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Evaluation of Existing Hanford Buildings for the Storage of Solid Wastes

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Date Published
May 1993

Prepared for the U.S. Department of Energy
Office of Environmental Restoration and
Waste Management

**Westinghouse
Hanford Company**

P.O. Box 1970
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Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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Date Received: 2-5-93 CW		INFORMATION RELEASE REQUEST		Reference: WHC-CN-3-4																																																															
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Purpose ☐ Speech or Presentation ☐ Full Paper (Check only one suffix) ☐ Summary ☐ Abstract ☐ Visual Aid ☐ Speakers Bureau ☐ Poster Session ☐ Videotape			☒ Reference ☒ Technical Report ☐ Thesis or Dissertation ☐ Manual ☐ Brochure/Flier ☐ Software/Database ☐ Controlled Document ☐ Other																																																																
			ID Number (include revision, volume, etc.) WHC-EP-0636																																																																
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Title Evaluation of Existing Hanford Buildings for the Storage of Solid Waste				Unclassified Category UC-																																																															
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New or novel (patentable) subject matter? ☒ No ☐ Yes If "Yes", has disclosure been submitted by WHC or other company? ☐ No ☐ Yes Disclosure No(s).			Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? ☒ No ☐ Yes (Identify)																																																																
Copyrights? ☒ No ☐ Yes If "Yes", has written permission been granted? ☐ No ☐ Yes (Attach Permission)			Trademarks? ☒ No ☐ Yes (Identify)																																																																
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Date(s) of Conference or Meeting		City/State		Will proceedings be published? ☐ Yes ☐ No Will material be handed out? ☐ Yes ☐ No																																																															
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Information conforms to all applicable requirements. The above information is certified to be correct.																																																																			
References Available to Intended Audience ☒ Yes ☐ No Transmit to DOE-HQ/Office of Scientific and Technical Information ☒ Yes ☐ No Author/Requestor (Printed/Signature) R. D. Hodgson <i>[Signature]</i> Date 2-5-93			INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP Stamp is required before release. Release is contingent upon resolution of mandatory comments. <div style="text-align: center;"> </div>																																																																
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EVALUATION OF EXISTING HANFORD BUILDINGS FOR
THE STORAGE OF SOLID WASTES

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Date 3-11-93

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LIST OF TERMS

ALARA	as low as reasonably achievable
CFR	Code of Federal Regulations
Ci	Curie
CWC	Central Waste Complex
D&D	Decontamination and decommissioning
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FFTF	Fast Flux Test Facility
FMEF	Fuels and Materials Examination Facility
FY	fiscal year
HVAC	heating, ventilation, and air conditioning
KEH	Kaiser Engineers Hanford
LLW	low-level waste
LLMW	low-level mixed waste
LL/TRU MW	low-level and/or transuranic mixed waste
MASF	Maintenance and Storage Facility
PNL	Pacific Northwest Laboratory
PUREX	Plutonium-Uranium Extraction
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
REDOX	Reduction Oxidation
SAF	Secure Automated Fabrication
SWP	Special Work Procedure
TRU	transuranic
TRUSAF	Transuranic Waste Storage and Assay Facility
WAC	Washington Administrative Code
WHC	Westinghouse Hanford Company
WRAP	Waste Receiving and Processing

EXECUTIVE SUMMARY

Existing storage space at the Hanford Site for solid low-level mixed waste (LLMW) will be filled up by 1997. Westinghouse Hanford Company (WHC) has initiated the project funding cycle for additional storage space to assure that new facilities are available when needed.

In the course of considering the funding request, the U.S. Department of Energy (DOE) has asked WHC to identify and review any existing Hanford Site facilities that could be modified and used as an alternative to constructing the proposed W-112 Project. This report documents the results of that review.

In summary, no buildings exist at the Hanford Site that can be utilized for storage of solid LLMW on a cost-effective basis when compared to new construction.

The nearest approach to an economically sensible conversion would involve upgrade of 100,000 ft² of space in the 2101-M Building in the 200 East Area. Here, modified storage space is estimated to cost about \$106 per ft² while new construction will cost about \$50 per ft². Construction costs for the waste storage portion of the W-112 Project are comparable with W-016 Project actual costs, with escalation considered. Details of the cost evaluation for this building and for other selected candidate facilities are presented in this report. All comparisons presented address the potential decontamination and decommissioning (D&D) cost avoidances realized by using existing facilities.

The primary reasons that efforts to modify and reuse such facilities are seldom practical are: (1) the existing facilities are usually old, deteriorated, and ill-maintained, (2) they were very specifically designed for unique tasks without consideration for expansion or multi-purpose use, and (3) most were built according to codes and standards that have been supplanted by newer requirements that are more restrictive and costly to meet; attempts at upgrade fall subject to the new requirements.

This study does not attempt to evaluate any cost alternatives involving waivers that would reduce U.S. Environmental Protection Agency (EPA) storage requirements that currently prevent the utilization of surplus Hanford Site facilities in their current condition.

1.0 INTRODUCTION AND SCOPE

In support of the change in mission at the Hanford site, the U.S. Department of Energy (DOE) has requested Westinghouse Hanford Company (WHC) to investigate the feasibility and costs of using existing Hanford Site facilities for storage of solid wastes. In response, WHC has evaluated the use of existing Site buildings for storage of solid waste in lieu of constructing approximately 72,000 ft² of new storage space planned for 1997.

Sections 1, 2, and 3 discuss the Scope, Objective, and Summary respectively. Waste types to be stored and the regulatory requirements for solid waste storage are discussed in Section 4. Section 5 discusses the building survey, the selection of the sample facility, the cost estimate upgrading the sample facility, and a cost comparison between the use of existing facilities and building new facilities. A discussion of the different facilities that were investigated is in Section 6.

2.0 OBJECTIVES

The objective is to locate an existing Hanford Site building that has been maintained in a reasonably good state of repair, estimate the cost of converting the building to a *Resource Conservation and Recovery Act of 1976* (RCRA) approved storage facility, and compare the conversion cost with the cost of constructing a new storage facility. The cost estimates are to include decommissioning the facilities at the end of the mission.

This study does not attempt to evaluate any cost alternatives involving negotiated waivers that would reduce U.S. Environmental Protection Agency (EPA) storage requirements that currently prevent the utilization of surplus Hanford Site facilities in their current condition. To utilize any of the facilities, alternative guidelines would be required to establish which of the storage requirements would require waivers.

3.0 SUMMARY

From the Hanford Site inventory of just under 2,000 buildings, 99 were initially identified as feasible candidates for consideration as waste storage space. This group was then further screened on the basis of physical characteristics, including size and layout adaptability, to produce the list of 20 that are further addressed in this report.

Evaluation of construction details, clean out costs, current use, and particularly contamination status for the 20 structures rather clearly identified the 2101-M Building as the optimum study candidate.

For this study, Kaiser Engineers Hanford (KEH) performed a detailed cost estimate for upgrading 100,000 ft² of the space in 2101-M to storage that would meet state and Federal requirements. This information, and costs for construction of new warehousing space, are summarized below.

Activities	2101-M Warehouse	New warehouse facility
Initial decontamination costs	Not required	Not required
Asbestos removal cost	\$540,000	Not required
Upgrade or new construction costs	\$10,100,000	\$5,038,000
D&D costs	\$133,000	\$806,000
Totals	\$10,773,000	\$5,844,000
Storage space cost per ft ²	\$108	\$58

No other unused Hanford Site buildings with sufficient storage capacity can be converted and upgraded more economically than 2101-M.

Thus, upgrade costs to bring existing unused Hanford Site facilities into compliance with all RCRA and DOE requirements for solid waste storage are significantly higher than cost for new construction.

4.0 REGULATORY REQUIREMENTS

The Hanford Solid Waste Management Program has established a long-range strategy to ensure that solid waste management at the Hanford Site is compliant with state and Federal laws and DOE directives. The storage portion of the strategy includes phased construction of storage facilities for low-level waste (LLW) and transuranic (TRU) solid waste while awaiting treatment or disposal. Waste containers to be stored may contain hazardous materials as defined by *Code of Federal Regulations* (CFR), 40 CFR 261 or dangerous and extremely hazardous waste as defined in *Washington Administration Code* (WAC) 173-303-070 through 173-303-103.

4.1 WASTE TYPES TO BE STORED

Existing storage facilities that support the Waste Receiving and Processing (WRAP) Facilities are low-hazard facilities and are intended to store waste with limited amounts of plutonium and/or fission products. These wastes include TRU wastes as well as some LLW and wastes that could potentially be classified as Category 3 LLW or as greater than Category 3 LLW (GTC3) in accordance with 10 CFR 61.

Long-term storage facilities will be necessary to store the following, higher activity waste categories, which will require moderate-hazard waste storage facilities:

- Low-Level Category 3 waste (LLW Category 3)
- Low-Level Greater than Category 3 waste (LLW GTC3)
- Low-Level Mixed Category 3 waste (LLMW Category 3)
- Low-Level Mixed Greater than Category 3 waste (LLMW GTC3)
- TRU and retrieved suspect TRU waste
- TRU and retrieved suspect TRU mixed waste.

Waste not fully characterized, such as waste exhumed from burial grounds, will be considered dangerous waste and must be placed in overpack containers and stored in RCRA approved storage facilities. The overpack requirement was derived from a RCRA requirement that wastes must be appropriately characterized before entering the storage facility. The overpack requirement plus good primary container integrity prevents commingling of potentially incompatible wastes and is expected to preclude the need for pre-characterization before the waste is placed in the storage facility.

4.2 STATE AND RESOURCE AND CONSERVATION AND RECOVERY ACT OF 1976 REQUIREMENTS FOR STORAGE FACILITIES

A facility that stores dangerous or mixed waste for over 90 days, may do so only if the facility has received either an "interim status" permit or a "final facility" permit from Ecology and the EPA. Interim status can be obtained by filing a Part A Permit Application with Ecology while being in compliance with the Dangerous Waste Regulations. Submittal of a Part B Permit Application is also required, in accordance with the schedules in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1992).

A final facility permit is obtained by the approval of a Part B Permit Application by Ecology and EPA, Region 10. A Facility is permitted to operate under interim status until a final facility permit is approved. New dangerous waste storage facilities may require the Part B permit to be approved before construction and operation.

The following are some of the dangerous waste regulations required by Ecology that would directly impact the selection of an existing facility for the storage of solid waste.

- WAC 173-303-395(4) Loading and unloading areas. "TSD facilities which receive or ship manifested shipments of liquid dangerous waste for treatment, storage or disposal must provide for and use an area for loading and unloading waste shipments. The loading and unloading area must be designed, constructed, operated and maintained to: (a) Contain spills and leaks that might occur during loading or unloading; (b) Prevent release of dangerous waste or dangerous waste constituents to ground or surface waters; (c) Contain wash waters (if any) resulting from the cleaning of contaminated transport vehicles and load/unload equipment; and (d) Allow for removal, as soon as possible, of collected wastes

resulting from spills, leaks and equipment cleaning (if any) in a manner which assures compliance with this subsection."

- WAC 173-303-630(5)(c) [Management of containers] "A minimum thirty-inch separation is required between aisles of containers holding dangerous waste(s). A row of drums must be no more than two drums wide."
- WAC 173-303-630(6) Inspections. "At least weekly, the owner or operator must inspect areas where containers are stored, looking for leaking containers and for deterioration of containers and the containment system caused by corrosion, deterioration or other factors."
- WAC 173-303-630(7)(a) [Containment] "Container storage areas must have a containment system that is capable of collecting and holding spills and leaks." [Note: This includes water from the discharge of the fire protection system]
- WAC 173-303-630(7)(a)(iii) [Containment] "Have sufficient capacity to contain ten percent of the volume of all containers or the volume of the largest container, whichever is greater."
- WAC 173-303-630(10) Closure "At closure, all dangerous waste and dangerous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with dangerous waste or dangerous waste residues must be decontaminated or removed."

The storage requirements for ignitable or reactive wastes (WAC 173-303-630(8)), and incompatible wastes (WAC 173-303-630(9)) are referenced here; however, this study does not consider the storage of these wastes in existing facilities.

4.3 HANFORD SITE REQUIREMENTS FOR STORAGE FACILITIES

The WHC Dangerous Waste Control Program is defined in *Environmental Compliance*, WHC-CM-7-5, Part I, "Dangerous Waste Control" and Part J, "Mixed Waste." This program ensures WHC compliance with Washington State Dangerous Waste Regulations Contained in WAC 173-303, The EPA regulations contained in 40 CFR 260-268, and the requirements imposed by DOE Order 5400.0. Mixed waste is defined as waste containing both radioactive and hazardous components as defined by the *Atomic Energy Act of 1954* and RCRA respectively.

5.0 BUILDING SURVEY

This section discusses the logic used to assemble the cost comparison between upgrading an existing building and constructing a new building. Included, is the method for selecting the candidate buildings, the background

information on the general condition of the facilities, and the evaluation method used to determine the comparison costs.

5.1 BACKGROUND

This study reviewed the possibility of utilizing one or more surplus Hanford Site facilities for the temporary storage of waste in an attempt to reduce site costs and minimize the potential for contaminating additional facilities.

The study reviewed the RCRA requirements currently being imposed on storage facilities, together with the DOE Order 6430.1A that specifies minimum requirements for DOE facilities. These requirements result in significant cost penalties if older structures are to be upgraded for use as temporary storage facilities.

When these nuclear facilities were closed down over the past 25 years, the maintenance budget to maintain many of these structures in a safe condition was effectively eliminated from the operating budgets. Because of the lack of maintenance, these structures fell into a state of disrepair. The condition of the majority of the old structures is very poor. Roofs are in need of repair, and in many instances, are unsafe to walk on. Asbestos insulation, siding, and roofing materials were used extensively in the construction of these facilities. In some of the buildings, the internal process hardware contains highly contaminated heating, ventilation, and air conditioning (HVAC) systems, process piping systems, vessels, and equipment, many of which are still installed in the buildings.

The electrical systems are very old, unreliable, outdated spare parts are not available, and in many cases, these systems do not comply with current National Electrical Code requirements. Upgrading of these older facilities (that are approaching 50 years in age, but were originally designed for a 20 year life) will require a substantial amount of rebuilding. Many of these facilities are process-type structures with individual process cells, designed to provide nuclear shielding, and are not suited to forklift access for the storage of large boxes or drums of waste on forklift pallets. These issues, coupled with the current storage requirements imposing the new RCRA, Safety, and Environmental Standards, can result in extremely expensive decontamination and remodeling costs.

Decontamination and cleanup must be completed before using any of these old structures for waste storage. This cleanup will require a large quantity of up-front dollars to perform this cleanup to state and Federal requirements. In comparison, the actual disposal costs for cleaning up a clean structure would be minimal.

5.2 EXISTING FACILITY SELECTION

A surplus facility listing (Table 1) was selected from the Hanford Site building list that contains over 1,970 buildings and facilities. Ninety-nine buildings were selected from the list, based on the current or previous use for the building and on the prospect of using the building for long-term

Table 1. Surplus Facility Listing. (3 sheets)

	427	190D	105H	190DR	437	231Z	108F
FLOOR SPACE	216,846	90,700	74,640	63,360	60,197	38,121	31,084
DRAWING NO.	SK-4-83004	H-1-15153	H-1-41946	H-1-46377	H-4-62392	H-2-33169	H-1-03168
STRUCTURAL MATERIAL	CONC.	CONC. BLK	CONC.	SHT. MTL.	SHT. MTL.	CONC/BLOCK	ST/CONC/BLOCK
STRUCTURAL TYPE	6-STORY	MULTI.STORY	MULTI.STORY	1-STORY	1-STORY	2-STORY	4-STORY
CURBING	NONE	NONE	NONE	NONE	NONE	NONE	NONE
FORKLIFT ENTRANCE	ROLL DOOR	ROLL DOOR	ROLL DOOR	ROLL DOOR	ROLL DOOR	ROLL DOOR	NO ACCESS
ROOF INTEGRITY	SAFE	UNSAFE	SAFE	PART. INSP - SAFE	SAFE	SAFE-LEAKS	POOR/LEAKS
PITS, STAIRWELLS, ELEVATOR SHAFTS, ETC.	YES	YES	YES	YES	YES	4 HOT CELLS	NO ELEVATOR
EXISTING CONTAMINATION	NONE	HAZ.	RADIO/HAZ	NONE	RADIO	RADIO/HAZ	HAZ
ASBESTOS	NO	YES	YES	YES	NO	YES	YES
ELEVATORS	YES	UNKNOWN	YES	NONE	NO	NO	NO
EXCLUSIVE USE	YES	YES	YES	YES	NO	YES	NO
SHIPPING AND RECEIVING AREA	YES	YES	YES	YES	YES	NO	NO
UTILITIES	O.K.	SUB CODE	SUB CODE	NO WATER	O.K.	O.K.	NO
HVAC	O.K.	SUB CODE	SUB CODE	NO	O.K.	O.K.	NO
ELECTRICAL	O.K.	SUB CODE	SUB CODE	O.K.	O.K.	O.K.	NO
FIRE DETECTION AND SUPPRESSION SYSTEMS	YES	SUB CODE	SUB CODE	YES	O.K.	YES	NO
CURRENT STATUS	FMEF	ABANDONED	ABANDONED	ACTIVE	MASF	ACTIVE	ABANDONED
FUTURE USE	NONE	NONE	NONE	NONE	PROCESS		NONE
D & D PLANS	NO D&D PLANS	NO D&D PLANS	NO D&D PLANS	Y 1993	NO D&D PLANS	NO D&D PLANS	NO D&D PLANS
DISQUALIFICATION REASON	NOT CONSTR. FOR FORKLIFT OR STORAGE	STRUCTURAL PROBLEMS	HIGH COST OF DECON AND UPGRADE	CAVERN AREA UNDER MAIN FLOOR	IN USE FOR FFTF SUPPORT	PU CONTAM. NOT BUILT FOR STORAGE	BLDG. AND STRUCTURAL PROBLEMS

Table 1. Surplus Facility Listing. (3 sheets)

	214A	273E	212R	212N	2714U	275UR	276S	2716S	2726U
FLOOR SPACE	1,010	6,000	5,979	5,979	4,320	2,880	2,650	1,500	1,080
DRAWING NO.	NONE	H-2-95388	W-71614	H-2-V71614	H-2-50002	H-2-50673	H-2-5296	H-2-72907	H-2-50169
STRUCTURE MATERIAL	SHT.MTL	SHT.MTL	CONC.	CONC.	SHT.MTL	WOODEN	SHT. MTL	SHT.MTL	GONE
STRUCTURAL TYPE	1 STORY	1 STORY	1 STORY	1 STORY	1 STORY	1 STORY	2 STORY	1 STORY	---
CURBING	NONE	NONE	NO	NO	NO	NO	NO	NO	NO
FORKLIFT ENTRANCE	NO	ROLL DOOR	RAIL DOOR	RAIL DOOR	ROLL DOOR	ROLL DOOR	ROLL DOOR	ROLL DOOR	---
ROOF INTEGRITY	UNKNOWN	SAFE	UNKNOWN	UNKNOWN	UNKNOWN	SAFE	UNKNOWN	UNKNOWN	---
PITS, STAIRWELLS, ELEVATOR SHAFTS, ETC.	NO	NO	BASIN	BASIN	NO	NO	NO	NO	---
EXISTING CONTAMINATION	NONE	NONE	RADIO/HAZ.	RADIO/HAZ	RADIO/HAZ	NONE	HAZ	NO	HAZ.
ASBESTOS	YES	NO	NO	YES	YES	NO	YES	NO	YES
ELEVATORS	NO	NONE	(CRANE)	(CRANE)	(CRANE)	YES	NO	NO	NO
EXCLUSIVE USE	YES	YES	YES	YES	YES	YES	YES	YES	---
SHIPPING AND RECEIVING AREA	NONE	YES	YES	YES	YES	YES	NO	YES	---
UTILITIES	NONE	HEAT	NONE	NONE	NONE	O.K.	NO	YES	---
HVAC	NONE	NONE	NONE	NONE	NONE	YES	NO	YES	---
ELECTRICAL	LIGHTS	LIGHTS	NONE	NONE	LIGHTS	YES	NO	YES	---
FIRE DETECTION AND SUPPRESSION SYSTEMS	YES	NO	NO	NO	NO	YES	NO	YES	---
CURRENT STATUS	STORAGE	ACTIVE FULL	INACTIVE	INACTIVE	ACTIVE	ACTIVE	INACTIVE	ACTIVE	---
FUTURE USE	90 DAY STORAGE	STORAGE	VACANT	HOOD STORAGE	STORAGE	INSUL. SHOP	NONE IDENT.	STORAGE	---
D & D PLANS	1998	NO D&D PLANS	IN D&D PROGRAM	IN D&D PROGRAM	1998	NO D&D PLANS	IN D&D PROGRAM	NO D&D PLANS	DESTROY ED
DISQUALIFICATION REASON	TOO SMALL	TOO SMALL	TOO SMALL	TOO SMALL	TOO SMALL	TOO SMALL	TOO SMALL	TOO SMALL	BLDG DESTROY ED

Table 1. Surplus Facility Listing. (3 sheets)

	2101M	275EA	224T	224B	271U	2721EA
FLOOR SPACE	169,320	36,000	32,300	32,300	30,700	25,600
DRAWING NO.	H-2-71509	H-2-3081	H-2-1763	H-2-77540	H-2-50604	H-2-80748
STRUCTURE MATERIAL	SHT. MTL	WOOD	CONC	CONC.	CONC.	SHT. MTL
STRUCTURAL TYPE	1 STORY	1 STORY	3-STORY	3-STORY	3 STORY	1 STORY
CURBING	NONE	NONE	NONE	NONE	NONE	NONE
FORKLIFT ENTRANCE	ROLL DOOR	ROLL DOOR	NO	NO	ROLL DOOR	ROLL DOOR
ROOF INTEGRITY	UNSAFE	UNSAFE	PART. INSP - UNSAFE	UNKNOWN	UNKNOWN	SAFE
PITS, STAIRWELLS, ELEVATOR SHAFTS, ETC.	YES	NONE	UNKNOWN	STW UNSAFE	UNKNOWN	NONE
EXISTING CONTAMINATION	HAZ.	HAZ.	HAZ.	HAZ.	HAZ.	NONE
ASBESTOS	YES	YES	YES	YES	YES	NO
ELEVATORS	NONE	NO	YES	YES-1940	YES	NO
EXCLUSIVE USE	NO	YES	YES	YES	YES	YES
SHIPPING AND RECEIVING AREA	YES	YES	NO	NO	NO	YES
UTILITIES	O.K.	NONE	O.K.	SUB CODE	O.K.	O.K.
HVAC	NO	NO	O.K.	SUB CODE	O.K.	O.K.
ELECTRICAL	O.K.	O.K.	O.K.	SUB CODE	O.K.	O.K.
FIRE DETECTION AND SUPPRESSION SYSTEMS	YES	YES	O.K.	SUB CODE	O.K.	O.K.
CURRENT STATUS	ACTIVE	ACTIVE	TRUSAF	SURPLUS	ACTIVE	ACTIVE
FUTURE USE	STORAGE/OFC	STORAGE	PROCESS	OFFICES	OFFICES	FIRE MAINT.
D & D PLANS	Y2000	NO D&D PLANS	NO D&D PLANS	IN D&D PROGRAM	NO D&D PLANS	NO D&D PLANS
DISQUALIFICATION REASON	CLOSE PROXIMITY TO MAJOR OFFICE BUILDINGS	WOODEN STRUCTURE	MULTILEVEL, LIMITED FORKLIFT ACCESS	MULTILEVEL, LIMITED FORKLIFT ACCESS	MULTILEVEL, LIMITED FORKLIFT ACCESS	HANGER DOOR & SLOPED FLOOR REPLACEMENT

storage. Warehouse buildings were given primary consideration; however, other types of buildings were considered, depending on size, age, availability, or original use. After the initial survey of the facilities, buildings with less than 15,000 ft² of floor space were eliminated because of the costs of upgrading and licensing each building, resulting in the facilities listing in Table 2.

5.3 INVESTIGATION OF EXISTING FACILITIES

Drawings for facilities listed in Table 2 were obtained and reviewed to evaluate their capability for storing the radioactive and mixed waste and to estimate the costs associated with remodeling these facilities to comply with the RCRA storage requirements.

The type of structure, material handling capability, truck and/or rail access for waste retrieval, design floor loading capability, floor slope, drains, contamination levels, confinement capability, and the air handling equipment required to provide four air changes per hour were analyzed. The costs associated with the removal of in-place radioactive contamination and/or hazardous waste contained within the process equipment, vessels, and piping were evaluated. Hazardous and contaminated waste types and levels, and asbestos insulation, siding, and roofing were also considered. Field trips were conducted to confirm the status and condition of these structures, and the responsible facility landlords were interviewed to gain additional details regarding these facilities, their present status, future usage, and general condition.

5.4 ESTABLISHING COST COMPARISONS

To compare the cost of upgrading an available existing facility with the cost of constructing a new facility, a cost comparison table was devised that includes the costs associated with each approach. If an existing facility is upgraded, the following costs are involved:

- Decontamination (if contaminated with radioactive or hazardous materials.)
- Upgrading of the building, which may include removal and replacement of obsolete or sub-standard equipment or systems,
- Final decontamination and decommissioning (D&D) of the building when mission is completed.

Table 2. Existing Facilities for the Storage of Solid Waste Reviewed
Storage Space of 15,000 ft² or greater.

Building number	Area	Building name	Ft ²
4732A	400	Warehouse	15,000
190DA	100D	Main process pumphouses annex - abandoned	17,045
4732C	400	Warehouse	20,000
4732B	400	Warehouse	24,000
2721EA	200E	Helicopter support facility	25,600
271U	200W	Pu storage	30,700
108F	100F	Biology Laboratory - abandoned	31,084
224B	200E	Storage building	32,300
224T	200W	Transuranic storage and assay facility	32,300
275EA	200E	Warehouse essential materials, north of PUREX	36,000
231Z	200W	Materials engineering laboratory	38,121
105F	100F	Reactor facility - abandoned	54,600
105D	100D	Reactor facility - abandoned	55,542
105DR	100D	Reactor facility - abandoned	58,300
437	400	Maintenance and storage facility (MASF)	60,197
190DR	100D	Main pumphouse - includes north/south annex - abandoned	63,360
105H	100H	Reactor facility - abandoned	74,640
190D	100D	Main process pumphouse - abandoned	90,700
2101-M	200E	Spare parts warehouse, office building	169,320
427	400	Fuels and materials examination facility	216,846

If a new building is constructed instead of utilizing an existing building, the following costs are involved:

- New building construction costs
- Final D&D of the new building when mission completed,
- Final D&D of the existing building (that was not utilized).

This cost comparison equation is shown in Figure 1.

5.5 BUILDING EVALUATION AND ESTIMATING CONSIDERATIONS

A 100,000 ft² portion of the 170,000 ft², 2101-M Facility was selected as being the most suitable comparison facility (Figures 2 and 3). The 2101-M Facility is relatively well maintained, and is currently being used as a warehouse and office facility. The 100,000 ft² area selected is a portion of the warehouse area. Necessary upgrades and estimated costs are shown in Table 3. The estimate was based on small, fixed-price contractors performing the work. The unit costs used to perform this work are consistent with similar work being performed by KEH on other projects on the Hanford Site.

The RCRA storage requirements were evaluated and it was considered necessary to remove and replace the existing segmented concrete floor to provide spill containment, curbs, and drainage to sumps. This required cutting the perimeter concrete in the 100,000 ft² area to free it from the foundation, jack hammer the slab into small sections, and slab removal. The new replacement concrete slab would be installed with the required slope, drainage, and liquid collection sumps. The floor would be painted with sealant to close all minute cracks that might appear in the new concrete. The air handling equipment required for four air changes per hour was added. Allowances were made for electrical upgrades necessary to provide a computerized inventory accountability system that is required at all storage sites, alarms and warning devices, and lighting upgrades. The engineering costs to prepare the construction packages and the construction management costs to manage the construction were added to the direct costs. Escalation and contingency costs were then added to the estimate using DOE-approved units.

The costs to move and/or dispose of the material currently stored inside this facility were not considered. The costs associated with the disruption of electrical, water, fire protection, HVAC, and sanitary facilities in the office area, and how this affects the day-to-day operations of the office personnel sharing the remaining portion of this building while these construction activities are being completed were not considered.

The question of having other operating, laboratory, and office personnel sharing a common building with stored nuclear waste material was also questioned. After the estimate was completed, this concern was discussed with WHC Safety. Safety stated that buffer zones are required to provide physical separation between a waste storage area and personnel not directly associated with the day-to-day operation of the facility. Based on these buffer zone

Cost Comparison Criteria

Cost Of Upgrading Old Buildings

- Cleanup Of Building
Plus
- Upgrade Of Building
Plus
- D&D Of Old Building

≤

Cost Of New Construction

- Construction Costs
Plus
- D&D Of New Building
Plus
- D&D Of Old Building

Figure 1. Cost Comparison Criteria.

Figure 2. 2101-M Warehouse Layout.

79301154.1

Figure 3. Building 2101-M.

Table 3. Parametric Estimating System Cost Analysis.

Description	Cost per ft ²	Total \$ for 100,000 ft ²
Roof removal/replace	\$11.73	\$1,173,000
Floor removal/replacement	\$19.92	\$1,992,000
Electrical upgrade	\$10.60	\$1,060,000
Asbestos/hazardous material removal/replacement	Not included in estimate	Workscope not defined
HVAC upgrade	\$14.67	\$1,467,000
Fire protection upgrade	\$ 1.67	\$ 163,000
Engineering	\$18.00	\$1,800,000
Construction management and indirects	\$13.80	\$1,380,000
Licensing/miscellaneous	\$10.65	\$1,065,000

Total (rounded) amount required for the remodel of 100,000 ft² of the 2101-M is \$10,100,000

KEH Parametric Estimating System costs are based on dollars per square foot to perform remodeling or replacement of building components to comply with building requirements. Comparative costs are based on a structure containing 100,000 ft² of floor space suitable for drum storage.

Assumptions: DOE Orders 6430.1A (DOE 1989) govern building modifications, DOE/HQ waver required to depart from DOE Orders.

Storage facilities would comply with state and EPA requirements.

Dollars and schedule time for radioactive and/or hazardous material clean up and disposal would be available to support storage requirements if existing facilities are used.

requirements the 2101-M Facility was disqualified as a possible solid waste storage facility. Safety estimated there are approximately 2,000 employees located in various trailers, office buildings and in the 2101-M office area that would be effected. Potential 2101-M Building safety issues were not addressed in this study because it was considered to be outside the defined scope.

5.6 BUILDING UPGRADE COSTS FOR 2101-M

Parametric Estimating System cost estimates were prepared by KEH to determine if upgrading a 100,000 ft² area of the 2101-M Facility to comply with current state and RCRA Requirements and the requirements of DOE Order 6430.1A, would result in a cost effective alternative to the construction of new facilities.

KEH Parametric Estimating System costs are based on dollars per square foot to perform remodeling or replacement of building components to comply with the above building requirements. The resultant costs are based on upgrading a 100,000 ft² area of the 2101-M Building to a RCRA approved facility for drum storage. The analysis results are shown in Table 3. The total dollars required to upgrade 100,000 ft² would be \$10,100,000.

5.7 COST OF NEW CONSTRUCTION

The costs of \$50.00 per ft² for new construction was taken from the actual costs for the construction of the Phase I, II, III, and IV storage facilities, fabricated under Project W-016, "Radioactive Mixed Waste Storage Facility". The four storage buildings are located at the Central Waste Complex (CWC) in the 200 West Area at the Hanford Site. These storage buildings provide temporary storage for waste exhumed from burial grounds and for newly generated low-level mixed wastes (LLMW) and transuranic mixed waste (LL/TRU MW) that will be processed by the WRAP facilities. These storage buildings meet the requirements for the storage of both radioactive and hazardous wastes.

5.8 COST FOR DECONTAMINATION AND DECOMMISSIONING

D&D must be considered in the planned use of any of the Hanford Site facilities. Decontamination costs depend upon the type of contaminants and the degree of contamination. Decommissioning costs include the destruction and disposal of the building. For this analysis, it was assumed that the selected facility (2101-M Building) will not become contaminated and that the final D&D costs will include decommissioning only. The D&D costs to dispose of a facility that is free of hazardous and nuclear contamination is approximately \$1.33 per ft². This cost is based on actual contracted costs to remove the 1166 Building at the Hanford Site. The 1166 Building contained 141,900 ft² of warehouse space and the building was demolished on a fixed price contract in 1992 for \$188,000. This price, however, did not include the cost of removing the roof, which was contaminated with hazardous materials in the form of asbestos impregnated roofing. The cost of removing the roof was approximately \$2,000,000, or approximately \$14.00 per ft².

Although the 1166 Building was wood construction and the 2101-M Building is a metal frame building with sheet metal siding, the demolition costs for both buildings are assumed to be the equivalent; however, the potential salvage value of the steel in the 2101-M Building structure could reduce the demolition costs.

5.9 COST OF UPGRADE COMPARED TO THE COST OF NEW CONSTRUCTION

The cost comparison criteria described in Section 5.4 is used to show how the individual costs associated with upgrading an existing building compares with new construction. Table 4 shows the incremental cost comparison. The comparison involves the initial decontamination costs for existing buildings, modifications and upgrades to existing buildings, cost of construction of new buildings, and the D&D of both buildings when their missions have been completed.

Table 4. Cost Comparison of Existing Facility Modification Versus New Facility Construction.

Activities	2101-M warehouse	New warehouse facility
Initial recontamination costs	Not required	Not required
Asbestos removal cost	\$ 540,000 ⁽⁴⁾	Not required
Modification and upgrade costs	\$10,100,000 ⁽¹⁾	Not required
Build new facility cost	Not required	\$5,038,000 ⁽³⁾
Eventual D&D of existing facility cost	\$ 133,000 ⁽²⁾	\$ 673,000 ⁽⁵⁾
Eventual D&D of new facility cost	Not required	\$ 133,000 ⁽²⁾
Total costs	\$10,773,000	\$5,844,000

¹KEH estimate, minimum cost to remodel 2101-M Warehouse to comply with EPA and DOE Order 6430.1A (DOE 1989) requirements for solid waste storage facilities.

²Based on actual contracted demolition costs to remove the 1166 Building, work completed November 1992, ahead of schedule and within budget. Clean out of contaminated materials not included.

³Estimate based on actual construction costs for Phase 1 through Phase IV solid waste storage building escalated to 1995/1996 dollars.

⁴Estimate taken from Wells and Hughes (1990).

⁵If a new facility is built, D&D costs for 2101-M would also include asbestos removal.

The results of the comparison indicate that the cost involved in renovating the most suitable Hanford Site facilities to comply with current DOE Order, EPA, and Ecology requirements and regulations will cost approximately twice as much as constructing a new warehouse of equivalent storage capacity. The comparison clearly indicates that it is far more cost effective to construct a new waste storage facility than it would be to upgrade the 2101-M Building to comply with RCRA requirements. A brief discussion of the cost comparison is included below.

INITIAL DECONTAMINATION COSTS

2101-M Building -- In utilizing the existing 2101-M Building, no decontamination costs were considered because there are no known areas within the building that are contaminated with either radioactive or non-asbestos hazardous materials. The removal of asbestos from the warehouse area of the 2101-M Building was estimated to cost \$540,000. If other contaminants are found during the upgrading work, an additional significant decontamination cost could be incurred.

New Facility -- A new storage facility would be constructed at the CWC. Initial decontamination is not a factor with a new facility.

MODIFICATION AND UPGRADE COSTS

2101-M Building -- The upgrading of the 2101-M Building to meet state and Federal requirements is estimated to cost \$10,100,000. The warehouse area upgrade costs were estimated separately from the office area to isolate the warehouse upgrade cost. The cost estimate assumes that buried systems such as water, sewer or electrical lines that may be under, or in the vicinity of the building will not have to be relocated.

BUILD NEW FACILITY COST

New Facilities -- The construction of a new 100,000 ft² facility is estimated to cost \$5,038,000. The new facility will be designed to meet the requirements of state and Federal codes, regulations, and requirements

EVENTUAL D&D OF EXISTING FACILITY COST

2101-M Building -- If the 2101-M Building were upgraded and utilized for solid waste storage, the D&D costs at the end of the mission are estimated to be \$133,000 or \$1.33 per ft², in 1993 dollars. This cost for D&D assumes that the building will not be contaminated with hazardous or radioactive materials during the use of the building.

New Facility -- If a new facility is constructed, the unused, existing facility will still require D&D. Therefore, the cost of \$133,000 for D&D and \$540,000 for asbestos removal from the existing facility must be added to the cost of the new facility.

TOTAL COST

2101-M Building -- The total cost to upgrade and utilize the warehouse area of the existing 2101-M Building is estimated to be \$10,773,000, or \$107.73 per ft².

New Facility -- The total cost to construct a new warehouse facility for the storage of solid waste is estimated to be \$5,844,000, or \$58.44 per ft².

6.0 SPECIFIC FACILITY EVALUATIONS

The details and general conditions found in some of the facilities that were investigated are described in this section. Where applicable, the reasons why each particular building was not considered acceptable for upgrade to a storage facility are discussed.

6.1 2101-M, 200 EAST AREA, OFFICE AND WAREHOUSE FACILITY

The 2101-M was selected as the most suitable storage facility on the Hanford Site (from a cost standpoint) to provide temporary storage for solid mixed waste. 2101-M is a large warehouse complex located in the 200 East Area. The facility contains approximately 170,000 ft² of covered floor space, 100,000 ft² of which is warehouse area. The 2101-M Building is a structural steel framed one story building, covered with sheet metal roofing and siding.

The facility is currently utilized to store spare parts for a number of Hanford Site facilities including major equipment items for the Fuels Materials and Examination Facility (FMEF) Project that were never installed. The facility appears to be filled to approximately 95% of storage capacity and is not scheduled to be released for decommissioning until the year 2000.

The field trip through the building gave the appearance the structure was in very good shape; however, after further investigation the building condition was found to be in relatively poor condition and major building modifications would be required before the building could be used to store the LLMW.

A number of electrically operated metal roll up doors are located throughout the facility to provide outside access, fire protection barriers, and area separation zones.

The floor loading for this facility is listed at 2,000 lbf/ft², which is adequate for RCRA storage; however, a replacement slab of adequate capacity with containment curbs, would be required because of a number of cracks in the 45 year old concrete slab. The cracked concrete floor must be removed and replaced to provide drainage and containment.

A review of the WHC roof condition report indicates the sheet metal roof has deteriorated to the point that the roof is considered unsafe to walk on. The metal skin has corroded to the point that a pencil can be pushed through the metal (Figure 4). Roof leaks have been located during rain and snow storms.

A review of the Hanford Site asbestos assessment report indicates the cost of renovating this facility will include approximately \$1 million for removal and disposal of asbestos impregnated materials. Asbestos cement transit siding was used in this structure.

To evaluate the 2101-M upgrade, KEH estimated only 100,000 ft² of the building would be upgraded and these costs could be compared to the new construction costs for recently completed storage buildings. If the entire 2101-M Building were to be renovated, the actual costs to perform these building upgrades could in fact be 1.7 times the KEH estimate, since approval is not likely for the repair and upgrade of only a portion of the leaky roof, electrical, and HVAC systems.

ANALYSIS OF 2101-M

The renovation required to use this facility for the storage of the RCRA waste materials could be performed at a cost as listed in Table 3.

The prime problem in planning to use this structure for storage is obtaining a release, upgrade, and permitting of this facility by 1997. The facility is scheduled for release in fiscal year (FY) 2000. The time required to move the materials currently stored there to other Hanford Site facilities and to perform the necessary construction required to qualify the structure for a RCRA storage facility would require a minimum of 1 year and possibly 18 months.

Where the materials currently being stored in this facility would be moved to, and who would pay for any necessary upgrades to the new storage facility would be additional issues to be resolved.

Based on the above unresolved issues this study concluded this structure would not be available to satisfy the scheduled WRAP storage needs.

6.2 275-EA WAREHOUSE ESSENTIAL MATERIALS

The 275-EA is an essential materials warehouse located north of Plutonium-Uranium Extraction (PUREX) in the 200 East Area. The wood frame warehouse contains an estimated 36,000 ft² of floor space, a large number of wood columns (approximately 25 ft center lines) support the structure. The structure is approximately 45 years old.

Figure 4. Building 2101-M Roof Deterioration.

The roof is considered unsafe to walk on and is in need of repair. A large number of these wood columns that support the roof have been marked as needing replacement; however, because of funding restraints these repairs have not been completed.

The concrete floor is fragmented with cracks is rated at 250 lbf/ft², which is not adequate for the projected waste material. The structure contains asbestos and is filled with spare parts, PUREX jumper hardware, and other miscellaneous hardware.

The structure is in need of many repairs and is currently considered an active and required facility with no scheduled date for its release from the active duty register.

ANALYSIS OF 275-EA

The renovation costs associated with upgrading this structure for use as a RCRA storage facility would exceed that of constructing a new warehouse to store this material. This study concluded this structure is not suitable for renovation and use as a RCRA storage facility because of the condition of the wooden structure and the concrete flooring.

6.3 224-B CONCENTRATION FACILITY

The 224-B Concentration Facility is a surplus building located in the 200 East Area. It is a reinforced concrete block structure containing an estimated 32,300 ft² of floor space. The structure consists of three floors plus an elevator motor house. The concrete block structure is in good condition, considering the structure is approximately 45 years old.

The first and second floors are 13 and 12-ft-high respectively, and the exterior dimensions are 60 ft by 197 ft. The 14 ft, 4-in.-high third floor is 60 ft by 145 ft. A 27.4 ft by 15 ft by 14-ft-high elevator motor house for the cargo elevator sits on top of the third floor.

The building is divided along its length by a 1-ft-thick concrete wall that separates the contaminated process area from the non-contaminated office and operating area. The process area consists of six cells. One cell, a two story cell, is separated from all of the other cells except for process piping connections. The remaining five cells are three stories high and are separated from each other by 15-ft-high concrete block walls. There are ground floor and secondary story outside entrances to each of the five cells.

The process equipment and pipe are still in place in the contaminated cell area; this includes 42 tanks, 5 centrifuges, miscellaneous scales, pumps, motors, electrical power distribution, instrument control panels, and more than 15,000 linear ft of piping. Radiologically, there is an estimated 150 Curies (Ci) of plutonium contained in the cell area. Entry into any of these six cells requires the use of a respirator, but none of the cells have a significant dose rate.

Non-cell areas are essentially free of surface contamination, however, radioactive residue remains in some of the piping.

ANALYSIS OF 224-B BUILDING

The old process structure is made up of a series of cells without interconnecting access. This type of structure would not be a suitable storage arrangement where forklift equipment is required to handle the drums and boxes.

The removal of the contaminated process equipment and the decontamination of the structure would be done by construction force account labor, wearing Special Work Procedure (SWP) clothing and using respirator equipment. The work in SWP clothing would also include the necessary modifications to the structure to comply with RCRA requirements. Work within a contaminated area where respirator equipment is required will reduce the productive labor to 50% of that experienced outside of contaminated zones. The cost of this cleanup/renovation work would require multimillion dollar up-front funding.

A large portion of the structure utilizes concrete block construction, which would not qualify as a seismically qualified containment structure. The HVAC duct contained within the structure is badly contaminated and would require extensive modifications to attain the required four air changes per hour to comply with RCRA storage requirements.

Normal remodeling projects that are located outside of any radiation zone usually costs twice that of new construction because remodeling requires the removal or replacement of many already installed pieces of equipment. Conclusions are that the cost of modifying the 224-B for RCRA storage is not practical and the building should not be considered as a possible candidate.

6.4 224-T FACILITY

The 224-T Facility, is located in 200 West Area, is similar to the 224-B Facility in the 200 East Area with the exception that the type of radioactive materials may differ slightly because the process missions for the two buildings were somewhat different. The 224-T Facility has been upgraded to meet seismic requirements.

The building is the location of the Transuranic Waste Storage and Assay Facility (TRUSAF), which only occupies the cold side of the building. Neutron assay and nondestructive examination equipment for TRU drums are in use in the building. The facility is a storage location for TRU waste until the WRAP Facility opens. This storage space for TRU waste drums is about 80% to 90% full. The upgradable condition of the hot side is not known at this time; however, efforts are underway to survey the hot side for possible future use.

The use of the 224-T Facility for the TRUSAF precludes its use for the storage of other types of solid waste.

6.5 2721-EA AIRCRAFT HELICOPTER HANGAR

The 2721-EA Aircraft Helicopter Hangar is relatively clean, has been constructed within the last 12 years, and is on the active facility list. The building has an area of 25,600 ft², but office space occupies part of the area. The structure is located in the 200 East Area and is used by the fire maintenance department to service Hanford Site fire fighting equipment.

The hangar is a single story metal frame structure with sheet metal roofing and siding. A large metal fold-up aircraft access door faces the south, which is approximately 100-ft-long and 15-ft-high. The sealing off of the large hangar door would be required for a RCRA storage facility.

The floor is in good condition and slopes to the southeast corner of the hangar, but the slope is so slight it tends to puddle and would require more slope and curbing for waste storage. The structure did not contain any posted floor loading information. The rated floor loading would require checking. Considering that the structure was designed for light aircraft service, extensive modifications to the floor could be required.

The roof is in good condition. There is no air handling equipment in the structure. The fire protection system is in good operating condition, although it was reported to have had three separate false occurrences that have activated the system over the past few years, completely flooding the building before it could be turned off.

A shipping and receiving area for truck off loading and access area would be required.

ANALYSIS OF 2721-EA BUILDING

The study concluded the remodeling costs involved in making the necessary modifications to this structure to comply with the RCRA requirements and the actual net floor space available when it was completed would result in excessive cost per usable square foot, resulting in this facility not being a suitable storage alternative. Another reason for disqualification of this structure is that it is currently on the active facility roster and is in use as a fire equipment maintenance shop.

6.6 271-U OFFICE BUILDING

The 271-U Office Building is located in the 200 West Area, adjacent and attached to the 221-U Canyon Building on the gallery side. The structure is 160 ft by 48 ft by 68 ft with approximately 30,720 ft² of floor space. It is constructed of reinforced concrete foundation, floors, and pillars with concrete block walls and an asphalt and gravel roof. The concrete block exterior wall construction will not allow the structure to pass a seismic evaluation.

The office building is a series of small rooms, each requiring modification, and provisions for material access. The basement contains compressors, ventilation supply equipment, offices, and shops. The first and second floor contain offices and storage. The third floor contains chemical makeup facilities and has an area that was previously used for plutonium storage.

The 296-U-10 Stack, which is mounted on the 271-U roof, exhausted the plutonium storage area. The contaminated HVAC duct would have to be modified to provide the required four air changes per hour.

The floor loading was not determined; however, an floor loading requirements for an office building is significantly less than that of a storage facility capable of storing palletted 55-gal drums, 3 drums high, where the drums could weigh 750 lb each.

ANALYSIS OF 271-U BUILDING

Based on the above noted issues, the utilization of the 271-U Office Building as an alternate RCRA storage facility is not considered an economical alternative to constructing a new storage facility

6.7 427 FUEL AND MATERIAL EXAMINATION FACILITY

FMEF is a hot cell and fuel processing facility that contains approximately 216,846 ft² of floor space. The structure is located in the 400 Area.

The facility is constructed around a large hot cell with a number of smaller destructive examination cells in the lower floor. These cells have thick concrete shielding walls with steel liners and are equipped with shielding windows and manipulators. The cell areas have limited access and are not suited for using a forklift for drum and box storage. The structure was designed with large corridors around the hot cells to support the remote examination activities the facility was originally designed for.

The corridors could be utilized as storage space; however, the need to inspect and retrieve any failed waste containers on a regular basis would require forklift access in the corridor. This greatly reduces the usable storage space.

The area above the large hot cell is equipped for Fast Flux Test Facility (FFTF) fuel fabrication and contains the Secure Automated Fabrication (SAF) equipment lines.

The facility is radiation free and there are several planned future missions for this facility. The facility is not on the Hanford Surplus Facility Listing and there is no published release date denoting when this facility will be placed on the surplus list. Process type structures containing individual cells and heavy shielding walls, would require major remodeling to provide access for the movement and storage of waste materials; therefore, this type of structure is generally not suited for waste storage.

ANALYSIS OF 427 BUILDING

The facility is currently on the active facility list and not released for storage needs. In addition, this process type structure is not well suited for forklift access and drum handling or storage requirements. Therefore, the 427 FMEF Facility is not considered a suitable facility for the storage of the LLMW.

6.8 437 MAINTENANCE AND STORAGE FACILITY

The Maintenance and Storage Facility (MASF) is a 60,197 ft² facility located in the 400 Area. The facility is currently a support maintenance facility for the FFTF Reactor and it is scheduled to be utilized as a facility to prepare the FFTF fuel for storage/disposal when the reactor is shut down.

Based on the current mission scheduled for this facility it will not be available for use as a waste storage facility.

6.9 221-U PLANT CANYON BUILDING

The 221-U Plant Canyon Building is a 83,500 ft² building located in the 200 West Area. The building is 810 ft by 66 ft and 77-ft-tall, and consists of 20, 40-ft-long process cells that are divided by reinforced concrete sections separated by expansion joints. A wall ranging in thickness from 5 ft to 9 ft, divides the building along its length into a process side and a gallery side.

A large 24-in. diameter, concrete encased clay tile radioactive drain pipe, located below the cells, provided drainage for all the cells to a sump located in cell 10. This main drain pipe is approximately 45 ft below grade, has cracks in it, and contains high levels of radioactive materials.

The gallery side of the building has four floors and each floor has a gallery that is 14-ft-wide (inside dimension). From the top floor down, these are: crane gallery, operating gallery, pipe gallery, and electrical gallery, respectively. These galleries contain all the piping, instrumentation control and electrical distribution equipment required to remotely operate the in-cell process equipment.

The contaminated gallery and in-cell equipment is still installed and would require decommissioning.

ANALYSIS OF 221-U BUILDING

Based on an 8 year old study by Rockwell International titled, "*Long Range Decommissioning Plan for Rockwell Hanford Operations Surplus Facility Management Program*," the up-front cost to decommission this facility was estimated at \$27,000,000 or \$323 per ft². The cost to modify the facility to comply with RCRA, Safety, and Environmental Requirements would add additional upgrade costs to the facility.

These estimates were further substantiated with an engineering study prepared by KEH titled, *"Hanford Waste Vitrification Plant Interim Storage Facility for Hanford Waste Vitrification Plant Evaluation of Alternates,"* prepared in June 1990. This study concluded it would cost over \$20 million to use either the 221-U or the PUREX Facility for an alternate storage facility.

Based on the reasons listed above, this facility is not considered suitable as a temporary waste storage facility.

6.10 221-B, 221-T, PLUTONIUM URANIUM EXTRACTION PLANT, AND REDUCTION OXIDATION PLANT

The 221-B, 221-T, PUREX, AND Reduction Oxidation (REDOX) Plant are canyon type buildings similar to the 221-U Building discussed above. Based on the reasoning and cost estimates discussed Section 6.9 above, this study concluded that decontamination and upgrade of any of these buildings, some of which contain higher levels of contamination than the 221-U Building, are not economically viable alternatives to be considered for upgrading to a solid waste storage facility.

6.11 231-Z MATERIAL ENGINEERING LABORATORY

The 231-Z Material Engineering Laboratory is located at Z Area in the 200 West Area, and is a two story process facility containing 54,000 ft² of floor space. The facility was constructed in 1944 as part of the original Manhattan Project and is approximately 48 years old.

The original building structure was constructed using concrete pillars filled with concrete block. The structure is currently in use for offices, craft shops, training, and waste storage. WHC and Pacific Northwest Laboratories (PNL) currently share the building. PNL has their portion of the building filled with contaminated glove boxes and 55-gal drums of radioactive waste materials.

Access to the upper floor is via two stairwells; however, no elevators are available for material handling capabilities for the second floor. The lower process area contains four (shielded) hot cells containing contaminated piping and equipment. Contaminated piping systems are also located on the second floor.

The facility is currently serviced with 200 West Area water, steam, electrical, and telephone services and has an operational fire detection and protection system. The HVAC system is operational although it is contaminated with TRU and, if used for any extended service, spare parts and maintenance would likely become a serious problem.

The roof contains asbestos impregnated material, currently has many leaks but is considered safe to walk on. Asbestos is currently installed as pipe insulation and is also used in the floor tile throughout the facility.

ANALYSIS OF 231-Z BUILDING

The cost to remove the contaminated process equipment, decontaminate the structure, replace the roof, remove the hazardous asbestos materials contained throughout the facility and make the modifications necessary to comply with RCRA requirements would greatly exceed the cost of constructing a new storage facility. The concrete filler blocks between the concrete pillars will not meet seismic qualification requirements for the Site.

Based on the issues listed above and their associated costs, this study concluded the 221-Z Facility is not suitable as a RCRA storage facility.

6.12 4732-A, 4732-B, AND 4732-C FAST FLUX TEST FACILITY WAREHOUSES

The 4732-A, B, and C warehouses have a combined floor space of 59,000 ft². They are located at the FFTF site within the 400 Area. These facilities are currently filled with FFTF spare parts and equipment.

The buildings were constructed in the 1970's and 1980's, and are structural steel framed metal buildings that are in good condition and do not contain any contamination. However, the structures do not contain the required RCRA containment curbs, drainage, and sumps.

These buildings are located near the FFTF office buildings that house a large number of engineering and management personnel.

ANALYSIS OF 4732A, 4732B, AND 4732C BUILDINGS

The scheduled release of these warehouse structures from FFTF support, for other program activities, will preclude the use of these facilities in the 1997 time frame. Also, the buffer zone requirements governing higher activity LLMW waste storage in relation to the physical location of office personnel located in the FFTF Office Building Complex would present as low as reasonable achievable (ALARA) and safety concerns, further precluding the use of these facilities in the 1997 time frame.

Based on the issues discussed above, these warehouse facilities will not be available within the time frame required to support the storage requirements and, therefore, cannot be considered.

7.0 REFERENCES

40 CFR 260, 1992, "Hazardous Waste Management System - General," *Code of Federal Regulations*, as amended.

40 CFR 261, 1992, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 262, 1992, "Standards Applicable to Transporters of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 263, 1992, "Standards Applicable to Transporters of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 264, 1992 "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 265, 1992, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 266, 1992, "Standards for the Management of Specific Hazardous Wastes and Specific Hazardous Waste Management Facilities," *Code of Federal Regulations*, as amended.

40 CFR 267, 1992, "Interim Standards for Owners and Operators of New Hazardous Waste Land Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 268, 1992, "Land Disposal Restrictions," *Code of Federal Regulations*, as amended.

40 CFR 270, 1992, "EPA Administered Permit Programs: The Hazardous Waste Permit Program," *Code of Federal Regulations*, as amended.

Atomic Energy Act, 1954, 42 USC 2011 et seq.

DOE, 1988, *General Environmental Protection Program*, DOE Order 5400.1, U.S. Department of Energy, Washington, D.C.

DOE, 1989, *General Design Criteria*, DOE Order 6430.1A, U.S. Department of Energy, Washington, D.C.

DOE-RL, 1991, *Hanford Central Waste Complex - Radioactive Mixed Waste Storage Facility Dangerous Waste Permit Application*, 2 Vols., DOE/RL-91-0017, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Resource Conservation and Recovery Act of 1976, 42 USC 6901 et seq.

State Environmental Policy Act, RCWA 43.21C010 et seq.

Ecology, EPA, and DOE, 1990, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

Daly, K.S. and H.B. Hathaway, 1993, *Hanford Integrated Office Space Plan*, WHC-EF-LL-SD-033, Westinghouse Hanford Company, Richland, Washington.

WAC 173-303, 1990, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

Wells, G.T. and M.C. Hughes, 1990, *Hanford Site Asbestos Abatement Plan*, WHC-EP-0390, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992, *Environmental Compliance*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.

KEH, 1990, *Engineering Study*, "Hanford Waste Vitrification Plant Project Interim Storage Facility for Hanford Waste Vitrification Plant Canisters, Evaluation of Alternatives," ER0665ES, Kaiser Engineers Hanford Company, Richland, Washington.

APPENDIX A
2101-M UPGRADE ESTIMATE

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KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M
FILE NO. BLD2101M

** TEST - INTERACTIVE ESTIMATING **
ALTERNATIVE SOLID WASTE STORAGE STUDY
DOE_R01 - PROJECT COST SUMMARY

PAGE 1 OF 8
DATE 12/18/92 11:20:11
BY GPH

COST CODE *****	DESCRIPTION *****	ESCALATED TOTAL COST *****	CONTINGENCY % *****	TOTAL *****	TOTAL DOLLARS *****
000	ENGINEERING	1,410,000	30	420,000	1,830,000
	(ADJUSTED TO MEET DOE S100.4)	-10,000		-20,000	-30,000
501	BUILDINGS	5,760,000	30	1,730,000	7,490,000
900	OTHER PROJECT COST	590,000	30	180,000	770,000
	(ADJUSTED TO MEET DOE S100.4)	50,000		-10,000	40,000

PROJECT TOTAL		7,800,000	30	2,300,000	10,100,000

TYPE OF ESTIMATE	STUDY ESTIMATE	DECEMBER 18, 1992	REMARKS:
ARCHITECT ENGINEER			CHECK ISSUE
OPERATING CONTRACTOR			

(ROUNDED/ADJUSTED TO THE NEAREST " 10,000 / 100,000 " - PERCENTAGES NOT RECALCULATED TO REFLECT ROUNDING)

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WMC-EP-0636

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M
FILE NO. BLD2101M

** TEST - INTERACTIVE ESTIMATING **
ALTERNATIVE SOLID WASTE STORAGE STUDY
STUDY
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

PAGE 2 OF 8
DATE 12/18/92 11:20:15
BY GPH

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
111100	DEFINITIVE DESIGN-CAT 1-ONSITE E/C	237000	0	237000	16.92 40100	277100	30 83130	360231
	SUBTOTAL 111 DEFINITIVE DESIGN-CAT 1	237000	0	237000	16.92 40100	277100	30 83130	360231
112100	DEFINITIVE DESIGN-CAT 2-ONSITE E/C	592503	0	592503	16.92 100252	692755	30 207826	900581
	SUBTOTAL 112 DEFINITIVE DESIGN-CAT 2	592503	0	592503	16.92 100252	692755	30 207826	900581
121000	ENGINEERING/INSPECTION-ONSITE E/C	355502	0	355502	23.54 83685	439187	30 131756	570943
	SUBTOTAL 121 ENGINEERING/INSPECTION-ONSI	355502	0	355502	23.54 83685	439187	30 131756	570943
	SUBTOTAL 12 ENGINEERING/INSPECTION	355502	0	355502	23.54 83685	439187	30 131756	570943
	SUBTOTAL 1 ENGINEERING	1185005	0	1185005	18.91 224037	1409042	30 422712	1831755
320001	DEMOLITION	635752	108078	743830	18.22 135526	879356	30 263807	1143162
320002	NEW CONCRETE FLOOR	923261	211954	1135215	18.22 206837	1342051	30 402616	1744667
320003	MODIFICATIONS TO STRUCTURE	2391006	406472	2797478	18.22 509700	3307176	30 992153	4299331
	SUBTOTAL 32 CONSTRUCTION-FIXED PRICE	3950019	726504	4676523	18.22 852063	5528583	30 1658576	7187160
	SUBTOTAL 3 CONSTRUCTION	3950019	726504	4676523	18.22 852063	5528583	30 1658576	7187160
400000	PROJECT INTEGRATION	197501	0	197501	18.22 35985	233486	30 70046	303531
	SUBTOTAL 4 PROJECT INTEGRATION	197501	0	197501	18.22 35985	233486	30 70046	303531
500000	OTHER PROJECT COST	500000	0	500000	18.22 91100	591100	30 177330	768430
	SUBTOTAL 5 OTHER PROJECT COST	500000	0	500000	18.22 91100	591100	30 177330	768430
PROJECT TOTAL		5,832,525	726,504	6,559,029	18.34 1,203,185	7,762,211	30 2,328,664	10,090,876

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WMC-EP-0636

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M
FILE NO. BLD2101M

** TEST - INTERACTIVE ESTIMATING **
ALTERNATIVE SOLID WASTE STORAGE STUDY
DOE_R03 - ESTIMATE BASIS SHEET

PAGE 3 OF 8
DATE 12/18/92 08:24:58
BY GPM

1. DOCUMENTS AND DRAWINGS
=====

DOCUMENTS: NONE

DRAWINGS: SKETCH OF FLOOR PLAN

2. MATERIAL PRICES
=====

UNIT COSTS REPRESENT CURRENT PRICES FOR SPECIFIED MATERIAL.

3. LABOR RATES
=====

CURRENT KEN BASE CRAFT RATES AS ISSUED BY KEN FINANCE (EFFECTIVE 10-28-91) INCLUDE FRINGE BENEFITS, LABOR INSURANCE, TAXES AND TRAVEL WHERE APPLICABLE, PER HANFORD SITE STABILIZATION AGREEMENT, APPENDIX A (EFFECTIVE 9-2-91). ED & I HOURLY RATES ARE BASED ON THE 1992 FISCAL YEAR BUDGET LIQUIDATION RATES AS ISSUED BY KEN FINANCE (EFFECTIVE 10-28-91).

4. GENERAL REQUIREMENTS/TECHNICAL SERVICES
=====

A.) FIXED PRICE CONTRACTOR OVERHEAD, PROFIT, BOND AND INSURANCE COSTS HAVE BEEN APPLIED AT THE FOLLOWING PERCENTAGES AND ARE REFLECTED IN THE "OH&P / B & I" COLUMN OF THE ESTIMATE DETAIL: LABOR 25%, MATERIAL 25%, AND 10% SUBCONTRACTS.

5. ESCALATION
=====

ESCALATION CALCULATED BY THE HANFORD MATERIAL & LABOR ESCALATION STUDY , FEBRUARY, 1992.

6. ROUNDING - LINE ITEMS:
=====

U.S. DEPARTMENT OF ENERGY - DOE ORDER 5100.4 PAGE J-2 SUBPARAGRAPH (N), REQUIRES ROUNDING OF A COST ESTIMATE TO \$10,000 FOR ITEM COST AND \$100,000 FOR TOTAL COST. REFERENCE: DOE 5100.4, FIGURE 1-11, DATED 10-31-84.

7. REMARKS
=====

- A.) EFFECTIVE APRIL 1, 1991, A FIVE PER CENT (5%) SURCHARGE HAS BEEN APPLIED TO THE CONTRACT ADMINISTRATION FACTOR FOR SUBCONTRACT ADMINISTRATION TO COVER COSTS OF THE BID PACKAGE PREPARATION DEPARTMENT. THESE COSTS INCLUDE POSTAGE, REPRODUCTION AND CONTRACT ADMINISTRATOR. THE SURCHARGE DOES NOT COVER CM ENGINEERING OR QUALITY OR SAFETY REVIEW COSTS. THE SURCHARGE COST APPEARS IN THE ADMINISTRATION TOTAL COLUMN OF THE "ONSITE INDIRECT COSTS BY WBS" REPORT. (DOE_R07)
- B.) THE ENGINEERING IS BASED ON A PERCENTAGE OF CONSTRUCTION COST AND REPRESENTS AN ALLOWANCE.
- C.) THE PROJECT INTEGRATION IS AN ALLOWANCE BASED ON CONSTRUCTION COST.
- D.) ESCALATION IS BASED ON ASSUMED START DATES.
- E.) ESCORT COST HAS NOT BEEN INCLUDED IF REQUIRED.
- F.) THIS ESTIMATE ASSUMES CONSTRUCTION WILL BE BY A FIXED PRICE CONTRACTOR.
- G.) THIS ESTIMATE DOES NOT INCLUDE COST FOR ANY UTILITIES THAT MAY BE REQUIRED FOR MODIFYING THE STRUCTURE.
- H.) THIS EXISTING PROJECT IS TO MODIFY 100,000 SQFT OF AN EXISTING FACILITY THAT HAS A TOTAL SQFT OF APPROX. 169,000 SQFT. COST IS NOT INCLUDED FOR ANY DISRUPTION TO THE REMAINING OFFICES THAT WILL BE IMPACTED BY THE MODIFICATIONS TO THE WASTE STORAGE AREA.

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WMC-EP-0636

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M
FILE NO. BLD2101M

** TEST - INTERACTIVE ESTIMATING **
ALTERNATIVE SOLID WASTE STORAGE STUDY
DOE_R03 - ESTIMATE BASIS SHEET

PAGE 4 OF 8
DATE 12/18/92 08:24:58
BY GPH

7. REMARKS

=====

- 1.) THE FOLLOWING IS A LIST OF COST CONSIDERATIONS NOT INCLUDED IN THIS ESTIMATE.
1. THE COST TO REPLACE THE EXISTING ROOF IS FOR 100,000 SQFT AND DOES NOT INCLUDE COST FOR REPLACING THE ROOF FOR 169,000 SQFT STRUCTURE.
 2. REMOVAL OF THE EXISTING SLAB DOES NOT INCLUDE ANY COST FOR UNDER SLAB UTILITIES OR THE REROUTING IF REQUIRED.
 3. COST FOR REMOVAL OF SOIL UNDER EXISTING SLAB, IF CONTAMINATED, NOT INCLUDED.
 4. ASBESTOS REMOVAL IF REQUIRED NOT INCLUDED.
 5. EXISTING STRUCTURE IS 35 YEARS OLD AND COST HAS NOT BEEN INCLUDED IF ELECTRICAL AND HVAC SYSTEMS DO NOT MEET CODE.
 6. COST IS FOR OPEN WAREHOUSE AND DOES NOT INCLUDE ANY COST FOR OFFICES IF REQUIRED, OR ANY EQUIPMENT FOR THE OPERATION.
 7. COST HAS NOT BEEN INCLUDED TO ISOLATE SYSTEMS BETWEEN THE TWO INDEPENDENT FUNCTIONS OF THE BUILDING.
 8. OTHER PROJECT COST HAVE NOT BEEN INCLUDED SUCH AS PERMITTING ETC.
- 1.) THIS ESTIMATE REFLECTS BEST CASE COST FOR THE 100,000 SQFT PORTION OF THE FACILITY TO BE USED FOR STORAGE. THE 30% CONTINGENCY DOES NOT COVER THE AMOUNT OF DOLLARS TO MAKE MODIFICATIONS TO THE ENTIRE FACILITY WHICH COULD EASILY DOUBLE THE COST OF THIS PROJECT.

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M
FILE NO. BLD2101M

** TEST - INTERACTIVE ESTIMATING **
ALTERNATIVE SOLID WASTE STORAGE STUDY
STUDY
DOE_R04 - COST CODE ACCOUNT SUMMARY

PAGE 5 OF 8
DATE 12/18/92 11:20:18
BY GPH

COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ON-SITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
000 ENGINEERING								
111100	DEFINITIVE DESIGN-CAT 1-ONSITE E/C	237000	0	237000	16.92	40100	277100	30
112100	DEFINITIVE DESIGN-CAT 2-ONSITE E/C	592503	0	592503	16.92	100252	692755	30
121000	ENGINEERING/INSPECTION-ONSITE E/C	355502	0	355502	23.54	83685	439187	30
TOTAL 000 ENGINEERING		1185005	0	1185005	18.91	224037	1409042	30
501 BUILDINGS								
320001	DEMOLITION	635752	108078	743830	18.22	135526	879356	30
320002	NEW CONCRETE FLOOR	923261	211954	1135215	18.22	206837	1342051	30
320003	MODIFICATIONS TO STRUCTURE	2391006	406472	2797478	18.22	509700	3307176	30
400000	PROJECT INTEGRATION	197501	0	197501	18.22	35985	233486	30
TOTAL 501 BUILDINGS		4147520	726504	4874024	18.22	888048	5762069	30
900 OTHER PROJECT COST								
500000	OTHER PROJECT COST	500000	0	500000	18.22	91100	591100	30
TOTAL 900 OTHER PROJECT COST		500000	0	500000	18.22	91100	591100	30
PROJECT TOTAL		5,832,525	726,504	6,559,029	18.34	1,203,185	7,762,211	30
							2,328,664	
								10,090,876

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WMC-EP-0636

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M
FILE NO. BLD2101M

** TEST - INTERACTIVE ESTIMATING **
ALTERNATIVE SOLID WASTE STORAGE STUDY
DOE_R05 - ESTIMATE SUMMARY BY CSI DIVISION

PAGE 6 OF 8
DATE 12/18/92 11:20:21
BY GPM

CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	TOTAL	SUB TOTAL	CONTINGENCY %	TOTAL	TOTAL DOLLARS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
ENGINEERING										
00	TECHNICAL SERVICES	1185005	0	1185005	18.91	224037	1409042	30	422712	1831755
	TOTAL ENGINEERING	1,185,005	0	1,185,005	18.91	224,037	1,409,042	30	422,712	1,831,755
CONSTRUCTION										
00	TECHNICAL SERVICES	697501	0	697501	18.22	127085	824586	30	247376	1071961
02	SITEWORK	635752	108078	743830	18.22	135526	879356	30	263807	1143162
03	CONCRETE	486216	137657	623873	18.22	113670	737542	30	221263	958805
05	METALS	238063	40471	278534	18.22	50749	329282	30	98785	428067
07	MOISTURE AND THERMAL	384450	65357	449807	18.22	81955	531761	30	159528	691290
09	FINISHES	390538	66391	456929	18.22	83253	540182	30	162055	702237
15	MECHANICAL	1100000	187000	1287000	18.22	234491	1521491	30	456447	1977939
16	ELECTRICAL	715000	121550	836550	18.22	152419	988969	30	296691	1285660
	TOTAL CONSTRUCTION	4,647,520	726,504	5,374,024	18.22	979,148	6,353,169	30	1,905,952	8,259,121

	PROJECT TOTAL	5,832,525	726,504	6,559,029	18.34	1,203,185	7,762,211	30	2,328,664	10,090,876

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WMC-EP-0636

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M
FILE NO. BLD2101M

**** TEST - INTERACTIVE ESTIMATING ****
ALTERNATIVE SOLID WASTE STORAGE STUDY
STUDY
DOE_R06 - CONTINGENCY ANALYSIS BASIS SHEET

PAGE 7 OF 8
DATE 11/20/92 08:25:08
BY GPH

REFERENCE: ESTIMATE BASIS SHEET
COST CODE ACCOUNT SUMMARY

PAGE 3 & 4 OF 8
PAGE 5 OF 8

THE U.S. DEPARTMENT OF ENERGY - RICHLAND ORDER 5700.3 "COST ESTIMATING, ANALYSIS AND STANDARDIZATION" DATED 3-27-85, PROVIDES GUIDELINES FOR ESTIMATE CONTINGENCIES. THE GUIDELINE FOR A STUDY ESTIMATE SHOULD HAVE AN OVERALL RANGE OF 20% TO 30% .

CONTINGENCY IS EVALUATED AT THE THIRD COST CODE LEVEL AND SUMMARIZED AT THE PRIMARY AND SECONDARY COST CODE LEVEL OF THE DETAILED COST ESTIMATE.

ENGINEERING A 30% CONTINGENCY WAS APPLIED TO THE ENGINEERING DUE TO COST BEING DEVELOPED AS A PERCENTAGE OF CONSTR

AVERAGE ENGINEERING CONTINGENCY 30%

CONSTRUCTION A 30% CONTINGENCY WAS APPLIED TO THE CONSTRUCTION DUE THE LIMITED INFORMATION AVAILABLE.

AVERAGE CONSTRUCTION CONTINGENCY 30%

AVERAGE PROJECT CONTINGENCY 30%

A-9

WMC-EP-0636

KAISER ENGINEERS MANFORD
WESTINGHOUSE MANFORD COMPANY
JOB NO. BLDG 2101M
FILE NO. BLD2101M

** TEST - INTERACTIVE ESTIMATING **
ALTERNATIVE SOLID WASTE STORAGE STUDY
STUDY
DOE_R07 - ONSITE INDIRECT COSTS BY WBS

PAGE 8 OF 8
DATE 12/18/92 11:20:24
BY GPH

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
=====	=====	=====	=====	=====	=====	=====	=====
111100	DEFINITIVE DESIGN-CAT 1-ONSITE E/C	237000	0.00	0	0	0	0
112100	DEFINITIVE DESIGN-CAT 2-ONSITE E/C	592503	0.00	0	0	0	0
121000	ENGINEERING/INSPECTION-ONSITE E/C	355502	0.00	0	0	0	0
320001	DEMOLITION	635752	17.00	108078	0	0	108078
320002	NEW CONCRETE FLOOR	923261	17.00	156954	15000	40000	211954
320003	MODIFICATIONS TO STRUCTURE	2391006	17.00	406472	0	0	406472
400000	PROJECT INTEGRATION	197501	0.00	0	0	0	0
500000	OTHER PROJECT COST	500000	0.00	0	0	0	0
=====							
PROJECT TOTAL		5,832,525		671,504	15,000	40,000	726,504

A-10

WHC-EP-0636

**** TEST - INTERACTIVE ESTIMATING ****
ALTERNATIVE SOLID WASTE STORAGE STUDY

DOE_ROB - ESTIMATE DETAIL BY WBS / COST CODE

A-11

WHC-EP-0636

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M

** TEST - INTERACTIVE ESTIMATING **
ALTERNATIVE SOLID WASTE STORAGE STUDY
STUDY
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

PAGE 2
DATE 12/18/92 11:20:27
BY GPM

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	HANMOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	ON&P / B & I	TOTAL DOLLARS
112100	DEFINITIVE DESIGN-CAT 2-ONSITE E/C										
112100.00	TECHNICAL SERVICES										
112100.0000002	DEFINITIVE DESIGN CAT 2 15% CONST. COST	000	1 LS	0	0	0	0	592503	0	0	592503
SUBTOTAL	TECHNICAL SERVICES			0	0	0	0	592,503	0	0	592,503
TOTAL	COST CODE 00000 WBS 112100 (ESCALATION 16.92 % - CONTINGENCY 30.00 %)			0	0	0	0	592,503	0	0	592,503
TOTAL WBS 112100	DEFINITIVE DESIGN-CAT 2-ONSITE E/C			0	0	0	0	592,503	0	0	592,503

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WMC-EP-0636

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. BLDG 2101M

**** TEST - INTERACTIVE ESTIMATING ****
ALTERNATIVE SOLID WASTE STORAGE STUDY
STUDY
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

PAGE 3
DATE 12/18/92 11:20:27
BY GPH

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	HANHOOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	ON&P / B & I	TOTAL DOLLARS
121000	ENGINEERING/INSPECTION-ONSITE E/C										
121000.00	TECHNICAL SERVICES										
121000.0000002	ENGINEERING/INSPECTION 9% CONST. COST	000	1 LS	0	0	0	0	355502	0	0	355502
	SUBTOTAL TECHNICAL SERVICES			0	0	0	0	355,502	0	0	355,502
	TOTAL COST CODE 00000 WBS 121000 (ESCALATION 23.54 % - CONTINGENCY 30.00 %)			0	0	0	0	355,502	0	0	355,502
	TOTAL WBS 121000 ENGINEERING/INSPECTION-ONSITE E/C			0	0	0	0	355,502	0	0	355,502

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	ON&P / B & I	TOTAL DOLLARS
320001	DEMOLITION										
320001.02	SITWORK										
320001.0200002	SAW CUT 6" CONC. SLAB	501	1632 LF	284	7549	4400	0	0	0	2987	14936
320001.0200004	REMOVE 6" CONC. SLAB W/REBAR	501	100000 SF	8500	197965	20000	0	0	0	54491	272456
320001.0200006	LOAD & HAUL 6" SLAB W/REBAR	501	100000 SF	2400	59688	47000	0	0	0	26672	133360
320001.0200008	REMOVE EXISTING ROOFING AND METAL DECKING	501	100000 SF	0	0	0	0	215000	0	0	215000
SUBTOTAL SITWORK				11,184	265,202	71,400	0	215,000	0	84,150	635,752
TOTAL COST CODE 50102 WBS 320001 (ESCALATION 18.22 % - CONTINGENCY 30.00 %)				11,184	265,202	71,400	0	215,000	0	84,150	635,752
TOTAL WBS 320001 DEMOLITION				11,184	265,202	71,400	0	215,000	0	84,150	635,752

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	ON&P / B & I	TOTAL DOLLARS
320002	NEW CONCRETE FLOOR										
320002.03	CONCRETE										
320002.0300002	FORM 6" CONC. CURB	501	3264 SF	578	14938	434	4080	0	0	4863	24315
320002.0300003	FORM TRENCH FOR GRATING	501	3135 SF	555	14343	417	3919	0	0	4670	23349
320002.0300004	DUMBELL TYPE PVC 6" WIDE 3/8 WATER STOP	501	1632 LF	90	2401	0	4651	0	0	1763	8815
320002.0300006	POUR 6" CONC. CURB	501	60 CYD	36	860	41	3180	0	0	1020	5101
320002.0300008	4" GRAVEL BASE UNDER SEAB	501	100000 SF	480	11470	1200	11000	0	0	5918	29588
320002.0300010	REINFORCING FOR SLAB	501	100000 SF	1020	30027	0	41900	0	0	17982	89909
320002.0300012	FINE GRADE UNDER SLAB	501	100000 SF	120	3015	3900	0	0	0	1729	8644
320002.0300014	SET SCREEDS FOR SLAB	501	100000 SF	1000	26680	1500	8000	0	0	9045	45225
320002.0300016	VAPOR BARRIER UNDER SLAB	501	100000 SF	200	4658	0	2000	0	0	1665	8323
320002.0300018	POUR 6" CONCRETE SLAB	501	1852 CYD	1111	26548	1276	98156	0	0	31495	157475
320002.0300020	FINISH SLAB	501	100000 SF	1450	38947	6400	0	0	0	11337	56684
320002.0300022	PRENOLDED EXPANSION JOINT	501	1200 LF	26	694	0	600	0	0	324	1618
320002.0300024	CURING	501	100000 SF	200	4658	0	3000	0	0	1915	9573
SUBTOTAL	CONCRETE			6,866	179,239	15,168	180,486	0	0	93,726	468,619
	SALES TAX 7.80 %						14077		0		14077
	ON&P (ON MARKUPS ONLY)									3519	3519
TOTAL	COST CODE 50103 WBS 320002 (ESCALATION 18.22 % - CONTINGENCY 30.00 %)			6,866	179,239	15,168	194,563	0	0	97,245	486,216
320002.05	METALS										
320002.0500002	METAL GRATING FOR TRENCH	501	1180 LF	54	1589	0	33040	0	0	8657	43286
SUBTOTAL	METALS			54	1,589	0	33,040	0	0	8,657	43,286
	SALES TAX 7.80 %						2577		0		2577
	ON&P (ON MARKUPS ONLY)									644	644
TOTAL	COST CODE 50105 WBS 320002 (ESCALATION 18.22 % - CONTINGENCY 30.00 %)			54	1,589	0	35,617	0	0	9,301	46,507
320002.09	FINISHES										
320002.0900002	APPLY SPECIAL PROTECTIVE COVERING TO SLAB	501	100000 SF	12000	282480	3000	25000	0	0	77620	388100

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
SUBTOTAL	FINISHES			12,000	282,480	3,000	25,000	0	0	77,620	388,100
	SALES TAX 7.80 %						1950		0		1950
	OH&P (ON MARKUPS ONLY)									487	487
TOTAL	COST CODE 50109			12,000	282,480	3,000	26,950	0	0	78,107	390,537
	WBS 320002										
	(ESCALATION 18.22 % - CONTINGENCY 30.00 %)										
TOTAL WBS 320002	NEW CONCRETE FLOOR			18,920	463,308	18,168	257,131	0	0	184,654	923,261

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	HANHOOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
320003	MODIFICATIONS TO STRUCTURE										
320003.05	METALS										
320003.0500004	INSTALL NEW 1-1/2" METAL DECKING TO EXISTING ROOF STRUCTURE	501	100000 SF	1000	29430	2000	113000	0	0	36108	180538
	SUBTOTAL METALS			1,000	29,430	2,000	113,000	0	0	36,108	180,538
	SALES TAX 7.80 % OH&P (ON MARKUPS ONLY)						8814		0	2203	8814 2203
	TOTAL COST CODE 50105 WBS 320003 (ESCALATION 18.22 % - CONTINGENCY 30.00 %)			1,000	29,430	2,000	121,814	0	0	38,311	191,555
320003.07	MOISTURE AND THERMAL										
320003.0700002	APPLY NEW BUILT-UP ROOF	501	100000 SF	0	0	0	25000	325000	0	32500	382500
	SUBTOTAL MOISTURE AND THERMAL			0	0	0	25,000	325,000	0	32,500	382,500
	SALES TAX 7.80 %						1950		0		1950
	TOTAL COST CODE 50107 WBS 320003 (ESCALATION 18.22 % - CONTINGENCY 30.00 %)			0	0	0	26,950	325,000	0	32,500	384,450
320003.15	MECHANICAL										
320003.1500002	FIRE SPRINKLER SYSTEM ALLOWANCE TO MODIFY EXISTING SYSTEM ONLY.	501	100000 SF	0	0	0	0	100000	0	10000	110000
320003.1500004	HVAC ALLOWANCE TO EXISTING SYSTEM ONLY.	501	100000 SF	0	0	0	0	900000	0	90000	990000
	SUBTOTAL MECHANICAL			0	0	0	0	1,000,000	0	100,000	1,100,000
	TOTAL COST CODE 50115 WBS 320003 (ESCALATION 18.22 % - CONTINGENCY 30.00 %)			0	0	0	0	1,000,000	0	100,000	1,100,000
320003.16	ELECTRICAL										

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	ON&P / B & I	TOTAL DOLLARS
320003.1600002	ELEC ALLOWANCE TO EXISTING SYSTEM ONLY.	501	100000 SF	0	0	0	0	650000	0	65000	715000
SUBTOTAL	ELECTRICAL			0	0	0	0	650,000	0	65,000	715,000
TOTAL	COST CODE 50116 WBS 320003 (ESCALATION 18.22 % - CONTINGENCY 30.00 %)			0	0	0	0	650,000	0	65,000	715,000
TOTAL WBS 320003 MODIFICATIONS TO STRUCTURE				1,000	29,430	2,000	148,764	1,975,000	0	235,811	2,391,005

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	ON&P / B & I	TOTAL DOLLARS
400000	PROJECT INTEGRATION										
400000.00	TECHNICAL SERVICES										
400000.0000002	PROJECT MANAGEMENT ALLOWANCE 501	501	1 LS	0	0	0	0	197501	0	0	197501
	5% OF CONST. COST										
SUBTOTAL	TECHNICAL SERVICES			0		0		197,501		0	
					0		0		0		197,501
TOTAL	COST CODE 50100			0		0		197,501		0	
	WBS 400000				0		0		0		197,501
	(ESCALATION 18.22 % - CONTINGENCY 30.00 %)										
TOTAL WBS 400000	PROJECT INTEGRATION			0		0		197,501		0	
					0		0		0		197,501

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
500000	OTHER PROJECT COST										
500000.00	TECHNICAL SERVICES										
500000.0000002	PERMITTING FEE ALLOWANCE	900	1 LS	0	0	0	0	500000	0	0	500000
	SUBTOTAL TECHNICAL SERVICES			0	0	0	0	500,000	0	0	500,000
	TOTAL			0	0	0	0	500,000	0	0	500,000
	COST CODE 90000 WBS 500000 (ESCALATION 18.22 % - CONTINGENCY 30.00 %)										
	TOTAL WBS 500000 OTHER PROJECT COST			0	0	0	0	500,000	0	0	500,000

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	SUB- CONTRACT	EQUIP- MENT	ONEP / B & I	TOTAL DOLLARS
				31,104	757,940	91,568	4,072,506	0	504,615	5,832,524
							405,895			
REPORT TOTAL										

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