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Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

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1	1	Cog.Eng. W. A. Hansen		7/8/96	T4-03						
1	1	Cog. Mgr. D. B. Powel			T4-03			7/8/96			
1	1	P.J. Crane		7/19/96	T4-03						
1	1	D. R. Pyzel			T4-03			7/12/96			
1	1	D.A. Pratt			T4-03			7/18/96			

18.	19.	20.	21. DOE APPROVAL (if required)
Signature of EDT Originator / Date: 7/6/96	Authorized Representative for Receiving Organization / Date	Cognizant Manager / Date: 7/8/96	Ctrl. No. [^C] Approved [^C] Approved w/comments [^C] Disapproved w/comments

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CAISSON UNI-1 STUDY PROVIDE PERMANENT STRUCTURE AROUND THE CAISSON FILL PIPE

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Abstract: This document is an Engineering Study and analysis to determine the best way to provide a permanent structure around the UNI-1 Caisson fill pipe.

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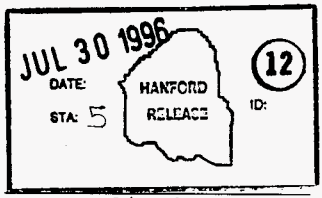

Release Approval — Date: 7/30/96

Release Stamp

Approved for Public Release

CAISSON UNI-1 STUDY

PROVIDE PERMANENT STRUCTURE

AROUND THE CAISSON FILL PIPE

JUNE, 1996

CONTENTS

1.0 OBJECTIVE

Solid Waste Engineering has been tasked with determining the most effective and cost effective way to more permanently enclose the wooden structure that maintains a soil radiation barrier around Caisson UNI 1 fill pipe.

1.1 BACKGROUND AND SCOPE

Underground Caissons are used for the storage of small packages of TRU waste. One of these Caissons UNI 1 has a square wood box constructed around the inlet pipe to the caisson which is filled with soil, to reduce the radiation level near the pipe to an acceptable level. The installation was made after waste hung up in the caisson inlet pipe which increased the radiation levels measured round the pipe and at ground level. The wood is starting to deteriorate and may allow the soil used as a radiation moderator to sluff, which in turn would allow the radiation levels to increase in the vicinity of Caisson UNI 1. A permanent structure needs to be put in place to preclude any increases in personnel radiation exposure. The wood structure is 10 ft. 8 inches square, 1 side is within 13 1/2" of the Caisson vent pipe.

2.0 SUMMARY

2.1 Purpose

To evaluate various options to provide a permanent structure around the UNI 1 fill pipe which would preclude soil sluffing causing the radiation levels in the vicinity of Caisson UNI 1 to increase.

2.2 Description of the Preferred Alternative

The recommended alternative is a prefabricated, concrete square 11 ft 8" square (inside dimension) by 7 ft high with a cover that can be placed using a crane.

2.3 Estimated Cost

Pacific International estimated that a shape the size required would cost $11,665.00 FOB Hanford.

3.0 RECOMMENDATIONS AND CONCLUSIONS

3.1 Recommendations

It is recommended that the prefabricated concrete square be pursued as the 1st alternative (Para 5.3.2 below). This alternative is based on: 1) reducing time spent in a radiation zone, 2) installing a structure that will contain the wood structure, 3) be easily removed in the future, 4) reduce the time spent on this project by SWM Operations.

4.0 UNCERTAINTIES

5.0 ALTERNATIVES AND SOLUTIONS

5.1 Criteria

Criteria for making the selection of the structure will be cost, durability, and low personnel radiation exposure (during application of the proposed solution).

5.2 Assumptions

The wooden structure retaining the soil around the UNI 1 fill pipe is deteriorating and needs to be covered so that deterioration does not cause the soil providing the radiation shielding to sluff and cause an increase in the background radiation level near the Caisson.

5.3 Alternatives

5.3.1 Build forms and pour a concrete 11 ft X 11 ft wall to house the wood structure.

a. Advantages The form would fit close to the existing wooden timbers containing the soil shielding, support a concrete cover, be aesthetically correct, and contain soil that will be added to accommodate any wood timber deterioration.

b. Disadvantages The fabrication of the forms and pouring of the concrete is very expensive because of the labor involved, workers may be required to suit up in at least white clothing, building the forms and placing the reenforcement is very time consuming. The forms would not be easy to remove when and if the caissons were to be emptied.

c. Safety Considerations and Impacts Being labor intensive the chance of accidents is high.

d. Environmental Impacts and Permitting Requirements All alternatives considered will be equal with regard to this item.

e. Cost and Schedule Estimates The labor required to complete this alternative would cause this alternative to be expensive. (no cost data has been obtained for this alternative).

f. Other Information The area where work will be done is in a low level radiation area. Therefore, an alternative that requires less time near the Caissons is preferred.

5.3.2 Purchase a prefabricated, reinforced, concrete square and place it around the wood structure.

a. Advantages The concrete square could be ordered with very little impact on other work underway at SWM, and include all of the advantages discussed in 5.3.1. The square could be set in place very quickly using riggers which would reduce personnel radiation exposure. The square would be easy to remove when the waste retrieval from the caissons is performed some time in the future.

b. Disadvantages The assembly would be very heavy to handle. A level base would need to be established on which to set the concrete square assembly.

c. Safety Considerations and Impacts The lifting and handling that would be performed will need to be addressed in the JHA.

d. Environmental Impacts and Permitting Requirements See para. 5.3.1.d

e. Cost and Schedule Estimates Prefabricating the concrete assembly off site should prove to be less expensive than forming the assembly in the field. (Pacific International of Tacoma estimated that a square 11.3 ft X 11.3 ft inside dimension and 11.2 outside dimension X 8 ft high with a top would cost $11,665.00) -- The height could be a little less -- 7 ft but the inside dimension needs to be 11.5 ft based on the 10 ft 8 inch 6x6 that is part of the existing form). **SEE SKETCH #1**

5.3.3 Place a mound of rocky soil over the Caisson and the wood -- then cover the soil with rick rack.

a. Advantages This alternative has many advantages such as cost and ease of application.

b. Disadvantages The mound of soil would cover part of the breather filter assembly. The mound of soil might sluff during windy or rainy conditions

5.3.4 Place concrete Ecology Blocks around the wood structure on 3 sides and 2/3s of the 4th side (to accommodate the breather vent tube). Prefabricate a concrete slab to enclose the 4th side and purchase a prefabricated top.

a. Advantages The ecology blocks are inexpensive $25.00 each, and the prefabricated concrete slabs to fit in the 4th side and the top should be relatively inexpensive and easy to handle.

b. Disadvantages The ecology blocks do not fit tightly together and may allow some soil erosion and sluffing.

c. Safety Considerations and Impacts Most of the labor would be in rigging the blocks to form the wall, therefore, care would have to be taken when positioning the blocks.

d. Cost and Schedule Estimates The alternative would take 44 ecology blocks at $25.00 for each block and a concrete slab approximately 4ft X 7ft. ($1100.00 plus the slabs for the side and top -- probably less than $3000.00 for the material). SEE SKETCH #2

5.3.5. Place corrugated steel around the wooden structure. Corrugated steel structure could be purchased and bolted together to form the structure.

a. Advantages The corrugated structure might be less expensive than the concrete discussed above and could be installed by site forces as it could be scheduled.

b. Disadvantages The corrugated steel only comes in circular shapes and therefore, would fit properly between the existing wood structure and the vent pipe. The fabrication would require that work be accomplished in radiation area which would cause personnel to receive radiation.

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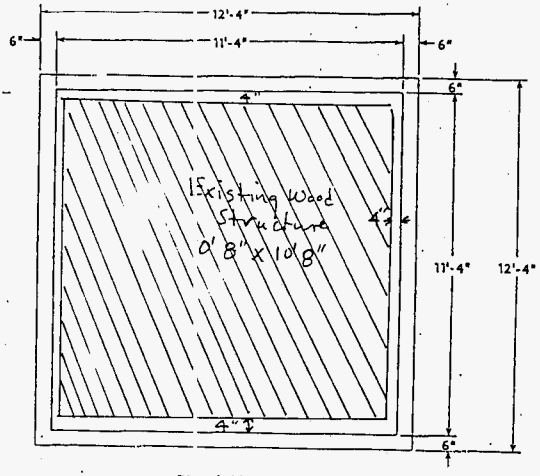
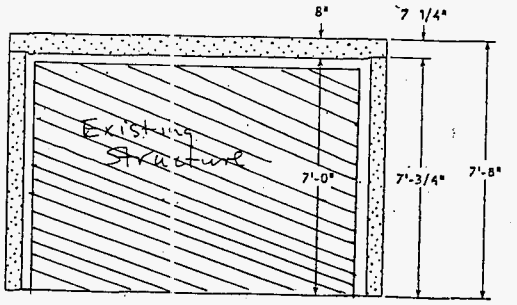
Rev. 0

Sketch # 1



PLAN VIEW



SECTIONED VIEW

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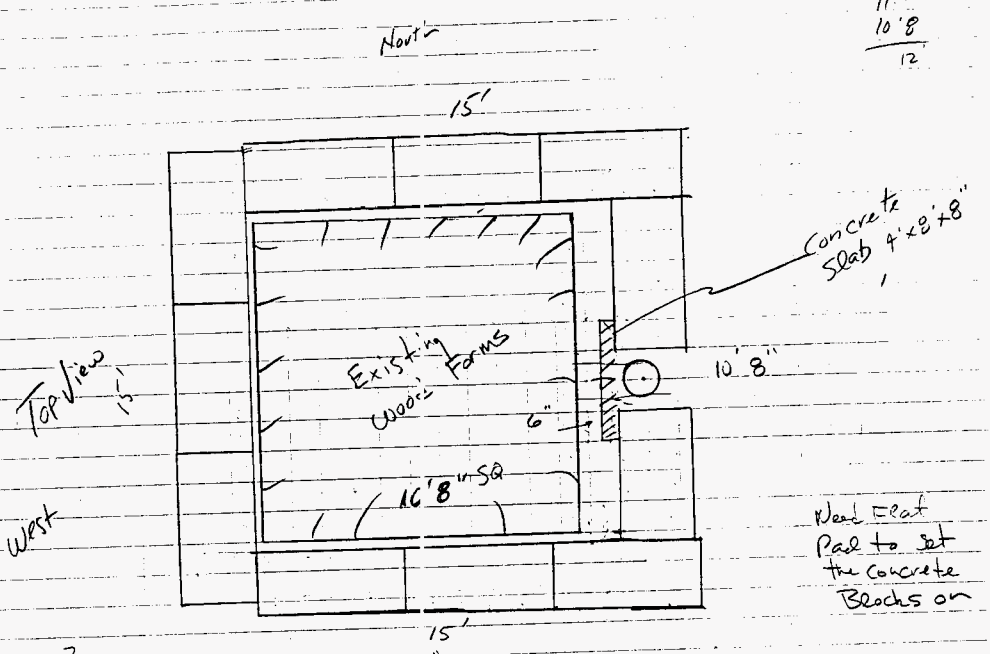
Sketch 2

11.6
10.8
12

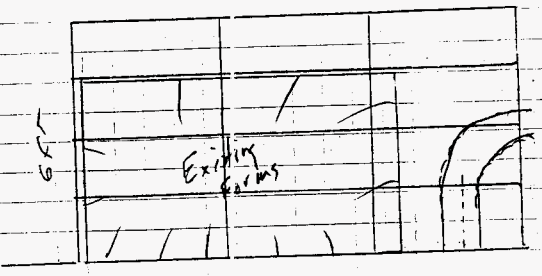


Need Feat Past to set the concrete Blocks on

44 Blocks @ 25#

Dirt
Slab 4'x8'
Top 13'x13'

Blocks 2'4" x 2'4" x 5'



Side View

Looking North