9	351.5	7602.1	351.1	7599.0	7599.0
2015	757.6	282.3	475.3	8475.2	349.5	7951.6	349.3	7952.3	7952.3
2016	765.2	223.7	541.5	8996.7	343.2	8294.8	343.0	8295.3	8295.3
2017	757.1	231.4	525.7	9522.4	356.3	8651.1	356.6	8651.6	8651.6
2018	757.4	384.7	372.6	9895.1	317.0	8968.1	316.7	8968.6	8968.6
2019	765.0	223.4	541.6	10436.7	317.1	9285.2	317.2	9287.9	9287.9
2020	757.1	279.0	478.1	10914.8	297.9	9583.1	298.1	9583.9	9583.9
2021	757.6	285.6	472.0	11386.8	279.5	9862.6	279.9	9863.7	9863.7
2022	765.2	326.8	438.4	11825.2	300.2	10162.8	301.3	10164.0	10164.0
2023	757.1	332.7	424.4	12249.6	267.0	10430.0	268.0	10432.0	10432.0
2024	757.4	222.4	535.0	12784.6	263.2	10693.2	264.8	10697.8	10697.8
2025	765.0	284.4	480.5	13265.1	226.8	10919.9	228.1	10922.9	10922.9
2026	757.1	300.4	456.7	13721.8	179.1	11099.0	180.6	11099.6	11099.6
2027	757.6	220.9	536.7	14258.5	179.2	11278.2	181.8	11280.4	11280.4
2028	765.2	291.3	473.9	14732.4	91.4	11369.6	94.0	11374.4	11374.4
2029	757.1	291.7	465.4	15197.8	56.0	11425.6	58.4	11484.0	11484.0
2030	757.4	286.4	471.0	15668.8	423.5	11849.1	429.0	11919.0	11919.0

RATE OF RETURN TO ENTERPRISE OWNER 21.76%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 22.21%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	CAREERS EQUITY
1978	72.0	"	69.6	1.8	47.7	22.6
1979	52.3	"	117.9	1.3	81.9	37.3
1980	37.5	"	150.4	1.7	105.9	46.2
1981	66.8	"	210.0	2.4	149.0	63.4
1982	92.2	"	291.9	3.4	206.4	86.9
1983	85.4	"	364.4	4.2	262.3	106.1
1984	70.2	"	419.2	4.9	305.7	118.5
1985	55.2	"	457.2	7.3	338.1	126.4
1986	33.0	"	471.6	7.6	355.0	124.2
1987	56.4	"	507.2	13.7	366.3	134.4
1988	34.2	"	519.3	14.0	382.5	130.8
1989	5.2	"	502.1	13.9	398.4	117.7
1990	71.5	"	548.2	14.4	437.3	125.2
1991	26.0	"	547.7	14.7	444.9	117.5
1992	63.2	"	600.9	15.3	489.0	127.1
1993	69.3	"	637.0	15.8	522.2	130.6
1994	84.5	"	664.9	16.3	563.6	137.6
1995	153.5	"	799.0	17.4	648.3	164.2
1996	84.6	"	832.9	18.0	684.5	166.3
1997	153.5	"	932.7	19.1	768.5	168.4
1998	189.2	"	984.2	19.8	810.4	193.6
1999	156.3	"	1076.0	20.5	885.0	211.5
2000	441.1	"	1436.4	23.7	1134.4	315.6
2001	149.9	"	1499.1	24.5	1204.3	319.3
2002	250.1	"	1651.1	26.1	1325.5	351.7
2003	107.4	"	1703.4	26.9	1379.3	351.0
2004	162.6	"	1733.5	27.7	1430.7	350.5
2005	226.3	"	1856.9	28.9	1517.7	368.2
2006	227.6	"	1951.2	28.0	1597.9	383.3
2007	221.1	"	2033.3	28.9	1672.1	392.1
2008	151.1	"	2039.2	31.2	1693.4	377.0
2009	219.8	"	2103.6	32.0	1752.6	383.1
2010	214.6	"	2154.6	32.7	1802.8	385.4
2011	229.1	"	2209.2	33.4	1851.9	390.7
2012	219.8	"	2245.3	33.9	1868.1	391.1
2013	156.1	"	2211.7	33.8	1874.9	370.7
2014	221.4	"	2232.7	34.2	1895.9	371.0
2015	218.5	"	2244.7	34.5	1913.1	366.1
2016	219.8	"	2243.1	34.7	1919.1	366.7
2017	167.4	"	2191.3	34.4	1891.8	333.9
2018	240.6	"	2194.5	34.6	1899.9	329.3
2019	221.1	"	2162.8	34.6	1860.7	316.7
2020	214.6	"	2169.5	34.4	1842.2	306.7
2021	221.1	"	2040.9	34.0	1785.1	285.8
2022	162.6	"	1903.4	32.9	1683.7	252.5
2023	168.2	"	1770.0	31.9	1573.8	228.8
2024	157.9	"	1566.3	30.3	1418.8	197.6
2025	219.8	"	1430.4	29.0	1274.7	164.6
2026	635.6	"	1241.4	27.5	1097.4	171.5
2027	156.1	"	931.5	24.8	824.0	132.3
2028	226.3	"	590.1	22.2	569.8	102.3
2029	226.6	"	47.5	18.6	34.6	31.4
2030	221.1	"	.0	13.0	.1	13.1

TOTAL CAPITAL INVESTMENT 8197.1

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	72.03	24.31001	23.7899	23.7899
1979	124.29	42.41003	41.01569	41.01569
1980	161.81	55.92	53.39729	53.39728
1981	229.6	79.09009	75.43799	75.43797
1982	320.7998	112.3999	105.8639	105.864
1983	406.1697	143.7	134.0426	134.0427
1984	476.3796	170.7002	157.2053	157.2054
1985	531.5696	193.4705	175.4245	175.4247
1986	584.5596	209.5906	186.3046	175.4246
1987	620.9595	234.4207	204.2166	194.0366
1988	655.2095	252.7209	216.2191	194.0366
1989	688.4094	261.5912	217.9351	194.0366
1990	731.9392	294.6011	241.5399	194.0366
1991	757.9392	313.0713	250.1199	194.0366
1992	841.1692	352.1416	377.5357	194.0366
1993	918.4092	383.2219	300.4348	194.0366
1994	994.939	431.312	328.3298	194.0366
1995	1148.399	500.1421	378.2714	194.0366
1996	1233.169	546.6423	406.5521	194.0366
1997	1386.649	623.1726	457.594	194.0366
1998	1499.679	663.4927	493.6399	194.0366
1999	1652.192	767.1626	545.8253	194.0366
2000	2093.253	948.2325	690.7751	194.0364
2001	2343.178	1038.874	740.2463	194.0364
2002	2493.265	1167.753	822.7783	194.0362
2003	2650.629	1271.313	874.707	194.0362
2004	2813.166	1382.443	928.3518	194.0362
2005	3009.478	1521.623	1005.026	194.0362
2006	3267.068	1669.124	1078.132	194.0362
2007	3488.157	1816.104	1151.092	194.0362
2008	3639.277	1945.853	1260.961	194.0362
2009	3859.067	2106.433	1273.492	194.036
2010	4073.657	2271.704	1344.307	194.0359
2011	4302.805	2450.952	1412.925	194.0358
2012	4522.594	2634.511	1492.456	194.0357
2013	4678.622	2803.759	1543.255	194.0357
2014	4900	3004.168	1617.	194.0356
2015	5118.468	3205.406	1689.101	194.0355
2016	5338.277	3412.225	1761.631	194.0355
2017	5505.656	3613.885	1816.866	194.0355
2018	5746.246	3846.395	1896.261	194.0352
2019	5967.336	4066.595	1969.221	194.0352
2020	6181.926	4339.695	2040.035	194.0352
2021	6403.016	4613.902	2112.995	194.0349
2022	6565.574	4881.844	2166.639	194.0349
2023	6753.812	5160.801	2228.758	194.0349
2024	6911.672	5492.879	2300.452	194.0349
2025	7131.461	5656.75	2353.262	194.0347
2026	7267.189	5869.738	2431.146	194.0346
2027	7322.168	5899.168	2462.645	194.0346
2028	7749.457	7239.684	2547.321	201.219
2029	7976.064	7941.363	2632.091	276.6804
2030	8197.094	8197.191	2705.041	276.6802

PRESENT VALUE OF CAPITAL INV AT RATE 2% 1M
438.0869
PRESENT VALUE OF CAPITAL INV AT RATE 2% 1M
835.946

15.95

10.

Cost Summary—Dollars in Millions

MDS		CAPITAL		COMMITTED COST	TOTAL		PRINCIPLE		FINANCED COST		TOTAL	
				OPERATIONS					INTEREST	OPERATIONS		
2.0	TOTAL	8,197.2	2,781.7	10,978.9	8,197.2	4,225.7	2,781.7	15,204.6				
2.0	CAPITAL ITEMS	8,197.2		8,197.2	8,197.2	4,225.7		12,422.9				
1.1	SYSTEM FACILITIES-EQUIPMENT	6,087.6		6,087.6	6,087.6	2,951.7		9,039.3				
1.1.1	SHIP	165.0		165.0	165.0	123.7		288.7				
1.1.2	CASH	243.0		243.0	243.0	113.9		356.9				
1.1.3	CASH TRANSPORTER RAIL CAR	19.0		19.0	19.0	7.2		26.2				
1.1.4	RAIL CAR TUG	0.8		0.8	0.8	0.3		1.1				
1.1.5	CASH TRANSPORTER											
1.1.6	SEAPORT FAC	1.0		1.0	1.0	1.0		1.9				
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	53.5		101.5				
1.1.8	WATER BASIN 2 PORT											
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	26.8		50.8				
1.1.10	PACKAGING FACILITY											
1.1.11	PACKAGING FAC	116.0		116.0	116.0	130.4		246.4				
1.1.12	CANNISTERS	1,017.5		1,017.5	1,017.5	508.1		1,525.6				
1.1.13	EMPLACEMENT TRAMS	30.0		30.0	30.0	15.2		45.2				
1.1.14	UNULT MODULE	4,303.4		4,303.4	4,303.4	1,887.4		6,110.8				
1.1.15	CECLOGIC REC MODULE											
1.1.16	REFUGITORY STORAGE MOD											
1.1.17	OPEN	44.9		44.9	44.9	50.1		95.0				
1.1.18	LOW-INTER FAC	73.0		73.0	73.0	84.3		157.3				
1.1.19	MLM PROC FAC											
1.1.20	RECOVERY FAC											
1.2	SUPPORT FACILITIES EQUIPMENT	5.4		5.4	5.4	5.1		10.5				
1.2.1	ADM BLD & FLT YD	1.4		1.4	1.4	1.3		2.7				
1.2.2	WAREHOUSE & ULT	4.0		4.0	4.0	3.8		7.8				
1.3	CHIEFS COST	1,051.7		1,051.7	1,051.7	634.1		1,685.8				
1.4	INTEREST DURING CONS	1,652.5		1,652.5	1,652.5	634.8		1,657.3				
2.0	OPER & MAINT		2,781.7	2,781.7			2,781.7	2,781.7				
2.1	DIRECT LABOR		281.0	281.0				281.0				
2.1.1	PORT & REC TRAMS		5.1	5.1				5.1				
2.1.2	WATER BASIN REC(4PORT)		145.8	145.8				145.8				
2.1.3	WATER BASIN REC(2PORT)											
2.1.4	WATER BASIN STOR		27.1	27.1				27.1				
2.1.5	PROG. FAC LABOR											
2.1.6	PROG. FAC LABOR		313.7	313.7				313.7				
2.1.7	UNULT ENFORCEMENT LABOR		44.0	44.0				44.0				
2.1.8	CECLOGIC REC MOD LABOR											
2.1.9	CASH TRAMS MAINT LAB		30.7	30.7				30.7				
2.1.10	LCI LM PROCES LABOR		14.5	14.5				14.5				
2.1.11	MLM PROC LABOR											
2.1.12	RECOVERY PLANT LAB											
2.2	INDIRECT LABOR		871.8	871.8				871.8				
2.2.1	PORT & REC TRAMS LAB		6.1	6.1				6.1				
2.2.2	W.B. REC(4PORT) I LAB		218.6	218.6				218.6				
2.2.3	W.B. REC(4PORT) I LAB											
2.2.4	W.B. STOR IND LAB		40.5	40.5				40.5				
2.2.5	PROG. FAC IND LAB											
2.2.6	PROG. FAC IND LAB		470.4	470.4				470.4				
2.2.7	UNULT IND LABOR		65.8	65.8				65.8				
2.2.8	CEO REC MOD IND LAB											
2.2.9	CASH TRAMS MAINT LAB		46.1	46.1				46.1				
2.2.10	LCI LM PROC IND LAB		22.3	22.3				22.3				
2.2.11	MLM PROC IND LAB											
2.2.12	REC PLANT IND LAB											
2.3	MATERIAL SUP UTIL ECT		671.7	671.7				671.7				
2.3.1	PORT REC FMS		8.1	8.1				8.1				
2.3.2	W.B. REC OPNS 4 PORT		218.6	218.6				218.6				
2.3.3	W.B. REC OPNS 2 PORT											
2.3.4	W.B. STORAGE OPNS		40.5	40.5				40.5				
2.3.5	PROG. OPNS(2000)											
2.3.6	PROG. OPNS(2000)		470.4	470.4				470.4				
2.3.7	UNULT OPNS		65.8	65.8				65.8				
2.3.8	CECLOGIC REC OPNS											
2.3.9	CASH TRAMS		47.0	47.0				47.0				
2.3.10	LCI LM PROC OPNS		21.3	21.3				21.3				
2.3.11	MLM PROCESSING OPNS											
2.3.12	RECOVERY PLANT OPNS											
2.4	CONTRACTED SERVICES		371.6	371.6				371.6				
2.4.1	SHIP CM		318.4	318.4				318.4				
2.4.2	US PORT FEE		0.4	0.4				0.4				
2.4.3	EUROPE PORT FEE STOP											
2.4.4	US FAIR(15 TO STOP)		17.2	17.2				17.2				
2.4.5	EUROPE FAIR TRAMS											
2.4.6	US STOP(TIME CHRG)		19.6	19.6				19.6				
2.4.7	EUROPE STOP											
2.4.8	US REC(15)											
2.4.9	EUROPE REC CR											
2.4.10	EUROPE WASTE DIS											
2.4.11	US FAIR TRANSP		15.7	15.7				15.7				
2.4.12	EUROPE FAIR TRANSP											
2.4.13	EUROPE FAIR TRANSP											
2.4.14	US PORT FEE		0.3	0.3				0.3				
2.4.15	EUROPE PORT FEE											
2.4.16	EUROPE PORT FEE											
2.4.17	PACIFIC PORT FEE											
2.4.18	PACIFIC PORT FEE											
2.4.19	FAIR FAIR TRANSP											
2.4.20	FAIR FAIR TRANSP											
2.4.21	FAIR FAIR TRANSP											
2.5	DECON TRUST FUND		65.7	65.7				65.7				

Section E3.33

Case: 33A

Description: SC baseline except finance rate 7% and no taxes

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 8.197 billion dollars

Owners ROI - 6.6%

Service charge - \$92 /Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YG) \$92.152
 RATE OF RETURN ON INVESTMENT 7.68%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$4539.773

33A

Yearly Profit and Loss Statement

YEAR	PEP REVENUE	SEPA CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	1.3	1.3	1.1	3.4	2.4	6.9	.0	5.6
1979	.0	2.8	2.8	1.9	5.8	3.9	11.6	.0	8.8
1980	.0	3.5	3.5	2.8	7.5	5.1	15.4	.0	11.9
1981	.0	7.9	7.9	3.9	18.2	7.2	21.6	.0	13.7
1982	.0	16.2	16.2	5.7	14.7	10.2	30.4	.0	14.2
1983	.0	21.8	21.8	6.7	18.6	13.0	38.2	.0	17.2
1984	.0	26.1	26.1	8.0	21.7	15.3	45.0	.0	18.9
1985	.0	35.5	35.5	19.7	24.0	17.2	60.9	.0	25.4
1986	.0	43.9	43.9	28.3	25.2	18.6	64.0	.0	28.1
1987	.0	51.9	51.9	35.0	27.3	20.8	103.3	.0	51.4
1988	.0	71.4	71.4	52.4	28.7	22.1	106.2	.0	34.8
1989	.0	85.6	85.6	52.3	28.4	22.4	106.1	.0	28.3
1990	.0	89.7	89.7	52.3	31.3	23.5	112.0	.0	22.3
1991	.0	182.5	182.5	56.2	31.8	26.5	114.5	.0	12.0
1992	.0	123.8	123.8	56.6	35.1	38.0	121.7	.0	2.1
1993	.0	146.2	146.2	57.1	37.5	33.1	127.6	.0	18.5
1994	.0	173.5	173.5	57.5	48.5	36.7	134.7	.0	38.7
1995	.0	282.3	282.3	58.8	46.6	43.3	148.0	.0	54.4
1996	.0	217.2	217.2	58.8	49.4	46.9	155.1	.0	62.1
1997	.0	244.8	244.8	59.6	55.1	53.6	168.3	.0	76.6
1998	.0	272.0	272.0	59.9	58.6	57.7	176.3	.0	95.7
1999	.0	291.2	291.2	59.1	64.1	64.5	187.6	.0	103.5
2000	.0	315.2	315.2	59.3	82.6	80.7	222.6	.0	92.6
2001	.0	346.2	346.2	59.9	87.1	87.2	234.3	.0	111.9
2002	.0	368.8	368.8	60.6	96.0	98.1	254.7	.0	106.1
2003	.0	392.7	392.7	61.3	108.2	105.1	266.5	.0	126.2
2004	.0	421.8	421.8	62.0	104.2	112.5	278.7	.0	143.1
2005	.0	439.0	439.0	62.6	118.8	122.9	296.3	.0	142.7
2006	.0	439.1	439.1	63.2	116.9	133.3	313.3	.0	125.8
2007	.0	443.5	443.5	63.2	122.2	139.8	324.4	.0	119.1
2008	.0	439.0	439.0	63.3	124.1	145.2	332.6	.0	106.4
2009	.0	439.2	439.2	63.4	128.9	155.4	347.6	.0	91.6
2010	.0	443.7	443.7	63.4	132.7	163.6	359.8	.0	83.9
2011	.0	439.0	439.0	63.4	136.9	174.6	374.9	.0	64.1
2012	.0	439.1	439.1	63.4	139.9	183.7	387.1	.0	52.8
2013	.0	443.5	443.5	63.5	139.5	189.6	392.6	.0	50.9
2014	.0	439.0	439.0	63.7	141.6	208.4	405.7	.0	33.2
2015	.0	439.2	439.2	63.8	143.0	206.4	413.2	.0	26.1
2016	.0	443.7	443.7	63.9	144.2	219.4	427.6	.0	16.1
2017	.0	439.0	439.0	64.0	142.2	221.2	427.4	.0	11.6
2018	.0	439.1	439.1	64.1	143.7	237.4	445.2	.0	6.1
2019	.0	443.5	443.5	64.3	143.4	252.8	460.4	.0	16.9
2020	.0	439.0	439.0	64.4	141.7	268.9	475.0	.0	26.1
2021	.0	439.2	439.2	64.5	139.9	288.7	492.6	.0	53.3
2022	.0	443.7	443.7	64.2	132.9	308.1	497.3	.0	73.8
2023	.0	439.0	439.0	64.4	126.7	321.6	512.8	.0	84.4
2024	.0	439.1	439.1	64.5	117.2	341.5	523.5	.0	106.4
2025	.0	443.5	443.5	64.6	109.6	375.6	549.9	.0	120.7
2026	.0	439.0	439.0	64.7	100.3	424.7	589.7	.0	175.7
2027	.0	439.2	439.2	64.9	84.1	466.0	615.0	.0	207.4
2028	.0	443.7	443.7	65.8	68.2	567.7	701.8	.0	441.6
2029	.0	439.0	439.0	65.1	46.3	769.1	880.6	.0	92.5
2030	.0	439.1	439.1	65.3	12.8	268.6	346.6	.0	314.1
TOTAL	.0	15518.6	15518.6	2781.7	4225.6	8127.1	15204.4	.0	314.1
AUG	.0	292.8	292.8	52.5	79.7	154.7	286.9	.0	5.9
88/AUG	.0	92.2	92.2	16.5	25.1	48.7	90.3	.0	1.9

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				GAREPS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	1.3	73.1	- 71.9	- 71.9	- 27.5	- 27.5	- 28.3	- 28.3	- 28.3	- 28.3
1979	2.8	54.1	- 51.3	- 123.2	- 22.9	- 50.5	- 22.5	- 51.8	- 51.8	- 51.8
1980	3.5	48.3	- 46.9	- 160.1	- 20.4	- 70.9	- 20.6	- 72.6	- 72.6	- 72.6
1981	7.9	78.7	- 62.8	- 222.9	- 30.2	- 101.0	- 30.9	- 103.4	- 103.4	- 103.4
1982	16.2	97.7	- 81.4	- 304.3	- 36.8	- 137.8	- 37.8	- 141.2	- 141.2	- 141.2
1983	21.0	98.1	- 77.0	- 375.3	- 35.5	- 173.4	- 36.4	- 177.6	- 177.6	- 177.6
1984	26.1	78.2	- 52.1	- 427.4	- 30.6	- 203.9	- 31.3	- 208.9	- 208.9	- 208.9
1985	35.5	74.9	- 39.4	- 466.8	- 30.9	- 234.9	- 33.3	- 242.2	- 242.2	- 242.2
1986	43.9	53.2	- 9.3	- 476.1	- 17.7	- 252.6	- 18.0	- 260.1	- 260.1	- 260.1
1987	51.9	111.4	- 59.5	- 535.6	- 55.4	- 308.0	- 61.6	- 321.7	- 321.7	- 321.7
1988	71.4	69.6	- 18.2	- 553.9	- 30.9	- 338.9	- 31.2	- 352.9	- 352.9	- 352.9
1989	85.6	60.5	- 25.1	- 528.8	- 7.4	- 346.3	- 7.3	- 360.3	- 360.3	- 360.3
1990	89.7	126.8	- 37.1	- 565.9	- 29.4	- 375.7	- 29.9	- 398.2	- 398.2	- 398.2
1991	182.5	82.2	- 20.3	- 545.6	- 4.0	- 379.8	- 4.3	- 394.4	- 394.4	- 394.4
1992	123.8	139.9	- 16.0	- 561.6	- 6.9	- 386.7	- 7.5	- 402.0	- 402.0	- 402.0
1993	146.2	126.3	- 19.9	- 541.8	- 15.5	- 371.2	- 15.1	- 386.9	- 386.9	- 386.9
1994	173.5	142.1	- 31.4	- 510.4	- 32.3	- 338.8	- 31.7	- 355.2	- 355.2	- 355.2
1995	282.3	211.5	- 9.1	- 519.5	- 28.8	- 318.0	- 27.7	- 327.4	- 327.4	- 327.4
1996	217.2	143.6	- 73.6	- 445.9	- 68.6	- 249.4	- 60.0	- 257.5	- 257.5	- 257.5
1997	244.8	213.1	- 31.8	- 414.1	- 55.6	- 193.8	- 54.5	- 215.0	- 215.0	- 215.0
1998	272.0	169.2	- 102.8	- 311.3	- 91.1	- 102.7	- 90.5	- 122.5	- 122.5	- 122.5
1999	291.2	215.4	- 75.3	- 235.5	- 86.4	- 16.3	- 85.6	- 36.9	- 36.9	- 36.9
2000	315.2	208.3	- 105.1	- 130.6	- 8.3	- 24.7	- 11.5	- 48.3	- 48.3	- 48.3
2001	346.2	209.8	- 136.4	- 267.0	- 109.1	- 84.4	- 108.3	- 59.9	- 59.9	- 59.9
2002	368.8	310.7	- 58.1	- 234.1	- 75.3	- 159.7	- 73.7	- 133.6	- 133.6	- 133.6
2003	392.7	218.6	- 174.0	- 60.1	- 127.7	- 287.4	- 126.9	- 260.5	- 260.5	- 260.5
2004	421.8	224.6	- 197.2	- 127.1	- 144.4	- 431.8	- 143.6	- 404.1	- 404.1	- 404.1
2005	439.0	288.9	- 150.0	- 277.1	- 126.2	- 558.0	- 125.0	- 529.1	- 529.1	- 529.1
2006	439.1	290.7	- 148.3	- 425.5	- 111.7	- 669.8	- 110.6	- 639.7	- 639.7	- 639.7
2007	443.5	284.3	- 159.3	- 584.7	- 111.1	- 780.9	- 110.2	- 750.0	- 750.0	- 750.0
2008	439.0	214.4	- 224.6	- 809.3	- 121.8	- 902.7	- 121.5	- 871.5	- 871.5	- 871.5
2009	439.2	223.2	- 156.8	- 966.1	- 86.4	- 989.1	- 85.6	- 957.1	- 957.1	- 957.1
2010	443.7	278.0	- 165.7	- 1131.8	- 82.2	- 1071.3	- 81.6	- 1038.6	- 1038.6	- 1038.6
2011	439.0	292.6	- 146.4	- 1278.2	- 59.4	- 1130.7	- 58.7	- 1097.3	- 1097.3	- 1097.3
2012	439.1	283.2	- 155.9	- 1434.3	- 52.1	- 1182.9	- 51.6	- 1149.0	- 1149.0	- 1149.0
2013	443.5	219.6	- 223.9	- 1658.2	- 71.3	- 1254.1	- 71.3	- 1228.3	- 1228.3	- 1228.3
2014	439.0	265.0	- 173.9	- 1832.1	- 33.3	- 1287.4	- 32.9	- 1253.2	- 1253.2	- 1253.2
2015	439.2	282.3	- 157.8	- 1989.9	- 31.2	- 1318.6	- 30.9	- 1284.1	- 1284.1	- 1284.1
2016	443.7	293.7	- 159.9	- 2149.8	- 21.7	- 1340.3	- 21.4	- 1305.6	- 1305.6	- 1305.6
2017	439.0	231.4	- 207.6	- 2357.4	- 38.1	- 1378.4	- 38.4	- 1344.0	- 1344.0	- 1344.0
2018	439.1	304.7	- 134.4	- 2491.8	- 1.3	- 1377.1	- 1.6	- 1342.5	- 1342.5	- 1342.5
2019	443.5	285.4	- 158.1	- 2650.0	- 4.3	- 1372.8	- 4.3	- 1338.2	- 1338.2	- 1338.2
2020	439.0	279.0	- 160.0	- 2790.0	- 20.3	- 1352.5	- 20.0	- 1318.1	- 1318.1	- 1318.1
2021	439.2	265.6	- 173.6	- 2963.6	- 38.9	- 1313.6	- 38.5	- 1279.7	- 1279.7	- 1279.7
2022	443.7	226.8	- 216.8	- 3180.4	- 21.4	- 1292.2	- 20.3	- 1259.4	- 1259.4	- 1259.4
2023	439.0	252.7	- 186.3	- 3366.7	- 51.1	- 1241.1	- 50.1	- 1209.2	- 1209.2	- 1209.2
2024	439.1	222.4	- 216.7	- 3583.4	- 55.0	- 1186.1	- 53.5	- 1155.7	- 1155.7	- 1155.7
2025	443.5	284.4	- 159.1	- 3742.5	- 94.6	- 1091.4	- 93.3	- 1062.4	- 1062.4	- 1062.4
2026	439.0	308.4	- 138.6	- 3881.1	- 139.1	- 952.4	- 137.5	- 924.9	- 924.9	- 924.9
2027	439.2	220.9	- 218.3	- 4099.4	- 139.2	- 813.2	- 136.5	- 786.4	- 786.4	- 786.4
2028	443.7	291.3	- 152.4	- 4251.8	- 230.2	- 583.0	- 227.6	- 560.8	- 560.8	- 560.8
2029	439.0	291.7	- 147.3	- 4399.1	- 374.2	- 208.8	- 370.5	- 190.3	- 190.3	- 190.3
2030	439.1	286.4	- 152.7	- 4551.8	- 105.2	- 314.0	- 110.6	- 301.0	- 301.0	- 301.0

RATE OF RETURN TO ENTERPRISE OWNER 6.62%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 7.86%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	N	FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	72.0	"	69.6	.8	47.7	22.6
1979	52.3	"	117.9	1.3	81.9	37.3
1980	37.5	"	128.4	1.7	105.9	46.2
1981	66.8	"	210.8	2.4	149.0	63.4
1982	92.2	"	291.9	3.4	208.4	86.9
1983	85.4	"	364.4	4.2	262.5	106.1
1984	70.2	"	419.2	4.9	305.7	118.5
1985	55.2	"	457.2	7.3	338.1	126.4
1986	33.0	"	471.6	7.6	355.0	124.2
1987	56.4	"	507.2	13.7	386.5	134.4
1988	34.2	"	519.3	14.0	402.5	138.8
1989	5.2	"	502.1	13.9	396.4	117.7
1990	71.5	"	548.2	14.4	437.3	122.2
1991	26.0	"	547.7	14.7	444.9	117.5
1992	83.2	"	600.9	15.3	489.0	127.1
1993	69.2	"	637.0	15.8	522.2	130.6
1994	84.5	"	684.9	16.3	563.6	137.6
1995	153.5	"	795.0	17.4	648.3	164.2
1996	94.8	"	832.9	18.0	684.5	166.3
1997	153.5	"	932.7	19.1	763.5	188.4
1998	109.2	"	984.2	19.8	810.4	193.6
1999	156.3	"	1076.0	20.5	865.0	211.5
2000	441.1	"	1436.4	23.7	1144.4	310.6
2001	149.9	"	1499.1	24.5	1204.3	319.3
2002	250.1	"	1651.1	26.1	1325.5	351.7
2003	157.4	"	1783.4	26.9	1379.3	351.0
2004	162.6	"	1753.5	27.7	1438.7	358.5
2005	226.3	"	1826.9	28.9	1517.7	368.2
2006	227.6	"	1921.2	28.8	1597.9	383.3
2007	221.1	"	2033.3	28.9	1672.1	392.1
2008	151.1	"	2039.2	31.2	1693.4	377.0
2009	219.8	"	2103.6	32.0	1752.6	383.0
2010	214.6	"	2154.6	32.7	1802.8	385.4
2011	229.1	"	2209.2	33.4	1851.9	390.7
2012	219.8	"	2245.3	33.9	1888.1	391.1
2013	156.1	"	2211.7	33.8	1874.9	378.7
2014	221.4	"	2232.7	34.2	1895.9	371.0
2015	218.5	"	2244.7	34.5	1913.1	366.1
2016	219.8	"	2245.1	34.7	1919.1	368.7
2017	167.4	"	2191.3	34.4	1891.8	333.9
2018	240.6	"	2194.5	34.6	1899.9	329.3
2019	221.1	"	2162.8	34.6	1868.7	316.7
2020	214.6	"	2108.5	34.4	1842.2	300.6
2021	221.1	"	2040.9	34.0	1789.1	285.8
2022	162.6	"	1903.4	32.9	1683.7	252.5
2023	188.2	"	1778.0	31.9	1573.0	228.8
2024	157.9	"	1566.3	28.3	1418.8	197.8
2025	219.8	"	1430.4	29.0	1274.7	184.8
2026	235.6	"	1241.4	27.5	1097.4	171.5
2027	156.1	"	931.5	24.8	824.0	132.9
2028	226.3	"	590.1	22.2	509.8	102.5
2029	226.6	"	47.5	18.6	34.6	31.4
2030	221.1	"	.0	13.0	.1	13.1

TOTAL CAPITAL INVESTMENT 0197.1

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	72.83	24.31001	23.7699	23.7699
1979	124.29	42.41883	41.81569	41.81569
1980	161.81	55.92	53.39729	53.39728
1981	228.6	75.59009	75.43799	75.43797
1982	320.7998	112.3999	105.8639	105.864
1983	406.1897	143.7	134.8426	134.8427
1984	476.3796	170.7802	157.2053	157.2054
1985	531.5696	193.4785	173.4245	173.4247
1986	564.5396	209.5906	186.3046	186.3047
1987	620.9595	224.4287	204.9166	204.9167
1988	655.2895	252.7209	216.2191	216.2192
1989	668.4094	261.9912	217.9351	217.9352
1990	731.9392	294.6811	241.5399	241.5401
1991	757.9392	313.0713	258.1129	258.1281
1992	841.1692	352.1416	277.5857	276.8977
1993	910.4092	388.2219	308.4348	280.8945
1994	994.939	431.312	328.3298	280.8943
1995	1148.399	508.1421	372.9714	288.894
1996	1233.189	548.6423	408.9221	288.8938
1997	1326.649	623.1726	457.594	288.8936
1998	1492.879	685.4927	493.6399	288.8933
1999	1652.198	767.1626	545.2253	288.8931
2000	2093.259	948.8325	698.7751	336.928
2001	2243.178	1038.874	748.2486	336.9277
2002	2493.268	1167.753	822.7783	336.9275
2003	2658.628	1271.313	874.787	336.9272
2004	2813.188	1382.443	928.3518	336.927
2005	3059.478	1521.823	1003.028	336.9268
2006	3267.068	1669.124	1078.132	336.9263
2007	3488.157	1816.184	1151.892	336.9263
2008	3659.277	1945.853	1208.961	336.926
2009	3859.067	2106.433	1273.492	336.9258
2010	4073.637	2271.784	1344.387	336.9255
2011	4302.885	2458.952	1419.925	349.1812
2012	4522.594	2634.511	1492.456	370.2097
2013	4678.652	2883.755	1543.955	370.7556
2014	4908	3084.188	1617.	418.9456
2015	5112.488	3285.486	1689.181	457.2266
2016	5338.277	3419.225	1761.631	513.9282
2017	5505.656	3613.885	1816.866	557.2629
2018	5746.246	3846.395	1896.261	636.6575
2019	5967.336	4086.595	1969.221	709.6169
2020	6181.926	4339.695	2048.835	788.4314
2021	6483.816	4613.982	2112.995	853.3909
2022	6565.574	4881.844	2166.639	907.0356
2023	6753.812	5180.881	2228.758	969.1548
2024	6911.672	5492.879	2280.252	1021.249
2025	7131.461	5856.75	2353.282	1093.779
2026	7267.189	6269.728	2431.146	1171.543
2027	7523.168	6699.168	2482.645	1223.843
2028	7749.437	7239.684	2557.321	1297.719
2029	7976.804	7941.363	2632.881	1372.48
2030	8197.894	8197.191	2765.841	1372.48

PRESENT VALUE OF CAPITAL INV AT RATE %, \$M
 1224.993
 PRESENT VALUE OF CAPITAL INV AT RATE %, \$M
 835.946

7.599998

18.

Cost Summary—Dollars in Millions

NBS		COMMITTED COST			FINANCED COST			TOTAL
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	
0.0	TOTAL	8,197.2	2,781.8	10,978.9	8,197.1	6,422.5	2,781.8	17,401.4
1.0	CAPITAL ITEMS	8,197.2		8,197.2	8,197.1	6,422.5		14,619.6
1.1	SYSTEM FACILITIES-EQUIPMENT	6,087.6		6,087.6	6,087.6	4,477.4		10,565.0
1.1.1	SHIP	165.0		165.0	165.0	199.0		364.0
1.1.2	CASH	243.0		243.0	243.0	172.2		415.2
1.1.3	CASH TRANSPORTER, RAIL CAR	19.0		19.0	19.0	10.8		29.7
1.1.4	RAIL CAR TUG	0.8		0.8	0.8	0.4		1.2
1.1.5	CASH TRANSPORTER							
1.1.6	SEAPORT FAC	1.0		1.0	1.0	1.5		2.5
1.1.7	WATER BASIN 4 PORT	48.0		48.0	48.0	82.6		130.6
1.1.8	WATER BASIN 2 PORT							
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3		65.3
1.1.10	PACKAGING FACILITY							
1.1.11	PACKAGING FAC	116.0		116.0	116.0	201.2		317.2
1.1.12	CRUISTERS	1,017.5		1,017.5	1,017.5	810.8		1,828.3
1.1.13	ENPLACEMENT TRANS	30.0		30.0	30.0	22.9		52.9
1.1.14	HAULT MODULE	4,303.4		4,303.4	4,303.4	2,726.3		7,029.7
1.1.15	GEOLOGIC REC MODULE							
1.1.16	REPOSITORY STORAGE MOD							
1.1.17	CASH	44.9		44.9	44.9	77.3		122.2
1.1.18	LOW INTER FAC	75.0		75.0	75.0	130.1		205.1
1.1.19	MLM PROC FAC							
1.1.20	RECOVERY FAC							
1.2	SUPPORT FACILITIES EQUIPMENT	5.4		5.4	5.4	7.9		13.3
1.2.1	FROM BLD & PLT YD	1.4		1.4	1.4	2.0		3.4
1.2.2	WAREHOUSE & ULT	4.0		4.0	4.0	5.8		9.8
1.3	OTHERS COST	1,051.6		1,051.6	1,051.6	967.9		2,019.5
1.4	INTEREST DURING CONS	1,652.5		1,652.5	1,652.5	969.3		2,621.8
2.0	OPER & MAINT		2,781.8	2,781.8			2,781.8	2,781.8
2.1	DIRECT LABOR		561.1	561.1			561.1	561.1
2.1.1	PORT & REC TRANS		5.1	5.1			5.1	5.1
2.1.2	WATER BASIN REC(4PORT)		145.8	145.8			145.8	145.8
2.1.3	WATER BASIN REC(2PORT)							
2.1.4	WATER BASIN STOR		27.1	27.1			27.1	27.1
2.1.5	PACK FAC LABOR							
2.1.6	PACK FAC LABOR		313.7	313.7			313.7	313.7
2.1.7	HAULT ENPLACEMENT LABOR		44.0	44.0			44.0	44.0
2.1.8	GEOLOGIC REC MOD LABOR							
2.1.9	CASH TRANS MAINT LAB		30.8	30.8			30.8	30.8
2.1.10	LEI LM PROCES LABOR		14.5	14.5			14.5	14.5
2.1.11	MLM PROC LABOR							
2.1.12	RECOVERY PLANT LAB							
2.2	INDIRECT LABOR		871.8	871.8			871.8	871.8
2.2.1	PORT & REC TRANS LAB		8.1	8.1			8.1	8.1
2.2.2	W.B. REC(4PORT) LAB		218.6	218.6			218.6	218.6
2.2.3	W.B. REC(4PORT) I LAB							
2.2.4	W.B. STOR IND LAB		40.5	40.5			40.5	40.5
2.2.5	PACK FAC IND LAB							
2.2.6	PACK FAC IND LAB		470.4	470.4			470.4	470.4
2.2.7	HAULT IND LABOR		65.8	65.8			65.8	65.8
2.2.8	GEO REC MOD IND LAB							
2.2.9	CASH TRANS MAINT LAB		46.1	46.1			46.1	46.1
2.2.10	LEI LM PROC IND LAB		22.3	22.3			22.3	22.3
2.2.11	MLM PROC IND LAB							
2.2.12	REC PLANT IND LAB							
2.3	MATERIAL SUP UTIL ECT		871.6	871.6			871.6	871.6
2.3.1	PORT REC PMS		8.1	8.1			8.1	8.1
2.3.2	W.B. REC OPMS 4 PORT		218.6	218.6			218.6	218.6
2.3.3	W.B. REC OPMS 2 PORT							
2.3.4	W.B. STOR OPMS		40.5	40.5			40.5	40.5
2.3.5	PACK OPMS(2500)							
2.3.6	PACK OPMS(3000)		470.4	470.4			470.4	470.4
2.3.7	HAULT OPMS		65.8	65.8			65.8	65.8
2.3.8	GEOLOGIC REC OPMS							
2.3.9	CASH TRANS		46.9	46.9			46.9	46.9
2.3.10	LEI LM PROC OPMS		21.3	21.3			21.3	21.3
2.3.11	MLM PROCESSING OPMS							
2.3.12	RECOVERY PLANT OPMS							
2.4	CONTRACTED SERVICES		371.6	371.6			371.6	371.6
2.4.1	SHIP CH		318.4	318.4			318.4	318.4
2.4.2	US PORT FEE		0.4	0.4			0.4	0.4
2.4.3	EUROP PORT FEE STOR							
2.4.4	US RAIL(SF TO STOR)		17.2	17.2			17.2	17.2
2.4.5	EUROP RAIL TRANS							
2.4.6	US STOR(TIME CHRG)		19.6	19.6			19.6	19.6
2.4.7	EUROP STOR							
2.4.8	US RECON CP							
2.4.9	EUROP REC CP							
2.4.10	EUROP WASTE DIS							
2.4.11	US RAIL TRANS		15.7	15.7			15.7	15.7
2.4.12	EUROP RAIL TRANS							
2.4.13	EUROP RAIL TRANS							
2.4.14	US PORT FEE		0.3	0.3			0.3	0.3
2.4.15	EUROP PORT FEE							
2.4.16	EUROP PORT FEE							
2.4.17	PACIFIC PORT FEE							
2.4.18	PACIFIC PORT FEE							
2.4.19	PAC RAIL TRANS							
2.4.20	PAC RAIL TRANS							
2.4.21	PAC RAIL TRANS							
2.5	DECON TRUST FUND		85.7	85.7			85.7	85.7

Section E3.34

Case: 28A

Description: SC baseline except ROI = 15%

Summary of Input Characteristics:

Financial

Enterprise ROI - 15%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 8.191 billion dollars

Owners ROI - 14.5%

Service charge - \$148/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/MG) \$146.291
 RATE OF RETURN ON INVESTMENT 15.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$13999.120

28A

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SEMI CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	2.0	2.0	.8	4.8	2.4	8.0	.0	- 6.0
1979	.0	4.3	4.3	1.5	8.3	3.9	13.7	.0	- 9.3
1980	.0	5.6	5.6	2.5	10.8	5.1	18.3	.0	- 12.8
1981	.0	12.8	12.8	3.6	15.2	7.2	25.9	.0	- 13.2
1982	.0	26.1	26.1	5.1	21.2	10.2	36.6	.0	- 10.5
1983	.0	33.8	33.8	6.4	26.5	12.6	45.6	.0	- 11.8
1984	.0	42.0	42.0	7.7	31.0	15.1	53.8	.0	- 11.8
1985	.0	57.1	57.1	19.4	34.4	17.1	70.9	.0	- 13.8
1986	.0	70.7	70.7	19.9	36.4	18.4	74.7	.0	- 3.0
1987	.0	63.5	63.5	35.0	39.8	20.7	115.5	.0	- 52.0
1988	.0	114.9	114.9	35.3	41.6	22.0	118.9	.0	- 4.0
1989	.0	137.7	137.7	35.3	41.5	22.2	119.0	7.1	- 11.6
1990	.0	144.4	144.4	35.4	43.8	23.3	126.5	6.8	- 11.1
1991	.0	164.9	164.9	36.2	46.9	26.3	129.4	13.5	- 22.0
1992	.0	199.2	199.2	36.6	51.7	29.8	138.1	23.2	- 37.9
1993	.0	235.2	235.2	37.1	55.4	32.9	145.4	34.1	- 55.7
1994	.0	279.2	279.2	37.5	60.1	36.5	154.1	47.5	- 77.5
1995	.0	325.6	325.6	38.0	69.2	43.1	170.3	59.0	- 95.3
1996	.0	349.6	349.6	38.8	73.4	46.7	179.0	64.8	- 105.8
1997	.0	384.0	384.0	39.6	82.0	53.4	195.0	75.6	- 123.4
1998	.0	437.6	437.6	39.9	87.4	57.6	204.9	88.4	- 144.3
1999	.0	468.5	468.5	39.1	95.7	64.3	219.1	94.8	- 154.7
2000	.0	507.3	507.3	39.3	122.8	80.5	262.5	93.0	- 151.8
2001	.0	557.1	557.1	39.9	129.0	87.0	276.7	106.6	- 173.8
2002	.0	566.6	566.6	60.6	143.1	97.9	301.6	106.8	- 173.0
2003	.0	631.9	631.9	61.3	149.7	104.9	315.9	126.1	- 156.0
2004	.0	678.7	678.7	62.0	156.1	112.3	330.4	132.4	- 116.0
2005	.0	706.4	706.4	62.6	166.2	122.7	351.5	134.9	- 80.0
2006	.0	706.6	706.6	63.2	175.6	133.1	371.8	127.2	- 80.6
2007	.0	713.7	713.7	63.2	183.8	138.6	385.6	124.6	- 205.3
2008	.0	706.4	706.4	63.3	187.3	145.0	395.5	118.1	- 192.7
2009	.0	706.8	706.8	63.4	194.7	155.2	413.3	111.5	- 162.0
2010	.0	713.9	713.9	63.4	201.0	163.4	427.8	108.7	- 177.4
2011	.0	706.4	706.4	63.4	207.5	174.4	445.3	99.2	- 164.8
2012	.0	706.6	706.6	63.4	212.4	183.5	459.4	93.9	- 153.3
2013	.0	713.7	713.7	63.5	218.4	189.6	465.5	94.3	- 153.9
2014	.0	706.4	706.4	63.7	215.8	200.4	479.9	88.0	- 150.4
2015	.0	706.8	706.8	63.8	218.1	206.4	488.3	83.8	- 155.5
2016	.0	713.9	713.9	63.9	220.4	219.4	503.7	79.9	- 130.3
2017	.0	706.4	706.4	64.0	217.9	221.2	503.0	77.3	- 126.1
2018	.0	706.6	706.6	64.1	220.7	237.4	522.2	70.1	- 114.3
2019	.0	713.7	713.7	64.3	228.7	252.8	537.7	66.9	- 109.1
2020	.0	706.4	706.4	64.4	218.8	268.9	552.1	58.6	- 95.7
2021	.0	706.8	706.8	64.5	215.6	268.7	548.9	52.4	- 85.5
2022	.0	713.9	713.9	64.6	206.4	260.2	531.2	54.2	- 69.5
2023	.0	706.4	706.4	64.8	197.5	221.7	583.9	46.5	- 75.9
2024	.0	706.6	706.6	64.9	183.9	241.5	589.3	44.2	- 72.1
2025	.0	713.7	713.7	65.0	171.7	375.7	612.4	38.5	- 52.8
2026	.0	706.4	706.4	65.1	157.0	424.7	646.8	22.6	- 36.9
2027	.0	706.8	706.8	65.2	132.0	466.0	663.2	16.6	- 27.0
2028	.0	713.9	713.9	65.3	106.7	587.2	759.0	.0	- 75.9
2029	.0	706.4	706.4	65.5	71.5	789.2	926.1	.0	- 199.8
2030	.0	706.6	706.6	65.6	18.4	888.8	932.8	134.5	- 219.5
TOTL	.0	24972.4	24972.4	2781.8	2414.4	6191.6	17387.7	2016.9	- 2567.7
M/G	.0	471.2	471.2	52.5	121.0	154.6	328.1	56.9	- 66.2
\$\$/M/G	.0	148.3	148.3	16.5	30.1	48.6	103.3	17.9	- 27.1

UNFINISHED ENTERPRISE
BEFORE TAXYearly Cash Statement FINISHED ENTERPRISE
AFTER TAX

OWNERS

YEAR	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	2.0	72.8	- 70.8	- 70.8	- 27.7	- 27.7	- 38.6	- 38.6
1979	4.5	55.8	- 51.3	- 122.1	- 23.1	- 50.8	- 38.6	- 62.9
1980	5.6	46.0	- 40.4	- 162.5	- 20.7	- 71.5	- 31.3	- 73.7
1981	12.8	70.4	- 57.6	- 220.1	- 29.0	- 100.5	- 39.9	- 103.6
1982	26.1	97.3	- 71.2	- 291.3	- 32.1	- 132.7	- 33.4	- 137.1
1983	33.6	86.7	- 53.1	- 344.4	- 27.4	- 160.1	- 38.5	- 175.6
1984	42.0	77.9	- 35.9	- 380.3	- 22.2	- 182.3	- 23.2	- 198.7
1985	57.1	74.6	- 17.5	- 397.8	- 17.8	- 200.1	- 20.3	- 219.1
1986	70.7	52.9	17.8	- 379.9	.1	- 200.0	.3	- 209.4
1987	83.5	111.4	- 27.9	- 397.7	- 34.1	- 234.1	- 40.5	- 250.0
1988	114.9	89.1	25.8	- 371.9	2.0	- 232.1	1.7	- 251.3
1989	137.7	68.5	69.2	- 302.7	26.7	- 205.4	26.8	- 228.6
1990	144.4	126.9	17.5	- 285.2	6.3	- 199.1	5.6	- 213.0
1991	164.9	82.2	82.7	- 202.5	32.4	- 166.7	32.1	- 181.1
1992	199.2	139.2	60.0	- 142.5	31.7	- 135.0	30.8	- 150.3
1993	235.2	126.3	108.9	- 33.6	55.6	- 79.4	54.9	- 94.2
1994	279.2	142.1	137.1	104.3	74.3	- 5.2	73.4	- 20.8
1995	325.6	211.5	114.1	218.4	74.4	69.2	72.8	48.0
1996	349.6	143.6	206.0	424.4	108.0	177.2	107.2	155.2
1997	344.0	213.1	130.9	555.3	106.6	283.8	105.0	260.2
1998	437.6	189.2	248.4	803.7	144.2	428.0	143.3	403.5
1999	468.5	219.4	249.1	1052.8	142.3	570.3	141.1	544.6
2000	507.3	500.3	7.0	1059.8	56.8	626.9	52.1	596.6
2001	557.1	299.8	257.3	1317.1	177.0	803.9	175.7	772.3
2002	558.6	319.7	238.9	1556.0	148.7	952.6	146.4	918.7
2003	631.9	312.6	319.3	1875.3	203.9	1156.5	202.7	1121.4
2004	678.7	234.6	444.1	2319.4	223.8	1380.2	222.4	1343.8
2005	796.4	282.9	513.5	2832.9	209.7	1589.9	207.9	1551.7
2006	786.6	290.8	495.8	3328.7	199.5	1789.4	197.8	1759.6
2007	713.7	384.3	329.4	3658.1	202.5	1991.9	201.1	1950.7
2008	706.4	214.4	492.0	4150.1	215.0	2206.8	214.4	2165.1
2009	706.8	283.7	423.1	4573.2	183.0	2389.8	181.7	2346.8
2010	713.9	278.0	435.9	5009.1	182.0	2571.8	180.9	2527.6
2011	706.4	282.6	423.8	5432.9	162.8	2734.6	161.7	2689.3
2012	786.6	283.2	503.4	5936.3	158.7	2893.3	157.3	2847.3
2013	713.7	212.6	501.1	6437.4	178.6	3071.9	178.6	3020.9
2014	706.4	265.0	441.4	6878.8	143.9	3215.8	143.3	3169.2
2015	706.8	222.3	484.5	7363.3	145.6	3361.4	145.2	3314.4
2016	713.9	263.7	450.2	7813.5	139.7	3501.0	139.3	3453.7
2017	706.4	231.4	475.0	8288.5	158.8	3659.8	159.2	3612.8
2018	706.6	304.7	401.9	8690.4	124.6	3784.4	124.1	3736.9
2019	713.7	285.4	428.3	9118.7	123.8	3908.2	123.8	3862.7
2020	786.4	279.0	507.4	9626.1	114.2	4022.4	114.5	3977.2
2021	706.8	265.6	441.2	10067.3	100.6	4123.0	101.1	4078.3
2022	713.9	227.2	486.7	10554.0	119.3	4242.3	120.8	4199.2
2023	706.4	253.0	453.4	11007.4	93.0	4335.3	95.2	4294.4
2024	706.6	222.7	483.9	11491.3	92.2	4427.5	94.5	4388.9
2025	713.7	284.8	428.9	11920.2	61.2	4488.7	63.2	4452.1
2026	706.4	300.7	405.7	12325.9	29.5	4518.2	31.9	4484.0
2027	706.8	221.3	485.5	12811.4	36.6	4554.8	40.7	4524.7
2028	713.9	291.6	422.3	13233.7	- 36.4	4517.8	- 32.2	4492.5
2029	706.4	292.0	414.4	13648.1	- 184.4	4333.4	- 178.6	4313.9
2030	706.6	286.7	419.9	13968.0	231.0	4564.4	239.8	4553.7

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	CURRENT EQUITY
1978	72.8	*	69.6	1.9	47.9	22.6
1979	52.3	*	117.9	1.6	82.4	37.1
1980	37.5	*	150.4	2.2	106.9	55.7
1981	66.6	*	210.8	3.1	150.6	82.4
1982	92.2	*	291.9	4.4	211.0	105.4
1983	80.4	*	309.5	5.5	262.9	109.1
1984	70.2	*	414.6	6.4	307.5	113.0
1985	55.2	*	432.7	5.0	341.6	110.0
1986	33.0	*	467.3	5.4	360.3	118.8
1987	56.4	*	503.0	15.8	373.9	124.9
1988	33.7	*	514.8	16.2	411.7	113.3
1989	5.2	*	597.8	16.1	409.8	164.1
1990	71.3	*	544.8	16.9	451.2	108.7
1991	26.0	*	543.7	17.2	461.3	99.6
1992	82.6	*	596.5	18.0	507.9	106.7
1993	65.2	*	632.9	18.0	544.1	107.0
1994	84.3	*	660.9	19.6	568.9	111.6
1995	153.5	*	791.3	21.2	677.3	130.1
1996	84.8	*	829.3	22.0	717.6	133.8
1997	153.5	*	929.4	23.6	800.9	152.1
1998	109.2	*	981.1	23.6	852.5	133.1
1999	156.3	*	1073.1	25.0	932.1	146.7
2000	441.1	*	1433.7	30.3	1197.6	306.7
2001	149.9	*	1496.6	31.6	1263.6	304.0
2002	230.1	*	1648.8	34.0	1391.6	291.1
2003	157.4	*	1701.3	35.2	1452.1	284.4
2004	162.6	*	1751.6	36.4	1510.8	277.9
2005	226.3	*	1855.2	33.1	1603.3	290.0
2006	227.7	*	1949.8	39.8	1669.8	299.8
2007	221.1	*	2032.1	41.2	1771.3	301.9
2008	151.1	*	2038.2	41.8	1799.6	288.3
2009	220.3	*	2103.3	43.0	1865.8	280.0
2010	214.6	*	2154.4	44.1	1921.5	277.0
2011	229.1	*	2209.2	45.2	1977.2	277.1
2012	219.8	*	2245.4	46.0	2012.9	272.5
2013	156.1	*	2211.9	46.0	2010.1	247.8
2014	221.4	*	2232.8	46.6	2024.5	244.9
2015	218.5	*	2244.9	47.0	2056.7	235.2
2016	219.8	*	2245.3	47.4	2066.4	236.3
2017	167.4	*	2191.5	47.0	2045.3	193.2
2018	240.6	*	2194.7	47.5	2058.8	183.4
2019	221.1	*	2163.0	47.5	2043.8	166.7
2020	214.6	*	2108.7	47.2	2008.1	147.9
2021	221.1	*	2041.1	46.7	1955.5	132.3
2022	182.6	*	1903.5	45.2	1846.8	99.9
2023	188.2	*	1770.1	43.7	1733.2	89.5
2024	157.9	*	1586.4	41.3	1569.7	58.2
2025	215.8	*	1430.5	39.4	1412.1	57.8
2026	235.6	*	1241.5	37.0	1215.6	62.8
2027	156.1	*	931.5	32.9	915.3	49.1
2028	226.3	*	590.0	28.7	563.2	55.5
2029	226.6	*	47.4	22.8	35.9	34.3
2030	221.1	*	.1	14.0	.0	14.0

TOTAL CAPITAL INVESTMENT 8191.6

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	72.03	24.10002	23.7699	23.7699
1979	124.29	41.86063	41.81569	41.81569
1980	161.81	54.92999	53.39729	53.39729
1981	228.6	77.9681	75.43799	75.43799
1982	320.7998	109.8339	105.8639	105.864
1983	401.1897	138.28	132.2926	132.2927
1984	471.3796	168.3303	155.5553	155.5553
1985	526.5696	184.9507	173.7746	173.7746
1986	559.5596	199.2607	184.6346	184.6347
1987	615.5595	222.061	203.2666	203.2667
1988	649.7095	238.0312	214.4041	214.4042
1989	654.9094	245.1013	216.1201	216.1202
1990	726.4392	275.2312	239.7249	239.725
1991	752.4392	291.1214	248.3049	248.305
1992	835.0691	327.2014	275.5728	275.5729
1993	904.3091	360.1917	299.4219	299.422
1994	968.8389	399.3617	326.3167	326.3168
1995	1142.299	464.9719	376.9385	376.9386
1996	1227.069	509.4932	404.9392	404.9393
1997	1380.549	579.6423	455.5008	455.5009
1998	1469.773	637.2835	491.6267	491.6268
1999	1646.099	713.9624	543.2124	543.2125
2000	2037.150	889.0735	688.7622	688.7623
2001	2237.078	973.4334	738.2356	738.2357
2002	2487.168	1095.563	820.7654	820.7655
2003	2644.526	1192.472	872.6941	872.6942
2004	2807.068	1297.113	926.3329	926.333
2005	3023.378	1430.104	1001.914	1001.915
2006	3261.038	1571.234	1078.142	1078.143
2007	3482.127	1710.664	1149.102	1149.103
2008	3633.247	1833.604	1199.971	1199.972
2009	3833.537	1967.734	1271.667	1271.668
2010	4068.127	2146.594	1342.462	1342.463
2011	4297.273	2320.051	1416.1	1416.101
2012	4517.062	2498.139	1498.63	1498.631
2013	4673.121	2663.069	1542.13	1542.131
2014	4894.469	2859.947	1615.175	1615.176
2015	5112.957	3056.255	1687.276	1687.277
2016	5332.746	3266.325	1759.206	1759.207
2017	5508.125	3454.684	1815.041	1815.042
2018	5740.715	3681.954	1894.456	1894.457
2019	5961.805	3918.004	1967.395	1967.396
2020	6176.395	4168.34	2038.21	2038.211
2021	6397.484	4441.953	2111.17	2111.171
2022	6560.043	4711.242	2164.814	2164.815
2023	6748.281	5015.039	2238.933	2238.934
2024	6906.141	5336.437	2279.026	2279.027
2025	7125.93	5713.777	2351.557	2351.558
2026	7361.578	6145.926	2429.321	2429.322
2027	7517.637	6602.363	2480.82	2480.821
2028	7743.926	7189.695	2555.495	2555.496
2029	7978.473	7824.531	2630.256	2630.257
2030	8191.562	8191.662	2703.215	2703.216

PRESENT VALUE OF CAPITAL INV AT RATE %: \$M

15.

472.8328

PRESENT VALUE OF CAPITAL INV AT RATE %: \$M

10.

632.8328

Cost Summary - Dollars in Millions

HQS		COMMITTED COST			FINANCED COST			
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
0.0	TOTAL	8,182.3	2,780.5	10,962.9	8,182.3	8,396.5	2,780.5	17,259.3
1.0	CAPITAL ITEMS	8,182.3		8,182.3	8,182.3	8,396.5		14,578.8
1.1	SYSTEM FACILITIES-EQUIPMENT	6,077.5		6,077.5	6,077.5	4,438.4		10,515.9
1.1.1	SHIP	165.0		165.0	165.0	150.0		315.0
1.1.2	CASH	243.0		243.0	243.0	172.2		415.2
1.1.3	CASH TRANSPORTER, RAIL CAR	19.0		19.0	19.0	10.6		29.7
1.1.4	RAIL CAR TUG	0.8		0.8	0.8	0.4		1.2
1.1.5	CASH TRANSPORTER							
1.1.6	SEAFORT FAC	1.0		1.0	1.0	1.5		2.5
1.1.7	WATER BASIN 4 PORT	38.0		38.0	37.9	63.7		101.7
1.1.8	WATER BASIN 2 PORT							
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3		65.3
1.1.10	PROCESSING FACILITY							
1.1.11	PACKAGING FAC	116.0		116.0	116.0	201.2		317.2
1.1.12	CONCRETE	1,017.5		1,017.5	1,017.5	918.7		1,936.2
1.1.13	REPLACEMENT TRANS	30.0		30.0	30.0	12.9		42.9
1.1.14	FAULT MODULE	4,303.4		4,303.4	4,303.4	2,726.3		7,029.7
1.1.15	CEOLOGIC REC MODULE							
1.1.16	RECOVERY STORAGE MOD							
1.1.17	CASH	44.9		44.9	44.9	77.3		122.2
1.1.18	LONG-TERM FAC	75.0		75.0	75.0	128.1		203.1
1.1.19	WATER FAC							
1.1.20	RECOVERY FAC							
1.2	SUPPORT FACILITIES EQUIPMENT	5.4		5.4	5.4	7.9		13.3
1.2.1	FOR OLD & PLY YD	1.4		1.4	1.4	2.0		3.4
1.2.2	WAREHOUSE & YLT	4.0		4.0	4.0	5.0		9.0
1.3	OTHER COST	1,052.4		1,052.4	1,052.4	968.9		2,021.3
1.4	INTEREST DURING CON	1,047.8		1,047.8	1,047.8	961.3		2,009.1
2.0	OPER & MAINT		2,780.5	2,780.5			2,780.5	2,780.5
2.1	LIFE CYCLE		581.0	581.0			581.0	581.0
2.1.1	PORT & REC TRANS		5.1	5.1			5.1	5.1
2.1.2	WATER BASIN REC (4PORT)		145.8	145.8			145.8	145.8
2.1.3	WATER BASIN REC (2PORT)							
2.1.4	WATER BASIN STOP		27.1	27.1			27.1	27.1
2.1.5	PROJ. FAC LAJOR							
2.1.6	PROJ. FAC LAJOR		313.7	313.7			313.7	313.7
2.1.7	FAULT REPLACEMENT LABOR		44.0	44.0			44.0	44.0
2.1.8	CEOLOGIC REC MOD LABOR							
2.1.9	CASH TRANS MAINT LAB		30.7	30.7			30.7	30.7
2.1.10	WATER BASIN LAB		14.5	14.5			14.5	14.5
2.1.11	WATER BASIN LAB							
2.1.12	RECOVERY PLANT LAB							
2.2	INDIRECT LABOR		871.8	871.8			871.8	871.8
2.2.1	PORT & REC TRANS LAB		8.1	8.1			8.1	8.1
2.2.2	WATER BASIN REC (4PORT) LAB		218.6	218.6			218.6	218.6
2.2.3	WATER BASIN REC (2PORT) LAB							
2.2.4	WATER BASIN STOP LAB		40.5	40.5			40.5	40.5
2.2.5	PROJ. FAC LAB							
2.2.6	PROJ. FAC LAB		470.4	470.4			470.4	470.4
2.2.7	FAULT LAB		65.8	65.8			65.8	65.8
2.2.8	CEOLOGIC REC MOD LAB							
2.2.9	CASH TRANS MAINT LAB		44.1	44.1			44.1	44.1
2.2.10	WATER BASIN LAB		22.3	22.3			22.3	22.3
2.2.11	WATER BASIN LAB							
2.2.12	RECOVERY PLANT LAB							
2.3	MATERIAL SUP UTIL ECT		670.5	670.5			670.5	670.5
2.3.1	PORT REC FIS		8.1	8.1			8.1	8.1
2.3.2	WATER BASIN REC (4PORT) LAB		218.6	218.6			218.6	218.6
2.3.3	WATER BASIN REC (2PORT) LAB							
2.3.4	WATER BASIN STOP LAB		40.5	40.5			40.5	40.5
2.3.5	PROJ. FAC LAB							
2.3.6	PROJ. FAC LAB		470.4	470.4			470.4	470.4
2.3.7	FAULT LAB		65.8	65.8			65.8	65.8
2.3.8	CEOLOGIC REC LAB							
2.3.9	CASH TRANS LAB		45.8	45.8			45.8	45.8
2.3.10	WATER BASIN LAB		21.3	21.3			21.3	21.3
2.3.11	WATER BASIN LAB							
2.3.12	RECOVERY PLANT LAB							
2.4	CONTRACTED SERVICES		371.6	371.6			371.6	371.6
2.4.1	SHIP CH		318.4	318.4			318.4	318.4
2.4.2	US PORT FEE		0.4	0.4			0.4	0.4
2.4.3	ELFAC PORT FEE STOP							
2.4.4	US FAIR (SF TO STOP)		17.2	17.2			17.2	17.2
2.4.5	ELFAC FAIR TRANS							
2.4.6	US STOP (TIME CHRG)		19.6	19.6			19.6	19.6
2.4.7	ELFAC STOP							
2.4.8	US FAIR CH							
2.4.9	ELFAC REC CP							
2.4.10	ELFAC WASTE DIS							
2.4.11	US FAIR TRANS		15.7	15.7			15.7	15.7
2.4.12	ELFAC FAIR TRANS							
2.4.13	US PORT FEE		0.3	0.3			0.3	0.3
2.4.14	ELFAC PORT FEE							
2.4.15	ELFAC PORT FEE							
2.4.16	ELFAC PORT FEE							
2.4.17	ELFAC PORT FEE							
2.4.18	ELFAC PORT FEE							
2.4.19	ELFAC PORT FEE							
2.4.20	ELFAC PORT FEE							
2.4.21	ELFAC PORT FEE							
2.5	TECH TRUST FUND		15.7	15.7			15.7	15.7

Section E3.35

Case: 29A

Description: SC baseline except ROI = 25%

Summary of Input Characteristics:

Financial

Enterprise ROI - 25%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 8.191 billion dollars

Owners ROI - 28.3%

Service charge - \$273/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YR) 1273.047
 RATE OF RETURN ON INVESTMENT 25.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 135008.238

29A

Yearly Profit and Loss Statement

YEAR	PER REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	3.7	3.7	.8	4.8	2.4	8.0	.0	-3.3
1979	.0	8.3	8.3	1.5	8.3	3.9	13.7	.0	-5.0
1980	.0	18.3	18.3	2.5	18.8	5.1	26.3	.0	-8.1
1981	.0	23.5	23.5	3.6	15.2	7.2	25.9	.0	-2.4
1982	.0	48.1	48.1	5.1	21.2	10.2	36.6	4.4	7.1
1983	.0	62.3	62.3	6.4	26.5	12.8	45.6	6.3	10.3
1984	.0	77.4	77.4	7.7	31.0	15.1	53.8	9.0	14.6
1985	.0	105.2	105.2	19.4	34.4	17.1	70.9	13.0	21.3
1986	.0	130.1	130.1	19.9	36.4	18.4	74.7	21.1	34.7
1987	.0	153.8	153.8	35.0	39.8	20.7	115.5	14.5	38.7
1988	.0	211.6	211.6	55.3	41.6	22.0	118.9	35.2	57.0
1989	.0	253.5	253.5	55.3	41.5	22.2	119.0	51.1	83.4
1990	.0	265.8	265.8	55.4	45.8	25.3	126.5	53.0	86.4
1991	.0	303.6	303.6	56.2	46.9	26.3	129.4	66.2	108.0
1992	.0	366.8	366.8	56.6	51.7	29.8	138.1	88.9	141.8
1993	.0	433.1	433.1	57.1	55.4	32.9	145.4	109.3	178.4
1994	.0	514.0	514.0	57.5	60.1	36.5	154.1	136.8	223.1
1995	.0	599.5	599.5	58.0	69.2	43.1	170.3	163.1	266.1
1996	.0	643.7	643.7	58.8	73.4	46.7	179.0	175.6	288.1
1997	.0	725.5	725.5	59.6	82.0	53.4	195.0	201.6	328.9
1998	.0	805.8	805.8	59.9	87.4	57.6	204.9	228.3	372.6
1999	.0	862.7	862.7	59.1	95.7	64.3	219.1	244.6	399.0
2000	.0	934.0	934.0	59.3	122.6	68.5	250.5	255.2	416.3
2001	.0	1025.8	1025.8	59.9	129.8	87.8	277.7	284.7	464.4
2002	.0	1069.0	1069.0	60.6	143.1	97.9	301.6	291.6	475.8
2003	.0	1163.5	1163.5	61.3	149.7	104.9	315.9	322.1	525.6
2004	.0	1249.7	1249.7	62.0	156.1	112.3	330.4	349.3	570.0
2005	.0	1300.6	1300.6	62.6	166.2	122.7	351.5	368.7	568.5
2006	.0	1301.0	1301.0	63.2	173.6	133.1	371.8	353.1	576.1
2007	.0	1314.1	1314.1	63.2	183.8	138.8	385.8	352.8	575.6
2008	.0	1308.6	1308.6	63.3	187.3	145.8	396.5	343.9	561.2
2009	.0	1301.5	1301.5	63.4	194.7	155.2	413.3	337.5	550.6
2010	.0	1314.5	1314.5	63.4	201.8	163.4	427.8	337.0	549.8
2011	.0	1300.6	1300.6	63.4	207.5	174.4	445.3	325.0	538.3
2012	.0	1301.0	1301.0	63.4	212.4	183.5	459.4	319.8	521.8
2013	.0	1314.1	1314.1	63.5	212.4	189.6	465.5	322.5	566.2
2014	.0	1308.6	1308.6	63.7	215.8	200.4	479.9	311.9	568.8
2015	.0	1301.5	1301.5	63.8	218.1	206.4	488.3	309.0	504.2
2016	.0	1314.5	1314.5	63.9	220.4	219.4	503.7	308.1	502.7
2017	.0	1300.6	1300.6	64.0	217.9	221.2	503.0	303.1	494.5
2018	.0	1301.0	1301.0	64.1	220.7	237.4	522.2	296.8	462.9
2019	.0	1314.1	1314.1	64.3	220.7	232.8	537.7	295.0	481.4
2020	.0	1300.6	1300.6	64.4	218.8	268.9	552.1	284.5	464.1
2021	.0	1301.5	1301.5	64.5	215.6	288.7	568.9	278.4	454.2
2022	.0	1314.5	1314.5	64.6	208.4	300.2	571.2	282.4	460.8
2023	.0	1308.6	1308.6	64.8	197.5	321.7	583.9	272.3	444.3
2024	.0	1301.0	1301.0	64.9	183.9	341.5	590.3	270.1	448.7
2025	.0	1314.1	1314.1	65.0	171.7	375.7	612.4	266.7	435.1
2026	.0	1300.6	1300.6	65.1	157.0	424.7	646.8	248.5	405.4
2027	.0	1301.5	1301.5	65.2	132.0	466.0	663.2	242.5	395.7
2028	.0	1314.5	1314.5	65.3	106.7	567.8	739.8	216.4	356.3
2029	.0	1300.6	1300.6	65.5	71.5	769.2	906.1	149.9	244.6
2030	.0	1301.0	1301.0	65.6	18.4	868.6	993.6	380.4	168.1
TOTAL	.0	45081.6	45081.6	2781.8	6414.4	8191.6	17387.7	10073.3	17720.4
AUC	.0	867.6	867.6	52.5	121.0	154.6	328.1	265.2	334.3
11.1.C	.0	273.0	273.0	16.5	38.1	46.6	103.3	64.6	105.2

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	3.7	72.9	- 69.1	- 69.1	- 26.0	- 26.0	- 26.0	- 26.0	- 26.0	- 26.0
1979	8.3	53.8	- 45.5	- 114.6	- 19.3	- 45.3	- 45.3	- 45.3	- 45.3	- 45.3
1980	10.3	48.0	- 37.7	- 152.3	- 18.0	- 63.3	- 63.3	- 63.3	- 63.3	- 63.3
1981	23.5	70.4	- 46.9	- 199.2	- 18.3	- 81.6	- 81.6	- 81.6	- 81.6	- 81.6
1982	48.1	97.3	- 49.3	- 248.5	- 14.5	- 96.1	- 96.1	- 96.1	- 96.1	- 96.1
1983	62.3	86.7	- 24.4	- 272.9	- 5.3	- 101.4	- 101.4	- 101.4	- 101.4	- 101.4
1984	77.4	77.9	- 0.5	- 273.4	- 4.2	- 105.6	- 105.6	- 105.6	- 105.6	- 105.6
1985	105.2	74.6	30.6	- 242.8	17.2	- 88.4	14.7	- 73.7	14.7	- 59.0
1986	130.1	52.9	77.2	- 165.6	30.5	- 57.9	30.5	- 27.4	30.5	- 27.4
1987	153.8	111.4	42.4	- 123.2	21.6	- 36.3	15.2	- 21.1	15.2	- 11.9
1988	211.6	69.1	142.5	7.4	63.5	27.2	63.5	35.7	63.5	27.2
1989	253.5	60.5	193.0	200.4	98.0	125.2	98.0	125.2	98.0	125.2
1990	265.8	128.9	136.9	337.4	81.6	206.8	81.6	206.8	81.6	206.8
1991	303.6	82.2	221.4	558.8	118.4	325.2	118.4	325.2	118.4	325.2
1992	366.8	139.2	227.6	786.4	139.6	464.8	139.6	464.8	139.6	464.8
1993	433.1	128.3	304.8	1091.2	178.3	643.1	177.6	643.1	177.6	643.1
1994	514.0	142.1	371.9	1463.1	219.9	863.0	219.9	863.0	219.9	863.0
1995	599.5	211.5	388.0	1851.1	244.2	1107.2	244.2	1107.2	244.2	1107.2
1996	643.7	143.6	500.1	2351.2	290.3	1412.3	290.3	1412.3	290.3	1412.3
1997	725.5	213.1	512.4	2863.6	312.1	1724.4	310.0	1700.0	310.0	1700.0
1998	905.8	169.2	736.6	3600.2	372.5	2096.9	371.5	2072.4	371.5	2072.4
1999	862.7	215.4	647.3	4247.5	386.7	2483.6	385.4	2457.8	385.4	2457.8
2000	934.0	500.3	433.7	4681.3	321.2	2804.8	316.7	2774.0	316.7	2774.0
2001	1025.8	309.8	716.0	5397.3	467.5	3272.4	466.3	3240.6	466.3	3240.6
2002	1069.0	310.7	758.4	6155.7	451.5	3724.0	449.2	3690.0	449.2	3690.0
2003	1163.5	218.6	944.9	7100.6	533.5	4257.5	532.3	4222.3	532.3	4222.3
2004	1249.7	224.6	1025.1	8125.7	577.6	4835.1	576.4	4798.7	576.4	4798.7
2005	1300.6	288.9	1011.7	9137.4	578.2	5413.3	576.4	5375.1	576.4	5375.1
2006	1301.0	290.8	1010.2	10147.6	568.0	5981.3	566.4	5941.5	566.4	5941.5
2007	1314.1	384.3	929.8	11077.4	574.8	6556.1	573.4	6514.3	573.4	6514.3
2008	1300.6	214.4	1086.2	12163.6	583.4	7139.5	582.0	7097.7	582.0	7097.7
2009	1301.5	383.7	917.8	13081.4	551.7	7691.2	550.4	7646.1	550.4	7646.1
2010	1314.5	272.0	1042.5	14123.9	554.4	8245.6	553.0	8201.5	553.0	8201.5
2011	1300.6	292.6	1008.0	15131.9	531.2	8776.8	530.1	8731.6	530.1	8731.6
2012	1301.0	283.2	1017.8	16149.7	527.2	9304.0	526.4	9258.0	526.4	9258.0
2013	1314.1	219.6	1094.5	17244.2	530.8	9834.8	528.8	9808.8	528.8	9808.8
2014	1300.6	285.0	1015.6	18259.8	512.4	10347.2	511.8	10320.6	511.8	10320.6
2015	1301.5	282.3	1019.2	19279.0	514.3	10861.5	513.9	10834.5	513.9	10834.5
2016	1314.5	383.7	930.8	20209.8	512.0	11373.5	511.6	11346.1	511.6	11346.1
2017	1300.6	231.4	1069.2	21279.0	527.2	11900.7	527.2	11873.7	527.2	11873.7
2018	1301.0	304.7	996.3	22275.3	493.1	12413.8	492.6	12366.3	492.6	12366.3
2019	1314.1	285.4	1028.7	23304.0	498.1	12911.9	498.0	12864.4	498.0	12864.4
2020	1300.6	279.0	1021.6	24325.6	482.7	13394.6	482.0	13347.3	482.0	13347.3
2021	1301.5	285.6	1015.9	25341.5	469.3	13863.9	469.8	13817.1	469.8	13817.1
2022	1314.5	227.2	1087.3	26428.8	491.7	14355.6	490.2	14310.4	490.2	14310.4
2023	1300.6	253.0	1047.6	27476.4	462.2	14817.8	463.7	14774.1	463.7	14774.1
2024	1301.0	222.7	1078.3	28554.7	460.8	15278.6	460.0	15237.5	460.0	15237.5
2025	1314.1	224.8	1089.4	29644.1	433.4	15712.0	435.4	15672.5	435.4	15672.5
2026	1300.6	300.7	999.9	30644.0	397.9	16109.9	400.4	16072.9	400.4	16072.9
2027	1301.5	221.3	1080.2	31724.2	400.3	16510.2	401.4	16462.3	401.4	16462.3
2028	1314.5	291.6	1022.9	32747.1	345.8	16856.0	350.0	16806.0	350.0	16806.0
2029	1300.6	292.0	1008.6	33755.7	229.9	17120.9	265.8	17096.0	265.8	17096.0
2030	1301.0	286.7	1014.3	34770.0	599.5	17720.4	606.4	17706.4	606.4	17706.4

RATE OF RETURN TO ENTERPRISE OWNER 28.32%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 26.68%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT	*	FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	72.0	*	69.6	1.9	27.9	22.6
1979	52.3	*	117.9	1.6	82.4	27.1
1980	37.5	*	150.4	2.2	106.9	25.7
1981	66.8	*	210.0	3.1	150.6	22.4
1982	92.2	*	291.9	4.4	211.0	22.4
1983	80.4	*	359.5	5.5	262.9	102.1
1984	70.2	*	414.6	6.4	307.5	113.5
1985	55.2	*	452.7	9.0	341.6	120.0
1986	33.0	*	467.3	9.4	360.3	116.4
1987	56.4	*	503.0	15.8	393.9	124.9
1988	33.7	*	514.8	16.2	411.7	119.3
1989	5.2	*	497.8	16.1	409.9	104.1
1990	71.5	*	544.0	16.9	451.2	109.7
1991	26.0	*	543.7	17.2	461.3	99.6
1992	82.6	*	596.5	18.0	507.9	106.7
1993	69.2	*	632.9	18.8	544.1	107.0
1994	64.5	*	680.9	19.6	588.9	111.6
1995	153.5	*	731.3	21.2	677.3	130.1
1996	84.8	*	629.3	22.0	717.6	133.8
1997	153.5	*	929.4	23.6	800.9	152.1
1998	109.2	*	981.1	24.6	852.5	155.1
1999	156.3	*	1073.1	25.8	932.1	166.7
2000	441.1	*	1433.7	30.3	1197.6	266.4
2001	149.9	*	1496.6	31.6	1263.6	264.5
2002	230.1	*	1648.8	34.0	1391.6	291.1
2003	157.4	*	1781.3	35.2	1452.1	324.4
2004	162.6	*	1751.6	36.4	1518.0	277.2
2005	228.3	*	1655.2	38.1	1603.3	290.0
2006	227.7	*	1949.8	39.2	1689.8	299.8
2007	221.1	*	2032.1	41.2	1771.3	302.0
2008	151.1	*	2038.2	41.8	1799.6	288.3
2009	220.3	*	2183.3	43.0	1865.8	280.5
2010	214.6	*	2154.4	44.1	1921.5	277.0
2011	229.1	*	2209.2	45.2	1977.2	277.1
2012	219.8	*	2245.4	46.0	2018.9	272.5
2013	156.1	*	2211.9	46.0	2010.1	247.8
2014	221.4	*	2232.8	46.6	2034.5	244.9
2015	218.5	*	2244.9	47.0	2056.7	235.2
2016	219.8	*	2245.3	47.4	2066.4	226.3
2017	167.4	*	2191.5	47.0	2045.3	193.2
2018	240.6	*	2194.7	47.5	2058.8	183.4
2019	221.1	*	2163.0	47.5	2043.8	166.7
2020	214.6	*	2108.7	47.2	2008.1	147.9
2021	221.1	*	2041.1	46.7	1955.5	132.3
2022	162.6	*	1903.5	45.2	1848.6	99.9
2023	188.2	*	1770.1	43.7	1733.2	80.6
2024	157.9	*	1566.4	41.5	1569.7	58.2
2025	219.8	*	1430.5	39.4	1412.1	37.8
2026	230.6	*	1241.5	37.0	1215.6	22.6
2027	156.1	*	931.5	32.9	915.3	49.1
2028	226.3	*	590.0	28.7	563.2	25.5
2029	226.6	*	47.4	22.8	35.9	34.3
2030	221.1	*	.1	14.0	.0	14.0

TOTAL CAPITAL INVESTMENT 6191.6

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	72.03	24.10062	23.7699	23.7699
1979	124.29	41.86093	41.01569	41.01569
1980	181.81	54.82999	53.39729	53.39729
1981	228.6	77.7601	75.43799	75.43797
1982	320.7998	109.8399	109.8639	109.8164
1983	401.1897	138.28	132.3926	117.8961
1984	471.3796	163.8303	153.5553	126.8197
1985	526.5696	184.9507	173.7746	126.8197
1986	559.5596	199.2607	184.6546	126.8197
1987	615.9596	222.661	203.2666	126.1176
1988	649.7095	238.0312	214.4041	126.1176
1989	654.9094	243.1013	216.1201	126.1176
1990	726.4392	275.2312	239.7349	126.1176
1991	752.4392	291.1514	248.3049	126.1176
1992	835.0691	327.2014	275.5728	126.1176
1993	904.3091	360.1917	298.4219	126.1176
1994	968.6389	399.9617	326.3167	126.1176
1995	1142.239	464.9719	376.9585	126.1176
1996	1227.069	509.4922	404.9392	126.1176
1997	1320.549	579.6423	453.5808	126.1176
1998	1469.779	637.2825	491.6267	126.1176
1999	1646.099	713.9624	543.2124	126.1176
2000	2007.158	889.5725	688.7622	126.1174
2001	2237.078	973.4324	738.2356	126.1174
2002	2487.168	1095.533	830.7654	126.1174
2003	2644.528	1192.473	872.6941	126.1174
2004	2807.088	1297.113	926.3289	126.1174
2005	3033.378	1430.104	1001.014	126.1174
2006	3261.038	1571.234	1076.142	126.1174
2007	3482.127	1718.864	1149.102	126.1174
2008	3633.247	1833.604	1198.971	126.1174
2009	3853.537	1987.754	1271.667	126.1174
2010	4068.127	2146.594	1342.462	126.1174
2011	4297.273	2320.051	1418.1	126.1174
2012	4517.062	2498.139	1490.63	126.1174
2013	4673.121	2663.069	1542.13	126.1174
2014	4894.469	2859.947	1613.175	126.1174
2015	5112.957	3056.255	1687.276	126.1174
2016	5332.746	3266.335	1759.806	126.1174
2017	5508.125	3454.804	1815.041	126.1174
2018	5740.715	3681.954	1894.436	126.1174
2019	5961.805	3918.004	1967.395	126.1174
2020	6176.395	4168.34	2038.21	126.1174
2021	6397.484	4441.253	2111.17	126.1174
2022	6560.043	4711.242	2164.814	126.1174
2023	6748.281	5015.039	2226.933	126.1174
2024	6906.141	5336.437	2279.026	126.1174
2025	7125.93	5713.777	2351.557	126.1174
2026	7361.578	6145.926	2429.321	126.1174
2027	7517.637	6602.363	2480.82	126.1174
2028	7743.926	7180.695	2553.495	126.1174
2029	7970.473	7934.231	2630.256	126.1174
2030	8191.562	8191.602	2703.215	126.1174

PRESENT VALUE OF CAPITAL INV AT RATE %, 4M

25

PRESENT VALUE OF CAPITAL INV AT RATE %, 4M

10.

832.8328

Cost Summary - Dollars in Millions

HQS		COMMITTED COST			FINANCED COST			TOTAL
		CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	
0.0	TOTAL	8,182.3	2,780.5	10,962.8	8,182.3	4,386.5	2,780.5	17,355.3
1.0	CAPITAL ITEMS	8,182.3		8,182.3	8,182.3			14,078.8
1.1	SYSTEM FACILITIES-EQUIPMENT	6,677.5		6,677.5	6,677.5			10,555.8
1.1.1	SHIP	185.0		185.0	185.0			225.0
1.1.2	CASH	243.0		243.0	243.0			15.2
1.1.3	CASH TRAFFICPORTER-PAUL CAR	19.8		19.8	19.8			29.7
1.1.4	PAUL CAR TUG	0.8		0.8	0.8			1.2
1.1.5	CASH TRAFFICPORTER							
1.1.6	CEVACPT FAC	1.0		1.0	1.0	1.5		2.5
1.1.7	WATER BASIN 4 PORT	38.0		38.0	37.9	63.7		101.7
1.1.8	WATER BASIN 2 PORT							
1.1.9	WATER BASIN STORAGE	24.0		24.0	24.0	41.3		65.3
1.1.10	PACKAGING FACILITY							
1.1.11	PACKAGING FAC	116.8		116.8	116.8	201.2		317.2
1.1.12	CRUISING STEPS	1,017.5		1,017.5	1,017.5	816.7		1,634.2
1.1.13	ENTRANCE TANKS	30.0		30.0	30.0	22.9		52.9
1.1.14	WALD MODULE	4,503.4		4,503.4	4,503.4	2,726.3		7,231.7
1.1.15	CEOLOGIC REC MODULE							
1.1.16	PERFORATORY STORAGE MOD							
1.1.17	CASH	44.9		44.9	44.9	77.3		122.2
1.1.18	LOUINTER FAC	75.0		75.0	75.0	130.1		205.1
1.1.19	PLU FPOC FAC							
1.1.20	RECOVERY FAC							
1.2	SUPPORT FACILITIES EQUIPMENT	5.4		5.4	5.4	7.9		13.3
1.2.1	FOR BLD & FLT YD	1.4		1.4	1.4	2.0		3.4
1.2.2	WAREHOUSE & FLT	4.0		4.0	4.0	5.9		9.8
1.3	CHARGES COST	1,052.4		1,052.4	1,052.4	968.9		2,021.3
1.4	INTEREST DURING CON	1,047.8		1,047.8	1,047.8	961.3		2,009.1
2.0	OPER & MAINT		2,780.5	2,780.5			2,780.5	2,780.5
2.1	DIRECT LABOR		581.0	581.0			581.0	581.0
2.1.1	PORT & REC TRAFFIC		5.1	5.1			5.1	5.1
2.1.2	WATER BASIN REC (PORT)		145.8	145.8			145.8	145.8
2.1.3	WATER BASIN REC (PORT)							
2.1.4	WATER BASIN STOP		27.1	27.1			27.1	27.1
2.1.5	FACI. FAC LABOR							
2.1.6	FACI. FAC LABOR		313.7	313.7			313.7	313.7
2.1.7	WALD ENFORCEMENT LABOR		44.8	44.8			44.8	44.8
2.1.8	CEOLOGIC REC MOD LABOR							
2.1.9	CASH TRAFFIC MAINT LAB		30.7	30.7			30.7	30.7
2.1.10	LOU LIL. FPOC LABOR		14.5	14.5			14.5	14.5
2.1.11	PLU FPOC LABOR							
2.1.12	RECOVERY PLANT LAB							
2.2	INDIRECT LABOR		871.8	871.8			871.8	871.8
2.2.1	PORT & REC TRAFFIC LAB		8.1	8.1			8.1	8.1
2.2.2	W.B. REC (PORT) LAB		218.6	218.6			218.6	218.6
2.2.3	W.B. REC (PORT) LAB							
2.2.4	W.B. STOP AND LAB		48.5	48.5			48.5	48.5
2.2.5	FACI. FAC IND LAB							
2.2.6	FACI. FAC IND LAB		470.4	470.4			470.4	470.4
2.2.7	WALD IND LABOR		65.8	65.8			65.8	65.8
2.2.8	CEOLOGIC REC MOD LAB							
2.2.9	CASH TRAFFIC MAINT LAB		46.1	46.1			46.1	46.1
2.2.10	LOU LIL. FPOC IND LAB		22.3	22.3			22.3	22.3
2.2.11	PLU FPOC IND LAB							
2.2.12	REC PLANT IND LAB							
2.3	MATERIAL SUP UTIL ECT		670.5	670.5			670.5	670.5
2.3.1	PORT REC ECT		8.1	8.1			8.1	8.1
2.3.2	W.B. REC CRIS 4 PORT		218.6	218.6			218.6	218.6
2.3.3	W.B. REC CRIS 2 PORT							
2.3.4	W.B. STORAGE CRIS		48.5	48.5			48.5	48.5
2.3.5	FACI. CRIS (W.B.)							
2.3.6	FACI. CRIS (W.B.)		470.4	470.4			470.4	470.4
2.3.7	WALD CRIS		65.8	65.8			65.8	65.8
2.3.8	CEOLOGIC REC CRIS							
2.3.9	CASH TRAFFIC		45.8	45.8			45.8	45.8
2.3.10	LOU LIL. FPOC CRIS		21.3	21.3			21.3	21.3
2.3.11	PLU FPOC CRIS							
2.3.12	REC PLANT CRIS							
2.4	CONTRACTED SERVICES		371.6	371.6			371.6	371.6
2.4.1	SHIP CH		318.4	318.4			318.4	318.4
2.4.2	US PORT FEE		0.4	0.4			0.4	0.4
2.4.3	ELFOP PORT FEE STOP							
2.4.4	US FAIRLIST TO STOP		17.2	17.2			17.2	17.2
2.4.5	ELFOP FAIRLIST TRAFFIC							
2.4.6	US STOP/TIME CRIS		19.6	19.6			19.6	19.6
2.4.7	ELFOP STOP							
2.4.8	US REC/CRIS							
2.4.9	ELFOP REC CRIS							
2.4.10	ELFOP WASTE DIS							
2.4.11	US FAIR TRAFFIC		15.7	15.7			15.7	15.7
2.4.12	ELFOP FAIR TRAFFIC							
2.4.13	ELFOP FAIR TRAFFIC							
2.4.14	US PORT FEE		0.3	0.3			0.3	0.3
2.4.15	ELFOP PORT FEE							
2.4.16	ELFOP PORT FEE							
2.4.17	ELFOP PORT FEE							
2.4.18	ELFOP PORT FEE							
2.4.19	ELFOP PORT FEE							
2.4.20	ELFOP PORT FEE							
2.4.21	ELFOP PORT FEE							
2.5	TECH TRUST FUND		45.7	45.7			45.7	45.7

Section E3.36

Case: 30A

Description: SC baseline except ROI = 30%

Summary of Input Characteristics:

Financial

Enterprise ROI - 30%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 8.191 billion dollars

Owners ROI - 34.8%

Service charge - \$351/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/PO) 3331.463
 RATE OF RETURN ON INVESTMENT 30.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT 146214.010

30A

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	4.8	4.8	.0	4.8	2.4	8.0	.0	3.2
1979	.0	10.6	10.6	1.5	6.3	3.9	13.7	.0	3.1
1980	.0	13.2	13.2	2.5	10.8	5.1	18.3	.0	5.1
1981	.0	30.2	30.2	3.6	15.2	7.2	25.9	1.6	8.7
1982	.0	61.9	61.9	5.1	21.2	10.2	36.6	9.6	15.7
1983	.0	80.2	80.2	5.4	26.5	12.6	45.6	13.1	31.4
1984	.0	99.6	99.6	7.7	31.0	15.1	53.8	17.4	28.4
1985	.0	135.4	135.4	19.4	34.4	17.1	70.9	34.5	40.0
1986	.0	167.5	167.5	19.9	36.4	18.4	74.7	35.3	57.6
1987	.0	197.9	197.9	55.0	39.8	20.7	115.5	31.3	51.1
1988	.0	272.4	272.4	55.3	41.6	22.0	118.9	30.3	50.2
1989	.0	326.3	326.3	55.3	41.6	22.2	119.0	28.8	138.5
1990	.0	342.2	342.2	55.4	43.8	23.3	126.5	32.0	133.8
1991	.0	390.8	390.8	56.2	46.9	24.3	129.4	34.4	162.1
1992	.0	472.2	472.2	56.6	51.7	25.6	133.1	128.9	207.1
1993	.0	557.5	557.5	57.1	55.4	26.3	140.4	156.6	245.5
1994	.0	661.6	661.6	57.3	60.1	26.5	154.1	192.9	314.7
1995	.0	771.7	771.7	58.8	69.2	27.1	170.3	228.5	372.9
1996	.0	826.5	826.5	58.8	73.4	26.7	179.0	246.8	402.7
1997	.0	933.8	933.8	59.6	82.0	27.4	190.0	260.7	408.1
1998	.0	1037.2	1037.2	59.9	87.4	27.6	204.9	316.3	516.0
1999	.0	1110.5	1110.5	59.1	95.7	24.3	219.1	338.7	552.7
2000	.0	1202.3	1202.3	59.3	122.8	20.5	262.5	357.1	582.7
2001	.0	1320.4	1320.4	59.9	129.8	27.0	276.7	376.6	647.1
2002	.0	1376.1	1376.1	60.6	143.1	27.9	301.6	408.3	664.2
2003	.0	1497.7	1497.7	61.3	149.7	104.9	315.9	449.1	732.7
2004	.0	1608.6	1608.6	62.0	156.1	112.3	330.4	485.7	792.5
2005	.0	1674.2	1674.2	62.6	166.2	122.7	351.5	502.6	820.1
2006	.0	1674.7	1674.7	63.2	175.6	133.1	371.9	495.1	807.8
2007	.0	1691.5	1691.5	63.2	183.8	133.8	380.8	496.2	809.6
2008	.0	1674.2	1674.2	63.3	187.3	145.0	395.5	465.9	782.6
2009	.0	1675.2	1675.2	63.4	194.7	155.2	413.3	479.5	762.4
2010	.0	1692.1	1692.1	63.4	201.0	163.4	427.8	460.4	763.6
2011	.0	1674.2	1674.2	63.4	207.5	174.4	445.3	467.0	761.9
2012	.0	1674.7	1674.7	63.4	212.4	183.5	458.4	461.8	753.0
2013	.0	1691.5	1691.5	63.5	212.4	189.6	465.5	465.9	760.2
2014	.0	1674.2	1674.2	63.7	215.6	200.4	479.9	453.8	740.4
2015	.0	1675.2	1675.2	63.8	218.1	206.4	488.3	451.0	735.9
2016	.0	1692.1	1692.1	63.9	220.4	219.4	503.7	451.6	736.8
2017	.0	1674.2	1674.2	64.0	217.9	221.2	503.0	445.0	726.1
2018	.0	1674.7	1674.7	64.1	220.7	237.4	522.2	438.0	714.6
2019	.0	1691.5	1691.5	64.3	220.7	252.8	537.7	436.4	715.3
2020	.0	1674.2	1674.2	64.4	218.8	268.9	552.1	426.4	689.7
2021	.0	1675.2	1675.2	64.5	215.6	288.7	568.9	420.4	685.9
2022	.0	1692.1	1692.1	64.6	206.4	300.2	571.2	423.9	694.9
2023	.0	1674.2	1674.2	64.8	197.5	321.7	583.9	414.3	675.9
2024	.0	1674.7	1674.7	64.9	183.9	341.5	590.3	412.1	672.3
2025	.0	1691.5	1691.5	65.0	171.7	375.7	612.4	410.1	669.1
2026	.0	1674.2	1674.2	65.1	157.8	424.7	646.8	390.4	637.0
2027	.0	1675.2	1675.2	65.2	132.0	466.0	663.2	384.6	627.4
2028	.0	1692.1	1692.1	65.3	106.7	527.8	739.8	361.9	590.4
2029	.0	1674.2	1674.2	65.5	71.5	569.2	705.1	291.8	476.2
2030	.0	1674.7	1674.7	65.6	18.4	588.6	672.6	102.4	619.7
TOTAL	.0	59187.3	59187.3	2781.8	2414.4	6191.6	17287.7	15658.1	22911.3
PG	.0	1116.7	1116.7	52.5	121.0	154.6	328.1	299.8	466.9
PG-1C	.0	331.5	331.5	16.5	36.1	46.6	103.3	94.3	153.9

30A
Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	4.8	72.8	- 68.0	- 68.0	- 24.9	- 24.9	- 25.8	- 25.8	- 25.8	- 25.8
1979	10.6	53.8	- 43.1	- 111.1	- 18.9	- 41.8	- 17.6	- 43.5	- 43.5	- 43.5
1980	13.2	40.0	- 26.8	- 137.9	- 13.1	- 54.9	- 13.7	- 57.1	- 57.1	- 57.1
1981	30.2	70.4	- 40.1	- 178.1	- 13.2	- 68.1	- 14.1	- 71.2	- 71.2	- 71.2
1982	61.9	97.3	- 35.4	- 213.5	- 6.0	- 74.1	- 7.3	- 78.0	- 78.0	- 78.0
1983	80.2	66.7	13.5	- 200.1	5.8	- 68.3	4.7	- 73.0	- 73.0	- 73.0
1984	99.6	77.9	21.7	- 178.3	18.0	- 50.3	17.0	- 56.0	- 56.0	- 56.0
1985	135.4	74.6	60.9	- 117.3	35.9	- 14.4	33.4	- 23.4	- 23.4	- 23.4
1986	167.5	52.9	114.6	2.9	61.6	47.2	61.2	37.9	37.9	37.9
1987	197.9	111.4	86.5	89.4	49.0	96.2	42.6	80.4	80.4	80.4
1988	272.4	69.1	203.3	292.8	101.2	197.4	100.8	181.2	181.2	181.2
1989	326.3	60.5	265.8	558.6	143.7	341.1	143.7	324.9	324.9	324.9
1990	342.2	126.9	215.3	773.9	129.9	470.9	122.2	447.1	447.1	447.1
1991	390.8	82.2	308.6	1082.5	172.5	642.5	172.2	619.3	619.3	619.3
1992	472.2	139.2	333.0	1415.5	200.9	843.4	200.0	819.3	819.3	819.3
1993	557.0	126.3	430.7	1846.2	255.4	1098.8	254.7	1073.3	1073.3	1073.3
1994	661.6	142.1	519.5	2365.7	311.4	1410.2	310.5	1384.3	1384.3	1384.3
1995	771.7	211.5	560.2	2925.9	351.0	1761.2	349.4	1724.8	1724.8	1724.8
1996	828.0	143.6	684.4	3610.3	404.5	2165.7	404.1	2164.1	2164.1	2164.1
1997	933.8	213.1	720.7	4331.0	441.3	2607.0	439.7	2603.8	2603.8	2603.8
1998	1037.2	169.2	868.0	5199.0	516.0	3123.0	515.0	3098.0	3098.0	3098.0
1999	1110.0	215.4	894.6	6093.6	540.3	3663.3	539.1	3637.9	3637.9	3637.9
2000	1202.3	200.3	1002.0	7095.6	437.0	4101.2	433.0	4100.0	4100.0	4100.0
2001	1360.4	209.8	1150.6	8246.2	650.3	4751.5	649.0	4750.5	4750.5	4750.5
2002	1376.1	310.7	1065.4	9311.6	641.9	5393.4	639.8	5393.3	5393.3	5393.3
2003	1497.7	218.6	1279.1	10590.7	770.7	6164.1	739.5	6164.1	6164.1	6164.1
2004	1608.6	324.6	1284.0	11874.7	800.1	6964.2	736.9	6964.2	6964.2	6964.2
2005	1674.2	238.9	1435.3	13309.9	809.8	7773.9	808.0	7773.9	7773.9	7773.9
2006	1674.7	290.6	1384.1	14694.0	799.7	8573.6	798.1	8573.6	8573.6	8573.6
2007	1691.5	264.3	1427.2	16121.2	808.8	9382.4	807.4	9382.4	9382.4	9382.4
2008	1674.2	214.4	1459.8	17581.0	815.0	10197.4	814.4	10197.4	10197.4	10197.4
2009	1675.2	263.7	1411.5	18992.5	783.4	10980.8	782.2	10980.8	10980.8	10980.8
2010	1692.1	278.0	1414.1	20406.6	788.4	11769.2	787.7	11769.2	11769.2	11769.2
2011	1674.2	292.6	1381.6	21788.2	762.8	12532.1	761.7	12532.1	12532.1	12532.1
2012	1674.7	263.2	1411.5	23199.7	758.9	13311.0	758.1	13311.0	13311.0	13311.0
2013	1691.5	219.6	1471.9	24671.6	784.6	14095.6	784.6	14095.6	14095.6	14095.6
2014	1674.2	295.0	1379.2	26050.8	744.0	14839.7	743.4	14839.7	14839.7	14839.7
2015	1675.2	262.3	1412.9	27463.7	746.0	15585.7	745.6	15585.7	15585.7	15585.7
2016	1692.1	263.7	1428.4	28892.1	746.1	16331.8	745.7	16331.8	16331.8	16331.8
2017	1674.2	231.4	1442.8	30334.9	758.6	17090.4	759.2	17090.4	17090.4	17090.4
2018	1674.7	304.7	1370.0	31704.9	724.8	17815.4	724.3	17815.4	17815.4	17815.4
2019	1691.5	265.4	1426.1	33131.0	732.1	18547.5	732.0	18547.5	18547.5	18547.5
2020	1674.2	279.0	1395.2	34526.2	714.3	19261.7	714.6	19261.7	19261.7	19261.7
2021	1675.2	265.6	1409.6	35935.8	701.0	19962.8	701.5	19962.8	19962.8	19962.8
2022	1692.1	227.2	1464.9	37400.7	725.8	20688.5	727.3	20688.5	20688.5	20688.5
2023	1674.2	253.0	1421.2	38821.9	693.0	21382.4	695.3	21382.4	21382.4	21382.4
2024	1674.7	222.7	1452.0	40273.9	692.5	22074.9	694.7	22074.9	22074.9	22074.9
2025	1691.5	264.8	1426.7	41700.6	667.4	22742.2	669.4	22742.2	22742.2	22742.2
2026	1674.2	300.7	1373.5	43074.1	629.5	23371.8	632.0	23371.8	23371.8	23371.8
2027	1675.2	221.3	1453.9	44528.0	637.0	24008.8	641.1	24008.8	24008.8	24008.8
2028	1692.1	291.6	1400.5	45928.5	579.8	24588.6	584.0	24588.6	24588.6	24588.6
2029	1674.2	292.0	1382.2	47310.7	491.5	25080.1	497.3	25080.1	25080.1	25080.1
2030	1674.7	286.7	1388.0	48698.7	831.2	25911.3	840.0	25911.3	25911.3	25911.3

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	SHARES EQUITY
1978	72.0	"	69.6	.9	47.9	22.6
1979	52.3	"	117.9	1.6	62.4	37.1
1980	37.5	"	158.4	2.2	106.9	45.7
1981	66.8	"	210.0	3.1	150.6	62.4
1982	92.2	"	291.9	4.4	211.0	85.4
1983	88.4	"	359.5	5.5	262.9	102.1
1984	79.2	"	414.6	6.4	307.5	113.0
1985	55.2	"	452.7	9.0	341.6	120.0
1986	33.0	"	467.3	9.4	368.3	116.4
1987	56.4	"	503.0	15.8	393.9	124.9
1988	33.7	"	514.8	16.2	411.7	115.3
1989	5.2	"	497.8	16.1	409.8	104.1
1990	71.5	"	544.0	16.9	451.2	109.7
1991	26.8	"	543.7	17.2	461.3	99.6
1992	82.6	"	596.5	18.0	507.9	106.7
1993	82.2	"	632.9	18.0	544.1	107.0
1994	84.5	"	688.9	19.6	568.9	111.6
1995	153.5	"	791.3	21.2	677.3	135.1
1996	94.8	"	829.3	22.0	717.6	133.6
1997	153.5	"	929.4	23.6	808.9	152.1
1998	109.2	"	981.1	24.6	832.5	153.1
1999	156.3	"	1073.1	25.8	932.1	166.7
2000	441.1	"	1433.7	30.3	1197.6	266.4
2001	149.9	"	1496.6	31.6	1263.6	264.5
2002	258.1	"	1648.8	34.0	1391.6	291.1
2003	157.4	"	1781.3	35.2	1452.1	284.4
2004	162.6	"	1751.6	36.4	1518.0	277.9
2005	226.3	"	1855.2	38.1	1603.3	290.0
2006	227.7	"	1949.8	39.8	1669.8	299.8
2007	221.1	"	2032.1	41.2	1771.3	302.0
2008	151.1	"	2038.2	41.8	1799.6	288.3
2009	220.3	"	2163.3	43.0	1865.8	280.0
2010	214.6	"	2154.4	44.1	1921.5	277.0
2011	229.1	"	2209.2	45.2	1977.2	277.1
2012	219.8	"	2245.4	46.0	2018.9	272.5
2013	156.1	"	2211.9	46.0	2010.1	247.8
2014	221.4	"	2232.8	46.6	2034.5	244.9
2015	218.5	"	2244.9	47.0	2056.7	235.2
2016	219.8	"	2245.3	47.4	2066.4	226.3
2017	167.4	"	2191.5	47.0	2045.3	193.2
2018	240.6	"	2194.7	47.5	2058.8	183.4
2019	221.1	"	2163.0	47.5	2043.8	166.7
2020	214.6	"	2108.7	47.2	2008.1	147.9
2021	221.1	"	2041.1	46.7	1955.5	132.3
2022	162.6	"	1903.5	45.2	1848.0	99.9
2023	188.2	"	1770.1	43.7	1733.2	80.6
2024	157.9	"	1566.4	41.5	1569.7	56.2
2025	219.8	"	1438.5	39.4	1412.1	57.8
2026	235.6	"	1241.5	37.0	1215.6	62.8
2027	156.1	"	931.5	32.9	915.3	49.1
2028	226.3	"	590.0	28.7	563.2	55.5
2029	226.6	"	47.4	22.8	35.9	34.3
2030	221.1	"	.1	14.0	.0	14.0

TOTAL CAPITAL INVESTMENT

6191.6

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	72.03	24.19002	23.7699	23.7699
1979	124.29	41.86003	41.01569	41.01569
1980	161.81	54.92999	53.39728	53.39728
1981	228.6	77.9601	75.42799	75.42799
1982	320.7998	109.8399	105.8639	105.8639
1983	401.1897	138.28	132.3926	132.3926
1984	471.3796	163.8303	155.5353	155.5353
1985	526.5396	184.9507	173.7795	173.7795
1986	559.5596	199.2607	184.6346	184.6346
1987	615.9595	222.061	203.2666	203.2666
1988	649.7095	238.0312	214.4041	214.4041
1989	654.9094	245.1013	216.1301	216.1301
1990	726.4392	275.2312	239.7249	239.7249
1991	752.4392	291.1314	248.3049	248.3049
1992	805.0691	327.2014	275.5728	275.5728
1993	904.3091	360.1917	308.4819	308.4819
1994	968.6389	399.9617	326.3167	326.3167
1995	1142.239	444.9719	376.9525	376.9525
1996	1227.089	509.4922	404.9392	404.9392
1997	1360.549	579.6423	455.5808	455.5808
1998	1459.779	637.2825	491.6267	491.6267
1999	1646.098	713.9624	543.3124	543.3124
2000	2067.158	889.5725	688.7622	688.7622
2001	2237.079	973.4224	738.2356	738.2356
2002	2487.168	1095.563	820.7654	820.7654
2003	2644.528	1192.473	872.6941	872.6941
2004	2807.088	1297.113	926.3389	926.3389
2005	3033.378	1430.104	1001.014	1001.014
2006	3261.638	1571.234	1076.142	1076.142
2007	3482.127	1718.864	1149.102	1149.102
2008	3633.247	1833.684	1198.971	1198.971
2009	3853.537	1987.754	1271.667	1271.667
2010	4058.127	2146.594	1342.462	1342.462
2011	4297.273	2328.051	1413.1	1413.1
2012	4517.062	2499.139	1490.63	1490.63
2013	4673.121	2663.069	1542.13	1542.13
2014	4894.469	2829.947	1615.175	1615.175
2015	5112.957	2996.255	1687.276	1687.276
2016	5332.746	3266.925	1759.806	1759.806
2017	5500.125	3454.604	1815.041	1815.041
2018	5748.715	3661.594	1894.436	1894.436
2019	5961.805	3918.004	1967.379	1967.379
2020	6176.395	4168.54	2038.21	2038.21
2021	6397.484	4441.553	2111.17	2111.17
2022	6560.043	4711.242	2164.814	2164.814
2023	6719.281	5017.039	2226.933	2226.933
2024	6906.141	5336.437	2277.028	2277.028
2025	7125.93	5713.777	2351.557	2351.557
2026	7361.576	6145.926	2429.321	2429.321
2027	7517.637	6606.363	2480.82	2480.82
2028	7743.926	7180.695	2555.495	2555.495
2029	7970.473	7934.531	2630.256	2630.256
2030	8191.562	8191.602	2703.215	2703.215

PRESENT VALUE OF CAPITAL INV AT RATE %, \$M
 208.467
 PRESENT VALUE OF CAPITAL INV AT RATE %, \$M
 832.8328

38

18.

Cost Summary - Dollars in Millions

NBS	CAPITAL	COMMITTED COST	TOTAL	PRINCIPLE	FINANCED COST	TOTAL
		DEFERMENTS			INTEREST	
					DEFERMENTS	
0.0 TOTAL	8,182.3	2,780.5	10,962.9	8,182.3	2,780.5	10,962.9
1.0 CAPITAL ITEMS	8,182.3		8,182.3	8,182.3		8,182.3
1.1 SYSTEM FACILITIES-EQUIPMENT	6,077.5		6,077.5	6,077.5		6,077.5
1.1.1 SHIP	185.0		185.0	185.0		185.0
1.1.2 CRASH TRANSPORTER/RAIL CAR	243.0		243.0	243.0		243.0
1.1.3 RAIL CAR TUG	19.0		19.0	19.0		19.0
1.1.4 CRASH TRANSPORTER	0.8		0.8	0.8		0.8
1.1.5 SEAFORT FAC	1.0		1.0	1.0		1.0
1.1.6 WATER BASIN 4 PORT	38.0		38.0	37.9	63.7	101.7
1.1.7 WATER BASIN 2 PORT						
1.1.8 WATER BASIN STORAGE	24.0		24.0	24.0	41.3	65.3
1.1.9 PACKAGING FACILITY						
1.1.10 SPILLAGE FAC	116.0		116.0	116.0	201.2	317.2
1.1.11 CRIMESTOPS	1,017.5		1,017.5	1,017.5	818.7	1,836.2
1.1.12 ENFORCEMENT TRAINS	30.0		30.0	30.0	22.9	52.9
1.1.13 INHIBIT MODULE	4,303.4		4,303.4	4,303.4	2,788.3	7,091.7
1.1.14 GEOLOGIC REC MODULE						
1.1.15 RECOVERY PLANT	44.9		44.9	44.9	77.3	122.2
1.1.16 LUMBER FAC	75.0		75.0	75.0	130.1	205.1
1.1.17 RECOVERY FAC						
1.2 SUPPORT FACILITIES EQUIPMENT	5.4		5.4	5.4	7.9	13.3
1.2.1 ADM BLD & FLT YD	1.4		1.4	1.4	2.0	3.4
1.2.2 WAREHOUSE & LUT	4.0		4.0	4.0	5.9	9.9
1.3 CHIEFS COST	1,052.4		1,052.4	1,052.4	968.9	2,021.3
1.4 INTEREST DURING CON	1,047.0		1,047.0	1,047.0	961.3	2,008.3
2.0 CPEP & MAINT		2,780.5	2,780.5		2,780.5	2,780.5
2.1 DIRECT LABOR		281.0	281.0		281.0	281.0
2.1.1 PORT & REC TRNS		5.1	5.1		5.1	5.1
2.1.2 WATER BASIN REC (4PORT)		145.8	145.8		145.8	145.8
2.1.3 WATER BASIN REC (2PORT)						
2.1.4 WATER BASIN STOR		27.1	27.1		27.1	27.1
2.1.5 FACI FAC LABOR						
2.1.6 FACI FAC LABOR		313.7	313.7		313.7	313.7
2.1.7 INHIBIT ENFORCEMENT LABOR		44.0	44.0		44.0	44.0
2.1.8 GEOLOGIC REC MOD LABOR						
2.1.9 CRASH TRNS MAINT LAB		30.7	30.7		30.7	30.7
2.1.10 LUMBER PROCESS LABOR		14.5	14.5		14.5	14.5
2.1.11 LUMBER FAC LABOR						
2.1.12 RECOVERY PLANT LAB						
2.2 INDIRECT LABOR		871.8	871.8		871.8	871.8
2.2.1 PORT & REC TRNS LAB		8.1	8.1		8.1	8.1
2.2.2 W.B. REC (4PORT) LAB		218.6	218.6		218.6	218.6
2.2.3 W.B. REC (2PORT) LAB						
2.2.4 W.B. STOR LAB		40.5	40.5		40.5	40.5
2.2.5 FACI FAC LAB						
2.2.6 FACI FAC LAB		470.4	470.4		470.4	470.4
2.2.7 INHIBIT LAB		65.8	65.8		65.8	65.8
2.2.8 GEO REC MOD LAB						
2.2.9 CRASH TRNS MAINT LAB		46.1	46.1		46.1	46.1
2.2.10 LUMBER FAC LAB		22.3	22.3		22.3	22.3
2.2.11 LUMBER FAC LAB						
2.2.12 REC PLANT LAB						
2.3 MATERIAL SUP UTIL ECT		670.5	670.5		670.5	670.5
2.3.1 PORT REC FHS		8.1	8.1		8.1	8.1
2.3.2 W.B. REC (4PORT) FHS		218.6	218.6		218.6	218.6
2.3.3 W.B. REC (2PORT) FHS						
2.3.4 W.B. STOR FHS		40.5	40.5		40.5	40.5
2.3.5 FACI (FHS) (2500)		470.4	470.4		470.4	470.4
2.3.6 FACI (FHS) (2500)		65.8	65.8		65.8	65.8
2.3.7 INHIBIT FHS						
2.3.8 GEOLOGIC REC FHS						
2.3.9 CRASH TRNS		45.8	45.8		45.8	45.8
2.3.10 LUMBER FAC CRASH		21.3	21.3		21.3	21.3
2.3.11 LUMBER PROCESSING FHS						
2.3.12 RECOVERY PLANT FHS						
2.4 CONTRACTED SERVICES		371.6	371.6		371.6	371.6
2.4.1 SHIP CH		318.4	318.4		318.4	318.4
2.4.2 US PORT FEE		0.4	0.4		0.4	0.4
2.4.3 ELFCP PORT FEE STOR						
2.4.4 US RAIL (SF TO STOR)		17.2	17.2		17.2	17.2
2.4.5 ELFCP RAIL TRNS						
2.4.6 US STOR (TIME) (FHS)		19.6	19.6		19.6	19.6
2.4.7 ELFCP STOR						
2.4.8 US RECON CP						
2.4.9 ELFCP REC CP						
2.4.10 ELFCP WASTE DIS						
2.4.11 US RAIL TRNSP		15.7	15.7		15.7	15.7
2.4.12 ELFCP RAIL TRNSP						
2.4.13 ELFCP RAIL TRNS						
2.4.14 US PORT FEE		0.3	0.3		0.3	0.3
2.4.15 ELFCP PORT FEE						
2.4.16 ELFCP PORT FEE						
2.4.17 PACIFIC PORT FEE						
2.4.18 PACIFIC PORT FEE						
2.4.19 PAC RAIL TRNSP						
2.4.20 PAC RAIL TRNSP						
2.4.21 PAC RAIL TRNSP						
2.5 TECH TRUST FUND		85.7	85.7		85.7	85.7

Section E3.37

Case: 17A-T

Description: SC baseline except transportation only

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics Transportation Only:

Capital investment - 617.1 million dollars

Owners ROI - 19.7%

Service charge - \$45.90/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/YR) \$45.698
 RATE OF RETURN ON INVESTMENT 30.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$6596.605

17A-T

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	.6	.6	.8	2.3	1.4	4.5	.8	3.8
1979	.0	1.4	1.4	1.5	2.6	1.6	5.6	.8	4.3
1980	.0	1.7	1.7	2.4	3.1	1.9	7.4	.8	5.7
1981	.0	3.9	3.9	3.4	3.9	2.4	9.7	.8	5.7
1982	.0	8.1	8.1	3.8	5.5	3.4	13.2	.8	5.8
1983	.0	18.5	18.5	6.1	5.9	3.6	15.7	.8	5.2
1984	.0	13.0	13.0	7.4	5.9	3.7	17.0	.8	4.9
1985	.0	17.7	17.7	4.7	6.0	3.8	14.5	1.2	2.0
1986	.0	21.9	21.9	4.7	6.6	4.3	15.8	2.3	3.6
1987	.0	25.8	25.8	6.9	7.7	5.0	19.3	2.4	3.9
1988	.0	33.6	33.6	5.9	6.4	5.3	19.8	6.0	9.8
1989	.0	42.6	42.6	5.9	6.6	5.7	20.1	6.6	14.0
1990	.0	44.7	44.7	5.6	8.1	5.7	19.7	9.3	15.3
1991	.0	51.0	51.0	6.5	9.9	6.7	23.2	10.6	17.3
1992	.0	61.7	61.7	6.8	10.5	7.2	24.5	14.1	23.0
1993	.0	72.0	72.0	7.2	11.3	7.8	26.3	17.7	28.9
1994	.0	86.4	86.4	7.5	11.6	8.4	27.7	22.3	36.4
1995	.0	100.8	100.8	7.9	12.2	8.8	28.8	27.3	44.6
1996	.0	108.2	108.2	8.2	12.6	9.3	30.2	32.8	45.4
1997	.0	121.9	121.9	9.1	12.9	9.7	31.6	34.3	50.9
1998	.0	135.5	135.5	9.4	14.3	11.2	35.0	38.0	61.9
1999	.0	145.0	145.0	9.7	15.2	11.7	36.7	41.2	67.2
2000	.0	157.0	157.0	9.7	14.6	11.7	36.1	46.0	75.0
2001	.0	172.4	172.4	10.4	14.3	12.0	36.7	51.6	84.2
2002	.0	179.7	179.7	10.7	14.9	12.9	38.5	53.7	87.6
2003	.0	195.6	195.6	11.2	15.0	13.0	39.2	58.8	97.6
2004	.0	210.1	210.1	11.8	15.2	12.8	40.0	64.6	105.4
2005	.0	218.6	218.6	12.3	15.2	12.8	40.7	67.6	110.3
2006	.0	218.7	218.7	12.7	15.7	12.9	41.2	67.5	110.1
2007	.0	220.9	220.9	12.7	15.3	12.1	40.1	68.7	112.1
2008	.0	218.6	218.6	12.7	15.1	12.2	40.0	67.9	110.7
2009	.0	218.8	218.8	12.7	14.7	12.4	39.8	68.0	110.9
2010	.0	221.0	221.0	12.7	13.9	12.3	38.9	69.2	112.9
2011	.0	218.6	218.6	12.7	14.1	12.6	39.3	68.1	111.2
2012	.0	218.7	218.7	12.7	13.6	12.2	38.7	68.5	111.8
2013	.0	220.9	220.9	12.7	13.6	12.4	38.7	69.2	113.0
2014	.0	218.6	218.6	12.7	13.2	12.7	38.3	68.4	111.7
2015	.0	218.8	218.8	12.7	12.5	12.9	38.1	68.6	112.0
2016	.0	221.0	221.0	12.7	11.9	12.3	36.8	70.0	114.2
2017	.0	218.6	218.6	12.7	11.7	12.7	37.1	69.0	112.5
2018	.0	218.7	218.7	12.7	12.5	14.3	39.4	68.1	111.2
2019	.0	220.9	220.9	12.7	11.9	14.3	38.9	69.2	112.9
2020	.0	218.6	218.6	12.7	10.8	13.9	37.4	68.5	112.4
2021	.0	218.8	218.8	12.7	10.1	14.1	36.9	69.1	112.7
2022	.0	221.0	221.0	12.7	10.3	16.1	39.1	69.1	112.8
2023	.0	218.6	218.6	12.7	10.1	16.9	39.6	68.0	111.0
2024	.0	218.7	218.7	12.7	9.7	18.0	40.9	67.6	110.2
2025	.0	220.9	220.9	12.7	9.6	19.8	40.9	68.4	111.6
2026	.0	218.6	218.6	12.7	8.5	24.6	45.7	65.7	107.2
2027	.0	218.8	218.8	12.7	7.3	26.0	46.0	64.9	105.9
2028	.0	221.0	221.0	12.7	5.8	33.3	51.8	64.3	104.9
2029	.0	218.6	218.6	12.7	3.8	44.0	60.9	59.9	97.6
2030	.0	218.7	218.7	12.7	.4	6.0	19.6	75.7	123.4
TOTAL	.0	7729.4	7729.4	515.6	251.5	617.0	1644.1	6318.3	3735.0
AVG	.0	145.8	145.8	9.7	10.4	11.6	31.8	43.6	70.5
ST.DC	.0	45.9	45.9	3.1	3.3	3.7	10.0	13.7	22.2

17A-T

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS			
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	.6	35.4	- 34.8	- 34.8	- 12.1	- 12.1	- 14.6	- 14.6	- 14.6	- 14.6	- 14.6	- 14.6
1979	1.4	6.1	- 4.7	- 39.5	- 4.5	- 16.6	- 4.7	- 19.3	- 4.7	- 19.3	- 4.7	- 19.3
1980	1.7	10.9	- 9.2	- 48.7	- 8.7	- 25.3	- 6.9	- 26.2	- 6.9	- 26.2	- 6.9	- 26.2
1981	3.9	15.7	- 11.8	- 60.5	- 7.9	- 33.2	- 8.2	- 34.4	- 8.2	- 34.4	- 8.2	- 34.4
1982	8.1	30.2	- 22.1	- 82.6	- 11.4	- 44.6	- 12.0	- 46.4	- 12.0	- 46.4	- 12.0	- 46.4
1983	10.5	13.1	- 2.7	- 85.3	- 4.7	- 49.4	- 5.0	- 51.4	- 5.0	- 51.4	- 5.0	- 51.4
1984	13.0	8.6	- 4.4	- 89.7	- 1.6	- 51.0	- 1.8	- 53.2	- 1.8	- 53.2	- 1.8	- 53.2
1985	17.7	7.4	- 10.3	- 100.0	- 3.9	- 47.1	- 4.3	- 57.5	- 4.3	- 57.5	- 4.3	- 57.5
1986	21.9	17.7	- 5.8	- 105.8	- 2.6	- 44.5	- 2.5	- 54.4	- 2.5	- 54.4	- 2.5	- 54.4
1987	25.0	22.7	- 2.3	- 108.1	- 2.2	- 42.4	- 1.7	- 44.0	- 1.7	- 44.0	- 1.7	- 44.0
1988	35.6	18.3	- 16.7	- 124.8	- 9.3	- 33.1	- 9.3	- 33.1	- 9.3	- 33.1	- 9.3	- 33.1
1989	42.6	11.0	- 31.7	- 156.5	- 16.1	- 17.0	- 16.1	- 17.0	- 16.1	- 17.0	- 16.1	- 17.0
1990	44.7	5.6	- 39.1	- 195.6	- 19.1	- 2.1	- 19.1	- 2.1	- 19.1	- 2.1	- 19.1	- 2.1
1991	51.0	32.5	- 18.6	- 214.2	- 13.0	- 15.0	- 12.6	- 12.6	- 12.6	- 12.6	- 12.6	- 12.6
1992	51.7	25.0	- 26.7	- 240.9	- 23.6	- 38.6	- 23.4	- 35.7	- 23.4	- 35.7	- 23.4	- 35.7
1993	72.8	25.0	- 47.8	- 288.7	- 38.3	- 66.9	- 28.1	- 63.8	- 28.1	- 63.8	- 28.1	- 63.8
1994	66.4	28.3	- 38.1	- 326.8	- 36.9	- 103.7	- 34.7	- 98.5	- 34.7	- 98.5	- 34.7	- 98.5
1995	100.3	18.3	- 82.0	- 408.8	- 40.9	- 144.7	- 40.8	- 139.3	- 40.8	- 139.3	- 40.8	- 139.3
1996	108.2	21.5	- 86.7	- 495.5	- 48.8	- 193.4	- 48.6	- 190.0	- 48.6	- 190.0	- 48.6	- 190.0
1997	121.9	19.5	- 102.4	- 597.9	- 57.2	- 250.6	- 57.0	- 251.9	- 57.0	- 251.9	- 57.0	- 251.9
1998	135.5	47.1	- 88.3	- 686.2	- 64.9	- 315.5	- 64.5	- 306.5	- 64.5	- 306.5	- 64.5	- 306.5
1999	145.0	23.0	- 122.0	- 808.2	- 68.1	- 373.6	- 67.9	- 374.4	- 67.9	- 374.4	- 67.9	- 374.4
2000	157.0	9.7	- 147.3	- 955.5	- 73.6	- 447.2	- 73.7	- 444.1	- 73.7	- 444.1	- 73.7	- 444.1
2001	172.4	16.9	- 155.5	- 1111.0	- 86.1	- 534.3	- 86.1	- 530.2	- 86.1	- 530.2	- 86.1	- 530.2
2002	179.7	31.8	- 147.9	- 1258.9	- 84.7	- 619.0	- 84.5	- 624.7	- 84.5	- 624.7	- 84.5	- 624.7
2003	193.6	25.5	- 168.1	- 1427.0	- 97.6	- 716.6	- 97.5	- 722.3	- 97.5	- 722.3	- 97.5	- 722.3
2004	210.1	31.3	- 178.8	- 1605.8	- 103.9	- 820.5	- 103.7	- 826.0	- 103.7	- 826.0	- 103.7	- 826.0
2005	218.6	24.0	- 194.7	- 1800.5	- 111.2	- 931.7	- 111.2	- 937.1	- 111.2	- 937.1	- 111.2	- 937.1
2006	218.7	25.7	- 193.0	- 1993.5	- 110.6	- 1042.3	- 110.5	- 1047.6	- 110.5	- 1047.6	- 110.5	- 1047.6
2007	220.9	19.2	- 201.7	- 2195.2	- 113.1	- 1157.4	- 113.1	- 1162.7	- 113.1	- 1162.7	- 113.1	- 1162.7
2008	218.6	20.7	- 197.9	- 2393.1	- 113.0	- 1270.4	- 113.0	- 1275.8	- 113.0	- 1275.8	- 113.0	- 1275.8
2009	213.8	17.9	- 195.9	- 2589.0	- 113.7	- 1384.1	- 113.7	- 1389.5	- 113.7	- 1389.5	- 113.7	- 1389.5
2010	221.0	12.7	- 208.3	- 2797.3	- 116.6	- 1500.6	- 116.7	- 1506.2	- 116.7	- 1506.2	- 116.7	- 1506.2
2011	218.6	27.2	- 191.4	- 2988.7	- 110.3	- 1610.9	- 110.2	- 1616.4	- 110.2	- 1616.4	- 110.2	- 1616.4
2012	218.7	17.9	- 200.8	- 3189.5	- 113.0	- 1724.7	- 113.9	- 1730.3	- 113.9	- 1730.3	- 113.9	- 1730.3
2013	220.9	25.7	- 195.2	- 3384.7	- 112.6	- 1837.3	- 112.6	- 1842.9	- 112.6	- 1842.9	- 112.6	- 1842.9
2014	218.6	19.4	- 199.2	- 3583.9	- 113.0	- 1950.3	- 113.0	- 1955.9	- 113.0	- 1955.9	- 113.0	- 1955.9
2015	218.8	16.6	- 202.2	- 3786.1	- 113.3	- 2063.3	- 113.6	- 2069.6	- 113.6	- 2069.6	- 113.6	- 2069.6
2016	221.0	17.9	- 203.1	- 3989.2	- 115.4	- 2178.7	- 115.5	- 2185.1	- 115.5	- 2185.1	- 115.5	- 2185.1
2017	218.6	24.6	- 194.0	- 4183.2	- 111.5	- 2290.7	- 111.6	- 2298.6	- 111.6	- 2298.6	- 111.6	- 2298.6
2018	218.7	33.7	- 184.0	- 4367.2	- 106.4	- 2397.1	- 106.3	- 2402.9	- 106.3	- 2402.9	- 106.3	- 2402.9
2019	220.9	19.2	- 201.7	- 4568.9	- 114.3	- 2511.5	- 114.4	- 2517.4	- 114.4	- 2517.4	- 114.4	- 2517.4
2020	218.6	12.7	- 206.0	- 4775.0	- 115.3	- 2626.7	- 115.5	- 2632.6	- 115.5	- 2632.6	- 115.5	- 2632.6
2021	218.8	19.2	- 199.6	- 4974.6	- 113.3	- 2740.0	- 113.4	- 2746.2	- 113.4	- 2746.2	- 113.4	- 2746.2
2022	221.0	32.2	- 188.8	- 5163.4	- 109.3	- 2849.3	- 109.5	- 2859.6	- 109.5	- 2859.6	- 109.5	- 2859.6
2023	218.6	28.5	- 196.1	- 5359.5	- 110.0	- 2959.3	- 110.1	- 2969.7	- 110.1	- 2969.7	- 110.1	- 2969.7
2024	218.7	25.7	- 193.0	- 5552.5	- 110.5	- 3069.8	- 110.5	- 3076.3	- 110.5	- 3076.3	- 110.5	- 3076.3
2025	220.9	17.9	- 203.0	- 5755.5	- 113.5	- 3183.3	- 113.7	- 3189.9	- 113.7	- 3189.9	- 113.7	- 3189.9
2026	218.6	33.7	- 184.9	- 5940.4	- 104.7	- 3288.2	- 104.7	- 3294.7	- 104.7	- 3294.7	- 104.7	- 3294.7
2027	218.8	25.7	- 193.1	- 6133.5	- 106.4	- 3404.6	- 106.6	- 3401.2	- 106.6	- 3401.2	- 106.6	- 3401.2
2028	221.0	24.4	- 196.6	- 6330.1	- 106.1	- 3510.7	- 106.4	- 3507.6	- 106.4	- 3507.6	- 106.4	- 3507.6
2029	218.6	24.6	- 194.0	- 6524.1	- 100.7	- 3611.4	- 101.1	- 3608.7	- 101.1	- 3608.7	- 101.1	- 3608.7
2030	218.7	19.2	- 199.5	- 6723.6	- 123.4	- 3734.9	- 124.0	- 3732.7	- 124.0	- 3732.7	- 124.0	- 3732.7

RATE OF RETURN TO ENTERPRISE OWNER 19.71%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 19.68%

17A-T

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	HOURLING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	34.6	*	33.2	.0	23.0	10.2
1979	4.7	*	36.3	.7	25.8	11.2
1980	7.6	*	42.0	.9	30.0	12.0
1981	12.3	*	51.3	1.2	35.2	14.9
1982	25.3	*	73.8	1.7	54.4	21.2
1983	7.0	*	77.2	2.0	58.3	20.9
1984	1.2	*	74.7	2.2	59.2	15.7
1985	12.7	*	73.6	1.8	59.0	16.6
1986	13.0	*	82.3	1.9	66.0	17.7
1987	15.9	*	93.2	2.4	75.6	20.6
1988	13.0	*	100.7	2.4	82.6	20.9
1989	5.2	*	100.2	2.4	84.2	18.6
1990	.0	*	94.5	2.3	82.1	15.7
1991	26.0	*	113.8	2.7	97.1	19.0
1992	11.7	*	118.3	2.9	102.1	19.0
1993	15.9	*	126.0	3.1	109.6	19.6
1994	13.0	*	130.9	3.2	114.7	19.6
1995	10.4	*	122.6	3.3	117.6	18.3
1996	13.3	*	136.5	3.5	122.0	18.0
1997	10.4	*	137.2	3.7	123.9	17.0
1998	37.7	*	163.7	4.1	142.4	25.2
1999	13.3	*	165.2	4.2	145.6	23.6
2000	.0	*	153.5	4.1	139.6	18.9
2001	6.5	*	147.9	4.1	135.1	16.9
2002	21.1	*	156.1	4.3	140.4	20.0
2003	14.3	*	158.4	4.4	142.0	20.0
2004	19.5	*	163.3	4.6	148.1	21.7
2005	11.7	*	164.2	4.6	147.9	20.9
2006	13.0	*	164.3	4.7	148.6	20.5
2007	6.5	*	156.7	4.7	140.9	17.4
2008	8.1	*	154.5	4.6	144.0	15.2
2009	5.2	*	147.3	4.6	139.5	12.4
2010	14.6	*	135.0	4.4	130.9	8.5
2011	5.2	*	137.0	4.5	132.0	6.5
2012	14.6	*	130.0	4.4	127.1	7.3
2013	13.0	*	130.6	4.4	127.2	7.7
2014	6.9	*	124.7	4.3	122.6	6.4
2015	5.9	*	115.6	4.2	115.1	4.8
2016	5.2	*	108.6	4.1	109.2	3.4
2017	12.0	*	107.8	4.1	107.3	4.1
2018	26.0	*	112.8	4.2	114.5	6.3
2019	6.5	*	111.8	4.1	108.2	7.7
2020	.0	*	97.9	3.9	97.2	4.6
2021	6.5	*	90.3	3.8	90.1	4.6
2022	19.5	*	93.7	3.8	90.2	8.2
2023	15.9	*	92.7	3.8	88.2	8.6
2024	13.0	*	87.2	3.7	85.0	7.9
2025	5.2	*	72.8	3.6	70.5	5.9
2026	21.1	*	69.3	3.5	64.5	6.4
2027	13.0	*	54.3	3.3	50.0	7.4
2028	11.7	*	32.7	3.1	29.6	6.1
2029	12.0	*	.1	2.7	.0	2.8
2028	6.5	*	.1	2.2	.0	2.3

TOTAL CAPITAL INVESTMENT

617.1

17A-T

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	34.62	11.66002	11.4246	11.4246
1979	39.27998	13.49998	12.96229	12.9624
1980	46.86998	16.37003	15.46709	15.4671
1981	59.12997	20.91003	19.51289	19.51289
1982	84.33997	29.96004	27.84868	27.84868
1983	91.39996	33.10005	30.16197	30.16197
1984	92.56996	34.41006	30.54888	30.54887
1985	95.29996	36.34009	31.44697	30.54888
1986	108.3	41.86011	33.73898	31.19299
1987	124.1599	48.55011	40.97878	33.03552
1988	137.1599	54.53012	45.26277	33.03557
1989	142.3599	58.14614	46.97878	33.03555
1990	142.3599	60.23015	46.97878	33.03555
1991	168.3599	71.28015	55.50878	33.03554
1992	180.0599	77.94014	59.41977	33.03552
1993	193.9199	86.36012	64.65356	33.03551
1994	208.9199	94.25023	68.94356	33.03549
1995	219.3199	101.7102	72.37556	33.03548
1996	232.5799	110.6102	78.75136	33.03546
1997	242.9799	119.0802	80.18335	33.03545
1998	260.6797	137.3201	92.62428	33.03543
1999	293.9395	148.1698	97	33.03542
2000	293.9395	155.2899	97	33.03542
2001	300.4399	165.3099	99.145	33.0354
2002	321.4993	181.0697	106.0947	33.0354
2003	335.7991	193.0195	110.8137	33.03539
2004	355.2991	207.1996	117.2467	33.03537
2005	366.999	219.0995	121.1697	33.03535
2006	379.999	231.4195	123.3997	33.03534
2007	386.499	240.5895	127.5447	33.03532
2008	394.5588	250.5393	130.2044	33.03531
2009	399.7588	260.2393	131.9204	33.03529
2010	399.7588	268.8191	131.9204	33.03529
2011	414.3186	282.2991	136.7251	33.03528
2012	419.5186	292.459	138.4411	33.03526
2013	432.5186	305.2991	142.7311	33.03525
2014	439.2783	316.6687	144.9618	33.03523
2015	443.1782	328.0886	146.2488	33.03522
2016	448.3782	339.1587	147.9648	33.0352
2017	468.3381	352.6687	151.9116	33.03519
2018	486.3381	371.2286	160.4916	33.03517
2019	492.8381	384.6687	162.6366	33.03516
2020	492.8381	395.6587	162.6366	33.03516
2021	499.3381	409.2388	164.7816	33.03514
2022	518.8381	428.6287	171.2166	33.03513
2023	534.658	446.4487	176.4563	33.03511
2024	547.658	464.7285	180.7483	33.0351
2025	552.8979	482.4087	182.4563	33.03508
2026	573.9578	509.4785	189.4061	33.03506
2027	586.9578	526.9785	193.696	33.03506
2028	599.6577	549.0483	197.557	33.03505
2029	618.6177	610.5884	201.5888	33.03503
2030	617.1177	617.0884	203.6488	33.03502

PRESENT VALUE OF CAPITAL INV AT RATE %: 4M 19.99998
 78.32647
 PRESENT VALUE OF CAPITAL INV AT RATE %: 4M 10.
 120.4961

CASE - 17A-T
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN BILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Transport							
Capital Expenditures	617.1		617.1	617.1	551.5		1,168.6
Total Transport							
O&M Expenditures		515.5	515.5			515.5	515.5

E3-224

Section E3.38

Case: 17A-S

Description: SC baseline except storage portion only

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics Storage Portion Only:

Capital Investment - 7.207 billion dollars

Owners ROI - 22.1%

Service charge - \$137/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/KG) #137.385
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT #13784.328

17A-S

Yearly Profit and Loss Statement

YEAR	REP REVENUE	GEN CH REVENUE	TOTAL REVENUE	OPEP EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1976	.0	1.9	1.9	.0	2.2	1.3	3.5	.0	1.7
1979	.0	4.2	4.2	.0	4.6	2.7	7.3	.0	3.2
1980	.0	5.2	5.2	.1	6.3	3.8	10.1	.0	4.9
1981	.0	11.8	11.8	.1	9.3	5.6	15.1	.0	3.2
1982	.0	24.2	24.2	.1	12.8	7.8	20.8	1.3	2.1
1983	.0	31.3	31.3	.2	15.6	10.1	26.9	1.7	2.8
1984	.0	38.9	38.9	.2	18.6	12.1	31.4	2.7	4.3
1985	.0	52.9	52.9	.2	22.1	13.8	36.1	.7	1.1
1986	.0	65.4	65.4	.2	25.0	14.5	39.8	4.8	7.9
1987	.0	77.3	77.3	.2	27.3	16.1	43.7	.8	11.9
1988	.0	106.4	106.4	.2	29.3	16.9	46.5	5.8	9.0
1989	.0	127.3	127.3	.2	30.1	16.9	47.1	14.8	22.9
1990	.0	133.7	133.7	.2	30.1	19.8	49.7	13.7	22.3
1991	.0	152.7	152.7	.2	29.4	19.8	57.1	21.1	34.0
1992	.0	164.5	164.5	.2	33.5	22.6	60.6	30.6	49.8
1993	.0	217.8	217.8	.2	37.3	25.5	110.3	48.6	66.3
1994	.0	258.5	258.5	.2	41.3	28.4	117.7	53.5	87.3
1995	.0	301.5	301.5	.2	49.8	34.1	132.0	64.4	105.1
1996	.0	323.7	323.7	.2	53.3	36.9	138.4	70.4	114.9
1997	.0	364.8	364.8	.2	61.4	42.7	152.3	60.8	131.6
1998	.0	405.2	405.2	.2	64.5	45.5	158.2	63.9	133.1
1999	.0	433.8	433.8	.2	68.3	51.2	171.7	66.6	162.5
2000	.0	469.7	469.7	.2	79.4	57.0	184.8	108.3	176.6
2001	.0	515.6	515.6	.2	86.4	62.7	197.6	120.9	197.3
2002	.0	537.6	537.6	.2	90.9	71.9	219.5	120.9	197.2
2003	.0	585.1	585.1	.2	105.1	76.3	230.2	134.9	226.1
2004	.0	628.4	628.4	.2	111.2	80.6	240.6	147.4	240.5
2005	.0	654.0	654.0	.2	121.8	86.2	258.9	150.2	245.0
2006	.0	654.2	654.2	.2	132.1	95.2	276.4	143.6	234.3
2007	.0	660.6	660.6	.2	142.1	102.4	293.7	136.5	227.6
2008	.0	654.0	654.0	.2	147.2	106.6	303.1	133.4	217.6
2009	.0	654.5	654.5	.2	156.9	114.9	321.2	126.7	206.6
2010	.0	661.0	661.0	.2	166.2	123.9	339.7	122.1	199.2
2011	.0	654.0	654.0	.2	175.1	134.5	359.3	112.8	162.7
2012	.0	654.2	654.2	.2	183.4	144.8	378.0	105.0	171.3
2013	.0	660.8	660.8	.2	186.1	152.4	388.4	103.5	166.9
2014	.0	654.0	654.0	.2	193.0	165.8	408.8	93.2	152.1
2015	.0	654.5	654.5	.2	198.6	177.2	436.0	86.8	141.6
2016	.0	661.0	661.0	.2	203.5	192.6	456.4	81.6	133.1
2017	.0	654.0	654.0	.2	203.1	201.9	455.4	75.5	123.1
2018	.0	654.2	654.2	.2	205.6	216.9	473.0	68.9	112.4
2019	.0	660.8	660.8	.2	206.6	223.6	490.8	64.6	105.4
2020	.0	654.0	654.0	.2	206.1	249.3	506.2	56.2	91.7
2021	.0	654.5	654.5	.2	204.2	270.3	525.4	49.0	80.8
2022	.0	661.0	661.0	.2	195.4	282.4	528.9	50.2	81.9
2023	.0	654.0	654.0	.2	187.0	284.2	542.3	42.4	69.2
2024	.0	654.2	654.2	.2	173.9	282.3	547.4	40.6	66.2
2025	.0	660.8	660.8	.2	163.1	335.5	574.0	33.8	55.6
2026	.0	654.0	654.0	.2	148.3	407.4	597.4	17.7	48.3
2027	.0	654.5	654.5	.2	124.1	445.9	621.7	12.5	36.3
2028	.0	661.0	661.0	.2	100.0	547.5	699.3	.8	28.2
2029	.0	654.0	654.0	.2	66.3	756.4	874.5	.0	228.5
2030	.0	654.2	654.2	.2	14.4	214.6	229.8	141.4	231.5
TOTL	.0	23122.3	23122.3	2219.4	3352.4	7607.3	14770.1	3261.6	5078.5

17A-S

Yearly Cash Statement

YEAR	UNFINANCED ENTERPRISE BEFORE TAX				FINANCED ENTERPRISE AFTER TAX				OWNERS	
	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	1.9	33.2	- 31.7	- 31.7	- 11.7	- 11.7	- 12.9	- 12.9	- 12.9	- 12.9
1979	4.2	35.0	- 30.8	- 62.5	- 12.5	- 24.1	- 12.8	- 24.9	- 24.9	- 24.9
1980	5.2	36.1	- 30.9	- 93.4	- 10.5	- 34.6	- 10.7	- 35.6	- 35.6	- 35.6
1981	11.8	46.6	- 35.0	- 128.4	- 14.1	- 48.7	- 14.6	- 50.3	- 50.3	- 50.3
1982	24.2	54.4	- 30.2	- 158.6	- 9.8	- 58.5	- 10.2	- 60.5	- 60.5	- 60.5
1983	31.3	58.1	- 26.8	- 185.4	- 6.4	- 64.9	- 9.9	- 70.4	- 70.4	- 70.4
1984	38.9	58.6	- 9.9	- 195.3	- 2.3	- 67.2	- 2.8	- 73.2	- 73.2	- 73.2
1985	52.9	57.2	- 4.4	- 199.7	- 2.3	- 69.5	- 3.2	- 76.4	- 76.4	- 76.4
1986	65.4	53.3	- 22.2	- 177.5	- 12.7	- 82.2	- 12.6	- 89.0	- 89.0	- 89.0
1987	77.3	67.7	- 10.4	- 187.9	- 13.3	- 95.5	- 12.1	- 101.1	- 101.1	- 101.1
1988	106.4	69.1	- 37.4	- 125.4	- 14.5	- 110.0	- 14.4	- 115.5	- 115.5	- 115.5
1989	127.5	47.8	- 79.7	- 205.1	- 34.4	- 144.4	- 34.9	- 150.4	- 150.4	- 150.4
1990	133.7	112.4	- 14.3	- 219.4	- 12.1	- 156.5	- 11.3	- 161.7	- 161.7	- 161.7
1991	152.7	47.8	- 104.8	- 324.2	- 47.2	- 203.7	- 47.3	- 251.0	- 251.0	- 251.0
1992	184.5	119.4	- 65.0	- 389.2	- 48.6	- 252.3	- 39.2	- 290.2	- 290.2	- 290.2
1993	217.5	119.5	- 98.3	- 487.5	- 58.6	- 310.9	- 57.9	- 348.1	- 348.1	- 348.1
1994	258.5	119.5	- 139.0	- 626.5	- 81.1	- 392.0	- 80.4	- 422.5	- 422.5	- 422.5
1995	301.5	191.1	- 110.4	- 736.9	- 78.9	- 470.9	- 77.5	- 500.0	- 500.0	- 500.0
1996	323.7	119.6	- 204.0	- 940.9	- 113.4	- 584.3	- 112.8	- 612.8	- 612.8	- 612.8
1997	364.8	191.2	- 173.6	- 1114.5	- 109.9	- 694.2	- 108.5	- 721.3	- 721.3	- 721.3
1998	405.2	119.8	- 285.4	- 1400.0	- 155.5	- 849.7	- 155.0	- 884.7	- 884.7	- 884.7
1999	433.8	191.4	- 242.4	- 1642.4	- 144.1	- 993.8	- 142.8	- 1026.6	- 1026.6	- 1026.6
2000	469.7	191.5	- 278.2	- 1920.6	- 160.7	- 1154.5	- 159.4	- 1186.0	- 1186.0	- 1186.0
2001	515.8	191.6	- 324.2	- 2244.8	- 183.5	- 1338.0	- 182.3	- 1370.3	- 1370.3	- 1370.3
2002	537.6	278.8	- 258.7	- 2503.5	- 159.4	- 1497.4	- 157.8	- 1538.1	- 1538.1	- 1538.1
2003	585.1	191.8	- 393.3	- 2896.8	- 213.5	- 1710.9	- 212.0	- 1750.1	- 1750.1	- 1750.1
2004	628.4	191.9	- 436.5	- 3333.3	- 238.3	- 1949.2	- 235.2	- 1985.3	- 1985.3	- 1985.3
2005	654.0	263.5	- 390.5	- 3723.8	- 221.4	- 2170.6	- 219.6	- 2194.9	- 2194.9	- 2194.9
2006	654.2	263.7	- 390.5	- 4114.3	- 215.0	- 2385.6	- 213.8	- 2408.7	- 2408.7	- 2408.7
2007	660.8	263.8	- 397.0	- 4511.3	- 213.9	- 2599.5	- 212.2	- 2620.9	- 2620.9	- 2620.9
2008	654.0	192.4	- 461.7	- 4973.0	- 230.1	- 2829.6	- 229.2	- 2849.1	- 2849.1	- 2849.1
2009	654.5	264.0	- 390.4	- 5363.4	- 200.4	- 3030.0	- 198.8	- 3048.9	- 3048.9	- 3048.9
2010	661.0	264.2	- 396.8	- 5760.2	- 197.6	- 3227.6	- 196.1	- 3244.0	- 3244.0	- 3244.0
2011	654.0	264.3	- 389.7	- 6149.9	- 184.8	- 3412.4	- 183.3	- 3427.3	- 3427.3	- 3427.3
2012	654.2	264.4	- 389.8	- 6539.7	- 177.3	- 3589.7	- 175.9	- 3603.2	- 3603.2	- 3603.2
2013	668.8	193.0	- 475.8	- 7015.5	- 196.5	- 3786.2	- 195.0	- 3801.2	- 3801.2	- 3801.2
2014	654.0	264.6	- 389.4	- 7404.9	- 159.9	- 3946.1	- 158.7	- 3967.0	- 3967.0	- 3967.0
2015	654.5	264.8	- 389.7	- 7794.6	- 152.9	- 4109.0	- 151.0	- 4118.0	- 4118.0	- 4118.0
2016	661.8	264.9	- 396.1	- 8190.7	- 145.1	- 4254.1	- 144.2	- 4268.2	- 4268.2	- 4268.2
2017	654.0	209.1	- 445.0	- 8635.7	- 132.9	- 4387.0	- 132.0	- 4419.2	- 4419.2	- 4419.2
2018	654.2	265.1	- 389.1	- 9024.8	- 125.2	- 4512.2	- 124.2	- 4543.4	- 4543.4	- 4543.4
2019	660.8	265.3	- 395.5	- 9420.3	- 115.1	- 4627.3	- 112.9	- 4660.3	- 4660.3	- 4660.3
2020	654.0	265.4	- 388.6	- 9808.9	- 107.8	- 4735.1	- 107.2	- 4742.5	- 4742.5	- 4742.5
2021	654.5	265.5	- 388.9	- 10197.8	- 95.5	- 4830.6	- 95.8	- 4828.3	- 4828.3	- 4828.3
2022	661.0	194.1	- 466.9	- 10664.7	- 117.0	- 4947.6	- 116.5	- 4964.1	- 4964.1	- 4964.1
2023	654.0	223.5	- 430.5	- 11105.2	- 89.6	- 5037.2	- 81.0	- 5045.1	- 5045.1	- 5045.1
2024	654.2	194.3	- 459.9	- 11565.1	- 85.8	- 5123.0	- 81.9	- 5127.0	- 5127.0	- 5127.0
2025	660.8	266.0	- 394.6	- 11959.7	- 52.8	- 5175.8	- 54.6	- 5180.6	- 5180.6	- 5180.6
2026	654.0	266.1	- 387.9	- 12347.6	- 26.4	- 5202.2	- 26.8	- 5207.4	- 5207.4	- 5207.4
2027	654.5	194.7	- 459.6	- 12807.2	- 34.0	- 5236.2	- 32.1	- 5239.5	- 5239.5	- 5239.5
2028	661.8	266.3	- 394.7	- 13201.9	- 42.9	- 5279.1	- 38.9	- 5278.4	- 5278.4	- 5278.4
2029	654.0	266.4	- 387.6	- 13589.5	- 197.6	- 5476.7	- 192.0	- 5470.4	- 5470.4	- 5470.4
2030	654.2	266.5	- 387.8	- 13977.3	- 231.5	- 5708.2	- 240.1	- 5710.5	- 5710.5	- 5710.5

RATE OF RETURN TO ENTERPRISE OWNER 22.14%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 22.81%

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	33.0	*	32.2	.4	22.2	10.3
1979	34.9	*	64.3	.8	45.1	28.8
1980	26.0	*	88.6	1.1	61.9	25.6
1981	46.7	*	127.7	1.6	92.1	37.2
1982	54.3	*	174.1	2.2	126.8	49.3
1983	57.9	*	221.9	2.9	163.5	61.2
1984	46.6	*	258.4	3.3	193.3	68.3
1985	42.0	*	266.6	6.2	218.2	74.6
1986	16.0	*	290.1	6.4	226.6	89.9
1987	39.9	*	314.0	12.2	249.0	77.1
1988	21.2	*	318.3	12.4	256.4	72.3
1989	.0	*	301.4	12.3	233.0	60.7
1990	71.5	*	353.1	13.0	294.5	71.6
1991	.0	*	333.3	12.9	287.4	58.8
1992	71.5	*	322.2	13.6	327.1	60.7
1993	71.5	*	426.3	14.2	365.5	77.0
1994	71.5	*	471.4	14.9	402.4	83.9
1995	143.1	*	560.4	16.3	485.1	111.6
1996	71.5	*	612.0	16.9	518.2	113.7
1997	143.1	*	715.4	19.3	596.7	136.9
1998	71.5	*	741.4	18.8	625.0	135.1
1999	143.1	*	833.2	20.1	698.4	154.6
2000	143.1	*	919.2	21.3	768.5	172.0
2001	143.1	*	999.6	22.5	835.1	187.0
2002	230.2	*	1157.9	24.6	955.6	226.9
2003	143.1	*	1224.7	25.6	1015.8	234.5
2004	143.1	*	1287.1	26.7	1074.0	239.7
2005	214.6	*	1413.5	28.0	1176.9	265.1
2006	214.6	*	1532.9	30.2	1277.5	285.6
2007	214.6	*	1640.1	31.9	1376.0	301.0
2008	143.1	*	1681.6	32.7	1425.0	289.4
2009	214.6	*	1721.3	34.4	1518.3	297.2
2010	214.6	*	1878.0	35.0	1607.5	300.4
2011	214.6	*	1922.1	37.5	1669.8	299.8
2012	214.6	*	2021.9	39.9	1755.6	299.2
2013	143.1	*	2012.6	39.3	1785.9	266.1
2014	214.6	*	2061.4	39.3	1842.5	239.4
2015	214.6	*	2098.8	41.3	1891.2	249.1
2016	214.6	*	2120.0	42.3	1925.2	226.0
2017	156.7	*	2077.6	42.3	1911.7	208.1
2018	214.6	*	2075.3	42.7	1922.3	195.7
2019	214.6	*	2056.3	42.9	1917.1	182.1
2020	214.6	*	2021.6	42.8	1898.5	165.9
2021	214.6	*	1965.9	42.5	1858.4	150.0
2022	143.1	*	1826.5	41.1	1754.1	113.2
2023	172.4	*	1694.7	39.7	1642.6	91.2
2024	143.1	*	1515.4	37.0	1486.9	66.0
2025	214.6	*	1370.5	35.7	1341.0	65.2
2026	214.6	*	1177.6	33.3	1145.6	65.3
2027	143.1	*	874.7	29.3	856.5	47.6
2028	214.6	*	541.8	25.3	518.9	48.3
2029	214.6	*	.0	19.7	.0	19.8
2030	214.6	*	.0	11.0	.0	11.1

TOTAL CAPITAL INVESTMENT 7207.4

17A-S

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	33.50999	11.29001	11.6593	11.6593
1979	68.42999	23.56999	22.53189	22.53189
1980	94.45999	32.54000	31.17178	31.17178
1981	141.19	49.13005	46.59268	46.59268
1982	195.46	68.62009	64.50173	62.99623
1983	253.37	89.8701	83.81209	79.96477
1984	301.9199	108.57	99.63356	92.15381
1985	343.8999	125.66	113.487	106.0072
1986	361.9197	135.3898	119.4335	106.0072
1987	401.8196	152.7798	132.6094	119.1742
1988	423.0696	164.6902	139.6129	119.1742
1989	423.0696	170.0802	139.6129	119.1742
1990	494.5994	200.1104	163.2178	121.1917
1991	494.5994	207.1704	163.2178	121.1917
1992	566.1292	239.0303	186.8226	121.1917
1993	637.6599	272.2602	210.4274	121.1917
1994	709.1887	306.8101	234.0323	121.1917
1995	852.2485	367.1101	281.2419	121.1917
1996	923.7783	405.6601	304.8467	121.1917
1997	1066.638	470.1501	373.0564	121.1917
1998	1138.368	513.3201	375.6614	121.1917
1999	1281.428	503.03	422.8711	121.1917
2000	1424.468	655.96	470.0808	121.1917
2001	1567.547	732.4399	517.2905	121.1917
2002	1797.737	842.1599	593.2532	121.1917
2003	1940.797	925.01	640.4629	121.1917
2004	2083.837	1009.62	687.6726	121.1917
2005	2259.447	1121.541	728.4873	121.1917
2006	2513.037	1235.521	829.502	121.1917
2007	2727.626	1351.62	909.1165	121.1917
2008	2870.686	1445.71	947.3264	121.1917
2009	3085.276	1565.761	1018.141	121.1917
2010	3299.266	1692.251	1088.956	121.1917
2011	3514.456	1824.681	1159.77	121.1917
2012	3729.046	1963.482	1230.585	121.1917
2013	3972.105	2096.271	1277.795	121.1917
2014	4026.695	2244.221	1348.609	121.1917
2015	4301.265	2410.131	1419.424	121.1917
2016	4515.875	2590.692	1490.239	121.1917
2017	4674.531	2762.818	1542.595	121.1917
2018	4869.121	2966.828	1613.41	121.1917
2019	5103.711	3196.828	1684.224	121.1917
2020	5318.301	3419.799	1755.039	121.1917
2021	5532.691	3674.509	1825.854	121.1917
2022	5675.949	3921.627	1873.063	121.1917
2023	5848.328	4205.715	1925.948	121.1917
2024	5991.387	4504.492	1977.137	121.1917
2025	6205.977	4665.023	2047.972	136.3908
2026	6420.566	4874.945	2118.787	173.998
2027	6563.625	5707.141	2163.996	198.7604
2028	6778.215	6259.352	2238.811	269.575
2029	6992.805	6992.032	2307.625	340.3894
2030	7207.395	7207.422	2378.44	340.3892

PRESENT VALUE OF CAPITAL INV AT RATE % 4M 19.99998
 216.964
 PRESENT VALUE OF CAPITAL INV AT RATE % 4M 18.
 620.0668

CASE - 17A-S
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN BILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Storage Capital Expenditures	7,207.5		7,207.5	7,207.5	5,352.4		12,559.9
Total O&M Expenditures		2,210.5	2,210.5			2,210.5	2,210.5

Section E3.39

Case: 17A-W

Description: SC baseline except waste management portion only

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics Waste Management Only:

Capital investment - 97.5 million dollars

Owners ROI - 20.6%

Service charge - \$21.56/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/PO) \$21.562
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$2439.146

17A-W

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERU CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1978	.0	.3	.3	.0	.3	.2	.4	.0	.1
1979	.0	.7	.7	.1	1.1	.7	1.9	.0	1.2
1980	.0	.8	.8	.2	1.4	.6	2.3	.0	1.5
1981	.0	1.9	1.9	.2	1.9	1.1	3.2	.0	1.4
1982	.0	3.8	3.8	.3	2.7	1.8	4.8	.0	2.8
1983	.0	4.9	4.9	.5	4.0	2.0	7.0	.0	2.0
1984	.0	6.1	6.1	.6	3.4	3.3	7.3	.0	3.2
1985	.0	8.3	8.3	1.2	6.1	3.7	11.0	.0	2.7
1986	.0	10.3	10.3	1.2	6.1	3.8	11.1	.0	.9
1987	.0	12.1	12.1	2.1	6.1	3.9	12.1	.0	.0
1988	.0	16.7	16.7	2.1	6.1	3.9	12.0	1.8	2.9
1989	.0	20.0	20.0	2.1	5.9	3.9	11.9	3.1	5.0
1990	.0	21.0	21.0	2.1	5.8	3.9	11.7	3.5	5.7
1991	.0	24.0	24.0	2.1	5.7	3.9	11.6	4.7	7.7
1992	.0	29.0	29.0	2.1	5.5	3.9	11.5	6.7	10.9
1993	.0	34.2	34.2	2.1	5.3	3.9	11.3	8.7	14.2
1994	.0	40.6	40.6	2.1	5.2	3.9	11.1	11.2	18.3
1995	.0	47.3	47.3	2.1	4.9	3.9	10.9	13.6	22.6
1996	.0	50.8	50.8	2.1	4.7	3.9	10.7	15.3	27.9
1997	.0	57.3	57.3	2.1	4.5	3.9	10.4	17.8	33.1
1998	.0	63.6	63.6	2.1	4.2	3.9	10.2	20.3	38.2
1999	.0	68.1	68.1	2.1	3.9	3.9	9.9	22.1	36.1
2000	.0	73.8	73.8	2.1	3.6	3.9	9.6	24.4	39.8
2001	.0	81.0	81.0	2.1	3.2	3.9	9.3	27.3	44.5
2002	.0	84.4	84.4	2.1	2.8	3.9	8.9	28.7	46.9
2003	.0	91.9	91.9	2.1	2.4	3.9	8.3	31.8	51.9
2004	.0	93.7	93.7	2.1	1.9	3.9	7.7	34.8	56.7
2005	.0	102.7	102.7	2.1	1.5	3.1	6.7	36.3	59.6
2006	.0	102.7	102.7	2.1	1.1	2.8	5.9	36.8	60.8
2007	.0	103.8	103.8	2.1	.7	2.3	5.0	37.0	61.2
2008	.0	102.7	102.7	2.1	.4	1.4	3.9	37.6	61.3
2009	.0	102.8	102.8	2.1	.1	.6	2.8	38.0	62.0
2010	.0	103.8	103.8	2.1	.0	.2	2.2	38.6	63.0
2011	.0	102.7	102.7	2.1	.0	.1	2.1	39.2	62.4
2012	.0	102.7	102.7	2.1	.0	.0	2.1	39.3	62.4
2013	.0	103.8	103.8	2.1	.0	.0	2.1	39.7	63.1
2014	.0	102.7	102.7	2.1	.0	.0	2.1	39.3	62.6
2015	.0	102.8	102.8	2.1	.0	.0	2.1	39.3	62.6
2016	.0	103.8	103.8	2.1	.0	.0	2.1	39.7	63.1
2017	.0	102.7	102.7	2.1	.0	.0	2.1	39.9	62.4
2018	.0	102.7	102.7	2.1	.0	.0	2.1	39.3	62.4
2019	.0	103.8	103.8	2.1	.0	.0	2.1	39.7	63.1
2020	.0	102.7	102.7	2.1	.0	.0	2.1	39.8	62.4
2021	.0	102.8	102.8	2.1	.0	.0	2.1	39.8	62.4
2022	.0	103.8	103.8	2.1	.0	.0	2.1	39.7	63.1
2023	.0	102.7	102.7	2.1	.0	.0	2.1	39.6	62.4
2024	.0	102.7	102.7	2.1	.0	.0	2.1	39.3	62.4
2025	.0	103.8	103.8	2.1	.0	.0	2.1	39.7	63.1
2026	.0	102.7	102.7	2.1	.0	.0	2.1	39.3	62.4
2027	.0	102.8	102.8	2.1	.0	.0	2.1	39.3	62.4
2028	.0	103.8	103.8	2.1	.0	.0	2.1	39.7	63.1
2029	.0	102.7	102.7	2.1	.0	.0	2.1	39.3	62.4
2030	.0	102.7	102.7	2.1	.0	.0	2.1	39.3	62.4
TOTAL	.0	3631.2	3631.2	94.6	114.6	97.0	306.2	1282.2	2609.9
POC	.0	60.5	60.5	1.8	2.2	1.3	5.3	23.9	38.6
STAC	.0	21.6	21.6	.6	.7	.6	1.8	7.0	12.2

17A-W

UNFINANCED ENTERPRISE
BEFORE TAX

Yearly Cash Statement

FINANCED ENTERPRISE
AFTER TAX

OWNERS

YEAR	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL CASH IN	CUM NET CASH
1978	3.3	3.3	-	3.6	1.3	1.3	1.3	1.3
1979	7	12.8	12.1	15.8	4.9	6.2	5.1	6.4
1980	8	4.1	3.2	19.0	2.1	8.3	7.2	13.6
1981	1.9	8.0	6.2	25.2	3.0	11.3	8.1	21.7
1982	3.8	13.0	9.2	34.3	3.7	15.0	11.8	33.5
1983	4.9	20.9	16.0	50.4	6.8	21.8	18.6	52.1
1984	6.1	21.1	15.0	65.4	7.3	29.2	25.9	78.0
1985	8.3	12.9	4.6	70.0	3.7	32.9	3.9	81.9
1986	10.3	3.2	7.1	77.1	1.4	34.3	1.4	83.3
1987	12.1	4.0	8.1	85.2	2.2	36.5	2.1	85.4
1988	16.7	2.1	14.7	100.0	5.7	42.2	5.7	91.1
1989	20.0	2.1	18.0	118.0	7.7	49.9	7.7	98.8
1990	21.0	2.1	18.9	136.9	8.2	58.1	8.3	107.1
1991	24.0	2.1	21.9	158.8	10.0	68.1	10.1	117.2
1992	29.0	2.1	26.9	185.7	13.1	81.2	13.1	130.3
1993	34.2	2.1	32.2	217.9	16.2	97.4	16.3	146.6
1994	40.6	2.1	38.5	256.4	20.1	117.5	20.2	166.8
1995	47.3	2.1	45.3	301.7	24.3	141.8	24.3	191.1
1996	50.8	2.1	48.8	350.5	26.3	168.1	26.4	217.5
1997	57.3	2.1	55.2	405.7	30.2	198.3	30.3	247.8
1998	63.6	2.1	61.6	467.3	34.1	232.4	34.1	281.9
1999	68.1	2.1	66.1	533.4	36.7	269.1	36.8	318.7
2000	73.8	2.1	71.7	605.1	40.1	309.2	40.2	358.9
2001	81.0	2.1	79.0	684.1	44.5	353.7	44.5	403.4
2002	84.4	2.1	82.4	766.5	46.4	399.9	46.5	450.0
2003	91.9	2.1	89.8	856.3	51.1	451.0	51.2	501.2
2004	98.7	2.1	96.6	952.9	55.9	506.9	56.0	557.2
2005	102.7	2.1	100.7	1053.6	58.5	565.4	58.5	615.7
2006	102.7	2.1	100.7	1154.3	58.8	624.2	58.9	674.6
2007	103.8	2.1	101.7	1256.0	60.0	684.2	60.1	734.7
2008	102.7	2.1	100.7	1356.7	60.4	744.6	60.5	795.2
2009	102.8	2.1	100.7	1457.4	61.6	806.2	61.6	856.8
2010	103.8	2.1	101.8	1559.2	62.9	869.1	62.9	919.7
2011	102.7	2.1	100.7	1660.0	62.3	931.4	62.3	982.0
2012	102.7	2.1	100.7	1760.7	62.4	993.8	62.4	1044.4
2013	103.8	2.1	101.7	1862.4	63.1	1056.9	63.1	1107.5
2014	102.7	2.1	100.7	1963.1	62.4	1119.3	62.4	1170.0
2015	102.8	2.1	100.7	2063.8	62.4	1181.7	62.4	1232.4
2016	103.8	2.1	101.8	2165.6	63.1	1244.8	63.1	1295.5
2017	102.7	2.1	100.7	2266.3	62.4	1307.2	62.4	1357.9
2018	102.7	2.1	100.7	2367.0	62.4	1369.6	62.4	1420.3
2019	103.8	2.1	101.7	2468.7	63.1	1432.7	63.1	1483.4
2020	102.7	2.1	100.7	2569.4	62.4	1495.1	62.4	1545.8
2021	102.8	2.1	100.7	2670.1	62.4	1557.5	62.4	1608.2
2022	103.8	2.1	101.8	2771.9	63.1	1620.6	63.1	1671.3
2023	102.7	2.1	100.7	2872.6	62.4	1683.0	62.4	1733.7
2024	102.7	2.1	100.7	2973.3	62.4	1745.4	62.4	1796.1
2025	103.8	2.1	101.7	3074.0	63.1	1807.8	63.1	1858.5
2026	102.7	2.1	100.7	3174.7	62.4	1870.2	62.4	1920.9
2027	102.8	2.1	100.7	3275.4	62.4	1932.6	62.4	1983.3
2028	103.8	2.1	101.8	3376.2	63.1	1995.0	63.1	2045.7
2029	102.7	2.1	100.7	3476.9	62.4	2057.4	62.4	2108.1
2030	102.7	2.1	100.7	3577.6	62.4	2119.8	62.4	2170.5

17A-W

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	DEPRECIATION CAPITAL	LONG TERM DEBT	OWNERS EQUITY
1978	3.9	*	3.7	.0	3.6	1.2
1979	12.7	*	15.7	.2	11.0	5.0
1980	3.9	*	10.8	.3	13.4	0.7
1981	7.6	*	25.0	.3	10.4	7.4
1982	12.7	*	26.3	.3	26.6	10.4
1983	20.5	*	54.5	.7	39.8	15.0
1984	20.5	*	71.7	1.0	52.8	19.9
1985	11.7	*	79.7	1.2	53.8	21.1
1986	1.9	*	77.0	1.2	60.2	18.9
1987	1.9	*	75.9	1.4	60.4	16.8
1988	.0	*	72.0	1.3	59.3	14.0
1989	.0	*	68.1	1.3	58.0	11.4
1990	.0	*	64.2	1.3	56.6	8.8
1991	.0	*	60.3	1.3	55.1	6.4
1992	.0	*	56.4	1.3	53.4	4.2
1993	.0	*	52.5	1.2	51.6	2.1
1994	.0	*	48.6	1.2	49.5	.3
1995	.0	*	44.7	1.2	47.3	1.4
1996	.0	*	40.8	1.1	44.8	2.9
1997	.0	*	36.9	1.1	42.1	4.1
1998	.0	*	33.0	1.0	39.1	0.1
1999	.0	*	29.1	1.0	35.8	0.8
2000	.0	*	25.2	.9	32.3	6.1
2001	.0	*	21.3	.8	28.3	6.1
2002	.0	*	17.4	.8	23.9	2.7
2003	.0	*	13.6	.7	19.3	0.0
2004	.0	*	10.4	.7	15.2	1.8
2005	.0	*	7.7	.6	11.1	3.2
2006	.0	*	4.9	.5	7.2	2.1
2007	.0	*	2.3	.4	3.7	1.0
2008	.0	*	.0	.4	1.4	.8
2009	.0	*	.2	.4	.4	.3
2010	.0	*	.1	.3	.1	.3
2011	.0	*	.0	.3	.0	.3
2012	.0	*	.0	.3	.0	.3
2013	.0	*	.0	.3	.0	.3
2014	.0	*	.0	.3	.0	.3
2015	.0	*	.0	.3	.0	.3
2016	.0	*	.0	.3	.0	.3
2017	.0	*	.0	.3	.0	.3
2018	.0	*	.0	.3	.0	.3
2019	.0	*	.0	.3	.0	.3
2020	.0	*	.0	.3	.0	.3
2021	.0	*	.0	.3	.0	.3
2022	.0	*	.0	.3	.0	.3
2023	.0	*	.0	.3	.0	.3
2024	.0	*	.0	.3	.0	.3
2025	.0	*	.0	.3	.0	.3
2026	.0	*	.0	.3	.0	.3
2027	.0	*	.0	.3	.0	.3
2028	.0	*	.0	.3	.0	.3
2029	.0	*	.0	.3	.0	.3
2030	.0	*	.0	.3	.0	.3
TOTAL CAPITAL INVESTMENT	97.5					

17A-W

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	3.9	1.318001	1.287	1.287
1979	16.56999	2.609999	2.466097	2.466099
1980	20.46999	7.049996	6.732095	6.732096
1981	28.26997	9.839981	9.329999	9.329999
1982	40.99997	14.34999	13.51819	13.5182
1983	61.46997	21.61802	20.26529	20.26529
1984	81.67997	29.06003	27.02029	27.02029
1985	93.67997	33.76004	30.38138	30.38138
1986	99.52997	35.34006	31.52499	31.52497
1987	97.47997	37.00002	32.16838	32.16837
1988	97.47997	38.18003	32.16838	32.16837
1989	97.47997	39.45009	32.16838	32.16837
1990	97.47997	40.8401	32.16838	32.16837
1991	97.47997	42.37012	32.16838	32.16837
1992	97.47997	44.06012	32.16838	32.16837
1993	97.47997	45.92012	32.16838	32.16837
1994	97.47997	47.96012	32.16838	32.16837
1995	97.47997	50.20013	32.16838	32.16837
1996	97.47997	52.67014	32.16838	32.16837
1997	97.47997	55.36014	32.16838	32.16837
1998	97.47997	58.37015	32.16838	32.16837
1999	97.47997	61.66016	32.16838	32.16837
2000	97.47997	65.27016	32.16838	32.16837
2001	97.47997	69.25017	32.16838	32.16837
2002	97.47997	73.62018	32.16838	32.16837
2003	97.47997	78.14018	32.16838	32.16837
2004	97.47997	82.16018	32.16838	32.16837
2005	97.47997	86.33018	32.16838	32.16837
2006	97.47997	90.32018	32.16838	32.16837
2007	97.47997	93.76018	32.16838	32.16837
2008	97.47997	96.07018	32.16838	32.16837
2009	97.47997	97.06017	32.16838	32.16837
2010	97.47997	97.33017	32.16838	32.16837
2011	97.47997	97.46017	32.16838	32.16837
2012	97.47997	97.46017	32.16838	32.16837
2013	97.47997	97.46017	32.16838	32.16837
2014	97.47997	97.46017	32.16838	32.16837
2015	97.47997	97.46017	32.16838	32.16837
2016	97.47997	97.46017	32.16838	32.16837
2017	97.47997	97.46017	32.16838	32.16837
2018	97.47997	97.46017	32.16838	32.16837
2019	97.47997	97.46017	32.16838	32.16837
2020	97.47997	97.46017	32.16838	32.16837
2021	97.47997	97.46017	32.16838	32.16837
2022	97.47997	97.46017	32.16838	32.16837
2023	97.47997	97.46017	32.16838	32.16837
2024	97.47997	97.46017	32.16838	32.16837
2025	97.47997	97.46017	32.16838	32.16837
2026	97.47997	97.46017	32.16838	32.16837
2027	97.47997	97.46017	32.16838	32.16837
2028	97.47997	97.46017	32.16838	32.16837
2029	97.47997	97.46017	32.16838	32.16837
2030	97.47997	97.46017	32.16838	32.16837

PRESENT VALUE OF CAPITAL INU AT RATE %: \$M 19.99998
 39.14182
 PRESENT VALUE OF CAPITAL INU AT RATE %: \$M 10.
 59.2373

CASE - 17A-W
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN BILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Waste Management							
Capital Expenditures	97.5		97.5	97.5	114.6		212.1
Total Waste Management							
O&M Expenditures		94.5	94.5			94.5	94.5

Section E3.40

Case: 17A-A

Description: SC baseline except sum of transport, storage, and waste management functions

Summary of Input Characteristics:

Financial

Enterprise ROI - 20%

Borrowing - 2/3 of any capital expenditure at 10%

Government financial participation - none (private enterprise)

Location

Transportation - from island in Pacific

Location cost factor - 1.0

Water provisions - none

Storage

Type of storage - aircooled vaults

Storage cost factor - 1.0

Recovery

Start up time - 2000

Modular plant - single plant

Value of recovered products - 260 \$/Kg spent fuel

Pricing

Service charge - average over fuel population

Recovery credit - none

Summary of Output Characteristics:

Capital investment - 7.922 billion dollars

Owners ROI - 21.3%

Service charge - \$204/Kilogram of spent fuel

COST OF SPENT FUEL SERVICE (DOLLARS/MG) \$204.667
 RATE OF RETURN ON INVESTMENT 20.00%
 TOTAL NET CASH FLOW OVER TOTAL LIFE OF PROJECT \$23727.350

17A-A

Yearly Profit and Loss Statement

YEAR	REP REVENUE	SERV CH REVENUE	TOTAL REVENUE	OPER EXPEN	INT EXPEN	DEP EXPEN	TOTAL EXPEN	TAXES	NET INCOME
1973	.0	2.8	2.8	.8	4.8	2.9	8.5	.0	5.7
1974	.0	6.2	6.2	1.6	8.3	5.0	14.9	.0	6.7
1975	.0	7.7	7.7	2.6	10.7	6.5	19.8	.0	12.1
1976	.0	17.6	17.6	3.8	15.1	9.1	27.9	.0	10.3
1977	.0	36.0	36.0	5.4	21.1	12.8	39.3	.0	3.3
1978	.0	46.7	46.7	6.8	26.5	16.2	49.5	.0	2.8
1979	.0	58.9	58.9	8.2	30.9	19.1	58.1	.0	.2
1980	.0	72.8	72.8	21.1	34.2	21.3	76.7	.8	1.3
1981	.0	97.6	97.6	21.2	33.9	22.6	77.7	6.8	11.1
1982	.0	115.3	115.3	36.7	39.2	24.9	100.8	.0	5.6
1983	.0	138.7	138.7	35.7	40.8	26.3	102.8	12.6	22.2
1984	.0	150.0	150.0	35.8	40.4	26.5	102.7	23.7	41.6
1985	.0	159.3	159.3	35.8	44.3	27.4	107.5	26.6	25.0
1986	.0	227.6	227.6	36.4	45.1	30.4	131.9	36.4	35.4
1987	.0	275.0	275.0	36.7	49.5	33.7	149.9	51.3	83.7
1988	.0	324.7	324.7	37.1	54.1	37.2	148.4	66.9	109.2
1989	.0	385.3	385.3	37.6	58.3	40.6	156.5	87.0	141.9
1990	.0	449.4	449.4	38.0	66.9	46.0	171.7	105.5	172.2
1991	.0	482.5	482.5	38.4	70.7	50.1	179.2	115.3	193.1
1992	.0	543.8	543.8	39.4	78.8	56.3	194.5	132.8	216.6
1993	.0	604.1	604.1	39.7	83.6	60.7	203.9	152.0	248.1
1994	.0	646.7	646.7	60.1	91.2	66.9	218.2	162.8	265.7
1995	.0	700.2	700.2	68.2	97.6	72.6	238.4	178.5	291.3
1996	.0	769.0	769.0	69.9	103.9	79.6	243.5	199.7	325.8
1997	.0	801.4	801.4	61.4	116.7	88.7	266.7	203.2	331.0
1998	.0	872.2	872.2	63.0	122.5	92.1	277.6	226.3	366.6
1999	.0	936.8	936.8	66.7	129.7	96.0	292.4	246.6	402.4
2000	.0	975.0	975.0	63.3	133.9	104.0	301.2	254.1	414.7
2001	.0	975.3	975.3	63.6	148.8	110.9	323.3	247.7	494.1
2002	.0	985.1	985.1	65.9	158.1	116.8	339.9	245.6	490.7
2003	.0	975.0	975.0	64.0	162.7	120.2	346.9	239.7	389.4
2004	.0	975.6	975.6	64.2	171.3	127.9	363.4	232.5	379.3
2005	.0	965.4	965.4	64.3	180.2	136.4	380.9	229.7	371.8
2006	.0	975.0	975.0	64.4	189.2	147.1	400.7	218.2	356.6
2007	.0	975.3	975.3	64.6	196.9	157.0	418.5	211.6	345.2
2008	.0	985.1	985.1	64.6	199.7	164.3	429.6	211.3	344.7
2009	.0	975.0	975.0	64.8	206.1	173.4	444.4	199.7	325.9
2010	.0	975.6	975.6	64.9	211.1	180.1	456.2	193.6	315.6
2011	.0	965.4	965.4	65.0	215.4	184.3	465.7	190.1	310.1
2012	.0	975.0	975.0	65.1	214.9	214.6	494.6	182.6	287.8
2013	.0	975.3	975.3	65.3	218.0	231.2	514.5	175.1	265.7
2014	.0	985.1	985.1	65.4	218.5	247.9	531.8	172.3	261.1
2015	.0	975.0	975.0	65.5	216.9	263.2	545.6	163.2	246.2
2016	.0	975.6	975.6	65.7	214.4	284.4	564.4	156.3	235.0
2017	.0	965.4	965.4	65.7	209.7	298.6	574.1	157.8	207.5
2018	.0	975.0	975.0	65.9	197.1	321.1	584.0	148.6	183.4
2019	.0	975.3	975.3	66.0	183.5	340.8	590.3	146.3	188.7
2020	.0	985.1	985.1	66.1	171.7	379.1	618.9	139.9	168.3
2021	.0	975.0	975.0	66.2	156.9	432.0	655.2	121.5	138.3
2022	.0	975.6	975.6	66.3	151.5	474.0	671.8	115.5	128.4
2023	.0	965.4	965.4	66.5	145.8	520.8	733.1	88.3	144.0
2024	.0	975.0	975.0	66.6	70.0	600.9	937.5	14.3	23.3
2025	.0	975.3	975.3	66.6	14.8	621.1	902.5	355.7	417.1
TOTAL	.0	34469.7	34469.7	2320.4	6018.5	1922.0	10760.7	6747.3	10661.6
AVG	.0	650.4	650.4	53.2	113.6	149.5	316.2	127.3	206.8
\$/MG	.0	204.7	204.7	16.7	36.7	47.0	99.5	40.1	65.1

17A-A

Yearly Cash Statement

UNFINANCED ENTERPRISE
BEFORE TAX:FINANCED ENTERPRISE
AFTER TAX:

OWNERS

YEAR	ANNUAL CASH IN	ANNUAL CASH OUT	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH	ANNUAL NET CASH	CUM NET CASH
1978	2.8	72.8	- 70.0	- 70.0	- 87.1	- 87.1	- 88.0	- 88.0
1979	6.2	53.9	- 47.7	- 117.7	- 81.9	- 169.0	- 129.8	- 208.8
1980	7.7	40.2	- 32.5	- 150.2	- 19.3	- 189.7	- 19.8	- 228.6
1981	17.6	70.0	- 52.9	- 203.1	- 25.1	- 214.8	- 26.0	- 254.6
1982	36.0	97.6	- 61.6	- 264.7	- 23.5	- 238.3	- 24.8	- 289.4
1983	46.7	92.2	- 45.5	- 310.1	- 18.2	- 256.5	- 19.4	- 308.8
1984	53.0	79.4	- 26.4	- 336.5	- 8.6	- 265.1	- 9.5	- 318.3
1985	73.8	77.6	1.3	- 335.2	1.1	- 264.0	3.8	- 314.5
1986	97.6	54.1	43.4	- 291.8	16.9	- 247.1	16.7	- 297.8
1987	115.2	114.4	.8	- 291.0	6.5	- 240.6	13.0	- 284.8
1988	128.7	90.0	38.7	- 252.3	29.5	- 211.1	29.3	- 254.1
1989	150.0	60.0	90.0	- 162.3	58.1	- 153.0	58.2	- 195.9
1990	159.3	127.0	32.3	- 130.0	39.3	- 113.7	39.7	- 155.6
1991	227.6	82.4	145.2	- 64.8	70.1	- 43.6	69.9	- 85.7
1992	275.0	140.0	135.0	69.2	77.2	33.4	76.4	121.4
1993	324.7	144.5	180.1	249.3	105.0	248.4	102.2	223.6
1994	385.3	142.1	243.2	492.5	136.0	384.4	137.2	361.8
1995	449.4	211.4	238.0	730.5	149.0	533.4	147.4	511.2
1996	482.5	145.2	337.3	1067.8	163.4	696.8	157.7	668.9
1997	543.8	212.9	330.9	1398.7	197.2	894.0	195.6	863.5
1998	604.1	168.9	435.1	1833.8	244.3	1138.3	243.5	1103.9
1999	646.7	216.4	430.3	2264.1	248.7	1387.0	247.4	1351.4
2000	700.2	203.3	496.9	2761.0	320.2	1707.2	319.2	1670.6
2001	769.0	210.5	558.5	3319.5	313.9	2021.1	312.7	1982.3
2002	801.4	312.6	488.7	3808.2	290.3	2311.4	288.1	2270.4
2003	872.2	219.3	652.9	4461.1	322.1	2633.5	321.0	2591.4
2004	936.8	225.2	711.6	5172.7	395.8	3029.3	394.7	3019.1
2005	975.0	289.6	685.4	5858.1	370.9	3400.2	369.1	3388.2
2006	975.3	291.4	683.9	6542.0	384.7	3784.9	382.9	3771.1
2007	985.1	285.0	700.1	7242.1	388.7	4173.6	387.2	4160.3
2008	975.0	215.1	759.9	8002.0	403.3	4576.9	402.0	4568.3
2009	975.6	283.9	691.7	8693.7	375.5	4952.4	373.9	4936.2
2010	965.4	278.9	686.5	9380.2	376.9	5329.3	375.4	5313.6
2011	975.0	293.6	681.4	10061.6	357.1	5686.4	355.8	5651.4
2012	975.3	284.3	691.0	10752.6	353.3	6039.7	352.0	6006.4
2013	965.1	280.7	684.4	11437.0	375.9	6415.6	373.4	6383.8
2014	975.0	286.1	688.9	12125.9	335.0	6750.6	333.9	6717.7
2015	975.6	283.4	692.2	12818.1	328.7	7079.3	327.3	7045.0
2016	965.4	284.8	680.6	13508.7	323.3	7402.6	322.6	7367.6
2017	975.0	235.7	739.3	14248.0	326.6	7729.2	326.7	7694.3
2018	975.3	305.8	669.5	14917.5	299.9	8029.1	299.4	8004.7
2019	965.1	286.5	678.6	15596.1	296.5	8325.6	296.2	8305.9
2020	975.0	280.1	694.9	16291.0	285.2	8610.8	285.5	8591.2
2021	975.6	286.7	688.9	16979.9	271.0	8881.8	271.4	8858.6
2022	965.4	288.3	677.1	17657.0	269.4	9151.2	269.8	9128.4
2023	975.0	254.1	720.9	18377.9	261.8	9413.0	263.2	9411.6
2024	975.3	322.0	653.3	19031.2	262.4	9675.4	264.7	9686.3
2025	985.1	385.9	599.2	19630.4	229.2	9904.6	231.1	9917.5
2026	975.0	301.9	673.1	20303.5	193.3	10097.9	195.8	10093.3
2027	975.6	322.4	653.2	20956.7	202.7	10300.6	206.3	10309.6
2028	965.4	292.7	672.7	21629.4	140.6	10441.2	144.8	10446.0
2029	975.0	293.1	681.9	22311.3	49.1	10490.3	50.0	10491.0
2030	975.3	287.7	687.6	22998.9	417.1	10907.4	426.3	10917.3

RATE OF RETURN TO ENTERPRISE OWNER 21.32%
 RATE OF RETURN AFTER TAX OF ENTERPRISE 21.92%

17A-A

Capital Investment Balance Sheet

YEAR	CAPITAL INVESTMENT		FIXED ASSETS	WORKING CAPITAL	LONG TERM DEBT	CHIEFS EQUITY
1978	72.8		69.1	1.9	47.8	22.3
1979	52.2		116.4	1.7	81.9	36.2
1980	37.5		147.3	2.2	185.6	43.9
1981	66.6		205.1	3.1	146.7	58.6
1982	92.2		284.5	4.4	297.8	81.1
1983	85.4		353.6	5.5	261.6	97.6
1984	70.2		484.8	6.5	384.3	107.0
1985	56.4		439.9	9.2	337.0	112.1
1986	33.0		430.2	9.0	353.2	106.5
1987	57.7		483.0	16.0	385.1	113.9
1988	34.2		490.9	18.1	408.3	106.8
1989	5.2		469.6	16.0	395.2	90.4
1990	71.5		511.8	16.6	433.2	95.2
1991	26.0		507.3	16.9	439.6	84.7
1992	32.2		556.8	17.7	462.6	91.9
1993	87.4		687.0	18.5	526.0	99.0
1994	84.5		650.9	19.3	566.5	103.7
1995	153.5		757.6	20.8	650.8	126.4
1996	84.8		792.2	21.5	684.9	126.8
1997	153.5		869.4	23.0	762.6	143.8
1998	109.2		923.0	23.9	887.5	154.4
1999	156.3		1027.4	23.2	979.9	172.6
2000	143.1		1097.8	26.3	993.3	164.8
2001	149.6		1158.7	27.5	998.4	157.8
2002	251.2		1331.3	29.7	1115.8	241.2
2003	157.4		1376.6	30.8	1177.9	249.5
2004	162.6		1462.7	31.9	1237.4	257.2
2005	226.3		1564.9	33.7	1335.9	282.7
2006	227.6		1701.7	35.4	1433.2	303.9
2007	221.1		1806.0	37.0	1525.6	317.4
2008	151.1		1836.9	37.8	1570.3	304.3
2009	219.8		1728.8	39.3	1658.4	309.7
2010	214.6		2607.0	40.8	1738.6	309.1
2011	229.1		2089.1	42.3	1821.8	309.6
2012	219.8		2151.8	43.6	1892.6	302.8
2013	156.1		2143.1	44.1	1913.0	274.1
2014	221.4		2166.0	45.2	1965.0	266.1
2015	218.5		2214.3	46.0	2006.2	254.1
2016	219.8		2229.3	46.7	2034.3	241.7
2017	170.6		2165.3	46.7	2019.1	212.9
2018	240.6		2134.8	47.2	2056.8	205.2
2019	221.1		2160.0	47.3	2025.2	190.1
2020	214.6		2119.4	47.1	1995.6	170.8
2021	221.1		2056.1	46.7	1948.4	154.3
2022	162.6		1980.1	45.2	1844.3	121.0
2023	128.2		1787.2	43.0	1738.8	109.2
2024	156.1		1662.4	41.6	1569.8	74.2
2025	219.8		1443.2	39.6	1411.4	71.9
2026	225.6		1246.8	37.2	1210.1	74.0
2027	156.1		923.9	33.0	906.4	55.4
2028	226.3		574.3	38.7	548.4	54.6
2029	226.6		.0	22.3	.1	22.9
2030	221.1		.0	13.6	.1	13.6

TOTAL CAPITAL INVESTMENT 7922.0

17A-A

Capital Investment Sources

YEAR	TOTAL CUMULATIVE FACILITY INVESTMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS PLUS DEBT RETIREMENT	OWNERS INVESTMENT PLUS CASH FROM OPERATIONS	OWNERS INVESTMENT
1978	72.03	24.26001	23.7699	23.7699
1979	124.28	42.40002	41.01239	41.01239
1980	161.8	56.02	55.394	55.39399
1981	228.53	79.8801	78.43469	78.43466
1982	320.7898	112.2399	109.8606	109.8607
1983	406.1797	144.5901	134.0393	134.0394
1984	476.3696	172.0503	157.302	157.2921
1985	532.7795	195.7803	175.8172	175.8174
1986	565.7495	212.5205	188.6973	175.9261
1987	623.4595	238.3909	205.7416	194.9704
1988	657.7095	257.4412	217.0441	194.9704
1989	662.9094	267.7114	218.7601	194.9704
1990	724.4392	301.2214	243.3649	194.9704
1991	768.4392	320.8716	250.9449	194.9704
1992	843.6692	361.0818	278.4106	194.9704
1993	931.0591	404.5317	307.2493	194.9704
1994	1015.589	449.0718	335.1443	194.9704
1995	1169.049	519.072	385.7859	194.9704
1996	1253.839	568.9221	413.7666	194.9704
1997	1407.299	644.6624	464.4064	194.9704
1998	1516.529	709.0625	500.4543	194.9704
1999	1672.848	792.9826	552.0393	194.9704
2000	1813.903	876.5725	599.2495	194.9704
2001	1945.468	967.0525	648.2042	194.9704
2002	2216.712	1096.593	721.2168	194.9703
2003	2374.078	1195.223	783.4456	194.9703
2004	2536.638	1292.253	837.0903	194.9703
2005	2762.327	1427.622	911.7659	194.9703
2006	2990.517	1557.223	966.2706	194.9703
2007	3211.697	1666.953	1059.83	194.9702
2008	3362.727	1772.363	1169.7	194.9702
2009	3562.517	1894.143	1182.23	194.97
2010	3797.187	2058.464	1253.045	194.97
2011	4026.257	2204.504	1323.665	194.9699
2012	4246.843	2353.46	1401.134	194.9698
2013	4482.102	2499.09	1452.823	194.9698
2014	4623.449	2656.417	1523.738	194.9697
2015	4841.937	2835.756	1597.839	194.9696
2016	5061.727	3027.385	1670.37	194.9696
2017	5292.344	3213.223	1756.873	194.9696
2018	5472.934	3426.163	1806.068	194.9693
2019	5694.023	3666.823	1879.028	194.9693
2020	5938.613	3912.963	1943.842	194.9693
2021	6127.703	4121.262	2022.002	194.969
2022	6292.362	4347.969	2076.446	194.969
2023	6480.5	4749.68	2138.565	194.9689
2024	6636.559	5066.746	2190.064	194.9689
2025	6856.348	5444.957	2267.594	194.9688
2026	7091.996	5881.945	2340.358	194.9687
2027	7248.055	6341.645	2391.858	194.9687
2028	7479.344	6823.222	2466.533	194.9686
2029	7708.891	7300.949	2541.294	240.537
2030	7921.28	7922.039	2614.253	240.5369

PRESENT VALUE OF CAPITAL INI AT RATE % IN

19.99998

336.6267

PRESENT VALUE OF CAPITAL INI AT RATE % IN

10.

807.7532

CASE - 17A-A
GLOBAL SPENT FUEL LOGISTICS STUDY
COST SUMMARY - DOLLARS IN MILLIONS

WBS	CAPITAL	OPERATIONS	TOTAL	PRINCIPLE	INTEREST	OPERATIONS	TOTAL
Total Capital Expenditures							
for Storage only	7,207.5		7,207.5	7,207.5	5,352.4		12,559.9
Waste Management only	97.5		97.5	97.5	114.6		212.1
Transport only	617.1		617.1	617.1	551.5		1,168.6
Total O&M Expenditures							
for Storage only		2,210.5				2,210.5	
Waste Management only		94.5				94.5	
Transport only		515.5				515.5	
Total	7,922.1	2,820.4	7,922.1	7,922.1	6,018.5	2,820.4	13,940.6

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