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Engineering Study For Closure of 209E Facility

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U.S. Department of Energy Contract DE-AC06-96RL13200

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Key Words: Critical mass laboratory, CML, 209E Building, non-nuclear classification, Critical Assembly Room, Mix room, criticality experiments, decontamination, decommissioning.

Abstract: This document is an engineering study for evaluating alternatives to determine the most cost effective closure plan for the 209E Facility, Critical Mass Laboratory. This laboratory is located in the 200 East Area of the Hanford Site and contains a Critical Assembly Room and a Mix room were criticality experiments were once performed.

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Engineering Study

Closure of the 209E Facility

Work Order E61945

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
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a.

ENGINEERING STUDY
for
CLOSURE OF THE 209E FACILITY

Prepared
for
Lockheed Martin Hanford Corporation
by
Fluor Daniel Northwest

APPROVED:

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ACRONYM AND ABBREVIATIONS LIST

BCCAA	Benton County Clean Air Authority
BHI	Bechtel Hanford, Inc.
BWHC	Babcock &Wilcox Hanford Company
CAR	critical assembly room
CFR	Code of Federal Regulations
CFRP	consolidated fuel reprocessing program
CML	Critical Mass Laboratory
D&D	decontamination and decommission
DOE	U.S. Department of Energy
EA	environmental assessment
Ecology	Washington State Department of Ecology
EM-40	U.S. Department of Energy, Environmental Restoration Division
EM-60	U.S. Department of Energy, Office of Facility Transition
FDNW	Fluor Daniel Northwest, Inc.
FEAS	fuel element assembly system
HEPA	high-efficiency particulate air
HVAC	heating, ventilating, and air conditioning
LMHC	Lockheed Martin Hanford Company
NDA	nondestructive analysis
NEPA	National Environmental Policy Act
NOC	Notice of Construction
PBS	polymeric barrier system
Pu	plutonium
PUREX	Plutonium Uranium Extraction Facility
RCRA	Resource Conservation and Recovery Act
RL	Richland Operations Office (DOE)
ROM	rough order of magnitude
SAR	safety analysis report
SWB	standard waste box
TK	tank
WIPP	Waste Isolation Pilot Plant
WRAP	waste receiving and packaging
WSDOH	Washington State Department of Health

ENGINEERING STUDY
for
CLOSURE OF THE 209E FACILITY

WORK ORDER E61945

I. INTRODUCTION

The Critical Mass Laboratory (CML) is located in the 200-East Area of the Hanford Site, south of 7th Street and east of Baltimore Avenue (Fig 1). The building is identified as the 209E Facility. The facility was designed to provide a heavily-shielded reactor room where quantities of fissile materials in solution could be brought into critical configurations under carefully controlled and monitored conditions (Fig 2). The facility no longer has a mission and is awaiting final closure and decontamination and decommissioning (D&D).

The CML is not included in any Resource Conservation and Recovery Act (RCRA) Part A or B permit. National Environmental Policy Act (NEPA) documentation was not found in the Hanford Site NEPA files for the 209E Facility.

Two CML rooms identified for remediation are the Critical Assembly Room (CAR) (Fig 3) and the Mix room (Fig 4). The CAR contains contaminated equipment including 4 gloveboxes, 12 tanks, and miscellaneous vessels and bottles. Criticality experiments were conducted in the CAR. The room contains two reactor gloveboxes where the critical test assemblies are contained. The Mix room provided the necessary facilities for receiving, handling, and preparing the various forms of fissile materials during the experiments. The room contains contaminated equipment, including three gloveboxes and eight tanks. An office complex, equipment room, and changeroom are a part of the 209E Facility, but are not addressed for closure in this engineering study.

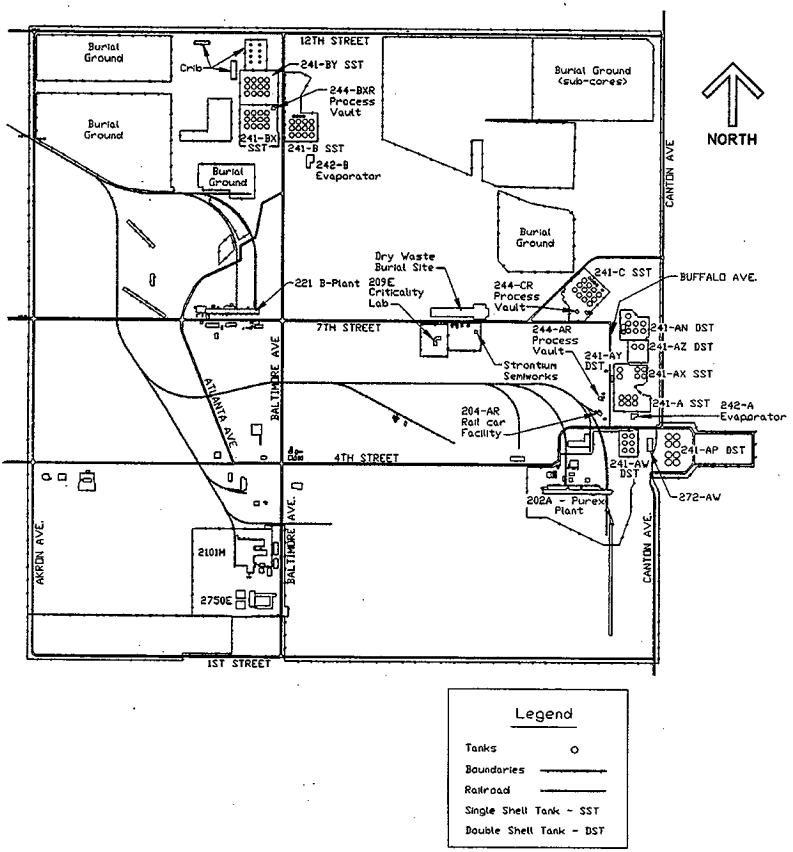

Figure 1: Hanford Site, 200-East Area

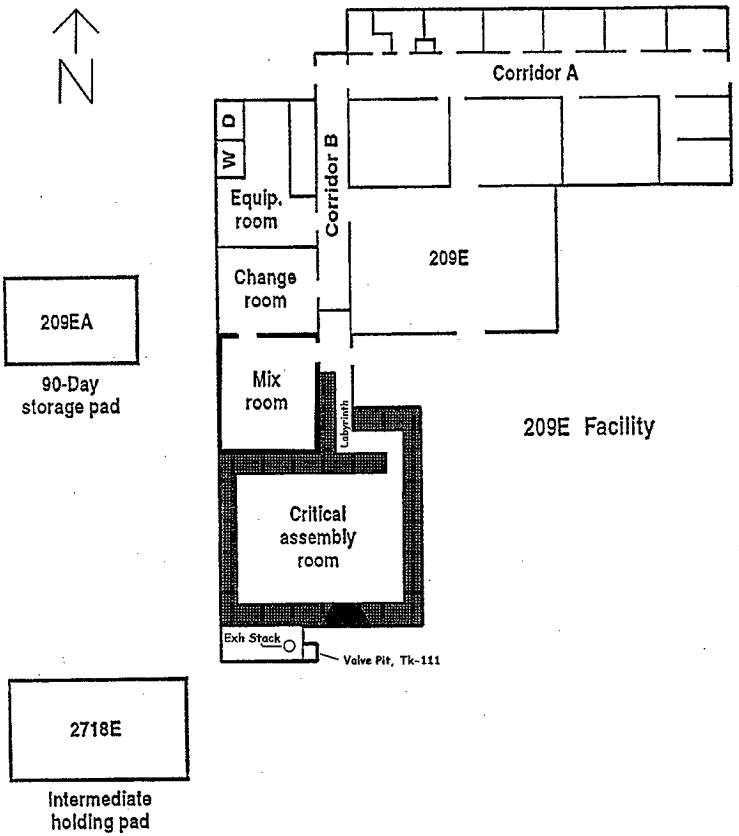

Figure 2: Critical Mass Laboratory, 209E Facility, Facility Layout

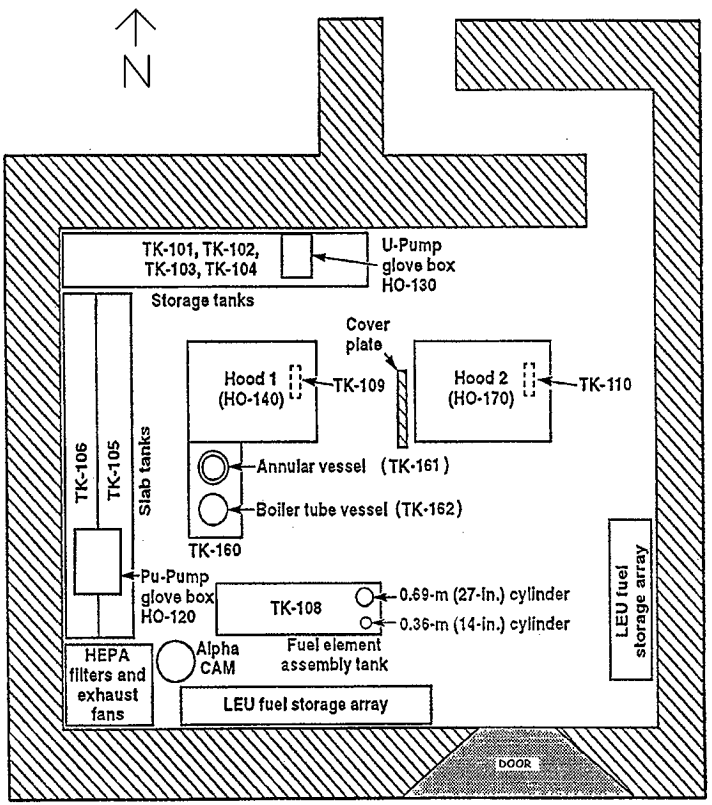

Figure 3: Critical Assembly Room Layout

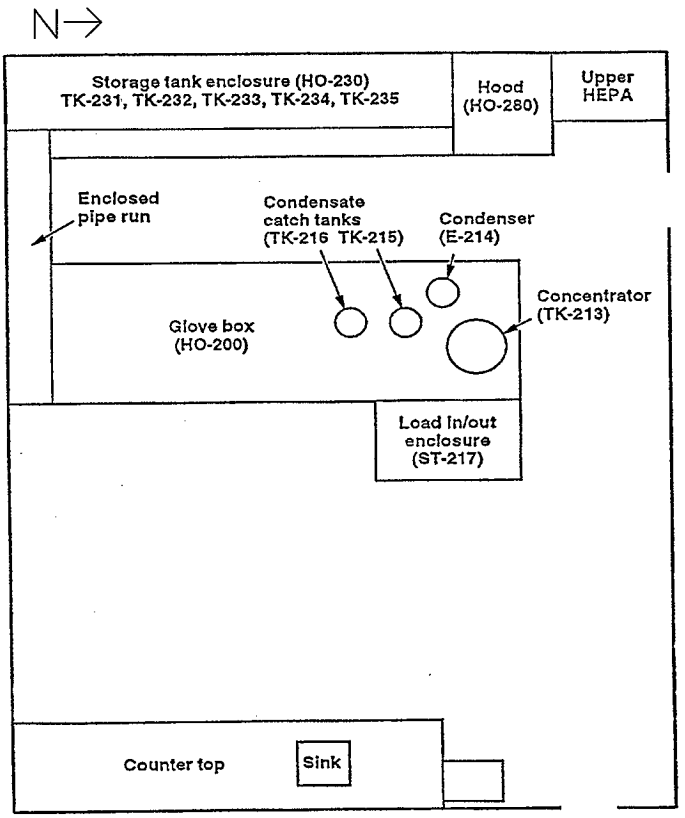

Figure 4: Mix Room Layout

The purpose of this engineering study is to determine the safest method and most cost-effective technology to prepare the 209E Facility for closure. The engineering study will present alternatives for closure and eventual turnover of the facility from Lockheed Martin Hanford Company (LMHC) to the environmental restoration and management contractor, Bechtel Hanford, Inc. (BHI). BHI will presumably perform the D&D of the facility under the U.S. Department of Energy (DOE) EM-40 program.

II. SUMMARY AND CONCLUSIONS

Five alternatives were evaluated for the closure or disposition of the 209E Facility. Table 1 summarizes the total estimated cost, manhours, and time to complete each alternative.

TABLE 1: SUMMARIZATION OF ALTERNATIVES

Alternatives	Total Estimated Cost	Total Estimated Manhours	Estimated Time to Complete (Months)
1. Leave As Is	$94,188/year	1,202/year	0
2. Fix In Place	$729,464	8,977	8
3. Removal and Fix In Place	$1,024,737	13,327	10
4. Stage-Wise Removal	$1,721,144	19,715	13
5. Turnover to the EM-60 Program*	$10,000	80	3

* A formal cost estimate was not performed for Alternative 5 due to its minimal cost compared with the other alternatives. The estimated costs represent the cost to turnover the facility "as is" and does not include future deactivation costs to the EM-60 program.

The end-point specification document and safety analysis report (SAR) for the CML closure have not been completed, but both documents are being prepared by Babcock & Wilcox Hanford Company (BWHC) and by LMHC. The documents are important because they explain the acceptance criteria for turnover to BHI. This study was not

based upon BHI acceptance criteria, but on current technology (taking safety and cost effectiveness into account), lessons learned at the Plutonium Uranium Extraction Facility (PUREX), the 308 Building, and personnel (operators and engineers) experience.
Fluor Daniel Northwest (FDNW) recommends that future engineering studies on the closure, decommission, or shutdown of a facility consider having the end-point specification and the SAR completed prior to starting a study.

III. DESCRIPTION OF ALTERNATIVES

A. CRITERIA

The objective of this study is to determine the safest and most cost-effective method for closure of the CML (209E Facility) until turnover to the D&D contractor. The strategy should be similar to that used by BWHC in prior remediation efforts used in the closure of PUREX. It is assumed that a debris removal effort, to be completed before the remediation activities begin, will address all loose waste items in the facility, i.e., trash, waste drums, miscellaneous containers of chemicals, packaged waste, etc.

The original goal was to prepare the building for closure having a nonnuclear classification of "other industrial," however, FDNW determined that this classification is not achievable considering the objective of this study. The following criteria were addressed:

- Determine the best and most cost-effective technology for cleaning and applying a fixative to the remaining plutonium (Pu).

- Investigate the safest and most current methods to decontaminate and remediate the plutonium-handling equipment (i.e., gloveboxes, fume hoods, and piping), ductwork and fixtures. Address both radiochemical and hazardous waste.

- Assess the environmental, regulatory, and permitting requirements.

B. ALTERNATIVES CONSIDERED

A four-step approach was utilized to develop alternatives with each alternative building upon the last. While developing these approaches, an alternative evolved that did not use the same approach as the other four; this concept was added as Alternative 5. The following alternatives were considered:

Alternative 1. Leave As Is
Alternative 2. Fix In Place
Alternative 3. Removal and Fix in Place
Alternative 4. Stage-Wise Removal
Alternative 5. Turnover to the EM-60 Program

Prior to shutdown of the facility, all tanks in the solution handling system were flushed with condensate to remove as much Pu as reasonably possible. All of the tanks were verified as empty and were purged with an air sweep to evaporate most or all of the residual liquid. During unmanned status, an air sweep of nominal 30 liters/hour (one cubic foot/hour) was maintained for all storage tanks. In any of the alternatives where tanks, vessels, etc., are to be sealed or left without decontaminating, they need to be confirmed as dry or dried. This action is necessary, especially for those tanks that are to be sealed, due to the possibility of residual water in vessels being converted, by residual radioactivity, into a mixture of hydrogen and oxygen gases (Van Tuyl 1987). This mixture of gases could possibly lead to a ruptured tank or flammable gases being released into the facility.

Alternative 1: Leave As Is

Alternative 1 would continue with the present facility operations, surveillance, and maintenance schedule. The fire protection system would remain in service; the system is wet pipe to the CAR and dry pipe inside the CAR. The CAR halon system is out of service. The estimated yearly cost for this alternative is $94,188, with an estimated 1,202 manhours. The estimate also includes the cost of maintaining the office spaces within the facility. Appendix A, pages 1 through 12, contains the detailed cost estimate for Alternative 1.

Electrical

The normal power, emergency power, exhaust fan, and vacuum air sampling electrical systems are still in service. All other electrical compartments are out of service. The batteries for the emergency lights have been removed. The criticality alarm system for the Mix Room has been removed and transferred to the CAR. The intercom was turned off and only one telephone service was left. The electric supply for the annunciator panel has been disconnected.

Heating, Ventilating, and Air Conditioning

The supply ventilation is shut off and air is supplied to the CAR and the Mix room by infiltration. The exhaust fan is operating below maximum capacity.

Environmental

Alternative 1 would not require permits and regulatory notifications because no remediation work would be performed on the facility.

Advantages

No additional costs above those already required would be needed to maintain the facility. Alternative 1 is the simplest of all alternatives and requires no additional work to the facility.

Disadvantages

Alternative 1 does not reduce possible health and environmental risks. It does not further the D&D process or meet the RL objective of remediation of nonactive facilities.

Alternative 2: Fix In Place

Alterative 2 would fix in place all contamination with an acrylic latex contamination fixative (polymeric barrier system [PBS]) (the fixative) and shut down all building systems except for required safety systems.

Electrical

Normal and emergency power would be turned off in the CAR and the Mix room, except for lighting, fire alarm, receptacles/outlets, air sampler, exhaust ventilation system, and constant air monitoring on the main exhaust stack. The power would be turned off and the cables disconnected and removed before the fixative is applied to the equipment. In addition, all accessible electric components associated with the equipment would be removed. After all the work is completed, the ventilation, receptacle/outlets, lighting and fire protection system would be turned off. For safety purposes, the fire protection system would be drained and disconnected last. Turning off the fire protection system is contingent on being able to zero value the building, i.e., change the building assessed value to zero dollars.

Heating, Ventilating, and Air Conditioning

Currently, the supply ventilation system is turned off and air is supplied by infiltration. The supply ventilation system may need to be restarted if the required number of room air changes cannot be met through increasing the exhaust rate and, thus, the rate of infiltration. The confinement heating, ventilating, and air-conditioning (HVAC) system would need to be reactivated.

Environmental

Since fixing the contamination would be performed in rooms with ventilation controls, there is minimal potential to emit fugitive radioactive air emissions. The Washington State Department of Health (WSDOH) must be contacted, and a Notice of Construction (NOC) may be required. If any of the areas containing asbestos would be disturbed by the work to fix the contamination, a good faith inspection must be performed and the Benton County Clean Air Authority (BCCAA) must be notified ten working days prior to work beginning.

A notice to the Washington State Department of Ecology (Ecology) is unnecessary because there is no apparent route for releasing any hazardous air emissions. A NEPA review would be used to evaluate the environmental impacts of entering the

facility to deactivate, deenergize, and/or isolate unneeded facility systems. This is expected to be allowed by using the existing sitewide Categorical Exclusion.

Description of Alternative

The first step of Alternative 1 would be to isolate the gloveboxes/hoods. All pipe and tubing intrusions would be cut and capped outside the gloveboxes/hoods. A glove bag would be used to cover the pipes during this process. The inside of the gloveboxes/hoods would be wiped down to remove as much surface contamination as possible. Contaminated areas inside the gloveboxes/hoods would then be sprayed with the fixative. The remaining glovebox ports and hood openings would then be sealed. The glovebox ports would be sealed with a metal plate and the hoods sealed with a fabricated metal door (closure).

All gloveboxes contain a high efficiency particulate air (HEPA) filter that vents/inlets directly to the room. These HEPA filters would be removed and the opening sealed. One of the metal plates sealing the glovebox ports would be designed to house a HEPA filter mask canister to allow the gloveboxes to passively vent to their respective rooms, thus eliminating any danger of pressurizing.

The floor and walls of the CAR and the Mix room would be surveyed for areas of contamination. These areas would be wiped clean and any remaining contamination fixed in place with the fixative.

All remaining slab tanks, i.e., not located in a glovebox/hood, would be sealed shut by cutting and capping the inlet to the tanks, using the same method as cutting and capping the pipes and tubing into the gloveboxes/hoods. The only exceptions would be tank (TK) -109, TK-110, and TK-111. These slab tanks are encased in concrete, TK-109 and TK-110 are buried in concrete 1 meter (3 ft) under the CAR while TK-111 is located in the waste hold-up valve pit outside the building, level with the floor of the pit.

A nondestructive analysis (NDA) was not performed on these tanks due to inaccessibility. TK-109 and TK-111 are known to have contained radioactive waste, while TK-110 never received any radioactive waste but, due to its piping configuration, radioactive waste could have entered the tank either by leaks or operator error. The removal of these tanks would present more hazards to workers and the environment than leaving them intact. Therefore, it is recommended that the tanks be sealed utilizing available technologies, i.e., filled with grout (or equivalent), and sealed off completely.

TK-160 (the consolidated fuel reprocessing program [CFRP] water tank) contains CFRP process tanks, TK-161 and TK-162. If TK-160 still contains water, it should be drained. TK-161 and TK-162 would then be sealed by cutting and capping the inlets and outlets, using the same technique used for the slab tanks.

TK-108, the fuel element assembly system (FEAS), contains a 360-mm (14-in.) and a 690-mm (27-in.) experimental vessel. No other information on the dimensions of these tanks could be found, therefore, the tanks would need to be examined before a containment solution could be determined.

The active exhaust ventilation systems for the CAR and the Mix room are interconnected before exiting the stack. All gloveboxes/hoods have a HEPA filter positioned before the ventilation duct. Exhaust ventilation air from each room passes through a bank of HEPA filters. The exhaust ventilation systems connect before the first stage of HEPA filtration outside the building. The active exhaust ventilation system is likely contaminated up to the first bank of HEPA filters outside of the building. The active exhaust ventilation system would be sealed off just down stream from that HEPA filter. This allows the contaminated ducting and gloveboxes/hoods to equalize pressure with the room via the HEPA filtered passive vents in the gloveboxes/hoods. All possible egress points, i.e., aerosol/smoke injection ports and joints, would be sprayed with the fixative.

The hoist and trolley crane located in the Mix room would be removed from service and mothballed.

Minimal maintenance and surveillance would be required until turnover to the D&D contractor. The estimated cost for Alternative 2 is $729,464 with an estimated 8,977 manhours. Appendix A, pages 13 through 24, contains the detailed cost estimates. Appendix B contains the schedule for Alternative 2.

Advantages

The advantage of Alternative 2 is that it is a quick and inexpensive solution. It is fairly simple to survey the equipment, walls, and floors and fix the contamination in place. Applying the fixative could possibly contain all contamination and, thereby, reduce the overall operating cost of the facility. In addition, an environmental assessment (EA) is not expected to be necessary.

Disadvantages

The likelihood of the fixative being able to contain all of the Pu in place is uncertain. Due to the complexity and inaccessibility inside and under/behind gloveboxes (there is believed to be contamination under some gloveboxes), there would be many areas where contamination may not be fixed in place. TK-105 and TK-106 (located in the CAR) have a history of weeping plutonium, even after attempts to seal the contamination. Attempting to isolate and seal these tanks could be unsuccessful over an extended period of time. The HEPA canister filters fitted into the ports on the gloveboxes/hoods, to be used as passive ventilation, are designed for low airflow. There is the remote possibility that the equalization airflow could exceed the filters design limit.

Alternative 3: Removal and Fix In Place

Alternative 3 is an expansion of Alternative 2. All equipment would be removed from the gloveboxes/hoods before cleaning, applying the fixative, and sealing the gloveboxes/hoods. TK-105 and TK-106 would be removed from the facility.

Electrical

Normal and emergency power should be turned off in the CAR and the Mix room except for lighting, fire alarm, receptacles/outlets, air sampler, exhaust ventilation system, and constant air monitoring on the main exhaust stack. When equipment is removed or sprayed with the fixative, the power would be turned off before disconnecting and removing the cables from the equipment. In addition, all accessible electric components associated with the equipment would be removed. After all the work is completed, the ventilation, receptacle/outlets, lighting, and fire protection system would be turned off. For safety purposes, the fire protection system would be drained and disconnected last. Turning off the fire protection system is contingent on being able to zero value the building.

Heating, Ventilating, and Air Conditioning

Currently, the supply ventilation system is off and air is supplied by infiltration. The supply ventilation system may need to be restarted if the required number of room air changes cannot be met through increasing the exhaust rate and, thus, the rate of infiltration. The confinement HVAC system would need to be reactivated to full functionality.

Environmental

Removing waste and equipment has the potential to emit fugitive radioactive air emissions. An NOC must be submitted to the WSDOH.

If asbestos is suspected, a good faith inspection must be performed and the BCCAA must be notified ten working days prior to work beginning. All asbestos work must comply with Code of Federal Regulations (CFR) 40 CFR 61 and the agreement with the BCCAA. Since the asbestos would be assumed to be radioactively contaminated, the material would be disposed of in burial boxes and sent to the disposal trenches in the 200-West Area.

A notice to Ecology could be necessary if hazardous air emissions from cutting up items of contaminated heavy metals would be released.

Alternative 3 may require an EA to analyze the unknowns associated with the hazardous and radioactive materials (e.g., location and dose exposure levels in areas currently unaccessible as in and around gloveboxes and/or tanks).

Alternative 3 would produce radioactive and mixed waste requiring storage and/or disposal.

Description of Alternative

The first step of Alternative 3 would remove (bag out) all equipment (tanks, pumps, condensers, etc.) in the existing gloveboxes/hoods. Equipment must fit into a waste isolation pilot plant (WIPP) certified container. The equipment would need to be cut into appropriate sized pieces before removal from the glovebox/hood. The pieces would be double bagged with sharp corners and edges taped to prevent ripping of the bags and placed in standard waste boxes (SWB) or 210-L (55-gal.) drums. The SWBs and drums would then be sent to the waste receiving and packaging (WRAP) facility for later permanent disposal at the WIPP.

The gloveboxes/hoods would be decontaminated, sealed, and passively vented in the same manner as Alternative 2. The floors and walls of the CAR and the Mix room would be decontaminated in the same manner as in Alternative 2.

All slab tanks, except TK-105 and TK-106, would be sealed in the same manner as in Alternative 2. TK-105 and TK-106, are too large to place in a glovebox/hood and have a history of weeping plutonium at the south end of the tanks. Attempts to stop the leaks by caulking or painting have been successful for only a short time and had to be repeated as necessary. Attempting to isolate and seal these tanks could be unsuccessful over an extended period of time. Therefore, a greenhouse would be erected and the tanks cut up and placed in SWBs or 210-L drums.

The remaining tanks, piping, tubing, instrumentation, vessels, and ventilation systems would be handled in the same manner as Alternative 2. The hoist and

trolley crane located in the Mix room would be removed from service and mothballed.

Minimal maintenance and surveillance would be required until turnover to the D&D contractor. The estimated cost for Alternative 3 is $1,024,737 with an estimated 13,327 manhours. Appendix A, pages 25 through 38, contains the detailed cost estimates. Appendix B contains the schedule for Alternative 3.

Advantages

The main advantage of Alternative 3 over Alternative 2 is the removal of equipment from the gloveboxes/hoods and the removal of TK-105 and TK-106. Removing the equipment from the gloveboxes/hoods would allow for better decontamination of the gloveboxes/hoods, thus, lowering the amount of residual plutonium in the facility. With the gloveboxes/hoods cleaner and the remaining contamination stabilized, the concerns with the passively venting HEPA filter (as described in the disadvantages section of Alternative 2) are lessened.

By removing TK-105 and TK-106, the leaking contamination from this source is eliminated.

Disadvantages

Only a portion of the Pu source term would be removed. There is still the possibility that contamination exists under the gloveboxes/hoods that would not get fixed in place. By not removing/moving the gloveboxes/hoods in the CAR, it is not possible to be sure that all contamination is removed or fixed in place.

As in Alternative 2, the HEPA canister filters fitted into the ports on the gloveboxes/hoods, to be used as passive ventilation, are designed for low airflow. There is the remote possibility that the equalization airflow could exceed the filters design limit. Although, with the gloveboxes/hoods being cleaner in Alternative 3, the concern is lessened.

Alternative 4: Stage-Wise Removal

Alternative 4 differs from Alternative 3 in that it removes all major equipment, most minor equipment, and cleans or fixes in place any remaining contamination. Work would take place in a stage-wise manner. Equipment with larger concentrations of materials are removed first.

Electrical

Normal and emergency power would be turned off in the CAR and the Mix room, except for lighting, fire alarm, receptacles/outlets, air sampler, exhaust ventilation system, and constant air monitoring on the main exhaust stack. When equipment is removed, the power would be turned off before disconnecting and removing the cables from the equipment. All accessible electric components associated with the equipment would be removed. After the work in Alternative 4 is completed, the ventilation, receptacle/outlets, lighting, and fire protection system would be turned off. For safety purposes, the fire protection system should be drained and disconnected last. Turning off the fire protection system is contingent on being able to zero value the building.

Heating, Ventilating, and Air Conditioning

Currently, the supply ventilation system is off and air is supplied by infiltration. The supply ventilation system may need to be restarted if the required number of room air changes cannot be met through increasing the exhaust rate and, thus, the rate of infiltration. The confinement HVAC system would need to be reactivated to full functionality.

Environmental

Removing waste and equipment has the potential to emit fugitive radioactive air emissions. An NOC must be submitted to the WSDOH.

If asbestos is suspected, a good faith inspection must be performed and the BCCAA must be notified ten working days prior to work beginning. All asbestos work must comply with 40 CFR 61 and the agreement with the BCCAA. Since the asbestos

would be assumed to be radioactively contaminated, the material would be disposed of in burial boxes and sent to the disposal trenches in the 200-West Area.

A notice to Ecology could be necessary if hazardous air emissions from cutting up items of contaminated heavy metals would be released.

Alternative 4 would probably require an EA to analyze the unknowns associated with the hazardous and radioactive materials (e.g., location and dose exposure levels in areas currently unaccessible as in and around gloveboxes and/or tanks).
Alternative 4 would produce radioactive and mixed waste requiring storage and/or disposal.

Description of Alternative

All equipment is required to be disposed of in a WIPP certified container, either a 210-L drum or an SWB. Equipment too large for either of these containers would be size reduced. Equipment pieces would be double wrapped in plastic with any sharp edges or protrusions covered with tape to protect the plastic from cuts. All containers would be processed through the WRAP facility for certification and stored for eventual shipment to WIPP for disposal.

Stage 1:

The first activity for equipment removal would be to isolate the equipment from all systems except any required safety systems. Piping and tubing systems would be cut and capped using the same method as in Alternatives 2 and 3. The next step would to remove all accessible equipment within the glovebox and package it for disposal. Most glovebox internal equipment should not require size reduction, except for some of the slab tanks. Removal of equipment would include disassembly and cutting to reduce size. Once internal equipment is removed and the gloveboxes are isolated, the inside and outside if required, would need to be painted with the fixative to provide contamination control in preparation for size reduction. The final step prior to size reduction would be to construct a ventilated greenhouse

around the glovebox and disconnect any remaining safety systems and the active ventilation system.

The first step in size reducing the old style gloveboxes would be to remove the plexiglass windows. The remaining framework would be cut up into manageable pieces.

Tanks would be isolated and removed for disposal. If size reduction is required, the fixative would be applied to accessible contaminated areas. When there are contaminated areas that are not accessible with the fixative, the size reduction would need to be performed inside a ventilated greenhouse. When this stage is completed, the majority of the plutonium would have been removed (an actual percentage of removal is not possible because the total plutonium held in the facility is not known, i.e some equipment and places could not be analyzed by nondestructive analysis).

The estimated cost for the first stage of Alternative 4 is $1,266,891 with an estimated 14,427 manhours. Appendix A, pages 39 through 51, contain the detailed cost estimate.

Stage 2:

The next logical step would be to remove the other piping and equipment that is known or highly suspected of containing high levels of contamination. Equipment would include the exhaust ventilation system up to the first stage of HEPA filtration outside of the building. Suspect piping and tubing would include the transfer lines, vent lines, and vacuum lines.

Transfer lines have been directly exposed to high levels of contamination and are a prime target for removal. Vessel vent lines are not directly exposed but may contain contamination due to migration or the venting of contaminated air. The exhaust outlet from the gloveboxes and hoods were not originally protected with HEPA filters. The exhaust ventilation system up to the first stage of HEPA filtration

outside the building is most likely contaminated. Therefore, the last step of stage 2 would remove the CAR and the Mix room exhaust ventilation system up to the first stage of HEPA filtration outside the building.

The estimated cost for the second stage of Alternative 4 is an additional $99,165 with an estimated 1,004 additional manhours. Appendix A, pages 52 through 63, contains the detailed cost estimate.

Stage 3:

Stage 3 would include removal of all remaining equipment, cleaning and applying a fixative to contaminated concrete, and removing the remaining confinement ventilation system (ducts, filters and fans). Once the work performed by stages 1 and 2 is completed, all the remaining piping, wiring, and instrumentation can be removed from the CAR and the Mix room. This activity would leave bare walls exposed that may contain embedded contamination. However, contamination is unlikely due to the application of a fiber glass reinforced resin surface (Amercoat No. 74) that was applied to all the interior concrete surfaces of the CAR and to the concrete walls and plaster ceiling in the Mix room during initial construction. After a radiological survey determines the location of contamination on the walls and floor, the areas would be wiped clean of any contamination not removed by wiping and would be painted over. The hoist and trolley crane located in the Mix room would be removed from service and mothballed. The remaining task would be to remove the Zone 2 confinement HVAC system in its entirety.

The estimated cost for stage 3 of Alternative 4 is an additional $355,088 with an estimated 4,284 additional manhours. Appendix A, pages 64 through 76, contains the detailed cost estimate.

Minimal maintenance and surveillance would be required until turnover to the D&D contractor. The estimated total cost for Alternative 4 is $1,721,144 with an estimated total of 19,715 manhours. Appendix B contains the total schedule to complete Alternative 4.

Advantages:

The majority of the contamination source term would be removed, thereby, reducing the possibility of exposure to people and the environment. Work performed in Alternative 4 helps future D&D operations on the facility.

Disadvantages:

It is unlikely that the facility would be clean enough to be classified as "other industrial." The application of Alternative 4 is very costly and more removal than is necessary by any subsequent D&D activity may be performed.

Alternative 5: Turnover to the EM-60 Program

Alternative 5 would turn the CML over to the DOE EM-60 program, managed by BWHC, for use as a D&D training facility and a site for testing new D&D technologies.

After a general housekeeping is performed, Alternative 5 would leave the facility as is and the CML would be turned over to the EM-60 program. The EM-60 program would be responsible for continued maintenance, surveillance, and operation of the facility and grounds. A formal cost estimate was not performed for Alternative 5 due to its relatively low cost compared to the other alternatives. However, a rough order of magnitude (ROM) cost estimate for Alternative 5 is $10,000 with an estimated 80 manhours mainly for administrative work to turn over the facility. This cost does not include the EM-60 program deactivation costs.

Communications are underway with BWHC, LMHC, and RL regarding the transfer of the 209E Facility to BWHC for use as a training facility.

Advantages

The CML is an isolated self-contained laboratory facility with office space, meeting rooms, a control room, and a changeroom that provides a good setting for training. There are rooms for additional training needs and sufficient parking around the building.

The CAR and the Mix room contain typical gloveboxes and equipment that would be found in other DOE facilities that handled fissile materials. The CML would be an ideal training center for teaching D&D workers the techniques required for safe and efficient D&D operations. It would also provide an ideal facility to test new D&D systems. New decontamination methods and size reduction equipment could be tested in the facility.

Disadvantages

Although contamination levels are not excessive, it would still be a challenge to decontaminate to non-transuranic levels and to provide a realistic evaluation of the methods effectiveness.

IV. IDENTIFICATION OF PREFERRED ALTERNATIVE

A. EVALUATION OF ALTERNATIVES

Alternative 1, Leave As Is, was ruled out as a viable alternative early in the study because it did not meet RL objectives for closure of nonactive facilities. LMHC also expressed their disinterest in this alternative.

Alternative 2, Fix In Place, is one of the more cost effective alternatives, but it does not leave the building in the safest state for personnel and the environment. In a less complex facility, this would be a good solution but it does not meet the needs of the CML.

Alternative 3, Removal and Fix In Place, mitigates the primary concerns encountered in Alternative 2 by removing the equipment in the gloveboxes/hoods and the leaking tanks. Although costs for Alternative 3 are approximately 29% more than costs for Alternative 2, the facility would be left in a safer state for personnel and the environment.

Alternative 4, Stage-Wise Removal, is the most extensive and thorough of all the alternatives, but is also the most expensive. While this alternative aides future D&D

work, it most likely performs more work than is necessary to close the facility. Alternative 4 leaves the facility in a safer state for personnel and the environment than the other alternatives, but does not balance the increase in cost, nearly 60% more than Alternative 3.

Alternative 5, Turnover to the EM-60 Program, is the most cost effective of all alternatives. The alternative does not include any decontamination but turning the facility over to the EM-60 program would result in the facility receiving decontamination via training and testing of new technologies. This is a win-win solution: the building would eventually receive the needed D&D work, a facility would be provided to train workers, and new D&D technologies could be developed.

B. PREFERRED ALTERNATIVE

Alternative 5 is the preferred alternative. It is the most cost effective alternative and maintains the building in a safe state. Hanford and other DOE sites would benefit by implementing this alternative. D&D workers would be trained in new and safer techniques, and new D&D technologies would be developed that may save lives and tax payer dollars in the future.

To execute Alternative 5, RL and LMHC would have to resolve the best course of action to achieve turning over the facility to the EM-60 program. A second alternative was chosen if RL determines that Alternative 5 is not a viable solution. The second preferred alternative is Alternative 3, Remove and Fix In Place, because it presents the best balance of safety and cost effectiveness of the other four alternatives.

C. UNCERTAINTIES

The only uncertainty is if RL will decide that turnover of the facility to the EM-60 program is a viable solution. Therefore, a backup alternative is presented.

The uncertainties in Alternative 3 are whether there is contamination under the gloveboxes in the CAR and if sealing the underground tanks with grout would prove

satisfactory. While contamination under the gloveboxes is not a safety problem while the building is idle, it becomes an unknown for D&D workers. There is some work being performed in Savannah River with "smart grout" that may work better for filling the underground tanks. This process should be considered if Alternative 3 is chosen.

V. REQUIRED CHANGES TO IMPLEMENT PREFERRED ALTERNATIVE

Alternative 5, Turnover to the EM-60 Program, would require the following activities:

- Resolution of the current unresolved safety question, specific to contamination control.
- Completion of the facility SAR.
- Completion of the facility housekeeping and waste disposal effort.
- Completion of a property and equipment transfer form.
- Financial transfer of current and future operating funds.

Alternative 3, Removal and Fix In Place, would require the following actions:

- Resolution of the current unresolved safety question, specific to contamination control.
- Completion of the facility SAR.
- Completion of the facility housekeeping and waste disposal effort.

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APPENDIX A

Cost Estimates

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. 2475AA81

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 1
PHMCR01 - PROJECT COST SUMMARY

DATE 06/17/97 13:04:01
BY DKH/RWO

SORT	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST	0	0	0	0
LMHC	LOCKHEED MARTIN HANFORD CORP.	72,452	30	21,736	94,188
	SUBTOTAL	72,452	30	21,736	94,188
SITE	SITE ALLOCATIONS	0	0	0	0
	PROJECT TOTAL	72,452	30	21,736	94,188

TYPE OF ESTIMATE	PLANNING/FEASIBILITY ESTIMATE	JUNE 17, 1997
FDNW LEAD ESTIMATOR	ESTIMATING MANAGER	
PROJECT MANAGER	Chris H. Brevick	
CLIENT		

REMARKS:

ALTERNATIVE 1
CAVEATS IS

DRAFT

A-1

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
310100	ALTERNATIVE 1 - LEAVE AS IS	72452	0.00	0	72452	30	21736	94188	0	94188
PROJECT TOTAL		72,452	0.00	0	72,452	30	21,736	94,188	0	94,188

1. ESTIMATE PURPOSE

THIS ESTIMATE WILL BE USED FOR A SCOPING STUDY.

2. ESTIMATE TECHNICAL BASIS

A. THIS ESTIMATE HAS BEEN PREPARED FOR LOCKHEED MARTIN HANFORD CORP. AS REQUESTED BY FNDW PROJECT MANAGEMENT.
B. A ROUGH DESCRIPTION OF THE SCOPE OF WORK MAY BE FOUND IN THE OUTLINE OF ALTERNATIVES, AN UNDATED AND UNNUMBERED DOCUMENT.
C. THE FOLLOWING CONSTRAINTS AND/OR SPECIAL CONDITIONS EXIST: ALL WORK DONE IN THE CRITICAL ASSEMBLY ROOM AND IN THE MIXING ROOM WILL REQUIRE FOLLOWING THE APPROPRIATE RADIATION WORK PROCEDURE.

3. ESTIMATE METHODOLOGY

A. DIRECT COSTS:
A MANLOADING TECHNIQUE WAS USED TO COME UP WITH THE LABOR HOURS WHEN NECESSARY DUE TO THE UNDEFINED SCOPE.
(1) CONSTRUCTION LABOR, MATERIAL AND EQUIPMENT UNITS HAVE BEEN ESTIMATED BASED UPON ONE OR MORE OF THE FOLLOWING STANDARD COMMERCIAL ESTIMATING RESOURCES, PUBLISHED ESTIMATING MANUALS AND R.S. MEANS

B. DIRECT COST FACTORS
(1) SALES TAX HAS BEEN APPLIED TO ALL MATERIALS AND EQUIPMENT PURCHASES AT 8%.
(2) NO WAREHOUSING COSTS ARE SHOWN SINCE THEY ARE CONSIDERED TO BE INCLUDED IN THE MATERIAL PROCUREMENT RATE (MPR).
(3) AN ESTIMATING FACTOR OF 15% HAS BEEN APPLIED TO DIRECT CRAFT LABOR FOR GENERAL REQUIREMENTS AND 23.58% FOR TECHNICAL SERVICES.
(4) CONSUMABLES ARE ESTIMATED AT 3.2% OF DIRECT CRAFT LABOR COSTS.
(5) SPECIAL WORK PROCEDURE (SWP) FACTORS ARE APPLIED AGAINST DIRECT LABOR FOR ACTUAL TIME LOST DUE TO THE PERSONNEL PROTECTIVE EQUIPMENT AND PROCEDURES. THE RATES WHICH HAVE BEEN APPLIED ARE AS FOLLOWS:
PROTECTIVE CLOTHING FACTOR HAS BEEN APPLIED AT 15%,
MASK WORK AT 85% PLUS 15% FOR PROTECTIVE CLOTHING.
CONTAMINATION RESTRICTIONS ASSOCIATED WITH RADIATION DOSE LIMITS (BURNOUT) HAVE NOT BEEN CALCULATED AS IT IS NOT BELIEVE TO BE A CONCERN FOR THESE ACTIVITIES.
(6) PREMIUM PAY
OVERTIME REQUIREMENTS AND SHIFT DIFFERENTIAL PAY FOR CRAFT LABOR WILL NOT BE REQUIRED FOR THIS WORK, AS STRAIGHT TIME, 40 HOUR WEEKS ARE DEEMED ADEQUATE TO ACCOMPLISH THIS WORK.
(7) GENERAL FOREMAN FACTOR OF 7% HAS BEEN APPLIED TO DIRECT CRAFT LABOR CREWS.
(8) A FACTOR OF 10% HAS BEEN APPLIED TO DIRECT CRAFT LABOR TO ALLOW FOR USAGE OF GOVERNMENT OWNED EQUIPMENT CONTROLLED BY DYNCORP.

C. RATES
(1) FLUOR DANIEL NORTHWEST LABOR RATES ARE BASED UPON THE FLUOR DAINEL FEDERAL OPERATIONS (FEDFO) DISCLOSURE STATEMENT AND APPROVED PROVISIONAL BILLING RATES. FOR ESTIMATING PURPOSES, AVERAGE RATES BY OPERATIONS CODE HAVE BEEN DEVELOPED BASED UPON RECENT COST HISTORY.
(2) FLUOR DANIEL NORTHWEST SERVICES (CONSTRUCTION CRAFT LABOR) RATES ARE THOSE LISTED IN APPENDIX A TO THE HANFORD SITE STABILIZATION AGREEMENT.
(3) FDH & PHMC SUBCONTRACTOR STANDARD LABOR RATES ARE THOSE LISTED IN THE FINANCIAL DATA SYSTEM (FDS) FDST 321R REPORT ORGANIZATION RATES PLUS ADDERS.

D. SITE ALLOCATIONS FACTORS
SITE ALLOCATION FACTORS ARE DEVELOPED AND PROVIDED BY FLUOR DANIEL HANFORD (FDH) FOR ESTIMATING USE.
(1) GOVERNMENT FURNISHED SERVICES RATE IS APPLIED TO ALL COSTS TO LIQUIDATE GOVERNMENT FURNISHED SERVICES PROVIDED TO THE ENTERPRISE COMPANIES: 14% FOR FDNW, 10% FOR FDNWS (CONSTRUCTION).
(2) HANFORD SITE G&A RATE OF 16.7% IS APPLIED TO ALL COSTS TO LIQUIDATE THE HANFORD GENERAL & ADMINISTRATIVE COSTS.
(3) HANFORD SITE MPR RATE OF 7.0% IS APPLIED TO ALL PURCHASED MATERIAL AND 7.7% TO ALL PURCHASED SERICES TO LIQUIDATE THE COST OF PROCUREMENT (INCLUDING RECIEVING).

FDNW APPLIES THE ABOVE FACTORS TO ESTIMATED COSTS AS FOLLOWS:
(1) FDH GFS/G&A CM FACTOR: A COMPOSITE FACTOR OF 33.04% HAS BEEN APPLIED TO TOTAL FDNW FIXED PRICE CONSTRUCTION MANAGEMENT WHICH INCLUDES GOVERNMENT FURNISHED SERVICES (GFS) AND SITE G&A/FEE.
(2) FDH GFS/G&A LABOR FACTOR: A COMPOSITE FACTOR HAS BEEN APPLIED TO TOTAL FDNW LABOR COSTS AS FOLLOWS: AE/CM COSTS = 33.04%, FDNWS CONSTRUCTION LABOR = 28.37%, FDNWS CONSTRUCTION MANAGEMENT LABOR = 33.04%, FDNW CONTRACT MANAGEMENT AND ADMINISTRATION = 33.04%
(3) FDH MPR/G&A MATERIAL FACTOR: A COMPOSITE FACTOR OF 24.87% HAS BEEN APPLIED TO TOTAL FDNW MATERIAL COST WHICH INCLUDE A MPR OF 7% AND MATERIAL G&A/FEE OF 16.7%

4. ESCALATION

ESCALATION PERCENTAGES WERE CALCULATED FROM THE JANUARY 1997 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE ACQUISITION" EM-50.

5. CONTINGENCY

A. DEFINITION OF CONTINGENCY AS PROVIDED BY DOE

"CONTINGENCY COVERS COSTS THAT MAY RESULT FROM INCOMPLETE DESIGN, UNFORESEEN AND UNPREDICTABLE CONDITIONS, OR UNCERTAINTIES WITHIN THE DEFINED PROJECT SCOPE. THE AMOUNT OF CONTINGENCY WILL DEPEND ON THE STATUS OF DESIGN, PROCUREMENT, AND CONSTRUCTION; AND THE COMPLEXITY AND UNCERTAINTIES OF THE COMPONENT PARTS OF THE PROJECT. CONTINGENCY IS NOT TO BE USED TO AVOID MAKING AN ACCURATE ASSESSMENT OF EXPECTED COST" (OFFICE OF WASTE MANAGEMENT (EM-30) COST AND SCHEDULE GUIDE.

B. CONTINGENCY ALLOWANCE GUIDELINES

THE DOE GUIDELINE CONTINGENCY ALLOWANCE FOR A PLANNING/FEASIBILITY ESTIMATE IS 20% TO 30%.

C. METHODOLOGY

CONTINGENCY IS EVALUATED AT THE LOWEST WORK BREAKDOWN STRUCTURE (WBS) LEVEL WITHIN THE COST ESTIMATE DETAILS. IT IS SUMMARIZED AT UPPER WBS LEVELS AND REPORTED ON THE SUMMARY REPORTS.

D. ANALYSIS

AN ASSESSMENT OF DESIGN MATURITY, WORK COMPLEXITY AND PROJECT UNCERTAINTIES HAS BEEN PERFORMED. AN EXPLAINATION OF THIS ASSESSMENT AND CONTIGENCY RATES WHICH HAVE BEEN ADDED TO THE COST OF WORK ARE AS FOLLOWS:

WBS 31XXXX CONSTRUCTION, ENGINEERING AND PROJECT MANAGEMENT - A 30% CONTINGENCY HAS BEEN APPLIED TO COVER COSTS LIKELY TO SURFACE THAT HAVE NOT BEEN ANTICIPATED AT THIS EARLY STAGE OF PLANNING. TECHNIQUES TO BE UTILIZED FOR DECONTAMINATION, STABILIZATION AND REMOVAL WILL NEED FURTHER STUDY AND MANY OF THE ACTIVITIES WILL BE SUBJECT TO CHANGE AT ANY TIME DURING THE WORK PROGRESS.

6. REMARKS

MAJOR ASSUMPTIONS WHICH HAVE BEEN MADE IN THE PREPARATION OF THIS ESITMATE ARE AS FOLLOWS:

A.) COSTS FOR CLOSURE CERTIFICATIONS, WIPE SAMPLES, SAMPLE ANALYTICAL COSTS, CORE SAMPLES, SOIL SAMPLES, TECHNICAL PUBLICATIONS, VERIFICATION SAMPLING AND A DECOMMISIONING PLAN HAVE NOT BEEN ADDRESSED, AND IF THESE ARE REQUIRED, WILL NEED TO BE INCLUDED.
B.) LIMITED INFORMATION WAS AVAILABLE AND GROSS ASSUMPTIONS WERE MADE.
C.) THE ESTIMATE ASSUMED THAT BURN-OUT WOULD NOT BE ENCOUNTERED.
D.) ENGINEERING AND PROJECT MANAGEMENT COSTS WERE FIGURED AS A PERCENTAGE OF CONSTRUCTION, SEE R08 REPORT.

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAB1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 1
PHMCR04 - COMPANY/WBS SUMMARY

DATE 06/17/97 13:04:10
BY DKH/RWO

SORT CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST									
310100	ALTERNATIVE 1 - LEAVE AS IS	0	0.00	0	0	0	0	0	0	0
TOTAL FDNW	FLUOR DANIEL NORTHWEST	0	0.00	0	0	0	0	0	0	0
LMHC	LOCKHEED MARTIN HANFORD CORP.									
310100	ALTERNATIVE 1 - LEAVE AS IS	72452	0.00	0	72452	30	21736	94188	0	94188
TOTAL LMHC	LOCKHEED MARTIN HANFORD COR	72452	0.00	0	72452	30	21736	94188	0	94188
PROJECT TOTAL		72,452	0.00	0	72,452	30	21,736	94,188	0	94,188

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONSTRUCTION MANAGEMENT %	CONSTRUCTION MANAGEMENT TOTAL	OTHER COSTS	SUB TOTAL	TOTAL
310100	ALTERNATIVE 1 - LEAVE AS IS	72452	0.00	0	0	0	72452
PROJECT TOTAL		72,452		0	0	0	72,452

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAB1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 1
PHMCR06 - SITE ALLOCATIONS BY WBS

DATE 06/17/97 15:03:42
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	DYN EQ.USAGE	FDH GFS/G&A CONST.MGMT	FDH MPR F.P./S.C.	FDH GFS/G&A LABOR	FDH MPR/G&A MATERIAL	SITE ALLOC SUBTOTAL
310100	ALTERNATIVE 1 - LEAVE AS IS	72452	0	0	0	0	0	0
	PROJECT TOTAL	72,452	0	0	0	0	0	0

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAB1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 1
PHMCR07 - SITE ALLOCATION ESCALATION/CONTINGENCY REPORT

DATE 06/17/97 13:04:16
BY DKH/RWO

WBS	DESCRIPTION	SITE ALLOC SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
310100	ALTERNATIVE 1 - LEAVE AS IS	0	0.00	0	0	0	0	0
PROJECT TOTAL		0	0.00	0	0	0	0	0

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** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 1
PHMCR08 - ESTIMATE DETAIL BY WBS / COST CODE

DATE 06/17/97 13:04:19
BY DKH/RWO

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
310100	ALTERNATIVE 1 - LEAVE AS IS										
310100.00	TECHNICAL SERVICES										
310100.0001000	********** DEFINITIVE DESIGN, ENGINEERING/INSPECTION, PROJ. MGMT. **********	000	0	0	0	0	0	0	0	0	0
310100.0001001	THERE ARE NO COSTS FOR ANY OF THESE IN THIS ALTERNATIVE	000	0	0	0	0	0	0	0	0	0
SUBTOTAL	TECHNICAL SERVICES			0	0	0	0	0	0	0	0
TOTAL	COST CODE 00000			0	0	0	0	0	0	0	0
	WBS 310100				0		0		0		0
	(ESCALATION 0.00% - CONTINGENCY		30.00 %)								
310100.02	SITEWORK										
310100.0201000	********** CONTINUE CURRENT SURVEILLANCE AND MAINTENANCE **********	810	0	0	0	0	0	0	0	0	0
310100.0201002	SURVEILLANCE AND MAINTENANCE (209-E)	810	1 L/S	900	45000	0	0	0	0	0	45000
310100.0201004	SURVEILLANCE AND MAINTENANCE (CRIB)	810	1 L/S	10	500	0	0	0	0	0	500
310100.0201012	HEALTH PHYSICS SURVEILLANCE ACTIVITIES AT 4 HR/WK	810	1 YR	208	9938	0	0	0	0	0	9938
310100.0201020	********** POWER, HVAC, WATER AND LIGHTING FOR ONE YEAR **********	810	0	0	0	0	0	0	0	0	0
310100.0201022	SANITARY WATER AND SEWER AT $125/PERSON/YR	810	1 YR	0	0	0	0	3000	0	0	3000
310100.0201024	ELECTRICAL UTILITY MAINTENANCE	810	1 YR	84	4014	0	0	0	0	0	4014
310100.0201026	BPA ELECTRICITY	810	1 YR	0	0	0	0	10000	0	0	10000
SUBTOTAL	SITEWORK			1,202	59,452	0	0	13,000	0	0	72,452
TOTAL	COST CODE 81002			1,202	59,452	0	0	13,000	0	0	72,452
	WBS 310100										

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
TOTAL WBS 310100 ALTERNATIVE 1 - LEAVE AS IS				1,202	59,452	0	0	13,000	0	0	72,452

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
REPORT TOTAL				1,202	59,452	0	0	13,000	0	0	72,452

SORT	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST	342,006	30	102,602	444,608
LMHC	LOCKHEED MARTIN HANFORD CORP.	99,804	30	29,941	129,745
	SUBTOTAL	441,810	30	132,543	574,353
SITE	SITE ALLOCATIONS	119,316	30	35,795	155,111
	PROJECT TOTAL	561,126	30	168,338	729,464

TYPE OF ESTIMATE: PLANNING/FEASIBILITY — JUNE 17, 1997	REMARKS: ALTERNATIVE 2 FIXED PRICE
FDNW LEAD ESTIMATOR: DW — ESTIMATING MANAGER:	
PROJECT MANAGER: Chris H Brevick	
CLIENT	

DRAFT

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
310200	ALTERNATIVE 2 - FIX IN PLACE	441810	0.00	0	441810	30	132543	574353	155111	729464
PROJECT TOTAL		441,810	0.00	0	441,810	30	132,543	574,353	155,111	729,464

1. ESTIMATE PURPOSE

THIS ESTIMATE WILL BE USED FOR A SCOPING STUDY.

2. ESTIMATE TECHNICAL BASIS

A. THIS ESTIMATE HAS BEEN PREPARED FOR LOCKHEED MARTIN HANFORD CORP. AS REQUESTED BY FDNW PROJECT MANAGEMENT.
B. A ROUGH DESCRIPTION OF THE SCOPE OF WORK MAY BE FOUND IN THE OUTLINE OF ALTERNATIVES, AN UNDATED AND UNNUMBERED DOCUMENT.
C. THE FOLLOWING CONSTRAINTS AND/OR SPECIAL CONDITIONS EXIST: ALL WORK DONE IN THE CRITICAL ASSEMBLY ROOM AND IN THE MIXING ROOM WILL REQUIRE FOLLOWING THE APPROPRIATE RADIATION WORK PROCEDURE.

3. ESTIMATE METHODOLOGY

A. DIRECT COSTS:
A MANLOADING TECHNIQUE WAS USED TO COME UP WITH THE LABOR HOURS WHEN NECESSARY DUE TO THE UNDEFINED SCOPE.
(1) CONSTRUCTION LABOR, MATERIAL AND EQUIPMENT UNITS HAVE BEEN ESTIMATED BASED UPON ONE OR MORE OF THE FOLLOWING STANDARD COMMERCIAL ESTIMATING RESOURCES, PUBLISHED ESTIMATING MANUALS AND R.S. MEANS

B. DIRECT COST FACTORS
(1) SALES TAX HAS BEEN APPLIED TO ALL MATERIALS AND EQUIPMENT PURCHASES AT 8%.
(2) NO WARENOUSING COSTS ARE SHOWN SINCE THEY ARE CONSIDERED TO BE INCLUDED IN THE MATERIAL PROCUREMENT RATE (MPR).
(3) AN ESTIMATING FACTOR OF 15% HAS BEEN APPLIED TO DIRECT CRAFT LABOR FOR GENERAL REQUIREMENTS AND 23.58% FOR TECHNICAL SERVICES.
(4) CONSUMABLES ARE ESTIMATED AT 3.2% OF DIRECT CRAFT LABOR COSTS.
(5) SPECIAL WORK PROCEDURE (SWP) FACTORS ARE APPLIED AGAINST DIRECT LABOR FOR ACTUAL TIME LOST DUE TO THE PERSONNEL PROTECTIVE EQUIPMENT AND PROCEDURES. THE RATES WHICH HAVE BEEN APPLIED ARE AS FOLLOWS:
PROTECTIVE CLOTHING FACTOR HAS BEEN APPLIED AT 15%,
MASK WORK AT 85% PLUS 15% FOR PROTECTIVE CLOTHING.
CONTAMINATION RESTRICTIONS ASSOCIATED WITH RADIATION DOSE LIMITS (BURNOUT) HAVE NOT BEEN CALCULATED AS IT IS NOT BELIEVE TO BE A CONCERN FOR THESE ACTIVITIES.
(6) PREMIUM PAY
OVERTIME REQUIREMENTS AND SHIFT DIFFERENTIAL PAY FOR CRAFT LABOR WILL NOT BE REQUIRED FOR THIS WORK, AS STRAIGHT TIME, 40 HOUR WEEKS ARE DEEMED ADEQUATE TO ACCOMPLISH THIS WORK.
(7) GENERAL FOREMAN FACTOR OF 7% HAS BEEN APPLIED TO DIRECT CRAFT LABOR CREWS.
(8) A FACTOR OF 10% HAS BEEN APPLIED TO DIRECT CRAFT LABOR TO ALLOW FOR USAGE OF GOVERNMENT OWNED EQUIPMENT CONTROLLED BY DYNCORP.

C. RATES
(1) FLUOR DANIEL NORTHWEST LABOR RATES ARE BASED UPON THE FLUOR DAINEL FEDERAL OPERATIONS (FEDFO) DISCLOSURE STATEMENT AND APPROVED PROVISIONAL BILLING RATES. FOR ESTIMATING PURPOSES, AVERAGE RATES BY OPERATIONS CODE HAVE BEEN DEVELOPED BASED UPON RECENT COST HISTORY.
(2) FLUOR DANIEL NORTHWEST SERVICES (CONSTRUCTION CRAFT LABOR) RATES ARE THOSE LISTED IN APPENDIX A TO THE HANFORD SITE STABILIZATION AGREEMENT.
(3) FDH & PHMC SUBCONTRACTOR STANDARD LABOR RATES ARE THOSE LISTED IN THE FINANCIAL DATA SYSTEM (FDS) FDST 321R REPORT ORGANIZATION RATES PLUS ADDERS.

D. SITE ALLOCATIONS FACTORS
SITE ALLOCATION FACTORS ARE DEVELOPED AND PROVIDED BY FLUOR DANIEL HANFORD (FDH) FOR ESTIMATING USE.
(1) GOVERNMENT FURNISHED SERVICES RATE IS APPLIED TO ALL COSTS TO LIQUIDATE GOVERNMENT FURNISHED SERVICES PROVIDED TO THE ENTERPRISE COMPANIES: 14% FOR FDNW, 10% FOR FDNWS (CONSTRUCTION).
(2) HANFORD SITE G&A RATE OF 16.7% IS APPLIED TO ALL COSTS TO LIQUIDATE THE HANFORD GENERAL & ADMINISTRATIVE COSTS.
(3) HANFORD SITE MPR RATE OF 7.0% IS APPLIED TO ALL PURCHASED MATERIAL AND 7.7% TO ALL PURCHASED SERICES TO LIQUIDATE THE COST OF PROCUREMENT (INCLUDING RECIEVING).

FDNW APPLIES THE ABOVE FACTORS TO ESTIMATED COSTS AS FOLLOWS:
(1) FDH GFS/G&A CM FACTOR: A COMPOSITE FACTOR OF 33.04% HAS BEEN APPLIED TO TOTAL FDNW FIXED PRICE CONSTRUCTION MANAGEMENT WHICH INCLUDES GOVERNMENT FURNISHED SERVICES (GFS) AND SITE G&A/FEE.
(2) FDH GFS/G&A LABOR FACTOR: A COMPOSITE FACTOR HAS BEEN APPLIED TO TOTAL FDNW LABOR COSTS AS FOLLOWS: AE/CM COSTS = 33.04%, FDNWS CONSTRUCTION LABOR = 28.37%, FDNWS CONSTRUCTION MANAGEMENT LABOR = 33.04%, FDNW CONTRACT MANAGEMENT AND ADMINISTRATION = 33.04%
(3) FDH MPR/G&A MATERIAL FACTOR: A COMPOSITE FACTOR OF 24.87% HAS BEEN APPLIED TO TOTAL FDNW MATERIAL COST WHICH INCLUDE A MPR OF 7% AND MATERIAL G&A/FEE OF 16.7%

4. ESCALATION

ESCALATION PERCENTAGES WERE CALCULATED FROM THE JANUARY 1997 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE ACQUISITION" FM-50.

5. CONTINGENCY

A. DEFINITION OF CONTINGENCY AS PROVIDED BY DOE

"CONTINGENCY COVERS COSTS THAT MAY RESULT FROM INCOMPLETE DESIGN, UNFORESEEN AND UNPREDICTABLE CONDITIONS, OR UNCERTAINTIES WITHIN THE DEFINED PROJECT SCOPE. THE AMOUNT OF CONTINGENCY WILL DEPEND ON THE STATUS OF DESIGN, PROCUREMENT, AND CONSTRUCTION; AND THE COMPLEXITY AND UNCERTAINTIES OF THE COMPONENT PARTS OF THE PROJECT. CONTINGENCY IS NOT TO BE USED TO AVOID MAKING AN ACCURATE ASSESSMENT OF EXPECTED COST" (OFFICE OF WASTE MANAGEMENT (EM-30) COST AND SCHEDULE GUIDE.

B. CONTINGENCY ALLOWANCE GUIDELINES

THE DOE GUIDELINE CONTINGENCY ALLOWANCE FOR A PLANNING/FEASIBILITY ESTIMATE IS 20% TO 30%.

C. METHODOLOGY

CONTINGENCY IS EVALUATED AT THE LOWEST WORK BREAKDOWN STRUCTURE (WBS) LEVEL WITHIN THE COST ESTIMATE DETAILS. IT IS SUMMARIZED AT UPPER WBS LEVELS AND REPORTED ON THE SUMMARY REPORTS.

D. ANALYSIS

AN ASSESSMENT OF DESIGN MATURITY, WORK COMPLEXITY AND PROJECT UNCERTAINTIES HAS BEEN PERFORMED. AN EXPLAINATION OF THIS ASSESSMENT AND CONTIGENCY RATES WHICH HAVE BEEN ADDED TO THE COST OF WORK ARE AS FOLLOWS:

WBS 31XXXX CONSTRUCTION, ENGINEERING AND PROJECT MANAGEMENT - A 30% CONTINGENCY HAS BEEN APPLIED TO COVER COSTS LIKELY TO SURFACE THAT HAVE NOT BEEN ANTICIPATED AT THIS EARLY STAGE OF PLANNING. TECHNIQUES TO BE UTILIZED FOR DECONTAMINATION, STABILIZATION AND REMOVAL WILL NEED FURTHER STUDY AND MANY OF THE ACTIVITIES WILL BE SUBJECT TO CHANGE AT ANY TIME DURING THE WORK PROGRESS.

6. REMARKS

MAJOR ASSUMPTIONS WHICH HAVE BEEN MADE IN THE PREPARATION OF THIS ESITMATE ARE AS FOLLOWS:

A.) COSTS FOR CLOSURE CERTIFICATIONS, WIPE SAMPLES, SAMPLE ANALYTICAL COSTS, CORE SAMPLES, SOIL SAMPLES, TECHNICAL PUBLICATIONS, VERIFICATION SAMPLING AND A DECOMMISIONING PLAN HAVE NOT BEEN ADDRESSED, AND IF THESE ARE REQUIRED, WILL NEED TO BE INCLUDED.
B.) LIMITED INFORMATION WAS AVAILABLE AND GROSS ASSUMPTIONS WERE MADE.
C.) THE ESTIMATE ASSUMED THAT BURN-OUT WOULD NOT BE ENCOUNTERED.
D.) ENGINEERING AND PROJECT MANAGEMENT COSTS WERE FIGURED AS A PERCENTAGE OF CONSTRUCTION, SEE R08 REPORT.

SORT CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST									
310200	ALTERNATIVE 2 - FIX IN PLACE	342006	0.00	0	342006	30	102602	444608	155111	599719
	TOTAL FDNW FLUOR DANIEL NORTHWEST	342006	0.00	0	342006	30	102602	444608	155111	599719
LMHC	LOCKHEED MARTIN HANFORD CORP.									
310200	ALTERNATIVE 2 - FIX IN PLACE	99804	0.00	0	99804	30	29941	129745	0	129745
	TOTAL LMHC LOCKHEED MARTIN HANFORD COR	99804	0.00	0	99804	30	29941	129745	0	129745
PROJECT TOTAL		441,810	0.00	0	441,810	30	132,543	574,353	155,111	729,464

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAC1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 2
PHMCR06 - SITE ALLOCATIONS BY WBS

DATE 06/17/97 15:04:17
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	DYN EQ.USAGE	FDH GFS/G&A CONST.MGMT	FDH MPR F.P./S.C.	FDH GFS/G&A LABOR	FDH MPR/G&A MATERIAL	SITE ALLOC SUBTOTAL
310200	ALTERNATIVE 2 - FIX IN PLACE	403837	14518	12546	0	87420	4832	119316
PROJECT TOTAL		403,837	14,518	12,546	0	87,420	4,832	119,316

WBS	DESCRIPTION	SITE ALLOC SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
310200	ALTERNATIVE 2 - FIX IN PLACE	119316	0.00	0	119316	30	35795	155111
PROJECT TOTAL		119,316	0.00	0	119,316	30	35,795	155,111

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAC1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 2
PHMCR08 - ESTIMATE DETAIL BY WBS / COST CODE

DATE 06/17/97 13:23:48
BY DKH/RWO

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
310200	ALTERNATIVE 2 - FIX IN PLACE										
310200.00	TECHNICAL SERVICES										
310200.0002100	********** DEFINITIVE DESIGN **********	000	1 L/S	985	65010	0	0	0	0	0	65010
310200.0002200	AT 25 % OF CONSTRUCTION ********** ENGINEERING/ INSPECTION **********	000	1 L/S	650	39000	0	0	0	0	0	39000
310200.0002300	AT 15% OF CONSTRUCTION ********** PROJECT MANAGEMENT **********	000	1 L/S	534	38982	0	0	0	0	0	38982
	AT 15% OF CONSTRUCTION										
SUBTOTAL	TECHNICAL SERVICES			2,169	142,992	0	0	0	0	0	142,992
TOTAL	COST CODE 00000 WBS 310200 (ESCALATION 0.00% - CONTINGENCY 30.00 %)			2,169	142,992	0	0	0	0	0	142,992
310200.01	GENERAL REQUIRMENTS										
310200.0102000	HPT TO MAN STEP-OFF PAD	810 M	1 L/S	990	47302	0	0	0	0	0	47302
SUBTOTAL	GENERAL REQUIRMENTS		(MASK)	990	47,302	0	0	0	0	0	47,302
	SWP 100.00%			990	47302						47302
TOTAL	COST CODE 81001 WBS 310200 (ESCALATION 0.00% - CONTINGENCY 30.00 %)			1,980	94,604	0	0	0	0	0	94,604
310200.02	SITEWORK										
310200.0202100	********** FIX IN PLACE ALL CONTAMINATION **********	810 M	0	0	0	0	0	0	0	0	0
310200.0202102	APPLY FIXATIVE TO ALL SURFACES, 50 MIL EPOXY.	810 M	20000 SF	1680	47023	0	14000	0	0	490	61513
310200.0202120	********** SEAL GLOVE BOX PORTS, ETC.	810 M	0	0	0	0	0	0	0	0	0

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
	**********										
310200.0202122	SEAL GLOVE BOX PORTS, INSTALL BLANK-OFFS WITH SEALANT.	810 M	1 L/S	48	1737	0	250	0	0	9	1996
310200.0202124	SEAL HOOD OPENINGS, INSTALL CAPS AND SEAL OFF.	810 M	1 L/S	50	1810	0	300	0	0	11	2121
310200.0202126	CUT AND CAP PIPES	810 M	1 L/S	80	3092	0	250	0	0	9	3351
310200.0202140	********** DISCONNECT VENTILATION **********	810 M	0	0	0	0	0	0	0	0	0
310200.0202142	DISCONNECT ACTIVE VENTILATION TO GLOVE BOXES/HOODS, CAP OFF.	810 M	1 L/S	24	869	0	240	0	0	8	1117
310200.0202160	********** CONNECT PASSIVE HEPA **********	810 M	0	0	0	0	0	0	0	0	0
310200.0202162	CHECK PASSIVE HEPA FILTER VENTILATION SYSTEM TO GLOVE BOXES/HOODS, SHOULD ALL BE EXISTING.	810 M	1 L/S	16	579	0	0	0	0	0	579
310200.0202180	********** SYSTEMS SHUTDOWN **********	810 M	0	0	0	0	0	0	0	0	0
310200.0202182	SHUTDOWN ALL SYSTEMS NOT REQUIRED FOR SAFETY, ALLOWANCE.	810 M	1 L/S	64	2432	0	500	0	0	18	2950
310200.0202200	********** POWER, HVAC, WATER AND LIGHTING FOR ONE YEAR **********	810 M	0	0	0	0	0	0	0	0	0
310200.0202204	ELECTRICAL UTILITY MAINTENANCE	810 M	1 YR	0	0	0	0	4000	0	0	4000
310200.0202206	BPA ELECTRICITY, MINIMAL	810 M	1 YR	0	0	0	0	1200	0	0	1200
SUBTOTAL	SITEWORK		(MASK)	1,962	57,542	0	15,540	5,200	0	545	78,827
	CONSUMABLES 3.20 %						1841				1841
	SWP 100.00%			1962	57542						57542
	GENERAL FOREMAN 7.00 %			274	8055						8055
	GENERAL REQUIREMENTS 15.00 %			629	18470						18470
	SALES TAX 8.00 %						1390		0		1390
	OH&P (ON MARKUPS ONLY)									113	113

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
TOTAL	COST CODE 81002			4,828		0		5,200		658	
	WBS 310200				141,610		18,771		0		166,240
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
TOTAL WBS 310200 ALTERNATIVE 2 - FIX IN PLACE				8,977		0		5,200		658	
					379,206		18,771		0		403,836

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
REPORT TOTAL				8,977	379,206	0	18,771	5,200	0	658	403,836

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAD1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 3
PHMCR01 - PROJECT COST SUMMARY

DATE 06/17/97 13:39:29
BY DKH/RWO

SORT	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST	392,520	30	117,756	510,276
LMHC	LOCKHEED MARTIN HANFORD CORP.	264,194	30	79,258	343,452
	SUBTOTAL	656,714	30	197,014	853,728
SITE	SITE ALLOCATIONS	131,545	30	39,464	171,009
	PROJECT TOTAL	788,259	30	236,478	1,024,737

TYPE OF ESTIMATE: PLANNING/FEASIBILITY — JUNE 17, 1997
FDNW LEAD ESTIMATOR: DAH — ESTIMATING MANAGER:
PROJECT MANAGER: Chris H Bevick
CLIENT

REMARKS:
ALTERNATE #3
REMOVAL AND FIX IN PLACE

DRAFT

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAD1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 3
PHMCR02 - WORK BREAKDOWN STRUCTURE (WBS) SUMMARY

DATE 06/17/97 13:39:33
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
310300	ALT. 3 - REMOVAL & FIX IN PLACE	656714	0.00	0	656714	30	197014	853728	171009	1024737
PROJECT TOTAL		656,714	0.00	0	656,714	30	197,014	853,728	171,009	1,024,737

1. ESTIMATE PURPOSE

THIS ESTIMATE WILL BE USED FOR A SCOPING STUDY.

2. ESTIMATE TECHNICAL BASIS

A. THIS ESTIMATE HAS BEEN PREPARED FOR LOCKHEED MARTIN HANFORD CORP. AS REQUESTED BY FDNW PROJECT MANAGEMENT.
B. A ROUGH DESCRIPTION OF THE SCOPE OF WORK MAY BE FOUND IN THE OUTLINE OF ALTERNATIVES, AN UNDATED AND UNNUMBERED DOCUMENT.
C. THE FOLLOWING CONSTRAINTS AND/OR SPECIAL CONDITIONS EXIST: ALL WORK DONE IN THE CRITICAL ASSEMBLY ROOM AND IN THE MIXING ROOM WILL REQUIRE FOLLOWING THE APPROPRIATE RADIATION WORK PROCEDURE.

3. ESTIMATE METHODOLOGY

A. DIRECT COSTS:
A MANLOADING TECHNIQUE WAS USED TO COME UP WITH THE LABOR HOURS WHEN NECESSARY DUE TO THE UNDEFINED SCOPE.
(1) CONSTRUCTION LABOR, MATERIAL AND EQUIPMENT UNITS HAVE BEEN ESTIMATED BASED UPON ONE OR MORE OF THE FOLLOWING STANDARD COMMERCIAL ESTIMATING RESOURCES, PUBLISHED ESTIMATING MANUALS AND R.S. MEANS

B. DIRECT COST FACTORS
(1) SALES TAX HAS BEEN APPLIED TO ALL MATERIALS AND EQUIPMENT PURCHASES AT 8%.
(2) NO WAREHOUSING COSTS ARE SHOWN SINCE THEY ARE CONSIDERED TO BE INCLUDED IN THE MATERIAL PROCUREMENT RATE (MPR).
(3) AN ESTIMATING FACTOR OF 15% HAS BEEN APPLIED TO DIRECT CRAFT LABOR FOR GENERAL REQUIREMENTS AND 23.58% FOR TECHNICAL SERVICES.
(4) CONSUMABLES ARE ESTIMATED AT 3.2% OF DIRECT CRAFT LABOR COSTS.
(5) SPECIAL WORK PROCEDURE (SWP) FACTORS ARE APPLIED AGAINST DIRECT LABOR FOR ACTUAL TIME LOST DUE TO THE PERSONNEL PROTECTIVE EQUIPMENT AND PROCEDURES. THE RATES WHICH HAVE BEEN APPLIED ARE AS FOLLOWS:
PROTECTIVE CLOTHING FACTOR HAS BEEN APPLIED AT 15%,
MASK WORK AT 85% PLUS 15% FOR PROTECTIVE CLOTHING.
CONTAMINATION RESTRICTIONS ASSOCIATED WITH RADIATION DOSE LIMITS (BURNOUT) HAVE NOT BEEN CALCULATED AS IT IS NOT BELIEVE TO BE A CONCERN FOR THESE ACTIVITIES.
(6) PREMIUM PAY
OVERTIME REQUIREMENTS AND SHIFT DIFFERENTIAL PAY FOR CRAFT LABOR WILL NOT BE REQUIRED FOR THIS WORK, AS STRAIGHT TIME, 40 HOUR WEEKS ARE DEEMED ADEQUATE TO ACCOMPLISH THIS WORK.
(7) GENERAL FOREMAN FACTOR OF 7% HAS BEEN APPLIED TO DIRECT CRAFT LABOR CREWS.
(8) A FACTOR OF 10% HAS BEEN APPLIED TO DIRECT CRAFT LABOR TO ALLOW FOR USAGE OF GOVERNMENT OWNED EQUIPMENT CONTROLLED BY DYNCORP.

C. RATES
(1) FLUOR DANIEL NORTHWEST LABOR RATES ARE BASED UPON THE FLUOR DAINEL FEDERAL OPERATIONS (FEDFO) DISCLOSURE STATEMENT AND APPROVED PROVISIONAL BILLING RATES. FOR ESTIMATING PURPOSES, AVERAGE RATES BY OPERATIONS CODE HAVE BEEN DEVELOPED BASED UPON RECENT COST HISTORY.
(2) FLUOR DANIEL NORTHWEST SERVICES (CONSTRUCTION CRAFT LABOR) RATES ARE THOSE LISTED IN APPENDIX A TO THE HANFORD SITE STABILIZATION AGREEMENT.
(3) FDH & PHMC SUBCONTRACTOR STANDARD LABOR RATES ARE THOSE LISTED IN THE FINANCIAL DATA SYSTEM (FDS) FDST 321R REPORT ORGANIZATION RATES PLUS ADDERS.

D. SITE ALLOCATIONS FACTORS
SITE ALLOCATION FACTORS ARE DEVELOPED AND PROVIDED BY FLUOR DANIEL HANFORD (FDH) FOR ESTIMATING USE.
(1) GOVERNMENT FURNISHED SERVICES RATE IS APPLIED TO ALL COSTS TO LIQUIDATE GOVERNMENT FURNISHED SERVICES PROVIDED TO THE ENTERPRISE COMPANIES: 14% FOR FDNW, 10% FOR FDNWS (CONSTRUCTION).
(2) HANFORD SITE G&A RATE OF 16.7% IS APPLIED TO ALL COSTS TO LIQUIDATE THE HANFORD GENERAL & ADMINISTRATIVE COSTS.
(3) HANFORD SITE MPR RATE OF 7.0% IS APPLIED TO ALL PURCHASED MATERIAL AND 7.7% TO ALL PURCHASED SERICES TO LIQUIDATE THE COST OF PROCUREMENT (INCLUDING RECIEVING).

FDNW APPLIES THE ABOVE FACTORS TO ESTIMATED COSTS AS FOLLOWS:
(1) FDH GFS/G&A CM FACTOR: A COMPOSITE FACTOR OF 33.04% HAS BEEN APPLIED TO TOTAL FDNW FIXED PRICE CONSTRUCTION MANAGEMENT WHICH INCLUDES GOVERNMENT FURNISHED SERVICES (GFS) AND SITE G&A/FEE.
(2) FDH GFS/G&A LABOR FACTOR: A COMPOSITE FACTOR HAS BEEN APPLIED TO TOTAL FDNW LABOR COSTS AS FOLLOWS: AE/CM COSTS = 33.04%, FDNWS CONSTRUCTION LABOR = 28.37%, FDNWS CONSTRUCTION MANAGEMENT LABOR = 33.04%, FDNW CONTRACT MANAGEMENT AND ADMINISTRATION = 33.04%
(3) FDH MPR/G&A MATERIAL FACTOR: A COMPOSITE FACTOR OF 24.87% HAS BEEN APPLIED TO TOTAL FDNW MATERIAL COST WHICH INCLUDE A MPR OF 7% AND MATERIAL G&A/FEE OF 16.7%

4. ESCALATION

ESCALATION PERCENTAGES WERE CALCULATED FROM THE JANUARY 1997 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE ACQUISITION" FM-50.

5. CONTINGENCY

A. DEFINITION OF CONTINGENCY AS PROVIDED BY DOE

"CONTINGENCY COVERS COSTS THAT MAY RESULT FROM INCOMPLETE DESIGN, UNFORESEEN AND UNPREDICTABLE CONDITIONS, OR UNCERTAINTIES WITHIN THE DEFINED PROJECT SCOPE. THE AMOUNT OF CONTINGENCY WILL DEPEND ON THE STATUS OF DESIGN, PROCUREMENT, AND CONSTRUCTION; AND THE COMPLEXITY AND UNCERTAINTIES OF THE COMPONENT PARTS OF THE PROJECT. CONTINGENCY IS NOT TO BE USED TO AVOID MAKING AN ACCURATE ASSESSMENT OF EXPECTED COST" (OFFICE OF WASTE MANAGEMENT (EM-30) COST AND SCHEDULE GUIDE.

B. CONTINGENCY ALLOWANCE GUIDELINES

THE DOE GUIDELINE CONTINGENCY ALLOWANCE FOR A PLANNING/FEASIBILITY ESTIMATE IS 20% TO 30%.

C. METHODOLOGY

CONTINGENCY IS EVALUATED AT THE LOWEST WORK BREAKDOWN STRUCTURE (WBS) LEVEL WITHIN THE COST ESTIMATE DETAILS. IT IS SUMMARIZED AT UPPER WBS LEVELS AND REPORTED ON THE SUMMARY REPORTS.

D. ANALYSIS

AN ASSESSMENT OF DESIGN MATURITY, WORK COMPLEXITY AND PROJECT UNCERTAINTIES HAS BEEN PERFORMED. AN EXPLAINATION OF THIS ASSESSMENT AND CONTIGENCY RATES WHICH HAVE BEEN ADDED TO THE COST OF WORK ARE AS FOLLOWS:

WBS 31XXXX CONSTRUCTION, ENGINEERING AND PROJECT MANAGEMENT - A 30% CONTINGENCY HAS BEEN APPLIED TO COVER COSTS LIKELY TO SURFACE THAT HAVE NOT BEEN ANTICIPATED AT THIS EARLY STAGE OF PLANNING. TECHNIQUES TO BE UTILIZED FOR DECONTAMINATION, STABILIZATION AND REMOVAL WILL NEED FURTHER STUDY AND MANY OF THE ACTIVITIES WILL BE SUBJECT TO CHANGE AT ANY TIME DURING THE WORK PROGRESS.

6. REMARKS

MAJOR ASSUMPTIONS WHICH HAVE BEEN MADE IN THE PREPARATION OF THIS ESITMATE ARE AS FOLLOWS:

A.) COSTS FOR CLOSURE CERTIFICATIONS, WIPE SAMPLES, SAMPLE ANALYTICAL COSTS, CORE SAMPLES, SOIL SAMPLES, TECHNICAL PUBLICATIONS, VERIFICATION SAMPLING AND A DECOMMISIONING PLAN HAVE NOT BEEN ADDRESSED, AND IF THESE ARE REQUIRED, WILL NEED TO BE INCLUDED.
B.) LIMITED INFORMATION WAS AVAILABLE AND GROSS ASSUMPTIONS WERE MADE.
C.) THE ESTIMATE ASSUMED THAT BURN-OUT WOULD NOT BE ENCOUNTERED.
D.) ENGINEERING AND PROJECT MANAGEMENT COSTS WERE FIGURED AS A PERCENTAGE OF CONSTRUCTION, SEE R08 REPORT.

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAD1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 3
PHMCR04 - COMPANY/WBS SUMMARY

DATE 06/17/97 13:39:37
BY DKH/RWO

SORT CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST									
310300	ALT. 3 - REMOVAL & FIX IN PLACE	392520	0.00	0	392520	30	117756	510276	171009	681285
	TOTAL FDNW FLUOR DANIEL NORTHWEST	392520	0.00	0	392520	30	117756	510276	171009	681285
LMHC	LOCKHEED MARTIN HANFORD CORP.									
310300	ALT. 3 - REMOVAL & FIX IN PLACE	264194	0.00	0	264194	30	79258	343452	0	343452
	TOTAL LMHC LOCKHEED MARTIN HANFORD COR	264194	0.00	0	264194	30	79258	343452	0	343452
PROJECT TOTAL		656,714	0.00	0	656,714	30	197,014	853,728	171,009	1,024,737

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAD1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 3
PHMCR05 - CONSTRUCTION MANAGEMENT/OTHER COST SUMMARY

DATE 06/17/97 13:39:42
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONSTRUCTION MANAGEMENT %	CONSTRUCTION MANAGEMENT TOTAL	OTHER COSTS	SUB TOTAL	TOTAL
310300	ALT. 3 - REMOVAL & FIX IN PLACE	655333	0.21	1381	0	1381	656714
PROJECT TOTAL		655,333		1,381	0	1,381	656,714

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAD1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 3
PHMCR06 - SITE ALLOCATIONS BY WBS

DATE 06/17/97 15:04:44
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	DYN EQ.USAGE	FDH GFS/G&A CONST.MGMT	FDH MPR F.P./S.C.	FDH GFS/G&A LABOR	FDH MPR/G&A MATERIAL	SITE ALLOC SUBTOTAL
310300	ALT. 3 - REMOVAL & FIX IN PLACE	655333	13165	456	0	115594	2330	131545
PROJECT TOTAL		655,333	13,165	456	0	115,594	2,330	131,545

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAD1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 3
PHMCR07 - SITE ALLOCATION ESCALATION/CONTINGENCY REPORT

DATE 06/17/97 13:39:47
BY DKH/RWO

WBS	DESCRIPTION	SITE ALLOC SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
310300	ALT. 3 - REMOVAL & FIX IN PLACE	131545	0.00	0	131545	30	39464	171009
PROJECT TOTAL		131,545	0.00	0	131,545	30	39,464	171,009

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAD1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 3
PHMCR08 - ESTIMATE DETAIL BY WBS / COST CODE

DATE 06/17/97 13:39:50
BY DKH/RWO

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
310300	ALT. 3 - REMOVAL & FIX IN PLACE										
310300.00	TECHNICAL SERVICES										
310300.0003100	********** DEFINITIVE DESIGN **********	000	1 L/S	1667	110022	0	0	0	0	0	110022
310300.0003200	AT 25 % OF CONSTRUCTION ********** ENGINEERING/ INSPECTION **********	000	1 L/S	1100	66000	0	0	0	0	0	66000
310300.0003300	AT 15% OF CONSTRUCTION ********** PROJECT MANAGEMENT **********	000	1 L/S	904	65992	0	0	0	0	0	65992
	AT 15% OF CONSTRUCTION										
SUBTOTAL	TECHNICAL SERVICES			3,671	242,014	0	0	0	0	0	242,014
TOTAL	COST CODE 00000 WBS 310300 (ESCALATION 0.00% - CONTINGENCY 30.00 %)			3,671	242,014	0	0	0	0	0	242,014
310300.01	GENERAL REQUIRMENTS										
310300.0103226	BURIAL CHARGES FOR 3 BOXES OF LLW @ $15.25/CF.	810	3 EA	0	0	0	0	5856	0	0	5856
SUBTOTAL	GENERAL REQUIRMENTS			0	0	0	0	5,856	0	0	5,856
TOTAL	COST CODE 81001 WBS 310300 (ESCALATION 0.00% - CONTINGENCY 30.00 %)			0	0	0	0	5,856	0	0	5,856
310300.01	GENERAL REQUIRMENTS										
310300.0103000	HPT TO MAN STEP-OFF PAD	810 M	1 L/S	1550	74059	0	0	0	0	0	74059
SUBTOTAL	GENERAL REQUIRMENTS		(MASK)	1,550	74,059	0	0	0	0	0	74,059
	SWP 100.00%			1550	74059						74059
TOTAL	COST CODE 81001 WBS 310300			3,100	148,118	0	0	0	0	0	148,118

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
310300.02	SITEWORK										
310300.0203220	********** REMOVE EQUIPMENT **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203222	REMOVE ALL EQUIPMENT IN GLOVE BOXES/HOODS, CUT UP AND PUT INTO BURIAL BOXES.	810 M	1 L/S	288	10944	0	0	0	0	0	10944
310300.0203224	BURIAL BOXES	810 M	2 EA	0	0	0	0	2000	0	0	2000
310300.0203240	********** DECON / FIXATIVE **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203241	WIPE DOWN GLOVE BOXES/HOODS AND FIX IN PLACE REMAINING CONTAMINATION.	810 M	0	0	0	0	0	0	0	0	0
310300.0203242	WIPE DOWN	810 M	1 L/S	48	1311	0	100	0	0	0	1411
310300.0203244	APPLY FIXATIVE, 50 MIL EPOXY.	810 M	7000 SF	588	16458	0	4900	0	0	0	21358
310300.0203250	********** SEAL GLOVE BOX PORTS, ETC. **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203252	SEAL GLOVE BOX PORTS, INSTALL BLANK-OFFS WITH SEALANT.	810 M	1 L/S	48	1737	0	250	0	0	0	1987
310300.0203254	SEAL HOOD OPENINGS, INSTALL CAPS AND SEAL OFF.	810 M	1 L/S	50	1810	0	300	0	0	0	2110
310300.0203256	CUT AND CAP PIPES	810 M	1 L/S	80	3092	0	250	0	0	0	3342
310300.0203280	********** DISCONNECT VENTILATION **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203282	DISCONNECT ACTIVE VENTILATION TO GLOVE BOXES/HOODS, CAP OFF.	810 M	1 L/S	24	869	0	240	0	0	0	1109
310300.0203290	********** CONNECT PASSIVE HEPA **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203292	CHECK PASSIVE HEPA FILTER VENTILATION SYSTEM TO GLOVE BOXES/HOODS, SHOULD ALL BE EXISTING.	810 M	1 L/S	16	579	0	0	0	0	0	579
310300.0203300	********** ISOLATE TANKS	810 M	0	0	0	0	0	0	0	0	0

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
	**********										
310300.0203310	ISOLATE TANKS TK-109, 110 AND 111, FILL WITH GROUT.	810 M	1 L/S	64	2304	100	50	0	0	0	2454
310300.0203320	ISOLATE AND SEAL TANKS TK-101, 102, 103, 104, 161 AND 162.	810 M	1 L/S	128	4608	200	300	0	0	0	5108
310300.0203340	TANKS 105 AND 106	810 M	0	0	0	0	0	0	0	0	0
310300.0203342	ERECT GREENHOUSE, W/HEPA	810 M	1 EA	64	1920	5000	500	0	0	0	7420
310300.0203344	CUT UP TANKS 105 & 106, PUT INTO BURIAL BOX	810 M	1 L/S	32	1216	0	0	0	0	0	1216
310300.0203346	BURIAL BOX	810 M	1 EA	0	0	0	0	1000	0	0	1000
310300.0203360	********** BLANK OFF VENTILATION **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203362	BLANK OFF VENTILATION SYSTEM FROM THE CAR AND MIX ROOM ON THE OUTSIDE OF BUILDING PAST FIRST HEPA FILTER.	810 M	1 L/S	36	1303	0	50	0	0	0	1353
310300.0203364	SEAL UP INJECTION PORTS, CALIBRATION PORTS, JOINTS AND OTHER POSSIBLE EGRESS POINTS IN DUCT WORK.	810 M	1 L/S	32	1158	0	100	0	0	0	1258
310300.0203380	********** SYSTEM SHUTDOWN **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203382	SHUT DOWN REMAINING SYSTEMS NOT NECESSARY FOR SAFETY	810 M	1 L/S	48	1728	0	0	0	0	0	1728
310300.0203390	********** CONTINUE CURRENT SURVEIL-LANCE AND MAINTENANCE **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203391	SURVEILLANCE AND MAINTENANCE (209-E)	810 M	1 L/S	900	45000	0	0	0	0	0	45000
310300.0203392	SURVEILLANCE AND MAINTENANCE (CRIB)	810 M	1 L/S	10	500	0	0	0	0	0	500
310300.0203394	HEALTH PHYSICS SURVEILLANCE ACTIVITIES AT 4 HR/WK	810 M	1 YR	208	9938	0	0	0	0	0	9938
310300.0203396	********** POWER, HVAC, WATER AND LIGHTING FOR ONE YEAR **********	810 M	0	0	0	0	0	0	0	0	0
310300.0203398	ELECTRICAL UTILITY MAINTENANCE	810 M	1 YR	0	0	0	0	4000	0	0	4000

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
310300.0203399	BPA ELECTRICITY	810 M	1 YR	0	0	0	0	1200	0	0	1200
SUBTOTAL	SITEWORK		(MASK)	2,664	106,475	5,300	7,040	8,200	0	0	127,015
	CONSUMABLES 3.20 %						3407				3407
	SWP 100.00%			2664	106475						106475
	GENERAL FOREMAN 7.00 %			372	14906						14906
	GENERAL REQUIREMENTS 15.00 %			855	34178						34178
	SALES TAX 8.00 %						835		0		835
TOTAL	COST CODE 81002			6,556	262,034	5,300	11,282	8,200	0	0	286,817
	WBS 310300										
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
TOTAL WBS 310300 ALT. 3 - REMOVAL & FIX IN PLACE				13,327	652,166	5,300	11,282	14,056	0	0	682,805

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAD1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALTERNATIVE 3
PHMCR08 - ESTIMATE DETAIL BY WBS / COST CODE

DATE 06/17/97 13:39:51
BY DKH/RWO

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
REPORT TOTAL				13,327	652,166	5,300	11,282	14,056	0	0	682,805

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAE1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 1
PHMCR01 - PROJECT COST SUMMARY

DATE 06/17/97 13:49:35
BY DKH/RWO

SORT	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST	597,979	30	179,394	777,373
LMHC	LOCKHEED MARTIN HANFORD CORP.	180,418	30	54,125	234,543
	SUBTOTAL	778,397	30	233,519	1,011,916
SITE	SITE ALLOCATIONS	196,135	30	58,840	254,975
	PROJECT TOTAL	974,532	30	292,359	1,266,891

TYPE OF ESTIMATE: PLANNING/FEASIBILITY — JUNE 17, 1997
FDNW LEAD ESTIMATOR: RM — ESTIMATING MANAGER:
PROJECT MANAGER: Chris H Brevick
CLIENT

REMARKS:
ALTERNATIVE #4, STAGE 1

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
310410	ALTERNATIVE 4 - STAGE 1	778397	0.00	0	778397	30	233519	1011916	254975	1266891
PROJECT TOTAL		778,397	0.00	0	778,397	30	233,519	1,011,916	254,975	1,266,891

1. ESTIMATE PURPOSE

THIS ESTIMATE WILL BE USED FOR A SCOPING STUDY.

2. ESTIMATE TECHNICAL BASIS

A. THIS ESTIMATE HAS BEEN PREPARED FOR LOCKHEED MARTIN HANFORD CORP. AS REQUESTED BY FDNW PROJECT MANAGER.
B. A ROUGH DESCRIPTION OF THE SCOPE OF WORK MAY BE FOUND IN THE OUTLINE OF ALTERNATIVES, AN UNDATED AND UNNUMBERED DOCUMENT.
C. THE FOLLOWING CONSTRAINTS AND/OR SPECIAL CONDITIONS EXIST: ALL WORK DONE IN THE CRITICAL ASSEMBLY ROOM AND IN THE MIXING ROOM WILL REQUIRE FOLLOWING THE APPROPRIATE RADIATION WORK PROCEDURE.

3. ESTIMATE METHODOLOGY

A. DIRECT COSTS:
A MANLOADING TECHNIQUE WAS USED TO COME UP WITH THE LABOR HOURS WHEN NECESSARY DUE TO THE UNDEFINED SCOPE.
(1) CONSTRUCTION LABOR, MATERIAL AND EQUIPMENT UNITS HAVE BEEN ESTIMATED BASED UPON ONE OR MORE OF THE FOLLOWING STANDARD COMMERCIAL ESTIMATING RESOURCES, PUBLISHED ESTIMATING MANUALS AND R.S. MEANS

B. DIRECT COST FACTORS
(1) SALES TAX HAS BEEN APPLIED TO ALL MATERIALS AND EQUIPMENT PURCHASES AT 8%.
(2) NO WAREHOUSING COSTS ARE SHOWN SINCE THEY ARE CONSIDERED TO BE INCLUDED IN THE MATERIAL PROCUREMENT RATE (MPR).
(3) AN ESTIMATING FACTOR OF 15% HAS BEEN APPLIED TO DIRECT CRAFT LABOR FOR GENERAL REQUIREMENTS AND 23.58% FOR TECHNICAL SERVICES.
(4) CONSUMABLES ARE ESTIMATED AT 3.2% OF DIRECT CRAFT LABOR COSTS.
(5) SPECIAL WORK PROCEDURE (SWP) FACTORS ARE APPLIED AGAINST DIRECT LABOR FOR ACTUAL TIME LOST DUE TO THE PERSONNEL PROTECTIVE EQUIPMENT AND PROCEDURES. THE RATES WHICH HAVE BEEN APPLIED ARE AS FOLLOWS:
PROTECTIVE CLOTHING FACTOR HAS BEEN APPLIED AT 15%,
MASK WORK AT 85% PLUS 15% FOR PROTECTIVE CLOTHING.
CONTAMINATION RESTRICTIONS ASSOCIATED WITH RADIATION DOSE LIMITS (BURNOUT) HAVE NOT BEEN CALCULATED AS IT IS NOT BELIEVE TO BE A CONCERN FOR THESE ACTIVITIES.
(6) PREMIUM PAY
OVERTIME REQUIREMENTS AND SHIFT DIFFERENTIAL PAY FOR CRAFT LABOR WILL NOT BE REQUIRED FOR THIS WORK, AS STRAIGHT TIME, 40 HOUR WEEKS ARE DEEMED ADEQUATE TO ACCOMPLISH THIS WORK.
(7) GENERAL FOREMAN FACTOR OF 7% HAS BEEN APPLIED TO DIRECT CRAFT LABOR CREWS.
(8) A FACTOR OF 10% HAS BEEN APPLIED TO DIRECT CRAFT LABOR TO ALLOW FOR USAGE OF GOVERNMENT OWNED EQUIPMENT CONTROLLED BY DYNCORP.

C. RATES
(1) FLUOR DANIEL NORTHWEST LABOR RATES ARE BASED UPON THE FLUOR DAINEL FEDERAL OPERATIONS (FEDFO) DISCLOSURE STATEMENT AND APPROVED PROVISIONAL BILLING RATES. FOR ESTIMATING PURPOSES, AVERAGE RATES BY OPERATIONS CODE HAVE BEEN DEVELOPED BASED UPON RECENT COST HISTORY.
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(1) GOVERNMENT FURNISHED SERVICES RATE IS APPLIED TO ALL COSTS TO LIQUIDATE GOVERNMENT FURNISHED SERVICES PROVIDED TO THE ENTERPRISE COMPANIES: 14% FOR FDNW, 10% FOR FDNWS (CONSTRUCTION).
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FDNW APPLIES THE ABOVE FACTORS TO ESTIMATED COSTS AS FOLLOWS:
(1) FDH GFS/G&A CM FACTOR: A COMPOSITE FACTOR OF 33.04% HAS BEEN APPLIED TO TOTAL FDNW FIXED PRICE CONSTRUCTION MANAGEMENT WHICH INCLUDES GOVERNMENT FURNISHED SERVICES (GFS) AND SITE G&A/FEE.
(2) FDH GFS/G&A LABOR FACTOR: A COMPOSITE FACTOR HAS BEEN APPLIED TO TOTAL FDNW LABOR COSTS AS FOLLOWS: AE/CM COSTS = 33.04%, FDNWS CONSTRUCTION LABOR = 28.37%, FDNWS CONSTRUCTION MANAGEMENT LABOR = 33.04%, FDNW CONTRACT MANAGEMENT AND ADMINISTRATION = 33.04%
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ESCALATION PERCENTAGES WERE CALCULATED FROM THE JANUARY 1997 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE ACQUISITION" FM-50.

5. CONTINGENCY

A. DEFINITION OF CONTINGENCY AS PROVIDED BY DOE

"CONTINGENCY COVERS COSTS THAT MAY RESULT FROM INCOMPLETE DESIGN, UNFORESEEN AND UNPREDICTABLE CONDITIONS, OR UNCERTAINTIES WITHIN THE DEFINED PROJECT SCOPE. THE AMOUNT OF CONTINGENCY WILL DEPEND ON THE STATUS OF DESIGN, PROCUREMENT, AND CONSTRUCTION; AND THE COMPLEXITY AND UNCERTAINTIES OF THE COMPONENT PARTS OF THE PROJECT. CONTINGENCY IS NOT TO BE USED TO AVOID MAKING AN ACCURATE ASSESSMENT OF EXPECTED COST" (OFFICE OF WASTE MANAGEMENT (EM-30) COST AND SCHEDULE GUIDE.

B. CONTINGENCY ALLOWANCE GUIDELINES

THE DOE GUIDELINE CONTINGENCY ALLOWANCE FOR A PLANNING/FEASIBILITY ESTIMATE IS 20% TO 30%.

C. METHODOLOGY

CONTINGENCY IS EVALUATED AT THE LOWEST WORK BREAKDOWN STRUCTURE (WBS) LEVEL WITHIN THE COST ESTIMATE DETAILS. IT IS SUMMARIZED AT UPPER WBS LEVELS AND REPORTED ON THE SUMMARY REPORTS.

D. ANALYSIS

AN ASSESSMENT OF DESIGN MATURITY, WORK COMPLEXITY AND PROJECT UNCERTAINTIES HAS BEEN PERFORMED. AN EXPLAINATION OF THIS ASSESSMENT AND CONTIGENCY RATES WHICH HAVE BEEN ADDED TO THE COST OF WORK ARE AS FOLLOWS:

WBS 31XXXX CONSTRUCTION, ENGINEERING AND PROJECT MANAGEMENT - A 30% CONTINGENCY HAS BEEN APPLIED TO COVER COSTS LIKELY TO SURFACE THAT HAVE NOT BEEN ANTICIPATED AT THIS EARLY STAGE OF PLANNING. TECHNIQUES TO BE UTILIZED FOR DECONTAMINATION, STABILIZATION AND REMOVAL WILL NEED FURTHER STUDY AND MANY OF THE ACTIVITIES WILL BE SUBJECT TO CHANGE AT ANY TIME DURING THE WORK PROGRESS.

6. REMARKS

MAJOR ASSUMPTIONS WHICH HAVE BEEN MADE IN THE PREPARATION OF THIS ESITMATE ARE AS FOLLOWS:

A.) COSTS FOR CLOSURE CERTIFICATIONS, WIPE SAMPLES, SAMPLE ANALYTICAL COSTS, CORE SAMPLES, SOIL SAMPLES, TECHNICAL PUBLICATIONS, VERIFICATION SAMPLING AND A DECOMMISIONING PLAN HAVE NOT BEEN ADDRESSED, AND IF THESE ARE REQUIRED, WILL NEED TO BE INCLUDED.
B.) LIMITED INFORMATION WAS AVAILABLE AND GROSS ASSUMPTIONS WERE MADE.
C.) THE ESTIMATE ASSUMED THAT BURN-OUT WOULD NOT BE ENCOUNTERED.
D.) ENGINEERING AND PROJECT MANAGEMENT COSTS WERE FIGURED AS A PERCENTAGE OF CONSTRUCTION, SEE R08 REPORT.

SORT CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST									
310410	ALTERNATIVE 4 - STAGE 1	597979	0.00	0	597979	30	179394	777373	254975	1032348
	TOTAL FDNW FLUOR DANIEL NORTHWEST	597979	0.00	0	597979	30	179394	777373	254975	1032348
LMHC	LOCKHEED MARTIN HANFORD CORP.									
310410	ALTERNATIVE 4 - STAGE 1	180418	0.00	0	180418	30	54125	234543	0	234543
	TOTAL LMHC LOCKHEED MARTIN HANFORD COR	180418	0.00	0	180418	30	54125	234543	0	234543
PROJECT TOTAL		778,397	0.00	0	778,397	30	233,519	1,011,916	254,975	1,266,891

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONSTRUCTION MANAGEMENT %	CONSTRUCTION MANAGEMENT TOTAL	OTHER COSTS	SUB TOTAL	TOTAL
310410	ALTERNATIVE 4 - STAGE 1	718244	8.38	60153	0	60153	778397
PROJECT TOTAL		718,244		60,153	0	60,153	778,397

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	DYN EQ.USAGE	FDH GFS/G&A CONST.MGMT	FDH MPR F.P./S.C.	FDH GFS/G&A LABOR	FDH MPR/G&A MATERIAL	SITE ALLOC SUBTOTAL
310410	ALTERNATIVE 4 - STAGE 1	718244	21118	19875	0	151318	3824	196135
PROJECT TOTAL		718,244	21,118	19,875	0	151,318	3,824	196,135

WBS	DESCRIPTION	SITE ALLOC SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
310410	ALTERNATIVE 4 - STAGE 1	196135	0.00	0	196135	30	58840	254975
PROJECT TOTAL		196,135	0.00	0	196,135	30	58,840	254,975

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
310410	ALTERNATIVE 4 - STAGE 1										
310410.00	TECHNICAL SERVICES										
310410.0004100	********** DEFINITIVE DESIGN **********	000	1 L/S	1652	109032	0	0	0	0	0	109032
310410.0004200	AT 25 % OF CONSTRUCTION ********** ENGINEERING/ INSPECTION **********	000	1 L/S	1812	108720	0	0	0	0	0	108720
310410.0004300	AT 15% OF CONSTRUCTION ********** PROJECT MANAGEMENT **********	000	1 L/S	890	64970	0	0	0	0	0	64970
	AT 15% OF CONSTRUCTION										
SUBTOTAL	TECHNICAL SERVICES			4,354	282,722	0	0	0	0	0	282,722
TOTAL	COST CODE 00000 WBS 310410 (ESCALATION 0.00% - CONTINGENCY 30.00 %)			4,354	282,722	0	0	0	0	0	282,722
310410.01	GENERAL REQUIRMENTS										
310410.0104066	BURIAL CHARGES FOR 8 BOXES OF LLW @ $15.25/CF	810	8 EA	0	0	0	0	15616	0	0	15616
SUBTOTAL	GENERAL REQUIRMENTS			0	0	0	0	15,616	0	0	15,616
TOTAL	COST CODE 81001 WBS 310410 (ESCALATION 0.00% - CONTINGENCY 30.00 %)			0	0	0	0	15,616	0	0	15,616
310410.01	GENERAL REQUIRMENTS										
310410.0104000	HPT TO MAN STEP-OFF PAD	810	M 1 L/S	1888	90209	0	0	0	0	0	90209
SUBTOTAL	GENERAL REQUIRMENTS		(MASK)	1,888	90,209	0	0	0	0	0	90,209
	SWP 100.00%			1888	90209						90209
TOTAL	COST CODE 81001 WBS 310410			3,776	180,418	0	0	0	0	0	180,418

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
310410.02	SITEWORK										
310410.0204000	********** STAGE 1 **********	810 M	0	0	0	0	0	0	0	0	0
310410.0204002	RESTORE SUPPLY VENTILATION AND BALANCE SYSTEM, ASSUME NO NEW EQUIPMENT NEEDED.	810 M	1 L/S	80	2895	0	0	0	0	0	2895
310410.0204012	REMOVE ALL EQUIPMENT IN GLOVE BOXES/HOODS, CUT UP AND PUT INTO BURIAL BOXES.	810 M	1 L/S	288	10944	0	0	0	0	0	10944
310410.0204014	BURIAL BOXES	810 M	2 EA	0	0	0	0	2000	0	0	2000
310410.0204022	DISCONNECT PIPES TO GLOVE BOXES AND HOODS, CAP OFF.	810 M	1 L/S	80	3092	0	250	0	0	9	3351
310410.0204034	FIX IN PLACE CONTAMINATION ON GLOVE BOXES AND HOODS	810 M	7000 SF	595	16654	0	5250	0	0	184	22088
310410.0204036	APPLY FIXATIVE, 50 MIL EPOXY.	810 M	7000 SF	588	16458	0	4900	0	0	172	21530
310410.0204042	CONSTRUCT GREENHOUSES AROUND GLOVE BOXES AND HOODS, COSTS INCLUDE 2 HEPA SYSTEMS	810 M	6 EA	384	13824	10000	0	0	0	0	23824
310410.0204052	DISCONNECT REMAINING SAFETY SYSTEMS AND HVAC	810 M	1 L/S	64	2432	0	0	0	0	0	2432
310410.0204062	CUT UP GLOVE BOXES AND HOODS FOR PLACEMENT INTO BURIAL BOXES	810 M	1 L/S	400	13600	0	500	0	0	18	14118
310410.0204064	BURIAL BOXES	810 M	6 EA	0	0	0	0	6000	0	0	6000
310410.0204082	REMOVE TANKS NOT IN GLOVE BOXES OR HOODS, CUT UP AND PUT INTO BURIAL CONTAINERS	810 M	1 L/S	80	3040	0	200	0	0	7	3247
310410.0204084	BURIAL BOXES	810 M	2 EA	0	0	0	0	2000	0	0	2000
SUBTOTAL	SITEWORK		(MASK)	2,559	82,939	10,000	11,100	10,000	0	390	114,429
	CONSUMABLES 3.20 %						2654				2654
	SWP 100.00%			2559	82939						82939
	GENERAL FOREMAN 7.00 %			358	11611						11611
	GENERAL REQUIREMENTS 15.00 %			821	26623						26623
	SALES TAX 8.00 %						1100		0		1100
	OH&P (ON MARKUPS ONLY)									131	131
TOTAL	COST CODE 81002			6,297		10,000		10,000		521	
	WBS 310410				204,112		14,854		0		239,488

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
TOTAL WBS 310410 ALTERNATIVE 4 - STAGE 1				14,427	667,252	10,000	14,854	25,616	0	521	718,244

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
REPORT TOTAL				14,427	667,252	10,000	14,854	25,616	0	521	718,244

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAF1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 2
PHMCR01 - PROJECT COST SUMMARY

DATE 06/17/97 14:05:52
BY DKH/RWO

SORT	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST	52,302	30	15,690	67,992
LMHC	LOCKHEED MARTIN HANFORD CORP.	7,644	30	2,293	9,937
	SUBTOTAL	59,946	30	17,983	77,929
SITE	SITE ALLOCATIONS	16,335	30	4,901	21,236
	PROJECT TOTAL	76,281	30	22,884	99,165

TYPE OF ESTIMATE: PLANNING/FEASIBILITY — JUNE 17, 1997
FDNW LEAD ESTIMATOR: DKH
ESTIMATING MANAGER: D K Hay
PROJECT MANAGER: Chris H Brevick
CLIENT:

REMARKS:
ALTERNATIVE #4, STAGE 2

DRAFT

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAF1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 2
PHMCR02 - WORK BREAKDOWN STRUCTURE (WBS) SUMMARY

DATE 06/17/97 14:05:54
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
310420	ALTERNATIVE 4 - STAGE 2	59946	0.00	0	59946	30	17983	77929	21236	99165
PROJECT TOTAL		59,946	0.00	0	59,946	30	17,983	77,929	21,236	99,165

1. ESTIMATE PURPOSE

THIS ESTIMATE WILL BE USED FOR A SCOPING STUDY.

2. ESTIMATE TECHNICAL BASIS

A. THIS ESTIMATE HAS BEEN PREPARED FOR LOCKHEED MARTIN HANFORD CORP. AS REQUESTED BY FDNW PROJECT MANAGER.
B. A ROUGH DESCRIPTION OF THE SCOPE OF WORK MAY BE FOUND IN THE OUTLINE OF ALTERNATIVES, AN UNDATED AND UNNUMBERED DOCUMENT.
C. THE FOLLOWING CONSTRAINTS AND/OR SPECIAL CONDITIONS EXIST: ALL WORK DONE IN THE CRITICAL ASSEMBLY ROOM AND IN THE MIXING ROOM WILL REQUIRE FOLLOWING THE APPROPRIATE RADIATION WORK PROCEDURE.

3. ESTIMATE METHODOLOGY

A. DIRECT COSTS:
A MANLOADING TECHNIQUE WAS USED TO COME UP WITH THE LABOR HOURS WHEN NECESSARY DUE TO THE UNDEFINED SCOPE.
(1) CONSTRUCTION LABOR, MATERIAL AND EQUIPMENT UNITS HAVE BEEN ESTIMATED BASED UPON ONE OR MORE OF THE FOLLOWING STANDARD COMMERCIAL ESTIMATING RESOURCES, PUBLISHED ESTIMATING MANUALS AND R.S. MEANS

B. DIRECT COST FACTORS
(1) SALES TAX HAS BEEN APPLIED TO ALL MATERIALS AND EQUIPMENT PURCHASES AT 8%.
(2) NO WAREHOUSING COSTS ARE SHOWN SINCE THEY ARE CONSIDERED TO BE INCLUDED IN THE MATERIAL PROCUREMENT RATE (MPR).
(3) AN ESTIMATING FACTOR OF 15% HAS BEEN APPLIED TO DIRECT CRAFT LABOR FOR GENERAL REQUIREMENTS AND 23.58% FOR TECHNICAL SERVICES.
(4) CONSUMABLES ARE ESTIMATED AT 3.2% OF DIRECT CRAFT LABOR COSTS.
(5) SPECIAL WORK PROCEDURE (SWP) FACTORS ARE APPLIED AGAINST DIRECT LABOR FOR ACTUAL TIME LOST DUE TO THE PERSONNEL PROTECTIVE EQUIPMENT AND PROCEDURES. THE RATES WHICH HAVE BEEN APPLIED ARE AS FOLLOWS:
PROTECTIVE CLOTHING FACTOR HAS BEEN APPLIED AT 15%,
MASK WORK AT 85% PLUS 15% FOR PROTECTIVE CLOTHING.
CONTAMINATION RESTRICTIONS ASSOCIATED WITH RADIATION DOSE LIMITS (BURNOUT) HAVE NOT BEEN CALCULATED AS IT IS NOT BELIEVE TO BE A CONCERN FOR THESE ACTIVITIES.
(6) PREMIUM PAY
OVERTIME REQUIREMENTS AND SHIFT DIFFERENTIAL PAY FOR CRAFT LABOR WILL NOT BE REQUIRED FOR THIS WORK, AS STRAIGHT TIME, 40 HOUR WEEKS ARE DEEMED ADEQUATE TO ACCOMPLISH THIS WORK.
(7) GENERAL FOREMAN FACTOR OF 7% HAS BEEN APPLIED TO DIRECT CRAFT LABOR CREWS.
(8) A FACTOR OF 10% HAS BEEN APPLIED TO DIRECT CRAFT LABOR TO ALLOW FOR USAGE OF GOVERNMENT OWNED EQUIPMENT CONTROLLED BY DYNCORP.

C. RATES
(1) FLUOR DANIEL NORTHWEST LABOR RATES ARE BASED UPON THE FLUOR DAINEL FEDERAL OPERATIONS (FEDFO) DISCLOSURE STATEMENT AND APPROVED PROVISIONAL BILLING RATES. FOR ESTIMATING PURPOSES, AVERAGE RATES BY OPERATIONS CODE HAVE BEEN DEVELOPED BASED UPON RECENT COST HISTORY.
(2) FLUOR DANIEL NORTHWEST SERVICES (CONSTRUCTION CRAFT LABOR) RATES ARE THOSE LISTED IN APPENDIX A TO THE HANFORD SITE STABILIZATION AGREEMENT.
(3) FDH & PHMC SUBCONTRACTOR STANDARD LABOR RATES ARE THOSE LISTED IN THE FINANCIAL DATA SYSTEM (FDS) FDST 321R REPORT ORGANIZATION RATES PLUS ADDERS.

D. SITE ALLOCATIONS FACTORS
SITE ALLOCATION FACTORS ARE DEVELOPED AND PROVIDED BY FLUOR DANIEL HANFORD (FDH) FOR ESTIMATING USE.
(1) GOVERNMENT FURNISHED SERVICES RATE IS APPLIED TO ALL COSTS TO LIQUIDATE GOVERNMENT FURNISHED SERVICES PROVIDED TO THE ENTERPRISE COMPANIES: 14% FOR FDNW, 10% FOR FDNWS (CONSTRUCTION).
(2) HANFORD SITE G&A RATE OF 16.7% IS APPLIED TO ALL COSTS TO LIQUIDATE THE HANFORD GENERAL & ADMINISTRATIVE COSTS.
(3) HANFORD SITE MPR RATE OF 7.0% IS APPLIED TO ALL PURCHASED MATERIAL AND 7.7% TO ALL PURCHASED SERICES TO LIQUIDATE THE COST OF PROCUREMENT (INCLUDING RECIEVING).

FDNW APPLIES THE ABOVE FACTORS TO ESTIMATED COSTS AS FOLLOWS:
(1) FDH GFS/G&A CM FACTOR: A COMPOSITE FACTOR OF 30.04% HAS BEEN APPLIED TO TOTAL FDNW FIXED PRICE CONSTRUCTION MANAGEMENT WHICH INCLUDES GOVERNMENT FURNISHED SERVICES (GFS) AND SITE G&A/FEE.
(2) FDH GFS/G&A LABOR FACTOR: A COMPOSITE FACTOR HAS BEEN APPLIED TO TOTAL FDNW LABOR COSTS AS FOLLOWS: AE/CM COSTS = 33.04%, FDNWS CONSTRUCTION LABOR = 28.37%, FDNWS CONSTRUCTION MANAGEMENT LABOR = 33.04%, FDNW CONTRACT MANAGEMENT AND ADMINISTRATION = 33.04%
(3) FDH MPR/G&A MATERIAL FACTOR: A COMPOSITE FACTOR OF 24.87% HAS BEEN APPLIED TO TOTAL FDNW MATERIAL COST WHICH INCLUDE A MPR OF 7% AND MATERIAL G&A/FEE OF 16.7%

4. ESCALATION

ESCALATION PERCENTAGES WERE CALCULATED FROM THE JANUARY 1997 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE ACQUISITION" FM-50.

5. CONTINGENCY

A. DEFINITION OF CONTINGENCY AS PROVIDED BY DOE

"CONTINGENCY COVERS COSTS THAT MAY RESULT FROM INCOMPLETE DESIGN, UNFORESEEN AND UNPREDICTABLE CONDITIONS, OR UNCERTAINTIES WITHIN THE DEFINED PROJECT SCOPE. THE AMOUNT OF CONTINGENCY WILL DEPEND ON THE STATUS OF DESIGN, PROCUREMENT, AND CONSTRUCTION; AND THE COMPLEXITY AND UNCERTAINTIES OF THE COMPONENT PARTS OF THE PROJECT. CONTINGENCY IS NOT TO BE USED TO AVOID MAKING AN ACCURATE ASSESSMENT OF EXPECTED COST" (OFFICE OF WASTE MANAGEMENT (EM-30) COST AND SCHEDULE GUIDE.

B. CONTINGENCY ALLOWANCE GUIDELINES

THE DOE GUIDELINE CONTINGENCY ALLOWANCE FOR A PLANNING/FEASIBILITY ESTIMATE IS 20% TO 30%.

C. METHODOLOGY

CONTINGENCY IS EVALUATED AT THE LOWEST WORK BREAKDOWN STRUCTURE (WBS) LEVEL WITHIN THE COST ESTIMATE DETAILS. IT IS SUMMARIZED AT UPPER WBS LEVELS AND REPORTED ON THE SUMMARY REPORTS.

D. ANALYSIS

AN ASSESSMENT OF DESIGN MATURITY, WORK COMPLEXITY AND PROJECT UNCERTAINTIES HAS BEEN PERFORMED. AN EXPLAINATION OF THIS ASSESSMENT AND CONTIGENCY RATES WHICH HAVE BEEN ADDED TO THE COST OF WORK ARE AS FOLLOWS:

WBS 31XXXX CONSTRUCTION, ENGINEERING AND PROJECT MANAGEMENT - A 30% CONTINGENCY HAS BEEN APPLIED TO COVER COSTS LIKELY TO SURFACE THAT HAVE NOT BEEN ANTICIPATED AT THIS EARLY STAGE OF PLANNING. TECHNIQUES TO BE UTILIZED FOR DECONTAMINATION, STABILIZATION AND REMOVAL WILL NEED FURTHER STUDY AND MANY OF THE ACTIVITIES WILL BE SUBJECT TO CHANGE AT ANY TIME DURING THE WORK PROGRESS.

6. REMARKS

MAJOR ASSUMPTIONS WHICH HAVE BEEN MADE IN THE PREPARATION OF THIS ESITMATE ARE AS FOLLOWS:

A.) COSTS FOR CLOSURE CERTIFICATIONS, WIPE SAMPLES, SAMPLE ANALYTICAL COSTS, CORE SAMPLES, SOIL SAMPLES, TECHNICAL PUBLICATIONS, VERIFICATION SAMPLING AND A DECOMMISIONING PLAN HAVE NOT BEEN ADDRESSED, AND IF THESE ARE REQUIRED, WILL NEED TO BE INCLUDED.
B.) LIMITED INFORMATION WAS AVAILABLE AND GROSS ASSUMPTIONS WERE MADE.
C.) THE ESTIMATE ASSUMED THAT BURN-OUT WOULD NOT BE ENCOUNTERED.
D.) ENGINEERING AND PROJECT MANAGEMENT COSTS WERE FIGURED AS A PERCENTAGE OF CONSTRUCTION, SEE R08 REPORT.

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAF1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 2
PHMCR04 - COMPANY/WBS SUMMARY

DATE 06/17/97 14:05:57
BY DKH/RWO

SORT CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST									
310420	ALTERNATIVE 4 - STAGE 2	52302	0.00	0	52302	30	15690	67992	21236	89228
	TOTAL FDNW FLUOR DANIEL NORTHWEST	52302	0.00	0	52302	30	15690	67992	21236	89228
LMHC	LOCKHEED MARTIN HANFORD CORP.									
310420	ALTERNATIVE 4 - STAGE 2	7644	0.00	0	7644	30	2293	9937	0	9937
	TOTAL LMHC LOCKHEED MARTIN HANFORD COR	7644	0.00	0	7644	30	2293	9937	0	9937
PROJECT TOTAL		59,946	0.00	0	59,946	30	17,983	77,929	21,236	99,165

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. 2475AAF1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 2
PHMCR05 - CONSTRUCTION MANAGEMENT/OTHER COST SUMMARY

DATE 06/17/97 14:06:00
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONSTRUCTION MANAGEMENT %	CONSTRUCTION MANAGEMENT TOTAL	OTHER COSTS	SUB TOTAL	TOTAL
310420	ALTERNATIVE 4 - STAGE 2	53652	11.73	6294	0	6294	59946
PROJECT TOTAL		53,652		6,294	0	6,294	59,946

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAF1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 2
PHMCR06 - SITE ALLOCATIONS BY WBS

DATE 06/17/97 15:06:59
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	DYN EQ.USAGE	FDH GFS/G&A CONST.MGMT	FDH MPR F.P./S.C.	FDH GFS/G&A LABOR	FDH MPR/G&A MATERIAL	SITE ALLOC SUBTOTAL
310420	ALTERNATIVE 4 - STAGE 2	53652	2033	2080	0	12011	211	16335
PROJECT TOTAL		53,652	2,033	2,080	0	12,011	211	16,335

WBS	DESCRIPTION	SITE ALLOC SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
310420	ALTERNATIVE 4 - STAGE 2	16335	0.00	0	16335	30	4901	21236
PROJECT TOTAL		16,335	0.00	0	16,335	30	4,901	21,236

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAF1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 2
PHMCR08 - ESTIMATE DETAIL BY WBS / COST CODE

DATE 06/17/97 14:06:05
BY DKH/RWO

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
310420	ALTERNATIVE 4 - STAGE 2										
310420.00	TECHNICAL SERVICES										
310420.0004200	********** DEFINITIVE DESIGN **********	000	1 L/S	133	8778	0	0	0	0	0	8778
	AT 25 % OF CONSTRUCTION										
310420.0005200	********** ENGINEERING/ INSPECTION **********	000	1 L/S	88	5280	0	0	0	0	0	5280
	AT 15% OF CONSTRUCTION										
310420.0005300	********** PROJECT MANAGEMENT **********	000	1 L/S	72	5256	0	0	0	0	0	5256
	AT 15% OF CONSTRUCTION										
SUBTOTAL	TECHNICAL SERVICES			293	19,314	0	0	0	0	0	19,314
TOTAL	COST CODE 00000			293	19,314	0	0	0	0	0	19,314
	WBS 310420										
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
310420.01	GENERAL REQUIRMENTS										
310420.0105000	HPT TO MAN STEP-OFF PAD	810 M	1 L/S	80	3822	0	0	0	0	0	3822
SUBTOTAL	GENERAL REQUIRMENTS		(MASK)	80	3,822	0	0	0	0	0	3,822
	SWP 100.00%			80	3822						3822
TOTAL	COST CODE 81001			160	7,644	0	0	0	0	0	7,644
	WBS 310420										
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
310420.02	SITEWORK										
310420.0205000	********** STAGE 2 **********	810 M	0	0	0	0	0	0	0	0	0
310420.0205002	REMOVE SUSPECTED CONTAMINATED PIPING, AIR RECIRCULATION SYSTEM, COOLING UNIT AND ZONE 1 HVAC SYSTEM.	810 M	1 L/S	224	8064	0	500	0	0	18	8582

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
310420.0205004	BURIAL BOXES	810 M	6 EA	0	0	0	0	6000	0	0	6000
SUBTOTAL	SITEWORK		(MASK)	224	8,064	0	500	6,000	0	18	14,582
	CONSUMABLES 3.20 %						258				258
	SWP 100.00%			224	8064						8064
	GENERAL FOREMAN 7.00 %			31	1128						1128
	GENERAL REQUIREMENTS 15.00 %			71	2588						2588
	SALES TAX 8.00 %						60		0		60
	OH&P (ON MARKUPS ONLY)									11	11
TOTAL	COST CODE 81002			551	19,845	0	818	6,000	0	29	26,693
	WBS 310420										
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
TOTAL WBS 310420 ALTERNATIVE 4 - STAGE 2				1,004	46,803	0	818	6,000	0	29	53,651

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
REPORT TOTAL				1,004	46,803	0	818	6,000	0	29	53,651

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. 2475AAG1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 3
PHMCR01 - PROJECT COST SUMMARY

DATE 06/17/97 14:18:14
BY DKH/RWO

SORT	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST	170,802	30	51,241	222,043
LMHC	LOCKHEED MARTIN HANFORD CORP.	44,836	30	13,451	58,287
	SUBTOTAL	215,638	30	64,692	280,330
SITE	SITE ALLOCATIONS	57,506	30	17,252	74,758
	PROJECT TOTAL	273,144	30	81,944	355,088

TYPE OF ESTIMATE: PLANNING/FEASIBILITY — JUNE 17, 1997
FDNW LEAD ESTIMATOR: DKH — ESTIMATING MANAGER: [signature]
PROJECT MANAGER: Chris H Brevick
CLIENT

REMARKS:
DRAFT
ALTERNATIVE #4, STAGE 3

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAG1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 3
PHMCR02 - WORK BREAKDOWN STRUCTURE (WBS) SUMMARY

DATE 06/17/97 14:18:17
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
310430	ALTERNATIVE 4 - STAGE 3	215638	0.00	0	215638	30	64692	280330	74758	355088
PROJECT TOTAL		215,638	0.00	0	215,638	30	64,692	280,330	74,758	355,088

1. ESTIMATE PURPOSE

THIS ESTIMATE WILL BE USED FOR A SCOPING STUDY.

2. ESTIMATE TECHNICAL BASIS

A. THIS ESTIMATE HAS BEEN PREPARED FOR LOCKHEED MARTIN HANFORD CORP. AS REQUESTED BY FDNW PROJECT MANAGER.
B. A ROUGH DESCRIPTION OF THE SCOPE OF WORK MAY BE FOUND IN THE OUTLINE OF ALTERNATIVES, AN UNDATED AND UNNUMBERED DOCUMENT.
C. THE FOLLOWING CONSTRAINTS AND/OR SPECIAL CONDITIONS EXIST: ALL WORK DONE IN THE CRITICAL ASSEMBLY ROOM AND IN THE MIXING ROOM WILL REQUIRE FOLLOWING THE APPROPRIATE RADIATION WORK PROCEDURE.

3. ESTIMATE METHODOLOGY

A. DIRECT COSTS:
A MANLOADING TECHNIQUE WAS USED TO COME UP WITH THE LABOR HOURS WHEN NECESSARY DUE TO THE UNDEFINED SCOPE.
(1) CONSTRUCTION LABOR, MATERIAL AND EQUIPMENT UNITS HAVE BEEN ESTIMATED BASED UPON ONE OR MORE OF THE FOLLOWING STANDARD COMMERCIAL ESTIMATING RESOURCES, PUBLISHED ESTIMATING MANUALS AND R.S. MEANS

B. DIRECT COST FACTORS
(1) SALES TAX HAS BEEN APPLIED TO ALL MATERIALS AND EQUIPMENT PURCHASES AT 8%.
(2) NO WAREHOUSING COSTS ARE SHOWN SINCE THEY ARE CONSIDERED TO BE INCLUDED IN THE MATERIAL PROCUREMENT RATE (MPR).
(3) AN ESTIMATING FACTOR OF 15% HAS BEEN APPLIED TO DIRECT CRAFT LABOR FOR GENERAL REQUIREMENTS AND 23.58% FOR TECHNICAL SERVICES.
(4) CONSUMABLES ARE ESTIMATED AT 3.2% OF DIRECT CRAFT LABOR COSTS.
(5) SPECIAL WORK PROCEDURE (SWP) FACTORS ARE APPLIED AGAINST DIRECT LABOR FOR ACTUAL TIME LOST DUE TO THE PERSONNEL PROTECTIVE EQUIPMENT AND PROCEDURES. THE RATES WHICH HAVE BEEN APPLIED ARE AS FOLLOWS:
PROTECTIVE CLOTHING FACTOR HAS BEEN APPLIED AT 15%,
MASK WORK AT 85% PLUS 15% FOR PROTECTIVE CLOTHING.
CONTAMINATION RESTRICTIONS ASSOCIATED WITH RADIATION DOSE LIMITS (BURNOUT) HAVE NOT BEEN CALCULATED AS IT IS NOT BELIEVE TO BE A CONCERN FOR THESE ACTIVITIES.
(6) PREMIUM PAY
OVERTIME REQUIREMENTS AND SHIFT DIFFERENTIAL PAY FOR CRAFT LABOR WILL NOT BE REQUIRED FOR THIS WORK, AS STRAIGHT TIME, 40 HOUR WEEKS ARE DEEMED ADEQUATE TO ACCOMPLISH THIS WORK.
(7) GENERAL FOREMAN FACTOR OF 7% HAS BEEN APPLIED TO DIRECT CRAFT LABOR CREWS.
(8) A FACTOR OF 10% HAS BEEN APPLIED TO DIRECT CRAFT LABOR TO ALLOW FOR USAGE OF GOVERNMENT OWNED EQUIPMENT CONTROLLED BY DYNCORP.

C. RATES
(1) FLUOR DANIEL NORTHWEST LABOR RATES ARE BASED UPON THE FLUOR DAINEL FEDERAL OPERATIONS (FEDFO) DISCLOSURE STATEMENT AND APPROVED PROVISIONAL BILLING RATES. FOR ESTIMATING PURPOSES, AVERAGE RATES BY OPERATIONS CODE HAVE BEEN DEVELOPED BASED UPON RECENT COST HISTORY.
(2) FLUOR DANIEL NORTHWEST SERVICES (CONSTRUCTION CRAFT LABOR) RATES ARE THOSE LISTED IN APPENDIX A TO THE HANFORD SITE STABILIZATION AGREEMENT.
(3) FDH & PHMC SUBCONTRACTOR STANDARD LABOR RATES ARE THOSE LISTED IN THE FINANCIAL DATA SYSTEM (FDS) FDST 321R REPORT ORGANIZATION RATES PLUS ADDERS.

D. SITE ALLOCATIONS FACTORS
SITE ALLOCATION FACTORS ARE DEVELOPED AND PROVIDED BY FLUOR DANIEL HANFORD (FDH) FOR ESTIMATING USE.
(1) GOVERNMENT FURNISHED SERVICES RATE IS APPLIED TO ALL COSTS TO LIQUIDATE GOVERNMENT FURNISHED SERVICES PROVIDED TO THE ENTERPRISE COMPANIES: 14% FOR FDNW, 10% FOR FDNWS (CONSTRUCTION).
(2) HANFORD SITE G&A RATE OF 16.7% IS APPLIED TO ALL COSTS TO LIQUIDATE THE HANFORD GENERAL & ADMINISTRATIVE COSTS.
(3) HANFORD SITE MPR RATE OF 7.0% IS APPLIED TO ALL PURCHASED MATERIAL AND 7.7% TO ALL PURCHASED SERICES TO LIQUIDATE THE COST OF PROCUREMENT (INCLUDING RECIEVING).

FDNW APPLIES THE ABOVE FACTORS TO ESTIMATED COSTS AS FOLLOWS:
(1) FDH GFS/G&A CM FACTOR: A COMPOSITE FACTOR OF 33.04% HAS BEEN APPLIED TO TOTAL FDNW FIXED PRICE CONSTRUCTION MANAGEMENT WHICH INCLUDES GOVERNMENT FURNISHED SERVICES (GFS) AND SITE G&A/FEE.
(2) FDH GFS/G&A LABOR FACTOR: A COMPOSITE FACTOR HAS BEEN APPLIED TO TOTAL FDNW LABOR COSTS AS FOLLOWS: AE/CM COSTS = 33.04%, FDNWS CONSTRUCTION LABOR = 28.37%, FDNWS CONSTRUCTION MANAGEMENT LABOR = 33.04%, FDNW CONTRACT MANAGEMENT AND ADMINISTRATION = 33.04%
(3) FDH MPR/G&A MATERIAL FACTOR: A COMPOSITE FACTOR OF 24.87% HAS BEEN APPLIED TO TOTAL FDNW MATERIAL COST WHICH INCLUDE A MPR OF 7% AND MATERIAL G&A/FEE OF 16.7%

4. ESCALATION

ESCALATION PERCENTAGES WERE CALCULATED FROM THE JANUARY 1997 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE "OFFICE OF INFRASTRUCTURE ACQUISITION" FM-50.

5. CONTINGENCY

A. DEFINITION OF CONTINGENCY AS PROVIDED BY DOE.

"CONTINGENCY COVERS COSTS THAT MAY RESULT FROM INCOMPLETE DESIGN, UNFORESEEN AND UNPREDICTABLE CONDITIONS, OR UNCERTAINTIES WITHIN THE DEFINED PROJECT SCOPE. THE AMOUNT OF CONTINGENCY WILL DEPEND ON THE STATUS OF DESIGN, PROCUREMENT, AND CONSTRUCTION; AND THE COMPLEXITY AND UNCERTAINTIES OF THE COMPONENT PARTS OF THE PROJECT. CONTINGENCY IS NOT TO BE USED TO AVOID MAKING AN ACCURATE ASSESSMENT OF EXPECTED COST" (OFFICE OF WASTE MANAGEMENT (EM-30) COST AND SCHEDULE GUIDE.

B. CONTINGENCY ALLOWANCE GUIDELINES

THE DOE GUIDELINE CONTINGENCY ALLOWANCE FOR A PLANNING/FEASIBILITY ESTIMATE IS 20% TO 30%.

C. METHODOLOGY

CONTINGENCY IS EVALUATED AT THE LOWEST WORK BREAKDOWN STRUCTURE (WBS) LEVEL WITHIN THE COST ESTIMATE DETAILS. IT IS SUMMARIZED AT UPPER WBS LEVELS AND REPORTED ON THE SUMMARY REPORTS.

D. ANALYSIS

AN ASSESSMENT OF DESIGN MATURITY, WORK COMPLEXITY AND PROJECT UNCERTAINTIES HAS BEEN PERFORMED. AN EXPLAINATION OF THIS ASSESSMENT AND CONTIGENCY RATES WHICH HAVE BEEN ADDED TO THE COST OF WORK ARE AS FOLLOWS:

WBS 31XXXX CONSTRUCTION, ENGINEERING AND PROJECT MANAGEMENT - A 30% CONTINGENCY HAS BEEN APPLIED TO COVER COSTS LIKELY TO SURFACE THAT HAVE NOT BEEN ANTICIPATED AT THIS EARLY STAGE OF PLANNING. TECHNIQUES TO BE UTILIZED FOR DECONTAMINATION, STABILIZATION AND REMOVAL WILL NEED FURTHER STUDY AND MANY OF THE ACTIVITIES WILL BE SUBJECT TO CHANGE AT ANY TIME DURING THE WORK PROGRESS.

6. REMARKS

MAJOR ASSUMPTIONS WHICH HAVE BEEN MADE IN THE PREPARATION OF THIS ESITMATE ARE AS FOLLOWS:

A.) COSTS FOR CLOSURE CERTIFICATIONS, WIPE SAMPLES, SAMPLE ANALYTICAL COSTS, CORE SAMPLES, SOIL SAMPLES, TECHNICAL PUBLICATIONS, VERIFICATION SAMPLING AND A DECOMMISIONING PLAN HAVE NOT BEEN ADDRESSED, AND IF THESE ARE REQUIRED, WILL NEED TO BE INCLUDED.
B.) LIMITED INFORMATION WAS AVAILABLE AND GROSS ASSUMPTIONS WERE MADE.
C.) THE ESTIMATE ASSUMED THAT BURN-OUT WOULD NOT BE ENCOUNTERED.
D.) ENGINEERING AND PROJECT MANAGEMENT COSTS WERE FIGURED AS A PERCENTAGE OF CONSTRUCTION, SEE R08 REPORT.

SORT CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	SUB TOTAL	SITE ALLOCAT'N	TOTAL DOLLARS
FDNW	FLUOR DANIEL NORTHWEST									
310430	ALTERNATIVE 4 - STAGE 3	170802	0.00	0	170802	30	51241	222043	74758	296801
	TOTAL FDNW FLUOR DANIEL NORTHWEST	170802	0.00	0	170802	30	51241	222043	74758	296801
LMHC	LOCKHEED MARTIN HANFORD CORP.									
310430	ALTERNATIVE 4 - STAGE 3	44836	0.00	0	44836	30	13451	58287	0	58287
	TOTAL LMHC LOCKHEED MARTIN HANFORD COR	44836	0.00	0	44836	30	13451	58287	0	58287
PROJECT TOTAL		215,638	0.00	0	215,638	30	64,692	280,330	74,758	355,088

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONSTRUCTION MANAGEMENT %	CONSTRUCTION MANAGEMENT TOTAL	OTHER COSTS	SUB TOTAL	TOTAL
310430	ALTERNATIVE 4 - STAGE 3	196381	9.81	19257	0	19257	215638
PROJECT TOTAL		196,381		19,257	0	19,257	215,638

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAG1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 3
PHMCR06 - SITE ALLOCATIONS BY WBS

DATE 06/17/97 14:18:41
BY DKH/RWO

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	DYN EQ.USAGE	FDH GFS/G&A CONST.MGMT	FDH MPR F.P./S.C.	FDH GFS/G&A LABOR	FDH MPR/G&A MATERIAL	SITE ALLOC SUBTOTAL
310430	ALTERNATIVE 4 - STAGE 3	196381	7324	6363	0	43370	449	57506
PROJECT TOTAL		196,381	7,324	6,363	0	43,370	449	57,506

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAG1

** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 3
PHMCR07 - SITE ALLOCATION ESCALATION/CONTINGENCY REPORT

DATE 06/17/97 14:18:25
BY DKH/RWO

WBS	DESCRIPTION	SITE ALLOC SUBTOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
310430	ALTERNATIVE 4 - STAGE 3	57506	0.00	0	57506	30	17252	74758
PROJECT TOTAL		57,506	0.00	0	57,506	30	17,252	74,758

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
310430	ALTERNATIVE 4 - STAGE 3										
310430.00	TECHNICAL SERVICES										
310430.0006100	********** DEFINITIVE DESIGN **********	000	1 L/S	481	31746	0	0	0	0	0	31746
310430.0006200	AT 25 % OF CONSTRUCTION ********** ENGINEERING/ INSPECTION **********	000	1 L/S	318	19080	0	0	0	0	0	19080
310430.0006300	AT 15% OF CONSTRUCTION ********** PROJECT MANAGEMENT **********	000	1 L/S	261	19053	0	0	0	0	0	19053
	AT 15% OF CONSTRUCTION										
SUBTOTAL	TECHNICAL SERVICES			1,060	69,879	0	0	0	0	0	69,879
TOTAL	COST CODE 00000			1,060		0		0		0	
	WBS 310430				69,879		0		0		69,879
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
310430.01	GENERAL REQUIRMENTS										
310430.0106110	BURIAL COSTS FOR 40 DRUMS OF LLW CONCRETE DEBRIS AT $15.25/CF	810	40 EA	0	0	0	0	4270	0	0	4270
SUBTOTAL	GENERAL REQUIRMENTS			0	0	0	0	4,270	0	0	4,270
TOTAL	COST CODE 81001			0		0		4,270		0	
	WBS 310430				0		0		0		4,270
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
310430.01	GENERAL REQUIRMENTS										
310430.0106000	HPT TO MAN STEP-OFF PAD	810 M	1 L/S	400	19112	0	0	0	0	0	19112
SUBTOTAL	GENERAL REQUIRMENTS		(MASK)	400	19,112	0	0	0	0	0	19,112
	SWP 100.00%			400	19112						19112
TOTAL	COST CODE 81001			800		0		0		0	
	WBS 310430				38,224		0		0		38,224

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										
310430.02	SITEWORK										
310430.0206000	********** STAGE 3 **********	810 M	0	0	0	0	0	0	0	0	0
310430.0206020	REMOVE ALL REMAINING EQUIPMENT.	810 M	1 L/S	160	6080	0	200	0	0	7	6287
310430.0206022	BURIAL BOX ALLOWANCE	810 M	2 EA	0	0	0	0	2000	0	0	2000
310430.0206040	REMOVE REMAINING CONFINEMENT VENTILATION SYSTEM - DUCTS; FILTERS AND FANS	810 M	1 L/S	40	1448	0	200	0	0	7	1655
310430.0206042	BURIAL BOX ALLOWANCE	810 M	2 EA	0	0	0	0	2000	0	0	2000
310430.0206060	SEAL PIPING BETWEEN CAR AND MIX ROOM	810 M	1 L/S	16	618	0	50	0	0	2	670
310430.0206080	SCABBLE/BUSH HAMMER CONCRETE WALLS AND FLOOR	810 M	6120 SF	447	12208	0	122	0	0	4	12334
310430.0206082	SURVEY	810 M	1 L/S	8	382	0	0	0	0	0	382
310430.0206090	SCABBLE/BUSH HAMMER CONCRETE WALLS AND FLOOR SECOND TIME IN HOT AREAS ONLY	810 M	3000 SF	219	5981	0	60	0	0	2	6043
310430.0206092	SURVEY	810 M	1 L/S	8	382	0	0	0	0	0	382
310430.0206100	SCABBLE/BUSH HAMMER CONCRETE WALLS AND FLOOR THIRD TIME IN REMAINING HOT AREAS.	810 M	200 SF	15	410	0	4	0	0	0	414
310430.0206102	SURVEY	810 M	1 L/S	8	382	0	0	0	0	0	382
310430.0206110	DRUM COSTS, 55 GAL W/LINER	810 M	40 EA	0	0	0	4000	0	0	0	4000
310430.0206140	ISOLATE TANKS TK-109, 110 AND 111, FILL WITH GROUT.	810 M	1 L/S	64	2304	100	50	0	0	2	2456
SUBTOTAL	SITEWORK		(MASK)	985		100		4,000		24	
					30,195		4,686		0		39,005
	CONSUMABLES 3.20 %						966				966
	SWP 100.00%			985	30195						30195
	GENERAL FOREMAN 7.00 %			137	4227						4227
	GENERAL REQUIREMENTS 15.00 %			316	9692						9692
	SALES TAX 8.00 %						452		0		452
	OH&P (ON MARKUPS ONLY)									49	49
TOTAL	COST CODE 81002			2,424		100		4,000		73	
	WBS 310430				74,309		6,104		0		84,587
	(ESCALATION 0.00% - CONTINGENCY 30.00 %)										

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
TOTAL WBS 310430 ALTERNATIVE 4 - STAGE 3				4,284	182,412	100	6,104	8,270	0	73	196,960

FLUOR DANIEL NORTHWEST, INC.
LOCKHEED MARTIN HANFORD CORP.
JOB NO. E61945/F3RUL5
FILE NO. Z475AAG1

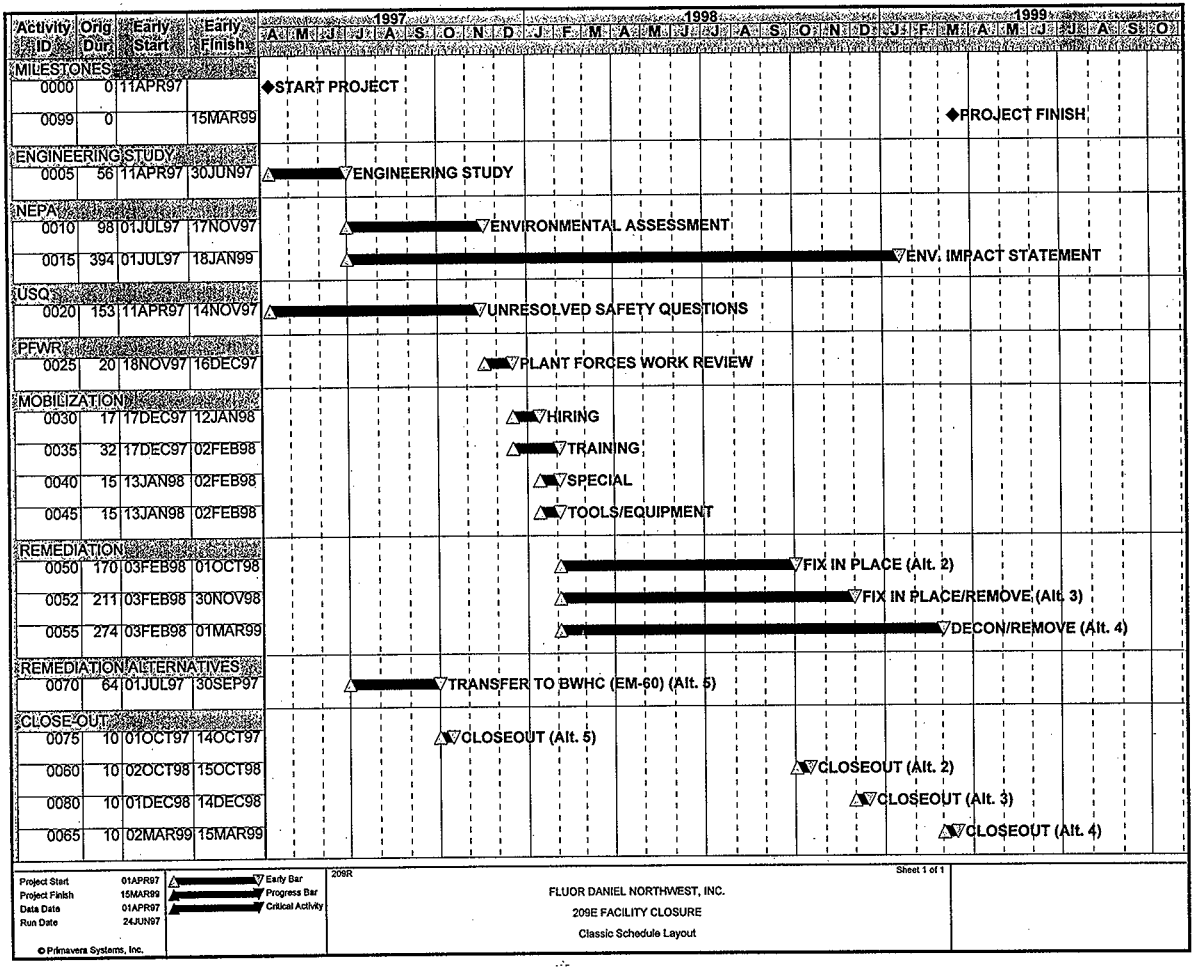
** IEST - INTERACTIVE ESTIMATING **
209E FACILITY ENGINEERING STUDY
PLANNING/FEASIBILITY ESTIMATE - ALT #4, STAGE 3
PHMCR08 - ESTIMATE DETAIL BY WBS / COST CODE

DATE 06/17/97 14:18:29
BY DKH/RWO

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB-CONTRACT	EQUIP-MENT	OH&P / B & I	TOTAL DOLLARS
REPORT TOTAL				4,284	182,412	100	6,104	8,270	0	73	196,960

APPENDIX B

Schedules


Activity ID
Orig Dur
Early Start
Early Finish
1997
1998
1999
A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O
MILESTONES
0000 0 11APR97
0099 0 15MAR99
START PROJECT
PROJECT FINISH
ENGINEERING STUDY
0005 56 11APR97 30JUN97
ENGINEERING STUDY
NEPA
0010 98 01JUL97 17NOV97
0015 394 01JUL97 18JAN99
ENVIRONMENTAL ASSESSMENT
ENV. IMPACT STATEMENT
USQ
0020 153 11APR97 14NOV97
UNRESOLVED SAFETY QUESTIONS
PFWR
0025 20 18NOV97 16DEC97
PLANT FORCES WORK REVIEW
MOBILIZATION
0030 17 17DEC97 12JAN98
0035 32 17DEC97 02FEB98
0040 15 13JAN98 02FEB98
0045 15 13JAN98 02FEB98
HIRING
TRAINING
SPECIAL
TOOLS/EQUIPMENT
REMEDIATION
0050 170 03FEB98 01OCT98
0052 211 03FEB98 30NOV98
0055 274 03FEB98 01MAR99
FIX IN PLACE (Alt. 2)
FIX IN PLACE/REMOVE (Alt. 3)
DECON/REMOVE (Alt. 4)
REMEDIATION ALTERNATIVES
0070 64 01JUL97 30SEP97
TRANSFER TO BWHC (EM-60) (Alt. 5)
CLOSE-OUT
0075 10 01OCT97 14OCT97
0060 10 02OCT98 15OCT98
0080 10 01DEC98 14DEC98
0065 10 02MAR99 15MAR99
CLOSEOUT (Alt. 5)
CLOSEOUT (Alt. 2)
CLOSEOUT (Alt. 3)
CLOSEOUT (Alt. 4)
Project Start 01APR97
Project Finish 15MAR99
Data Date 01APR97
Run Date 24JUN97
Early Bar
Progress Bar
Critical Activity
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209R
Sheet 1 of 1
FLUOR DANIEL NORTHWEST, INC.
209E FACILITY CLOSURE
Classic Schedule Layout

APPENDIX C

Equipment List

Vessel	Name	Capacity (liters)	Contamination	Dimensions		Location	Construction
				Mix Room			
HO-200	Mix Room Glovebox	—	28 g Pu	Inner surface area ~300 sq ft	Inner surface area ~28 sq m	Center Mix Room	¼" stainless steel, ASTM A240 304L
ST-217	Load in/out station	—	—	Inner surface area ~120 sq ft	Inner surface area ~11 sq m	HO-200	¼" stainless steel, ASTM A240 304L
ST-219	Load in airlock	—	—	—	—	HO-200	¼" stainless steel, ASTM A240 304L
Tk-206	Prover vessel	10	—	circular, 11" dia, 30¼" tall	circular, 0.28m dia, 0.77m tall	HO-200	glass
Tk-213	Concentrator	18	1 g Pu	circular, 10 7/8" ID, 14½" OD, 29 3/4" tall, encased, 16"OD, 15"ID, 30½" tall	circular, 0.28m ID, 0.37m OD, 0.76m tall, encased, 0.46m OD, 0.38m ID, 0.77m tall	HO-200	tank: 1/8" titanium sides, ¼" titanium top, ASTM B265 GR2 encasement: ¼" stainless steel, ASTM A240 304L
E-214	Condenser	—	—	—	—	HO-200	
P-201	Pump	—	—	—	—	HO-200	
P-203	Pump	—	—	—	—	HO-200	
Tk-215	Process condensate catch tank	15	—	circular, 6" ID, 36 1/8" tall	circular, 0.15m ID, 0.92m tall	HO-200	glass
Tk-216	Process condensate catch tank	15	—	circular, 6" ID, 36 1/8" tall	circular, 0.15m ID, 0.92m tall	HO-200	glass
Tk-242	Closed loop expansion tank	5	—	7" ID, 19½" tall	0.18m ID, 0.50m tall	HO-200	6" stainless steel sch40 pipe, ASTM A312 TP 304L
HO-230	Pu Storage Tank Enclosure	—	—	Exposed outer surface area ~190 sq ft	Exposed outer surface area ~18 sq m	West Wall Mix Room	¼" stainless steel, ASTM A240 304L
Tk-231	Pu Storage Tank	320	42 g Pu	18' 6" long, 3' tall, 3" wide	5.6m long, 1m tall, 80mm wide	HO-230	¼" stainless steel, ASTM A240 304L
Tk-232	Pu Storage Tank	320	31 g Pu	18' 6" long, 3' tall, 3" wide	5.6m long, 1m tall, 80mm wide	HO-230	¼" stainless steel, ASTM A240 304L
Tk-233	Pu Storage Tank	320	47 g Pu	18' 6" long, 3' tall, 3" wide	5.6m long, 1m tall, 80mm wide	HO-230	¼" stainless steel, ASTM A240 304L
Tk-234	Pu Storage Tank	156	33 g Pu	9' long, 3' tall, 3" wide	3m long, 1m tall, 80mm wide	HO-230	¼" stainless steel, ASTM A240 304L
Tk-235	Pu Storage Tank	156	3 g Pu	9' long, 3' tall, 3" wide	3m long, 1m tall, 80mm wide	HO-230	¼" stainless steel, ASTM A240 304L
HO-280	Fume hood	—	—	47" wide, 49½"tall, 34" deep	1.20m wide, 1.26m tall, 0.86m deep	West Wall Mix Room	¼" stainless steel, ASTM A240 304L

Vessel	Name	Capacity (liters)	Contamination	Dimensions		Location	Construction
				Critical Assembly Room			
HO-120	Pu Pump Glovebox	---	1 g Pu	26" deep, 21 1/8" tall, 36" wide, sloped view port top front	0.66m deep, 0.54m tall, 1m wide, sloped view port top front	West Wall CAR	3/8" stainless steel, ASTM A240 304L
P-122	Pu Fill Pump	---	---	---	---	HO-120	
HO-130	Uranium Pump Glovebox	---	---	18" deep, 18" tall, 38" wide	0.46m deep, 0.46m tall, 1m wide	North Wall CAR	3/16" stainless steel, ASTM A240 304L
P-131	Uranium Mix Pump	---	---	---	---	HO-130	
P-132	Uranium Fill Pump	---	---	---	---	HO-130	
SPL-133	Sampler	---	---	---	---	HO-130	
HO-140	Assembly Hood #1	---	---	8' square, 15' tall	2.4m square, 4.6m tall	Center CAR, Northwest	¼" stainless steel, ASTM A240 304L
Tk-109	Dump tank for HO-140	40	Quantity unknown	36" long, 26" tall, 3" wide	1m long, 0.66m tall, 80mm wide	Under HO-140, encased in concrete 3' below floor	¼" stainless steel, ASTM A240 304L
HO-170	Assembly Hood #2	---	PuBe neutron sources; Pu sources (foil and scrap); 0.1 µg Cf-252 source; 10 g U source; tritium sources	8' square, 15' tall	2.4m square, 4.6m tall	Center CAR, Northeast	¼" stainless steel, ASTM A240 304L
Tk-110	Dump tank for HO-170	40	Assumed, quantity unknown	36" long, 26" tall, 3" wide	1m long, 0.66m tall, 80mm wide	Under HO-170, encased in concrete 3' below floor	¼" stainless steel, ASTM A240 304L
Tk-141	Bellows Tank	Variable	36 g Pu	Bellows with 1/16" thick, 3' 8" square end plates; expandable from 3" to 9" wide; (3' 8" x 3' 8" x 3-9")	Bellows with 1.6mm thick, 1.1m square end plates; expandable from 80mm to 230mm wide; (1.1m x 1.1m x 80 - 230mm)	Tk-142	¼" stainless steel, ASTM A240 304L
Tk-142	Bellows Reflector Tank	---	---	56" long; 37" deep; 27" wide	1.4m long; 1m deep; 0.69m wide	HO-140	¼" stainless steel, ASTM A240 304L
Tk-101	Condensate storage tank #1	330	1 g Pu	41" tall, 3" wide, 19' long	1m tall, 80mm wide, 5.8m long	North Wall CAR	¼" stainless steel, ASTM A240 304L
Tk-102	U Storage tank #2	330	---	41" tall, 3" wide, 19' long	1m tall, 80mm wide, 5.8m long	North Wall CAR	¼" stainless steel, ASTM A240 304L
Tk-103	Pu Storage tank #3	290	8 g Pu	41" tall, 3" wide, 18' 6" long	1m tall, 80mm wide, 5.6m long	North Wall CAR	¼" stainless steel, ASTM A240 304L
Tk-104	Pu Storage tank #4	290	15 g Pu	41" tall, 3" wide, 18' 6" long	1m tall, 80mm wide, 5.6m long	North Wall CAR	¼" stainless steel, ASTM A240 304L
Tk-105	Dump storage tank	400	38 g Pu	40" tall, 3" wide, 20' 11¼" long	1m tall, 80mm wide, 6.4m long	West Wall CAR	¼" stainless steel, ASTM A240 304L
Tk-106	Dump mix tank	400	123 g Pu	40" tall, 3" wide, 20' 11¼" long	1m tall, 80mm wide, 6.4m long	West Wall CAR	¼" stainless steel, ASTM A240 304L
Tk-108	Fuel element assembly system (FEAS)	---	---	No information available from drawings	No information available from drawings	Center CAR, Southwest	No information available from drawings
14" Experimental Vessel	---	---	2.7 g Pu	No information available from drawings	No information available from drawings	FEAS	No information available from drawings
27" Experimental Vessel	---	---	4.2 g Pu	No information available from drawings	No information available from drawings	FEAS	No information available from drawings
Tk-111	Waste hold-up tank	220	Quantity unknown	8' long, 3' 10" sloped downward to 4' tall, 3" wide	2.4m long, 1.2m sloped downward to 1.22m tall, 80mm wide	Outside bldg, south side, under valve pit	¼" stainless steel, ASTM A240 304L
Tk-160	Consolidated Fuel Reprocessing Program (CFRP) water tank	---	---	5' tall, 6' 2" wide, 3' 3" deep; rests upon legs 4' 1½" above floor	1.5m tall, 1.88m wide, 1m deep; rests upon legs 1.26m above floor	Center CAR, West	¼" stainless steel, ASTM A240 304L
Tk-161	CFRP process tank	110	4 g Pu	14"ID, 42 3/8" tall	0.36m ID, 1.08m tall	Tk-160	¼" stainless steel, ASTM A240 304L
Tk-162	CFRP process tank	400	4 g Pu	27"ID, 42 3/8" tall	0.69m ID, 1.08m tall	Tk-160	¼" stainless steel, ASTM A240 304L

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